

HAM

AN ARGUS SPECIALIST PUBLICATION

OCTOBER 1989 £1.50

RADIO

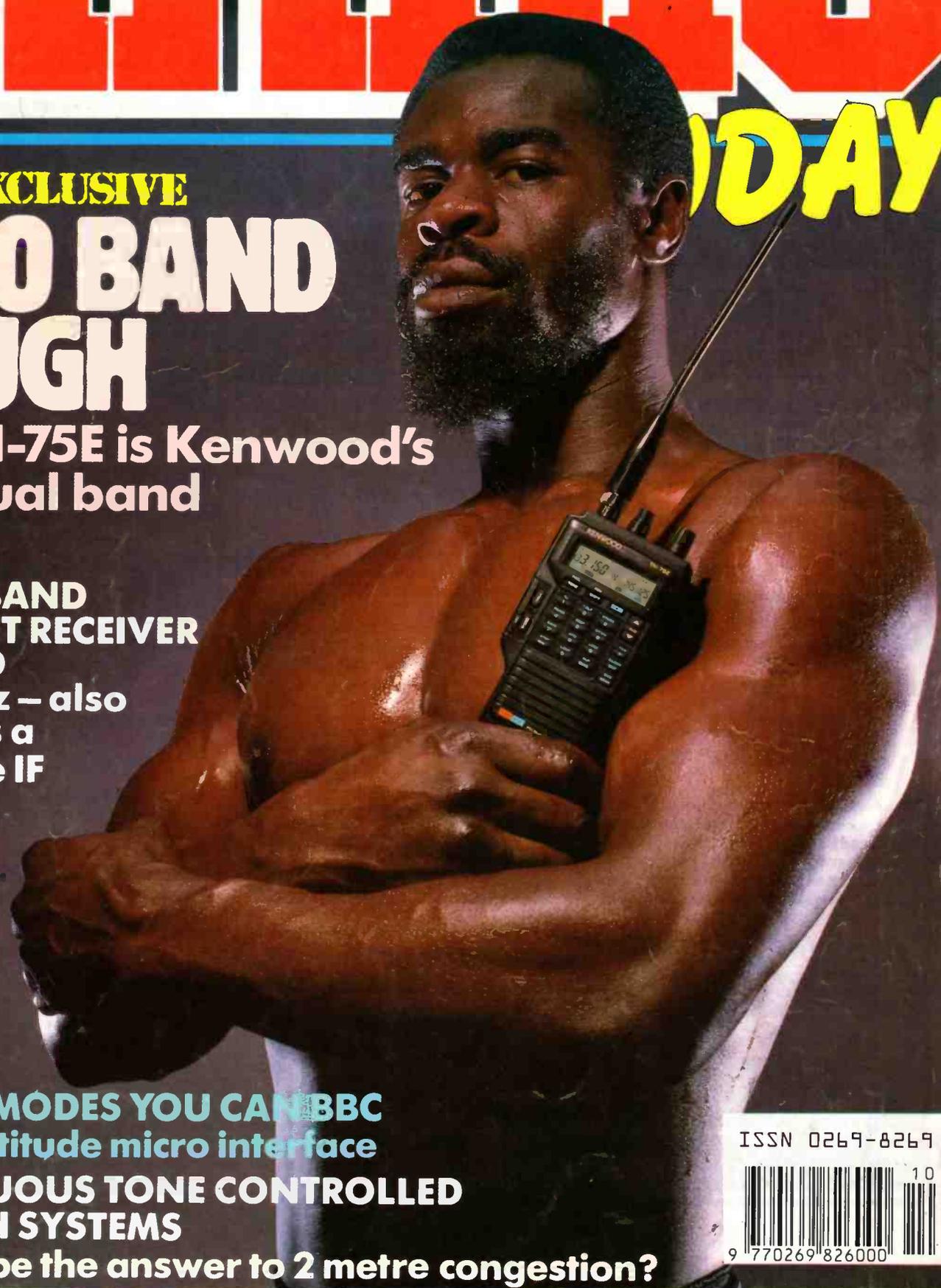
WEDNESDAY

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Fist mic	£21.00
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Raycom package price	£849.00

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Raycom package price	£425.00

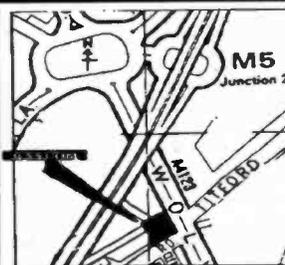
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TODAY

VOLUME 7 NO 10 OCTOBER 1989

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Published by:
Argus Specialist
Publications Ltd

Distributed by
SM Distribution Ltd

Printed & bound by:
Chesham Press, Chesham, Bucks

Design by
ASP Design Studio
Editorial and Advertising
address:

Ham Radio Today, ASP Ltd
Argus House, Boundary Way
Hemel Hempstead, Herts HP2 7ST
Tel: 0442 66551

*(please mark your letter for the
appropriate department)*

Subscriptions and back issues:
Ham Radio Today Subscription Dept,
Infonet Ltd, 5 River Park Estate,
Berkhamsted, Herts HP4 1HL
Tel: (0442) 876661/4

Subscription rates:
UK £18.00, Europe £22.50,
Middle East £22.70, USA \$40.00
Far East £24.40, Rest of World £23.00
Airmail rates on request.

USA Subscription Agent:
Wise Owl Worldwide Publications,
4314 West 238th Street,
Torrance CA90505

ARGUS PRESS GROUP Member of the
Audit Bureau of Circulation



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Packet Radio

Roundup

Well, it seems the RSGB have seen the wisdom of introducing packet radio into the Project YEAR (Youth in Electronics via Amateur Radio) effort. For those not in the know, Project YEAR attempts to get newcomers interested in amateur radio, and is funded mainly by the DTI and UK industry, together with coordinating effort by the RSGB. Following the latest joint DTI/RSGB industry meeting, it is pleasing to see the RSGB have included packet radio in their

of many individual amateurs, with stations often being linked to each other by the generosity again of the many Network Node operators, the end result being an efficient nationwide chain offering reliable message handling. Great for getting information about the latest DX stations on air, what's been happening on 6m, and when the next club meeting takes place. In the early days, amateurs also found this medium was great for advertising their surplus

been informed that an internally fitted 9600 baud modem will soon be available to allow the packet whizz-kids to reach the staggering heights of 9600 baud packet even more easily. This modem will simply plug into the existing modem disconnect header of the pcb of TNC-2 clones, removing the current need for wiring modifications. As soon as it becomes available, this column will of course feature a report plus the odd photograph or two (it's about time we had a few of them).

I'm continuing to check the suitability of various transceivers for 9600 baud compatibility, both on 2m and 23cm. It's possibly ironic but the earlier crystal-controlled sets or old mixer-type synthesiser equipments often interface with the 9600 baud requirement of direct transmit modulation better than some of the later synthesised do-everything sets! The need for a separate Tx oscillator, due to the continuous Tx data present on receive to prevent oscillator 'pulling' on the Tx switching, is often absent in many current sets, these normally using a combined Rx/Tx voltage-controlled oscillator. If the Tx modulation to this is simply switched off on RX, the initial TX rise will often need a longer Tx Delay setting to allow the oscillator to stabilise, reducing the advantage of a fast data rate. I understand a modified eeprom may soon be available for fitting in the modem to overcome this, so watch this space.

As some amateurs are unsure of going inside their sets to connect these modems, remember that we already have sets with 1200 baud packet connections available from the mic socket (Rx audio, squelch busy line, Tx audio and PTT), maybe soon we'll have a data input/output on one of the mic connector pins present either in new equipment or as a simple modification to existing sets. Making fast baud rates easy to use may be the answer to the most common problem in many areas —

Chris Lorek G4HCL looks round the packet scene, and sees as far as Gibraltar.

intended draft syllabus. The impression gained by many amateurs observing the early days of Project YEAR was that HF QRP was the 'in' thing for getting youngsters interested, a view some people disagree with. This is because most schools have at least one computer, and the kids know how to use it; they don't all know how to use a morse key to fight through HF QRM with their 2W output.

The syllabus carries items such as the need to know about the rudimentary elements of a packet radio system, a network, a digipeater, a node and a mailbox, as well as a further section requiring the student to know the basic elements of a packet station such as the transmitter, receiver, antenna, feeder, keyboard, visual display, computer, terminal node controller, and power supply unit. Maybe soon the new 'incentive' or 'student' licence holders will be able to teach the 'old hands' who've passed the RAE a thing or two about communication!

The Network

The BBS network is currently placed on air through the generosity

of many individual amateurs, with stations sometimes to the displeasure of BBS system operators who felt it contravened their licence requirements. This has all been ceased now, but a new form of message seems to be on the increase, that of stirring things among the national Society and its officers, equipment suppliers and their staff, and many other individuals through the use of 'open letters'. More than one BBS system operator has threatened to shut his system down if this carries on, which of course he is perfectly entitled to do for whatever reason he wishes. So let's make sure one or two hotheads don't ruin things for everyone else. Perhaps one answer is for BBS operators to erase these messages as well to prevent them being forwarded? The real answer is not to abuse our valuable network, as in the end no-one gains.

New Products

Still no news on the new TNC-320 packet/Amtor TNC, except that a pcb exists but with no surrounding hardware. As soon as it's ready, we'll be testing it in HRT. Following on from last month, I've

that of congestion due to the sheer popularity of packet.

Packet in Gibraltar

Jim ZBOD kindly sent me some information about packet activities in ZB land. A digipeater and mailbox has already been set up by ZBOD and ZB2BL (although Jim doesn't say which callsign it uses) which is placed right on top of the rock at 420m ASL, running 25W into a ¼ wave ground plane. It's positioned at the site of the 6m ZB beacon. The packet box can link between EA7H in Huelva which is 100 miles west, and EA7B in Almeria which is 160 miles east, not an easy feat considering EA7B only runs 2W into a similar ground plane. Maybe a 6m packet link could be next, hence allowing us UK amateurs to link into it. Jim asks if anyone can help him with international forwarding links and/or any available BBS software which includes its source code, he can be reached through PO Box 6, Gibraltar. By the way, the prefix ZB2 is commonly associated with Gib, but many amateurs don't realise that the ZBO



series is their Class B equivalent, the current series going from ZBOA through to ZBOW.

End of Message — CTRL-Z

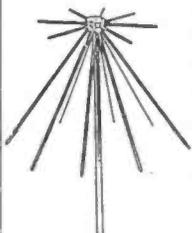
At the time of writing, the national Data Convention at the University of Surrey is just around the corner. Next month I'll be detailing what happened there involving the packet scene, together with details of the South Coast 23cm/70cm/4m linking network designed to take the

inter-node traffic off 2m. If you'd like your group's activities given a mention, or even your views on what packet is or should be all about, then I can be reached via packet with a message routed to G4HCL @ GB7XJZ. If you prefer pen and paper, then letters addressed to Chris Lorek, c/o HRT Magazine at the editorial address will also get to me, but please note that my callbook address is not correct. Till next month, 73 de G4HCL.

REVCO

WHEN QUALITY COUNTS

REVCONC



The UK's favourite discone composed of traditional British quality engineering. The REVCONC works well without exaggerated advertising claims. It is designed to cover 50 to 500MHz, and thousands of satisfied users will testify to its efficiency. Unlike some manufacturers we do not claim a wider frequency coverage, and we do not quote inflated figures for gain. A gain figure is meaningless unless the reference point is stated. Optional vertical whip feature: It is possible to fit a vertical whip section to a discone. We do not want to give you the "hard sell" where this vertical element is concerned, but there is some evidence that it may improve the performance of the antenna around the resonant frequency of the whip. That's why we make it an optional feature. Another option is the N-type connector instead of the popular SO239. N-types give a better UHF performance, but they cost a bit more. The choice is yours. Because the REVCONC is British-made by a Company which has been in business for 30 years, you buy with confidence, knowing that there is back-up should anything go wrong.

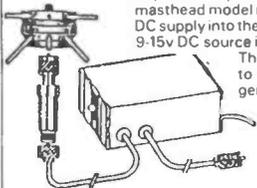
RADAC



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

WIDE-BAND PRE-AMPLIFIERS

The problem with omni-directional wide-band antennas is their lack of gain. The REVCO PA3 range of wide-band pre-amplifiers complement the antennas and compensate for their shortcomings. The basic specification of the products is similar: coverage 20MHz-1GHz, at 1GHz: minimum gain 13dB, noise factor 5.5dB. Choose from a mast-head version (PA3) or a standard die-cast box style (PA31). Best results are normally obtained from the masthead model which gives a boost to weak signals which would otherwise have been lost in the feeder cable. Also feeder cable noise is not amplified which is the case if the amplifier is mounted at the base of the feeder. On the other hand, the die-cast box version requires no special installation and is readily taken out of circuit. The masthead model is supplied with a special power unit which feeds the DC supply into the antenna feeder. No psu is provided for the PA31 as any 9-15v DC source is suitable (current requirement about 25mA).



The PA31 finds application in instrument work, e.g. input to spectrum analysers, boosting the output from signal generators to give a low-power Tx. The standard version of the PA31 has BNC sockets and is designated "PA31/B"; available to special order N-type sockets ("PA31/N") or SO239 ("PA31/S"). A special feature of the PA3 series is a high-pass filter to attenuate frequencies below 20MHz: high-power HF & MF broadcast stations can be very troublesome!

ON-GLASS ANTENNAS

This type of antenna mount has been around for a long time, but they are very difficult to produce successfully at VHF. The Cellular Radio Industry has popularised the glass-mount, but there are fewer design problems at 900MHz, because the coupling assemblies are small. REVCO's extensive experience in making the UK's best Cellular On-glass has led to the production of superior quality VHF and UHF models. Here are a few facts which you should know: **Coupling efficiency:** apart from the question of effective power transfer to the outside world, you don't want too much RF floating around inside the car, do you? Not health for vehicle electronic systems, and possibly not good for humans either. REVCO glass mounts feature very efficient power transfer. **Sticking power:** no good if they fall off half way home. A properly installed REVCO stays on. Should you change your car, a refit kit is available. **Simplicity:** Some of the competition has a multitude of loose components: the REVCO has 2 pre-assembled parts: inside and outside. What could be simpler? **Weather-resistance:** REVCO antennas are made from corrosion resistant materials so you can leave them out in the rain with confidence. It is not necessary to plaster the product with silicone rubber to keep the water out. The REVCO glass mounts do cost a bit more, which reflects these superior features.

REVCO also make a full range of mobile antennas for frequencies from 27MHz to 950MHz, and new products are constantly under development. Contact your local Dealer or in case of difficulty write, phone or fax. Trade enquiries welcome.

Revco Electronics Ltd, Old Station Yard, South Brent, S Devon TQ10 9AL Tel: 0364 73394 Fax: 0364 72007

RADIO TODAY

Aerial Catalogue

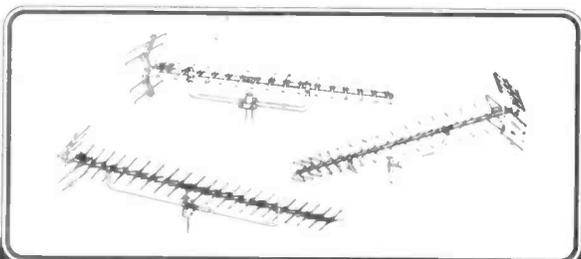
Aerial Techniques of Poole have produced a new, enlarged catalogue with a complete list of their varied aerial and accessory stock (television receivers as well as radio aerials) and details of their enquiries and consultancy service.

The catalogue is a handsome job, A4 size, professionally printed and illustrated on white paper with a laminated card cover, details, specifications and a separate price list.

Although there is little specifically in the amateur field, the catalogue includes aerials for marine, PMR, and aircraft bands, as well as a range of FM radio and broadcast TV aerials and masthead preamplifiers. Also available are upconverters and downconverters for TV dxing, satellite receivers, filters, rotators, brackets, and even a range of small televisions.

The catalogue is available from **Aerial Techniques, 11 Kent Road, Parkstone, Poole, Dorset BH12 2EH** by return for 75p.

CURRENT CATALOGUE



11, Kent Road, Parkstone, Poole, Dorset BH12 2EH
Tel: 0202 738232

Murder Hunt

Dyfed/Powys Police are appealing to radio amateurs who were in the South Wales area between 19-29 June in connection with the double murder of Peter and Gwenda Dixon on Thursday 29 June.

The Dixons were found murdered near the coast path outside Little Haven, Pembrokeshire. Peter Dixon was a keen amateur and had been operating mobile using the callsign GWOHFQ. The police would like to hear from any amateur or SWL who worked or heard GEOHFQ during that time.

It is also known that a man used Mr. Dixon's National Westminster Bank service till card in Pembroke, Carmarthen and Haverfordwest over the next three days. He is described as 5ft 8in to 6ft tall, 30 to 45 years old, suntanned and unshaven, with a rucksack and a gent's cycle with straight handlebars. An artists impression shows him wearing long hiking shorts, a short-sleeved shirt and heavy lace-up boots, but, of course, he may have dressed differently at different times.

Any information to **Police HQ, PO Box 99, Llangunnor, Carmarthen, Dyfed SA31 2PF. Tel. 0267 236444** or to your local police station.

18 and 24MHz Open To Amateurs

On June 30 the Department of Trade and Industry announced changes to the A licence allowing additional types of transmission and higher power on the 18 and 24MHz bands.

WARC 1979 agreed that these bands — 18.068 to 18.168 and 24.890 to 24.990 MHz — should be transferred to amateur on a primary basis. To protect the then current users while replacement frequencies were being found for them, the new bands were made available to Class A license holders with limitations on the type of transmission, power limits and antenna characteristics, subject to causing no interference to other services.

From July 1 these bands have been open to Class A operators with all permitted transmissions, subject to the usual maximum power limit of 20dBW carrier or 26dBW pep.

The internationally agreed bandplan in Region 1 is as follows: **CW only:** 18.068 to 18.100MHz, 24.890 to 24.920MHz; **CW and RTTY:** 18.100 to 18.110MHz, 24.920 to 24.930MHz; **CW and phone:** 18.110 to 18.168MHz, 24.930 to 24.990MHz.

Full use of the two bands will put a new complexion on HF operation and, we hope, will lay to rest for a while both the idea that amateurs will be gradually shouldered off the bands by commercial interests. The demand for bandspace is increasing, indeed, but new modes of communication under development should also stretch the available bandspace so that there is enough for everyone.

New Kit Modules

Jandek is a new company specialising in kits based on a modular approach so that the homebuilder can take advantage of as many or as few modules as required, combined either with each other or with self-designed circuitry.

Initially the kits will be devoted to receivers and QRP, but Jandek hope to add basic test equipment to the list quite soon.

Each kit includes a tinned pcb and 11 board-mounted components, with instructions, technical information and suggestions. All but one of the current modules is under a fiver, and we hope to be able to review the range within the next couple of months.

A full leaflet can be obtained from Jandek at 6 Fellows Ave., Kingswinford, W. Midlands DY6 9ET. Tel. 0384 288900 (evs and wkds).

South Yorks Roster

An update received this week from G3ZHI on radio clubs and groups in South Yorkshire. Raynets and Packets here; see Radio Tomorrow for the Clubs.

Raynet in South Yorkshire: Country controller G6OPM; Sheffield B. Cooper G8RWV, 26 Richmond Ave., Sheffield; Doncaster Raynet and Circocoates Rally P. Smith G4ZWQ, 23 Florence Ave., Balby, Doncaster. Tel. Doncaster 857526; Barnsley C. Burton G8EGL (the Lipdales, Barnsley. Tel. Barnsley 281855.

Repeaters in South Yorkshire: GB3NA, BG3SY UK FM Group (northern), L. Loughton G4UAN, Claremont, Main St., East Ardsley, Wakefield, W. Yorks. Tel. Wakefield 822579. RSGB Regional Coordinator: K. Fisher G6LMR, 26 Manilla St., Sunderland, Tyne & Wear.

RSGB Regional Representative: P. Coates G0COA, 1 Ash Brow, Flockton, Wakefield, W. Yorks.

YAXPAK Yorkshire Packet Group GB7YAX-2 D. Vickers G4SEQ, 48 Bromley Rd., Hanging Heaton, Batley, W. Yorks. Tel. Wakefield 440062.

New muTek Models

The first release in muTek's new range of linear frequency transverters, is the Mk II version of the TVVF 50c. This transverter will enable operation on 6 metres from a 2m IF. Output is 25W pep from a rugged power mosfet. The transverter is fully protected against high vswr and has rf alc allowing a 40dB range of input drive level without internal adjustment. The maximum drive level is 10W.

The receive amp is based on a balanced pair of BF988s with excellent sensitivity and strong signal handling. The prototype will be on show for the first time at the Woburn Abbey Rally.

Models in the range will all operate from a 28V supply, and will include models for 6m, 2m, 70cm and 23cm, with options for 2m and 10m IF.

Following this will be a replacement front end board for the Icom IC202 series portable transceivers.

Further information on all items and catalogue from muTek Ltd., PO Box 24, Long Eaton, Nottingham NG10 4NQ.

Brummies Off Again

The University of Birmingham Radio Society is mounting a DXpedition to Scotland from August 26 to September 2 under the call-sign G8IUB/GM8IUB. Operation will be on 144MHz and possibly 50MHz.

The trip commemorates a vacation trip from the

Lake District through Scotland in 1962, at which time, points out their letter, "none of (the present voyagers) were born". No postgrads tagging along, then?

Enquiries, offers of assistance etc. should be sent to the Club Chairperson Richard G1GUHQTHR or on packet to G8IUB at GB7SUT.

More Morse Memory

ICS Electronics are introducing a number of new products by AEA, manufacturers of the PK-232 multimode data controller.

In the MM-3 morse memory keyer, AEA "have re-entered the morse keyer market with every feature of every morse product that they have built over the years all rolled into one. The device has an RS232 computer interface, and can give practice QSOs without going on the air by employing its random code group proficiency trainer, random four letter word (no jests, please. We're sure they've checked it ...) generator and QSO simulator based on AEA's Dr. QSO program for the Commodore 64 micro.

The memory keyer has 2 to 99 wpm speed selection, approx 8,400 characters of storage divided into 20 memories which can hold messages as long or as short as required. Memory can be expanded to 36,000 characters, and is battery backed. The keyer acts as a complete contest keyer with automatic serial number insertion and incrementing, toggling between pot or keypad speed control, and has remote switches for four of the memories. It can be programmed as an automatic beacon.

ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel, W. Sussex BN18 0BD. Tel. 0903 731101.



Pat and John Retire — New Teledata Group Faces

Two stalwarts of the British Amateur Radio Teledata Group, Pat and John Beadie, are retiring from their posts on the BARTG Committee after many a year of work on the group's behalf.

Pat and John have been very much the public face of BARTG as membership secretary and sales officer and the group renders its sincerest thanks.

As often happens when pillars of a Society retire, the two jobs are being taken over by three people.

The new membership secretary, for enrolments and renewals, will be Ann Reynolds G6ZTF, 169 Ball Green Rd., Coventry, Warks CV6 7GW. Components and software sales will be the province of Ted Hatch G3ISD, 147 Borden Lane, Sittingbourne, Kent ME10 1BY, and publications, including the range of Beginners' Guides, will be handled by the Group's editor, Peter Adams G6LZB, 464 Whippendell Rd., Watford, Herts WD1 7PT.

These appointments will take place from November 4, the date of the Group's AGM.

Back in the Belfry

This year's RSGB HF Convention will once again be held at the Belfry Hotel (just east of Oxford near to the M40) on Sunday October 1 at 9.30.

As well as the usual attractions, the convention will feature the presentation of the Young Amateur of the Year Award 1989 in the presence of representatives from the DTI, RSGB, Navico, Cirket and last year's winner Andrew Keeble G1XYE. RSBG stands will include HF and HF Contests, EMC and propagation studies, and a Planning Panel Clinic if a panel member is available. There is a program of lectures from 10.30 and DX slide shows from 4pm, including one on Steve Telenius Lowes' Coços Keeling DXpedition, featured in HRT's June 1989 issue. That should be good in colour.

The programme is provisional at present. Further information is available from the RSGB or from Don Field G3XTT, QTHR, tel. 0734 724192.

New For Old

A new bi-monthly magazine for vintage radio buffs will be in publication from August 22. Named Radio Bygones, it will cover amateur radio, domestic radio and tv, all manner of commercial, military, aviation and marine comms from the days of Hertz and Marconi onwards up to the recent past. Editorial will include restoration and repair, history and nostalgia, and guides to collections, exhibitions and exhibits, with colour pictures.

The Editor will be Geoff Arnold, formerly editor of Practical Wireless, who first became interested in radio during World War II. Radio Bygones will incorporate Chas Miller's domestic radio journal The Radiophile, and will be available by subscription, and over the counter at selected museums and specialist outlets, priced £2.20 per issue or £12 for a year's subscription of six issues. Sample copies of the first issue will be available for £2 from the publisher, **G C Arnold Partners, 8A Corfe View Rd., Corfe Mullen, Wimbourne, Dorset BH21 3LZ, tel. 0202 658474.**

Derby Contest Points

Derby DARS has published the results of its 3rd Annual National 144/146 MHz contest held on 12th March this year.

The winner in section one (full legal power limit) is G2EUV/P from Leicestershire with 12,870 points. The section 2 (30W

maximum output) winner is G4RLF/P from Wiltshire with 11,088 points, runner up is G7APD/P from Northants with 10,584 points, both multiple operators, and close behind is the leading single operator, G4ARI with 10,530 points. The leading SWL is D. Gilbert from Surrey with 288 points.

Complete details can be had from Derby DARS by sending an SAE to **Mike Sharp G4XPE, Derby DARS, 119 Green Lane, Derby DE1 1RZ.**

RAE Classes

Avondale Evening Centre, Heathbank Road, Cheadle Heath, Stockport, Cheshire SK3 0OU will be running Morse and RAE courses from September on Monday (Morse) and Tuesday (RAE) from 7pm to 9pm. The course tutor will be Rik Whittaker G4WAU, and further information is available from him evenings or weekends on 061 477 2382 or from Avondale School on 061 427 4703. Enrolment will be taking place from Monday 18 September.

