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Alinco DX-70 multimode HF and 6m rig previewed

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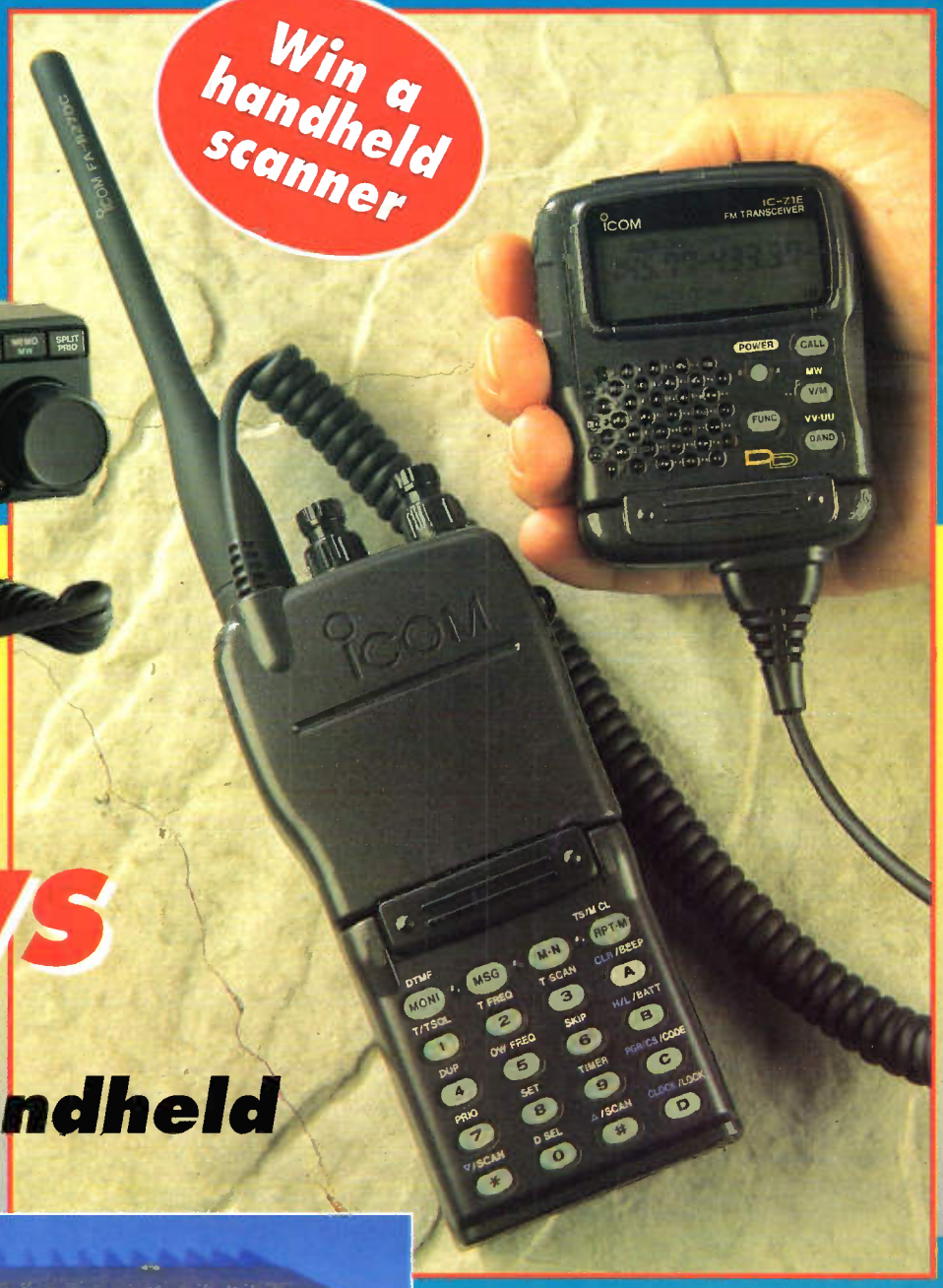

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NEXUS

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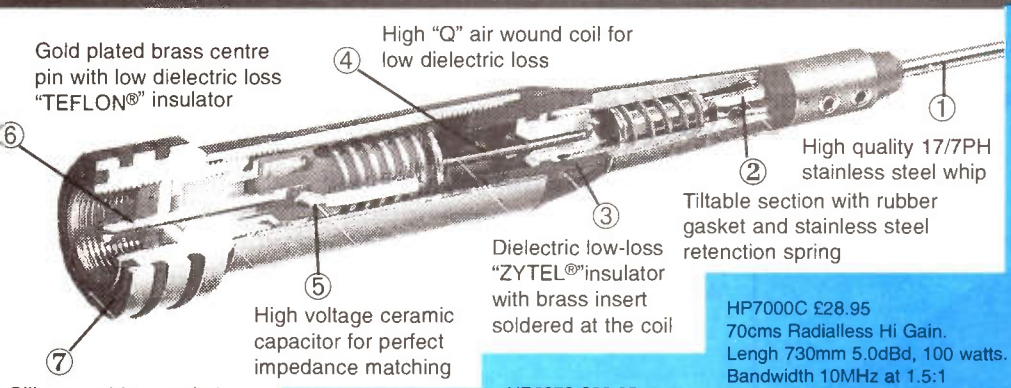

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CQ de G8IYA

Editorial

Is your gear safe? Really?

Many of us worry about leaving our new, expensive, shiny mobile rig in our car when it's parked in the street. Often rightly so, because many countries, like ours, have certain 'undesirables' about who'd like to relieve us of our possessions.

Here's a true event, which happened a number of years ago. A car, complete with installed multimode 2m rig, all belonging to a certain G8IYA was parked in a security guarded car park. Along come two youths, who decided to break in and drive it away. The theft was discovered (by the owner, not the security guards who could see the car from their gate office window) a few hours later and the police were alerted. The car, complete with occupants, was found by the police, again within a few hours. The occupants were, of course, 'taken in' and subsequently found guilty of "taking without owner's consent" and accordingly sentenced. The policeman, seeing the 'G8IYA' label on Dymo tape on the 2m rig and hearing activity from the radio, picked up the mic and, during a gap in the conversation, called for 'Gee Eighty-one Y A'. The rig happened to be on a simplex channel, and the resulting conversation must have been somewhat interesting! The amateur who replied asked the police officer to please stand by on that frequency, he'd be called back, he then quickly switched to the local 2m repeater and put out a call for G8IYA, the response from another amateur being that G8IYA wasn't on the air at that time. "Yes, the rig's still in the car which has been stolen isn't it, I'm, just taking to a police officer on S22 who's using it from the car!" To cut a long story short, apart from probably the entire local repeater population immediately QSYing to S22 to listen to the ensuing conversation, owner and property were reunited and two youths were given custodial sentences after admitting many other similar offences in the subsequent court proceedings.

Wouldn't we all (well, at least the honest ones amongst us) be happy if all such cases turned out this way. Sadly, they all don't. Technology often comes to the rescue, and various forms of electronic countermeasures are available, to hopefully deter such 'undesirables'. It isn't always a losing battle, but leaving an expensive rig in an unprotected vehicle *is* often liable to tempt fate.

Similarly, what about your 'shack'. Many amateurs use a wooden shed in the garden or back yard for their station, this being unoccupied most of the time. Wireless alarm systems are commonly available, which could be ideal for such purposes. I've a review of one of these planned for inclusion in Ham Radio Today magazine.

Fax-back list

In the meantime. if you've any 'horror stories', or indeed any 'happy endings', which you feel other readers would be interested in and may hopefully take advice from, why not drop me a line. Also, if you've been unfortunate enough to have your rig stolen, let me know the rig type, serial number and owner/police office details, and I'll publicise it. *How about an up-to-date list of all stolen gear on the Ham Radio Today fax-back service?* Just the sort of list to take along to your next rally or boot sale! The service is there, for your use. Post or fax me your information for inclusion.

This month's software offer

Following the success of the recently offered IOTA *Super-Duper* contest logging programs, this month I'm offering the latest Super-Duper (Version 7, just released) contest logging program for DX entrants to ARRL contests. The collection also includes the Version 7 update to the IOTA programs. These are both 'freeware' programs.

A great number of readers have been successful with the simple one-IC interface unit, published in the March 1995 issue of Ham radio Today magazine, with the *JVFAX* and *HamComm* programs respectively offered by, and provided on the front cover, of Ham Radio Today. In this month's software collection I've also included *PKTMON*, which allows you to use the very same one-IC interface together with your receiver to also receive HF (300 baud) and VHF (1200 baud) packet radio.

I've also been asked, by many readers, whether the published simple TX/RX interface can be used with the readily-available BayCom v1.5 program for packet communication. The BayCom program is designed for use with a 'real' modem, however by using the *EMBAYCOM* program with this you can indeed use the one-IC interface for TX and RX packet use on 300baud (HF) and 1200 baud (VHF) packet. So, I'm pleased to include *EMBAYCOM* also on this month's software collection! All the offered software comes with on-disk documentation.

How to get your software

For this month's software collection, which is supplied on a 1.44Mb HD PC disk and including return UK p/p to you, just send a £1.00 cheque or postal order, payable to; *Mr. Steven Lorek*, together with your name and address and the original 'corner flash' from this month's 'contents' page, to; *Software Services, P.O. Box 400, Eastleigh, Hants SO53 4ZF*. Overseas readers, including Southern Ireland, should send three US $1 notes (which normally covers airmail to Europe and surface mail to other countries). If you live outside Europe and require airmail you should send four US$ in notes. Other payment methods cannot be accepted due to excessive banking charges - and *please do not* make your cheque or PO payable to any other individual or any company (as this is an 'at cost' service, we cannot pay to return letters, cheques etc. which do not comply with the above instructions).

Queries regarding supply of these 'at-cost' disks should be sent to Software Services, P.O. Box 400, Eastleigh, Hants SO53 4ZF, with an SAE or IRC for reply, *please do not* telephone, or write to, the HRT Editorial staff, *or* the magazine publishers (Nexus), as they cannot answer your queries. Your software disk will normally be placed in the post to you within 7-14 days of *receipt* of your request, but please allow up to 28 days for delivery.

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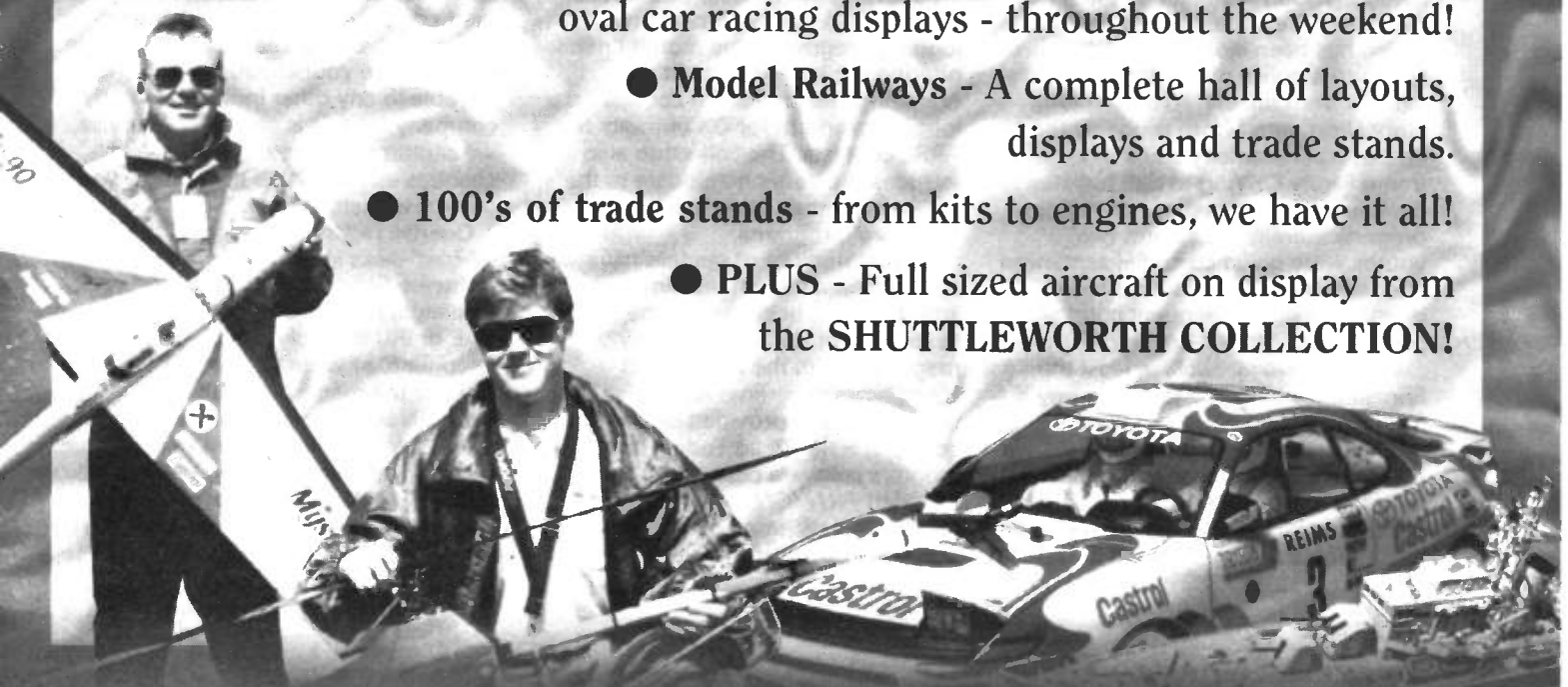


FOR DISCOUNTED ADVANCED TICKETS PLEASE CALL 01442 66551

Seen at the show

At this year's London Amateur Radio and Computer Show a number of new ham products were launched, and a number of 70cm handheld rigs were even given away!

One of the 'big surprises' was the new DX-70 tiny-size HF and 6m multimode transceiver from Alinco, operational on the Waters and Stanton stand. See the preview feature in this month's issue - our Tech Ed was very pleased to be the one leaving the show with the only model in Europe for test! Also launched by Alinco was the new DR-150E fully-featured 2m mobile transceiver - see the review in this month's issue (we like to make sure that Ham Radio Today keeps you up to date!).

The other major equipment launch was the new IC-775DSP HF rig from Icom. This is a 200W multimode HF transceiver with a built-in second receiver, together with a built-in Digital Signal Processor to provide digitally filtered receive audio performance plus digitally generated transmit SSB with a PSN modulator. The set uses a Direct Digital Synthesizer with no mixers for frequency generation, with 1Hz tuning steps, and the receiver claims a dynamic range of 105dB (500Hz IF bandwidth, 100kHz spacing). A prototype model was shown on the Icom (UK) stand at the show, with production sets available later this year. Also on the Icom (UK) stand was their new IC-Z1E remote control dual band handheld, see the review feature in this month's issue (yes, we did it again!).

On the Aerial side, two new magnetic loop aerials from Drae were launched by Nevada. The ML170 at £199.95 covers 3-10.3MHz continuously, using a 1.7m diameter loop of semi-rigid 13mm diameter coax, the smaller ML70 at 80cm diameter covering 7MHz to 30MHz continuously, this being priced at £179.95. We've a review of these lined up for the magazine of course.

Martin Lynch launched his optional 5 year warranty at the show, where purchasers of new sets could, for an additional 'up-front' fee, extend the warranty on their new gear to 5 years, quite a pioneering move. He says it includes all repair costs apart from dial lamp bulbs, and is transferable upon sale of the rig.

Bargain hunters at the show were not forgotten of course. You could pick up an ex-PMR rig for 2m conversion for just a couple of pounds, indeed some ex-PMR rigs were on sale for just £1.00 at time on the Trade Centre PMR stand. There were plenty of other 'surplus stands', although many of these seemed to be selling old computer hard drives and the like for 'do-it-yourself' PC builders. Despite the insistence of the organisers that stand holders display their name and address, at least one such 'surplus computer dealer' declined to do so, one totally refusing to provide this on request, nor a receipt for goods he sold, to our Tech Ed. The stall holder didn't get the business of course, but this could be a cautionary tale to others who may find an apparent 'bargain' at such events not quite the bargain they thought.

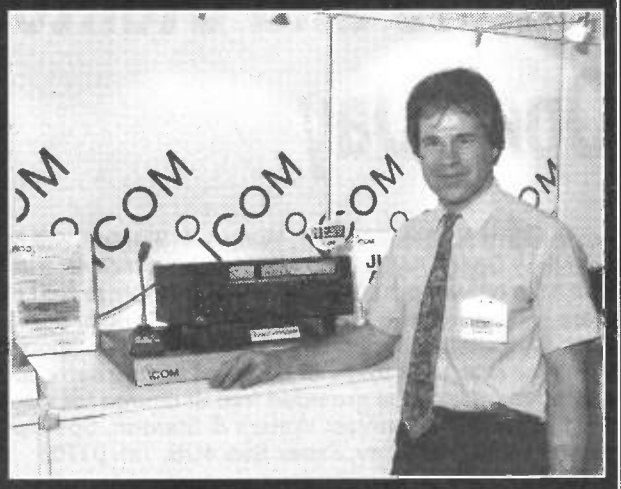
On a happier note, Yaesu (UK) offered licensed visitors a free prize draw, with two chances on each day of the show to win an FT-416 70cm handheld. This seems to be a 'regular feature' for Yaesu (UK) at such large shows - very nice! Yaesu also had their new FT-51R on display (exclusively reviewed in our April 95 'London Show Special' issue) which attracted a lot of attention.

Each day saw a different lecture. Saturday was Steve White G3ZVW showing how the obstacle of learning Morse can be made easier. A packed audience filled the room, such was the interest the lecture had to be run in two sessions! Sunday saw Ruth Hull N0ULD and Ken Baker KO0W, both from Kantronics Inc. in the USA, give a lecture on many aspects of packet radio, one of the fastest growing interests in ham radio.

See you there next year?

Jeff Stanton G6XYU of Waters and Stanton looking happy at the launch of their new Alinco DX-70

Dennis Goodwin G4SOT of Icom (UK) demonstrated the new IC-775DSP digital HF rig



US licence test session

Ham Radio Today magazine have been informed that the next US Licence test session will be held on the 27th May 1995, 09.00 UTC (10.00 local), at Northdale House, Hanger Lane, London NW10. There will examinations for US Novice, Technician, General, Advanced and Extra Classes. We're told that all you require is a US mailing address and that the fee is £4.00 per session. Walk-in candidates will be accepted, although prior notification of attendance would be preferred, to give an idea of numbers. For further information contact; Yves Remedios, AC4WT, London ARRL-VE Team, 44 Kingsway, Wembley HA9 7QR (please enclose an SAE for reply), or Tel. 0181 902 5995 (after 7.30pm), or via packet G4UDT @ G4UDT.GB7BST.#32.GBR.EU

There's also a further VE Team in the south of England who run regular test sessions, this is the Solent VE Team. The contact person for this is Paul Steed G0VEP, 1 Falcon Green, Farlington, Portsmouth PO6 1LW (please enclose an SAE for reply), Tel. 01705 371677, or via Packet G0VEP @ GB7HJP.#48.GBR.EU. The venue for the exams is the St. John Ambulance HQ Havant, Potash Terrace, Havant, Hampshire. US licence test sessions are usually held each month, alternating between London and Havant. Please remember, the above contacts are all unpaid voluntary examiners, therefore if you write to them for more information, or to register for an exam session, please enclose a stamped self-addressed envelope if you require a reply.

DX Happening

The Yorkshire Cluster Support Group (GB7YDX), after their inaugural AGM and DX meeting last year, are holding a similar event on the 13th May 1995, in the Ebor Suite at the Post House, Tadcaster Rd., York (near to Racecourse). The Cluster Support Group AGM will commence at 12.30am, with the DX meeting starting at 2.00pm. They have four guest speakers: Well-known DXpeditioner Roger Western G3SXW will speak on his 1994 trip to Ghana when he operated as part of the multi-op 9G5AA international team in the CQWW CW Contest.

Ron Stone GW3YDX, a well-known character of the UK DX scene, will be lecturing on aerials - in particular the new range of innovative Force 12 and KLM aerials which he is now importing into the UK.

Bob Harrison G4UJS, a leading member of highly successful Northern Lights VHF Contest Group, will be giving delegates the low-down on the secrets on how to win on VHF/UHF - this talk is rumoured to have humorous undertones!

Amateur Radio software writer Alan Jubb G3PMR, will be speaking and demonstrating his Shacklog and new IOTA Awards Manager programs.

RSGB Contest Committee Chairman Chris Burbanks G3SJJ and Chris Swallow G3VHB, will be describing their contesting software and answering questions on contesting matters in general.

The DX meeting is expected to go on long into the night if last year was anything to go by - the food and bar facilities of the Post House are reported as excellent. You don't need to be a member of the Yorkshire Cluster Support Group to attend. Anyone interested in DXing - including SWLs, are invited. Bookings can be made to Neil Smith G4DBN, Tel. 01757 638159 (GB7YDX SysOp) or Steve Wilson G3VMW, Tel. 01937 845503. To attend, tickets cost £12.00, including coffee and hot buffet, or £5.00 without food and coffee. For delegates requiring a restaurant meal or overnight stay, speak to Neil or Steve regarding this.

TRADE TOPICS

Waters and Stanton Open Day

For the fifth successive year, Waters & Stanton will hold their free Open Day at their Hockley premises on Sunday 21st May between 10.00am and 5.00pm. We're told that there will be a vast quantity of special offers, end of lines, cancelled orders, secondhand and reconditioned items for sale, with loads of bargains for the early caller. Refreshments will be provided free of charge for visitors. For further details contact Waters & Stanton, Spa House, 22 Main Road, Hockley, Essex SS5 4QS, Tel. 01702 206835/204965

News from Martin Lynch

At the London Show this year, Martin Lynch launched a unique, fully transferable, five year warranty on all new equipment supplied by him. Described as being available for a nominal sum, we're told the warranty covers all repair, replacement parts, servicing, labour and collection and re-delivery costs on all new equipment. All such warranties are to be fully transferable, thus the piece of equipment may be sold or exchanged any number of times within the five year period, without loss of warranty cover. "total confidence and absolute peace of mind for every one of my customers is what I intend" says Martin. Martin Lynch has also pioneered a programme allowing up to fifteen months warranty on used equipment, up to eight years old. For further details contact Martin Lynch, Tel. 0181 566 1120 or leave a data message on the 'Lynchline' BBS on 0181 566 0000.

ALINCO

It's Looking Good!

HF - VHF - UHF

Reviewed This Issue

DX-70

100W HF Transceiver

+ 10W 6 Metres

SSB / CW / FM / AM on all bands

Detachable head

£ T.B.A.

The new DX-70 is ALINCO's HF transceiver with detachable head for mobile or base operation. Includes wide and narrow filtering, QSK, 100 memories, reverse CW, speech processor and pass-band tuning. For more information send fron brochure

ALINCO are forging ahead in ham radio design and technology.

DR-150E

2M 50W Transceiver

Switchable AM/FM Receive

108-174 / 430-512MHz

800-990 MHz

£349.95

Reviewed This Issue

ALINCO give you more features for your money which adds up to a great deal!

The new DR-150E offers 50 WattsFM with CTCSS encode, full DTMF, switchable AM/FM on receive, 1200 and 9600 data speeds, channel number option and channel scope spectrum display. You'll find a host of other hidden features too! Phone for leaflet.

Reviewed HRT Soon!

DR-610E

2M/70cm 50W/35W

Switchable AM/FM Receive

108-174 / 400-512MHz

Detachable head

£659.95

The DR-610 is our new dual band FM transceiver that includes the latest channel scope spectrum display. Switchable AM/FM gives you a wide range of receiving possibilities and you also get full DTMF plus CTCSS encode. 120 memories provides ample storage and there's a host of additional features all described in the free colour brochure.

ALINCO have more exciting products lined up for 1995 - stay with us!

DR-MO6

6M 10/3W Transceiver

100 memories

Full DX potential

CTCSS Encode

£299.95

Reviewed HRT February

ALINCO - want to know more?
Contact one of our many dealers today.

The DR-MO6 gives you the chance to operate on one of our most exciting bands. You can enjoy both local and DX contacts, all from the same transceiver. Whether you use the CTCSS to access the new repeaters on this band or work simplex, you'll experience the delights and freedom that only the 6 metre band can offer.

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Alinco DX-70 Preview

Chris Lorek G4HCL marvels at the newcomer from Alinco which offers all-mode transceive coverage of 160m to 10m, plus 6m, all in a tiny box

Well, well, what a surprise from Alinco! Not only have they launched their first ever multimode rig, but also their first ever HF rig in the same package. Not only does it cover all the HF bands, but 6m as well. This must have been the 'biggest kept secret' in the ham radio equipment field for some time, because the DX-70 made it's first European public appearance at this year's London Show. Ham Radio Today was very pleased to be offered the very first (in fact, the *only*) European prototype sample to test on air.

Features

The set offers 100W maximum transmit output power on all HF amateur bands with 10W on 6m, together with a switchable low power facility on all bands. The receiver covers 150kHz to 30MHz plus 50-54MHz. The set offers SSB, CW, AM and FM transceive capabilities as standard - no optional 'add-ons' needed here, there's even a built-in CTCSS tone encoder for 6m and 10m repeater use. Narrow (1kHz) and wide (2.4kHz) IF filters are fitted for CW/SSB and 'narrow AM' receive, these being switchable from the front panel, together with a further wider filter for normal AM and FM use. The specifications also state that a 500Hz bandwidth narrow CW filter can be switched in, which I gather is an audio filter. An IF shift control helps in fighting adjacent frequency interference on a crowded band, and switchable 10dB and 20dB receive attenuators guard against overload, a 10dB preamp also being fitted for use when needed on a 'quiet' band or for example whilst mobile with a small aerial. Separate aerial sockets are fitted to the rear panel, one for HF and the other for 6m.

The rig lends itself superbly for mobile use, with its case measuring just178mm W x 58mm H x 228mm D the transceiver should easily fit into even most tiny car dashboard space. But if size is still a problem, then the front panel can be detached and an optional cable used to link this to the main transceiver 'body' which can easily fit under your seat. The microphone and speaker connections stay at the main transceiver end, so you can simply detach the front and pop it into your pocket when leaving the car without needing to unplug these other leads as well.

Controls

A series of multi-function controls and buttons make the best possible use of the available front panel area. For example, a click-step 'Multi Function' rotary control switches between band change, or frequency change in 1MHz, 100kHz, 10kHz or 1kHz steps, and memory channel selection. The 'RF' button cycles through the receiver 10dB preamp, no preamp (0dB), 10dB attenuation and 20dB attenuation; and the RIT button cycles through receiver, transmitter, and combined receiver and transmitter frequency shift.

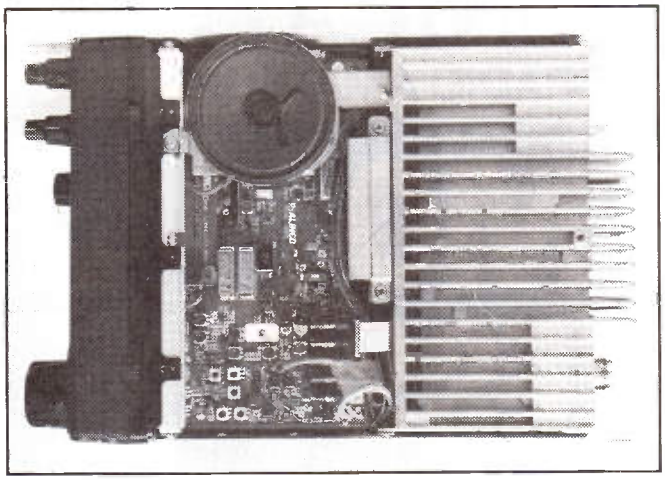
Further buttons toggle the narrow/wide receive bandwidth, and high/low transmit power, these buttons providing a 'double function' toggling the internal noise blanker on/off, slow/fast AGC, and control of an optional external aerial tuning unit.

