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Constructional
Making Morse Keys

Feature
Preparing For The Morse Test

Reviewed
The MTR1 Morse Tutor Kit With Replay

And
The Amazing Kenwood TS-50S HF Mobile Transceiver

ISSN 0141-0857

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ISSUE 1035

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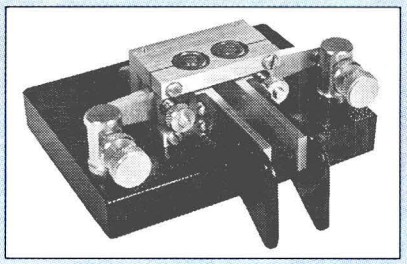

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Front cover: Our thanks go to Eastern Communications of Happisburgh, Norfolk, for the Vibroplex Original Deluxe "Bug" key featured on the front cover and donated as a prize for our June competition.

COMING NEXT MONTH

Practical Wireless looks into the challenging world of QRP

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Staff

EDITORIAL & ADVERTISEMENT OFFICES
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Arrowsmith Court
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CREDIT CARD ORDERS
(0202) 659930
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FAX (0202) 659950

Editor
Rob Mannion G3XFD
Art Editor
Steve Hunt
Technical Projects Sub-Editor
NG ("Tex") Swann G1TEX
Production/News
Donna Vincent
Editorial Assistant
Zoë Shortland

Advertisement Manager
Roger Hall G4TNT
PO Box 948
London SW6 2DS
071-731 6222
Cellphone (0850) 382666
FAX 071-384 1031

Advert Copy and Sales (Broadstone Office)
Lynn Smith (Sales), Ailsa Turbett (Production)
(0202) 659920
FAX (0202) 659950

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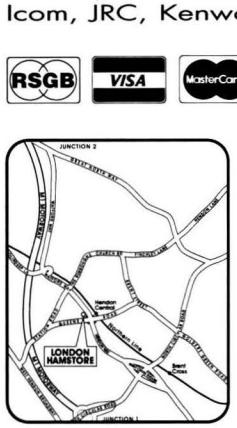

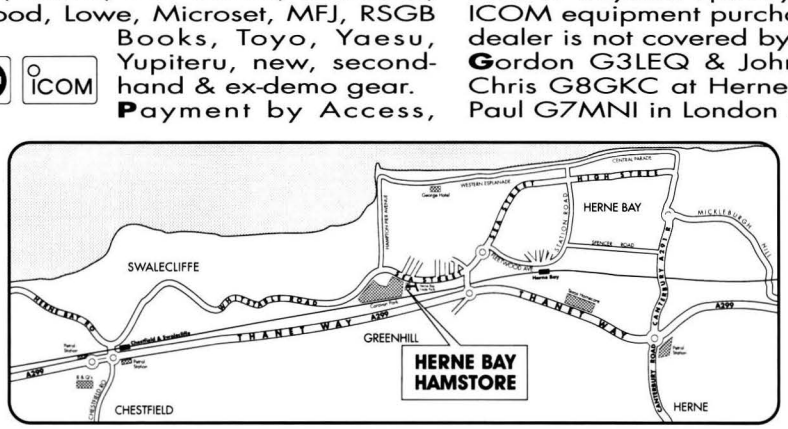

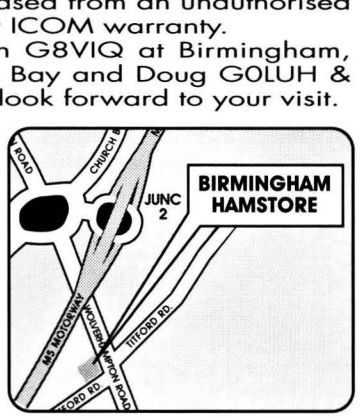

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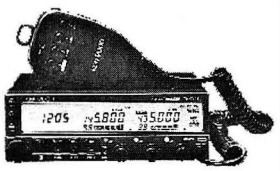

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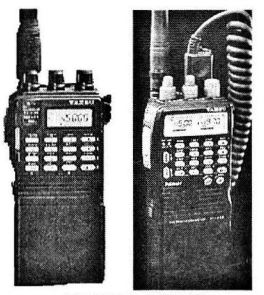

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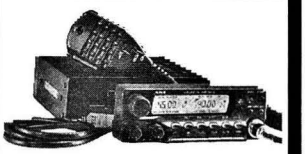

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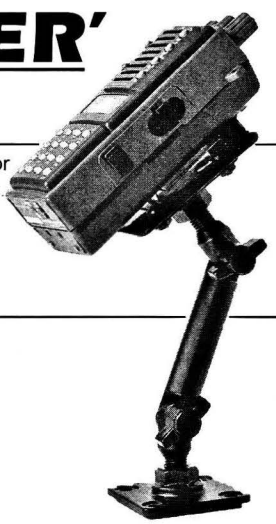

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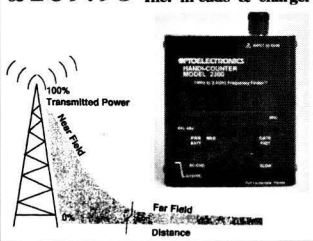

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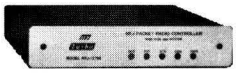

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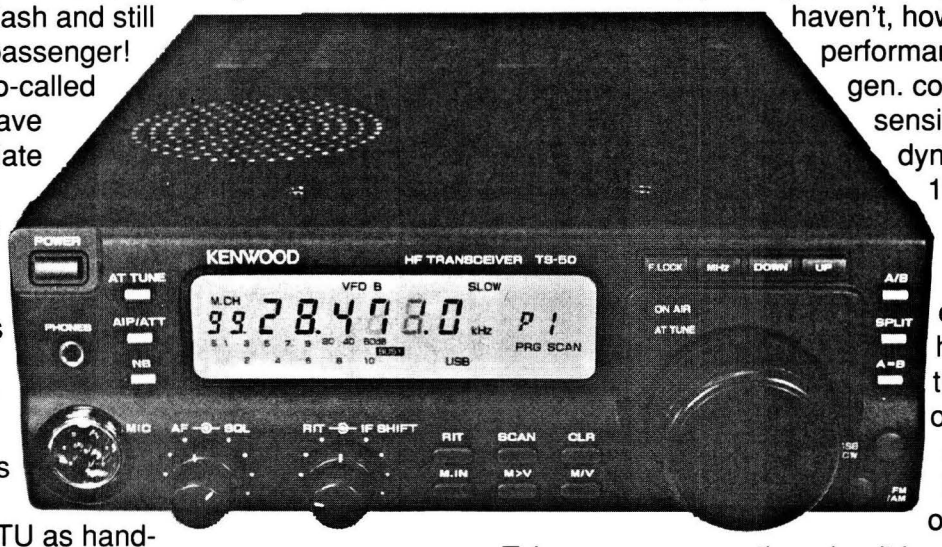

Quite how Kenwood have squeezed so much into such a tiny package, I can only marvel at. They haven't, however, skimped on performance: All modes, gen. cov. RX, 0.25µV sensitivity on ssb, a dynamic range of 105dB and a full 100W output.

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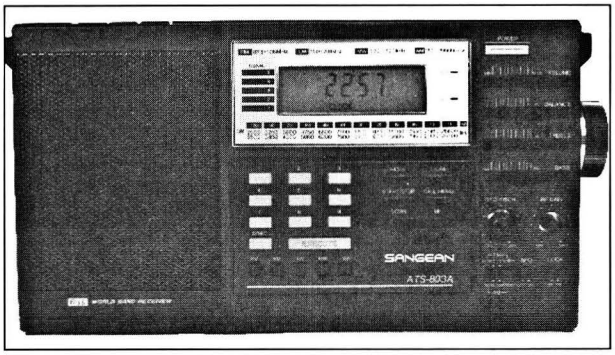

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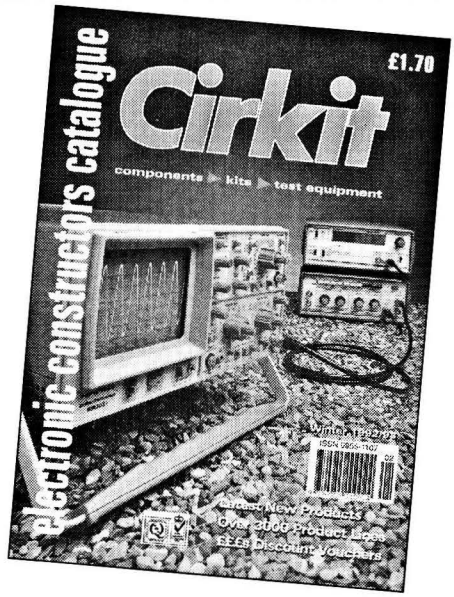

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Keylines

Occasionally, something I mention in 'Keylines' strikes a chord among readers and we receive letters on the topic in the office. This reaction is just what my editorials are designed to do of course. Despite this, I'm sometimes astonished at the reaction from readers on certain topics and my invitation to readers asking for opinions on the 'No Code HF Licence' really opened the floodgates!

It's getting on for nearly four years since I first sat in the Editor's chair at *PW*, and I can honestly say that the 'No Code' topic has beaten all records for letters in my time. We've had strongly worded letters, and sensibly written letters. But, there's no doubt about it (as far as *PW* readers are concerned) it's a topic which everyone seems to have an opinion on, whether it's for or against a 'No Code' h.f. licence in the UK.

Incidentally, I would like to draw readers' attention to my comment on the 'Receiving You' pages. There, I have provided the name and address of the Radiocommunications Agency official who is waiting for your comments. Judging by the letters I've received...she's in for a **very busy time**!

So, now that everyone else seems to have had their say, I'll have a go and state my personal opinion for what it's worth. But, before I do so, please bear in mind that it **is personal**, and it comes from a very keen c.w. operator who thoroughly enjoys using Morse, whether it be QRP or QRO.

Although I know I run the risk of being hung, drawn and quartered by many of our readers, I really think that we will soon have the first 'No Code' h.f. licences with us soon. In practice, I think that the authorities will introduce concessions on the h.f. amateur bands for specialised modes. And, in my opinion the first concession will go towards packet radio operations.

Once h.f. packet radio operation is permitted without the operator having a Morse qualification, I think there's also a possibility of separate non-amateur radio frequencies being allocated for packet radio. In fact, I feel that many computer enthusiasts, with no interest in 'traditional' amateur radio will go for this option, **if** it's introduced.

I think, that following the introduction of the packet only h.f. licence, the other specialised modes including RTTY, AMTOR, FAX and SSTV, will be granted the same facilities. In my opinion, operators of these specialised modes will also have a strong argument that they don't really need to know Morse.

Will I be proved right? Only time will tell, and judging by the amazing variety of opinions, I've no doubt that our hobby will be shaken to its very foundations during the discussion period. In the meantime, I'm going to carry on enjoying c.w. operations and hope that whatever happens with the qualifications aspects of the hobby regarding h.f. operations, I'll always be able to work other people on the key and help others enjoy amateur radio in whatever mode they enjoy the most.

After all, amateur radio should be enjoyable. And, speaking for myself, I'm determined that through *PW*, we'll carry on enjoying the hobby, never forgetting that it is our hobby. I'm going to leave the in-fighting and squabbling to the politicians!

Rob Mannion G3XFD

COMPETITION CORNER

E	K	V	U	Y	E	V	B	J	L	E	U	I	K
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C	H	C	L	F	P	E	V	C	L	P	F	I	F
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Q	G	L	V	P	O	H	S	K	R	O	W	P	V

This month we are offering two special prizes to match the *PW* Morse theme. You could win yourself the first prize which is the superb Vibroplex Deluxe mechanical 'bug' Morse keyer featured on the front cover, worth £136 and kindly donated by Eastern Communications (see 'Morse Equipment Showcase'). The second prize winner will receive a MTR1 Morse Tutor with replay kit, donated by Brian Jordan (see the review by Clive Hardy G4SLU in this issue). So, get busy and decode the Wordsearch, and you might win your own Morse Tutor kit!

Words to find:

● Worthington ● Jordan ● Electronic
● Morse ● Keyer ● Test ● Workshop
● Dobbs ● Focal ● Hunter ● Bits ● Bytes

Name.....

Address .....

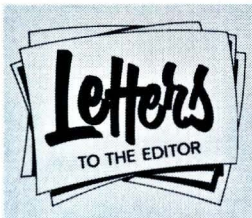
.....

.....

Send your entry (photocopies acceptable with corner coupon) to: Competition Corner, Wordsearch Competition, June '93, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Friday 25 June 1993.

Competition Corner June '93

Receiving You



Send your letters to the editorial offices in Broadstone. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*. The Star Letter will receive a voucher worth £10 to spend on items from our Book, or other services offered by *Practical Wireless*. All other letters will receive a £5 voucher.

Morse Qualification

Dear Sir

No valid reason can be advanced for retaining the requirement for Amateur Radio operators to have a Morse qualification.

The requirement was introduced into the Radio Regulations, Washington in 1927, but was already in force prior to that. It was to ensure that Experimental Stations whether professional or amateur (this was in the days before the Amateur Service existed) could be contacted by official stations wherever necessary, e.g. if causing interference.

The need for all amateur stations to be able to be contacted by Morse had disappeared by the end of World War Two. By then equipment was both stable and efficient to the extent that the risk of interference was slight. The present licensing regulations (in the UK at least) are adequate to protect other services from interference.

What possible reason can there be for denying access to the h.f. bands to operators who are qualified by the RAE but who wish only to communicate by telephone, RTTY, fascimile or SSTV? Class B Licensees are just as competent to operate equipment as Class A Licensees and if they venture on to Morse without learning the craft, only they suffer.

Abolition of the Morse qualification would not prevent the use of Morse anymore than the lack of operating skill prevents use of the RTTY. It would, in fact, be equal in status to radio-telephone, RTTY, data, fascimile and SSTV.

I would strongly oppose any move to introduce a separate 'Code Free' licence in addition to our existing Class A and Class B licences.

Abolition of the Morse qualification would remove the need for separate Class A and Class B licences leaving us with just one general licence for all modes and frequency band. The use of Morse can continue to be encouraged through voluntary qualifying schemes such as that run by RNARS. Personally I would like to see a similar scheme operated by the RSGB.

These considerations apply equally, of course, to the Novice Licence situation, there only need be one Novice Licence.

Wilfred M. Dunell
G3BYW
Haslingfield
Cambridge

No Code Licence

Dear Sir

I would like to give my complete agreement to the comments in the letter from Leslie Bliss about the proposed 'No Code HF Licence'. It is absolutely scandalous that such a proposal should ever be considered.

I was taught Morse during the last war but my concern is for all our dedicated amateurs who have knuckled down in their spare time and have become very expert in this fascinating mode. Throw the motion out at once.

Finally, do you miss being at your last place, the Quay at Poole? (one of my favourite spots).

Regards and thanks for a super magazine.

John Densem G4KJV
Chippenham
Wiltshire

Editor's comment: The view, the ships and being near the sea in our old offices were a delightful experience John, but the parking and traffic problems were not so pleasant. I'm pleased to report that we don't have that problem in Broadstone.

★★★★ Star Letter ★★★★

PW 144MHz QRP Contest

Dear Sir

Reference 'Keylines' April issue *PW* and "alternative energy-powered QRP Contest entrants". Shame on you Rob Mannion! Where has your amateur spirit gone! Since when did it become necessary to "verify every competitor"?

I thought it usual on entering a log to any competition, for a Radio Amateur to **sign** a statement to the effect that he/she had kept "within **the rules and spirit** of the contest."

Contests are for fun, and if the entrants cannot be trusted to keep to the rules (whatever they are in any one case) then the contest is not worth entering or winning! - or could that be why some people don't like contests?

I note that 'The Amateur's Code', (Paul M. Segal, W9EEA, in *ARRL Handbook*) says "The Amateur is considerate" - never knowingly uses the air to lessen the pleasure of others - ie. you don't win contests by cheating on your power source declaration.

Also "The Amateur is progressive" - the Station is well-built and efficient and his operating practice is above reproach - ie. don't win contests by using 10W, and saying that it was only 1W.

Perhaps the contest should run from 2000 to 0800 hours for Solar-powered entrants only. Then you can penalise any who were enterprising enough to solar-charge their NiCads on the previous sunny day!

Best wishes to all at *PW*, keep up the good work, In true Amateur spirit from your old friend,

Peter Welch G3OFX
Bitterne Park
Southampton

Editor's defence: Readers will probably realise I'm being 'got at' by an old friend (Peter's photograph appeared on the 60th anniversary issue, representing the amateur from 1932!). Perhaps our new s.w.l. category QRP Contest entrants could listen out for supposedly solar-power stations, and check to see if the sun was out when they were on the air?

Code Free Licence

Dear Sir

A code free licence, why not? but first ensure that the present c.w. sections of bands are preserved solely for c.w. by making it a condition of the licence.

At the same time I would then favour abolishing the radio amateurs examination, and making the licence freely available to the general public over the post office counters.

Standards have dropped in amateur radio, and when this code goes it won't take long for a new campaign to start to get rid of something else!

G. P. Hamblin G4VBB
Burton-upon-Trent

No Code Licence

Dear Sir

As an experienced radio propagation researcher, I would like to be able to get a ticket for h.f. without having to learn Morse, which holds no interest other than as an evolutionary stage of radio history.

Despite my reservations, I believe that Morse c.w. still has its place as an effective form of long range, narrow bandwidth radio, so I would not discourage its use.

A good compromise might be to bring in a new no-code h.f. licence which would limit radiated h.f. power to less than 20W. This would give access to the bands and encourage voice DXing, by taking advantage of ionospheric openings rather than pouring c.w. power into a piled-up ether.

Tony Hopwood
Upton-on-Severn, Worcester

No Code Amateur Radio Licence

Editor's note: Readers interested in the discussion regarding the possibilities of a 'No Code' h.f. licence have been invited to submit their views to the Radiocommunications Agency. Judging by the large number of letters received at the *PW* office, the subject has aroused a great deal of interest. In a recent letter to me, the RA have confirmed that they wish interested parties to write in to them directly, and your letters and comments will be taken into account when the subject is discussed at the RA later this year. I urge everyone who has written into *PW*, to write again and send their letters directly to: Mrs Karen Scott, Room 712, Radiocommunications Agency, Waterloo Bridge House, Waterloo Road, London SE1 8UA.

Morse Test

Dear Sir

So 'the Old Brigade' are forming ranks to protect their privileges on the h.f. bands, especially when they have no true foundations for most of their arguments!

To obtain a driving licence we do not need to demonstrate an ability to control a 1898 steam roller. Nowadays, with computerised communications, satellites and other sophisticated wizardry why should we have to pass a Morse test to use the h.f. bands?

If the test is to be retained, then maybe it's time we introduced other skill tests for 'phone, packet, AMTOR, RTTY, SSTV and FAX?

A large proportion of radio amateurs who have obtained Class 'A' licences soon get rusty. Just listen to some of the Morse on h.f. Surely under the correct regime, anyone who can't produce adequate Morse should lose his/her 'A' licence and revert to 'B' licence status only?

If changes are deemed necessary they should be to the RAE, to cover the 'new' modes, EMC, interference, bandplan useage and operational procedures. Surely if we are to retain the Morse test, we should also consider reintroducing valve theory into the current RAE?.

Come on! Join the 'Scrap The Test' Campaign

A. R. Clayton
Bunny, Nottingham

The Morse Requirement

Dear Sir

As a one-time licensed amateur and marine radio officer I was in favour of keeping the Morse requirement for the h.f. bands. But now that Morse is no longer a requirement to licence a marine radio officer it is illogical to keep it for the amateur licence.

In other words you need to know Morse to become a amateur, but to become a professional you don't! If future amateurs don't or won't learn Morse, the loss is theirs, as one can reach the other side of the world on c.w. with one watt, or less.

A. J. Long
Cambridge

The British Amateur Radio Licence

Dear Sir

How the acquisition of a British amateur radio licence has become easier since 1945:

1: Pass written RAE (exemption for certain qualifications) and 12w.p.m. Morse Test. First year, c.w. only, 25W maximum input to p.a. Full operation permitted only after satisfactory completion of this probationary year.

2: Pass RAE (other qualifications not accepted) and 12w.p.m. Morse test.

3: Pass RAE. A v.h.f. licence available with no c.w. test, but Morse test still required for h.f licence.

4: Written RAE replaced by multi-choice (pick-and-tick) exam.

5: Novice licence.

Future possibilities (predictions?):

1: Scrap the cw test.

2: Scrap the RAE (you don't need a knowledge of radio theory to use a semi-automatic black box).

Enough said!

Walter Farrar G3ESP
Ackworth, Pontefract

Code Free Licence

Dear Sir

I have just read the four letters regarding the 'Code Free H.F. Licence' in April *PW*. What drivel! Anyone would think it was proposed to ban code.

I have yet to hear a logical or rational argument for keeping the code requirement. I wonder why the armed forces have all but ceased to use it? Perhaps its too slow, ordinary speech averages about 100 words a minute. Try sending or reading code at that speed without a machine!

In 1905 no examination or Morse test was required and there was no fee or call sign either. The applicant had to '...prove to the satisfaction of the Postmaster General that the sole object of obtaining a licence is to enable him to conduct experiments in wireless telegraphy...'

By 1910 call signs had been introduced and in 1913 a new condition that applicants had to have '...the necessary scientific qualifications...' and a fee of one guinea (£1.05) was charged but still no Morse test.

In 1919 the Post Master General announced new licences would be introduced. Applicants would have to '...have in view some definite object of scientific value... be certified as a competent investigator ... have knowledge of adjusting and operating the apparatus .... and have a Morse operating speed of 12 words a minute...' Between this date and 1939 when all licences were again cancelled there were many variations of conditions.

The first post-war licence was issued in 1947. And as a result of negotiations by the RSGB, many of the old limitations were swept away. The only 'qualifications' required were an RAE pass and the Morse test or suitable service qualifications, these latter were withdrawn in the 1950s. In 1964 the 'B' licence was introduced for v.h.f. without the Morse test.

The reasons for the introduction of the Morse test are no longer valid. I can see no justifiable reason for retaining it except for the minority who wish to use it. Some people seem to think the rules should never be changed. Perhaps we should go back to the 1905 terms - that might leave us with a few genuine experimenters.

I referred to the RSGB book *World At Their Fingertips* by John Clarricoats G6CL for various quotations in this letter, it tells what the RSGB does and has done in the past for the Radio Amateur.

E. Mitchell G8CON
Waterlooville
Hampshire

Newsdesk '93

Silent Key - Stan Crabtree G3OXC

Regular readers, particularly those who enjoy the historic side of radio, will be saddened to hear of the death of Stan Crabtree G3OXC on Wednesday 17 March 1993 at the age of 62. Stan's speciality was historic wireless, and his last article 'Back To The Future In 1901', published in the March issue of *PW*, featured the fascinating story of the first known wireless repeater station.

Stan Crabtree's work was always interesting to read, and I've no doubt readers will miss his regular contributions to *PW*. I have written to Stan's widow Helen and their children Elaine and David, on behalf of the *PW* team and our readers, extending our deepest sympathy.

Rob Mannion G3XFD

Practical Wireless 1933 Archives

Can you help the *Practical Wireless* team restore the archives? We have discovered that the *PW* archives are missing Volume 2, No. 45, July 29 1933. If you have one and it's in mint condition complete with cover, please contact the Editorial offices at **Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW, tel. (0202) 659910.**

Forest Of Dean Foxhunt

The delightful Forest of Dean is the setting for a foxhunt that's guaranteed not to attract a single hunt saboteur! The popular d.f. hunt to be held on 10 and 11 July, is organised by the Swansea DF Group, under the auspices of the RSGB. The aim of the weekend is to promote interest in 144MHz 'foxhunting' and also encourage inter-club and national competition.

There's a choice of camping sites in the Forest of Dean, but the Swansea group plan to stay at the Forestry Commission site at Braceland, National Grid Reference SO560130, which is 5km east of Monmouth tel. (0594).33057. A barbeque is planned for the Saturday evening.

There's two double fox events on Saturday. They begin at 1030 with **Phil GW7MMG** and **Chris GW1WTZ,** and then at 1600 with **James GW7KZS** and **Carl GW7KIL**. On the Sunday, one double-fox event is planned at 0930 with **Kevin GW7OKM** and **Chris GW7KBP.**

Further information on the weekend is available from **Phil Smith GW1XBG, tel. (0792) 642001.** Additionally, anyone entering the foxhunting area on Friday evening or on Saturday and Sunday, requiring information should contact **Ian GW0NLY** who will be monitoring the foxhunting frequency of 144.725MHz.

Amateur Radio Repeater Licence Change

The Radiocommunications Agency have announced in their Press Notice P/93/139 (dated 15 March) that a licence change should make the amateur radio repeater network more effective. The change, which took place on April 1, should make the network more effective, cut costs by lightening the management of repeaters and devolve more responsibility to the people that run them.

The RA announced on March 15, that from April 1, approval for repeater stations to operate will be granted by the issue of Notices of Variation to the repeater keeper's personal Amateur Radio Licences. The RSGB has been the licensee for all stations in the amateur radio repeater network, and the change will relieve it of the heavy cost of administering and licensing the stations from its own resources.

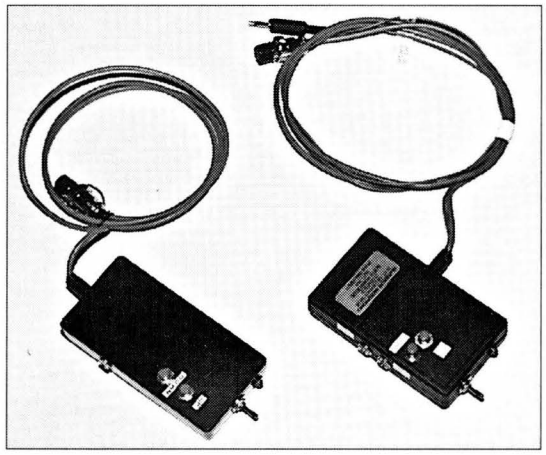
A Notice of Variation will be issued to any amateur whose application to run a repeater station has complied with the requirement set out in the agreement between the Secretary of State for Trade & Industry and the RSGB. The Notice of Variation will effectively delete the general prohibition on amateurs from operating a repeater, and set out in a schedule the details of the station the repeater keeper is allowed to use, such as location, callsign, frequency, class of emission, maximum power and antenna characteristics.

The repeater keeper will be made responsible for the correct operation of the repeater and for the monitoring of the use of it, and taking steps they think fit in liaison with the RA and the RSGB to limit messages that are not permitted in the amateur service. The keeper will also be required to provide up-to-date and effective close-down arrangements that are necessary in case of interference being caused by the repeater.

The RA and RSGB are negotiating the terms of an agreement whereby the RSGB will act as agent for the Secretary of State for distributing the Notices of Variation. This means that much of the present procedure with applications/ information being submitted through the RSGB will continue. The main change will be that the licensee responsible will be the repeater keeper, rather than the RSGB. There will be no extra licence fee charge on repeater keepers for applications approved, nor will they be approached by the RSGB for a contribution to recover the society's costs. **The Radiocommunication Agency can be contacted (public enquiries) on 071-215-5000.**

Hands Free Operation From Heatherlite

After many requests for a hands-free control box from the amateur radio fraternity, Heatherlite Microphones are now producing a unit which could solve individual problems. North Humberside-based Heatherlite are now producing a separate control box to use with a range of microphones and earphones to suit the individual operator. They come with or without 1750Hz toneburst, and include scan buttons for up/down control, side jack sockets for microphone and ear/speaker attachment, and l.e.d. display for transmit-receive indication.



The control box can use its internal battery supply or utilise power from the in-line socket if a power feed is available. The control units are wired up with the appropriate (in-line socket type) to suit the individual transceiver. The control boxes costs £30, and further information is available direct from **Heatherlite Microphones at 75 St. Catherines Drive, Leconfield, North Humberside HU17 7NY, tel. (0964) 550577.**

Newsdesk .93

Clayesmore Morse Festival Weekend 1993

The first Clayesmore Morse Festival Weekend took place over the weekend of March 27-28 at Clayesmore School, Iwerne Minster, between Blandford and Shaftesbury in Dorset. The weekend was formally opened by the Clayesmore Headmaster, Mr David Beeby, who welcomed everyone and during his short opening speech recounted the techniques he used to learn Morse during his schooldays.

Morse weekenders attended from as far away as South Wales, Staffordshire, London, East Anglia and the West Country. The youngest Morse weekender was aged seven and the oldest was 82!

Along with the chance of taking the Morse Test, the RSGB Dorset Morse Test team were on hand to give advice, and George Gunnill G4DLE the Chief Examiner for Dorset gave an introductory talk on the subject.

The weekend activities and entertainment also included talks from Bob Kent of Kent Keys, and Geoff Arnold G3GSR gave a talk on the specialist Morse magazine, *Morsum Magnificat*, and Tony Dewsbury gave a talk on the specialised Morse equipment available from Dewsbury Electronics.

The Saturday evening included a private visit to the Royal Signals Museum at Blandford Camp. At the museum the visitors were given a personally guided tour by the Curator, Major Roger Pickard. Roger Pickard even arranged a special surprise for the visitors, in the form of a display of the museum's comprehensive collection of Morse keys.

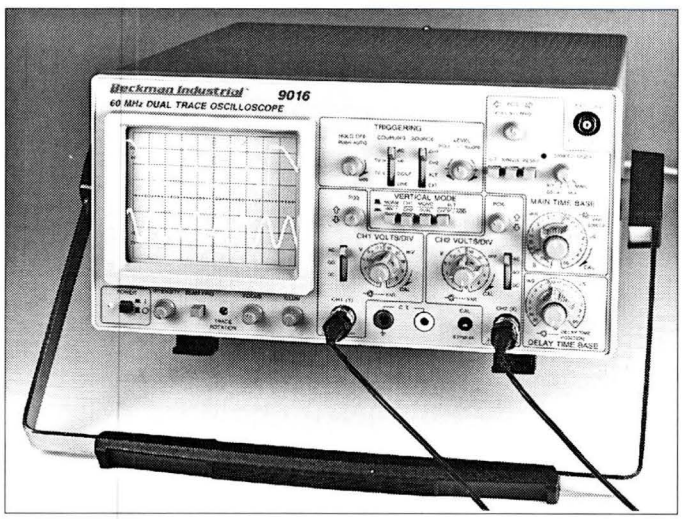
On the Sunday, after lunch, the weekend was just rounding off with a question and suggestion session for the projected 1994 event when the TV news cameras from HTV in Bristol arrived. The weekend activities, including interviews and a mock Morse testing session, eventually featured in HTV's evening news programme on the following Tuesday. **Further details on the planned 1994 Morse Festival Weekend can be obtained from the Clayesmore Radio Society (G0RSC), Clayesmore School, Iwerne Minster, Blandford, Dorset DT11 8PH.**

New Venue For Royal Naval Amateur Radio Society Rally

The ever popular RNARS Rally moves to a new venue on Sunday 13 June this year. Following the impending closure of the old location at HMS *Mercury*, where it has been held for 32 years, the 1993 rally moves to its new location at HMS *Collingwood*, in Fareham just off the M27.

As usual, there will be many trade stands, an on-the-spot QSL printer, bring & buy, demonstrations and lots of entertainment for the whole family. The rally, to be held on the sports field at HMS *Collingwood*, opens at 10am and there will be talk-in available on 144 and 430MHz to guide visitors in from the A27 and the nearby M27 (leave at Junction 11 and follow towards Fareham). Further information from rally organiser **Cliff Harper G4UJR at 34 Neva Road, Bitterne Park, Southampton, Hampshire SO2 4FJ, tel. (0703) 557469.**

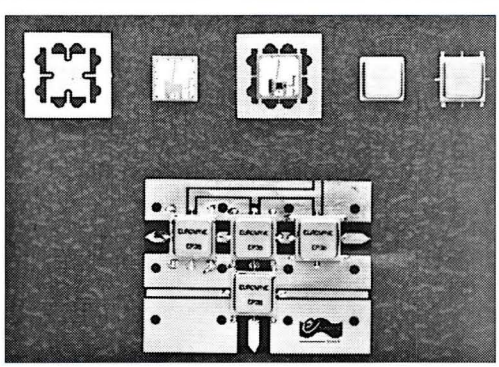
Wavetek 60MHz Professional Oscilloscope



Wavetek Ltd. Instruments Division, based in Stourbridge in the West Midlands, have introduced the new Beckman Industrial 60MHz, two-channel dual timebase oscilloscope to join their other products. The new instrument features multiple triggering and the manufacturers consider that it will be ideal for field service, production, test, repairs laboratory and educational applications.

Featuring a conservatively rated 60MHz bandwidth, the Beckman 9016 features dual sweep generators to provide a normal waveform display or enable the user to zoom in' on an expanded portion of a complex waveform after a continuously variable delay. The instrument is also fitted with a variety of trigger coupling choices, including TV modes. Additionally, 'Alternate triggering' also known as 'vertical mode' selects alternately from both channels to display two asynchronous waveforms in a stable manner, while continuously variable 'hold off' aids triggering on complex signals. The 9016 costs £799 and further details are available from: **Roger Doyle of Wavetek Instruments Division (formerly the Instrumentation Products Division of Beckman Industrial Ltd.) at Astec Building, High Street, Wolaston, Stourbridge, West Midlands DY8 4PG, tel. (0384) 442394.**

Wavelength Introduce New Voltage Controlled Oscillators



Wavelength Electronics, based in Broadstairs Kent, have announced that they have introduced a new range of voltage controlled oscillators suitable for industrial and avionic applications. The v.c.o.s are available in both the lead type and surface mounting formats.

The Wavelength v.c.o.s combine a very wide frequency range (100MHz to 26GHz) with high linearity, low noise and low microphony. Options include narrow band, multi-octave and thermostated types. The company have just released a surface mount narrow band v.c.o. using a standard size MMIC package with a centre frequency between 200MHz and 3.5GHz.