The City and Guilds 765 RAE course run by **Clacton Adult Education Centre**, Green Lodge, 180 Old Road, Clacton on Sea, Essex will begin on Wednesday 20 September at 7pm at the Colbaynes School High School, Pathfield Road, Clacton branch. Course tutor will be Jeff Harris G3LWM, who can be contacted by post only at 21 Waltham Way, Frinton on Sea, Essex CO13 9JE. Enrolment week is 11-15 September at Green Lodge.

Tel. Clacton 424151.

A course will be run at the **Duston Upper School**, Berrywood Road, Duston, Northants from 19 September. Enrolment will be by post during August, and in person on August 31 and September 1 from 7.45 to 9pm.

Further details can be obtained from the Community Office at the school.

RAE classes in South Yorkshire: information from the following: **Barnsley College**: J. Longstaff G3VJR, 23 Harlington Rd., Alwick on Dearne, Mexborough. Tel. Mexborough 585965.

Rotherham College: R. Rush G4CRE, 8 Sheaf Place, Worksop, Notts. Tel. 481310. **Doncaster College**: M. Fowler G8XTU, 6 Harcourt Close, Bessacar, Doncaster. Tel. Doncaster 531365. **Stocksborough College**: P. Stables G4MRU, 54 Harvey St., Deepcar, Sheffield. Tel. Sheffield 886083. **Mexborough ARS**: E. Rogers G3MWN, 7 Buckleigh Rd., Wath upon Dearne, Rotherham. Tel. Rotherham 873211.



Aerials and Apples

New from AEA through ICS Electronics is the AT-300 Antenna Tuner. Features include a large low-loss enclosure designed to maximise RF reaching the antenna, balanced and unbalanced outputs, built in dual-needle SWR meter and low-pass, low-harmonic design to minimise chances of tv-i and allow a wider range of impedance matches.

Also new is a PK-232 driver program for the Apple Macintosh. MACRATT includes FAX and is mouse-driven. MACRATT runs the PK-232 in host mode and will run under Multifinder. There are ten marco keys which can be used for RTTY, Amtor and morse. The program runs with the 512K, 512e, Plus, SE and MAC II models.

ICS Electronics Ltd., Unit V, Rudford Industrial Estate, Ford, Arundel, W. Sussex BN18 0BD. Tel. 0903 731101.

Calling Old Dunstables

Dunstable Downs Radio Club is coming of age. Founded in a pub on Dunstable High Street in December 1968, the Club reaches its 21st birthday this year. To celebrate, the Club wants to contact all its old members to invite them to the birthday celebration on November 18th. Overnight accommodation has been arranged at a local hotel at very reasonable rates (they don't say

whether or not this includes the original pub).

The committee would be pleased to hear from old (and, no doubt, present) members whether or not they are able to attend the dinner. Please contact the Secretary, Tony Kelsey-Stead G0COG QTHR or tel 0582 508259 or the Chairman Clive Asquith G4END on 0582 27907.

Here's wishing DDRC a merry celebration in November and 21 more prosperous years.

CLUES ACROSS

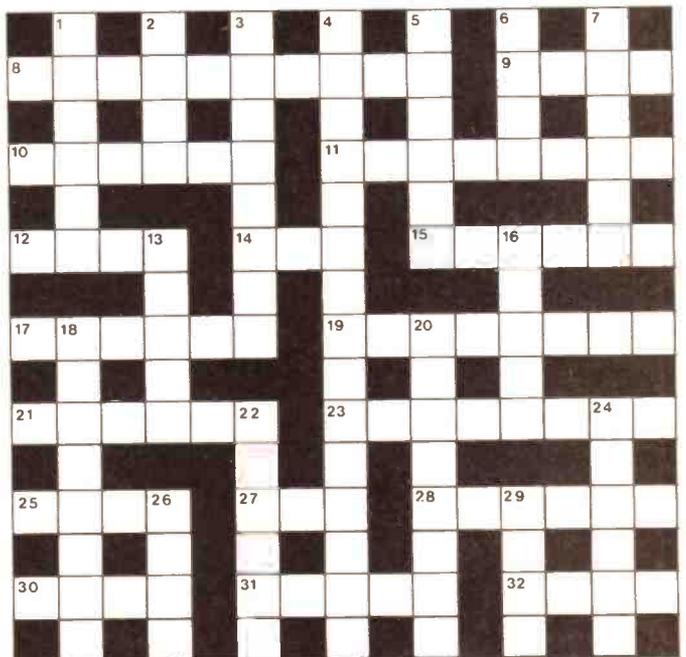
- 8 Equipment used in cars (6,4)
- 9 Mountain top, district in Derbyshire (4)
- 10 CB name? (6)
- 11 Close to unmarried girl, not quite a hit (4,4)
- 12 Directional Antenna, oak in old cottages? (4)
- 14 Little Sally in works all nations (3)
- 15 Additional parts, passer mixed up (6)
- 17 Some frequencies are not exclusive, they're (6)
- 19 What Gs can do that SWLs cannot (8)
- 21 Where I see slow scan images (2,2,1,1)
- 23 Spreads out from like radio signals (8)
- 25 What to do with a rag? (4)
- 27 Gearwheel, partly cognisant (3)
- 28 Continent, of which we are part (6)
- 30 Jack is one sort, mains is another (4)
- 31 Part of brother, means additional, alternative (5)
- 32 Computer animals with long tails (4)

CLUES DOWN

- 1 Turn, as in beam (6)
- 2 Seek and you will (4)
- 3 Repeaters can be operated forward or (8)
- 4 What the 'S' meter measures, relatively (6,9)
- 5 Satellites, Academy awards? (6)
- 6 Turn maps around to find meat in tins (4)
- 7 Ah less about trouble or bother (6)
- 13 To get from YL to XYL you have to do this (5)
- 16 Where you would find maritime mobile (2,3)
- 18 Small portable transceiver (4,4)
- 20 Non-professionals? In name only! (8)
- 22 V phonetically speaking (6)
- 24 Anticipate, be pregnant (6)
- 26 Payment, rate for the job, make war (4)
- 29 Computer animals with horns and memory (4)

CROSSWORD

This is the HRT Pilot Puzzle. Do you like having a crossword to while away the odd ten minutes while you wait your turn on the net? Answers next month. Or would you rather have had them this month? Surely something can be arranged . . . let us know.



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into the IC-725 for use with the AH-3 H.F. Automatic Antenna Tuner for mobile or base station operation.

Accessory options available are the PS-55 20A P.S.U., AH-3 Auto Antenna Tuner, UI-7 AM Tx. FM Tx/Rx Unit, FL-100 500Hz CW Filter, FL-101 250Hz CW Narrow Filter and SP-7 External Loudspeaker.

For more information on the IC-725 budget H.F. and other ICOM amateur equipment contact your nearest authorised ICOM dealer or phone us direct.

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2 Meters

ICOM's 25 watt IC-275E is a superb transceiver for contest operating and for general DX working. This prestige

144MHz multimode is also available as a IC-275H 100 watt version, which requires an external AC supply.

70cms

Enjoy 430MHz operation with the 25 watt IC-475E, or go high power using the IC-475H. An optional CT-16 Satellite Interface Unit is available for combining ICOM "75" transceivers for easy tuning.

6 Meters/10 Meters

The 10 watt IC-575 covers 28-30MHz and 50-54MHz and includes the AC supply. Join in with the recent openings to the U.S.A. with this superb transceiver. Also to be released soon is the IC-575H 50/100 watt high power version, which will operate with an external AC supply.

With the introduction of the "75" series you now have all the technical quality you'll need to enjoy VHF and UHF communications. For more detailed information on these transceivers contact your local ICOM dealer or ICOM (UK) Ltd.

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

Datapost: Despatch on same day whenever possible.

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



LETTERS

Letter of the Month

Our organisation is a CB radio user representative group at the DTI meetings held in London but, having made that statement the one thing that we CBers and Amateurs share apart from the radio spectrum is the DTI's classification that we are all "hobbyist" users.

At the June DTI meeting we CBers were offered three different options with regards to our licences.

1. Centralised issue (from Chesterfield, we assume).
2. A single payment for a "lifetime licence".
3. No licence at all with no payment(s) due.

The user groups after great consideration opted for number 1. We felt that the extra revenue generated from the DTI not having to pay the Post Office counter service charge (around 30% from each licence fee paid), would offer the DTI more financial backing to clean up our part of the radio spectrum. Also the groups were and still are concerned for the future of our old 27MHz UK FM system as without the annual revenue the DTI may need to go to the Government for financial aid, which would leave the way open for the Government to "get rid of" this problematic frequency in favour of the European CEPT system.

However, when we questioned the DTI about these options and asked if options 2 and 3 had been offered to

the Amateurs they replied "No". So why not, if we are all "hobbyist" users? And why shouldn't the Amateurs be given the same freebee chances as CB?

It clearly would not affect the way in which you gain your qualifications for the A and B Licence, but instead of it being issued by rotation through the Chesterfield computer, it could be issued via the City and Guilds, or in another way. It would not affect your Amateur status or leave the way open to every Tom, Dick or Harry. Your systems would still be safe! I would be very pleased to read the replies in your letters pages from your readers.

Please don't start saying that we should contact the RSGB as we have tried on a number of occasions with other questions and for information, and we have never ever received a reply. We are, however, very interested in knowing what amateurs think of this idea.

And although I am not myself a radio amateur I do enjoy reading your magazine from cover to cover. Thank you for an excellent publication.

— Ian Oliver, Monitoring Service of Great Britain, National Publicity and Public Relations Officer.

It all comes down to money in the end, and I certainly agree that revenue is needed to support the DTI if they are to support us. I will leave it at that for now: what do amateurs think of this differential treatment?

I find the worst offenders are nearly always RTTY stations. Also, on many occasions I have found my QSOs interrupted by morse maniacs. I use both RTTY and morse myself, as well as phone and FM, so I have no axe to grind.

I don't do these things myself and I expect the same courtesy back. Unfortunately it is not an idea that meets with universal approval. It only needs a few operators in every IARU country to get into these ways, and the whole thing goes up in smoke.
J D Bolton, Timperley, Cheshire.

Band plans are purely voluntary. The licence only states what modes can be used inside the band. The national

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

radio societies have decided that it would be a good idea to split up the various modes into different areas of the band, and in general, but by no means always, it is in operators' interests to stick to the band plan. — G3YZW

"Does Crime Pay?"

I have been a radio user for the last 18 years. After eight housebreaking attempts on my home in ten weeks I was advised by the police to move home or get rid of my radio gear. This was after spending £300 on alarm equipment.

I have now moved to another town and I am thinking of going back to valve equipment and selling my Yaesu rig. At least you can't climb out of a third floor window with a Racal RA17 under your arm in a plastic bag. Have any other readers solved the problem of how to hide an HF beam?

— Please don't print name, radio engineer, Greenock.

Moving to a place with a lot of tall trees round it springs to mind.

A Voice Listening In The Wilderness

Five or six years ago I acquired a 10m rig in the hopes (still unfulfilled) of getting that 'A' license. It was a Belcom LS-102L all-mode 10m transceiver, with a frequency range 28 to 29.999MHz.

It has not been used for transmitting on 10m, only listening, not all that successfully so far.

But if the DTI's latest "authority" (HRT August 1989, page 6) means anything, then no-one can use this rig at all. Is that what they want? Can it legally be used on 10m at all?

— Yours in puzzlement, Aberdeen.

Gentlemen and the Law

It is obvious to me, after 6 years as a licenced amateur, that the universal "gentlemen's agreement" band plans are nothing more than pretty printed cards for supply free by various amateur mags.

It is time for stronger measures. I believe that there are already too many laws, but if people are in the main not prepared to act in accordance with gentlemen's agreements, then the only recourse is to force them.

The rule only has to be simple: failure to operate a station in the appropriate mode designated by the band plan should mean licence suspension for three months and a £100 fine.



To the best of our knowledge, no. Single-band 10m transceivers in the UK can only be built or owned by individual amateurs for their own use, and they must operate within the band 28 to 29.7. Private conversions can be made from legal CB gear so long as no extra modes are added (this restricts such conversions to FM); any transceiver operating on 10m and any other amateur band is quite legal. But single-band 10m gear cannot be legally bought or sold without DTI approval. The position on commercial 10m sets bought 'in ignorance' is not entirely clear; the DTI would like people owning such sets which otherwise conform to amateur use to apply for a personal authority to own the set.

The crux is that for many years these sets were not legal, but the fact lay largely forgotten. For various reasons, this has become a live issue again and many owners had acquired one of these sets by purchase or conversion without realising that they were breaking the law (or at least the letter of the law).

If your set runs above 29.7MHz, or it runs on 10 metres only, and you bought it, then it would seem to be illegal. The DTI have assured us that they are not wishing to harrass amateurs, and that individual authorities to own and operate will be issued to amateurs who apply. Be this as it may, we know that amateurs are feeling harrassed, and that our writer is yet another who wants to know what his position is without revealing his identity. We know that another amateur who wrote to us in a similar vein was afterwards contacted by the DTI to tell him that he was breaking the law. Did he feel harrassed? You bet. The fact that an authority to continue to own and operate his set (which conformed to amateur specifications in every way) was then immediately

issued was a thin palliative after suddenly receiving the 'official letter' out of the blue.

This is not a happy state of affairs, especially when amateurs and amateur suppliers believe that they are seeing downright dodgy CB sets changing hands apparently ignored by the same authorities who are tapping on their shoulders.

It is certainly true that the change in the law last autumn was intended to benefit amateurs rather than suppress them. Feelings of benefit are not abounding, though.

It may be that this is a matter of style and not intention so far as the DTI is concerned, but it is not a happy state of affairs.

Apologies to G4HCL

In reply to the letter from G8LER in August 1989 claiming that "there was an important point omitted" in my feature on the Pye Europa in the March 1989 issue, may I suggest he reads the first paragraph on page 22 of that issue, where he will note that a highlighted warning to the effect on the floating speaker line is given, complete with full details of the packet tnc interconnection for both audio and squelch lines.

Possibly you would have been wise to double check before printing a claimed error which could cast uncalled-for doubt on the usefulness of our pioneering series on PMR conversions.

— Chris Lorek BSc (Hons) AMIEE G4HCL

I'm sorry that this erroneous suggestion was printed. We are only too happy to receive suggestions and addenda from readers to constructional articles, and we normally send these to the original author for comment. Locked into a false sense of security by this process and the passing of time, I overlooked the fact that I had not had a yay or nay from Chris on this point, and G8LER's letter unfortunately reached print without the usual checks. In fact, Chris did not receive a copy of the letter, and was most unhappy when it appeared.

Chris is a world authority on pmrs, and his collected experience in pmr conversion appears shortly in the Surplus Two-Way Radio Conversion Handbook, published by Argus Books. He is always happy to get a response from readers, and rest assured that nothing written will pass through our production cycle until it has been through his hands first. — HPA.

£10 FOR THE LETTER OF THE MONTH

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

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

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AC141 0.24	BC109B 0.12	BC214 0.09	BD137 0.32	BD698 1.50	BF355 0.37	BR4443 1.15	MRF237 4.95	RC16335 0.85	2N1308 1.35	25C1162 0.95
AC141K 0.38	BC114A 0.09	BC214C 0.09	BD138 0.32	BD701 1.25	BF362 0.38	BRY39 0.45	MRF450A 15.95	RC16572 0.85	2N1711 0.30	25C1172 2.20
AC142K 0.45	BC115 0.55	BC237B 0.15	BD139 0.30	BD702 1.25	BF363 0.45	BSW64 0.95	MRF453 17.50	S2060D 0.95	2N2219 0.80	25C117L 1.15
AC176 0.22	BC116A 0.50	BC237B 0.15	BD140 0.30	BD707 1.90	BF371 0.25	BSX60 1.25	MRF454 26.50	SKE5F 1.45	2N2626 0.55	25C1306 1.75
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AD161 1.50	BC147B 0.12	BC300 0.30	BD202 0.50	BF173 0.22	BF497 0.23	BU125 1.25	OC28 1.50	T9038V 2.95	2N3706 0.12	25C1969 2.50
AD162 0.50	BC148A 0.09	BC303 0.30	BD203 0.50	BF177 0.38	BF499 0.23	BU126 1.60	OC29 4.50	THY15/80 2.25	2N3708 0.12	25C1985 1.50
AF106 0.50	BC149 0.09	BC307B 0.09	BD204 0.70	BF178 0.26	BF500 0.23	BU204 1.55	OC32 5.50	THY15/85 2.25	2N3733 9.50	25C2028 1.15
AF114 2.50	BC153 0.30	BC327 0.10	BD222 0.46	BF179 0.34	BF501 0.25	BU205 1.30	OC42 1.50	TIP29 0.40	2N3737 2.75	25C2029 1.95
AF115 1.95	BC157 0.12	BC328 0.10	BD223 0.59	BF180 0.29	BF508 0.30	BU208 0.95	OC44 1.25	TIP29C 0.42	2N3792 1.35	25C2078 1.45
AF116 2.50	BC159 0.09	BC328 0.10	BD225 0.48	BF181 0.29	BF509 1.50	BU208A 1.15	OC45 1.00	TIP30C 0.43	2N4280 3.50	25C2091 0.85
AF117 2.50	BC161 0.55	BC337 0.10	BD232 0.35	BF182 0.29	BF591 1.75	BU208D 1.35	OC70 1.00	TIP31C 0.55	2N4427 1.95	25C2098 2.95
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AF121 0.60	BC171 0.09	BC347A 0.13	BD236 0.49	BF184 0.35	BF743 0.35	BU326S 1.50	OC72 2.50	TIP33C 0.95	2N5294 0.42	25C2314 0.80
AF124 0.65	BC172B 0.10	BC347A 0.13	BD237 0.40	BF185 0.28	BF743 0.35	BU407 1.24	OC75 1.50	TIP34B 0.95	2N5296 0.48	25C2371 0.36
AF125 0.65	BC173B 0.10	BC347A 0.13	BD242 0.65	BF195 0.11	BF743 0.35	BU408 1.50	OCB1 1.00	TIP41A 0.45	2N5298 0.60	25C2310 0.95
AF126 0.45	BC174 0.09	BC347A 0.13	BD246 0.75	BF197 0.11	BF743 0.35	BU426A 0.75	OCB4 1.50	TIP41C 0.45	2N5496 0.95	25K19 0.55
AF127 0.65	BC177 0.15	BC347A 0.13	BD246 0.75	BF198 0.16	BF743 0.35	BU500 2.25	OC139 12.50	TIP42C 0.47	2N5641 16.50	25K33 0.55
AF139 0.40	BC178 0.15	BC347A 0.13	BD246 0.75	BF199 0.14	BF743 0.35	BU508A 1.95	OC171 4.50	TIP47 0.65	2N5643 16.50	
AF150 0.60	BC182 0.10	BC347A 0.13	BD246 0.75	BF240 0.20	BF743 0.35	BU526 1.90	OC200 4.50	TIP48 0.65	25A329 0.95	
AF178 1.95	BC182B 0.10	BC347A 0.13	BD246 0.75	BF241 0.15	BF743 0.35	BU807 2.25	OC201 5.50	TIP50 0.65	25A715 0.55	Special Offer
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AS527 0.85	BC183L 0.09	BC347A 0.13	BD246 0.75	BF257 0.35	BF743 0.35	BUY20 2.15	OC205 10.00	TIP125 0.65	25C496 0.80	if you order 10
AS577 1.50	BC184B 0.09	BC347A 0.13	BD246 0.75	BF257 0.35	BF743 0.35	BUY20 2.15	OC205 10.00	TIP125 0.65	25C496 0.80	or more of any
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			BD518 0.75	BF271 0.28	BF743 0.35	BUY20 2.15	OC205 10.00	TIP161 2.95	25C789 0.75	conductors
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AN239 2.50	CA3086 0.46	LA4422 1.50	MC1358 1.58	SN76110N 1.25	STK0019 7.95	TA7632A 3.50	TBA673 2.95	TDA1037 1.95	TDA2611A 1.95	UPC1353C 2.45
AN240P 2.80	CA3123E 1.95	LA4430 2.50	MC1358 1.58	SN76110N 1.25	STK0039 7.95	TA7632A 3.50	TBA750 2.95	TDA1044 2.15	TDA2620 3.50	UPC1360 2.95
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AN260 2.95	CA3140S 2.50	LC7120 3.25	MC14106P 2.95	SN76227N 1.05	STK0059 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN262 1.95	CA3140T 1.15	LC7130 3.50	MC1451BCP 3.50	SN76533N 1.15	STK0079 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN264 2.50	ET6616 2.50	LC7131 5.50	MC1451BCP 3.50	SN76533N 1.15	STK0079 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN271 3.50	HA1137W 1.95	LC7137 5.50	MC1231B 1.75	SN76650N 1.65	STK014 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
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AN313 2.95	HA1322 1.95	LM380N 1.50	MSM5807 8.75	STK014 7.95	STK015 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN315 2.95	HA1339A 2.95	LM380N 2.95	SAAS500A 3.50	STK015 7.95	STK015 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN316 3.95	HA1366W 2.75	LM383T 2.95	SAA1025 7.25	STK018 7.95	STK018 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN331 3.95	HA1406 1.95	LM390N 3.50	SAA1251 4.95	STK025 11.95	STK025 11.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
AN342 2.95	HA1551 2.95	LM1011 3.15	SAA5010 5.35	STK032 7.95	STK032 7.95	TA7632A 3.50	TBA750 2.95	TDA1047 1.95	TDA2625 3.50	UPC1365C 3.95
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Review: Little Big TH~75E

Kenwood have a pioneering history in dual band 2m/70cm transceivers, their TW4000 2m/70cm mobile being the first of its kind on the UK market. Many amateurs have asked 'When will there be a dual-band handheld from Kenwood?'. Well, here it is! HRT have been fortunate in testing the first ever UK review set to

Separate squelch controls are fitted for VHF and UHF, concentric to the volume and balance controls.

Bands and Memories

The set controls 2m and 70cm in selectable 'Main' and 'Sub' band modes, the main tuning knob, keypad, and transmit facility always

pad button. As well as these, a 'call' channel may be programmed on each band for quick selection by a press of the Call button on the PTT bar extension. Each memory channel may store the operation frequency, repeater shift, and sub-tone frequency if fitted, and channels 0, 1 and 2 may be used to store odd-split

The HRT Review Team gets to grips — literally — with Kenwood's first dual band hand portable.

see if it matched up to the usual Kenwood quality and performance. We were pleased with our findings...

True Dual

The set offers true simultaneous dual-band operation, having the ability to receive on both bands at the same time, or alternatively allowing transceive operation on one band while still allowing a monitor to be kept on the other band for activity. This is unlike some of the simpler dual-band transceivers which allow reception only on one band or the other, but not both at any one time (even when they offer cross-band 'duplex'). The simultaneous dual band facility, as fitted to the TH-75E, allows you to have a QSO on 2m, while, say, listening out for your friend on 70cm.

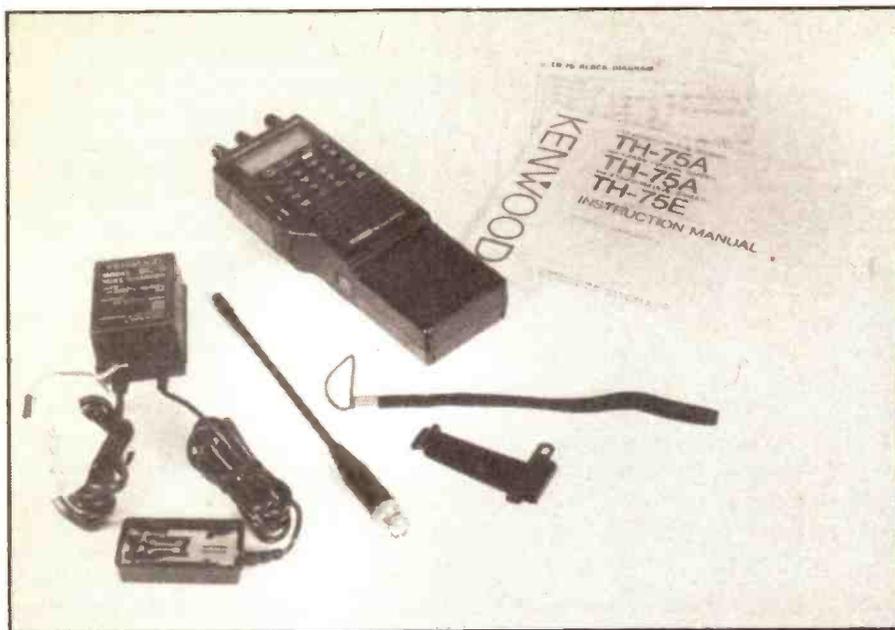
The set covers the 2m and 70cm bands in selectable 5, 10, 12.5, 20 and 25kHz steps. The default settings are 12.5kHz on 2m and 25kHz on 70cm. Tuning is accomplished either by the rotary click-step knob on the set top, or by direct frequency entry using the front panel keypad. A common on/off/volume control is fitted to the top panel, next to a 'balance' control acting as an audio fader between the two bands in use.

acting on the main band, with further up/down buttons controlling the sub band tuning. Switching between the two is performed by a push of the 'Band' button positioned on the PTT bar extension. The large LCD panel shows the frequency of each band to the nearest kHz, as well as providing a 'Busy' indication for each band. An S-meter section displays the relative strength of received signals on the main band, acting as a battery voltage indicator on transmit to show the state of your nicads. The LCD may be backlit for night time use, a panel above the PTT bar being used for this. The backlight automatically stays on for 5 seconds following the last button push to save you keeping your finger on the button while tuning or selecting a memory channel.

An automatic band change (ABC) may be enabled which will automatically switch control of the main band to the band with a received signal present, useful when mobile for example to make sure you reply to the received CQ on the right band. On transmit, reception on the sub band may either be automatically muted or enabled, depending upon the setting of the 'duplex' facility.

