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SEPTEMBER 1989 £1.40

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2m mobile
transceiver

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for the Pye
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As continuing proof of our faith in the product and to provide even better levels of service we make the following promise: we will exchange on the spot without quibble any unit failing within 1 year of purchase due to component failure or manufacturing defect (nicad/helical excluded) - with effect from July 1st 1989 - where will you find a better deal? 73 or 88!

ICOM AT RAYCOM ICOM IC-R9000



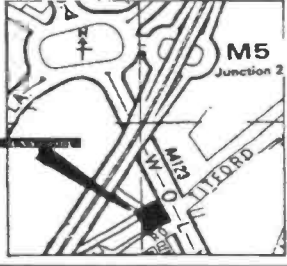
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VOLUME 7 NO 9 SEPTEMBER 1989

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Published by:
Argus Specialist
Publications Ltd
Distributed by
SM Distribution Ltd
Printed & bound by:
Chesham Press, Chesham, Bucks
Design by
ASP Design Studio
**Editorial and Advertising
address:**
Ham Radio Today, ASP Ltd
Argus House, Boundary Way
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*(please mark your letter for the
appropriate department)*

Subscriptions and back issues:
Ham Radio Today Subscription Dept,
Infonet Ltd, 5 River Park Estate,
Berkhamsted, Herts HP4 1HL
Tel: (0442) 876661/4
Subscription rates:
UK £16.80, Europe £21.30,
Middle East £21.50, USA \$38.00
Far East £23.20, Rest of World £21.80
Airmail rates on request.
USA Subscription Agent:
Wise Owl Worldwide Publications,
4314 West 238th Street,
Torrance CA90505

ARGUS PRESS GROUP Member of the
Audit Bureau of Circulation



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Packet Radio

Roundup

I recently tested the latest PMS eprom-based software for the industry standard TNC-2 and clones such as the Tiny-2, version PMS-2.3 from Siskin Electronics. The main changes are incorporated in the personal message system (PMS), which now incorporates reverse forwarding as well as accepting auto-forwarded messages from your local friendly BBS operator. The software uses the

K(ill) K n [CR] deletes message number n (only to/from your callsign).

L(ist) L [CR] lists the 10 latest messages.

M(ine) M [CR] lists the 10 latest messages to/from your callsign.

R(ead) R n [CR] reads message number n.

S(end) S (callsign) [CR] begins a message addressed to (callsign).

receives a packet of data from your local BBS, and think what it would look like at 9600 baud, eight times as fast. A few seconds' worth of data fills your computer screen. Next, think how we will need less congestion as packet is used more and more. Speeding things up certainly helps. Will we be forming an 'alternative' speed with incompatibility problems, or should we see this as true advance, remembering it was a British amateur who pioneered this?

Is 9600 baud the packet mode of the future? Chris Lorek G4HCL thinks so.

normal commands such as send, read and the like to ensure compatibility with networked BBS stations, but the facility exists also for you to enter messages to other stations, for forwarding via the system, on your PMS. Auto-forwarding in the usual sense is not supported, as it would cause congestion in some places, but by prior arrangement with the sysop of your local BBS it may 'poll' your TNC's PMS from time to time for any outgoing messages and pick them up as required, download any messages you have received from other amateurs and, if required, your PMS will even kill messages that have been successfully forwarded.

This facility does of course require the co-operation of your local BBS operator, and in places where one BBS is used very heavily it may not be practical, but it does show what is possible and certainly in my area this is now a routine day-to-day occurrence. End-user access to the PMS is still possible for your friends to leave messages, the latest version having the added facility of a 'J' listing similar to that of most versions of Kantronics TNC software. Commands available now are:

B(ye) B [CR] disconnects you from PMS.

H(elp) H [CR] or ? [CR] displays this help file.

J(log) J [CR] displays a list of callsigns heard (optional date/time)

Subject: max 28 characters ending with [CR].

Test: End each line with [CR]. End message by typing /ex [CR] or CTRL-Z [CR] at the beginning of a new line.

V(ersion V [CR] displays the software version of the PMS system.

This software is currently fitted to all new Pac-Comm TNCs, and I am told eprom upgrades are available for user fitment at nominal cost from the importers, Siskin Electronics (Tel. 0703 849962).

9600 Baud

No, I'm not talking about high speed node-to-node links that the highly technical sysop boffins of this world are starting to get up and running. I'm talking about individual amateurs. Already there are ready-built 9600 baud modem units available, as well as pcb kits, for the amateur to add to any existing TNC which has external modem facility. There are six amateurs in my immediate area using 9600 baud on 2m alone. I even have a TheNet node (G4HCL-3) up and running on 144.625MHzx 9600 baud linked to my other TheNet nodes, all of which are used by several local BBSs for interlinking.

Think of the congestion in many areas on 144.650MHz 1200 baud, take a look at your DCD led-when it

Transceiver Connections

Due to the data speed involved, it is unfortunately not possible to simply connect the 9600 baud modem audio lines to your rig's mic and speaker sockets, as the audio circuitry will not handle it. Instead, receive audio must be taken from the discriminator output of your set, and transmit audio must be fed to the oscillator itself. On some rigs this is a very simple operation, for example on the FT211RH I use here only two soldered leads are necessary with absolutely no circuit modifications to the rig. Maybe manufacturers of future rigs may be persuaded to add 'direct' Tx/Rx sockets to their rigs.

In the meantime I'm starting to collate information on various types and makes of transceivers, and wherever possible and appropriate testing these for suitability for 9600 baud use as well as standard 1200 baud, documenting the required connection details and TXDelay figures. A future edition of HRT will carry the results of these, but in the meantime a message sent to me via the network will result in a response for anyone interested who can't wait.

Future Amateurs

Do you know any interested potential newcomers to communications, like the inquisitive nipper next door who's just finished O levels (or the equivalent)? More often than not, the young enthusiast will have some form of computer. Their parents may be fed up with seeing games played

on it all day, or running up their phone bill dialling landline BBSs, wishing they would do something useful with it. Now, what do you think would get them excited about amateur radio? Maybe the ability to get a simple radio (either a low power VHF homebrew affair or a modified ex-PMR rig) operating into their local packet node, from then on sending and receiving error free messages across the world through the use of store-and-forward networks and satellites. Just like the film *War Games* that was a sensational hit amongst youngsters worldwide, where computer BBS linking was the star feature. Are these the amateurs of the future, or should we instead try to get youngsters excited about QRP CW communications? Think about it. Insults or agreements to G4HCL @ GB7XJZ, I'll be pleased to publish the results!

Time Delayed QSOs

Now what is packet radio? One amateur who contacted me was very disappointed with the lack of 'real' operators to talk to, despite the number of amateurs active on the mode. On connecting to another amateur, we suddenly find we're communicating to a TNC's PBBS (Personal Bulletin Board) with an invitation to leave a message. It's almost like the telephone answering machine effect, some people despise them, others think of them as a valuable tool to get a message across and obtain a reply without the need for repeated attempts. Maybe we should think of Packet Radio as a form of 'electronic mail' rather than a form of real-time two-way communication?

The rate of communication, especially on busy channels (not everyone has gone over to 9600 baud yet), can be fairly slow, although arguably this can be much faster and more accurate than some earlier modes of communication. However, the store-and-forward system can be a great asset to many people who wish to communicate reliably with their friends around the world, but often cannot get on the air at mutually convenient times. To take an example, I often have time-shifted QSOs with local and not-so-local amateurs, with about three or four messages per day being sent to a local station as an over. One such link is with a station one BBS hop away, where his TNC

first receives my auto-forwarded message, he enters a reply on his TNC, the local BBS then automatically picks this message up as a reverse forward and sends it onto me. One day he was mowing his grass while I was out shopping, and we were still 'in QSO'. This may be slow, but it certainly is very convenient!

Rally Hunting

The summer rally season is now certainly with us, and from your feedback it seems that many readers have been returning from their local (and not so local) rallies clutching a nice new TNC to get started on with packet, the Tiny-2 and the PK-88 being very popular for the beginner. This does have a side-effect though, as once the 'bug has bitten' your shack 2m FM rig then often stays put just on the packet frequency of 144.650 or 144.675MHz.

This is when a further rally hunt starts, for a surplus two-way radio suitable for use just with packet on one or two crystallised frequencies. The Pye Europa or Westminster are ideal for this of course, and are sold at typical prices of between £2 (old Westminster) and £25 (as-new Europa). Regular readers of HRT will of course have full details of what to look for from our successful PMR conversion features, others will have to wait for the *Surplus PMR Conversion Handbook* (available in August from our book division, Argus Books).

HF Linking

Many stations will know that messages via the packet BBS network can be forwarded round the world by several means, but on HF packet does tend to be rather slow due to data corruption, and it has been shown that Amtor has significant advantages here as long as no more than one station wishes to use the channel. The latest UK Amtor gateway, GB7PLX, is now fully licensed and operational. Messages can be forwarded from UK packet mailboxes to the gateway, and from there to a number of Amtor mailboxes worldwide, and, via several of these, to the national packet networks for some foreign countries. To use the gateway, first check with the sysop of your home BBS that there is a forwarding route to GB7PLX that is entirely via mailboxes using Worli

software with hierarchical addressing capability. If so, then you can send messages through the gateway as follows:

1) For messages to foreign packet mailboxes, enter:

SP <callsign> @ <bbs>.<ccc>.
AMTOR

for example:

SP VK4AHD @
VK4BBS.AUS.AMTOR.

The <ccc> is the three-letter country codes that are valid. The initial list consists of:

NORway
SWEden
AUStrelia
USA

2) For messages to worldwide AMTOR mailboxes, enter:

SP <callsign> @ <amtorbbs>.
AMTOR

for example: SP VK2SG @ VK2AGA.
AMTOR

Again, check from the bulletins which AMTOR bbs callsigns can be reached. The initial list consists of:

PAORYS
LA9OK
HB9AK
SM6GXQ
SK7CS
KS5V TEXAS
KB1PJ OHIO
WA8DRZ CALIFORNIA
VK2AGE SYDNEY

3) To send messages just to the GB7PLX mailbox, for collection on HF just enter:

SP <callsign> @ GB7PLX

If your home BBS does not have a hierarchical route to GB7PLX, then this last facility is the only one open to you. Note that return messages may not, initially, come via the same route. My thanks go to Peter G3PLX for this information.

End of Message CTRL-Z

A few thought-provoking subjects to be going on with: now let's hear your views. Also, if you'd like a mention given to your group. I can be reached via packet with a message routed to G4HCL @ GB7XJZ. Or if you prefer pen and paper, then letters addressed to Chris Lorek, c/o HRT Magazine at the editorial address will also get to me in due course, but please note that my callbook address is not correct. Till next month, 73 de G4HCL.

RADIO TODAY

Plug In, Psych Up

Many readers will by now have spotted the little devices called Identitags. For the non-spotted, these are plastic labels

which slip over the prongs of a standard mains plug and carry an appliance label, so that you know whether it is the fridge or the video you are about to immobilise in order to recharge your scanner.

What readers may not realise is that these things have clairvoyant qualities.

Take the in-house test procedure. Not trusting enough to try out an Identitag called "computer" on the computer, we stuck it on the vacuum cleaner, where it held fast (test results) for a week or so before being biffed off by hard treatment. Opinion: soundly engineered for normal purposes. Possibly not ideal for being dragged round the floor.

Anyway, a couple of hours later the computer went on the blink.

Diagnosis: cat hairs in the disc drive. Cause: cooling fan professionally designed to suck hairs into disc drive. Treatment: Hoover out the disc drive. Result: computer functioning again. (We don't suggest you try it).

You see what we mean?

Identitags are available for "almost all" appliances. Unfortunately this does not extend to all the bits and bobs in a well-stocked shack, but there are blanks which you can mark yourself. Most computer peripherals are covered. They are also available in braille, and the makers clearly have custom-marking and advertising in mind.

The makers are **Identiplugs of 39 Whitehouse Enterprise Centre, Whitehouse Road, Newcastle Upon Tyne NE15 6EP. Tel. 091 228 0068.** They should be appearing in display racks in hardware retailers.



Westminster Footnote

Jack Hum has written to say that he has encountered a high level of interest on the air concerning John Whetston's article converting the Pye Westminster transceiver for 52MHz (HRT May 1989). "This is just what is required to populate the upper meg of the 6m band and set at rest the reputation it has as "the place where nobody wants to talk to you..." says Jack. The raw Westminster is readily available at rallies and the like, and the May backissue of HRT is available from our backissue service at (note address): HRT Back Numbers Department, Infonet Ltd., 5 River Park Estate, Berkhamstead, Herts HP4 1HL. Price £1.90.

Win A New Kenwood Mobile

The TM-231E 2m 50W mobile transceiver, new from Kenwood, is now available from Lowe Electronics. There are also a TM-431E (70cm) and a TM-531E (23cm) in the family, both of which have an output power of 35W.

They all feature high/medium/low power selection, backlit controls, and a programmable microphone control. In addition to the tone, VFO, and memory buttons on the microphone, an extra switch may be programmed to control one of a range of functions. To simplify mobile operation, there are 20 memories which store all operating parameters including repeater offset and access tone. The rig has a good range of scan and step options, and a wide range of accessories is available.

And the best news for Ham Radio Today readers — we have a 2m TM-231 E lined up as the first prize in our competition for new subscribers. See page xx for details. Not only will you have a chance of winning this attractive new rig (be the envy or your mobile interlocutors) but you get the next twelve issues of Ham Radio Today delivered straight to your door for the same price you'd pay to hoof out and get it from the shops.

Meanwhile, **Lowe Electronics are at Bentley Bridge, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel. 0629 580800.**

Addendum

Sometimes we get typos. Sometimes the proofreader goes on holiday and we get the kind of typos that drink Carling Black Label.

A number of the latter have been located in the "External mic amp with AGC" project in November 1988 issue.

ICI SL6270 is incorrectly named in the Parts List but

appears correctly in the text on page 12.

In Fig. 3, page 14, C10 is incorrectly labelled C9. C10 is the smaller, upper and non-electrolytic capacitor in the diagram. The capacitor labelled C10 is actually C11. Values appear correctly in the Parts List apart from C11, which does not appear at all, and should be 100nF.

The unmarked resistor on the circuit diagram on page 13 is R1, 1M.

Regional Liaison

An issue of the RSGB RLO Newsletter hit the mat recently.

Following the appeals for more material, compliments to the form-sending department at Lambda House, request for more feedback from and about the membership via the Regional Liaison Officers, two news items of interest. One is a note that the EMC Advisory Scheme has recently been approved by Council, and should be moving into action shortly. The EMC committee intends to submit a joint code of practice to the DTI and Radio Investigation Service to get some sort of regular common procedure in dealing with EMC investigations.

The other is a statistical analysis of a recent informal (that is, distributed by hand by the RLOs) survey circulated round the clubs.

Only 14% of the known 658 RSGB-affiliated clubs responded, but this was felt to be a good result for the method of distribution.

Figures that interested us showed that 18% of clubs responding use Radio Tomorrow for the club calendar — comparable with our nearest rival and the local press, but well behind Radcom at 62%.

54% are on their local library lists, 67% hold an annual event, 70% have had a special event call sign in the last year,

48% do construction at the club, 70% are involved in Raynet, 52% have a club net and 56% run Morse classes. On the other hand, only 23% run RAE classes, 11% have schools liaison officers.

From this it is clear that many or most clubs can organise activities which are informal or call for sustained activity once a year, but it is harder for clubs to organise teaching or liaison which has to meet outside timetables or work within office hours.

Only 23% of clubs undertake RAE classes, but 67% of clubs — more than teach Morse — reckon they could teach to Novice Licence standards.

A 50% statistic on this survey represents about 45 clubs countrywide. There must be many more who are active and/or didn't receive or return the survey. This modest sample indicates how much local clubs do to keep amateur radio active and how much they can offer to proto-amateurs who want to learn.

The prime source of formal RAE teaching is still local colleges and adult education classes, and now is the time of year to be finding out about classes in your area for yourself, your friends and offspring. Your club, library, local paper or phone directory are the places to look.

Low Power Still Typed

HRT has more details now of the abolition of licensing for certain low-power radio devices since May 1.

This move is unlikely to add up to any boons for radio amateurs, because type approval will still be required for all unlicensed items, but it is indicative of the general loosening of radio regulations for the sake of industry. The intention to reduce licensing requirements was laid out in a White Paper of November 1988 called, significantly, "Releasing enterprise" (Cm 512).

Radio model control equipment and metal detectors were exempted in 1981, cordless telephones in 1983, and receive-only equipment, including satellite tv receivers (but not, of course, television sets), in February 1989.

How many people knew that you were supposed to have a licence to listen to your tranny until February of this year? Not many. The televisionist assumption has been that we are all 'covered' by broadcast tv licensing. The authorities have sensibly and civilly turned a blind eye on non-tv-licensed broadcast radio listeners for years, but it is noteworthy that the requirement for such a licence did not vanish until the prospect of profitable satellite tv business reared its head.

The areas under the current deregulation involve, loosely, telemetry, telecommand (garage door openers), teleapproach (proximity detectors), radio alarms and radio microphones. Categories which will continue to need a licence will include telecommunication equipment with any facility for returned speech, and equipment using bands where other users have priority, or employing power levels capable of causing interference.

An information leaflet, "Low Power Devices Information Sheet" is available from **Room 605, Waterloo Bridge House, Waterloo Road, London SE1 8UA, phone (for this leaflet only) 01 215 2072.**

Mock Not Morse

Those readers to devote themselves to pursuits of the intellect may have overlooked the recent US teen-sci-fi movie *Space Camp*. What lessons has this cultural artefact for the radio amateur? Orbiting the earth, cut off from voice communication with NASA, the courageous teenage troops wonder what to do next. The daffy one suggests switching some of the spare circuits on and off. Groans from the crew. "You mean Morse Code" exclaims the adult person in charge. "Go to it." Moral: Morse Code is not as silly as some people claim. On the ground, intent on trying to gain remote control of the shuttle, NASA ignores the flashing lights and rampaging clicks until an intelligent robot starts to decode. Everyone is saved. Moral: no matter how clever you are, you might as well be a dumbo if your brain isn't tuned in.

That's the fiction in outer space. But how about facts in inner space?

The Aylesbury Vale Radio Society's June newsletter relayed the story of an 18-year-old motorcyclist, Dennis Dugger, paralysed after an accident. Unable to move or talk, he could only communicate by blinking.

Dugger's radio amateur father and hospital administrator Steve Shipley devised a compact circuit and infra-red light sensor which, mounted on his glasses, detected reflected light from his eyelids and translated it into a bleep.

Dugger learned Morse code visually in two days, and could 'transmit' so fast that practicing A-licensees had to be called in to decode.

The ability to communicate has helped him to recover to the point (so far) that he can whisper, and walk with crutches. Steve Shipley has patented the device, called the Opticon, and is working on extending its uses.

As somebody once said, to communicate in morse all you need is an on and an off — and unlike binary, you don't need a computer to translate. Put it another way: morse will never be obsolete while there is language to communicate.

I Came, I Saw The Video, I Conquered

Summer time is here again, and the summit of any modestly-sized hill or mountain is thick with /Ps hoping to get into the next country on 2 watts.

On 2 June an expedition comprising Richard G3XWH, Robin G3YHC and Simon G4KCR made it to the top of Ben Nevis, the tallest and possibly least accessible tall peak in the UK, to undertake what is believed to be the first 40m SSB operation from the summit, and possibly the first SSB operation ever from that site.

While the rest of the country was enjoying the sunshine, the expedition at 4,000 feet contended with snow and freezing conditions to make over 40 contacts in two hours, running 2 watts and reaching as far as Holland. They also produced a video.

Waters and Stanton Electronics, who sponsored the expedition's HF equipment, now have the 90 minute video with commentary and a detailed record of the mountain landscape and the problems encountered and overcome by the expedition. A copy can be loaned free of charge by any bona fide radio club interested in the subject. All the highest peaks in Scotland, England and Wales can be reached by any fit individual with stout walking boots and a day to spare. There are great distances and lovely views to be had in clear weather, but always check with the local mountain rescue/outdoor centre for weather conditions, sunset time, recommended safety procedures, etc.

For loan of the Ben Nevis Expedition video, contact Peter Waters on 0702 204965 between 9am and 5pm or write to Waters and Stanton, 18-20 Main Road, Hockley, Essex SS5 4QS.

Cubs Prowl HF Bands

The picture shows Scouts from the Northampton Scout Amateur Radio Group trying the new HF-225 receiver from Lowe Electronics. Based at Overton Scout campsite, the Group's annual training courses include Communicator, Computer and Electronics badges. The permanent station has HF and VHF facilities which are used for demonstrations to other Scout and Cub groups as well as by the local group.

"The simple control layout, easy tuning and remarkable performance make the HF-225 an ideal receiver for young people listening to the crowded amateur bands for the first time. As they gain experience, the youngsters can explore the more advanced facilities such as the thirty memories and selectable filters," says our press release. It's good to see organisations like the Scouts giving very young folk a chance to get interested in an informed environment. How long before they want something with more knobs and switches? Not long, once they have the bug, we reckon.



RAE Course

You may not be looking for an RAE course yourself — but you may know someone who is, or ought to be. Tell them.

North Trafford College of Further Education, Talbot Road, Stretford is starting the next season of radio amateurs' courses in September. Theory classes will be on Thursday evenings or Wednesday mornings, Morse on Tuesday evening or Wednesday afternoon, amateur tv on Wednesday mornings and advanced Morse on Monday evenings. Enrolment dates at the college will be 6, 7 and 8 September. The lecturer is J T Beaumont G3NDG. Tel. 061 872 3731 for information, or turn up for enrolment.

North East Hampshire Institute has Radio Amateur 765 starting Thursday 21 September at the Wavell School, Lynchford Rd., Farnborough, Hants, and Morse for beginners starting Monday 18 September,

same location. Enquiries tel. 0252 26096 after August 29.

Pendlebury High School, Cromwell Rd., Swinton, Manchester, will be having RAE classes 7.30 Mondays from mid-September (instructor is P. Whatmough G4HYE). Details from G4HYE on 061 794 3706 or from Swinton Adult Education Centre, tel. 061 784 5798, and Morse on Tuesdays at 7.30, instructor W. Stevenson G4KKI. Details from Swinton AE as before.

Newark Technical College, Chantry Park, Newark, Notts has the RAE course starting in September, on Monday evenings from 7 to 9pm. The tutor will be Alister Morrison G4YZG, and the date and fees have not been finalised at time of writing. Contact Bert Drury GIUMK at the College for details.

Don't forget — your local library should have a list of local colleges which do specialist courses.

We'll Meet Again

Members of the Monte Cassino Veterans Association will be running a grand reunion at the Floral Hall, Eastbourne, E. Sussex on 2nd/3rd September.

As this year's reunion coincides with the 50th anniversary of the outbreak of the War, all ex-service people and members of veterans associations, and their families, are

invited. They have a capacity of 600. There will be a concert and buffet/dance on Saturday and a remembrance service and parade on Sunday.

Information from Mr. J. Clarke, 41 Aldermays Rd., Manchester M21 2QW (sae please). No news of any special event station yet. Doubtless there are radio ops of that vintage who will be acting to get something together. If not, why not?

Paper Round

Aylesbury Vale Radio Society Newsletter June 1989. Meetings news and reports, sale ads and a more than normally acute and interesting set of general radio news items. A4, 6pp, stapled. Full club calendar unfortunately too "late" for Radio Tomorrow. Information from Geoff G3YLC 0280 817496.

"2830" Dual Band Option

Raycom Communications have been unable to resolve their relationship with the ill-fated Uniden 2830 to the satisfaction of the DTI.

As detailed in last month's Radio Today, the 2830 falls foul of legislation forbidding the manufacture or sale in the UK of single-band amateur radios on 10 metres.

Raycom offered samples of the US version of the 2830, the HR2520, for DTI inspection in the hope of gaining permission to sell them. The HR2510 cannot be converted for CB use without track cutting and component modification, but under DTI rules this still qualifies as "easily convertible", so Raycom were not granted the dispensation.

Ham Radio Today has been assured that all 2830s handled by Uniden and Raycom, including a number handed back to Uniden by the DTI, had been re-exported. Raycom took the initiative in demonstrating that units sourced at Uniden had only been sold to licensed amateurs. The remainder were re-exported and not 'moved sideways' to CB customers.

Raycom's most recent move has been to approach Uniden and the DTI to clear a version of the HR2510 fitted with a

custom microprocessor to give it dual band operation. Dual band transceivers are outside the legislation controlling single-band 10m equipment.

Uniden have apparently agreed to this provided Raycom guaranteed an order of 5,000. "I said OK", Ray Withers told us today. "The US model has sold over 100,000 in the States, and we can't even sell that one here without modification". Raycom have stocks of 6m/2m custom-made transverters for the 2830/HR2510 which they cannot market until a compatible model is available. The dual band model is expected in January 1990. "We will be selling it for the same price as the 2830 if possible, but that depends partly on the exchange rate," said Ray Withers.

The 2830 is still being "grey imported" into the UK from various sources. These are, of course, not supported by Raycom or Uniden. "They are being imported straight from the States with 110 volt or 220 volts power units, even with two-pin plugs, people are plugging them straight in, blowing something up, and then sending them to Uniden for repair," says Ray. Uniden has already told HRT that it will service only units registered by Raycom before sales ceased last December.

Backnumbers and Photocopies

Back issues of HRT for the last twelve months only can be obtained from HRT's backissues agent, Infonet Ltd., 5 River Park Estate, Berkhamsted, Herts HP4 1HL, current price £1.90 post paid.

Photocopies of articles from older issues can be obtained from Photocopies Department (HRT), Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, price £1.50 per article.

Please state the date of the issue/s you need. If you do not know the date, please send an enquiry to Ham Radio Today with an SAE. Individual items take time to track down, particularly if you are not sure whether HRT has published the article/review in question, so give approximate dates if you can, and help get us to the right bit of the file.

Callbook Partly Postcoded

The Amateur Radio Call Book is to include the first two letters of the postcode for those amateurs who withhold name and address information.

