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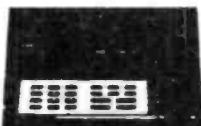


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HAM RADIO TODAY

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LETTERS

Letter of The Month

Get Stuck In To Johns Stamp Collection!

Dear HRT, Thank You A few months ago you may recall running my (*Free Readers...*) advert, which was a request for new and used postage stamps. Well thanks to you and other radio magazines — the response has been overwhelming, with many amateurs from all corners of the world sending me stamps. I have received many letters from Hams asking if I want them to keep sending stamps — the answer to this question is a big Yes, we still need many more stamps if we are to buy a rig for our disabled friend.

After consulting my fiancee and other members of our household we've decided that we will continue to save and sort the stamps that come in, for as long as they continue — we can always use them to buy for others less fortunate. As mentioned earlier I've

received many, many letters from people asking how the project is progressing — it time and postage money was no barrier I would enjoy nothing more than to sit down and reply to each and every one. So I would be more than grateful if you could inform all readers that I'm still collecting and enjoying it, and wish to express my sincere thanks to all who have taken the time to help. Thank you also — for a most interesting magazine.

John Allsop, G4YDM

We're delighted to hear that the project is going so well — and it makes such a nice change to find somebody helping others. We'll be sending on our small contribution to the project in the shape of a £20 cheque. Readers who missed John's Free Ad and would like to participate should send their stamps to:

John Allsop, 30 Manor Park, Concord Village, District 11, Washington, Tyne & Wear NE37 2BT.

Are You Really Insured?

Dear HRT, I am writing to tell you about a subject that should be close to all radio enthusiasts, and that is insurance.

I saved up for two years to pay for a transceiver so that as soon as I passed my exam I could go onto the air. I spent my hard-earned cash on a TS940S in a non-working state, so off to Lowe Electronics it went for repair. About three weeks later it was returned working and looking like new — great I thought, now the next thing, get it insured. I popped into my building society who then arranged the best insurance policy for me, great — no worries.

Six weeks later I was burgled, my flat was torn apart and vandalised and my precious TS940S was gone. Next day I went to my building society to see if I was covered, yes they said, good I said — nothing to worry about. Two weeks later and after endless trips to and fro from my building society and the consumer advice centre I

RAE CLASSES 88 — 89

BRISTOL

W Bristol Adult Education Area,
Stoke Lodge,
Shirehampton Road,
Stoke Bishop,
Bristol

Course Tutor: B E Carr, G4UHQ.
Details from Anne Mitchell on
Bristol (0272) 683112.

RAE Course starts 26th Sept
each Wednesday from 7 to 9pm
for the May '89 RAE.
Morse Course starts 26th Sept
each Monday 7 to 9pm.

Fee: Each course costs £36.60p
Reduced fees available.

CLACTON

Clacton Adult Education Centre
Green Lodge
180 Old Road
Clacton on Sea
Essex

Course Tutor: Jeff Harris, G3LWM
Contact: Clacton on Sea 424151

RAE Course
Enrolment begins during week
commencing 12th Sept, Course
Tutor available for specific
questions on Wed 14th Sept

FARNBOROUGH

South Farnborough Centre,
Wavell School,
Lynchford Road,
Farnborough
Contact: Sally Rogers on (0252) 26096 from 5th September.

RAE Course and Morse Course
RAE course commences Thursday
22nd Sept, Morse course starts
Mon 19th Sept.

GUILDFORD

Guildford College of Technology,
Stoke Park,
Guildford,
Surrey

Contact: Brian Purse, G1RNV during normal college hours for further
details on (0483) 31251.

RAE Course starts 12th Sept
each Monday from 6.30 to 8.30
for May '89 RAE.
Enrolment on 5th & 6th Sept
2 till 4 & 6 till 8pm.

HARWICH

Harwich Centre,
Adult & Youth Education,
Main Road,
Dovercourt,
Essex

Course Tutor: Jeff Harris, G3LWM
Contact: Harwich 2467

LONDON — HENDON

Hendon College,
Corner Mead,
Grahame Park,
Colindale,
London NW9 5RA

Course Tutor: Tony Essex
Contact: 01 200 8300 (for enrolment).

LONDON — ILFORD

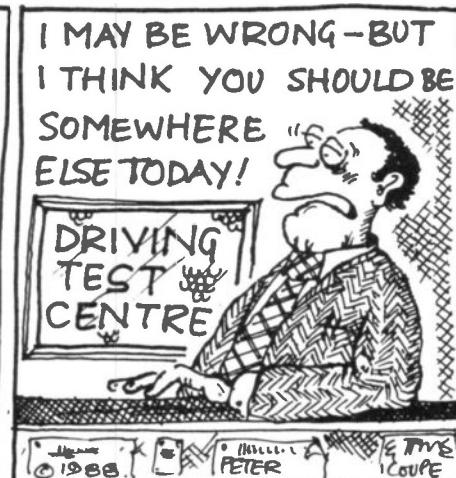
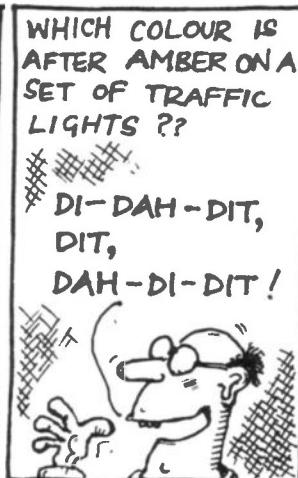
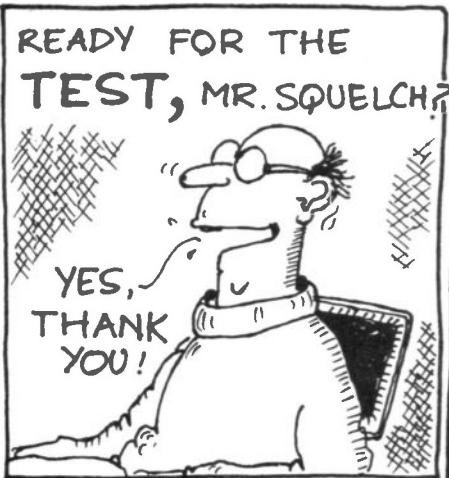
Barking R & E Soc.
commencing September.

Contact: Paul Greener, G4ULK on 01 553 1172 or QTHR.

MANCHESTER

Reddish Vale Evening Centre,
Reddish Vale Road,
Stockport,
Cheshire SK5 7HD

Course Tutor: Dave Wood, G4UJD
Contact: G4UJD on 061 480 9157 (available most evenings).



eventually found out that I wasn't insured. In money terms I had lost about £5,500.

All I can say is the following, if you love your gear as much as I did then get it insured and make sure it is insured. You have been warned by my experience.

Shaun Imms, Birmingham

A sobering tale indeed, and something of an indictment of the so-called professionals who obviously didn't take the time to properly cater for the insurance needs of their customer. I can only echo Shauns advice and urge operators to make very sure that their gear is adequately insured — as equipment becomes smaller and lighter it also becomes increasingly liftable and more expensive to replace. — G4IRQ

Where's the Microscope?

Dear HRT, With reference to the article in the July issue of *HRT '2M Repeater Utility for the BBC Micro'* may I plead with you that future similar articles, which include a listing, should be set in normal size type. I had to resort to a watchmaker's eyeglass to decipher the programme. Even better would be to offer for sale a copy of the program on disc or tape.

You will perhaps be aware that the age distribution for radio amateurs shows a preponderance of members in the older age groups and sight does tend to become less acute as the years take their toll.

I have one minor criticism of John Beaumonts program; I suggest it would be improved by including and extra option 'EXIT' in the Menu, to restore the normal operating system after using the utility. (The normal 'BREAK' is disabled and it is necessary to use 'CTRL/BREAK' or switch off to allow an alternative program to be loaded.)

I took up computing as a hobby in retirement and this year have taken the Amateur Radio Examination as I hope

to explore RTTY applications, etc. I hope you will publish further articles covering such applications.

S H Sheppard, Stoke-by-Nayland

Fair comment Mr Sheppard, we must admit that the listing was a bit of an 'eye-sore' in both senses of the word, in future we will endeavour to make the listings clearer. As for making programs such as these available on cassette or disc we will certainly consider the possibility if there is sufficient demand from our readers, and needless to say we would also welcome software contributions of a ham radio nature for any popular home micro. — G4IRQ

Offering a Helping Fist!

Dear HRT, I have just received my copy of *HRT*, August edition, and I read with interest the letter from Mr A M W Cattle (Outsiders View).

If you would be kind enough to pass my name, address, phone no. etc on to Mr Cattle, I would be only too happy to try to help him. I am at present helping some ham friends of mine to study for their CW test, and I have made up a couple of units for individual CW tuition which I think Mr Cattle might find useful.

I should like to offer my little contribution to the hobby by actively encouraging new blood.

Many thanks for a super mag.
Brian Wells, GOJEZ

LETTER OF THE MONTH

Dear HRT, I was astonished by Martyn Bolts letter proposing the next AGM of the RSGB should be held in Cleckheaton Town Hall. I had no idea Cleckheaton was the centre of the UK!

The RSGB should, however, consider my locality (Brecon, Powys). Not only would Bwlch Village Hall be much cheaper to hire than Cleckheaton

I'm sure that your kind offer of help will be greatly appreciated Brian and trust that you won't mind us printing your phone number just in case your aren't QTHR — the number is (0705) 813130.

Nowhere Nicer than Norwich

Dear HRT, I fully endorse your reply to A M W Cattle (August issue). I recently moved to Norfolk and one of my first evenings out was to the Norwich Amateur Radio Club, which meets in the Red Roofs Club, Fifers Lane, Norwich. (Not that this is a plug! — Ed)

I was made more welcome there than at any other club that I have visited. Everybody went out of their way to talk to me and find out who I was and what my interests were. On my second visit, the following week, we chatted about my inability to learn morse so far. Sheila, G7AJY and her husband Terry offered me a computer, data recorder etc. to learn with and Geoff, G4ODC who does the RSGB morse broadcast locally, offered his help along with everybody else in the group.

You can do no better than to join a good club. So as I think I have, I will take this opportunity to thank them for making me welcome and suggest that everyone should take the first step as I did — its worth it.

Ken Walker, Norwich

Town Hall, but it has the additional advantage of being right on the middle of nowhere. But, beware, once the participants have tasted local hospitality they won't want to go anywhere else and AGMs will be held monthly!

Bruce Carter, GW8AAG

OK — Bwlch Village Hall it is then. We'll be sending you the £10 as a booking deposit!

The Congo Emergency

It must be every radio amateur's dream to be involved in a real-life drama that necessitates the operation of his or her station in passing

generally known was that the Belgians, unlike Britain, had at that time been making very little provision for any kind of smooth transfer of power

E. Pavely (G3GWD) remembers how radio hams played a vital role in the 1960 Congo crisis.

emergency messages in time of crisis. Ample examples of this have appeared from time to time in the media and the most recent disaster to hit the headlines in which amateurs participated to quite a large extent was the Mexico City earthquake.

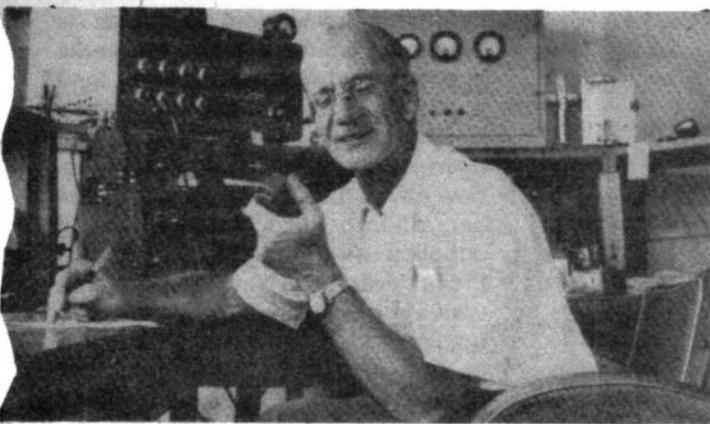
One event, however, in which I was very actively involved, occurred in July 1960 and the story of this communications network has until now never been properly revealed. Many radio hams in the newly-formed Congo Republic risked their lives and in many cases those of their families in passing emergency traffic to the outside world. To quote a famous politician's phrase 'the wind of change' had in the 1950's started to sweep across Africa. Whether this was a good or bad development future historians will have to decide but to people living and working in neighbouring countries and territories to the then Belgian Congo nothing much had changed very much. The Belgians appeared to be very firmly in control in their only colonial possession and normal amateur communications were possible with the many OQ5 stations who were active in the Congo.

The Congo (or Zaire as it is now known) covers a vast area of central Africa stretching from the mouth of the Congo river on the West African coast, south to Angola and Zambia and east to the borders of Uganda and Tanzania — something like 918,000 square miles of generally very inhospitable country.

Unfortunately what was not

did come, it happened so fast that many people in the Congo were caught completely unawares and a political vacuum was created which, in a very short time, involved the Great Powers and required the intervention of United Nations forces to try and bring some order out of the chaos which resulted.

The specific reason why this story has not been told earlier are quite complicated but some of these should become apparent as the story unfolds. In June 1960, Belgium suddenly withdrew control from its main



"Robbie" Robson — This is the biggest thing I've been involved in, he said.

colonial territory in Africa, the Congo (now Zaire). A local government was hastily installed but this soon lost control in the wake of a mutiny by the Congolese army. The events which followed and the political repercussions which arose as a result of the Belgian action have no place in this discussion but suffice it to say that many communities such as mission stations, schools and hospitals found themselves completely cut off in very remote parts of the territory. Because of the communication difficulties in this part of Africa many of these communities had always relied upon amateur radio as a means of keeping in touch with other areas and so it was

that at this particular time their 'rigs' literally became life-savers overnight.

By coincidence, amateurs in the neighbouring British territories of Kenya, Uganda and Tanganyika (now Tanzania) were already pretty well organised in the art of message handling by virtue of the fact that each Easter the then Radio Society of East Africa organised a communications network to enable the officials of the Safari motor rally (now the Kenya Safari) to log the progress of the competitors around the 3,000 mile circuit. Let it be said now that, each Easter, the East African hams had a special, if not unique, dispensation from the licensing authorities to use their equipment for this purpose, but only for the duration of the competition.

Amateurs in East Africa began monitoring calls for assistance from the Congo during the weekend of 8/9th July 1960, mainly on 7MHz. This caused a problem as the terms of the licence precluded the passing of messages to third parties. However due to the frantic nature of many of the messages received from 905 stations, a leading amateur in Nairobi, Robby Robson VQ4ERR (sadly no longer with us) got in touch with the Postmaster General of East Africa at his private house and obtained permission for us to handle emergency traffic straight away in view of the gravity of the situation. Thus there swung into action probably, at least up until that time, the largest international amateur emergency network to have taken place.

Many of the 905 amateurs had only fairly low powered rigs which, in a lot of cases, were operating on

HECTIC WEEK FOR the HAMS

By NATION Reporter

DURING the height of the Congo troubles last weekend, radio amateurs in East Africa broke every rule and regulation in the book by sending messages without official permission — and at one stage, as desperate messages flooded the air, a Nairobi Post Office official drew attention to the fact that at least one of the hundreds of messages could and should have been routed by telephone.

That incident—described by the Patron of The Radio Society of East Africa, "Robbie" Robson, as "the last straw" — reflects the anomalous situation in which the "hams" find themselves when disaster strikes and their services are urgently needed.

All 100 members of the Society played an important part last week in undertaking vital communications between the Belgian Congo and the rest of the world.

They have gone without sleep, taken heavy and unsatisfactory meals with only their radios for company—and in doing so they risked losing their precious hearing.

When official communications break down in an emergency, the only other method available is the radio amateur who must get permission before broadcasting a commercial message.

battery or generator power and much of the equipment was, in any case, home-brewed. Thus many of the distress messages calling for medical aid for refugees and information about families trapped in the turmoil had to be relayed to the rescue authorities outside the Congo. In this connection a necessity existed for direct long distance communications with Europe for the clearance of situation reports and this was accomplished mainly on 14MHz by the net organised by the Radio Society of East Africa. Later in the operation, a need developed for rapid communications with the United Kingdom authorities with regard to British Aircraft movements and British Commonwealth citizens still in the Congo. Much traffic was passed on behalf of the International Red Cross who organised refugee centres in Uganda and Kenya and other neighbouring territories.

An important link was established with several stations in the USA who handled messages on behalf of American missionaries trapped in various locations of the Congo. Something like 2,000 messages

Problem

Red tape is invariably a problem but unnecessary delays occur when the emergency crops up after Post Office hours. There is no one available to give the "go ahead" and one complaint from an amateur that he would immediately contact the Governor was met with the reply "You do that."

"The Congo tragedy is the biggest thing I have been involved in with amateur radio and it underlines the need for official recognition by the Government here," is the case in Britain, America and other countries," 55-year-old "Robbie" said.

"Communications are always subject to interference during disasters and the only thing left is amateur radio. We in East Africa are already renewing our equipment and reconditioning old generators so that if anything happens here we will be able to do something about it."

Throughout the week "Robbie" and many others battled with a "jamming" signal on the 40-metre radio band which is, or should be, exclusive to amateurs.

Distraught

At the same time telephones broke down and in "Robbie's" case dozens of distraught Belgian refugees arrived on his doorstep anxious and inquiring for information of stranded relatives. "I doubt if there is an amateur in the whole of Kenya who would not agree that it was pretty hectic," said "Robbie".

"But the worst experience I had was with the French idiom. An amateur passed a message that several hundred women and children had been trapped in a building surrounded by natives who had cut off their legs.

"I was nearly sick on the spot until I realised that the expression 'cut off their legs' meant something like the English expression 'you could have knocked me down with a feather'."

**MEMBER STATION
457**

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THE NATION DID NOT DARE print this picture last week. It was taken by staff man Mike Harris when he was in Stanleyville and it shows three Belgians who were operating a clandestine ham radio station there. We decided not to publish the picture because it might get back to Stanleyville and lead to their arrest. But yesterday it was learned they had already been arrested and deported.

were passed by the amateur network in East Africa during the period of the crisis which lasted from 9th-28th July 1960. At that time of course SSB was in its infancy as far as amateurs were concerned so the vast majority of traffic was passed by AM with a few CW links in various places. One

Nairobi station was equipped with SSB equipment which was used for some of the more urgent messages transmitted to Europe and the USA.

Quite a few hams in East Africa had commercial transmitters such as the KW Vanguard (of blessed memory) but again much equipment was

home-brewed with most receivers being of WW2 vintage ie. HROs, AR88s etc very often suitably modified to bring them up to date. As was mentioned earlier, many people in the Congo risked their lives (and some were not so lucky) to maintain the communications network and one very brave lady pilot from Nairobi flew any number of missions in a light aircraft into the Congo to take in supplies and bring out refugees. Press coverage in Nairobi at the time was very extensive with great tributes paid to the amateur involvement in the crisis, and although this particular story in the early troubled history of what is now the Republic of Zaire was covered by the world press generally it is fair to say that the efforts of Radio Amateurs went unrecognised in the outside world.

E. Pavely, G3GWD, has requested that our normal contributors fee should be sent to the Save the Children Fund in recognition of their excellent work in Africa. Readers may wish to know that the Save the Children Fund is located at Mary Datchelor House, 17 Grove Lane, London SE7.



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There is a choice of five scanning functions, full programmed memory, memory band and priority. The die-cast frame gives a solid construction featuring rubber gaskets for splashproof operation. The IC-32E is supplied with VHF/UHF a dual band antenna, BP3 battery pack and wall charger.

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If you are newly licensed or just undecided about which band to operate first, then the new ICOM IC-3210 is just the answer. This dual band FM transceiver is ideally suited for the mobile operator. Transmit on one frequency and receive on the other and you're operating full duplex. It's just like talking on the telephone.

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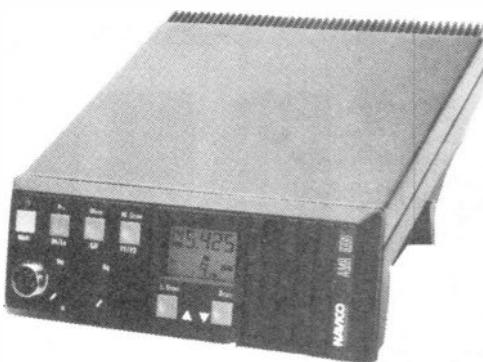
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SHOW REPORT



L to R: Christopher Harris (Hrt Ads Manager), Chris Lorek (G4HCL) and Mrs Whitfield, wife of Lowe MD, make the prize draw.

This year the RSGB celebrates its 75th Anniversary, and in keeping with this event held their biggest ever convention over a three day period at the National Exhibition Centre in Birmingham. This year the society was honoured by having the presence of His Royal Highness Prince Philip, Duke of Edinburgh, in attendance during the first day. After he performed the official opening ceremony, Prince Philip toured the main exhibition hall chatting to both exhibitors and radio amateurs. In the Lucas centre he visited the exhibition displaying 75 years of radio, ranging from the very earliest equipment to current digital radio techniques, indeed spending several minutes at the operational packet radio station. He then joined members of the RSGB together with international representatives for a 75th anniversary luncheon.

Student Licence

During this, the RSGB president introduced Victor Brand, G3JNB, who made a very interesting presentation on Project YEAR — Youth into Electronics via Amateur Radio. This is an entirely new initiative to create and develop, among young people, an interest in science,

engineering and electronics by introducing them to the hobby of amateur radio. One of the objectives is to establish, in conjunction with radio amateurs and the Department of Trade and Industry, an entirely new class of amateur licence, the 'Student Licence'. Although still at the discussion and formulation stage, the RSGB hope this will allow 4w DC power input to the final stage of the transmitter on the following bands and modes:

160m 50kHz segment, Phone/CW
80m 20kHz segment, CW only
30m 10kHz segment, CW only
10m, CW only
23cm, All mode, (under consideration)
3cm, All mode, (under consideration)

Future possibilities include the addition of segments in the 15m, 6m and 70cm bands.

As well as this, operation of a Class A or B amateur radio station under the direct supervision of the full licence holder may also be permitted.

Matters still to be resolved include the duration of the licence, any minimum age requirement, and whether crystal-controlled or VFO transmitter operation is to be allowed. However it is hoped that some form of licence, a 'stepping stone' to a Class A or B, will be available in 1989.

Bargain Hunt

Following the luncheon, the remainder of the show was rather uneventful in comparison, with none



We had to get up early to get this shot — the HRT stand before the hoards descended (in the nicest possible way of course!).

of the interesting lecture streams that have been organised in previous years. Two barbecues taking place in the evenings were poorly attended, although the weather could have been to blame even though Hall 5 was the venue for the first 'indoor' barbecue (we still wonder how they defeated the fire sprinkler system!).

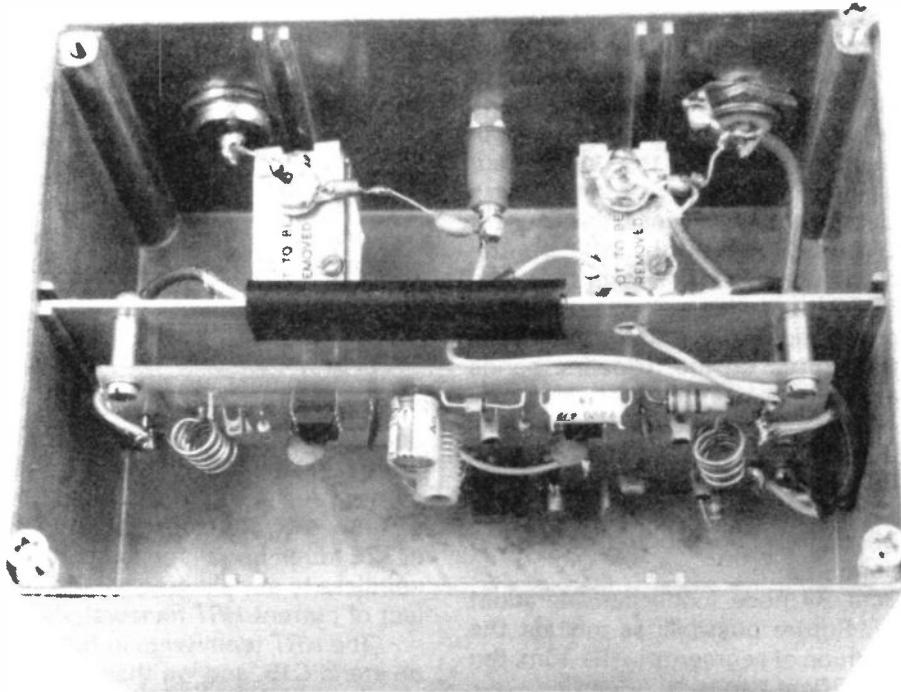
The vast majority of visitors came looking for bargains at the large trade show of course, having around 80 traders to choose from as well as various club and society stands. Goods on sale varied from £20,000 spectrum analysers (similar to those used by the *HRT* equipment review team) right down to PL259 coax connectors. A surprise from Navico, a newcomer to the amateur radio equipment field, in the shape of a modern British made 2m mobile selling for less than £300, this will be reviewed in next months *HRT*.

At the show the 'Big Three' UK dealers (SMC, Lowe, and Icom) respectively launched the FT4700 mobile dual-band transceiver, the JST135 HF transceiver, and the IC32E dual band duplex portable, needless to say all three are the subject of current *HRT* reviews!

The *HRT* team were in full force on stand C15, and we thank you for all your kind comments regarding the magazine, a record number of subscriptions being taken. The *HRT* Packet Radio station was operational on our stand monitoring the NEC packet mailbox as well as other special stations, and our free prize raffle was very popular. The first prize of a HF125 all-mode HF receiver went to Mr J. Powell of Stockport, the second prize of a KAM all-mode packet terminal unit went to Mr D. Walker of Newthorpe, and the third prize of a £20 book token went to Mr E. Gough of Matlock.

In common with many other visitors we departed exhausted but happy, see you there next year!

Modular Masthead PRE-AMP



Over the years the benefits of mast-head pre-amps have been increasingly recognised by radio amateurs. Not only do they compensate for less than wonderful front-ends but they are also a boom

base station version would already be present in the form of the vehicle electrical system. One other point to be noted with this design is that, unlike some circuits, it is inherently fail safe. This will no doubt bring a

Interested in a 2m mast-head pre-amplifier? Then why not build this modular design by Brian Pallett, G3VML.

to those who must live with long VHF cable runs. Many designs have appeared for similar projects before but what makes this one a little different is that the use of Plessey SL560C integrated circuits for the amplifier stages results in an easily reproducible design — especially so when combined with straightforward PCB layouts.