Ten memory channels on each band may be programmed, and then individually selected by a single key-





Tx/Rx frequencies if required.

A 'memory shift' facility is available, where following a push of the Ent button you can tune away from any of the pre-selected memory channels, retaining any programmed repeater shift etc. This facility lets you have, in effect, 10 VFOs on each band all pre-set to any given start position.

The memory channels of either band may be scanned for activity as required, or for those who live in the fast lane and don't want to miss a thing, the dual memory scan (DMS) lets you scan all channels for activity, the scan halting when the receiver squelch raises. Any number of channels may be locked out of this mode as required, and the scan may be set to resume either two seconds after the squelch closes, or five seconds after the scan halts regardless of squelch state. By pre-setting upper and lower scan limits in memory channels 8 and 9 respectively, a programmed band scan may be initiated which searches between these two frequencies in the pre-set tuning steps.

For dual-channel monitoring in the same band, a 'priority' scan mode checks memory channel 1 briefly every five seconds, the set giving you a bleep if activity is present on this channel.

Bleeps and Tones

While monitoring a channel for activity, the set may be placed in Alert mode where it bleeps for five sec-



onds at a pre-set volume level whenever the squelch raises. A flashing bell symbol appears on the lcd until cancelled, to wake you up when someone puts a call out! If you habitually forget to switch the set off, an auto-power-down is also available where the set gives a five second bleep after 59 minutes of no activity or manual key presses, switching into a low current drain 'power-down' state at 60 minutes.

For users in busy areas or for club net use, an optional sub-tone unit may be internally fitted to provide ctcss use on any of 37 sub-audible tone frequencies (see the feature on ctcss in this month's HRT for information on this). When used with the Alert facility, this can act as a handy pager to let you know you've been called. For the technical whizz-kid packet radio buffs, a 'fast squelch' facility is available where the set keeps power applied to certain parts of the receiver circuitry to allow a fast

audio recovery on receipt of a packet burst. This uses slightly more battery power on receive but allows reception of packets with short Tx delay settings.

The review set was supplied with a PB-6 7.2V 600mAh battery pack giving a nominal 1.5W output on transmit. A larger 12V nicad pack is also available giving a correspondingly higher transmit output power, and an external 13.8V power source may also be used to provide an output of greater than 5W if required for home or mobile use. For all-day users, 200mAh and 1100mAh 7.2V packs are also available together with an empty battery case allowing you to insert six AA cells.

Due to the extra circuitry involved, the TH-75E is not in the league of the 'micro-miniature' handhelds, measuring 180mm (H) x 66mm (W) x 40mm (D) when fitted with the supplied PB-6 low-power battery, and weighing around 510g. A carrying strap and metal belt clip are supplied, and the set comes with a mains charger for overnight nicad recharging. Optional extras include both normal and rapid desktop nicad chargers, external DC supply cables, soft carrying cases, a speaker microphone and VOX handset, and even a waterproof bag for those out-in-the-rain activities such as foxhunts and emergency exercises.

In Use

On first holding the set, I got a feeling of true ruggedness, the sealed controls and sockets on the top of the set adding to the general appearance of the set probably being able to withstand the odd rain shower as well. Although I have used Kenwood portables before, several incorrect button pushes at first told me that I still needed to read carefully through the instructions book to operate the set, because of the new facilities offered. The manual provided, written in American English, provided good operating instructions together with block and circuit diagrams, but no internal adjustment information.

Tuning into my semi-local 2m repeater showed the receiver to be very sensitive indeed, although I had to choose my position carefully to get my transmitted signal into the repeater due to the set's lower output power. The recovered audio quality on receive was very good. It was



possible to increase the volume also to quite a loud level before any trace of internal distortion was apparent. I could happily monitor next to noisy roadside traffic. This is highly commendable bearing in mind the tiny internal speaker. Good reports on my transmitted audio were received, with plenty of punch but no trace of overdeviation, although as previously mentioned I found I was sometimes at a weak signal level when compared to the strength of most received signals on the TH-75E.

On 70cm, the receiver was reasonable but not quite as sensitive as the 2m section: all three of my local and not-so-local 70cm repeaters came in at reasonable strength. Using the dual reception facility really showed what many amateurs must be missing. Being able to scan around 70cm while listening to the local 2m 'natter channel' showed many QSOs to be taking place which otherwise would not have been heard.

I found the sensibly placed 'band' and 'call' buttons, next to the PTT bar, very easy to use. With the set in my inside pocket, the auto band change allowed me to reply on the correct

band after the set had been suitably extracted! Using the set mobile showed an adequate level of receive audio present for driving an external speaker, although the set was, in my case at least, a little too large to hold comfortably and control for QSYing purposes with one hand on the move. The extra level of RF output provided, due to an external 13.8V supply as opposed to the use of the nicad, certainly made a difference in the overall readability of my signal by other stations.

At night the lcd illumination worked well, but I found operation of the keypad very difficult due to the unlit black keys against a black background. Instead I relied upon memory channels, using the tuning knob for selection. Likewise, the 'tone' button for repeater access was a little awkward to use, even in daylight this required a two-handed operation. I was limited on 70cm and to a lesser extent on 2m due to the number of repeater and simplex channels outnumbering the available memory channels, so that switching between memories and the VFO or 'memory shift' mode was often necessary.

I found the supplied 600mAh nicad to be capable of providing over six hours of continuous receive-only operation without a recharge being necessary, lasting me a normal day's operation. The charger contacts fitted to the top of the nicad, requiring the removal of the battery from the transceiver to charge. Hence, in the absence of an external DC supply, it was not possible to use the set for monitoring purposes while the nicad was being topped up by the charger, but of course this causes no problems for the normal overnight charge.

The set always remained cool due to the well designed metal heatsink on the rear case, even during long transmission periods the set never reached what I would call 'very hot', unlike some of the portable sets nowadays. I did however find one drawback with this, in that when fitted with the supplied battery the set was slightly top heavy and the slightest touch often made it fall over! ... ah well, one can't have everything.

Insides

The rear panel of the set is made from cast alloy to provide a heatsink for the transmitter power amplifier modules; this also provides a rigid chassis which would protect the set from the odd knock or two in use (although we resisted the temptation to see if it still worked after being dropped from a height!). The front and top panels are made from a tough polycarbonate material, accurately colour matched to the rest of the set, providing a durable all-round form of mechanical assembly.

Inside, surface mounted chip components are much in evidence, with the analogue circuitry using several pcbs in the main chassis linked by flat multi-way connection leads to the digital circuit board fitted to the front panel of the set. It is interesting to note that all the multi-way leads have a metallic screening foil to reduce the level of digital interference radiated.

The circuitry comprises two separate RF and IF sections on receive, together with two separate transmitter RF circuits, the receive and transmit audio stages begin combined. Receiver first IF stages of 16.900MHz (2m) and 59.525MHz (70cm) are used, monolithic crystal filters being fitted here to provide the main part of

the receiver selectivity. Identical second IF stages are used, with CFUM455E ceramic filters to provide further selectivity, ceramic resonators being used in each case for demodulation. 4066 cmos analogue switches are used for audio switching between each band, a twin gang balance control being used before the main audio power amplifier.

A uPD7510 microprocessor provides the frequency control and general housekeeping functions of the set, a rotary encoder providing up/down pulses being used for the tuning control. A lithium battery with a stated life of approximately five years provides memory backup in the absence of external power.

Laboratory Tests

The measured receive sensitivity on 2m was extremely good, confirming the excellent on-air results. On 70cm the receiver was less sensitive, but even so was adequate for the transmit power available. The minimum squelch threshold level was very low, allowing even very weak signals to lift the squelch, and the S-meter gave a reasonably useful dynamic range although less so on 70cm than 2m. The adjacent channel selectivity of 25kHz separated signals was quite good, the rejection of 12.5kHz signals was reasonable but may prove limiting in busy areas if the set was used as a base station in the presence of strong 12.5kHz adjacent signals.

On transmit, the power output with a 7.2V supply showed a reasonable degree of PA efficiency, hence giving a useful battery life, although the 70cm output power was a little on the low side. With a 13.8V supply, over 5W output was achieved on each band. The deviation was accurately set on each band. In all, a reasonable technical performance for a portable, up to the usual Kenwood standards.

Conclusions

The TH-75E is a welcome addition to the Kenwood range, being their first ever dual-band portable. Have they succeeded in their task? 'Yes' must be the answer; the set is rugged, it works well, and offers true, twin band operation that few other portables do.

Laboratory Results

Receiver:

Sensitivity: Input level required to give 12dB SINAD:

144MHz:	0.14 μ V pd
145MHz:	0.12 μ V pd
146MHz:	0.12 μ V pd
430MHz:	0.25 μ V pd
435MHz:	0.24 μ V pd
440MHz:	0.24 μ V pd

Squelch Sensitivity:

	2m	70cm
Threshold:	<0.05 μ V pd (2dB SINAD)	<0.05 μ V pd (7dB SINAD)
Maximum:	0.15 μ V pd (7dB SINAD)	0.07 μ V pd (7dB 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:

	2m	70cm
+12.5kHz:	30.5db	30.0dB
-12.5kHz:	31.5dB	32.5dB
+25kHz:	75.5dB	72.0dB
-25kHz:	75.5dB	69.5dB

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:

	2m	70cm
100kHz:	87.0dB	84.5dB
1MHz:	95.0dB	97.5dB
10MHz:	97.0dB	105dB

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

	2m	70cm
25/59kHz spacing:	69.5dB	64.5dB
50/100kHz spacing:	69.5dB	64.5dB

Maximum Audio Output:
Measured at 1kHz on the onset of clipping:

3 ohm load:	415mA
8 ohm load:	345mV
15 ohm load:	220mW

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

2m	70cm
84.0dB	86.0dB

The 2m receiver section was extremely sensitive, coupled with the facility of a higher Tx output by the use of a higher voltage nicad pack would if required provide a good communications range. On the negative side, the set often needed two hands to operate, ie to adjust the

volume or to access a repeater, but the one-button press memory channel access coupled with the rotary tuning control were useful in simplifying the operation.

Our thanks go to Lowe Electronics Ltd for the loan of the review equipment.

S-Meter Linearity:

Indication	2m		70cm	
	Sig.Level	Rel.Level	Sig.Level	Rel.Level
2	0.39 μ V pd	0dB ref	0.31 μ V pd	0dB ref
4	0.71 μ V pd	+ 5.2dB	0.39 μ V pd	+ 2.0dB
6	1.38 μ V pd	- 11.0dB	0.54 μ V pd	+ 4.8dB
8	2.24 μ V pd	+ 15.2dB	0.76 μ V pd	+ 7.8dB
10	3.41 μ V pd	+ 18.8dB	1.01 μ V pd	+ 10.3dB
12	5.77 μ V pd	+ 23.4dB	1.55 μ V pd	+ 14.0dB

Current Consumption:

Standby, Squelch Closed:	43mA (2m only)
	48mA (70cm only)
	79mA (2m/70cm)
	105mA (2m/70cm, Fast Squelch)
Receive, Mid Volume:	118mA (2m/70cm)
Receive, Max Volume:	179mA (2m/70cm)

Transmitter

TX Power and Current Consumption:

Freq MHz	Power	7.2V Supply	13.8V Supply
145	High	1.98W/890mA	5.01W/1.30A
	Low	430mW/495mA	320mW/480mA
435	High	1.29W/980mA	5.23W/1.40A
	Low	410mW/540mA	510mW/540mA

Harmonics/Spurii:

	2m	70cm
2nd Harmonic:	- 64dBc	- 72dBc
3rd Harmonic:	- 73dBc	< - 90dBc
4th Harmonic:	< - 90dBc	< - 90dBc
5th Harmonic:	< - 90dBc	-
6th Harmonic:	< - 90dBc	-
7th Harmonic:	< - 90dBc	-



Frequency Accuracy:

2m	70cm
-120Hz	-370Hz

Peak Deviation::

2m	70cm
4.84kHz	4.68kHz

Toneburst Deviation:

2m	70cm
3.64kHz	3.22kHz

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3.5-4MHz Superhet Receiver

Part 1

This article describes the construction of a superhet receiver for the 3.5MHz amateur band. The use of printed circuit boards (which can be etched at home), the inter-board plug and socket arrangement, and pre-wound inductors make construction of the project and fault-finding fairly simple. The prototype receiver was tested and aligned using only the minimum of test equipment: in particular, no oscilloscope. A constructor who has some experience but who does not have access to this sort of test gear

of the RF amplifier is set by the RF gain control. The desired output signal from the RF amplifier is mixed with the buffered VFO output, running at nominally 3.955-4.455MHz, and the difference frequency at 455kHz is selected by an SSB-bandwidth IF filter. Fixed gain IF amplification is followed by the product detector where the IF signal is mixed with the buffered output from the carrier insertion oscillator (CIO). The CIO runs at a frequency with the correct offset from the intermediate frequency to demodulate

the lower sideband (LSB) transmissions found on the 3.5MHz band.

The audio output from the product detector is filtered by a passive (LC) audio filter with a 3kHz cut-off frequency to eliminate interfering audio from adjacent undesired signals. A stage of fixed gain audio pre-amplification drives the AF power amplifier via the volume control. The receiver is fitted with an internal loudspeaker which is cut-off when headphones or an external speaker are inserted.

A good, solid superhet receiver that anyone can build, by S. Niewiadomski.

The Circuit

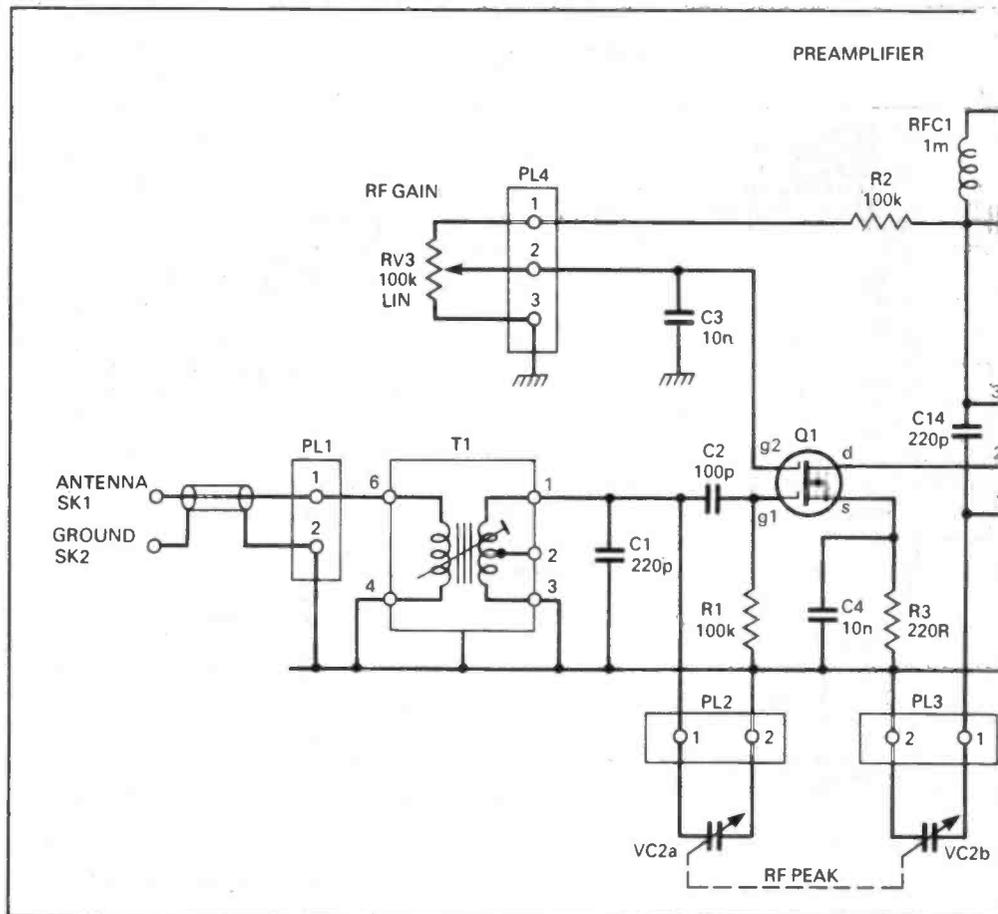
A detailed explanation of how the various blocks in the receiver are implemented follows. Please note that the components are numbered separately for each of the four pcbs, with the exception of variable resistors RV 1, 2, 3 and 4 and variable capacitors VC1 and 2.

should therefore not be afraid of tackling the project.

The design of any receiver is considerably simplified when only single band operation is required: oscillator band-switching and internal frequency conversion are eliminated and the design can be optimised for the particular band of interest. As well as being suitable for listening on the amateur 3.5MHz band, the receiver can also be used in conjunction with external converters to cover other parts of the spectrum. For this reason, the frequency coverage has been set to a full 500kHz, between 3.5 and 4.0MHz (with a little overlap at each end), rather than just the 300kHz segment allocated to UK amateurs. Even with this extended frequency range, the tuning rate is sufficiently slow to make the resolution of SSB signals easy, without the need for a fine tuning control. Brief details of how suitable converters can be designed are given towards the end of this article.

Block Diagram

Fig.1 shows a block diagram of the receiver. The antenna input is buffered and amplified by an RF amplification stage which contains two tuned circuits giving good image rejection and a degree of preselection. A twin-gang variable capacitor enables the resonant frequency of the tuned circuits to be peaked at exactly the received frequency. The gain



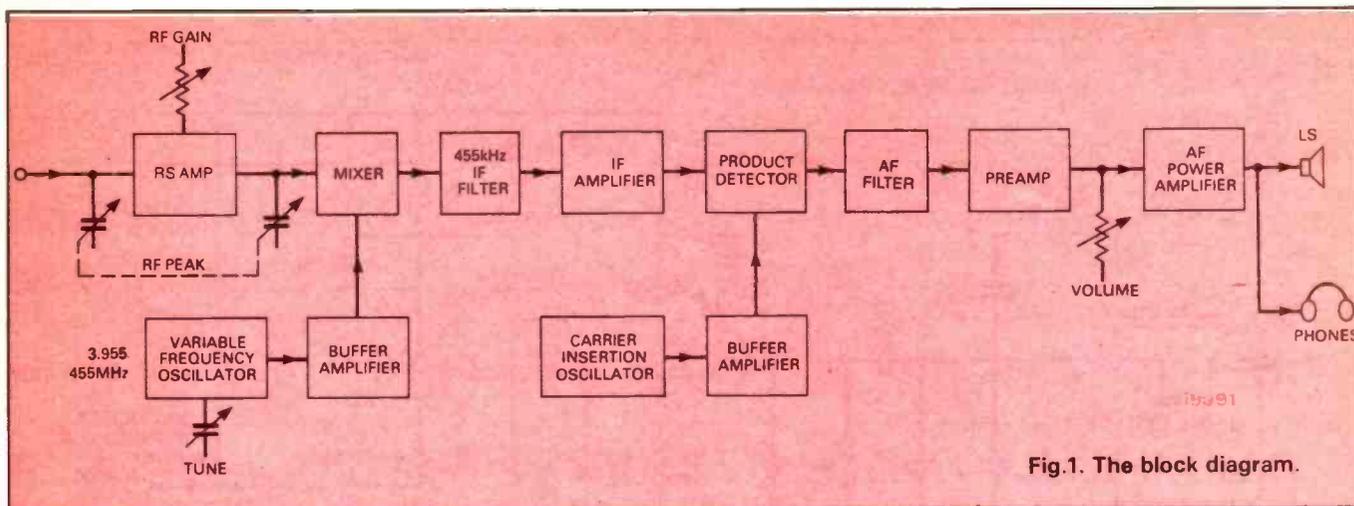


Fig. 1. The block diagram.

RF/IF board (pcb1, Fig. 2)

RF amplification is provided by Q1, a dual-gate mosfet. The voltage gain of this stage is controlled by altering the voltage on gate 2 via RV3, the RF gain control. The antenna input and drain output of Q1 are coupled via tuned transformers T1 and T2 which are peaked to the received frequency by adjusting the RF peak control VC2.

Q2, also a dual-gate mosfet, is configured as a mixer, converting the output from the RF amplifier stage to the intermediate frequency of 455kHz using the input from the VFO at 3.955-

4.455MHz. The 455kHz difference output from the mixer is selected by the IF filter, a Murata CFM455J1, which is a relatively low-cost but high-performance ceramic device optimised for SSB reception. R5, the drain resistor of Q2, sets the drive impedance to the filter and is chosen to match its 2 kohm input impedance. Similarly, R7 terminates the filter with the correct impedance.

IC1, a MC1350 amplifier, provides the main IF amplification for the receiver. This device has provision for gain control by altering the voltage on pin 5. Full gain is obtained when the controlling voltage is

less than 5 volts and the gain reduces as the voltage is taken higher. In general, the controlling voltage can be provided from a manual IF gain control, or from an AGC system. In this particular application the gain control input is permanently strapped to ground, setting IC1 to full gain, by connecting a link on PL6. Purists may object to this, but in practice no problems have been encountered, as strong signals which may tend to overload IC1 can be attenuated in the RF amplifier by setting the RF gain control to a low gain position. Constructors may wish to experiment with the manual or automatic control of

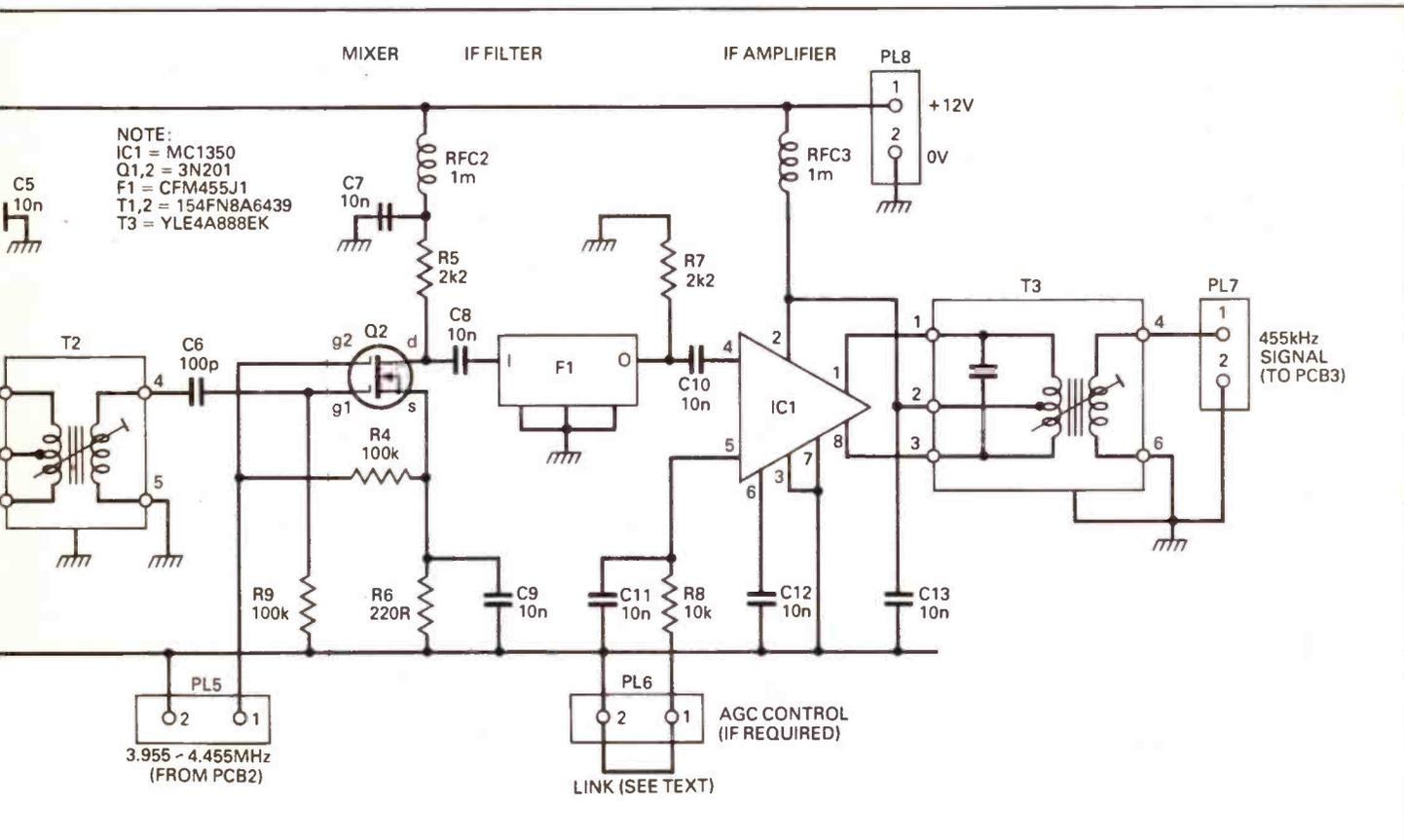
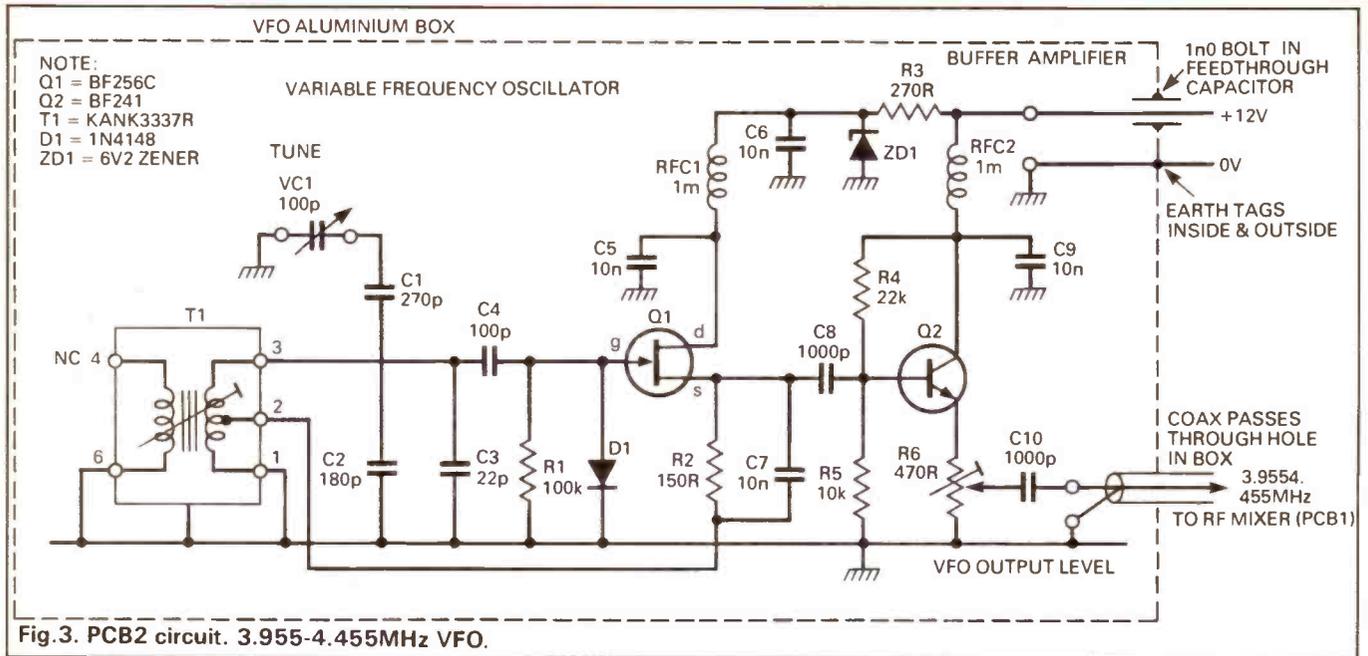


Fig. 2. PCB1 circuit: the RF amp, mixer, IF filter and IF amp.