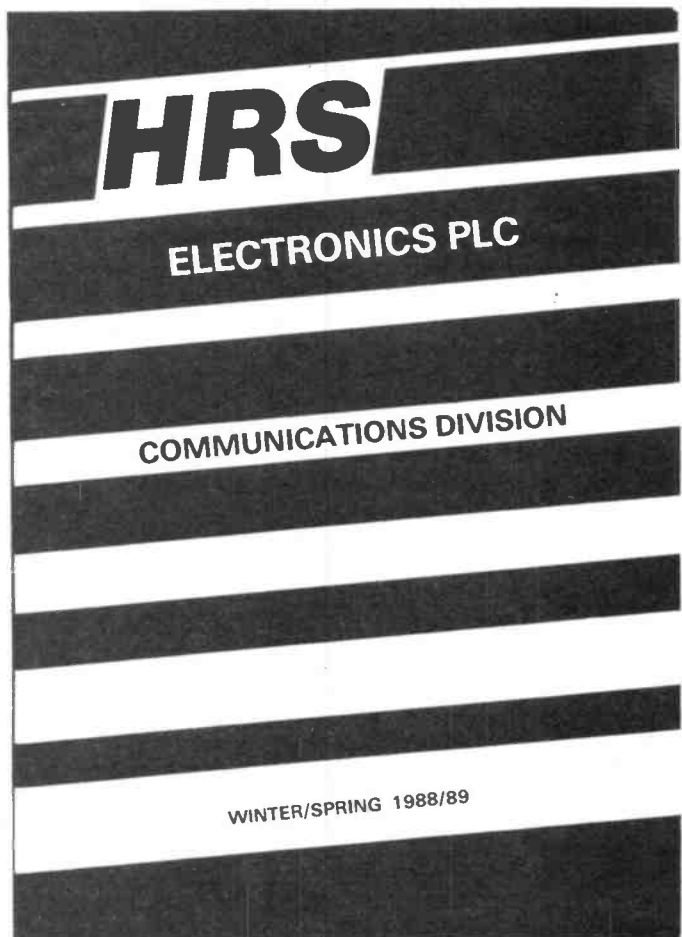
"Their privacy is protected since the information released will indicate only a broad area equivalent to a county of major conurbation" says the DTI press notice.

Why include postcodes when amateurs don't want their details included? "People like to know how many people are in their general area," said a spokesman at the DTI press office.

Radio amateurs don't generally hound one another in their lairs unless specifically invited, so HRT doesn't see privacy being a real problem, but were we asked? We don't recall.

There haven't been any commercial pressures to include this demographic information, have there? We just wondered. It does cross one's mind, these days. "I'm not aware of any," said the spokesman. And the DTI is simply responding to requests from amateurs? "I would presume so." This gent is not necessarily fudging. Press offices are the interface between the press and the people who do have the answers. Interfaces, as we know, also function as buffers, and they can only store so much data. So I am not going to spoil my day and someone else's by demanding categorical replies to picky questions which may amount to nothing at all.

But we would be interested to know what readers think of the plan, just for the record.



HRS Catalogue

The latest HRS catalogue received from HRS Electronics PLC is exclusively devoted to amateur radio equipment and includes a range of antennas manufactured by Cushcraft, and several different rotators.

It covers linear amplifiers (including a very good range of 2m linears), filters, keys, SWR meters, TNC and much more. A good catalogue for all the "extras".

HLS Electronics, Garrets Green Lane, Birmingham B33 0UE.

ICOM

THE NEW IC-2SE, SIMPLE OR MULTI-FUNCTION 144 MHz FM TRANSCEIVER

Icom's tradition of building high quality, reliable handhelds continues with the IC-2SE an incredibly compact handheld designed with features that exceed larger, bulky handhelds. The IC-2SE proves that superior quality comes in all sizes.

Slim and unbelievably compact.

The IC-2SE measures only 49(W) x 103.5(H) x 33(D)* mm with the BP-82 Battery Pack. Hold the IC-2SE in your hand to truly appreciate its miniature size. Weighing just 270g† with the BP-82, the IC-2SE will easily fit anywhere – on belts in shirt pockets, handbags, etc. *1.9(W) x 4(H) x 1.3(D) in. † 9.5 oz.

Simple design for operating convenience.

Even with its tremendous versatility and a wide variety of functions, the IC-2SE is easy to use. All functions are performed by a total of just six switches and three controls. The IC2SE includes both simple and multi-function modes. The result is two transceivers in one: both an easy-operation and multi-function transceiver. Simple mode ensures totally error-free operations. Multi-function mode allows you a variety of function settings depending on your operating requirements.

Other advanced features:

Reduced size doesn't have to mean reduced quality. The IC-2SE proves this with a wide variety of advanced functions.

- Tuning control on the top panel for quick QSYing.
- Monitor function that allows checking of the input frequency of a repeater.
- Function display that clearly shows all information required for operations.
- Splash resistant design and durable aluminum die-cast rear panel for dependable outdoor operations.

Options

• **BA-11, Bottom Cap.** Protective cap for terminals on the base of the IC-2SE.

• Battery packs and case.

BP-81	7.2V, 110mAh
BP-82	7.2V, 300mAh
BP-83	7.2V, 600mAh
BP-84	7.2V, 1000mAh
BP-85	12V, 340mAh
BP-86	Case for six R6 (AA) size batteries

• BC-72E, AC Battery Charger.

Desk top charger for the BP-81 - BP-85.

• **CP-12, Cigarette lighter cable with noise filter.** Allows you to use the IC-2SE through a 12V cigarette lighter socket. Also charges the BP-81 - BP-85.

• **FA-140BB, 144MHz flexible antenna.** Flexible antenna for 144MHz band operation. Same type supplied with the IC-2SE.

• HM-46, Speaker/Microphone.

Combination speaker and microphone equipped with an earphone jack. Clips to your shirt or lapel.

• **HS-51, Headset.** Headset with VOX function that allows you hands-free operation.

• Carrying Cases.

Carrying Case	Battery Packs, Battery Case
LC-53	BP-81
LC-55	BP-81, BP-83 or BP-86
LC-56	BP-84 or BP-85

• **MB-30, Mounting Bracket.** Mounts the IC-2SE in a vehicle or on a wall.

• **OPC-235, Mini DC Power Cable.** For use with a 13.8 V DC power supply

4SE 70cm
VERSION
NOW
AVAILABLE

Actual Size



Icom (UK) Ltd.

Dept HRT, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Count on us!

THE COMPACT HANDHELD WITH A SPLIT PERSONALITY

5 Watt Output Power.

Utilizing a specially designed ultra-small highly efficient power module, the IC-2SE delivers a full 5 W* of output power. Bring those distant repeaters into range.
* At 13.8V DC

48 Memory Channels.

The IC-2SE has 48 fully-programmable memory channels and one call channel. Each memory and call channel stores an operating frequency and other information required for repeater operations.

Convenient Repeater Functions.

The IC-2SE is equipped with programmable offset frequencies for accessing repeaters. All memory channels and a call channel store repeater information for your convenience. The IC-2SE includes a newly designed 1750 Hz tone call transmit function. A 1750 Hz tone call transmits when the PTT switch is pushed twice quickly.

Power Saver for longer operating time.

The power saver ensures lower current flow during standby conditions. Operating times are much longer than with older, more conventional transceivers.

Built-in Clock with timer functions.

The IC-2SE is equipped with an advanced 24-hour system clock with timer function. The transceiver automatically turns on when real time matches a pre-programmed time. This is perfect for scheduling QSO's. Auto power-off timers and other settings can be made in clock mode.

Convenient Scan Functions.

The IC-2SE is equipped with VFO and memory scan.

- **VFO Scan.** VFO Scan repeatedly scans all VFO frequencies. In addition, unnecessary frequencies can be skipped.

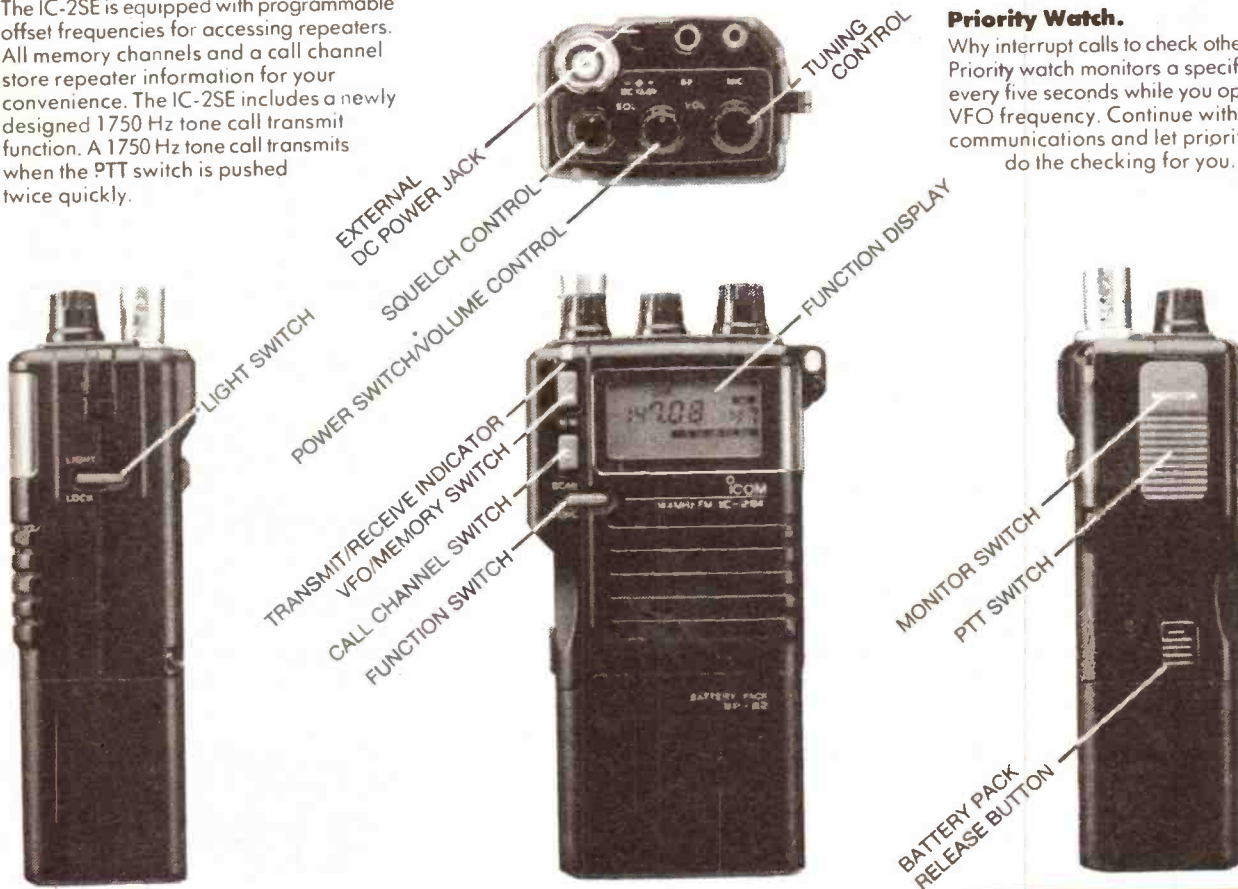
- **Memory Scan.** Memory scan repeatedly scans memory channels.

Auto Power Off Timer Function.

If you ever forget to turn the IC-2SE off, don't worry. It will turn itself off. Power-off time can be selected or deactivated using multi-function mode. Preserve battery pack power for the times when you need it most.

Priority Watch.

Why interrupt calls to check other stations? Priority watch monitors a specified station every five seconds while you operate on a VFO frequency. Continue with your communications and let priority watch do the checking for you.



Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 0900-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

Despatch: Despatch on same day whenever possible.

Visa & Mastercards: Telephone orders taken by our mail order dept. instant credit & interest-free H.P.



LETTERS

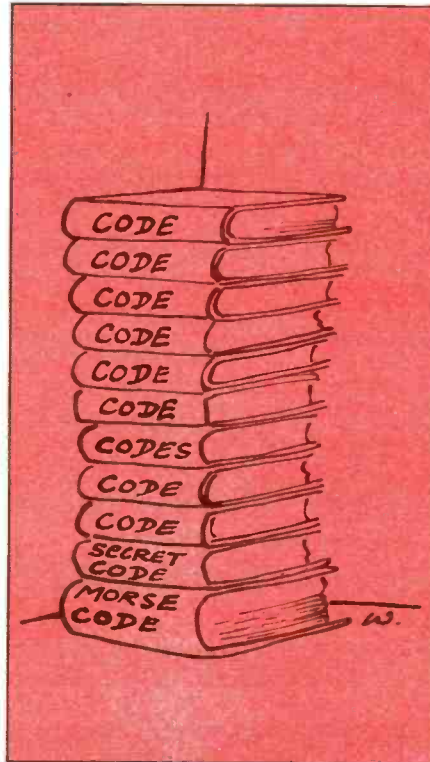
Letter of the Month

You asked for people who cannot learn morse to write to you. I did manage it eventually, but it took many years from 1970 to 1986 — 16 years with only short breaks in between.

It took me 5 or 6 years to learn to read at low speed, a couple more years to read 12wpm after which I gained a reading speed into the 20+ areas, but it took several more years of instruction by Pontefract and Mexborough radio club (*Where are you, Pontefract and Mexborough Radio Club?*) and G4AOO and G4SPM to be able to send back at 12wpm. But I am now good enough to teach, and that is the opinion of two RSGB morse examiners, and do now help other people.

What people who have difficulty should do is join a club that teaches and get individual instruction and NEVER give in.

— Roy T Oxley G0FYM, Pontefract, Yorkshire.



In this commercial age, I am surprised at how good the allocations for amateur radio are. There is no direct payback to the government for making provision for amateur radio, though I would argue that the indirect payback more than justifies it. To take one example, many people (myself included) are attracted to electronic engineering via amateur radio. I am sure that the long term contribution to the economy from this factor alone justifies amateur radio. Let's hope that the authorities continue to see it this way. G3YZW.

Bearcat Doubling

I would like to mention the article about the Bearcat 950LXT. I have a BC 580LXT and I am disappointed that, like the 950LXT, it does not cover the 70MHz band. However, taking advantage of the poor image rejection I am able to receive the 70MHz band by doubling the IF and subtracting it from the frequency I require, if $IF \ 10.85MHz \times 2 = 21.7MHz$. If I want to listen to $70.000MHz = 70.000MHz - 21.7MHz = 48.3MHz$, and I set the scanner to $48.3000MHz$, I will pick up any transmissions on $70.000MHz$. The only problem is that some cordless telephones (illegal ones, I think) are on the 49MHz band, and if someone is using one close to you on the same frequency as you have entered then you will also pick that up as well.

I would like to thank your magazine and Chris Lorek for his excellent articles, especially modifying PMR equipment. Let's have more please, such as how to make a frequency synthesiser for the Pye Westminster, etc.

I would also like to know if any readers have been able to extend the

Darkness Over All

Just to put the record straight, the IARU does not decide the frequencies allocated to the amateur service. As I am sure G5KW is aware, the organisation responsible for this is the ITU. This body convenes the World Administrative Radio Conferences (WARCs), the last major one in 1979. Hence the so-called WARC bands: 10, 18 and 24MHz plus a number of microwave allocations. At the 1979 WARC there was a request from the IARU for a 50MHz allocation in Region 1, but this was withdrawn by the IARU delegation and never voted on.

The reason for the withdrawal was that it was felt that to press it might prejudice other allocations. Despite this, the RSGB continues to perpetrate the myth that the proposal was narrowly defeated, for reasons which are unclear. The decision to withdraw was made by G5CO and the late G2BVN after lengthy consideration. It was at this time that the DTI delegate to the WARC made a commitment to providing a UK allocation at 50MHz, which led eventually to the issue of the original UK permits.

In view of the number of countries in Region 1 which now have an

allocation at 50MHz, the time is ripe for a formal allocation across Region 1. An examination of allocations in Regions 2 and 3 shows that amateurs there get a much larger slice of the cake than Region 1. For example, all of Regions 2 and 3 have a 4MHz-wide allocation at 2 and 6 metres, as well as larger allocations on some HF bands.

It now is clear that there will be another general WARC in 1992 or 1993 at which a decision could be made. Now is the time that the RSGB and other national societies should be formulating proposals for the WARC. Readers will have noted the complete lack of information from the RSGB on what these are likely to be.

Indeed, there has been almost no mention of what other changes may be in the offing as a result of advances in technology. There is a strong growth in demand for UHF spectrum for cellular and PMR interests, while much HF traffic has been transferred to satellites.

Tell us what it going on, RSGB, rather than keeping us in the dark. We are not mushrooms. Or are we?

— P L Crossland G6JNS, Holt Heath, Worcester.

We regret that Ham Radio Today cannot reply to queries individually. Every month we publish a section of the most interesting. We will endeavour to answer straightforward queries about the back issues index if readers enclose an SAE and much patience. It helps if letters and back issue enquiries arrive on separate sheets of paper, although the same envelope can be used.



coverage of the FDK Multi 800D and if so could they tell me how to do it?
— R C Grant, Preston, Lancs.

This technique of reception can be quite satisfactory. The frequency which you have to enter may need to be above or below the wanted frequency depending on whether the local oscillator is above or below the frequency to which the set is tuned. In this case, the oscillator is at 59.15MHz when the scanner is tuned to 48.3MHz, which is 10.85MHz away from the frequency of interest. Problems can arise with some scanners, if they have to be tuned above the frequency of interest, because they will then be tuned to the airband and may be designed only to receive AM in this band. G3YZW.

A Delegation

We feel that the RSGB in pressing for the introduction of a Novice Amateur Radio Licence is not reflecting the feelings of the Amateur radio fraternity. In our opinion the introduction of a novice licence is undesirable for the following reasons:

1. The Radio Amateur Examination as it stands should not prove to be too great a hurdle for anyone with a genuine interest in the hobby, only requiring a modicum of technical knowledge to gain the required grades.

2. The proposed frequency allocations for the Novice Licence are more generous than those allocated to the Class B Licence holder who has passed the full technical exam and is prohibited from operating in any part of the HF spectrum.

3. If this licence is designed to be a stepping stone towards the full licence, what incentive is there to further one's technical knowledge when the next step is a Class B Licence with fewer privileges.

4. Those of us that work QRP know that a few milliwatts can span the globe, so the interference potential of 'novices' on the HF bands could be to the detriment of the hobby. Experience is best gained on the VHF Bands or by short wave listening.

5. Surely the best way of interesting youngsters in amateur radio is by better publicity for the hobby, for example, special events station at school fairs, better liaison between local clubs and the press, guest speakers at schools — this already happens with careers, banking, trade unions, videos available on free loan to schools in the same way that they are to affiliated clubs or integrated into science classes.

6. The current lower age limit of 14 is probably set at the correct level because a sense of responsibility tends to increase with maturity.

If the Novice class licence was to be introduced we would suggest the following guidelines:

a) It should not grant greater privileges than those of the Class B Licence Holder.

b) Activity should be confined to a restricted section of one large VHF band such as 70cm where activity is generally low, and should be confined to phone.

c) The lower age limit of 14 should be retained.

d) It should be limited to 3 years so as to provide incentive towards a Class B or a full licence.

e) Power to be restricted to 5 watts output.

Has anyone at RSGB given any thought to the problems of monitoring the HF bands if the proposed frequency allocations go ahead? It is quite common on the CB bands for powers in excess of legal limits to be used, and for no one to take any action.

Why did the RSGB not ballot members on the proposed Novice Licence — could it be for the same reason that the issue of capital punishment is not put to referendum they know what the outcome will be?
— G0IYG, G0IYH, G0IZP, G0JMR, G4CGT, G4YLB, Darwen, Lancs.

Copies to RSGB, Practical Wireless, Ham Radio Today. Who will print it!

I thought that we already had a novice licence — the class B licence. There may be some who disagree, but I passed the RAE just before taking O levels and thought it an easier exam. To this extent, we already have a novice licence, and I remain unconvinced that anything further could be beneficial.

— G3YZW

Thank you for coming out straight about sending copies around the trade, are you still counting?

£10 FOR THE LETTER OF THE MONTH

You've got a gripe about the bandplans, or you're sick of being wiped out by next door's microwave. Or maybe you've been bowled over by the excellent service from your local radio shop.

Whatever you've got to say about amateur radio say it here in the letters column and you could win yourself £10 for writing the letter of the month.

Sent your epistles to: Letters Column, Ham Radio Today, ASP Ltd, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST.

METREWAVE

Back in the Fifties, when metrewave operation in the UK was beginning to take off, there was a geographical bandplan to enable operators to turn their beams in wanted directions. Those were the days when everything went by valves and antennas were horizontal.

come across a variety of stations each using its individual frequency for weeks, even months, on end. This made them immediately recognisable even before they sent their callsigns. If you did not have a crystal for your particular part of the band you could probably find one by scanning a

If, then, no signals were to be heard how could an operator check that his equipment was working? The answer: establish a chain of fixed frequency beacon stations that would both serve the need for guaranteed signal at all times and provide an inkling of how "conditions" were. The first one to be established in Britain came into being in rather unusual circumstances.

"Like beacons shining in the night", suggests Jack Hum, G5UM, would be a poetic description of the nationwide 24-hour-a-day spot frequency service.

Those days had another characteristic: every station was crystal controlled (even though a few hardy souls developed VXOs and even master oscillators, whose drift didn't

feature called "Xtal Xchange" which the ham radio media of the day published to allow unwanted crystals to find good homes where they *might* be wanted.

The IGY

In 1957 the International Geophysical Year was introduced with the objective of prosecuting research on a global basis into natural phenomena. On the radio front Britain's national society played a prominent part in this work: its observations greatly increased the fund of knowledge about metrewave propagation. But because signals in the vhf spectrum tend to be random, would it not be a good thing to erect a beacon to radiate 24-hours a day to give a guaranteed signal at all times? Thanks to an offer by a well known Kentish vhf enthusiast, G5KW, to establish such a beacon at his home station — and at his expense — this project came into radio active life.

During the IGY this beacon could be heard on 145.5mMHz from the G5KW site using the apt callsign GB3IGY. Its value proved to be so significant as to suggest that beacons had come to stay, and, after the IGY had passed into history, couldn't permanent markers be provided? Answer: yes. Thus came into being GB3VHF established in North Kent not far from its precursor GB3IGY. It was almost literally "a beacon of hope" to metrewave operators who without it would not only find the bands dead but would have suspected their always home-built equipment of malfunction — and in the days of "hot devices" (meaning valves) this was not uncommon thirty-plus years ago.

Historically . . .

Although the British metrewave beacon chain pioneered many like it

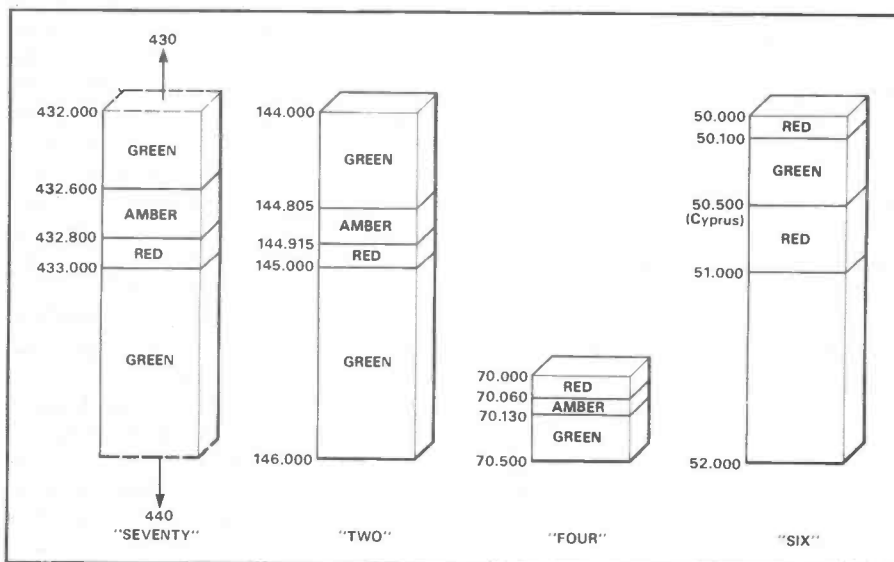


Fig 1: The QSY chart. Keep to the green lane when changing frequency. Never use the red lane: this is where the beacons are. Use the amber lane sparingly: a few distant beacons exist here, and someone somewhere may wish to listen to them. At all times observe the band plan (see RSGB Callbook).

matter much because receive techniques were sufficiently wideband that you could follow any modest variations of incoming signal).

The predominant use of crystal control meant that ". . . you could tell a chap by his frequency". If a southerner turned his beam north and searched the appropriate segment of band-planned 2 metres, he would

But if propagation conditions were such as to discourage people from putting out a signal on 4 metres, 2 metres or 70cm (the bands available in the mid-Fifties) there would be a deathly silence, just as there is on occasion today. The phrase "They all come crawling out of the woodwork when the DX is about" was as apt then as it is now.

in other countries, it was not, strangely enough, entirely unique. A reminiscence of a small slice of metre-wave history will explain why.

Fifteen years before GB3IGY at the height of World War 2 there was a requirement in the RAF for a series of *radar* beacons — not cw/fsk ones like today's — to be installed around the coasts of the British Isles each with an overlapping coverage to the next one. Each automatically transmitted a self-evident callsign (eg, WK for Wick) for 24 hours a day in the 176MHz band, which was where aircraft radars then operated.

An airborne radar receiver with a cathode tube trace calibrated up to 100 miles would detect one of these beacons from perhaps far over the Atlantic to permit navigation back to base with its aid as the blip on the crt developed increasing amplitude (width) as the aircraft neared home.

This beacon chain, the brainchild of a bright young BBC engineer who had been commissioned into the RAF, could be quite literally a life-saver. Many cases were reported when "the blip" was the only contact with home after all other forms of communication had either failed or were observing "wireless silence".

Metreband

Back to today: the requirement for, first, GB3IGY and then GB3VHF met the need of 2-metre operators. But what of the "next band up", meaning 433MHz? Because all equipment for 70cm were home-constructed (that they worked at all — using valves, remember! — was regarded by most experimenters as nothing short of a miracle) a beacon was enormously important. It would confirm that one's station was working, or at least the "receive" side of it, invariably a converter. Thanks to the good offices of a national electronics firm — or perhaps of the hams who worked there — a 70cm beacon was established on a West London factory roof radiating the self-evident callsign GB3GEC, immediately recognisable from its characteristic T6 note — not that there was much else to recognise on "Seventy" at that period in amateur radio history.

In the subsequent years beacons have become the norm in most of the metrewave and microwave bands to give permanent 24-hour signals to tell

the listener: "Yes, chum, your gear really is working".

This trend has developed not only in Britain, which pioneered it, but in many other countries of the world. In consequence, it is possible for a listener to assess propagation conditions by noting the behaviour of those distant beacons which on 28 and 50MHz especially can presage inter-continental DX.

Green, Amber, Red

Usefully, a comprehensive beacon list is included in *The RSGB Callbook* (the metrewave person's second best friend after his/her licence, remember?). There are 5½ pages of them, from 10.144MHz to 24GHz, active from most of the developed countries of the world.

To illustrate even those which operate in the UK would require a large map covered with a mass of information — not necessary, anyway, because the info is in *The Callbook*.

Instead, a different kind of illustration will be more valuable by showing operators where the metrewave beacon bands exist so that these frequency areas may be avoided during day to day activity. In short, if you propose to QSY after making contact on a calling channel or through a repeater, don't QSY into a beacon band simply because you can hear nothing there: you may be using an fm rig that will not resolve beacon emissions, or you may be so far away from the nearest beacon that you can't even hear its key-thump. But others will. Others may well be using a weak beacon signal as an indicator of propagation conditions, and they will not thank anyone for plonking, albeit unwittingly, an fm signal on to it.