Although this pre-amp has been designed primarily for masthead operation, it would also be quite easy to adapt the design for mobile use if required. Switching techniques would remain the same, except of course that the outboard 12v power supply needed in the

sigh of relief from those people who have been unfortunate enough to suffer from designs which specialise in having their MOSFETs blown out every time the operator forgets to power up the pre-amp or pre-amp/linear *before* going to transmit!

Project Overview

Power for the pre-amp is derived from a 12v DC feed supplied at the transceiver end of the station which is fed up the coaxial cable to the mast-head pre-amp module where it is used to power both the pre-amp and the RF sensor modules. Upon detection of RF from

the transmitter, the RF sensor circuit switches out the pre-amp module and returns to the 'pre-amp in' status when the RF signal is removed. The two relays concerned are normally in the energised state except when transmitting and thus should there be a power failure on the 12v line they will switch to their resting positions, so bypassing (and protecting) the receive pre-amp. Obviously there will be a slightly higher current overhead as a result of using this system because the relays have to be energised to bring the pre-amp into circuit. However the fail-safe advantages, and a general reluctance to shin up the mast every time the pre-amp is blown up, clearly outweighs the current consumption limitations.

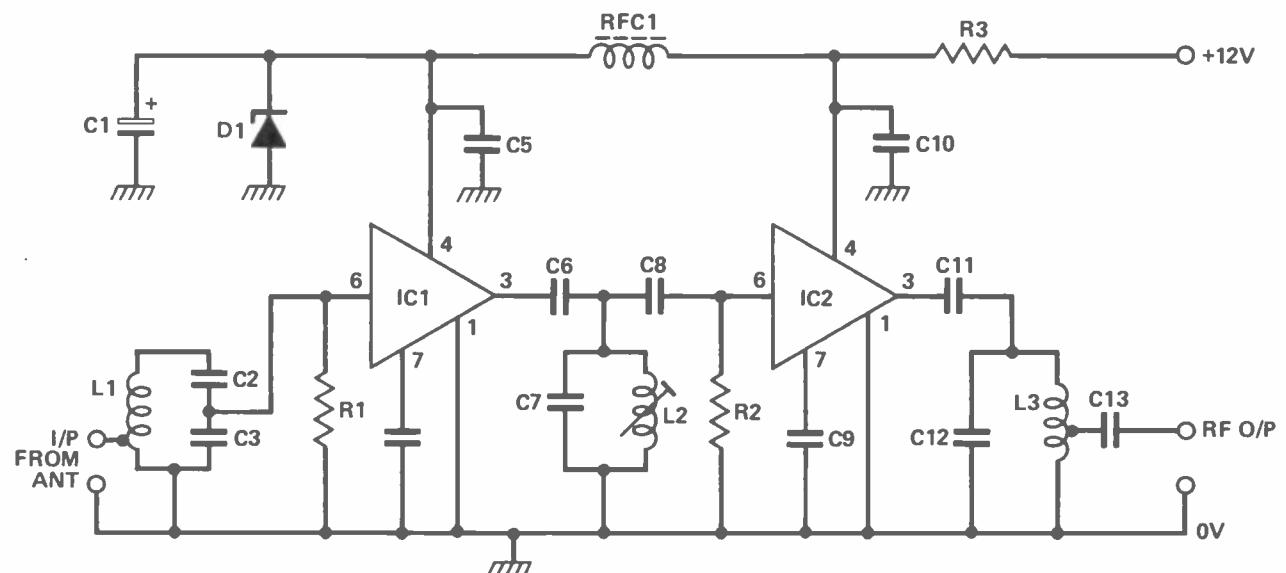
The third and final part of the project consists of the power unit interface, the purpose of which is simply to convey the 12v DC operating voltage up the coax cable, using the outer braid and inner conductor, with the minimum effect on matching between the coax and the rig. Although the full project consists of the pre-amp module, RF sensor/switching module and the power unit interface (the source of the 12v DC being either the shack PSU or the car electrical system in a mobile version) the pre-amp could be built without the switching module for a mast head receive-only system.

As constructed here, the aerial pre-amp has a small signal gain of approximately 20dB and offers a frequency response of plus or minus 1dB measured relative to a centre frequency of 145MHz.

Pre-Amp Circuit

The pre-amp circuit (see Fig. 1) takes its input from the antenna line via the tuned circuit consisting of L1 and C2/C3. The antenna is matched into the tuned circuit by means of a tap one turn from the cold (ie earthy) side of L1 and so

Fig. 1 Diagram of the pre-amp module



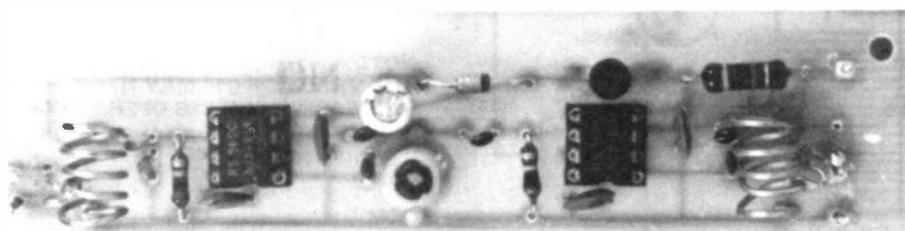
provides an impedance match close to the target of 50ohms. The signal is taken from the junction of C2 and C3 and fed to the input of IC1, an SL560C RF amplifier chip which amplifies the signal and passes it to the next stage of RF amplification provided by IC2, also an SL560C. Although the circuit is essentially a cascade design there is a parallel tuned acceptance circuit formed by C6, C7, C8 and L2 which is located between the two chips and can be adjusted to the mid-point of the 2m band.

The signal output from IC2 is fed to a parallel tuned circuit formed by C12 and L3 via C11. As with the pre-amp input circuit the coil is tapped one turn up from the earthy end so as to provide a 50ohm load impedance to the following equipment, DC decoupling of the 12v supply being provided by C13. Power to the SL560 amplifier chips is provided via the current limiting resistor R3 and is stabilised by means of the 6v8 zener diode D1. The component overlay and PCB foil pattern for this module are shown in Fig. 2 and Fig. 3.



RF Sensor Module

As has been explained earlier, the function of this part of the project (see Fig. 4) is to ensure that the pre-amp module is switched out of circuit when RF appears at its input. When RF is detected and it is in excess of the threshold set by R4 (0.5W in this case) the board switches relays RLB and RLC to the



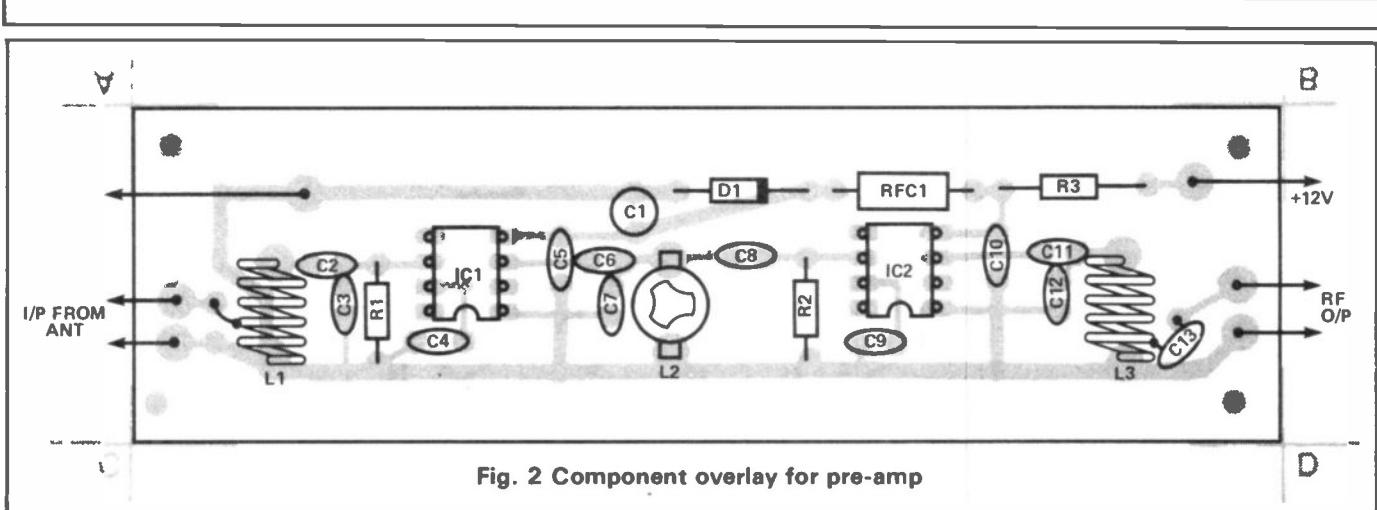


Fig. 2 Component overlay for pre-amp

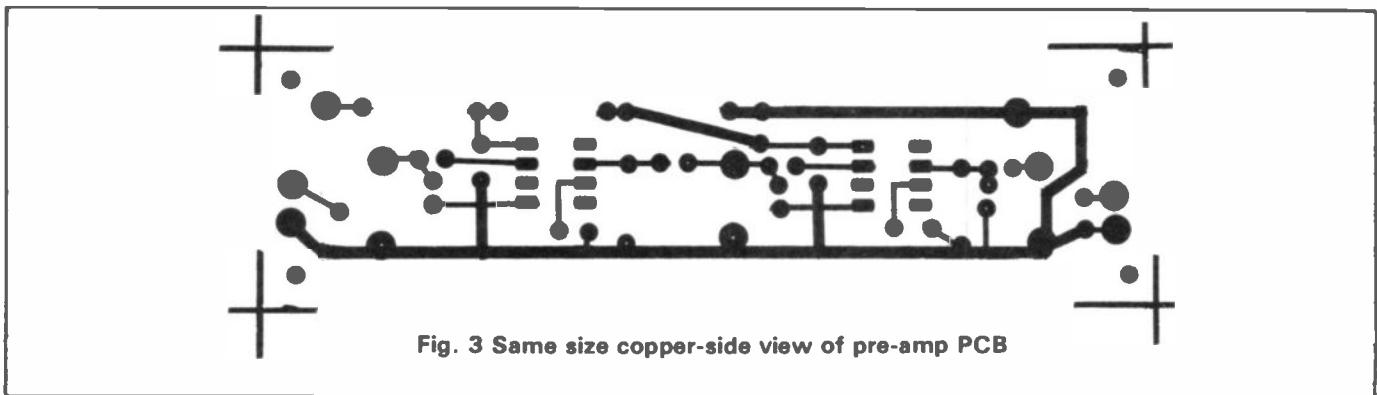


Fig. 3 Same size copper-side view of pre-amp PCB

'straight through' position. On transmit the RF carrier is applied to the junction of C14 and the RF choke RFC2 from the inner conductor of the coaxial feeder, the latter component serving to decouple any RF which may appear on the positive supply rails feeding the modules. As with the pre-amp module, the RF decoupling components on the positive supply could

be omitted and the system 'hard-wired' for use on receive only installations.

The RF carrier is detected by diodes D2 and D3, the resulting voltage being developed across C13 and the base of Q1 — a BC109. The forward voltage biases Q1 into conduction and as a result energises the relay RLA, diode D4 protects the transistor from back EMF effects

and D5 fulfils the same function for the relay contacts A1. By means of RLA the RF changes over the relays RLB and RLC on the pre-amp board from their normally energised state (in the absence of RF) to their de-energised state, thus bypassing — and protecting — the pre-amp components. Should the +12v supply to the system fail, RLB and RLC will become de-energised and

Fig. 4 Diagram of RF switching module

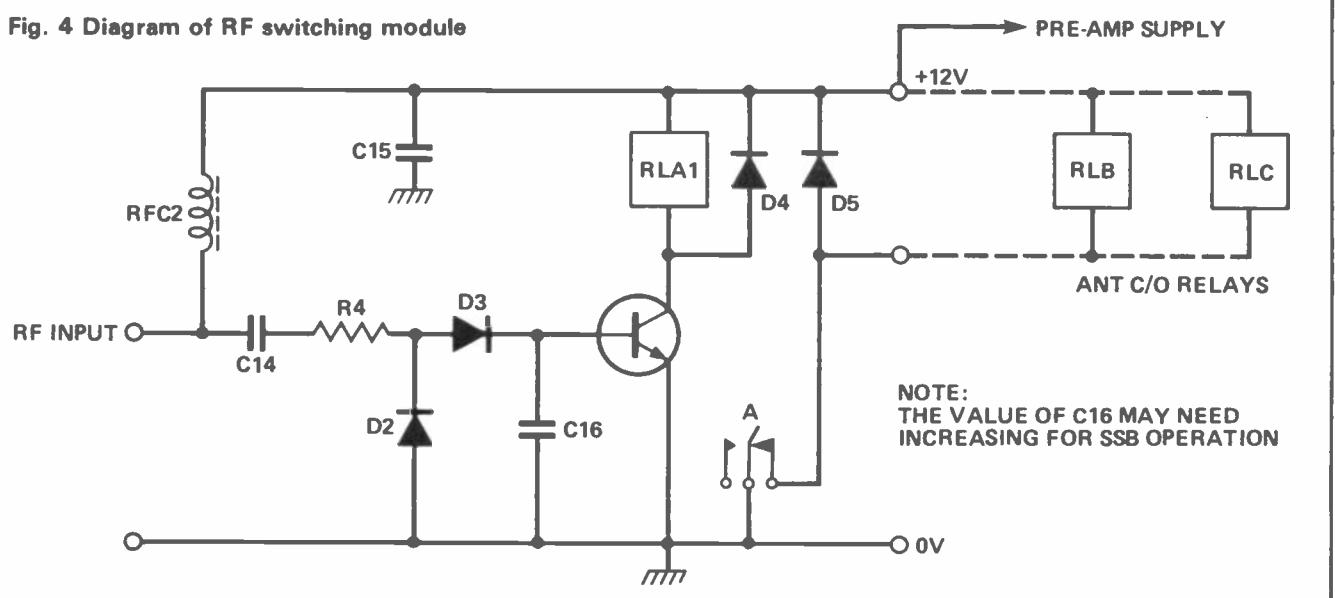
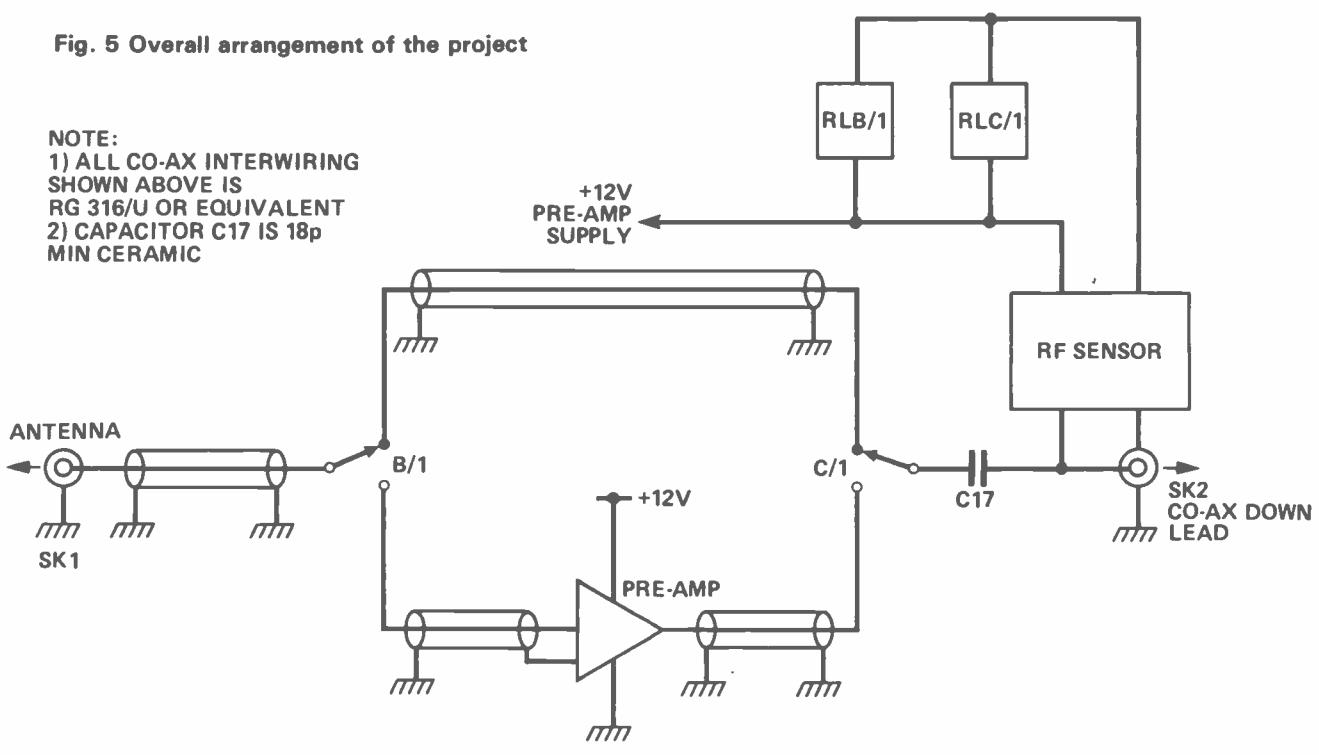


Fig. 5 Overall arrangement of the project

NOTE:
 1) ALL CO-AX INTERWIRING
 SHOWN ABOVE IS
 RG 316/U OR EQUIVALENT
 2) CAPACITOR C17 IS 18p
 MIN CERAMIC



WORKED SOME 2 METER SIDEband.....
 MUST HAVE BEEN A RALLY NEAR LONDON....
 EVERYONE KEPT ASKING ME TO TELL THEM
 THE LOCATION OF MAIDENHEAD !!



the pre-amp will be switched to its fail-safe out of circuit mode. The component overlay can be found shown in Fig. 6 and the PCB foil detail in Fig. 7.

Construction And Testing

The experienced constructor should come across very few problems assembling either the aerial pre-amp or the RF sensor module. However, before fixing components to the PCB, it is recommended that you first study the relevant component layout diagram and make a note of the position, polarity and pin out connection of each component.

Because there are very few components associated with the power unit interface it was con-

Fig. 5a Diagram of the 12V power module

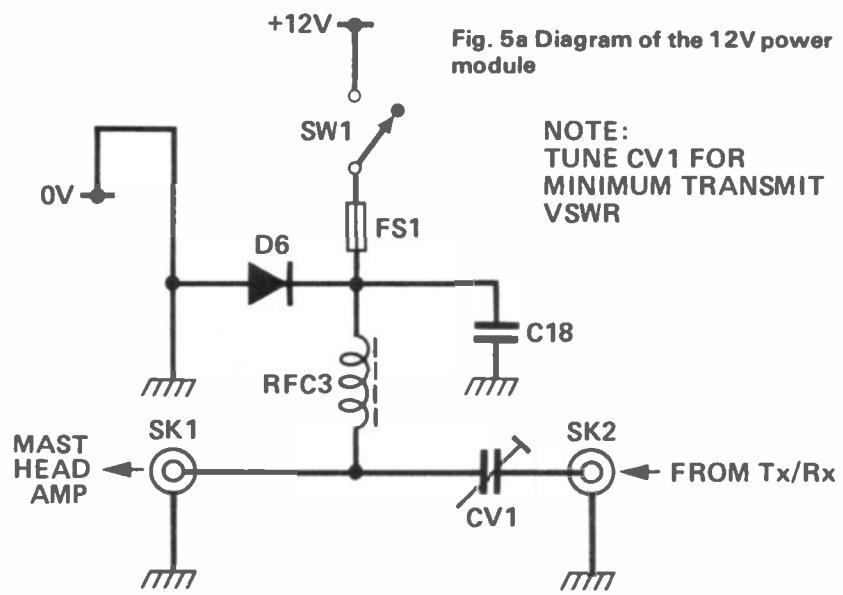
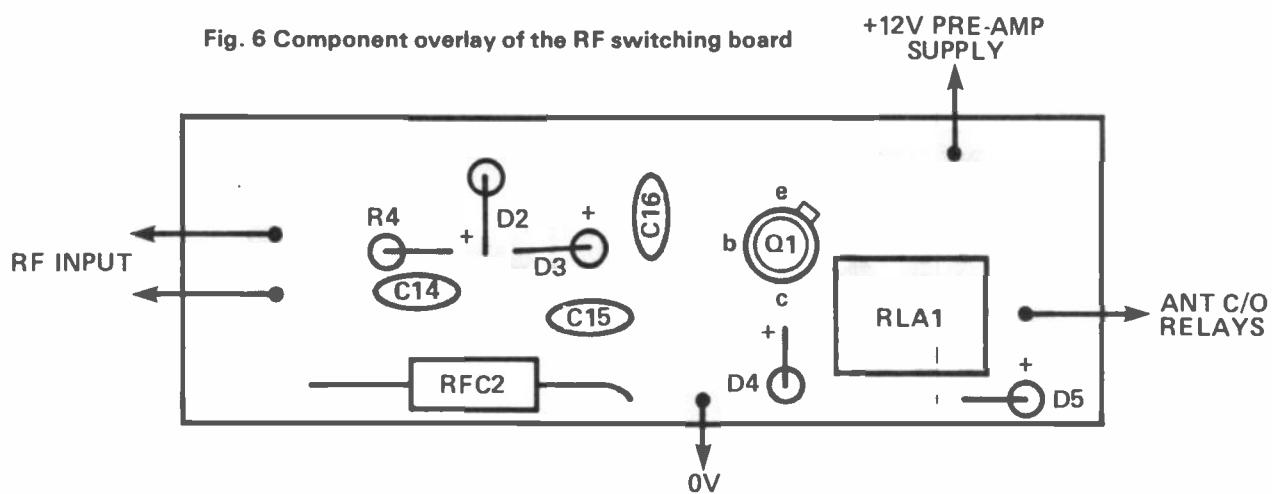
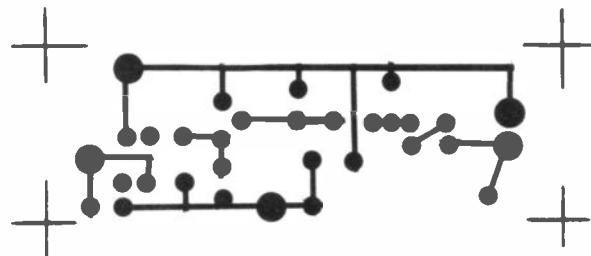
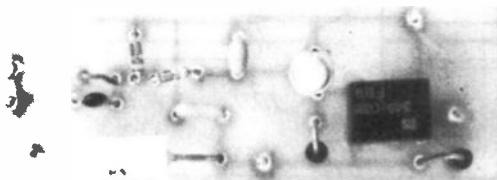


Fig. 6 Component overlay of the RF switching board



View of the finished RF switching board



sidered unnecessary to produce a component layout diagram. However conventional VHF constructional techniques should be employed, for example keep all component interconnections as short as possible. Testing and final adjustment of the completed aerial pre-amp module can be implemented by installing the module in series with the co-ax feeder leading to a 2 metre receiver (or transceiver). For those without access to test equipment, the signal source can be derived from a distant beacon, or from a friends test transmission around 145MHz; but in any case choose a signal source that would normally not exceed a receiver 'S' meter reading of approximately 2.

Adjustments to the tuned circuits, formed by inductors L1 and L2, is achieved by either compression or stretching of the coils, whereas adjustment of the tuned

circuit formed by L2 is achieved by screwing the coil slug in or out. NB *only use the recommended trimming tool*. The pre-amp tuning

process can be monitored by observing the receiver 'S' meter response. Finally, stagger tune the pre-amp by adjusting inductor L1 for maximum gain for a signal source of 144MHz and L3 for maximum gain for a signal source of 146MHz.

Where the pre-amp is to be used for mast-head operation, the best method is to house the pre-amp in a weather proof die-cast aluminium box. The length of the interconnection between the RF sensor module input and the RF carrier pick off point within the box should be kept as short as possible. Choice of the external RF change over relays is left to the constructor. The cost of these relays is roughly proportional to the relay contact power rating plus inversely proportional to the insertion loss at the required operating frequency.

Components List

RESISTORS

R1, 2	10k
R3	270R, 1/2W
R4	330R

CAPACITORS

C1	10μ 16v Electrolytic
C2, 3	20p
C4, 5, 9, 10, 15, 16, 18	10n monolithic ceramic
C6, 8, 11, 13, 14	2p2
C7	4p7
C12	10p
CV1	5-20p air-spaced

SEMICONDUCTORS

D1	6v8, 1.3W zener
D2, 3	BAT85 or 1N914
D4, 5, 6	1N4001
IC1, 2	SL560C
Q1	BC109

INDUCTORS

L1, 3	5 turns 20swg tinned Cu 1/4in inside diameter, tapped 1 turn from cold end. Length 1/2in 0.064μH TOKO Style S18 Cirkit stock No 35-00303
L2	10μH axial encapsulated RS type 228-141
RFC1, 2, 3	

MISCELLANEOUS

RLA	Ultra-min RS No 345-038
RLB, RLC	See text
SK1	SO239 panel mount socket
SK2	BNC panel mount socket
SW1	Single pole single throw switch
F1	1A fuse
	Cirkit No 35-00001

New British Made

2m Mobile Launched



At the recent NEC Convention, the UK Marine Electronics firm of Navico displayed their new 2m mobile transceivers, the AMR1000 and AMR1000S, designed to particularly appeal to UK and European amateurs. Priced at £249 and £299 respectively, they offer coverage of 144-146MHz in selectable 12.5kHz or 25kHz steps, with a direct readout of the simplex or repeater channel in use as well as offering a switchable frequency readout. Selectable 25W or 5W output power is provided, and the appropriate transmit repeater shift is automatically programmed when

operating in the UK repeater sub-band, a 1750Hz toneburst being provided for repeater access.

The AMR1000S also offers memory facilities together with memory scan and priority channel sampling operations. Both transceivers have a reversible front panel with a built in forward-facing loudspeaker and multi-function LCD, this even providing a digital S-meter display! A range of power supplies, mobile and base station aerials, and operating accessories will also be available.

The *HRT* review team spent a great deal of time discussing this transceiver with Alan Wrigley, Director of Navico and needless to say, *HRT* will again be giving our readers a 'World First' review of the unit in next month's issue!

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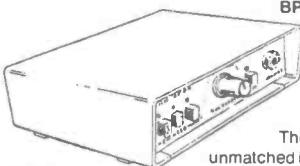
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SOME QUOTES!

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G4IJE Sept 87 Review "bargain of the century"; Excellent/outstanding EI9EJ; A very good buy — G2DRT (RSGB Council); Amazing on CW, even better on RTTY — GOHWA; Damn clever — Home Office Telecoms; Excellent standard of construction — G1CQV. We could fill the page!



MORE QUOTES!