For further details contact **Paul Glover at Wavelength Electronics (quoting ref. WA101) on (0843) 602869.**

Newsdesk '93

Edgware Radio Society Straight Key Evening

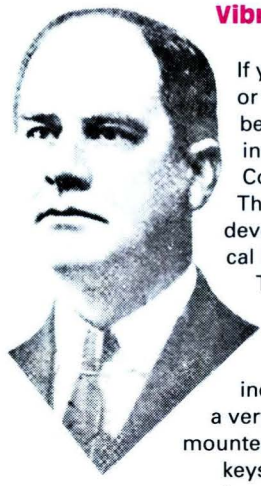
Once again the Edgware & District Radio Society are organising a straight key evening for c.w. enthusiasts. The 1993 event takes place on May 21, the third Friday in the month.

The 1993 Straight Key Evening is the 12th annual event, and the society is hoping to have **GB2SKE** on the air to celebrate the occasion. It's hoped to have GB2SKE on the air in the previous afternoon also.

The organisers stress the SKE is **not a contest**, and it's intended to encourage everyone to plug a straight key into the rig and enjoy themselves. The idea is for everyone to indulge in some relaxed and friendly operating.

The evening starts from about 1900 (British summer time) for as long as you like or can stay on air. The frequencies are around 3.550MHz, call CQ SKE. The GB2SKE callsign will be active on 3.5 and 7MHz and for Novices taking part, either GB2SKE or GX3ASR (the ED&RS club callsign) will be operating above 3.560MHz. Further details can be obtained from the SKE organiser **John Bluff G3SJE at 53 Winchester Road, Kenton, Harrow, Middlesex HA3 9PE, tel. 081-204-1034.**

Vibroplex Bug Book



If you collect Morse keys in general, are keen on or own a Vibroplex mechanical 'bug' key, you'll be particularly interested to learn about a very interesting book published by Eastern Communications, entitled *The Vibroplex Co, Inc.* The book tells the story of the company that developed the 'revolutionary' design of mechanical Morse key between 1890 to 1990.

The book, written by specialist collector and author Bill Holly K1BH, charts the history of the key, with plenty of illustrations to help collectors to date their own keys. It also includes interesting information on patents and a very interesting section on the various plates mounted on the Vibroplex keys, and how they have changed over the years.

The book costs £19.85 inc. p&p, for the standard copy, or £23.95 (inc. p&p) for a copy signed by the author. **Eastern Communications at Cavendish House, Happisburgh, Norfolk, tel. (0692) 650077.**

Portable Power Pack From Key Solar Systems

Well-known solar power and alternative energy specialist Bob Keyes GW4IED of Key Solar Systems, has introduced a new portable battery power pack. The neat shoulder or waist carried pack comes complete in its own stout canvas bag and provides power for both 6 and 12V equipment.

Weighing only 1.8kg, the LVM77 pack has a 4Ah capacity at 12V and 8Ah at 6V, enough to power an average video camera for eight hours. The power pack is rechargeable from another battery in three to four hours, direct or via the supplied cigar-lighter plug. It can also be recharged with the LVM78 charger unit, and cannot be overcharged. It's claimed that over 1000 recharge cycles are possible with the sealed-for-life lead acid batteries. The LVM77 cost £81.20 inc. VAT plus carriage.

For further details on the LVM77 and LVM78 units, **contact Bob Keyes GW4IED of Key Solar Systems at 4 Glanmor Crescent, Newport, Gwent NP9 8AX, FAX or tel. (0633) 280958.**

Versatile UPVC Sheet From Octa

The Octa range of extruded UPVC sheet from Klockner Pentaplast provides for extensive applications and uses across a wide range of industries including building, electronics, machinery construction, air conditioning, printing and display purposes.

The adaptable, cost effective and strong material which is manufactured to a very high specifications is available in a range of sizes and types including: Octaclear clear UPVC sheet between 1 and 6mm thickness, Octatech opaque UPVC sheet between 1 and 10mm thickness and Octalight foamed UPVC sheet between 1 and 10mm thickness.

All the products offer resistance to chemicals, are flame retardant and are recyclable. Attractions for the radio hobby enthusiast include the facts that the Octa range can be cut, sawn, punched, drilled, milled, welded, bonded, nailed, screwed and heat formed.

For specific details on the Octa product range and suitable applications contact **Tony Blackburn Klockner Pentaplast Ltd., Station Road, Theale, Reading, Berkshire RG7 4AA, tel. (0734) 303277.**

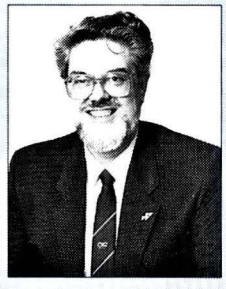
Radio Amateur President Of Society Of Cable TV Engineers

Doctor Roger Blakeway G1PXM, Corporate Director of Engineering and Development for the Videotron Corporation, has recently undertaken the role of the new President of The Society of Cable Television Engineers (SCTE) for a two-year term.

The SCTE, founded in 1945, is a learned body and is dedicated to raising the standard of cable television engineering to the highest technical levels. It organises technical seminars and produces a quarterly publication called *Cable Television Engineering.*

The SCTE seeks, by co-operation between members and by the specialist knowledge of individual members, to elevate and improve the status and efficiency of all those engaged in cable television engineering. The society also embraces the wider telecommunications aspects now emerging through cable distribution technology. Membership is growing fast and currently stands at 700 members.

Roger Blakeway is active on the 50 and 144MHz and is a keen 'Worked All Britain' enthusiast.



He would be interested in hearing from any other radio amateur involved in the cable TV industry with the aim of providing a listing of 'like souls' in the SCTE magazine. Drop G1PXM a line...he's QTHR, or contact him through **Videotron Corporation Ltd., Videotron House, 11 - 29 Belmont Hill, London SE13 5AU, tel. 081-244-1297.**

MARTIN LYNCH

G4HKS

THE AMATEUR RADIO EXCHANGE CENTRE

H.F. TOP TEN

No.1

The new TS-50S from Kenwood
DEPOSIT £199.95 & 12 payments of £66.67
With matching Auto ATU, Deposit £295.00

No. 2 The NEW IC-737 from ICOM
Deposit £475.00 & 12 payments of £85.00

No. 3 The Yaesu FT-890
Without Auto ATU, Deposit £375.00 & 12 payments of £85.00. With Auto ATU, Deposit £495.00 & 12 payments of £90.00

No. 4 The TS850S from Kenwood
Without Auto ATU, Deposit £510.00 & 12 & payments of £95.00. With Auto ATU, Deposit £540.00 & 12 payments of £105.00

No. 5 Yaesu's FT990
Without Int. PSU & CW filter, Deposit £595.00 & 12 payments of £129.50. With both options, Deposit £699.00 & 12 payments of £150.00

No. 6 Icom IC-728
Deposit £195.00 & 12 payments of £66.66

No. 7 Icom IC-729
Deposit £275.00 & 12 payments of £85.00

No. 8 The TS-690S from Kenwood
Without Auto ATU, Deposit £480 & 12 payments of £85.00. With Auto ATU, Deposit £510 & 12 payments of £95.00

No. 9 The TS-450S
Without Auto ATU, Deposit £449.00 & 12 payments of £75.00. With Auto ATU, Deposit £480.00 & 12 payments of £85.00

No. 10 A joint entry at No. 10, The Flagships from YAESU & KENWOOD, the FT1000 & TS950SDX transceivers.
FT1000 & TS950SDX, deposits from as little as £700.00.

V.H.F. TOP TEN

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

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

No.1

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

No. 2 The NEW MVT7100 from Yupiteru.
Deposit £49.00 & 9 payments of £44.45

No. 3 The Yaesu FT530
Nicads & Charger included. Deposit £100.00 & 12 payments of £35.75

No. 4 Icom IC-W21ET dual band Handie.
Nicads & Charger included. Deposit £74.00 & 9 payments of £45.00

No. 5 Alinco DJ-580.
Nicads & charger included. Deposit £49.00 & 12 payments of £30.00

No. 6 The TR851E
The TR751E 2M, Deposit £149.00 & 12 payments of £50.00. For the TR851E 70cm, Deposit £199.00 & 12 payments of £50.00

No. 7 Kenwood's TH-78
Deposit £49.00 & 12 payments of £35.00

No. 8 The TM-732E from KENWOOD
Deposit, £69.00 & 12 payments of £50.00

No. 9 The NEW TH28E & TH48E.
TH28E Transceive on 2M, rx on 70cm, Deposit £39.00, £250 in 3 Months. TH48E Transceive on 70cm, rx on 2M, Deposit £49.00, £280 in 3 Months

No. 10 The FT290R mk11
Without matching linear, Deposit £129 & 12 payments of £35.00. With Matching FL2025 Clip on Linear, Deposit £159 & 12 payments of £45

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Club News

Please send in all of your 'Club News' items to Donna Vincent at the editorial offices in Broadstone.

Avon

North Bristol ARC. Fridays, 7pm. Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol. RAE & Morse tuition available for members. May 14 - Rig Maintenance & Repairs by Castle Electronics, 21st - Police Communications by Avon Police, 28th - Video by G0RFB & WAB Visit to Outer Skerries by G0MEM, June 4 - committee meeting. **Tony G4ROX on (0272) 513573.**

Bedfordshire

Shefford & DARS. Thursdays, 8pm. Church Hall, Ampthill Road, Shefford, Bedfordshire. May 20 - visit to Jordens Mill, June 3 - Pedestrian DF Hunt. **Paul G1GSN on (0462) 700618.**

Berkshire

Maidenhead & DARC. The Red Cross Hall, The Crescent, Maidenhead, 7.30pm. May 18 - preparations for HF & VHF Field Days, June 5/6 - HF National Field Day. **Neil G8XYN on (0628) 25952.**

Newbury & DARS. Wednesdays, 7.30pm. Bucklebury Memorial Hall. May 26 - home construction hints. **(0635) 46241.**

Reading & DARC. 2nd & 4th Thursdays, 8pm. The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. May 28 - construction & alignment evening, June 5/6 - HF NFD contest, 7th - Novice RAE, 10th - VHF NFD planning. **Nick Challacombe G0LGG on (0734) 722489.**

Buckinghamshire

Aylesbury Vale RS. 1st & 3rd Wednesdays, 8pm. Village Hall at Hardwick. May 19 - Meters In The Shack by I. Eamus G3KLT. **Martyn G4XZJ on (0296) 81097.**

Cheshire

Mid-Cheshire ARS. Cotebrook Village Hall, Cotebrook, nr. Northwich, Cheshire. May 19 - Setting Up An HF Station by G4XUV, G0IRA & G4CAX, 26th - Identifying Components by G0IRA, June 2 - Junk Sale, 9th - on the air night. **Mike Baguley G7LQD on (0606) 331210.**

Stockport RS. 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. May 27 - clinic evening, June 9 - DXpeditions by HSO/G3NOM. **Jim France G3KAF on 061-439 4952.**

Wirral ARS. 1st & 3rd Wednesdays, 7.45pm. Ivy Farm, Arrowe Park Road, Birkenhead, Wirral. May 18 - natter night, 19th - pre NFD meeting, 25th - natter night, June 1 - natter night, 2nd manned 2m DF Hunt, 8th - natter night. **Alec Seed G3FOO on 051-644 6094.**

Cleveland

Wrexham ARS. Maesgwyn Community Centre, Maesgwyn Road, Wrexham. May 18 - annual constructors contest. **Ian Wright GW1MVL on (0978) 845858.**

Cumbria

Eden Valley RS. Odd months, 7.30pm. BBC Club, Penrith. May 27 - talk & slides from the Anglo Scot Repeater Group, Morse practice & demonstration of building circuitry. **John Pape G0NYQ, 2 Mill Hill, Appleby-in-Westmoreland on (07683) 52106/52148.**

Derbyshire

Buxton Radio Amateurs. Lee Wood Hotel, Buxton, 8pm. 25 May - SWL - An Enjoyable Hobby by Brendan G1OHD, June 8 - quiz night. **Derek Carson G4IHO on (0298) 25506.**

Devon

Appledore & DARC (Devon). 3rd Mondays, 7.30pm. Appledore Football Clubroom. May 17 - Radio Noise by Ken Symonds G0DLC, 18th - construction evening. **Reg Lyddon G4ETJ QTHR on (0237) 477301.**

Plymouth RC. Tuesdays, 6.30pm RAE class, 7.30pm Morse class, 8pm club activities. (As from June for the summer, meetings will be fortnightly). The Basement, The Royal Fleet Club, Devonport. May 25 - Rig Analysis by Peter Thornhill G6ZKQ, June 1 - natter night. **G7NMA, 50 Bellington Crescent, Plympton, Devon PL7 3QP.**

Torbay ARS. Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. May 21 - Junk Sale. **W. Hipwell G3HTX on (0803) 526762.**

Dorset

Dorset Police ARS. The Dorset Police ARS will now be holding regular monthly meetings, at force HQ on the first Thursday of every month, at 7.30pm. Membership is open to Police Officers, serving and retired, Civilian employees, Special Constables and their immediate family. June 3 - visit to Hurn Airport RADAR & Tower. Further info from **PC 915 Richard Newton at Ferndown Police Station on (0202) 229351.**

Down

Bangor & DARS. 1st Fridays, 8pm. Winston Hotel, Queens Parade, Bangor, Co. Down. June 4 - informal chat. **Des Buckley GI3HCP on (0247) 460251.**

East Yorkshire

North Ferriby United ARS. Fridays, 8pm. North Ferriby Utd. FC Social Club, Church Road, North Ferriby, East Yorkshire. May 14 - Surplus Equipment Sale, 21st - night on the air, 28th - discussion. **Frank Lee G3YCC on (0482) 650410.**

Essex

Bishop's Stortford ARS. 3rd Mondays, 8pm. British Legion Club, Windhill, Bishops Stortford. **John Dudeney on (0799) 550313.**

Braintree & DARS. 1st & 3rd Mondays, 8pm. Community Centre, Victoria Street, Braintree. May 17 - AGM. **J. F. Button G1WQQ c/o G4JXG, 88 Coldnailhurst Avenue, Braintree, Essex CM7 5PY.**

Vange ARS. Thursdays, 8pm. Barnstaple Community Centre, Long Riding, Basildon, Essex. May 20 - Bert's Bugs by Bert Thompson, 27th - Port Connections by Roy G3ASH. **Doris on (0268) 552606.**

Greater London

Acton, Brentford & Chiswick ARC. 3rd Tuesdays, 7.30pm. Chiswick Town Hall, Heathfield Terrace, London W4. May 18 - QRP problems - open discussion. **Colm Mulvany G0JRY on 081-749 9972.**

Edgware & DRS. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. May 21 - straight key evening, 27th - constructors contest & NFD Briefing by Ian Cope, June 5/6 - NFD. G4IUZ, 10th - Experiences In Sri Lanka by Doug Goodison G0LUH. **Howard Drury G4HMD on (0923) 822776.**

Southgate ARC. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. May 27 - DF workshop. **Brian Shelton G0MEE on 081-360 2453.**

Greater Manchester

Rochdale & DARS. Mondays. T. S. Frobisher, Greenbank Road, Rochdale. June 6 - HF Airband by G0PUD. **Brian on 061-653 8316 or Dave (0706) 32502.**

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

Gwynedd

Dragon ARC. 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. May 17 - talk by David Last GW3MZY. **Tony Rees GW0FMQ on (0248) 600963.**

Hampshire

Basingstoke ARC. 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. May 23 - 2m direction finding competition OS174-Fox: Eddie G4SQZ, June 7 - construction competition & VHF NFD planning. **(0256) 25517.**

Itchen Valley RC. 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. May 14 - Radio Investigation Service of the DTI, 28th - To The Border & Back by Mike G6AIQ. **Les Kennard G3ABA on (0703) 732997.**

Southampton ARC. 1st Mondays. Millbrook Community School, Green Lane, Maybush, Southampton, also 3rd Mondays at the home of one of the club members. **Malc Troy G1UWL QTHR.**

The Three Counties ARC. Every other Wednesday, 8pm. Railway Hotel, Liphook Hampshire. May 26 - QRP, June 9 - demonstration of sweep generator techniques with Graham G4WNT. **Kevin Roche G8GOS on (0420) 83091.**

Winchester ARC. 3rd Fridays, 7.30pm. Red Cross Centre, Durngate House. May 21 - Radio Astronomy by Alan Dodwell. **Peter Simpkins G3MCL on (0962) 865814.**

Hereford & Worcester

Bromsgrove ARS. 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. May 25 - technical topics, June 8 - aerial construction. **Mr D. Edwards G4ZWR on (0527) 546075.**

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

Hertfordshire

Cheshunt & DARC. Wednesdays, 8pm. Church Room, Church Lane, Wormley, nr. Cheshunt, Herts. May 19 - outdoor meeting, Baas Hill Common, Broxborne, 26th - natter night. **Roger Frisby G4OAA on (0992) 464795.**

Dacorum AR & TS. 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. May 18 - talk by Mr Armstrong from AKD. **Dennis Boast G1AKX on (0442) 259620.**

Hoddesdon RC. Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. June 10 - social night. **Roy G4UNL on 081-804 5643.**

Stevenage & DARS. Tuesdays, 7.30pm. Stevenage Day Centre, Chells Way, Stevenage. May 25 - practical night. **Neil Ravilious 2E1ASZ on (0438) 350882.**

Kent

Bredhurst T&RS. Thursdays, 8.15pm. Parkwood Community Association, Parkwood Green, Rainham, Kent. **Martin Pearson G7JBO on (0634) 365980.**

Bromley & DARS. 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes, Kent. May 18 - TV Principles by Ian Daniels. **Alan Messenger G7GBH on 081-777 0420**

Sevenoaks & DARS. May 17 - PC Boards For The Amateur by John Turnbull G1TVJ. **The Secretary, c/o Sevenoaks District Council, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.**

Lancashire

Hesketh ARC. Every other Tuesday. Birkdale, Southport. May 25 - radio quiz night, June 8 - Honey In The Ether. **Bernie G7DEM on (0704) 63344.**

Leicestershire

Charnwood ARCC. 1st & 3rd Sundays. The Albion, Loughborough. May 16 - 160m night on the air, 30th - club field day, June 6 - VHF contest planning. **Phil on (0509) 232927.**

Lincolnshire

Grantham RC. 1st & 3rd Tuesdays, 8pm. Kontak Sports & Social Club, Barrowby Road, Grantham. June 1 - inter-club quiz. **John Kirton G8WWJ on (0476) 65743.**

Spalding & DARS. Fridays, 8pm. The Riverside Centre, The Old Fire Station, Double Street, Spalding, Lincolnshire. May 14 - Motor Sport & Radio Communications. **David Johnson on (0778) 425367 (6-7pm).**

Merseyside

Liverpool & DARS. Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. May 18 - NFD preparations, 25th - Surplus Sale. **Ian Mant G4WWX on 051-722 1178.**

Wirral & DARC. Irby Cricket Club, Mill Hill Road, Irby, Wirral, 8pm. May 16 - RSGB '93, NEC, 19th - D&W, The Harp, Ness, 26th - Egg Race IV, 27th - 31st GB8WA Special Event Station, June 2 - D&W, The Greave Dunning, Greasby, 9th - practice DF Hunt, Heswall lay-by. **Paul Robinson G0JZP on 051-648 5892.**

Middlesex

Echelford ARS. Community Hall, St. Martin's Court, Kinston Crescent, Ashford, Middlesex, 7.30pm. May 27 - Surplus Equipment Auction. **P. Townshend G6PMT on (0344) 843472.**

Norfolk

Norfolk ARC. Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norwich. May 16 - trip to RSGB Exhibition at NEC, 19th - practical tuning-up, 26th - final HF NFD briefing. **Jack Simpson G3NJQ on (0603) 747992.**

Northants

Kettering ARS. Tuesdays, 7.30pm. Electricity Sports & Social Club, Eksdale Street, Kettering. May 15/16 - Special Event Station, 25th - Amateur Radio Direction Finding by George Whenham G3TFA. **Len G0RDV (but QTHR as G7EHM) on (0536) 514544.**

Nottinghamshire

Nottingham ARC. Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. May 20 - Foxhunt No 2/Activity, 27th - construction evening, June 3 - Forum, 10th - BBQ. **Ian Miller G4JAE on (0602) 232604.**

South Notts ARC. Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate. May 14 - on air HF & VHF, 21st - talk-in on S22/open forum, 28th - construction at Fairham College, 30th - First Fox Hunt, June 4 - on air HF & VHF. **Julie Brown G0SOC, PO Box 4, Nottingham NG11 9DE.**

Scotland

Dundee ARC. Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. May 18 - DARC awards evening, 25th - construction night. **George Millar GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.**

Wigtownshire ARC. Thursdays, RAE & Morse, chats, etc. Community Education Office, Stranraer Academy, 7.30pm to 10pm. **Ellis Gaston GM0HPK on (0776) 7215 evenings or (0294) 217979 day.**

South Glamorgan

Barry ARS. Alternate Thursdays. Old College Inn. **Ann MacKay GW0SQT, QTHR.**

South Yorkshire

Devonshire Arms ARC. Mondays. Devonshire Arms Public House, Herries Road, Sheffield. **David G0JJR on (0742) 446282.**

Sheffield ARC. Mondays 7.30pm. Firth Park Pavilion, Firth Park Road, Sheffield. May 17 - RSGB video, 24th - practical night, 31st - Bank Holiday drop-in. **(0742) 446282.**

Mexborough & DARS. Fridays 7.00pm. Harrop Hall, Dolcliffe Road, Mexborough. **Tom Sheppard G0SK on (0709) 586329.**

Suffolk

Felixstowe & DARS. May 24 - ESWR planning, 30th - 17th Annual East Suffolk Wireless Revival, June 7 - night on the air. **Paul Whiting G4YQC on (0394) 273507.**

Leiston ARC. June 1 - TVI by Ray Petri. **David Ferguson G6FS, 3 Aldeburgh Road, Leiston, Suffolk IP16 4JY.**

Sudbury & DARC. 1st Tuesdays, 8pm. Five Bells Inn, Great Cornard, Sudbury, Suffolk. June 1 - construction competition project is set. **Colin Muddimer G0PAO on (0787) 77004.**

Surrey

Surrey RCC. Terra Nova' The Waldrons, Waddon, Croyden, Surrey. May 17 - natter night, June 7 - History Of The Original London Aerodrome. **Berni G8TB on 081-660 7517.**

Sutton & Cheam RS. 3rd Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Natter nights - 1st Thursdays. May 20 - AGM, June 5/6 - HF National Field Day. **John Puttock G0BWV, 53 Alexandra Avenue, Sutton SM1 2PA.**

The Kingston & DARS. 3rd Wednesdays, 8pm. Alfriston, 3 Berrylands Road, Surrey KT5 8RB. May 19 - Surplus Equipment Sale. **Ray Fuller on 081-398 1128.**

Wimbledon & DARS. 2nd & last Fridays. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. May 14 - Surplus Equipment Sale. 28th - Developments In Cellular Radio. **Chris Frost G0KEB on 081-397 0427.**

Warwickshire

Stratford-Upon-Avon & DRS. 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. May 24 - DF Foxhunt. **Alan Beasley G0CXJ on (0608) 82495.**

West Midlands

Barr Beacon RC. 1st Mondays & 3rd Wednesdays, 7.30pm. 112 Walsall Road, Aldridge, West Midlands. **C. J. Baker G0NOL on (0922) 36162.**

Midland ARS. Unit 22, 60 Regent Place, off Caroline Street, Birmingham B1 3NJ. Wednesdays - RAE classes. Thursdays - natter nights. **John Crane G0LAI on 021-628 7632 evenings.**

Solihull ARS. 3rd Thursdays. The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Ivor Mantell G4NRY. May 20 - Packet Radio by Derek Waller G0FPN. **(0827) 53344 daytime.**

West Yorkshire

Denby Dale & DARS. Pie Hall, Denby Dale, nr. Huddersfield, 8pm. May 19 - rally meeting, June 2 - fox hunt. **Ivan Lee, Clayton Lodge, Sunnyside, Edgerton, Huddersfield HD3 3AD.**

Halifax & DARS. 1st & 3rd Tuesdays, 7.30pm. May 18 - visit to Police Headquarters, Richmond Close. **David Moss G0DLM on (0422) 202306.**

Keighley ARS. The Ingrow Cricket Club, Ingrow, Keighley, 8pm. May 13 - horse racing/natter night, 20th - natter night, 27th - horse racing/natter night, June 3 - natter night, 10th - Radio Controlled Models by R. Horrell. **Kathy Conlon G0RLO on (0274) 496222.**

Wiltshire

Devizes & DARC. Weekly 8pm, Hare & Hounds Inn, Hare & Hounds Street, Devizes. May 14 - Simple Active Filters. **Noel Woolrych G4TIX.**

Trowbridge & DARC. 1st & 3rd Wednesdays, 8pm. Southwick Village Hall, 8pm. May 19 - natter night, June 2 - 144MHz direction finding contest. **Ian G0GRI on (0225) 864698.**

NEVADA EVER

SCANNING RECEIVERS

NEW – MVT-7100,
Set to be *THE* handheld of 1993. This radio must be heard to be believed. It provides effortless reception of SSB and CW signals using **TRUE** carrier injection with 50Hz resolution. It can even (with accessories) be hooked up for FAX and DATA reception.

- 100KHz–1650MHz
- 1000 memory channels
- All mode reception (incl. SSB & CW)

Each set is supplied with all accessories including: UK Charger, NiCad Batteries, Earphone, Telescopic Antenna, Original Yupiteru English Manual..... **PRICE £449**

YUPITERU MVT 7000 HANDHELD

- Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
- 200 Memory channels
- Rotary or keypad freq. control
- AM/FM/NFM
- Large display with strength meter

Each set is supplied complete with:-
Full set of high power NiCads, AC charger. DC power lead and carry strap **£369**

HP2000 HANDHELD
Still our most popular handheld scanner.

- 500KHz-1300MHz
- 1000 Memory channels
- AM/FM/WFM Modes
- Sensitive Receiver
- Supplied with all accessories & UK charger **£299**

MS1000 Base/mobile
A mobile version of the HP2000 hand-held but with added features.

★ Tape recorder voice activated switching
★ Audio squelch
★ 500kHz–600MHz, 805–1300MHz
★ Supplied with mains adaptor **£279**

MVT-8000
Mobile version of the 7000 c/w mains adaptor. Especially sensitive @ UHF. Recommended..... **£389.00**

AR3000A
Our most popular base scanner. Latest updated version. (100kHz–2036MH) **£899**

SCS computer software
New software for IBM/clones. Gives logging, monitoring and control of AR3000..... **£59.95**

ACE PAC-3 software
Full feature software for AR3000..... **£119**

AR1500 HANDHELD
Covers 500kHz-1300MHz receiving NFM/WFM/AM and SSB.
Supplied with a large selection of accessories including:-

- Charger
- Dry Cell Battery Case
- Long Wire Antenna
- Ear Piece
- Soft Case **£339**

YAESU RADIO

Yaesu FRG100 HF receiver
A superb new radio covering 50kHz to 30MHz – our top selling general coverage receiver **£559**

Yaesu FT747GX – Still an unbelievable performer across the H.F. bands and one of the top 5 in budget H.F. Transceivers. Top Band to Ten, you won't be disappointed..... **£785**

Yaesu FT-890 – Recent reviews answer all your questions. Based on a winning combination, available with or without auto A.T.U..... **£1175**

Yaesu FT-530 – A Twin Band Handheld and a host of features including Dual In-Band RX, CTCSS DTMF all fitted. Wideband coverage plus optional speaker mic with LCD display. Guaranteed to be the next No. 1 ..... **£449.95**

Yaesu FT-1000 – You will never want another H.F. Transceiver! The FT-1000 does it all. This has to be the ultimate word in H.F. communications.
Full brochure available..... **£3275**

Yaesu FT990 All mode HF TCVR..... £1995
Yaesu FT757GX HF TCVR £995
Yaesu FT767GX HF + VHF/UHF £1597
Yaesu FL7000 500 Watt HF amp..... £1795
Yaesu FT736R VHF/UHF multimode..... £1569
Yaesu FT650 6/10/12 mtr TRCVR..... £1221
Yaesu FRG8800 receiver £599

DRAKE

Drake R8E – Number one in the U.S. since 1943. Drake is known right across the globe for its technology and above all, reliability – remember the "B" line separates (mine are still going!). Wide frequency coverage, excellent dynamic range Superb filtering In fact it's simply the best shortwave clarity you'll find. Outperforming many other receivers costing much more. Whatever your interests – Drakes' R8E can handle it!!!

- Fully filtered with AMS as standard
- 99 programmable memories with Scan
- Computer control option
- I.F. Pass-band offset facility

£1195

Options
R8E Matching Speaker..... **£49.95**
VHF Conv. (35-54 & 108-174MHz)..... **£225.00**
P.C Computer Drive Software ... **£59.95**
Full Technical W/Shop Manual **£29.95**

KENWOOD RADIO

Kenwood TS50

Just arrived. This new "micro" 100 watt HF mobile rig is in short supply because of its popularity. We have purchased large quantities – call for info or part exchange price on your old HF rig..... **£999**

Kenwood R-5000 – Tried and tested in all corners of the world. This receiver keeps going and going. 150kHz-30MHz. All mode with many options - what more could you want..... **£949**

Kenwood TS450/690S – Two superb H.F Transceivers capable of delivering the "punch" when necessary. 100W O/P, optional Auto A.T.U. plus general coverage receive.... **TS450 – £1249: 690S – £1399**

TH28/48/78E's – The family of 3 "designer-type" handhelds that feel comfortable in the hand whether Two Meters, 70 Cms (ideal novice band) or 2/70 Twin Bander is what you're after - take a serious look at the "TH" range ..... **£Call**

Kenwood TS850S – Another sure winner from Kenwood! Designed with the serious operator in mind and built to last... why not consider upgrading or part-exchanging your old TS830..... **£1599**

Kenwood TS140S HF transceiver £849
Kenwood TS950SDX £3499
Kenwood TS790E £1799
Kenwood TS711E £1099
Kenwood TR751E £699
Kenwood TM741E £758
Kenwood TL922 ..... £1699
Kenwood TM702E £499
Kenwood TM732E £599

MICROPHONES

Adonis 508G
Desk mic
★ FM/SSB audio selector
★ Electret insert
★ Slide switch to allow selection of 2 radios
99.95

Adonis 308 Low noise desk mic..... £84.95
Kenwood MC50 Desk mic..... £49.95
Kenwood MC60A Desk mic..... £99.95
Kenwood MC80 Desk mic..... £59.95
Kenwood MC85 desk mic £119.95
Kenwood MC43S Hand mic..... £22.95
Kenwood MC44E h/mic..... £29.95
Kenwood MC45E h/mic..... £29.95
Kenwood MC44 DME h/mic..... £45.95
Kenwood MC45 DME £49.95

Sadelta XL30 Desk microphone. Made in Spain especially for Kenwood Icom and Yaesu radios – The electret insert gives outstanding clarity..... **£46.00**

SAGANT ANTENNAS

High quality Japanese manufactured – outstanding performance.

End fed zepp antennas Using vinyl coated annealed copper wire – supplied with matching unit for coax feed.

ZA3.5F (39 mtrs long)..... **£79.95**
ZA7 (20 mtrs long)..... **£79.95**
ZA14 14 MHz (9.9 mtrs long)..... **£89.95**

Antenna parts

EL40X (3.5/7MHz) 12.9 mtrs **£89.95**
EL40XC Pair of 40 mtr traps ... **£19.95**
BL40X Balun 1:1 2kW S0239..... **£29.95**

EXTENDAMAST 10 METRE RETRACTABLE MAST

Suitable for: Dipoles, Long Wires, VHF/UHF Beams, G5RV and many other antennas.

A new and inexpensive aluminium 10 metre retractable mast that may be used at home or for portable use. Easy to erect in minutes - your antennas can now be independant of trees, buildings and other make shift fixing points! The steel guying rings are corrosion protected to provide years of useful life. Because individual requirements vary guy wires are *not* included. A base fixing plate is available as an extra.

Introductory Price £69 Plus £8 Carriage

THIS MONTH'S BEST BUY

NRD-525 HF GENERAL COVERAGE RECEIVER

Considered to be one of the finest receivers ever made! We've managed to locate a limited quantity at a very special price. Now's your chance to own one of the thoroughbreds amongst receivers.