Apropos QSY (above) have you noticed how many operators these days fail to set up on an alternative frequency when asked to do so? Either they mishear the proposed new frequency to move to, or they do not press that vital repeater-to-simplex button. Or both. Many latter-day transceivers are fitted with such a variety of bells and whistles that you can hardly blame a new operator for failing to sound them all. Yet there's always the instruction book (if you can translate the Japanese-English!).

BFO into an FM-Only

The operator wishing to identify beacons on his fm-only rig will need to add a beat frequency oscillator to its if section. He may not wish to do this for 70cm or 2m, recognising that nearly everywhere a repeater is within range and will serve the same purpose. But on 70MHz and 50MHz there are no repeaters which can be used in this way, but some very good beacons widely separated geographically. An fm user will find them difficult to resolve unless they are very local and can be identified by key thump. Hence the need for a BFO.

This can take the form of the very simple circuit shown at Fig.2. It injects a signal into the 10.7MHz if chain of the transceiver and is activated from one of the spare channel switch positions which exist on the front panels of the highly popular ex-PMR rigs which are now the norm on Four.

Construction of this unit is simplicity itself. It requires but one common-or-garden transistor (say, a BC108) and the minimal number of components that go with it. It does not even need an inductor: enough injection into the if line will be available by proximity, which means that no coupling need be provided between the bfo unit and the if stage.

The most expensive component is the 10.7MHz crystal. Across it is a trimmer to allow the pitch of the bfo signal to be varied to the operator's satisfaction of the wanted beacon. Offset it by a couple of kilohertzes and there's your signal — just like waggling a rit on a Jap rig!

The unit may be built on a piece of pcb one-inch square, and fitted in to one of the several available spaces which exist inside the ubiquitous ex-PMR transceivers: but if possible, position it reasonably close to the if line to ensure adequate injection.

Because large numbers of ex-Pye Westminsterers are in use on 70MHz the details at Fig.2 relate to this model, although with minor variations they can be adapted to any fm-only receiver where BFO facilities are required.

First of all, in the "Westminster" the dc supply for the BFO is obtained from the channel board on the receiver crystal board, ie, if the Channel 5 position is to be used for beacon injection, obtain the required dc voltage from the green wire which

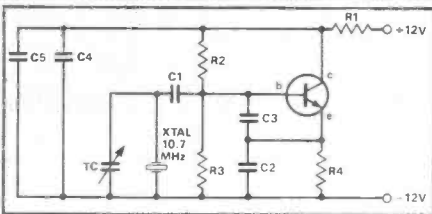


Fig 2: Circuit diagram for a simple 10.7MHz beat frequency oscillator for use with an fm-only transceiver, to permit reception of beacon transmissions.

goes to the Channel 5 position on the crystal board. When Channel 5 is selected on the front panel switch the needful 10V+ will appear. When this circuit is introduced to the ex-Pye Westminster PMR transceiver the required dc supply for the BFO

may be obtained from any of the coloured channel identification wires.

- These are:
- Brown wire Channel 1
 - Red wire Channel 2
 - Orange wire Channel 3
 - Yellow wire Channel 4
 - Green wire Channel 5
 - Blue wire Channel 6
 - Purple wire Channel 7

It will be noted that this colour code conforms with the standard resistor colour code — a very logical arrangement.



Parts List

- R1 12+ d.c. feed resistor
2.2kohms
- R2/R3 base bias resistors 27kR
- R4 emitter bias resistor
2.2kohms
- C1 feedback capacitor 45pF
- C2 capacitance divider 100pF
- C3 capacitance divider 220pF
- C4 d.c. line capacitance 10nF
- C5 d.c. line capacitance 0.1nF
- XTAL 10.7MHz
- TC trimmer to offset BFO note,
say, 5 to 25pF variable.

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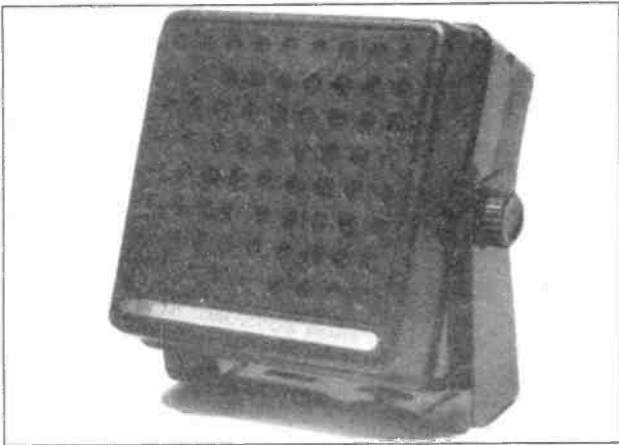
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Review

: ICOM IC2~SE Handheld

We thought, 48 memories, easy to use, and so tiny you can hide it completely with the palm of your hand? Well the IC2SE fits this description, so we then thought we'd better get our hand on one. It was displayed for the first time at the Sandown VHF convention, with many visitors asking 'when can we have one?' HRT were lucky in being able to receive the very first review model, direct from Icom UK.

VFO mode, the knob now switches in 100kHz steps to allow a rapid QSY from one part of the band to another, the 'V/M' button acts as a memory channel program command, the 'Call' button functions as a Priority Scan button, the PTT bar as a transmitter power control switch, the light bar has a frequency lock, and the 'Moni' bar above the PTT as a TX repeater offset switch. In memory mode, this second function facility allows the

The HRT review team faces a miracle of microprocessor technology in meek clothing.

Simple Control

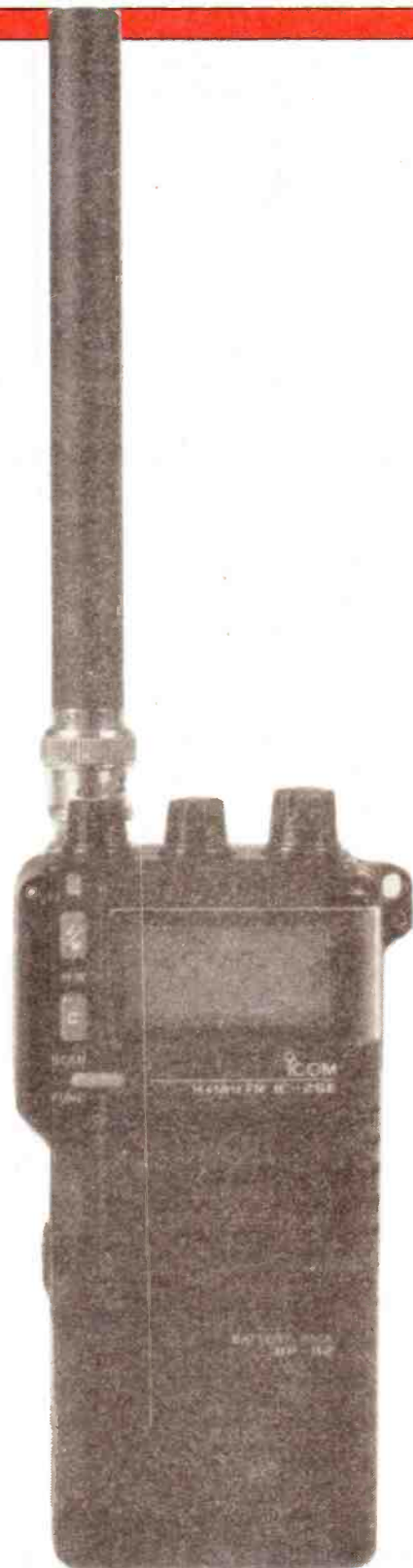
The set has two forms of control; the first which many amateurs will use is a 'simple' mode using the primary and secondary functions of the controls. In the primary function mode, a rotary knob on the top panel acts as a digital 'VFO' to tune around the band, a press of the 'V/M' button changes this to a memory channel selector knob controlling up to 48 channels, a further press taking you back to VFO operation. A press of the 'C' button on the front panel gives you instant access to your pre-programmed 'Call' channel, either simplex or repeater. The top section of the side-mounted PTT bar acts as a 'monitor' facility which momentarily opens the receiver squelch, and when on a repeater frequency automatically switches the receiver from the output to the input frequency. A small side-mounted push bar switches on a display backlight for a few seconds to let you see what frequency you're on during the dead of night.

Secondary functions are initiated by a press of the small 'Func' bar on the front panel followed by operation of one of the other controls. Here in

V/M button to transfer the memory frequency to the VFO, and the Call button to initiate memory channel scan. If all of this is a bit too much to remember, a small printed panel with this information on the rear of the set acts as a memory jogger.

Multi-Function Mode

This one certainly needs reference to the operating manual. By keeping various buttons pressed down when switching the set on, further button presses then allow control of the set's functions and settings in a type of 'tree' structure. As an example, Select mode allows the selection of the Call Set, Duplex/Tone Squelch, Scan Skip, Priority Mask and Pager/Code Squelch modes. In Call Set mode, two further modes are selected, Set or Private. The first allows you to set the programmed scan frequency limits, bleep tone on/off, repeater offset frequency, and the subaudible tone frequency if the optional module has been fitted, the second controls the light switch function, PTT lock, scan skip function, scan resume condition, power saver duty cycle, and the busy lamp function. And so on to the next



mode. Briefly, in Multi-Function it is possible to control the functions of virtually everything you would want, such as frequency steps, memory channel lockout, low power setting level with three choices, and so on. This mode can be employed in normal use by the boffins who can remember how to use them all!

Batteries and Bits

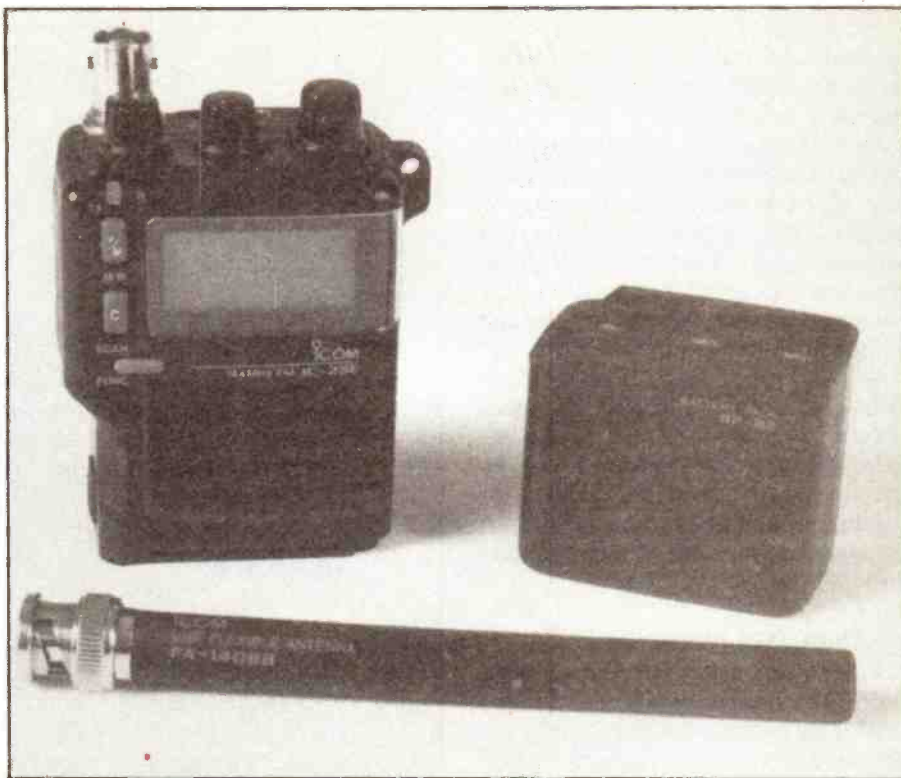
A range of battery packs are available for the set, the battery voltage determining the maximum power output of the set. A variety of 7.2V packs, these providing 1.5W nominal output, are available, with a 12V 340mAh pack giving higher power at the expense of shorter battery life. The small 7.2V 300mAh BP-82 pack was provided with the review set, the transceiver with this fitted measures a compact 105mm (H) × 53mm (W) × 32mm (D) and weighs in at 270g. The set may also be powered from an external 13.8V supply, the transmitter in this case giving 5W output, and a variety of accessories such as a car cigar lighter power cable, mini DC power cable, external speaker/microphone, headset, and vehicle mounting bracket let you use the handheld as a mobile or base rig as well, an external aerial fitting to the set-top BNC connector.

Tone Additions

A number of options, internally fitted tone add-ons are described in the manual: a sub-audible tone encoder, sub-tone encoder/decoder, and a touch tone DTMF decoder. The UT-51 sub-tone encoder allows you to add a CTCSS tone to your transmitted audio to operate repeater or other decoder functions; the UT-50 provides a more useful sub-tone decode as well as encode facility to allow you to quietly monitor busy channels for other similarly-equipped amateurs in your group. Finally, the UT-49 DTMF decoder allows you to use the set with tone-sequence selective calling, or as a pager responding to a pre-programmed DTMF number sequence transmitted by another station to alert you with the IC-2SE merrily bleeping away.

In Use

The set fitted in my right hand very comfortably, and after a bit of practice, operation of the controls



was possible just using the thumb and forefinger of my right hand, the set resting in my palm. A short 2m helical is supplied with the set, about as tall as the set itself, the whole assembly then being compact enough to fit in most of my pockets with ease. These factors are very important in a handheld. With this one the natural tendency is to carry it around with you without feeling encumbered.

When switching the set on, it took about a second before any life appeared, probably due to the micro-processor waking up and loading in the last-used settings. After this, operation was virtually instantaneous. Using the set in its normal or 'simple' operating mode was very easy, a quick glance at the rear of the set sometimes being necessary at first to remind me how to get out of repeater shift and so on. The large LCD panel displays many of the facilities of multi-function mode, but in normal use this was uncluttered and only indicated the facilities selected, such as frequency, memory channel etc. As a result only a quick glance at the display was needed to show what the set was doing.

Memories

Memory scanning was initiated by a double-button push, but I ended

up with problems here when I decided I sometimes didn't want the set to lock on to the local 2m repeater. Programming a memory channel 'lockout' was very complicated when out and about as this required several operations in the complex multi-function mode. After getting fed up with performing this several times, in the end I didn't bother and tolerated it instead! There is no 1750Hz tone button as such. Instead Icom let you send a constant 1750Hz tone by a quick double-press of the PTT bar. At first I thought this might cause a few problems, as many repeaters now require you to provide speech modulation as well as a toneburst to waken the repeater up. In practice I found I could allow around half a second for the toneburst, then speak loudly to superimpose speech above this tone for a few seconds, then drop carrier momentarily to stop the toneburst before continuing. A bit messy, but it does away with the need for another button on the small set.

Audio

The audio quality on receive was quite good, the small internal speaker handled normal portable listening levels quite well. When mobile, not surprisingly I found I needed either to hold the set up to my ear, or to use an external speaker due to road and

wind nose, but this was to be expected. On transmit, reports from other stations were quite reasonable although one repeater fitted with an over deviation indicator told me the set was spreading a little too much, and that the set's deviation needed internal adjustment. Whenever the set was used when powered from an external 12V or 13.8V power source, the rear panel of the transceiver got rather hot during normal QSOs, but then one has to pay this price when taking the small heatsinking capabilities of the set into account. Throughout the on-air tests however, the set performed quite reliably even when getting hotter by being left out on a car dashboard in the mid-day sun.

Personal Features

After using the set for a while, I found the multi-function mode was useful for setting the required mode of operation in preparation for a given type of use. For instance, the receiver power saver may be enabled with a pre-set on/off ratio for normal portable use to prolong battery life, but disabled when in use at home for packet radio operation which needs reasonably fast switching times. Likewise, various memory channels may be skipped as required for monitoring purposes, or a given 'priority' or 'call' channel programmed depending upon any change of use over a given period. This way, the set retains its simple operation, but may be 'customised' to the user's requirements. By using the power saver function together with keeping transmission periods short, the set provided a day's worth of normal use without the PB82 nicad going flat, an overnight recharge bringing this up to full capacity again. By suitable pre-programming, a power-down facility may be initiated whenever the set is left switched on without receiving any signals or any keys being depressed. With the set having a built-in clock it may, if you really want, wake you up to the resounding tunes of your local 2m natter channel just like a clock radio!

Laboratory Tests

The general receiver performance was good for a handheld, especially so when considering the size and capabilities of the set, this not leaving



much room for sophisticated RF circuitry. The adjacent channel selectivity was fine for use with $\pm 245\text{kHz}$ signals, but possibly not too good for use in heavily populated areas where 12.5kHz channels are used on FM due to congestion. The S-meter gave a good dynamic range, better than many other Icom handhelds tested by HRT in the past, giving a much better idea of signal strength, useful in helping to position the set when attempting a contact at extremes of range of a repeater with the set's relatively low transmit power.

On transmit, an adequate amount of power was given on 7.2V, slightly over the nominal 1.5W, increasing the supply to 13.8V brought this up to over the 5W mark. The measured peak deviation confirmed the on-air result of overdeviation, the lower toneburst deviation however confirmed that 'talking over the tone' would be possible for repeater access.

A unique feature of the set is a small re-chargeable lithium battery for memory retention. Although this has a lifetime of one week if no external power source, such as a battery or external power, is connected, it doesn't need replacing every few years which is a nice thought.

Conclusions

The IC-2SE should certainly find a home inside the jacket or shirt pockets of many amateurs, being small, light, and having the ability to perform a number of functions with suitable pre-programming, a matching 70cm transceiver is also available in the shape of the IC-4SE. In everyday use, it was easy to operate when held in the right hand with sensibly placed controls, it fitted into the palm very comfortably with enough receiver audio for normal handheld use. The technical performance was fine for a handheld, although when used as a mobile or base station it could be a compromise due to heatsinking limitations and possibly 12.3kHz compatibility where this spacing is used.

Icom UK have added that the set may if required have the further capability of a wide extended frequency range on receive. The review set actually received over 75MHz to 130MHz and 140MHz to 195MHz, this of course covering several bands including the AM aircraft band, which may be of interest to scanner enthusiasts. Who needs to carry around a separate handheld scanner when visiting the local airfield now?

Our thanks go to Icom UK for the kind loan of the review set.

Laboratory Results

Receiver

Sensitivity: Input level required to give 12dB SINAD:

144MHz: 0.174uV pd
 145MHz: 0.177uV pd
 146MHz: 0.180uV pd

Squelch Sensitivity:

Threshold: 0.06uV pd (<2dB SINAD)
 Maximum: 0.232uV pd (16dB SINAD)

Adjacent Channel Selectivity:
 Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal.

+ 12.5kHz 27.5dB
 - 12.5kHz 20.0dB
 + 25kHz 63.5dB
 - 25kHz 62.0dB

Blocking: Increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal.

+ 100kHz 74dB
 + 1MHz 85dB
 + 10MHz 99dB

Intermodulation Rejection: Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation products.

25/50kHz spacing 61.0dB
 50/100kHz spacing 60.0dB

Maximum Audio Output: Measured at 1kHz into 8ohm load, at the onset of clipping (with BP82 nicad).

175mW

Image Rejection: Increase in level of signal at first IF image frequency over level of on-channel signal to give identical 12dB SINAD signals.

64.0dB

S-Meter Linearity:

Indication	Sig. Level	Rel. Level
S1	0.14uV pd	-21dB
S2	0.22uV pd	-17dB
S3	0.28uV pd	-15dB
S4	0.32uV pd	-14dB
S5	0.40uV pd	-12dB
S6	0.50uV pd	-10dB
S7	0.63uV pd	-8dB
S8	1.00uV pd	-4dB
S9	1.60uV pd	0dB ref.
S9+	3.20uV pd	+60dB

Current Consumption:

Standby, Economiser off	55mA
Receive, Mid Volume	108mA
Receive, Max Volume	187mA



Transmitter

TX Power and Current Consumption:

Freq MHz	7.2V Supply	12.0V Supply	13.8V Supply
144	1.80W/885mA	4.85W/1.34A	5.05W/1.30A
145	1.80W/875mA	4.90W/1.34A	5.10W/1.27A
146	1.75W/865mA	4.85W/1.31A	5.00W/1.25A

Peak Deviation:

5.85kHz

Toneburst Deviation:

3.79kHz



PHONE
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SELECTRON HOUSE, SPRINGHEAD ENTERPRISE PARK
SPRINGHEAD RD, GRAVESEND, KENT DA11 8HD

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Semiconductors

AC125 0.30	BC107A 0.11	BC2078 0.25	BD131 0.42	BD534 0.45	BF273 0.18	BLY48 1.75	MJE350 0.75	R2540 2.48	TIP3055 0.55	25C937 1.95
AC126 0.45	BC107B 0.11	BC2088 0.20	BD132 0.42	BD535 0.45	BF335 0.35	BR100 0.45	MJE520 0.48	RCA16029 0.85	TIS91 0.20	25C1034 4.50
AC127 0.20	BC108 0.10	BC212 0.09	BD133 0.50	BD575 0.95	BF336 0.34	BR101 0.49	MJE2955 0.95	RCA16039 0.85	TV106 1.50	25C1096 0.80
AC128 0.28	BC108B 0.12	BC212L 0.09	BD135 0.30	BD587 0.95	BF337 0.29	BR103 0.55	MPSA13 0.29	RCA16181 0.85	TV106/2 1.50	25C1162 0.50
AC128K 0.32	BC109 0.10	BC213 0.09	BD136 0.30	BD588 0.95	BF338 0.32	BR303 0.95	MPSA92 0.30	RCA16334 0.90	ZRF0112 16.50	25C1124 0.95
AC141 0.28	BC109B 0.12	BC213L 0.09	BD137 0.32	BD698 1.50	BF355 0.37	BR4443 1.15	MRF237 4.95	RCA16335 0.85	2N1308 1.35	25C1162 0.95
AC141K 0.34	BC114A 0.09	BC214 0.09	BD138 0.30	BD701 1.25	BF362 0.38	BRY39 0.45	MRF450A 15.95	RCA16572 0.85	2N1711 0.30	25C1172A 2.20
AC142K 0.45	BC115 0.55	BC214C 0.09	BD139 0.32	BD702 1.25	BF363 0.65	BRF453 0.95	MRF453 17.50	S20600 0.95	2N2219 0.28	25C1173 1.15
AC176 0.22	BC116A 0.50	BC214L 0.09	BD140 0.30	BD707 0.90	BF371 0.25	BSX60 1.25	MRF454 26.50	SKESF 1.45	2N2626 0.55	25C1306 1.75
AC187 0.25	BC117 0.19	BC237B 0.15	BD144 1.10	BDX32 1.50	BF394 0.19	BT100A/02 0.85	MRF455 17.50	T6021V 0.45	2N2905 0.40	25C1364 0.50
AC187K 0.28	BC119 0.24	BC238 0.15	BD150C 0.29	BDX53B 1.65	BF422 0.32	BT106 1.49	MRF475 2.95	T6027V 0.45	2N3053 0.40	25C143A 2.50
AC188 0.25	BC125 0.25	BC239 0.15	BD159 0.65	BF115 0.35	BF423 0.25	BT116 1.20	MRF477 14.95	T6029V 0.45	2N3054 0.59	25C1449 0.50
AC188K 0.37	BC140 0.31	BC251A 0.15	BD160 1.50	BF119 0.65	BF457 0.32	BT119 3.15	MRF479 5.50	T6036V 0.55	2N3055 0.52	25C162B 0.75
ACY17 1.15	BC141 0.25	BC252A 0.15	BD166 0.50	BF127 0.39	BF458 0.36	BT120 1.65	MRF479 5.50	T9002V 0.55	2N3702 0.12	25C1678 1.50
AD142 2.50	BC142 0.21	BC258A 0.39	BD179 0.72	BF154 0.20	BF467 0.68	BU105 1.95	OC23 9.50	T9011V 0.75	2N3703 0.12	25C1945 3.75
AD149 1.50	BC143 0.24	BC258B 0.39	BD182 0.70	BF158 0.22	BF493 0.35	NU108 1.69	OC25 1.50	T9015V 2.15	2N3704 0.12	25C1953 0.95
AD161 0.50	BC147B 0.12	BC284 0.30	BD201 0.50	BF160 0.27	BF495 0.23	BU124 1.25	OC26 1.50	T9034V 2.15	2N3705 0.20	25C1957 0.80
AD162 0.50	BC148A 0.09	BC300 0.30	BD202 0.50	BF173 0.22	BF499 0.25	BU125 1.25	OC28 5.50	T9038V 3.95	2N3706 0.12	25C1969 2.95
AF106 0.50	BC149 0.09	BC301 0.30	BD203 0.50	BF177 0.38	BF499 0.25	BU126 1.60	OC29 4.50	THY15/80 2.25	2N3708 0.12	25C1985 1.50
AF114 2.50	BC153 0.30	BC303 0.26	BD204 0.70	BF178 0.26	BF499 0.25	BU204 1.55	OC32 5.50	THY15/85 2.25	2N3733 9.50	25C2128 1.15
AF115 1.95	BC157 0.12	BC307B 0.09	BD222 0.46	BF179 0.34	BF499 0.25	BU205 1.30	OC42 1.50	TIP29 0.40	2N3737 2.75	25C2029 1.95
AF116 2.50	BC159 0.09	BC327 0.10	BD223 0.59	BF180 0.29	BF499 0.25	BU208 0.95	OC44 1.25	TIP29C 0.42	2N3792 1.35	25C2078 1.45
AF117 2.50	BC161 0.55	BC328 0.10	BD225 0.48	BF181 0.29	BF499 0.25	BU208A 1.15	OC45 1.00	TIP30C 0.43	2N4280 3.50	25C2091 0.85
AF118 3.50	BC170B 0.15	BC337 0.10	BD232 0.35	BF182 0.29	BF499 0.25	BU208B 1.35	OC70 1.00	TIP31C 0.55	2N4427 1.95	25C2098 2.95
AF121 0.60	BC171 0.09	BC338 0.09	BD233 0.35	BF183 0.29	BF499 0.25	BU326 1.20	OC71 0.75	TIP32C 0.42	2N4444 1.15	25C2166 1.95
AF124 0.65	BC172B 0.10	BC347A 0.13	BD236 0.49	BF184 0.35	BF499 0.25	BU326S 1.50	OC72 2.50	TIP33C 0.95	2N5294 0.42	25C2134 0.80
AF125 0.65	BC173B 0.10	BC461 0.35	BD237 0.40	BF185 0.28	BF499 0.25	BU407 1.24	OC75 1.50	TIP34B 0.95	2N5296 0.48	25C2371 0.36
AF126 0.45	BC174 0.09	BC47B 0.20	BD242 0.65	BF195 0.11	BF499 0.25	BU408 1.50	OC81 1.00	TIP41A 0.45	2N5298 0.60	25C9310 0.95
AF127 0.65	BC177 0.15	BC527 0.20	BD246 0.75	BF197 0.11	BF499 0.25	BU426A 0.75	OC84 1.50	TIP41C 0.45	2N5496 0.95	25K19 0.55
AF139 0.40	BC182 0.10	BC547 0.10	BD376 0.32	BF198 0.16	BF499 0.25	BU500 2.25	OC139 12.50	TIP42C 0.47	2N5641 16.50	25K33 0.55
AF150 0.60	BC182 0.10	BC548 0.10	BD379 0.45	BF199 0.14	BF499 0.25	BU508A 1.95	OC171 4.50	TIP47 0.65	2N5643 16.50	
AF178 1.95	BC182BL 0.10	BC549A 0.10	BD410 0.65	BF240 0.20	BF499 0.25	BU526 1.90	OC200 4.50	TIP48 0.65	2SA329 0.95	
AF239 0.42	BC183 0.10	BC550 0.14	BD434 0.65	BF241 0.15	BF499 0.25	BU807 2.25	OC201 5.50	TIP50 0.65	2SA715 0.55	
ASV27 0.85	BC183L 0.09	BC557 0.08	BD436 0.60	BF245 0.30	BF499 0.25	BU807 2.25	OC205 10.00	TIP120 0.60	2SC495 0.80	
ASV77 1.50	BC184B 0.09	BC558 0.10	BD437 0.60	BF256LC 0.35	BF499 0.25	BU807 2.25	OC205 10.00	TIP125 0.65	2SC496 0.80	
AU106 6.95	BC204 0.25	BC639/10 0.30	BD438 0.75	BF257 0.28	BF499 0.25	BU807 2.25	OC205 10.00	TIP142 1.75	2SC498 0.80	
		BCY33A 19.50	BD510 0.95	BF259 0.28	BF499 0.25	BU807 2.25	OC205 10.00	TIP146 2.75	2SC499 0.80	
		BD115 0.30	BD518 0.75	BF271 0.28	BF499 0.25	BU807 2.25	OC205 10.00	TIP161 2.95	2SC789 0.55	
		BD124P 0.59	BD520 0.65	BF271 0.28	BF499 0.25	BU807 2.25	OC205 10.00	TIP2955 0.80	25C9310 0.95	