"Too good for radio hams" — G30GQ; 40 Mtrs CW very impressed — Rev G. Dobbs G3RVJ; Better than all the knobs on the Tentec G6SX.

For further information, write or call Bill Green G8HLZ

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FT-4700 Dual Bander

Review



G4HCL takes to the road with the latest full duplex 2m/70cms mobile from Yaesu

When mobiling around the country, it is often a great advantage to be able to use both 2m and 70cm, 2m for general natters both on simplex and on the many 2m 'area' repeaters, together with the often more friendly, local chats on the significantly greater number of 'community' 70cm repeaters. Quite often, amateurs are content to just 'sit' on 2m, oblivious to what is happening on 70cm, because they feel they can only handle one rig in the car at a time, 2m currently being the most popular band.

Dual-band mobile rigs have recently become very attractive as a result, but many of those currently on the market only give you the choice of operating on 2m or 70cm, not enabling you to listen out simultaneously on both bands. The 'Big Three' Japanese manufacturers now all offer a full two-band facility in their products, the latest rig from Yaesu being the FT-4700RH. It caused quite a stir on the HRT stand at the NEC this year, being unveiled then for the first time in the UK. We promised you the first ever review on the set, so here we go . . . !

Offerings

The set gives full coverage of the 2m and 70cm amateur bands, with a maximum power output of 50W and 40W respectively, having a selectable

5W low power level in each case. True simultaneous reception of both bands is possible, a front panel mounted rotary 'Balance' control providing a 'fader' facility between the relative audio levels of each band, a 'Mute' button giving a selectable audio mute facility if required between each band. To avoid duplication of control knobs and buttons, a large panel mounted 'Band' button alternates control between 2m and 70cm, a pointer being displayed against the relevant band frequency display on the front LCD. The tuning steps on each band may be individually set to 5kHz, 10kHz, 12.5kHz, 20kHz or 25kHz, the frequency being controlled by the main panel mounted tuning knob or by the Up/Down buttons fitted to the mobile fist mic. Further Up/Down buttons adjacent to the LCD control the frequency in large 1MHz steps for a fast QSY. A panel mounted volume control varies the overall receive audio level, the adjacent squelch knob however only affects the main (ie. controlled) band, an internally pre-set squelch level being enabled on the sub-band.

Repeater operation is catered for with selectable +/- repeater shifts on each band, these may be individually programmed to any required frequency shift in 50kHz steps within the band frequency limits. Full reverse repeater operation is available by a

View of remote control front panel

single button-push. On 2m, a selectable automatic shift may be programmed, this coming into operation between the tuned frequencies of 145.600 and 145.800MHz, as well as allowing manual shift selection as and when required. A microphone mounted button provides a 1750Hz tone allowing for initial repeater access.

Optional sub-tone units may be internally fitted on each band, this being a simple plug-in operation. The CTCSS (Continuous Tone Controlled Squelch Switch) may then be selected with either encode-only or encode and decode facilities provided, controlled from the front panel using selectable sub-audible tone frequencies ranging from 67Hz to 250.3Hz. CTCSS allows silent monitoring of a busy radio channel until a signal modulated with a similar sub-tone frequency appears, this enabling the speaker. There are already many amateurs in the UK using this system, combined with controlled experimental use on some repeaters.

Memories

Nine memory channels on each band may be individually programmed, each storing frequency, any programmed transmitter/repeater offset, sub tone frequency with encode/decode status, and any

programmed tuning step, together with a further 'Call' channel accessible by a one-button touch. A D/MR button toggles between 'Dial' and 'Memory' mode, however a press of one of the panel-mounted Up/Down buttons allows you to QSY from any memory channel in the stored frequency steps, using the main tuning knob or the microphone mounted Up/Down buttons.

Any or all of the memory channels may be scanned for activity as required, a 'Skip' facility may be programmed into any of the memory channels inhibiting these from the scan whilst still allowing manual selection. Two memory channels on each band store 'Lower' and 'Upper' frequencies for a programmable band-segment scan facility, this being enabled by selection of the 'L' or 'U' channel followed by a press of one of the front panel 'Up' or 'Down' buttons. Alternatively in 'Dial' mode, or when in 'Memory-QSY' mode, the entire band may be scanned for activity.

In each case the scan is initiated by keeping one of the microphone-mounted Up/Down buttons pressed for more than half a second, the scan halting when the receiver squelch raises. Two modes of scan start may be programmed, the first halting on a channel until the signal disappears and continuing two seconds later, the second mode halting for five seconds on a busy channel and then continuing regardless of channel activity. As well as

this, a 'Priority' channel scan is available, where any selected memory channel is briefly sampled for activity when in 'Dial' mode, the set locking onto the memory when active.

The set's status is shown on a large orange back-lit LCD panel, together with bargraph displays for each band showing relative signal strength on receive together with an indication of transmit operation, an adjacent red LED also lighting when in transmit mode. Beneath the display all the controls and their indications are also back-lit to allow operation at night, a circle of light also showing around the main tuning knob to allow location in the dark. A front panel 'Dim' button gives a two-level illumination to save distraction when driving.

Detachable Front Panel

The front panel of the radio may be detached and reversed as required to permit the internal speaker to face either upwards or downwards to suit the final mounting position. However one of the set's best features in my opinion is that with an optional cable and blanking plate, the front panel may be mounted completely remotely from the main transceiver body. This would allow the display to be positioned near to windscreens level in the amateur's vehicle, thus reducing the eye-travel distance required away from the road ahead when operating the set. This aspect is far more important than the use of

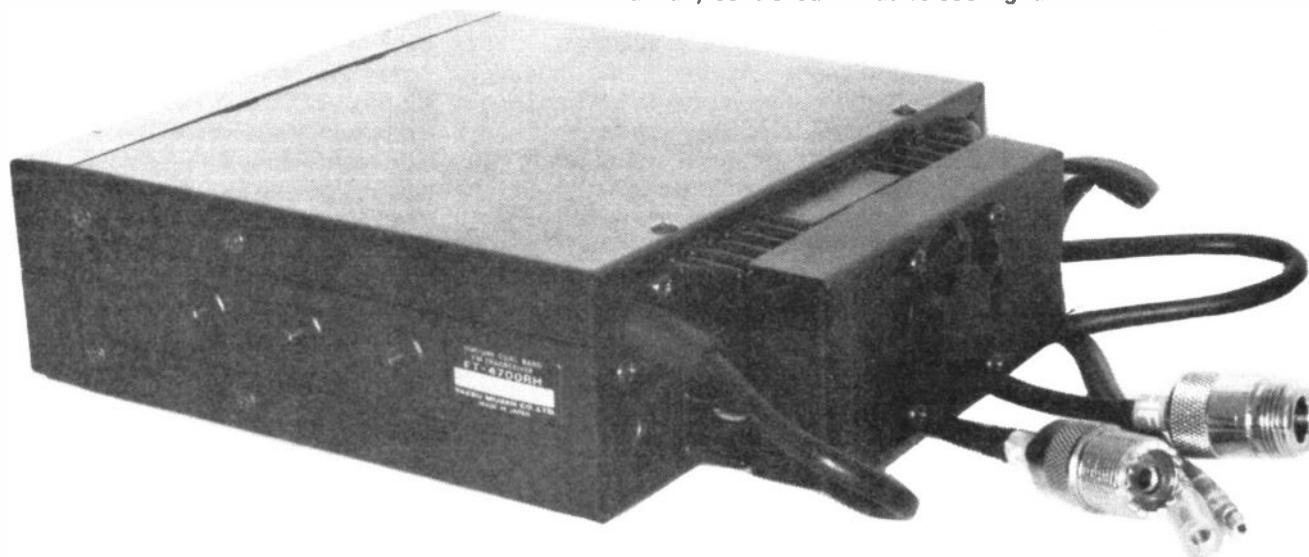
any mobile 'safety mics' in my opinion (see 'Mobile Radio Safety', HRT May 87, for the results of an independent study). A further advantage is that the panel may for instance be quickly removed when leaving the car and carried away in your pocket as a theft deterrent, alternatively it may be mounted on the sun visor and hinged up out of sight when leaving the car.

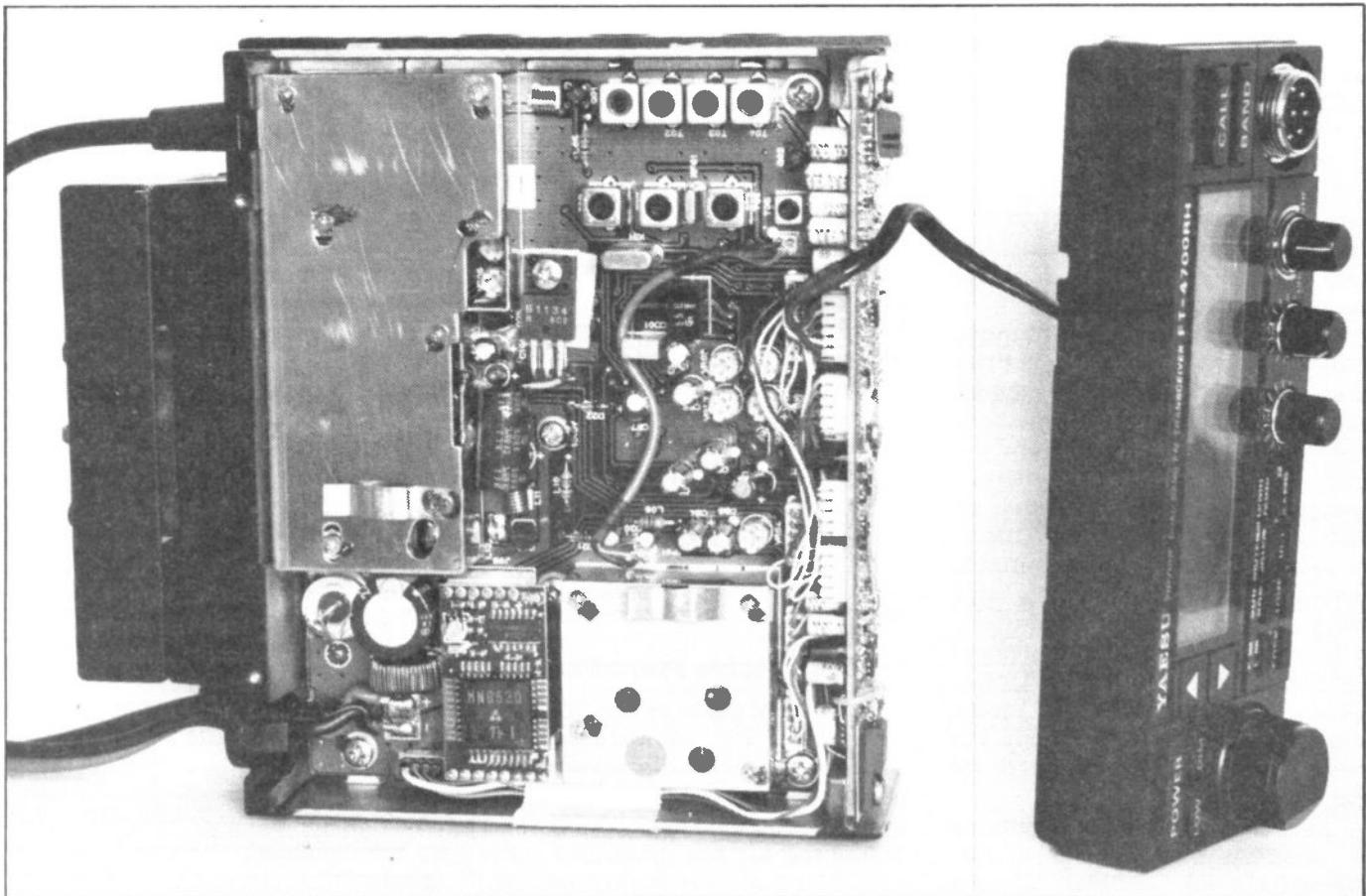
The overall size of the set is 185mm (D) x 150mm (W) x 50mm (H), the front panel itself being 27mm deep, the panel knobs adding 10mm to the depth in all cases. The rear heatsink size is kept to a minimum by the use of a small thermostatically-controlled fan on the rear panel. Aerial connections are on flying coax leads terminated with an SO239 socket for 2m, and an N-type socket for 70cm, the short flying power leads being terminated in the usual Yaesu 'bullet' connectors. This arrangement allows the set to be mounted in positions where space is at a premium. A rear-panel mounted 3.5mm socket allows an extension speaker to be plugged in, this disabling the small internal speaker. The set comes supplied with a quick release mounting bracket and fixing hardware, a DC power lead fused in each leg, a mobile fist mic and mic clip, spare DC fuses, a 3.5mm extension speaker jack plug, and a user instruction manual.

In Use

After programming up the memory channels, I connected the

The 'business' end of the FT4700, showing the two separate RF cables and the thermostatically controlled miniature cooling fan.





View of the 2m side of the FT4700 PCB, showing the 'umbilical' cable which can be extended to give a remote control option.

set to my rooftop dual-band colinear aerial via a 2m/70cm diplexer. I was pleased to find that I could set the rig off on a programmed band scan on 70cm, then change control over to 2m and also start the set scanning on that band. The end result was that I certainly did not miss a thing! I must confess that it *did* occasionally get a little confusing when two received signals were on the go at the same time, both coming out of the same speaker, the 'Balance' control was quickly brought into operation in these circumstances!

To obtain a little peace, a phone call to the supplier of the review set quickly brought a plug-in sub-tone unit in the post, which I fitted to the set in a matter of minutes. This allowed me to quietly monitor on VHF for my amateur friend down the road whilst allowing simultaneous rag-chews with more distant 'locals' on the many 70cm repeaters audible at my QTH. With 2m becoming more and more congested, sub-tone usage is becoming more popular, with repeaters such as GB3BX for example using this facility for a 'Dual-Squelch' system under lift conditions.

Once I had familiarized myself with the operation of the set, I installed the unit in the trusty HCL-mobile and ventured out onto the roads. The remote cable option was supplied with the review set, this was used to good effect by positioning the body of the transceiver beneath the passenger seat, with the control unit placed on top of my dashboard within easy view. I found the display, placed in this position, was very readable even when subjected to direct sunlight. At night the backlight illumination was superb when used in On Receive 'Dim' mode.

On receive I found there was ample audio from the set, even with the set's speaker positioned beneath the seat, I did however find the audio slightly more readable when I used an external speaker directed towards me. I did find the volume control a little 'jumpy' in use, the audio level appearing to vary in steps as I rotated the knob. Again I found the rotary 'Balance' control very useful when mobile, I could easily locate this together with the volume and squelch controls by touch alone without taking my eyes from where

I was heading.

The RF sensitivity of the set was quite adequate, I found no problems in working distant repeaters, the high transmit power obviously helping in this respect. On transmit I received good audio reports, my usual amateur QSO partners finding no difference in quality or tonal balance from my standard mobile set. The supplied microphone, being fairly directional, picked up very little wind noise even with the car windows wide open. I appreciated the microphone mounted tone-burst, this being the most sensible position for such a control in my opinion — fumbling around the dashboard looking for a tone button when accessing a repeater is not really conducive to safe driving! In all, I was very pleased with the ergonomics of the set, it was easy to operate, and due to the use of the remote panel very easy to position in a sensible place in the car.

Inside The Box

The set is constructed using a solid die-cast alloy chassis, with the 2m section on one side and the 70cm

section on the other side of a central metal section. This arrangement affords good screening between the two radio circuits, this being important to prevent the possibility of cross-coupling and desensitisation when operating on full duplex. An interface board is fitted vertically to the front section, this linking via a small six-way plug and socket connection to the essentially separate control head. When the remote cable option is used, an internally metallised plastic blanking plate simply fits on the front of the set covering this board, the control head otherwise fits directly in place of this.

Surface mounted 'chip' components are used extensively, combined with discrete electrolytic capacitors, coils, filters and crystals. Essentially two completely separate radios are used under common control, each having multi-section tuned front end stages followed by an active mixer and a pair of monolithic dual crystal filters. On VHF, a varicap tuned front end stage is used, suggesting a wide receive frequency range has been designed in. Following the first IF, downconversion to 455kHz takes place, with further

filtering using CFU455E ceramic filters, discrimination, and combination of audio via the balance control circuitry to feed a common TDA2003 audio amplifier mounted on the front interface board.

On transmit, separately screened VCOs are used for each band, the modulated VCO signal is filtered and amplified to the 40W/50W level by the use of block PA modules, an ALC arrangement being used in each case to control both high and low RF power levels. Extensive screening is used around the transmitter amplifier and low pass filter circuitry to keep RF away from the remainder of the set.

Laboratory Tests

The receiver sensitivity was quite reasonable, varying little across each frequency range. The adjacent channel rejection for 25kHz channelling was also quite reasonable, that of $\pm 12.5\text{kHz}$ however was asymmetric on 2m, good on the LF side but a little poor on the HF side. The intermodulation distortion and blocking performance, ie. the susceptibility of the set to suffer from other strong signals, was again quite reasonable,

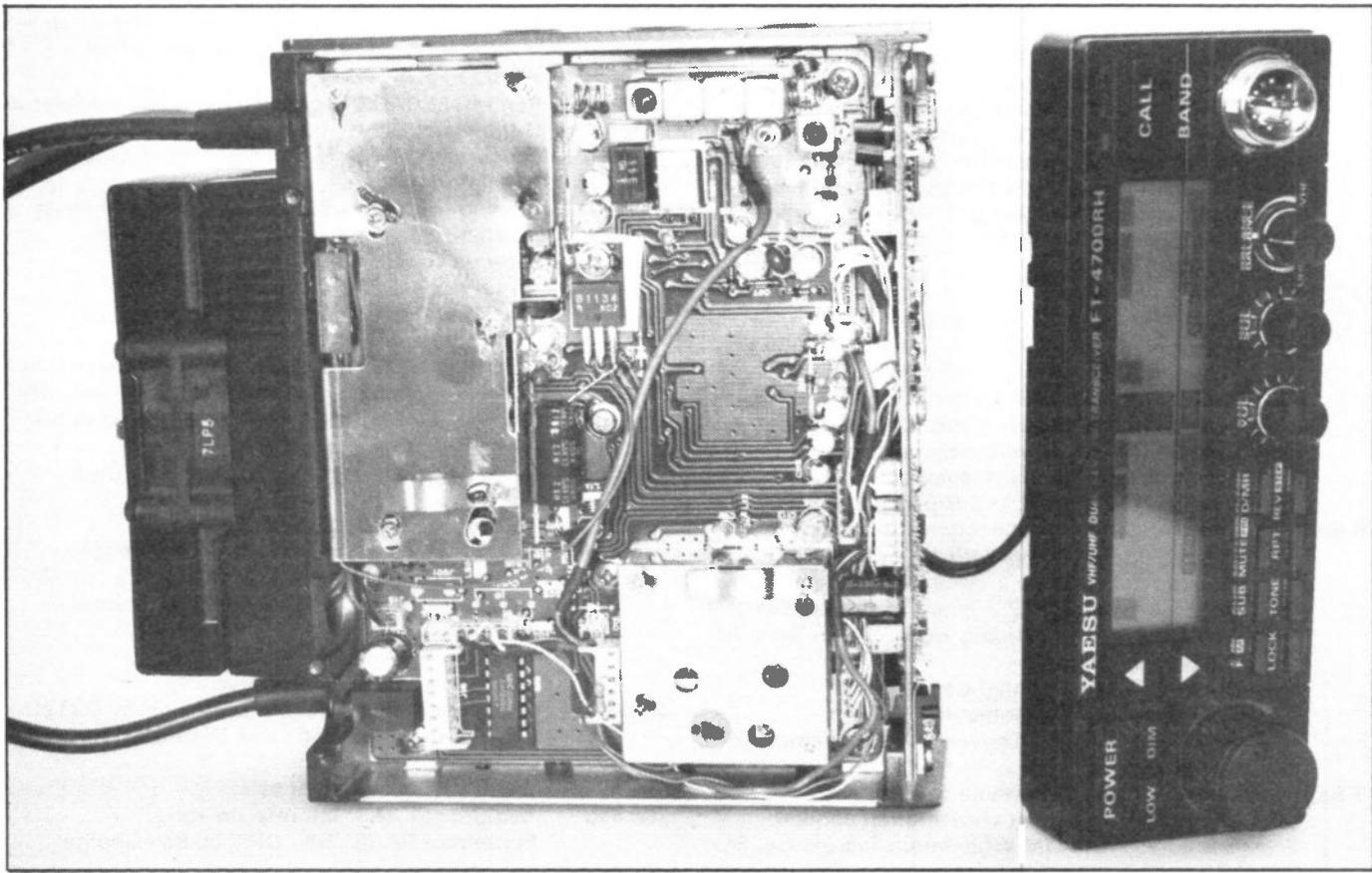
I could not complain. The receiver audio was found to 'step' in increments of a few dB at a time, depending upon the position of the rotary volume control, showing that a stepped voltage 'comparator' circuit was being used rather than a continuous analogue volume adjustment in the set.

On transmit, the output power was accurately set and remained so at higher supply voltage levels, the deviation being accurately aligned by the factory at just below the 5kHz absolute maximum level. The harmonic levels were well suppressed, and I could find no trace of any spuri, showing a very clean synthesiser wideband output.

Conclusions

The concept of the set's detachable control panel is an excellent feature, enabling easy operation by the driver whilst also giving a measure of theft prevention if required, this being very important nowadays when one's rig sometimes forms a significant part of the value of the car!

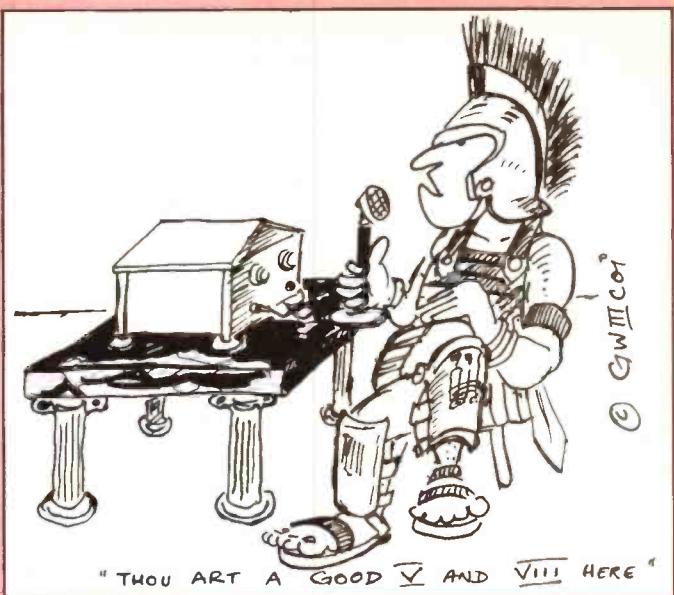
The 70cms side of the PCB.