★ Receives 90kHz to 34 MHz
★ 200 channels of memory
★ RTTY, CW, SSB, AM, FM, FAX
★ Pass band tuning
★ Wide dynamic range
★ Built in Clock/Timer circuits -
★ Fully solid state modular design
★ Programmable memory scan
★ Microprocessor controlled, electronic tuning

LIMITED QUANTITY AT **£795**

THE FASTEST MAIL ORDER COMPANY

Access VISA

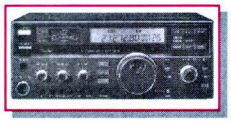
USE YOUR CREDIT CARDS FOR SAME DAY DESPATCH

YTHING FOR THE RADIO ENTHUSIAST

HUGE STOCKS - FAST DELIVERY - PERSONAL SERVICE

NEVADA COMMUNICATIONS, 189 LONDON ROAD, PORTSMOUTH P02 9AE
TELEPHONE HOTLINE: (0705) 662145 FAX: (0705) 690626

ICOM RADIO



Icom IC-737 – A new full coverage HF transceiver with Auto ATU, Electronic Keyer, good receiver an a host of extras.....**£1350**

Icom IC-728 – If you like Icom, you'll like the 728 HF Transceiver. As expected, built to a high standard. Full coverage, 100W o/p, many accessories .....**£Under 1000**

Icom IC-735 – This is more than just another transceiver - well designed & stylish in looks with an enviable performance. All the usual features and still **£1069**

Icom IC-W21E – Twin band handie with full duplex "Whisper" mode. C/W NiCad and charger **£425**

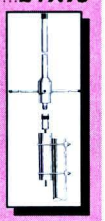
Icom R-100 – The mobile monitoring station. 500kHz to 1.8GHz. What more is out there? 100 mems, AM, FM & WFM modes **£565**

Icom R-7100 – An affordable - professional grade receiver. Hosting 25-2000MHz coverage & a whole 900 memories to play with! Full colour brochure available.....**£1259**
incl. free discone

Icom R-72 – Lets not forget all the S.W.L's - Icom haven't with this general coverage H.F receiver 100kHz-30MHz. All mode (FM optional) with 99 mems for favourite frequencies **£759**
incl. free antenna

SCANNING ANTENNAS

WB1300 Discone – (25-1300MHz) Stainless steel top of the range "N" type connector. Complete with short mounting pole and clamps. 8 elements with vertical whip. Suitable for transmit on 6m, 2m, 70cm, 32cm, and 23cm bands. Length 1.7 mtrs **£49.95**



Nevada Scanmaster – (500kHz - 1500MHz). New high quality wide-band receiving antenna uses fibre glass/stainless steel with 4 small radials. "N" type connector. Length 1.1 metres **£39.95**

Micro-Scan – (180-1300MHz). New low cost budget ground plane antenna.....**£12**

Skyband – (25-1300MHz). Our most popular stainless steel economy wideband discone. Recommended. Bargain Price ONLY **£27.95**

SONY ACTIVE ANTENNAS

AN1 – An external active antenna with built-in pre-amp, covers 150kHz-30MHz. Fully portable with easy to mount fixing brackets..**£57.95**

AN3 – Active antenna for Aircraft and VHF reception, suitable for Sony Air 7 plus many others **£54.00**

EARTALKER

Eartalker – A completely new concept in microphone technology. The Eartalker is a combination of earphone and microphone which is worn within the ear. It provides outstanding transmitted audio quality and is suitable for all leading brands of handheld (Call for details on your particular model). Separate volume, PTT switch and control box **£39**

MICRO-READER

ERA Microreader – Data Communications decoder - decodes RTTY, CW, AMTOR (A) & SITOR (B). 16 character LCD display needing only connection to receiver extension speaker socket. Shortly to become available will be the large 4-line LCD display with built-in parallel printer driver port. Variable in-built morse tutor. (Call and reserve your optional display now).....**£169.00**

ALINCO & STANDARD

Alinco DJ-580 – Fast becoming the top selling Twin Band handheld here in the U.K. Complete with all "mod-cons" including AM Airband RX. Comes ready to go just plug-in and charge - the perfect way to operate 2M & 70 Cms **£399**

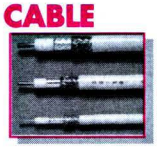
Alinco DJ-F1E – Don't take my word for it but my customers agree that this is the perfect companion when considering a 2M handheld. Full coverage and again offered with Airband receive.....**£249**

Alinco DR-599E – Replacing the 590E - This little unit has an impressive 50W on each band, automatic remote repeater function (ideal raynet exercises) and a host of extra facilities including ext.RX. Full colour brochure available - call us now! .**£599.95 incl. free duplexer**

Standard C528 – This Twinband handheld is the model the others were based on! Still a popular choice with many features including remote cloning and repeater talk-thru! **£365**

Alinco DJ-F4E – A popular novice band radio on 70cms. Simple to operate handheld with 40 memories and 5 Watts output....**£269**

LOW LOSS CABLE



Superb Japanese low loss cable with aluminium foil and braid double earth screening, tough weather resistant yet flexible. Fantastic low loss – suitable for high power and frequencies up to 3GHz.

5D-FB (8.1mm – 0.055dB/mtr).....**£0.65/mtr**
8D-FB (11.1mm – 0.039dB/mtr).....**£1.65/mtr**
10D-FB (13.1mm – 0.031dB/mtr).....**£2.42/mtr**
Losses quoted at 100MHz

CONNECTORS (for above)
"N" Types **£3.56**
BNC.....**£3.75**
PL259 .....**£1.50**

KENPRO RADIO

KT-44 – 70 cms handheld. Thumb wheel frequency control. Full 10MHz! Ideal novice or repeater user. c/w NiCad, beltclip & charger **£159.00**

KT-22 – Popular 2M version of the KT-44 with simple NO FUSS operation. Ideal standby handheld or for use on Packet.....**£149.00**

NEW HAND-HELDS

ALAN CT-145 – Fully featured 2M handheld with options for DTMF & CTCSS Paging. 5 watts output is available when powered from external 12V DC supply. Now with extended receive - 130-169MHz. Excellent reliability & performance.....**£199.00**

SONY SHORTWAVE

As a Sony Shortwave centre, we stock a complete range of Sony Shortwave product. Here is a selection of our best sellers:-

SW77 – One of the best new editions to the Sony range. The SW77 covers 150kHz-30MHz plus an additional 76-108MHz. With a rotary tuning dial, 125 scan memories, the reception of AM/FM/USB/LSB and CW modes is a breeze. Fitted tape record facility finishes this superb all round receiver.**£349.95**

SW1E – Pocket Shortwave plus VHF Commercial radio. Each unit is supplied with headphones, case and shortwave guide. This model will not hurt your pocket..**£139.95 this month only**

SW55 – A new portable that gives good reception of SSB and all modes from 150kHz to 30MHz and 76-108MHz VHF ...**£269.99**

SWR/POWER METERS

Diamond SX100
(1.6–60MHz) 3kW **£124.95**

Diamond SX200
(1.8–200MHz) 200W **£89.95**

Diamond SW400
(140–525MHz) 200W **£99.95**

Revex W520
(1.8–200MHz) 200W **£79.95**

Zetagi Mod 700
Professional line using 2 separate sensors 2–3MHz, 120–500MHz, cross needle power/SWR up to 1kW **£99.95**

0% FINANCE AVAILABLE
(SUBJECT TO STATUS)
RING FOR DETAILS

NEW VECTRONICS AMP

Vector 500. "Canadian Punch!" A full 1000 Watts PEP on SSB enables you to beat the pile-ups. Now available here in the U.K. Top band to 10 from only 60-80 Watts input. Call now for your brochure!.

- 4x811A Low Cost Tubes
- 600W C.W. 1000W PEP
- Compact 24lb weight

£865

TRADING POST

We buy as well as sell new and used radio equipment, please feel free to call Paul or John on our Hotline for an instant quote on either P/X or Buy-Ins.

Yaesu FT-690 6m Port-a-pack.....**£345**
Yaesu FRG-9600 25–950MHz RX **£365**
Yaesu FT290R 2m Port-a-pack **£325**
Icom R72 Short wave RX, boxed **£625**
Trio JR500/S Receiver **£149**
Tokyo HC200 ATU (80–10m).....**£99**
Trio R1000 Short wave receiver. **£275**
Yaesu FT-902DM HF TX, v.g.c.....**£625**
Sommerkamp FT-1012D HF TX **£495**
Adonis 308 Desk mic (boxed).....**£65**
Yaesu FT747GX HF 12V TX.....**£650**
Yaesu FT-890 HF TX, c/w M/M.....**£1175**
Icom R100 Mobile scanning RX. **£425**
Tokyo HT-120 20m mobile TX **£245**
CT1600 2m H/H c/w BS25+h/set **£165**
Yaesu FT-470 Twin band h/held **£365**
Kenwood TR-77 Twin band h/held....**£325**
Alinco DJ-560 Twin band h/held **£345**
Kenwood TS-530/S HF TX, v.g.c.....**£549**
Kenwood AT-230 ATU, v.g.c.....**£169**
Icom IC-240 2m mobile **£149**
Tokyo HX-240 HF transvertor **£185**
Adonis AM-508 Mic (compressor).....**£75**
Yaesu FRT-7700 S/W RX ATU.....**£49**
Uniden B/Cat 200XLT H/H scanner.**£140**
Yupiteru MVT-7000 H/H scanner **£215**

Call us now – even if we haven't listed your radio, for what we know to be unbeatable P/X deals.

VECTRONICS

Vectronics – Canadian based - HIGH QUALITY PRODUCTS

ANTENNA TUNING UNITS
VC300 – 150 Watt (300W P.E.P.) ATU with dual pointer metering of FWD/REV/SWR. Two coaxial inputs plus wire or balanced line (4:1 balun included).....**£149.00**
VC3000LP – As above but with built-in Dummy Load and peak or average pwr mtr.....**£169.00**
HFT1500 – 1500 Watt ATU (3kW P.E.P.) coax, line wire, and balanced line inputs (4:1 balun included). Peak and average power reading meter. High quality roller coaster and slow motion variable capacitor drives allow you to match just about anything! **£399**
PM-30 – Power/swr meter reads peak/average power up to 3kW 1.8–60MHz.....**£89**

NEVADA ATU COMPONENTS
HIGH POWER VARIABLES – 150pF, 170pF or 250pF (7.8KV).....**£19.95**

T.V.I. SUPPRESSION
KENWOOD LF30A – 1.5kW low pass filter provides more than 60 dB suppression above 35MHz **£39.00**
GLOBAL HP-4A – UHF TV high pass/band break filter **£9.95**

CAR SUPPRESSION
FU400 – RF suppressor for use with either car alternators or generators (effective 2.2–400 MHz).....**£7.95**

The Practical Wireless 144MHz QRP Contest

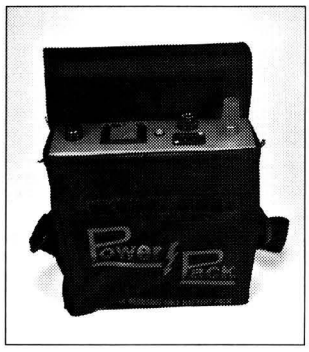
Once again the contest Adjudicator Neill Taylor G4HLX, invites you to enter the PW QRP Contest. And for the first time, we're able to invite s.w.l.s to join in, with the chance to enjoy themslves and win a special prize in their own section.

The eleventh annual *Practical Wireless* 144MHz QRP Contest promises to be another great day for the v.h.f. QRP operator. As regular entrants know, the event provides a chance for even the most modest station to compete effectively.

For the second year running, well known *PW* advertisers are supporting the contest. Shropshire-based **Specialist Antenna Systems**, in conjunction with **Cushcraft Antennas** from the USA will be donating a 144MHz Cushcraft beam, and **Bob Keyes GW4IED** of **Key Solar Systems** is donating a portable battery power pack system.

The high level of activity from well-sited stations means that everyone can enjoy some DX contacts, despite the 3W output power limit. If you are new to v.h.f. contests, this is an ideal chance to join the fun for the first time.

Newcomers might like to look at the introductory article published with last year's rules, in the June 1992 *Practical Wireless*. A photocopy of the article is available free, by either telephoning or writing to the *PW* offices in Broadstone (**no s.a.e. required**).



Second prize for the 1993 contest is a portable battery power pack donated by Bob Keyes GW4IED of Key Solar Systems.

New Listener Category

A new feature of the *PW* contest this year, is the separate category for listeners. This will give the v.h.f. listener a chance to compete against others in logging the large number of stations to be heard from many locator squares.

A special prize, kindly donated by **Mike Devereux G3SED of Portsmouth-based Nevada Communications**, will be awarded to the winning listener. The prize will be presented at the 1993 Leicester Show.

And once again, along with the chance of valuable prizes for the leading stations, certificates will be awarded to entrants who lead in various categories. Plus, of course, the coveted Winner's Cup for the overall number one station, which I'm looking forward to presenting at the Leicester Show in late October.

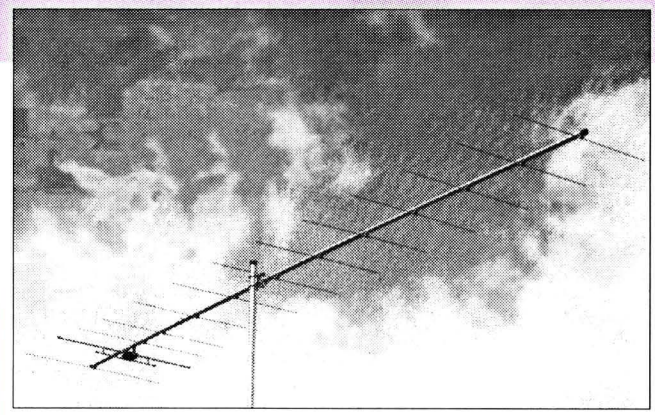
General Rules

There are no major changes to the general rules this year. So please refer to the rules published in *Practical Wireless* June 1992 (free photocopies available from the Broadstone offices, no s.a.e. required), making the following changes:

Rule 1. The duration will be from 0900 to 1700UTC on 20th June 1993.

Rule 6. Entries must be postmarked no later than 5th July 1993. Any photographs may be forwarded later to arrive by 7th August 1993.

Rule 8. Delete last paragraph. Certificates will be awarded to leading stations in various categories, including the leading station in each locator square.



First prize for the Practical Wireless 144MHz QRP Contest 1993 will be a 144MHz antenna, donated by Specialist Antenna Systems and Cushcraft (USA).

To obtain a copy of the full rules of the contest, please write to the Practical Wireless office at Broadstone (see contents page for address).

Listeners' Challenge

Entries are invited from v.h.f. listeners who hear and log stations on the 144MHz band during the contest period. The rules for listeners are based on the general rules (see above).

1: The listeners' contest is open to any individual or group, receiving s.s.b., c.w. or f.m. signals in the 144MHz band. The receiving station may not change its location during the contest. The duration is as stated in the general rules (above).

2: Stations heard and logged may be any station engaged in a contact (CQ, test, or other general calls may not be logged for points), whether taking part in the contest or not. The restrictions of general rule 2 shall apply, in particular with regard to repeater and satellite contacts being invalid.

3: Scoring for listeners' entries will be done in a similar way to that specified in general rule 4, i.e. the score will be the number of stations heard, multiplied by the number of different locator squares heard.

4: Listeners' logs should conform to the requirements of general rule 5 except that the columns must show:

- **(i) time UTC**
- **(ii) callsign of station heard**
- **(iii) callsign of station being worked**
- **(iv) RS(T) report of signals heard**
- **(v) RS(T) and serial no. (if any) sent by station heard**
- **(vi) locator (or location) as sent by station heard.**

Only log entries which contain all this information will count for points. If you hear both sides of a contact, write separate log entries for each station. The same callsign may appear in column (iii) no more than once in every ten log entries.

5: As far as they are appropriate for receiving stations, general rules 6, 7 and 8 shall also apply. Be certain to supply information (a), (c), (d), (g), (h) and (k) in rule 6.

Enjoy The Contest

Well, that's the lot from me before the contest. I wish you all the very best of luck, and I hope that you'll enjoy the contest as much as I enjoy organising. I hope we'll have good weather, a good turn-out again, and I'm really looking forward to seeing a lot of s.w.l. entries.

Here's to Sunday 20th June, good weather, good conditions and good fortune. 73 from Neill Taylor G4HLX.

0900 - 1700UTC Sunday 20 June 1993

The Kenwood TS-50S HF Mobile Transceiver

The Rev. George Dobbs G3RJV, has found time to put his soldering iron down to try out the new and truly amazing little 100W mobile rig from Kenwood. And true to form George has found a suitable quotation!

The newly-introduced Kenwood TS-50S 100W mini h.f. mobile transceiver reviewed by George Dobbs G3RJV.

Review

In small proportions we just beauties see; And in short measures, life may perfect be.

– Ben Jonson 1573-1637

These days the press has much to say about the sins of the modern age. What a shame they always seem to miss out the chief one - covetousness. We're taught to want.

So how sad it is, that I fell into the trap as soon as I got my hands on the review Kenwood TS-50S transceiver. Within half an hour I was convinced that I needed one!

Small And Handsome

The TS-50S is small and handsome. Measuring only 179 x 60 x 233mm and weighing 6.4 lbs, it's probably the smallest full feature h.f. transceiver available. It looks more like a 144MHz mobile transceiver than a 100W h.f. rig.

The case is a rugged metal structure with a pleasantly styled and uncluttered front panel. It looks good.

Obviously aimed at the h.f. mobile market, the TS-50S is supplied complete with mobile mounting brackets. There's also an internal noise blanker to filter ignition noise.

The standard MC-47 microphone comes complete with scan and programming buttons for ease of mobile operation. My review TS-50S also came with the AT-50 automatic antenna tuner designed for mobile or fixed station use.

The AT-50 is a matching box and runs in an automatic 'hands - off' mode in conjunction with the TS-50S. It can also be used in semi-automatic mode with other transceivers.

Full Feature Transceiver

The TS-50S is a full feature microprocessor-controlled transceiver. It has all the usual facilities associated with such equipment plus one or two thoughtful little extras.

The transmitter offers l.s.b., u.s.b., c.w., f.m. and a.m. modes at selectable power levels of 100, 50 or 10W. The receiver is general coverage in the range 500kHz to 30MHz. All of the TS-50S features are accessed from a few controls on the front panel.

Nowadays, it's easy to get lost in the bowels of the software on modern transceivers. However, although there are plenty of software facilities in this transceiver, the main operating facilities are not shrouded in the mysteries of multiple button pressing.

Is it possible to use the transceiver without constant reference to the manual? To find out, I switched on the TS-50S and attempted to use it without reading the manual and unlike some transceivers, this is perfectly possible with the TS-50S.

The main operating controls are clearly marked, and they do what the legends suggest, and so the little beastie is easy to drive. However, the 'clever' features are another layer down and do require the use of the manual.

Front Panel Controls

Let's start by quickly looking through the front panel controls. The **Power** switch gives a cheerful 'hello' for about a second before the display comes up.

The **AIP/ATT** button activates the **A**dvanced **I**ntercept **P**oint and/or the **Att**enuator functions. The attenuator provides a fixed 20dB attenuation on receive and the a.i.p. provides an automatic r.f. gain control below 9.5MHz.

The AIP/ATT button toggles between both off either on or both on. Although I would have preferred a manual r.f. gain control, I found that these features, especially when used together, enable the TS-50S to cope well on the 7MHz band during the busy evening period.

The **NB** button provides a noise blanker, designed for pulse noise and especially ignition noise during mobile operation. The **Audio** gain control is ganged with the **Squelch** control.

The squelch is active in all modes. Although it should be turned right down, except in f.m. or a.m. use, I found it interesting to try on 7MHz s.s.b. operation.

The **RIT** control is ganged with the **IF Shift** control. When the RIT button is activated, the frequency shift is indicated on the display.

I would have liked to have seen an RIT reminder l.e.d. with the button. But perhaps I'm just more careless than other operators! This control also doubles as a scan speed control.

The **IF Shift** is a very useful facility and works well. Being able to shift the i.f. filter pass-band,

Review

when you've mastered it, can be a great help in dodging adjacent channel interference and this version works well.

Memory Functions

The five buttons which control the memory functions are grouped near the RIT button. There are 100 memories with full scan facilities. All very useful I think, although I can never work out what we are supposed to do with 100 memories!

The transceiver's two v.f.o.s are operated with three buttons: **A/B toggle**, **Split** frequency working and **A=B**, which are conveniently placed next to the main tuning knob. Incidentally, the tuning control has an adjustable torque level hidden below the knob.

Naturally, when the rig is in the v.f.o. mode, the knob controls the operating frequency but this also includes 'Fuzzy Logic Control. This means that the rate of frequency step changes automatically, depending on how fast the control is turned.

Conveniently Placed

To the right of the tuning control are the mode switch buttons, conveniently placed for 'third finger operation'. The s.s.b./c.w. button toggles between c.w. and the appropriate l.s.b. or u.s.b.mode for the selected band, although it can be set to toggle l.s.b./u.s.b./c.w.

The multi-function s.s.b./c.w. button also selects the appropriate a.g.c. speed - fast for c.w. and slow for s.s.b. The **FM/AM** mode switch toggles these modes.

Above the tuning control are four larger buttons: **F.Lock**, **MHz**, **Down** and **Up**. The 'Down' and 'Up' buttons switch up and down the amateur bands. But they can also move the frequency up and down by 1MHz if the MHz button is on.

The 'Down' and 'Up' buttons also select memory channels and menu settings. The F.Lock button locks and unlocks the tuning control and many other functions, and it's also used to enter the menu set-up.

Fixed And Mobile

On the air, I used the TS-50S over several days from a fixed station and mobile locations. I concentrated on s.s.b. operations as I was asked to check the transceiver for mobile use.

At home I used the TS-50S into a very average antenna. It was a doublet, some 37m long, open wire fed to a Z-match antenna tuning unit.

A little casual operating on several bands using s.s.b., with a few c.w. QSOs proved to be a very pleasant experience. The TS-50S was easy to use and gave a good account of itself.

I used it at the 50 and 10W levels. This is because my usual operation is QRP, and my a.t.u. is modest and my bi-directional Wattmeter only runs to about 20W.

The TS-50S did all that would be expected from the power level and station set up. Altogether I found the TS-50S very user friendly.

I did spend a fair amount of the testing time on 7MHz s.s.b. in the evening, considering this to be a good test of the transceiver. It held its own very well.

I was able to join the struggle with the best of them! My subjective view of the advanced interception point (AIP) facility is that it is very useful in crowded band conditions. Adding the Attenuator enabled the TS-50S to cope with the 7MHz band at its worst.

Key Operation

My operation on the key, using c.w. was limited. I would have liked more time because I suspect I could have got to like the transceiver on c.w.

It would have been interesting to try the optional 500Hz c.w. filter. However, I should mention that there are two c.w. facilities on the TS-50S which I enjoyed using.

The c.w. reverse (**CW-R**) facility enables the operator to swap sidebands on receive to dodge QRM. The c.w. receive pitch can be changed in 50Hz increments from 400Hz to 1kHz.

Recent research has suggested that a pitch lower than the usual 800Hz, is less fatiguing and makes for easier operating. But, anyone who is musical already knows that from Gregorian Chant to modern music, 440Hz has been the preferred human pitch!

Not To Plan

My mobile operating did not quite go to plan. I took the TS-50S out to the Pennine hills above my house with a new Sandpiper h.f. whip to test.

As I began to set up the Sandpiper mobile antenna in situ and the rain began it does that in the Pennines!). I quickly got into the car and decided to allow the AT-50 automatic antenna tuner to take up the tuning.

The a.t.u. did the job very well. Despite the fact that the Sandpiper mobile antenna had not been accurately set up, I had a very enjoyable afternoon of static mobile s.s.b. operation.

In mediocre conditions on 14MHz, I had a continuous string of contacts from all over Europe, and a good lengthy QSO with W2MEL in Florida. The microphone button controls were useful, and the transceiver was convenient to use in the cramped conditions of the car. Several stations also commented on the quality of the audio.

Summing Up

In summing up, I must say I like the TS-50S. Kenwood have produced an attractive and worthwhile product.

The rig is an ideal mobile transceiver which would also make a compact and domestically acceptable fixed station. It's easy to use and performs well.

The final comment comes from my wife Jo' G0OWH, who is a very reluctant s.s.b. operator. After working UH8EA in a minor pile-up on the crowded 7MHz band, she said "Can we afford to buy one?" And she's the usually more shrewd in the house regarding our financial affairs!

My thanks for the loan of the review transceiver go to Mike Atkins of Kenwood UK (Comms Div.) Dwight Road, Watford, Hertfordshire WD1 8EB, tel: (0923) 816444, who advises me that the recommended price for TS-50S is £999.95. The matching automatic tuning unit , the AT-50, is available £299.95. A 500Hz crystal filter unit for c.w. is also available for £54.95.

Fig. 1: The Kenwood TS-50S mini h.f. transceiver, with the AT-50 matching automatic antenna tuning unit mounted on top. Both units are fully portable, operating from a basic 12V d.c. power supply. The TS-50 is a very compact 100W transceiver, and only measures 179 x 60 x 233mm.

Specifications

General

Mode	J3E(l.s.b., u.s.b.), A1A(c.w.), A3E(a.m.), F3E(f.m.)
Number of memory channels	100
Antenna impendance	50Ω
Supply voltage	13.8V d.v. ±15%
Grounding Method	Negative ground

Current drain

Transmit	20.5A (maximum output)
Receive (standby)	1.45A

Usable temperature range	-20C to + 60°C (-4°F to + 140°F)
Frequency stability	Within ±10p.p.m. (-10°C to + 50°C)
Frequency accuracy	Within ±10 p.p.m. (at room temperature)
Dimensions	179 x 60 x 233mm
Weight (main unit only)	2.9 kg (6.4 lbs)

Transmitter Frequency Range	1.800 - 2MHz *1, *2	18.068 - 18.168MHz
	3.500 - 4MHz *3	21.000 - 21.450MHz
	7.000 - 7.3MHz *4	24.890 - 24.990MHz
	10.100 - 10.150MHz	28.000 - 29.700MHz
	14.000 - 14.350MHz	

*1 Europe, France 1.810MHz, *2 Belgium, France 1.850MHz, *3 Europe 3.8MHz, *4 Europe 7.1MHz

Power output

1.810 to 28MHz (s.s.b., c.w., f.m.)	Max. 100W, Med. 50W, Min. 10W
1.810 to 28MHz (a.m.)	Max 25W, Med.12.5W, Min. 2.5W
Modulation type	Balanced (s.s.b.) f.m. (variable reactance) a.m. (low level)
Spurious emissions	-50dB or less
Carrier suppression	40dB or more (mod. freq. 1.5kHz)
Unwanted sideband suppression	40dB or more
Maximum f.m. deviation	5kHz (=10% -20%)
Microphone impedance	600Ω

Receiver Characteristics

Receiver freq. range	500kHz to 30MHz
Circuit type (s.s.b., c.w., a.m.)	Double conversion (1st .i.f. 73.045MHz, 2nd 10.695MHz)
Circuit type (f.m.)	Triple conversion (1st. i.f. 73.045MHz, 2nd. 10.695MHz, 3rd. 455kHz)

Sensitivity

(s.s.b., c.w.)	500kHz to 1.5MHz <0.25µBV (at 10dB S+N/N)
	1.5. to 1.7MHz <0.35µV
	1.7 to 30MHz <0.25µV
(a.m.)	500kHz to 1.5MHz <0.25µV (10dB S+N/N)
	1.5 to 1.7MHz <0.35µV
	1.7 to 30MHz <0.25µV
(f.m.)	28 to 30MHz <0.5µV (at 12dB SINAD)

Selectivity

(s.s.b., c.w.)	-6dB at 2.2kHz, -60dB less than 4.8kHz
(a.m.)	-6dB more than 5kHz, -60dB less than 40kHz
(f.m.)	-6dB more than 12kHz, -50dB less than 25kz
Image rejection	>70dB
First i.f. rejection	>80dB
Squelch sensitivity (s.s.b., c.w., a.m.)	500kHz to 30MHz <2µV
Squelch sensitivity (f.m.)	<0.32µV
Receiver independent tune (RIT)	>1.1kHz (10Hz steps) >2.2kHz (20Hz steps)
Audio output	2W (into 8Ω at 5% distortion)
Audio output impedance	8Ω

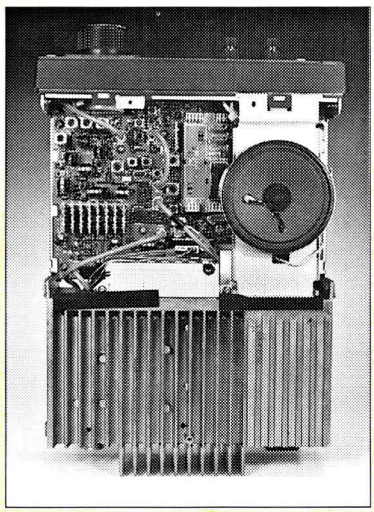


Fig. 2: An inside view of the TS-50S, showing the massive heat-sinking required for the compact 100W transmitter and the exceptionally neat and un-cluttered p.c.b.

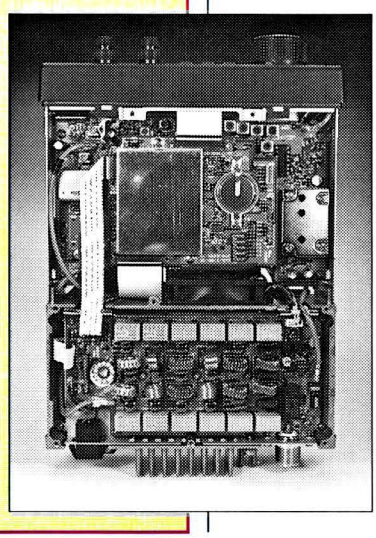


Fig. 3: Main board view of the TS-50S. The well designed lay-out is deceptive, as it disguises the complex nature of the microprocessor-controlled transceiver.

Feature

Ron Wilson G4NZU, Senior Morse Examiner for Nottinghamshire, passes on some of his experience and useful advice for anyone about to take the Morse test.

Preparing for the Morse Test

The last candidates at the Nottinghamshire test centre taking the old style test with their examiners. Back row (left to right) three candidates and Bill G3ZVG. Front (left to right) Ron Wilson G4NZU, candidate, Charles G3XTL and Trevor G0IXR (Charles G3DXZ and Colin G0FOG weren't on duty.

Over 280 candidates have passed through the Nottinghamshire RSGB Morse Testing centre. We feel our experience as examiners and trainers will help those preparing for the test, or anyone helping candidates prepare.

The opinions expressed here, are personal. They don't necessarily reflect any 'official view' of the RSGB Morse Testing Service.

The Student

Our aim, quite simply, is to ask the student to **think** about the **what**, **why** and **how** of their studies.

Any aspiring c.w. operator soon finds out there are many schools of thought, each thinking they're the 'right' or 'only' method of learning and using Morse. We can't enter into this argument! We only ask the learner to listen and think, which suits their needs best.

So once you're learning, how do you know you're ready for the receiving test? Unfortunately, there's no clear cut answer that applies to every student.

Assuming you're a regular listener to the GB2CW broadcasts, then a good 'rule of thumb' would be that they are able to obtain 'good' copy of a passage at about 15 words per minute (w.p.m.). This means that most of the passage is correct.

Candidates who are 'comfortable' at 15w.p.m. will know that they have some 3w.p.m. in reserve. They'll be more confident, knowing that they can cope with the test speed.

A Danger

There's a danger in reaching the stage where 15w.p.m. becomes 'easy'. That's when the test speed is often reported as 'sounding slow' and the candidate could end up causing problems for themselves in the receiving section.

If you're at this stage, we recommend you concentrate on the 12w.p.m. texts for a week or so before the examination in order to 'tune' the ear and brain. Reaching the 'comfortable' stage also tells you that it's time to go for the test!

The Test

Now to the test itself. After the candidates have taken the 'receive' passage, there'll be a short pause before the scripts are collected.

This is where you can ensure your writing is capable of being read by the examiner. It's best to write on alternate lines, as you then have room to make any alteration quite clear and legible.

A problem which can strike any individual no matter how expert, is missing the odd letter. The natural reaction to missing a letter is to leave a gap. This is correct if the operator is dealing with groups of random letters of a code, and so cannot do anything about the missing letter.

In the amateur Morse test, the candidate is working with English, abbreviated or not. Because of this, the gap will be surrounded by other informative letters which 'make sense' and so a missing letter can be rescued.

You can now apply your thinking, by considering what the space or gap you have left could stand for. Is it a single letter, or two, or a letter **and** a word gap? Or is it a word gap **and** a letter?

The uncertainty can be avoided if the beginner develops the habit of putting a dot each time a letter is missed. If the habit of 'miss it - dot it' is developed then the problems are minimised.

A dot means a missing letter and you still retain the ability to indicate the word gap. It can be useful when on the h.f. bands under difficult conditions.

There are two further advantages to the method. Firstly, as progress is made the dots per page show a clear drop. Secondly, as the corrections are put in, a student will quickly identify their 'problem' letters.

Generally, candidates don't know that the omission of word gaps does not constitute an error, and also that the maximum number of errors in a single word is two. Thus three errors in a single word would only count as two, as would an omitted or inserted word.

Single Tutor

Many candidates seem to stick with a single tutor, whether it's a friend or a GB2CW station. However, it's best to make every effort to hear different styles, or 'fists' because hearing keying variety is helpful.

Many tutors use an electronic keyer and their Morse should be well formed. This is fine, especially in the early stages of learning the code, but **please** bear in mind the real life situation.

Firstly, many operators use a hand key on air. Secondly, the examiners will use a hand key in the test.

All hand keyers develop their own characteristic style. It's therefore helpful to the student to hear a variety of different 'fists'. This will help them to adjust to the examiner's style as quickly as possible during the practice piece.

Operating The Key

Generally speaking, the methods of operating the key when sending Morse, are almost as many as the number of candidates. The variety is staggering!

The Nottinghamshire team have seen keys mounted on marble, still needing Blu-Tack to prevent them moving over the table. We've also seen the table bending in sympathy with the Morse, and so on!

It's obvious that many candidates take no practical advice on the operation of the key. Perhaps this is because so many students learn in isolation.

Key Comfort

In amateur radio, perhaps the most important factor when operating a key, is that of comfort. This means comfort in the operating position, comfortable posture and comfortable 'grip'.

The radio amateur has relatively short periods of operation. Consequently it's difficult to train the muscles to support an arm. The famed 'brass' or 'glass' elbow is another version of tennis elbow, each brought about by unnecessary muscle strain.

The aches and pains (nowadays known as repetitive strain syndrome) led to the development of the mechanical keyers. Fortunately nowadays, the discomfort can be avoided by a little thought and experiment.

Firstly, it's necessary to give careful consideration to the **type** of key required. The next question to be settled relates to the working position in which the key is to be used, the height relationships of the working and seating surfaces.

With a high table and low chair, there'll be difficulties in obtaining a comfortable and natural operating position. This is because the forearm will be forced into an upward angle.

If a key whose knob is several inches above the working surface is selected, the problem worsens. A low flat key would be better. Alternatively, you could position the key at a lower level.