Integrated Circuits

AN103 2.50	AN7145M 3.95	LA4102 1.50	MB3756 2.50	SAS590 2.75	STK437 7.95	T47609P 3.95	TBA550Q 1.95	TA1001 2.95	TA2581 2.95	UPL181H 1.25
AN124 2.50	AN7150 2.95	LA4140 2.95	MC1307P 1.00	SL9018 7.95	STK439 7.95	TA7611AP 2.95	TBA560C 1.45	TA1003A 3.95	TA2582 2.95	UPL182H 1.50
AN214 2.50	AN7151 2.95	LA4031P 1.95	MC1310P 1.95	SL9178 6.65	STK461 11.50	TA7629 2.50	TBA560Q 1.45	TA1006A 2.50	TA2593 2.95	UPL185H 3.95
AN214Q 2.50	BA521 1.50	LA4400 3.50	MC1327 1.70	SL1310 1.80	STK463 11.50	TA7629A 3.50	TBA570 1.00	TA1005 2.25	TA2600 2.50	UPL191V 1.50
AN239 2.50	CA1352E 1.75	LA4422 1.50	MC1327Q 0.95	SL1327 1.10	STK0015 7.95	TA7630A 3.50	TBA651R 2.50	TA1035 2.50	TA2610 2.50	UPL350C 2.45
AN240P 2.80	CA3086 0.46	LA4430 2.50	MC1351P 1.75	SL1327Q 1.10	STK0029 7.95	TA7630B 3.50	TBA673 1.95	TA1037 1.95	TA2611A 1.95	UPL353C 2.45
AN247 2.50	CA3123E 1.95	LA4430 2.50	MC1352P 2.35	SN7414 1.50	STK0039 7.95	TA7630C 3.50	TBA750 1.95	TA1040 2.15	TA2624 3.50	UPL360 2.95
AN260 2.95	CA3138M 2.50	LA4461 3.95	MC1358 1.50	SN7415N 1.25	STK0061 1.50	TA7630D 3.50	TBA750Q 2.65	TA1044 2.15	TA2625 4.50	UPL365C 3.95
AN262 1.95	CA3140T 1.15	LC7120 3.25	MC1358 1.50	SN7415N 1.25	STK0061 1.50	TA7630E 3.50	TBA750Q 2.65	TA1044 2.15	TA2626 2.75	UPD2002H 1.95
AN264 2.50	CA3140T 1.15	LC7130 3.50	MC1358 1.50	SN7415N 1.25	STK0061 1.50	TA7630F 3.50	TBA750Q 2.65	TA1044 2.15	TA2627 2.45	UPD2114C 2.50
AN271 3.50	HA1137W 1.95	LC7137 5.50	MC1406P 2.95	SN7415N 1.25	STK0061 1.50	TA7630G 3.50	TBA750Q 2.65	TA1044 2.15	TA2628 2.75	555 0.35
AN301 2.95	HA1156W 1.50	LM323K 4.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630H 3.50	TBA750Q 2.65	TA1044 2.15	TA2629 2.45	556 0.60
AN303 3.50	HA1306 1.50	LM324N 0.45	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630I 3.50	TBA750Q 2.65	TA1044 2.15	TA2630 2.75	723 0.50
AN313 2.95	HA1322 1.95	LM380N 1.50	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630J 3.50	TBA750Q 2.65	TA1044 2.15	TA2631 2.75	741 0.35
AN315 2.95	HA1339A 2.95	LM380N8 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630K 3.50	TBA750Q 2.65	TA1044 2.15	TA2632 2.75	747 0.50
AN316 3.95	HA1366W 2.75	LM383T 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630L 3.50	TBA750Q 2.65	TA1044 2.15	TA2633 2.75	748 0.35
AN331 3.95	HA1406 1.95	LM390N 3.50	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630M 3.50	TBA750Q 2.65	TA1044 2.15	TA2634 2.75	780B 0.50
AN342 2.95	HA1551 2.95	LM1011 3.15	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630N 3.50	TBA750Q 2.65	TA1044 2.15	TA2635 3.50	7805 0.50
AN362L 2.50	LA1201 0.95	MS155L 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630O 3.50	TBA750Q 2.65	TA1044 2.15	TA2636 3.50	7812 0.50
AN612 2.15	LA1201 0.95	MS155L 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630P 3.50	TBA750Q 2.65	TA1044 2.15	TA2637 3.50	7815 0.50
AN632 3.95	LA1201 0.95	MS155L 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630Q 3.50	TBA750Q 2.65	TA1044 2.15	TA2638 3.50	
AN7140 3.50	LA1201 0.95	MS155L 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630R 3.50	TBA750Q 2.65	TA1044 2.15	TA2639 3.50	
AN7145 3.50	LA1201 0.95	MS155L 2.95	MC1451BP 7.50	SN7415N 1.25	STK0061 1.50	TA7630S 3.50	TBA750Q 2.65	TA1044 2.15	TA2640 3.50	

BELT KITS

Akai VS1-2-4-5 1.75	3HSSU2N 37.50	PYE 713 4 LEAD 8.50
Amstrad 7000 1.50	3HSSU3N 35.00	PYE 713 5 LEAD 8.50
Amstrad 4600-5200 2.95	3HSSV 18.95	PYE 731/25 8.50
Ferg 3V22 HR3360 2.75	3HSSVA 29.50	RANK A774 6.35
Ferg 3V23 HR7700 0.95	PS3BS 24.50	RANK A823 6.95
Ferg 3V29 HR7200 1.50	PS3BSF 35.00	RANK T20A 6.95
Ferg 3V31 HR7650 1.50	PS3BT 30.00	SIEMENS TVK76/1 6.95
Ferg 3V35-36 HRD120 1.25	PS4B2S 29.95	SIEMENS EUROPA 7.50
Ferg 4-2-4-3-4-4-5 1.25	PSB3S 45.00	THORN 1500 5.45
Fisher 710-716-722 1.50	10% Discount on Five Mixed Heads 35K88 0.45	THORN 1600 5.45
Hitachi VT11-33 1.25		THORN 3500 7.95
Hitachi VT5000 2.25		THORN 8000 6.95
Hitachi VT8000 0.95		THORN 8500 7.15
Hitachi VT9300 0.95		THORN 9000 8.50

Tone Burst for t

The Pye Europa was one of the best designed mobile VHF transceivers of its era, in that it was small, self-contained with integral loudspeaker, and with all components and stages very accessible for ease of tuning, adjustment and maintenance.

The VHF high-Band version of the MF5FM was designed to provide

construct circuit which can be accommodated on the plug-in facility module without having to touch the main circuit, to provide a useful tone-burst oscillator to access the amateur repeater stations.

Facility Module

Fig.1 shows how the module may

32mm high, an epoxy glass-fibre non-plated 60mm wide × 110mm long; and a 14-way gold-plated edge-plug integral with the rear of the board.

To re-install the module, locate the 'T' bracket on the rearmost underside of the board in the related slot within the main unit, and push the module forward until the internal catch engages when the module panel is flush with the main panel.

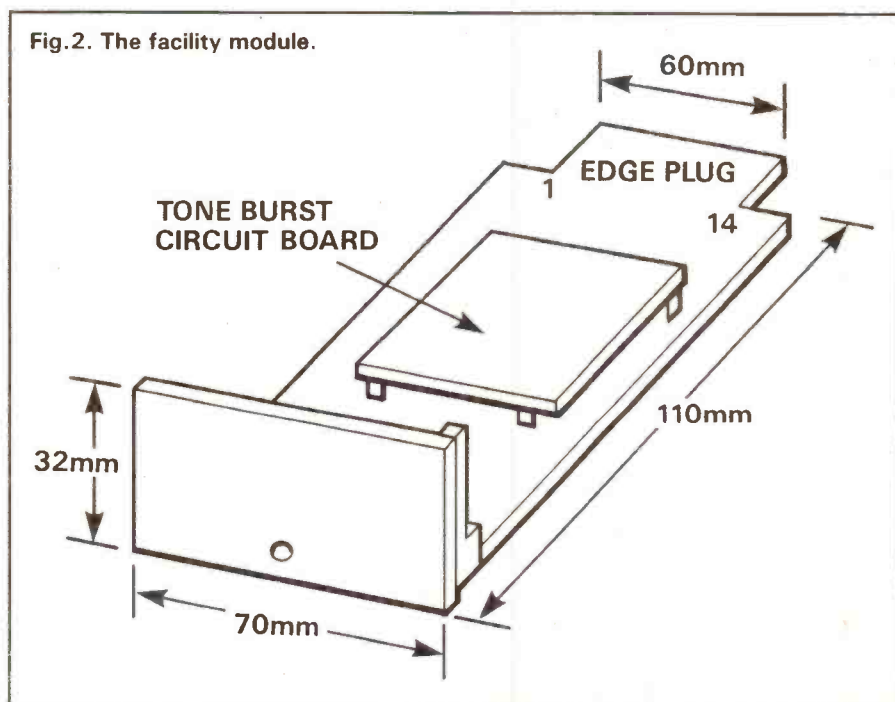
Four circular cut-outs in the plastic reinforcement allow direct access to the aluminium panel of the module, for mounting of components

E. Chicken G3BIK gives the Europa a tone burst via its internal facility module.

a nominal 5 watts of rf output over the frequency range 146-174MHz, and the MF25FM gave 25 watts. In practice they could encompass the amateur 144MHz band, and many have found their way into such service.

A particularly useful aspect of the design was the provision of an externally removable facility module by which it was possible to make connection to various parts of the circuit, such as the microphone pre-amplifier before and after af compression, the demodulated af output before and after squelch, +12 volts regulated, and +10.2 volts regulated on both transmit and receive.

The article describes an easy-to-



be withdrawn from the front panel in the absence of the special extractor tool, by simply inserting a small diameter screwdriver into the 4mm diameter access-hole in the lower centre of the module, and gently pulling the module forward while exerting a downward pressure on the screwdriver to raise its tip, releasing the internal catch.

The mechanical details of an un-committed facility module are shown in Fig.2. The main components of the module comprise a plastic-reinforced aluminium panel 70mm wide ×

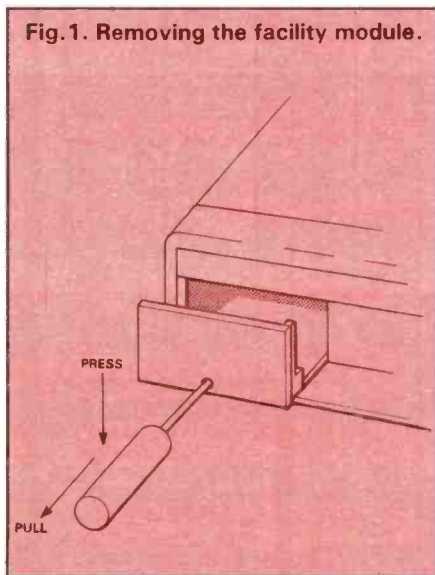
such as switches or lamps.

Figs. 3 and 4 give the electrical connections of the module's rear edge-plug, and microphone's 5-way DIN socket respectively.

Tone-burst Oscillator

Repeater stations on the amateur bands are normally quiescent until activated by an incoming tone signal of the appropriate frequency and time duration.

To access a repeater, the caller must first transmit a 250 millisecond (quarter-second) burst of tone at



the Pye Europa

Fig.3. Edge-plug electrical connections viewed from underside

14	-----	Chassis/0V negative dc supply rail.	
13	-----	Stab. + 10.2V when PTT transmit.	Pin 21 on Rx board
12	0-----	Squelched audio from af preamp.	Pin 13 on Rx board.
11	0-----	Stab. + 10.2V rail	Pin 20 on Rx board.
10	0-----	No connection	
9	0-----	Regulated + 12V dc supply rail.	Pin 22 on Rx board.
8	0-----	Squelched audio to Vol.Control	
7	0-----	Stab. + 10V rail for TX	Pin 10 on Tx board.
6	0-----	Mic preamp post-comprsn,pre-clipp.	Pin 8 on Tx board.
5	0-----	No connection	
4	0-----	No connection	
3	0-----	Mic 'live' input.	Pin 1 on handset socket.
2	0-----	Unsquelched af from detector.	Pin 5 on Rx board.
1	0-----	Chassis/0V negative dc supply rail.	

$$\text{Frequency } F \text{ Hz} = 1/T \text{ where } T \text{ secs} = 0.7 (R5 + 2 \times VR1)C10$$

$$\text{and assuming } VR1 \text{ is set to } 6.33 \text{ k}\Omega = 0.7 \times (4700 + 2 \times 6330) \times 0.047 \times 10^{-6}$$

$$T = 0.5711 \text{ secs}$$

$$F = 1/T = 1750 \text{ Hz}$$

The variable resistor RV1 allows for adjustment of the tone frequency to compensate for component tolerances, but no provision is made for fine adjustment of tone-burst time-duraton because it is not critical.

The negative-going voltage transition required to trigger the monostable is derived by inversion from the positive dc supply system, taking advantage of the fact that pin 13 of the edge-plug rises from 0V to +10.2V during transmit, by way of the press to talk switch.

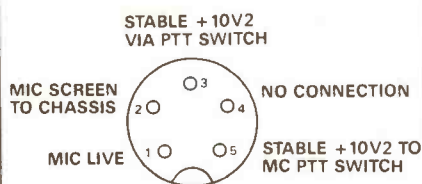
Transistor Q1 is arranged as a voltage inverter, which is normally non-conducting. It conducts when its base is connected through R1 to the positive supply rail, which happens when the push-button switch SW1 is pressed while switch SW2 is in the manual position, or whenever the ptt switch on the microphone is pressed while the switch SW2 is in the automatic position.

On changing from the non-conducting to the conducting state, the voltage level at the collector of transistor Q1 falls from high to low. That transition is differentiated by capacitor C3 and resistor R3 to present a brief negative-going pulse to the trigger pin 6 of the monostable, which in turn initiates and sustains the 1750 Hz multivibrator for 250 milliseconds.

The 10V to peak voltage-level of the multivibrator output signal is attenuated by a factor of about 100 via the RC low-pass filter network comprising R6,R7 and C11 to produce a pseudo-sinusoidal output signal of circa 100 millivolts peak to peak, which is similar in magnitude to the output signal from the microphone on speech peaks.

This signal is fed to pin 3 of the edge-plug on the facility module,

Fig.4. The microphone DIN socket connections (from outside).



1750Hz.

The circuit shown in Fig.5 is designed to provide such a tone-burst transmission from the Pye Europa, either manually at the press of a button or automatically when the press-to-talk switch on the microphone is pressed.

While the latter is more convenient, the purist might argue that it causes a tone to be transmitted more often than is required by the repeater, which may be mildly irksome to the listener at the receiving end.

A change-over switch mounted on the front-panel of the facility module allows the operator to choose between the two methods.

By feeding the tone-burst signal into the transmitter in parallel with the microphone and at the appropriate voltage level, the fm deviation produced by the tone modulation is similar to that on speech peaks, with the advantage of being able to hear the tone from within the microphone as an assurance that the tone-burst

is functional.

The tone-burst circuit is constructed as a separate unit, and its dc supplies and signal connections are picked up by flying-leads from the solder-lands of the edge-plug on the facilities module.

Pin 11 of the edge-plug provides a regulated +10.2V to the tone-burst unit, to ensure stability of tone frequency.

IC1 is a low power cmos version of the well proven 556 dual timer the first section of which is configured as a monostable, whose output pin 5 is normally low (0 volt) until receipt of a trigger pulse at pin 6 which causes the output to go high (+10V), where it remains for a period of approximately 250 milliseconds.

The time period during which the output of the monostable is high, is determined by the combination of R4 and C4, given by:

$$\begin{aligned} T \text{ secs} &= 1.1(RC) \\ &= 1.1 \times (1.0 \times 10^6 \times 0.22 \times 10^{-6}) \\ &= 242 \text{ ms} \end{aligned}$$

Output pin 5 is directly connected to the reset terminal pin 10 of the second timer of IC1, which is arranged to act as a multivibrator with a repetition frequency of 1750Hz. Oscillatory action can only occur when its reset pin is high ie during the 250 ms period of the preceding monostable.

Frequency of oscillation is determined by the components R5,RV1, and C10, given by:

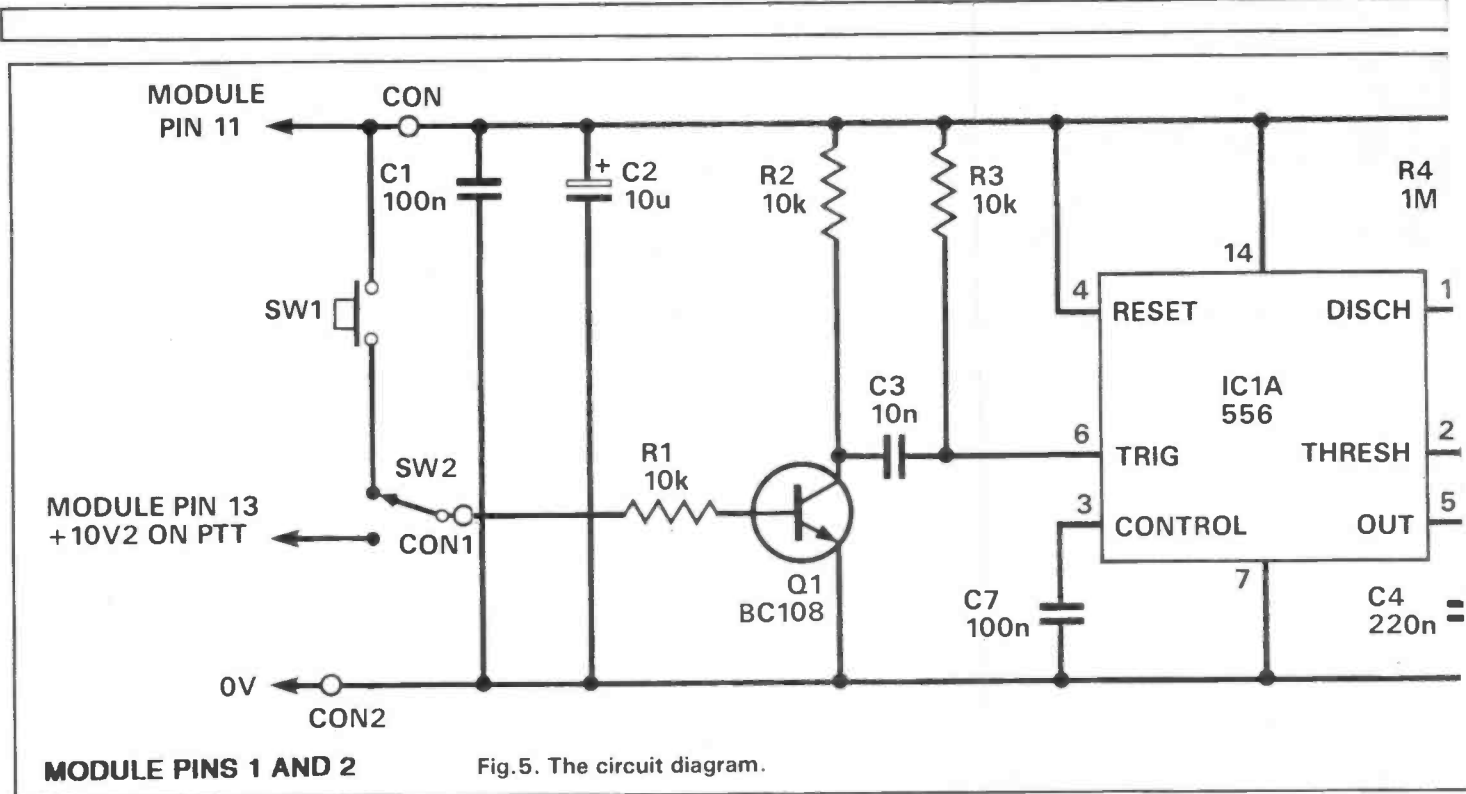


Fig.5. The circuit diagram.

which connects directly to the microphone 'live' terminal on the microphone input socket, so modulating the transmitter to radiate the tone-burst signal. C9 at the output of the multivibrator prevents any dc from reaching the microphone.

Construction

The tone-oscillator can be constructed either as a 70mm x 45mm printed-circuit board, or hard-wired on copper strip-board of similar dimension.

A suitable pcb layout is given in Fig.6.

Components should be mounted horizontally because of the height restriction in the transceiver, and care must be taken with the placing of capacitors C1,2,5,6 to ensure adequate decoupling as a safeguard against adverse effects from the strong local rf field while transmitting. C1 should be connected as directly as possible between the emitter of Q1 and the top end of its collector load-resistor R2; and C5 directly between dc supply pins 14 and 7 of IC1.

DC supply is taken from the stabilised +10.2V rail of the transceiver, which remains available at pin 11 of the edge-connector during both receive and transmit, with negative/chassis at pins 1 and 14. Current demand is negligible and well within the scope of the transceiver's regu-

lated power supply.

After assembly, the circuit unit is then bolted or glued to the upper side of the facility module base-board, and the two switches SW1 and SW2 can be conveniently mounted onto the vertical panel through the circular cut-outs in the plastic reinforcement.

Finally, a few flying leads are required to connect the finished circuit to the solder-lands on the edge-plug of the module and to the panel-mounted switches, as indicated in Fig.5.

Testing

Ideally, to avoid unnecessary transmissions during setting-up the tone-burst oscillator, the unit should be tested prior to re-installation of the facility module plus tone-burst circuit in the transceiver.

In the absence of an external 10 volt dc supply unit, a 9 volt battery is temporarily connected to pins 11 and 14 of the edge connector on the module, the positive going to pin 11.

If an oscilloscope is available, the output signal of the tone-burst circuit may be examined by connecting the CRO probe to edge-plug pin 3, with the timebase set to 0.5 millise/div, and the amplifier gain to 50 millivolts/div.

To produce a constant tone output, the junction of C3, R3 and Pin 6 of IC1 is temporarily connected to the zero-volt/chassis rail at Pin 1 or 14 of

the edge-connector, and a square-wave signal should appear on the screen where it will remain for as long as IC1 trigger-pin 6 is grounded.

The time-period for one cycle of the required 1750Hz signal is $1/1760 = 0.57$ milli-second, so the frequency-setting variable resistor RV1 on the circuit board is adjusted until one cycle of the oscillatory square-wave fills approximately 1.2 horizontal divisions on the screen.

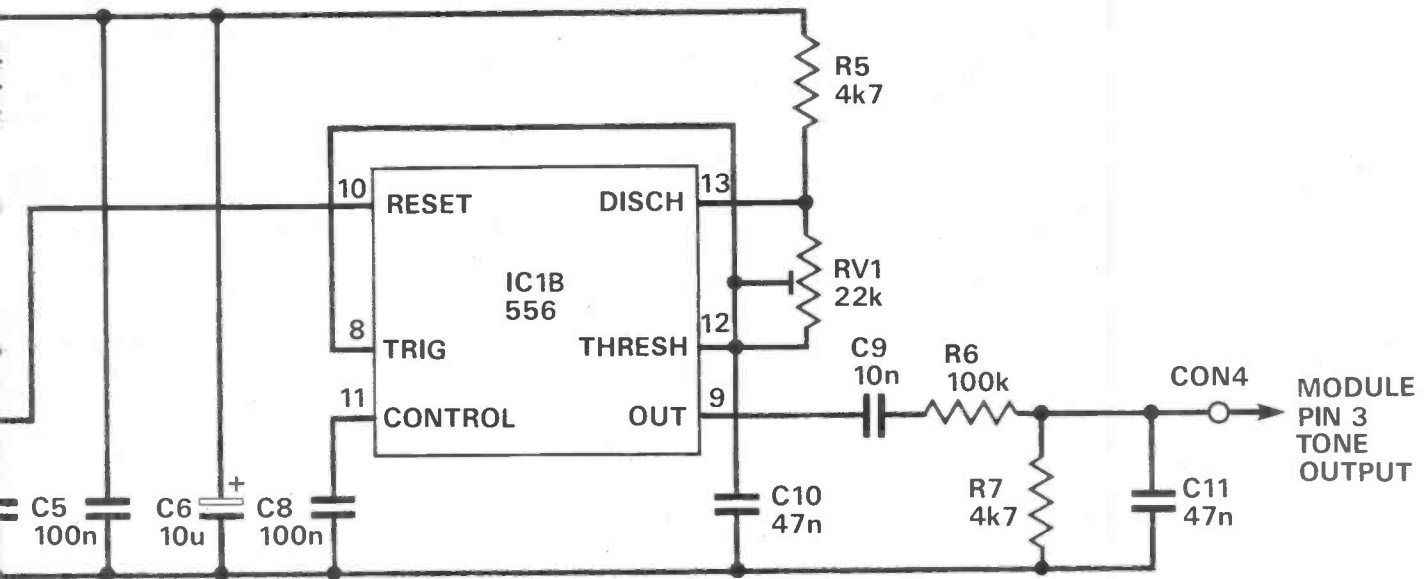
Peak to peak amplitude of the trace should be about two vertical divisions, ie 100 millivolt.