RADIO Tomorrow

1 Sep	Pontefract DARS: Finals on SSB Field Day. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.	7 Sep	Dundry Road, Whitchurch, Bristol. Details Len Baker G4RZY on Whitchurch 834282.
	Yeovil ARC: 'Inductance' by G3MYM 7.30pm at The Recreation Centre, Chilton Grove, Yeovil.	8 Sep	Willenhall DARS: Night on the air (HF).
	Horsham ARC: Talk 'Radio navigation in WW2' by GOAPZ. 8pm. The Guide Hall, Denne Road, Horsham, Sussex. Details from Phil Godbold on Steyning 814516.	9 Sep	Pontefract DARS: Committee meeting. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
2 Sep	Coventry ARS: Canal trip.	10 Sep	Loughton DARS: Rainbow & Dove Field weekend planning night. Loughton Hall, Rector Lane, Loughton, Essex.
3/4 Sep	Sutton & Cheam RS: SSB Field Day.	11 Sep	Wimbledon DARS: Surplus Equipment Sale.
4 Sep	Dunstable Downs RC: 5th National Amateur Radio Car Boot Sale. 10am onwards at the Shuttleworth Collection, Old Warden Aerodrome, Nr Biggleswade. Details from Tony Kelsey-Stead GOCOQ on (0582) 508259.	12 Sep	Stevenage ARS: Lincoln Hamfest.
	Vale of Evesham RAC: Treasure Hunt.	13 Sep	Coventry ARS: Treasure hunt and barbecue.
	Telford Radio Rally & Exhibition. Telford Racquet Centre, Telford. All usual facilities and stands, including snacks, bar and restaurant. Morse tests also taken through booking with RSGB. Talk-in via GB75TRG on S22 and SU22. Admission 10.30 disabled, everyone else 11am. Details from John G8ARS (0952 727719) or Martyn G3UKV (0952 255416).	14 Sep	Rugby ATS: Preparation for 3rd Annual auction & barbecue. 7.30pm. Cricket pavilion, BTI Radio station, 'B' building entrance, A5 Trunk Rd, Hillmorton, Rugby.
	Preston ARS: 21st Annual Mobile rally at The University of Lancaster. Trade stalls, large Bring & Buy, Club and repeater groups. RSGB stand and bookstall. Licensed bar, snack bar & restaurant. Talk-in on S22. Rally opens at 11am with entry at 10.30am for disabled groups. Admission by programme 50p includes free draw for colour TV. Free parking. Details from Godfrey G3DWQ on (0772) 53810.	15 Sep	Dorking DRS: Talk 'Power Supplies' by Chris G1PXH at 'The Falkland Arms'.
5 Sep	Todmorden DARS: Talk on antennas by G8PG. 8 pm. Queen Hotel, Todmorden.	16 Sep	Worksop ARS: Talk, 'Photography on the cheap' with Colin G4RUD.
	Welwyn-Hatfield ARC: Talk 'World War II Radio'. Lemsford Village Hall, Brocket Rd, Lemsford.	17 Sep	Cheshunt DARC: Natter evening. Church Room, Church Lane, Wormsley, Nr Cheshunt, Herts. 8pm.
	Stourbridge & DARS: Natter/On-air night. Robin Woods Centre, Beauty Bank, Stourbridge.	18 Sep	Willenhall DARS: Project night.
	Braintree DARS: Construction evening. 7.30pm. Braintree Community Association Centre, Victoria Street (next to Bus park), Braintree.	19 Sep	Mid-Sussex ARS: Talk 'Design & construction of solid state & valve linear amplifiers' by John G3WZT.
	Fylde ARS: Talk 'Fuel economy with central heating' by R. Bishop G4PNI. The Kite Club, Blackpool Airport.	20 Sep	Pontefract DARS: On the air night. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
	Rugby ATS: 2m DF. 7.30pm. Cricket pavilion, BTI Radio station, 'B' building entrance, A5 Trunk Rd, Hillmorton, Rugby.	21 Sep	Todmorden DARS: Natter night. 8pm. Queen Hotel, Todmorden.
	Stevenage ARS: HF night on the air.		Welwyn-Hatfield ARC: On air to Andorra (with luck!). Knightsfield Scout HQ, opp Ingles, Welwyn Garden City.
	Worksop ARS: Natter night.		Stourbridge & DARS: Talk 'Packet Radio' by G8JTL, Robin Woods Centre, Beauty Bank, Stourbridge.
	South Powys ARC: Conversion of ex-computer power supplies.		Braintree DARS: Talk 'PMR & VHF Repeaters' by Malcolm Salmon, G3XVV. Braintree Community Association Centre, Victoria Street (next to Bus park), Braintree.
7 Sep	Cheshunt DARC: Portable on Baas Hill.		Fylde ARS: Informal meeting The Kite Club, Blackpool Airport.
	Wirral ARS: Low cost construction contest.		Midland ARS: Surplus sale.
	S Bristol ARC: AGM Whitchurch Folk House, East		Rugby ATS: 3rd Annual auction & barbecue. 7.30pm. Cricket pavilion, BTI Radio station, 'B' building entrance, A5 Trunk Rd, Hillmorton, Rugby.
			Worksop ARS: Natter night.
			South Powys ARC: Social evening.
			Cheshunt DARC: Talk. 'Aerial Basics' by G3TIK. Church Room, Church Lane, Wormsley, Nr Cheshunt, Herts. 8pm.
			Wirral ARS: Equipment sale.
			Mid-Sussex ARS: Informal meeting.
			Pontefract DARS: Talk 'QRP' by Rev George

- 23 Sep Dobbs. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- Loughton DARS: Rainbow & Dove Field weekend planning night. Loughton Hall, Rectory Lane, Loughton, Essex.
- Coventry ARS: The (Indoor!) Direction finding contest — cup qualifier.
- 24 Sep Pontefract DARS: Raynet exercise — 'Went Valley Hike'. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- 25 Sep Sutton & Cheam RS: RSGB HF Convention at Belfry Hotel, Nr Oxford.
- Harlow Rally.
- 26 Sep RSGB City of Bristol Group: Talk 'Linear accelerators Part 2. 7.30pm. Small Lecture Theatre, Queens Building, University of Bristol.
- 27 Sep Stevenage ARS: Committee meeting.
- Dorking DRS: Illustrated talk 'Amateur radio in the USSR' by Al Slater G3FXB at Ashcombe School.
- Workshop ARS: Talk, 'Simple Transceiver for Top Band' with Peter G4BVV.
- 28 Sep Cheshunt DARC: Natter evening. Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. 8pm.
- 29 Sep Mid-Sussex ARS: Talk 'Weather radar for civil aircraft' by Phil Stride G2BUY.
- Pontefract DARS: On the air night. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- 30 Sep Coventry ARS: Night on the air and Morse tuition.
- Wimbledon DARS: Talk 'Facts And Fallacies About Learning Morse' by G3ESH.
- 2 Oct Blackwood & DARS: Welsh Amateur Radio Convention. Oakdale Community College, Blackwood, Gwent. Details from B. Davies, GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Gwent NP2 0UQ. Tel: (0495) 225825.
- 3 Oct Todmorden DARS: Surplus equipment sale. 8pm. Queen Hotel, Todmorden.
- Welwyn-Hatfield ARC: Junk sale. Details from Jef G6YIQ, Lemsford Village Hall, Brocket Rd, Lemsford.
- Stourbridge & DARS: Natter/On-air night. Robin Woods Centre, Beauty Bank, Stourbridge.
- Braintree DARS: Construction evening. 7.30pm. Braintree Community Association Centre, Victoria Street (next to Bus park), Braintree.
- 4 Oct Fylde ARS: Talk 'Computers — what's on the horizon' by S. Williamson G3WGU, The Kite Club, Blackpool Airport.
- Stevenage ARS: Construction evening.
- Worksop ARS: Natter night.
- South Powys ARC: Demonstration of RTTY/'Mailbox'.
- 5 Oct Wirral ARS: AGM.
- Willenhall DARS: Night on the Air (HF).
- 6 Oct Mid-Sussex ARS: Informal meeting.
- Pontefract DARS: RSGB night with Martin G3ZXZ. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- Vale of Evesham RAC: GOEMS on his US Visit.
- Horsham ARC: Autumn junk sale. 8pm. The Guide Hall, Denne Road, Horsham, Sussex.
- Details from Phil Godbold on Steyning 814516.
- 7 Oct Loughton DARS: Rainbow & Dove Field weekend planning night. Loughton Hall, Rectory Lane, Loughton, Essex.
- Coventry ARS: AGM.
- 11 Oct Rugby ATS: Activity night. 7.30pm. Cricket



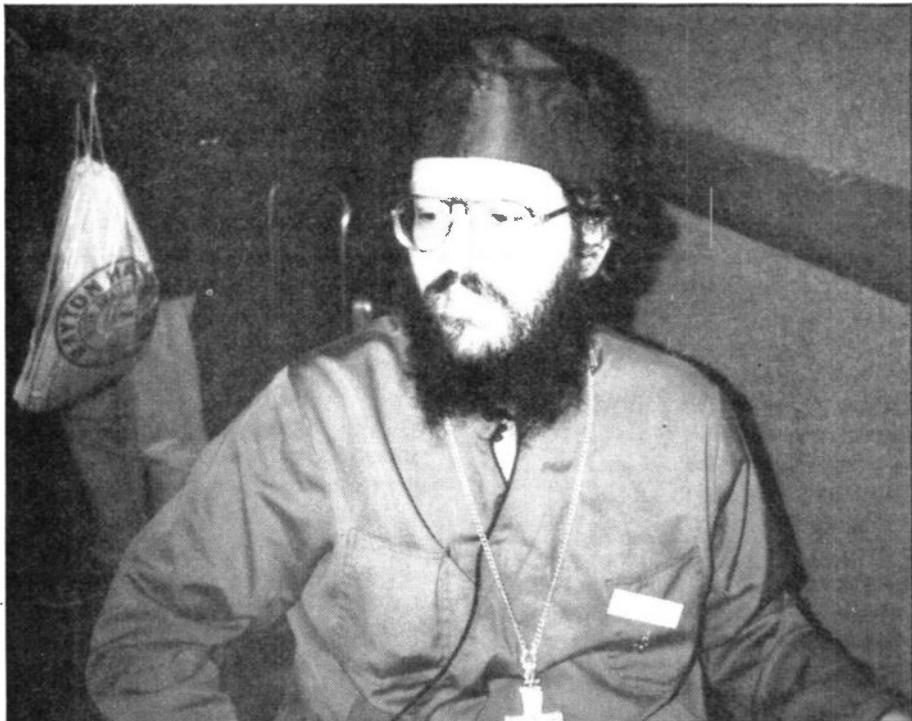
- pavilion, BTI Radio station, 'B' building entrance, A5 Trunk Rd, Hillmorton, Rugby.
- Dorking DRS: Talk 'Shortwave listening' by John G6ZOV.
- Workshop ARS: Junk sale.
- Cheshunt DARC: Natter evening. Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. 8pm.
- 13 Oct Mid-Sussex ARS: Junk sale, bring & buy.
- Pontefract DARS: Committee meeting. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- 14 Oct Coventry ARS: Night on the air & morse tuition.
- 17 Oct Todmorden DARS: Natter night. 8pm. Queen Hotel, Todmorden.
- Welwyn-Hatfield ARC: Construction & Design an audio amplifier by Norman G3BYG. Knightsfield Scout HQ, Opp Ingles, Welwyn Garden City.
- Stourbridge & DARS: G3ZOM with QRP QRV. Robin Woods Centre, Beauty Bank, Stourbridge.
- Fylde ARS: Informal meeting. The Kite Club, Blackpool Airport.
- Midland ARS: AGM.
- Rugby ATS: Talk 'Weather satellites' by Dave Young G8VXB. 7.30pm. Cricket pavilion, BTI Radio station, 'B' building entrance, A5 Trunk Rd, Hillmorton, Rugby.
- Worksop ARS: Natter night.
- South Powys ARC: Social evening.
- 19 Oct Wirral ARS: Talk, 'First aid' by Bill Davies G4YWI.
- Willenhall DARS: Natter night.
- 20 Oct Pontefract DARS: Talk 'Satellite TV' by Richard G4FB. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- 21 Oct Loughton DARS: Rainbow & Dove Field weekend planning night. Loughton Hall, Rectory Lane, Loughton, Essex.
- 25 Oct Stevenage ARS: Committee evening.
- Worksop ARS: AGM.
- 26 Oct Cheshunt DARC: Natter evening. Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. 8pm.
- 27 Oct Pontefract DARS: On the air night. 8pm. Carleton Community Centre, Carleton Rd, Pontefract.
- 28/29 Oct Leicester Amateur Radio Show at Granby Halls.
- 31 Oct RSGB City of Bristol Group: AGM. 7.30pm. Small Lecture Theatre, Queens Building, University of Bristol.

CONTACTS

CONTACTS

Aberdeen ARS	Don	04676251	Lagan Valley ARS	Jim, G14TCS	0846 682474
Abergavenny & NH ARC	GW4XQH	0873 4655	Leeds DARS	G1EBS	0274 665355
Aberporth ARC	GW0DPR	023987 274	Lincoln SWC	Pete Brazier	052 523 270
Aire Valley RS	G6NPT	0532 44597	Lothians RS	Pam, G4STO	0427 788356
Alyn and Deeside ARS	GW4RKX	0244 660066	Louth DARC	Robin	0506 890177
Amateur Radio & CC	Trevor	04895 81032	Loughborough ARC	G1ZB	047286 595
AMRAC	Phil, G6DLJ	0703 847754	Lough Erne ARC	Philip	0509 412043
Armagh & Dungannon DARC	J. A. Murphy	0861 522153	Loughton DARC	Bill	0365 24905
Atherstone ARC	Roy	0203 393518	Macclesfield DRS	G4FKI	0525 714591
Axe Vale ARC	Bob	029 74 5282	Maidstone YMCA ARS	G1NUS	0625 24534
Ayr ARG	GM3THI	Ayr 42313	Maidstone YMCA ARS	John	0628 28463
Barking RES	R. Woodberry	01 594 4009	Mansfield ARS	G0BUW	0622 30544
Barry College RS	John	065679 710	Medway ARTS	Keith, G1PQW	0709 814135
Basingstoke ARC	Dave	07356 5185	Midland ARS	G4GYU	0623 27257
Bath DARC	G4UMN	Frome 63939	Mid Sussex ARS	Tony	0634 578647
Biggin Hill ARC	GOAMP	0689 57848	Mid Ulster ARC	G8BHE	021 422 9787
Borehamwood Elstree ARS	Tony	01 207 3809	Mid Warwickshire ARS	G0GMC	07918 2937
Braintree ARS	Pub Sec	0376 28714	Milton Keynes DARS	Sam	07622 22855
Bredhurst RTS	Kelvin GOAMZ	0634 376991	Morecambe Bay ARS	G4TIL	Southam 4765
Bridgend DARC	Dave	0656 723508	N. Bristol ARC	Mike, Q0ERE	0234 750629
Brighton DARS	Peter	0273 607737	N. Cornwall RS	G4ZJL	0524 52042
Binstead ARS	Douglas	Ryde 67665	N. Staffs ARS	Alan Booth	0272 690404
Bristol ARC	G4YOC	Bitton 4116	N. Wakefield RC	J. West	0288 4916
Bristol (Shirehampton) ARC	Ron Ford	0272 770504	Newbury DARS	G6MLI	0782 332657
Burnham Beeches RC	G6EIL	0628 25720	Newport ARS	Steve	0532 536633
BT (Reading) ARC	G4MUT	0734 693766	Norfolk ARC	G3VOW	0635 43048
Bury RS	Allan	0204 706191	Oswestry DARC	GW6ZUQ	02912 6867
Cambridge DARC	D. Wilcox	0954 50597	Peterborough RES	Andy	Norwich 610874
Chesham DARS	Liz	09278 3911	Plymouth ARC	Brian	0691 831023
Cheshunt DARC	G4VMR/G4VSL	092084 250	Pontefract DARS	Peter	0234 750629
Chester DRS	Dave	0244 336639	Poole ARS	G4SCA	0752 337980
Chichester DARC	C. Bryan	0243 789587	Preston ARS	Colin, G0AAO	0977 43101
Clacton ARS	Reg	0255 430466	Reading DARC	G0EQV	0202 674802
Chiltern ARC	Ron, G3NCL	0494 712020	Rhyl DARC	George	0772 718175
Clifton ARS	RA Hinton	01 301 1864	Salisbury RES	Steve, G4YFB	Reading 867820
Conwy Valley ARC	GW4KGI	0745 823674	Salop ARS	GW1PLI	097 888 621
Coulsdon ATS	Alan	01 684 0610	Sheffield ARC	Neil	0980 22809
Coventry ARS	Bill, G3UOL	0203 414684	Shefford DARS	Simon	0743 67799
Crawley ARC	Jack	0293 28612	S. Bristol ARS	John	Sheffield 581766
Darent Valley RC	Sec	0322 63368	S. Cheshire	Alan, G4PSO	Hitchin 57946
Dartford Heath DFC	Pete	0322 844467	S. Lakeland ARS	Len Baker	0272 834282
Denby Dale DARC	G3SDY	0484 602905	S. Manchester RC	Chris	07816 73185
Derwentside ARC	G1AAJ	0207 520477	S. Tyneside ARS	G4VKE	0229 65359
Donegal ARC	E13BOB	074 57155	S. E. Kent (YMCA) ARC	Dave Holland	061 973 1837
Dorking DRS	John	0306 77236	Southdown ARS	John	0304 211638
Droitwich DARC	G4HFP	0299 33818	Southampton: See Waterside.	P. Henly	0323 763123
Dudley ARC	John	0384 278300	Southgate ARC	Dave	0992 30051
Dunfermline RS	GM0DYD	0383 413440	Spen Valley ARS	G4MLW	0924 409739
Dunstable Downs RC	Phill Morris	0582 607623	Stevenage DARS	G6EDA	0438 724991
Eastbourne EARC	G1BRC	0323 29913	Stockton DARS	John Walker	0642 582578
East Kent ARS	Stuart	0227 68913	Stockport RS	Mel	061 224 7880
East Lancashire ARC	Stuart	0254 887385	Stourbridge DARS	G3ZOM	K/ford 288900
Edgware DRS	G4IUZ	0707 65707	Stowmarket DARS	M. Goodrum	0449 676288
Exeter ARS	Roger Tipper	0392 68065	St Helens DARC	A. Riley	051 430 9227
Fareham DARC	Alan, G3CCB	0329 288139	Surrey RCC	John	01 657 0454
Farnborough DRS	Mr Taylor	0252 837581	Swale ARC	B. Hancock	0795 873147
Felixstowe DARS	G4YQC	0473 642595	Taunton DARC	Peter	0823 75973
Fishguard DARS	Bernard	0348 872671	Telford DARS	Tom Crosbie	0952 597506
Fylde ARS	F. Whitehead	0253 737680	Three Counties ARC	Keith, G0BTU	0730 66489
Galashiels DARS	GM3DAR	0896 56027	Tiverton SWRC	Alan	0392 881569
Glossop DARG	G4GNQ	QTHR	Todmorden DARS	G1GZB	070 681 7572
Gt. Lumley ARES	G4MSF	091 4693955	Trowbridge DARC	Ian	0380 830383
G. Peterborough ARC	Stan	0733 69822	V of Evesham RAC	Paul	Evesham 831508
Halifax DARS	D. Moss	0422 202306	V White Horse ARS	Ian White	Abingdon 31559
Harpden ARS	G1BJC	05827 2455	Verulam ARC	Gerry	St Albans 52003
Harrow RS	Tony	01 861 0419	WACRAL	G4NPM	0795 873147
Hastings ERC	Dave Shirley	0424 420608	Wakefield DRS	G4VRY	0532 820198
Haverhill DARS	Rob Proctor	0787 281359	Warrington ARC	Paul, G0CBN	0925 814005
Havering DARC	GOBOI	04024 41532	Waterside SWC	Bernie Lyford	0703 893937
Hillingdon ARC	Howard, G6SII	01 561 2917	Welland Valley ARS	J. Day	0858 32109
Hornsea ARC	Richard	0401 62498	Welwyn Hatfield ARC	Kevin, G4WLG	0707 335162
Horsham ARC	Paul, G4YFY	0403 87 404	West Kent ARS	B. Guinnessy	0892 32877
Inverness ARC	Brian	0463 242463	Westmorland ARS	G. Chapman	0539 28491
Itchen Valley RC	G1IPQ	S'oton 736784	White Rose ARS	G4ATZ	0937 842790
Keighley ARS	G1IGH	0274 496222	Wigston ARC	G6HAJ	Leicester 403105
Kidderminster DARS	Tony	0562 751584	Willenhall ARS	G4LWI	0902 782036
Kingston DARS	G3ODH	Epsom 26005	Wimbledon DARS	George	01 540 2180
			Winchester ARC	Gordon	0703 772191
			Wirral DARC	Peter	051 677 7376
			Wolverhampton ARS	Keith	0902 24870
			Worcester DARC	D. Batchelor	0905 641733
			Worksop ARS	G4ZUN	0909 486614
			Wythall RC	G1MEE	0546 824705
			Yeovil ARC	Eric Godfrey	Yeovil 75533
			308 ARC (Surbiton)	Bob	01 391 0788

QRZ



Gerry Kambites, 5X5GK, at the Visalia Hamvention in the US.

Steve Telenius-Lowe, G4JVG, tells us all about his hole — needless to say there's some DXing in there somewhere!

The big news for HF DX operators over the last couple of months was the appearance on 7th July of 4J1FS from Maly Vysotsky island in the eastern Gulf of Finland. The expedition was the first ever joint East-West DXpedition and it is hoped that, because of the unique location of the island, it will count as a new DXCC country.

Back in the USSR

The island is Soviet territory, but was leased to Finland on 27th September 1962. It is separated from Finland both by Soviet islands and part of the USSR mainland and thus, by the old DXCC countries criteria it

should count separately from Finland. Indeed, on 17th November 1970 the ARRL decided that, if and when there was a DXpedition to Maly Vysotsky, it would count as a new country. However, it has taken 18 years, and the present degree of Soviet "Glaznost", for such an expedition to get off the ground, and in the meantime the DXCC countries criteria rules have been changed. It remains to be seen if this one will be accepted, because of the 18 year-old ruling, or if the new rules will be enforced.

My own view is that if it had been a Finnish island which was leased to the USSR it would be more clear-cut,

but since it is still Soviet territory and merely leased to Finland the fact that USSR islands and mainland are between it and Finland is irrelevant. However, Martti Laine, OH2BH, one of the expedition's organisers, is a pretty persuasive guy and has some influence with Don Search and the ARRL DX Advisory Committee, so if he gets his way we will have a new country on the DXCC list. Apart from Martti the other operators were OH5NZ, OH2RF, UR2AR, UW3AX and UZ3AU. They all did a superb job of operating, sticking to the publicised frequencies (1 kHz up on CW, around '45- 14145, 7045 etc. - on SSB) and making themselves quite easy to work (from Britain) despite the large pile-ups that the possibility of a new country was bound to generate.

Equipment & QSLs

Their station consisted of a Kenwood TS-940S and TL-922 linear to a KLM KT-34A 4-element tribander beam and dipoles. The rig was powered by a Honda 3-kW generator. Anyone working — or hearing — 4J1FS should send their QSLs (with s.a.e.s. and IRCS) to Armas Valste, OH2NB, P.O. Box 63, SF-00391, Helsinki, Finland. No doubt some fairly impressive, probably pictorial, QSLs will be printed. For those of you whose atlas — like mine — does not show Maly Vysotsky, it is located at 60° 17'N, 28° 34'E, very close to the town of Vysotsk, just to the southwest of Vyborg. The island itself is about a mile long, uninhabited and in an area of great strategic importance, so it is fairly amazing that permission was granted for the expedition at all, let alone the fact that half the crew were from a Western country. Surely a good example of international friendship through amateur radio?

By the time this is in print another, much more modest, DXpedition should have taken place. Next week (as this is being written) I

should be operating as GJ4JVG/A from Jersey and possibly also as GJ4JVG/P from the Minquiers Islands. The Minquiers, pronounced "Minkies" (*at last somebody knows how to say it! — Ed*), are a group of small rocky islands and sandbanks lying about 12 miles south of Jersey, between Jersey and the north coast of France. At high tide there is not much of them, although the largest island, Maitresse Ile, has several stone cottages on it. There is a 35 foot tide to the south of Jersey however, and at low tide more than 100 square miles of sand, rocks and shingle is exposed — a larger land area than that of Jersey itself! Because of the tides and currents, reaching the Minquiers is a tricky business, and whether or not I get there is entirely dependant on there being calm enough weather at the time.

The Minquiers count separately from the other Channel Islands for the purposes of the Islands on the Air (IOTA) awards and therefore are much in demand by IOTA award hunters. They have only been activated once in the past, by G3ZAY and G3XTT in October 1985 (for a full account of that expedition, see "DXing from the Minquiers" by Martin Atherton, G3ZAY, in the June 1987 "Ham Radio Today"). One interesting fact about the Minquiers is that it was only as recently as 1956 that the International Court in the Hague confirmed that these islands (and the Ecrehous, which are to the north-east of Jersey) belonged to Jersey, and not France, which had had a long standing claim of sovereignty.

Visalia Convention

Martin, G3ZAY, also kindly provided the photos that he took recently in California, where he visited the Visalia convention. Gerry Kambites, 5X5GK, is a Canadian Greek Orthodox priest who was working as a missionary in Uganda. He was just about the only active amateur there for a long time and was often a very good signal on 14MHz SSB in the evenings. Unfortunately, the Ugandan authorities took a dislike to something and he is not going to return to the country. Uganda has become a very rare country again.

Also in California, Martin sent along the picture of W6KPC's ant-



The massive 20m array at W6KPC set in the Californian vineyards. There are 36 elements in all with the highest beams located 350ft agl!

enna system for 20 metres. It consists of no less than 36 elements, stacked in three pairs of 6 element yagis. The lower tower is 250 feet, and the lowest twelve elements rotate about the tower. Above that is a 100 foot rotating Telrex tower, on which the other 24 elements are

mounted. While very few of us can aspire to anything remotely like the W6KPC set-up, it is interesting to see what can be achieved if money, space and engineering know-how are unlimited. There are of course several full-size three and four element arrays for 80 metres around in California and even one or two such in Europe.

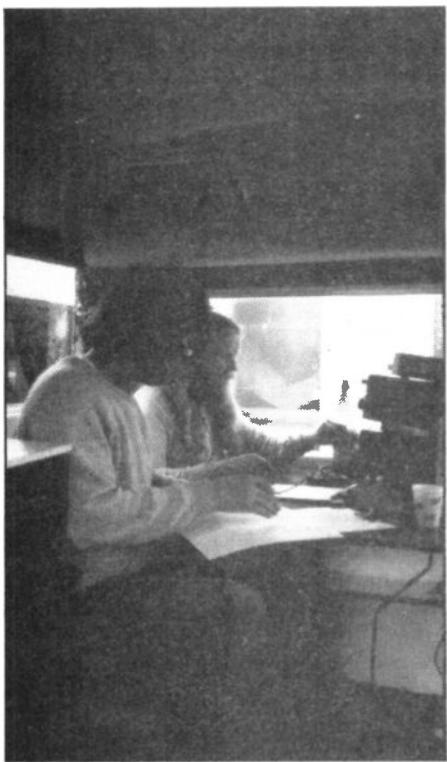
RSGB HF Convention

While not yet quite on the same scale as Visalia or Dayton, the RSGB's HF Convention has fast become THE premier event for the HF operator and especially the DXer in Britain. Last year's event was superb (see "QRZ" in the February 1988 "Ham Radio Today") and this year's sounds as if it will be at least as good. As always, the HF Convention will be held at the Belfry Hotel, on the A40 close to junction 7 on the M40, at Milton Common, near Oxford. This year, it is on Sunday 25th September and the doors open at 0930. Admission is £3 at the door. the programme of events includes G4RLE on "EMC — the politics and the EEC directive" at 1030, G3OSS on "HF Equipment — new or second-hand?" at 1145, trophy presentation at 1330, "QRP Topics" by G3PDL at 1430; and at 1545 WOAIH on "Building a US contest super-station", followed by F6EXV with his slide-show and talk on this year's Palmyra, Kingman Reef and Christmas Island DXpeditions.

Last year there was also an informal get-together and a series of several DXpedition slide-shows on the Saturday evening. This will almost



The G4CDX QSL card now being sent out for QSOs made during the 1988 CQ WPX Contest.



Steve and Steve, G4YFB and G3YDV operating G3ULT/P from a caravan during the RSGB National Field Day CW Contest.

certainly be repeated this year and although not part of the official proceedings is also not to be missed. I am fortunate in living close to the Belfry Hotel, but for those of you travelling some distance, the hotel does offer special rates for people attending the convention — contact the hotel direct for details.

It was good to receive a letter from Nick Trotman, G8SYE, who is now the proud possessor of both a brand new rig and brand new daughter. Congratulations on both counts, Nick! The rig in question is an HF one, a Ten Tec Argonaut 515 and the only thing Nick needs now is a GØ licence with which to put it through its paces. Meanwhile, the Rx side has been pressed into action, and Nick reports logging TR8JLD, ZD8HCF and 5T5NU on 14MHz SSB and many South Americans and several Africans on 28MHz SSB, using just a 140 foot end fed wire. Good luck with the morse studies and you will soon be working some of these stations as well. In fact, I was lucky enough to be able to have a QSO with TR8JLD, Jean-Louis, on 7088kHz at 2120 GMT one evening not so long ago, with 59 signals both ways. Jean-Louis is probably the most active DXer in Gabon and has a good signal on all bands. His QSL manager is AK1E

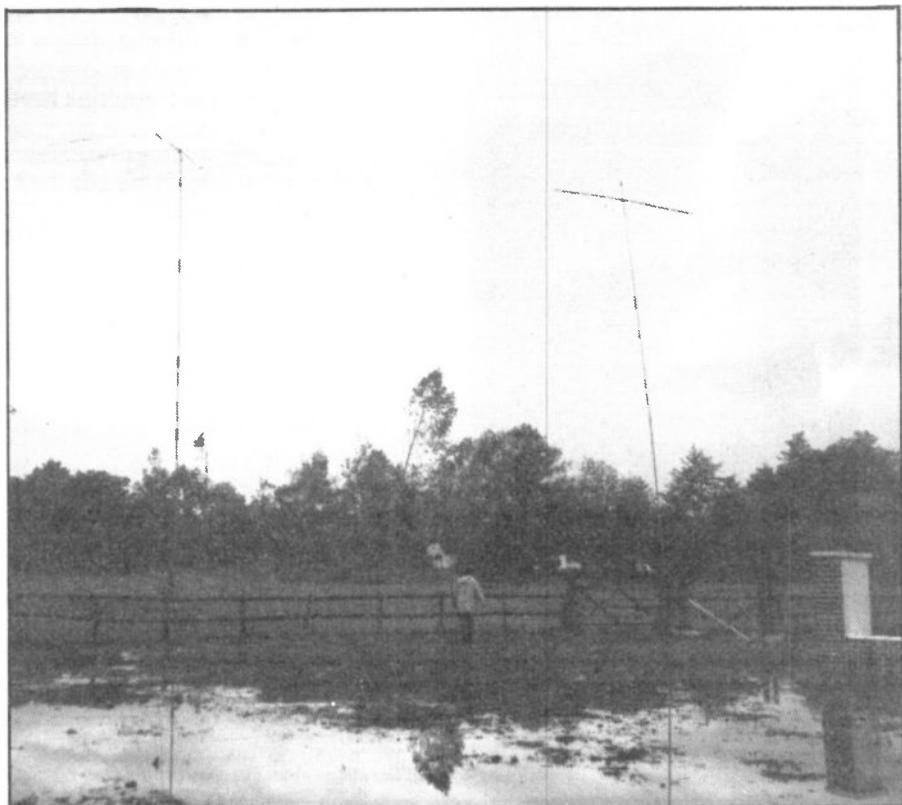
if anyone requires a card from this country.