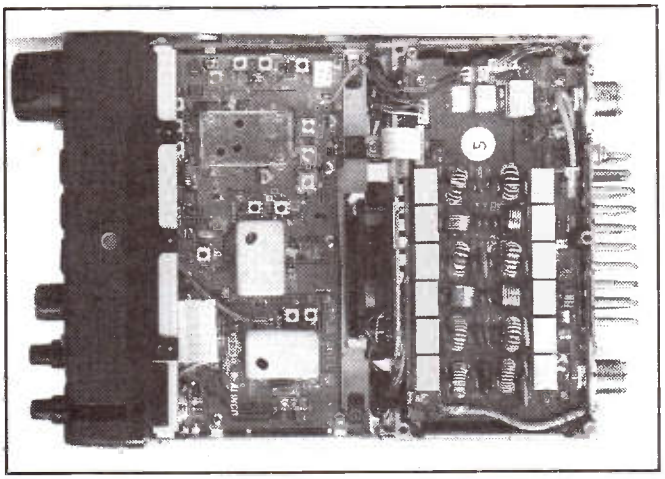
The lesser-used functions are controlled with a 'set' facility, so that you can tailor the operation of the set to your requirements. For example, you can set the DX-70 to either automatically select the correct LSB or USB mode for you depending upon the frequency band, or just remain at the last-set sideband when you change band, and for data users an automatic IF shift can be programmed for both sidebands to accentuate the higher frequencies to suit most data terminal units. There's even an internal speech processor, and for CW use full and semi-break in, with selectable delay times, are fitted. The CW sidetone can be varied to suit your preferences, and CW receive can be front-panel switched between upper and lower sideband BFO offsets as a QRM-fighting measure.

The front panel LCD shows you the usual frequency, mode, high/low power, RIT/XIT status and offset, narrow/wide filter and so on, together with a bargraph S-meter along the lower section of the display, this reading from S1 up to S9+60dB.

On the air

It may be a small set, but even on my very first QSO





(successfully breaking though an SSB 'pile-up' on 20m) I found it certainly put out a good 'punchy' signal on the air! I then read the manual, and found the SSB processor was switched in, possibly explaining why! Leaving this in, I had a successful short rag-chew with a weak (S4) maritime mobile station in the Canary Islands (thanks for the report Bob), which showed my signal which was also just S4 at the distant end, despite the QSB present during that contact, was getting through with no problems.

After that, it was time to read the manual fully, get to know the set, and have plenty more contacts on the air!

Operation

I quickly got used to using the set, despite the necessary 'double-function' buttons, I particularly found the smooth VFO knob very pleasant to use. Although I quickly learned how to use the set by touch alone for mobile use, so as not to take my eyes off the road, I also learned to methodically use the handy 'dial lock' button to keep me on frequency during a contact on the move as the VFO knob was easily knocked.

Throughout even long contacts using the set's maximum 100W, the case remained quite cool to the touch. An internal fan ducting air through the PA heatsink fins was the reason for this, although I had to literally put my ear to the rear of the case to see if it was working - it was extremely quiet in operation.

What about the 'bad' points of the set? Well, I found the speech processor was rather a disadvantage during 'local' contacts, my audio sounding much better without it, which probably isn't surprising. Another was that, when selecting, say, FM mode for 6m or 10m use, changing band then switched to my last-used frequency on that band but with the mode unchanged - I had to re-select SSB or CW as appropriate. However, the set's 100 memory channels were useful here, combined with a single button-push 'memory to VFO' operation let me use this as a very handy band switch for amateur and broadcast bands.

I found the pre-production set's receiver often suffered on busy bands, such as 80m and 40m at night when used with my trap dipole for these bands. However, to be fair this was a pre-production model, and I'm informed by the manufacturers this performance will be improved on final production sets. But even so, considering the set's tiny size I can't complain too much!

Laboratory tests

Yes, I *did* subject the set to my usual 'thorough check' of technical performance, I have the figures here in front of me. However because of the aforementioned fact that this was only a pre-production set means that it wouldn't be fair or correct to view these as representative. But suffice to say, I was very impressed. After having subjected the poor set to the horrors of my test gear, as a final test I even kept the transmitter running in 100W 'key-down' mode for 10 minutes continuously. After this time the rear heatsink was still only warm, and not scalding (as I'd have expected!), to the touch. I found no traces of unwanted 'microphony' from the set, i.e. frequency 'wobble' due to vibration, an important issue for a rig intended for mobile use.

The UK distributors have promised Ham Radio Today magazine one of the first production-standard models, which I'll be pleased to test and publish the results plus a few comments in a future issue.

Conclusions

Alinco seem to have surprised the world with their latest rig, a radical departure from their previous VHF/UHF FM-only offerings. But they've managed to do a very good job, as I found no major shortcomings with the set when considering it's size and features. They must be congratulated on their well-deserved efforts, and I'm sure they will be when amateurs around the world will be queuing up to place their orders for one!

I'm told the DX-70 is due to sell at around £1100 in the UK, with availability around May, and my thanks go to Waters and Stanton Electronics for the timely loan of the set to test for Ham Radio

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Icom IC-Z1E 2m/70cm Handheld Review

G4HCL goes into remote control with Icom's latest dual band handheld

I've seen 'remote control' speaker-mics for 2m/70cm handhelds before, these usually being available as an 'optional extra' and offering a limited number of control features. Icom's IC-Z1E goes one stage better, by using a detachable front panel on the set, with controls for volume, backlight, and various VFO and memory channel change buttons as well as the full-function backlit Liquid Crystal Display.

The set can, of course, also be used with the panel attached to the main body, this clips on very easily and quickly. But the 'remote' kit comes with the set as standard - there's no additional cost, so you've got the best of both worlds!

Coverage

The set covers the usual 144-146 and 430-440MHz bands on transceive, and separate click-step rotary controls are used to change channel and frequency on each band independently. A multi-function keypad on the main body also lets you directly tap in frequencies and channels. Besides allowing independent operation on both bands, the set also has a 'dual-receive' function where you can, if you wish, listen to two frequencies on the same band, either 2m or 70cm, each frequency being shown on either side of the LCD and independently controlled by the separate tuning controls.

On transmit, FET power amplifier modules are used to give around 1.5W output from just a 4.8V nicad pack as supplied, an optional 9.6V pack giving correspondingly higher power. Plugging in an external 13.5V supply raises the power on each band to around 5W, and in all cases switchable low power and 'economy low' power levels of 500mW and 15mW are also available.

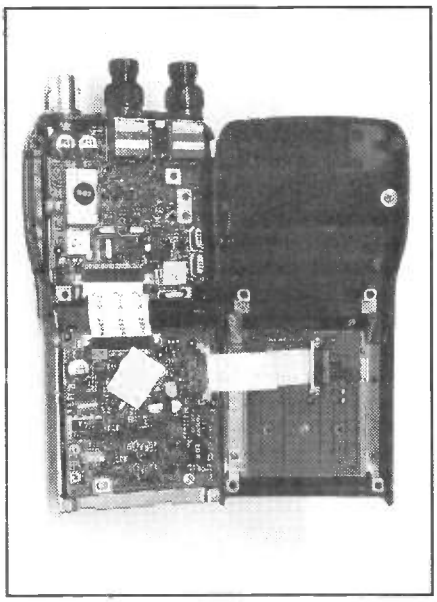
Memories and scanning

The set offers 46 memory channels on each band, 40 'normal' memories plus 6 'scan edge' channels for band limit VFO scanning. A further 'repeater memory' automatically remembers the last frequency you used with a repeater offset, a press of the 'RPT-M' button quickly switching the set back to that frequency.

There are four types of scan, either 'full scan' for the entire VFO range, 'programmed scan' which searches between any two of the three programmed pairs of scan limit channels on each band, memory scan which scans all memory channels, and memory 'skip' scan which misses the channels you've programmed to be skipped. The scan in each case halts when the receiver senses a valid signal, and resumes either after 5 seconds, after 10 seconds, or two seconds after the signal disappears, depending on how you've programmed your own preferences.

Signalling

DTMF (Dual Tone Medium Frequency, or 'touch tone') signalling is fitted as standard, for selective calling or 'paging' between your own particular group of amateurs, this using the standard 3-digit format common to several other manufacturers. In 'paging' mode, besides your receiver telling you you've been called, it stores and displays the ID of the station who's called you.



As well as this, a novel form of alphanumeric message paging is also available on the set, which may be used with other transceivers so equipped. Again using DTMF tones, the set can transmit and receive short numeric and text messages, each of up to six letters/numbers, the ten last received messages being stored in the set's memory. Together with this, ten 'message' memories are also fitted so you can store pre-programmed messages for transmission, and you can also key in any text directly using the set's keypad with a short 'look-up' table being given in the instruction book.

CTCSS (sub-tone) encode and decode is available by plugging an optional tone squelch unit inside the set.

Physical features

The IC-Z1E with the supplied BP-171 4.8V 700mAh nicad measures 57mm (W) x 125mm (H) x 36mm (D) and weighs 380g. Together with a 58 page instruction book it comes with a belt clip and carry strap, and an AC wall socket plug-in nicad charger for overnight charging. Options include a fast one hour 'pod' type charger, 4.8V 950mAh and 9.6V 600mAh nicad packs, a battery case to fit four AA size cells, and external DC supply leads for car or shack use.

Together with a selectable rate receiver 'battery saver', which cycles the circuitry on/off on a quiet channel to extend the battery life, there are various on/off timers and backlight options, including a setting where the control panel LCD may be backlit but not the keypad's translucent keys - useful for 'remote' use at night to save your batteries that bit more.

On the air

I was able to test the set in a number of locations and modes, to hopefully simulate most user's situations. For example, the IC-Z1E accompanied me in the city centres of London and Southampton plus a weekend at a busy radio rally, as well as out and about in less 'RF congested' areas, mobile operation over regions covering several hundred miles of the UK using a dual-band external whip, even 'train mobile/portable' one day, together with operation from my shack using my rooftop and tower-mounted aerial systems. I'm pleased to say that *not once* throughout the review period did I have *any* problems with unwanted signals getting into the receiver - this is certainly a change from some 'earlier generation' dual band portable sets!

In 'busy' areas, I found the external control unit, clipped onto my jacket or shirt lapel with the main body clipped onto my belt, to be superb. It left my hands completely free with the set happily monitoring both bands in 'scan' mode, yet all I needed was a quick glance down at the display whenever a signal came through to see what was 'going on'.

This mode of operation does have its disadvantages. I live in an areas served rather weakly by 2m repeater and hardly at all by 70cm repeaters, so I missed a lot of activity by having the set's aerial stuck right next to my body at waist height. Raising the set up to face height brought signals up substantially of course, and this was the 'usual' mode I operated the set in whilst portable around my home area. Having said that, the set's versatility does give users the 'best of both worlds' in this respect!

Most of the time I found the set's controls easy to use, although changing the volume on either band usually meant several button-pushing operations, which continually annoyed me. There were several programmable methods of volume changing, but each meant an initial push of the tiny 'volume' section of the side-mounted PTT bar to change between up/down channel control and up/down volume control - there were no dedicated 'volume' knobs or 'volume' up/down buttons as such.

Not surprisingly, I found the audio from the small speaker wasn't loud enough for mobile use with the set or the control unit clipped onto my dashboard - an external speaker was needed here. But clipping the control unit with its speaker onto my shirt collar, next to my ear, instantly solved this! Reports on my transmitted audio were quite reasonable, in fact the *only* adverse report on my transmission (besides weak signals when portable!) was when one station with a discriminator meter on his rig commented that my transmit frequency was slightly low.

By now you may have gathered that the control unit was quite light - it was, and throughout the review period I found it a very handy 'accessory' even though it was a 'standard' feature. The only thing I would have wished it to have was a toneburst button - I had to reach down to the main body of the set and press the 'RPT-M' button whilst transmitting to access a repeater from 'cold'. Adding the optional CTCSS unit would however overcome this, albeit at extra cost, for the UK repeaters fitted with this alternative access method.

Lab tests

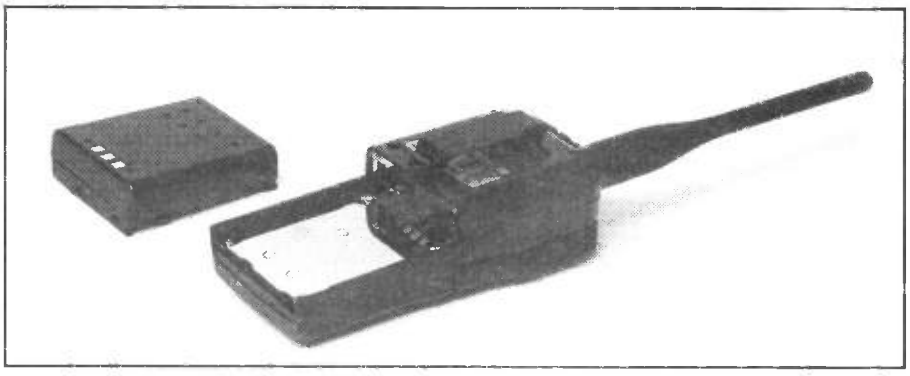
The accompanying results show that the receiver was reasonably sensitive, with also quite reasonable strong signal handling performance. The image and 'half IF' rejection was particularly good, this particular effect being the 'scourge' of a number of other handhelds which cause them to suffer from paging and other unwanted signal breakthrough effects in busy areas.

On transmit, the set gave a substantial amount of power when tested with higher supply voltages, and didn't get as hot as I'd have expected, this undoubtedly being due to the extra 'metalwork' present on the set's casing. When powered from a fully charged nicad as supplied, the set gave just in excess of 1.5W on both bands, and always above 1W when powered from a stabilized external 4.8V DC source to replicate a nicad on the verge of going flat. The transmit harmonics were well suppressed on both bands, but as found on air the transmit frequency was a little low of the centre frequency.

Conclusions

Icom's new portable with its detachable control unit is quite a pioneering approach. In use, I found it very handy indeed, I only wished the aerial was 'up at the top' also, although I'd agree this would cause practical problems! However, with the facility of the set being used in either 'remote' mode, or in 'normal' mode with the panel fitted to the set itself, the result is the best of both worlds. It'll be interesting to see how amateurs around the world take to this unique 'new' way of operating portable!

My thanks go to Icom (UK) for the loan of the review transceiver. who have just informed us, that the IC-Z1E does also now have a 'twin' in the new IC-W31E. This model is exactly the same as the Z1E, but it is conventional that it does not have the remote control panel feature.



LABORATORY RESULTS

All measurements taken using fully charged 4.8V nicad, high power TX, otherwise stated.

RECEIVER;

Sensitivity;

Input level required to give 12dB SINAD;

144MHz;	0.14µV pd
145MHz;	0.14µV pd
146MHz;	0.14µV pd
430MHz;	0.19µV pd
435MHz;	0.18µV pd
440MHz;	0.19µV pd

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;

	145MHz	*435MHz*
+12.5kHz;	27.0dB	34.3dB
-12.5kHz;	25.1dB	20.7dB
+25kHz;	64.8dB	59.2dB
-25kHz;	64.5dB	58.4dB

Current Consumption

Standby, squelch closed ;	108mA
Receive, mid volume;	135mA
Receive, max volume;	198mA

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;

	145MHz	*435MHz*
+100kHz;	77.0dB	71.9dB
+1MHz;	87.7dB	81.3dB
+10MHz;	94.9dB	83.2dB

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

	145MHz	*435MHz*
25/50kHz spacing;	60.0dB	56.2dB
50/100kHz spacing;	60.0dB	56.6dB

TRANSMITTER

TX Power and Current Consumption;

Measured using stabilised external DC supply

Freq.	*Power*	*4.8V Supply*	*9.0V Supply*	*13.2V Supply*
144MHz	High	1.10W/740mA	4.80W/1.50A	5.35W/1.33A
	Low	450mW/470mA	450mW/480mA	490mW/470mA
	E. Low	20mW/80mA	20mW/100mA	20mW/100mA
145MHz	High	1.10W/720mA	4.80W/1.50A	5.20W/1.35A
	Low	480mW/480mA	450mW/480mA	480mW/470mA
	E. Low	20mW/80mA	20mW/100mA	20mW/100mA
146MHz	High	1.10W/720mA	4.80W/1.50A	5.05W/1.37A
	Low	490mW/475mA	450mW/480mA	430mW/485mA
	E. Low	20mW/80mA	20mW/100mA	20mW/100mA
430MHz	High	1.07W/900mA	4.16W/1.55A	5.30W/1.55A
	Low	560mW/550mA	610mW/530mA	600W/540mA
	E. Low	20mW/100mA	20mW/110mA	20mW/110mA
435MHz	High	1.02W/88mA	4.11W/1.53A	5.40W/1.57A
	Low	570mW/560mA	620mW/545mA	610W/540mA
	E. Low	20mW/100mA	20mW/110mA	2mW/110mA
440MHz	High	1.00W/860mA	4.08W/1.51A	5.56W/1.58A
	Low	580mW/550mA	620mW/530mA	620W/545mA
	E. Low	20mW/100mA	20mW/110mA	2mW/110mA

Harmonics;

	145MHz	*435MHz*
2nd Harmonic;	-83dBc	-73dBc
3rd Harmonic;	-78dBc	-80dBc
4th Harmonic;	<-90dBc	<-90dBc
5th Harmonic;	<-90dBc	-
6th Harmonic;	<-90dBc	-
7th Harmonic;	<-90dBc	-

Peak Deviation;

145MHz	*435MHz*
5.12kHz	5.06kHz

Toneburst Deviation;

145MHz	*435MHz*
3.71kHz	3.60kHz

Frequency Accuracy;

145MHz	*435MHz*
-497Hz	-1.50kHz

Image Rejection;

Increase in level of signal at first IF image frequency, over level of on-channel signal, to give identical 12dB SINAD signal;

	145MHz	*435MHz*
Half IF	89.4dB	84.6dB
Image	106.8dB	65.6dB

Maximum Audio Output;

Measured at 1kHz on the onset of clipping (10% distortion), 8 ohm load, at earphone socket;

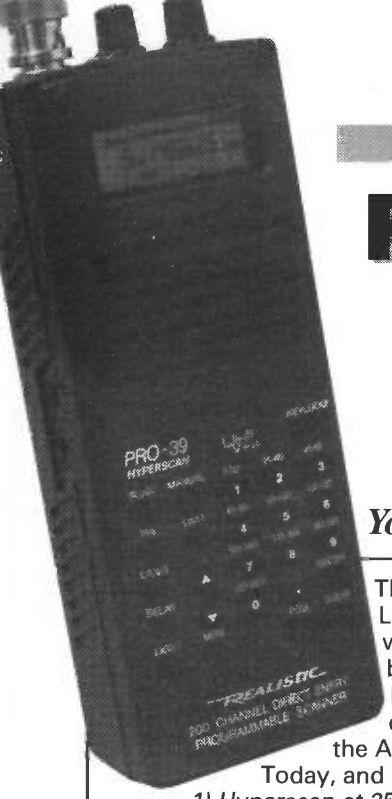
145MHz	*435MHz*
66mW RMS	67mW RMS

S-Meter Linearity

	145MHz	*435MHz*
S1	Sq. open	Sq. open
S3	0.43µV pd (-7.5dB)	0.57µV pd (-5.8dB)
S5	0.56µV pd (-4.2dB)	0.70µV pd (-4.1dB)
S7	0.78µV pd (-2.2dB)	0.88µV pd (-2.1dB)
S9	1.01µV pd (0dB ref)	1.12µV pd (0dB ref)
S9+	1.41µV pd (+2.9dB)	1.47µV pd (+2.3dB)

Squelch Sensitivity;

	145MHz	*435MHz*
Threshold;	0.09µV pd (5dB SINAD)	0.10µV pd (3.5dB SINAD)
Maximum;	0.23µV pd (24dB SINAD)	0.30µV pd (23dB SINAD)



FREE Competition - Win a Handheld Scanner!

You could win a superb new handheld scanner in our free competition!

This month, we've teamed up with Link Electronics in Peterborough who've kindly supplied us with a brand new Realistic PRO-39 handheld scanner for our reader's competition. This was reviewed in the April 1995 issue of Ham Radio Today, and has features of;

1) Hyperscan at 25 channels per second, and searches through frequencies at 50 channels per second,
2) Direct keyboard access to 35,444 frequencies
3) Auto-scan of 200 memory channels
4) Electronic channel lockouts
5) Backlighted LCD
6) Two-second selectable scan delay
7) BNC jack for flexible aerial (supplied) or your external mobile/base aerial
8) 'Supercap' for 1 hour memory backup
9) Crystal and ceramic filters to cut out adjacent channel interference
10) Uses six 'AA' dry cells, or rechargeable nicads, or AC adapter

You'll be able to find the answers to all of the questions in this month's issue of Ham Radio Today magazine, so have a good read (hint - look at the 'small print' in the 'who's who and what's what' section near the back of the magazine)

Here are the rules, which we've tried to keep as simple as possible;

1) Only one entry per person, members of the same household may if they wish each send an entry if condition 2) below is fulfilled.
2) Readers must answer the questions given on the competition entry form.
3) Each entry must either be on the original form from this page, complete with the 'corner flash', or (if you don't wish to cut up your issue of Ham Radio Today) may be laid out on a plain piece of paper with the same information (name, address, answers etc. in the same arrangement as the entry form) and accompanied by the original 'corner flash' from the form below.
4) Faxed entries from subscribers only will be accepted if accompanied by the subscriber number and/or address details as given on the address label, this we hope will benefit overseas subscribers as well as UK readers. Such entries should be faxed to 01703 263429 (Int+ 44 1703 263429).
5) Entries must be received by 12.00 noon on Thursday, 22nd June 1995, addressed to; Scanners Competition, Ham Radio Today, Nexus, Nexus House, Boundary Way, Hemel Hempstead, HP2 7ST, England.
6) All correct entries will be placed in a box and will be independently drawn at 12.00 noon on Friday 23rd June 1995. The person with the first drawn correct entry drawn will be informed that day by phone (if number is given), and will subsequently receive their prize in the post.
7) The Ham Radio Today Editor reserves the right to publish the name, callsign if applicable, and post town (but not full address) of the competition winner in a future issue of Ham Radio Today magazine.

Ham Radio Today Scanner Competition Entry Form

Questions (circle the correct answer in each case);

a) On which day each month is Ham Radio Today published?

i) The 3rd Wednesday of each month
ii) The 1st Friday of each month
iii) The 2nd Monday of each month

b) How many memory channels does the PRO-39 have?

i) 20
ii) 200
iii) 2000

c) Which number is the Ham Radio Today Voicebank and Fax-Back Information Line on?

i) 01442 66551
ii) 01703 263429
iii) 01737 768611

d) Where are Link Electronics situated?
i) London
ii) Peterborough
iii) Southampton

Name.....

Callsign(optional).....

Address.....
.....
.....
.....

Postcode.....Phone No. (optional).....

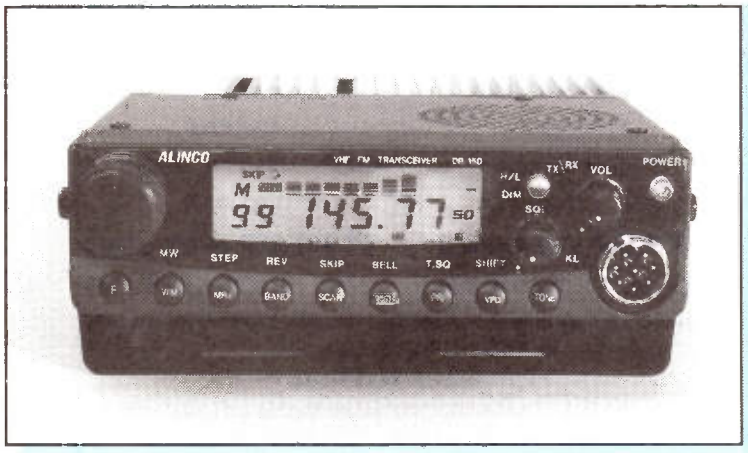
send to; Scanners Competition, Ham Radio Today, Nexus, Nexus House, Boundary Way, Hemel Hempstead, HP2 7ST

Data protection; Occassionally we may make names and addresses available to carefully vetted companies who sell goods and services by mail that we believe to be of interest to our readers, if you would prefer not to receive such mailings please tick here; ☐

PRO-39 COMPO

Alinco DR-150E Review

Chris Lorek G4HCL tests the latest high power 2m transceiver from Alinco, complete with extra receivers built in!



At first glance, the new DR-150E 2m transceiver from Alinco doesn't look all that special. "It's another new 50W 2m FM rig" I first thought, although at £349 it seemed reasonably enough priced. Then I started to find out what else it could do. I was rather taken aback - this wasn't just a 'normal' 2m rig, it was a fully featured 'top of the range' set, complete with spectrum scope display, built-in receivers for 400-470MHz, 800-950MHz and extended VHF receive coverage of 108-174MHz including switchable AM for airband receive (where allowed by licensing), plus a whole host of other operating 'bells and whistles'! I thought I'd better take a closer look....

Power for distant repeaters

The rig's transmitter is specified at 50W maximum output, with switchable low power levels of 25W and 10W - no more weak signals into distant repeaters any more. Just in case the power goes to your head and you 'waffle' for too long, a programmable transmission timer can also stop you 'timing out' on the repeater. CTCSS encode for repeater access is fitted as standard (to save you bringing up distant repeaters on the same channel) along with 1750Hz toneburst for alternative repeater access. A quick-access reverse repeater facility lets you check the repeater input to see if you can make possibly better use of the 50W power for a simplex contact.

Up to 100 memory channels are available for storage of your favourite frequencies, these of course can be manually selected, or scanned as you wish, with a press of the up/down microphone-mounted buttons or the set's front-panel buttons.

Display

The upper section of the set's Liquid Crystal Display serves a dual purpose. In 'normal' mode it acts as a bargraph S-meter, however in 'spectrum' mode it acts as a panoramic spectrum display, with seven vertical bargraphs showing you the relative levels of signals up to three channels, in VFO or memory channel mode, either side of your centre channel, as well as showing the selected channel signal level in the centre segment.

Mobile features

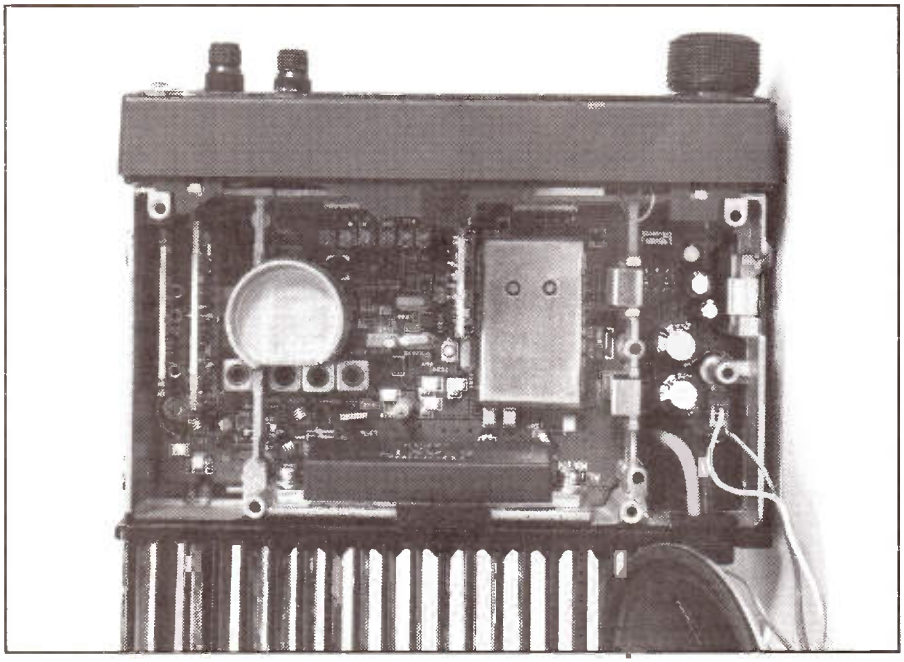
As an alternative to a frequency display, the set's LCD can be set to instead give a large channel number display for easier recognition on the move, based upon your memory channel numbers. For example, *Ch 20* can often be easier to recognise on the move by a quick glance at the display as *S20*, than *145.500* would be, likewise repeater channels when you might wonder whether the -600kHz shift is switched in or not.