Connecting a low-frequency counter if available instead of the CRO probe, should make setting of the 1750Hz tone frequency that bit more accurate.

With the CRO still connected, but with the temporary zero-volt connection removed from the junction of C3, R3 and IC1 pin 6, and with switch SW2 in the manual position, pressing the push-button switch SW1 should cause the oscillatory signal to appear on the screen for brief period of time.

The CRO timebase is then switched from 0.5 msec/div to say 100 msec/div, and the 250 millisecond time interval of the tone-burst signal should span between 2-3 horizontal divisions.

With switch SW2 now in the automatic position, a temporary connection between pins 11 and 13 of the edge connector should again



produce a 250 msec burst of tone signal to appear on the screen, thereby simulating the PTT switching operation.

In the event of neither a CRO or a low-frequency counter being available, it should still be possible to monitor and adjust the tone frequency by listening to the signal at pin 3 of the edge-plug by means of an ear-piece or headphones, or by connecting the signal into an audio-amplifier, and comparing it audibly with the tone produced on a piano or electronic keyboard when the A² key is played.

A² frequency is 1760Hz which is close enough to the required 1750Hz for practical purposes, and its location is the nineteenth white key above middle-C on a piano keyboard.

With the facility tone-burst module now re-installed in the Pye Europa transceiver, and with the appropriate repeater channel selected, pressing either the push-button with the change-over switch in its manual position, or the microphone PTT switch while in the automatic position, should activate the repeater and cause it to be heard on the loudspeaker.

While theoretically the frequency of the tone oscillator should be independent of the supply voltage, it is possible if required to obtain access to the installed module for fine adjustment of the frequency-setting RV1, by

removing the upper cover plate of the Europa, and lifting upwards the hinged receiver board.

The upper cover plate section is fastened by the two screws at its rear corners, the removal of which allows the cover to be lifted off, so giving access to the receiver circuit-board.

This is retained by three small screws along its rear edge, one at

each corner and one central, which when removed allow the board to hinge forward and upwards to latch into the vertical position for convenient access to the module below.

Apart from the mechanical aspects, there is no reason why this tone-burst circuit should not perform equally well for transceivers other than the Pye Europa.

Components

Resistors

0.25W Metal Film

R5,R7	4k7
R1,2,3	10k
R6	100k
R4	1MΩ
RV1	22k Min Preset

Capacitors

25V dc working	
C3,9	10n ceramic

C10	47n ceramic
C1,5,7,8	100n ceramic
C4	220n ceramic
C2,6	10μ electrolytic

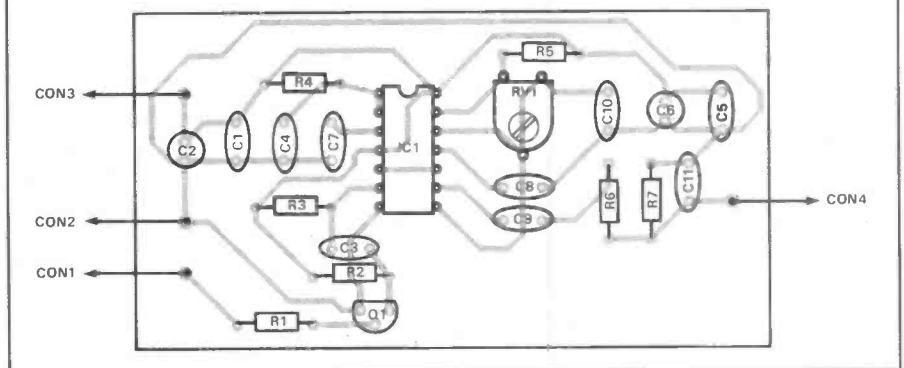
Semiconductors

Q1	BC108
IC1	556 cmos low-power

Panel-Mounting Switches

SW1	Min push to make
SW2	Min spdt

Fig. 6. The layout and components.



MORSE FORUM

It is good to hear so many recent call signs coming up on CW. To many it can be an ordeal — trying to think about procedure, spelling the words and then trying to send CW on top of everything else. However, I think most people who passed that hurdle have said it is well worth it. When I first made it onto the air almost twenty years ago I was nervous.

Clubs and Mags

The CW Fists Club is still expanding. Their latest newsletter dropped on the mat recently and gave the number of members as over 440. It offers weekend nets on 40 and 80 as well as a QSL bureau for members, and encouragement and advice for newcomers to the mode.

While talking of Fists, a reminder

there was deluge of letters opposing this view.

The views received put over many points. The idea of the simplicity and efficiency of the mode was put forward. Another correspondent reminded people that CW is an art practised and loved by many people, while someone else stated the spectrum efficiency of the mode was very important in today's crowded conditions.

However, one letter which particularly caught my eye was from someone who argued for the continued use of a CW test. He explained that it was not just a code test, but also a communications test. He said that being trained in CW helps to give the ability to listen, discern and react by writing down the information heard. By passing a code test it gives a measure of proof that some practical communications skills have been gained.

I had to agree with this point. Amateur radio is about communicating!

This month's Morsel includes two tutor reviews — how to do it overseas, and how to do it at all.

However, now I am glad I stuck with CW.

Book Review

CW into Foreign Languages is a book which the RSGB have just started to stock. On the front cover it says that it is "instantly" possible to converse with the world using morse in Spanish, German, Swedish, Dutch, Russian, Norwegian, French, Polish, Hungarian and Yugoslavian (Serbo-Croatian). An impressive list.

The book contains a directory of prefixes against the languages which are spoken. It is then split into individual sections for each language. They give around ninety to a hundred different expressions for each language with their English equivalent. Everything from "Good morning" to "Band connections have been good (or bad) lately" and a very useful "Did not understand, please repeat in English" are all included.

The book was not produced to the standard of many amateur radio books, and includes some Tippexed corrections. However, if you do want to talk to others in their own language it would be very useful.

CW into Foreign Languages is published in Canada by VE3E1M and VE3M6Y. It is available from the RSGB at £4.95, post paid to members.

about their phone-a-sked. This idea is aimed at people who have not had a lot of CW experience on the air and want a friendly and understanding ear at the other end. A few contacts of this nature should build up confidence so that it is possible to make a solo foray into the bands. Details of phone-a-sked and Fists can be obtained from Geo Longden G3ZQS, QTHR.

Morsum Magnificat is still going very strong under Tony Smith G4FAI. The summer edition includes a wide variety of topics from heliographs to world record CW speeds. And if you are wondering what heliographs are, the description in MM is very good.

One article which could not fail to get attention was about the Eddy-stone bug. This key could have given the name bug to semi-automatic keyers because its "streamlined die-cast housing" gave it a most insect like appearance. For those who are interested there is more about it in the autumn issue of Morsum Magnificat.

Communications Skills

Recently in QST (the ARRL society magazine) there has been a lot of debate in the correspondence columns about CW and whether it is obsolete. One poor contributor started it off by suggesting that CW was outdated, and in the following issue

Shop Window

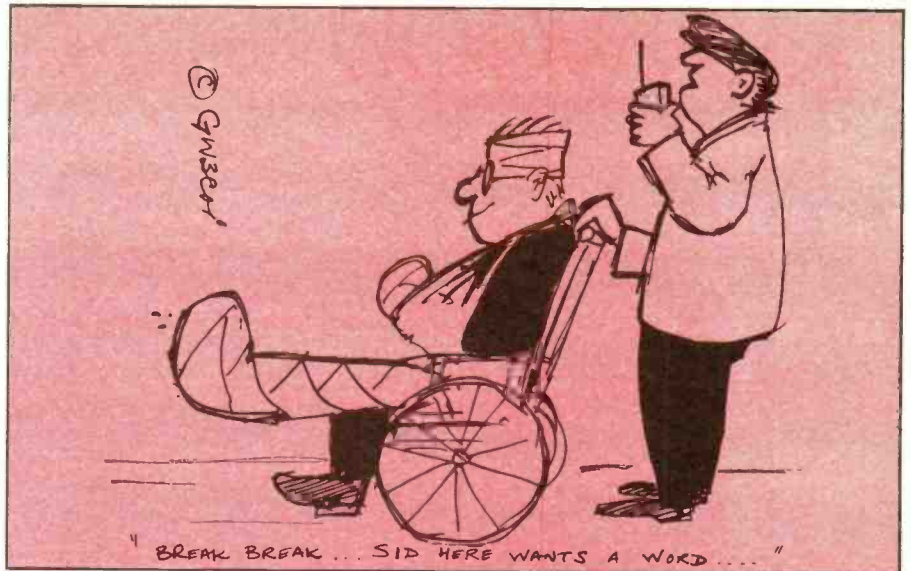
Datong is a company which manufactures a wide range of products for the amateur market. It has built up a very good reputation for them since it was founded in 1974 by Dr. D.A. Tong G4GMQ. Its product line includes items such as speech processors, active aerials, converters, squelch systems and so forth. Datong also markets some items which are of interest to the morse enthusiasts, or would be morse enthusiasts. One of these is a morse tutor.

Morse tutors are now a common feature of learning CW. Essentially they are units which automatically generate a random stream of morse characters at a speed set by the operator. This is very useful because the characters are generated in a random or nearly random fashion. This makes it impossible to learn what is coming next as it is possible to do once a tape or record has been

played a few times. Even so, it is still necessary to use a morse tutor in conjunction with some plain language receiving practice.

It is also worth remembering a morse tutor need not just be used in preparing for the Morse Test. It can be used for general practice, or increasing one's speed after the Test.

Datong produce their morse tutor, the D70 in an attractive case. It generates a stream of morse characters in a perfectly random sequence. These characters can consist of all letters, all numbers or a mixture of the two, dependent on a front panel switch setting. Controls are also included for volume, speed and the delay between the letters. The speed can be varied from 6.5 to 37 words per minute, and the display from the correct or calibrated value of 3 dot periods up to a maximum of 3 seconds. This feature is very useful because it enables people to start learning the characters at the correct speed, while giving a longer thinking time. By doing this, it is possible to learn the rhythm of the character which could not be done if the characters were sent slowly.



The D70 comes complete with an internal speaker and an earpiece which can be plugged in to save driving everyone else around the bend with dots and dashes. It is also battery powered so it can be used anywhere and any time.

Finally, the cost — £56.35, which includes VAT as well as postage and packing. It can be obtained from Datong Electronics Limited,

Clayton Wood Close, West Park, Leeds LS16 6QE. Tel 0532 744822.

Sign Off

Well, that's all for now. For everyone who wants to write in the address is QTHR, but for anyone without a call book it is 144 Worpole Road, Staines, Middlesex TW181EQ. So, until the next time, BCNU es 73's de G3YWX.

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KENWOOD

amateur radio equipment

When only the best will do



Now for something completely different — or how I found 2 metres and discovered the true secret of life.

Kenwood have always tried to give the radio amateur a sensibly thought out range of equipment, and the TR-751E occupies that particular place devoted to the all purpose, go-anywhere, high performance 2 metre multi-mode transceiver. Many of you will remember what an impact the TR-9000 had on 2 metre operation when it was introduced, and with other manufacturers scrambling to keep up, the success was repeated by the TR-9130. The TR-751E follows and improves upon those earlier successes, and it's no wonder, when you consider what is contained in this tiny package.

The TR-751-E does not simply give you high performance; it presents it in such a way as to be easily used, logical in operation, and a lasting source of satisfaction. Is it any wonder that Angus McKenzie said in his review (*Amateur Radio*):—

"Trio (Kenwood) have clearly thought out the ergonomics very carefully and I found it one of the easiest mobile rigs to use, especially considering its comprehensive facilities." He also said, commenting on the actual performance of the receiver:—

"The receiver sounded alive, and seemed to be giving a performance very similar to that of the Icom IC271 with MuTek front end. I found this rather stunning, and it is clear that Trio have achieved a far better noise figure in the front end than ever before on a 2 metre rig."

Chris Lorek, in his review (*Ham Radio Today*) confirmed what had already been said:—

"The receiver appeared remarkably efficient at pulling weak signals in. When I connected in an external GaAsFET preamp at the aerial socket I noticed very little improvement."

This level of performance also extends to the transmitter, and Kenwood transceivers have always been noted for their high quality audio on the air. With 25 Watts of RF available, the signal has more than enough "punch" to get through, and all in all there is little one can find about the TR751-E which is less than ideal. So — what does it all do?

You know by now that I dislike quoting long specifications, particularly considering that one could describe both a Metro and a Porsche as having four wheels on the outside and one in front of the driver — doesn't really tell you a lot about the true differences does it? Well, I believe that the TR751-E gives you a most versatile 2 metre multi-mode station; small enough to use mobile or portable, but comprehensive enough to use as

a full-spec. base station at home. In that respect, it's also attractive enough to be domestically acceptable, and discreet enough in styling to go anywhere in the house. The facilities provided are quite remarkable considering the size of the set, but as always easy to use, in Kenwood tradition.

For those of you who read about the TS-440S (didn't you?), you will recall my comment about the need for a transceiver to stay on the same frequency when switching modes (yes, that's right, some of them don't). The TR751-E gives you true frequency readout at all times, in all modes, on receive as well as transmit. Would you expect Kenwood to do anything but what is correct?

Also in Kenwood tradition, a comprehensive colour brochure is available which describes the TR751-E in complete detail, together with the range of matching accessories (no, there isn't a matching handbag . . .). The information is free, but the Post Office demand payment for getting it to you. If you care to send a stamped addressed envelope we will fill it with the required information. If you want something weightier to read, send us £1 and we will fire back the complete full colour Kenwood catalogue and other interesting reading. If you want to have a moan, my name is:—

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73 (or for 2DYM 73s) see you soon Richard . . .

TR751E (2m) £599
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25 YEARS IN AMATEUR RADIO



MORE OF EVERYTHING — EXCEPT COST

Not many of you will realise that this is the Centenary year of a little known Russian designer called Ivan Itchifinga, whose claim to fame was that he invented the finger operated push button. In the early years his invention was not very popular, but by the 1980s many equipment designers began to incorporate Ivan's push button at every opportunity with the eventual result that some amateur radio transceivers simply bristled with the d...d things.

I say "some" transceivers, because the Kenwood designers have always demonstrated an uncanny ability to make their equipment easy to use by real human beings, and this ease of use comes from minimising the number of push button operated "gimmicks" on the front panel. This is not good news for the Ivan Itchifinga Trust Fund, but it makes a lot of sense for those radio amateurs and listeners who want to actually use their equipment rather than counting the number of superfluous excrescences on the front panel.

The totally new range of VHF and UHF transceivers which Kenwood are now introducing all demonstrate what I mean about elegant simplicity of operation, and although having every useful and desirable feature anyone could want in a transceiver, they are all easy to use and made attractive by their relative lack of Itchifinga buttons.

The range currently comprises the TM-231E for 2 metres, the TM-431E for 70 centimetres, the TM-531E for 23 centimetres and the superb TM-701E 2M/70CM dual bander. Since they are all designed to be a matching series, their appearance is somewhat similar, so I show only the photograph of the TM-531E.

The TM-701E is a most versatile animal, giving you full coverage of both 2 metres and 70 centimetres, with 25W output on both bands, all the repeater shifts you need, and the ability to operate in full cross band duplex, which means that for those who are properly licenced it can operate as a cross band repeater.

The TM-231E puts out a massive 50W on 3 metres, the TM-431E 35W on 70, and the TM-531E 10W on 23cm. For the increasing number of users of 23cm FM for packet radio links, the TM-531E is proving an ideal transceiver, and many are now burbling away happily — to each other. Mind you, with the acknowledged excellent of Kenwood audio quality, they are also equally at home on your favourite repeater of simplex channel.

The most remarkable thing about the new Kenwood range is that you can have Kenwood quality and performance for surprisingly low cost. If you compare prices with competing models from other manufacturers, you will find Kenwood hard to beat and difficult to resist.

For full details, just ask or call at your nearest Lowe branch or approved Kenwood dealer.

TM-231E	(2m)	£289
TM-431E	(70cm)	£318
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TM-701E	(2/70)	£469

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VERY REALISTIC

~The PRO-2005 scanner

The scanner receiver now seem to be more and more of a 'consumer' item as well as serving a useful purpose for the active radio enthusiast who doesn't want to miss a thing. For some time, simple models have been available in high street Tandy stores, and latterly the features offered by their Realistic brand range have increased to what will now interest the radio amateur as well as the man in the street. The latest scanner on offer

a bank-by-bank basis, as well as scanning any selected number of banks. This way, you can store frequencies in separate banks, for instance, amateur frequencies in one, local airport frequencies in another, CB frequencies in another and so on, to allow you to select whichever you want to scan.

Together with these, ten further Monitor frequencies may be programmed and selected for general

scanner's functions. Unlike its predecessor it uses separate buttons with a positive depression rather than a flat membrane panel, far more user-friendly in operation. The number keys provide the double function, of selecting the required frequency or numbered memory channel and they acting as memory bank selectors in channel scan mode. All other front panel controls have only a single function, simplifying operation.

A look inside the box shows a high standard of construction, more surprising as the outside, on close inspection, appears to be totally plastic apart from the unplated rear metal panel. All PCBs housing critical circuitry, such as the voltage controlled oscillators, are well screened, and considerable use is made of surface mounted components for reliability.

Chris Lorek G4HCL meets the scanner in which Ham meets High Street, and both come out looking good.

is the Realistic PRO-2005, giving FM and AM coverage of 25-520MHz and 760-1300MHz. A review model quickly came our way from Selectronic in Essex.

VHF/UHF Coverage

The set gives continuous coverage of the VHF/UHF frequency range, in 5kHz, 12.5kHz or 50kHz steps, with the exception of some of the UHF television band section. As such it covers the 10m, 6m, 4m, 2m, 70cm and 23cm amateur bands, as well as 27MHz and 934MHz CB, the civil and military aircraft bands, the VHF marine band, and numerous two-way radio and telephone frequency bands. Having both wide and narrow band FM demodulators, you can even listen to Broadcast Band II radio stations if you fancy a change from the local 2m or 70cm repeater.

Channels

As with most scanners, numerous memory channels are provided for storage and retrieval of your favourite frequencies, the PRO-2005 having 400 channels arranged into 10 banks of 40 channels each. As well as manual selection, memory channels may be scanned for activity on

listening or for searching across a pre-programmed range. The usual facility of locking out selected channels from the automatic scan is available, to prevent beacons or constant transmissions such a Volmet services locking the scan up. As well as this, a priority scan mode may be switched in, where the set automatically samples any selected channel for activity every two seconds, locking onto it for the duration of any received signal.

Keyboard

The front panel keyboard provides control of the majority of the

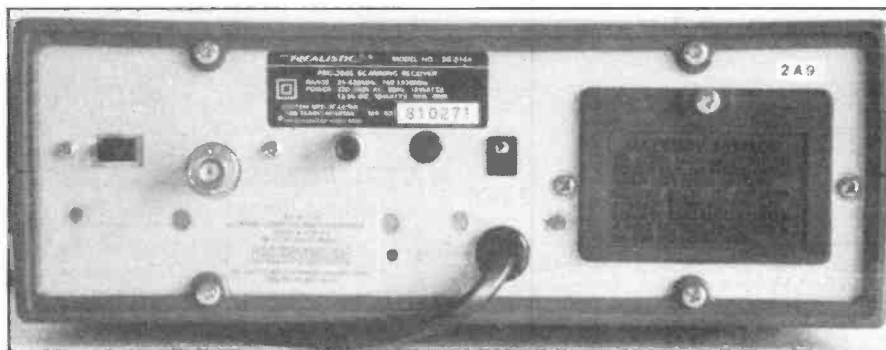
Searching

The first thing many people use a scanner for is to search out active frequencies, particularly if one of the many frequency listing books isn't at hand. The PRO-2005 has the facility for programming up to ten search ranges, each with their individual lower and upper frequency limits, frequency step interval, and reception mode. These are entered by first pressing the Program key followed by the required search bank number, a press of the Limit key and then the lower and upper frequency values.



The mode of operation and frequency step interval is selected automatically from a pre-set default table shown below.

Two search speeds are available. Pressing the speed button while searching varies this as required. To allow reception of replies on a simplex channel, a two-second delay facility may be programmed to stop the search immediately resuming when the received signal disappears, also a press of the Monitor button halts the search onto whatever frequency the scanner is receiving at the time in case you come across something interesting! Whenever the scanner squelch raises, the search momentarily halts, but a 'sound' squelch mode may also be selected if required. This prevents the set locking up on silent carriers, where it samples the received signal for half a second, and if no modulation is present it goes on to the next channel. A five second silent pause in received modulation is needed before the receiver will continue to scan, to allow for any normal pauses in speech.



Freq (MHz)	Mode	Step (kHz)
25-30	AM	5
30-87.5	NFM	5
87.5-108	WFM	50
108-136	AM	12.5
136-225	NFM	5
225-520	NFM	12.5
760-1300	NFM	12.5

These may be overridden by suitable button pushing operations, for example in the UK we tend to use 12.5kHz rather than 5kHz steps on the VHF range around 2m, likewise FM rather than AM on 27 and 29MHz. In this case the selected step or mode indicator flashes away to warn you.

Added Facilities

The set operates from a standard AC mains supply, with a fitted AC lead. A rear panel socket is also provided for powering the receiver from an external 13.8V DC supply if required. An optional DC power lead is required for this. A built-in speaker is fitted to the top lid of the set, and a 3.5mm earphone socket on the fascia is provided for private listening. As well as the usual volume and squelch functions, a front panel selectable dimmer allows you to reduce the intensity of the display backlight for night-time use. Round the back of the set, a further socket is provided for an external speaker, and a phono socket gives a fixed level audio output for tape recording. A small screw-in telescopic aerial is provided for local reception, with a BNC connector on the rear panel for connection of an external aerial. A rear mounted slide switch controls a 10dB RF attenuator to limit overload problems when receiving strong signals. A 9V PP3 size battery is required for memory channel retention in the absence of external power, this fits into a holder through the rear of the set.

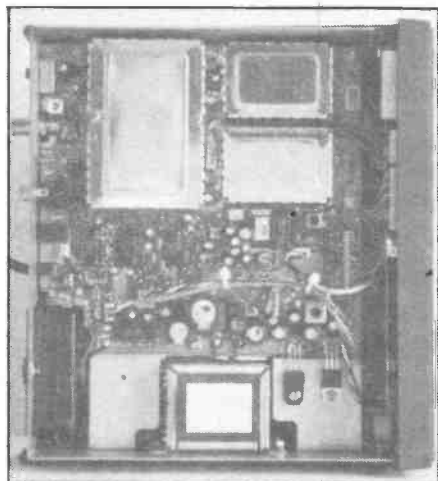
In Use

When first plugging in and switching the set on, it merrily beeped away flashing the 'Batt' indicator on the display, telling me to plug a battery into the rear panel. Following that, armed with my copy of a VHF/UHF frequency guide (see HRT June 89 for a comprehensive selection), I busied myself by programming multitudes of frequencies into the set. The scanner was initially used in the lounge of my house, using just the short telescopic aerial. Living near to an international airport, even this small whip provided many hours of interesting listening, as well as reception of all manner of other interesting goings-on. The sensitivity at VHF on the 2m amateur band, seemed quite good as I was able to listen to my semi-local repeater with ease, which is a fairly weak signal indoors when monitored on a dedicated 2m handportable.

For serious listening however, a decent external aerial is a must. The receiver was transferred hence to the radio shack, and my 25-1300MHz discone plugged in. Not surprisingly, the scanner really came alive, with signals from all sorts of locations, an international shipping port some miles away, and the London South Volmet service, all being received with ease. Here I felt that some form of signal strength indication would have been useful, but then one can't have everything!

Modes and Ranges

I found it useful to be able to defeat the default settings, which are apparently designed mainly for North America where AM is not used on VHF apart from the airbands. Here in the UK many two-way services make use of this mode for communication, including radio amateurs on 4m using re-tuned ex-PMR equipment. Many scanner receivers on the market



Inside the screened units: a high standard of construction.

Programming Operations

As well as direct frequency entry, a useful feature is the ability of the scanner to transfer frequency and mode information from the Monitor memory, for example during a search of a frequency range, into a dedicated memory channel for selection or scanning at a later time. When manually entering frequencies or scan limits, the following modes and steps are automatically selected:

Manufacturer's Specification

Frequency Coverage:

25MHz — 520MHz
760MHz — 1300MHz

Reception Frequency Interval:

5kHz, 12.5kHz, 50kHz

Reception Modes:

Wide FM (FM Broadcast, TV Sound)
Narrow FM (Two-way communications)
AM

Channels:

400 Channels in any band combinations

Sensitivity:

WFM: 30dB S/N at 22.5kHz Deviation:

25MHz — 520MHz	3 μ V
760MHz — 1100MHz	3 μ V
1100MHz — 1300MHz	10 μ V

NFM: 20dB S/N at 3kHz Deviation:

25MHz — 520MHz	0.5 μ V
760MHz — 1100MHz	0.5 μ V
1100MHz — 1300MHz	3 μ V

AM: 20dB S/N at 60% Modulation:

25MHz — 520MHz	2 μ V
760MHz — 1100MHz	2 μ V
1100MHz — 1300MHz	5 μ V

IF Rejection:

610MHz at 70MHz:	60dB
610MHz at 1000MHz:	60dB

Squelch Sensitivity:

NFM and AM	Threshold:	25 — 520MHz:	0.5 μ V
		760MHz — 1100MHz:	0.5 μ V
		1100MHz — 1300MHz:	3 μ V
	Tight S/N:	25 — 520MHz:	25dB
		760MHz — 1100MHz:	25dB
		1100MHz — 1300MHz:	20dB

WFM	Threshold:	25 — 520MHz:	3 μ V
		760MHz — 1100MHz:	3 μ V
		1100MHz — 1300MHz:	15 μ V
	Tight S/N	25 — 520MHz:	40dB
		760MHz — 1100MHz:	40dB
		1100MHz — 1300MHz:	40dB

Aerial Impedance:	50ohm
Audio Power:	1.3 watts nominal
Tape Output Level:	600mV, 10kohms impedance
Power Requirements:	AC 240V 20W DC 13.8V 12W
Memory Battery Required:	9V PP3
Dimensions:	76mm x 220mm x 205mm
Weight:	2.2kg

Selectivity:

NFM and AM:	+/- 9kHz	-6dB
	+/- 15kHz	-60dB
WFM:	+/- 150kHz	-6dB
	+/- 300kHz	-60dB

Scanning Rate:

Fast:	16 Channels/sec
Slow:	8 channels/sec

Priority Sampling:

2 seconds

Delay time:

2 seconds

however only have AM reception allowed on airband, with the added annoyance of 5kHz steps only on the remainder of the VHF range, the PRO-2005 being rather more useful in this respect.

As the scanner covered up to 1300MHz, I took a listen for the local 1297MHz FM repeater, using my outdoor 26 element log-periodic yagi. Unfortunately I couldn't hear a thing, a quick check by coupling my FT2311 23cm transceiver to the same aerial system brought the repeater in fully quieting. This showed the PRO-2005 was rather 'deaf' up there, although to be fair the manufacturer's sensitivity specification is considerably reduced in this range.