The opposite situation of the high chair and low table is less constraining. Here, the arm will be able to hang naturally from the shoulder - the ideal - and so avoid strain.

The Grip

Secondly, we've to consider the 'grip'. But does it matter how we 'grip' the key? In the final analysis any 'grip' which allows the operator to produce 'good' Morse is acceptable.

The proviso is that the 'grip' is comfortable. It should allow the operator to control the mechanics of the key, and allow the sending speed to reach the desired standard.

The 'grip' used by an individual will dictate, to some extent, a third factor, the positioning of the key on the bench. But, if you are comfortable with any particular method - stick with it.

Sending Test

A loss of standard half way through the Morse sending test may be due to the candidate trying to send at a speed which they think is 12w.p.m. Perhaps due to their inexperience, they seem to pick a speed somewhat below the 12w.p.m.

The candidate can then lose their rhythm, make an error, correct it, but lose the 'flow'. Things then seem to go from bad to worse.

Many learners seem to develop a natural speed of about 14w.p.m. Wouldn't it be better for the candidate to use this natural speed? Personally, I'm sure the examiners wouldn't be stressed and would appreciate the improved sending.

An advantage of the faster speed is that there will be time for the correction of the odd error. This always happens at the end of the longest word in the passage!

Examination Tension

The Morse test is an examination and there will be some tension in the situation. Despite this, there should be no need for the reports of terror and jangled nerves so frequently talked about by learners.

The psychological symptoms betray a lack of confidence on the part of the student. Confidence can be developed by the B class amateur, by actually using Morse **on the air**, for example on 144MHz.

A successful examination will be easier for anyone preparing for the new style Morse test, particularly if they take the opportunity to practice by having QSOs on air. This is because they'll know how to conduct themselves, unlike those who took the old style test!

Instead of you sending practice Morse to a friend and them sending likewise, you can carry on a conversation. It will be hilarious at first as you get used to 'sending from the head', but as in all things connected with Morse, all it requires is practice.

Examiners Talk

Why don't you invite the local examiner(s), to give a talk about the test? You'll see that they're not really monsters!

The examiners are normal human beings who really want candidates to pass if at all possible. There's another advantage in meeting them before hand, because the appearance of a familiar face in the examination room must help.

New Format

With the new format test, it will still be necessary to send plain language and plain number passages in order that candidates may learn the characters. They'll also have to formulate QSO style pieces ready for the new test.

The new format test specifies the number of letters and figures in a passage. So, there's a possibility that the receive passage will conform to a rather stereotyped format which should make it easier for the candidates.

Because of the new Morse test format, the candidate should have little fear of having a real live QSO once they're on air. The new test should also be easier as it's **(a)** related to the real world of Morse communication, and **(b)** shorter than the old test but with the same number of permitted errors.

Final Thoughts

I'll finish with two final thoughts. Although many candidates learn Morse in isolation, it really helps if you have a class or group where the various ideas and problems can be discussed.

The final thought is that the Morse test could perhaps be the easiest examination in the world to prepare for. You only need to know 26 letters and 10 digits!

My thanks go to my fellow examiners - G3DXZ, G3XTL, G3ZVG, G0FOG and G0IXR for many stimulating discussions, help and advice, the candidates themselves and the students in my Morse class which led to this article being prepared. **PW**

Feature

Defending the Electronic Keyer

John Worthington GW3COI, takes time off from his PW cartoonist's drawing board to defend the electronic Morse keyer in his own irreverent way!

The affliction known as 'brass arm'.

Over the last few years I've observed the growing lobby of hand Morse key enthusiasts. In a way, it's the same as the parties of climbers who tackle mount Everest without oxygen. I see the similarity because for the most part, manual key advocates insist that true Morse can only be sent on a hand key, and that the best c.w. is heard only that way.

The hand Morse key lobby will go on to say that what's heard from the majority of automatic keyers is mainly rubbish. And they'll say this is because the 'bug' keyer operator will try to send too quickly, and mistakes form 90% of transmissions.

Well, readers should know where I stand on this very grave matter. To this end, I would say briefly that since five years of enforced manual keying in the RAF, I've seldom used a hand key, unless nothing else is available.

Simple Comfort

My reason for using electronic keyers, is the simple one of comfort. Even when I used a hand key daily, I was never able to eliminate the affliction known as brass arm - a very tiresome ache in the forearm and elbow-region.

I envied the apparent ease displayed by some operators. They could flail away on a hand key without any signs of discomfort.

Of course, it may well be that these very chaps, some of whom must be even older than me and therefore approaching Royal Telegram time, are the ones who actually started the **S**taunch **HA**nd **K**ey **S**ociety (known as Shacks).

Fair To Middling

So, having declared my interest I must go on to say that my own c.w. on a hand key is fair to middling when I'm fresh. Unfortunately, it rapidly deteriorates into extremely hard to read Morse!

"I do most of my c.w. operating from a deep armchair".

On the other hand, my sending on a keyer is not really any better. **But I can keep it up for a good time**, owing to the lack of physical strength required.

What gets my goat about these self-righteous 'manual bashers', is their insistence that only their methods can produce the perfect copy. This is plainly not so, if a reasonably lengthy study is made of the bands and some research is done.

On collating the research information later, it will be seen that bad Morse is fairly evenly widespread. But in my experience it is generally a clear victory for electronic keyers in the matter of good clear readable c.w.

In My Opinion

On the other hand, in my opinion, it will be seen that a high proportion of hand keyed Morse will not be as easy to read. Yes, I do realise that badly 'bugged' Morse is just as easy to come across, but the culprit is not likely to be a dogmatic preacher on keying habits.

From time to time, designs for electronic keyers will appear with claims that 'bad Morse is impossible with this one'. But until the day that the ultimate keyer is produced, it will still be possible to send bad Morse.

I know that modern keyboard Morse senders will come close to the ideal. Despite this, the operator still has to insert the space manually and anyway, I think that keyboard senders are part of the RTTY concept.

Magnificent Model

A close friend of mine used to send awful copy on his magnificent brassbound Navy hand key. And when he made one of the first generation of electronic keyers (designed by OZ7BO) he was soon sending awful Morse with that too!

So, the moral is plain to see. You can be a baddie whether your weapon is a wooden truncheon or an Exocet missile!

The modern generation of electronic keyers is the best thing that has ever happened to my c.w. For example, I do most of my operating from a deep armchair with the key across my lap.

The keyer is also quite happy in a vertical position with its rear end on the floor. Or even under the bedclothes for a spot of nocturnal DXing!

Slow Morse

Another winning feature of the modern electronic keyer is its ability to send really slow Morse. This is very handy when instructing would-be operators.

It's so easy to sit down for half an hour and use the electronic keyer, whereas a hand key demands sacrifices of strength, nerve, patience and stoicism. You need stoicism for the pains that arise from holding your arm in the 'busted collar, bone position' for long stretches!

If there's a contest on this weekend, especially and solely for hand key users, it will be very interesting to listen and find out whether the general level of excellence is any higher than usual! **PW**

THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

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BE SEDUCED BY ITS PERFORMANCE.

If someone can make a dual-band transceiver as small and feature-packed as this, who cares about its looks?

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We'll tell you who cares Kenwood cares.

Which is why the TH78E isn't just the neatest dual-band transceiver you can buy, it's also the best designed. Right down to thoughtful touches like the sliding keypad cover.

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Kenwood TH78E is part of a range of hand portables from £240 to £430.

KENWOOD

HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

MTR1 Morse Tutor

Clive Hardy G4SLU has built and tested two kits, produced by a new manufacturer to help you learn Morse, and judging by his comments, he enjoyed the projects.

Review

I was very keen to take up the Editor's latest challenge, and build a special Morse code training aid. In fact, the Morse Tutor with replay kit, is the first product from a new manufacturer, Brian Jordan G4EWJ.

When built on its single-sided 79 x 99mm p.c.b., the completed kit sends Morse in 5-letter, 5-number, or mixed five letters and numbers groups. It sends at speeds from five to 36 words per minute.

The groups are sent in blocks of ten, with randomly selected characters. Each block can then be replayed at the push of a button. One push on a button generates another block.

When you're ready for sending, the project will record and play back about 90 seconds (at 12 words per minute) of Morse input by the operator. It also acts as a Morse practice oscillator.

The pitch of the unit's audio tone can be varied. The operator can also adjust the volume and the delay between the characters generated by the tutor.

Display And Dictionary

There's also a display and dictionary p.c.b. This is an add-on unit for the Morse tutor with replay kit. It's built on the same size board, and is attached more or less vertically to the rear of the tutor kit board.

With the extra display board fitted the, replay options are extended and two extra facilities are added. The character being replayed can then either be heard in the usual way, or seen on a red l.e.d. matrix display.

The visual option does not apply to Morse input by the operator. There's also a dictionary containing 5000 words which can be accessed randomly in blocks of ten words, and 150 passages of text similar to the new QSO type Morse test.

The Jordan kits are supplied in large clearly labelled polythene bags. And, each type and value of component was in a separately labelled, smaller polythene bag.

One item that caught my eye was a lead bending tool. It was just a small piece of perforated board for bending the leads of the diodes and resistors.

The lead-bending tool was simple but very effective. A nice touch to include it in the kit. I was already looking forward to starting construction!

Clear And Informative

The instructions were very clear and informative. Each stage is given a letter of the alphabet starting, naturally, with the letter A.

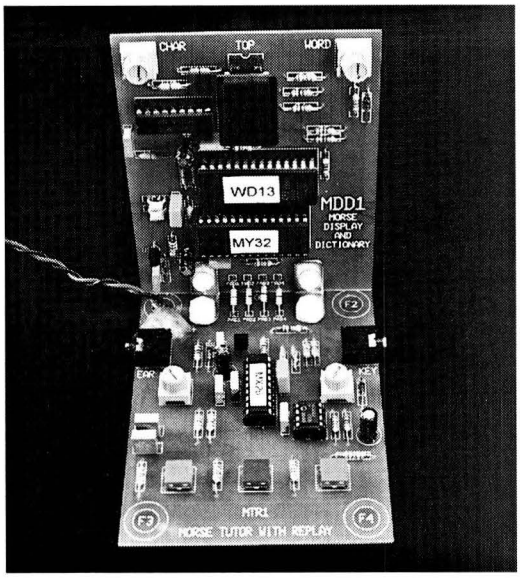
The components required for each stage are in the polythene bag labelled with the appropriate letter of the alphabet. The label also lists what's in the bag and the component numbers.

The boards are a good quality item and are screen printed on the upper side with the component layout and numbers. There's also a copy of the layout together with a description of the various components included in the kit.

Following the instructions closely, it took me a little over an hour to build each kit, and they both worked first time. Everything fitted the boards well, the holes in the boards being very accurately drilled.

So exact are the holes, that the polyester capacitors must be offered to the board absolutely square. If this isn't done correctly, both leads will not align with the holes.

I also found that the leads of the three push-buttons had to be straightened from their original kinked state



The completed MTR1 Morse tutor kit and MDD1 display kit built by Clive Hardy G4SLU.

before they would easily fit onto the board. However, those are my only two comments on, rather than criticisms of the kits.

The only tools required are a soldering iron, solder, a pair of small wire cutters, and a multimeter to check the 5V supply to the i.c.s. There are two i.c.s on the tutor board and three on the display board.

When you're building the kits, a pair of small pliers will help. These can be used when you're fitting the links between the two boards as this can be fiddley.

You'll also need a 9V PP3 battery and headphones (the Walkman type are perfect). Finally, a Morse key fitted with a 3.5mm jack is required for sending practice.

When it comes to fixing the battery, it can be attached to the tutor board with a supplied piece of double-sided tape. However, I preferred to anchor the battery to the board with a couple of cable ties.

Finally on the battery topic - don't do as I did and leave the battery connected when not in use because it won't last long, and I quickly opted for an a.c. adaptor.

Various Options

The various operating options are selected by means of push-buttons. The volume and delay are adjusted by means of small potentiometers on the tutor board.

Two similar potentiometers on the display board control how long each character is displayed and the delay between groups or words. It didn't take me long to learn which buttons to press for each function.

Summing Up

In summing up, I remember using a sound-only tutor to good effect, but it didn't have any of the features of the MDD1 or the replay facility of the MTR1. As a means of checking on sending ability it is very handy. The display option will be particularly helpful for students in the early stages of learning Morse.

I thoroughly enjoyed building and using the kits, which are well produced with excellent instructions, and should be within the capabilities of the novice constructor (there's a help-line if you run ito problems). The end product is easy to operate and a useful aid to the budding A class licencee.

My thanks go to Brian Jordan G4EWJ of 42 Ben Nevis Road, Birkenhead, Wirral, Merseyside L42 6QY, tel: 051-643-8506, for supplying the review kits which are available direct from him at £29.95 including p&p for the MTR1 tutor kit, and £34.95 inc. p&p for the MDD1 Display kit. **PW**

THE THREE POINTS OF THE KENWOOD TRIANGLE REPRESENT ADVANCED TECHNOLOGY, QUALITY AND STYLE

KENWOOD APPROVED DEALERS

AXMINSTER
Reg Ward & Co, 1 Western Parade, West Street, Axminster, Devon. Tel: 0297 34918

BELFAST
GM Electronics, 1-3 Evelyn Avenue, Belfast, Northern Ireland. Tel: 0232 471295

BIRMINGHAM
South Midlands Communications, 504 Alum Rock Road, Alum Rock, Birmingham. Tel: 021 327 1497

BIRMINGHAM
Ward Electronics, 422 Bromford Lane, Ward End, Birmingham. Tel: 021 328 6070

BOURNEMOUTH
Lowe Electronics, 27 Gillam Road, Northbourne, Bournemouth. Tel: 0202 577760

BRISTOL
Lowe Electronics, 79 Gloucester Road, Patchway, Bristol. Tel: 0272 771770

BRISTOL
AMDAT, 4 Northville Road, Northville Bristol. Tel: 0272 699352

CAMBRIDGE
Lowe Electronics, 162 High Street, Chesterton, Cambridge. Tel: 0223 311230

CARDIFF
PMR Ltd, Industrial Estate, Gwaelod-y-Garth, Cardiff. Tel: 0222 810999

CLACTON ON SEA
Coastal Communications, 19 Cambridge Road, Clacton on Sea, Essex. Tel: 0255 474292

CORK
Intronic Ltd, Windsor Hall, Glounthaune, Cork, Eire. Tel: 010 353 2135 4422

COUNTY TYRONE
Tyrone Amateur Electronics, 44 High Street, Omagh, Co Tyrone, Northern Ireland. Tel: 0662 242043

CUMBERNAULD
Lowe Electronics, Cumbernauld Airport Cumbernauld. Tel: 0236 721004

DONCASTER
Alan Hooker, 42 Nether Hall Road, Doncaster, South Yorkshire. Tel: 0302 325690

EALING
Martin Lynch, 286 Northfield Avenue Ealing, London. Tel: 081 566 1120

EASTCOTE
Lowe Electronics, 223 Field End Road, Eastcote, Middx. Tel: 081 429 3256

EDGWARE
Haydon Communications, 132 High Street, Edgware, Middx. Tel: 081 951 5782

FIFE
Jaycee Electronics, 20 Woodside Way, Glenrothes, Fife. Tel: 0592 756962

HANGER LANE
A R E, 6 Royal Parade, Hanger Lane, London. Tel: 081 997 4476

HAYWARDS HEATH
Bredhurst Electronics, High Street, Handcross, Haywards Heath, West Sussex. Tel: 0444 400786

HOCKLEY
Waters & Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex Tel: 0702 206835

LEEDS
South Midlands Communications, Nowell Lane Ind Est, Nowell Lane, Leeds. Tel: 0532 350606

LEEDS
Lowe Electronics, 34 New Briggate, Leeds. Tel: 0532 452657

MAIDSTONE
Lowe Electronics, Chatham Road,

Sandling, Maidstone. Tel: 0622 692773

MATLOCK
Lowe Electronics, Chesterfield Road, Matlock, Derbyshire. Tel: 0629 580800

NEWCASTLE
Lowe Electronics, Newcastle Airport, Woolsington, Newcastle. Tel: 0661 860418

NEWPORT PAGNELL
Photo Acoustics Ltd, 58 High Street, Newport Pagnell, Bucks. Tel: 0908 610625

NEWTON LE WILLOWS
Amateur Radio Comms Ltd, 38 Bridge Street, Earlestown, Newton Le Willows Merseyside. Tel: 0925 229881

NORFOLK
Eastern Communications, Cavendish House, Happisburgh, Norfolk. Tel: 0692 650077

NORTH HUMBERSIDE
Peter Rodmell Communications, Field Head House, Leconfield, North Humberside. Tel: 0964 550921

NOTTINGHAM
R A S Nottingham, 3 Farndon Green, Wollaton Park, Nottingham. Tel: 0602 280267

PORTSMOUTH
Nevada, 189 London Road, Portsmouth Hants. Tel: 0705 662145

SLOUGH
Lowe Electronics, London Heathrow, 6 Cherwell Close, Langley, Slough, Berks. Tel: 0753 545255

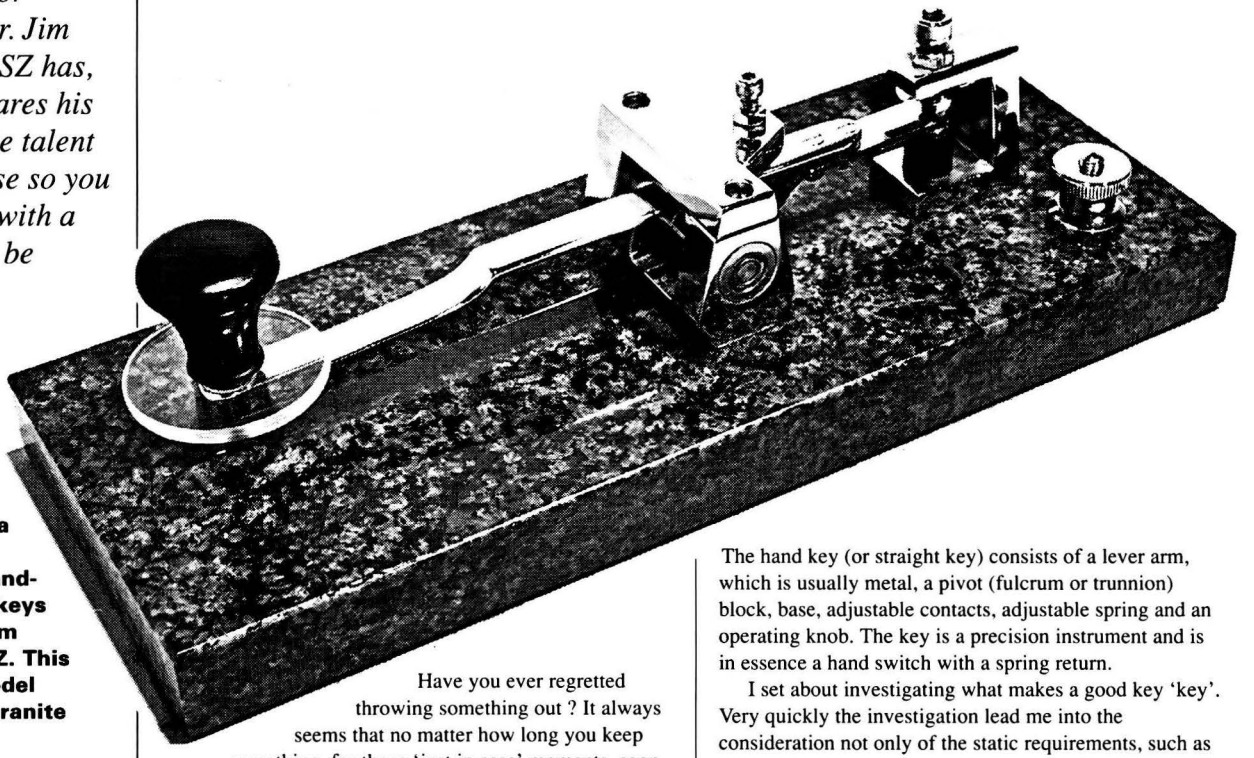
STOURBRIDGE
Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands. Tel: 0384 390063

KENWOOD

HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

Making Traditional Morse Keys Part 1

Have you ever thought of making a quality hand-built Morse key for yourself? Dr. Jim Lycett G0MSZ has, and now shares his considerable talent and expertise so you can end up with a hand key to be proud of.



The latest in a long line of traditional hand-made Morse keys built by Dr Jim Lycett G0MSZ. This particular model stands on a granite base.

Have you ever regretted throwing something out ? It always seems that no matter how long you keep something, for those 'just in case' moments, soon after you get rid of it, you find you need it.

The one time which remains with me, with sorrow and regret, is the time I discarded numerous rough brass castings and their wooden patterns - you've guessed it, of Morse keys. This happened when we decided to close the family business of electrical rewinders in the late 1970s.

From early childhood days I can recall the foundry bin with castings of arms, trunnions etc, and I even remember attempting to assemble a key from the miriad of bits and pieces in my early teens.

A few years ago, I found an interest in amateur radio, and these memories came flooding back. This article is offered as an introduction to key design for the home constructor.

Machining has been kept to a minimum, so the designs offered here can be made using hand tools. But first a little of the theory!

The hand key (or straight key) consists of a lever arm, which is usually metal, a pivot (fulcrum or trunnion) block, base, adjustable contacts, adjustable spring and an operating knob. The key is a precision instrument and is in essence a hand switch with a spring return.

I set about investigating what makes a good key 'key'. Very quickly the investigation lead me into the consideration not only of the static requirements, such as geometric size and weight, but also the dynamic requirements of the key.

The Requirements

Let's firstly take a look at the static requirements of the key. A universal key layout was produced to record important dimensions of several popular keys this is shown in **Fig. 1**. The front of the key being defined as the knob end, and **Table 1**, tabulates the dimensions of the keys examined.

The ratio of arm length (L) to contact positions (L:F and L:B), and the ratio arm length to spring distance (L:S) form useful guides to the statics of the key. These are summarised in **Table 2**. The analysis of the ratios L:F and L:S reveal the relative merits in terms of hand movement, keying pressure and spring tension (compression).

Next, the ratio L:F effectively determines contact pressure and keying movement. High values indicate a high mechanical advantage, and hence a contact pressure L/F times that of the keying pressure.

The gap is set by adjusting either the front or back contact height, and hence the hand movement. The ratio L:S gives the spring tension advantage.

High values of L:S mean stronger springs are needed, and thus they're more difficult to finely adjust. Trade-offs exist between hand movement and contact pressure, and thus an optimum must be sought as it significantly effects the feel of a key.

Table 1: Dimensions of Popular Morse Keys

Make	L	F	B	S	material	bearings
High Inertia Keys						
Kent	90	37	43	20b	brass	b.race
G4ZPY	90	50	40	40b	brass	bush
HK703	90	32	32	19b	brass	4 ball
1056A	76	38	32	15b	brass	T.pin
GW	125	45	32	18f	brass	pin
Admiralty Keys						
8558	100	65	65	30u	brass	spring
AP7681	45	45	45	20b	brass	point
WWII Army Keys						
WT No2	67	29	25	15f	brass	p.pin
WT No3	67	25	29	15f	brass	p.pin
Low Inertia Keys						
Junker	83	32	28	17f	steel	point
J-41	79	35	30	19f	brass	point
RS	79	35	22	22f	steel	4 ball
9618	43	43	27	15c	steel	spring

Low Inertia

The well-known Second World War American J-41 low profile (McElroy style key), and the Junkers type fall into the low inertia category of key. This is because their key arms are formed from pressed sheet metal approximately 3mm thick.

At the other extreme (when it comes to arm section) we have the high inertia keys constructed from solid bar stock material (such as the British-made Kent key) or metal castings (as in the Post Office PO 1056A type). Incidentally, it's said that keying speeds of up to 45 words per minute are possible with high inertia keys.

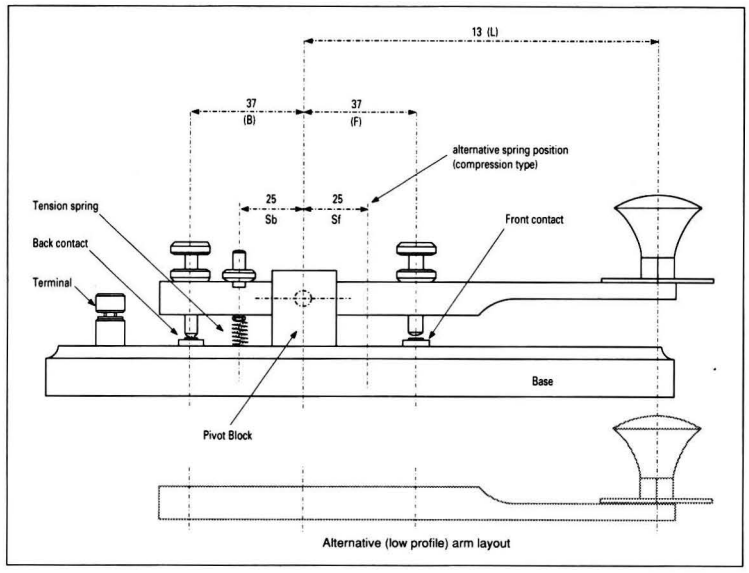


Fig. 1: The 'universal' Morse key layout developed by G0MSZ from his studies of many different types and individual styles of keys (see text and Table 1).

Simplest Key

Possibly the simplest type of Morse key, consists of a flat flexible metal strip which bends and touches the fixed stud contact when keyed. The relatively modern ex-Army thigh key of 1978 is similar in principle to this basic key.

Without doubt the Admiralty key displays the most advanced state of the art in spring suspension. It's a beautiful key to use. The diagram, **Fig. 2** shows the typical arrangement and principle involved in this key.

Samuel Morse first used a tablet consisting of metal sections arranged to form the code for the individual characters. A metal stylus was drawn across the tablet, completing the electrical circuit as it contacted the metal sections.

The hand key started to evolve when operators of the stylus realised they could beat out the code without the predefined patterns of the tablet. But another contact on the key was needed, as single current working of the telegraph system required a 'make' and a 'break' contact as well.

It's interesting to note that nearly all modern keys still maintain the evolutionary design of the 'front' and back' contact. Although nowadays the back contact is used only as a stop.

Three major concepts in key design can be identified. Firstly, there's the low inertia keys favoured by American 'speed' keyers (this style is reflected in some modern bug key designs such as the Bencher).

Secondly, there's the high inertia key, popular in Britain, and used by the Post Office and armed forces. Finally, there's the spring suspension type used by the maritime operators.

Predominate Feature

The lever arm is the most predominant feature of a straight (hand) key, providing both style and character. A long arm generates the impression of smoothness and purpose associated with a thoroughbred race horse.

A short key arm may be compared to the agility of a pony, and **Fig. 3** shows a number of popular styles of arm. The choice is yours!

In considering the basics, I've found that by maintaining symmetry about the fulcrum (pivot point) for the front and back contacts, the rest of the design falls neatly into place. So, with this simple criteria laid down, let's consider the position of the knob.

The earlier analysis showed that the ratio L:F determined both the hand movement for a given contact gap, and contact pressure for a given hand keying force. I found that values of L:F in the range

Make	L:F	L:B	L:S
Kent	2.43	2.09	4.5
G4ZPY	1.87	2.25	2.25
HK-703	2.81	2.81	4.74
1056A	2.00	2.37	5.07
GW	2.78	3.91	6.94
8558	1.54	1.54	3.33
AP7681	1.00	1.00	2.25
WT No2	2.31	2.68	4.47
WT No3	2.68	2.31	4.47
Junker	2.59	2.96	5.53
J-41	2.26	2.63	4.16
RS	2.26	3.59	3.59
9618	1.00	1.60	2.86

Table 2: Ratio of dimensions

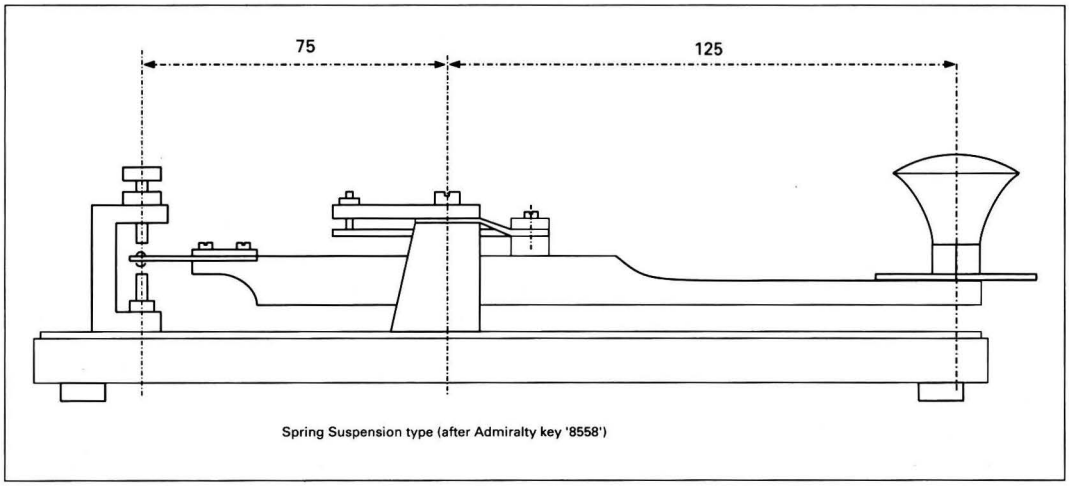


Fig. 2: The well-known Admiralty type Morse key (see text).

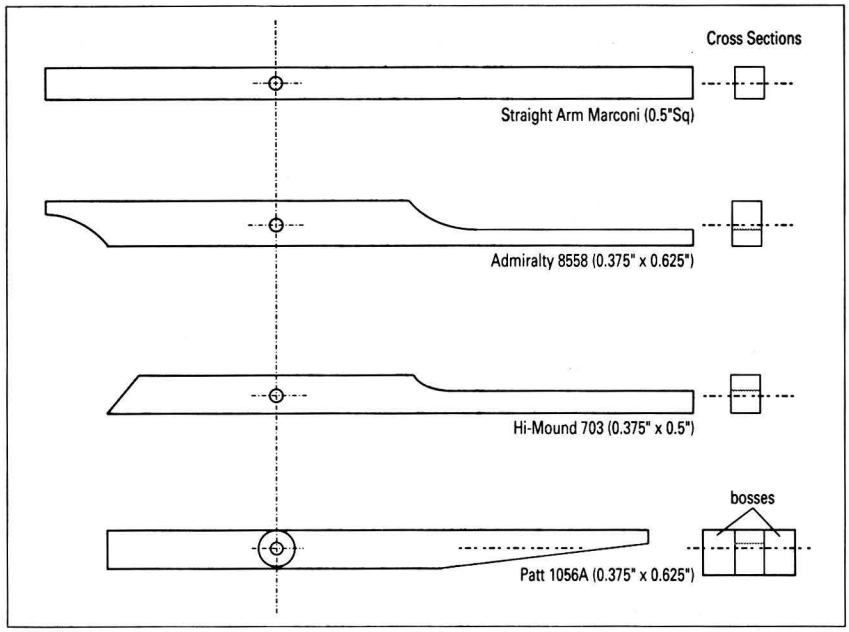


Fig. 3: Illustration showing a number of different popular styles for key arms (see text).

2:1 to 3:1 produced a good positive feel to the key, whilst with values approaching 1:1 it became difficult to key quickly.

You'll appreciate that the guidelines I've mentioned are highly subjective. But they're included for you information and assistance.

The Design

The design, arrived at by computer simulation, gives an aesthetic and practical optimum for the value of L:F as 2.84. This means that if you want an arm approximately 200mm long, then L= 125, F= 45, B= 45, or for a (254mm) long arm then L=165, F= 58, B= 58.

The arm, following the Marconi style of key, is 0.5 in square brass, which is readily obtainable through material stockists (see supplier list in the next part). The whole design can also be scaled down to use 3/8in square material or the metric equivalent. ***(Editorial note: To try and avoid confusion, we have minimised conversions from metric to imperial and vice versa as much as possible. The imperial dimensions have been kept where these appear to be standard stock sizes).***

If however, the reduced section is used, I would strongly suggest bearing bosses be sweated onto each side of the bar. This increases the arm width.

The maximum bar length for the smaller section should not exceed 125mm, otherwise noticeable flexing will occur. Selecting a rectangular section of say 0.375 wide x 0.5 inch deep makes a practical alternative to 0.5in square section.

A suitable arm length for the larger section is 200mm. This is is a little longer than the present generation of excellent straight keys available to the radio amateur, and falls well into the old professional key length.

Next, carefully mark out the holes for the adjusters (front and back contact, and spring), pin locking screw and knob stud, on the top of the arm along the longitudinal centre line. It's **essential that the hole for the bearing pin is perpendicular to the side of the arm**. If it's not, the finished key will be askew and not very nice to look at.

Personal Preference

When building the key, use your personal preference in selecting the style of spring adjuster and its location 'fore' or 'aft' of the pivot. Threaded holes must be drilled with the correct tapping drill size. For a 2BA thread, a drill size of 4.4mm is needed.

The next job is drilling and tapping (threading) the holes. Then the arm may be shaped to your choice using a hacksaw and file.

When you're shaping the arm, you can remove large amounts of brass and finish off by filing. Don't forget to put a small radius on all sharp edges.

Finally this month, I'll leave you with a word of warning. Be selective in the amount of material you remove, staying well clear of the pivot and adjuster holes.