As well as the usual 'noise squelch', controlled by the squelch knob, a 'carrier level' squelch is also available. This opens the receiver squelch only when the signal level exceeds your pre-set level on the S-meter display. Another nice touch is that of a programmable squelch time delay, where you can vary the time interval between the carrier dropping below the squelch threshold and the audio being muted, which can help in 'choppy' signal situations on the move.

For local use, a receive attenuator may also be switched in, which can also be useful if you're in congested RF areas where unwanted signal reception could be a problem.

High speed packet

As well as allowing 1200 baud packet operation using the usual mic and speaker connections, a rear panel jack connector is fitted for 9600 baud packet use. This should allow you to be able to simply plug in your



higher-speed TNC without the need to 'delve inside' to modify the set to suit.

Selective calling

The set has the same DTMF selective calling and paging facilities that you find on other 'top of the range' sets, these allowing you to monitor frequencies silently until the set receives your unique three-digit DTMF sequence. In case you want to monitor other codes off-air, the DR-150E can also decode these and display up to the last 15 received DTMF digits on its LCD.

To accompany the built-in CTCSS encoder, an optional plug-in CTCSS decoder is available for alternative 'quiet' channel monitoring. With either form of selective calling, a 'bell' alert function, which is also built into the set, can also be usefully used with this to let you know you've been called in your absence. Also, with the optional CTCSS decoder fitted, a 'CTCSS scan' facility lets the set search and display the sub-tone frequency being used on any VFO frequency you're receiving on. This could be useful in checking which CTCSS frequency is being used by stations operating into a given repeater, by performing a quick 'input check'.

External Control

If all the above isn't enough, then by adding an optional DTMF keypad mic, many of the set's facilities, plus a few extra like direct frequency entry, are accessible via the mic keypad. In particular it allows easy selection of the various spectrum scope display features of the set from the mic.

The set measures 140mm (W) x 40mm (H) x 150mm (D), and weighs 800g. It comes with a mobile mounting bracket, fist mic, DC lead and instruction manual.

On the road

After unpacking the set, without further ado it went straight into the car, was quickly connected to the battery (directly via fused leads) and to my pre-installed glass mounted whip, and was ready to use on the move. A number of journeys over a period through both rural, semi rural, and heavily built-up areas, both as a passenger and a driver, allowed me to give the set a hopefully representative trial on the air.

The first thing that surprised me was the respectable amount of audio from the set's receiver, the upward facing speaker helping here. On transmit the supplied microphone was easy to use, it fitted into my hand very well, and the positive-action up/down buttons let me shift frequency and start the set scanning, whilst I was on the move without taking my eyes off the road at all.

I found the receiver sensitivity nicely matched the high transmitter power output when working through repeaters or with 'base stations'. But I often found, quite expectedly, that I had difficulty in receiving weaker handheld stations when operating simplex whilst mobile around my local city centre - *they* could of course copy me extremely *well!*

During mobile ragchews using maximum power, the set became quite hot due to the high power dissipation. In fact, in such cases I had to be very careful the rear heatsink didn't touch any part of the car's plastic dashboard, for fear of re-modelling the plastic finish slightly!

Back in the shack, when I could appreciate what the LCD was showing me a little more, I found the 'spectrum scope' quite a novel way of finding out what was happening on the channels either side of the one I was operating on. In scan mode as well as when tuning around, the channel levels even 'slid along' so I could 'home in' on a given signal. With some appropriate memory channel programming, I arranged my locally accessible repeaters and chat-channels on adjacent memory channels to thus allow the set's spectrum scope to show what the activity was like just on my favourite channels. When in single-channel 'monitor' mode, the receiver's audio did briefly mute every five seconds whilst it updated itself on channel activity. I usually didn't find any problems with this, but I invariably had to switch the spectrum function off when in QSO to save missing anything.

Being an inquisitive sort of chap, I also found the receive coverage of other bands quite handy. For example, I could usefully also program 70cm channels into the set's memory alongside 2m channels and operate the receiver just like a scanner. I just had to be careful to make sure that I was receiving a 2m signal before I could reply - the set's LCD displaying 'OFF' if I tried to transmit on other bands!

Technicalities

The circuitry of the insides of the set is neatly laid out, the overall standard of construction looking very neat. Indeed the liberal use of chip components, besides improving reliability, makes the inner of the set look rather empty!

The set's dual conversion receiver uses intermediate frequencies of 45.1MHz and 455kHz, the measured lab results of image and 'half IF' rejection on 2m being very good as a result of the high first IF. In fact, the image on 2m was so well suppressed I had difficulty in measuring it! The same wasn't the case on the UHF receive section, due undoubtedly to less bandpass filtering being present, the UHF sensitivity also being down compared to the 2m side.

On transmit the power levels were quite well regulated, I measured just a bit less than 50W on maximum, and the transmit deviation and frequency were accurately set.

Conclusions

The Alinco DR-150E appears to offer quite an extensive range of operating features for a 2m mobile, together with a high transmit power, for a reasonable price. I had plenty of trouble-free contacts when using the set both on the move and at home, the spectrum scope being an added advantage to let me quickly see what was happening on nearby channels. The 9600 baud packet data port is a welcome addition, which I'm sure will become increasingly useful as more and more users progress to this speed.

My thanks go to Waters and Stanton Electronics for the loan of the review transceiver.

LABORATORY RESULTS

All measurements taken on 145.00MHz (and 435.00MHz RX when stated), with set powered from stabilised 13.2V using supplied length of DC cable, high power TX, unless otherwise stated.

RECEIVER;

Maximum Audio Output;

Measured at 1kHz on the onset of clipping (10% distortion), 8 ohm load;

145MHz	*435MHz*
2.38W RMS	2.38W RMS

Sensitivity;

Input level required to give 12dB SINAD;

144MHz;	0.16µV pd
145MHz;	0.16µV pd
146MHz;	0.16µV pd
430MHz;	0.61µV pd
435MHz;	0.56µV pd
440MHz;	0.54µV pd

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;

	145MHz	*435MHz*
+12.5kHz;	32.0dB	40.7dB
-12.5kHz;	29.4dB	21.5dB
+25kHz;	59.7dB	56.0dB
-25kHz;	58.8dB	55.9dB

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;

	145MHz	*435MHz*
+100kHz;	70.8dB	67.5dB
+1MHz;	90.7dB	83.4dB
+10MHz;	93.1dB	85.9dB

TRANSMITTER

TX Power and Current Consumption;

Measured using stabilised DC supply connected to supplied fused DC lead

Freq.	*Power*	*10.8V Supply*	*13.2V Supply*	*15.6V Supply*
144MHz	High	37.2W/8.15A	43.9W/8.85A	44.1W/9.05A
	Mid	20.9W/5.80A	21.4W/6.25A	21.7W/6.35A
	Low	10.8W/4.25A	11.0W/4.45A	10.9W/4.50A
145MHz	High	39.5W/8.55A	44.1W/8.55A	44.4W/8.80A
	Mid	20.7W/6.00A	21.7W/6.05A	21.7W/6.20A
	Low	10.8W4.35A	11.0W/4.40A	11.0W/4.45A
146MHz	High	35.2W/7.80A	44.6W/8.40A	44.9W/8.70A
	Mid	21.1W/5.70A	21.8W/5.95A	21.8W/6.10A
	Low	10.8W/4.20A	11.0W/4.25A	11.0W/4.45A

Peak Deviation;

4.97kHz

Toneburst Deviation;

3.22kHz

Frequency Accuracy;

-250Hz

Harmonics;

2nd Harmonic;	-71dBc
3rd Harmonic;	-67dBc
4th Harmonic;	-70dBc
5th Harmonic;	<-90dBc
6th Harmonic;	<-90dBc
7th Harmonic;	-87dBc

Squelch Sensitivity;

	145MHz	*435MHz*
Threshold;	0.09µV pd (3.5dB SINAD)	0.33µV pd (3.5dB SINAD)
Maximum;	0.30µV pd (21dB SINAD)	1.15µV pd (22dB SINAD)

Image Rejection;

Increase in level of signal at first IF image frequencies, over level of on-channel signal, to give identical 12dB SINAD signal;

	145MHz	435MHz
Half IF	89.3dB	44.4dB
Image	>110dB	16.0dB

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

	145MHz	*435MHz*
25/50kHz spacing;	69.8dB	77.9dB
50/100kHz spacing;	67.8dB	80.2dB

S-Meter Linearity

	145MHz	*435MHz*
1	0.20µV pd (-27.3dB)	1.39µV pd (-25.7dB)
2	0.27µV pd (-24.6B)	1.87µV pd (-23.2dB)
3	0.52µV pd (-19.0dB)	3.41µV pd (-17.9dB)
4	0.89µV pd (-14.3dB)	5.57µV pd (-13.7dB)
5	1.70µV pd (-8.7dB)	10.4µV pd (-8.3dB)
6	2.42µV pd (-5.6dB)	15.3µV pd (-4.9dB)
7	4.60µV pd (0dB ref)	26.8µV pd (0dB ref)

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LETTERS

Dear HRT,

After reading two letters in the April issue of HRT, I felt the need to write, reference CB v Hams, and points raised by both Dave and T. McPherson in particular.

I am both a licensed Amateur Radio Operator and also a CB Operator and have been for over twenty years. The first point I would like to raise is, why do Radio Amateurs feel the need to blame CB for the state of the bands? I first got interested in radio communication through CB, as stated over twenty years ago (for those with poor maths over six years before CB was legalised). I had achieved my Amateur status long before legalisation of CB. Ok, it might be said I am a exception, not so. In the examination was 25 people, 24 of which were CB operators. In 1981 CB was legalised, originally designed as a local means of radio communication for the general public. As like their Amateur friends, the CB operator strives for the perfect setup, 90% of which are within the limits of the licensing conditions, and for many the further the distance, the more enjoyable the *hobby*. DX has become easier now that the UK government has brought us in line with the rest of Europe, by legalising the CEPT bandwidth 26.965 to 27.405MHz.

I have read lots of letters where the Amateur is complaining about CBer's (for want of a better description) using illegal equipment, and invading the adjoining amateur bands. But we never hear of the amateur using high powered HF equipment that has been modified on the designated CB bands. These rigs run at a higher output than the prescribed 4W legal power. These amateurs, although serious upon their designated band, have been known to behave in a unprofessional manner on the CB bands. I will agree that there is a minority who twiddle and tweak, use illegal amplifiers, but let's be serious, this is not just confined to CB.

A recent published report by Subscription Services (who handle both CB and Amateur licensing), reported that something like 80% of their money came from CB licenses. I will agree that the bands are abused by a small minority, and by bands I mean all bands whether CB or Amateurs, and that the RIS should clean up the bands. But why start with the CBer's, after all it is mainly their money that will finance this clean-up. Why not start on 2m, after all they have their own fair share of music players and keyers (not all unlicensed either, as a G3 operator was found recently playing music), or let them look at those amateurs who abuse 27MHz, especially the minority who abuse the calling channel as many in the Berkshire area can until recently verify.

As for using CB as a stepping stone into Amateur Radio? Why not? I know of a dozen CBer's who are sitting their RAE this year, but what will await them when they obtain their licenses. A fraternity who consider them as idiots because they own a CB radio. I think it is about time that a certain fraternity accept the fact that after all is said and done, whether you be CBer or Amateur, all that is wanted is to contact and make friends with other people, whether they be two miles or two thousand miles away. So why not accept CB as an extension to Amateur Radio, because like Amateur Radio it is a hobby, and if people get the incentive to sit the RAE, it can only benefit Amateur Radio, *can it not.*

Mrs. Editor, why can't you help by including a small section dedicated to the 27MHz band in some way?

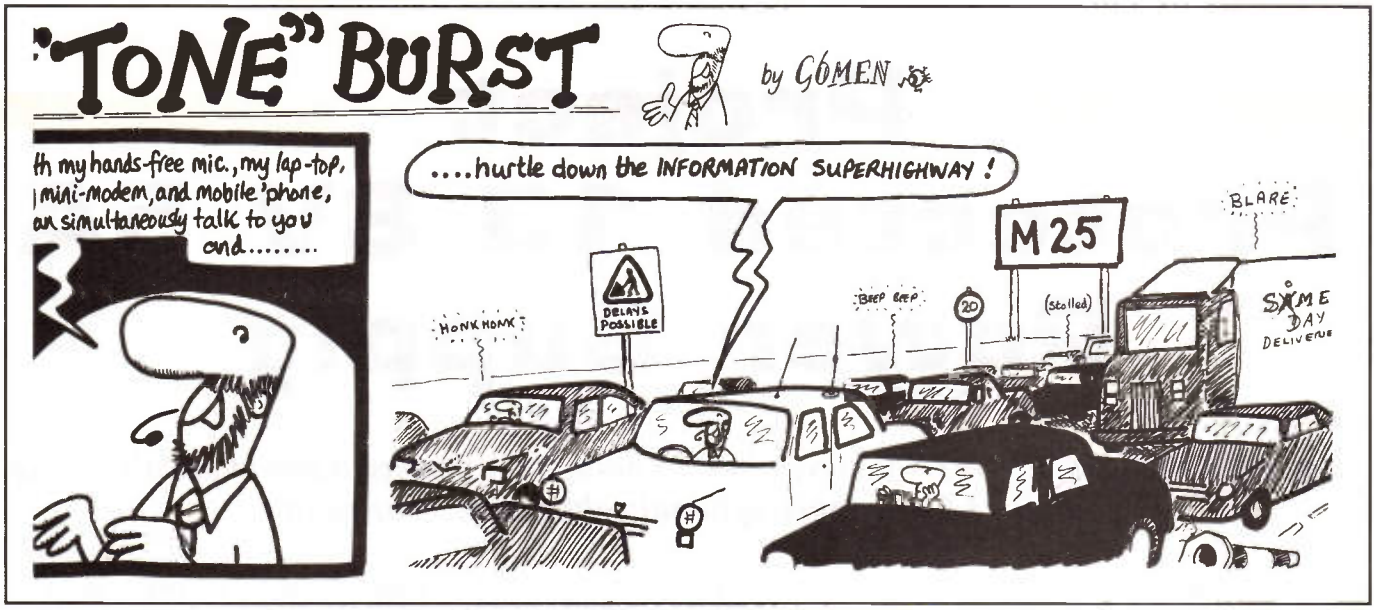
S. Metson, G7FWV

Editorial comment;

Our sister magazine 'CB' also published by our group, Nexus, does indeed cover this subject - in fact it's the only UK magazine wholly dedicated to CB. Ham Radio Today, incorporating Scanners, does of course restrict itself to covering these interests. But we do acknowledge, and most certainly welcome, readers with all forms of hobby radio interests to our pages. Many amateurs have come into the hobby through CB, just witness the phenomenal growth a number of years ago after the introduction of CB to the UK, and we're glad this growth is once again continuing. But there is one significant difference between the two hobbies. Amateurs are licensed to use whatever equipment they choose, and on whatever frequencies they choose on the allocated bands, they are not restricted to only being 'appliance operators'. CB licensees throughout Europe are restricted, by law, to being such 'appliance operators' and may only use pre-built and government type-approved transceivers on specified channels and modes. Others, the 'enthusiasts' who possibly have a greater interest in radio communication, may like to 'pretend' they're licensed amateurs with their rigs and aerials. But this restrictive fact remains, which is probably the reason many such enthusiasts sit the RAE and become 'real' amateurs.

£10 for letter of the month

Do you have something constructive to say on the state of Amateur Radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month (normally paid during the month following publication). So write in with your views, to; Letters Column, Ham Radio Today, Nexus, Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or fax your letter direct to the Editor's desk on 01703 263429. Please keep your letters short, we reserve the right to shorten them if needed for publication. Letters must be original and not have been sent to any other magazines, and must include names and addresses plus callsign if held. Reader's views published here may not necessarily be those of the magazine



Where are the 2E0's?

Dear HRT,

I am a 2E0 'A' Novice station. Since being licensed, I have noticed the lack of 2E0's in the callbook and on the air. It is such a great shame, because 10 metres is such a good band. I have had such an amazing amount of contacts. Here are some of my contacts during January: OM1GM, DL5MCQ, SM0OWX, DL1MFL, HA8FM, S51CL, SP9BBH, HA7JMJ, DE3FR, DE6ADD. My contacts for February: LU3HYS, PY4HF, CX2VG, PU5EEM, PU2MHB, DL3XUN, 5R8ED, EA8/PA3GIO/M

Roger Moore, 2E0AHQ

Minimum order charges

Dear HRT,

On reading John G4XPP's letter in the March 95 edition, I was surprised to find that he thought the minimum mail order charge was a 'wrinkle' to induce him to spend more money than he intended. Although I am not in the amateur radio trade, I can fully understand why the retailer feels it necessary to impose a minimum order charge.

In order to make a profit, the retailer must first cover his overheads. The cost of paying someone to answer the phone, process the order etc., is the same whether the order is large or small. The profit on the sale obviously varies with the value of the order, therefore by the law of diminishing returns, some orders are too small to cover the overheads. To overcome this problem there are three possible courses of action;

1) Increase the profit margins to cover even the smallest order and risk becoming uncompetitive.

2) Keep the prices the same and hope for more high value orders than low value.

3) Introduce a minimum order charge.

The first two options risk the business becoming unprofitable and ceasing to trade. Unfortunately the less traders in the market place the more the chance of them price fixing and all the other ills that John complains of. While I am with him in looking for a fair deal, I do feel that minimum order charges are in the interests of both the trader and the customer.

Bernie Lyford, G0BPA

MORE LETTERS NEXT MONTH

Nothing for the Ladies

Dear HRT,

I have just visited a large Amateur Radio and Computer Show and I must write and express my disappointment at the lack of facilities for the wives and girlfriends of amateurs. The organisers should consider these ladies, who were mostly bored with nothing to do or see. Unlike Elvaston Castle, with home craft fairs etc. to visit, as well as tea bars. Not everyone drinks beer and spirits. What catering facilities there were, were most unsatisfactory, you could not get a seat and the heat was most uncomfortable.

So, come on organisers, think of these Station Managers, if you do I'm sure you would get more visitors with families, who would love to make it a day out to remember.

Mrs. L. A. Seaton

RAE Software

Dear HRT,

First I would like to thank you for the disk you graciously copied for me, of the Mods and ARRL exam, both programs have been great. Thanks again. Secondly, I would like to ask if anyone has done one for the City and Guilds exam?

E. J. Gaunt, a future Ham.

Editorial comment;

There has been a disk put together covering a 'sample exam' for the UK Novice RAE (available from Venus Electronics in Sussex - we've sent you a copy with compliments Mr. Grant), but we know of none for the 'full' RAE. Maybe one of our readers can help?

Project
Protected 13.8V 5A Power Supply

Ben Spencer MinstPI G4YNM shows how to build a 5A protected power supply giving either 13.8V or other optional voltages for your station

This power supply unit (PSU) provides 13.8V at 5A output at 100% duty cycle. It features time dependent current limiting and short circuit protection, thermal overload and safe operating area protection for the regulator IC and over voltage protection for the equipment it is powering. ***Warning: this project deals with mains electricity, if you are a beginner, please get help from someone experienced in this type of project - Ed.***

Circuit description

The AC mains is filtered by a standard chassis mounting Euro filter plug and after passing through mains fuse F1 and on/off switch S1 is fed to transformer T1. The 16V output of T1 is rectified by bridge rectifier D1 and filtered by capacitor C1. The rectified DC is fed via fuse F2 to the voltage regulator U1, which is set to 13.8V output controlled by R3 and R4. Capacitors C2, C3 and C4 are used to decouple U1 whilst diodes D2 and D3 prevent C2, C3 and C4 from discharging into the regulator. Regulator U1 has internal circuitry which limits the maximum continuous current to 5A.

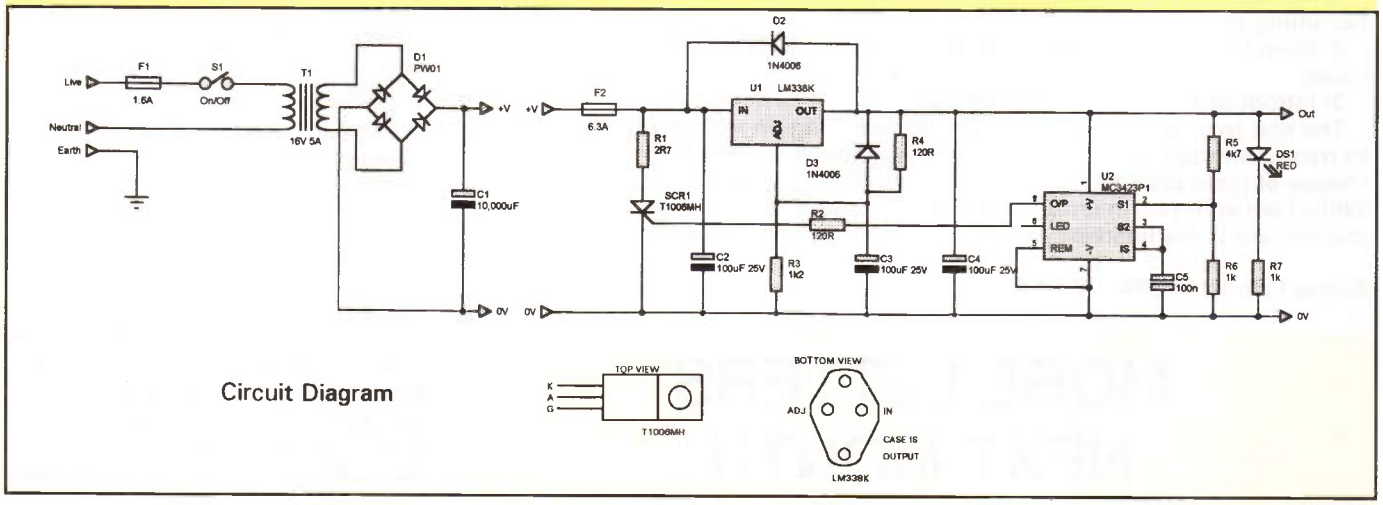
Overvoltage crowbar IC U2 trips when pin 2 sees 2.6V for 1ms or longer, thus allowing short transients to be safely ignored. Resistors R5 and R6 form a potential divider which provide 2.6V to pin2 only if the regulator output rises to about 14.8V, which only occurs if U1 develops a fault. Pin U2:8 goes high under fault conditions and this switches thyristor SCR1 on via R2. When the thyristor fires it presents a short circuit across capacitor C1 via fuse F2. This discharges capacitor C1 and ruptures fuse F2 disconnecting the input and reducing the risk of the overvoltage output from damaging the connected equipment.

Construction

The Euro plug style filter, mains fuse holder, mains switch, heatsink, LED and binding posts are all panel mounted. The mains transformer, reservoir capacitor (C1) and single sided PCB are all chassis mounted. The wiring from bridge rectifier D1 and capacitor C1 must be heavy duty, (the red and black wires from domestic 2.5mm ring main cable are ideal). To reduce the risk of electric shock the filter plug and mains fuse holder should be covered with protective rubber boots, and all other mains wiring covered with heatshrink sleeving. **Keep all mains wiring separate from DC wiring.**

The component overlay and solder side foil pattern are shown in the accompanying diagrams. The LED can be fitted to the project front panel and light wires run to the PCB. Mount U1 on a (1.2deg.C per Watt or better) heatsink using a thermal mounting kit, ensure the device case is electrically isolated from the project chassis. The PCB should be cleaned to remove solder flux residue and thoroughly checked for shorts, solder splashes, incorrectly inserted components and then mounted into your project case. *Note:* The PCB should not be mounted more than 50mm away from the regulator U1. Connect PCB pins +V and -V to C1 using heavy wires.

Use light wires to connect U1's *adjustment* terminal to the PCB pin marked ADJ and connect U1's *output* terminal (i.e. the TO3 case) to the PCB pin marked OUT. Use heavy wires to connect U1's *output*



Circuit Diagram

Components list

Resistors; all 0.25W 5% except where noted

R1	2R7 0.6W
R2, R4	120R
R6, R7	1k
R3	1k2
R5	4k7

Capacitors;

C1	10,000µF 35V electrolytic
C2, C3, C4	100µF 25V electrolytic
C5	100nF disc ceramic

Semiconductors;

D1	PW01 6A 200PIV bridge rectifier
D2, D3	1N4006 power diode
DS1	Red LED
U1	LM338K 5A regulator
U2	MC3423PI overvoltage crowbar
SCR1	T1006MH 10A 600V thyristor

Misc;

S1	SPST 240V 1A toggle switch
T1	240/16V 5A transformer
F1	20mm x 5mm 3.16A fuse
F2	20mm x 5mm 6.3A fuse

Single sided PCB
Project case
M3 mounting hardware
1.1W/deg. C heatsink
TO3 style thermal mounting kit
20mm x 5mm panel mount fuse holder boot
Binding posts (1 red, 1 black)
20mm fuse clips (2 off)
Euro plug style EMC filter and rubber boot
Euro socket style mains lead
Panel mount fuse holder and boot

terminal to the front panel positive binding post and the negative terminal of C1 to the front panel negative binding post. Now stop and check the wiring thoroughly. If you have made a mistake it is likely to be disastrous when you apply the mains!

Test and calibration

Apply mains power and check that the green LED is lit. Connect a 30VDC voltmeter across the output terminals and check that it is about 13.8V. Finally, here's an opportunity to be unpleasant and get away with it. Connect a 10A ammeter across the output and check that the current limits at about 5A. Remove the ammeter and voltmeter. Fit the cover to your project case, the PSU is now ready for service!

Other output voltages and currents

The PSU can be made to operate at other voltages. Resistors R3 and R4 determine the output voltage (R4 *must* be 120Ω), the formula to set the output voltage is;

$R3 = (V_O - 1.25) / ((1.25 / R4 + I_{ADJ})$

where V_O is the output voltage and I_{ADJ} is 50µA.

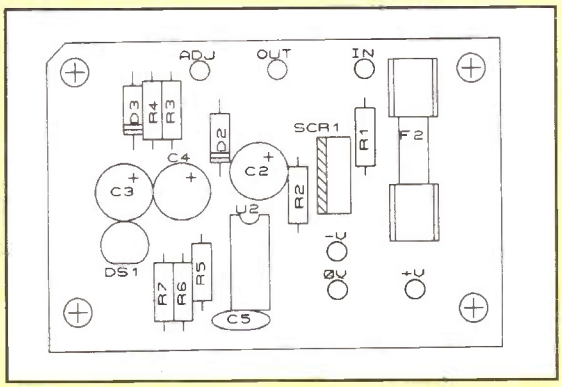
Here's a worked example; suppose you require 8V output (say for your handheld transceiver) then R3 = (8V - 1.25) / ((1.25 / 120Ω) + 50µA) = 644Ω. So use a 560Ω resistor and an 82Ω resistor is series; $V_O = 1.25 (1 + R3 / R4) + I_{ADJ} R3 = 7.9696V \approx 8V$

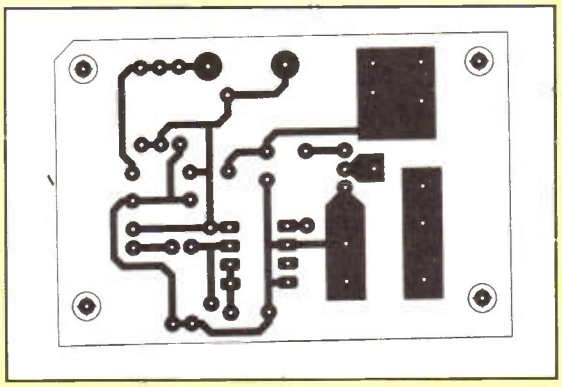
The trip voltage should be about 10% higher than the operating voltage. The MC3423 trips when it sees 2.6V on pin 2, that is R5 and R6 set the trip voltage. You can change either R5 or R6 or both to get the correct trip voltage. The trip voltage is; $V_{TRIP} = 2.6 (R5 + R6) / R6$. If changing R5 then; $R5 = R6V_{TRIP} / 2.6) - R6$. If changing R6 then; $R6 = R5 / ((V_{TRIP} / 2.6) - 1)$

Worked example; suppose you had decided to set the regulator output voltage to 8V, then the trip voltage V_{TRIP} should be at least 8.8V. If changing R5; R5 = 1000Ω x 8.8V / 2.6V - 1000Ω = 2384Ω, here you could use a 2200Ω resistor and 1800Ω resistor in series. If changing R6; R6 = 4700Ω / ((8.8V / 2.6V) - 1) = 1970Ω, here you could use an 1800Ω resistor and 180Ω resistor in series.