Reception Quality

The audio quality from the internal speaker was reasonably good on both narrow and wide FM. Plugging in an extension speaker while listening to the local broadcast stations on

Band II gave excellent quality. The quality on AM was somewhat limited due to AGC (automatic gain control) performance. I sometimes found off-tuning by plus or minus 5kHz on Airband improved reception by sufficiently weakening the signal (note this was not due to offset signals which is a feature the PRO-2005 is capable of handling by suitable pre-programming).

I found very few internally generated 'birdies' in the set; the majority of the silent carriers it received came from the various computers and other digital equipment in my shack. Even with the large external aerial connected I found no problems of cross-modulation, for example from the passing aircraft transmitting on AM while I was receiving other weak signals, I have in the past noticed a few other scanners, particularly handheld types, to suffer from this.

In all, I was quite pleased with the on-air performance, all I would have wished for was SSB reception facilities coupled with manual up/down stepping, for example to listen on the amateur 6m band for all the DX I could hear, but not resolve, coming in on the set.

Conclusions

The PRO-2005 is certainly a communications receiver capable of holding its own, rather than a consumer-type radio offering little in the way of performance. It has a wide coverage, capable of monitoring a variety of radio signals, although I found the sensitivity at the upper limit of its frequency range was rather disappointing.

For an 'extra' receiver in the shack, it could certainly prove useful, although for purely amateur reception it is of course limited to AM and FM modes. The AM performance I found to be a bit of a compromise, although perfectly acceptable considering the overall specification. For general listening on VHF and UHF however, it has ample channels combined with a number of useful operating features such as selectable step rates and sound squelch. Coverage down to 25MHz could prove interesting as we come to the current sunspot maximum with openings occurring nearly every day.

My thanks go to Selectronic (Canvey Island, Essex) for the loan of the review set.

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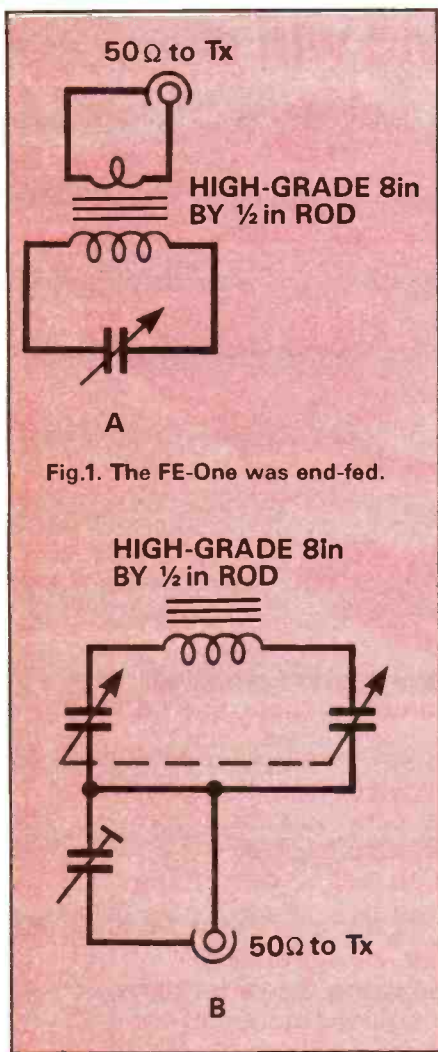
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Fe~Three I



The first practical Ferrite Rod Tx Antenna I designed was called the Fe-One, and it seems to have aroused interest. It was the result of many experiments. One of the definitions of "experiment" is "to test, or try out, a theory". My theory was that it might be possible to produce a tiny Tx antenna, using a high grade ferrite rod. Essentially a low power device, the Fe-One produced quite good practical results, but its chief limitation was that it was so narrow-band (High Q) that one had a hard time to re-resonate it to a new frequency to answer a short CQ.

As can be seen in Fig.1 the Fe-

One was end-fed carefully constructed using a very high grade material 7½in by ½in diameter ferrite core, special wire and ptfе tape. The antenna was matched to the Tx/Rx

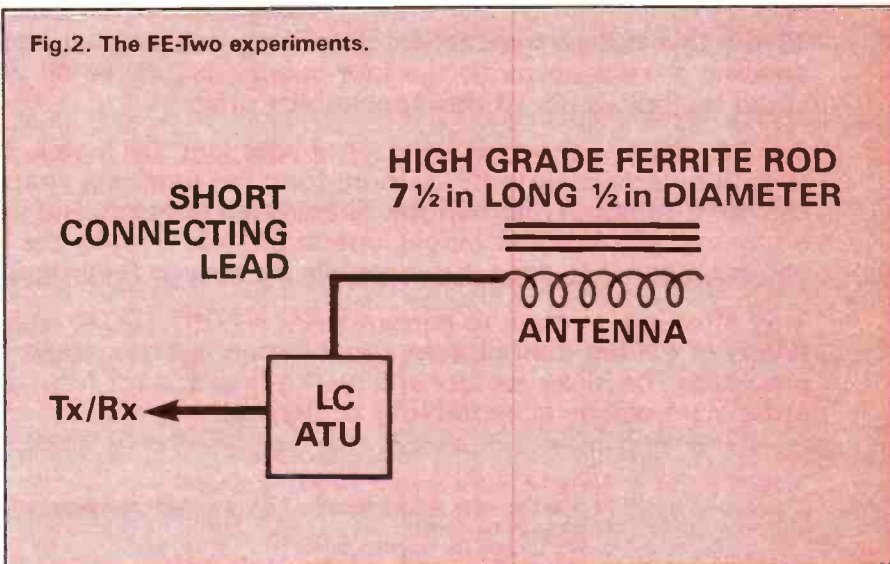
to a short range QSO of about 20 miles. The efficiency was again very low, though slightly better than Type A.

As a result of these and earlier

Richard Marris's 80m antenna is based on a ferrite rod and can be used over a 50kHz band without tuning.

with a conventional LC atu. Though designed for 80 meters, subsequent experiments indicated that it could be scaled down to 40 meters, with a fair

experiments, prior to the Fe-One, I decided that, with careful core selection and layout, it might be possible to design a mini-ferrite helical dipole



chance of usability on 20 meters as well.

Some folk had suggested at around the same time that a conventional ferrite loop should be tried. Two versions were built and tested.

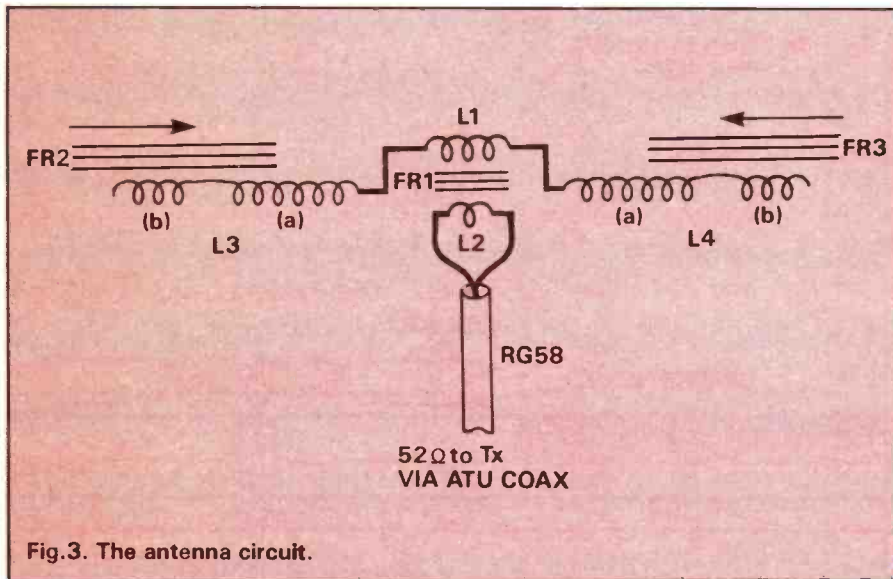
Type A (Fig.2) loaded fairly well, but was prone to core saturation and seemed to have a very low input/output efficiency. Type B loaded very well, and it was possible to struggle

with a practical bandwidth, and therefore no need for a resonating control. This should work in a similar manner to a conventional dipole, and both indoor and outdoor versions should be possible.

The Fe-Three

This antenna is only one meter long by about 80 cm high and 34 cm deep (Fig.3). Though designed for

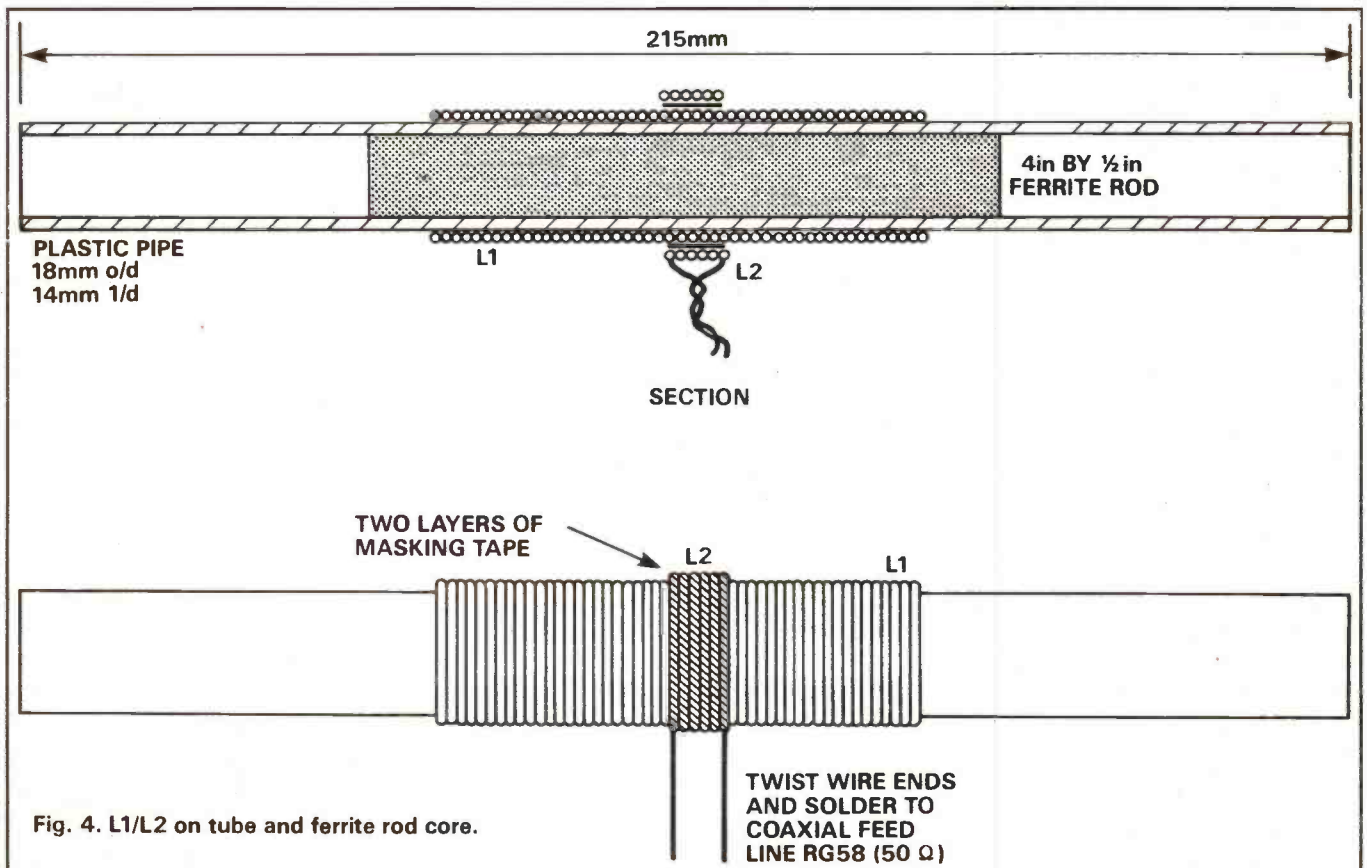
Mini Dipole



indoor use, it could be sealed into a length of plastic pipe, and mounted discreetly outdoors, where it would be unrecognisable. Though designed for 80 meters, the Fe-Three could almost certainly be re-scaled to 40 and 20 meters.

Unlike earlier models, it needs no manual tuning, and the antenna can be used over an approximate 50kHz pre-selected segment of the band. My prototype in its final form worked between 3540 and 3590 kHz — that is, I used it for CW.

Fig. 3 shows the "circuit". The coil of L1 (Fig. 4) is wound onto a plastic tube former, which is fitted over an imported nickel-zinc ferrite rod (FR1, Amidon R61-050-400, 4in long by 1/2in diameter. Quote these dimen-



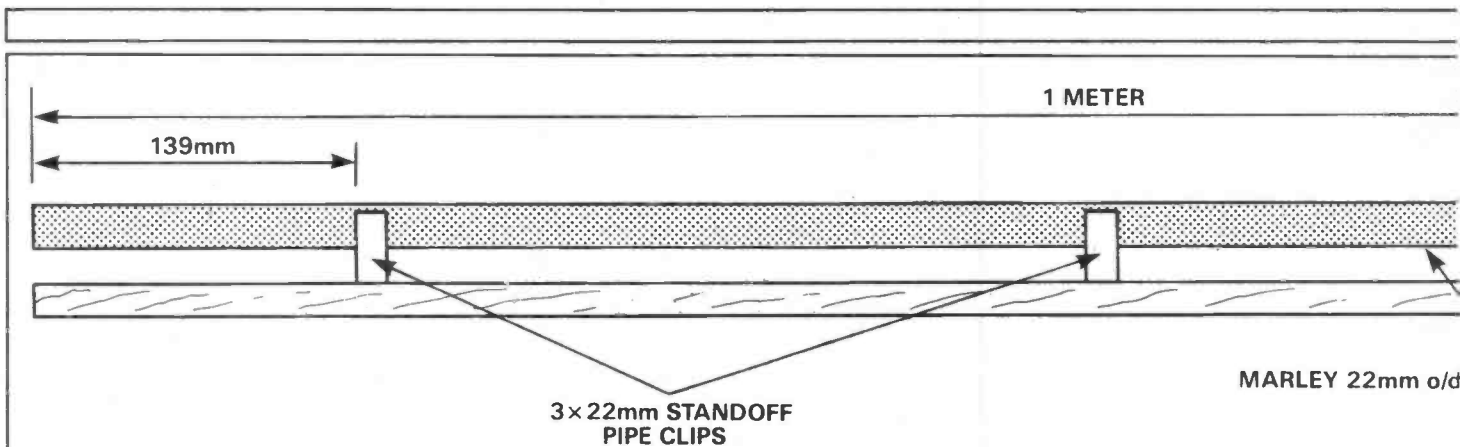


Fig. 5a. The basic mechanical assembly.

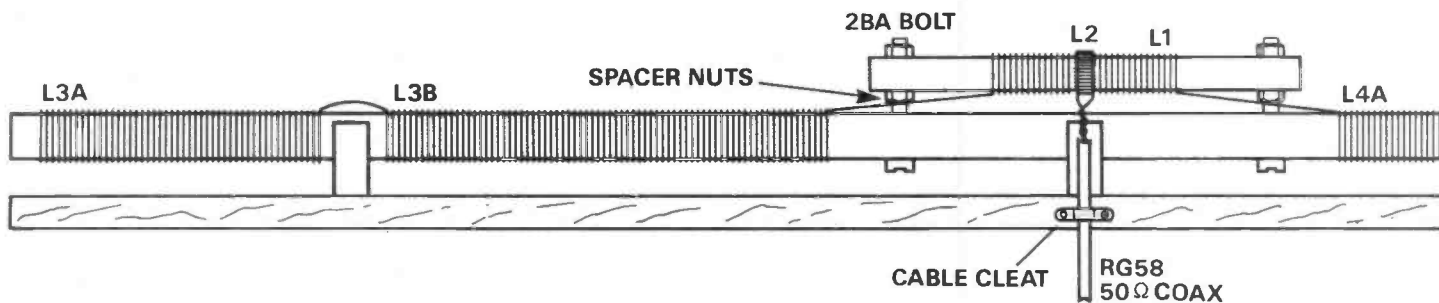


Fig. 5b. The final antenna assembly.

sions when ordering). Then L2 is overwound onto the centre of L1, and is the coupling coil to the atx/Tx. L1 represents approximately 60% of the electrical length of the antenna.

L3 and L4, on either end of L1, make up the total helical length to an electrical half-wave (Fig. 5). A pre-set band segment adjustment is achieved by sliding in two Maxi-Q Grade F ferrite rods, FR2 and 3, 8in long by 3/8in diameter. (See foot of article. Quote sizes when ordering).

All coils are wound on insulated tubing using stranded 7/0.2mm pvc-covered wire with an overall diameter of 1.2mm, rated at 1kV rms, 1.4 amps at 70°C. This wire gives approximately 18 close wound turns per inch. Similar wire is available in a smaller diameter and should not be used. (The wire used on the prototype was Marco CBL/EW 7/white.)

Construction

L1 and L2 are wound on a 215mm length of 18mm outside diameter,

14mm inside diameter plastic pipe from a diy store — Fig. 4. L1 consists of 58 turns close wound over the middle of the tube. L2 (6 close turns) is wound over the centre of L1, with the ends twisted together and sleeved, and later soldered to the coaxial feedline. Between L1 and L2 are three layers of masking tape. The 4-inch ferrite rod FR1 is in the centre of the 18mm plastic tube, and is covered with a layer or two of masking tape to make a tight fit.

Fig. 5 shows the mounting boom assembly. It consists of a piece of strong wood 1 meter by 24mm by 15mm, and a 1 meter length of Marley 22mm outside diameter upvc overflow pipe, which is mounted with three Marley 22mm stand-off pipe clips, which are screwed onto the wood. The L1/L2 assembly is mounted in the centre as shown.

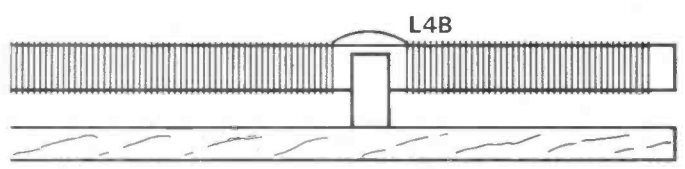
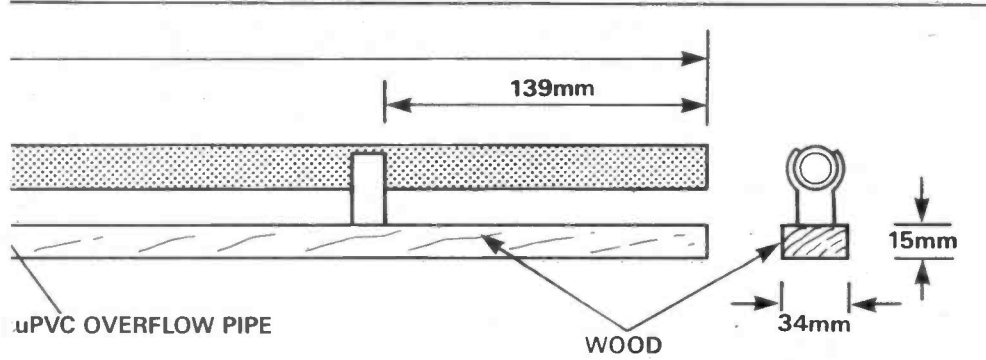
On the final prototype helical windings L3B and L4B have 80 close wound turns each and L3A and L4A have 155 turns each. Before the F-

grade ferrite rods were inserted, the antenna resonated at approximately 3640kHz (see Testing and Operation). This can be raised in the band by removing turns equally from the inner ends of L3A and L4A.

The L1/L2 assembly is mounted in the centre by two 2BA bolts with two nuts on each as a spacer between it and the main 22mm pipe. The ends of L2 are soldered to a 1 meter length of 50 ohm RG58 coaxial feedline, which is cleated to the wood, as shown in Fig. 5.

Testing and Operation

The prototype was connected to a conventional 80 meters LC atx, which in turn was connected to the Tx/Rx. With a couple of watts input, it was found that the antenna centred on 3640kHz. Sliding in the F grade rods FR2 and FR3 at either end (Fig. 6) lowered the frequency. As these rods are of much smaller diameter than L3 and L4, the frequency changed gradually as the rods were pushed



NOTE: SEE TEXT FOR WINDING DETAILS OF L1-4

more than 10-15 watts input used, and in the interests of household safety and harmonic possibilities, this should not be exceeded indoors. Harmonic generation did not appear until about 22 watts input.

Outdoors

For outdoor use the Fe-Three could be sealed into a plastic tube and mounted on an outside wall or windowsill. The surroundings might affect the tuning range slightly. This could be adjusted by FR2/FR3 before sealing the tube. FR2/FR3 must be firmly secured into position after adjustment. The configuration has not been tried, but it seems a logical proposition to me.

Note: For those who seriously want to know more about ferrite materials and cores, Amidon (USA) publish an 82 page book titled *Iron-Powder and Ferrite Coil Forms*. This will not tell you how to design ferrite rod antenna, but it does give details of many ferrite core materials and their electrical properties, such as Q curve charts dimensions, temperature and frequency charts and information, power handling ability, saturation and many other useful tidbits. Amidon offer 16 different types of ferrite core materials, and suggest various applications. The largest rod is a massive 12in by 3/4in diameter for LF. All Amidon dimensions are quoted in inches, not in metric. The book also covers toroids, beads and so on.

References

- Amidon Associates Inc., 12033 Otsego Street, North Hollywood, California 91607, USA.
- Maxi-Q, G & P Powles, 8 Brunel Units, Brunel Road, Gorse Lane Industrial Estate, Clacton-on-Sea CO15 4LU.
- Marco Trading, The Maltings, High Street, Wem, Shrewsbury SY4 5EN.

further in, until resonance reached 3565kHz, giving an effective operating bandwidth from 3540-3590kHz without further atu adjustment. Ad hoc experiments with reduced L3 and L4 turns, as previously described, gave a centre frequency of 3750kHz. A reduction of L1, L2, L3 and L4 turns would be necessary for 40 meters.

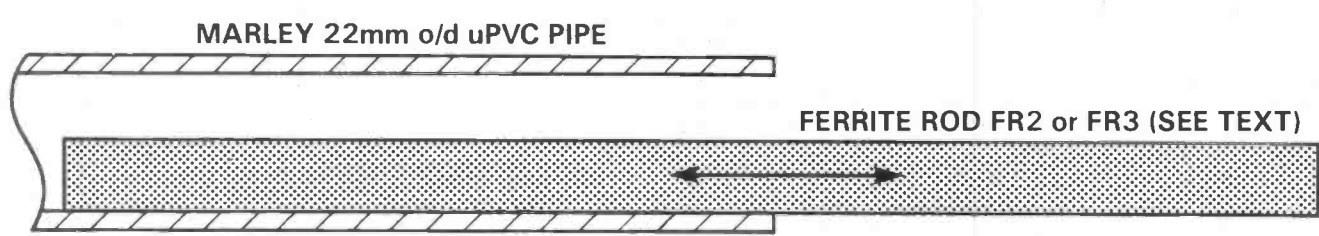
On the prototype the end rods FR2 and FR3 were held in position with a large blob of Blu-Tac, but the more ambitious who want to make a permanent antenna could produce a

wood and ferrite rod piston affair. The rods *must* rest against the inner lower wall of L3B and L4B — see Fig.6. Surplus rod can be cut off.

The antenna has been tested up to 25 watts Tx input, at which point core saturation started to appear in the form of warmth, harmonics and instability.

In practice the antenna was only used on a table top near the operating position longitudinally about north/south, giving maximum radiation roughly east/west. At no time was

Fig.6. Positions of adjustable ferrite rods FR2 and FR3 (see text).



BYLARA BIRTHDAY



Cutting the cake we have Diana G4EZI (holding knife) who is a founder member, and Ann GOBIR, the Chairman.

right." Generally speaking, YLs are taking to the radio at a faster rate than ever before. And we have to admit that they make very good operators.

"Our ladies are often complimented on their skill in operating, and we exercise very good manners on the radio. Also, we seem to have no great difficulty in passing the RAE or learning morse," said Ann.

True. During the war years, we quickly realized that ladies found operating on CW no obstacle, and that they made fine radio operators. So it is no surprise that they are now gracing the hobby. Perhaps the only surprise is that they took so long to

7.15pm clock time, where they take it in turn to be net controller. They also make a point of turning up each Wednesday at 10am on 40 metres for their get-together.

Diana first came up with the idea of attracting members from overseas to join BYLARA. This was a great success. "Many YLs from overseas look forward to coming to our rallies," explained Ann. "Today we have had visitors from Sweden and Germany. They have become long standing pen pals and of course we meet them regularly on the radio."

Ann said, "Being a YL station has advantages in working DX, and particularly working pileups. Many DX stations will come back to us when they hear a YL voice. This is probably the reason why so many of us have been able to get a DXCC quite easily."

BYLARA have a policy of being in attendance at most if not all of the rallies. The idea, as Ann explained, is to let the visitors see that it is not difficult for women to obtain an amateur radio license. "When they see we are quite normal, and that most of us are just ordinary women with no special education, or outstanding abilities, a lot of ladies seem quite surprised. I think a lot of women are put off from taking the RAE, because they think you have to have a degree in electronics or something. We see our job on the BYLARA stand, as a public relations exercise to put their minds at rest on this point."

BYLARA tries to cater for all tastes. They have their own contests and awards. Their awards manager is Joy G4MOGUU who is kept busy sending out the BYLARA award for having worked 15 YLs, or the Advanced award for having been in QSO with 30 or more BYLARA members.

Each BYLARA member receives a quarterly issue of the twenty page newsletter. Annual membership is only £3.00, and would you believe it, even OMs can join!

So look out for them at the next rally you attend. Go and have a chat with them: you will be assured of a warm welcome.

Congratulations on your tenth anniversary BYLARA, we wish you continued success.

Charles Elliott G4UJW meets BYLARA ladies over their 10th birthday cake.

At the Drayton Manor Park Rally, BYLARA celebrated their tenth birthday in style. The warm weather on the 21st of May was just right for the large number of marquees set up for the event in the lovely surroundings of the Manor Park, Drayton.

"This is a very special day for us" said Ann GOBIR, who lives in Bromsgrove and is Chairman of BYLARA. "So we couldn't have chosen a better day or a better place to celebrate our tenth anniversary." Since BYLARA started ten years ago to the day, they have gone from strength to strength with a membership of over 300. For the initiated — are there any? — BYLARA stands for British Young Ladies Amateur Radio Association.

Explained Ann, "It's not just wives and girlfriends who are getting interested in amateur radio. Ladies are becoming interested in their own

get properly organised.

Ann explained that it was at this same rally at Drayton ten years ago that a small group of YLs got together to discuss the possibility of starting their own national society for women radio amateurs in this country.