In part 2, I'll describe the making of the pivot block, the adjusters, contacts and the base details. In next to no time, you'll soon have a good-looking key to encourage **you** to venture onto c.w. once again! **PW**

Summary of Abbreviations

Suffix after figures in S column

b	- spring position back of key
f	- spring position front of key
c	- cantilever construction
u	- spring suspension (no bearings)
b.race	- sealed ball bearing race and pin
bush	- self lubricating bush and pin
4 ball	- 4 balls in cup bearing
P.pin	- parallel pin bearing
point	- pointed pin and cup bearing
T.pin	- taper pin bearing

Keys Examined

1056a	- Post Office Key (single current Morse key
8558	- admiralty key 5805-99-580-8558
9618	- military key (knee strap) 5805-99-949-9618
AP 7681	- admiralty key pattern 7681 - Goodburn
GW	- GW Morse Keys
G4ZPY	- Marconi style key, by G4ZPY Paddle Keys
HK703	- Hi-Mound hand key HK703
J-41	- US Army Telegraph Set TG-5-B,
Junker	- German naval key
Kent	- Solid Brass Key, by R A Kent (Engineers)
RS	- Radio Shack (Tandy) Morse Key
WT No2 and 3	- military keys WT 8amp No2 and 3 (various MKs) c1940 after Whitely W.B 8amp Morse key introduced 1938,

SHOWCASE

Once again as we have a Morse 'theme', the PW team takes another opportunity to present a guide to help you find and choose equipment to learn, practice, read, use and enjoy the c.w. mode to the best advantage.

This showcase displays equipment ranging from the basic mechanical to the most sophisticated electronic transmission and reception aids. You are all catered for, whether you want to just bash away on the hand key or use a keyboard or electronic key.

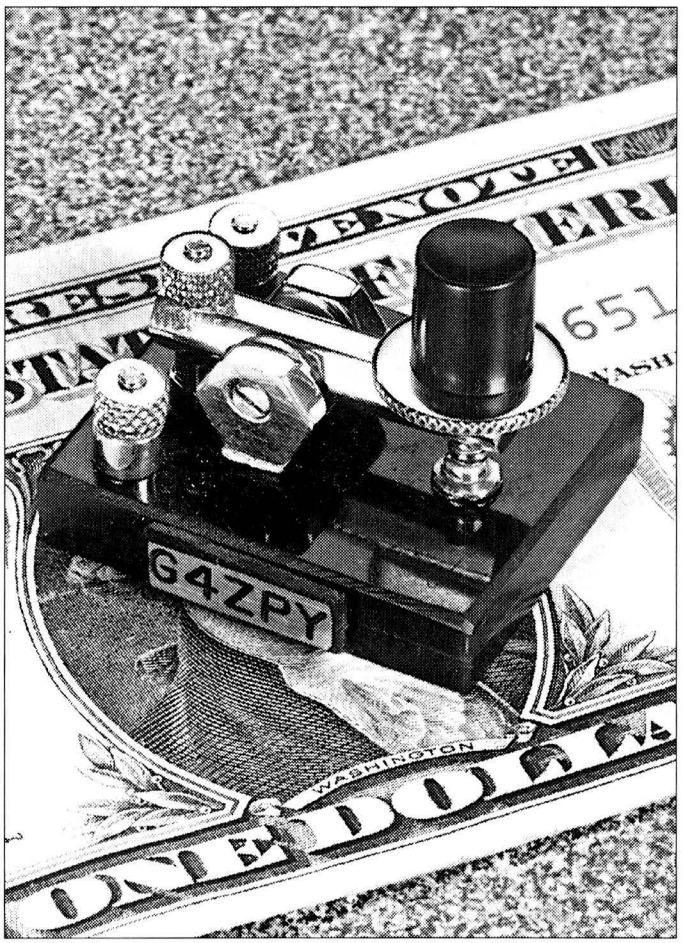
So, enough chatting, let's open the 1993 showcase.

Basic Keys And Keyers

If you're interested in traditional sending, there's everything available, from the very basic hand keys to superbly hand-crafted brass keys. If you're keen to try other ideas, there's everything from simple electronic keyers to the formidable-looking electronic keyer that looks like it doesn't need you.

Coltec Electronics

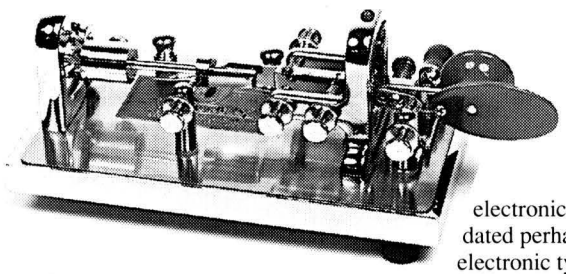
Although they may not be very familiar to *PW* readers, anyone who is a regular rally-goer will have already met this company. Based in Birmingham, Coltec Electronics attend many rallies, and they are yet another British-based organisation producing budget-priced kits for the amateur radio market. Of particular interest for c.w. enthusiasts is their CT122IK iambic keyer, which Coltec claim will key all rigs. They also state they're prepared to do 'one off' projects if you need something special. For further details and prices contact the company at **330 Brays Road, Sheldon, Birmingham B26 2PS. Tel: 021-722 2429**.



***G4ZPY Paddle Keys International**. Gordon Crowhurst is the well-known moustache under the 'G4ZPY Paddle Keys' sign and you'll find him at many rallies. Gordon produces a distinctive range of standard hand and paddle Morse keys, finished to a high standard. One key is produced in kit form.*

All the keys have a good firm action, although Rob Mannion G3XFD feels that the model with the heavy base made from lakeland stone was the most popular key.

*For further details of their full range of products contact them at: **41 Mill Dam Lane, Burscough, Ormskirk, Lancashire L40 7TG. Tel: (0704) 894299**.*

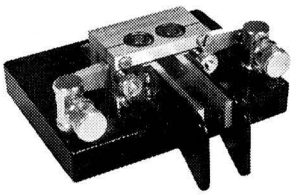


Eastern Communications are importers of the Vibroplex range of traditional bug keys. These keys use a mechanical action to smooth out the timing of the dot action, the dash time is still up to the operator. In these days of complex electronics a little dated perhaps, but the electronic type doesn't look as nice as a chrome plated Vibroplex key on the shack bench. For more information about these keys and other items contact them at: **Cavendish House, Happisburgh, Norfolk NR12 0RU. Tel: (0692) 650077**

Kanga Products. Well-known to members of the G-QRP Club, their products are aimed at the low-power operating fraternity. Based in Kent, Kanga produce a variety of c.w. transmitters, receivers and accessories in kit form. Of particular interest to the c.w. enthusiast is their budget-priced iambic keyer kit. For further details of the keyer kit and the full range of products (free catalogue) contact: Kanga Products at: **Seaview House, Crete Road East, Folkestone, CT18 7EG. Tel/FAX: (0303) 891106 (mobile) (0860) 363915.**

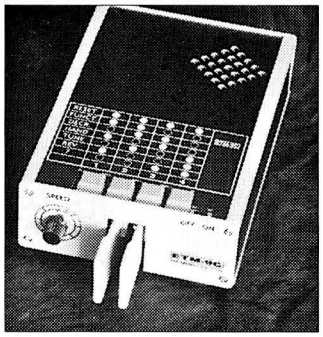
Kent Keys. Produced by Bob Kent's company based in Preston Lancashire, these Morse keys are hand-made and finished to a high standard. Bob produces a wide variety of keys, with kit options available on various models if you fancy building one yourself. For those people who can't get on with iambic paddle keys, this company also produce a neat little single paddle side-to-side key. Their latest electronic keyer comes with a superb small double paddle key.

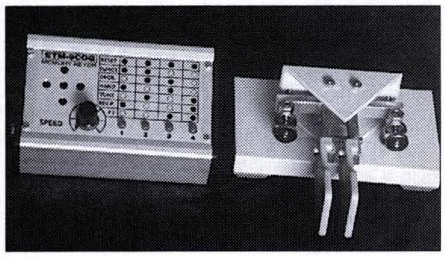
For further details and information on their products, contact them at: **243 Carr Lane, Tarleton, Preston, Lancashire PR4 6YB. Tel: (0772) 814998), FAX: (0772) 815437**.



Samson Keys have been produced for the last 26 years by Herman Samson DJ2BW from his works in Germany. The product information guide claims that the keyers are in use all over the world and at many coastal stations. They include the well-known ETM/SQ twin-paddle key. The Samson ETM-9C electronic keyer, with built-in twin paddle keys, is claimed to be particularly easy to operate, and their other model, the Samson ETM-9COG keyer is designed for use with external twin-paddle keys.

Contact address at the top of page 34.





Full **Samson Keys** product details, information and prices of the keys and keyers etc., are available from the sole UK Agent:

F. H. Watts G5BM, Woodland View, Birches Lane, Newent, Gloucester GL18 1DN. Tel: (0531) 820960.

S.E.M. *Based in the Isle of Man, this manufacturer produces, along with other amateur radio equipment, several items of particular interest to the c.w. enthusiast. Their range includes a twin-paddle key and the well established iambic keyer (which for versatility uses a reed relay for switching) plus the latest addition to the range, the Cosmic Keyer. For further information and product details contact* ***Mr G. P. Crapper, S.E.M., Union Mills, Isle of Man. Tel: (0624) 851277.***

Aids And Tutors

As the equipment on offer here is so varied, we've grouped everything together under the one title. After all, they are made to help you get the best out of using the Morse mode!

Comar Electronics supply a range of decoding systems designed mainly for the short wave listener. For Morse code they have PC-SWL. This program for the IBM and clones, comprises software and an interface unit that connects to the serial port of the computer. The Morse module has automatic or manual speed setting from 1 to 40 w.p.m. An on-screen indicator is included to aid tuning. There is also an adjustable c.w. filter and listening log database. For more information contact Comar at: **Unit 10, Samuel Whites Estate, Medina Road, Cowes, IoW PO31 7LP.**

Dewsbury Electronics produce an interesting range of Morse-related equipment. The Supa-Tuta has been reviewed in *PW*, and it's now well-established. The Supa-Tuta range is, as the name suggests, a teaching device. The units are portable (requiring an external 9-14V d.c at about 300mA so it will run on almost any power supply). The Supa-Tuta comes with built-in courses designed to suit all. From the total newcomer through to advanced operator. There is now a Supa-Tuta 'Plus', with a comprehensive keyer facility added to the teaching aids of the basic Supa-Tuta. Their range is comprehensive and it has recently been extended. For the latest details contact Dewsbury Electronics at **176 Lower High Street, Stourbridge, West Midlands DY8 1TG. Tel: (0384) 390063/371228, FAX: (0384) 371228.**

Enterprise Radio Applications are better known by their company's initials, ERA. Their well-established ERA 'Microreader MkII' (reviewed in an earlier *PW*) has a very effective Morse tutor built-in to it. The sending speed is fully adjustable in 2 w.p.m. steps up to 26 w.p.m. There is also a built-in sounder to provide the side-tone. This well-known unit, is designed also to decode (and display) Morse and RTTY signals . Merely connect the audio output from the receiver to the unit. Incoming signals are decoded and displayed on the built-in l.c.d. screen. The company also produce a separate RS232 display unit, so you don't have to tie up your computer while receiving. For full details on this and other products, contact ERA at: **5 Clarendon Court, Winwick Quay, Warrington WA2 8QP. Tel: (0925) 573118.**

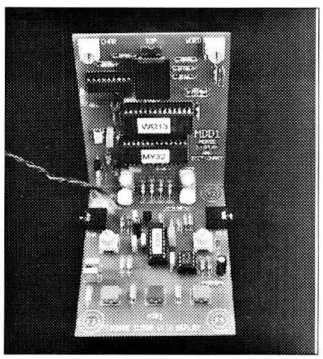
Grosvenor Software provide continuing support for the Dragon computer. A Morse tutor is available on tape that provides random sending from 8 to 99 w.p.m. Inter-character spacing can be adjusted and text can be letter or figure groups mixed and including punctuation and random words. The software packages, covering most of the popular computers, are readily available. The IBM PC is supported by the BMKMULTY package which provides any combination of up to seven decoding and transmission modes. The Morse module features fully automatic tracking of signals up to 100 w.p.m. One useful feature is the ability to detect a real Morse signal in random noise. This is particularly useful when monitoring a specific frequency for activity. **Grosvenor Software (G4BMK), 2 Beacon Close, Seaford, E. Sussex BN25 2JZ.**

ICS Electronics. This company, based in West Sussex, has tended to specialise in computer-based amateur radio and data receiving equipment for some time. Of the many products that ICS stock there are several to interest the Morse enthusiast. One of their well-established products is the AEA 'Morse Machine'. This electronic memory keyer features a multi-function electronic keyer, plus a comprehensive training mode (reviewed in *PW*). The machine also has a simulated QSO program, which is designed to help you practice a under 'real' QSO conditions. If you're really keen, you can even use the built-in simulated DX Contest program and join in or just listen in for practice! The AEA 'Morse Machine' is fully computer compatible, and it offers a host of features. For full details, prices and information on this and other products contact ICS Electronics Ltd. at: **Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD. Tel: (0903) 731101, FAX: (0903) 731105.**

J & P Electronics have a Morse program suitable for operation with a wide range of popular computers, including: Spectrum, MSX, Amstrad 464/6128, CBM64, C16, 8, +4, BBC B, Electron, Atari 400/800/XL. The program is designed to take the absolute beginner to speeds of up to 20 w.p.m. In addition to adjustable speed (6-20 w.p.m.), the sending pattern can be adjusted from single characters and numbers through to full test passages and more. The speed can also be set

Datong D70 Morse Tutor. *This famous product is well-known, among amateurs. It's a very compact portable unit that operates from an internally mounted 9V battery. The tutor can send a random selection of either letters, numbers or a mix of the two. Rotary controls on the front panel, allow speed adjustment from 6.5 through to 37 w.p.m. You can also increase the inter-character space from normal to just over 4 seconds. The side tone is supplied via an internal speaker which can also be used for sending practice. The portability of the D-70 means it can be taken anywhere. For the D70 or any of their other products, contact Datong at:* ***Clayton Wood Close, West Park, Leeds LS16 6QE.***

to give increased delay between characters. This facility helps to preserve the rhythm of the Morse. You can enter text from the keyboard - which is useful when you start to learn the stored messages. **J & P Electronics Ltd., Unit 45, Meadowmill Estate, Dixon Street, Kidderminster DY10 1HH.**



Brian Jordan G4EWJ, is a new name on the market, although he intends to become one of the bigger boys. He has started off with a rather nice Morse tutor with replay. This unit and an optional display and plain language dictionary are reviewed in this issue. For more information on these, and his planned products, Brian may be contacted (callers by appointment only please) at: **42 Ben Nevis Road, Birkenhead, L42 6QY. Tel/Fax: 051 643 8506**

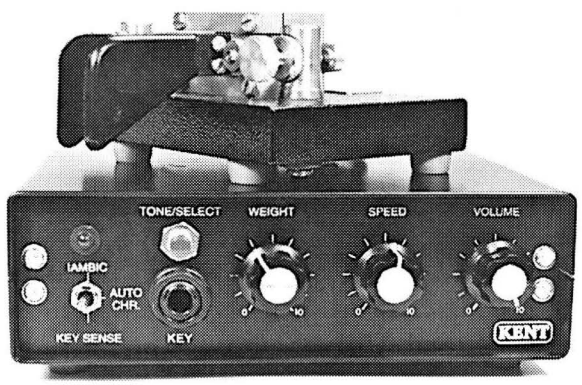
Technical Software produce versatile Morse tutor programs to run on BBC B, CBM64, Spectrum and VIC20 computers. You can gradually increase the range of characters being learned. You can also set the program to send some of the difficult characters more frequently. Plain language can be sent from the keyboard, or from one of the forty text files supplied with the program.

Another program, TX-3, as the name suggests, is aimed at the radio amateur as it includes a transmit facility. An additional bonus is the provision of RTTY and ASCII modes. The c.w. option features automatic speed tracking from 4 to over 250 wpm. This makes life very easy for the operator. All received text is held in a review store that can be directed to the screen or printer. The decoding section also includes auto-word wrap to prevent words becomming split across two lines. **Technical Software, Fron, Upper Llandwrog, Caernarfon, Gwynedd LL54 7RF.**

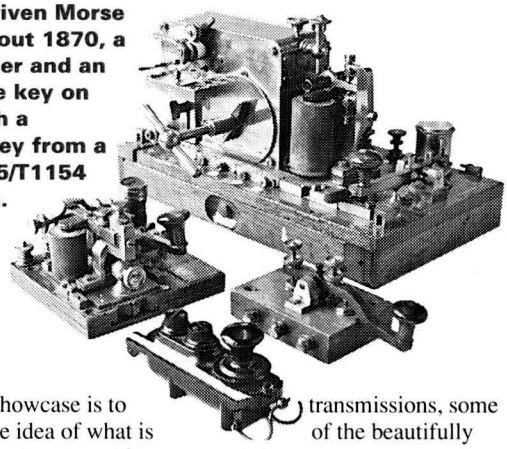
Velleman Morse Decoder Kit. An extensive range of Velleman kits, originating from Holland and Belgium, is now stocked and distributed by Maplin Electronics. Of special interest to the c.w. enthusiast, or someone who would like to learn or read Morse, is the Velleman K2659 Morse Decoder with display. This unit is self-contained and when built does not require any connection to the radio, as the received Morse is picked up by the K2659's built-in microphone. All the operator has to do is place the decoder near the radio, switch it on and watch the decoded Morse as it's displayed on the l.c.d. screen. The l.c.d. screen displays 16 characters and the manufacturers claim it will decode Morse at almost all speeds. For further details, see the Maplin Electronics catalogue (page 591) which available from W H Smith and other large newsagents, or direct from **Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (0702) 554161, FAX (0702) 553935.**

Well, the *PW* team hope that this 'showcase' will help you choose the equipment you need to enjoy c.w. mode on the bands. If nothing, it will surely show that you're not alone in wanting to enjoy and make the most of the Morse mode on the bands!

PW



Kent Keys *Along with their full range of hand-made Morse keys (address and details, provided above) Kent's produce a completely self-contained Morse receiving practice unit. The Kent Morse Tutor is a hand-sized unit, housed in a plastics case, providing a range of sending speeds, spacing, delays and volume settings. As the tutor has a built-in battery power supply and internal speaker and earphone socket, it can be used for personal practice anywhere. All controls and commands are entered in via the key-pad on the front panel. Further details from Kent's Preston address above.*



A spring driven Morse inker of about 1870, a field sounder and an early Morse key on parade with a 'Bathtub' key from a WWII R1155/T1154 installation.

This Morse Showcase is to give you some idea of what is available and where to get it from. We were given help and information by all of the suppliers, mentioned in these pages. We were also given much help and encouragement from what might be considered a rather strange direction.

Major Roger Pickard, the curator of the Royal Signals Museum at Blandford camp, is in charge of a fascinating museum of signalling.

A Day At The Museum

The Royal Signals Museum is concerned with the military history of the Royal Signals, and has many exhibits covering the many different ways of communication that have been used by the army in its various campaigns.

Among the many exhibits in the museum, is a large variety of Morse related items. Some of the exhibits date back to the first years of Morse transmissions, some of the beautifully made keys and sounders are shown in this panel.

Displayed items range, in time, from the days of the wars remembered by Corporal Jones of *Dad's Army*, to ultra-modern satellite communications.

Secret Sets

Another section of the museum has displays of the many transmitters and receivers used by the resistance movements or prisoners of war. You could gain some ideas for your next portable rig from these displays (or hide the brand-new all-singing all-dancing rig from the better half).

The museum is open between 10am and 5pm each working day. During the summer months of June to September, the museum is open at weekends between 10am and 4pm.

The museum within the Blandford Army camp in Dorset, is well worth a day's visit. Just turn up at the gate, or for more details contact the museum on Blandford Military, tel: (0258) 452581.

This beautifully crafted field sounder of about 1890 is another of the exhibits in the museum.

Simple Printer CW Interface

Ben Nock G4BXD

describes a simple interface to allow you to send Morse characters from the parallel printer port of your computer.

I have owned a variety of computers, and one of the ideas that came to mind was to transmit Morse characters from the computer. There are programs available that make the sounds of the Morse characters.

These programs can sound out the characters, but they can't control the transmitter switching. I was looking for a system to do both.

Looking at several computers, I noticed that they all had different types of controlled output lines. How could I make a system that was portable from computer to computer?

On looking deeper into the various systems, I was struck by the fact that even the cheapest computer seemed to come with a simple parallel (or Centronics) printer interface. In this type of low speed interface, a single byte (eight bits) is placed onto eight output lines. Another output line, I'll call it the 'character ready' line for clarity, is then pulsed, to signify to the printer that a character is there.

The printer then reads in the value placed on the eight lines, and signals back to the computer that it has read the character in. On receiving this printer ready signal, the computer places another character onto the eight lines and pulses the 'character ready' line again. Timing the output of the characters is dependent on the receipt of the printer ready signal.

I won't go into all of the logic to explain anymore, I'll just get down to describing how I did it. The accompanying diagram details a simple interface that can be driven from the standard Centronics parallel printer port. The interface can operate the transmit line of a transmitter and so relieve the fist bashing.

I have given the bare bones of a program, that could be written in almost any version of BASIC. The more advanced reader could rewrite the program into Pascal or C.

I have used character strings within the program to hold the station details. This idea should make the unit very useful during a contest.

The Interface

The interface shown in **Fig. 1**, in its simplest configuration, consists of a data latch and f.e.t. switching device. The data latch is an 74LS373 data device between the printer port and the switching f.e.t.

There are other outputs on the '373 i.c. which could be used to drive other lines, and I leave this up to the reader to elaborate on the circuit. A second i.c. (a 74LS122) supplies the computer with the correct signal to fool it into thinking that real printer is connected.

The transmitter switching device is a VN10 f.e.t. ,and is driven from one output of IC1. It is connected across the key terminals.

Leaving the key in circuit gives the facility of being able to 'go manual' if need be. In my set up, an Epson PC computer is coupled to a TS-430 transceiver, which has a very low voltage/current keying circuit

The Program

The program is written in GWBASIC, although a version in Pascal is now being written so that it can be compiled into a stand-alone program. I shall now describe the outlines of the GWBASIC program, and I'll tell you later how to get my most up-to-date version.

To create the Morse character, the computer builds up the character by 'key on'-pause-'key off'-pause timing, as necessary. In fact, in exactly the same way you create them. Only the dot time is variable, and all other timings are taken from this time period.

So by altering this period (DELAY) in line 1000, the overall speed of sending can be altered. The DELAY value will need to be experimentally determined for each different computer type. If the variable DELAY is varied the speed of the characters alters but not the ratio of dot to dash.

Further morse characters can be formed similarly to the program lines 200 onwards. A semicolon (;) is needed after each LPRINT commands for the timing to work correctly. We simply turn the relavant Centronics bit line on and off in the correct sequence and with the correct timing. This method, in effect, causes the morse letter to be created as usual.

I have used two sub routines, one to make a dot, and one to make a dash. The difference between the two routines is timing. As a dash is three times the length of the dot the maximum value of 'T' in the dash sub routine

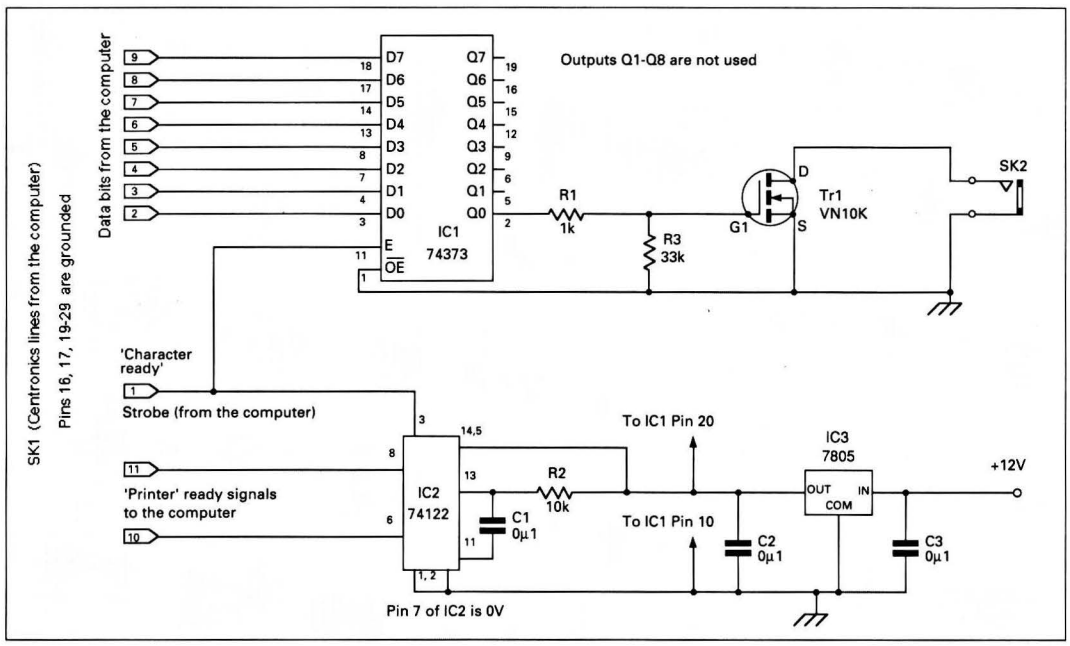
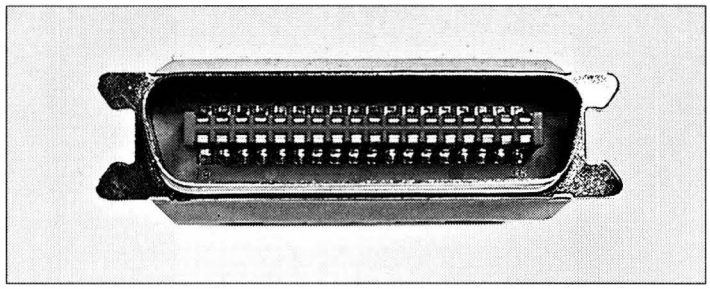


Fig. 1: This is the logical diagram of the simple interface. Output lines Q1 to Q7 are not used at present. The output Q0 is the least significant bit.



This is the Centronics plug looking onto the pins. Pin number 1 is top left, pin 18 is top right. On the bottom row, pin 19 is on the left underneath pin 1. while pin 36 is below pin 18 on the right

is three times as long as it is in the dot routine.

Lines 200 onwards are used to form each individual Morse character. Similar lines can be written for D-Z, 0-9, / & or any other character that you need. But remember to finish off with a return instruction.

The routine starting at line 100 is used to enter, from the keyboard, the text for transmission. It loops round continuously unless a 'breakout' routine is built in.

Program Halted

At this point after the program has halted after running, by jumping to the routine at line 160, (use GOTO 160 instruction) a final sign-off string of characters is sent, before the program halts again. This string of characters could be repeated data for transmission shown in line 1050. Of course you will put your details in instead of mine.

Several different message strings can be set up to give the information needed at different parts of a QSO. Then some sort of menu would be needed so that the choice of string sent could be transmitted.

A completed program and interface were used in a recent 1.8MHz c.w. contest with very good results. As most computers, of the IBM type, have built in clocks then an automated log book facility could easily be added, simply writing the time and date along with station worked to a data file on the disk.

For those of you unable to fill in the missing bits of program, I shall be glad to supply a copy of my c.w. QSO program for the IBM PC, all for the the cost of a disk and postage. **PW**

Listing One

```
1 REM  There is no need to type in anything after the 'REM command in each line
10 GOSUB 1000                          :REM Set up variables
20 REM  Various other setup options can be made in this area
..
..
90 REM to create Morse characters, type the command  GOTO 100
99 STOP
100  A$ = INKEYS                       :REM gets a character from the keyboard
110 GOSUB 200                          :REM  Output the character.
120 GOTO 100.
..
160 L = LEN (S$)                       :REM SETS STRING LENGTH
165 FOR X = 1 TO L                     :REM LOOPS AROUND THE STRING
170 A$ = MID$ (S$,X,1)                 :REM SELECTS EACH CHARACTER IN TURN
175 GOSUB 200                          :REM RUNS IT DOWN THE LIST
180 NEXT X                             :REM LOOP END
190 STOP                               :REM Stop if you get to this point
..
200 IF A$ = "A" THEN GOSUB 600: GOSUB 700
210 IF A$ = "B" THEN GOSUB 700: GOSUB 600: GOSUB 600: GOSUB 600
220 IF A$ = "C" THEN GOSUB 700: GOSUB 600: GOSUB 700: GOSUB 600
..
..IF A$ = " " THEN GOSUB 800:          :REM Delay for a space character
490 RETURN                             :REM To the calling program line(
500                                    :REM. room for your own routine in here
..
600 A = 1                              :REM This outputs a Morse DOT
610 LPRINT CHR$ (A);                   :REM turn on control bit
620 FOR T = 1 TO DELAY: NEXT T         :REM wait for a shrt time
630 A = O
640 LPRINT CHR$ (A);                   :REM turn off control bit
650 RETURN                             :REM to  callling section of the program
..
..
700 A = 1                              :REM this outputs a Morse DASH
710 LPRINT CHR$ (A);                   :REM turn on control bit
720 FOR T = 1 to 3*DELAY: NEXT T       :REM wait for three short times
730 A = O
740 LPRINT CHR$ (A);                   :REM turn off control bit
750 RETURN
..
..
800 FOR T = 1 TO 5 * DELAY             :REM Delay for a space  between words
805 NEXT T
810 RETURN
..
..
999 REM Set up variables such as DOT Period and Fixed messages (in strings )
1000 DELAY = 100                       :REM Dot period
..
..
1050  S$ = "DE G4BXD. TNX FER CALL. NAME IS BEN BEN ES QTH  IS HULL. SO BST 73 ES GD DX. 73 DE
G4BXD
1060 CQ$="CQ CQ CQ DX CQ CQ CQ DX DE G4BXD G4BXD  K"
.
..
1090 RETURN
```

Antenna Workshop - Dipping To Resonance

In this month's antenna workshop Peter Dodd G3LDO looks at antenna element and transmission line resonance, what it is and why it's so useful to be able measure it.

An inductor and capacitor connected together form a tuned circuit, with a natural resonant frequency, and is said to have 'lumped' (actual) values. At this frequency the energy storage capacity of the inductor and capacitor are equal.

An antenna element also has a resonant frequency, but in this case the inductances and capacitances are distributed along the conductor. This type of circuit is said to be a linear or distributed circuit.

Any length of wire will work as an antenna to some degree. The strength of the electromagnetic field produced by this wire will depend on the current flowing in it. This assumes that all other things are equal, such as antenna height, length and environment. Maximum field strength will only be produced if the voltage and the current are in phase.

Antenna Reactance

If the antenna has some reactance, then the power radiated will be limited by the current and voltage phase difference. If the antenna is to operate efficiently, the reactance must be tuned out and the antenna made resonant at the operating frequency.

An antenna element can be made resonant at an operating frequency by changing its length, or by connecting a tuned circuit to it. It follows that resonant antennas work over narrow bands of frequencies

An antenna does not have to be resonant to accept power. The aperiodic, or broad band antenna usually employs a resistive component to reduce the antenna reactance.

The effect of nearby objects on an antenna or on its radiation pattern can sometimes be quite dramatic. Re-radiated signals from a nearby object can enhance or degrade the signal in a particular direction. In fact, the operation of many beam antennas depends on it.

Electrical Resonance

Wires or tubing making up antennas, its supporting elements and transmission lines to and from the antenna, all have an electrical resonance at some frequency.

When the resonant frequency of a metal object, within an r.f. field, is not the same as the r.f. field, little power is absorbed. When the object is resonant with that field, power is absorbed.

The absorption principle is used in the absorption wavemeter or diode field strength meter. This comprises a calibrated tuned circuit, with a diode r.f. voltmeter to indicate relative power.

Dip Oscillator

The most useful and direct method of measuring tuned circuit or antenna element resonance is the dip oscillator. With the dip oscillator (or dip-meter) radio frequency power from a calibrated, tuneable oscillator is absorbed by a resonant circuit when the oscillator is tuned to the circuit's resonant frequency.

The dip oscillator usually has a meter to monitor the oscillator power level, that's why it's commonly known as the 'dip-meter' of course! A dip in the reading occurs as the oscillator frequency is swept through the resonant frequency of the circuit under test.

The dip-meter is no longer as popular with antenna experimenters as it used to be. Is the measurement of resonance less important these days? Personally, I think there are a couple of reasons and one of these concerns power.

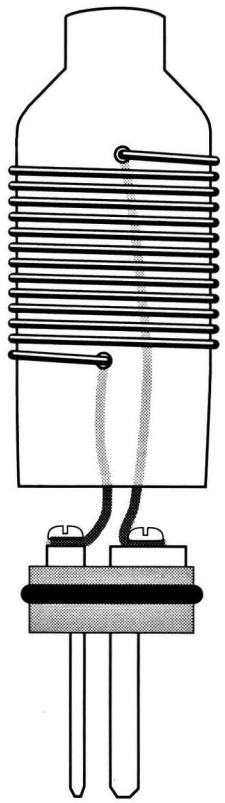
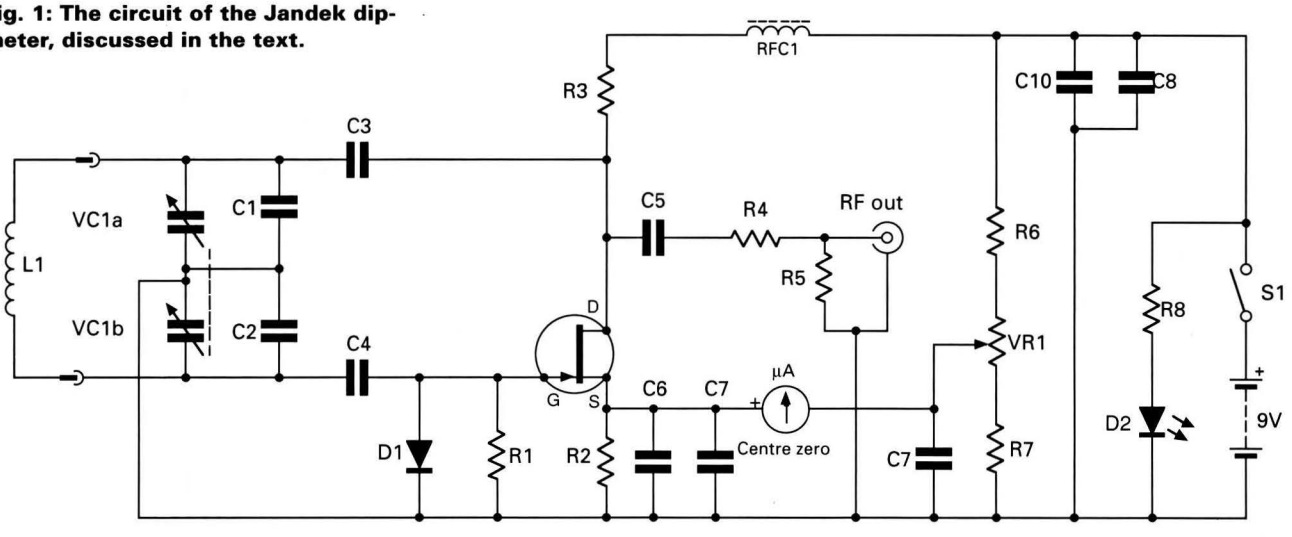


Fig.2: The coils for the g.d.o. are wound on a DIN loudspeaker plug.