If you require a 1.5A PSU then the LM338K can be replaced with the LM317T which is in a TO220 package, fuse F2 should be replaced with a 3.16A part, T1 can be a 1.5A part and C1 replaced by a 4700µF part. All other parts remain unchanged.

If you have any queries regarding this project please address them to the author enclosing an SAE if you require a reply, write to Ben Spencer, Enterprise House, 33 New King Street, Bath BA1 2BL England. We are told that a ready-made PCB and all PCB-mounted parts are available from the author as a kit. The non-PCB mounted (and PCB mounted) parts are usually available from most component dealers, see Ham Radio Today display and classified ads for details of these.





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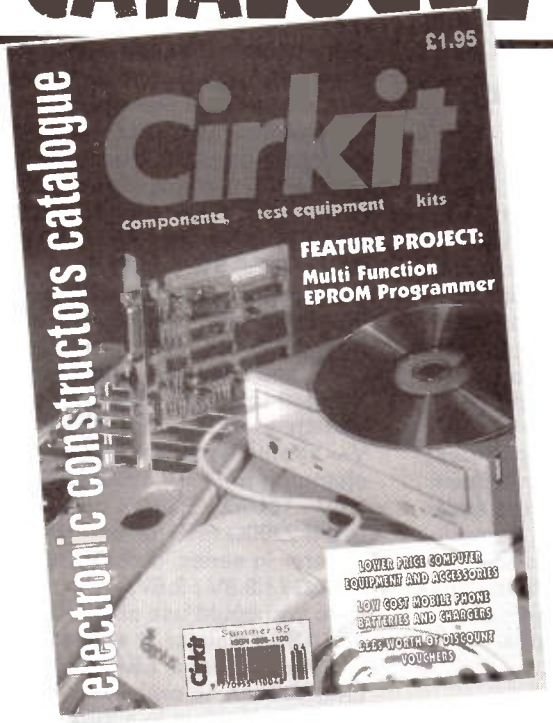

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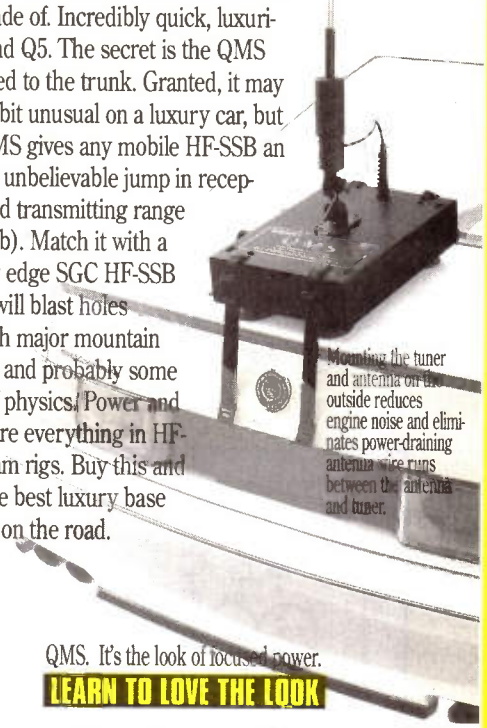

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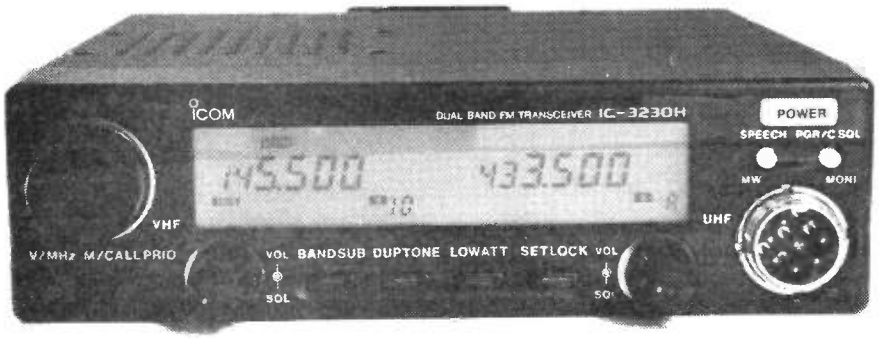
Behind the Scenes of a HRT Equipment Reviewer

Our resident equipment reviewer gives an insight to what goes on in



An easy-to-read display and simple controls are useful

The HRT Editor tells me she often gets asked "How are the technical reviews carried out - why not do an article on it?" So I've had my arm twisted! (I've also had my arm twisted to have given a lecture on this subject to a number of local, and not so local, radio clubs). So here goes;

I've been performing technical reviews for Ham Radio Today magazine since 1985, 10 years in fact - although it seems a lot longer! The reason why I say this is that, on average, I 'get through' around two reviews a month, in other words 24 reviews a year. I believe, although I could be proved wrong, that HRT has more technical reviews published each year than any other UK amateur magazine. And I can tell you, trying to keep track of all of them when someone rings me up and asks 'did you review such-and-such a rig' gets quite a job!

You may have jumped on the fact that I've said technical reviews. What's the difference between a ú3000 HF rig and a ú700 HF rig? Or a ú700 dual band handheld and a ú400 dual band handheld. More bells and whistles? Not always, because sometimes the cheaper rigs have more operating features than the more expensive competing equipments.The difference is usually inside the box. Let's take an example; It can be very nice to have a flashy do-everything 2m/70cm handheld, with alphanumeric memory indications, and wideband reception from DC to light including the broadcast bands, airband, cellphones, CB, and your local pizza delivery firm as well as the 2m and 70cm amateur band repeater down the road. But when you're trying to use it to have a contact, and in mid-QSO you get an awful and deafening howling noise out of the set's speaker because Joe Blogg's the plumber has been paged on 160.5MHz, which just happens to be half your handheld's Intermediate Frequency away from your local repeater, you may think a little differently.

You may think "Why did I buy this useless rig?" This is where people like I come in!

Top of the line rig?

I recently tested a rather expensive 'top-of-the-line' base station scanner receiver, which was, and no doubt still is, being heavily advertised in the press as well as being described as "Our best" in a high street dealer's catalogue. This set, costing over ú300, had far, far worse on-air performance than an ú80 handheld scanner in the same catalogue. Mind you, the case is quite nice and modern, it's covered with buttons, and it's got bells and whistles galore. It's just a pity it can't receive very much. If you're interested in seeing a truthful report on something, take a look in last month's issue of HRT, and I was recently interested to see a similar finding in an American magazine on the same set. This firm, incidentally, has the book I edited on scanners in every one of its shops in the UK, they do still talk to me, and do still keep asking me to review their sets!

Technical tortures

I take great pleasure in subjecting virtually every one of the latest all-singing, all-dancing amateur radio receivers and transceivers to the rigours of my signal generators, spectrum anaylser, and varying other forms of electronic tortures. I do of course have great fun, usually, in having a good 'play on the air' with the gear as well. I also have a good idea of what to look for in terms of 'real' on-the air performance, and try to subject the rig to this in 'real life'. For example, it can often be a bit useless to test a HF rig without going on 40m at night, trying to listen to weak signals next to the adjacent S-meter bending 41m broadcast band.

If a HF set's ideal for mobile use as well as in the shack, I try it out mobile as well. I test the noise blanker's effectiveness. I see if there's enough audio out of the set's speaker for use on the move. I see how easy it is to use the controls on the move. I see how easy it is to install and remove.

If it has built-in accessories such as a speech processor, I try these as well, and if it has facilities for data use, such as rear-panel connections for packet and the like, they get tested also. It's times like this, that the need to keep unplugging the front panel mic every time you switch modes, comes to light.

Into the light

Talking about light, I fondly remember testing one of the very first tiny 2m handhelds, the FT-23. It was superb, it worked well, and the LCD gave a good indication of what the set was doing. During the daytime. You couldn't operate it at night without carrying a torch with you because there was no backlight! I put in my review text at the time "I wonder which designer got the sack for that omission". Their next handheld had a backlight.

Every few months, there seems to be another new 2m, or 70cm, or combined 2m/70cm mobile or portable rig coming onto the market. Yes, it's smaller than the one before it. It offers more power than the one before it. It offers more operating features than the one before it. But let's just step back and have a think about some of this.

Power

The latest rig may be smaller than its predecessor, but it puts out more power. OK, what about the efficiency of the set's transmitter power amplifier? You'll typically get around 30 or 40% overall efficiency, which means for a 2m 50W FM mobile rig, it needs to dissipate around 100W in heat. For a 5W handportable rig, it needs to dissipate around 10W in heat. This heat has got to go somewhere. When you're holding the latest tiny all-singing wonder-box Japanese rig cupped in your hand, having a long ragchew with your friend, where do you think this 10W of heat goes into? Your palm and your fingers do tend to be rather good heat absorbers, and it's a fact of nature that your human parts can only stand so much temperature increase, without these things called nerves sending a message to your cranium to shout "Ow, ow, ow", followed by a rapid relaxation of the digits in question to drop the rather hot radio on the floor, where it sometimes tends to smash into a number of pieces.

You could of course wear gloves, and put the set into a plastic carrying case to give a bit of insulation. That helps your hands, but remember, the heat still has to go somewhere. It doesn't magically disappear. So the set's poor little circuits get hotter and hotter, and after a certain time they go bang. Yes, I've seen it happen. In fact, I once watched a solid state 12V DC PA section of a rig merrily catch fire.

Controls

Again, as rigs get smaller, there's less room for operating controls. This means there must either be less of these knobs and buttons, or the knobs and buttons become smaller. Sets evolve and get smaller, but humans don't tend to evolve in line by growing smaller fingertips.

One evolvement has been that of a 'menu' function on sets. Here, you press a button to then access more features, which you then select or change by up/down buttons while you're looking at the alphanumeric display. This sounds great, doesn't it? An answer to a radio amateurs' prayer?

Now, let's QSY to S22 from the repeater I've been on. So, I select VFO mode, and press the up/down buttons until I get to 145.550. Oh, missed it, move back, now select another menu to switch the toneburst off, oh, I've still got my repeater shift in, pop to the next menu selection, now I'll mute the cross-band audio with this button..... bang...crash! Oops, sorry officer, I was adjusting my radio rather than looking at the road ahead.

A head-up display can make use on the move safer

Displays

Yes, displays sometimes get smaller as well, and squinting at a tiny LCD below your dashboard isn't conducive to safe driving. It's been professionally proved, and documented in a paper by Bell Laboratories, that operating the front panel and keypad controls of a radio whilst on the move is far, far more dangerous than using a handheld microphone or telephone handset. In fact, it was shown that any danger from using a handheld microphone was minimal in comparison to the danger of taking your eyes off the road to use the set's controls. Which is why I concentrate on 'ease of use' of a rig on the move.

Thankfully, remote mounted control units are becoming popular for amateur mobile rigs, even for HF rigs. For an example, take a look at the photo of the FT-900 remote control unit and display. This idea is quite good - you can stick the set in the boot or whatever, and have the display and controls up at eye level, just below the windscreen. It's just a pity that in this case the control panel didn't have a speaker built in - you need to buy one as an optional extra, which you probably don't find out about until you've bought the equipment! That's another thing I make sure I test and report on.

Speakers

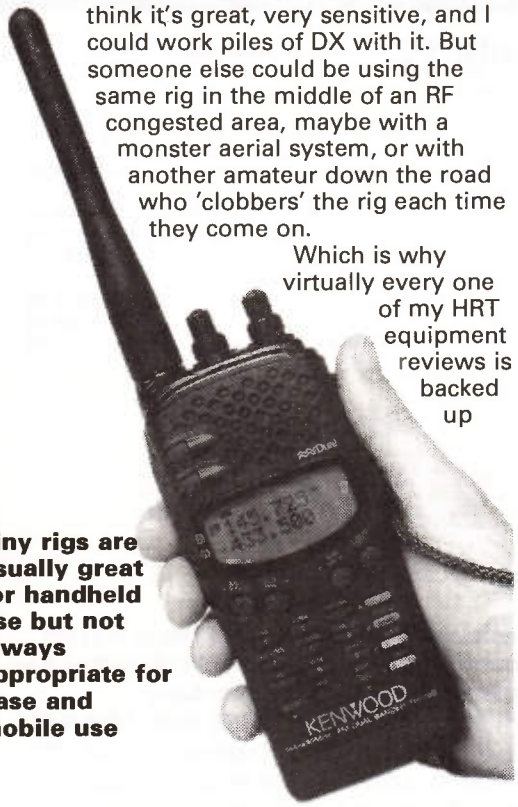
Many sets, particularly VHF/UHF mobile rigs, nowadays are tiny, and naturally have similarly tiny speakers built in. So, for mobile use, I test the built-in speaker and see if it's up to the job, or whether a typical user would have to fork out another ú20 or so for an external speaker before the rig can be used. Some rigs come with a decent sized, even front-facing, speaker, the result is that one rig is effectively ú20 cheaper than the other.

Small rigs do of course nicely suit today's cars with their tiny dashboard spaces. Again, where appropriate I comment on the mounting arrangements in my reviews, and whether the set's small enough to be placed on top of, rather than below, a typical dashboard. What you need to watch out for however is that you don't obscure your view of the windscreen with your rig. Do that, and try to get your car through an MOT, and it could fail.

It's difficult to test everything of course, and each amateur will naturally be using the equipment in a unique way. For example, on HF very few amateurs have exactly the same aerial at exactly the same height, with exactly the same amount of QRM, as I have in my station

location. Their operating habits, like a preferred mode, are different. I could also use a rig somewhere in the in the middle of nowhere and think it's great, very sensitive, and I could work piles of DX with it. But someone else could be using the same rig in the middle of an RF congested area, maybe with a monster aerial system, or with another amateur down the road who 'clobbers' the rig each time they come on.

Which is why virtually every one of my HRT equipment reviews is backed up with around a full page worth of my laboratory test results.



Tiny rigs are usually great for handheld use but not always appropriate for base and mobile use

Manufacturers all produce glossy brochures, detailing technical specifications. But what you often won't find is that the figures, and very importantly the method of measuring these figures, aren't the same between one manufacturer and another. So you usually can't compare the strong signal handling between, say, a given Icom rig, Kenwood rig, and Yaesu rig. Another thing to bear in mind is that most manufacturers, naturally, show performance figures in the best possible light.

RX performance

Receiver blocking and intermodulation for example may be given with an optional ú120 narrow filter installed and all the attenuators switched in, whereas the sensitivity figures will be given with all the attenuators switched out. You need to read the small print for that, as well as probably have a good technical understanding. Some specification figures may not even give these important figures, which are the very thing that you need to compare the performance of one rig against another, even from the same manufacturer.

What's a dB anyway? A dB is a ratio, and something like 'selectivity 60dB'; means absolutely nothing. Just like dB gain of an aerial means nothing. It could mean dB over a wet carrot, or a coat hanger, or anything on Earth the manufacturer wants it to mean without bothering to tell you. Also, is the sensitivity measured in ÊV pd or ÊV emf? 0.5 ÊV emf is 0.25ÊV pd in a 50 ohm system - and the sensitivity figure instantly doubles. Wow, must be good, this rig - look at the good figures! Many of them mean nothing, they often just look impressive, and if I were to just copy them I could nicely fill up some of the magazine with virtually useless codswallop. I could get away without spending hours, and sometimes days, over a set of hot signal generators and spectrum analyzer - for each rig.

The next article will, I hope, give you an insight into what the various figures mean, both in real 'on air' use and how they're measured in the lab to simulate this.

to be continued.....

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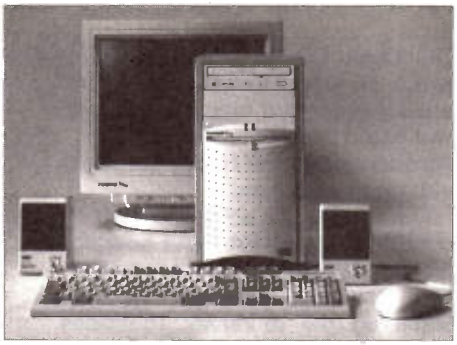

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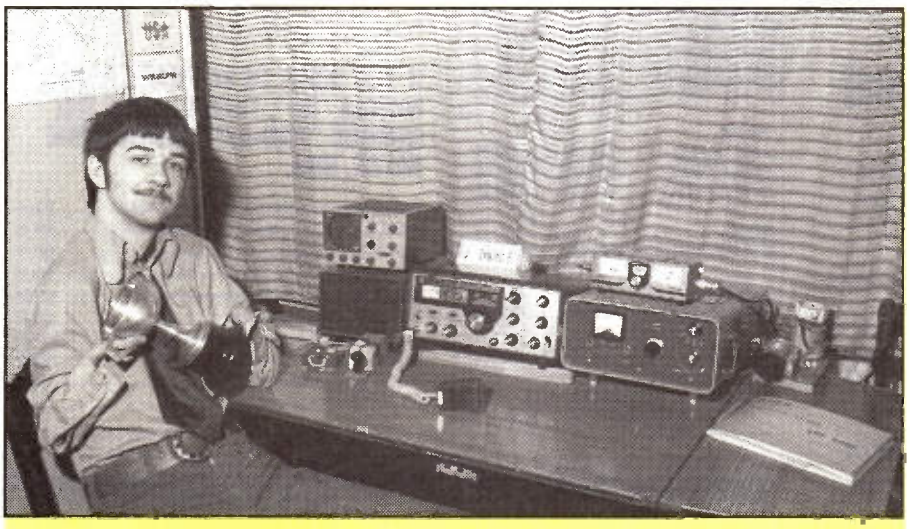
The FT-200 SSB Transceiver

Ben Nock, G4BXD shows how a commonly available secondhand rig can provide a cost-effective 100W HF transciever



A very young G4BXD with FT-200 and KW600 amplifier

The Yaesu FT-200 is another of those earlier HF transceivers that are still prevalent around many rallies today, and could provide an ideal introduction to the hobby for those of limited cash flow.

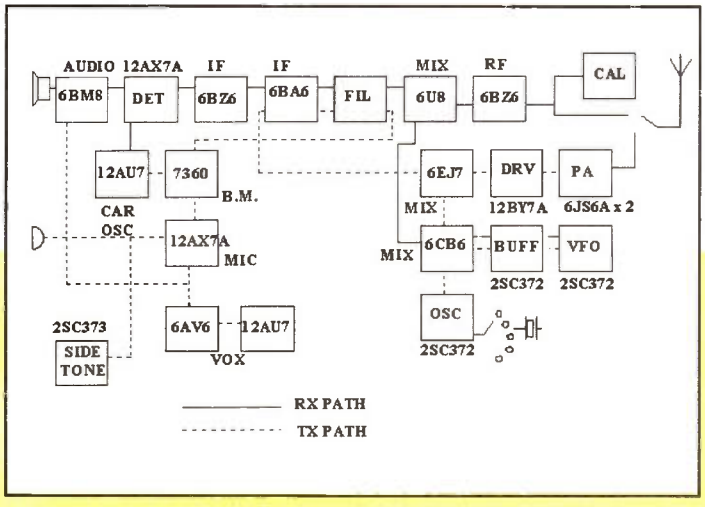
The FT-200 is a self-contained rig capable of 240W PA input power on the pre-WARC bands between 80-10m. It will run USB and LSB, CW and even AM. 16 valves, 15 diodes and 7 transistors are used, a 9MHz crystal filter provides the selectivity and a separate power supply houses a matching speaker. The whole ensemble is housed in a quite pleasingly styled perforated desktop case.

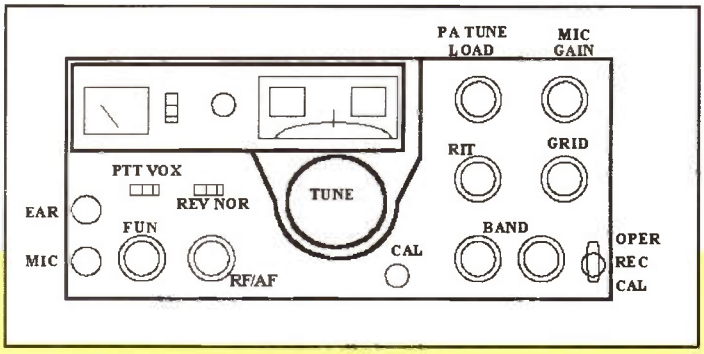
I owned an FT-200 around 1975 soon after it appeard on sale, and again in the early 80's. Despite being over 20 years old, or even because of it, the rig was very nicely styled, the perforated case even came with a carrying handle on the side making it an easy rig to carry to a portable location. The transceiver measures 405mm x 127mm x 280mm. Having the power supply separate meant that the rig only weighed in at 8kg compared with over 13kg for the FT-101.

The mains power supply, the FP 200, provided all the supplies needed and even housed the loudspeaker. The set requires 600, 300 and 150V HT, a -100V bias line and 12.6V AC for the heaters. A 12V mobile/portable power supply, the DC 200, could be used for such applications, drawing 12.5A on receive and 27A amp on SSB transmit peaks. A separate VFO unit was also available, the FV 200, which plugged into a socket on the rear wall of the set.

Inside the case

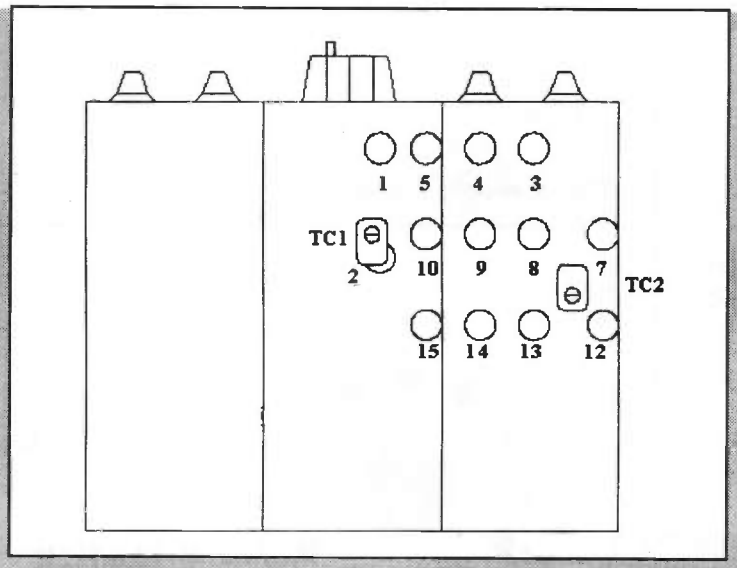
The receiver operates as a single conversion superhetrodyne, the IF being at 9 MHz. The transmitter SSB generation also takes place at 9 MHz, and is then mixed with the already mixed output of the VFO and a crystal oscillator on certain bands.



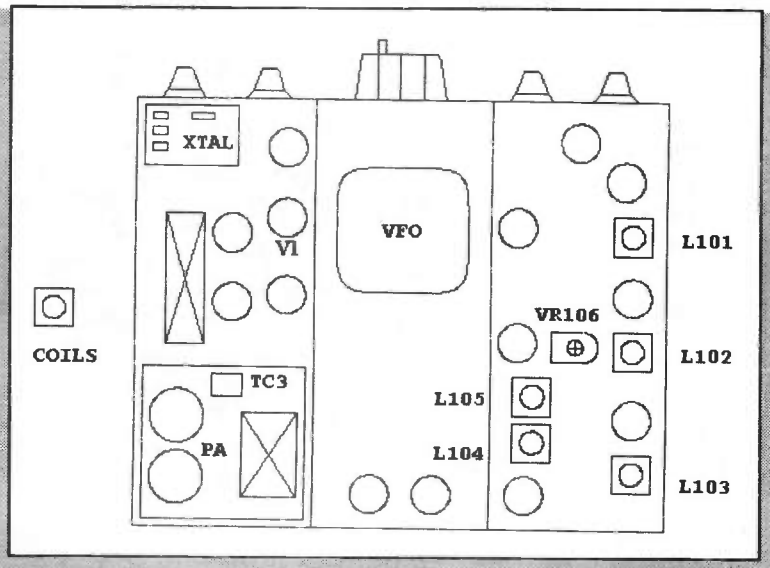


ABOVE: Main controls

LEFT: FT-200 block diagram



Underside coil layout



Topside layout

On the 80m and 20m bands, the VFO, operating at 5 to 5.5 MHz, is directly mixed with the 9 MHz SSB generator to give either 4 to 3.5MHz, or 14 to 14.5MHz. Notice that the tuning is reversed for the two bands, the FT-200 compensates for this by having two sets of scales visible in the tuning window on the front of the set. Which band you are on determines which scale you read. They are identified by being in red and black lettering, matching the lettering on the band switch.

On 40, 15 and 10m, the VFO is first mixed with a crystal oscillator, 11MHz, 35.5MHz and 42.5MHz respectfully, before being mixed with the 9MHz SSB signal to give the final band frequencies.

On receive, a 6BZ6 is used as the RF amplifier feeding a 6U8 operating as mixer. The IF at 9MHz is passed through the crystal filter into a 6BA6 operating as IF amplifier in both receive and transmit paths. A further IF amp is used in the receive mode, a 6BZ6 serving in this role. The amplified IF is then passed to a 12AX7 operating as product detector and AVC generator. A 6BM8 supplies the audio output for the set.

On transmit, a 12AX7 acts as the mic amp, which, along with the 12AU7 carrier oscillator, feed a 7360 balanced modulator. The output of the 7360, the 9MHz DSB, is now passed through the crystal filter and the first RX IF amp stage to then feed the transmit mixer, a 6EJ7. This mixer takes the 9MHz SSB and mixes with the VFO/xtal oscillator output. The output of this mixer, now on the band wanted, feeds a 12BY7 driver and a pair of 6JS6A in the pa.

A 12AU7 and 6AV6 act as the VOX (Voice Operated Transmitssion) amplifiers, transistors being used for the calibrator and sidetone generator circuits. The VFO and crystal oscillator are transistorised also, whilst the pre-mixer is a 6CB6.

The rear apron of the set houses the power input socket, an accessory socket giving access to all the voltages (which needs a special plug fitted for normal operation), a loudspeaker socket, an external VFO socket, the main aerial socket, the key jack and the VOX, PA BIAS and S meter controls.

Transverter facility

A further socket on the rear provides low level RF, suitable for driving a transverter. The accessory socket has a separate pin feeding the PA heaters, which needs a shorting link fitted for normal operation. With this link disconnected, the PA is switched off and the low level drive, along with the accessory socket providing power, can be used to drive a transverter, making the FT-200 a nice driving rig.

With the lack of 160m coverage I did in fact build, in the mid 70's, just such a transverter. With an input on 7 MHz and output on 160m, ad powered from the FT-200, the arrangement working very well indeed.

Whilst there are no spare positions on the band change switch, the 10m section has a separate control that selects one of four 500kHz segments of the band. It might just be possible to rearrange the switch wiring to allow one of the positions to provide a further band. The PA tank coil would also need modification, and the task would not be suited to a raw beginner. But, it would no doubt provide a excellent project for those really keen.