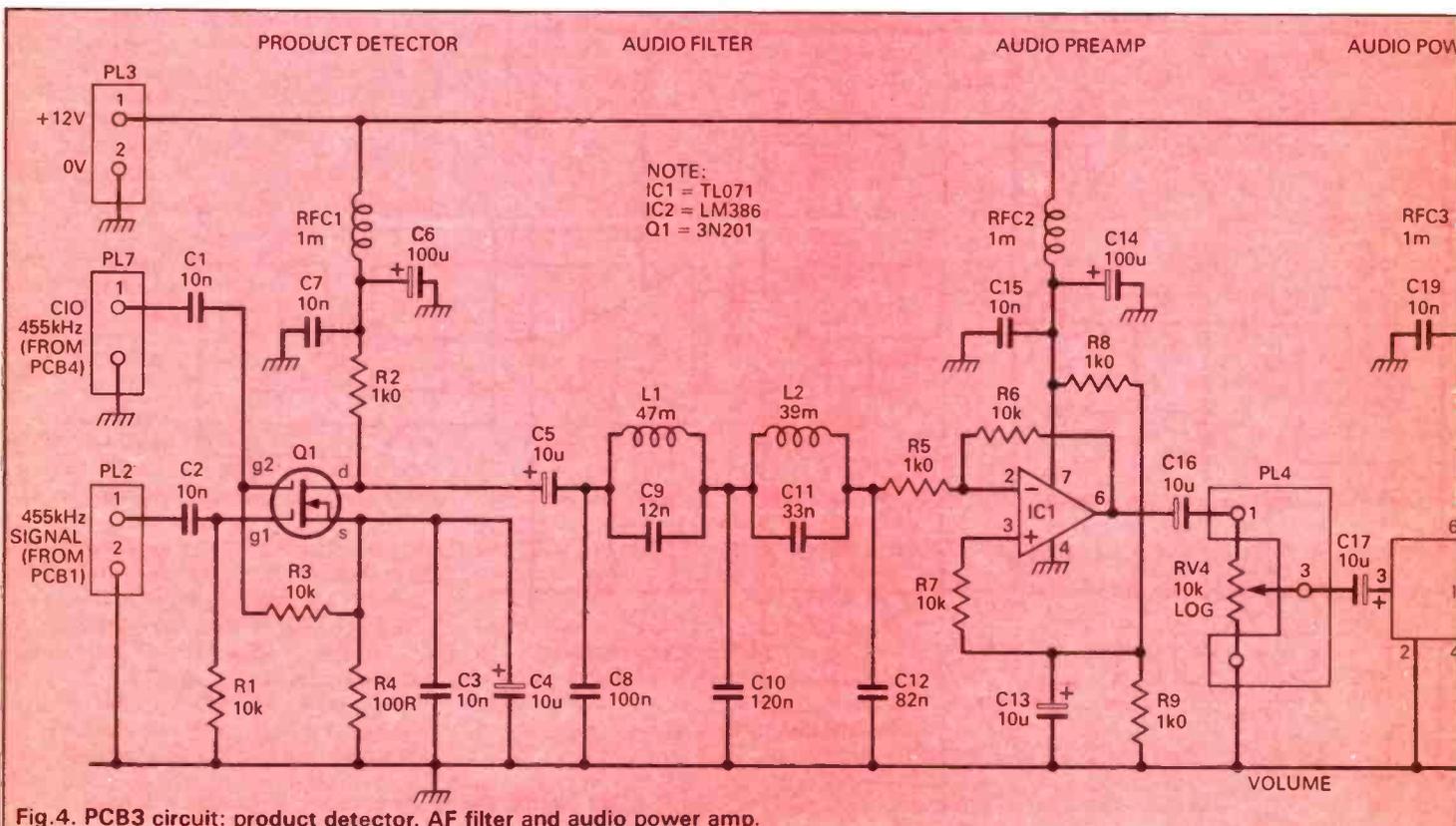
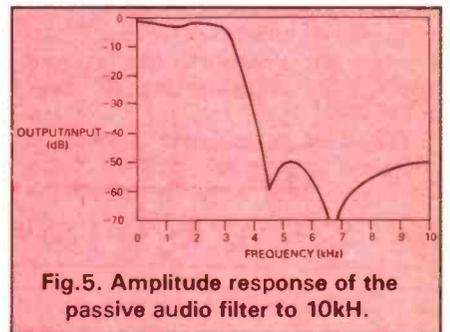


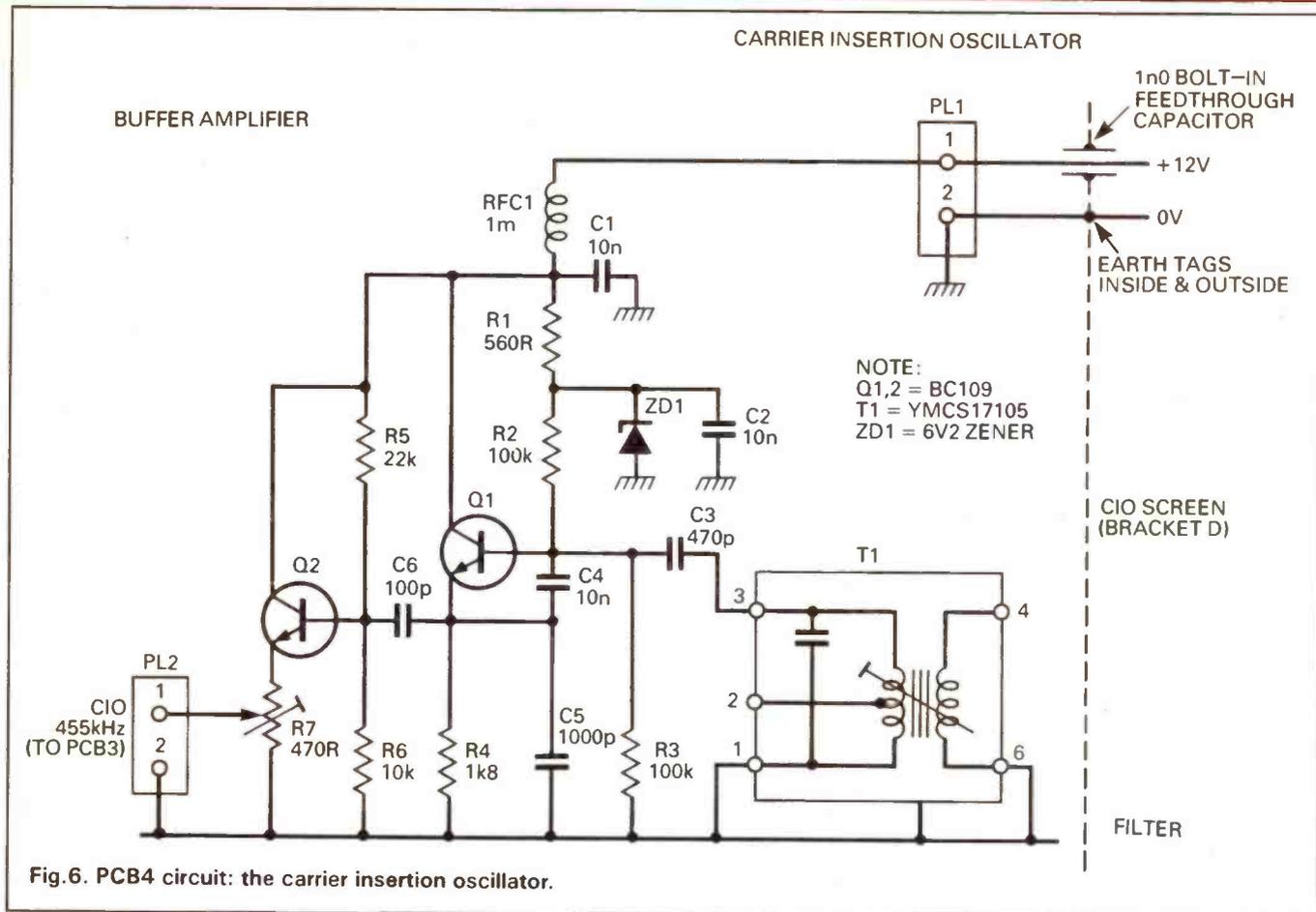
the gain of IC1. The amplified output of IC1 is taken from this board via a push-pull arrangement using the centre-tapped transformer T3 which is tuned to 455kHz. Supply de-coupling for each stage is provided using 1mH RF chokes and 10nF capacitors, ensuring stability and freedom from spurious responses.

VFO board (pcb2, Fig.3)

A conventional VFO circuit is designed around jfet Q1, and is a guaranteed

first-time starter using a ready-wound coil. The frequency determining capacitors C1-C3 and VC1 (the tune control) have been chosen to give the desired frequency coverage of 3.955-4.455MHz with a little overlap at each extreme. Miniature ceramic plate components were used in the prototype for C1-C3 which give some warm-up drift and reasonable operating stability. There is room for experimentation with the types of these capacitors to improve frequency





stability if desired.

Q2 forms an emitter follower buffer amplifier for the VFO output, isolating the oscillator stage from loading effects. The level of the output can be set by adjusting R6.

A stabilised 6.2 volt supply voltage for the oscillator is generated by R3 and D2, and de-coupled by C6, RFC1 and C5. The supply for the buffer stage is de-coupled by RFC2 and C9.

Product detector audio board (pcb3, Fig.4)

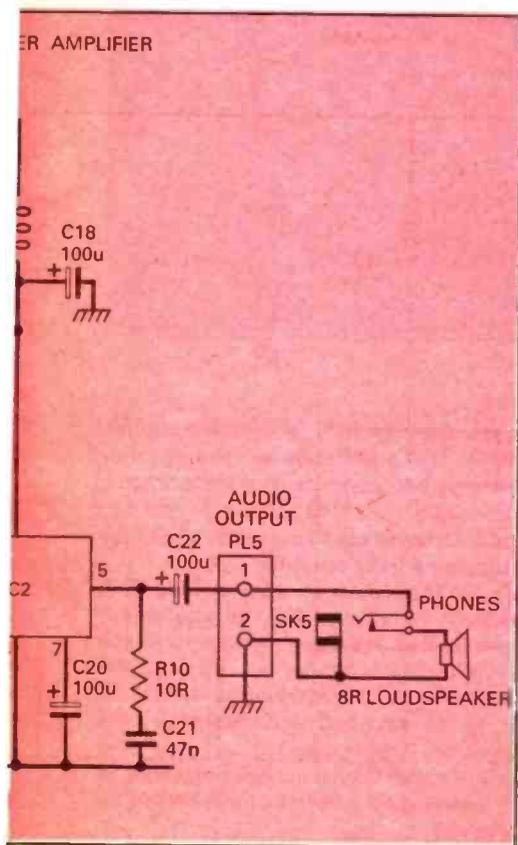
On this board, Q forms a product detector, mixing the amplified IF signal with the carrier insertion oscillator output and producing the recovered audio. The output from the product detector feeds a fifth order 3kHz cut-off frequency elliptic lowpass filter formed by C8-C12, L1 and L2. The components used to construct the filter are entirely off-the-shelf and require no winding, tuning or selection. The amplitude response of the filter is shown in Fig.5. Ripple in the passband and points of high attenuation in the stopband are characteristic of the elliptic response. This filter provides 50dB of attenuation at 4.2kHz and maintains at least this level of attenuation to well outside the audio band. Correct source and termination impedances are provided for the filter by R2 and R5.

IC1 is a low noise op-amp (a TL071 or similar) providing a fixed level of audio pre-amplification. This feeds the volume control, VR2, the wiper of which is connected to the audio power amplifier IC2, a LM386. This IC produces less output noise than the popular LM380, and is housed in a more compact 8 pin dil package. A standard output-stabilising Zobel network is fitted, consisting of R10 and C21. IC2 drives the phones socket SK5 via C22. When the phones are not inserted into SK5, the 8 ohm internal loudspeaker is connected to the audio output.

Carrier insertion oscillator board (pcb4, Fig.6)

Q1 and associated components form an LC-tuned carrier insertion oscillator. The frequency of oscillation is determined by the inductance of T1 and the value of its internal capacitor. Exact trimming of the frequency to 453.5kHz to correctly demodulate LSB is achieved by rotating the core of T1, altering its inductance. A stabilised 6.2 volt supply voltage for the oscillator is generated by R1 and D1, and de-coupled by RFC1 and C2.

Q2 forms an emitter follower buffer amplifier for the C10 output, isolating the oscillator stage from loading effects. This circuit is identical to that used as a VFO buffer stage. The level of the C10 output



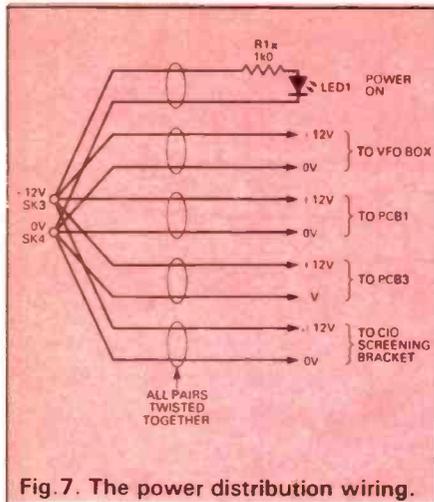


Fig. 7. The power distribution wiring.

can be set by adjusting R7.

Power distribution wiring (see Fig. 7)

Power for each board in the receiver, and the Power On led, is distributed from SK 3 and SK 4 via twisted pair wiring. R1, the current limiting resistor for LED1, is soldered directly on the led rather than being mounted on one of the pcbs.

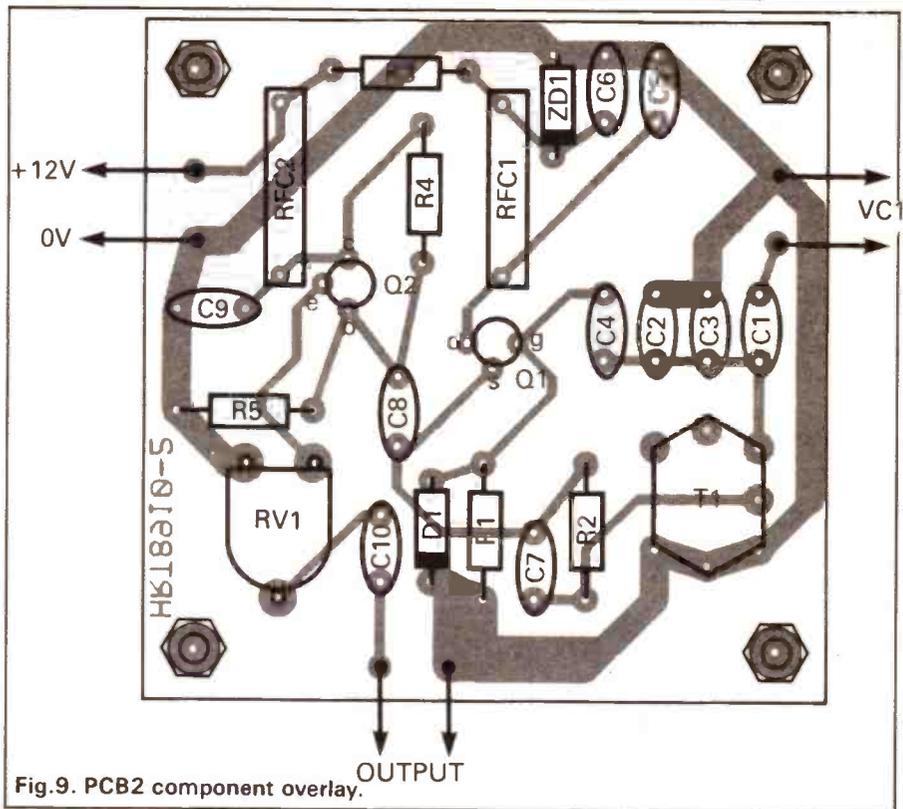


Fig. 9. PCB2 component overlay.

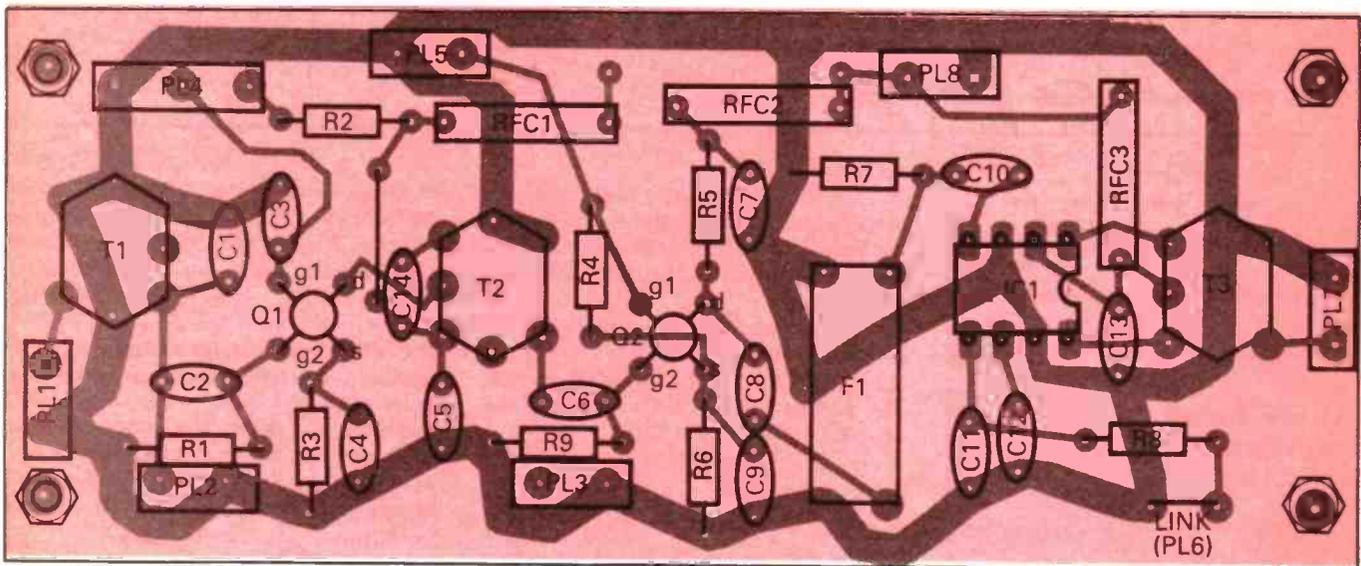


Fig. 8. PCB1 component overlay.

Construction

With the exception of the front panel controls, sockets SK1-5, the loudspeaker, LED1 and R1, all the components are mounted on single-sided printed circuit boards. The pcb track patterns and component placement drawings for the four boards are shown in Fig. 8 (pcb1), Fig. 9 (pcb2), Fig. 10 (pcb3) and Fig. 11 (pcb4).

Boards will be available from the PCB Service, but they are easy and cheap to make at home.

Mounting the components on each board should be done methodically, starting at one corner of each board and

working towards the opposite corner mounting each component as it occurs. In my opinion, this is to be preferred to mounting say all the resistors first, then all the capacitors and so on, as it tends to result in less errors. Take the normal static-handling precautions with the fets, ensuring that your soldering iron is earthed. Bare tinned copper wire can be used for the links on the boards, without any danger of short circuits. Sockets were used for all the ICs on the prototype without any instability problems. Fault-finding is much easier if an IC can be substituted without unsoldering.

As each board is completed it should

be checked carefully for assembly faults. Check the orientation of the polarity sensitive components, including diodes, transistors, polarised capacitors and ICs. Ensure that no solder splashes or bridges exist, especially between IC pins.

On the prototype receiver, plugs and sockets were used for the inter-board connections. If this arrangement is used on your receiver, the correct size plugs will need to be cut down from the rows of 10 or 12 as supplied and alternate pins removed. This makes de-bugging of a design easier than if connections have to be unsoldered when a board has to be removed.

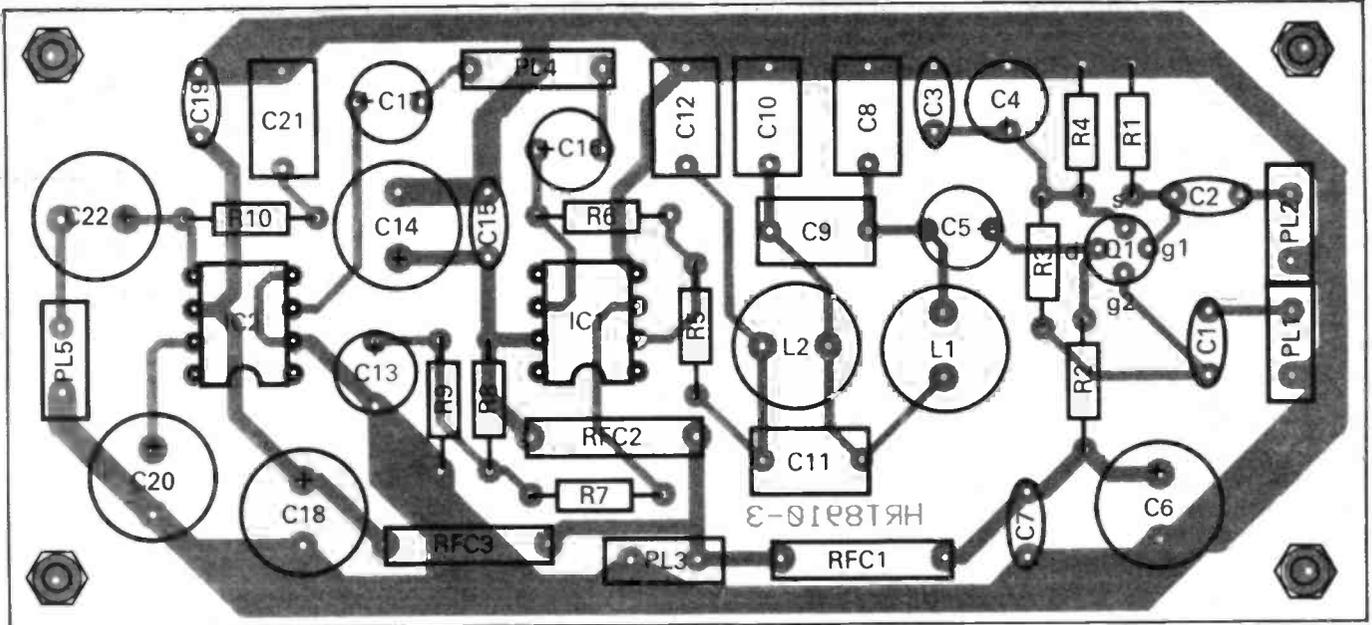


Fig.10. PCB3 component overlay.

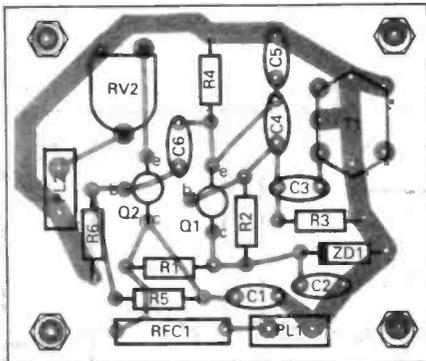


Fig.11. PCB4 component overlay.

Parts List

VFO Unit (PCB2)

RESISTORS

R1 100k
R2 150R
R3 270R
R4 22k
R5 10k

All fixed resistors are 0.25W 5% carbon film type.

RV1 470R horiz. min. preset

CAPACITORS

C1 270p ceramic plate
C2 180p ceramic plate
C3 22p ceramic plate
C4 100p ceramic plate
C5,6,7,9 10n disc ceramic
C8,10 1000p ceramic plate
VC1 100p air-spaced tuning capacitor, Jackson C804 or similar

WOUND COMPONENTS

RFC1,2 1mH axial RF choke
T1 Toko KANK3337R

MISCELLANEOUS

Printed circuit board
8 pin dual-in-line socket for IC1 (if required)

F1 CFM455J1

PL1,2,3

5,7,8 2-way pcb-mounted plugs (made from 3-way 0.1in plugs with middle pin removed)

PL4 3-way pcb-mounted plugs (made from 5-way 0.1in plug with alternate pins removed)

SEMICONDUCTORS

Q1 BF245 JFET
QTR2 BF241
D1 1N4148
ZD1 6V2 400mW zener

MISCELLANEOUS

Printed circuit board
1mm (0.040in) terminal pins
Aluminium box size 103x65x53mm (Electrovalue)
1nF bolt-in feedthrough capacitor
6BA nuts, bolts, solder tags

Product Detector/Audio (PCB3)

R1,3,6,7 10k

R2,5,8,9 1k

R2,5,8,9 1k

R4 100R

R10 10R

All fixed resistors are 0.25W 5% carbon film type.