I am pleased to be able to report that I have now received my Australian licence and my callsign is VK9YG, as requested. I will be active from Home Island, in the Cocos Keeling group, from 18th October to 1st November, although operating time may be limited depending on other attractions on the islands! I plan to operate around the following frequencies: 28595, 21295, 14195, 7095/7045, 3785-3800 and 3640-3650kHz. In addition, I will try 160 metres — frequencies will be dependent on local signals and where there is a clear spot. Antennas consist of two log-periodic beams for 10, 15 and 20 metres and verticals, dipoles, inverted-L's and delta-loops for the lower frequency bands, all supported by two towers, one 60 foot and the other 70 foot high, located within a few feet of the Cocos Keeling South Lagoon's water's edge.

It sounds an idyllic location and I can hardly wait to get there. During my stay on Cocos Keeling I will take part seriously in the CQ World Wide SSB contest, which will be between 0000 GMT On 29th October and 2400 GMT on 30th October, ie. 48

hours over Saturday and Sunday. During this period I hope to be on the air as much as possible, although due to the anticipated amount of activity in the contest, I will probably not be able to stay close to the announced frequencies all the time. I will try to use the special callsign AX9YG during the contest, if possible, but the QSL route for both VK9YG and AX9YG QSOs is direct to me at "Penworth", Tokers Green Lane, Tokers Green, Reading, RG4 9EB. If you are sending a QSL or SWL report, PLEASE enclose a self-addressed envelope with a minimum of a 13p stamp or 1 IRC (International Reply Coupon) to cover return postage. Correct SWL reports sent direct with an s.a.e. and sufficient return postage will be confirmed, but I regret that SWL reports sent via the bureau cannot be acknowledged.

The above address is also the one to which you should send any reports of your HF activities or operations, or comments on DXpeditions, HF contests etc. I look forward to hearing from you, and would especially appreciate receiving photographs of your station, antennas or anything of interest to other HF operators or SWLs.



The site of G3ULT/P at Eversley on the Berkshire Hampshire border. The Reading DARC had a TH3 at 55' plus a 40' pole supporting wire antennas for 160, 80 and 40 metres. The soggy field provided an excellent earth.



Pocket Packet Power.

The availability of hand held transceivers has meant that it is now possible to carry your amateur radio along with you wherever you go. The TH-25E 2 metre and TH-45E 70 centimetre transceivers are fine examples of Kenwood's ability to take an apparently simple idea and add that touch of magic which makes for ease of operating and user satisfaction.

Both transceivers feature an easy to see LCD frequency readout, 14 channels, up to 5W output, and in this age of keypads for everything actually use a tuning knob to leap across the bands in suitable frequency steps. Ever tried "tuning around" with a keypad? The same convenient knob also allows you to step through the memory channels, and even choose which direction to scan or sweep.

Despite the apparent absence of knobs, every possible facility is provided, including power saving on receive (with automatic switch-off should the set not be used for one hour), repeater and reverse repeater shifts — and tone burst of course, and a single key press will load memories from 1 to 10 with

every channel upwards starting with the one you put into channel 1. This means that if you put 145mHz into channel 1, a single key press will load 145.0125 in channel 2, 145.025 into channel 3, and so on to channel 10.

The "Tone Alert" function sounds an alert beep for five seconds when a signal is received, and this lets you walk away from the set in the knowledge that it will call you back when needed.

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AR800E £199 inc. VAT. Carr. extra.



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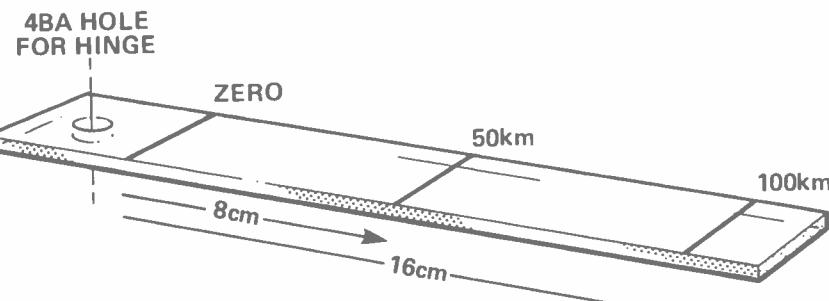
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HAM RADIO TODAY OCTOBER 1988

METREWAVE



"Meet the QRB-stick" suggests Jack Hum, G5UM, in describing what he calls the world's simplest method of measuring QSO-distances.

Back at the dawn of VHF-time, and that means forty-plus years ago, you counted yourself fortunate to work much farther than a hundred miles on the then-available bands of 145 and 420 Mc/s (note "megacycles"!) Your phone mode would be amplitude modulation if the local televiwers didn't object too much when it was heard through their sound channels. Your DX mode would be CW, which carried three or four times farther than AM.

Because any contacts were an event, and gratefully received, it was worth knowing from how far away that weak and watery incoming signal was being generated and exceptionally it could be beyond that putative 100 miles QRB. Very exceptionally, contacts up to many hundreds of miles proved possible as the mechanisms of tropo and aurora became better understood and it was the hams' pioneering work in this field that made them better understood.

Even more exceptionally there were those rare "real DX" contacts, of which the exemplar was the one made to the USA by G6DH as long ago as November of 1947, on a 50Mc/s frequency allocated by special dispensation from on high. That historic event is well worth remembering by those who think it is all new on today's Six Metre Band: it isn't, but that doesn't

detract from the excitement when it happens.

Magic Hundred Miles

For most of the time it was that magic three-figure 100-mile QRB which exercised the minds of those metrewave pioneers who did it all with home-built valve equipment and home-constructed aerials.

Reckoning that 100 miles or less was the QRB you would most

often wish to measure, you would equip yourself with a large map to be mounted on a sheet of hardboard and suspended from the picture rail of the radio room or if there was no picture rail then Rawlplugged into the wall. A hole would be drilled at the exact point on the map where the home QTH was located and a 4BA bolt run through it, to be secured loosely on the reverse. On the obverse -meaning the front of the map- the other end of the 4BA bolt engaged with a hole drilled at the end of a length of flat perspex. This perspex strip would be calibrated in ten mile intervals by scratching marks laterally across its surface according to the scale of the map used. Hey presto, a ready-made no-cost QRBaker-stick! When swung across the map in the direction of your QSO-partner's location (he would have told you this, or you could have looked it up in the Callbook), then equally hey presto, you had instant QRB readout.

What Map?

Before any of this could happen a decision needed to be made about



the size of map to be installed. The answer was simple: any map that extended say a couple of hundred miles from the home QTH would suffice for most of the DX likely to be worked in those days.

Early on, your G5UM installed a Bartholomew coloured counties map of England and Wales (separate editions were available for Scotland and Ireland). Today, this map has only a historic value. It shows the old, pre-merger counties, it shows no motorways, for they were not invented, but it does show all the dear old railways of yesterdecade (and observing how many there were, all inhabited by coal-burning steam locomotives, the propensity for pollution may be imagined -and indeed remembered by the metrewave buffs who were around at the time, who saw some merit in the smog of those years: it usually indicated that VHF conditions were likely to be good!)

The scale of that old map was 10 miles to the inch. Accordingly, a length of flat perspex 10 inches long by one inch wide was required to give a hundred-mile radius-ing. The rod had an inch extension at its "home QTH end" to admit that 4BA bolt, which acted as a hinge. A very contemporary replacement to that old map, also by Bartholomew, measures 36ins by 29ins, which dictates the size of hardboard backing needed to mount it. Half a dozen drawing pins tacked to the top, bottom and middle edges of the map will secure it to the hardboard. The major scale on this current map shows $6\frac{1}{4}$ ins = 200km. The minor scale below it gives $5\frac{1}{2}$ ins = 100 miles, very truly a contemporary map: on the old one the miles scale came first with kilometres in a subservient position! An incidental attraction about this current map is that it delineates the local authority districts within each county, which will have some appeal to those enthusiasts who ask you over the air "What is your local Authority?". You can find out what *his* is without even asking him: it's on the map! No doubt there are other equally contemporary maps that provide equally comprehensive information. The one under discussion happened to be that which was recommended by G5UM's local map shop, and it cost only £2.50.



What length of QRB-strip?

With a contemporary map the old "10 inches equals a 100 miles" stip will hardly do. You've got to go metric. What, then, is a realistic length of QRB-stick to use with it? Because most of today's metrewave contests are based on kilometre radius rings the newly constructed QRB-stick should take this into account. Its length will be governed by the scale of the map which the radio amateur decides to install in the shack. On the map so far discussed, where 4cm of calibration equals 50km of distance, it would be quite feasible to multiply these figures by ten so that 40cm of QRB-stick length came to 500km of distance. A 500km stick at 40cm long would come out at about 18 inches, plus another half inch at the end to take the 4BA hinge. This is quite a convenient length to use on a map 36 inches deep.

When swung on its hinge this length of calibrated perspex would extend from Central England to the Grampians in one direction and well past the Low Countries in the other; or in an east-west direction from Norfolk well into the Irish Republic. This with a map to scale 1:1,250,000.

This order of coverage, though, might be regarded as too extensive except for the dedicated DX hound. For the average metrewave operator (if there is one!) distances between places in the UK will be the major requirement. A map at 1:1,250,000 cannot show the individual villages and settlements

which a more "intimate" map would do.

If you wanted to check out the QRB between, say, Hedingham in Essex and Crich in Derbyshire to work out the distance after you'd covered the path on 23cm, you couldn't. Neither place is shown on "the big map". Both are shown on maps where greater detail is presented, such as that "old and ancient, complete with railways" one mentioned earlier. Its scale is 1:636,000 or, to put it crudely, it shows twice as much detail, and this is probably what the generality of metrewave people want.

A profusion of such maps is available from the usual stockists, and a good browse over them is recommended before a purchase is made of an article likely to be in use for a long time. A map on linen will wear better than one on paper and will better withstand the scraping of the perspex QRB-stick over its surface. But it is likely to be more costly.

Stand by to Calibrate!

Having decided on the purchase of a suitable map (or indeed maps, one for DX, the other for everything else), the operator's next task is to calibrate the QRB-stick to go with it. This is done as follows: First, measure from the map's scale what the equivalent of 50km is. It could be 8cm. Next, incise across the perspex pointer a line to indicate "nought kilometres", allowing say half an inch of pointer through which to drill the 4BA hole to make it swing. Next, incise a lateral line at the 50km point, another at the

100km point and in sequence out to the edge of the QRB-stick. See Fig. 1. Because the perspex is transparent the kilometre markings should be emphasised by fixing a small strip of white adhesive tape at each 50km interval for ease of readout.

Finally, drill a hole at the "non-operation" end of the perspex - that is, through the passive half-inch already mentioned. You are in business!

Doing it the hard way?

Hams who have seen the QRB-stick in use at G5UM, or heard it described at club meetings, sometimes ask: "Aren't you doing it the hard way? Wouldn't it be simpler to work out distances with a computer?" You can indeed get a quick readout of QRB with a computer if you have one readily accessible at the operating position and so long as it doesn't generate a lot of hash that clobbers incoming signals -and some of them do. Knowing the



other operator's latitude and longitude, you can get almost instant readout of the distance away from you, the QTH locator et al. But you will need to spend moments asking for the lat-and-long of the other station before you can get the sums right.

Among many other facilities offered by a computer in the ham station is to index your QSOs, either all of your QSOs or just your first QSO with a given station - though it is for discussion whether or not it is

any faster or more accessible than the "old exercise book system" with one callsign block per page described here a year or two ago.

Just a final thought about doing it all by computer: is there any such device that occupies only half an inch of wall space, drinks nothing from the mains, costs almost nil, or is any faster than getting up from your radio room chair and swinging your QRB-stick while the QSO-partner is talking? If there is, no doubt the computer buffs will say!

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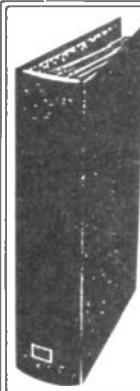
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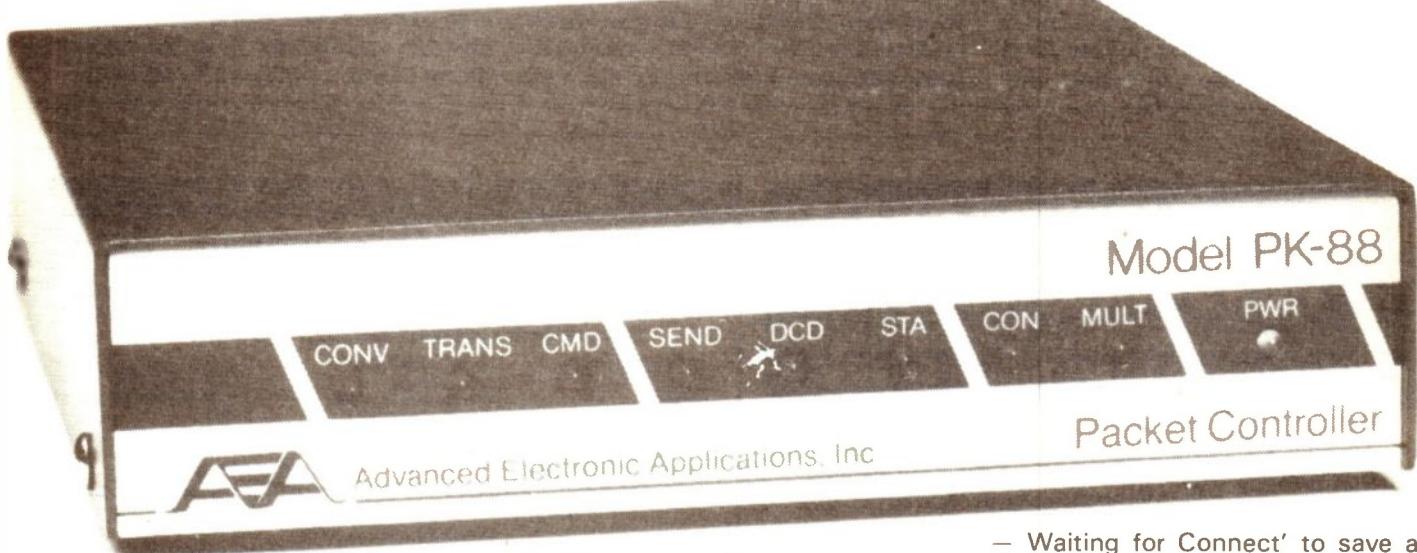
In part one of this series, I gave an idea of what packet was all about, with plenty of information to allow you to get started. The major advantages of packet, i.e. that of 100% error-free communication combined with digipeating facilities, makes it ideal for electronic message distribution amongst amateurs. Hence one of the most popular uses of packet is, not surprisingly, that of radio 'Mailbox' or 'Packet Bulletin Board Station' use.

A packet bulletin board is very similar to its landline counterpart, it acts as a focus for messages to and from other amateurs. However packet BBSs have one very large advantage, that of automatic forwarding. Let's say for instance that your friend in Plymouth wishes to send you a message, and knows that

Chris Lorek G4HCL continues his beginners guide to Packet Radio with Mailbox Operation

mailboxes in the country. Facilities also exist for international forwarding, as some Packet Bulletin Board Stations also have HF facilities as well as a VHF port. Others have ports on 432.675MHz as well as 144.650MHz to allow message forwarding to take place on a less active frequency as well as allowing two users at a time.

changing day by day, with many new mailboxes coming on air each month, so the best way really is to set your TNC to 'MONITOR ON' and take a look at local activity. At the time of writing, many stations are using their own callsign with a '2' SSID, i.e. G4SPV-2, however soon a formal GB7***-2 series will be used for all stations forming part of the national trunking, i.e. autoforwarding, network. The GB7***-2 series will also be part of the network, so again the best way is to monitor your local activity. Many PBBSs send out beacon messages informing amateurs of their callsign, location, and often a list of callsigns for whom messages are stored. Often they will also inform you of their status, i.e. 'BUSY - Connected to USER' or 'FREE



your local mailbox in Birmingham is GB7MAX-2. He connects onto his local mailbox, GB7PLY-2, and simply enters a message as being addressed to 'your Callsign@GB7MAX-2'. GB7PLY-2 then, fully automatically, routes your message across the country via intermediate mailboxes to reach GB7MAX-2, where the message is stored for you to read.

Alternatively, if you need advice on say, converting your Pye Westminster onto 2m or 70cm (and you weren't subscribing to HRT when we showed you how!) you can send a message addressed to 'ALL' and your plea will be circulated to all

Throughout the country, and indeed the world, individual amateurs spend many hundreds of pounds providing such a service to their fellow amateurs. Hence lesson one, remember it is someone else's equipment you are making use of, you don't have any right to do so apart from the station owner allowing you to do so. Treat this privilege carefully, don't spend all day connected to your local mailbox denying others of its use!

Locating Your Box

So how do you find your local mailbox? Well the simplest answer is to look at our table giving the callsigns of PBBS stations around the country. The network is of course

— Waiting for Connect' to save a 'busy' reply to your TNC.

Logging On

When you first connect onto a PBBS, you will receive a greetings message, followed by a short menu of commands and a prompt, possibly with a request to enter your name. Following this, each time you connect in the future the PBBS will greet you by name as well as your callsign. Each PBBS is unique in that it is often configured to suit local needs, you may find you get different menus or prompts, but if you get stuck, enter the command 'H' followed by a carriage return, which will bring you a 'help' instruction set. To find out a

Table 3 UK Mailboxes

BBS CALLSIGN	LOCATION	TYPE	OPERATOR				
GB7AAA-2	Northampton	WORLI	GOHWC	GB7LRG-2	Leicester	WA7MLB	G1LPC
GB7ABC-2	Rhyl	WA7MLB	GW3TMH	GB7MAC-2	Glasgow	WA7MLB	GM4AUP
GB7AOB-2	Fort William	K8KA	GM8AOB	GB7MAX-2	Tamworth	WA7MLB	G4JBX
GB7APC-2	Swindon	WA7MLB	G1APC	GB7MTP-2	Daventry	WA7MLB	G4MTP
GB7BBS-2	Wolverhampton	WA7MLB	G1DIL	GB7MXM-2	Stowmarket	WA7MLB	G4GBA
GB7BRK-2	Reading	WA7MLB	G1AWD	GB7NEM-2	Middlesborough	WA7MLB	G8EIA
GB7BYS-2	Bromley	K8KA	G1BYS	GB7PHL-2	Sheffield	WA7MLB	G4PHL
GB7CDM-2	Crewe	WA7MLB	G4BVE	GB7PLY-2	Plymouth	WA7MLB	GOBSX
GB7COV-2	Aberdeen	WA7MLB	GMOCQV	GB7PVR-2	Oxford	WA7MLB	G1PVR
GB7DGK-2	West Drayton	WA7MLB	G4DGK	GB7RDG-2	Reading	WA7MLB	G4YFB
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GB7FRI-2	Oban	WORLI	GMOFRI	GB7SUT-2	Sutton Coldfield	WA7MLB	G8AMD
GB7GBY-2	Grimsby	WA7MLB	G8UFQ	GB7TCM-2	Upton-On-Severn	K8KA	G8ADH
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GB7IMB-2	Bristol	WA7MLB	G8IMB	GB7VIC-2	Glasgow	WORLI	GM4HCO
GB7JSC-2	Glasgow	K8KA	GM1VBE	GB7VLS-2	Norwich	WA7MLB	G4VLS
GB7KCM-2	Southampton	WORLI	G4KCM	GB7VMR-2	Maidenhead	WA7MLB	G3VMR
GB7KHW-2	Biggleswade	WORLI	G6KHW	GB7WFD-2	Wakefield	WA7MLB	G4CLI
GB7KLX-2	Wirksworth	WORLI	G4KLX	GB7WOK-2	Wokingham	Homebrew	G3WGV
GB7KVD-2	Taunton	WA7MLB	G1KVD	GB7WRI-2	Randalstown	WA7MLB	G14WRI
GB7LDI-2	Norwich	WORLI	G3LDI	GB7XJZ-2	Eastleigh	WORLI	G6XJZ
GB7LIV-2	Liverpool	WA7MLB	G4LDJ	GB7ZBA-2	Norwich	WORLI	G4ZBA
GB7LNX-2	Lincoln	WA7MLB	G4GOU				

little about the mailbox, such as who it is run by, and what equipment it is using, enter the command 'I' again followed by a carriage return.

There are currently a few types of PBBS programs in use, and hence the operation between each is slightly different, but Tables 1 and 2 give the command listings for the two most popular versions. Table 3 shows you the software in use on your local box, however when you connect the PBBS will inform you on the first line, a typical sign-on menu being;

```
*** CONNECTED TO G4UXV-2
[MBL-$]
HUNTS BBS Fwd Code __33221
Huntingdonshire Repeater Group
BBS **** SUPPORT EASTNET ****
Hellow Chris, New 3892 — 3935,
Active 241
HUNTS BBS (A,B,D,H,I,J,K,L,N,
R,S,T,U,V,W,X,Y,?)>
```

This shows that MBL software is in use, together with the range of new messages since I last connected, and the number of 'active' messages, i.e. the number actually stored in the PBBS. If there are messages stored for you, the PBBS will often inform you of the fact and list these. When you first log in, you will see that all messages are 'New', i.e. they start at 0, and if you enter an 'L' to give a listing you will be waiting rather a long time for it to finish, as well as tying up the PBBS and the airwaves! So beware... don't request an entire

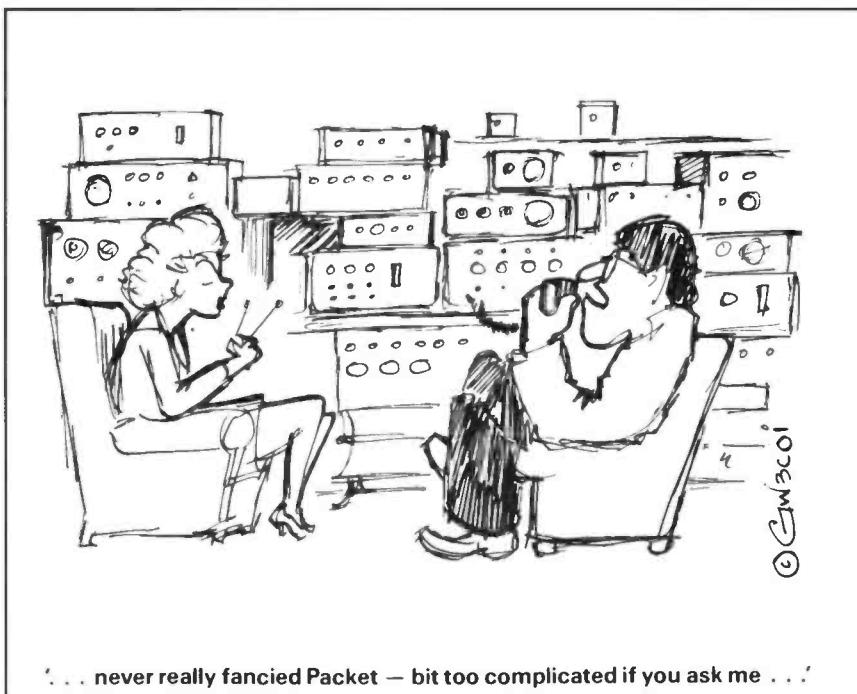
list at first, but try typing 'LL15' or similar for a listing of the last 15 messages stored, your popularity on the airwaves will then not deteriorate!

As well as sequential message numbers, the listing will give you the sender's callsign, his local mailbox identification, and a short description of the message content. When the listing has been completed, and the PBBS sends you a '>', you may enter any of the commands listed to gain further information. For instance if you wish to read message number

3465, type in 'R 3465' followed by a carriage return, do not end your entry with a '>', remember to enter a space between the command letter and the message number. If you do make a mistake, don't worry, the PBBS will just come back with '**** Invalid Command' or similar, and allow you to try again.

Files

Besides messages to and from other amateurs, these often being of short and periodic nature, a facility





exists for storage and retrieval of files. These may be computer programs, local radio club information, modification details for TNCs, and national packet network information. If you wish to see what is available, type 'W' followed by a carriage return, you will then see a listing of files or sub-directories stored, the number of kilobytes in length of each, and the amount of memory remaining in the PBBS for storage of further files. To download any of these, refer to the respective instruction set listed, but remember these files are normally fairly long hence try to pick a 'quiet' time. You may like to try entering 'D USER.DOC' which is the normally the 'User Documentation' file for the mailbox, you may like to print this out at your terminal for future reference.

When you wish to disconnect, enter the command 'B' followed by a carriage return, this tells the PBBS

that you have decided to log off. If you simply enter your TNC 'Command' mode and then disconnect, the PBBS will think the system link has failed and 'hand' for a while, sending any remaining output on the air, not allowing other stations access who may be waiting to use it after you. Remember it is a shared facility, use it properly! Remember also to 'Kill' messages addressed to you that you have read, by using the 'KM' command. After you have become used to operating your local mailbox, you may wish to dispense with the long sign-on menu by changing your status to an 'expert user' by entering 'X' or 'NE' as appropriate.