Amongst this group were Judith G4IAQ from Loughborough in Leicestershire, and Diana G4EZI who lives in Leeds: both still active members of BYLARA. "We owe a great deal to the hard work and perseverance of our founder members," said Ann. "From now on it will get steadily easier to build up our numbers."

The birthday cake was baked by Margaret GW4SUE, and carefully transported all the way from Newport in Gwent, to Drayton.

BYLARA have regular skeds on the HF bands every Monday evening, on 80 metres on or about 3.705, from



Drayton Manor Park Rally May 21st: A group of BYLARA members looking after the stand.

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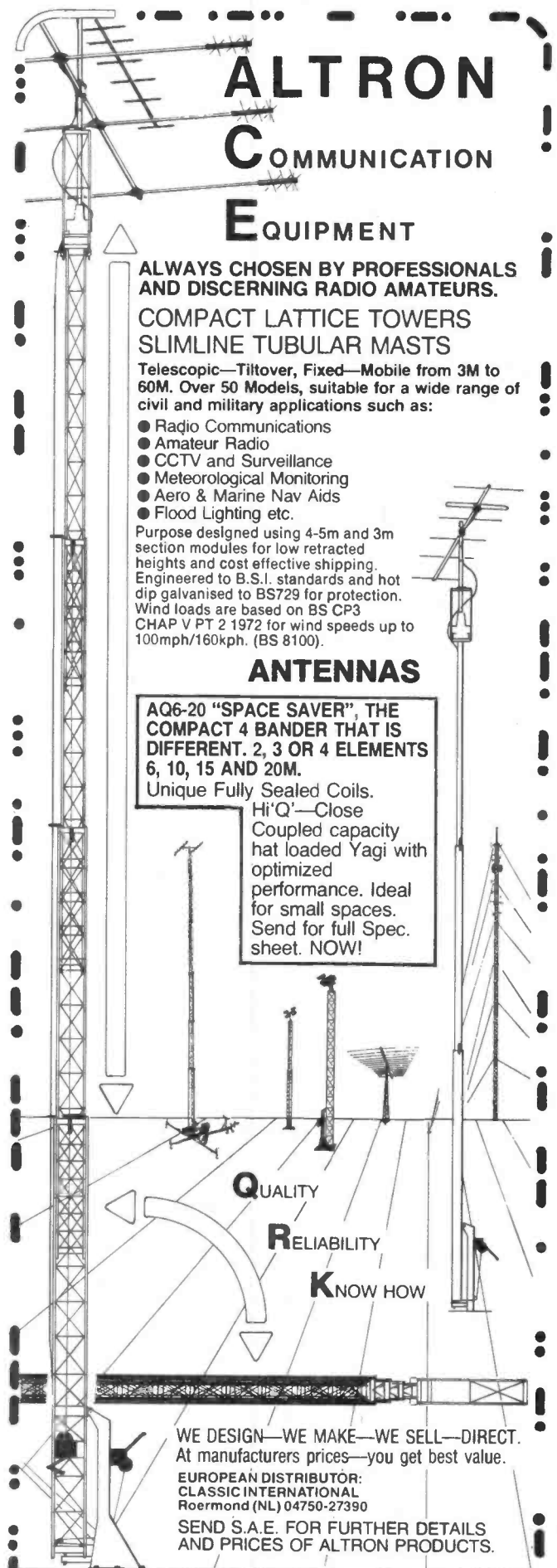
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QRZ

New nations are exciting, but what's — or where's — in an ITU callsign?



Ron, formerly 3D6BU, has been using the 3DA0AX call for just over a year now.

Since the last "QRZ", two months ago, HF propagation conditions seem to have dropped off a bit, at least in my experience, compared with the excellent conditions evident during the spring. Nevertheless, there has still been a lot of interesting DX about for those with the time or inclination to search it out.

Almost all the "new" countries potentially created by the re-wording of the DXCC countries criteria seem to be in the Pacific, which is notoriously difficult for European DXers to work, unless they have high power and beam antennas — and even then it ain't easy! This is because the propagation path from Europe to the Pacific usually goes over the north pole and signals therefore have to

pass through the auroral zones, which severely attenuates them. Two potential new countries have been activated recently, and they were both in this area. One, Banaba Island (formerly known as Ocean Island), belongs to the Republic of Kiribati (pronounced "Kirry-bass") and was activated in mid-May by Jim Smith, VK9NS and Bob, KN6J. They used the call T33JS on SSB and CW and T33RA on RTTY. Many European DXers, even those with big antennas and big power, had some considerable difficulty working this expedition, mainly, it would seem, due to poorish propagation. Whenever I heard the operation, the signal from T33JS was exceedingly weak, about 3×3 or 4×4 at best on 14195, with the European pile-up exceedingly loud. It has to be said also that some of the manners of the European and even a minority of British operators left a lot to be desired during this operation. Apparently, at times, Jim and Bob's signal peaked quite well on 15 metres in the afternoons (European time) — but I did not hear them on those occasions.

The other potentially new country in the Pacific which was activated recently in Conway Reef. 3D2CR was on the air in mid-April, and again was difficult to work for many in Europe (although I gather some found it very easy). Anyone who *did* work this expedition should QSL CW contacts via DJ9ON and SSB contacts via DK9KK. If Conway Reef is accepted as a new country (and we will have to wait for a decision from the ARRL's DX Advisory Committee following the 3D2CR expedition) we would have the strange situation that the small island-nation of Fiji would actually count as three separate

DXCC countries — Conway Reef, Rotuna, and Fiji itself — without any way of telling from the callsign which DXCC country the operation was from. In this particular case, the situation is even further confused because the ITU callsign allocation of 3D is split between Fiji and Swaziland, many thousands of miles away. Until quite recently, Swazi amateurs used the prefix 3D6 (whereas those from Fiji all used 3D2), but in reality 3DA-3DM is allocated to Swaziland and 3DN-3DZ is allocated to Fiji. So as to bring their country into line with the official ITU policy, the Swazi licensing authorities changed everybody's callsign, and made their prefix 3DA0. But instead of 3DU6BU, for example, becoming 3DA0BU, he was issued 3DA0AX instead. Confused? Wait, it gets worse! While all of the recent operations from Fiji and the islands surrounding Fiji have simply used the "normal" 3D2 prefix, last year I met an American amateur who had been in Fiji in 1987. When he applied for his licence there, he was issued 3D2DX, but was told that he should use another letter, between N and Z, so as to conform to the ITU regulations. Since they did not seem to mind which letter he used, as long as it was in the second half of the alphabet, he chose "X", so his call became 3DX2DX.

Another area where there is some doubt as to the DXCC country being worked is Market Reef, in the Baltic Sea. At one time, the resident lighthouse keeper there, Kee, was issued a callsign with a unique prefix — OJOMA. Since there were no other OJ stations about, and since OJOMA operated from nowhere other than Market Reef, DXers around the world came to regard OJO as being the proper prefix for this tiny island. Full-blown expeditions, mainly by mainland Finns, were also given callsigns such as OJODX and OJOAM. However, the Finnish licensing authority

regarded the OJ series of calls as special call signs, and they regarded Market Reef as being one of the Aland Islands. When they stopped issuing special call signs all operations from Market Reef — as well as the Aland Islands proper — were given “normal” OH0 calls. Even Kee’s call was changed from OJOMA to OHOMA when he had to renew his licence. So that DXers can tell that they are on Market Reef, most operations from there have added an unofficial suffix of OJ0 following the OH0 part of their call. This year, however, a Finnish group will be activating Market Reef again and this year they will be using the call OH2AP/OH0M — the OH0M indicating that it is from Market Reef rather than Aland. The expedition should be on the air from 7th-13th June, providing that it is possible to land on the island then. One of the operators will be from Sweden, and he will be using the call SI8MI during the expedition. The Swedish-Finnish border actually runs across Market Reef and, although operation from the Swedish side of the Reef counts only as Sweden, the SI8 prefix is a unique one, so it should create considerable interest.



Market Reef, site of the SI8MI and OH2AP/OH0M expedition in June.

The AGM of the Chiltern DX Club took place recently in Wokingham, at the QTH of Ian, G4LJF. After considerable discussion, the meeting agreed to keep the name of the club as CDXC (there had been a suggestion that it should be changed to something along the lines of “UK DX Club” or “British DX Group” to more accurately reflect the national membership and perhaps to encourage more members from areas outside the South-East of England). The Club also agreed to become affiliated to the RSGB, and new officers were elected. The new secretary is Roger Brown, G3LQP, Chairman Ian Shepherd, G4LJF and much to my sur-

prise, I found myself elected as Vice-Chairman. Membership of CDXC is open to all amateurs or SWLs with an active interest in HF DXing, the only qualification being to have worked and verified (or heard and verified for SWLs) 100 DXCC countries. If you are interested, write to the Secretary, Roger Brown, G3LQP, 32 Albert Road, Sutton, Surrey SM1 4RX.

Three members of CDXC, Martin G3ZAY, Don G3XTT and Andrew G0HSD, as well as Catherine, G6OQA and a couple of others are planning a DXpedition to some of the most remote Scottish islands in July. Unfortunately the expedition will be over by the time this is in print, but I hope it proves to be as successful as earlier Islands expeditions by members of this group. Call signs to be used will be GM6UW/P from the Flannan Islands (or Seven Hunters), off the north-west coast of Harris and Lewis and GBOSK from St Kilda which, apart from rockall, is the most north-westerly spot in the British Isles. St Kilda counts as EU-59 for the Islands on the Air awards, while the Flannan Islands have never been activated before and therefore do not yet have an Islands on the Air reference number. One will undoubtedly be issued following a successful expedition by the members of the GM6UW/P group.

Meanwhile, at the same time as the group is operating from off the north-west coast of Scotland, myself and Drew, GM3YOR, should be operating as TA/G4JVG and TA/GM3YOR from near Bodrum in Turkey. Activity should be between 10th-23rd July, around 28495, 21295, 14195, 7095 or 7045 and 3795 or 3645 on SSB (TA/G4JVG) and about 5kHz or 25kHz up from the lower band limits on CW (TA/G3YOR). This operation will be under the CEPT reciprocal licensing agreement ratified from 1st January this year by both the U.K. and Turkey and is believed to be the first such operation in Turkey by British amateurs (although there are at least two “Gs” temporarily resident in Turkey who are on the air). If you work or hear us, the QSL information is as follows:

TA/G3YOR, Drew Givens, 56 Myrtle Crescent, Kirkcaldy, Fife KY2 5DY and TA/G4JVG, Steve Telenius-Lowe, “Penworth”, Tokers Green Lane, Tokers Green, Reading RG4 9EB; please enclose an sae for a reply direct.

It was good to hear from Doug, G3KPO, who is the custodian of the Wireless Museum on the Isle of Wight. He would like everyone to know that the “Wight Wireless Rally” will be held again at the Wireless Museum, Arreton Manor, Isle of Wight, on Saturday 16th September between 1300-1700. No charge is made for admission to the museum or the extensive grounds, and there is



At the Chiltern DX Club AGM — Left to right: G3XTT, GW3CDP, G3LQP, GE4BLE. In the background, QRH of G4LJF.



At the Chiltern DX club AGM: Left to right — G3SJX, G3ZAY, G4EDG.



Visit the “Wight Wireless Rally” on 16th September. G3KPO is custodian of the Wireless Museum there, and will be operating as GB3WM.

plenty of free parking space. There will be a bring-and-buy surplus sale in the new covered area next to the café, so "load your boot". Talk-in stations on S22 (G3IOW) and RB4 (GB3IW), while GB3WM will be on 80 metres, around 3700kHz. While you are searching for bargains on the bring-and-buy stalls, or examining the vintage transmitters and receivers in the museum, the family will be able to stroll around the beautiful manor gardens. Further details can be obtained by ringing Douglas Byrne, G3KPO, on Ryde 67665. Incidentally, the museum is located close to the village of Arreton, a few miles from Newport. The picture shows the location of the Marconi Memorial, on the cliff top overlooking Alun Bay. It was here that Marconi set up the world's first wireless transmitting station in November 1897 and less than a month later readable signals were exchanged with a ship at sea.

It was also good to receive letters from Ken Kirby, G4VKK and Tom Beighton, G4JVJ, both of whom kindly forwarded on QSLs for me that had somehow arrived at their locations. It seems they both are regular readers of "Ham Radio Today" and "QRZ". Talking of QSLs, my QSL of the Month this time is from Ron VanderKraats, VE3AT, from Toronto. This splendid full colour QSL shows Toronto by night, with the CN Tower, 553 metres high (the world's highest free-standing structure) dominating the waterline. Ron's callsign and QTH is printed in gold-coloured ink.

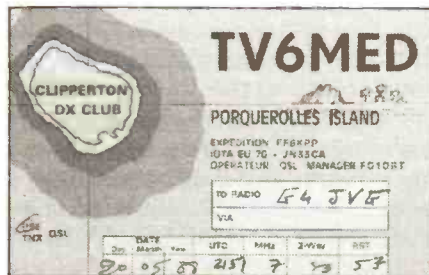


QSL of the month: From Ron VanderKraats, VE3AT, from Toronto, Canada.

I started this article by saying that although conditions had deteriorated recently, there had been plenty of DX about to work. Two DX expeditions that are definitely worthy of mention are XF4L, which was active from the Revilla Gigedo Islands in mid-April, and the second-ever expedition to

Malyj Vysotskij Island, 4J1FS, between 23rd and 30th May. The XF4L expedition was operated mainly by OHs who intended to work as many Europeans as possible. Due to the location of the islands, which belong to Mexico, any operation from there attracts enormous pile-ups of American amateurs, particularly those in California. It is therefore difficult for operators on XF4 to work Europeans. However, the XF4L group made a special effort and of their approximately 30,000 QSOs, almost half were with the deserving Europeans.

Malyj Vysotskij Island, in the Gulf of Finland, was first activated last year, after which it was declared by the ARRL as a separate DXCC country. The first expedition had operated almost exclusively on 20 metres, so it was good to be able to work this year's expedition on some more bands. Many DXers were able to work 4J1FS on all bands from 160-10 metres. Those working 4J1FS this year should QSL to John Ahlbom, OH5NZ, Puustellint. 3E, SF-53200 Lappeenranta, Finland — and don't forget to enclose an sae and at least one or two IRCs for postage.



Islands on the Air DXpedition to Porquerolles Island, off the coast of France.



QSL from IK3BSM/IL3, DXpedition to San Lazzaro Island.

Finally, QSLs from several interesting European operations last year are now trickling through the QSL bureau. They include two Islands on the Air expeditions to French islands, both with special prefixes, TV6OLE on Oleron Island (IOTA EU-32) and

TV6MED from Porquerolles Island (IOTA EU-70). An Italian island expedition (although this one doesn't count for IOTA) was IK3BSM/IL3 from San Lazzaro Island, within the Venice lagoon. It is an interesting place, as it has a 15th century Armenian Christian monastery there. Lastly, the Council of Europe headquarters in Strasbourg, France, operated a special event station with the call TPOCE. The members of the Council of Europe amateur radio group are trying to get the headquarters counted as a separate country as, they claim, it has the same extra-territorial status as the United Nations headquarters in New York (4U1UN) or the ITU HQ in Geneva (4U1ITU). However, this application has been rejected at least once already, so I think it is unlikely that TPOCE will become a DXCC counter. Nevertheless, TPOCE has had a nice full-colour QSL printed, showing the Council of Europe headquarters building in Strasbourg.

I would be interested to receive your news of DX worked or QSLs received. Also photographs of your shack or antennas would be most welcome for publication. Please send them to Steve Telenius-Lowe, G4JVG, "Penworth", Tokers Green Lane, Tokers Green, Reading RG4 9EB.



Operators of the TPOCE station at the Council of Europe headquarters are hoping for separate country status for this extra-territorial building in Strasbourg.

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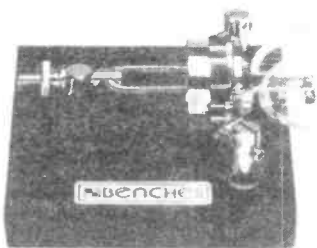
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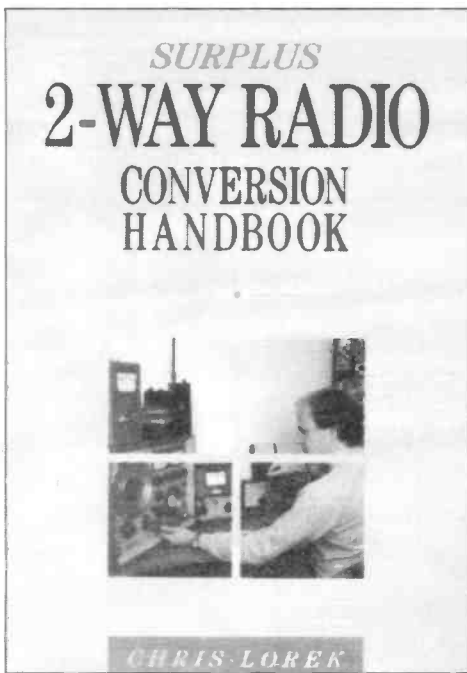
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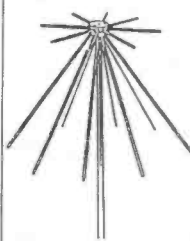
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RADAC

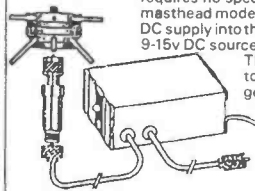


This Wide-band antenna offers an interesting alternative to the discone. It is simply an array of dipoles, but the clever bit involves arranging the dipoles to maximise bandwidth and minimise interaction. The RADAC can be set up for a range of frequencies from 27MHz to 500 MHz, and because very good impedance matches can be obtained the user can specify any six frequency bands in this range for optimised performance, either for receiving, or more usefully, for transmitting. For example, all the Amateur Bands from 10M to 70CM can be covered in one antenna. If you are in the PMR business, the RADAC can be customised for your needs. Aircraft listening enthusiasts can specify VHF & UHF Airband coverage. What a versatile antenna! Design and engineering excellence from REVCO!

WIDE-BAND PRE-AMPLIFIERS

The problem with omni-directional wide-band antennas is their lack of gain. The REVCO PA3 range of wide-band pre-amplifiers complement the antennas and compensate for their short-comings.

The basic specification of the products is similar: coverage 20MHz-1GHz, at 1GHz: minimum gain 13dB, noise factor 5.5dB. Choose from a mast-head version (PA3) or a standard die-cast box style (PA3I). Best results are normally obtained from the masthead model which gives a boost to weak signals which would otherwise have been lost in the feeder cable. Also feeder cable noise is not amplified which is the case if the amplifier is mounted at the base of the feeder. On the other hand, the die-cast box version requires no special installation and is readily taken out of circuit. The masthead model is supplied with a special power unit which feeds the DC supply into the antenna feeder. No psu is provided for the PA3I as any 9-15v DC source is suitable (current requirement about 25mA).



The PA3I finds application in instrument work, e.g. input to spectrum analysers, boosting the output from signal generators to give a low-power Tx.

The standard version of the PA3I has BNC sockets and is designated "PA3I/B"; available to special order N-type sockets ("PA3I/N") or SO239 ("PA3I/S"). A special feature of the PA3 series is a high-pass filter to attenuate frequencies below 20MHz; high-power HF & MF broadcast stations can be very troublesome!

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This type of antenna mount has been around for a long time, but they are very difficult to produce successfully at VHF. The Cellular Radio Industry has popularised the glass-mount, but there are fewer design problems at 900MHz, because the coupling assemblies are small. REVCO's extensive experience in making the UK's best Cellular On-glass has led to the production of superior quality VHF and UHF models. Here are a few facts which you should know:

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RADIO Tomorrow

On these club contacts and forward diary pages, dates are shown approximately from the week of publication to the end of the cover month, and further into the year where dates have been supplied. We need dates at least three calendar months in advance to get them into the nearest issue. For example: the last possible issue for dates from mid-August to mid-September is the September issue. The September issue normally appears on the first Friday in August, and we need club dates by the second Friday in June. Club dates received well in advance will normally be run in more than one issue. Please write and let us know if your club changed its name or contact.

SCOTLAND

Aberdeen ARS. Don Tel. 04676 251.
Ayr ARG. Robert Paterson GM4CUB Tel. 0292 262496.
Meetings: 2 Fris, Community Centre, Wellington Sq., Ayr.
Dunfermline RS. GM0DYD Tel. 0383 413440.
Galashiels DARS. GM3DAR Tel. 0896 56027.
Glenrothes DARC. John Hardwick GM4ALA Tel. 0592 742763 (hm) (0506 410677 (wk)).
Inverness ARC. Brian Tel. 0463 242463.
Lothians RS. P J Dick GM4DTH 21, West Maitland St., Edinburgh EH12 5EA. Prestel (NOT phone) 314471210. Meetings: 2,4 Thursdays 7.30pm Orwell Lodge Hotel, Polworth Terrace, Edinburgh.
Louth DARC. G11ZB, Tel. 047286 595.
Mid Lanark ARS. David Williams GM1SSA, Holytown 732403.
Waterside SWC. Bernie Lyford Tel. 0703 893937.
Westmoreland ARS. G. Chapman Tel. 0539 28491.

NORTH EAST ENGLAND

Barnsley ARC. Ernie G4LUE, 8 Hild Av, Cudsworth.
Bishop Auckland ARC. Peter Fawcett G0FBK Bishop Auckland 606819. Most Thurs. **Oct 15 Rally Sunnydale Leisure Centre, Shildon Ernie G4TYF B/A 607500.**
Bourne DARS. Vince Cawthron G4ODG Tel. 0778 422795.
Denby Dale DARC. G3SDY 0484 602905.
Derby DARC. Kevin Jones G4FPY Tel: 0332 669157. Meetings: 119 Green Lane, Derby. 7.30pm. Most Weds. **Aug 13 Derby Radio Rally, Lower Bemrose School, St. Albans Rd., Derby. All the usual, and monster junk sale. Martin Shardlow 0332 556875.**
Doncaster ARC. K McMahon Tel. Doncaster 852938.
N. Ferriby ARS. Frank G3YCC 0482 650410 Fris NFU Football Club Room, Church Rd., N. Ferriby, Yorks.
Hornsea RC. Richard Tel. 0401 62498. Meetings: The Mill, Atwick Rd., Hornsea. 8pm.
Hoyland ARC. M. Wardle, 11 Sokwell Ave, Barnsley
Keighly ARS. K A Conlon G1IGH. Tel. Bradford 496222.
Meetings: Weds, 8pm, The Clubroom, Victoria Hall, Keighly, Yorkshire. Aug 29 Using test meters G4YDI; Sept 12 Evening with Jim G4MH; Sept 26 Supper and quiz with Northern Heights; Sept 5, 19 Natter.
Leeds DARS. G1EBS Tel. 0274 665355.
Loughborough ARC. Philip Tel. 0509 412043.
Mansfield ARS. J M Coates G4GYU Tel. 0623 27257. Meetings: Fris.
Morecambe Bay ARS. G4ZJL Tel. 0524 52042.
Northern Heights ARS. Stan Grafton G0IYR Tel. 0274 673116.
Meetings: 1,3 Weds Bradshaw Tavern, Nr. Queenbury, Bradford, 8.15. Aug 16 DF foxhunt Radio in the Arctic G4EMW; Sep 20 Members' gadget mini-lectures (what the Americans call "show and tell").
Pontefract DARS. Colin Mills G0AAO Tel. 0977 43101. Meetings: Carleton Community Centre, Pontefract.
Rotherham ARC. F. Mobdy Tel. Rotherham 552925.

Rugby ATS. Kevin G8TWH Tel. 0203 441590 David G4DDW Tel. 0455 52599.
Scarborough ARS G4BP. I G Hunter G4UQP, 46 Station Rd., Scalby, Scarborough, N. Yorks YO13 0QA. Tel. 0723 376847.
Sheffield ARC. Alan Pemberton. Tel. Sheffield 670866.
Sheffield Packet Group. P Green, 6 Yews Close, Worrall.
Spalding ARS. Terry G4TWR Tel. 0775 2940.
Stockton DARS. G. Noble c/o Causeway Community Centre, Billingham, Stockton on Tees. Meetings: Weds Causeway Community Centre 7.30. Regular RAE and morse tuition.
Tyneside ARS. G. Lindsay G4KOT, 12 Augusta Court, Harrian Park, Wallsend, Tyne & Wear NE28 9QZ.
Wakefield: North Wakefield RC. John Hoban 0924 825443.
Meetings: Thurs 8.30 White Horse Inn, Fall Lane, East Ardsley, Wakefield. **Sep 24 Rally Outwood Grange School, Potovens Lane, Outwood 10.30 50p. Real ale, food, raffle, bring & buy, traders, repeater groups. Near M1, M62. Talk in S22. Richard G4GCX 0532 622139 or John G0EVT 0924 825443.**
Wigston ARC. G6HAJ Tel. Leicester 403105.
Workop ARS. John Huggins G0DZX Sheffield S31 7BX. Tel. 0909 565856. Meetings: The Clubhouse, West St., Workop.

NORTH WEST ENGLAND

Aire Valley RS. G6NPT Tel. 0532 44597.
Bolton ARC. Deane Sports Complex, New York, Junction Rd., Bolton. Glenn Bates G6HFF 00204 63459.
Cheshire: N. Cheshire RC. C Kirsop G6KSA, Morley Green Club, Wilmslow, Cheshire.
Chester DRS. Dave Tel. 0244 336639.
E. Lancs ARC. Stuart 0227 68913.
Fylde ARS. Frank G4CSA Tel. St Annes 720867. Meetings: South Shore Lawn Tennis Club, Midgeland Road, Blackpool. 2,4 Thurs. Aug 24 DF foxhunt; Sept 14 ARRL video New World of Amateur Radio; Sept 26 Tramways of Lancashire Eric Fielding G4IHF.
Isle of Man ARS. J Wrigley. Tel. 0624 834257.
Kirkby ARC. via meetings. Meetings: Weds Kirkby Sports Centre, 17 Valley Rd., Westvale, Liverpool 7.30.
Liverpool DARC. W H G Metcalfe G6VS, 38 Kempton Rd., Wavertree, Liverpool. Meetings: Tues, Conservative Club, Church Rd. Aug 15 SSB FD; Aug 22 Surplus sale; Aug 29 Police radio; Sept 5 Pre-war ham radio in VU2 George G6VS; Sept 12 club night; Sept 19 Surplus sale; Sept 26 pre-AGM.
Morecambe Bay ARS. D H Wood G4ZJL Tel. 0524 52042. Tues 7.30 Trimpell Sports and Social Club, Out Moss Lane, Morecambe, Lancs.
Preston ARS. George Tel. 0772 718175.
St. Helens DARC. Carol Wainwright G0CXT 0744 813589.
Meetings: Thurs 7.45 Community resource centre, Old Central Secondary School, College St., St. Helens. Regular morse tuition.
Staffs ARS. Bill G4WTP Tel. 0782 514741.
Stockport RS. John Verity G4ECI Tel. 061 439 3831. Meetings:

Dialstone Community Centre, Lisburne Lane off Dialstone Lane, Offerton, Stockport. 8pm. 2,4 Weds.
Todmorden DARC. E. Tyler GOAEC Tel. Halifax 882038.
 Meetings: 1,3 Thurs Queens Hotel, Todmorden. Aug 21 Diving film, talk; Sept 4 visit by Lowe Elecs; Sept 18 Antennas G3ITE (tbc); Oct 3 Junk sale.
Warrington ARC. Paul GOCBN Tel. 0925 814005.
Wirral ARS. A Seed G3FOO Tel. 051 644 6094. Meetings: 1,3 Weds 7.45 Ivy Farm, Arrowse Park Rd., Birkenhead.
Wyre ARS. Ian Broadbent GOKMT Tel. 03917 57636. Meetings: 1,3 Weds Fleetwood Crickte Club, Broadwaters 8pm.