CAPACITORS

C1,2,3

7,15,19 10n disc ceramic

C4,5,

13,16,17 10µ min radial electro

C8 100n polyester layer

(7.5mm lead spacing)

C9 12n polyester layer (7.5mm lead spacing)

C10 120n polyester layer

(7.5mm lead spacing)

C11 33n polyester layer (7.5mm lead spacing)

C12 82n polyester layer (7.5mm lead spacing)

C6,14

RF/IF Board (PCB1)

RESISTORS

R1,2,4,9 100k

R3,6 220R

R5,7 2k2

R8 10k

All fixed resistors are 0.25W 5% carbon film type.

CAPACITORS

C1,14 220p ceramic plate

C2,6 100p ceramic plate

C3,4,5

7,8,9,10

11,12,13 10n disc ceramic

WOUND COMPONENTS

RFC1,2,3 1mH axial RF choke

T1,2 Toko 154FN8A6439

T3 Toko YLE4A888EK

SEMICONDUCTORS

Q1,2 3N201 dual gate MOSFET

IC1 MC1350

18,20
22 100 μ min radial electro
C21 47n polyester layer (7.5mm
lead spacing)

WOUND COMPONENTS

RFC1,2,3 1mH axial RF choke
L1 Toko 4.7mH 10RB inductor
L2 Toko 39mH 10RB inductor

SEMICONDUCTOR

IC1 TL071 low noise op-amp
IC2 LM386
Q1 3N201 dual gate MOSFET

MISCELLANEOUS

Printed circuit board
8 pin dual-in-line sockets for IC1 and IC2
(if required)
PL1,2,3,5 2-way pcb-mounted plugs
(made from 3-way 0.1in
plugs with middle pin
removed)
PL4 3-way pcb-mounted plugs
(made from 5-way 0.1in
plug with alternate pins
removed)

**Carrier Insertion Oscillator
(PCB4)**

RESISTORS

R1 560R
R2,3 100k
R4 1k8
R5 22k
R6 10k

All fixed resistors are 0.25W 5% carbon
film type

RV2 470 ohm horizontal
miniature preset

CAPACITORS

C1,2,4 10n disc ceramic
C3 470p ceramic plate
C5,6 1000p ceramic plate

WOUND COMPONENTS

RFC1 1mH axial RF choke
T1 Toko YMCS17105

SEMI CONDUCTORS

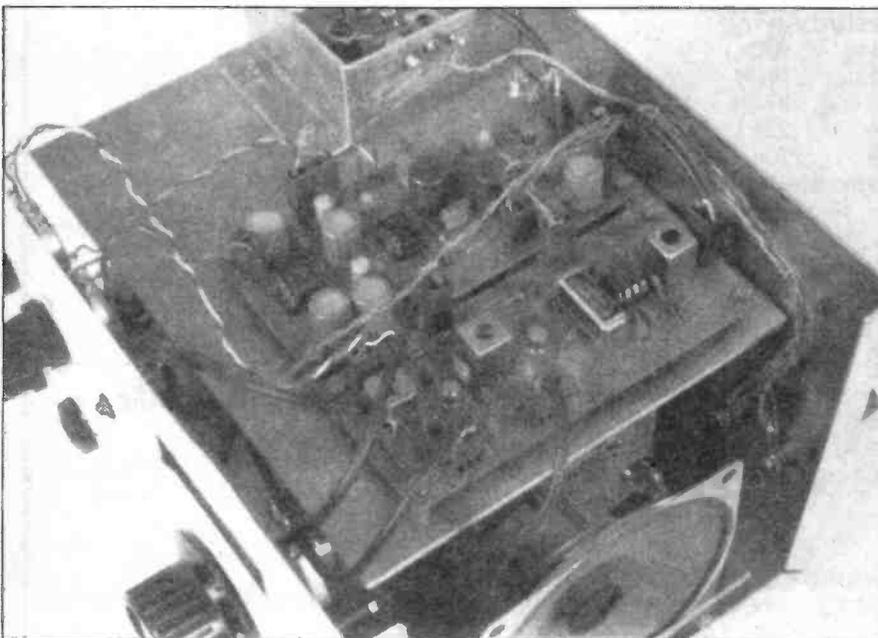
Q1,2 BC109 or similar NPN
silicon
ZD1 6V2 400mW zener

MISCELLANEOUS

Printed circuit board
1nF bolt-in feedthrough capacitor
6BA nuts, bolts, solder tags for bracket
PL1,2 2-way pcb-mounted plugs
(made from 3-way 0.1in
plugs with middle pin
removed)

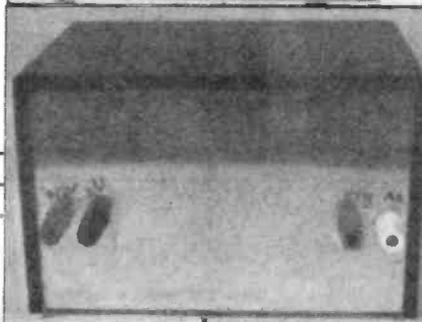
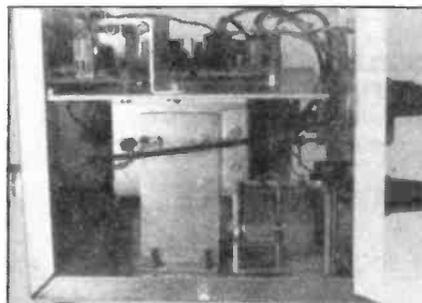
General

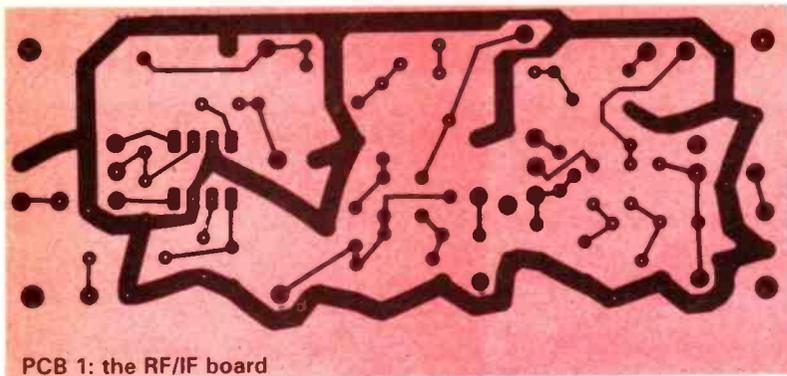
R1x 1k 0.25W 5% carbon film
type
RV3 100k linear potentiometer
(RF gain)
RV4 10k log potentiometer
(volume)
VC2 dual gang 10-365pF
variable capacitor (RF peak)
LED1 miniature red led (Power
On)
SK1-4 4mm insulated sockets,
various colours
SK5 mono headphones socket
Loudspeaker 8 ohm 3in diameter
Knobs: 1 large, 3 small
Slow motion drives: 6:1 reduction, 1/4 in
spindles, Electrovalve type 4511F or
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brackets (see text)
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inter-board wiring
RG174 miniature coax
Connecting wire



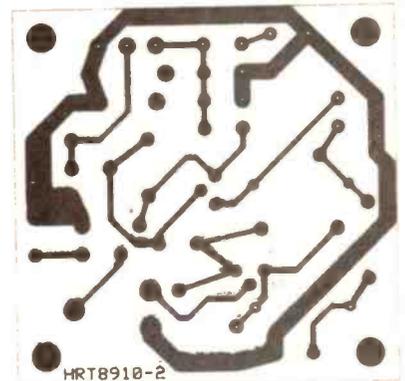
Next Month

In Part 2 we will describe the
assembly of the boards and sug-
gested plans for case and internal
layout.

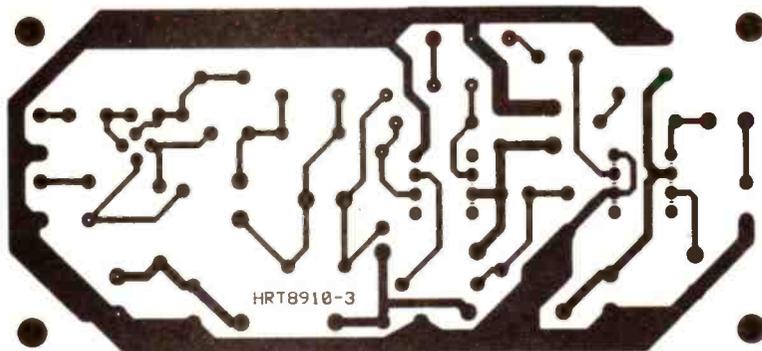




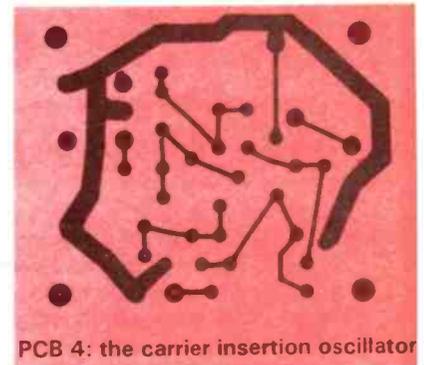
PCB 1: the RF/IF board



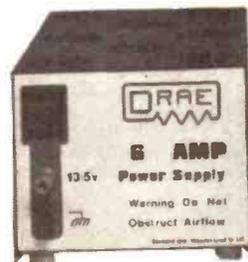
PCB 2: the VFO unit



PCB 3: the product detector/audioboard



PCB 4: the carrier insertion oscillator



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

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

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

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

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

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TM-701E	(2/70)	£469

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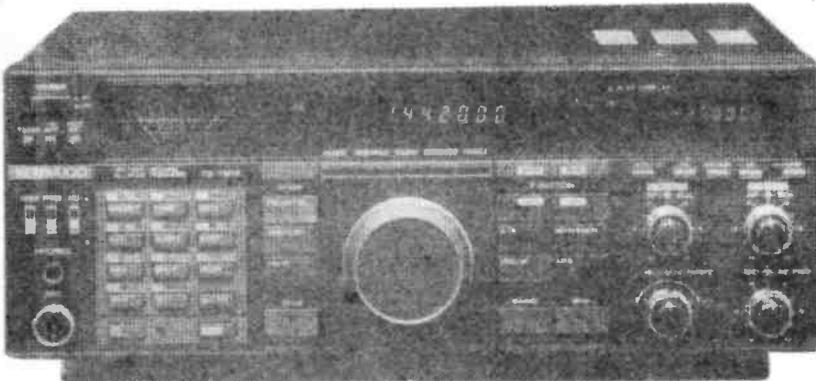
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You could of course pop in and talk to our front line manager Richard, G4NAD here at Matlock, ably assisted by Bill, G8LXN.

Lurking behind the scenes you might find Alan, G3MME or myself G3PCY, or even Bill, G3UBO on a flying visit. For technical queries you might find yourself talking to Barrie, G8OTY; or Rob, G8MPT; or Keith, G8YQX; or Bob who preceded Keith by getting G8YQL. In a technical world of his own we have John, who doesn't have an amateur licence, but with an M.A. from Cambridge he hardly needs one, does he?

You may get the impression that I'm trying to tell you something — and that is the simple fact that we know what we are doing when it comes to radio communication, and you won't get better advice anywhere in Europe.

73. John Wilson, G3PCY/5N2AAC

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LISTENING ON



A Voice of America reporter interviewing in Tienanmen Square in Beijing during happier times. Now, VOA's programmes in Chinese are being jammed again.

The world of broadcast band listening never stands still, and one reason for this is that it is inextricably linked with international politics. When I wrote in the last *Listening On . . .* that "the vast majority of transmissions" are no longer being jammed, who would

Radio Netherlands' *Media Network* programme played a moving recording of an English-language broadcast from Radio Beijing in which the announcer, obviously close to tears, described what had happened in the square, saying that his own colleagues from Radio Beijing were among those killed by the Chinese People's Liberation Army. The remainder of the broadcast consisted entirely of music and there were later reports that this particular announcer had been arrested.

Amazingly enough, Radio Beijing continued to re-broadcast programmes from stations with which they had signed co-operation and relay agreements, such as Radio Austria International and Radio Canada International, as reported in the last *Listening On . . .* This is all the more surprising if you listened to the programmes from these broadcasters, which were highly critical of the Chinese action, and yet actually being broadcast from transmitters in

a relay agreement with Radio Beijing).

The decision of Radio Canada International to start these programmes, which had been planned but were brought forward by several months because of the turmoil in China, was also surprising for another reason. The Canadian Broadcasting Corporation, Radio Canada International's parent body, is having no less than 140 million dollars lopped off their budget by the Canadian government. Various reports on Radio Canada International have said that



AWR-Asia's transmitting site on Guam.

The things radio stations do to get reports in . . .

have thought what would happen in China? Voice of America transmissions in Chinese are once again being jammed, following the events of June in Tienanmen Square, and there have been reports that BBC broadcasts in Chinese are being jammed as well.

China. Radio Canada International has even introduced short news bulletins in Chinese, the first time this station has used this language. Shortly after, Radio France International followed suit and started broadcasts in Chinese (they also have

many jobs within the CBS as a whole will be lost, while on one occasion RCI's director was saying that Radio Canada International may be forced to close down altogether. On the *Short Wave Listeners' Digest* programme, the presenter, Ian McFarland, was asking listeners to write in to say how much they wanted Radio Canada International to stay on the air. The station has been threatened with extinction before, but was given a last-minute reprieve because of the support of listeners and obviously they are hoping that the same trick will work again.

Onward, Christian Radio

Despite the problems in Canada, yet another station has recently come on the air from the USA. This one is WWCR in Nashville, Tennessee, and like many of the other private USA broadcasters, this one is another Christian radio station (WWCR apparently stands for "World Wide Christian Radio"). The station is quite a simple one, by modern standards, having a single transmitter and a non-

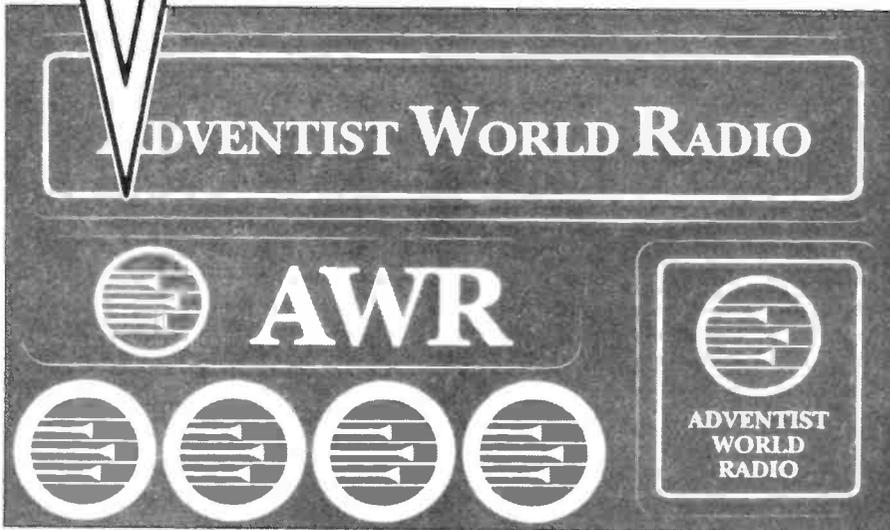
Adventist World Radio broadcasts from transmitters in several locations around the world. This is from AWR-Europe in Portugal.





**ADVENTIST
WORLD
RADIO
AWR**

Left and below:
in an attempt to
persuade
listeners to write,
AWR-Asia offers
felt pennants and
a "novelty" QSL
card, which
incorporates no
fewer than seven
removable stickers!



pennants and stickers, Adventist World Radio has come up with a novel idea and combined the standard QSL card with station stickers. The stickers can be peeled off the front of the QSL, leaving the verification details intact on the reverse! Apart from this, the station has recently had a QSL design competition, with prizes of up to 100 dollars for winning entries and, of course, the pride of seeing your own design on the QSL. Winners came from The Philippines, Indonesia and Japan. Another service that AWR offers its listeners is a fee newsletter, which is sent out quarterly. If you want to be put on the

paraphernalia (sometimes including magazines, books, badges, calendars, even wood carvings and animal skins!) which radio stations send out in an attempt to persuade listeners to write to them. For many stations, a large postbag is not only proof that there is somebody out there, but is also a useful lever to persuade sometimes reluctant governments to hand over larger sums of dosh, keeping them all in jobs (and also meaning they can afford more books and badges to send to listeners).

However, even if you are not interested in collecting this sort of stuff, some radio stations do rely on listeners' reception reports to let them know how well they are being received. I say "some" because many stations have teams of monitors around the world who send in regular reception reports and alert the stations if another station comes up on the regular frequency. Some radio stations also receive reception reports on a reciprocal basis from each other and thus do not have to rely on ordinary SWL reports. The advantage of the other system is that reception reports are received on a regular and frequent basis from a particular area — obviously several dozen reports over a period of weeks from a single location is much more useful than a single report on a day when condi-

rotatable antenna, a rhombic type, directed on Europe. WWCR has been heard on 15690kHz in the evenings: the schedule is believed to be 1500-0200 GMT. Programmes will be in several languages, including English, and in order to re-coup some of the estimated one million dollars start-up costs, air time is being sold off to other broadcasters, providing that they are also Christian organisations.

The Seventh-Day Adventists also have their own radio station, in fact several stations throughout the world, including transmitters in Portugal, Italy, Guam and Costa Rica. Adventist World Radio Asia (the station in Guam) sets great store by its contact with listeners, including SWLs and DXers, and broadcasts a programme especially for them, "DX Asiawaves" several times a week. It can sometimes be heard in Europe at 1030 GMT on Mondays on 13720 kHz, at 1630 GMT on Saturdays on 11980 kHz, and finally at 2330 on Sundays on 15125 kHz. Knowing that SWLs like to collect QSL cards,

Some stations, such as Radio Australia and Radio Austria International, send out pre-printed reception report forms for listeners use.

mailing list, write to AWR Asiawaves, AWR-Asia, PO Box 310, Hong Kong (and not to the station in Guam).

Many short wave listeners are quite content to listen to the programmes put out by radio stations, without wanting to collect QSL cards, stickers, pennants or any other

tions may have been extraordinarily good or bad.

Despite all this, many radio stations do welcome reception reports from individual listeners, and these are often the smaller stations without large monitoring networks around the world. Those stations which particu-

Reception Report



RADIO AUSTRALIA

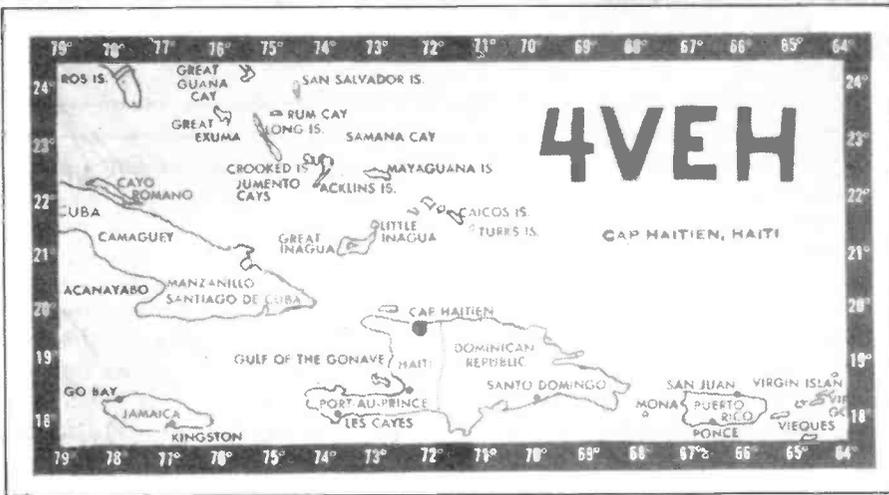
Sender (Name and Address :
in capitals, please) :

Receiver :

Antenna :

Frequency kc/s	Date	Time GMT	SINPO-Code					Interfering stations on same or adjacent channel
			S	I	N	P	O	

S	Signal Strength	I	Interference	N	Noise	P	Propagation Disturbance	O	Overall Merit
5	excellent	5	nil	5	nil	5	nil	5	excellent
4	good	4	slight	4	slight	4	slight	4	good
3	fair	3	moderate	3	moderate	3	moderate	3	fair
2	poor	2	severe	2	severe	2	severe	2	poor
1	barely audible	1	extreme	1	extreme	1	extreme	1	unusable



A rarity from the QSL collection: from a 2½ kW station in Haiti, Radio Station 4VEH.

Early SWL reports often print their own reception report forms, which they send out to listeners the first time they write in. Radio Australia and Radio Austria International are examples of stations which have printed these forms. They ask for the usual details — date, time and frequency heard, a reception rating (usually given in a code) and if at all possible the identification of interfering stations, if any. The code usually used for reception reporting is the so-called Sinpo code, or an abbreviated form of the same, the Sio code.

Sinpo or Sio

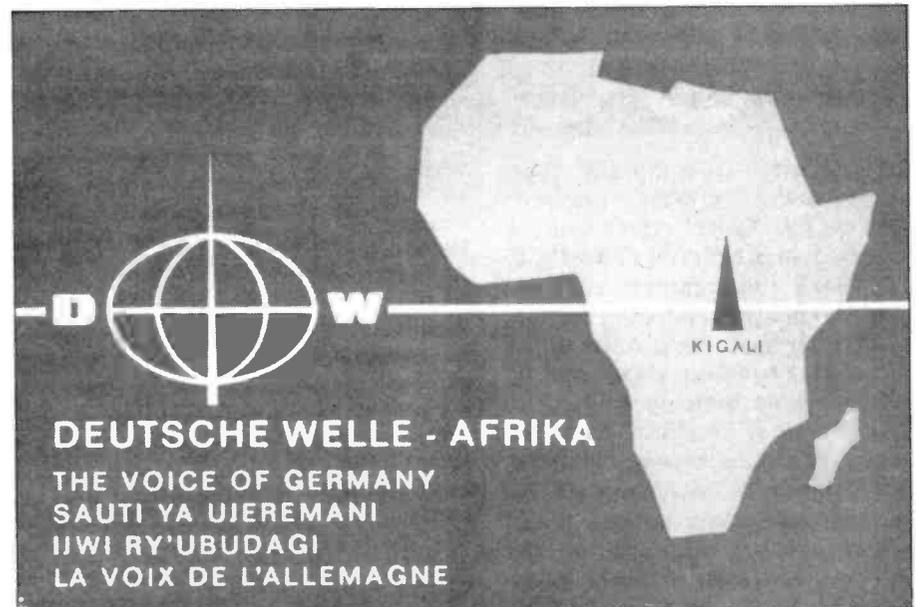
In this code, a rating of 1-5 is given for each parameter, where S stands for signal strength, I for interference. N for noise (atmospheric or man made), P for propagation disturbances (fading and so on) and O for an overall rating. So a rating of 55555 would indicate perfect reception (but should be reserved for local MW or VHF stations). A more likely Sinpo rating for a well-received shortwave station may well be something like 44443 (note that it is very unlikely that an "O" rating can be as high as the others, since if there is some degradation from interference, noise and propagation disturbances an honest rating must indicate that: a rating of 21334 would therefore clearly be impossible).

Once you have sent out a few reception reports, you will almost certainly receive a few QSL cards back in the post, even if you do not ask for them. At this point think: do you want to become "hooked"? It can become a very time-consuming hobby, not to say expensive bearing in mind present postage costs, to become a QSL collector. You will get to hear about new 1 kW stations opening up in Bolivia or Papua New Guinea and not only will you want to

get a QSL card from them, if you become really hooked you will want to be the first person in the UK, or even the first person in Europe, or even just the first person, to get a QSL card from such stations. Getting "DXCC", or one hundred broadcast stations countries confirmed by QSL card, is actually rather more difficult than DXCC from amateur stations (since many DXCC "countries" either do not have any broadcast stations at all, or if they have them, they are only on low-power medium wave or VHF frequencies and are therefore not audible in Britain). Nevertheless

signals into their target areas. Using this fact means it is possible to get more countries verified, if you are trying for your broadcast band DXCC award: providing you can get the station to state which transmitter site they were using. Deutsche Welle, the West German equivalent of BBC World Service, at one time issued special Deutsche Welle Africa QSLs, showing their relay station in Kigali, Rwanda. A recent report stated that they would once again be confirming reception reports on their Sri Lanka relay at Trincomalee, which has been off the air for some time due to the disturbances in that country. The relay station was due to re-open again in July, and reception reports sent to Deutsche Welle in Cologne would be specifically confirmed as emanating from Sri Lanka.

Meanwhile, another interview with Peter Senger of Deutsche Welle, broadcast some time ago on *Media Network*, revealed that the station had some ambitious plans to update some of their relays. The first station to benefit would be the one in Kigali,



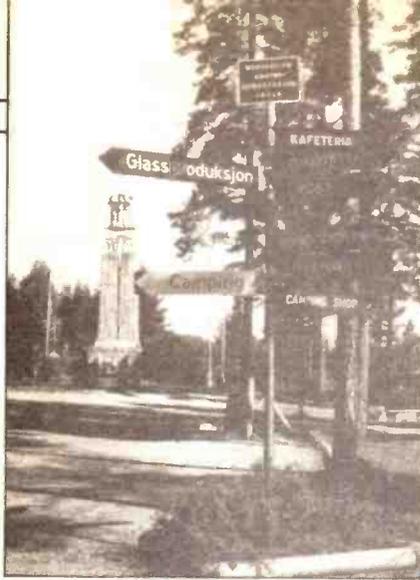
QSL from Deutsche Welle's African relay station in Kigali, Rwanda.

getting 100 countries confirmed is by no means impossible and there are a few organisations, such as the International Short Wave League, which issue fine certificates for proof of 100 broadcast-band countries confirmed.