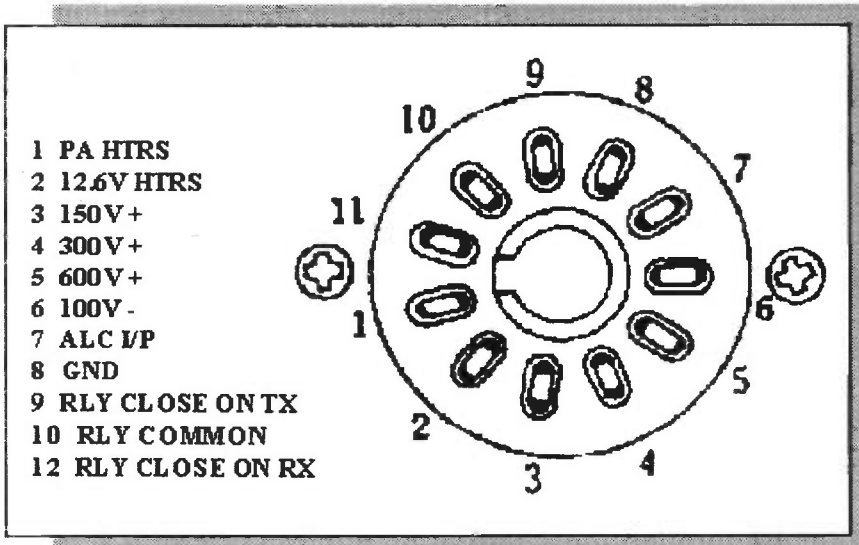
Alignment

If you manage to pick up one of these nice little sets the odds are it could do with a 'tweak' to bring it back to its best life. Remember, it is a valved set with high votages inside the case, *do* bear this in mind and take care.

Assuming you have a reasonable signal generator, you can use the S meter as an indication for tuning-up. If you don't have a generator you can probably still adjust the set to near alignment.

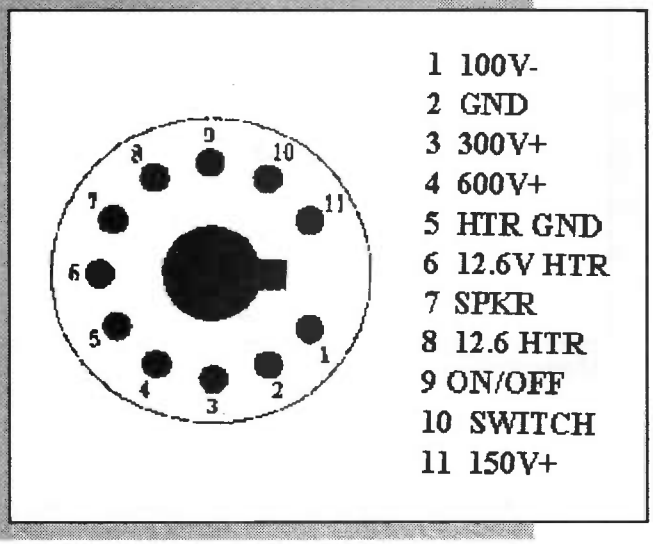
The alignment of the IF strip, in receive mode, is to adjust L101, L102, L103, L104 for maximum output with 9MHz injected into pin 2 of V1, which situated next to the VFO on the PA side, the second valve from the front of the set.

The RF alignment requires the signal generator (SG) connected to the aerial socket, dial set to zero, 'Grid' control two points from counter-clockwise end, SG to 3.5MHz, band to 80m, adjust L7 and L12 for maximum s meter reading. Band to 7 MHz, SG to 7.0MHz, dial to zero, Grid' unchanged, adjust TC1 and TC2 for maximum reading. Band to 14MHz, dial to 250, SG to 14.250MHz, 'Grid' at centre position, adjust L10/L15 for maximum reading. 21MHz band, dial to 250, SG to 21.250MHz, 'Grid' at



Accessory socket

Power supply socket



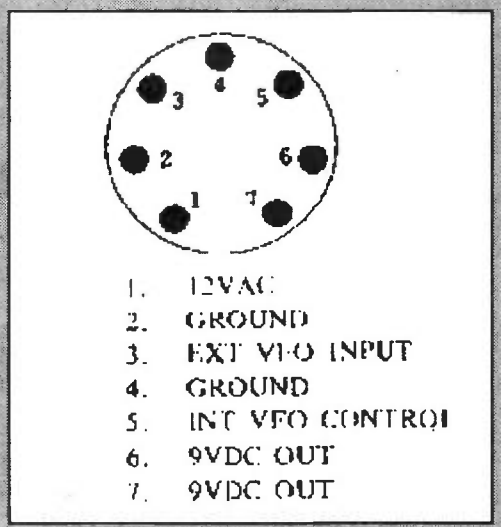
centre, adjust L9/L14 for max. 28.5MHz band, dial to 500, SG to 29MHz, 'Grid' to centre, adjust L3/L8/L13 for maximum reading. Band to 7 MHz, dial to 500, SG to 9MHz, set SG level to give a reading on the S meter, then adjust L2 for minimum reading.

Switching to transmit, dummy load into the aerial socket, on 14MHz, tune position, insert carrier using the mic gain control, keep it to a low value, note output on SWR/Power meter, adjust L103/L104/L105 for maximum output.

Re-peak the above RF coils for maximum output along with L6 on 80m, L5 on 40m, and L4 on 15m. In the 'Tune' position, tune up the transmitter for maximum output, reduce carrier level to a safe PA current, 70 mA, note the output on SWR meter and an adjacent receiver. Switch to SSB, mic gain to zero, and adjust VR106 for minimum carrier whilst watching the S meter. This is the balanced modulator adjustment, determining the level of suppressed carrier.

If the PA valves have been replaced it is quite likely the PA neutralisation will need adjusting. With the set in TX mode, set the idle current using the bias pot on the rear to 60 mA. Tune up the transmitter at 21.5MHz, switch to AM and adjust the carrier pot at the rear to give 150 mA. Rotate the 'Plate' control and observe a dip in PA current. As the 'Plate' control is rotated, you should observe a smooth rise and fall on each side of the dip. If it does, the PA is probably OK. If it does *not,* follow on with these steps.

Notice which side of the dip the current abruptly alters, set the 'Plate' control slightly on this side of the dip, keeping the PA current under 150 mA. Using a non-metallic tool, adjust TC3 through the PA screening in the direction that slightly reduces the PA current reading on the meter. Repeat these actions, dip, set slightly to the side giving uneveness, adjust, until there is a smooth rise and fall both sides of main dip.



Ext VFO socket

In conclusion

I can recall spending many hours using this rig, making contacts all over the world. One of the most memorable was the first ZL I worked, on 20m, using a 6m length of wire lying in the guttering of the house!

The small size of these rigs is ideal for those with limited space. The simple controls and well spaced out layout means even those who fear the myriad of knobs on present day sets should find no difficulty in enjoying the hobby with this set. Prices, of course, are always a contention. I would imagine that £150 should see a nice example of this set on your bench which should give hours of fun operating. Keep your eyes open at the rallies, and see if you can bring the fun back into radio!

SCANNERS

Bill Robertson gives a few frequencies, and takes a look at a new scanner-busting book plus the latest 'scanners on the streets'

Seasoned readers of the *Scanners* section in Ham Radio Today will know how the use of scrambling techniques is on the increase, and how trunking systems are becoming more common. All these make life that bit much harder for scanner listeners! With this in mind, I was interested to take a look at the book 'Scanner Busters', published by Interproducts in Scotland. They're already well known as being the publishers of the controversial 'UK Scanning Directory' with its many listed frequencies, including those of rather 'sensitive' radio users, so their latest offering certainly aroused my interest.

Scanner Busters

The sub-title to this book is "Overcome New Technology and listen into what you want to hear", with a picture of a police radio on the front cover. This suggests (to me at least!) that the book might be able to reveal how to overcome the various scrambling techniques used. It doesn't. What it *does* give you however, is a *very* interesting insight, mainly in non-technical language, the various ways in which two-way radio and cellular telephone communication is going, or has already started to go.

I found it very interesting reading, it even showed me how to recognise various forms of scrambled signal, such as the 'MASC' system used by many UK police forces. The book also gives a non-technical explanation of techniques such as trunking, even those such as spread spectrum which may increasingly be used in the future. There are plenty of photos of 'secure' radios as used by the police and military forces, and a final chapter on the US 'Clipper Chip' shows how 'big brother' wants to be able to listen into anyone's conversation!

The book is A5 size, softbound with 64 pages, ISBN 0 9519783 7 3, and is priced at £4.95. It's available at many specialist ham radio and scanner dealers, or direct from the publishers Interproducts (Tel. 01738 441199) to whom my thanks go for the provision of the review copy.

WeatherSat frequencies

A common question I've asked by readers of this column is 'What frequencies do the weather satellites operate on?'. Here's a quick list of those currently reported as operational;

Polar orbiting satellites;
NOAA 9; 137.62MHz.
NOAA 12; 137.50MHz.
METEOR 2-21; 137.40MHz.
OKEAN 4; 137.400MHz.
Geostationary;
Meteosat 4 (1 deg W); 1691/94.5MHz.
Meteosat 5 (0 deg); 1691/94.5MHz.
Meteosat 6 (10W); 1691/94.5MHz.

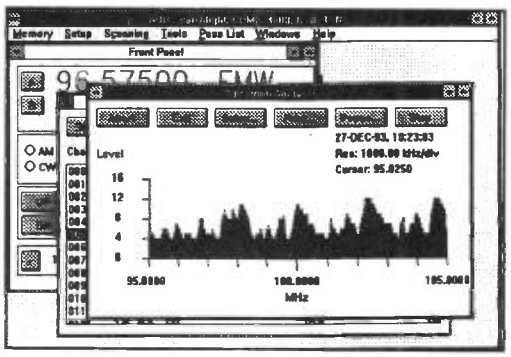
Some readers have asked whether a special receiver, rather than just a scanner, is needed. Well firstly, remember that you'll encounter 'Doppler Shift' on the orbiting satellites. This means the apparent frequency will be up to a few kHz higher as the satellite approaches you, and then up to a few kHz lower in frequency as it moves away from you. Purpose-made weather satellite receivers often include an AFC (Automatic Frequency Control) circuit which compensates for this, but you can always manually shift your scanner in 1kHz or 5kHz steps whilst listening. Another is that their FM deviation is quite wide - US type scanners are usually OK but ironically those designed for the UK and Europe often have narrower filters, and a filter replacement is sometimes worthwhile. AOR (UK) indeed offer a 'souped-up' version of the AR-3000A with this, and other upgrades, fitted. A review of this model, together with AOR's latest computerised scanning software, is planned for next month's issue.

If you're interested in weather satellite reception and would like to know more, an SAE to the Remote Imaging Group Membership Secretary, P.O. Box 142, Rickmansworth, Herts,WD3 4RQ, will bring you an information leaflet on the group.

New Realistic base scanners

Realistic have a new 200 channel scanner, the PRO-2036. It covers 68-88MHz, 108-136.975MHz (AM aircraft band), 137-174MHz, 400-512MHz plus the rather 'strange' band range of 849-869MHz. The 'auto-store' this time gets over the PRO-2035's problem of filling up memory channels with the same frequencies, as unlike the PRO-2035 it skips previously stored channels. With the CTCSS tone circuit board fitted in the PRO-2036, you can use this to select given transmissions for reception, an auto recording option also lets you automatically record received signals.

Another new 200 channel base scanner from Realistic is the PRO-2039, which again covers 68-88MHz, 108-136.975MHz (AM aircraft band), 137-174MHz and 400-512MHz, but adds a rather wider 'upper UHF' range of 806-960MHz. This one however doesn't have the auto-store, CTCSS, or record options. Realistic do seem to be coming out with new models left, right, and centre, I wonder how the poor public keep up with them all! I'm told by the Ham Radio Today Editor that a review of the PRO-2036 is also planned for next month's issue, and that I'll hopefully get my hands on it for a 'quick play' as well. It'll be interesting to see whether the on-air performance is as poor as the PRO-2035, or whether someone's seen the light and put some decent RF design work, rather than just more 'bells and whistles', into their latest sets!



'Searchlight' computerised scanning for the AR-3000A - to be reviewed next month

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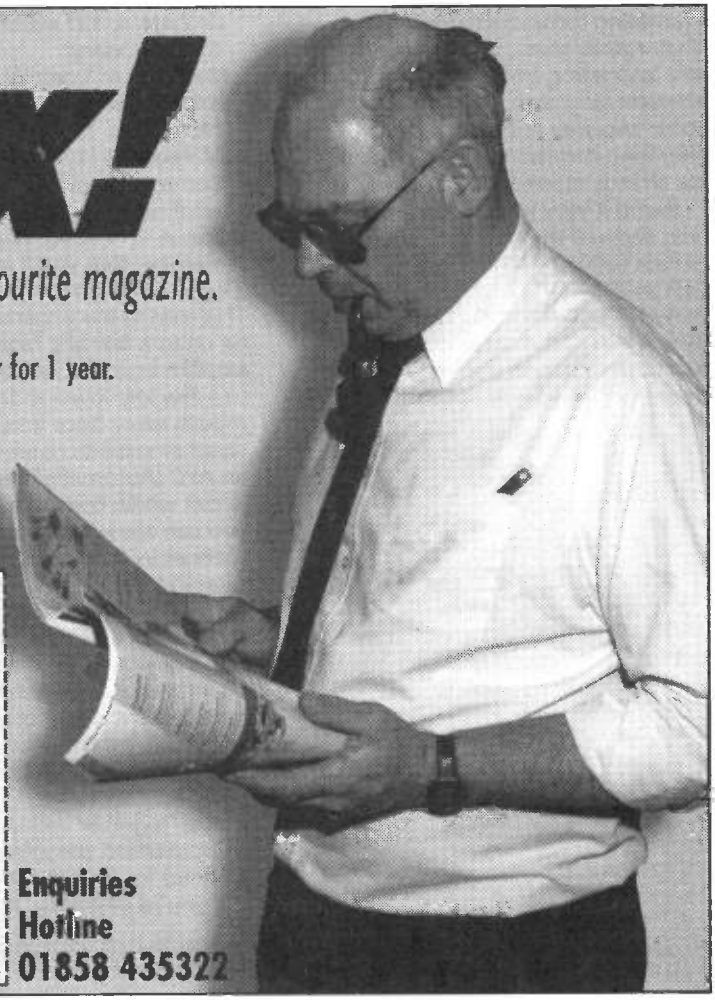

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DATA CONNECTION

Our resident Data SysOp shows how you can use the Ham Radio Today PC interface on yet another mode!

From feedback to both myself and the Ham Radio Today Editor, it looks like the HamComm/JVFAX project in the April 95 issue was incredibly popular! Maybe this was due to the HamComm 3 disk on the cover of the previous month's issue! One question commonly asked is "Where can I get PCBs, kits, and/or built-up units from?". You can obtain these from Badger Boards (Tel. 0121 384 2473), or if you'd like a self-contained interface fitted within an RS-232 connector these are available from Venus Electronics (Tel. 01252 837860). Note that the published interface diagrams showed capacitor C2 incorrectly polarised - it should be reversed (with the *positive* terminal to *0V*, not the negative terminal) on both the circuit and PCB and not as shown.
But the other question, which I'm often asked, is "Can the same interface be used for packet?" Many amateurs successfully use the BayCom system for packet, this using a different interface (a 'real' external modem rather than an op-amp interface). There are two programs I currently know of (and probably others I don't know about), *PKTMON* for stand-alone receiver-only use with the receive interface, and *EMBAYCOM* for TX/RX use with the BayCom v1.5 program. Both systems allow 1200 baud (VHF) and 300 baud (HF) packet operation. I've arranged for these programs to be included in this month's software offer, see elsewhere in this issue for details if you'd like to receive them as a 'cost-only' service to you!

Automatic Packet Reporting System

The latest TNCs from PacComm, AEA, and Kantronics now all seem to have GPS (Global Positioning System) reporting facilities combined in their firmware. The PacComm Tiny-2/GPS even has a built-in GPS receiver within it's case! Handheld GPS receivers are now quite common, and their prices have recently come down tremendously, I saw one amateur radio dealer selling such units at this year's London Show. With a suitable GPS receiver connected to a TNC and handheld transceiver, almost any object can be 'tracked' with it's location, speed, and direction of travel being given over the air. If you're thinking 'so what?', just let your imagination think of the possibilities for emergency use, with a team of mobiles in a disaster event. Using suitable software at the control centre you could quickly keep track of, say, St. John Ambulance vehicles equipped with amateur transceivers, or just vehicles in a marathon.

WB4APR recently developed *ARPS*, the Automatic Packet Reporting System, which does just that. A map is displayed on your PC screen with the locations of such stations displayed, and it's use isn't just limited to GPS-equipped packet stations. For example, it can also be used for 'triangulation' of an interfering or unknown transmitter, using the 'jammer' command in the ARPS software. Each station with a direction bearing on the transmitter inputs this into the program on his PC, which then transmits this and the DFing station's location. After a number of stations have done this, any or all stations can then display the intersection of the bearing lines on their screen map. If a GPS-packet equipped mobile station then 'goes off' to find the transmitter, it's location can be 'homed in' on the same system!

ARPS is distributed as shareware, you'll find it on landline BBSs and possibly also your local packet BBS. If you'd like a copy on 3.5in HD PC disk, I've arranged to have this available via the Ham Radio Today software service for the price of a disk and return p/p - £1.00 total in the UK. Just ask for the 'ARPS' disk, no corner flash needed, contact details otherwise as in this month's 'software offer' elsewhere in this issue (you can if you wish send £2.00 for both disks in the same request to save a stamp!).

KPC-9612 KISS mode

A query I read, which may be of interest to other readers, was; 'When I put the KPC-9612 in KISS mode for TCP/IP, it only transmits and receives via port 1, the 1200 bits/sec port. How can I use KISS on the 9600 bits/sec port?'

The way to overcome this is, with the TNC in 'Command' mode, enter *MYDROP*. The TNC will probably respond with *MYDROP 0/1*. To make the 9600 bits/sec port the default port for the KISS mode, just change this by entering *MYDROP 1/0* (my thanks to QST and ARRL for this info).

Modem access on GB7SYP

A bulletin from Dave G6TVA, who is the SysOp of GB7SYP, tells us that a 24hr modem access is now available on GB7SYP in Barnsley, South Yorkshire. Dave says that all are welcome to use this port, including non-amateurs who are given 'read only' privileges - use the callsign *MODEM* if you're not licensed. Telephone access at the time of writing is on (01226) 242055, due to be changed to (01226) 202151 by the time this appears in print, modem speeds up to 14,400 baud are supported.

CTRL-Z, End of message

Please do keep me in touch with what you're doing, and as always if you've any thoughts on data modes over ham radio that you feel would be of interest to others, do let me know. You can contact me either by packet direct, or via Ham Radio Today Editorial by phone, fax, or email. Until next month, it's 73 from Chris G4HCL @ GB7XJZ.#48.GBR.EU.

GPS firmware is now fitted to many TNCs

From My Notebook

Geoff Arnold G3GSR shows why corrosion occurs, and gives a warning on opening up semiconductors

I talked last month about condensation and the problems of corrosion caused by damp. Mention the subject of corrosion and the first thoughts are usually about metals. However, it s not just metals that can be affected, for wood and most plastics can have their characteristics changed to a greater or lesser degree due to moisture absorption.

Wood when water-soaked is no longer the reasonably good insulator which it is when dry. At one time wood was used for aerial insulators, or for spacers on open-wire feeders. The trick was to impregnate them with wax, otherwise their electrical resistance would fall steadily when exposed to the elements. A similar problem could occur if two bare conductors touch a wooden surface. Damp penetration also reduces the physical strength of wooden objects, such as pole-masts or, at a more mundane level, fence-posts. Wood used in damp situations needs to be properly treated to keep out water, and to have that treatment renewed at regular intervals.

Of the plastics, PTFE is the most resistant to damp, being rated to have zero water absorption. Among the other commonly encountered materials, polythene is the next best, followed by polystyrene (very variable depending on grade), rigid PVC, phenolic, silicone and epoxy resins, resin-bonded glass cloth and resin-bonded laminated paper. The last two are the common forms of printed circuit board material, the cheaper paper-based board absorbing moisture typically four to five times as rapidly as the glass fibre type.

Moisture absorption in these materials can cause chemical decomposition and also dimensional changes (swelling). Where significant potentials are present, tracking can also occur, either internally or on the surface of the plastic. The water doesn t have to be absorbed, though. Surface moisture resulting from condensation will tend to collect a film of dust and dirt, encouraging flashover between terminals. The flashover will carbonise the surface of the plastic, resulting in a permanent leakage path.

Electrolytic action

Corrosion of metals in the presence of damp is not simply the action of moisture on one metal, such as rusting - the conversion of iron into iron oxide - but often the effect of electrical currents generated by natural potential differences between two metals.

Now you may think that you need to have something like two metal plates in an alkaline or acid solution to form a source of chemical electrical energy, but it s not so. If you want to be convinced, take a voltmeter - it doesn t have to be anything sensitive or fancy, a cheap analogue multimeter will do - and clip the test-leads onto two plain, unplated screws, one of steel and one of brass. Immerse the ends of the screws into a glass of ordinary tap-water, close together but not touching, and watch the meter. Depending on the minimum voltage range of the meter, there may not be much of a movement of the needle, but it will be enough to prove to you that there is a potential difference between the screws, and where there is a potential difference, there will be electrolytic action, with one of the screws beginning to corrode. But which will it be? Also, what would be the effect of using other combinations of metals?

If you go back to textbooks on the subject, you will find tables of potentials between various metals and a standard reference electrode under certain conditions. Like many such standards, this reference electrode is a bit outside anyone s normal experience, being A saturated calomel (i.e. mercurous chloride) electrode in seawater at 25 deg. C . You don t need to worry about what this is; it is just a means of drawing up a useful table of values, usually along the following lines:

Gold	+0.3V
Rhodium	+0.3V
Silver	+0.01V
Nickel	- 0.14V
Copper	- 0.18V
Brass	- 0.3V
Stainless Steel	- 0.45V
Tin	- 0.47V
Chromium	- 0.5V
Steel	- 0.7V
Aluminium	- 0.75V
Cadmium	- 0.78V
Zinc	- 1.1V

For any pair of metals, the electrolytic or galvanic potential between them will be the difference of their individual potentials as listed. Note that it is the algebraic difference, in other words the signs of the voltages are important. So, the potential between our steel screw and our brass screw will be - 0.7 - (- 0.3) = - 0.4V or - 400mV. Had our brass screw been nickel-plated, the potential difference between them would have been 0.56V. And which one would corrode? It is always the most negative of the two, in this case the steel.

For equipment intended for general use in outdoor or other damp environments, the design should avoid having neighbouring metals with potential differences in excess of 0.5V. In extreme tropical conditions, for example in the jungle or in equipment to be fitted on deck in an ocean-going ship, PDs in excess of 0.25V should be avoided.

Going back to our little experiment, the potential you will measure with the screws in tap water will usually be about half of the figure calculated by the method given above. See what happens when you add salt to the water!

Constructing or installing equipment in a damp environment, such as on top of an aerial mast, in a motor vehicle, or on board a ship, requires careful thought as to the materials used. In general nowadays, professional designers are well aware of the pitfalls, and make the correct decisions, though they still occasionally come unstuck!

Before leaving the subject of damp corrosion, a little digression into the subject of storing parts such as screws in tin cans. Before

the now-widespread availability of plastic containers such as drawer units, or even margarine or ice-cream tubs, the favourite receptacles for storing small bits and pieces in home workshops were tin cans such as those which had held cocoa or Colman s mustard. They weren t actually made of tin, of course, this being just a colloquial shorthand for tinned steel .

People used to wonder how it was that tin protected the steel of the can from corrosion, and yet if you filled that can with steel screws, they would corrode (rust) faster than screws stored in a glass jar, or even left lying loose. How could this be?

The answer should be obvious from the table of potentials, as steel is -0.7V and tin is only -0.47V. The steel is the most negative, and so the screws will corrode in traditional fashion. The reason that the tin plating protects the steel of the can itself is that it forms an overall layer, keeping the damp in the air from getting at the steel beneath it. Scratch through the tin plating on the outside of the can and it will soon begin to rust around the scratch.

Dry Corrosion

Corrosion which takes place in a normal dry atmosphere forms protective skins on some metals, such as aluminium or copper and their respective alloys. These films of aluminium oxide or cuprous oxide do not absorb moisture, and so they prevent further corrosion unless they are broken or cleaned off. They also prevent the affected materials from being soldered!

Dust

Anywhere that there are rubbing contact surfaces, as in switches, relays, roller-coaster type coils and so on, or in moving mechanical parts such as bearings, operation may be affected if dust can find its way in. It is sometimes tempting to leave covers off parts of a piece of equipment in order to aid ventilation, but unless all moving parts are sealed you are likely to be asking for trouble!

Large equipment incorporating ventilating fans will usually be designed to draw air in through a filter (which must be regularly cleaned or replaced in service), located somewhere near the base of the equipment. The natural airflow due to convection is upward past the hot components, and the fan is sited to assist and encourage this flow, blowing the hot air out at the top of the cabinet or rack. This outward flow will also prevent dust particles being wafted into the cabinet by any passing draught, at least during the time that the fan is in operation.

Sometimes they bite back!

Finally, it s as well to remember that components can sometimes have their revenge on us for the way that we mistreat them. There are the obvious hazards, such as electric shock, or RF burns from transmitter tank circuits or aerials. There are burns from power transistors or valves, but even smaller transistors and valves, or ICs, can get very hot indeed if they re being over-run due to some fault condition.

Some years back, when I was last at radio college, we students used to do practical fault-finding exercises in pairs, one putting the faults on, and the other trying to diagnose and cure them. The chap I usually worked with had an unhappy knack of devising faults that removed the grid bias from valve stages - you would not credit how hot even a small voltage-amplifying valve such an EF86 can get when run for 20 minutes or so at zero bias!

Painful though contact with such components or supplies can be, the chances are that you will recover after the experience. Other components are less forgiving, in particular those which contain a material called beryllium oxide or beryllia, the dust of which is toxic.

Components likely to contain or be made from beryllium oxide include: power transistors, particularly VHF types; power diodes, thyristors, some types of ceramic material (usually identifiable by blue coloration or black lines); heatsink washers.

The hazard

Beryllia is **highly dangerous** in a dust form, when it might be inhaled or enter a cut or other wound. If dust caused by chafing, filing or breakage is inhaled, a single exposure lasting minutes or even seconds can cause injury to skin or mucous membranes severe enough to endanger life or cause permanent injury. Particles penetrating the skin through a wound are liable to cause severe ulceration.

Symptoms of beryllia poisoning, indicated by trouble in breathing or by cyanosis - a blue-grey discoloration of the skin - may develop within anything from a few days to several years after exposure.

Where beryllia is used in semiconductor devices it is totally encapsulated, and these components are quite safe to handle for replacement purposes, though care must be taken in removing defective items so that they are not physically damaged or broken open. The devices must not be carried loose in a pocket or container with other components where they may rub together and break or disintegrate into dust. Neither should they be heated excessively, although normal soldering with a thermal shunt is quite safe.

It is fairly obvious that such devices should not be filed, sawn or broken open for inspection. That means that the sometimes suggested method of making a drilling template for TO3 or SO55 transistors by sawing open a dud device and carving out the innards is highly dangerous, unless you know for sure that your particular device doesn t contain beryllia. Always consult the manufacturer s data sheets, which if appropriate will contain a suitable warning!

So far as can be seen from present-day component suppliers catalogues, heatsink washers don t appear to be made from beryllium compounds any more. You may well encounter them in surplus equipment, though, so it s as well to know about them. Heatsink washers containing beryllia are highly polished and of dark brass appearance. When new, they were individually wrapped to prevent them rubbing against each other. They must not be stored loosely, be filed or drilled, or heated other than when clamped in their heatsink application.

It is recommended that all beryllia parts be handled with gloves or tweezers when being removed from equipment. The use of gloves is essential for anyone having skin cuts or scratches.

QRP corner

Dick Pascoe G0BPS gives some circuit ideas for milliwatting on the bands

A nice packet message from Richard G0VCW arrived recently. He is thoroughly enjoying the low power aspect of the hobby, having been "inducted" via the novice course. He tells me that up until last August he was 2E0AFW. During his time as a novice he worked 32 countries, with 15 being two-way QRP. He enjoys the hobby so much, in particular Morse that he now teaches CW. Quite a long way to go in two and a half years.