Fig. 1: The circuit of the Jandek dip-meter, discussed in the text.



I've got an old valved grid dip oscillator (g.d.o.) which operates very well up into the v.h.f. band. The circuit is very primitive, and consumes some four or five watts. But it gives a much greater electromagnetic field around the coil coupling into the circuit under test. By comparison, the dip-meter described in this article uses only 30 to 40mW

Coupling a low powered oscillator with a small diameter coil into a 30mm diameter tube section of an antenna is difficult. It may explain why the dip-meter may have fallen out of favour. But improved coupling between the dip meter and the antenna element can be improved considerably. The secret is in the design of the coil.

Dip Kit

A dip meter circuit, that doesn't use a tapped coil, is shown in **Fig. 1**. It's the dip meter kit, produced by Jandek in the West Midlands.

In the Jandek kit, the coils are cleverly wound on DIN loudspeaker plugs as shown in **Fig. 2**. A selection of them can be seen in **Fig. 3**, along with the instrument.

A Colpitts oscillator, tuned by L1 and VC1a/b, has the level of oscillator power measured by monitoring the voltage on the source of Q1. This variation in voltage, as the oscillator is tuned through resonance of the circuit under test, is small compared with the total source voltage.

The resonance dip is enhanced by offsetting the meter reading using a network formed by R6, R7 and VR1. Using a centre zero meter, VR1 is set so that the meter is central when the instrument on but not coupled to a resonant circuit.

This instrument is quite sensitive. The one I use will detect my 'standard' tuned circuit at 90mm. The 'standard' circuit comprises 10 turns of 22s.w.g. enamelled copper wire wound on a short length of 40mm diameter plastics waste pipe. A 100pF capacitor is connected in parallel with the coil and it resonates at around 7.1MHz.

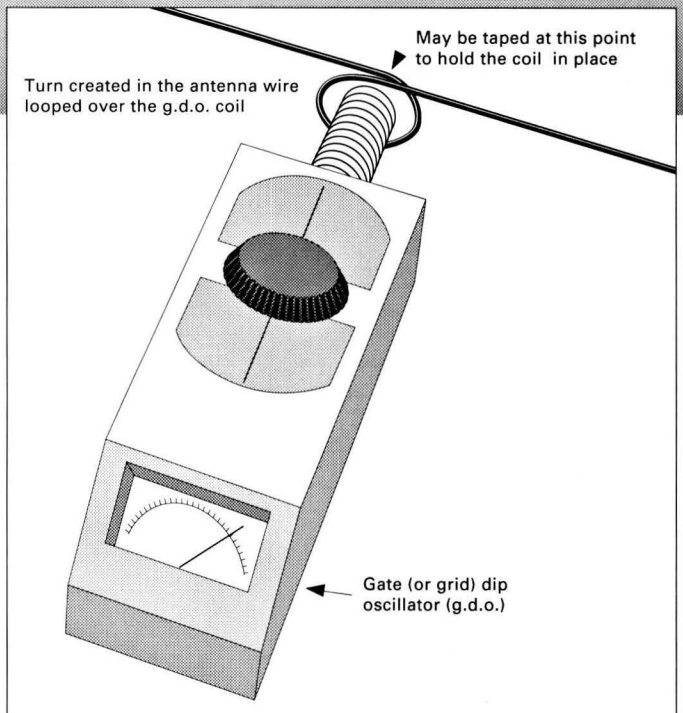


Fig. 4: To increase coupling to the antenna element, make a small loop in the antenna wire as shown.

Common Reason

Probably, the most common reason for measuring resonance is to ensure that a driven element, such as a dipole, is cut to the resonant length. Most antenna books give a formula for L of, L =143/f(MHz)m. Where L is the element length.

However, if the element is constructed from tapered sections, is bent, or is an odd-shaped loop then this formula no longer works. In this case, the direct measurement of resonance is the best way to determine the correct length.

Before you can measure resonance of an antenna element you must disconnect the feeder. If you don't do this the feeder becomes part of the resonant circuit and will give misleading readings.

If the element is split at the feed point, as a dipole, the split must be shorted out with a short length of copper wire. This joining wire can become the coupling link.

The resonance of a mobile antenna, is easier to measure. Antennas with a wide frequency range, such as loop antennas are a little more difficult. If you have problems measuring the resonance of a wire element with a dip meter then additional coupling can be achieved by forming a small loop in the wire

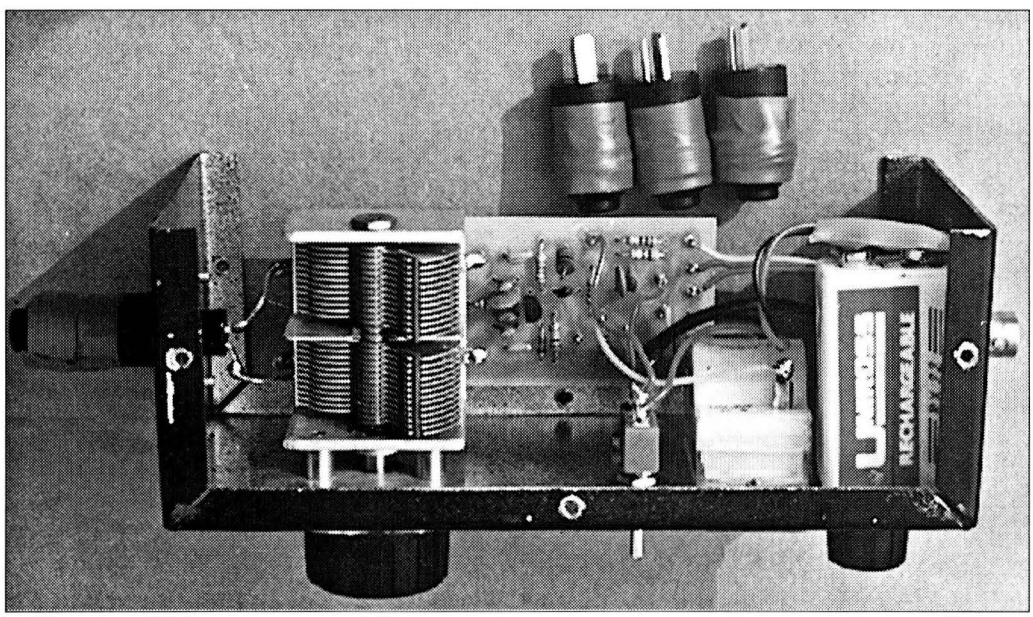


Fig. 3: The Jandek dip-meter and its associated tuning coils, tried out and discussed by G3LDO (see text).

element and taping it as shown in the diagram of **Fig. 4**.

Coupling to tubular elements is more difficult. If a dip cannot be obtained in the normal way, the dip-meter coil can be modified by increasing the coupling.

The coil is seven turns wound on a short board, 150mm wide 12mm thick. This coil tuned from 8 to 18 MHz.

The board also provides a platform for the dip meter, note pad, and even the frequency counter. You can also rest the measuring kit against the element while measurements are being made. This layout is shown in use in the photograph of **Fig. 5**.

Feeder Resonance

If the antenna feeder has a resonance at the transmit frequency it can easily absorb some of the transmitted power. The resultant 'antenna currents' can then absorb and re-radiate r.f. power and degrade the performance of the antenna.

A transmission line is a linear circuit with a well defined series of harmonic responses. A dip meter is a useful instrument for measuring these resonances.

The resonant frequency of a feeder can be measured by shorting one end of the feeder. You then fit a small wire loop to the other end so that the dip meter can be coupled to it.

I use a PL259 socket with a coupling loop soldered to it. This arrangement plugs into the connector at the end of the feeder.

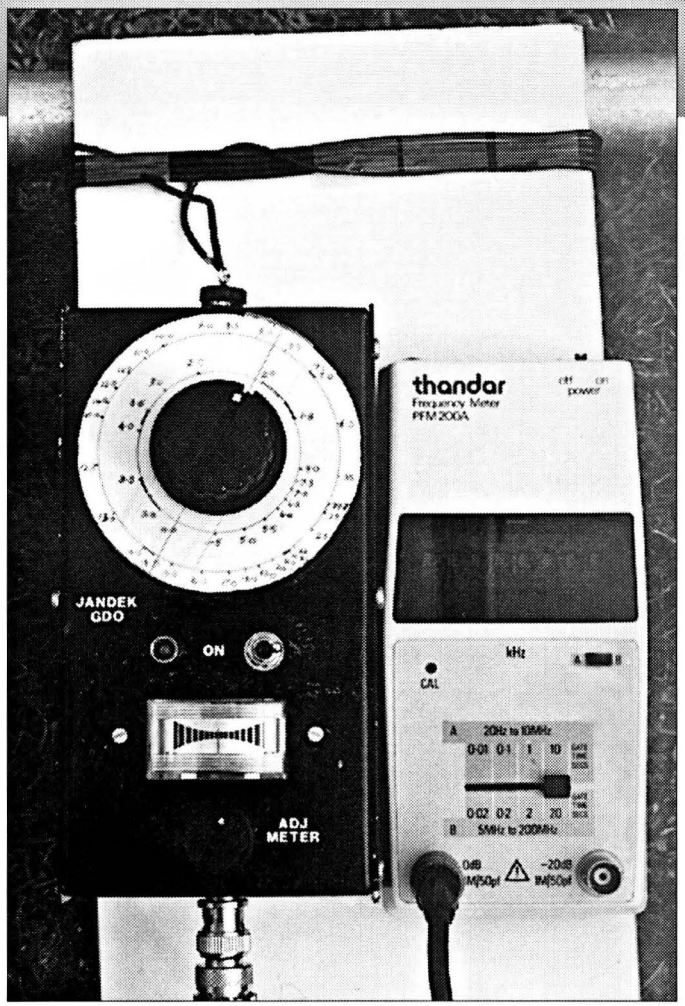


Fig. 5: I use an extra large coupling coil when measuring large diameter elements. The frequency meter on the right is to give an more accurate reading.

Feeder Resonance

Some people think that trying to measure feeder resonance with a dip meter is confusing, as a number of resonant points may be detected. I find them useful though, and to demonstrate the point, let's consider a length of the feeder that's not known.

The method of finding the lowest resonant frequency, and hence the electrical length of the feeder, is to look for a series of resonances using the higher frequency coils of the dip meter. The frequency difference between these resonances is approximately the lowest resonant frequency of the feeder.

On the coaxial cable from my shack to the antenna on the roof I measured resonances at 47.24, 35.4 and 23.7MHz. The differences between these figures are 11.84 and 11.7.

Using the coil covering about 11MHz, I measured the lowest resonant frequency as 11.76MHz. This is the electrical, not the physical length. The difference between the electrical and physical length is due to the velocity factor of the feeder. However, it did show that my feeder was not resonant in any of the amateur radio bands.

So you see using a dip meter can prove very useful! **My thanks for the loan of the dip-meter go to Derek Pearson G3ZOM of Jandek at 6 Fellows Avenue, Kingswinford, West Midlands DY6 9ET, tel. (0384) 288900 who can supply the kit for £28 plus £1 p&p.**

PW

Range 1 - 1.6 to 4MHz	**55 turns of 30s.w.g., random wound**
Range 2 - 3.36 to 4MHz	**27 turns of 30s.w.g., random wound**
Range 3 - 6.3 to 15.7MHz	**55 turns of 30s.w.g., random wound**
Range 4 - 11.9 to 35.2MHz	**55 turns of 30s.w.g., close wound**

Table 1: Tuning ranges covered by the Jandek dip-meter kit.

Further Reading

To help you further in this interesting aspect of working with the dip-meter or older grid dip oscillator, the *PW* team have gathered together the following selection of further reading for you:

'Getting Started The Practical Way', April 1992 issue of *PW* page 33 to 37, has a simple design and construction information for a dip-meter by the Rev. George Dobbs G3RJV, and in the May issue G3RJV describes how to use the instrument around the workshop. Photocopies of the article (85p each part, total £1.70 inc. p&p) are available from the *PW* office.

The Antenna Experimenter's Guide by Peter Dodd G3LDO, has more details on the use of a dip-meter for antenna tuning and is available from the *PW* Book Service, at £8.90 plus £1-00 p&p

'Antenna Workshop-An HF Mobile Antenna' on P26 of the March '93 issue of *PW*, shows antenna resonance measurement with a dip-meter

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FT990

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IC765

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ICOM IC3230H	2m/70cm FM, 45/35 Watt
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EDC6	DC lead 26/76/415/815
MH12A2B	Speaker Mic
MH18A2B	Mini speaker Mic
C50/51/52	(FT415/815) Carry Cases
NC42	Desk top charger
Icom ICW2	The 2/70 Dualbander
Icom IC25RE	2m + Wideband RX

ICOM Accessories	
CP13	Cigar Lighter Cable
HM65	Speaker Mic
HS60	Headset/Voxor PTT
OPC288	DC lead
LC71/72/73	W2/SRE Carry Cases
Kenwood TH28	2m Handy (TH28 70cm)
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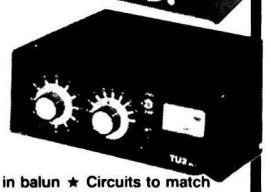

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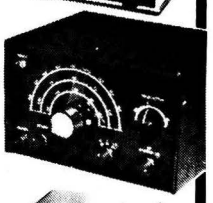

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The Computer in Your Shack

BITS & BYTES

With his first monthly page, Peter Hunter G0GSZ joins in with the Morse theme and looks at c.w. training programs, but starts off by looking at some of your letters.

As the theme of this month's *PW* is the Morse code, I thought I'd review one or two c.w. training programs in the column. But first, I'll start with your letters.

First from the post-bag is **Bill Nicoll GM4LFZ**, who sent me some h.f. FAX pictures he 'captured' on 14.3MHz. Well done Bill, glad you're enjoying the mode.

As a keen 'BBC-er' Bill has set-up a 'Program Data Base' system. He'd be glad to share this with other BBC users. If you send him an s.a.e., he'll send you details.

Bill also uses a PK232 and would like to include SSTV. If you can help, please contact GM4LFZ at **124 Hilton Avenue, Aberdeen AB2 2LH, Grampian Region, Scotland**.

Impoverished Student

Redvers Davies, says he's a "poor impoverished student". Despite this, he's become an expert at programming the Spectrum.

If you need a program for **YOUR** Spectrum, write (with an s.a.e.) and let me know, I'll pass it on to Redvers.

Nick Ray wrote to *PW*, suggesting a 'Getting Started' section for those having problems with Shareware programs. Well Nick, that is **exactly** what 'Bits & Bytes' is! (Though it doesn't stop with shareware programs).

If you need help, please write in. A lot of readers have done so already. Very soon I shall be compiling a list of the most commonly asked questions, together with the solutions.

Interesting Message

I was about to send this month's article in to *PW*, when a very interesting packet message arrived. So, I thought I'd share it with you.

The message is from **Peter SP9WAV** in Poland. Peter likes reading 'Bits & Bytes' so much, he translates parts of it for 'posting' on his local BBS.

Good for you Peter! I'm always glad to receive news from outside the UK , keep writing!

Morse Trainer

The Scottish-based **BOSCAD** company recently sent me their **PC Morse Trainer**. With the software you get an interface cable, **Fig. 1**,that plugs into the computer's serial port.

Next, you connect your Morse key (straight or paddle) to the computer for sending practice. Although some may criticise the facility for sending, others will insist it's an essential part of the training program.

There's no printed manual with PC Morse Trainer. However, there's an built-in manual as part of the program. This 'help' file can be printed, giving you a hard copy for reference.

According to the paperwork that comes with the BOSCAD unit, it'll work on any IBM compatible PC, using any type of monitor. Installation should be easy enough, even if you've never used a computer before.

The PC Morse Trainer is fully configurable to suit the operator. In my opinion it should help any aspiring amateur to pass the c.w. test.

A **free** demo disk is available, and the full package costs £30 (inc. p&p) from **BOSCAD Ltd, 16 Aytoun Grove, Baldridgeburn, Dunfermline, Fife KY12 9TA, Scotland, tel: (0383) 729584 (evenings only please)**.

Morse Program

The second 'commercial' Morse program I've got this time is called QRSCW. It generates random on-the-air-working QSOs.

The random QSO facility makes QRSCW ideally suited for the new UK Morse test. I really liked this aspect of the program.

I ran the program directly from the disk that it came on and found no problems. So it should work well, even on an Amstrad PC1512.

The current price of QRSCW is £10 inc. p&p, and it's available from: **M. D. Waller G0PJO, Chellows, Erwarton, Ipswich, Suffolk IP9 1LJ**.

Specialist Magazine

The next disk came via the specialist Morse magazine ***Morsum Magnificat***. The disk contained a set of programs, written by **Dr Gary Bold ZL1AN**.

The first program, TEACH, is a start-from-scratch program that teaches all characters by their sound. Not only are these characters sent randomly, but it sends the most difficult to learn characters first.

I've never heard of the method before, but it seems the ideal way to learn. As soon as the computer thinks you know a symbol it introduces a new one, and so it goes on. At the end of each session the program gives you a progress report.

Another program is called RNDM. This generates random groups of code. It then prints each group on the screen after sending. This is an excellent program for improving your speed once you know all the characters.

Next comes FSEND. This sends any ASCII file as Morse code.

Another program, which I like a lot is KBD. This sends out, as Morse code, anything that's typed at the keyboard, and displays it on the screen.

The keyboard idea makes it ideal for anyone who can type (even with one finger!) to help with your practice, you can turn your back to the computer and write down what you hear.

Finally there comes MREAD. This gives instructions for wiring a Morse key to your serial port. Whatever you send will be displayed on the screen (garbage and all!).

All the programs are **FREE!** So, to get your copy, please send a formatted 3.5in disk, with an s.a.e. for its return, to: **Tony Smith G4FAI, Consultant Editor, *Morsum Magnificat* magazine, 1 Tash Place, London, N11 1PA**.

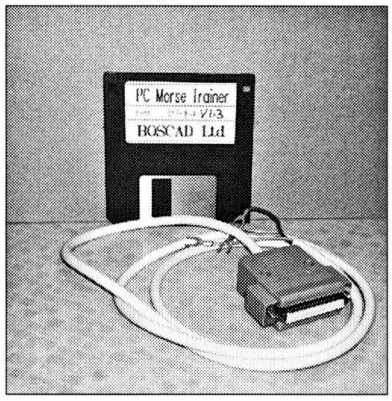


Fig. 1: The BOSCAD PC Morse Trainer, disk and cable. tried out by Peter Hunter G0GSZ.

Atari Computer

Now a couple of programs for the Atari ST computer. The first is called **QSOBASE** which is a QSO database program, and sounds very much like an electronic logbook!

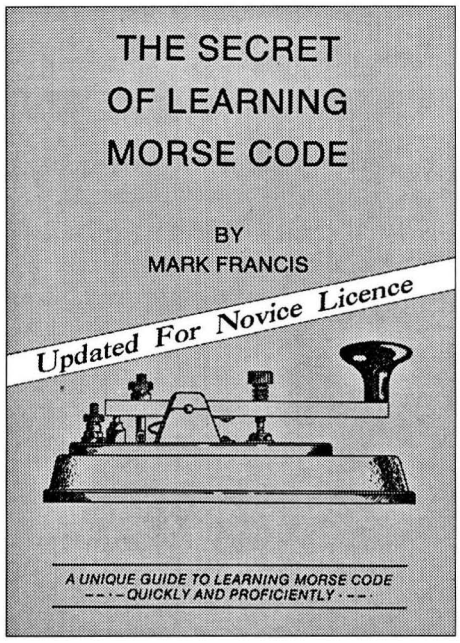
The other program is called the '**Ultimate Morse Tutorial**'. Reading the documentation, it seems to be a very good Morse training program for the Atari ST range.

Both the Atari programs are in the Public Domain. For more information please contact: **George Butler G4BXU, at Lucid Publications, 18 Hobart Road, Ramsgate, Kent CT12 6NW, tel: (0843) 582939**.

Finally

Finally, please keep the letters, messages and 'phone calls coming. So, until next month, 73 DE Peter Hunter G0GSZ. You can write or contact me at 2 Mayes Close, Bowthorpe, Norwich, Norfolk NR5 9AR, tel or FAX me on (0603) 748338. Packet: G0GSZ @ GB7LDI.#35.GBR.EU.

E N D

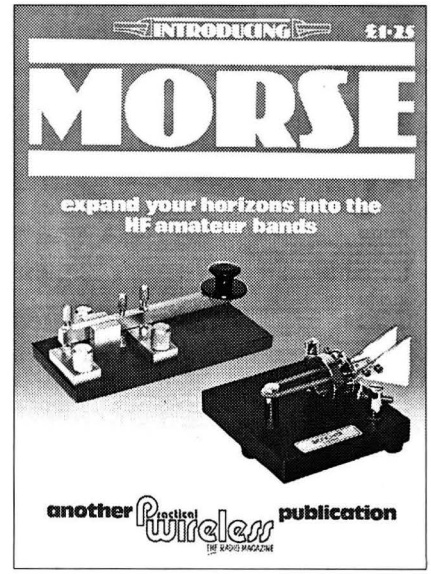


The Secret Of Learning Morse Code

By Mark Francis, published by Spa Publishing Ltd., Hockley Essex.

This book by Mark Francis G0GBY, has been successfully used by many aspiring h.f. band operators, and it's recently been up-dated for the Novice Licence. Particularly popular with clubs, the 84-page book contains a lot of general interest on the Morse subject and it has a comprehensive approach to the learning of the code. The book has comprehensive chapters explaining 'How it all started', 'Making up your mind', 'Learning the basics', and 'Receiving the code', before leading the reader on to the stage where you're 'Sending Morse', 'Improving your speed' and so on. There's even useful advice on how not to get flustered - by 'dotting' your gaps!

The book is packed throughout with useful information on the Q-code, sample tests and much useful information. ***The Secret Of Learning Morse Code*** is available from the *PW* Book Service for **£4.95 plus £1 p&p.**



Introducing Morse

This popular *Practical Wireless* re-print has long been a favourite with those wanting to take up Morse, and those wanting to read about suitable projects. It's packed through with ideas and Morse training techniques including 'The Origins Of Morse' by Tony Smith G4FAI, 'Learning Morse' by G3YPL, 'Morse Sending Trainer', 'Morse Keyer', an 'Iambic Keyer' and much more. *Introducing Morse* is certainly an excellent introductory guide for anyone interested in building projects for c.w., and enjoying the mode to best advantage. **£1.25 plus £1 p&p** from the *PW* Book Service.

Radio Diary

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

May 16: Fingal Radio Club Radio & Electronics Exhibition will be held at Jury's Hotel, Ballsbridge, Dublin. Doors open 11.30am to 4.30pm. Admission £1, accompanied children free. Used equipment stands, radio, electronics & computer trade stands, demonstrations of v.h.f. & h.f amateur equipment, IRTS stand. Car parking, restaurant & bar, door prizes & raffle, talk-in S22. **Brendan O'Kane EI4CYB, 79 Martello Court, Portmarnock, Co. Dublin, Ireland.**

May 16: The 2nd National Vintage Communications Fair will be held at the NEC, Birmingham. Doors open 10.30am to 5pm. Hundreds of items for sale, including vintage radios, telephones, gramophones, jukeboxes, radiograms, etc. Admission will be £3. **Jonathan Hill on (0398) 331532.**

May 16: The Parkanaur Rally will be held at the Silverwood Hotel, Lurgan, Co. Armagh. Doors open 12 noon. Admission £1. Plenty of parking. Usual traders. Refreshments available. Talk-in S22. All proceeds of this rally will go to the Stanley Eakins Memorial Fund, a very worthy charity. **W. A. Hutchman, 35 Carlingford Park, Newry, Co. Down, N. Ireland BT34 2NY.**

May 30: Maidstone YMCA Radio Rally will be held at YMCA Sports centre, Melrose Close, Maidstone, Kent ME15 6BD. Doors open 10.30am (10am for disabled). Entry is £1 per adult. Exhibition station GX3TRF (on h.f.). All-day video show for juniors. Refreshments & snacks available. Bring & Buy tables for hire. **Brenda Puncher G0IJK on (0622) 850277.**

May 30: The 17th Annual East Suffolk Wireless Revival will be held at the Maidenhall Sports Centre, Ipswich, Suffolk. Bring & Buy, car boot sale, vintage radio display & RAIBC, BYLARA, scout radio, RAYNET stands, etc. Non-radio stalls & children's play area. Refreshments & bar. Admission £1, which includes car parking. Talk-in on S22 (GB4SWR). Send s.a.e. for free maps. **Bob Baal G7HZV, 14 Gainsborough Road, Felixstowe, Suffolk IP11 7HS.**

May 30: Plymouth Radio Club Rally will be held at Plymstock School, Church Road, Plymstock. Traders stalls, Bring & Buy, refreshments, talk-in S22, parking facilities. Doors open 10.30am. **Derek Foster G7ESZ QTHR.**

June 6: Spalding & DARS are holding their Jubilee Mobile Rally at Springfields Gardens, Spalding. Doors open 10.30am. Admission £1, children & disabled visitors free, Trade stands, indoor flea market, car boot sale pitches. Car parking, catering facilities, bar. Talk-in on S22. **Mr T. Kettlewell G4TWR on (0775) 722940.**

June 13: The Royal Naval ARS have their Annual Mobile Rally at Sports Field HMS *Collingwood*, Fareham, Hants. Doors open at 10am to 5pm There will be dozens of trade stands, Bring & Buy tent, on-the-spot QSL printing, flea market, large arts & craft exhibition, radio controlled power boats, local radio clubs & repeater groups, vintage fire engine, two grand raffles, amusements for youngsters and refreshments, making this a great day out for all the family. Talk-in on 144 & 430MHz, free parking, no dogs except guide dogs. **Cliff Harper G4UJR, 34 Neva Road, Bitterne Park, Southampton SO2 4FJ. Tel: (0703) 557469.**

June 20: Denby Dale & DARS Annual Mobile Rally will be held at Shelley High School. Doors open 11am (10.30am for disabled visitors). Ample parking, traders, car boot sale, food. Talk-in S22 & SU22. **Philip G4FSQ on (0484) 644827.**

June 27: The 36th Longleat Amateur Radio Rally (follow the brown signs for 'Longleat House' from Warminster, Wiltshire). Extensive trade show, RSGB bookstall, large number of local & national societies exhibiting. Display of The Journeaux Historic Wireless Collection, large craft fair, camping & caravanning facilities by the rally for the whole weekend. Licensed bar and catering on site. **Shaun G8VPG, QTHR on (0225) 873098.**

July 4. The York Radio Rally will be held in the Tattersall Building, York Racecourse, Knavesmire, York. Door open at 11am. Admission £1. Amateur radio, electronics and computers, arts & crafts, Morse tests. Ample free parking, licenced bar & cafe. Talk-in on S22. **Andy Suter G0GXI on (0904) 708164.**

***July 10**: The Cornish Rally will be held at Penair School, Truro. **Barrie Thomas G0NNR on (0872) 862046.**

July 11: Galway Experimenters Club will be holding its Annual Radio & Computer Rally at Newtownshire, Galway. Doors open at 12 noon, large trade show, Bring & Buy, free parking & refreshements available. Talk-in on S22. **EI7DIB on 091-53592.**

July 25: Colchester Radio & Computer Rally (including Car Boot Sale), will be held at St. Helena School, Sheepen Road, Colchester. **Frank G3FIJ on (0206) 851189.**

July 25: Norfolk Amateur Radio Club & Hewett School Radio & Electronics Group will be holding their Rally at the Hewett School, Hall Road, Norwich. Doors open 10am. Admission £1 adults, OAPs/disabled/children 50p. Free parking. Trade stands, Bring & Buy, displays. **Sheila G0KWP on (0603) 618810.**

August 1: The 10th McMichael Rally & Car Boot Sale will be held at the Haymill Youth & Community Centre, Burnham Lane, Slough (nr. Burnham Railway Station). Doors open 10.30am, admission is £1.50. Car boot sale is £6 per pitch on the day. Free parking on site & talk-in on S22. **Neil G0SVN on (0628) 25952.**

August 8: Derby Mobile Rally will take place at the Littleover Community School, Pastures Hill, Littleover, Derby. Usual attractions, including the famous monster junk sale. It is hoped to provide improved facilities for disabled visitors in 1993. **Martin Shardlow G3SZJ on (0332) 556875.**

***August 8**: Flight Refuelling ARS Hamfest will take place at the Flight Refuelling Sports Ground, Merley, Wimborne, Dorset. Doors open 10am to 5pm. Usual mix of traders, Bring & Buy, craft exhibitors, car boot sale & field events. Overnight camping facilities available for Saturday 7th. Talk-in on S22. **Richard Hogan G4VCQ on (0202) 691021.**

August 30: Coleraine & District ARG Radio Rally & Bring & Buy will be held in The Golf Links Hotel, Portrush. From 12 noon to 5.50pm. Traders welcome free of charge, refreshments available. Admission £1. Talk-in S22. **Raymond GI4MFM on (0266) 558230.**

September 5: Milton Keynes & DARS will be holding their 7th Annual Radio Boot Sale at Cranfield Airfield, Cranfield, Beds. **Ray G1LRU on (0908) 660798.**

September 5: Vange Amateur Radio Society Annual Rally will be held at the Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon, Essex. Doors open from 10.30am. Admission 75p. Trade stands, Bring & Buy, raffle, refreshments, car parking. Talk-in on S22. Sign-posted approach roads. **Mike Musgrave G4NVT on (0268) 543025.**

***September 11:** The Scottish Amateur Radio Convention will be held in Cardonald College, 690 Mosspark Drive, Glasgow G52. Full trade show, lecture theatres, Bring & Buy, Morse tests, bar & restaurant. Free parking. Talk-in S22. **Tom Hughes GM3EDZ on 041-882 5753.**

***September 12:** Lincoln SWC Hamfest will be held at Lincolnshire Showground & Exhibition Centre, four miles north of Lincoln on A15 Lincoln/Scunthorpe Road. Doors open 10.30am. Usual trade stands, Bring & Buy, refreshments, licensed bar. Lots of attractions for whole family. Admission £1 by lucky programme, free parking, caravans welcome by arrangement. Talk-in S22. **Denis G1XZG on (0522) 684214.**

September 12: The BARTG Rally will be held at Sandown Exhibition Centre, Esher, Surrey. Bring & Buy, refreshments, many exhibitor & special interest groups. Doors open 10.30am to 5pm. Admission £1.50 adults & £1 OAPs, under 14s free if accompanied by an adult. Well sign-posted. **Peter Nicol on 021-453 2676.**

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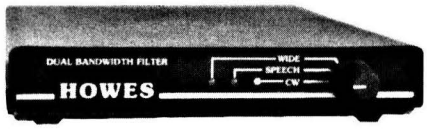

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73 from Dave G4KQH, Technical Manager.

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2M4P	2m 4w Power Divider
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Valve &

This month, Ron Ham breaks off from polishing that beautifully walnut-veneered cabinet in the corner of the 'Valve & Vintage' shop, to describe an interesting American made receiver, and warn us about top-capped valves.

Welcome to the 'Valve & Vintage' wireless shop. And as usual, my thanks go to all of you who have written in and for your kind remarks about 'Valve & Vintage'.

Your comments and memories about the bygone days of radio are much appreciated. Because they are personal experiences, it adds that little bit extra to a technical chat column like this.

However, although I don't have the space to include every detail about a particular item, subject, or diagram, my intention is to point you in the right direction. We'll then perhaps discuss it again in a later issue.

Don't forget also, that your practical and technical tips are sure to help someone. Your advice could help another reader to understand the piece of equipment they're handling that much better.

Military Valves

When comparing military valve numbers with their civilian equivalents recently, I used the letters 'CV' to guide you. But, like every other aspect of radio, there's much more behind military valve coding.

Les Painter (Swansea) tells me that because each of the three services had their own valve numbers in the early days of the Second World War, there was some confusion. As a result these were abandoned, and a **C**ommon **V**alve **(CV)** number was allocated to each type. Finally, Les also reminded me that the letters **'JAN'** on American valves stand for **J**oint **A**rmy **N**avy.

Valve Safety

Now it's time to look at valve safety. One of our readers has asked me to warn you that not all top caps are grid connections. Some of the 7-pin pre-war valves have their Anode connections on top of the valve.

The anode connection carries the full h.t. voltage. Touching the anode cap could give you a powerful electric shock.