As regular readers of *Listening On* . . . will be aware, many broadcast stations these days use relay transmitters in other countries in order to help them to get strong

where two more 250 kW transmitters were already on their way, to be followed by two more transmitters of 250 kW each for relays in Portugal and Antigua.

I have mentioned the *Media Network* programme several times as a useful source of news of what is happening on the broadcast bands (it is broadcast on Thursdays about 20 minutes into the Radio Netherlands



Left and Centre: The European DX Council's annual meeting took place recently in Morokulien, on the Swedish-Norwegian border (the border runs through the middle of the granite peace monument!).

broadcasts starting at 1130 and 1430 GMT on 5955 kHz). Another useful source of information is *Sweden Calling DXers*, broadcast on Tuesdays about 15 minutes into Radio Sweden's broadcasts at 1700 on 6065 and 9615 kHz and at 2100 on 9655 and 11705 kHz. Both transmissions are also on medium wave 1179kHz. In a recent *Sweden Calling DXers* programme, George Wood inter-

viewed a representative from Radio Norway International at the annual meeting of the European DX Council. Appropriately enough the meeting took place at Morokulien, a "territory" on the Swedish-Norwegian border which was established to mark the peace between the two countries. The border runs straight through various buildings and also down the middle of a large granite peace monument erected there. George Wood asked about the cut-back in Radio Norway International's programmes, which we reported on last time, and discovered that they too were for budgetary reasons. However, there were also plans afoot to relay Radio Denmark's programmes in the thirty minutes every hour when Radio Norway's transmitters were silent, although the earliest this would go ahead would be next year. Radio Denmark at present broadcasts entirely in Danish from a single old-fashioned transmitter rated at 50 kW (maximum) and efforts in Denmark to find another suitable transmitting site came to nought, so this could well be a suitable solution. Until the 1970s Radio Denmark had a very popular English-language service and

it could be that if their transmissions become audible again, thanks to the agreement with the Norwegians, this will be re-instated. We shall just have to wait and see.



Radio Denmark may soon be heard with stronger signals thanks to an agreement with the Norwegians. This is an historic QSL from the days when Radio Denmark had its own English service, now long defunct.

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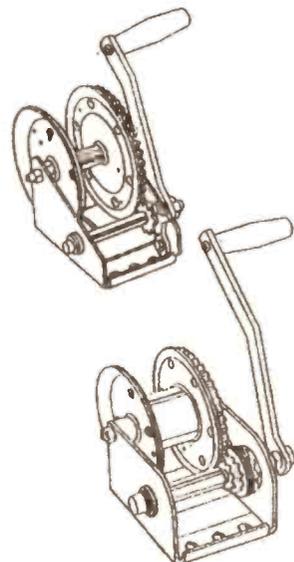
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Kent Straight Key

Straight keys are still an important piece of equipment for any amateur radio station. For the occasional morse operator who does not need a keyer they are ideal because they are a necessity for straight key days, general operating and even for keeping one's hand in.

Unfortunately, the source of good ex-forges keys has all but dried up. There are a few around on the second hand market but they tend to be rather expensive and poor value for money. This means that the best solution for most people is to buy a new key.

There are a number of new keys on the market ranging from the very cheap to the exceedingly expensive. At the bottom of the range keys for £10 or less are not even worth considering. At the other end of the spectrum keys for £100 are fine for the real connoisseur but rather too expensive for the average amateur.

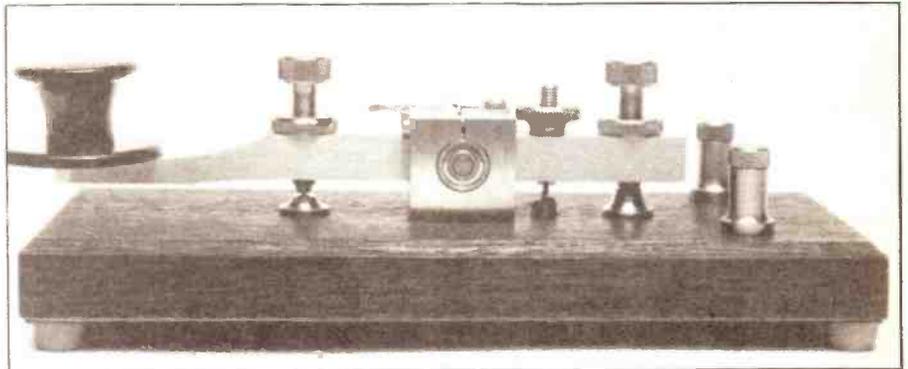
In the middle of the range there are a number of other keys, but one which a number of people have commented on very favourably is one produced by R.A. Kent (Engineers). This key can be obtained either ready made, as a kit with a base or as a kit without one. Being reasonably priced it seemed worth investigating.

The Key

The key is intended to be much more than another mass produced item from the Far East. Its components are machined from solid brass, and silver contacts are provided for low resistance. In addition to this ball race bearings are used to give extra smooth operation. The adjustments are made easy by the use of threaded screws with knurled heads together with knurled lock nuts.

The key has weights added to the base to give it an overall weight of 1kg. It also has rubber non-slip feet which combined with the weight mean that it remains quite steady during use.

The base measures 8x3 inches and the height of the key is just over 2½ inches. Its appearance is very pleasing, having a wooden base,



There's no substitute for a Straight Key. R.A. Kent makes new keys at sensible prices, says Ian Poole.

brass mechanics and green baize undertrim.

Kit and Construction

The kit arrived promptly and it was well packed in a neat box. Opening the parcel revealed all the component parts: the wooden base, steel base plate, green baize, the pre-assembled arm and bearing assembly, screws, pillars and all the other components. Also, very important, it came with a set of instructions outlining each stage in the assembly.

The assembly was started by reading through the instructions. Then the tools were assembled: a couple of screwdrivers, a soldering iron and solder, a small pair of pliers, some wire cutters and a knife or pair of scissors. Having done this the assembly was started in earnest. As the instructions were easy to follow the key went together remarkably easily and took much less than an hour to complete. In fact, anyone ought to be able to assemble it without any problems.

In Use

The Kent key lived up to all expectations. When it was used for real on the bands the substantial base combined with the smoothness of the bearings gave it a very "expensive" feel. In fact it was while it was being used that the quality of the Kent (Engineering) workmanship became even more apparent. Some things may look nice and not work well, but this key looked good and worked well.

However, it is not only myself who was impressed with the key. Several friends who looked at it and used it also expressed their liking for it. In fact, I am lucky to still have it!

Conclusion

The overall feel of the key is that of a well made piece of engineering. The finishing touches like the green baize at the base all add to the appeal of it. The only slight criticism is that the connecting pillars do not have any holes drilled through them so the screws can be tightened onto the wires. Instead the wires have to be caught between the pillar and the knurled screw head. However, this was only a preference and wires soldered to solder tags were used very successfully.

To summarise, the key is an excellent item and very good value for money. At a cost of £38 plus £2.50 postage and packing for the ready assembled unit; £31 plus £2.50 postage and packing for the complete kit or £22.50 plus £1.50 postage and packing for the kit less base, it cannot be beaten. It is only a little more expensive than some of the mass produced Far Eastern keys, but it works better, looks better and adds far more character to the shack.

The key can be obtained from R.A. Kent (Engineers), 243 Carr Lane, Tarleton, Preston, Lancs PR4 6YB. Tel: 0772-814998.

My thanks to them for their help in preparing this review.

BLADERUNNER

This very low cost 'disguise mount' 70 cms antenna was originally built to allow mobile operation through a local repeater, without drilling extra holes in a company car that was due

Move the blade forward by a few mm if necessary and solder firmly in position on both sides.

Install P clips to hold the coax in place. Prepare the coax, soldering the

braid to the ground plane as close to the blade as possible, followed by soldering the coax inner to the vertical radiator. (There is no need to solder the inner to both sides of the radiator.)

Graham Packer G3UUS devises a 70cm mobile 'blade' antenna inconspicuous to all but the few.

for replacement in the near future.

It is a development of the 'blade' antenna used for the aviation frequencies. Single blade antennas cover from 118 to 130 MHz (civil air band) and from 220 to 400 MHz (military air band) depending on their application. The 70 cm amateur band is much narrower in percentage terms than either of the air bands, but the blade's main advantage of wide frequency coverage with low VSWR makes duplication very simple.

Construction

From single sided or double sided copper clad board, cut a piece of board one half-wavelength long at 70 cm (35 cm) by a convenient width to fit on the rear parcel shelf (say 10 to 30 cm). In the case of the author's Ford Granada this was 13 cm, which fitted snugly into a moulding on the shelf.

Preferably using double sided fibre glass board, cut a strip 25 cm wide, rounding the top with a file (see Fig.1). This should be chopped to 175 mm overall length. Using a sharp knife or scribe, remove a strip of copper on both sides of the board.

Place the blade centrally on the ground plane pcb and spot solder the blade in position, taking care to get it vertical. (see Fig.2).

Try out the antenna on the parcel shelf to ensure that the blade doesn't foul the rear windscreen, especially if the windscreen has demist wires printed on the inside. There shouldn't be any RF interaction with the windscreen to worry about, but vibration could cause the blade to cut through the coating on the wires, which could cause DC to flow down the coax into the transceiver's front end, burning out the wire and not exactly improving your receiver performance.

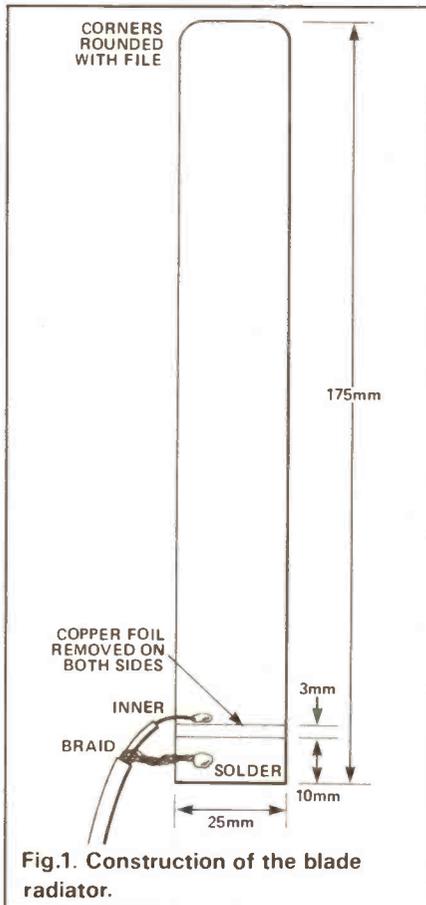


Fig.1. Construction of the blade radiator.

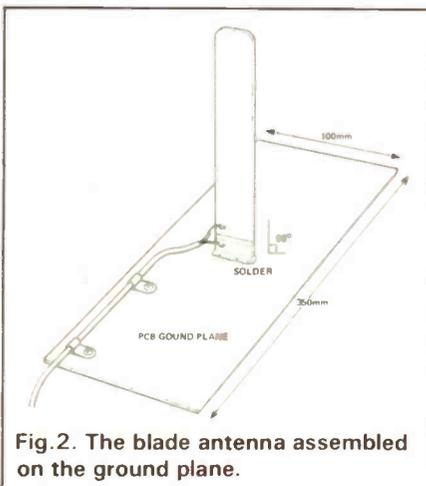


Fig.2. The blade antenna assembled on the ground plane.

A goodly spot of super-glue serves to hold the coax in place between the P clips prior to spraying the entire assembly the same colour as your parcel shelf covering. In my case this was matt black and the finished antenna is undetectable to all but a trained observer. (*Mobile antenna observation classes will surely be arranged by your local authority adult education institute, or you can teach yourself. Innit? Ed.*)

Performance

No accurate measurements were taken of polar pattern, but a coax switch was fitted to allow comparison between the blade and a Revco 6dB gain collinear magmount on the centre of the roof.

Switching back and forth between the two antennas gave, on average, a 10dB advantage to the collinear, much as would be expected. Using a local repeater as a test signal, no discernable difference in coverage area resulted. Going into a 'black hole' caused drop out on both antennas, retuning to somewhere half decent brought 'the box' back to fully quieting.

A spot measurement of VSWR produced 1.4:1, which by anybody's standards is quite acceptable.

Warning

This antenna is capable of handling several hundred watts of RF before the coax melts.

Rear passengers will have their heads within 200-300 mm of the radiator, admittedly not as close as the operator of a 70 cm hand portable, but total absorbed energy causes tissue damage, and some operators waffle on and on.

It is recommended that power levels are kept below 10 watts which will, in most cases, be perfectly compatible with the local repeater — if you can hear it, it can hear you!

RX-8 Multimode Receive Interface

It's always a new experience to look at the latest types of software in amateur radio. This offering is from Technical Software, who are based in Wales and provide several other 'receive only' programs of a similar type. The RX-8 was intended to operate with the BBC computer and,

of the program and precise instructions are given in the user manual as to how to instal it in the Beeb. I had no difficulty with this job. A further lead is supplied with a 6 pin DIN plug at one end and a 3.5mm plug at the other. The DIN plug fits into the back of the interface and the 3.5mm plus

9m deep by 4m high, finished in the same cream colour as the Beeb, the front and back panels black with white lettering. The front panel has a 10 led bargraph for tuning and three push on/push off switches, the right hand for power, the left hand one bringing the four-pole filter into circuit and the centre button selects the "narrow" position. The bandwidth is approximately 100Hz when narrow and 350Hz when wide. The rear panel of the interface has four sockets, left to right: AUDIO OUT through filter (phone socket), AUDIO OUT direct (3.5mm socket), INPUT (6 pin DIN socket) and the IDC socket which received the ribbon cable plug from the Beeb. It will be seen from the photograph that the interior of the interface contains a neat and well built pcb, and that care has been taken in the design and positioning of the various components.

Ken Michaelson G3RDG plugs this multimode receive eprom and interface into his BBC-B and has "all the fun in the world".



since I have one, it was a fine opportunity to give it a run.

The software acts as an eight mode data decoder, catering for Fax, Packet, SSTV, Sitor (Amtor), RTTY, morse, ascii and UoSAT. The complete setup arrived beautifully packed with each component in its own little polystyrene compartment. Although the parcel was large, the actual items inside were quite small. First there was the interface. This plugs into the user port of the Beeb. A length of ribbon cable with the necessary plugs at either end is supplied. Then there was the eprom. This is the heart

of the program and precise instructions are given in the user manual as to how to instal it in the Beeb. I had no difficulty with this job. A further lead is supplied with a 6 pin DIN plug at one end and a 3.5mm plug at the other. The DIN plug fits into the back of the interface and the 3.5mm plus

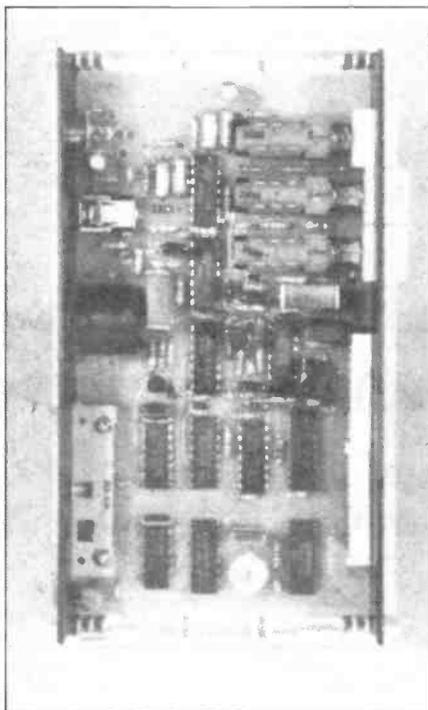
goes to an external speaker socket on the receiver. The power for the interface is taken directly from the Beeb, so there are no extraneous wires hanging about. Then there is a double sided cassette for a normal cassette player. This is a demo which gives the actual sounds of various transmissions which one might expect to hear when listening. A very good idea, particularly for the newcomer.

The Interface

The interface is 15.5m wide by

Connecting up was a simple matter, but I have additional eproms plugged in, one of which is the Watford 32K RAM memory. In order that the RX-8 could work, this memory had to be switched off by keying *RAMOFF. This caught me out at the start as I thought there was something wrong with the setup. However, when the extra RAM was out of circuit, pressing RX-8 immediately brought the screen into operation in the RTTY mode at a speed of 50 bauds. The software would answer to *RX8 as well as *RX-8, which makes it a little quicker and easier to operate. Should you forget to switch the interface on before starting you are given 'Interface not operational' on the screen, and the Beeb returns to Basic.

I would suggest to new purchasers that a thorough reading of the very well presented user manual is a must. It goes into detail about each of the modes which can be decoded, and unless you appreciate exactly what you are listening to, no sense can be made of the transmissions.



The interior of the Interface.

This was where the excellent cassette came into its own, as the new owner could actually hear what he/she was endeavouring to decode.

There are sixteen general options available, twelve of which were enabled by pressing SHIFT with by a letter. They were as follows:

In all modes:

SHIFT A Ascii mode
 SHIFT C FEC mode
 SHIFT F Fax mode
 SHIFT M Morse mode
 SHIFT P Packet radio mode
 SHIFT Q ARQ mode
 SHIFT R RTTY mode
 SHIFT S SSTV mode
 SHIFT U UoSAT mode

SHIFT V saves status/text store/SSTV or Fax screen picture to disc or tape.
 SHIFT L loads the above files.

In text modes:

C clears the screen
 P turns the printer output on
 O turns the printer output off
 T reviews the text store
 SHIFT T clears the text store

In addition, each mode has a further set of facilities. It seemed to me that this software had a lot going for it, and this proved to be the case.

Ingenious Status

Since the first option was RTTY at 50 bauds, I tuned in a weather forecasting station from Bracknell, GFL26 on 4489kHz. The software display showed the facilities on the bottom of the screen on the status line, displaying from left to right speed in bauds, mode, Nor/Rev, hi/lo tones and amost ingenious method of tuning the station. I normally use a straightforward 'scope for my RTTY tuning, but this program has a fixed horizontal line at the far right of the status line, and to the left of it another horizontal line whose vertical position indicated the frequency of the tone being received with the high tones at the top.

The line would rapidly alternate between the positions corresponding to the two tones in the signal, giving

line is above and the other below the fixed line is correct, but settings near the limit produced errors in bad conditions. The separation of the two lines is a measure of the frequency shift of the signal, and on investigation I found that for 170Hz shift it was about one-third the height of the status line and for 425Hz it was about two-thirds of this height. A very efficient way of tuning. While on the subject, signals transmitted in FM (UoSAT, 1200 baud PACKET and sometimes others) did not need tuning in. I will describe the tuning for Fax, 300 baud packet and CW later.

Still in RTTY, the speed could be changed by pressing the left or right cursor keys from 45 bauds to 300 bauds in steps, the altered speed appearing on the status line. Normal or Reverse shift could be altered by

```
ZCZC TA66
111400 UTC MAY =
OOSTENDERADIO NAV WNG 180/89 =
POS 51 23 57 N 02 09 18 E
TEMPORARILY ESTABLISHED A YELLOW BUOY WITH RADARREFLECTOR
100 M SW OF THE LIGHTBUOY 3+1 EVERY 15 SEC THIS BUOY
COVERS AN HYDROGRAFICAL INSTRUMENT SHIPPING IS REQUESTED
TO PASS AT SAFE DISTANCE AND NOT TO USE
ANCHOR NOR FISHING GEAR IN THE VICINITY +
NNNN
17/05/89 16:49
TA65
```

```
ZCZC TA65
081100 UTC MAY =
OOSTENDERADIO INFO 96/89 =
UNDERWATER OPERATIONS ARE CONDUCTED IN POS 51 16 70 N
02 52 45 E SHIPPING IS REQUESTED TO PASS AT A SAFE DISTANCE +
NNNN
17/05/89 16:49
TA59
```

```
ZCZC TA59
051115 UTC MAY =
OOSTENDERADIO NAV WNG 175/89 =
BELGIAN COAST OFF KOKSIJDE FLWNG UNLIT BUOYS FITTED WITH RADREFLECTOR
AND ST ANDREWS CROSS AS TOPMARK ESTABLISHED FOR YACHTING PURPOSES
51 07 38 N 02 35 18 E MARKED N
51 07 31 N 02 35 45 E MARKED NE
51 07 13 N 02 35 57 E MARKED E
51 06 55 N 02 35 45 E MARKED SE
51 06 48 N 02 35 18 E MARKED S
51 06 55 N 02 34 48 E MARKED SW
51 07 13 N 02 34 35 E MARKED W
51 07 31 N 02 34 48 E MARKED NW
NNNN
```

A printout sample in Navtex.

the visual impression of two lines. These two lines move up and down together as the tuning was altered but go no further than the edges of the screen status line. I discovered that if the signal was too weak for the interface to respond to it, the indication would disappear. What one has to do is adjust the tuning so that the two lines are equidistant from the fixed line.

In fact, this is not that critical as any tuning adjustment in which one

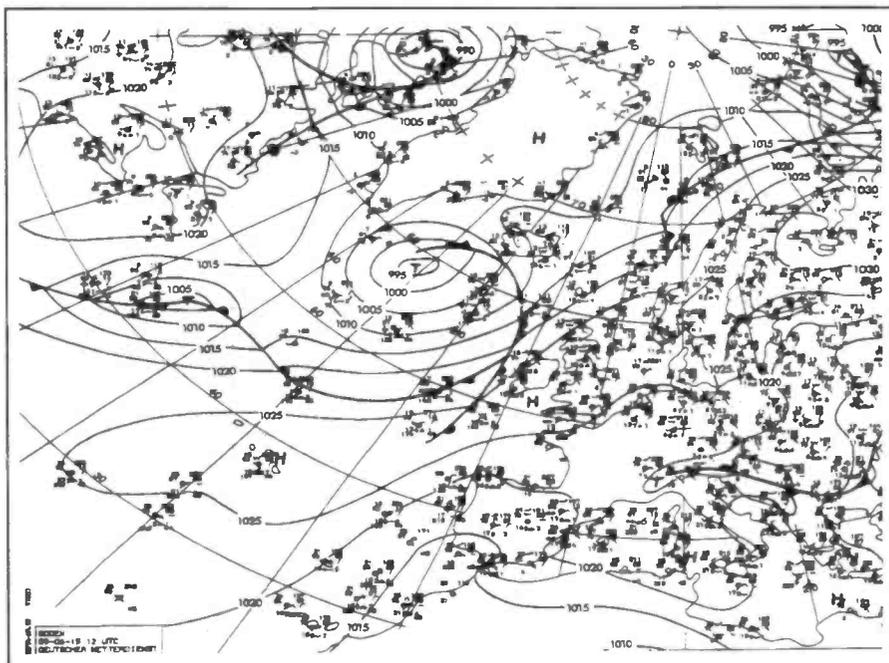
toggling the letter R, one press giving Reverse, the next giving Normal and so on. The same result can, of course, be achieved by altering the sideband setting of the receiver from USB to LSB. The high or low tone requirement could be altered by toggling F. The on screen tuning indicator mentioned above was not intended to operate when receiving 200 or 300 baud signals, which use the interface LED tuning display so that the signal lit up one of the centre six LEDs.

The next option shown on the status line was the 'Unshift-on-space' facility which was brought into operation by pressing U. The final display was either showing L or F indicating whether the program was currently in Letters or Figures shift. In a mixed transmission the two letters alternated. Once the initial setting up had been done, it was very simple to receive all sorts of transmissions with complete success. All the transmissions could be printed out and/or stored in memory.

I shall not describe all the available modes in detail, as it would take too long and, in any case, full instructions are given in the user manual. But I must comment on the reception of packet radio. For the 1200 baud signals it was only necessary to tune to the correct frequency, usually 144.650MHz, and there was the signal on FM. However, for 300 baud signals on the HF bands, one would normally need an accurate, very stable receiver and some form of sophisticated tuning indicator or an oscilloscope to enable you to tune to within 10Hz or so of the correct frequency. I myself, using an AEA PK-232 unit, found that it was necessary to use the scope output from the PK-232 to get accurate tuning. The RX-8, however, relieved me of that trouble with its unique 'no tune' demodulator. I found that I only had to be within about 500Hz of the correct frequency to get perfect reception. It appears that the system had a range of 1000Hz and any signal within this range would be copied. I just had to tune to light one of the six central LEDs, and that was that. I could only call it extraordinary, and it worked perfectly.

Fax Pix

Another mode that I have to mention is Fax. This mode has interested me for some time, and I currently use an ICS FAX-1 for the reception of weather pictures. The output of my FAX-1, however, goes directly to the printer. Not so the RX-8, which can be displayed on the screen as well. There is also just one tuning LED on the interface which has to be illuminated, and this was clearly marked FAX. Once the signal was tuned in, it was possible to run the mode under automatic operation by pressing A, and it would then start on a start signal from the transmitting station and stop when that station



A weathermap received from Offenbach DCF54.

had completed the picture and sent the stop signal.

There is also a method for centring the picture, fully described in the manual, as obviously if you tune in a transmission in the middle of a map, it will not be at the correct position. I could change the RPM (drum speed, the number of lines per unit length of paper) and the IOC (index of cooperation, which relates to the number of scan lines per unit length of paper), by using the cursor keys and thirteen more facilities which were all listed in the manual. In fact, there were two and half pages of description and instructions devoted to the reception of Fax. I received a number of maps from my favourite station, Offenbach Metro, DFC 54 on 134.2 kHz, an example of which is shown.

A further mode I use is SSTV. In both this mode and Fax, the first thing I read was 'Switch the Interface filter OFF' if you have been using it in another mode. The RX-8 received all current SSTV signals — monochrome, line sequential colour and Robot colour. All current timing standards were supported and colour transmissions could be displayed in either colour or mono. There are two pages devoted to the description of how to use the SSTV facility, so I will not say more.