One of his highlights was working Indonesia with just 1W and a homebrew doublet aerial. The other station was running high power of course.

The winter gales took their toll at my home, all aerials ended up on the ground after a series of very strong "severe gales". Am I the only one to think that we have had much more wind this year the previous years? My previous comments around last autumn about checking all aerials were needed here!

My annual trip to Dayton has been booked, after missing last year I am really looking forward to meeting many old friends again and seeing a lot of new homebrew equipment at the hospitality suite in the hotel. The Internet has been alive with comments from people planning to go. I have made several friends with this mode and it will be nice to meet them face to face.

Talking of Email, it was nice to see Geoff GJ4ICD at the VHF Convention and to immediately be offered his Email address too. It is very surprising who pops up on the net these days.

Back to Dayton, we are very lucky in having our own area at the show, with three clubs joining together to take three tables. We don't have a stand - we have a "booth". The Amateur Radio Club International (ARCI) join with the Michigan QRP club to take a double space, we have the other. This is a very good opportunity to show off the G-QRP club and the low power aspect of the hobby but also to "sell" the UK. We get a lot of interest, not only in the club goodies but in answering a lot of questions about this country.

This year just two of us are going to represent the club. Rev. George Dobbs G3RJV and I will meet up at the home of Bill N8ET who lives a couple of hours north of Dayton. It seems strange that we will travel that distance separately over the pond, but George prefers to leave via Manchester and I via Gatwick. It also gives me chance to stay a couple of days with my sister in Connecticut, just 30 miles from the ARRL headquarters! Bill does a lot for the G-QRP club over there and with a friend, Pat WS8T, will spend a lot of time with us at the booth.

Of course the selling of the club is not the only reason to go, Dayton is one of the biggest shows in the world. It is not *the* biggest as some may claim but close. The flea market is a collector's dream. Enough test equipment to make the most avid homebrewers eyes water, huge valves that you would love to see glow and other bits and bobs that every amateur would give his eye teeth for.

It is not all amateur gear too, I have bought Camera's, hats and badges. A huge array of food is available too. A bonus for the traders is the rest room. A huge array of various donuts are free to the traders along with large vats of "cawfee", black and very strong.

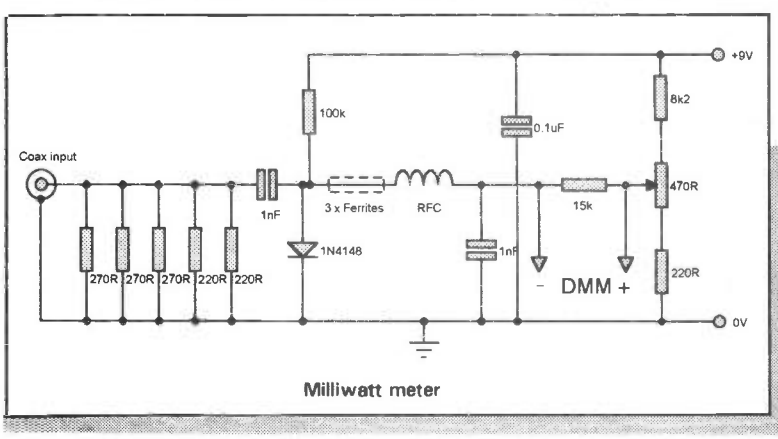
The only problem for most of us is the sheer volume of it all and the airlines' insistence on keeping to the 20kg luggage limit. I have even seen one amateur bring a huge top band transverter (80m-160m) onto an aircraft as hand luggage. It was rather a shock to the cabin staff too when he tried to get it into the luggage locker over my seat (crash helmet was requested!)

Just to dispel any nasty thoughts, both George and I pay for our own flights (£300 this year) the club does not subsidise us at all except for the cost of the booth.

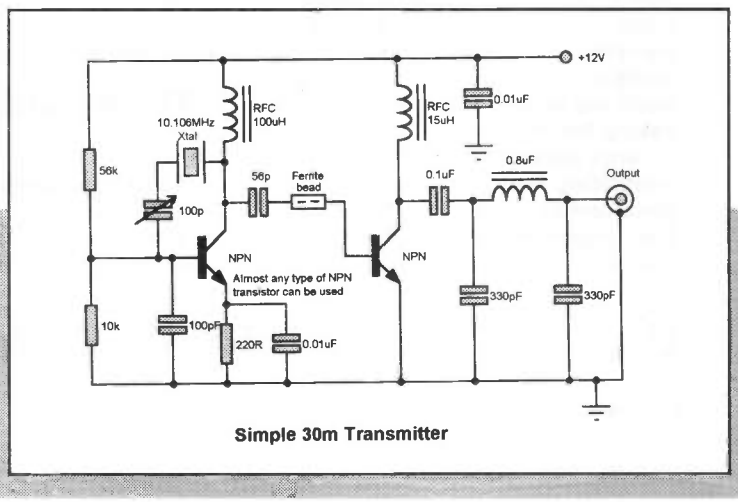
Milliwatting

Many low power operators like to use power levels below 1W. This has been nicknamed as QRPp or milliwatting. It is great fun, but there are problems in ascertaining the actual power output. Many modern rigs can be turned down to these levels, but the dial may show nothing below 10W out and may not even flicker at levels under 1 or 2W.

The following circuit from the CW operators club of Australia is the ideal way of measuring these power levels, and if 1W resistors in the load are used it may be used up to 5W for a short time. Carbon film resistors must be used as wirewound ones have an inductance too. For those who are happy to work with a maximum of 1W, then a pair of 100 ohm resistors may be used as the load instead. It is essential that a digital multimeter is used too.



Milliwatt meter



Simple 30m Transmitter

The circuit is very simple, the silicon diode used for detection is biased so that it is only just conducting, thus it is at its most sensitive. The circuit is a balanced bridge with the 470 ohm potentiometer being adjusted for zero on the meter when no RF is present. The 220 ohm resistor to earth on this pot is used to make this tuning easier.

When RF is applied to the unit, the bridge becomes unbalanced and the meter will give a reading. It is essential that this unit be built into a metal box to avoid stray RF from detracting from its accuracy.

Construction is simple, the only essential point is that the leads between R1, 2, 3, 4, 5, C1 and D1 must be as short as possible and between R6 and the RFC where they join the diode. The RF choke has three ferrite beads over one leg at the diode end. The lead to the transmitter should be shielded such as coaxial cable and any suitable connector may be used. There is no setting up procedure to follow except for zeroing the meter before starting. The meter should be set on DC voltage reading at the 10V range, in this case 10V equals 2W.

I have found this a very good unit to use and of course I am certain that my power is "legally" below the magic 1W. A real boon.

30 metre fun

For those who do not have a transmitter that will go down this low, how about trying this small unit? The power out should be in the range of 250mW, which will prove the milli wattmeter and also give you some fun in building. Finally it will get you on to 30m where for the uninitiated it is fairly quiet and a much less hectic area than 20m.

The circuit is simple and inexpensive, the most expensive part is the crystal! It can be built on Veroboard, 'ugly' style or even on a PCB.

The schematic almost tells it all. The 100pF variable capacitor swings the frequency a little. RFC 1, the 100µF is either a fixed choke or it can be carefully wound using 144 turns of fine wire on a T50/2. The 15µH is 55 turns on a T50/2 and the low pass filter made of 13 turns of wire also on a T50/2. Almost any NPN transistor may be used, my standard is the BC182 but I also have a few metal canned 2N2222. They are fairly easy to find.

To change bands is fairly easy, just change the crystal for another fundamental in the band of choice and change to output filter to the band required.

A low pass filter in this unit, as made up of the two 330pF capacitors and the 0.8µH inductor, is absolutely essential. Any simple transmitter *must* have a filter to follow it, to rely on the ATU is foolhardy to say the least. How many readers us a simple "T" match ATU? These are also the same configuration as a high pass filter. Think about it!

Back to the simple transmitter such as this one offered. The oscillator is free running on the frequency of the crystal. Without a Low Pass Filter the harmonics generated by the oscillator will also be transmitted. Thus, if our crystal is on 80m we shall also be transmitting on 40m, 20m, 10m and more. Try tuning your ATU with this.

That's it for now, news and views to me via the editor, packet to GB7RMS, Email to dick@kanga.demon.co.uk or even snail mail to Seaview House. Crete Road East Folkestone. CT18 7EG.

VHF/UHF Message

Geoff Brown GJ4ICD looks at comparisons with 50MHz contacts to and from Cape Verde

It's interesting to try a comparison with 50MHz QSO's with the Cape Verde Islands. Looking back over the past year at 50MHz, QSO's from Jordan and Mauritania some interesting facts can be recalled.

The Jordan expedition's shortest sporadic "E" QSO appears to have been with SV9ANK at a distance of around 1000km. In Mauritania, Eric 5T5JC's shortest QSO via "ES" seems to have been with EA8 at around the same distance, (an MUF of over 100MHz). Given these facts, the trip to Cape Verde looks promising. Our nearest possible contact (due to activity) seems to be with Eric 5T5JC at around 1300km, and the next possible QSO is with EA8 at around 1650km. Then comes the dead spot where there is no activity. Gibraltar and southern Spain are at the 3000km distance from Cape Verde, comparing Eric's 3000km QSO's which were into central France (IN95) and very plentiful.

5T5JC's 3000 to 4500km QSO's were as far north as northern Scotland and arcing across to Sweden, and, they were in the hundreds and at S9+. Cape Verde's 3000 to 4500km QSO's should be around IM76 in southern Spain to IO83 in the central UK.

So, there should be no problem for stations between these distances providing that we have propagation similar to what Eric had.

Eric worked over 10 grid squares in northern Europe between 4500km and 5300km and was S9+, JP74 seems to have been his best European DX at 5300km and is well outside the northern temperate zone. He may well have been able to work further, but there was no or little activity beyond this distance (JP74) for him to work. Now this is where the situation changes, as Cape Verde is further south from JP74 at 6100km! The D44 4500km belt lands an arc from IO83 (Manchester) to JN19 (Paris) to JN36 (HB9) and onto JM76 (9H1), and the D44 5300km belt arcs from IP52 (OY) to JO64 (northern DL) to JN89 (OK) and onto KN03 (YU7).

I personally think that all stations between these two belts (which will be the hardest QSO's) should have a chance of working Cape Verde via "ES". This also means if there is multi-multi hop or chordal propagation we could have QSO's with many stations that would exceed the 6000km distance (Finland), something that Eric did into the USA but couldn't do in Europe due to no activity in the Arctic circle. But there may well have been propagation. The D44 trip may answer these questions, as, if the areas are not populated by 50MHz operators, no knowledge can be gained. In our case they will.

Jordan

Jordan was a similar situation, the furthest European distance I recall being with a station in Scotland at 4200km. The distance from JY7SIX to 5T5JC was around 5100km, but again, these distances could not be exceeded because there is no or little activity until you hit the USA (which we did with one QSO!) at 10,000km. This is nearly 5000km further than 5T5JC, so what lies in the 5000+km belt for the D44 expedition? Well, certainly more than we could have achieved from Jordan, which goes without saying was brilliant.

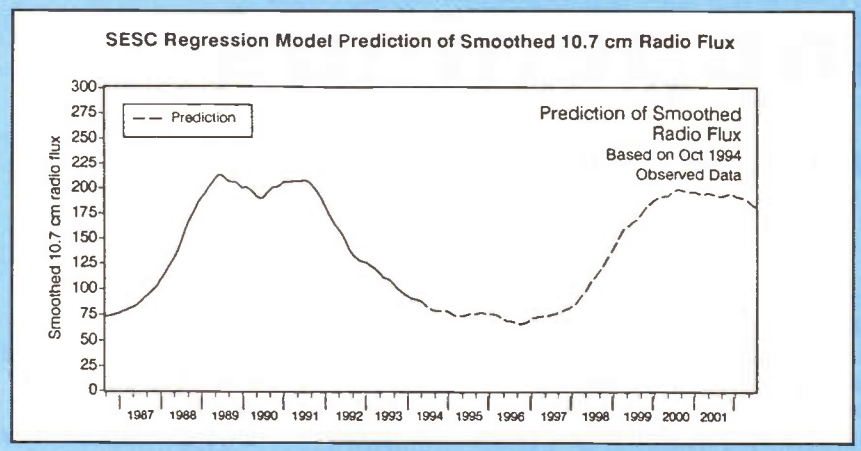
Conclusions

Remember when Eric 5T5JC appeared on 50MHz in October 1993? Look how shocked we were, October "ES"? over that distance! In June 1994, Eric had over 15 openings into the British Isles, these openings were not 5 minute jobs, but hours on end!

It will be interesting to see what happens from the Cape Verde Islands, and maybe someone could get word to the "Ivory Coast" boys as they are only 2500km from D44 and stand a good chance of an "ES" QSO. However, it seems that 5T5JC's efforts and his location, from, which he can work in many directions where there is activity, fared better than the Jordan expedition regarding distances via Sporadic "E".

Also, it is worth noting that Cape Verde is over 1000km closer to the

The Jordan DXpedition Group presented an illustrated lecture at this year's VHF Convention



Cycle 23 prediction

USA than Mauritania (5T5JC), and last year Eric had some tremendous openings to the USA. So, there are other possibilities to explore.

It seems that, from Cape Verde, we may have a continuous path of activity like Eric had into Europe at the right hops. Providing of course, we have good propagation, or similar propagation to what Eric had in 1994. Then, when and if we work the "OH" lads, the champagne will flow -6000km plus!

Sporadic "E" season

By now the sporadic "E" season should be well under way. Watch out for a few all time new countries like 3V8BB (Tunisia) and 3A2LZ (Monaco).

Other rare ones set to come on 50MHz are: UU8 (Ukraine), Z31DX (Macedonia), JY4MB (Jordan) and 1A0KM.

Currently active is the Camel Trophy gang from Belize (V31RD). They are active on 50MHz, 144MHz (EME) and of course HF. Operators include Richard (G4CVI/V31RD), Paul (G4CCZ) and Mike (G3SED), the latter two being operators in the Jordan trip last year.

Look out for Tim KC0PA/S0 who should now be active on 50MHz from the Western Sahara. This will be an all-time first for many stations. Next month of course is the D44 expedition, this could also be a new one for many, although I'm now told more "G" stations worked D44BC in 1989 than USA stations did. Maybe we should keep the beam on the States!

Júlio D44BC informs me that he has a 20A PSU to power the TS60 when we leave Cape Verde, so activity will continue with his new TS60.

Other news

R. N. Electronics have donated a transverter to Daniel, 3A2LZ/JN33RR who should now be active, Mike G3VYF has donated a beam, and the UKSMG have provided the QSL cards. Personally having visited Monaco I would think that a vertical aerial would be more useful, as Monaco is surrounded by massive mountains, let's see what transpires.

Silent key

I was very saddened to hear of the passing away of Jack Hum G5UM. Jack will be in my memory for many years to come, as, when I was an SWL and lived in Leeds nearly 30 years ago, Jack could always be heard on 144MHz AM "tuning high to low" as he used to say in those days. Every year that I went to the Leicester show I made a point to try and work Jack on the radio from the hotel. Most years I succeeded and had a short ragchew either direct or via the local repeater.

Jack's 432MHz signal was always prominent in Jersey and will be sadly missed, Houghton - on - the - Hill will never be the same.

VHF Convention

February saw the VHF convention at Sandown Park in Surrey. Traders seemed quite busy (well they must have been, as I was continually getting stabbed in the back by 2m aerials!).

Visitors from abroad were Bob WA6BYA (from California!), Angelo I2ADN, Tom DL7AV (a JY7SIX operator) and well known 50MHz DXer Arne SM7FJE who told me he was now at 135 50MHz countries.

Reports

Early February (4th) saw a very good 432MHz opening, Stan, GU3EJL (Alderney) reported long haul contacts with northern "G" on 70cm SSB, unfortunately conditions deteriorated for the UHF contest on the following day! (typical).

OZ7DX is being reported by many 50MHz buffs, his signal seems to be quite continuous via forward scatter and meteor scatter all over the UK. It seems that he is running a very potent station.

Andy, G7OEC reported a good opening on 144MHz on the 5th with; F6EAM (JN19), F6IRF (JN35), HB9SNR (JN36) and a few PA0's. On the 6th things were better with EB1EHO (IN73), F9HS (JN03), EA1NV (IN73), EB1DNK (IN73), and F6ILR (JN06). Andy also reports that there were 22 different callsigns on the "Anglian 50MHz Net" on Monday the 6th.

My thanks to the Internet, the UKSMG, the 6/10 reporting club, and others for this months news. Photos, news and views please to: Geoff Brown, TV Shop, Belmont Road, St. Helier, Jersey. Channel Islands, or phone/fax 01534 77067 any time, or via the Internet to: equinox@business.co.uk

9A QSL Listings

9A QSL LISTINGS - de Zeljko 9A2EY

9A1A - Hrvatski DX Klub, PO Box 108, HR-41001 Zagreb, Croatia.
9A1CCB - Radio Klub "Garic", Ured za Obranu, HR-43280 Garesnica, Croatia.
9A1CCY - Radio Klub "Jan Hus", PO Box 87, HR-43500 Daruvar, Croatia.
9A1CRJ- Radio Klub "Osijek", PO Box 155, HR-54000 Osijek, Croatia.
9A1EZA - Radio Klub "Ludbreg", PO Box 108, HR-42230 Ludbreg, Croatia.
9A2DI - Mirko Maderic, Sjenjak 22, HR-54000 Osijek, Croatia.
9A2EY - Zeljko Ulip, Dobri Dol 39, HR-41000 Zagreb, Croatia.
9A2JY - Boris Vrbanovic, Kozarceva 51, HR-41000 Zagreb, Croatia.
9A2LW - Aleksandar Fabiani, Siget 9, HR-41000 Zagreb, Croatia.
9A2MP - Petar Milicic, Vinogradska 13, HR-41000 Zagreb, Croatia.
9A2NV - Vladimir Novak, Podgaj 1, HR-41000 Zagreb, Croatia.
9A2OB - Ivan Sarcevic, Porecka 7, HR-54000 Osijek, Croatia.
9A2PA - Franjo Bosnjak, Helenski put 23, HR-43260 Krizevci, Croatia.
9A2QS - Ozren Niksic, V. Nazora 14, HR-43280 Garesnica, Croatia.
9A2RA - Zdravko Balen, Gredice 8, HR-41000 Zagreb, Croatia.
9A2SB - Zlatko Miocevic, Prenjska 25, HR-54331 Cepin, Croatia.
9A2TA - Antun Mikles, Linardiceva 19, HR-41000 Zagreb, Croatia.
9A2XP - Franjo Lovrisa, Stjepana Radica 77, HR-43541 Sirac, Croatia.
9A2YC - Ivan Vlasic, Obirska 18, HR-41090 Zagreb, Croatia.
9A2YF - Vladimir Koudela, Slavnik 14, HR-43500 Daruvar, Croatia.
9A3AQ - Zlatko Kovacevic, Stefaniceva 6, HR-41090 Zagreb, Croatia.
9A3AT - Milan Bozinovic, A. Cesareca 5, HR-42000 Varazdin, Croatia.
9A3FT - Renko Kirigin, Vukovarska 57, HR-58000 Split, Croatia.

HF Happenings

Don Field G3XTT gives a insight into what the 18MHz band has to offer

Looking back at my log for the February/March period, I see that band conditions were remarkably good to say we are close to the bottom of the 11-year sunspot cycle. During the CW leg of the ARRL CW Contest, 10m opened to the USA, and the same happened again in the SSB leg although not to the same extent. It really makes you wonder how often the band is open and we don't realise. It seems to take a major contest to generate the level of activity to identify a band opening. Lower in the spectrum, I put up a multiband rotary dipole at 18m for the RSGB 7MHz CW contest and was pleasantly surprised at what I was able to work. My first Japanese contact was at 1607z, just over an hour into the contest. At the that stage I was running only 200W and it was about 90 minutes before my sunset. I worked my first North American station of the contest, *VO1AH* in Newfoundland, at 1717, still before my sunset, so it must have been very early afternoon with him.

In the days after the contest I worked, amongst others, *ZK1DXP* (Cook Islands), *YJ0ADJ* (Vanuatu) and *VK9LM* (Lord Howe Island), all around 0700 GMT on 7MHz CW. 7MHz really is a very reliable long-distance band as I have said before, and well worth putting some effort in putting up a reasonable aerial. By the end of February, without trying very hard, I had worked over 100 countries on 7MHz since January 1st, some indication of the level of DX activity on the band.

I had hoped to have operated the ARRL CW contest this year with one of the big US groups, but a business trip to the US was cut short so I found myself back in the UK that weekend, with only a WARC bands aerial in the air at the time. Fortunately there was plenty of WARC band activity, including some excellent DX. I must particularly commend the German group who operated as VK9XY (Christmas Island) and VK9CR (Cocos Keeling Island). They did an excellent job and I was one of many who found them especially easy to make contact with on 24, 18 and 10MHz. Indeed, they were worked in Europe on all nine HF bands. Some other nice WARC band finds included ZL7ZB (Chatham Island) on 18MHz and ST2AA (Sudan) on 18 and 10MHz. I could give many other examples, but let me just mention 9X5EE (Rwanda), TU2XZ (Ivory Coast) and VQ9TP (Chagos Islands) who have also been regulars on those bands.

DX news

The *A51/JH1AJT* operation from Bhutan made over 8,200 contacts, of which about 950 were with Europe. Apparently the team left various pieces of equipment behind in the expectation that they will be able to return for a longer operation in the not too distant future. After the operation, *JH1AJT* appeared from Laos with the unusual callsign *XW1* (yes, no suffix!), and expects to be back there from time to time as he has business interests in the country.

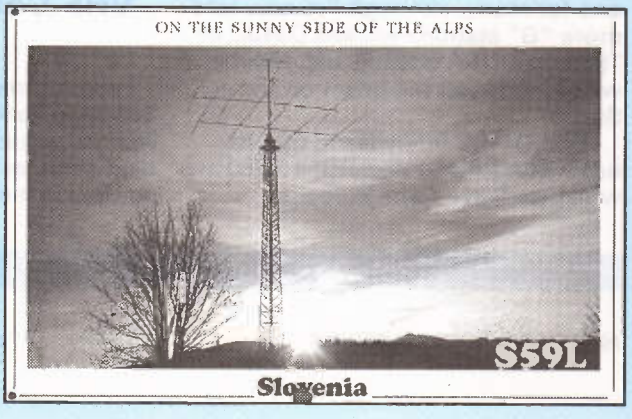
The German group which operated from the Congo as *TN2M* and *TN4U* in early February were disappointed to have been able to operate for only four days, having planned an operation of almost a month's duration. They had been promised that licences would be available on their arrival, but encountered massive bureaucratic problems once they arrived in the country, and even having obtained their licences were shut down again after just four days' operation. Sadly this will almost certainly put off any other would-be DXpeditioners to that particular country, at least for a while.

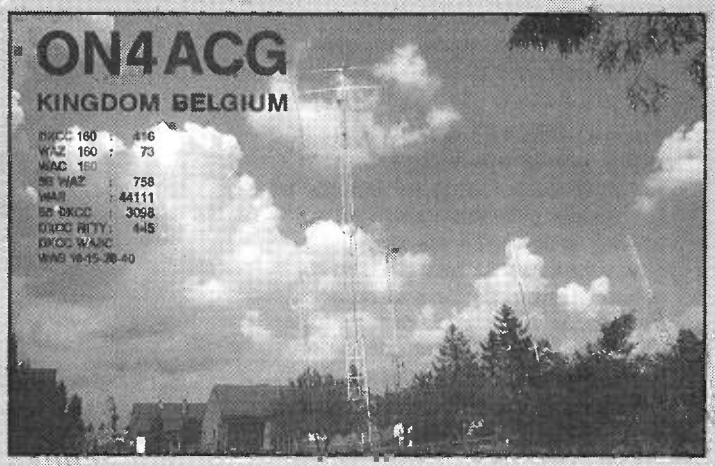
KC0PA/S0 has been active from Western Sahara and may still be there by the time this appears in print. There have been similar "portable" operations from S0 in the past, but as far as I am aware none of them have been credited for DXCC purposes. Fingers crossed if you worked this one!

Prefixes

Andorran stations used the prefix C37 in March to celebrate the 7th anniversary of the Andorran radio society. Novice stations in Sweden will be issued callsigns with the prefix SH, and will be allowed on certain HF bands with a maximum power of 100W. Once again Canadian amateurs are using special prefixes. Until the end of May they

If you have them, why not flaunt them! Aerial shots make interesting QSL cards





can use various prefixes in the VX, CJ, XO and XN series to celebrate the 50th anniversary of the end of WWII in Europe. And, of course, if you are interested in working unusual prefixes, don't forget the CQ WPX CW contest on the last full weekend of May (27/28th).

Band of the month

17 metres, or 18MHz, has been one of my most productive HF bands in recent years. Even 15m can be poor at this stage in the sunspot cycle, but 17m seems to keep going, with band openings to every part of the world. The main limitation is that the band is only 100kHz wide, from 18.068 to 18.168MHz. So far this hasn't been a major problem, but as activity continues to increase we could begin to see congestion. Right now activity levels are ideal, with plenty of people to work, but with room for everyone, and this is an ideal band on which to maintain schedules with distant parts. For example, one of my local club members, who has just a simple doublet aerial and no linear amplifier, has found 17m the ideal band for keeping in touch with his brother who lives in the US and is also a ham.

Obviously band conditions on 17m will vary with the seasons and with the state of the sunspot cycle. Typically, though, signals will start to appear after dawn, with a reliable long-path opening to the Far East as well as short-path signals from the nearer parts of Asia. As the day goes on, the short-path will also open to the Far East, and on a good day you will also start to hear signals over the pole from the Pacific area. From about midday you would expect to be able to work N. America, while African and South American stations should be workable throughout the daylight hours. Many stations are still using simple dipoles and vertical aerials on 17m, so signals may be weak but the relatively low levels of interference mean this is rarely a problem. Of course, if a rare DX station appears then life can get somewhat more hectic! And, yes, more band users are equipping themselves with Yagi and quad aerials, which is raising the stakes as far as DX chasing is concerned. I have to say, my own experience since installing a 3-element Yagi aerial for 17m is that it makes a tremendous difference, and I rarely need to fire up my linear amplifier to catch even the most exotic of stations to appear on the band.

Once the sunspot numbers start to pick up again and HF band conditions begin to improve, the sort of openings I described above will become longer, and we will eventually get to the stage where, at times, there will be intercontinental propagation on 17m 24 hours a day, very much as on 20m.

Although many of the commercial multiband vertical aerials will work effectively on 17m, I would recommend a high dipole or a full-wave loop as a good starting point if you don't want to go the expensive of a Yagi beam *(see last month's CobWebb aerial review - Tech Ed).* There are also some excellent multiband rotary dipoles for 30, 17 and 12m, such as the Cushcraft D3W, which give excellent results, and are sufficiently lightweight to be mounted on a VHF-type rotator.

Contests

Some novel HF contests have been announced recently. It's too late for one of them, the first annual Gridloc contest, but you might want to plan on taking part next year. This new event, which took place on 8/9th April, is a multimode contest in which the contest exchange is your Maidenhead locator square (first four digits, e.g. IO91). These squares then count as multipliers when calculating your score. It is interesting to see grid squares being used as a basis for HF contesting, and I will be fascinated to see whether the idea catches on. Incidentally, the contest organisers have taken an interesting approach to some other aspects, such as the fact that all entrants are restricted to one power class (less than 150W) which reduces the number of different categories and may even help to reduce QRM!

The other new, at least to Europe, contests are the European Sprints. There will be four of these each year, two phone and two CW, based on the format of the US Sprint contests which have become very popular indeed in recent years. The basic idea is that you have to move frequency after every contact, so it is impossible to set a high score by staying in one place and calling CQ. This forces participants to be much more quick witted in their operating, and also levels the playing field somewhat between those with big signals and those with small ones. Each contest also runs for just 4 hours, so they don't take out a whole weekend. The first SSB event ran on 15th April and the first CW event is scheduled for 20th May (1500 to 1900 GMT on 20, 40 and 80m). If you want a copy of the full rules I will be only too pleased to oblige (please enclose an SAE).