Vintage Valves

The more vintage sets that you add to your collection, the more you need to know about valves, their base types and connections. Along with British 4, 5 and 7-pin bases, you're also likely to meet the Mazda-octal type.

The Mazda-octal base differs from the more widespread International-octal (IO) type (the central Bakelite spigot is not the same size as the IO base). Additionally, some American sets use a 'UX' base.

"Valve manuals are still produced in Germany by Franzes Verlog, D-8000 Munchen," says **J.C. James (Congleton, Cheshire).** The last one cost DM.33. in Cologne and was "Well worth the outlay," he remarked.

Among the specialised valve titles in the large collection of wireless books that J.C. James has collected are Radio Receiving Tube Characteristics, Transmitting Tubes, Valves and Vacuum Tube Theory. All good stuff to look out for in the second-hand book shops!

Elderly American

The *PW* Editor G3XFD, found an elderly American mains radio, **Fig. 1**, for £1, at a car boot sale. The stylish polished wooden case with its fancy feet, 'magic-eye' tuning indicator (top centre, **Fig. 1)** and ornamental dial assembly is typical of the 'bedside' receivers produced in the USA in the 1937/43 era.

I can see from the photograph, that the receiver's frequency range, 550kHz to 16MHz, is spread continuously across three wave-bands.

Another photograph shows the inside condition of G3XFD's vintage receiver. The set appears to have six valve sockets, plus the magic-eye (top centre). The latter being a thermionic valve with a fluorescent screen at the top, providing the familiar green 'fan' shape for tuning indication.

Basic Receiver

At this point, let's say that a basic domestic superheterodyne receiver has five valves. These will usually include a frequency changer, i.f. amplifier, a double diode triode, an audio output valve and a rectifier.

If 6.3V valves were used in series (6.3 x 5), this would only amount to 31.5 volts. This, deducted from 240V leaves 208.5V to lose in either a larger resistance, known as a mains dropper, or a special mains lead with the dropping resistance wound inside it often described as 'hot-leads' or 'line-cords'.

To help reduce the electrical size of the dropper resistance, certain valves of the same type were manufactured with a choice of 6, 12, 25, 35 or 50V heaters.

For example, many types of half-wave rectifiers and output valves, were made for use in series chains. They included the 25Z4G (25.0V at 0.3A) and 35Z4G (35.0V at 0.15A) and 25L6G (25.0V at 0.3A) and 35L6G (35.0V at 0.15A) respectively.

Sixth Socket

Judging by the chassis layout, **Fig. 2**, the sixth valve socket could be for another i.f. amplifier. It could also be for a 'ballast lamp' (a plug-in dropper resistance mounted inside glass envelope).

In **Fig. 2**, it looks as though the two rivet heads at the bottom of the chassis secure the rear chassis fixing bolts. If this is so, the heads, plus the front ones underneath the cabinet, MUST be covered with an insulating material **because the chassis is live.**

Take care with 'live chassis' receivers. To be safe, use an isolating transformer when you're working on this type of set.

Closer Look

Because I can't see a mains dropper or evidence of a 'hot lead', I must assume that the far right-hand holder is for the 'ballast'. Unless the set was designed for 110V operation, then, with high heater voltage valves a large 'ballast' may not have been required.

The valve to the right of the variable capacitor could be either

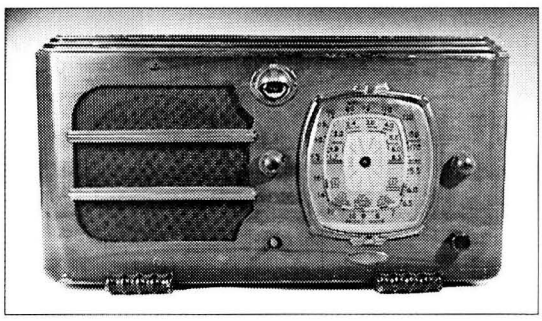

Fig. 1: An American set bought at a car boot sale for £1.

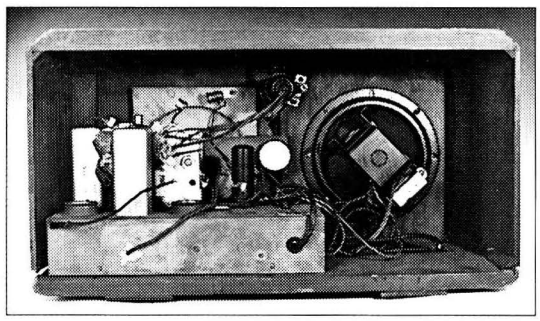

Fig. 2: Rear, internal view of the American receiver.

Vintage

By Ron Ham

the output valve or the rectifier. But the wiring would have to be examined carefully before deciding the correct valve positions.

From **Fig. 2**, the receiver's loudspeaker looks as though it is the energised type. This means that the magnetic field for the voice coil is produced by the energising coil, used instead of a permanent magnet. In some a.c./d.c. receiver types, as the American receiver appears to be, the energising coil was used as the main smoothing choke.

Series Heater

Most a.c./d.c. (universal) receivers I've serviced, had a series heater chain, with half wave rectification for the h.t. and a live chassis. In other words the voltage of the valve heaters is totted up and the difference between that figure and the incoming mains supply is made up with a heavy duty wire-wound resistance.

The valves must draw the same current. In some cases a line-cord was used for 'dropping' in place of the on-chassis resistance.

There were various replacement line cords, pre-formed by the set-makers. But the type generally used in the workshop came on a drum from Radiospares (still with us today as RS Components) with, from memory, a resistance of about 180Ω per foot.

Replacement line-cord usually had two wires plus the resistance line inside a cotton braid. The resistance wire was coiled on what I assume was an asbestos string, and covered with what looked like an asbestos matting.

Having the dropping resistance inside the mains lead meant a bit more space, and a bit less heat inside the cabinet. Obviously this lead could never be shortened because its length had a given electrical resistance. However, if a non-technical 'handyman' did shorten it, the increase in voltage across the valve heaters either drastically shortened their lives or burnt them out completely!

Hallicrafters Receivers

There's a similarity in the control layout throughout the series of Hallicrafters range of communications receivers, shown in **Fig. 3.** Lucky reader **Graham Camning (Eccles, Greater Manchester)** has inherited a Hallicrafters Sky Champion S-20R and although he has heard it working, he'd like to know more about its operation.

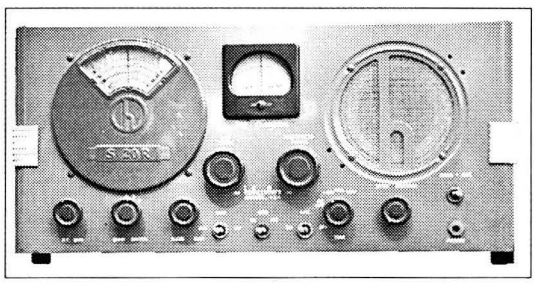

Fig. 3: A Hallicrafters S-20R receiver.

I can't help you with a manual Graham, but I suggest you try one of our advertisers or perhaps another reader may be able to help. But I do have a photograph, **Fig. 3**, from which I can give you a few tips.

Fortunately, the controls on the S-20R in the photograph are still clearly marked. So, let's start with the toggle switches from left to right along the lower centre of the front panel.

The switches on the S-20R individually control the automatic volume control (a.v.c.), the beat frequency oscillator (b.f.o.) and audio noise limiter (a.n.l.) respectively. Each control has its use at the right time.

For example, control over the a.v.c. is of great help when trying to hold a weak signal. The b.f.o. pitch, when being used to read a Morse or to resolve an s.s.b. signal, is adjusted to suit, by the control immediately below the loudspeaker.

On some of these early sets, I have found the a.n.l. is useful. They're very good for taking the 'bite' out of ignition interference at the high frequency end of the receiver.

Unfortunately, I can't remember how the send-receive toggle, far right, is wired in the S-20R. However, some receivers I've seen, it usually switches-off the receiver's h.t. The switch can also energise a relay to control a transmitter.

The mains on/off switch is incorporated in the audio tone control to the right of the a.n.l. toggle. The band-change switch is positioned between the audio and r.f. (radio frequency) gain controls.

When you first switch-on, don't forget to allow the receiver time to warm-up. Then select the wave-band you require and use the tuning and the other controls accordingly.

The 'Main Tuning' and 'Bandspread Tuning' controls are in the centre left and right respectively. Briefly, there are two variable capacitors behind the main dial (left) and the bandspread dial (top centre).

The bandspread capacitor has a very low capacity relative to the main tuning capacitor. This is because it's designed to 'spread' the tuning range around the frequency selected on the main dial.

To use the bandspread, you first 'set' the main control to the section of the band you require. Then, by careful use of the bandspread, you can 'fine tune' up and down in frequency.

All wireless sets gather dust. And if your Hallicrafters has been stored for a long period it's worth removing the loud-speaker for cleaning. The loudspeaker usually has four bolts, and after removing them, take the unit out.

Then clean out any muck that has gathered around the voice coil and between the outer edges of the speaker cone and its metal framework. Muck and dust can cause distortion because it restricts the free movement of the paper cone which in turn distorts the reproduced sound.

Rural Exchange

Having read about the rural telephone exchange in February's V&V, ex-G.P.O. telephone engineer, **John Woodcock (Basingstoke)** wrote to tell me he remembers the "all 600 Watts" of the issued 'VAX' bowl fire, and the many times he tried to get his hands warm enough on winter days to adjust the exchange equipment!

Can You Help?

I'm finishing off this month with 'Can You Help' requests. We start with **John Tye**, who requires an accumulator glass-jar. If you have one to spare, please ring John on **(0362) 638142.**

Next, we have the Editor, Rob Mannion, at the *PW* office in Broadstone. He'll be delighted to hear from anyone who has the precise instructions for replacing the dial drive cord on an Eddystone 888A communications receiver.

Finally, **Mr J.C James** would be grateful for any information about an Inverter, type 200. Reference and serial numbers are 5U/5083 and 855 respectively. Other information on the plate is DC Volts 25/28; r.p.m. 8000; a.c. Volts 115; Phase 1; VA 360; PF. 1.0; Cycles 1600; and Rating Cont. Answers please, to **'Braeside', 95, Lower Heath. Congleton, Cheshire, CW12 1NJ.**

That's it now, and it's time to close up the old wireless shop once again. We're open next month, and don't forget to 'call' again by writing to me at 'Faraday', Greyfriars, Storrington, West Sussex, RH20 2HE.

D A V I D B U T L E R G 4 A S R

This month David Butler G4ASR has news of interesting activity on microwaves and provides a possible solution to a mystery DX station on v.h.f. packet radio.

VHF Report

Fig. 1: Antennas at the QTH of SM4DHN (see text).

It's auroral events first. Although I only recorded one opening during February, on the 17th. But many more were detected in March, especially during the period 8-16 when 'Scottish-type' events were noticed every day, mainly around 1700UTC.

The term 'Scottish-type' means literally that. It's a weak opening where contacts from central England, for example, are restricted to stations in Scotland and surrounding areas.

Scottish stations will not only be able to work around the UK, they'll also be able to work into Scandinavia and northern Europe. This is because they're situated further north and are in a more favourable location to utilise the aurora. So, what may be a weak event for stations in southern UK may be quite reasonable if you live in Scotland.

Little 144MHz DX

Very little real DX was reported on the 144MHz band during March. But a few stations reported working SM4KYN (JO79) on March 11 and LA9BM (JP40) on March 15.

The beacons GB3LER (144.965MHz), OY6VHF (144.885MHz) and SK7MPI (144.960MHz) seem worth checking as all of these were putting in good auroral signals.

The 50MHz Band

Little DX was reported on the 50MHz band during the months of February and March. There was a small amount of Sp-E propagation on February 2, 3, 15 and 17, with European stations such as EH3CUU, ES5QA, OH3MF, OK1MAC, SM7OGX, SP5CCC and S55ZRS being worked by stations throughout England.

No DX was reported in March, although stations in continental Europe had a much better deal. They were able to make contacts via t.e.p. with African stations including ZS6AXT ZS6PJS, 7Q7JL and 7Q7RM.

The beacons V51VHF (50.018MHz) and ZD8VHF (50.032MHz) were also reported in central Europe. Don't give up, our turn will come!

By the time you read this, we'll be entering the beginning of the summer Sporadic-E season when much DX can be worked. And if you're prepared to ignore the multitude of S9+ European stations and dig down a layer or two, you'll also discover the **REAL DX**!

Perhaps therefore, it's worth noting that UW0ST has recently obtained a permit for the 50MHz band. He's expected to be active from locator square OO07 during the summer.

Belarus Republic

Another country to look out for is the Belarus Republic (UC) or Byelorussia as it was formerly known. **Hans Mueller DL5BAC** has provided details of an multi-national expedition to locator squares KO33, KO41, KO42 and KO43 between June 20-30.

The group will use a multitude of callsigns including EV5B, EV5C, EV5D, EV5K, EV5M, EV5N and UC1AWZ. They'll be active on both the 50MHz and 144MHz bands. More news next month.

If the band doesn't liven up, you could try making a sked with **Arie Baltes PA2TAB** (JO32). He's looking for c.w. or s.s.b. contacts on the 50MHz band primarily at weekends.

Arie is also QRV on the 70MHz band with a converter and an HB9CV antenna. You can make a sked for either band with PA2TAB via packet radio @ PI2DAZ.

Microwave Bands

Last month I gave you details of the first UK e.m.e. contacts on the 10GHz band between G3WDG/G4KGC, SM4DHN and WA7CJO. The photograph, **Fig. 1**, shows the home-made 6m diameter solid dish at the QTH of SM4DHN used for the 10GHz experiment.

The dish is also used on other s.h.f. bands for e.m.e. tests, as is the multi-Yagi system that can be seen in the background. The other photograph, **Fig. 2**, shows the 4.8m diameter front-fed dish at the QTH of WA7CJO which has been used to work 12 stations via the moon on the 10GHz band.

Active On 10GHz

Jonathon Eastment GW4LXO (IO81) is also active on the 10GHz band either from his home QTH, or from nearby hill-tops. On January 2 he heard stations on 144.175MHz, the microwave talk-back frequency. He then decided to go out portable from The Wenallt (IO81), South Glamorgan.

The 10GHz equipment used by GW4LXO is quite compact. It runs 100mW from a home-made narrow-band (s.s.b. or c.w.) transverter into a small horn antenna only 250mm long.

Once on the hilltop, Jonathan listened on 144.175MHz and heard G3FYX in Bristol calling for 10GHz contacts. Contact was quickly established on 10.368GHz at 5-9 both ways using the horn inside the car!

Immediately following the contact, another station was heard calling GW4LXO/P. On turning the hand-held horn (still inside the car) through some 60° the station was identified as G0BPU (JO02) in Ipswich.

Although the distance between the two stations was over 300km, a 5-minute s.s.b. contact was made with signals peaking 5-9 plus (still inside the car)!

After signing off with the Suffolk station, Jonathon tuned down the band (yes, this is on 10GHz) and heard G3JVL (IO90) on Hayling Island calling CQ. Contact was quickly established with signals again well over the S-9 level.

Moving back to the 144MHz calling frequency, another 10GHz contact was set up with G3JMY (IO81) in Bristol, again with very strong signals. Contacts were also tried with G4JNT (IO90) and G3LQR (JO02) but although signals were heard, the tropo conditions were disappearing and two-way contacts couldn't be established on this occasion.

I'm reliably informed that contacts are made on 10GHz regularly every night of the week between fixed stations around the UK. Jonathon mentions that when conditions are right, contacts are quite easy to make on the 10GHz band.

Jonathan reports making a contact with G3JVL inside the house by simply pointing the horn antenna through the double-glazed patio window. Why don't you join them? I know I will as I've just bought a 10GHz transverter kit from G3WDG/G4KGC and expect to be active from home later in the year.

Packet From Bosnia

In the April issue of *PW*, I mentioned that G4DYA had received packet radio on 70MHz from Bosnia-Hercegovina. It was suggested that Sp-E propagation was the cause, and I asked if anyone else had spotted DX callsigns appearing on 70MHz.

In answer to my query, **Simon Falconer G7GUO** has written in, as he's also monitored 4N7WW via packet. He suggests that it's feasible that the station is node hopping all the way from Bosnia.

Simon explains that when you go via a node, the callsign is given a subsidiary station identification (s.s.i.d.) of 15, for example 4N7WW-15. And every time it goes through another node, it's reduced by 1.

So, after going through 15 nodes, the s.s.i.d. would have been reduced to 0 and only 4N7WW would be displayed. Simon also offered the explanation that 4N7WW regularly appears on the UK DX Cluster network, being linked via GB7DXM from the European cluster system.

Following Simon's advice, I logged into my local cluster GB7DXC and sent the command SH/ST 4N7WW (which gives details of a connected station). And hey presto!, it showed that 4N7WW was indeed linked into the UK cluster network.

Looking in my ***Packet Cluster User's Guide*** (details from **John Clayton G4PDQ, Chairman of the UK Packet Cluster Working Group**) I note that the s.s.i.d. is stripped off automatically once a station is connected into the cluster. So I'm afraid Bosnia-Hercegovina doesn't have a 70MHz allocation after all.

The terminal node controllers (t.n.c.) don't have the facility to enter in a reciprocal callsign, and it's usual to input the suffix only. For example, a Brazilian station operating in the UK with the callsign G0/ZY1XWV, could appear on packet radio locally as ZY1XWV! So be warned. You can't always believe what you read!

Beacon History

Now for a bit of beacon history on GB3VHF, located at Wrotham, Kent (JO01). It's provided by **Brian Bower G3COJ**. Brian who has been active on the h.f. and v.h.f. bands for some considerable time, worked for the BBC before his retirement.

Over 20 years ago the BBC needed f.m. radio links on frequencies around 46MHz, 90MHz and 141MHz. When the in-house development was completed, instead of scrapping the prototype 141MHz transmitter, it was converted to the 144MHz band and used at GB3VHF in place of the original Pye transmitter.

The GB3VHF transmitter had been switched off following a change of frequency from 144.150MHz to 144.500MHz. The new transmitter, running 10W was activated in 1974, and later that year a 40W amplifier was added.

The beacon has continued in service ever since. But in the late 1970s it was moved to a new frequency of 144.925MHz.

In 1981 the BBC erected a new mast at Wrotham, and the opportunity was taken to renew the GB3VHF antenna system and install it on the new mast. The transmitter was rack-mounted and the microprocessor-controlled keyer (designed by G4BAU) was re-programmed.

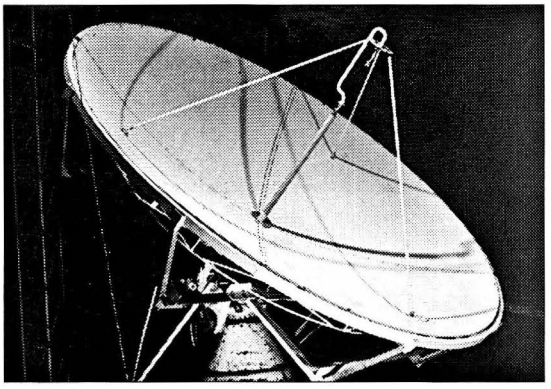

Fig. 2: The 10GHz e.m.e. antenna used by WA7CJO (see text).

The keyer gives both c.w. and RTTY identification. On RTTY it provides details the location of the mast to the nearest second of latitude and longitude.

When the old mast was demolished, the original antenna, in operation since 1961, was recovered. It's now in the radio museum at RSGB Headquarters.

In Autumn 1992, difficulties arose because the beacon was de-sensitising the co-sited 430MHz repeater GB3NK. As a consequence, GB3VHF was closed down.

The problem appeared to be low-level spurious oscillation in the amplifier stage. Eventually the problem was resolved, and the amplifier and beacon were returned to service in February 1993.

Solar Activity

During the first two weeks of February the active side of the sun was facing our way, and there was a large increase in solar activity. There were M-type flares recorded on virtually every day with one of the biggest, an M9.6/2B, being recorded on February 6.

The sun was also very active on February 10 with 4 M-type flares, and on February 12 a major flare alert was issued.

Ionospheric disturbances occurred daily, and on February 17 an M5.8 flare occurred, and a severe magnetic storm started at 0300UTC which affected northern latitudes. Later that day, from around 1700UTC, a radio aurora effected the lower v.h.f. bands.

The solar flux levels peaked at 188 units on February 9, sinking to 116 units on February 20. During the latter part of February 'stratwarm' alerts were issued.

The 'stratwarm' alert indicates a warming of the stratosphere. Some people believe that this can effect the h.f. bands and possibly frequencies as high as 50MHz, by producing or aiding extended skip distances. Whether this is true or not remains to be proved.

From March 1-16, many M-type flares were recorded. Most of these caused minor magnetic storms and consequent auroral activity.

Sudden ionospheric disturbances (s.i.d.) occurred every day. But in spite of all the flare activity, the solar flux levels declined dipping to only 122 units by March 16.

Although the quieter side of the sun rotated into view from March 16, there were still a number of small M-type flares in the following days. Radio wave sweep emissions from 10-300MHz were recorded on both March 20 and 21, lasting for about an hour or so. The geomagnetic field was quite active during this period and another auroral opening was detected on March 21.

Deadlines

As usual please send your letters to reach me by the deadlines at the end of the month at the very latest. I normally write up the column around this time. Don't forget that I can also receive messages via packet radio at my mailbox GB7TCM or at my DX cluster GB7DXC.

If you have any good quality photographs (or QSL cards, certificates, etc,) that you'd like to share with others, please send them to me and if you want them back, I'll return them.

E N D

HF BANDS Report

P A U L E S S E R Y G W 3 K F E

Paul Essery GW3KFE takes a look a chasing DX the difficult (but enjoyable) way - by using QRP, before looking at the month on the h.f. bands.

Simple transceivers can prove very successful on the h.f. bands. For example, many operators, including regular 'HF Bands' QRP reporter Eric Masters G0KRT, use the well-established Lake Electronics DTR7 transceiver on 7MHz.

Together we've established over the past few issues that DX on h.f. will operate 'split' frequency working. So, you've found where they're transmitting and where they're listening. But, does your DX hunter now concentrate totally on where the DX is listening? The answer is **NO!**

You can be sure that if your DX station decides to change band or go QRT, they'll announce that fact. But 30 minutes later, there'll still be misguided souls who haven't noticed their choice DX is now working on another band.

However, even if you miss the announcement there are always indications to help. For example, the rumpus on the DX station's previous frequency reduces noticeably.

Low Power

While low-power operators in general don't bother to chase DX, those who do seem to get on well. The guy with such a set-up needs to be like the cartoon character Yogi Bear -"Smarter than your average bear"!

It's been many years since I last heard from **Dave GM4ELV** in Glasgow. Dave has 206 countries confirmed with 210 worked - a very good return, and all with QRP! It also gives him WAZ and WAS.

Dave has just come back to the fold after being QRT since December 1990, and he's now gearing up for battle again. Making a good start, he worked KC4AAA at the South Pole and if my memory's right, GM4ELV always used wire antennas.

Outstanding Cards

Anyone waiting for QSL cards from the late **Father Moran 9N1MM**, will be pleased to know that outstanding UK cards have been collected from USA. They're now in the UK, and are being passed on to the RSGB's QSL Bureau at the time of writing.

I'm afraid that the YX0AI cards continue to mystify and anger people by their absence. Some folk seem to have theirs, others report no response. So, what **is** going on?

The P5RS7 cards should be out soon. They were promised to be ready in time for the Dayton HamVention in late April.

Passing Of GW3LJP

Bert Mills GW3LJP, died suddenly on the morning of February 28. By noon, the news had passed all round the county.

Bert's funeral on March 4 at Rhayader, was attended by amateurs from every club in Powys, Hereford and South Wales. He was a man who helped dozens of people get their licence or assisted with their problems. He'll be much missed.

Radio Conditions

Unfortunately, radio conditions have been very spotty of late. Although as always, it's a bad day when you can't scare up something interesting.

Nigel Alford took the open-wire feeder out of his G5RV and now has coaxial cable all the way. This has knocked the noise down by about 70%.

For **Don G3NOF** in Yeovil, beams are the thing. He has a 14/21/28MHz tribander plus another for the WARC bands (18/24MHz) at the top of his tower.

On 14MHz G3NOF raised XU5DX, while on 18MHz P29CW. Don used 21MHz to work FY5FW and the prize on 24MHz was S0RASD. He uses a Kenwood 950SD and his old Drake linear amplifier.

Gerald Bramwell in Swinton (Greater Manchester) uses a couple of metres of wire. But that doesn't stop him hearing most of what is about on sideband, n.b.f.m., c.w. or RTTY.

For example on 14MHz Gerald found that all the continents were represented, while 1.8MHz was found full of Ws, including W0LYI, on s.s.b.

Spratly Island

At the time of writing in late March, the rumours are that the Spratly Island operation will be on about the time *PW* hits the newsagents. **Let's hope 9M0S doesn't suffer the fate of the last attempt. Amateur radio can do without deaths.**

The Reports

I start the reports with **Adrian Rees** who listens to 3.5MHz on two two-element beams! One is aligned at 080° true, and the other is at 280°, thanks to trees, neighbours' houses and so on.

For 1.8MHz, Adrian has a full half-wave with one end raised to 25m with the other end at 15m. He uses an AR88 and a FR-50B recently fitted with a new set of valves. Among the loggings I'm pleased to see, on 1.8MHz, a contact with a Novice in Aberdeen.

In Hereford **Luciano Marquardt** found S79FIB on 28MHz and S0RASD on 14MHz for a couple of new countries. Incidentally, the address for cards to the latter is: **Arseli Echeguren Bardeci EA2JG, Las Vegas 69, 01479 Luyando, Alava, Spain**.

Now, it's time to hear from **Ted Trowell G2HKU** on the Isle of Sheppey. Ted has an HF6 vertical antenna and a G5RV. For QRP he uses an Icom IC-721S and an Omni V for the other contacts.

Ted's flea-power into the HF6 resulted in A71CW on 18MHz. He then worked PZ1DYT, A71CW 9H1EL and FY5YE on 21MHz, plus KP4TQ on 28MHz, all on c.w.

Using the Omni in the same mode at about 70W, Ted raised ZAs on 7MHz, 4X/0K1FGC on 10MHz, with VK9LM(Lord Howe), S21ZH on 14MHz. His 21MHz working resulted in VK0HA, VP5P, and on 28MHz TI4CF.

For once, G2HKU tried sideband. He worked ON7BW on 1.8MHz, 9K2YA and 7XZ2AB on 14MHz, YC6JKV and 9K2YA again on 21MHz, plus FR5GG (Reunion Is) and S79FIB on 28MHz. No beam antennas at **John G3BDQ's**, but nevertheless he found a brace of Diego Garcia stations in VQ9KC and VQ9CE on 21MHz. He also worked S0RASD and VP5/KC0ZC on 28MHz plus XX9TFN, (the QSL arrived in ten days!). John found his first Iraqi station, YI1OMR, for years, and managed a first-ever QSO with V31PC from Belize.

Finally, **Geoff Crowley** (Hafnarfjordur, Iceland) mentions the DX nets he listens to. These include the Brazil Net on 14.24MHz between 0900 and 1000, the Butterfly Net on 14.222MHz around 2215, and the 247 Net, on 14.247MHz at 2300. Times are UTC, frequencies ± the QRM. Incidentally, JY1 (Jordan) was logged on the Butterfly Net one night.

That's the lot for this month. Keep writing, sending in photographs and letting me know what you're doing on h.f. Cheerio for now, 73 DE Paul GW3KFE.

E N D

Packet Panorama

This month Roger J. Cooke G3LDI, praises a wormhole before bringing you news of a bulletin board in Wrexham.

There has been some discussion on the network regarding the use of 'wormholes', such as the 'Lonny link', for passing amateur traffic. Purely a personal view, but I feel that if some commercial organisation feels generous enough to allow amateur traffic via their satellite link, then we should feel priviledged and grateful for the facility. No doubt though, this thought will create, some energetic discussion on the subject.

There exists a similar although slower transfer facility on a regular h.f. link which at least enables us to keep up-to-date with the latest Keplerian element sets, DX and propagation news etc.

Lonny Link

Details of the Lonny link, the London - New York wormhole, comes courtesy of Bob G4XDD/NV3Y who is sysop of GB7XDD. Recently there was a meeting in London of some of the sysops associated with the Lonny link. Derek GB7HSN, Frank WA2NDV, and Tom NY2S discussed present and future plans, whilst Bob G4XDD, kept order and took the photographs.

The prime mover of this Lonny link wormhole is Frank WA2NDV, who's even named his dog Lonny. The motley crew are shown in **Fig. 1**!

The New York end of the Lonny link is located 66 floors up in a building on Rockerfeller Plaza in downtown New York City. The entry point is a 9600Bd packet data link, provided courtesy of the NBC-TV Employees Amateur Radio Club.

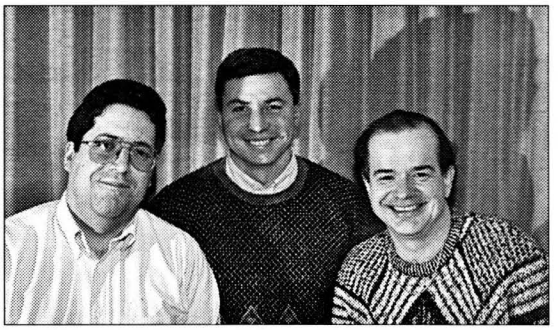

Fig. 1: Three wormhole operators, left-to-right Frank WA2NDV, Derek of GB7HSN and Tom NY2S. Photo Bob G4XDD/NV3Y.

The Lonny node in Central London gives BBSs such as GB7HSN and GB7XDD forwarding capability direct into the US BBS network, as well as enabling local users to access US nodes and join online conferences across the Atlantic. Until recently, the routing was a lot more complex than this.

Over a meal of giant burgers, waffles and coffee (what else?) in Knightsbridge, Frank WA2NDV and Tom NY2S, explained that further links had joined the network. A node listing at NYHUB now shows such exotica as: OXNARD:KA6LAZ-2, PALMAR:W6NWG-1, LANODE:K6VE-10, BGBEAR:AA6TN-1 and MALIBU:N6FDR-2.

Tom NY2S, is shown in **Fig. 2** testing the link from London using a small 386SX based laptop PC at GB7XDD. The response was incredibly fast, quicker in fact than Tom was used to from his office back home!

Back-to-back connections of TNCs from the operating shack at NBC-TV to the antenna site on the sixty-sixth floor. Activity on the wormhole and nodes can be checked from there, although the TNC configuration prevents wider monitoring.

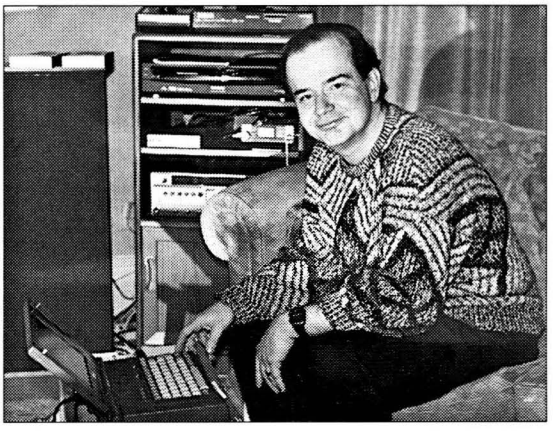

Fig. 2: Tom NY2S, in London, testing the wormhole link back to his BBS in New York. Photo Bob G4XDD.

Fig. 3: Frank WA2NDV joins in checking the Lonny link wormhole out. Photo Bob G4XDD.

Further afield, links into VK3 and Internet are possible, bringing fast worldwide packet links even closer and more accessible. Another check of the link whilst in London, by Tom and Frank is pictured in **Fig. 3**. Anybody who has made use of the Lonny link, will, I feel sure, sing its praises for the fast return of mail from the USA.

Wrexham BBS

News just in from Ian GM1MVL, who reports that GB7WXM the Wrexham area BBS is now on-line. The sysop for the bulletin board is Malcolm GW8HBP. Ian, as the board's remote sysop, says the board is operating on 144.650 and 432.675MHz.

This new station should provide a much needed user service in an area between GB7s CRG, SAM and PMB. Mail forwarding is to GB7PMB on 70.4875MHz.

Ian also says that a large quantity of Graphics Image Format (GIF) files are available on the board. This type of picture file is viewable on a variety of different computers. Files available on the BBS, are lunar and star images taken by a ST4 CCD camera.

The availability of these files is due to a chance meeting with Mr. Peter Williams of the Whittington Astronomical Society. He is a sysop of Starbase 4, a telephone BBS, that has regularly updated files.

This chance meeting has led to a good relationship with the Astronomical Society. If anybody is interested in these latest files, please send an IBM PC 1.44Mb formatted disk with the usual mailer and return postage to: **Ian, GW1MVL, 28 Maes y Gornel, Rhos, Wrexham, Clwyd, LL14 2LP.**

Well, that's about all I have room for, keep the news coming please, especially from the user groups, I could do with more news from you! 73 and happy packeting de Roger, G3LDI @ GB7LDI, Tel: (0508) 70278.

END

SATELLITE Scene

PAT GOWEN G3IOR

This month Pat Gowen G3IOR brings news of more DX on the satellites, encourages Novice licensees to participate and the latest 'moon bounce' happenings.

Welcome to the world of amateur radio in orbit! **Andre ON1AIG** has told me of lots of first time satellite DXCC opportunities on OSCAR-13. Some very exotic countries are now on, or are coming soon, including VK9 Lord Howe Island, FK8 New Caledonia, KH5 Palmyra, KH5K Kingman Reef, XF4 Revilla and Gigedo Islands.