Sending Messages

To enter a message, you simply type 'S G4HCL' or whatever the callsign of the station is for whom your message is intended. If the recipient is at a distant mailbox, say

G4UXV-2 (GB7HXA-2), you enter 'S G4HCL@G4UXV-2', simple as that. The PBBS will then invite you to enter your message, telling you how to terminate it, for instance with a 'Ctrl-Z' or '/EX' at the beginning of a line on its own. If you are using a computer or terminal with a message buffer facility you'll find it more efficient to type your message into your terminal's memory prior to logging onto the PBBS, alternatively you can type it in 'live' if you wish. Following this, the PBB will tell you that your message number *** has been stored, and give you a further menu and '>' prompt. If you type in 'LL 1' you will see your message listed, however you may notice that the distant mailbox callsign, if applicable, has been changed to a five figure number, for instance G4HCL @G4UXV-2' has been changed to 'G4HCL@_33221'. This is because a national message routing system has recently been agreed on between PBBS operators in the UK, allowing more efficient forwarding of messages. For instance if you initially entered 'S G4HCL@_33221' the message would get there just the same. It is useful to end the text of your message with your callsign together with the callsign of your local PBBS for any replies from distant amateurs.

TABLE 1 WA7MBL Command Set

General Commands:	
A	Abort message file downloading
B	Log off the PBBS
J	Display callsigns of stations recently heard or connected
JK	Display callsign of stations recently connected
J (port)	Display callsigns of stations recently heard or connected on TNC (port)
N (name)	Enter your name in system (12 characters maximum).
P (callsign)	Display path to (callsign) from PBBS.
T	Ring the bell at the SYSOP's terminal for 1 min.
V	display PBBS software version, date of release, number of active messages and next message No.
Help Commands:	
H	Display description of PBBS commands.
I	Display information about the PBBS station.
X	Toggle between short and extended command menu.
? (command)	Display description of PBBS command
Message Commands:	
K	Kill a message
KM	Kill all messages addressed to you that have been read.
K (n)	Kill message No.(n).
L	List all messages since you last logged in.
LB	List all bulletin messages.
LL (n)	List the last (n) messages stored on the PBBS.
LM	List all messages addressed to you.
LN	List all unread messages addressed to you.
LP	List all private messages to or from you.
LT	List all NTS traffic.
L> (callsign)	List all messages addressed to (callsign).
L> (callsign)	List all messages from (callsign).
L (n)	List messages newer than message number (n).
L (n1) (n2)	List messages numbered (n1) through to (n2).
R	Read a message.
RM	Read all messages addressed to you.
RN	Read all unread messages addressed to you.
R (n)	Read message No.(n).
S (callsign)	Send message to (callsign).
S (callsign 1)	Send message to (callsign 1) via PBBS (callsign 2).
@ (callsign 2)	Send message to (callsign 1) via PBBS (callsign 2).
S	Send a message.
SB (callsign)	Send bulletin message to (callsign).
SP (callsign)	Send private message to (callsign).
SS (callsign)	Send service message to (callsign).
ST (callsign)	Send NTS message to (callsign).
File Transfer Commands:	
D	Download a file from the PBBS.
D (name)	Download file named (name).
D (subdir) /	Download file named (name) from Subdirectory (subdir).
(name)	
D (name) (n)	Download (n) number of lines of file named (name).
U	Upload a file to the PBBS.
U (dir) / (name)	Upload file named (name) to subdirectory (dir).
W	List what files are available.
WN	List new files uploaded since you last logged on.
W*.ext)	List files with an extension of (ext).
W (dir)	List files in subdirectory (dir).
YAPP Binary File Transfer Commands:	
(Only available for MS-DOS computers running YAPP terminal program).	
Y	Display description of YAPP Binary File Transfer.
YD	Download a file using YAPP Binary File Transfer.
YN	List new binary files uploaded since you last logged on.
YU	Upload a file using YAPP Binary File Transfer.
YW	List what binary files are available.

TABLE 2 WDRLI Command Set

General Commands:			
B	Log off the PBBS	RM	Read all messages addressed to you.
J (port)	Display callsigns of stations recently heard or connected on TNC (port)	RT	Read all NTS Traffic.
N (name)	Enter your name in system (12 characters maximum).	R (n)	Read message No.(n).
P (callsign)	Display path to (callsign) from PBBS.	S (callsign)	Send message to (callsign).
T	Ring the bell at the SYSOP's terminal for 1 min.	S (callsign 1)	Send message to (callsign 1) via PBBS (callsign 2).
Help Commands:		@ (callsign 2)	
H	Display description of PBBS Commands.	SB (callsign)	Send bulletin message to (callsign).
I	Display information about the PBBS station.	SP (callsign)	Send private message to (callsign).
NE	Toggle between short and extended command menu.	SS (callsign)	Send service message to (callsign).
		ST (callsign)	Send NTS message to (callsign).
Message Commands:			
KF	Kill all your messages that have been forwarded.	File Transfer Commands:	
KM	Kill all messages addressed to you that have been read.	D	Download a file from the PBBS.
KT	Kill traffic after it has been taken.	D (name)	Download file named (name).
KY	Kill all messages addressed to or from you that have been read.	D (dir) (name)	Download file named (name) from directory (dir).
K (n)	Kill message No.(n).	U	Upload a file to the PBBS.
L	List all messages entered since you last logged in.	U (name)	Upload a file named (name).
LB	List all bulletin messages.	U (dir) (name)	Upload file named (name) to directory (dir).
LF	List all messages that have been forwarded.	W	List what files are available.
LL (n)	List the last (n) messages stored on the PBBS.	WN	List new files uploaded since you last logged on.
LM	List all messages addressed to you.	W(dir)	List files available in directory (dir).
LT	List all NTS traffic.		
LY	List all messages addressed to or from you that have been read.	Gateway Commands:	
L> (callsign)	List all messages addressed to (callsign).	G	Access gateway and use the following gateway commands;
L> (callsign)	List all messages from (callsign).	B	Log off the PBBS.
L (n)	List messages numbered (n) and higher.	C (callsign)	Send CONNECT request to (callsign).
L (n1) (n2)	List messages numbered (n1) through to (n2).	J	Display callsigns of stations recently heard or connected.
R	Read one message.	M	Monitor gateway frequency.
		R	Exit gateway and return to PBBS command mode.
		U	Send unconnected messages (CQs) via gateway.
		X	Toggle between short and extended gateway command menu.
		Ctrl W	Abort gateway C or U commands.

Personal Mailboxes

On many TNCs there exists a capability for a limited memory mailbox to be used for storage of messages to yourself when you're not around, you'll find these incorporated on the Kantronics KAM, KPC-2, and KPC-4, as well as the AEA PK-88. These are not part of the national network of course, but are very useful indeed if you are in direct range of your amateur friend who's never around when you are! The callsign used for these is invariably the normal station callsign with an SSID of -2, i.e. my personal mailbox is G4HCL-2. When the new amateur licence conditions come into force at the beginning of 1989, it is believed that the position of these will be clarified as being legal for storage of messages addressed to the callsign

holder only, but not for use for 'third party' messages for which the formal GB7 series of PBBSs are of course there for.

When you log on to one of these, you will normally receive a greetings message such as;
'WELCOME TO G4HCL'S PERSONAL PACKET MAILBOX'
 or suchlike, followed by the amount of memory remaining, a short menu and prompt. You may use a limited number of the same L, S, K, B etc. commands as MBL or RLI mailboxes, and indeed may use your personal mailbox to receive auto-forwarded messages addressed to you by arrangement from your local PBBS.

Logoff

So there we are, this article is certainly not meant to be an

exhaustive guide to every aspect of BBS operation, some stations employ HF/VHF or VHF/UHF gateway facilities for example, but it should give you ample information to get you going. Remember all PBBSs have the facility of being slightly different, the command list may be shortened for instance. Some PBBSs are set to offer only a limited service, if any at all, for multi-hop digipeated stations, the idea of course is not to DX into a PBBS, with automatic forwarding there is of course no need, as it only ties up what are becoming very busy radio channels purely due to the popularity of packet.

Next month I will introduce Nodes and Digipeaters, and more importantly what they do and how to use them, the advantages of Nodes being quite significant.



MORSE FORUM



Morse could probably be described as a specialist interest inside Amateur Radio. Even then amongst those interested in Morse there are those who specialise in different areas. Some are interested in operating, others in QRP and so on. Hopefully there will be something to interest everybody this month.

QRP

One of the specialist interests which seems to have grown very rapidly in recent years is QRP. The

still remember the excitement and almost disbelief when a station called me as I was testing out one of my first QRP transmitters soon after I got my licence.

However, it must be said that QRP operation is not always easy,

Even though these calling frequencies are worth using this does not mean to say that they *have* to be used. It can be quite fun to operate on a different frequency and surprise a few stations when you tell them what power is being used. In fact it is surprising just what can be done.

For those interested in QRP operation it is worth giving a mention to the G-QRP Club. It was founded several years ago to further QRP operation by spreading ideas, help and circuits which members would find useful, the club has been so successful that it now has over 4000 members in the UK and abroad! It publishes a magazine called SPRAT which is very useful and for anyone interested in QRP operation it is well worth joining. More information can be obtained from Reverend G. Dobbs, G3RJV, St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE.

Key Stories

Even though we take Morse keys for granted today, and sometimes even think of them as being just a basic item, it is surprising how much development has gone into them. The first instalment of a series about the development of Morse Keys has recently appeared in Morsum Magnificat written by W3WRE and it makes very interesting reading.

The story starts in 1844 with the birth of the key. Alfred Vail was testing some wires just before the opening of the Baltimore-Washington line. He found that it was possible to send information along the wire by a simple method of opening and closing the circuit. Previously other codes had used rather cumbersome and complicated devices to code and decode the information. Vail's key probably went very much the other way. It looked rather crude and would have been quite difficult to use.

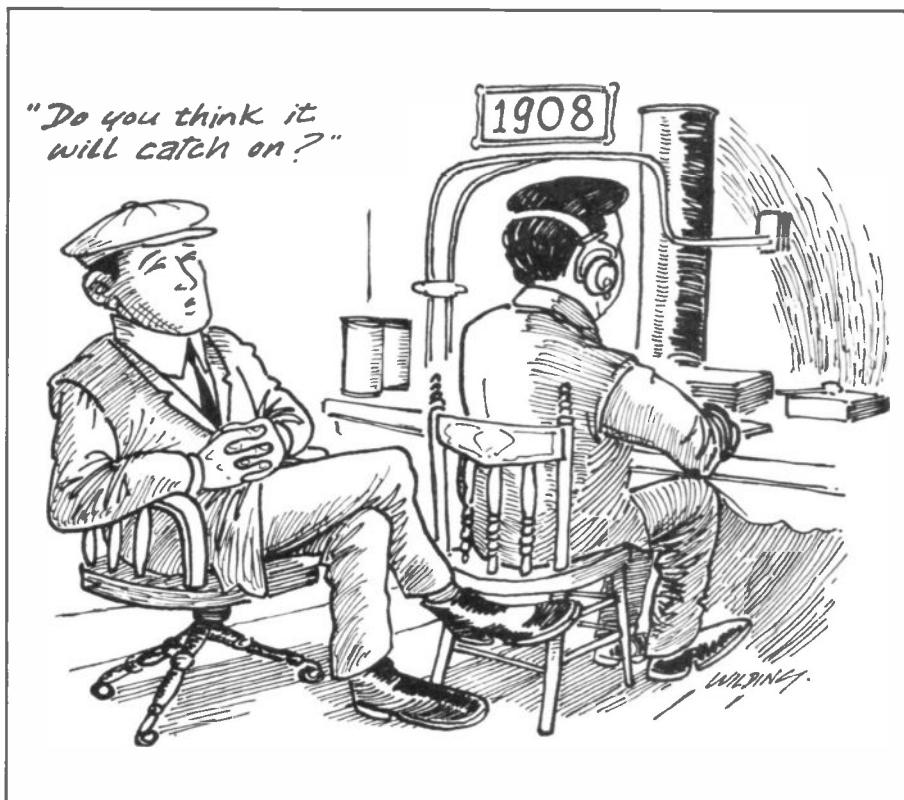
From these early beginnings the Morse key slowly developed. Initially all sorts of designs were used as they were made up by instrument makers with no real knowledge about

Ian Poole, G3YWX, takes us for another dip into the world of Morse code.

challenge of making contacts with a limited amount of power seems to have fired the imagination of a large number of people. Added to this, QRP equipment can often be made to be quite simple and this means that people have a fighting chance of being able to build their own equipment again. There is a great feeling of achievement when the first station replies to you on a piece of equipment you have built. In fact I can

are the QRP frequencies for the HF bands.

Band	QRP Calling Frequency (MHz)
80	3.560
40	7.030
30	10.106
20	14.060
15	21.060
10	28.060



morse. This happened because there were no commercial producers of keys as there are today.

Early keys were very much different to those we see today, they had no springs, but instead used weights to bias them off so they were very "heavy" to use. However it did not take too long before someone actually thought about using springs which made them much easier to use.

Many different designs appeared and keys of all shapes and sizes were produced throughout the latter half of the nineteenth century, but slowly the basic format of the key evolved to give the types we see on the market today.

Collecting Keys

Even though it may not be possible to come across any of the very old keys, key collecting is becoming quite a popular sideline. However keys are becoming increasingly difficult to find and certainly much more expensive than they used to be. Only recently I heard of a very ordinary ex-army key fetching a price which I thought was much too high. The basic problem is that there are too many people interested in snapping up the 'limited editions' of old keys which are available.

However it sometimes pays to look outside the radio fraternity. Here prices may be lower and competition less, although they will be few and far between. One possible area to look was suggested to me by a friend who attends some of the local "antique" or bric-a-brac sales which are held in town halls, church halls and the like. Here he said he has occasionally seen some morse keys as well as some old radios, all being sold for relatively modest sums.

So (provided you don't get there before me) it may be a good alternative to advertising in the magazines or buying keys at club junk sales.

News

Certain changes have taken place with the publication of 'Morsum Magnificat', the monthly magazine devoted entirely to morse and related topics. As a result of the ill health of Rinus PAOBFN it is now published only in English, by Tony Smith G4FAI. Fortunately this will mean that there are no changes for those receiving the English language version, however the subscription rates have had to be increased with effect from the autumn edition. It is now £6.50 per year, which still represents excellent value for a very interesting magazine. If anyone

wants to start their subscription with the summer edition the old rate of £6.00 still applies.

The 'EUCWE Fraternising CW QSO Party' is to be held again this year on the 19th and 20th of November. The rules will be very similar to last year where the frequencies to be used are 7101 to 7030kHz and 14020 to 14050kHz between 1500 and 1700 GMT, then 3520 to 3550 and 7010 to 7030kHz between 1800 and 2000 GMT on the 19th of November. On the 20th the 80m and 40m frequencies will be used between 0700 and 0900 GMT. This is followed by operation on 40m and 20m between 1000 and 1200 GMT. Exchanges consist of: RST/Name/ QTH/EUCW Club/Membership Number or if you are not a member of the EUCW club just send: RST/Name/ QTH/NM.

Clubs in the UK which are EUCW members include G-QRP, TOPS and now CW-FISTS, the latter having recently had its membership confirmed. As some readers may recall, I mentioned FISTS earlier in the year in 'Morse Forum'. The club now seems to be growing rapidly and certain ideas like the 'phone-a-sked' for newcomers seem to be coming to fruition now. This idea is aimed at people who are new to morse and who want to have a CW contact with somebody who doesn't worry about a few mistakes, less than breathtaking speed and a lack of confidence. It strikes me that this sort of idea could help many would-be CW enthusiasts to get their first few contacts.

Turning now to general CW HF operation, 10m is well worth a look these days. With the sunspot cycle in its current phase the band is becoming far more lively now that the much promised conditions have arrived — it is far more lively and some good DX can be heard until late into the evening. In fact during National Field Day at the beginning of June it was very active with many stations deciding to opt for 10m operation only.

Sign-off

Please remember to write in if you have any news, views or comments about CW which you would like to have aired. Please write to: 144 Worple Road, Staines, Middlesex TW18 1EQ. BCNU es 73 de Ian.

Radio Propagation and The Sun Part 4

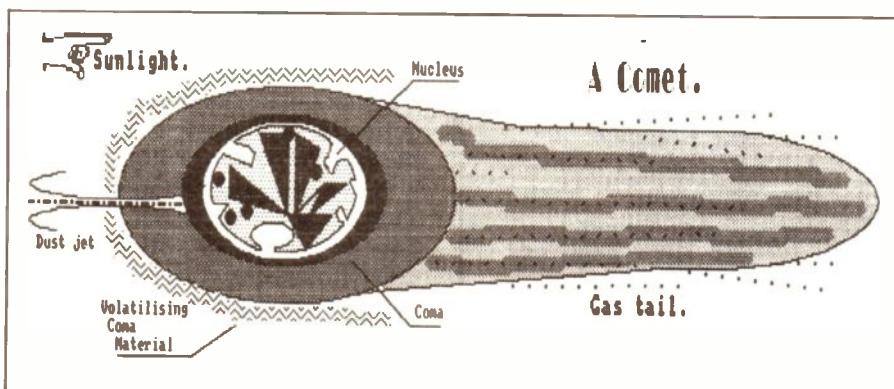


Fig. 1 The gas tail of a comet does not form until the comet comes within the influence of the sun and the solar wind. Heat from the sun begins to warm the comet, volatilising the icy mixture of the Coma, which releases microscopic dust particles. These released particles of dust leave a 'wake' of debris along the track of the comet's path through the sky.

At some time, the Earth, in its orbit around the sun, may intersect the 'wake' of the comet, which will cause the dust particles in the 'wake' to collide with Earth's atmosphere, producing the effect of a meteor shower. The Solar Wind 'pushes' the gas tail away from the sun, whilst the dust jet is attracted to the sun via the sun's much greater gravity.

Kevin Fox, G4MDQ, puts comets and meteors in context for users of the radio spectrum

Throughout all ages comets seem to have held a special fascination for both layman and astronomer alike. Indeed, many astronomers have dedicated their whole lives to doing nothing but seeking these celestial ghosts. Comets are supposedly the harbingers of disaster, and I don't think King Harold at the battle of Hastings would've argued with that! Remember the media fuss concerning the return of Halley's comet in 1987? That must have rated as the non-event of the century! I showed my family a tine and fuzzy speck in the eyepiece of my largest Schmidt/Newtonian telescope. Their reaction? "So what!"

The Tunguska Comet

In the early hours of 30th June 1908 an awesome explosion occurred in the remote region of *Tunguska*, in *Siberia*. Trees for miles around were

flattened. The sound of the explosion was heard hundreds of miles away, the seismographs around the world registered the shock wave. A comet had actually entered the Earth's atmosphere and struck the surface. By sheer good luck the comet landed in an uninhabited region. If it had entered the atmosphere a fraction of a second earlier, or even later, it might well have hit a city with disastrous results.

A new theory being taken quite seriously is that an extremely large comet hit the Earth millions of years ago. When the comet impacted on Earth it threw a large cloud of dust up into the higher atmosphere, where it was carried around for many years. The opaque dust shielded the surface of the Earth from the sun, lowering the planetary temperature producing what we would now call a *Nuclear Winter*. The sudden lowering of the Earth's temperature supposedly killed

off the dinosaurs and precipitated an Ice Age. Some evidence for this theory has been found by scientists who've discovered rare minerals (which have been positively identified in comets) deep within the Earth's upper mantle, and which date to the time of the dinosaur extinction.

Yet another theory claims that all the chemicals necessary for life to form on Earth, DNA and other organic compounds, were originally brought here within the nucleus of a comet which crashed into the sea. So what's all this got to do with amateur radio? Well comets play a vital role in providing those strange pings which MS enthusiasts go potty over!

Comets

Fig. 1 shows the structure of a comet. The *nucleus* consists of frozen gases such as methane, ammonia, formaldehyde etc. embedded in which are small meteoritic particles such as iron, nickel and silicate rocks. These particles vary in size from microscopic specks of dust, up to fairly large boulders! The size of the nucleus varies greatly, for example; the nucleus of Hally's comet is nine by six miles, and this is considered to be a very 'large' comet.

Surrounding the nucleus is an envelope of 'Gust', which is a telescoping of the words — gas and dust. This envelope, known as the *Coma*, contains water ice, more gas and tons of microscopic dust particles and can be as large as sixty thousand miles across! Although Fig. 1 shows the comet with a tail, this doesn't appear until the comet passes into the sun's influence, and in range of the solar wind.

Comets have strange orbits, no one is certain where they come from but one theory which seems to have developed a lot of credence was first postulated by a Dutch astronomer named Jan Oort. He suggested that a vast cloud of cometary material orbits the sun at a distance of between thirty — to one hundred

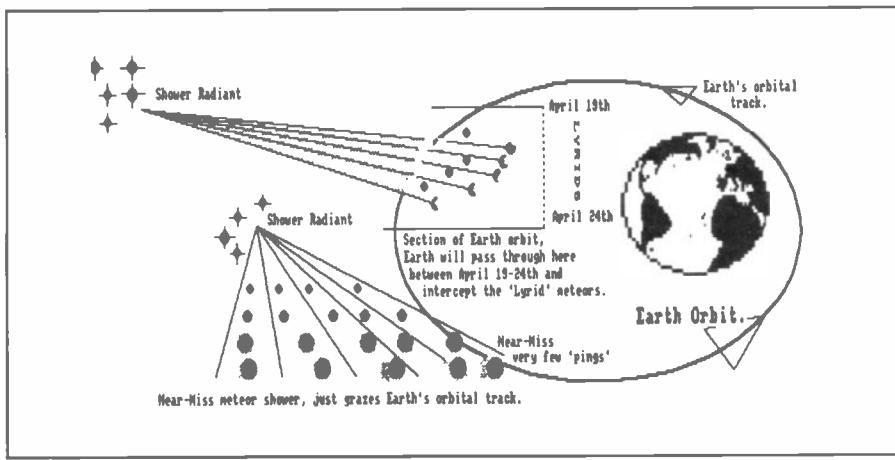


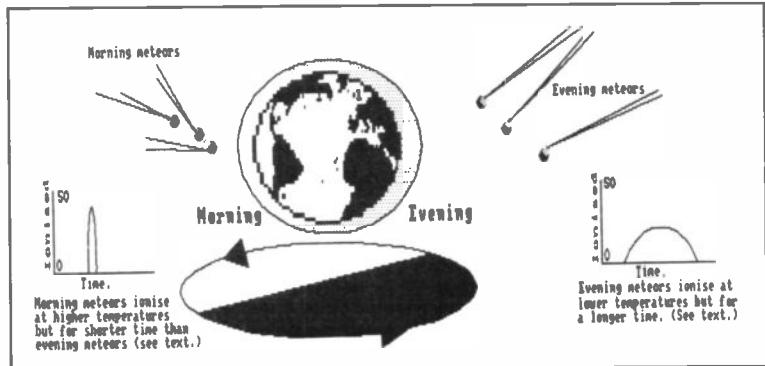
Fig. 2. Meteor Shower

thousand Astronomical Units (AU). Occasionally a passing star nudges a comet out of the cloud and causes it to 'fall' in towards the sun. His theory does seem to fit all the known facts concerning comets and their orbits.

Oort Cloud

So, back to our comet which has been perturbed out of the 'Oort Cloud' and is falling towards the sun. For billions of miles the comet holds the formation of nucleus and coma only, and then it passes into the sun's influence. Heat in the solar wind begins to act upon the coma, warming the comet. For billions of miles more, nothing appears to change, the comet is absorbing the heat, warming the coma, and building up the temperature in the nucleus. At this stage it will probably be spotted by a keen amateur astronomer. Professional astronomers are far too busy to keep a systematic watch for comets. Although once spotted, they're very interested in them, as they think that comets contain material left over from the creation of our universe — the so called 'Big-Bang', from which everything we have today was created.

Fig. 3a. Meteor Trail Colours



Meteors

It is the comet's dust tail which leaves a path of micro-meteorites in its wake, and which might eventually intersect the orbit of the Earth one day, giving rise to a meteor shower. Comet Biela, discovered in 1826 reappeared approximately every six and a half years. During the predicted return of 1845 it suddenly split into two parts, forming a double comet. At the next return in 1852 the twin comets were seen once again, however; nothing was observed for the next two apparitions (astronomers' posh name for a comet's return). Then, when the comet was due to return in 1872, the comet was still missing but in its place came a very intense meteor shower. Further intense meteor showers were experienced for the 1885 and 1898 returns, but now the *Andromedids* or *Bielids*, as they were known are sadly a faint shadow of their former glory.

Many new comets are discovered each year, in fact, last year (1987) was something of a record for new comets! However, not all of these comets will be obliging and leave us a nice trail of meteor particles. Periodic comets (those which return) travel in parabolic orbits. Some comets are captured by the massive planet Jupiter (who's mass is greater than all the other planets in the Solar System put together!). These comets orbit between the 'Earth-side' of Jupiter and out to Pluto.

Some comets are 'thrown' out of the Solar System altogether! After perturbation out of the 'Oort Cloud' the comet begins its long fall towards the sun, which has the greatest gravitational pull on the comet. But if the

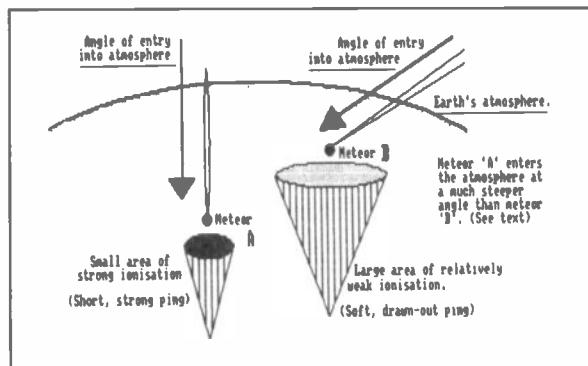


Fig. 3b. The angle with which the meteor enters the Earth's atmosphere could explain why some meteor pings are very intense but of short duration; whilst others are less intense but have a much longer duration.

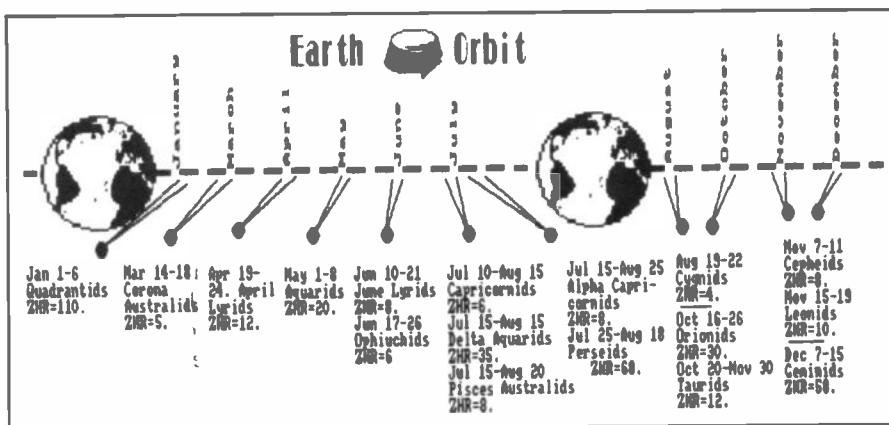


Fig. 4. Annual Meteor Showers

comet passes close to Jupiter, the gravitational pull of the sun loses out to the temporarily greater pull of Jupiter, and a celestial tug-of-war ensues which has the effect of dragging the comet out of its parabolic orbit into a hyperbolic one.