That's it for this month, my address for correspondence and reports; 105 Shiplake Bottom, Peppard Common, Henley on Thames, Oxon RG9 5HJ.

17m voluntary band plan

18.068 - 18.101	CW Only
18.101 - 18.109	Digimodes (& CW)
18.109 - 18.111	Beacons only
18.111 - 18.168	Phone (& CW)

Satellite Rendevous

Richard Limebear G3RWL of Amsat-UK with the latest on the RS-15 satellite plus the new Techsat-1 from Israel

As users of RS-15 may be aware, the satellite seems unable to maintain enough battery charge for beacon or transponder operation soon after entering darkness; it starts cycling off/on when the battery goes low. The intermittent off/on switching commences when the power supply falls below 12.4V; this usually happens within 15 minutes of entering eclipse. Immediately upon seeing sunlight again the voltage rises and satellite systems return to continuous operation.

RS-15's orbit gives UK observers a sequence of seven or eight passes in a 24-hour period, of which four or five are visible for 30 or 31 minutes in the best case. The orbit is not sun-synchronous, RAAN shifts slowly at about -1.6 degrees per day, and the pass sequence changes slowly in time accordingly. Eclipse durations will also vary seasonally with the shift of the sun between the solstices.

G4ULS has done a study based on how long the eclipses last and if/when they occur while the spacecraft is above the horizon. The period 8th April - 11th August is clear, then 12th Aug - 20th Aug shows a single pass per day with 10 minutes of shadow. 21st Aug - 20th Oct is clear, then from 21st October eclipsed passes rise from two per day with a maximum of 16 minutes eclipse to four and even five per day with maxima of up to 28 minutes eclipsed. Things start getting better about 25th December and by 12th Jan 1996 there are two passes per day with a maximum of 16 minutes of eclipse in them. Then 20th Jan - 22nd Feb 1996 is clear.

The combination of an annual cycle with one of about 216 days suggests a three- yearly repeat probability. Empirically, the pass sequence for 23rd Feb 1995 is seen as repeated to within 10 minutes and a degree or two of Az/El by that of 7th March 1998. Thus a moving three-year projection gives a reasonable forecasting guide.

Oscar 10

Its' still operational in Mode-B. Despite good signals from the transponder, there are very few stations using it. Its currently available when in view but ***please do not*** attempt to use it if you hear the beacon or the transponder signals FMing, and there are reports that AO-10 has started to 'FM' very badly at times.

Digital Satellites

DOVE's Voice experiment has been switched off but S Band is still on.

KO-23 and ***KO-25*** are both back after their recent crashes. They found the problem; the crashes mainly came from some groundstations which transmitted some illegal frames to on-board tasks.

AO-27 is back in FM repeater mode on weekends during daylight passes over the Northern Hemisphere. The centre downlink frequency for stations that are correcting for doppler shift is 436.797MHz. The uplink is centred on 145.850MHz. The repeater "may" also be activated on an ad-hoc basis during evening passes on weekends and weekdays.

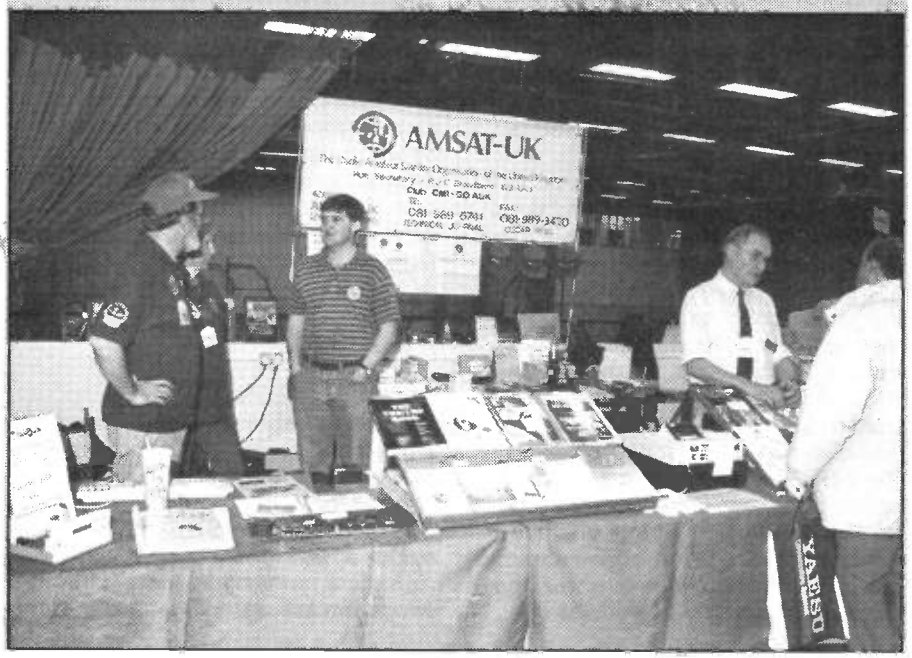
UoSat-Oscar 11

Some consideration is being given to switching the UO-11 primary downlink to 70cm (435.025 MHz) whole orbit and feedback from the user community about this particular change would be welcomed. News bulletins continue, we're trying to get a new bulletin up for each weekend.

UoSat-Oscar 22

On 29th Jan, during an orbit where UO-22 passed through the South Atlantic Anomaly, the spacecraft suffered a crash of its OBC-186. What was first thought to be a straightforward software crash proved to be much more serious. Examination of VLSI telemetry during morning passes on 30th Jan revealed that the current drain of the OBC was running about three times the normal value. Following a number of short real-time tests and observations, ground controllers took the decision to power down the OBC-186, RAMDISK and associated hardware for several hours. It was left in that state for roughly 18 hours

The AMSAT-UK stand at this year's London Show



before ground controllers resumed recovery attempts. After the power-up procedure the current drain had returned to normal and the downlink telemetry indicated nominal operation of the flight computer hardware. They then ran diagnostics which showed no problems and so the operational software was reloaded.

UO-22 crashed again during the past week as this is being written, no information has been received about this but the spacecraft is currently working OK.

New Techsat-1

The launch of the Israeli TECHSAT-1 was planned for 28th March from Plesetsk. Here are some satellite details;
Size: 0.45m x 0.5m x 0.5m;
Weight: 50 kg;
Stabilization: 3-axis, earth-pointing;
Power available: 20W average;
Housekeeping consumption: 10W;
Communication: Store and forward, multi-user digital system;
Orbit: circular, not sun synchronized;
Modulation: 9600 bps MSK or 1200 bps PSK (1200 bps for tests/emergencies);
TNC/Modems: G3RUH or compatible for 9600 bps; FUJI or PacSat for 1200 bps.

For stations without computers, the Kepler data translates into;
Period=98 min,
Increment=24.689 deg,
Apogee/perigee 672/650 km.
The visibility times vary in a cycle of (about) 124 days.

Testing of the systems is estimated to take three months, maybe less. Reports (presumably on early passes if you managed to capture these -Tech Ed) will be welcomed as the command station will only have been able to see the spacecraft after five or six orbits. The command station is 4X6EM at the Haifa TECHNION. Tel +972 4 292646; Fax +972 4 292646; Internet 4x6em@tx.technion.ac.il

You can also post telemetry reports on anonymous ftp site in the /techsat
directory: pc.4z4aba.ampr.org.

Forthcoming JAS-2

The next Japanese Amateur Satellite, ***JAS-2***, will be launched in January or February 1996. Here's some details; size will be the same as JAS-1, 44cm x 47cm; Weight: 50 kg. The planned orbit is polar and circular, Altitude: 800-900km. The digital mode of operation will be 9600 bps FSK or 1200 bps PSK, Digitalker; around 30 seconds. FM voice messager. TX power: 1W; Memory: 2M bytes.

Keplers

The latest satellite Keplers are available by fax from the Ham Radio Today fax-back line, 01703 263429, request fax document 88 from the satellite menu for this month's. They're also available by post by sending an SAE together with the corner flash from this page to the HRT Editor, stating whether you want *all* satellites (10-15 A4 pages), or just *all amateur* satellites (one A4 page). AMSAT-UK Keplers are also put out on packet fortnightly, sent to KEPLER @ GBR.

More info

If you're interested in amateur satellites and would like further information about Amsat-UK, contact: AMSAT-UK, c/o Ron Broadbent MBE, G3AAJ, 94 Herongate Rd., London, E12 5EQ. Big SAE gets membership info. SWL's are welcome. All new joiners get the USAT-P tracking program on a 5¼in disk.

AO13 Transponder schedule up to May 22nd

ModeB:	MA 0 to MA 190	I
ModeBS:	MA 190 to MA 218	I< S transponder; B trsp. is ON
ModeS:	MA 218 to MA 220	I< S beacon only
ModeS:	MA 220 to MA 230	I< S transponder; B trsp. is OFF
ModeB:	MA 230 to MA 256	I Alon/Alat 230/0
Omnis:	MA 250 to MA 140	I Move to attitude 180/0, May 22

Continuous up-to-date information about A0-13 operations is always availiable on the beacons, 145.812MHz and 2400.646MHz in CW, RTTY and 400 bps PSK.

Techsat-1 frequencies

Uplink	*Uplink*	*Downlink*
145.850	1269.700	435.225
145.890	1269.800	435.325
145.910	1269.900	
145.930	1269.950	

Planned Techsat-1 Kepler elements:

Satellite:	TECHSAT1
Epoch time:	95087.37500000 (Separation 28th March 0900 utc)
Element set:	001
Inclination:	075.3991 deg
RA of node:	328.7324 deg
Eccentricity:	0.0015304
Arg of perigee:	101.9385 deg
Mean anomaly:	355.9607 deg
Mean motion:	14.7000703 rev/day
Decay rate:	0 rev/day^2
Epoch rev:	0

(Ed's note - latest Kepler elements are available from Ham Radio Today by post or fax - see text)

JAS-2 Frequencies

145MHz uplink	**435MHz downlink**
Digital mode	
145.850	435.910
145.870	
145.910	
Analogue mode	
145.900145.600	435.800435.900

Club News

Aberdeen ARS meets every Friday in the RC Hall, 70 Cairngorm Crescent, Kincorth, meetings start at 8.00pm, visitors are welcome. Planned talks and events;
May 5th Junk sale
May 12th 2m PA project, by Steve GM0ULK
May 19th VHF/UHF Field Day planning
May 26th DIY spectrum analysis, by Bill Wilson
Jun 2nd Junk sale
For further details on the club, contact Martin GM0JCN, Tel. 01569 731177

Aylesbury Vale RS meet on Wednesday evenings in the Village Hall in Hardwick, located off the A413 between Aylesbury and Buckingham. Club diary;
May 3rd Discussion evening
May 17th Cellular radio technology, M. Knight
Jun 7th Packet radio and DX cluster, A Ralph
For further details and meeting times, contact Ivan Eamus G3KLT, Tel. 01296 437720

Basingstoke ARC meet on the first Monday of each month, 7.30pm, at the Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke, Hants. On the last Sunday of each month they usually have a 2m Direction Finding competition. Planned club diary;
May 1st Training and practice for 1995 VHF NFD
For further details, Tel. 01256 25517

Braintree and District ARS meet on the first and third Monday of the month (except bank holidays), 8.00pm, at the Braintree Hockey Club, Church Street, Bocking. 2m club net on the 2nd and 4th Mondays at 20.00 GMT, 145.375MHz. Planned club events/talks;
May 1st Operating evening
May 15th AGM
For further details please contact Margaret Andrews, Tel. 01376 327431

Bristol (South) ARC meet every Wednesday at the Whitchurch Folkhouse Association, Bridge Farm House, East Dundry Road, Whitchurch, Bristol. Club diary of events/talks;
May 3rd 20m activity evening
May 10th Building computers - Tech. upgrade
May 17th Aircraft video night
May 24th Club annual fox hunt
May 31st How to adjust and calibrate an HF rig
For more information and meeting times, Tel. 01275 834282 24hr answerphone.

City of Bristol Group meet on the last Tuesday in the month, 7.00pm for 7.30pm, at New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. Club diary of events/talks;
May 30th TVI 'kiss it better', by G3OUK
Jun 27th Half yearly EGM
Further details can be obtained from Dave Bailey G4NKT, Tel. 0117 9672124

Bromley and District ARC meet on the third Tuesday of each month, 7.30pm for 8.00pm at the Victory Social Club, Kechill Gardens, Hayes, Kent. Club net; Sundays 11.00am on 145.350MHz FM. Planned events/talks;
May 16th SSTV, by Alan G0TLK
Jun 20th Direction finding hunt
Further details from Alan Messenger G0TLK, Tel. 0181 777 0420

Bromsgrove ARC meet on the second and fourth Tuesday of the month at Lickey End Working Men's Club, Burcot, Bromsgrove. Club diary of events/talks;
May 9th AGM
May 23rd RSGB night
Jun 13th HF night on the air
Jun 27th Talk - how to go about DF hunting
Further details from Barry Taylor G0TPG, Tel. 01527 542266

Bury RS meet every Tuesday, 8.00pm, at the Mosses Centre, Cecil Street, Bury, Lanc's. CW classes available. Planned club diary;
May 9th Life on the ocean waves, G0PNL
May 16th RSGB video
May 23rd Technical forum
May 30th Inter-club quiz
Jun 13th Equipment specifications, G4KLT
Jun 20th Shack night
Jun 27th Technical forum
Further details from Laurence G4KLT, Tel. 0161 762 9308

Buxton ARC meet at the Lee Wood Hotel, Buxton, at 8.00pm on the second and fourth Tuesdays each month. Club diary of events/talks;
May 9th NOTA, Bob G0JNI
May 23rd Field day discussion
Jun 13th Treasure Hunt, Peter G0KLR
For further information contact Derek Carson G4IHO, Tel. 01298 25506

Cornish RAC meet on the first Thursday each month, 7.30pm, at Perranwell Village Hall, Nr. Truro. Planned club events/talks;
May 4th Homebrew HF linear amplifiers
Jun 1st HF aerials
For further details contact Robin G0MYR, Tel. 01209 820118

Denby Dale and District ARS meet at the Pie Hall, Wakefield Road, Denby Dale, W. Yorks, every Wednesday at 8.30pm. The first and third Wednesdays are lecture nights, alternate Wednesdays 'Noggin and Natter' nights. The club run RAE, Morse and NRAE courses, and is an accredited City & Guilds Examination Centre, at Shelley High School, Tel. 01484 424776 for details and application form. Planned club talks/events;
May 3rd Simple ATV 10GHz, by John G6GSV
May 14th Drayton Manor Rally coach trip
May 17th Sky update, Phil G4FSQ
May 24th Fox hunt
Jun 18th Club rally
Jun 21st Aerial clinic, Dave G0EVA
Further details from the Secretary, Kevin G1FYS, Tel. 01484 547553

Dragon ARC meet on the first and third Mondays of each month at the Four Crosses Hotel, Petraeth Road, Menai Bridge, at 7.30pm for 8.00pm. Visitors and new members are welcome. The club run several special event stations throughout the year. Club diary of events/talks;
May 1st Amateur Radio Videos evening
May 15th Creatures from the deep, by Dr. D. Last GW3MZY
May 28th Special event station GB2CPC, Penrhyn Castle
Jun 5th Uganda, Ted Evans
Jun 19th A spectrum analyser and 1001 uses for an oscilloscope, GW0ETF
Further details from the Secretary Tony Rees GW0FMQ, Tel. 01248 600963

Edgeware and District RS meet at the Watling Community Centre, 145 Orange Hill Rd, Burnt Oak, Edgeware, on the 1st and 3rd Thursdays of each month, starting at 8.00pm. Club nets; Mondays at 10.00pm on 1.976MHz and the last Sunday of the month at 9.15am on 3.775MHz. Morse Practice at 8.00pm at start of club meetings. Planned club diary;
May 11th EMC discussion
May 19th Straight key evening
May 25th NFD briefing, plus constructors cup
Jun 3/4th NFD, Copthall Stadium
Further details from Rod Bishop G0SQL, 99 St. Pauls Ave, Kenton, Harrow, Middx, Tel. 0181 204 1868

Farnborough and District RS
meet on the second and fourth Wednesdays of the month in the Elles room at the Farnborough Community Centre at 8pm. Planned club events/talks;
May 10th The Information Superhighway
May 24th Bring and buy evening
Jun 28th VHF NFD planning
For further details contact Andy Pevy G4XYW, Tel. 01344 761184

Grafton RS meet on the second and fourth Wednesdays each month, at The Holy Trinity Church Club Hall, Rear of Holy Trinity Church, Granville Road, London N4. New members and visitors always welcome. Planned club events/talks;
May 10th HF night on the air & CW practice
May 24th Receiver specifications, what do they mean?
For further information contact Rod Harrigan, G0JUZ, 7 Torrington Gardens, Bounds Green, London N11 2AB, Tel. 0181 368 8154

Halifax and District ARS meet at 7.30pm on the first Tuesday each month. at The Tap and Spile Pub (formally Royal Oak), Clare Road, Halifax, for committee and Morse tuition. On the second and fourth Tuesdays they meet, 7.00pm, at Queens Road (note Queens Road is closed for some periods at school holidays) .planned club events/talks;
May 16th Junk Sale (Queens Rd)
Jun 20th Magnetic loop aerials, Desmond G3ABS (Queens Rd)
Further details can be obtained from Mr. D. Moss G0DLM, Beechwood Lodge, Lightcliffe, Halifax HX3 8NU, Tel. 01422 202306

Hastings Electronics and RC meet every third Wednesday of each month for their main meeting, at West Hill Community Centre, Croft Road, Hastings, and every Friday for a social evening, at the Sea Anglers Club, 16 Grand Parade, St. Leonards. The club is a registered City and Guilds examination centre, and also run RAE, Novice and Morse courses. Planned club events/talks;
May 17th Measures for flying, G3MRS
Jun 21st Talk on the Global Positioning System (GPS) entitled "where are we going?"
For further details contact Reg Kemp G3YYF, Tel. 01424 830454

Hoddesdon Radio Club meet alternate Thursdays at the Conservative Club, Rye Road, Hoddesdon from 8.00pm. Visitors very welcome. The club run Morse training classes. Club diary of talks/events;
May 3rd Inter-club darts match at Chestnut Club
May 11th Planning permission, by Cllr. Jackson G3TZZ
May 25th Conducted tour of Hertfordshire Display Co.
For more information contact Dave G1CAY, Tel. 01992 460841

Horndean and District ARC now meet on the first and fourth Tuesday of each month, 7.30pm, at their new venue which is Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Club diary;
May 23rd EMC, by Nigel Gerdes G7CAW
Further details can be obtained from Stuart Swain, Tel. 01705 472846

Isle of Man ARS meet on Mondays, 8.30pm, at The Royal Naval Association, Regent Street, Douglas, the 1st Monday of the month being supplemented by 30-60 mins of general interest to members and society news, and on Thursdays they have an informal get together, 9.00pm, in The Manx Legion, Douglas Street, Peel. Planned club events/talks;
May 21st Garden Party Bring and Buy, bring along your items for sale - 10% goes to club funds
For further information contact Club Secretary Chris Wood GD6TWF, 2 Lyndale Ave, Peel, IM5 1JY, Tel. 842786

Keighley ARS meet at the Cricket Club, Ingrow, near Keighley every Thursday at 8.00pm. Many club meetings are 'Natter nights' and 'nights on the air', other events/talks include;
May 11th Fox hunt
May 25th Amateur Television demo, G3TQA
Jun 8th Treasure hunt
Jun 29th Cameo evening
Further details from Kathy Conlon G1IGH on 01274 496222

Leicester RS meet every Monday, 7.30pm, at The Chantry, Gilroes Cottage, Groby Road, Leicester. The HF and VHF shacks are available at each meeting, and have regular HF/VHF nights on the air combined with general natter evenings. The club also run RAE, NRAE and Morse courses. Planned club events/talks;
May 1st AOR wideband receivers, Richard G4NAD
May 22nd Constructors competition
Jun 5th Japanses Morse, Norman G3CSG
Jun 26th Ascension, 'The Radio Active Island'
For further details contact Stan Hay G3HYH, Tel. 0116 239 4367

Lincoln Short Wave Club meets every Wednesday night at the City Engineer's Club, Waterside South, Lincoln at 8.00pm, all are welcome. Their forthcoming diary of activities includes;
May 10th AGM
May 17th Visit to RAF Waddington
Jun 28th 'The man who was Q' - a video and talk by Mrs Fraser-Smith the widow of the James Bond star
Further details from Pam G4STO, Tel. 01427 788356.

Liverpool and District ARS meet at 8.00pm every Tuesday evening at The Churchill Club, Church Rd., Wavertree, Liverpool. They run RAE, Novice RAE and Morse courses. Planned club events/talks;
May 2nd Quiz
May 9th Club on the air
May 16th Military radio equip. of the former Soviet Block, G4WWX
May 23rd DF hunts (talk)
May 30th Surplus sale
Jun 6th QSL discussion
Jun 13th GX3AHD on the air
For further details contact Ian Mant G4WWX, Tel. 0151 722 1178.

Lothians Radio Society meet on the second and fourth Wednesdays each month, 7.30pm, at Orwell Lodge Hotel, Colinton Road, Edinburgh. Planned club events/talks;
May 10th DF hunt receiver tune-up/club project workshop
May 24th Top Band DF hunt, Braid Hills Hotel
Jun 14th AGM
Jun 28th Skittles night, members and partners
For further details contact Brian Howie GM4DIJ, Tel. 0131 337 7311

Maidstone YMCA ARS Meet at the YMCA Sports Centre, Melrose Close, Maidstone, Kent ME15 6BD. They run a Novice course on a Wednesday, and RAE and Morse courses every Friday. GB2CW is on Sundays, 8.30pm, 144.25MHz USB/CW, club net on same frequency at 9.05pm. Other nets of interest are 14.33MHz, 8.30am (Wed, Sat, Sun) USB/CW. 1.984MHz (+/- 20Hz), all modes net, 9.30am daily. Planned club events/talks;
May 6th RSGB Morse test
May 28th Club rally
Jun 9th AGM
Jun 16th Repair it - practical evening
Jun 23rd GX3YSC, GX3TRF, GX8TRF operator training evening
For further details call Brenda on 01622 850277

Mansfield ARC meet on the second Monday every month, 7.30pm, at The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. Visitors welcome. Planned club diary of events/talks;
May 1st AGM
For further details contact Howard G1JGY, Tel. 01623 423697, or Mick G0UYG, Tel. 01623 792243

Medway ARTS meet 7.30pm on Fridays at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham. Morse practice, construction and Novice help available. Club diary;
May 8th VE Day special event station
May 19th Getting started in contests
Jun 9th Junk sale
Jun 23rd Barbecue and Romanian evening
Further details from Gloria G3VUN, 40 Linwood Ave, Strood, Rochester, Kent ME2 3TR, Tel. 01634 710023

Norfolk ARC meet every Wednesday at The Norman Centre, Bignold Road, off Drayton Road, Norwich, 7.30 for 8.00pm start. Informal meetings are usually held on alternate Wednesdays, where it is a night on the air, construction QRP and Morse practice evening. Club diary of events/talks;
May 3rd GB3NB Repeater Group AGM
May 17th Radio navigation, G8MRQ
Jun 3/4th CW National Field Day
Jun 14th Visit to Norwich sorting office
Jun 28th Amateur Radio reminiscences, Victor G3JNB
Further details can be obtained from Mike G4EOL, Tel. 01603 789792.

Nottingham ARC meet every Thursday, 7.30pm. in the Sherwood Community Centre, Mansfield Road, Nottingham. Visitors interested in amateur radio, whether as a transmitting amateur or SWL, are most welcome. Forthcoming events/talks include;
May 4th Forum and night on the air
May 11th Junk sale
May 18th Fox hunt/ activity
May 25th Construction/activity
Jun 1st Radio and electronic beams
Jun 8th Forum and night on the air
Jun 15th Fox hunt/activity
Jun 22nd Visit to J. Needles power station
For further details contact Simon G0IEG, Tel. 0115 9501733

Plymouth Radio Club meet Tuesdays, 7.30pm, at the Royal Fleet Club, Devonport, Plymouth. Planned club diary;
May 28th Club rally
Jun 3rd Barbecue and Field Day
Jun 4th Field Day
For further details contact the Public Relations Officer, F. P. Russell, Tel. 01752 563222

Pontefract and District ARS meet every Thursday, 7.30pm, in the club room at the Carleton Community Centre, Carleton, Pontefract. Visitors and new members always welcome. They run Morse classes on Monday evenings, and Novice classes on Tuesday evenings. Planned club events/talks;
May 4th Mystery talk, by Bill G4ZVB
For further details contact Colin G0NQE, Tel. 01977 677006

Reading and District ARC meet on the second and fourth Thursdays, 8.00pm, at The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading, Berks. They run RAE and NRAE courses and are a registered C&G examination centre. They have a club library with a wide range of books on all aspects of Amateur Radio and related disciplines, a cross section of books are available at club meetings. Diary of events/talks;
May 11th EME the ultimate DX by Peter Blair
May 20th Christian Aid walk
Jun 3/4th HF NFD
Jun 22nd Electronic detectives, 'what's in the box', bring a DVM
Jun 29th Visit to Martin Lynch
Further details can be obtained from secretary Tony Canning G0OPB, Tel. 01734 698274 evenings.

Salop Amateur Radio Society meet at the Oak Hotel, The Mount, Shrewsbury every Thursday. They run regular RAE tuition and workshop evenings. Planned club diary of events/talks;
May 4th Junk sale
May 18th 2nd Fox Hunt
Jun 15th 3rd Fox hunt
For further details contact Ian G7SBD, 56 Roselyn, Harlescott, Shrewsbury SY1 4LP or via packet @ GB7PMB

Sheffield ARC meet Mondays, 7.30pm, at their new venue; Club 197, Brook Hill, Sheffield (this is the lecturer's social club opposite the main buildings of Sheffield University), and occasional Tuesdays for social events (times and venues set as required) . The club runs both RAE and Novice courses on Mondays starting at 7.30pm, plus Morse tuition when required. Planned club diary;

May 15th Club quiz
Jun 12th Annual DF hunt for club trophy, also DF quiz for members not in cars
Jun 26th Mid summer dinner, venue to be set

Further details via P. O. Box 365, Sheffield S1 1BY or Tel. 0114 2446282, or via packet to G0JJR (or G0TYO) @ GB7CWS

Southdown ARS meet on the first Monday each month (second Monday if first Monday is a Bank Holiday), 7.30pm, at Chaseley Home For Disabled Ex-Servicemen, Southcliff, Bolsover Road, Eastbourne, Sussex. Please enquire about RAE and Morse classes. Club net every Thursday, 9pm on 145.250MHz. Planned club talks/events;

May 1st Sound recording, by G0PQA
Jun 5th QRP - see it, buy it, build it, by G3TUX

Further details from John Vaughan G3DQY, Tel. 01323 485704

Southgate ARC meet on the second and last Thursdays of each month at the Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. Meetings are held each 2nd and 4th Thursdays of the month, between 19.30 and 22.00. The club also runs Novice licence courses and have regular 'on air nights'. Planned club diary of events/talks;

May 11th Talk - Meanwhile, what were the Germans doing?, by Marconi Historian Stan Woods
Jun 8th History of the Royal Navy Signals, by Ted G4NLR

For further details contact M. E. Viney G0ANN, 20 Auckland Road, Potters Bar EN6 3ES, Tel. 01707 850146.