WALES

Abergavenny and NH ARC. GW4XQH Tel 0873 4655.
Aberporth ARC. GWODPR Tel. 023987 274.
Bridgend DARC D E George GW10UP Tel. 0656 723508.
Delyn RC. Stephen Studdart GW7 AAV Tel. 0244 819618.
 Meetings: Daniel Owen Centre, Mold, Clwyd. Alt Tues.
Holyhead DARS. D Richards, 9 Queens Park Court, Holyhead, Gwynedd. Meetings: Forresters Arms, Kingsland Rd, Holyhead 2,4 Suns, 7.30.
Newport ARS. GW7BSC Tel. 0633 62488.
North Wales: Clwb Radio Amtatur Y DDraig GW4TTA. Tony Rees Tel. 0248 600963. Meetings: At the Four Crosses, Pentraeth Rd., Menai Bridge. 7.30pm. 1,3 Mons. Aug 21 Visit to County Emergency Centre, Caernarfon; Sept 4 Talk by Ray Jones GW7EMF County Emergency Planning Officer; Sept 18 Members' equipment demo.

THE MIDLANDS

Birmingham: Midland ARS Paul O'Connor G1ZCY Tel. 021 443 5157. Meetings: Thurs 7.30 Unit 16, 60 Regent Place, Jewellery Quarter, Birmingham. 19 Nov Mars Mini Rally at Stockland Green, Birmingham. Regular morse tuition.
Coventry ARS. Johnathan Ward G4HHT Tel. 0203 610408.
 Meetings: Baden Powell House, 121 St. Nicholas St., Radford, Coventry. 8pm. Fridays. Regular On-air and morse tuition.
Mid Warwickshire ARS. G4TIL Southam 4765.
Nuneaton DARC. Paul Bicknell G4JFT Tel. 0203 343412.
 Meetings: 4 Tues, Eton Social Club, Meadow St., Abbey Green. NEW CLUB.
Rugby ATS. Kevin Marriott G8TWH, 77 Lloyd Crescent, Stoke Hill, Coventry CV2 5NY. Meetings: Cricket Pavilion, BT1 Radio Station, B entrance, A5 Trunk Rd., Hilmorton, Rugby. Tuesdays 7.30.
Stratford on Avon DRC. David G0HWZ. Tel. 0789 750584.
 Meetings: 2,4 Mons, 7.30pm, Baptist Church, Payton St., Stratford on Avon.
Stourbridge DARS. C Brunn G1WAI Tel. 0562 885602. Meetings: Robin Woods Centre, Beauty Bank, Stourbridge, Wercs. 1,3 Mons.
Telford DARS. Tom Crosbie Tel. 0952 597506.
West Bromwich Central RC. Bill Oakes G1YQY, Tel. 021 556 3183.
Willenhall DARC. Dave GOEGG 0902 734475 Meetings: Weds 8pm Brewers Droop Inn, Wolverhampton St., Willenhall, W. Mids. CW tuition, good ale.
Wolverhampton ARS. Keith Tel. 0902 24870.
Worcester DARC. D Batchelor 0905 64173.
Wythall RC. Chris Pettitt GOEYD Tel. 021 430 7267.

SOUTH WEST ENGLAND

Bath DARC. G4UMN Tel. Frome 63939.
Blackmore Vale ARS. Stuart Brunton GOEXI 0747 840558.
 Meetings: 2,4 Tues 8pm Old Coach House, Bell & Crown, A303, Wilts. Aug 15 2m DF foxhunt; Aug 22 Show prep; Aug 23 Shaftesbury and Gillingham Show SES, ATV demo; Sept 12 ATV construction and theory Steve G1ZTO, Pat G6VPM; Sept 26 On air.
Bristol: North Bristol ARC. Ray G1YRS 04545 2768.
Bristol: South Bristol ARC. Len Baker G4RZY. Tel. 0272 834282.

Meetings: Whitchurch Folk House, East Bundry Rd., Whitchurch, Bristol BS14 0LN. Weds. Aug 16 Dx broadcast TV activity; Aug 23 Top band activity; Aug 30 Library/committee; Sept 13 Bristol Rally 1990 planning/committee.

Cornish RAC. Aug 13 Hamfest '89. Flight Refuelling Sports Grounds, Wimbourne, Dorset. Trade, crafts and gifts, field displays. 10am. Parking, camping. John GOAPI 0202 691649 Rob G6DUN 0202 479038.

Evesham: Vale of Evesham DARS. John G3DEF Tel. Evesham 6407. Meetings: 1 Thurs at 7.30pm at MEB Club, Worcester Road, Evesham. Aug 14 Informal.

Exeter ARS. R. J. Donno G3YBK 0392 78710. Meetings: 1 Mons, Community Centre, St. David's Hill, Exeter 7.30pm. Aug 14 Free and easy evening; Sept 11 Contest Working John G3HTA.

Plymouth ARC. G4SCA Tel. 0752 337980

Poole ARS. G0EQV Tel. 0202 674802.

Salisbury RES. Neil Tel. 0980 22809.

Salop ARS. Fred Hall G3NSY Tel. 0743 790457. Meetings: 2,4 Thurs, The Olde Bucks Head, Frankwell, Shrewsbury 8pm.

Telford Radio Rally, Telford Exhibition Centre, Shropshire. Sep 3. **Martyn G3UKV Tel. 0952 255416** or **Eddie G1JNZ Tel. 0952 592317** (stands).

Thornbury DARC. Tom Cromack G0FGI, Rose Cottage, The Naite, Oldbury on Severn, Bristol. 1,3 Weds, 7.30 United Reform Church, Chapel St., Thornbury, Evesham. Sept 6 Junk sale; Sept 20 Project evening.

Torbay ARS. G3NJA, G8HJA, Walt G3HTX Tel. 0803 526762. Meetings: ECC Club, Ringslade Rd., Nr. Highweek. Club nights Fris 7.30. Sun Aug 27 Torby Mobile Rally STC Social Club, Brixham Rd., Paignton. Trade, bring/buy, refreshments. 50p Sat/Sun Sept 2/3 SSB National FD contest, Centrax sports field, Newton Abbot.

Trowbridge DARC. Ian Carter G0GRA Tel. 0380 830383. Meetings: Most 4 Weds, 8pm, TA HQ, Bythesea Road, Trowbridge. Sept 13 Chordal Hop HF propagation Dave Bewick GODAB; Sept 27 Social.

Yeovil ARC. David Bailey G1MNM, QTHR. Meetings: The Recreation Centre, Chilton Grove, Yeovil. 7.30pm, Thurs. Aug 10 Greyline Propagation G3MYM; Aug 17 Water World talk; Aug 24 Talk by G8AWB; Aug 31 Natter; Sept 7 Product detectors G3MYM.

SOUTH EAST ENGLAND

Aylesbury Vale RS. Geoff G3YLC Tel. 0280 817496. Meetings: 1,3 Weds 8pm (July, Aug Wed only) Hardwick Village Hall (A413 N of Aylesbury).

Basingstoke ARC. D Deane G3ZOI Tel. 0734 332777 (hm) 0734 787930 (wk). Meetings: Forest Ring Community Centre, Sycamore Way, Winkelbury, Basingstoke. 7.30pm. 1 Mons.

Bedford DARC. Ray GOEYM. Tel. 0234 244506. Special Event Stations GB2WW and GB4BOB commemorating World War 2 during 1989. Aug 19 Kimbolton School Remembrance 379 Bomb Gp. USAAF; Sept 3 RAF Cardington, Declaration WW2 by GB.

Biggin Hill ARC. Geoff Milne G3UMI, 142 Hayes Lane, Hayes, Meetings 3 Tues, Victory Social Club, Kechill Gardens, Hayes. Aug 15 Operating evening; Sept 19 Valve/any questions.

Braintree DARS. M Andrews 0376 27431. Meetings: Braintree Community Association Centre, Victoria St. 7.30pm. 1,3 Mons. Aug 21 Something by Rob G8ZHF. Club net C6BRH or G4JXG, 2m 2,4 Mons, 8pm.

Bredhurst RTS. GOBRC, G7BRC. Kelvin Fay 0634 376991.

Brighton DARS. Peter Tel. 0273 607737. Meetings: 1,3 Weds, Roast Beef Bar, Brighton Racecourse, Elm Grove, 8pm.

Burnham Beeches RC. G6EIL Tel. 0628 25720.

Cambridge DARC. D Wilcox Tel. 0954 50597.

Chesham DARS. L Cabban Tel. 09278 3911. Meetings: Stable Loft, Bury Farm, Pednor Rd., Chesham. 8pm Weds.

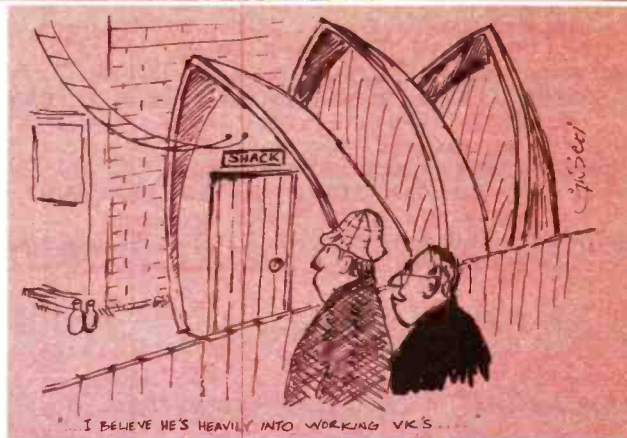
Cheshunt DARC. Roger Frisby G4OAA Tel. 0992 464795.

Meetings: Thurs, 8pm, Church Room, Church Lane, Wormley, Herts.

Chichester DARC. H Kaminski G1NBX Chichester 781785.

Meetings: St. Pancras Hall, St Pancras, Chichester. 7.30. Club net G8WSX S11 Monds 7.15. 1,3 Tues. Also Raynet inf.

Clifton ARS. Martin Brown GODGC Tel. 01 691 2341.
 Coulsdon ATS. Alan Tel. 01 684 0610
 Crawley ARC. Jack Tel. 0293 28612.
 Dover: South East Kent YMCA ARC. Des Edwards 0304 203073.
 Meetings: Dover YMCA, Godwynehurst, Leyburne Rd., Dover,
 Kent CT16 1SN. Weds. Nov 15 Morse tests.
 Dunstable Downs RC. Tony Kelsey-Stead 0582 508259.
 Meetings: Room 3, Chews House, 77 High St. South,
 Dunstable, Beds. Fris. Aug 18 Canada G3WLM; Aug 20
 DF/Treasure hunt; Aug 27 G3DDC/P on the Downs; Sep 10
 6th National Amateur Radio Car Boot Sale, Shuttleworth
 Collection, Old Warden Aerodrome, Nr. Biggleswade, Beds.
 10am. Fly in — permission from Northhill 288; Oct 29 RAE
 open evening.
 Eastbourne EARC. G1BRC 0323 29913.
 East Kent ARS. Stuart 0227 68913.
 Edgware DRS. Ian Cope G4IUZ, Hatfield 65707. Meetings:
 Watling Community Centre, 145 Orange Hill Rd., Burnt Oak,
 Edgware, 2,4 Thurs.
 Farnborough DRS. Tim Fitzgerald G4UQE 0276 29231. Meetings:
 2,4 Weds, Railway Enthusiasts Club, off Hawley Lane (M3
 bridge), Farnborough, Hants. Aug 23 Data converters G4CLF;
 Sept 13 Propagation G3LTP; Sept 27 Pre-AGM discussion.
 Felixtowe DARS. G4YQC Tel. 0473 642595.
 Grafton RS. Rod Harrigan G0JUZ Tel. 01 368 8154. Meetings:
 Holy Trinity Church Hall, Stapleton Hall Rd., London N4. 2,4
 Fris.
 Harlow DARC. Sept 24 Harlow Rally, Harlow Sports Centre.
 Traders in main hall, B&B and interest groups in Studio.
 Parking, New cafeteria. £1, accompanied children free. M1
 J11, or A414. G4KVR Tel. 0279 22365 (day) or G4MIS Tel.
 0279 722622 (evg and wknd).
 Hastings ERC. Dave Shirley Tel. 0424 420608.
 Horsham ARC. P Godbold Tel. Steyning 814516. Meetings: Guide
 Hall, Denne Rd., Horsham, Sussex. 8pm. 1 Thurs.
 Huntingdonshire ARC. G8LRS Tel. 0480 56772. Packet
 GB7HXA. Meetings: 1,3 Thurs The Medway Centre,
 Coneygeare Road, Huntingdon, Cambs 7.30am. Aug 28
 "Junk 88" sale and auction 10.30-5.00. Talk-in and
 refreshment.
 Itchen Valley RC. G1IPQ Tel. Southampton 736784.
 Kettering DARC. Barry Perrin G7CIV Tel. Rockingham 770701.
 Meetings: EMEB Social Club, Eskdale St., Kettering. Tues 8pm.
 Loughton DARS: J D Ray G8DZH Tel. 01 508 3434 (ev);
 01-5083434 Micronet 800 mailbox, TeleGold 74:MK1824;
 packet G8ZDH at GB7ESX. Meetings: Loughton Hall, Rectory
 Lane, Room 20, 7.45pm. Fris.
 Maidstone YMCA ARS. G0BUW Tel. 0622 20544. Meetings:
 YMCA Sports Centre, Melrose Close, Maidstone Kent. Fris
 8pm. Aug On air and tuition only; Sept 9 RSGB morse tests.
 Mid Sussex ARS. G0GMC Tel. 07918 2937.
 Milton Keynes DARS. Mike G0ERE Tel. 0234 750629.
 Norfolk ARC. Craig Joly G0BGD 0603 485784 QTHR. Meetings:
 Norfolk Dumpling, the Livestock Market, Hall Road, Harford,
 Norwich. Weds 7.30. Aug 16 International Rescue Corps Guy
 McCurley; Aug 23 Mosely Antennas Owen Chilvers G3JOC;
 Aug 30 North sea problems Pat Gowen G3IOR; Sept 6 T&C
 show briefing; Sept 10 Club station demo Town and Country
 Show, Royal Norfolk Showground, Costessey; Sept 13 Packet
 update, Roger Cooke G3LDL, Paul Turnham G4VLS; Sept 20
 Equipment reviews and EMC, Angus McKenzie G3OSS; Sept
 27 Informal.
 Northampton RC. D J Linnell G7CMA 19 Beech Av.,
 Northampton. Meetings: Location? Thurs. Aug 25 Image
 Processing Bernie G8ZGW; Sep 21 Ham Radio in S. Africa
 G4IRD.
 Reading DARC. M G Anthony G4THN, 9 Paice Green,
 Wokingham. Berks RG11 1YN.
 Reigate ATS (RATS). Alan G1LNT Tel. 0883 44723, Peter G8ITY
 Tel. 0293 36193 after 7. Meetings: Conservative Cente,
 Warwick Rd., Redhill, Surrey. 3 Tues, 8pm. Aug 15 Members'
 presentations; Sept 19 Morse facts and fallacies Tom
 Mansfield G3ESH.
 Reading ARC. Mike G4THN. Tel. 7434 774042. 2,4 Thurs,
 Caversham Conservative Club, Caversham, Reading Berks.
 St. Albans Verulam ARC. George Christofi G0JKZ Tel.01-427
 4800 Meetings; RAF Association HQ, New Kent Rd., off
 Marlborough Rd., St. Albans. 7.30. 2,4 Tues. Aug 22 Bring
 and Buy.



Sevenoaks DARS. Barry Leggett Tel. 0732 741222 ext. 245
 office hours. Meetings Emergency Control Centre, Sevenoaks
 District Council Office. 8pm 3 Mons.
 Shefford DARS. Tom Stellar G6RCT Tel. 0707 372211. Meetings:
 Church Hall, Ampt Hill Rd., Shefford, Beds. 8pm
 Southend DRS. S. Blinkhorn G1XGP, 102 Lord Roberts Ave., Leigh-
 on-Sea, Essex SS9 1NE.
 Southgate ARC. Brian Shelton Tel. 01-360 2453. Meetings: Holy
 Trinity Church Hall, Winchmore Hill, London N21. 7.45pm. 2,4
 Thurs.
 South Kent (YMCA) ARC. Des Edwards Tel. 0304 203073.
 Meetings: Dover YMCA, Godwynehurst, Leyburne Rd., Dover.
 Tues.
 Stevenage DARS. G6EDA Tel. 0438 724991 Meetings: 1,3 Tues
 Sitec Ltd., Ridgmond Park, Telford Av., Stevenage 8pm (7.30
 for tuition).
 Sutton & Cheam RS. John Puttock G0BWW 01 644 9945
 Meetings: 3 Fris, natter 1 Mons 7.30 Downs Lawn Tennis
 Club, Holland Av., Cheam. Aug 18 3 mini lectures; Sept 15
 TBA.
 Welwyn Hatfield ARC. Roger Curtis G0CYC 0707 324958.
 Meetings: Lemsford Village Hall, Brocket Rd., Welwyn Garden
 City, 1,3 Mons, 8pm; 9th WGC Scout HQ, Kingtsfield, WGC.
 Regular nets. Sept 4 Talk and demos by RIS; Sept 17 Water
 Carnival GB2WHC; Sept 18 TBA.
 West Sussex ARS. M Mundy, 142 Junction Road, Burgess Hill.
 Wimbledon DARS. Nick Lawlor G6AJY Tel. 01-330 2703.
 Meetings: 2,4 Fris, St. Andrews Church Hall, Herbert Rd.,
 Wimbledon London SW19. 7.30pm. Aug 11 Data transmission
 and amateur radio Ted Batts G8LWY; Aug 25 Up The Amazon
 Jim G4XLM, Peter G1LWY.
 Woburn Park RSGB Annual Mobile Rally. Aug 6. Norman Willet
 G3MVV. Tel. 0277 225563.

IRELAND

Armagh and Dungannon DARC. J Murphy Tel. 0861 522153.
 Donegal ARC. E13BOB Tel. 074 57155.
 Mid Ulster ARC. Jim Lappin Tel. 0762 851179. Meetings: 2 Suns
 (not July and Aug) 3pm Guide Hall, Gilford, Co. Down.

NATIONAL AND INTERNATIONAL

AMRAC. Phil G6DLJ Tel. 0703 847754.
 British Amateur Television Club. G8CJS or G8FOZP QTHR.
 British Amateur Radio Teledata Group. Pat Beedie GW6MOJ Tel.
 0558 822286. Ffynnonias, Salem, Llandeilo, Dyfed SA19
 7NP. SAE for information. GB2ATG amateur radio news
 service transmits on 1 and 3 Sundays, on 3.590MHz,
 14.090MHz and 144.600MHz. Operated by volunteers,
 GB2ATG welcomes amateur radio news for possible
 transmission, especially concerning radio data activity (RTTY,
 Amtor, packet, fax, etc.). Aug 27 Sandown Park Racecourse
 Rally, Esher Hall, Esher, Surrey 10.30 £1 adults, 50p OAPs,
 children. "The data comms rally but stands to interest all
 amateurs" Trade, car boot. Parking or rail to Esher 15 mins
 from station.
 International Short Wave League. Y Blain, 167 Wombridge Road,
 Trench, Salford, Shropshire TF2 6QA. Journal: Monitor.
 UK FM Group, Northern, L Laughton, Claremont, Main St., East
 Ardsley.



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432 6XB	6 ele cross	10.2dBd	1.07M	£32.20	B
432 19T	19 ele	14.2dBd	2.2M	£44.00	A
432 17X	17 ele cross	13.4dBd	2.2M	£60.80	A
432 17T	17 ele long	15.0dBd	2.9M	£48.45	A
144 5	5 ele	9.2dBd	1.8M	£24.20	A
144 7T	7 ele	10.0dBd	1.6M	£29.85	A
144 8T	8 ele long	11.0dBd	2.4M	£38.65	A
144 14T	14 ele	13.0dBd	4.57M	£57.75	A
144 19T	19 ele	14.2dBd	6.57M	£69.10	A
144 6X	6 ele cross	10.2dBd	2.5M	£49.15	A
144GP	Ground plane			£17.80	B
70 3	3 ele	7.1dBd	1.7M	£37.25	C
70 5	5 ele	9.2dBd	3.45M	£56.65	C
50 1	Dipole			£18.25	B
50 2	2 ele	4.7dBd	1.35M	£34.40	A
50 3	3 ele	7.1dBd	2.39M	£42.95	A
50 5	5 ele	9.2dBd	4.77M	£64.40	A
CK 50	conversion kit 50 2 to 50 3			£12.40	B

POWER SPLITTERS					
70 cms	2 way			£25.26	B
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RPM 1.5M 1.5 inch				£19.75	B
RPM 3M 1.5 inch				£39.50	A
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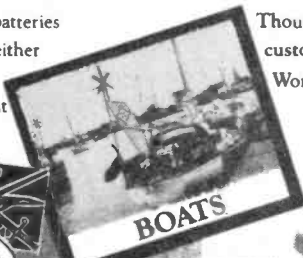
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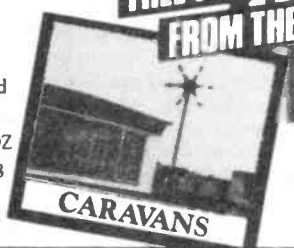
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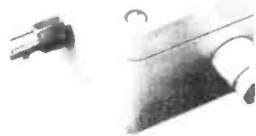
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TRIO R1000 200 KHz-30MHz offers. Would part exchange and cash for recent Yaesu wide coverage, all modes receiver 01 530 4934. South Woodford, London.

"TELEREADER" CRW685E keyboard and screen 'Brother' printer M1009 'Novex' monitor, all mint. £500. 5x400 scanner 26-520MHz £300. Coax LDF4-50 27m. £40. 25m. £37. Jaybeam 12xy-70cm. £20. Pioneer open reel tape deck. £100. 19ELXTONA 70cm. £10. Telescope 6" reflector by AE Luton. Eyepieces, 4mm, 9mm, 25mm, 2xBarlow, ¼ wave optics, very heavy duty tripod, equatorial mount. First class instrument. Philpot G4OYU. Tel: 0452 812216.

TRIO R2000 communications receiver, immaculate. £395 ono. Yaesu 9600 60MHz-950MHz scanner, as new. AM/FM SSB. £350 ono. Tel: Arthur G4KIG 0375 678833.

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ATARI 800XL computer joystick recorder software CW program complete outfit as new. Boxed, bargain. £40. Phone 0235 816947.

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FOR SALE Gould OS300 dual beam oscilloscope 0-20MHz. Immac condition, with manual professionally calibrated. "Snip" at £175, plus carriage. Phone 0698 883306 after 6pm. Ask for Tom. 3cm transmitter, 3cm receiver (manual), 70cm receiver. Lots of other gear. Exchanges. J. Brown, 45 Marlborough Avenue, Falmouth Cornwall. TR11 4HS.

GEC HF communication receiver type RC411 service manual wanted, buy or loan for photocopying all costs refunded. M. Levers 'Waverley' Independent Hill, Alfreton, Derbys. DES 7DG.

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AEA PK64 with HFM64 modem, fitten with new HDLC software update, packet Amtor, RTTY, CW. £145 ono. Excelerator plus disk drive for C64 with GEOs version 1.3. £75 ono. Sephton, 16 Bloemfontein Avenue, London, W12 7BL, 01-749 1454.

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YAESU FT757 GX general coverage transceiver. Yaesu FP 707 power supply. Icom IC AT 100 automatic antenna tuner. Also mobile bracket for 757. £800 the lot. Phone Kevin, 0964 614085. North Humberside.

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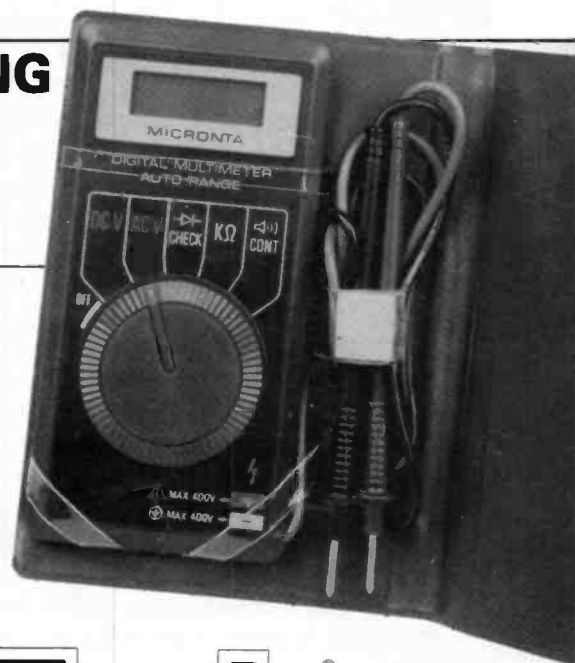
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In the AMR1000, Navico has produced what so many radio amateurs have been waiting years for - a superbly designed, no-frills transceiver that offers sheer quality of performance for those who are more interested in communicating simply and clearly than in playing with complicated electronic gadgetry.

The AMR1000 is the product of the very best in user-conscious design. New comers to 2m will find the operation is pitched at exactly the right level to give the ease of operation they need, without unnecessary complications. More experienced operators enjoy the versatility and ergonomically designed accuracy of a rig that according to Chris Lorek of HRT "...makes Japanese black boxes appear rather limited."

The list of features is impressively functional and includes:-

- Reversible angled front panel that is conveniently visible however mounted
- Clear, well-spaced switches
- New fist microphone with channel change facility
- Frequency and channelised operation giving fully automatic repeater operation

- Clear signal strength numerical read-out
- Variable LCD illumination
- Simple connection to Packet Radio TNCs without internal modification

The simple quality and attention to detail make this the most exciting British-designed and British-made contribution to amateur radio this decade.

Those who are looking for the same basic quality, but with a more sophisticated set of features, will find that the AMR1000/S fits the bill.

To find out more about Navico 2m transceivers, and discover why they are simply the best available, just complete and return the coupon.

It's as simple as that.

PRIORITY INFORMATION REQUEST

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