The last mode on which I want to comment is Morse reception. All you have to do in this mode is tune the receiver until a solid square shows on

the screen. One could play about with the filters in the interface or in the receiver until the right combination is achieved, but mostly it wasn't necessary to have them in circuit. The mode did not have to be set for the speed of the incoming signal as the 'autotrack' facility takes care of this. An arbitrary setting of 25 wpm seemed to be suitable for most morse. I found this mode very enjoyable to use, and copied a number of stations. It is obvious that CW is still used a great deal in spite of all the more modern methods of communication.

All in all, I think that this piece of software is exceedingly well-thought out and I only have one criticism. The general facilities are only printed at the beginning, and I found myself, as a newcomer, having to refer continually to this page to check the keystrokes. Could not the actual keystrokes to get into any mode be printed at the top of the description of the mode as well? The mode-specific keystrokes, however, are mainly mnemonic, which is helpful. Other than that, everything works as it should and I would think a short-wave listener with a BBC computer would only have to have a relatively ordinary receiver to experience a lot of fun. The price of the RX-8 multi-mode receive system is £259.00 including VAT and postage, and thanks are due to Technical Software, Fron, Upper Llandwrog, Caernarfon LL54 7RF (Tel. 0286 881886) for the use of the software for this review.

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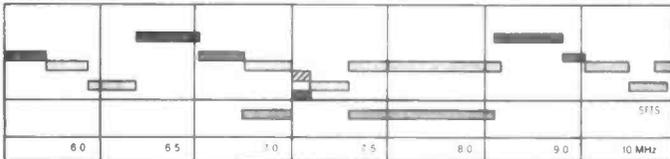
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CTCSS- A Private Line?

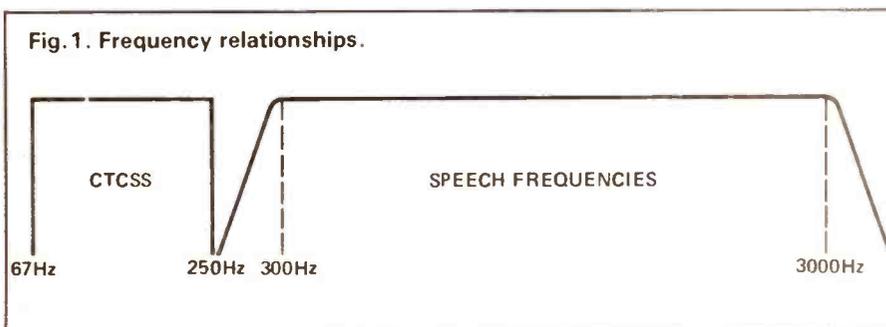
Many new FM transceivers now have the facility for CTCSS, often as an add-on module although lately one or two sets have it as a standard fitting. Well, what is this latest abbreviated buzzword, you may ask? Those in the know will recognise it as Continuous Tone Controlled Squelch System. OK, so what? . . . or more importantly, what will this do for you?

true? Well that's what CTCSS does. This can be fitted to many FM sets by simply plugging a small pcb into an existing connector inside the radio. For the homebrew or converted PMR rig addicts, a complete switchable tone CTCSS unit can be built using one IC, a crystal, and a few low-cost components. In fact, we are planning an HRT constructional article to

CTCSS, when a superimposed sub-tone of a given audio frequency is present on the signal, THAT controls the squelch as well. Different tones can be used for different groups or whatever, and there are in fact 38 standard CTCSS frequencies in common use internationally, given in Table 1. When used on the air, different groups each get an essentially 'private' channel, providing they don't all use the same channel at the same time.

Hide in plain sight — have a private frequency in a crowded land. Chris Lorek G4HCL tries it.

Fig. 1. Frequency relationships.



'Private' VHF/UHF Monitoring

If you're a member of an amateur radio organisation, be this Raynet, a DX or Sporadic-E warning net, or even a local technical group, you may well have a monitor receiver constantly tuned to a dedicated net channel, to listen out for calls from other members. Isn't it annoying when someone else starts having a QSO on it? They've every right to, of course; no-one 'owns' frequencies (not yet, anyway), although asking whether a frequency is in use and being told 'yes, this is the so-and-so frequency and we're having a net on it tomorrow' tends to be upsetting.

What if your receiver remained perfectly silent, until ONLY a member of your group calls? Too good to be

appear in the next few months.

How Does It Work?

If you take a look at Fig.1, you'll see the normal audio spectrum used for voice communication on FM, around 300Hz-3000MHz. Audio frequencies above this are filtered to keep the RF bandwidth down to a minimum; frequencies below this are filtered also to allow a higher signal-to-noise ratio and hence better readability. The frequencies below 300Hz are often described, in radio talk at least, as 'sub-audible' frequencies, and it is in this range that CTCSS, or, to give it its alternative name, sub-tone, operates.

Consider an FM squelch: when the signal's there, the squelch opens, when it isn't there, it shuts. With

Due to the low frequencies involved, it is not possible to simply feed a CTCSS tone into your microphone audio connector; it must be inserted after the pre-emphasis circuits, as shown in Fig.2. Most recent black boxes, and all ex-PMR equipments have this CTCSS connection point internally wired as standard, with no need for any modifications to be carried out. Likewise on receive, CTCSS tones must be taken shortly after the FM detector, prior to any filtering stages, as shown in Fig.3. Again this connection is normally fitted, often as a removable wire or resistor link, as a 'break' in the audio path is required for on/off audio switching. The CTCSS tone deviation is normally set at 20% of the peak speech deviation, that is 400Hz deviation of the CTCSS tone in a 25kHz channel spacing system.

To prevent the reception of CTCSS tones appearing as a 'buzz' accompanying the received signal, a 300Hz high pass filter is often used in the receive through audio path at the CTCSS detector stage, as shown in Fig.4. Also, to prevent false triggering due to received low speech frequencies, a 300Hz low pass filter is often used before the CTCSS detector itself. These together with the Rx detector and Tx tone generator are often combined in a purpose made IC, such as the FX365 available from Consumer Microcircuits in the

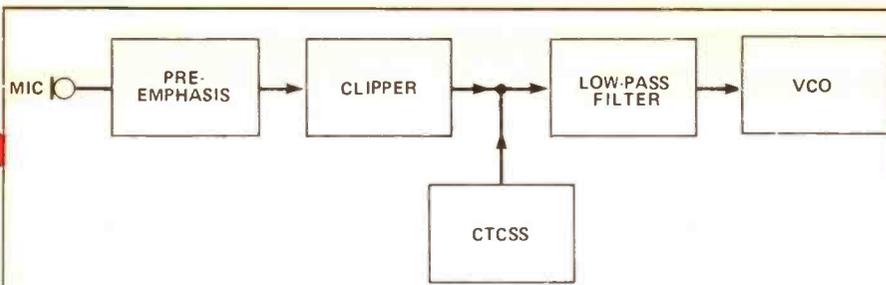


Fig.2. Transmission.

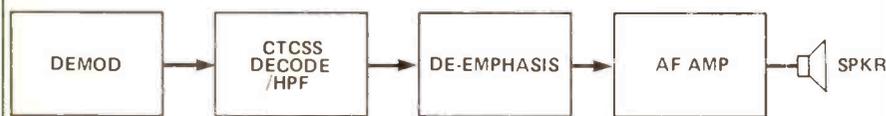


Fig.3. Reception.

UK, which will feature in the forthcoming HRT CTCSS project.

Uses

Apart from using the system as 'private net' squelch control on simplex channels, it may also be used for repeater control. On 10m FM due to the worldwide nature of propagation, it is often common practice to

As a further practical example, while wandering around a mobile rally it can often be annoying to have your handportable squelch continually opening due to blocking effects and the like from adjacent amateurs operating on other frequencies. At the last Sandown VHF Convention, myself and another amateur kept in contact

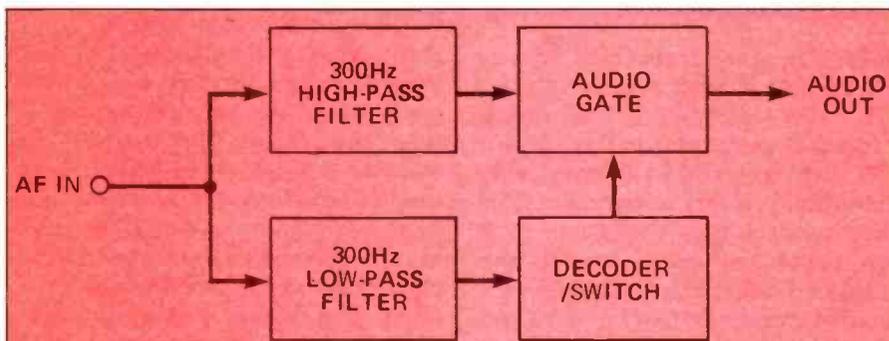


Fig.4. Decoder.

'access' the desired repeater using the CTCSS tone specific to that repeater. The repeater often 'regenerates' the CTCSS tone on the output frequency to allow users' receivers to be similarly controlled if required.

On 23cm in the UK, all repeaters are licensed as 'Beacon/Repeaters', radiating a continuous carrier at all times to act as propagation indicators. This constant signal can sometimes be annoying when operating mobile due to fading, or when receiving a weak signal in the shack all the time, even when no-one is using the repeater. To help with this, some 23cm repeaters radiate a 100Hz CTCSS tone whenever they are in 'talkthrough' mode, ie when stations are calling through or otherwise in QSO. By adding a 100Hz CTCSS decoder, one can listen for activity in peace. HRT actually published a suitable circuit for this, using an NE567 decoder IC, back in 1987.

with our 2m portables using 71.9Hz CTCSS. The result: perfect silence until called to the bar for a drink!

2m Channel Re-Use

There is currently much talk of congestion on 2m in some parts of the country. 12.5kHz channel spacing is one way to go, but the need for amateurs to dive inside their sets with a soldering iron to change crystal and ceramic filters together with the associated matching components, followed by re-alignment of the transmitter deviation, could in practice be rather difficult to implement.

An alternative is the use of the classic FM 'capture effect', where a wanted local signal completely overrides a weak, although readable, distant station. A typical case here is that of co-channel repeaters, where distant mobile on fixed stations operating through another repeater on the same channel are sometimes heard

through your local repeater. Typical British politeness often prevents us from simply transmitting over the other station, even though we may not be interfering with their QSO, although experienced repeater operators quite correctly carry on regardless.

The Answer?

Some 2m repeaters now have CTCSS facilities. Note that most repeaters will NOT simply relay CTCSS tones due to the normal audio filtering employed in their receiver and transmitter circuits, usually they need 'active' CTCSS regeneration circuits fitted to function correctly. One repeater in the West Midlands was fitted with CTCSS as far back as 1987, so it is certainly not a new idea. It employed 16 CTCSS 'slots' using the tone frequencies of 118.8Hz to 205.5Hz, regenerating these on the repeater output frequency as required for selective calling use. As well as this, experiments have been conducted with a 76Hz CTCSS tone acting as a secondary squelch for local users during lift conditions, the normal squelch during these periods being raised in level by 10dB to reduce the number of unwanted DX signals.

By adding CTCSS squelch to the receivers of similar close-spaced repeaters, possibly as an option to the existing 170Hz tone access requirement, we may be able to 'squeeze a few more' in areas of high population where there are just not enough channels to go round. The operating details of all repeaters are of course dependent upon local needs, so if in doubt ask your local group.

An obvious alternative to 2m repeater congestion is to go out and buy another rig for 70cm, however CTCSS has started happening, so what will happen in the next few years? Only time will tell!

Table 1 — CTCSS Frequencies

67.0Hz	107.2Hz	167.9Hz
71.9Hz	110.9Hz	173.8Hz
74.4Hz	114.8Hz	179.9Hz
77.0Hz	118.8Hz	186.2Hz
79.9Hz	123.0Hz	192.8Hz
82.5Hz	127.3Hz	203.5Hz
85.4Hz	131.8Hz	210.7Hz
88.5Hz	136.5Hz	218.1Hz
91.5Hz	141.3Hz	225.7Hz
94.8Hz	146.2Hz	133.6Hz
97.4Hz	151.4Hz	241.8Hz
100.0Hz	156.7Hz	250.3Hz
103.5Hz	162.2Hz	

50 MHz MESSAGE

To those of us dedicated to operating on the six metre band the question is often asked: 'Why is it so interesting? What is so unusual?' There are several reasons. Under suitable conditions, all modes of propagation will provide DX QSOs. During the period around sunspot peaks; before and after major solar disturbances the

work into North America and world-wide DX openings can be expected again this winter. Last year major openings to North, Central and South America occurred until the end of December.

G5KW and Cycle 21

During the early autumn of 1979,

Ken Ellis G5KW looks back at sunspot cycle 21 on six

MUF will rise above 50MHz and provide world-wide openings.

At least one operator, PY5ZBU, has already qualified for DXCC on six, and many more are in the upper 90s of countries worked. In the UK, despite the late grant of operating permission, several operators now have over 50 worked, and five continents have been worked by many.

What to Expect

On 50MHz there are three main DX seasons: the winter F2 (October to February) in the Northern Hemisphere, the Spring and Autumn north-south (TEP) Equinox season, and the summer Es period.

Winter DX is mainly due to F layer propagation, but may be enhanced by other modes at times. In mid-summer the F layer tends to split into F1 and F2 during the day and much of the extra ionisation goes F1 and this together with blanketing Es and D region ionisation all tend to cut off access to F2 so that propagation by F2 during mid-summer is only possible during hours of darkness which, over paths in higher latitudes (for example the greater circle path to North America), is very short. During the peak of Solar Cycle 21 (1978-1981) November and early December proved to be the best time for F layer

while operating from a chalet at Culverstone in Kent about 600 feet ASL, I experienced a frustrating problem that stations in the eastern area had experienced during Cycle 18. Although it was an excellent QTH using modern equipment and high gain aeriels, other stations to the south and west of Culverstone were heard in crossband QSO with W and VE stations, but nothing was heard at G5KW. The nearest successful station to G5KW was G3FXB in Sussex who was having QSOs with east and west coast stations. So a decision was made to go as far south-west as possible.

I purchased a 'retired' ambulance and converted it to a combined radio shack and living quarters. A 230 volt ac 12 dc generator, 2 heavy duty 12 volt batteries and a two section tilt-over 40 foot tower carried on the roof completed the main accessories. For operation on 28885 a KW2000B with KW1000 linear into a five element Yagi with a Racal RA17 receiver as back-up into a KW trap dipole provided an effective set up.

For 50MHz the main receiving was done on an Icom 551 multimode transreceiver with Yaesu 620B as standby. The antenna was a Cushcraft 617-6B 6 element on a 34 foot boom giving a forward gain of 14.0

dbd which I had airfreighted from the USA. Other smaller beams were used for comparison purposes. The original intention was to go to the Channel Isles but when I got to the Ferry port I found that caravans were not allowed on the Islands, so I decided to try the Isles of Scilly.

At Land's End there were some problems but eventually it was agreed to ship me there after I accepted that I might not be allowed to land the vehicle and come back by return. All was well at St Mary's on arrival so I found a temporary site to check the equipment before finding a suitable place to operate from.

The roof aerial was erected and equipment found to be in good working order. I heard later that during the few days after my arrival there had been a rush at the post office of people taking out TV licences, as it was thought that my vehicle was a tv detector van! Colonel Robertson the land agent of the Dutchy of Cornwall estates kindly gave me permission to operate at the Garrison Fort on high ground, at the south-west tip of the island. This is an excellent site, noise free, and with an excellent take-off in all directions. It was soon clear that despite the expense a wise decision had been made and some interesting results were likely as an almost daily QSO was made with VE1AVX at St Johns, Newfoundland approximately 2500 miles due west — the optimum distance for F2 propagation.

Isles of Scilly

Before analysing the results obtained, several factors should be considered. As we had not at that time received permission to operate two-way on 50MHz only crossband working was possible from UK on 28885kHz and DX stations on 50MHz with probable frequency propagation differentials. Fewer American stations operate from the mid-west and western areas. The statistics refer to G5KW as a single operator station and not continuous operation. Another factor to be considered when dealing with sunspot maximum is the effect of Es and other sporadic and unaccountable modes of propagation.

During the present run-up to the peak of cycle 22 with 24 hour operation on the band over 4000

operators in Europe, and with sophisticated time delay and transponder equipment used, a more detailed analysis can be made. It is hoped that controversial theories may be proved or discarded.

From the NBS and other prediction charts the highest MUF is stated to occur north and south of the magnetic equator in the 20° latitudes, with a gradual and progressive drop as the latitude becomes higher north or south. A distance of about 2500 miles is generally accepted as the maximum skip distance for single-hop F2 propagation on the east-west path. This is based on the "Control Point Theory" which assumes a point about 1200 miles from either end along the Great Circle path between the two stations under consideration. A difference of opinion exists as to whether multi-hop or a type of "wave guide" effect is responsible for the much greater distances covered during sunspot peaks and other abnormal propagation long distance contacts.

The fact that signals are heard at any point beyond the 2500 mile distance tends to support the "wave guide" theory; but we still have a lot to learn and the time delay programme being organised by Sheffield University from the Buxton site beacon on 50.000 MHz locked to the 60 kHz standard transmission from Rugby (MSF) will in time resolve this controversial problem.

The extension of HF propagation with skip distance widening as the sun gets higher with rising MUF must be considered.

In Fig.1 average times have been inserted along the route from VE1YX (formerly VE1AVX) to the far west with no evidence of a major skip in between; but this is NOT conclusive!

Highlights

Making WAC on any band is intriguing but fairly commonplace on the HF bands. On six metres it is something we in the UK have dreamed about for many years. In QST for January 1948, the late Denis Heightman G6DH, one of the most successful and experienced six metre operators at that time, wrote:

"It is interesting to speculate on the possibility of working all continents on 50MHz. As far as European stations are concerned the writer considers that, with the exception of

Australasia, this would have been possible with the conditions present on a few days during the period October-December 1947, and again be possible during the period January-March 1948. Australia to Europe would present the biggest problem, and a suitable path will probably only occur from Western Australia, since this path passes nearer the high MUF equatorial zones than that from VK2, etc. This path should be most favourable during February-March and October-November periods."

By the middle of November 1980, the flat peak of Cycle 21 was pro-

viding some real DX conditions on six metres and we were wondering if the 1947/48 predictions of G6DH would be realised. At about 0955z on 26th November, Gordon Pheasant G4BY alerted the six metre gang that he was receiving the Australian beacon VK6RTT on six metres. It was heard by several of us for a few minutes, fading out at my QTH on the IOS at 1010z. After the beacon faded out we had an excellent day with world-wide DX on six. During the evening double-hop contacts across America and crossband contacts with W6ABN (California) and other west coast stations were made.

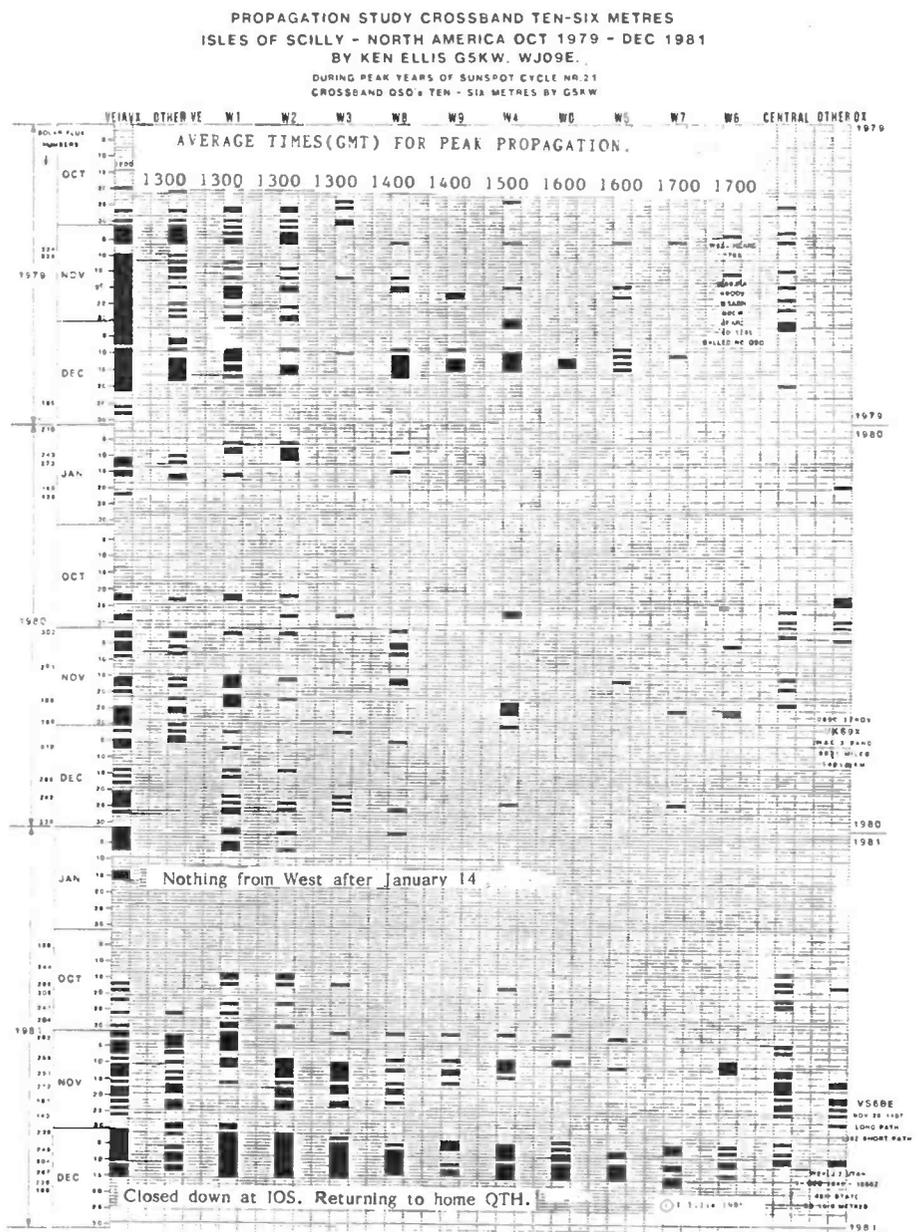


FIGURE 1.

Fig.1 Contacts crossband on 10/6 during sunspot cycle 12.

	VEIAVX	OTHER VE	W1	W2	W3	W8	W9	W4	W0	W5	W7	W6	CENTRAL AMERICA	OTHER OX
1979														
OCT	3	3	3	3	3	1	-	1	-	-	-	-	1	
NOV	27	14	14	12	2	4	2	3	-	3	1	-	4	
DEC	22	10	7	4	1	8	5	8	3	4	1	-	6	
	52	27	24	19	6	13	7	12	3	7	2	-	11	
1980														
JAN	6	4	3	5	-	1	-	-	-	-	-	-	1	
OCT	4	1	2	2	1	-	-	2	-	-	-	-	4	
NOV	16	10	9	3	-	6	-	5	-	1	1	3	-	
DEC	13	3	8	3	4	2	-	1	-	-	1	-	-	
	39	18	22	13	5	9	-	8	-	1	2	3	5	
1981														
JAN	10	-	6	2	-	1	-	-	-	-	-	-	-	
OCT	5	1	6	5	1	-	-	1	-	-	-	-	3	
NOV	18	16	12	13	12	7	5	6	6	2	-	4	14	
DEC	14	7	14	14	12	9	6	10	9	7	8	5	4	
	47	24	38	34	25	17	11	17	15	9	8	9	21	
TOTAL	138	69	84	66	36	39	18	37	18	17	12	12	37	

Fig.2 Ken Ellis's Scilly/USA contacts study, crossband on 6m, October 1979 to December 1981.

Simultaneously east coast stations were S9+. The band was open until a late hour. The following day it happened. G4BPY reported "On 27/10/80 my first reception was VK6RTU in Perth from 0858-0909z peaking 549. At 1000z I had a crossband QSO with VK6OX in West Australia, to make the first historic six metre UK WAC". As Gordon signed, Brian Bower G3COJ took over to make the second QSO, while I was awaiting my turn in desperation as VK6OX started to fade out! It took me from 0950-0955z to complete the QSO as Andy was having difficulty copying my report.

We were the only three to make it, and no other two-way or crossband QSOs took place until 20th March this year, when the all-time first two-way QSO took place between UK-VK. On November 20th 1981 I had two QSOs with VS6BE Hong Kong. At 1107z by the long path, and at 1142z by the direct short path.

One of my objectives was to work as many of the contiguous US states as possible. During 1979/80 I had managed to have crossband

QSOs with all the eastern states most of the central and western states, but a few eluded me, mainly due to lack of operators at that time. This was taken care of by some portable operation by enthusiasts from other areas. By the 13th of December 1981 I had managed to contact 47 states, needing only Utah to complete the magic figure of 48.

The last ferry from St Mary's before Christmas left on the 16th. It was necessary to book vehicles well in advance due to high demand and limited accommodation. As I had to dismantle the station and pack up everything for my final departure my last operating day was the 14th. I was calling 'CQ Utah' frantically most of the afternoon on 28885 and listening on a spot frequency on six for replies. I omitted to monitor 28885; had I done so I would have heard several stations trying to alert me to a visiting portable station W5VLJ/7 trying to contact me from Utah. Eventually I got the message from a station on 50MHz, and made it to complete the first and only station so far from this side to contact the 48 states crossband.

Unfortunately I have still not got cards to confirm this achievement. Now, of course, with two-way operation allowed the challenge of 'worked all 50 states' is under way. Several UK stations are more than half way to the target and this cycle peak should get some of the leaders near the goal.

It was a very satisfying way to finalise what had been a very enjoyable and informative Propagation study. On many occasions I found that the MUF hovered just below 50MHz and only at times came just inside the band, and whilst QSOs could be made on 50.005 moving higher in the band — nothing was heard. Also there was a distance cut-off. I was just on the fringe. A typical example was November 13th. G3WBQ remarks, "It was fascinating to hear G5KW on the Isles of Scilly giving S9 reports to North American stations with nothing heard at my QTH". On June 30th last year GJ3YHU worked 47 North American stations between 2230-0100z next morning. The only other station this side hearing anything was G3PVB in Devon who heard some of the stations at his QTH in Newton Abbot.