Stourbridge and District ARS meet on the first and third Mondays each month, at The Robin Woods Centre, Scotts Road, Stourbridge. Planned club events/talks;

May 1st On air and natter night
Jun 5th Portable on air night, venue somewhere high

Further details from James French, G7HEZ, 2 Pepper Hill, Stourbridge, West Midlands DY8 1BJ, Tel. 01384 374354, or via packet G7HEZ @ GB7PZT

Stratford upon Avon & District RS meet on the second and fourth Mondays, at the Home Guard Club, Main Road, Tiddington, Stratford upon Avon, at 7.30pm. Club events/talks include;

May 8th Digital broadcasting
May 22nd 2m fox hunt
Jun 12th Open house/night on the air
Jun 26th Top Band fox hunt

Further details from Martin Rhodes G3XZO, Tel. 01789 740073

Surrey Radio Contact Club meet on the first Monday of each month at TS 'Terra Nova', The Waldrons, Waddon, Croydon, Surrey. Planned club talks/events;

May 1st Construction contest
Jun 5th Digital broadcasting, by the BBC

For further details contact Berni Wynn G8TB, Tel. 0181 660 7517

Mid Sussex ARS meet on the first and third Fridays each month, 7.45pm, at Marle Place Further Education Centre, Leylands Road, Burgess Hill, West Sussex. Club shack open all other Friday evenings. Club net; Sundays 8.00am 3.740MHz (+/- QRM), 11.00am 145.350MHz FM, 8.00pm 70cm Novice net on GB3HY, Mon & Fri 9.00pm 28.400MHz SSB. Club diary;

May 5th Novice night, CTCSS for your PMR

Further details from Chris G0GMC, Tel. 01273 842937

Sutton and Cheam RS meet on the first Thursday (natter night) and third Thursday (formal meeting) each month, 7.30pm for 8.00pm at the Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Club 'natter freq' 70.3875MHz, Club nets; 20.30 Mon starting on 145.500MHz then QSY, Tue at 10.30 on 3.760MHz. Club talks/events;

May 18th AGM
Jun 2/3rd HF National Field Day
Jun 15th Junk sale

For further details, Tel. 0181 644 9945

Torbay ARS meet every Friday at the ECC Social Club, Highweek, Newton Abbot at 7.30pm. They have informal meetings most Fridays with a talk/event once a month, details as follows;

May 19th Junk and 90/10 sale
Jun 23rd Modern telecomms., by G3YCH

Further details can be obtained from Walt G3HTX, Tel. 0803 526762, or Peter G4VTO, Tel. 01803 864528 (Day Works no.)

Welwyn and Hatfield ARC meet on the First and Third Mondays each month, 8.00pm, at The Hyde Community Association Hall, Holly Bush Lane, Welwyn Garden City, Herts.

May 15th Aerial measurements, G3LDO
Jun 3/4th HF Field Day
Jun 5th QSL Bureau - RSGB John Hall G3KVA
Jun 19th Foxhunt

For further details Tel. 01920 462241 (evenings) or 0181 982 7298 (day)

Wimbledon and District ARS meet on the second and last Friday each month, at St Andrew's Chrich Hall, Herbert Road, Wimbledon SW19. Planned club events/talks;

May 12th Book bring and buy
May 26th Equipment workshop, G6DPS
Jun 9th On air, general activity evening
Jun 30th How does it work, questions and answers

For further details contact Michael McCarthy G0AWQ, 32 Hillside, Banstead, Surrey SM7 1HF, Tel. 01737 351313

Wirral ARS meet 8.00pm, at The Club Room, Ivy Farm, Arrowe Park Rd., Wirral L49 5LW, on the first and third Wednesdays each month, meetings besides those below are usually 'natter nights'. The club tell us they don't have an RAE course running at the moment, but plan to start one in early August on a Thursday evening. Planned club events/talks;

May 3rd Audio (part 2), by Cedric Cawthorne G4KPY
May 10th Committee meeting
May 17th Visit to Newton le Willows ARC, see and try the latest gear
Jun 7th Visit to Liverpool C.E Cathedral, see the highest VHF/UHF point in Liverpool
Jun 21st Visit to the Mersey Tunnel control room

For further details contact Alec Seed G3FOO, 31 Withert Ave, Bebington, Wirral L63 5NE, Tel. 0151 644 6094

Wirral and District ARC meet at 8.00pm, at the Irby Cricket Club, Mill Hill Road, Irby, Wirral every second and fourth Wednesday each month, and have regular D&W evenings every first and third Wednesdays at various other locations. Planned club events/talks;

May 10th Massage and reflexology demonstration
May 31st Practice DF hunt, 8pm at Heswally lay-by

For further details contact Bob Smith G4NCI, Tel. 0151 677 0210

Worthing and District ARC meet every Wednesday, 7.30pm for 8.00pm, at the Parish Hall, South Street, Lacing. Planned events/talks;

May 3rd Discussion evening
May 10th Amateur Television, G8DHE
May 17th G3WOR on the air
May 24th Printing QSL cards, G3LQI
May 31st Discussion evening
Jun 7th Ron's travels in the USA, G8VEH
Jun 14th Playing aerials, G3NDJ
Jun 28th Club history, G8MSQ

Further details from Roy Bannister G4GPX, Tel. 01903 753893

Yarmouth RC meet on Thursdays, 7.30pm, at Drill Hall, York Road. They run Novice and RAE courses, with instruction by David G3OEP the Senior Instructor for Norfolk, and Les G3YYQ. The club have regular informal evenings, other planned club events/talks;

May 4th Mechanical TV, G3OEP
May 18th Van maintenance party
Jun 1st Contest preparations
Jun 3/4th National Field Day

For further details contact Tony Besford G3NHU, Tel. 01493 721173

Yeovil ARC meet every Thursday at 7.30pm, at the Red Cross Centre, 72 Grove Avenue, Yeovil, Somerset. The club run a Novice and RAE course, all are welcome. Club nets, Sundays 10.30 on 3.665MHz (80m SSB), Tuesdays 20.30 on 145.350MHz (2m FM) and Fridays 20.00 on 3.550MHz (CW). Club events/talks;

May 11th RAE enrolment night towards December exam
Jul 30th Barbeque and fun day at the QTH of G3PCJ, all radio clubs within easy reach invited

Further details can be obtained from Cedric White G4JBL, Tel. 01258 473845

National and International

British Amateur Radio Teledata Group (BARTG) have a quarterly magazine, and hold a rally plus three contests each year. For details of joining the BARTG, their membership officer is Peter Adams, G6LZB, Tel. 01923 220774, for other information the group's Secretary is Ian Brothwell G4EAN, 56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ, Tel. 0115 926 2360, or via packet G4EAN @ GB7BAD.

G-QRP Club publish a quarterly journal devoted to low power communication, and hold regular get-togethers at their rally stands throughout the country. for membership details, contact their Secretary Rev. G. Dobbs, St. Aiden's Vicarage, 498 Manchester Road, Rochdale. Lancs. OL11 3HE. Tel. 01706 31812.

International Short Wave League who as well as running an International QSL bureau for amateurs and SWLs, have a monthly magazine and regular get-togethers at their rally stands plus several on-air nets on HF and VHF. They would like us to let readers know that they plan to have a stand at the following rallies during 1995; Norbreck (Blackpool), All Micro Show (Staffs), Plymounth, Elvaston Castle, Longleat, Cornish ARC rally, Staffordshire Hamfest and TARRG in Telford. ISWL members will be on hand to answer any questions, and ISWL guides and publications will also be on sale. For more details send an A4 sized SAE to; ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire. CW7 3LA

The Irish Radio Transmitters Society send out regular newsletters giving details of local activities, and publish the yearly IRTS callbook, they also have a video library. The contact man is Dave Moore EI4BZ, 12 Castle Ave, Carrigtwohill, Co Cork. Tel. (Eire) 021 883555.

Radio Amateurs' Emergency Network (RAYNET) can be contacted at Hunters Moon, Newton le Willows, Bedale, N. Yorks DL8 1SX. The RAYNET Training Team can be contacted at P. O. Box 2, Chinnor, Oxon OX9 4JY, they produce a quarterly newsletter for people interested in the National Training Scheme.

Radiocommunications Agency are the radio licensing authority for the UK. They have a large number of free publications, including the booklet 'How to Become a Radio Amateur', and their 'Novice Licence Information Sheet', and can offer advice on general aspects of licensing. They are based at Waterloo Bridge House, Waterloo Road, London SE1 8UA, The general enquiries point and switchboard service Tel. 0171 215 2150 is manned between 8.30am and 5.30pm Monday to Friday, with an automatic 'voicebank' and 'faxback' service outside these hours.

Radio Society of Great Britain are based at Lambda House, Cranbourne Road, Potters Bar, Herts. EN6 3JE, Tel. 01707 659015. They have a unique blend of full-time staff at Potters Bar coupled with many volunteer officials around the country, and can help members with many aspects of amateur radio.

Subscription Services Ltd. handle the issuing of amateur licenses in the UK, on behalf of the Radiocommunications Agency. They can help regarding enquiries concerning individual licences rather than general licensing matters (which the RA handle, see above). Contact details; The Radio Licensing Centre, SSL, P. O. Box 884, Bristol BS99 5LF, Tel. (manned 8.30am - 10.00pm, Mon-Sat inclusive) 0117 9258333.

To include your club, or rally, in this feature, make sure you send us your events details early. We only list active clubs, i.e. those who send us their diary of planned talks/events, (due to space restrictions we can only include clubs who send us details of events and talks, not natter nights for every meeting) so if they're not listed here they're obviously not very dynamic! Is your club listed - if not then either give your Secretary a boot or get some activities going! If your club also has a regular 'net', let us know, we'll let your prospective members know! ***Dates to be included in the issue published on the 7th July must reach us by the 22nd May*** *(unfortunately we cannot guarantee to include details received after this date, a lot of clubs are being missed out because their details arrive too late), addressed to;* ***The Editor, Ham Radio Today (Club News), Nexus, Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST****, or you can fax your club's details direct to the Editor's desk on 01703 263429.*

Rallies

If you're travelling a long distance to attend rallies, we recommend you contact the organisers of the events first, before travelling, to check if there has been any changes since this magazine went to press.

May 6th

Dartmoor Radio Rally, Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Parking for 600 cars, access for disabled, playground for children, trade stands, bring and buy, etc., refreshments, doors open 10.30am, talk-in on S22. For further details contact Ron, Tel. 01822 852586

May 14th

Dunstable Downs Radio Club Annual Amateur Radio Car Boot Sale, Stockwood Country Park, Luton, Nr. Junction 10 M1, 10am to 5pm, talk-in on 2m. Attractions include open day, environmental exhibits, side stalls, free entry to the Mossman Collection of Horse Drawn Vehicles, Craft Museum, train and carriage rides, and much more. For plot details, Tel. 01582 451057. Pre bookings for plots until May 11th. Plots can be purchased on the day

May 20th

The Ipswich Computer Show, Willis Corroon Sports and Social Club, The Street, Rushmere St Andrew, Ipswich. For further details, Tel. 01473 272002, Fax. 01473 272008

May 21st

Yeovil Amateur Radio Club QRP Convention
Featuring talks on amateur radio topics, display of vintage wireless equipment, construction challenge, and the usual traders. This year the convention's scope has been widened to include a 'Novice and Beginner's Corner', with displays and information on obtaining Novice and full licences including practical displays of test sets and home brew equipment. Further details, including convention location and directions, from George Davis G3ICO, Tel. 01935 25669.

May 28th

East Suffolk Wireless Revival
'The Ipswich Rally', Maidenhall Sports Centre, Stoke Park High School, Maidenhall Aproach, Ipswich, Suffolk. Trade stands, car boot sale, bring and buy, drive in aerial test facility, radio check facitity, international and local club stands, Novice licence City and Guilds entry, vintage wireless show, non-radio traders, improved disabled access, refreshments and bar, ample parking, talk-in on S22 GB4SWR. For further details contact Bob Baal G7HZV, Tel. 01394 271257 or 01473 645885

Maidstone YMCA ARS Rally, YMCA Sports Centre, Melrose Close, Maidstone, Kent (off Cripple St. Loose, 300yds south of Maidstone fire station). Doors open 10.30am (free entry at 10am for severely disabled visitors), entry £1.50, snack bar, all day video plus free sweets and drinks for children, outdoor table available for hire, talk-in on S22, 10FM and SU22. Free pre-rally camping and caravan facilities (Tel. 01622 743317). For further details contact Ian Wilson, Tel. 01622 630000 before 9.30pm.

June 4th

Spalding Amateur Radio and Computer Fair, Springfields Exhhibition Centre, Spalding, Lincs. Admission £1. Refreshments available from 7.30am, car boot pitches, two large halls, ample parking, plus visitors can also visit the Springfield Gardens at no extra charge. Open 10am until 5pm. For further details contact the Spalding & District ARS, Chespool House, Gosberton Risegate, Spalding, Lincs PE11 4EU, or Tel. 01775 750382

June 17th/18th

Bletchley Park Computer and Radio Rally, in the grounds of the former top secret government code-breaking and intelligence centre at Bletchley Park, Bletchley, Milton Keynes, Bucks, where there is also a wartime and computer museum. We're told there will be two huge marquees with large trade presence, and that admission to the rally will be included in the normal price of admission to the museum. Further details from RadioSport Ltd., Tel. 01923 893929

June 18th

Denby Dale and District ARS Rally Shelly High School, Skelmanthorpe, Huddersfield, West Yorkshire. Bring and buy, refreshments, bar, Morse tests, single level, talk-in on S22 and SU22. Further details from the secretary, Kevin G1FYS, Tel. 01484 547553

North of Scotland Amateur Radio Convention The organisers have informed us that this event has been cancelled

June 23rd-25th

International "Ham Radio '95" Rally at the Messe, Friedrichshafen, Germany, on the banks of the Bodensee (Lake Constance). Widely recognised as Europe's largest gathering of amateurs, the event features a huge trade exhibition, lectures, on-site camping and caravanning available. Details from Messe Friedrichsafen GmbH, Meistershofener Str. 25, D-88045 Friedrichshafen, Germany, Tel. INT+49 7541 7080, Fax. INT+49 7541 75290.

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nicads, charger, mic, case, handbook, £125. Drake T4XC R4-C, matching MS4 speaker, AC4 PSU, WARC plus Top bands, handbooks, leads, mint, £760. Mr. MacCourt (Dover), Tel. 01304 373101

'As new' Icom equipment: IC-2KLPS power supply, IC-PS30 system power supply, IC-735 HF transceiver, IC-2KL solid state amplifier, IC-AT500 HF auto aerial tuner. Any offer considered. Mr. Bindloss (Fareham, Hants), Tel. 01329 667071

MFJ948 Versatuner Mk2 ATU, as new, boxed, unwanted gift Christmas 1994, £100, buyer collects or postage extra. David Burton, 100 Carden Hill, Hollingbury, Brighton, E. Sussex BN1 8DB. No time wasters please.

Weatherfax HFFAX 7.0 with modem, instructions, boxed, runs on PC, £50. D. Gray (Southampton), Tel. 01703 207100

Alinco DJ-560 dual band FM handheld transceiver, all the usual whistles and bells! Plus spare battery holder and charger, VGC, boxed, £199. Hustler five band vertical, 80m to 10m, nine months old, VGC, £99. John (Coalville, Leics), Tel. 01530 838377

Racal 5820 99 119 6959 receiver. Trio 9R59DS receiver. K. Monaghan (Manchester), Tel. 0161 223 5332

Atari STE 1 Meg, 3.5in external disk drive, high resolution mono monitor, mono printer, screenbeat speakers, Forget Me Clock II, mouse, joystick, excellent condition, some software included, £300, buyer collects. Tony (Wirral), Tel. 0151 608 7417

Yaesu FT-101E, ATU, matching Yaesu speaker, superb HF rig, mic, manual, power lead, very good condition, £230 ono. Mark (Blackburn, Lancs), Tel. 01254 249401

Yupiteru MVT-7100, one year old, excellent condition, cost £450 new, full manuals etc., offers to; Dave (S. Tyneside), Tel. 0191 430 1719

Navico AMR1000 2m FM transceiver in original packing, excellent condition, ideal packet or mobile, £110 ono. John G6DCH (Horley, Surrey), Tel. 01293 775702

Yaesu FC-757AT auto ATU with lead and manual, genuine reason for sale, £125 ono. G7SVF (Isle of Wight), Tel. 01983 280313

Yupiteru MVT-7000 scanner, 3 months old, boxed with nicads, adaptor, case, desk top stand, additional wideband aerial and cigarette lighter adaptor, all as new, £240 ovno, buyer collects. Tony (Wirral), Tel. 0151 608 7417

Eddystone 770U Mk2/2 in fair to good condition, £85 cash. Alf (Birmingham), Tel. 0121 475 8647

Trio R-1000 communications receiver, 200kHz to 30MHz, AM, SSB, CW, any reasonable offer. Also Lowe UL-1000 variable gain tuned preamplifier, high Q loop aerial, 500kHz to 1.6MHz, offers. R. Chilton (Kingswinford), Tel. 01384 274660

Clearance: Kenwood TH-78E dualbander with soft case, CTCSS, VGC, £330. FT-901DM, 100W HF, with mic, manual, VGC, £380. Yaesu FT-280 (VHF), same as FT-480R multimode, 10W, manual, mic, immaculate, £250. Wanted - FT-767GX 6m, 2m, 70cm modules. Joe Chan (Cumbernauld), Tel. 01236 720204

Datong Morse keyboard, VGC, £60 ono. Star Masterkey keyer MkII, VGC, £45. R. Howes (Weymouth), Tel. 01305 777494

Hy-Gain 4ele 20m monoband beam, as new, never assembled, boxed, no room. Paid £439, will accept £280. (Neath). Tel. 01792 817957

TS-520 SSB transceiver, Trio ATU, Kenwood 520 speaker, Kenwood VFO-520, Kenwood 2m transverter, all boxed with manuals, £550 ONO. (Canterbury). Tel. 01227 860654 evenings.

FT-101E, good working order and condition, £260. Liner 2 2m SSB 10W, £60. CR100 1952 working £55. R1475 working no PSU, £40. Yaesu FTV-250 10-2m transverter, suit FT-101 or TS-430S, £75. Minimitter RF converter, 80-10m, 1500kHz IF, mains, £25. (Worcs). Tel. 01562 743253.

Yupiteru MVT5000 handheld scanner. 25-550, 800-1300MHz. Excellent condition, boxed with accessories, just over 1 year old, £160. (Chesterfield) Tel. 01246 272346

Kantronics KPC-3 TNC, four months old, in box, as new, £95 ONO. Realistic PRO-2005 scanner, 25MHz to 1300MHz, VGC, £140 ONO. (Surrey) Tel. 01252 332035 evenings and weekends.

Cushcraft AP8A eight band HF vertical, £100. Gould Advance dual trace oscilloscope, GWO, RS probes, £40. AKD HF wavemeter, £25. SEM 2m 1kW transmatch, £25. Wanted; cheap packet TNC or BayCom unit. (Great Yarmouth), Tel. 01493 853089

Trio-Kenwood R600 receiver, 150kHz to 30MHz, AM/SSB/CW with digital readout, unmarked mint condition, complete with manual and original packing, £175. (Bradford) Tel. 01274 619333

Icom IC-740 HF transceiver boxed, manuals, FM, OIRO £500. Icom IC-240 2m transceiver, good condition, OIRO £175. Kenwood R-1000 receiver, manual, good condition, OIRO £275. Alan GI6PYP (Co. Fermanagh) Tel. 01365 328681 after 6.00pm and weekends.

Shack Clearance. Trio TS-530SP HF transceiver, SP-230 matching speaker, VFO-240 remote VFO, AT-230 aerial tuner, SM-220 station monitor scope, MC50 desk mic, LF-30A LPF, R-600 HF communications receiver, all VGC, bargain £700 the lot. Chris (Cardiff), Tel. 01222 790463 after 7.00pm

Tiny-2 TNC, hardly used, £85 including all necessary cables and connectors. Tokyo 'Hy-Power' linear, FM/SSB 3W in 25W out. Liner 2 SSB VHF transceiver fitted FET front end, 8W output. (Lichfield) Tel. 01543 263608 anytime.

Eddystone receiver model 640, good condition, working, £50. Radio television servicing manuals, five volumes 1949-1954 Newnes, £10. Harry 2E1CZG (Essex), Tel. 01708 746731

AR-2002 desktop scanning receiver 25-550, 800-1300MHz in excellent condition, £225. (Hayle). Tel. 01736 757721

Jaybeam MM3 MiniMax 10, 15, 20 tribander, excellent condition, 18 months old, £175, buyer collects. ICS all-mode terminal unit AMT-2 with Commodore computer PSU and leads, £55 (Kent). Tel. 01474 823797

ER BP34, as new, £75 ONO. Ron G3BKL, 11 Greatcroft, Firsdown, Salisbury SP5 1SN, Tel. 01980 862489

Skyscan Aerial magmount, new, boxed, £20. 2-way coaxial switches £15. Yaesu FRA active aerial, £40. Yaesu FRT ATU, £35. Buyer collects or sent COD. (Morecambe). Tel. 01524 833506

WANTED

Sony CRF330K, Collins receiver. R. Rai (London), Tel. 0181 813 9193

Auto tuner AT-250, also 430S mic. (Derbyshire). Tel. 01283 221870

DC to DC KW-2000 mobile PSU in working order, also mains PSU for same in working order. Andy (Derbys), Tel. 01159 308096

For TR-2200G, information, circuit diagram, both TX and RX crystals, possibly any other bits. Please ring Ron G3BKL (11 Greatcroft, Firsdown, Salisbury SP5 1SN), Tel. 01980 862489

Dead or alive, KW77 RX speaker for same and loan or buy manual any condition. Can collect or any carriage. Please contact John G4LEX (Harrogate, North Yorks) after 6.00pm, Tel. 01423 567390

Newly licensed student desperately seeking to go on 2m FM. Offers on synthesized mobiles and handhelds seriously considered. Reasonable prices paid. Contact Ryan Stacey G7UIW (Peterborough), Tel. 01733 264328 after 5.00pm, if not available please leave message for a prompt reply.

Racal RA17 general coverage receiver or AR88, or Eddystone, must be in good condition and working, for SWL. Arthur, (Bexhill, East Sussex), Tel. 01424 217494, if not at home please leave details and I will return your call.

Will anyone donate or sell very cheaply a 70cm UHF TNC for an IBM compatible PC. Mr. R. W. Moore, 15 Burnett Rd., Christchurch, Dorset BH23 2DL

Standard C468 accessories, mainly CTCSS tone squelch (CTN160) or if anyone knows who's dealing in Standard equipment please call. Also wanted ex-PMR handhelds, Motorola, Philips, Pye etc. (Suffolk). Tel. 01502 508798 after 6.00pm.

Kenwood AT-130 ATU, also YK-88SN SSB narrow filter for TS-430S. Dave (Birmingham), Tel. 0121 558 3522

Pensioner requires coils, Wearite or Denco, valve types for homebrew project. Not too expensive. Mostly short wave 1.6 to 30MHz. Rob G8BSK (Southampton). Tel. 01703 552247

Any Ham Radio software for Amsrad PCW9512 plus must be 3.5in disk. Geoff (Kent), Tel. 0181 658 2440

Eddystone Receivers, models EC10, EC10MkII, EB35, EB36, EB37, 960, 870, etc. Diecast speaker, 'S' meter, wartime civilian receiver. Pye small transistor with watch incorporated. For cash, collection possible. Peter Lepino (Surrey), Tel. 01374 128170

Eddystone 145MHz
guide 1958 (pub), buy or borrow. Mr. P. Woolard, 33 Oslo Gardens, Danesholmes, Corby, Northants NN18 9DS

HP141 plug-in
type HP8555A. Info on TAR communications 2m/70cm vertical or company location now. Details to G3XGK (Suffolk), Tel. 01502 564160 evenings.

FT-767GX 6m,
2m, 70cm modules. Joe Chan (Cumbernauld), Tel. 01236 720204

EXCHANGE

Eddystone 888, and EC10 receivers, diecast speaker S-688, S meter 669. Exchange all of above for Yaesu FRDX-400, or FLDX-400. All of above in good working order. Dave Haigh (W. Yorks), Tel. 01422 244274 daytime, or 01422 244581 evenings.

Trio TS-430S, 0-30MHz full send and receive, all-mode inc. FM, mint condition and boxed, exchange for 486 PC full system in same condition. 104 Everill Gate Lane, Broomhill, Wombwell, Barnsley SY3 0YJ. Tel. 01226 759961

Three 6KD6's, boxed, little used, exchange for HF aerial tuner unit or Himound HK707 Morse key or 40m mobile aerial or any HF amateur gear. (Camborne, Cornwall). Tel. 01209 832154

Yaesu FT-101E 160-10m, fan, mic, Yaesu FRDX-400 HF 2m and 6m receiver, military R216 VHF receiver 19-157MHz FM, CW, AM, swap all for FT-102 transceiver. JR, 38 Ochilview, Devonside, Tillicoultry, Clacks, Scotland FK13 6JD, Tel. 01259 752937

Zycomm FM9000 4m conversion, 6 chan 3W output crystalled 70.260, 70.450, fast charger, flexible aerial, soft carry case, VGC. Badger HamFax board plus software, open to offers of exchange so WHY? Interested in UHF PMR for packet. Contact Alistair GM4UQD (Livingston, West Lothian), Tel. 01506 467351

Yupiteru 7100 HF/SSB scanner, 500kHz to 1300MHz coverage, includes case and spare nicads. Excellent condition, exchange for FT-290RII or sell £275. Dave G7SQY (Peterborough). Te;l. 01733 574725 evenings, or 01973 256993 9.00am-6.00pm

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Name ..... Signature .....

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2. You should use our classified ads section (rear pages of this magazine) for ads not fulfilling these conditions. Our advertising department (Tel. 0442 66551) will be pleased to accept prepaid ads.

3. All that is to be reproduced in the advertisement should be entered on the form printed periodically in the magazine. Advertisements must be no longer than 40 words, including contact information. Ensure you mark your form either 'Helplines', 'For Sale', 'Wanted', or 'Exchange'.

4. All advertisements **must** include either a contact telephone number (with STD code) and location (e.g. town or county) or a full address, or both for readers to reply, these details must be included **within** your advertisement. The Editor reserves the right to add a town/county location where this has been omitted. The term **QTHR** will **not** be published as many readers cannot use this. If entered the Editor reserves the right to either reject the advertisement or to add any published callbook address, however no guarantee of this nor its accuracy is given.

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6. Advertisers must fill in their names, addresses and (optionally) telephone number in the space provided, these details will not be published. Advertisers must sign the form to indicate acceptance of these conditions. Ads submitted without a form (a posted photocopy or alternatively a faxed coupon is acceptable), full address, or a signature will be rejected.

7. The submitted advertisement must be either written in block capitals or typed.

8. Advertisements will be inserted as and when space becomes available, on a first come first served basis, subject to these conditions. Please be patient though, we have limited space in which to publish free ads each month. If you cannot wait and require a guaranteed insertion, you should use the pre-paid classified ads section at the rear of the magazine.

9. We cannot be held responsible for printers' errors, however we will attempt to ensure that legible submissions are reproduced correctly. In the event of a gross error, at the request of the advertiser and at the Editor's discretion, a corrected version of the advertisement will be printed in the earliest issue in which space is available.

10. Neither the magazine nor its publishers will accept any responsibilty for the contents of the advertisements, and by acceptance of these conditions the advertiser undertakes to indemnify the publisher against any legal action arising out of the contents of the advertisement.

11. Advertisements are accepted in good faith, however the publisher cannot be held responsible for any untruths or misrepresentations in the advertisement, nor for the activities of advertisers or respondents.

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30.000-87.495	5.0kHz	n.f.m.
87.500-107.995	50.0kHz	w.f.m.
08.00-136.995	12.5kHz	a.m.
37.000-224.995	5.0kHz	n.f.m.
225.000-400.000	12.5kHz	a.m.
400.005-520.000	12.5kHz	n.f.m.
760.000-1300.000	12.5kHz	n.f.m.

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IC-Z1

Special Agent in the field

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To help you to store station names etc., alphanumeric notes can be programmed into each memory channel and displayed together with the operation frequency.

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- Twin tuning dials for both main and sub-band control.
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- V/V and U/U for simultaneous 2 signal receive capability in the same band.
- Large memory capacity of 100 channels (50 channels for each band).

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