Showers

Fig. 2 demonstrates the effect of the Earth passing through the 'wake of a comet's dust trail, and also a near-miss shower. This is the well known *Meteor Shower* phenomenon. At certain times during the year, our planet, in its orbit around the sun, periodically passes through these dusty comet trails. Astronomers give names to these encounters, calling them after stellar constellations which are in line with the appearance of the meteor shower, the so called *radiant*.

For example, in April the Earth passes through a meteor stream called the *Lyrids*. The name *Lyrids* is given to the shower because the meteors seem to be radiating from the constellation of Lyra, which contains the brilliant steely-blue giant star Vega (Fig. 2). The same applies to other showers, like the *Geminids* (radiant in Gemini), and the *Taurids* (radiant in Taurus). Of course, the meteors don't really radiate Earthwards from a constellation, this is purely a perspective effect, much like railway lines converging in the distance.

Again, referring to Fig. 2 this also explains why a particular meteor shower can be quite disappointing one year: yet can produce a spectacular show later on. Sometimes the Earth only skims the edge of a meteor stream: at others it passes square through the centre. For example, the annual Leonid shower. Every thirty-

three years the Earth passes through the densest part of the Leonid meteor stream, giving a ZHR (zenithal hourly rate) almost impossible to count! Yet in between this peak time, the ZHR is only ten per hour! The last spectacular Leonid shower was in 1966, so we're due for another in 1999. A table of annual meteor showers is given in Fig. 4.

Sporadic Meteors

Apart from the well known and carefully plotted annual meteor showers, there are also numerous random meteoroids which collide with the Earth's atmosphere, both by day and by night. Of course, we very rarely see these *sporadic* daytime meteoroids, because they are drowned by daylight, but at night they are a fascinating sight. Shooting stars, falling stars, call them what you will, any clear night should show some of these sporadic meteors burning up in the upper atmosphere, at a height of between forty to eighty miles.

Before local midnight, sporadic meteors (and shower meteors) produce an orange/red streak of light

across the sky, whilst after local midnight they produce a blue/white streak. The explanation for this is quite interesting. Before local midnight, the Earth is revolving away from the sun (and the line of the meteors), so that meteors have to literally 'catch the Earth up' just like one car over-taking another. This catching-the-Earth-up apparently robs the meteor of speed, so when it eventually enters the atmosphere, its speed is relatively slow, and the heating/ionisation process takes place at a lower temperature, giving the characteristic orange/red burn-up.

After local midnight, the Earth rotates towards the sun (and the meteors) so, like two cars approaching each other (on opposite sides of the road, of course) at seventy miles per hour, giving a combined passing speed of a hundred and forty miles per hour, the meteor enters the atmosphere at great speed. Heating and ionisation takes place at a much higher temperature, increasing the amount of ionisation and producing the blue/white light. Fig. 3a.

Some amateurs have noted that reflections from meteor trails can be very intense, but short lived: whilst others are not so intense but seem to last a lot longer. One possible explanation for this is the 'evening' — 'morning' meteor burst phenomenon. Evening bursts ionise at lower temperatures (because they're catching the Earth up) and consequently, they burn slower and for longer. Whereas 'morning' meteors burn up at a much higher temperature, producing a higher level of ionisation, but for a much shorter time. Fig 3a illustrates this effect, and my theory.

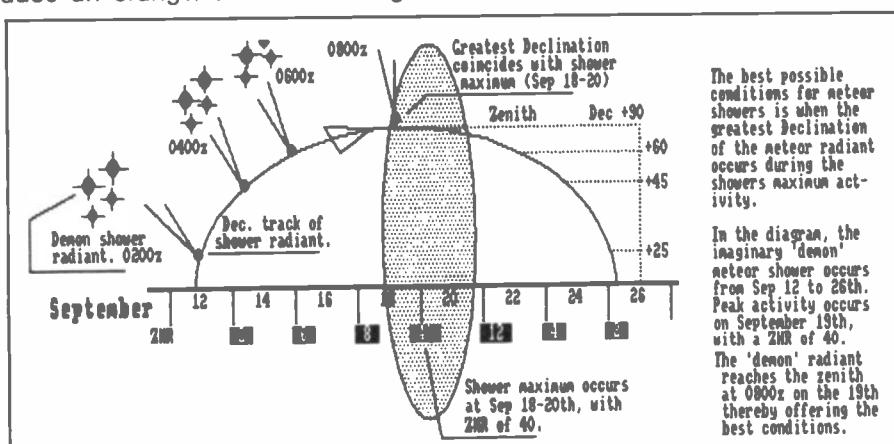


Fig. 5. Coincidence of radiant's greatest declination with the showers maximum activity.

Another popular explanation for short/long meteor bursts revolves around how the meteor actually enters the Earth's atmosphere (see Fig. 3b). Meteors which strike the atmosphere vertically penetrate deep into the lower atmosphere, where (if you've read part 3!) you will know that ionisation is much more difficult, and recombination is fast. The meteor ionises, but because this ionisation is taking place deep within the atmosphere, it doesn't last long. The net effect is a very intense 'ping', but very short lived.

Meteors which enter the atmosphere at a shallower angle do not penetrate deeply, they ionise in the upper atmosphere, where ionisation is easier, but much less intense; and recombination is much slower. This

which countries will be most favoured, and at what times.

Declination is the celestial equivalent of Altitude. Altitude is usually measured from the observer's horizon up to the zenith (point directly above your head). With 0° being the horizon, and 90° the zenith. Declination is much the same, only it is measured from the celestial equator to the zenith (Fig. 6), and whereas altitude is written as 45°N to indicate that the point is 45 degrees north of (above, for us) the Earth's equator — Declination is prefixed with a '+' sign to indicate whether north of the celestial equator, or with a '-' sign meaning south of the celestial equator.

There are probably some astronomers reading this and wincing rather loudly over what is, admittedly

cometary particles until, around the 21st, the Earth is in the densest part of the stream. The so called '*Maximum*' of the meteor shower.

The Zenithal Hourly Rate (an imaginary figure, which assumes how many meteors would be seen if they were all coming in at the zenith) reaches maximum, which for the April Lyrids is 12 reflections per hour. Again, the Earth moves through the densest part of the stream, until by April 24th, the Earth has moved out of the stream. The ZHR does give an indication of the expected activity of a shower. The higher the ZHR — then the more meteor reflections there is likely to be.

The net effect (you can confirm this for yourselves using any meteor shower) is a gradual increase in meteor trails from the direction of the constellation of Lyra (easy to find because of Vega) gradually increasing night by night, reaching a peak at approximately April 21st, and then gradually diminishing night by night, until the background 'noise' number of sporadic meteors is re-established.

As previously mentioned, the height of the radiant is important, and due to the Earth's rotation, this height is continually changing. Apart from other influences discussed earlier, such as higher ZHR's and the Earth periodically entering a really dense part of the meteor stream, the other factor which can provide a really spectacular meteor shower is the coincidence of the greatest altitude (Declination) of the shower radiant, and the shower's time of maximum activity (see Fig. 5).

This is where the radiant reaches its highest point (greatest '+' Declination) at the same time, or as near as possible, to the date of maximum activity. Once again, using the Lyrids, this would mean that on the 21st of April, the radiant would be high above the horizon in the UK. This doesn't happen very often, usually, the radiant culminates (another posh astronomical term which means it reaches its highest position in the sky) either just before, or just after maximum shower activity. Even if these two things do coincide, it will usually be at some totally ridiculous time! Some meteor radiants never rise much above the northern hemisphere's horizon at all. As in all things, a little knowledge and a little preparation beforehand always pays off.

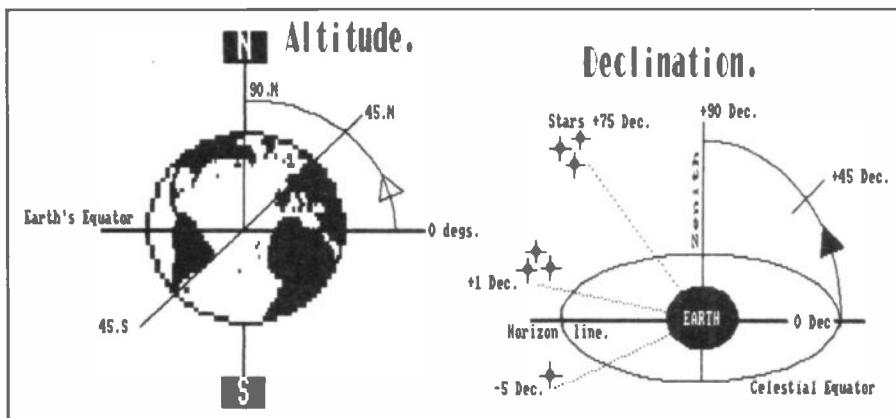


Fig. 6. Altitude is measured north and south of the equator. Declination is measured north and south of the celestial equator (see text).

gives rise to the weaker, prolonged 'pings'.

The position of the radiant is of prime importance to meteor scatter enthusiasts, transmitting when the meteor radiant is in a bad position for you is not only rather pointless, it could also cause another station severe QRM. Positions for meteor shower radiants are given in astronomical ephemerides, but the terminology used may be a bit off-putting at first.

Astronomers use a specialised version of the terrestrial *Altitude* and *Azimuth*, called *Right Ascension* and *Declination* (abbreviated to RA and DEC respectively). We can ignore RA for the purpose of this explanation, but it is very useful for plotting exactly in what direction the radiant will be. It is more important to know when the radiant is *above* your horizon, for obvious reasons. Also, knowing how high the radiant will be can also assist you in determining

a gross simplification. However, radio is the name of the game, not astronomy, so a detailed account of Right Ascension and Declination would be trying the reader's patience rather more than is strictly necessary.

On looking up the Declination for a particular meteor shower, bear in mind that the greater the Dec. the higher will be the radiant of the shower. But make sure that the Dec. is prefixed with a '+' sign! Also, don't forget that the Earth is rotating, therefore the Declination of the radiant will also be constantly changing. It will rise steadily, peak — then subside back down again.

A meteor shower occurs over a number of days, because the Earth takes time to travel through the meteor stream. If we take the Lyrid shower in April as an example — the Earth first encounters the outer-edge of the Lyrid stream round April 19th. During the next few days the Earth moves deeper into the stream of

ICOM IC-32E 2m/70cm Full Duplex Portable



At the NEC exhibition this year, it was certainly apparent that many visitors had heard about this new set and arrived suitably armed with their cheque books, as within a few hours of the show opening, virtually every IC-32E had been sold! At the exhibition the *HRT* review team were offered a set to test for our readers, and despite many tempting offers we managed not to sell it!

Features

The set offers coverage of both 2m and 70cm on FM, using independently selectable 12.5kHz or 25kHz steps. The maximum transmit power offered is a function of the battery voltage used, for instance 5.5W on 2m and 5.0W on UHF is possible with a 13.2V nicad with a switchable low power output of 1W being available in all cases. In common with other models of Icom portables, nicad packs offering 7.2V,

8.4V, 10.8V and 13.2V are available, and if you're upgrading from an IC-2E system for instance, you'll be pleased to know that many of the accessories such as chargers, spare nicads and so on may be retained for use with the IC-32E.

A 16-button keypad is used to control most of the set's many operating modes, a side mounted 'Function' bar effectively doubling the number of key functions available. To give an idea of the number of facilities, the user instruction manual

transmitting range of the transceiver. Individual memory channels may for instance be programmed with different offsets, together with a user-programmed offset on each band for VFO use. A 1750Hz toneburst for repeater access is given by depressing the squelch knob, and a reverse Tx/Rx frequency check is available by a press of the side-mounted 'Monitor' bar. An optional sub-tone unit may be internally fitted, either for repeater mode control or more commonly for quiet monitoring

Twin band capability, 5W output, crossband full duplex — Chris Lorek, G4HCL, puts the new IC-32E through its paces

carries over 50 pages of worked operating examples! For those of us who like the simple life with just rotary frequency control, a top panel click-step tuning knob provides frequency change in the selected tuning steps. Up/Down keypad buttons are of course also fitted, and direct frequency entry is possible using the keypad.

Twenty memory channels are provided (ten per band) and each of these is capable of storing the usual operating frequency and Tx offset together with scan status. By suitable programming, any of these may also be used to store cross-band frequencies, eg. 2m for receive and 70cm for transmit. As with the VFO mode, memory channels may be selected by using the rotary tuning knob, the Up/Down keypad buttons, or by direct channel number entry. Two further 'Call' channels (one per band) are also available for quick access to commonly used channels. Any memory frequency may be placed into 'VFO' mode if required to allow you to QSY from it by using the Up/Down buttons or the rotary tuning knob.

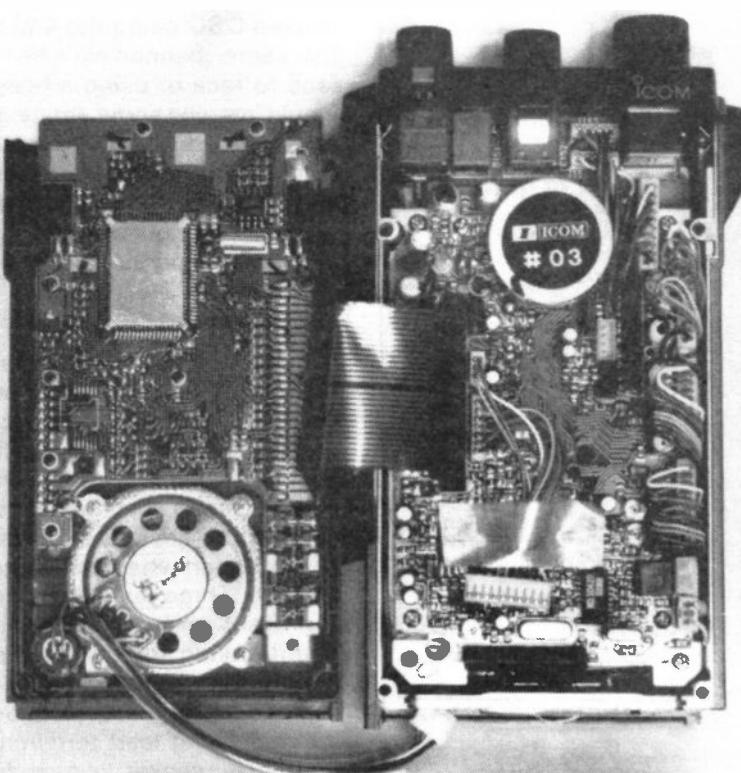
For repeater operation, any Tx offset may be programmed and stored in memory, limited only by the

of a busy channel, providing your QSO partner is also suitably equipped. In this case you may also switch in a 'Pocket Bleep' function if you wish, whereby the set commences bleeping at you for 30 seconds and flashes a symbol on the LCD whenever the set receives the appropriate sub-tone frequency.

To conserve battery life on quiet channels, a sampling receiver economiser may be switched in or out as required. This gives the advantage of a low current drain when required, coupled with the facility of defeating the economiser for use on modes such as packet radio, where it is important to receive the very first part of each transmission.

Scanning Around

A wide variety of scanning features are provided, a simple scan of the entire band being initiated by keeping the 'Up' or 'Down' keypad button pressed for over half a second, a selective band scan between two preprogrammed frequencies also being available. In memory mode, either all the memory channels may be sampled for activity, or only those programmed with frequencies within the desired band. Any number of channels may be individually prog-



rammed with a 'Skip' function to prevent them being scanned whilst still allowing manual selection.

A 'priority channel' monitor facility allows the set to automatically check a pre-programmed frequency briefly every five seconds, this may be a memory channel, a call channel, or a frequency on the other band and this facility may also be used in combination with the memory or VFO scan functions if you can stand the pace! In each case the scan halts when the receiver squelch lifts, continuing fifteen seconds later regardless of squelch state, otherwise pausing for two seconds if the squelch closes prior to the scan resuming.

Accessories

The set comes supplied with a twin-band set-top aerial, a standard Icom BP-3 8.4V 270mAH nicad pack, a plug-in mains charger, wrist carrying strap, screw-on metal belt clip, earphone, and a comprehensive instructions manual including a circuit diagram. A wide range of optional accessories are available, including different nicad packs and chargers, carrying cases, a 12V car battery cigar-plug supply cable, speaker-mic, headset, VOX (Voice

controlled Tx) unit, and a PTT switch box. The set when fitted with the BP-3 nicad measures 65mm(W) x 159mm(H) x 35mm(D) and weighs 510g.

In Use

Although I often initially try to use review transceivers prior to reading through the manual, I found that due to the large number of facilities I had to resign myself to the fact that I had to sit down for an hour or two to fully understand how to make full use of the set's many features. It was then that I found what I had been missing! As usual, I programmed the memory channels with my local repeaters and normal simplex 'natter channels', and then set off into the great outdoors. I used the set initially both portable and mobile, in the latter case using a small gutter-mounted band whip aerial.

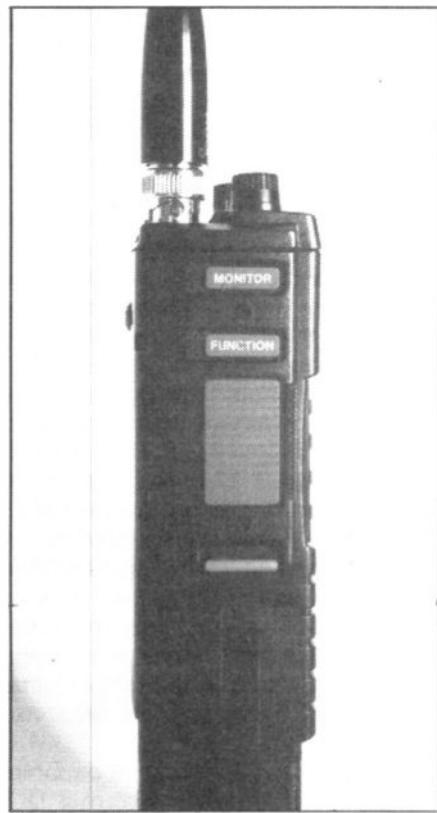
The standard dual-band whip seemed remarkably efficient and the set could operate into distant repeaters that I sometimes have the odd problem with. The display was very clear, it was easy to see what was happening with just a quick glance irrespective of the viewing angle, which was very useful when using the set when mobile. At night

the LCD backlight illumination was excellent, this function being enabled by pressing a side mounted bar next to the PTT. The display remains lit automatically until a couple of seconds after the last keypad button push, allowing you to operate the set one-handed, however you'd have to memorize the positions of the keypad functions due to these being unlit in the dark.

In use I found that all I usually needed was operation of the memory channels, these I controlled by using the rotary knob, together with a press of the 'Down' button on the extreme bottom left corner of the keypad to initiate and halt the channel scan mode.

I found sufficient audio was available from the internal speaker in most surroundings, however when passing traffic became noisy, turning the volume up to compensate often caused the small speaker to distort, holding the set closer or using an earphone would overcome this of course.

Reports received on my transmitted audio were often marked by breath noises while walking along due to high microphone gain, most of my regular QSO partners remarked that I sounded more 'toppy' than usual but nevertheless the quality was still good. Using the set on high





power showed that the supplied battery would last around half an hour in QSO following an overnight charge, using the set on receive normally gave a complete days worth of operation though. A spare battery pack would certainly have been useful.

Using the set in my shack with my rooftop dual-band collinear, showed the receiver to have adequate sensitivity. I did occasionally get frustrated however with the squelch which tended to 'jitter' on signals at the squelch threshold. The S-meter display seemed very lively, often indicating full scale or just a single segment with few signals lying in between these two extremes, so as a result it was rather limited in use. Rejection of signals spaced 12.5kHz away was quite reasonable, these 'in-between' channels are now being used more and more on 2m in some areas where activity is high. This aspect is now also becoming important in some areas on 70cm, where the primary band users also use 12.5kHz offsets from our 25kHz spaced amateur channels.

The set is claimed to be capable of operation from an external DC

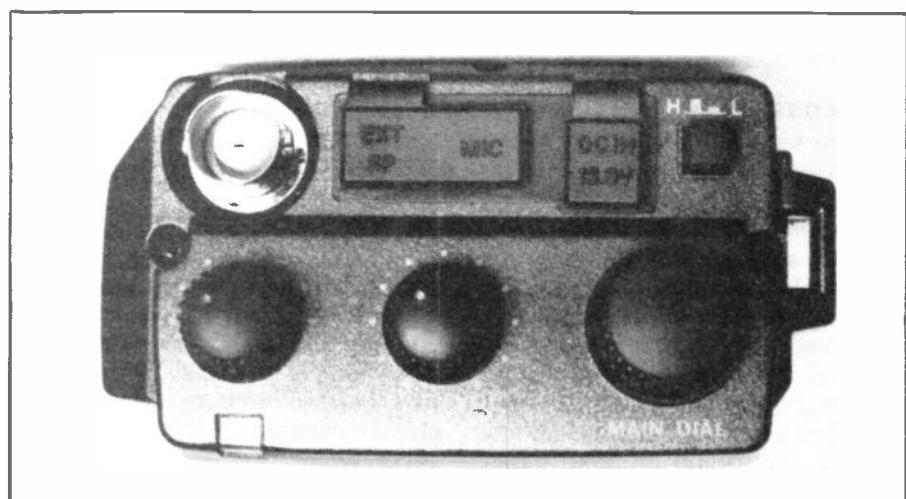
supply ranging from 5.5V to 16V and plugging in my 13.8V supply gave over 5W output on transmit. At this power level whilst in continuous QSO, the rear panel became warm but never too hot to hold. In QSO with a local amateur, I found the cross-band duplex arrangement worked very well indeed providing I was using an earphone at the time. The reason for this was that the internal microphone is very close to the speaker, hence giving a high degree of audio coupling. Nevertheless it certainly was a novel experience using a

portable in this manner, a more relaxed QSO being the end result in the same manner as when talking face to face or using a telephone. I would imagine some amateurs could also find this facility useful for emergency communication exercises and the like, potentially giving a higher throughput of information over a given time period.

Inside The Box

The unit is constructed using a rigid alloy cast frame for the outer rear case, the front and top panels being made of plastic. Rubber gaskets are used throughout, together with plug-in rubber seals covering the top panel speaker/mic sockets to give a degree of protection when used outdoors in the rain. Three main PCBs are used, the front panel mounted control board linking to the main chassis-mounted analogue boards by a pair of multi-way connector leads. An internal flying lead terminated in a multi-way socket allows for connection of the optional sub-tone unit.

For the technical boffins, the accompanying block diagram shows the internal circuit arrangement, a standard dual-conversion super-heterodyne is used on receive for both bands, with a common first intermediate frequency of 30.875MHz. A separate final frequency VCO (Voltage Controlled Oscillator) under independent synthesizer control is used for each band, each being directly modulated, amplified, and fed to the block PA modules which are bolted onto the rear case panel, this acting as a heatsink. RF combination into the single aerial connection is performed using high and low pass filter arrange-



ments following the separate Tx/Rx PIN diode changeover switches.

Laboratory Tests

On receive the set showed a good sensitivity on 2m and a reasonable sensitivity on 70cm. The rejection of adjacent channels, both 12.5kHz and 25kHz spaced, was good for such a portable where space is often at a premium-hence allowing little room for filters. The intermodulation rejection, where strong off-channel stations combine to form an interfering signal, was a little poor but here we are faced with a limitation in the available receiver current, a better performance may well mean an increase in current leading to your battery being flattened rather more quickly.

The audio output was ample for the small internal speaker, and should also suffice for driving an external

speaker for mobile use in all but the most noisy vehicles. The low current drain from the set on receive was excellent, particularly so when the economiser was enabled. The S-meter dynamic range was very limited indeed, confirming the results found on-air.

On transmit the harmonic levels were suppressed well for a portable. The available power output even at low battery voltages was reasonably high, and was well regulated at the higher supply voltages as well as on the low power setting in all cases. The transmit deviation was a shade too high on both bands, although within acceptable setting tolerances.

Conclusions

The IC-32E is a welcome newcomer from Icom, their first effort at a dual-band portable. It is rugged enough to stand up to many knocks

as well as the odd downpour, and the range of operating facilities offered is very comprehensive indeed. It gives the user the possibility of simple control by using the main tuning dial, coupled with a multiplicity of scanning options and the like if required by use of the extensive range of keypad functions.

The battery consumption is very good, especially on receive, although the strong signal handling performance is limited as a result. However for its intended use as a portable I feel the average user should find it perfectly adequate. I believe Icom are onto another winner, if the sales at the NEC are anything to go by then there should soon be many IC-32Es heard on the bands.

My thanks go to ARE Communications for the loan of the review set, at a time when there were very few unsold sets to be found!