There's also 1S Spratley Island, YK Syria, 5T5 Mauretania, HS0 Thailand, KP1 Navassa Island, PY0F Fernando de Noronha, A6 United Arab Emirates, 8P6 Barbados, JY5 Jordan, and 5Z Kenya. The full ESDX bulletin details are freely available on the packet radio network from Andre as **ON1AIG @ ON7RC.BT.BEL.EU**

Novice Satellite

The new Novice 432 to 440.0MHz allocation includes the satellite sub-band 435.0 - 438.0Mhz. So, 2E stations are now able to access any 'B' or 'S' mode amateur radio satellites (such as OSCARs 10, 13 or 21) that use 435MHz uplinks.

Data on the frequencies, modes, gear, antennas, methods and means is available. Just send a stamped A4 sized s.a.e. to the new *PW* offices (address on the contents page) asking for the free copy of the satellite information sheet. I'd also like your information too, and look forwards to seeing reports of DX worked by satellite, particularly by any novices.

Power Limitation

The 3W Novice licence power limitation certainly imposes an obstacle. But it can be overcome by using enough antenna gain to boost the limited output power to some 150W e.i.r.p.

The effect 150W gained is more than enough to access OSCAR-21, and even OSCAR-10 or 13 when they not overloaded by high power users, and when the satellite antenna is pointing at earth. The antenna system can be a 20+ element crossed Yagi, a pair of 2 x 10s or an 18-turn right hand circularly polarised (RHCP) helix to give the 17dBi forward gain needed. You can then work the world and the prized stations previous listed!

Big Antenna

There's a big antenna shown in **Fig. 1**, with **Doug Mallett G3HUL** standing with **Ray Soifer W2RS** on the right is G3HUL's 8 x 21 element 432MHz e.m.e. array. You can estimate its size by comparing it with the onlookers.

If you build something like this you will easily work the satellites with less than 500mW of uplink power. And you'll hear OSCAR-13's 'JL' mode downlink sounding like a broadcast station!

Moonbounce Story

I'm now going to tell you a short moon-bounce story! The story begins during the EME Contest week-end, when I aimed my 10-element crossed 144MHz Yagi at the moon, listening on my IC-251E.

Nine fully readable DX stations were heard within 15 minutes! Whilst a few of the nearer Europeans may have been via 'tropo', those from W5UN and KB8RQ could only have been via moon-bounce.

Ray Soifer W2RS, who was visiting me at the time calculated that with just 100W we could have worked them. Despite the limitations at our end, the superior antenna gain at the other end of the path would have permitted contact.

In fact, Ray has already achieved simple e.m.e. Using between 50 and 100W to a single long Yagi, he has worked some 30 stations via 144MHz e.m.e.!

Good Signal

One good signal I heard moon beaming, was that of

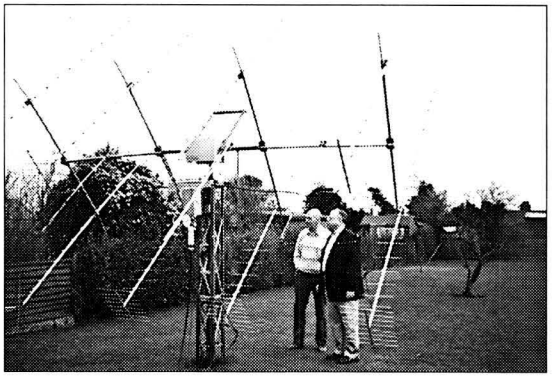

Fig. 1: Doug Mallett G3HUL and Ray Soifer W2RS surveying the G3HUL 8 x 21 element e.m.e. Yagi array.

John G3IMV. When I turned the antenna toward Milton Keynes where G3IMV lives, he came up to RST599. So, I knew that his signal was arriving by 'short path'!

Having calculated the e.m.e. Doppler shift, I beamed back to the rising full moon to see if I could hear his echoes. I did, but at reduced greatly reduced Doppler shift.

Furthermore John's echo was not coming back the normal 3 seconds after his tropo signal. It arrived just 330mS later!

This return time indicated a slower moving target situated some 50 000km out in the general direction of the moon. As I am unaware of any possible reflecting source other than perhaps the ion-combining magnetotail, I mentioned this unusual finding on the 14.345MHz International EME Net.

It turned out that quite a lot of the e.m.e. operators had noticed the effect I'd heard on John's echo. They had usually dismissed it as 'aurora' even when little or no such propagation existed at the time.

The returned signals aren't always in the moon's direction. Their tonal quality is quite different, sounding far more like aircraft flutter than the characteristic multi-Doppler auroral 'hiss'. In any case, it's impossible to get auroral returns from 50 000km out in space, which is what the echo delays indication.

Strange Effect

The strange effect appears to be a possible new method of communication that could be exploited by keen radio amateurs. To this end, **Nico Janssen PA0DLO** is enquiring into the effect. Nico is calculating the magnetotail off-set point. He's also getting some of those interested Dutch e.m.e. users with fast transmit/receive change-over to point their arrays to try for returns.

The effect seems to require a low angle elevation near-to-full moon, a low magnetic flux and a high solar Flux. These findings appear to fit the magnetotail theory with a 'dark zone' in the lunar direction bounded by highly ionised Solar material sides cone pointing. Theoretically these conditions could produce the discovered results.

If any of you v.h.f./u.h.f. enthusiasts know of any such findings, please let PA0DLO know. He is **QTHR or @ PI8ZAA** on packet. Provide as much information as possible on the return characteristics, duration, delay, lunar phase, azimuth and elevation, etc.

Well, that's the lot this month from the world of amateur radio in orbit. See you next time.

E N D

April 'Satellite Scene': A photo-credit was inadventently left off the photograph showing "The French ARSENE satellite under test" in the April issue of *PW*. The photograph was supplied courtesy of Aerospatiale, and we belatedly acknowledge and thank the company for the photograph.

ANDY EMMERSON G8PTH

The World of ATV

FOCAL POINT

This month Andy Emmerson G8PTH appears on screen with ATV news from Switzerland and home news from the Severnside groups work on their proposed 10GHz ATV repeater, ending up with an interesting letter from Ireland.

In my bi-monthly look at the ATV scene, I've got a very interesting letter from **Hardy HB9RRH** in Niederzuwill, Switzerland.

Hardy says "I am active on ATV with 70cm a.m. and 23cm f.m. I made an entry in last September's IARU Region 1 ATV contest with a small 70cm transmitter working with 1.2 Watts only.

"The portable transmitter weighs just 300gm, without batteries, and was developed and built by my friend HB9CSU, Dr Hans Karl Sturm. Hans Karl has just completed a fine repeater, the HB9FW, situated 790 metres above sea level. It is about 3km from my QTH, which is at JN47NK.

"Repeater input is 23cm f.m. on 1274MHz, output on 70cm a.m. with 60W sync. power on 432.350MHz picture, 437.850MHz sound. The antennas for 23cm and 70cm are slotted tubes, arranged as a four-antenna system on each band, all home-made. The pre-amp is 20dB.

"The relay covers the region of eastern Switzerland as far as Ulm in Germany. It is intended to make a link-up with the repeater DB0GY, situated near Friedrichshafen on Lake Constance.

"We are awaiting permission from the post offices of Germany and Switzerland. Apart from the repeater, I am quite often QRV from the top of some mountains.

"German amateurs have relayed my transmissions on several occasions as far as Munich as I have been active from a mountain some 1500 metres above sea level, sending pictures of hang-gliders starting from snow-covered slopes. It was a real thrill to us all.

"Two years ago I went together with my son to the Zugspitze, which at nearly 3000 metres is the highest mountain in Germany (near Garmisch-Partenkirchen). Hans Karl was able to receive my 70cm transmission in colour. The signals of my little 1.2 Watt transmitter covered the distance of about 180km with flying colours". Thank you for your fascinating letter Hardy!

Next, I've got some repeater news, and **G8EMX** is putting out a lively bulletin. It gives details of progress with the new Birmingham repeater.

The Midland Amateur Radio Society (MARS), have given their willing agreement for the TV repeater group to mount a repeater on top of their club headquarters for coverage trials. The site is about half a mile north-west of Colmore Circus. Trials are to go ahead, and in fact they should have started by now.

Severnside Group

Shaun O'Sullivan G8VPG from the **Severnside Group** reports that: "Work on our proposed 10GHz amateur television repeater continues to progress. A major milestone was passed on November 29th last, when the first site trials were carried out.

"Ted G3JMY, Ivor G1IXF and Viv G1IXE assembled on the proposed site and set up a transmitter operating on 10.15GHz, which is the expected output frequency. The aerial was the slotted waveguide the repeater will use. It was a typical cold November afternoon, but thankfully the rain that we had been having rather a lot of at that time had stopped.

"A number of people with 10GHz receiving equipment were eagerly awaiting, to see if the signals were watchable. For receive everyone was using converted satellite TV l.n.b.s in conjunction with dish antennas of varying sizes.

"The reports received were very encouraging. We should obtain good coverage of the Bristol area. Roy G3FYX in Winterbourne sent in a P5, commenting that more deviation was required. This was a comment everybody made and a suitable adjustment will be made to the transmitter in due course.

"Phil G1HIA at home in Horfield reported a P4. John G3RFL at home in Portishead saw between a P0 to P3 with fading, which I think surprised even him. Ken G4BVK at home in Hanham utilised his main steerable 1.2-m diameter satellite dish, but still could not seen anything (later investigations showed one of the stages in his l.n.b. was not working).

"The results from the day's work will enable us to produce the necessary area coverage map and complete the licence application forms. However, we must first get formal permission to use the site. It is a super site which is the reason why we are keeping it a little under our hats!"

Thanks Shaun for an interesting insight in preparing the ground for a new repeater!

Photograph of the Nottingham repeater GB3NV transmissions, as seen by Dave Clarke G7KAO in Dartford, Kent just after Christmas.

Czech Mate

One of our Czech readers, Miroslav Mate, is setting up a video studio. He would very much like to acquire any semi-professional equipment readers may have spare, and donations will be much appreciated.

Cameras, video tape recorders, tape, etc. would all be welcome. Transport could be arranged, so if you can donate anything, please get in touch. Miroslav also needs the manual or circuit for a Connexions TCR 8520/CM 8720 satellite receiver. Contact me, **Andy Emmerson G8PTH on (0604) 844130**.

Dublin Letter

From Templeogue (near Dublin) comes another letter from **Dave Hooper EI2HR**. "Pleased to meet you, Bob and Paul at last autumn's Malahide rally. The items bought from Bob are now delivering pictures over the Dublin area and I have now had contacts with nine ATVers, the nearest 11 miles and the furthest 14 miles.

"A surveillance camera bought at Malahide provides an alternative signal source to my camcorder. I have made a frame for it, with lights and a ball bearing runner so that the camera will cover approximately 6in x 8in down to postcard size for captions, etc.

"The card holder is hinged so that it can fold away underneath the frame leaving the camera seeing a long shot of the shack. My biggest problem is not enough hands. I must get rid of the push-to-talk and hand-held mike.

" Maybe a headset boom mike like EI7CL uses. Or a tie-pin mike. What do others use?".

Well, what do you use? Write and tell me, because that's all I've got room for this time. Cheerio for now.

END

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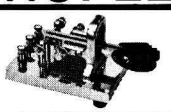

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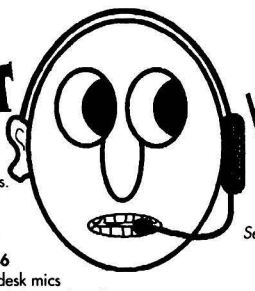

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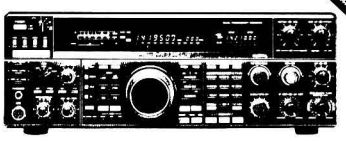

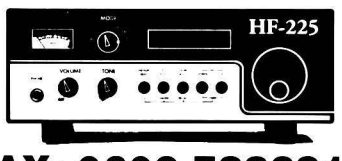

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We have up to date test equipment, fully equipped workshop for all types of radio equipment.
Second Hand Equipment Available, Part Exchange Welcome.

BROADCAST Round-up

I must confess to you, about my biggest mistake in short wave radio listening. It happened years ago, soon after I first started to listen to international radio stations, when I heard Radio Kuwait and sent in a reception report.

It was not particularly difficult as Radio Kuwait used very high power transmitters, but I enjoyed the programmes. They were transmitted simultaneously on short wave and in f.m. on v.h.f. in the city, mainly for Western expatriate workers.

Radio Kuwait responded to my reception report promptly, and sent a QSL card which I kept for some time. At the start of the Gulf War, I searched high and low for that early QSL card, and could not find it anywhere!

What a trophy it would have been, had I discovered its hiding place and no doubt featured it in a *PW* article at the time! Never throw anything away, because you never know when it might come in useful! Think what could happen to the value of QSL cards and other material from the old Radio Moscow of the Soviet Union.

Another 'collectable' stacked away in a bookcase at my home is a guide to East Berlin. It was produced in full colour by the East German government, and sent to me during the 1970s by Radio Berlin International.

Since the Berlin Wall came down I've had the opportunity to visit East Berlin. The sights are somewhat less inspiring than those portrayed in the book!

Stations around the world have often sent out huge amounts of goodies to listeners. Particularly generous in the past have been Radio Beijing, Radio Prague (whose teaspoons I still use in tea caddies) and the Voice of America.

The glossy colour magazines published by the Chinese authorities often proved an interesting read, although they had nothing to do with radio. But that's one of the pleasures of short wave listening, it's an introduction to the world.

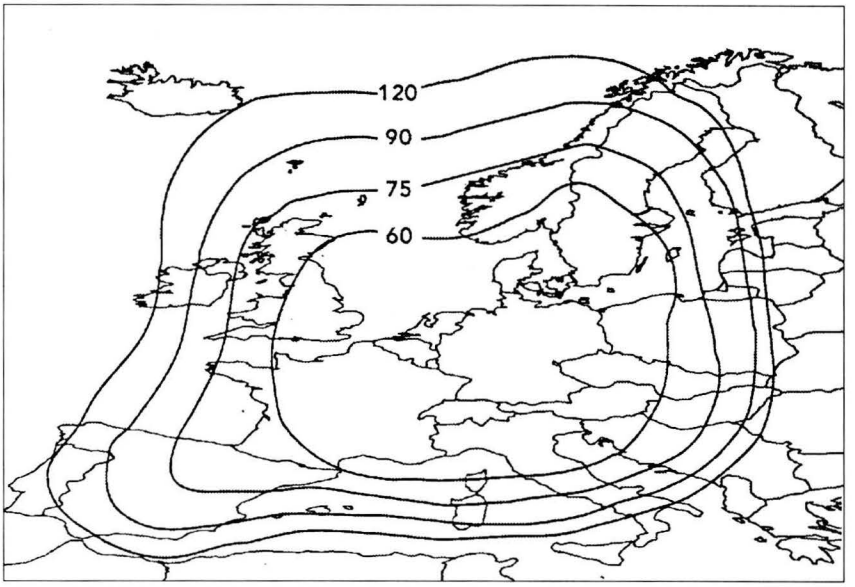

Fig. 1: The Astra satellite coverage footprint.

Today, more and more stations have felt the budgetary squeeze. Less prolific are the freebies winging their way from stations both from the East and the West. But there are still souvenirs to be had.

It's worthwhile sending in reception reports to stations and collecting QSL cards from time to time. They are often colourful and attractive and sometimes special series are issued to mark important occasions.

How to report to stations is a bit of a science in itself. The umbrella organisation for clubs in Europe the **European DX Council**, publishes a *Reporting Guide* which offers advice and a vocabulary of important DX languages including French, Spanish, German and specimen reports. It costs £2, including postage, from **The EDXC, PO Box 4, St Ives, Huntingdon, Cambridgeshire PE17 4FE**.

Latest Schedule

The latest schedule from Australia has arrived to confuse listeners in Europe, as there's a typographical mistake amongst the list of frequencies recommended for this part of the world.

However, I have sorted it all out, and can tell you that the suggested channels (times UTC, frequencies in MHz) for Radio Australia in English are:

0700-0900 on 21.595
0730-0830 on 15.24
0900-1300 on 21.725
1430-1800 on 9.56 and 13.755
1800-2030 on 5.88 and 7.26

You might also like to try between 0730 and 0900 on 25.75MHz ,which is suggested for the Middle East and North Africa and could be audible in Europe.

The World Service of the Christian Science Monitor alters its frequencies on 4 May for the period to 30 August. English is heard in Europe:

0600-0800 on 9.84 and 9.87
0800-1000 on 11.705
1400-1600 on 15.665
1800-2000 on 17.51 and 15.665
2000-2200 on 15.665 and 17.51
2200-2400 on 15.665

Broadcasts from the station to Asia in English are:

0000-0200 on 17.555
0400-0600 on 17.78
0600-0800 on 17.78 and 17.555
0800-1000 on 17.555
1000-1200 on 13.625 and 17.555
1200-1400 on 13.625
1400-1600 on 9.53 and 13.625
1600-1800 on 11.58 and 13.625
2000-2200 on 9.455
2200-2400 on 13.625 and 15.405

Transmitter exchanges between BBC World Service and NHK Radio Japan increased at the beginning of April when the BBC acquired time on a new transmitter at the Tokyo-Yamata site of the NHK to beam into China and other parts of Asia.

The BBC can be heard in a variety of languages from:

0900-1300 on 11.765 and from 2100 to 0030 on 15.37MHz. Radio Japan is using the BBC's station in Singapore

from 0100 to 0300 on 11.86 from 0500 to 1000 on 11.74 and from 2100 to 2200 on 6.035MHz.

Channel Africa's English schedule is currently:

0200-0300 on 9.73
0300-0400 on 9.73 and 3.995
0400-0500 on 9.695 and 3.995
0500-0600 on 11.745
0600-0700 on 17.71
1000-1100 on 17.805
1100-1200 on 9.73
1600-1800 on 17.71 and 5.96

Finally, BBC World Service and three of the domestic BBC stations, Radios 1, 4 and 5, are now fully operational on the Astra satellite. If you have satellite reception equipment, point your antenna at Astra 1B at 19.2° East and tune the receiver to Transponder 23 which carries UK Gold television. World Service is on the audio subcarrier at 7.38 MHz, Radio 1 at 7.74, Radio 4 at 7.56 and Radio 5 at 7.92 MHz.

The map, **Fig. 1**, shows the approximate footprint of Astra and suggested antenna sizes for sparkly-free (TV) reception of the services on the satellite. So, until next month, good listening, and don't forget that all the latest broadcast news is available each week in **Radioline** on **0891 654676**, updated every weekend!

E N D

ARCADE

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

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

Services

Queries:
Practical Wireless,
PW Publishing Ltd., Arrowsmith Court,
Station Approach,
Broadstone, Dorset BH18 8PW.

We will always try to help readers having difficulties with *Practical Wireless* projects, but please note the following simple rules:
1: We **cannot** deal with technical queries over the telephone.
2: We **cannot** give advice on modifications either to our designs, to commercial radio , TV or electronic equipment.
3: All letters asking for advice **must** be accompanied by a stamped self-addressed envelope (or envelope plus IRCs for overseas readers).
4: Make sure you describe the problem adequately, with as much detail as you can possibly supply.
5: Only one problem per letter please.

Back Numbers

Limited stocks of many issued of *PW* for past years are available at £2.00 each including post and packing. If the issue you want is not available, we can photocopy a specific article at a cost of 85p per article or part of article.
Over the years, *PW* has reviewed many items of radio related equipment. A list of all the available reviews and their cost can be obtained from the Editorial Offices ar Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW for a stamped self-addressed envelope.

Binders

PW can provide a choice of binders for readers' use. Plain blue binders are available, each holding 12 issues of any A4 format magazine. Alternatively, blue binders embossed with the *PW* logo in silver can be supplied. The price for either type of binder is £5.50 each (£1 p&p for one, £2 for two or more).
Send all orders to PW Publishing Ltd., FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Constructional Projects

Components for *PW* projects are usually readily available from component suppliers. For unusual or specialised components, a source or sources will be quoted.
Each constructional project is given a rating to guide readers as to the complexity.
Beginner:A project that can be tackled by a beginner who is able to identify components and handle a soldering iron.
Intermediate: A fair degree of experience of building radio or electronic projects is assumed, but only basic test equipment will be needed to complete any tests and adjustments.
Advanced: A project likely to appeal to the experienced constructor. Access to workshop facilities and test equipment will often be required. Definitely not for the beginner to attempt without assistance.

Mail Order

All items from *PW* are available Mail Order, either by post or using the 24hr Mail Order Hotline (0202) 659930. Payment should be by cheque, postal order, money order or credit card (Mastercard and Visa only). All payments **must** be in sterling and overseas orders **must** be drawn on a London Clearing Bank.

PW PCB Service

Orders and remittances should be sent to:
Badger Boards, Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326, marking your envelope PW PCB Service. Cheques should be crossed and made payable to **Badger Boards**. When ordering please state the aarticle title as well as the board number. Please print your name and address clearly in block capitals and do not enclose any other correspondence with your order.

We have talked to Badger Boards about the club and group discount on orders, and they are happy to continue this service. Club secretaries and group leaders should contact Badger Boards direct for the new discount rates.
Please allow 28 days for delivery.

Board	Article (Project) Title	Issue	Price
WR314	UHF Pre-Amplifier	Dec 92	£3.45
WR313	10MHz Transmitter	Nov 92	£4.65
WR312	Receive/Mixer (Getting Started)	Nov 92	£4.15
WR311	Oscillator BFO (Getting Started)	Sept 92	£2.60
WR310	1.2GHz Pre-scaler	Aug 92	£3.75
WR309	Volt Reg/Divide by 100	Aug 92	£3.15
WR308	TTL 1MHz Oscillator (Getting Started)	July 92	£2.20
WR307	Crystal Checker (Getting Started)	June 92	£4.25
SET	**WR303/304/305/306** Inductance Bridge	Apr 92	£19.30
WR302	GDO (Getting Started)	Apr 92	£4.75
WR301	Challenger Receiver	Feb 92	£4.75
WR300a	OSCAMP Oscillator	Mar 92	£4.75
WR300	OSCAMP Amplifier	Feb 92	£5.20
WR299	Multivibrator (Getting Started)	Jan 92	O/S
WR297/298	Additional Beaver boards		O/S
SET	**WR295/296** PW Beaver	Oct 91	£12.00
SET	**WR292/293/294** Chatterbox	Aug 91	£14.00
SET	**WR290/291** Robin Freq. Counter	Aug 91	O/S
SET	**WR292/293/294** Chatterbox	Aug 91	£14.00
WR289	Meon-4 (Control)	Jul 91	£4.67
WR288	Morse Master	Jun 91	£4.89
WR286	Meon-4 (RF PA)	Jun 91	£5.54
WR287	Morse (Speedbrush)	May 91	£4.85
WR255	Meon-4	May 91	£6.76
WR285	Scope Probe PSU	Apr 91	£4.87
WR284	Scope Probe	Apr 91	£5.75
WR283	Sudden Receiver	Mar 91	£4.54
WR282	Repeater Toneburst	Feb 91	£5.10
WR281	High Voltage PSU	Jan 91	£4.70
SET	**WR263/264 +WR276-80** Marland Transmitter	Jul 90 Sep 90	£21.96
WR272	NiCad Recycler	Jun 90	£7.06
WR275	Low Voltage Alarm	Jun 90	£6.49
WR273	Valve PSU	May 90	£7.00
WR274	RX Attenuator	May 90	£5.84
WR271	Product Detector	Apr 90	£5.05
WR270	Badger Cub	Apr 90	£5.04
WR269	Glynme	Feb 90	£6.83
WR268	Irwell (RF PA)	Feb 90	£6.12
WR264	Irwell (Relay)	Feb 90	£5.10
WR263	Irwell (VFO)	Jan 90	£6.12
WR267	PW 49'er	Jan 90	£6.12
WR266	Tuned Active Antenna	Jan 90	£5.71
WR265	Tuned Active Antenna (PSU)	Jan 90	£5.71
WR199	Meon 50MHz Transverter	Oct 85	£6.83
WR161	Marchwood 12V 30A PSU	Jul 83	£4.28

Please use the order form on page 65 for **all** items in the *PW* arcade.

BARGAIN BASEMENT

Write your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it together with your payment of £2.35 (cheques payable to PW Publishing Ltd.), or subscriber despatch label and corner flash to: **Donna Vincent, PW Publishing Ltd., Bargain Basement, Arrowsmith Court, Station Approach, Brosdstone, Dorset BH18 8PW.**
Subscribers must include the despatch label bearing their address and subscription number to qualify for their free advert.
Adverts published on a first-come, first-served basis, all queries to Donna Vincent on (0202) 659910.
Advertisements from traders, or for equipment that is illegal to possess, use or which cannot be licensed in the UK, will not be accepted.
No responsibility will be taken for errors.

For Sale

Amateur Radio* & *Ham Radio Today both from No 1 to '8, also *Practical Wireless* 1947-1970, offers. CapCo SpC 300D 1kW, still in box, £150. Bill. Tel: 041-649 4345.

BBC B disk drive, monitor, 2i/f socket, GX-2 SSTV FAX TX/RX system, TX-3 and RX-4 software, v.g.c. with manuals, £180. Roger G3SNT. Tel: 091-384 8543.

Bremi linear BRL 200 10W in 100W out. Suitable for 21 & 28MHz Manual, £55. G4ZQA QTHR. Tel: (0305) 820025.

CR100 Marconi general coverage receiver, good condition, £70. Marconi VTVM, £12. Knight VTVM, £10. Various valved radios all in working order £10-£15. Tel: Manchester 061-962 7577.

Datong ANF, £45. FL3, £80. ICS Fax-1, £175. Trio 9R59DS plus speaker, £65. Scopex 4S6, £60. CTE 1600 144MHz, £70. All good order, must collect, Lancashire. Tel: 070-621 8290 evenings only.

Drake TR7 transceiver with SPS7 power supply, s.s.b. and c.w. filters fitted, receive d.c.-30MHz, £565. Geoff G4ECF. Tel: (0483) 570033.

Eddystone models EC10, £75. 730/4, 770R, 770U/2, £95 each. Cash plus post, all in v.g.c. I still need an 870/A. Peter Lepino, Surrey. Tel: (0374) 128170 or Fax: (0372) 454381.

FT-747GX with f.m., £575. Uniden PRO620 home base, £110. Jesan KT2002 mobile, £50. Datong speech processor, £60. Altai base power mic, £30. Mostly new. Tom, Kettering. Tel: (0536) 522007.

IC251E 144MHz multi-mode, £200. TS780 144/432MHz multi-mode, £500. Tempo 144A 1kW p.e.p., £500. Tokyo 160W/p.a. 144MHz, £100. Daiwa 30A p.s.u., £90. 144/1296 TVTR/m 2W o/pt, £800. Genuine reason for sale, all o.n.o., all v.g.c. G4HGI, St Helens, Merseyside. Tel: (0744) 895139.

Icom IC-R7100 (with shop fitted h.f. section) 0-2000MHz, no gaps, like new, £850 o.n.o. Kenwood RZ-1 scanner 500kHz-950MHz, like new, £265 o.n.o. Would exchange both for Kenwood TS-690/TS-790 w.h.y. Barry G7OFR (can travel). Tel: Bradford (0274) 880895.

Jaybeam TB1-MkIII h.f. tri-bander 14, 21, 28MHz, s/s fittings, length 25ft. If space a problem 18, 21, 28MHz can be simply adapted, then approx 22ft overall. Absolutely mint, unused, boxed, instructions, list price £140, sale for £100. No offers please. G2FZU, QTHR. Tel: (0636) 813847.

Junk Box Sale, components, modules by Denco (coils, transformers). Electroniques (coils, transformers, front end and i.f. modules). Eddystone (receiver front ends, mother boards, 898 dials). Full data s.a.e. lists. Mr Woodward, 19 Jacomb Road, Lower Broadheath, Worcester WR2 6QW.

Kenpro KT-22 144MHz hand-held, brand new, £85. Fairmate HP200E scanner 0.5-1300MHz, mint boxed, £145. Sony Pro-80 new boxed, £135. G6NTQ, Dudley. Tel: (0384) 211744.

Kenwood TH-77E dual-band handie, speaker/mic, vox headset, extra batteries with chargers, worth £650, asking £375. Yaesu FT-7 mobile TX/RX, £325 o.n.o. Yaesu FT-101B, overhauled, clean, low-life p.a.s, £275. Derek G4ABS, Stratford-upon-Avon. Tel: (0789) 297158.

Kenwood TH77E dual band handie 144/433MHz. Boxed with NiCad battery and charger, Many memories and functions, £280. Tim G7KGM, Swindon. Tel: (0793) 855007.

Kenwood TS-850SB auto a.t.u. 500Hz c.w. filter mic as new, £1200. PS-52, £150. Ten-Tec Corsair 2, £700. TS-520 250Hz c.w. filter, £300. Cushcraft A4, £180. FC-102. 1kW h.f. a.t.u., £180. Tel: Falkirk (0324) 32594.

Lattice Mast heavy duty tilt-over, overall length 48ft retracts to 20ft, winch etc, can be seen standing, £325 o.n.o. Michael G0RDD, Peterlee, Co. Down. Tel: 091-518 3609.

National Panasonic model DR28 radio digital frequency display, wide/narrow bandwidth f.m./m.w./l.w./s.w. 3.2-30MHz tuning meter, good condition, £145 o.n.o. plus postage. Tel: Kent (0322) 667641 after 7pm.

Panasonic RF-B65D l.w./m.w./s.w. with s.s.b., boxed in good condition. Genuine reason for sale, £95. Tel: Ealing 081-998 4336.

RA17 MkII RX, £150. RA137A l.f adapter, £65. h.f. a.t.u., £40. LPF, £10. 400W load, £10. Sat TV RXs NEC3022, £65. Echostar Sr-1000 (70MHz i.f.) , £75 (tuneable). Other equipment available. Tel: 081-519 8189 evenings.

Sagant half-wave 14MHz Zepp, end fed PL259 in plastic wallet, list price £79.95 as new, £55, ideal h.f. holiday. Dave 081-444 5923.

SW receivers (various) 3.5-14MHz. t.r.f. and Howes kits ready-built some need tuning, 15 sets, £35 each or £450 the lot no PPS head phone operative, ideal for beginner. Tel: (0924) 469537.

Ten Tec Delta II, new, unused, selling due to abandoned mobile program, cost £1495, offers please. Tel: (0229) 89635 anytime.

Tennamast 40ft telescopic and tilt mast with Yaesu G-400 H/D rotator and Mosley TA33 JNR 3-ele Tri-bander 3 years old currently erected, £450 o.n.o. Tel: (0749) 880320.

Valve experiments? Many transformers available, mostly new, s.a.e. Early Erskine DB scope, bridges, Cintel for 'L' and 'C'. Interesting old valve amp. Valve voltmeters, 430MHz power oscillator. All collectors pieces. G3JIX, Staple Farmhouse, Staple, Canterbury, Kent CT3 1JX. Tel: (0304) 812723.

Various hi-fi separates, tuners etc, reasonable offers. Will exchange for h.f. TX/RX tuner. Tel: 091-5678 282.

Wraase SC-1 SSTV FAX transceiver with keyboard, £190. Terry G3TRB, Worcs. Tel: (0905) 775206.

Yaesu FL-2100Z linear amplifier in mint condition, £425. Revex W510 s.w.r. power meter 1-30MHz, 200W-5kW, £50 o.n.o. Tel: Liskeard (0579) 21107.

Yaesu FT-101Z looks and performs as new ex-silent key. Ted G4TLY, Malmesbury, Wiltshire. Tel: (0666) 822935.

Yaesu FT-230R, £120. SX600 s.w.r. power meter, £98. Maplin XG94C signal generator 100kHz-150MHz, £55. Maplin 13.8V 7A p.s.u., £28. Shack clearout s.a.e. for list. 70MHz ground plane new, £28. G8FRA, 9 Ilfracombe Grove, Green Lane, Coventry CV3 6DX. Tel/Fax: (0203) 415 815.

Yaesu FT-690 g.w.o. but case scratched hence only £175. Would part exchange towards h.f. TX/RX. Sextet modem, V21 to V32B15, £80. Epson RX80FT printer, £80 or exchange for 144 or 430MHz f.m. TX/RX. Mike. Tel: (0753) 540520.

Yaesu FT-707 h.f. s.s.b. transceiver, Yaesu FC-707 antenna tuner, Yaesu FP-707 power supply, £475 willing to haggle, will not split. Tel: Dorset (0202) 690182.

Yaesu FT-902DM, £550. FT-101E, £275. FT-101EX, £275. FRG-7700, £295. Icom IC-210, £150. TR2200G, £95. YC601, £100. FT-227R, £195. 2kW linear, £850. 1.2kW, £475. 1kW, £450. 600W, £250. All pristine condition. Richard, Nr Taunton. Tel: (0396) 86215 anytime.

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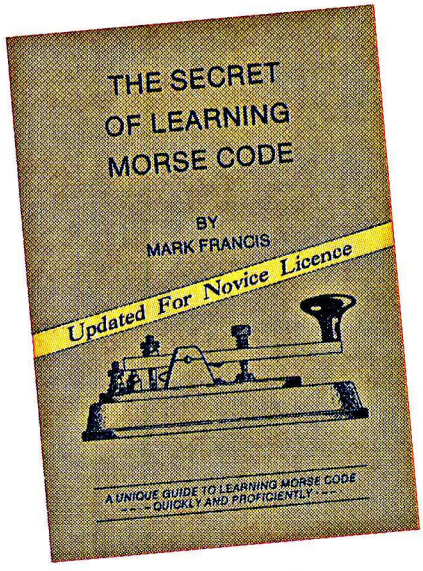

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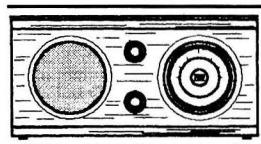

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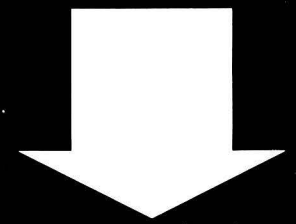

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