LABORATORY RESULTS

Receiver

Sensitivity Input level required to give 12dB SINAD			
FREQ	LEVEL	FREQ	LEVEL
144MHz	0.176uV pd	430MHz	0.232uV pd
145MHz	0.173uV pd	435MHz	0.212uV pd
146MHz	0.173uV pd	440MHz	0.234uV pd

Squelch Sensitivity	
Threshold	
145MHz	0.129uV pd (7dB SINAD)
435MHz	0.144uV pd (7dB SINAD)
Maximum	
145MHz	0.214uV pd (19dB SINAD)
435MHz	0.295uV pd (19dB SINAD)

Adjacent Channel Selectivity Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal.		
SPACING	145MHz	435MHz
+ 12.5kHz	34.0dB	35.0dB
- 12.5kHz	32.0dB	30.5dB
+ 25kHz	63.5dB	66.0dB
- 25kHz	62.0dB	64.5dB

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		
SPACING	145MHz	435MHz
+ 100kHz	74dB	75dB
+ 1MHz	83dB	86dB
+ 10MHz	95dB	97dB

Intermodulation Rejection Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product		
SPACING	145MHz	435MHz
25/50kHz	56.0dB	58.0dB
50/100kHz	56.0dB	58.0dB

Maximum Audio Output Measured at 1kHz on the onset of clipping	
LOAD	OUTPUT
3ohm	385mW RMS
8ohm	350mW RMS
15ohm	252mW RMS

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

145MHz	70.5dB	435MHz	92.0dB

S-Meter Linearity				
INDICATION	145MHz		435MHz	
	Sig. Level	Rel. Level	Sig. Level	Rel. Level
S1	Sq. open	-	Sq. open	-
S3	1.84uV pd	- 2.5dB	1.36uV pd	- 3.5dB
S5	1.98uV pd	- 1.9dB	1.58uV pd	- 2.2dB
S7	2.17uV pd	- 1.1dB	1.79uV pd	- 1.1dB
S9	2.46uV pd	0dB ref	2.03uV pd	0dB ref
S9+	3.05uV pd	+ 1.9dB	2.26uV pd	+ 1.0dB
S9++	3.38uV pd	+ 2.8dB	2.52uV pd	+ 1.9dB

Current		Consumption
Standby, economiser operating		0.5mA average
Standby, economiser disabled		36mA
Receive, Mid Volume		88mA
Receive, Max Volume		196mA

Transmitter

TX power and Current Consumption					
Freq MHz	Power	7.2V	9.6V	10.8V	13.2V
145	High	2.08W/ 0.1A	4.19W/ 1.25A	5.86W/ 1.45A	5.86W/ 1.45A
	Low	1.25W/ 700mA	1.25W/ 680mA	1.25W/ 700mA	1.25W/ 270mA
435	High	2.49W/ 1.25A	2.74W/ 1.48A	5.28W/ 1.62A	5.22W/ 1.68A
	Low	0.785W/ 700mA	0.785W/ 700mA	0.785W/ 720mA	0.785W/ 720mA

Harmonics/Spurii		
HARMONIC	145MHz	435MHz
2nd	- 66dBc	- 78dBc
3rd	- 76dBc	< - 90dBc
4th	- 81dBc	< - 90dBc
5th	- 87dBc	< - 90dBc
6th	< - 90dBc	< - 90dBc
Spurii	< - 90dBc	< - 90dBc

Peak Deviation		
145MHz	5.18kHz	435MHz
Toneburst Deviation		
145MHz	3.72kHz	435MHz
1.38kHz		

Free Readers Ads!

FOR SALE

RACAL RA217 manuals, good condition, 1 to 30MHz continuous coverage. Prefer buyer inspects, collects, offers. Also good test equipment, some collectors items, military radio equipment items, (no sets), various connectors RF/Mains, transformers, meters, capacitors etc. Lists available. John G4VJK, QTHR. Tel: 0293 783556.

FOR SALE: Panasonic RF9000 in mint condition Digital World Scanning Receiver, costing £3000, asking £900. Tel: 0462 33690 part exchange considered.

BBC ROMS Disc Doctor, Floppy Wise, WYSIWYG, Speech Rom, Kermit, The Basic Editor, Wordwise, all £10 each. Paul Goodrum, 9 Ryston Close, Downham Market. Tel: (0366) 388615.
FOR SALE Superstar 2000+ 50 channels 25.965 to 28.005 no brakes offers over £120 frequency counter RAMA 5 digits £35 o.v.n.o. Cobra 148 GTL DX as new £125 o.v.n.o. Phone 0283 221870.

FOR SALE Intellivision with paddles and full range games some unused, mint condition £80. Maxcon mobile hand held 40 channel CB as new complete £50. Harvard Mobile CB complete aerials etc. £40. Tel: 0283 713727.
TRIO TS940s with ATU, voice synthesiser, speaker, MC85 base mike, as new with boxes £1550. Possible PX accepted TS430S, FT757. Telephone (04574) 2156 Manchester area.

VHF Convertor FRV7700(F) 118 to 130 and 150 to 170MHz £30. Yaesu FAS 14R antenna selector. New March 88. Never used £60. GIOBRO Ray Wilson. Tel: 0232 799539.

ICOM IC24G £120. Somerkamp TS280FM £140. DFM £20. Pye Westminster £24. Olympic £40. Reporter £100. F30 AM £100. F27 AM £30. PC1 £70. RTC £25. PT40 CB £30. 410T CB £50. Intel-

sig PABX 100 ATE, offers? W30 AM £30. Sabre hand held £50. Bantam £40. M293 £200, many spares. Tel: (0435) 830888.

FOR SALE Yaesu FT726R fitted 2m/70cm boards, with SP102 matching speaker and MH-B8 mike, as new, original boxes £650.00. Tel: 0926 32486.

CW FILTER RCEQ design for sale, also 15 morse practise tapes and morse key. Tel: 01-773 1089 any offers? Peter Birch, 7 St Andrews Ct., 1 Brookfield Avenue, Sutton, SM7 3QP.

COLLINS 75SI receivers 3.4-28MHz fourteen bands, unmarked £280 o.n.o. KW20W transmitter immaculate specimen, recent 6146B's £185, both £420, manuals, carriage, insurance included. **WANTED** Collins 75S3RX linear PSU Transformer 240-2KV military equipment preferred. Phone Jackson GOGGI (Cumbria).

FOR SALE Icom ICR7000 25-2000MHS Dressler ARA 500 mint condition, £650, bargain. Phone 0722 22646 for serious minded purchasers only.

YAESU FT480R 2m all-mode transceiver £270, Trio TR8400 70cm FM transceiver £180, digital LCD multimeter autoranging £30, Jaybeam 8XY/2m crossed Yagi 2m aerial £20, R107T EXWD general coverage receiver £30, plus other misc. Ham gear. Tel: (0602) 271405/605056 (Nott'm.).

EPSON 5.25" double sided disk drive, slimline 48TRI £35.00 o.n.o. Also single sided unit as above, £25.00 o.n.o. Both little used. Epson RX100 + inc. serial I/F and tractor £200.00 o.n.o. Codar T28 £25.00 o.n.o. Epson CX23 acoustic modem £25.00. Call Glenn 0884 41208 after 6.00pm please.

FC757AT auto ATU as new £240 o.n.o. QTHR Tel: 0274 873122.

DX 100L receiver (realistic) 0.15 - 30MHz AM/SSB/CW CW/MW/SWX3 analogue display G.W.O. £28 inc. post-

age. Wanted digital scanner Rx for VHF or digital HF Rx at reasonable cost. Phone (0631) 65104 Mon.-Sat. evenings (Oban).

TRIO TR7800 25w 2m FM Transceiver, virtually mint c/w mounting bracket, Ni-cad memory back up, manual etc. £165. Buyer collects, G1UPP Michael (0460) 54583 after 4pm.

ANTENOR Tuner MFJ 1500 watt, used once, £150.00. Icom 2&H two metre transceiver, 45 watt, brand new £295.00. Commodore 64 SQ portable computer, built in monitor and disc drive £350.00. Phone evenings 0277 823434 Brentwood area.

AR88D Rx immaculate, Hali-crafters S27 Rx 27.8 to 143MHz, Vanguard Tx with top band, SEM Transmatch, Thandar frequency counter, advance signal generator all with manuals and good condition, exchange for 2 metre mobile or W.H.Y? McCallum 0733 231639.

TELETYPE ASR33 with paper tape reader/punch, offers. Also, collectors items, aircraft transmitter/receiver Type 1083, (Pre-WWII) offers. Heterodyne frequency meter LM-14 £10. T1154 transmitter £10 and loads of old valves! Abingdon (0235) 31935.

TRIO Communication Receiver Model 9R-59 with manual 540KHz - 30 Megs £100 or nearest offer. AVO 8 Mk V good condition £100. Varic 2kW 0-270v 10A output in case with voltmeter and 13A socket £50. Phone 01-673 4622 London.

FOR SALE FT707 needs a lot of work ie. rewiring, but all pieces complete, included is instruction manual, circuit and connection diagrams, also for sale FT707 Transverter. Phone Southampton 0703 224844.

10M MULTIMODE Superstar 360 with 25w linear £125.00 G3Z1B Reading 428036 after 6.30pm.

FOR SALE 70cm mobile Tx/Rx complete with mobile

mount in v.g.c. £240. Also 3x 5/8 colinear for 70cm £30, both 3 months old. Contact: C.S. Beynon, Bungalow No. 1 Racal-Decca Transmitting Station, Llancarfan, Barry, S. Glam. Tel: 04468-261.

TRANSFORMER two 12v 30A SEC (17 VDC) chassis and panel, four 60A diodes on heat-sink, two RS caps 63v 3300uF filter socket RS 6A with plug and lead, meter 2½" 0-25A buyer collects £35. G30XV Daventry 702265.

HF5 HF bands vertical £40. Amiga 500 computer, stereo colour monitor, additional disc drive, lots of software, all as new £575. Phone Peter (G4HAK) 0273 517933 (Newhaven, Sussex).

300 OHM screened balanced feeder, 2 rolls approx. 85 feet each. Brand new, unused. High quality USA TV type, low loss, £8 each + £2 p&p, include S.A.E. Bunney, 33 Cherville Street, Romsey, Hants SO51 8FB.

COMMUNICATIONS Receiver Trio 9R-59DS 0-30MHz plus speaker, Mizuho ATU 2 metre converter with power supply, handbook, the lot £135, includes Securicor. Steele, Tel: Little Cherrington 202 Oxfordshire after 8pm or exchange airband or scanner.

KENWOOD TS130S HF Transceiver, excellent condition, never transmitted with MC50 microphone £400. Icom IC255E 2m Transceiver, excellent hardly used, £150. Panasonic DR49 HF general receiver £80 would swap for HF/VHF scanners. Rowntree. Phone Gerrards Cross 0753 - 885163.

AEA/ICS CPI 'Computer Patch' RTTY unit, variable speeds, filters, tuning indicator etc. Super unit £80. SSB (German) LSM24 24cms, (1268-1270MHz) Oscillator/Mixer/Tx unit 2 metre IF 500mW out can be re-xtalled for any 23/24cm frequency £100. G4XHF, Tel: (0293) 515201.

ZETAGI B132 solid state broadband 100w linear, (1.8MHz to 30MHz) good condition, boxed, £70 G7ANG QTHR. Tel: 01-805 7016 ask for Angelo.

AVO 8 MK III & leather case, as new, Calibrated £90. Far-nell 0-30 5A bench P.S.U. £150. Moonraker 100 watt linear £35. Altai TE20D sigen, as new £70 Marconi low-band test set £60. Cossor mini-scope £25. Phone Alan Belfast 0232 301349.

SONY Air 7 mint including Ni-cads and charger £150, PSB FM AM PLL Rx. Jim Chelmsford 0245 400760.

LOWE HF-125 Technical manual as new £10. I need Narrow 10AZ filter from Trio JR310 working or not, JR310 for spares, can you help? Mr. Harmer, 9 Park Square East, Jaywick, Clacton, Essex CO15 2NL.

COMPUTER lap held battery operated Tandy 100 with 32K RAM, little used as new condition, ideal portable operation data comms. with TNC such as PK232 terminal program on ROM. Buyer inspects £220. G0BYC QTHR Telephone Worthing (0903) 506289.

CBM64 1541, C2N plus books and approx £600 software £325. Leader LSG16 signal generator £35. Tatung Einstein (TM01) £100. Prefer buyers collect or carriage at cost. Ron 061 437 0916.

SUPERSTAR 360FM immaculate, ideal for 10m conversion! Low-Mid-Super Hi AM/FM/SSB/CW £100.00. Or swap for a 934MHz transceiver with cash adjustment. Also as anyone got a "HAM International Hercules", 40 channel FM (27/81) homebase CB radio? Reasonable price paid for good rig! Also wanted Uniden Bearcat scanner base type not hand held. Contact: Martin 0443 411954 anytime.

FOR SALE quantity 24v DC Octal based relays, each having two pairs changeover contacts rated ten amps £2.00 each post paid. **WANTED** KDK 2025 two meter FM Mobile must be in good condition. John, G3JHL QTHR. Tel: 0794 512283 weekends or evenings.

UNUSED owing to bereave-

ment Yaesu FRG 8800 W/ FRV 8800, 234V 3W. Also Yaesu Musem Antenna Tuner FRT 7700, both items £475. Contact: 18 Legge Bourke Court, Chapnall Road, Walsoken, Wisbech, Cambs. PE13 3QR.

TRIO TR9000 for sale, bargain with mobile bkt. Price £300. Tel: 0302 859451.

YAESU FT290 Mk1 as new with soft case and unused set of Ni-cads £250. Tel: St. Helens 20370.

KENWOOD Trio R-600 Rx perfect for sale £210. Also Cobra 148 GTL - DX 25.500 MHz to 28.300 already but suitable for conversion to 10 metres with no problems £120 (v.g.c.) will swap both for FT101 W.H.Y. Stanford-le-Hope (0375) 670841 days.

FOR SALE Icom IC-255E 25 watts two VFO's multi-purpose scanning, good condition £175 B.N.O.S. 13.8V 12/12A new £75 and 2M Antenna 6.5DB free with all above. Tel: 0246 36496.

FOR SALE Marconi NT201 DSB/SSB/CW Tx complete with phase-locked oscillator for all bands 160-15 metres, and PSU full legal power on each band. £150.00 o.n.o. buyer collects. Phone: Michael on 0734 303800 (office hours) or G3LRQ QTHR.

10/11M linear for sale CTE 767 150W P.E.P. £40. Also have microwave modules VHF/UHF converter £18. Wanted any 2M portable VHF handset - crystal controlled eg. Pye Cleartone etc. G7AFJ Lancs 0282 867336 Neil.

YAESU FT690 Mk2, brand new in box, swap for FT77, FT707 or take FT78 P/X or sell for £275 o.v.n.o. Phone Bob on Luton (0582) 401881.

M.M.28/144 TNSVTR. Dawe output meter. Hytek computer/communication course in 5 volumes RLSO British National Radio School R.A.E. course, 20 books. SMC 10FM TNCVR. Clegg FM TNCVR. 143/149MHz. Variable 0 to 25w output, auto toneburst fitted. Ring G3YUG (0473) 830147 with offers anytime.

FOR SALE Sony ICF-6800W multi band receiver FM NW 29 SW SSB CW v.g.c. £170. Phone 01-620 1335 work,

01-794 0843 home.

GOING QRT Trio 2400 VHF hand held Kenwood SW100 VHF/UHF SWR meter, Yaesu FT1012D Mk 3, (fan, filters, etc.). Yaesu FC107 ATU, Yaesu SP107 speaker, new G5RV, base microphone, most items boxed, loads of Commodore 128 software including Geos 128, Superbase 128, Superscript 128, cheap/offers. Tel: 08482 - 314.

FT277ZD (101) DC/DC converter CW filter, fan, mike,

mint condition £500. FT290R mint condition Ni-cads charger case rubber duck £275. Will deal for Argosy QRP transceiver Tel: 061 301

3750 (Manchester).

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Waterloo (0705) 266126.

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SEEG T-1200 2m Transceiver complete with magnetic car aerial, only £110. Phone 01-599 6933.

ICOM IC201 multimode 2m base station £150. Large 12v 18A PSU ideal for running rig or linear amp £30. Icom IC255E 2m FM 25W Mobile rig £110. G4FKJ QTHR. Phone 0525 714591 evenings.

FT480R 144MHz multimode £275. FT790R 70cms multimode £250. TS530S HF multimode £450. BNOS 70cms linear amplifier, one watt in 50 out £150. All in mint condition G6YEK QTHR in new call book. Tel: 0326 73480 weekends.

HEATHKIT Mohican model GC-1U Mk2 general communications receiver 500kHz to 30MHz AM with BFO, professionally built with manual and wiring diagram £35 o.n.o. Telephone 021 308 2171.

LARGE selection back issues of HRT, ETI, AR, REW, PW, PE, SWM, etc. Plus selection amateur radio books, plus selling Amstrad CPC464 extras, send large SAE and I'll forward my list. Mr Small, 8

Cherry Tree Road, Chinnor, Oxon, OX9 4QY.

FOR SALE Superstar 360 FM multimode, spectrum conversion to 10 metres, mint condition £150. Wood and Douglas 2 metre linear 25w £20. Tel: Mark, Belfast 795783.

TRIO R600 HF receiver, as new, boxed, £200 o.n.o. Please contact David G6KTG. Tel: Staines (0784) 58346.

TILTOVER Telescopic mast unfinished project 80mm square box section steel 7.5m long 60mm O/D seamless steel tube 7m long hinge block, pin and top guide £75. Kev G6KTZ QTHR Tel: Leics. 0533 606494.

SWITCH Mode power supplies, monitors, terminals, fans, heatsinks, transistors, (ex mainframe) for sale to empty my garage and shack. Send SAE for list. Andy Burnham, 1 Woodside, West Horsley, Surrey KT24 6NA. Tel: 04865 3749.

KENPRO KT400 (similar to IC4E) 70cms handheld c/w charger, nicads, helical £160. 70cms power amp. 1w in 10w out £30. Pye pocket phones (PF2UB) suitable for conversion to 70cms, one good, one for spares, c/w details, diagrams £40. G1DEY 01-888 8903.

SHACK clearance, Dressler D200 linear £475. Yaesu FT902DM £475. FT790R £225. 4m MM Transverter with 100w linear £250 B/W camera with all extras £100, all in good clean working order. Mr. S. Goodwin, 44 Lansdowne Road, Bromley, Kent. Tel: 01-852 5262 (evenings, ansafone).

YAESU FT-209RH immaculate condition, hardly used, includes carry case, charger and adaptor, must be seen re-sale due to timewaster, will accept offers around £220. Tel: 0296 (Aylesbury) 87837 evenings only.

RACAL RA17L receiver £100 Eddystone EC10 receiver £45. Sommerkamp FRDX500 Sommerkamp FLDX500 £225. The pair Yaesu FRG7700 receiver £240. Maplin eight digit frequency counter £75. Altai rotator £25. P.O. radio receiver 35A 34 mhs 225 megs £35. CB PSU + mikes £5 each.

EXCHANGE

EXCHANGE Yaesu FT7B with ATU power supply and mobile aerials, would like to exchange for Yaesu FRG7700 short wave receiver. Ring Reading 882899 anytime.

TS510 HF transceiver £130 o.v.n.o. or exchange for FV700DM or FV707DM complete with leads or FRG7. Buyer to inspect and collect. Tel: York 654579.

QQV07-40 (one) 832A(2) 1625(6) 807(5) valves £50 lot would part exchange ST FM Amstrad Fishermen! Galion 44R Spinning reel never used W.H.Y. G3RNB Stan 0984 33115 (Somerset).

EXCHANGE Olympus OM707 SLR cost £360 with 35-70mm autofocus lens, 2 months old for 70cm/2 metre handheld or WHY? For sale Westminster on 70cms RBO working £25. Also VHF and UHF Burndept for sale. Contact Tony, Flat 5, 27 Upper Church Road, Weston Super Mare, Avon.

EXCHANGE Yaesu FTV901R 2 metre board fitted pristine condition for 2 metre mobile such as Yaesu 230 same condition, cash adjustment or sell FTV901R £140. G3KEC 05036 3651 QTHR.

EXCHANGE Bearcat 220FB scanner for BBC computer or W.H.Y. Write with phone number to Brian Fraser, 4 Oykel Bridge by Lairg Sutherland, Scotland IV27 4HE.

YAESU FT757GX, FP757HD, FC757AT, MDI mic, all mint £950 or exchange TS830S line up or TS930S. Phone Chris Kidsgrove 3734 after 6.00pm.

EXCHANGE mint condition telequipment DM64 storage oscilloscope with leads and manual, AVO-8 Mk2 multimeter, Solartron 7040 bench digital multimeter wanted 2m multimode FT290 or similar phone Penicuik (near Edinburgh) 0968 - 74040 evenings or weekend.

MODEL Engineers look! Compound milling table, 8" x 6" new. Exchange for ATU, FRG7, SRX30D, W.H.Y? Or sell £100. Wanted: low pass filter, SEM Eztune, digital readout for TS520S, antenna noise bridge. Geoff GOISN. Norwich 0603 406331.

EXCHANGE Eddystone 840A communication receiver for 2 metre rig FDK 700EX, 800D. Receiver v.g.c. and G.W.O. or swap for HF rig i.e. FT707 any condition. Wanted preferably repairable. Mr. J. Williams, 97 Gilmorton Close, Leicester LE2 9GX (Buyer must collect).

KW2000B for sale £175 o.n.o. very good condition. Also exchange Kenwood TH-215E H/H plus charger two nicad packs soft leather case and 7/8th whip for 2 metre mobile multimode. Phone 0289 88348 ask for Tom GOHBV QTHR.

EXCHANGE my Trio R2000 communications receiver plus VC10 VHF adaptor for an FT290 MkII with amp and battery pack, or will sell. phone Rotherham (0709) 541277.

CBM64 Computer with music expansion system, will exchange for 2mtr. handheld or scanner, cash adjustment considered. Brian Mulleady, 9 Elizabeth Crescent, Falkirk FK1 4JF.

WILL EXCHANGE Drake MN4C ATU (same as MN7 but colour different) for Capco SPC 300. Wanted - Manual for National 190 receiver, also Racal linear. QTHR Rubin G3BYT (0480) 53748.

EXCHANGE have Yaesu MD1 desk microphone, would swap for good paddle key eg. Bencher etc. Wanted mains transformer for Heathkit SB610 monitor scope. Phone Paul GOILO, Canterbury (0227) 455052.

EXCHANGE realistic DX440 HF Rx 150KC/30MC or PRO-32 VHF-UHF 68-512MHz scanner for Yaesu FT208R or Icom IC-02E or DX440 + PRO32 for FT290 or Nicads charger. Call Mac on Walsall 644519 between 5.15pm and 6.30pm or Walsall 646497 after 7.00pm.

EXCHANGE Somerkamp FT767DX (FT707) with mike owners and workshop manuals, parts for fitting top band and 4 spare crystals for either IC-271E or TS9130 or TR-251 25 watt multimodes.

Also have Shimizu SS1055 10 watt 5 band HF Rig plus MC-35S mike TL120 (200 watt PEP) linear and 48K ZX Spectrum ZX Micro-drive ZX Interface 1 leads books etc.

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EXCHANGE Ham International M588 multimode PCB type PTBM059COX and PTOS006AGX USB/LSB/AM/FM for HF transceiver faulty accepted ideal for 10m conversion or will sell £100.00. Tel: Andy 061 775 5207 anytime.

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PART EXCHANGE Midland 6001 Stalker O stem Bremi BRL210 plus other various CB 11m DX equipment for either Yaesu 707 or 757 with cash adjustment. Both radios easily converted to 10M. Telephone Norwich (0603) 614928 ask for Tony.

SONY ICFSWIS AC301 power adaptor AN101 active antenna etc. Brand new £225 or exchange good second hand Yaesu Kenwood or Icom receiver. Tel: day 01-623 3160, night 0732 453085.

CANON A1 camera fitted with Canon 35/70 zoom lens E.R.C. Vivitar zoom flash type 2500 as new condition, exchange for Yaesu FT290R multi-mode with accessories. Phone Mr. Horton, Rotherham 893772.

FT101B exchange for FT707 with C.W. filter or sell £300. Sony 7600D gen. cov. with A.C. Unit £110. MK4001KB RTTY Xceiver £100 GW3COI QTHR Abersoch 2675.

ULTRA bargain timel TR10 TH21E 2 metre H/H with box etc. for only £145, yes incredibly £145 or exchange for 10 metre multimode gear. Ring

Jon GOIUE on Tel: 0249 712009 (Wilts.).

EXCHANGE AR88D matching speaker v.g.c. for Eddystone or National matching speaker or WHY in early equipment. D.W. Blanchard, 141 Dunes Road, Greatsidne on Sea, New Romney, Kent.

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WANTED

WANTED R532 air-band receiver or similar. Also digital display YC221 for FT221. Tel: 0768 64890.

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WANTED carrying case for Trio 2300 also mobile mounting bracket for the same. Tel: 0533 879760.

WANTED Icom IC402 70cms SSB must be v.g.c. Cash waiting. Tel: 0926 498388.

WANTED EXGOV 1392 and have good home for a AR88. Phone Len 0977 797063.

WANTED KW202 or Eddystone 888A GWO G41ZM QTHR Rugby 811295.

ICOM ICB1050 10 metre FM with xtal filter £30. % wave 10 metre vertical £8. FT77, FT707, TS120S, TS520S or similar small HF transceiver wanted. Cash waiting for good radio. G1NZS after 6pm except weekends. Telford 607542.

WANTED Heathkit RA1 Rx's for spares and design testbeds. Any condition. Please send details of condition and realistic prices to: Marris, 35 Kingswood House, Farnham Road, Slough, Berks. SL2 1DA.

WANTED Sony, ICF, 2001D shortwave receiver or similar radio for DXing, plus airband. Tel: 02407 4153. (Buckinghamshire).

WANTED Practical Wireless 1930s-1960s Radio Constructor simple radio circuits keyline books, George Newnes, Bernard Books RGB books. Eagle Book of Model Aircraft, Model Petrol Engines, Percival Marshall. Phone 0793 485124 after 7.30pm.

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TS430 or similar urgently wanted for cash. For sale or swap. 70cm transvertor, FT7, FRG7700, SP980, PRO2001 scanner, Trio TR-3500, ICF-7600D, Search 9 with 2 mtr transmitter, TV cameras, video, Bedford Dormobile Mobile Shack, Oscilloscope, frequency counter, etc. Phone Bewdley 403858.

RETIRED Cornishman would welcome help/advice about making an amateur VHF rig. If anyone would write to me, I would enjoy corresponding. Please write to: Mr. Andrew, 7 Llanthewy Road, Newport, Gwent NP9 4JR.

WANTED authentic tuning meter for AR88 and also CW filter for Trio TS510. Phone 0546 2475.

WANTED Yaesu FRG8800 Datong FL3 Datong HF active Antenna or Yaesu FRG7. Ring with prices. Tel: 0532 778689.

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WANTED 2 metre transceiver, 25W Mobile preferred, not SSB FDK 700E, Icom IC225, Icom 24G, Yaesu FT220 or similar. Phone 0229 52867 evenings or 53179 during working hours. Ask for Ian.

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WANTED Yaesu FC 102 ATU preferably with antenna relay switching unit, will collect. Telephone 0562 67026 (Kidderminster).

WANTED Newrad instrument case for "Marchwood" 30amp PSU. Phone Les 0938 4247.

WANTED Sony Air-7 Air-band receiver 108-136MHz or any other good receiver in mint condition, also scanners have interests. And UHF Air-band please write your offer to: René Krautz, Gronlandsparken 590, DK-6715, Esbjerg N, Denmark. Phone (05) 468234 evenings.

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WANTED Redifon R1007 receiver, must be in good condition, price and details to John Brook, The Clock Tower, Pidgeon House Farm, Church Morton, Selsey, West Sussex PO20 9DS. Phone 0243 606682.

WANTED: Heathkit RA-1 in v.g.c. sensible price including handbook. Also handbook wanted for Heathkit RG-1 to buy or borrow for copying. Tel: (Bolton) 0204 693878.

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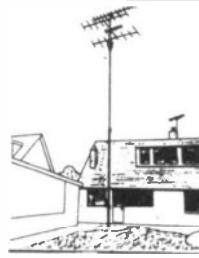
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