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RADIO Tomorrow

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

SCOTLAND

Aberdeen ARS. Don. 04676 251.
Ayr ARG. Robert Paterson GM4CUB. 0292 262496. 2 Fris, Community Centre, Wellington Sq., Ayr.
Dunfermline RS. GM0DYD. 0383 413440.
Galashiels DARS. GM3DAR. 0896 56027.
Glenrothes DARC. John Hardwick GM4ALA. 0592 742763 (hm) (0506 410677 (wk). Sept 16 National Convention.
Inverness ARC. Brian. 0463 242463.
Lothians RS. P J Dick GM4DTH 21, West Maitland St., Edinburgh EH12 5EA. Prestel (NOT phone) 314471210. 2,4 Thursdays 7.30pm Orwell Lodge Hotel, Polworth Terrace, Edinburgh.
Louth DARC. G1IZB. 047286 595.
Mid Lanark ARS. David Williams GM1SSA, Holytown 732403.
Waterside SWC. Bernie Lyford. 0703 893937.
Westmoreland ARS. G. Chapman. 0539 28491.

NORTH EAST ENGLAND

Barnsley ARC. Ernie Bailey G4LUE. Barnsley 716339. Mons St. Mary's Church Hall, Laithe Lane, Barnsley.
Bishop Auckland ARC. Peter Fawcett G0FBK Bishop Auckland 606819. Most Thurs. **Oct 15 Rally Sunnydale Leisure Centre, Shildon Ernie G4TYF B/A 607500.**
Bourne DARS. Vince Cawthron G4ODG. 0778 422795.
Denby Dale DARC. G3SDY 0484 602905.
Derby DARC. Kevin Jones G4FPY. 0332 669157. : 119 Green Lane, Derby. 7.30pm. Most Weds.
Doncaster ARC. K McMahon. Doncaster 852938. Mons, Corporation Brewery Taps, Doncaster.
N. Ferriby ARS. Frank G3YCC 0482 650410 Fris NFU Football Club Room, Church Rd., N. Ferriby, Yorks.
Hornsea RC. Richard. 0401 62498. The Mill, Atwick Rd., Hornsea. 8pm. **Sun Oct 15 Elhoex 1989 Ralley, Floral Hall, Hornsea, N. Humberside 11am Jeff G4IGY 0964 532874 wk. 0964 533331. Trade, bring and buy, displays. Hornsea Potteries Leisure Park nearby.**
Hoyland ARC. I.M. Wardle G0GDC, 11, Soltwell Ave, Wombwell, Barnsley. Weds West Bank House, opp Hoyland Leisure Centre.
Keighly ARS. K A Conlon G1IGH. Bradford 496222. Weds, 8pm, The Clubroom, Victoria Hall, Keighly, Yorkshire. Sept 26 Supper and quiz with Northern Heights; Sept 5, 19 Natter; Oct 3 Planning meeting; Oct 7, 8 East Riddlesden Hall SES; Oct 10, 17 natter; Oct 31 Junk sale.
Leeds DARS. G1EBS. 0274 665355.
Loughborough ARC. Philip. 0509 412043.
Maltby ARS. K Johnson G1PQW. Rotherham 814135. : Fris Hellaby Hall, Hellaby.
Mansfield ARS. J M Coates G4GYU. 0623 27257. Fris.
Mexborough ARS. D Thomas G6FUM. Doncaster 859654. Fris Harrop Hall, Mexborough.

Morecambe Bay ARS. G4ZJL. 0524 52042.
Northern Heights ARS. Stan Grafton G0IYR. 0274 673116. 1,3 Weds Bradshaw Tavern, Nr. Queenbury, Bradford. Sep 20 Members' gadget mini-lectures (what the Americans call "show and tell").
Pontefract DARS. Colin Mills G0AAO. 0977 43101. Carleton Community Centre, Pontefract.
Rotherham ARC. F. Moody. Rotherham 552925.
Rugby ATS. Kevin G8TWH. 0203 441590 David G4DDW. 0455 52599.
Scarborough ARS G4BP. I G Hunter G4UQP, 46 Station Rd., Scalby, Scarborough, N. Yorks. 0723 376847.
Sheffield ARC. M Sables. Sheffield 886083. Mons Firth Park Pavillion, Sheffield.
Sheffield Packet Group. P Green, 6 Yews Close, Worrall.
Spalding ARS. Terry G4TWR. 0775 2940.
Stockton DARS. G. Noble c/o Causeway Community Centre, Billingham, Stockton on Tees. Weds Causeway Community Centre 7.30. Regular RAE and Morse tuition.
Tyneside ARS. G. Lindsay G4KOT, 12 Augusta Court, Harrian Park, Wallsend, Tyne & Wear.
UK FM Northern. L Laughton G4UNA. Wakefield 822579. East Ardsley Cricket Club, one Sun per month.
Wakefield: North Wakefield RC. John Hoban 0924 825443. Thurs 8.30 White Horse Inn, Fall Lane, East Ardsley, Wakefield. **Sep 24 Rally Outwood Grange School, Potovens Lane, Outwood 10.30 50p. Real ale, food, raffle, bring & buy, traders, repeater groups. Near M1, M62. Talk in S22. Richard G4GCX 0532 622139 or John G0EVT 0924 825443.**
Wigston ARC. G6HAJ. Leicester 403105.
Workshop ARS. John Huggins G0DZX Sheffield S31 7BX. 0909 565856. The Clubhouse, West St., Workshop.

NORTH WEST ENGLAND

Aire Valley RS. G6NPT. 0532 44597.
Bolton ARC. Deane Sports Complex, New York, Junction Rd., Bolton. Glenn Bates G6HFF 00204 63459.
Cheshire: N. Cheshire RC. C Kirsop G6KSA, Morley Green Club, Wilmslow, Cheshire.
Chester DRS. Dave. 0244 336639.
E. Lancs ARC. Stuart 0227 68913.
Fylde ARS. Frank G4CSA. St Annes 720867. South Shore Lawn Tennis Club, Midgeland Road, Blackpool. 2,4 Thurs. Sept 26 Tramways of Lancashire Eric Fielding G4IHF; Oct 12 Space exploration in 1990s Peter Sullivan; Oct 26 informal.
Isle of Man ARS. J Wrigley. 0624 834257.
Kirkby ARC. Via meetings. Weds Kirkby Sports Centre, 17 Valley Rd., Westvale, Liverpool 7.30.
Liverpool DARC. W H G Metcalfe G6VS, 38 Kempton Rd., Wavertree, Liverpool. Tues, Conservative Club, Church Rd. Sept 19 Surplus sale; Sept 26 pre-AGM; Oct 3 AGM.
Morecambe Bay ARS. D H Wood G4ZJL. 0524 52042. Tues 7.30

Trimpell Sports and Social Club, Out Moss Lane, Morecambe, Lancs.

Preston ARS. George. 0772 718175.

St. Helens DARC. Carol Wainwright G0CXT 0744 813589. Thurs 7.45 Community resource centre, Old Central Secondary School, College St., St. Helens. Regular Morse tuition.

Staffs ARS. Bill G4WTP. 0782 514741.

Stockport RS. John Verity G4ECI. 061 439 3831. Dialstone Community Centre, Lisburne Lane off Dialstone Lane, Offerton, Stockport. 8pm. 2,4 Weds.

Todmorden DARC. E. Tyler GOAEC. Halifax 882038. 1,3 Thurs Queens Hotel, Todmorden. Sept 18 Antennas G3ITE (tbc); Oct 3 Junk sale; Oct 17 natter; Nov 6 Sun earth and radio by Gordon Adams G3LEQ.

Warrington ARC. Paul G0CBN. 0925 814005.

Wirral ARS. A Seed G3FOO. 051 644 6094. 1,3 Weds 7.45 Ivy Farm, Arrowe Park Rd., Birkenhead.

Wyre ARS. Ian Broadbent G0KMT. 03917 57636. 1,3 Weds Fleetwood Cricket Club, Broadwaters 8pm.

WALES

Abergavenny and NH ARC. GW4XQH 0873 4655.

Aberporth ARC. GW0DPR. 023987 274.

Bridgend DARC D E George GW1OUP. 0656 723508. Nov 19 1989 Rally Bridgend Recreation Centre, Angel St., Bridgend, Mid. Glam. 11am C Trotman GW4YKL 0443 226198 D George GW1OUP 0656 723508.

Delyn RC. Stephen Studdart GW7AAV. 0244 819618. Daniel Owen Centre, Mold, Clwyd. Alt Tues.

Holyhead DARS. D Richards, 9 Queens Park Court, Holyhead, Gwynedd. Forresters Arms, Kingsland Rd, Holyhead 2,4 Suns, 7.30.

Newport ARS. GW7BSC. 0633 62488.

North Wales: Clwb Radio Amtatur Y DDraig GW4TTA. Tony Rees. 0248 600963. Four Crosses, Pentraeth Rd., Menai Bridge. 7.30pm. 1,3 Mons. Sept 18 Members' equipment demo; Oct 2 AGM; Oct 16 Talk by Dr. Ieuan Jones GW4FQU.

THE MIDLANDS

Coventry ARS. Johnathan Ward G4HHT. 0203 610408. Baden Powell House, 121 St. Nicholas St., Radford, Coventry. 8pm. Fridays. Regular On-air and Morse tuition.

Midland ARS. Paul O'Connor G1ZCY. 021 443 5157. Tues 7.30, Unit 16, 60 Regent Place, Hockley (Jewellery Quarter), Birmingham. Morse tuition Weds, Raynet Thurs. Oct 17 AGM. **MARS Birmingham Rally, Sun 19 Nov** Stockland Green Leisure Centre, Slade Road, Erdington. 10 to 5, 50p, free parking. Peter G6DRN 021 326 7515, Bob G4YUI 021 472 7998l.

Mid Warwickshire ARS. G4TIL Southam 4765.

Nuneaton DARC. Paul Bicknell G4JFT. 0203 343412. 4 Tues, Eton Social Club, Meadow St., Abbey Green.

Rugby ATS. Kevin Marriott G8TWH, 77 Lloyd Crescent, Stoke Hill, Coventry. Cricket Pavilion, BTI Radio Station, B entrance, A5 Trunk Rd., Hilmorton, Rugby. Tues 7.30.

Stratford on Avon DRS. Alan Beasley G0CXJ. 0608 82495. 2,4 Mons, 7.30pm, Baptist Church, Payton St., Stratford on Avon. Sep 25 Photography in Radio Paul Clarke; Oct 9 Ham Radio Around the World Jes Hickingbotham G3HZG.

Stourbridge DARS. C Brunn G1WAI. 0562 885602. Robin Woods Centre, Beauty Bank, Stourbridge, Worcs. 1,3 Mons.

Telford DARS. Tom Crosbie. 0952 597506.

West Bromwich Central RC. Bill Oakes G1YQY. 021 556 3183.

Willenhall DARC. Dave GOEGG 0902 734475 Weds 8pm Brewers Droop Inn, Wolverhampton St., Willenhall, W. Mids. CW tuition, good ale.

Wolverhampton ARS. Keith. 0902 24870.

Worcester DARC. D Batchelor 0905 64173.

Wythall RC. Chris Pettitt GOEYD. 021 430 7267.

SOUTH WEST ENGLAND

Axe Vale ARC. Pat Cross G0GHH. Balls Farm Cottage, Musbury Rd., Axminster. Oct 6 AGM.

Bath DARC. E Otten G4GEV. Bath 832156.

Blackmore Vale ARS. Stuart Brunton GOEXI. 0747 840558. 2,4 Tues 8pm Old Coach House, Bell & Crown, A303, Wilts. Sept 26 On air; Oct 10 Junk sale; Oct 24 G4RBV club station on air.

Bristol: North Bristol ARC. Ray G1YRS 04545 2768.

Bristol: South Bristol ARC. Len Baker G4RZY. 0272 834282. Whitchurch Folk House, East Bundry Rd., Whitchurch, Bristol BS14 0LN. Weds.

Evesham: Vale of Evesham DARS. John G3DEF. Evesham 6407. 1 Thurs at 7.30pm at MEB Club, Worcester Road, Evesham.

Exeter ARS. R. J. Donno G3YBK 0392 78710. 1 Mons, Community Centre, St. David's Hill, Exeter 7.30pm. Oct 9 AGM.

Plymouth ARC. G4SCA. 0752 337980

Poole ARS. GOEQV. 0202 674802.

Salisbury RES. Neil. 0980 22809.

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

Stratford Upon Avon DARS. A Beasley G0CXJ. 060 882 495. Sep 11 Introductory session; Sep 25 Photography in radio Paul Clark; Oct 9 Ham radio around the world Les Hickingbotham G3HZG.

Thornbury DARC. Tom Cromack G0FGI, Rose Cottage, The Naite, Oldbury on Severn, Bristol. 1,3 Weds, 7.30 United Reform Church, Chapel St., Thornbury, Evesham. Sept 20 Project evening; Oct 4 Packet update Ray GW1FJI; Oct 18 HF Activity.

Torbay ARS. G3NJA, G8HJA. Wait G3HTX. 0803 526762. ECC Club, Ringlade Rd., Nr. Highweek. Club nights Fris 7.30. Oct 6, 13, 27 club nights; Oct 20 Between the bands; Oct 20-22 Jamboree on the Air.

Trowbridge DARC. Ian Carter G0GRA. 0380 830383. Most 4 Weds, 8pm, TA HQ, Bythesea Road, Trowbridge. Sept 13 Chordal Hop HF propagation Dave Bewick GODAB; Sept 27 Social; Oct 11 Packet and data communications by Amdat, Bristol. Oct 25 social.

Yeovil ARC. David Bailey G1MNM, QTHR. The Recreation Centre, Chilton Grove, Yeovil. 7.30pm, Thurs.

SOUTH EAST ENGLAND

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

Basingstoke ARC. D Deane G3ZOL. 0734 332777 (hm) 0734 787930 (wk). Forest Ring Community Centre, Sycamore Way, Winkelbury, Basingstoke. 7.30pm. 1 Mons.

Bedford DARC. Ray GOEYM. 0234 244506. Special Event Stations GB2WW and GB4BOB commemorating World War 2 during 1989. Oct 14 Cardington Airfield 60th anniversary of R101 airship.

Biggin Hill ARC. Geoff Milne G3UMI, 142 Hayes Lane, Hayes, 3 Tues, Victory Social Club, Kechill Gardens, Hayes 7.30. Sept 19 Valve/any questions; Oct 17 Junk sale.

Braintree DARS. M Andrews 0376 27431. Braintree Community Association Centre, Victoria St. 7.30pm. 1,3 Mons. Club net C6BRH or G4JXG, 2m 2,4 Mons, 8pm.

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

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

Burnham Beeches RC. G6EIL. 0628 25720.

Cambridge DARC. D Wilcox. 0954 50597.

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

Cheshunt DARC. Roger Frisby G4OAA. 0992 464795. Thurs, 8pm, Church Room, Church Lane, Wormley, Herts. Sept 24 Harlow Rally; Sept 27 Radio on postage stamps Arthur Robinson G3ZYQ; Oct 4,18 natter; Oct 11 Interclub darts match; Oct 25 Spectrum abuse David Evand G3OUF RSGB.

Chichester DARC. H Kaminski G1NBX Chichester 781785. St. Pancras Hall, St Pancras, Chichester. 7.30. Club net G8WSX S11 Monds 7.15. 1,3 Tues. Also Raynet inf.

Clifton ARS. Martin Brown GODGC. 01 691 2341.

Coulsdon ATS. Alan. 01 684 0610

Crawley ARC. Jack. 0293 28612.

Dover: South East Kent YMCA ARC. Des Edwards 0304 203073. Dover YMCA, Godwynehurst, Leyburne Rd., Dover, Kent CT16 1SN. Weds. Nov 15 Morse tests.

Dunstable Downs RC. Tony Kelsey-Stead 0582 508259. Room 3, Chews House, 77 High St. South, Dunstable, Beds. Fris. Sep 10 6th National AR Boot Sale, Old Warden Aerodrome, Biggleswade. Oct 29 RAE open evening.

Eastbourne EARC. G1BRC 0323 29913.

East Kent ARS. Stuart 0227 68913.

Edgware DRS. Ian Cope G4IUZ, Hatfield 65707. Watling Community Centre, 145 Orange Hill Rd., Burnt Oak, Edgware. 2,4 Thurs.

Farnborough DRS. Tim Fitzgerald G4UQE 0276 29231. 2,4 Weds, Railway Enthusiasts Club, off Hawley Lane (M3 bridge), Farnborough, Hants. Sept 13 Propagation G3LTP; Sept 27 Pre-AGM discussion; Oct 11 Annual construction contest; Oct 25 TBA.

Felixtowe DARS. G4YQC. 0473 642595.

Grafton RS. Rod Harrigan G0JUZ. 01 368 8154. Holy Trinity Church Hall, Stapleton Hall Rd., London N4. 2,4 Fris.

Harlow DARC. Sept 24 Harlow Rally, Harlow Sports Centre. Traders in main hall, B&B and interest groups in Studio. Parking, New cafeteria. £1, accompanied children free. M1 J11, or A414. G4KVR. 0279 22365 (day) or G4MIS. 0279 722622 (evg and wknd).

Hastings ERC. Dave Shirley. 0424 420608.

Horsham ARC. P Godbold. Steyning 814516. Guide Hall, Denne Rd., Horsham, Sussex. 8pm. 1 Thurs.

Huntingdonshire ARC. G8LRS. 0480 56772. Packet GB7HXA. 1,3 Thurs The Medway Centre, Coneygeare Road, Huntingdon, Cambs 7.30am.

Itchen Valley RC. G1IPQ. Southampton 736784.

Kettering DARC. Barry Perrin G7CIV. Rockingham 770701. EMEB Social Club, Eskdale St., Kettering. Tues 8pm.

Loughton DARS: J D Ray G8DZH. 01 508 3434 (ev); 01-5083434 Micronet 800 mailbox, TeleGold 74:MIK1824; packet GBZDH at GB7ESX. Room 14, Loughton Hall, Rectory Lane, Loughton 7.45pm. Fris. Sep 16-17 Aylmers Farm field weekend G4ONP; Sep 22 Amateur TV update by Barry Tickell G6ESL; Oct 6 HF on air; Oct 20 Essex Data Group Roadshow; packet demo by Malcolm Salmon G3XVV and Dave Castle G6OQJ.

Maidstone YMCA ARS. G0BUW. 0622 20544. YMCA Sports Centre, Melrose Close, Maidstone, Kent. Fris 8pm. Sept 9 RSGB morse tests.

Mid Sussex ARS. G0GMC. 07918 2937.

Milton Keynes DARS. Mike G0ERE. 0234 750629.

Norfolk ARC. Craig Joly G0BGD 0603 485784 QTHR. Norfolk Dumpling, the Livestock Market, Hall Road, Harford, Norwich. Weds 19.30. Sept 13 Packet update, Roger Cooke G3LDI, Paul Turnham G4VLS; Sept 20 Equipment reviews and EMC, Angus McKenzie G3OSS; Sept 27 Informal; Oct 4 Radio navigation systems Malcolm Prestwood G3ODH. Oct 11 Committee; Oct 18 News gathering by the RSGB, John Nelson GW4FRX; Oct 25 informal.

Northampton RC. D J Linnell G7CMA 19 Beech Av., Northampton. Location? Thurs. Sep 21 Ham Radio in S. Africa G4IRD.

Reading DARC. M G Anthony G4THN, 9 Paice Green, Wokingham. Berks.

Reigate ATS (RATS). Alan G1LNT. 0883 44723, Peter G8ITY. 0293 36193 after 7. Conservative Centre, Warwick Rd., Redhill, Surrey. 3 Tues, 8pm. Sep 19 Morse facts and fallacies Tom Mansfield G3ESH; Oct 17 Construction Colloquia.

Reading ARC. Mike G4THN. 7434 774042. 2,4 Thurs, Caversham Conservative Club, Caversham, Reading Berks.

St. Albans Verulam ARC. Walter Craine G3PMF QTHR, RAF Association HQ, New Kent Rd., off Marlborough Rd., St. Albans. 7.30. 2,4 Tues.

Sevenoaks DARS. Barry Leggett. 0732 741222 ext. 245 office hours. Emergency Control Centre, Sevenoaks District Council Office. 8pm 3 Mons.

Sheffield DARS. Tom Stellar G6RCT. 0707 372211. Church Hall, Amphill Rd., Sheffield, Beds. 8pm.

Southend DRS. S. Blinkhorn G1XGP, 102 Lord Roberts Ave., Leigh-on-Sea, Essex.

Southgate ARC. Brian Shelton. 01-360 2453. Holy Trinity Church Hall, Winchmore Hill, London N21. 7.45pm. 2,4 Thurs. Sep 24 Astronomics R Butler; Sep 28 Darts with Cheshunt and Verulam; Oct 121 Round the World Voyage by Mark Brackenbury; Oct 26 informal.

South Kent (YMCA) ARC. Des Edwards. 0304 203073. Dover YMCA, Godwynehurst, Leyburne Rd., Dover. Tues.

Stevenage DARS. G6EDA. 0438 724991 1,3 Tues Sitec Ltd., Ridgmond Park, Telford Av., Stevenage 8pm (7.30 for tuition).

Sutton & Cheam RS. John Puttock G0BWW 01 644 9945 3 Fris, natter 1 Mons 7.30 Downs Lawn Tennis Club, Holland Av., Cheam. Sept 15 TBA; Oct 20 Junk sale.

Welwyn Hatfield ARC. Roger Curtis G0CYC 0707 324958. Lemsford Village Hall, Brocket Rd., Welwyn Garden City, 1,3 Mons, 8pm. 9th WGC Scout HQ, Knightsfield, WGC. Regular nets. Sept 17 Water Carnival GB2WHC; Sept 18 TBA; Oct 2 Advanced electronics production technology; Oct 16 TBA.

West Kent ARS. B Guinnessy. 0892 32877.

West Sussex ARS. M Mundy, 142 Junction Road, Burgess Hill.

Wimbledon DARS. Nick Lawlor G6AJY. 01-330 2703. 2,4 Fris, St. Andrews Church Hall, Herbert Rd., Wimbledon London SW19. 7.30pm.

IRELAND

Armagh and Dungannon DARC. J Murphy. 0861 522153.

Donegal ARC. E13BOB. 074 57155.

Mid Ulster ARC. Jim Lappin. 0762 851179. 2 Suns (not July and Aug) 3pm Guide Hall, Gilford, Co. Down.

NATIONAL AND INTERNATIONAL

AMRAC. Phil G6DLJ. 0703 B47754.

British Amateur Television Club. G8CJS or GBFOZP QTHR.

British Amateur Radio Teledata Group. Pat Beedie GW6MOJ.

055B 822286. Ffynnonias, Salem, Llandeilo, Dyfed. SAE for information. GB2ATG amateur radio news service transmits on 1 and 3 Sundays, on 3.590MHz, 14.090MHz and 144.600MHz. Operated by volunteers, GB2ATG welcomes amateur radio news for possible transmission, esp concerning radio data activity (RTTY, Amtor, packet, fax, etc.).

International Short Wave League. Y Blain, 167 Wombridge Road, Trench, Salford, Shropshire TF2 6QA. Journal: Monitor.

UK FM Group, Northern. L Loughton, Claremont, Main St., East Ardsley.



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FOR SALE

ARMY Spark Transmitter No 1, offers? Signal Generator W1649 140-240MHz £15; Wavemeter class D £5 (without cases), valves old & new, including DA30 new; Meters 2"-3"; two AVOs needing attention, models 7, 40 £35; relays, buzzers, time delays etc. Need information on telephones 8520, 8550, N1906D41T, -D34T and Ferranti EC72273D. 25 Glenmore Road, Oxton, Birkenhead L43. Tel. (051) 652 8799.

EXCHANGE CB Radio Harrier CBX FM for 2m Transceiver. Please phone Leicester 418260.

DRESSLER ARA900 active antenna 50MHz to 1300MHz as new £90. Tel. 0621 855285 (evenings), 0621 742555 (daytime).

FT690R Mk1 £220; Spectrum Linear TA651 £40; Spectrum RC6-2, boxed, £18; MMTR 96-144 £90; LMW 23cm linear 1w input 3w output -20; MML 432-50 10w input 50w output £80; Tonna 50MHz 5 ele £25; Datong RF compressor PCB boxed £18; G8FAK QTHR. Bedford 0234 751475.

EDDYSTONE EC10 MkII almost mint condition, £50. Collect, central London. Telephone (0892) 28139.

FOR SALE: Trio TS830S VFO-DFC230, £800 cash. John Scott, 11 Edenbridge Road, Newton Heath, Manchester M10 6UP.

STANDARD C5800, all mode 2 metre transceiver, boxed, complete, £220 or exchange 70cm same value. 01-646 5227.

TRIO 2000 with VC10 VHF converter and manual, £380. Phone Colin, Hull 0482 668154.

TEXTRONIC 551 dual beam scope with type "O" "1A5" and "1A4" plug in modules complete with all manuals and

workshop trolley, £150. Phone St. Asaph 0745 584061, North Wales.

REFTEC 834MHz sets (2)m gwo complete with mikes and manual, exchange for FC902 ATU; also Spectrum 2x + manual, PSU, boxed 30 games, Chatbox, RX4, Scarab; exchange medium rotator. Please write: "The Dormouse", 5 Sunset Walk, Bush Estate, Eccles-on-Sea, Norfolk NR12 0SX.

YAESU FT790 nicads charger, softcase, manual, £270; 70cm linear 20 watt Tokyo HL20U £40; Wood and Douglas 70cm linear 1 watt in 10 watt out £15; Tonna 19 element crossed for 70cm £20; 2 mtr seven element crossed £10. G1AVU 058285 3598.

FOR SALE: Complete HF amateur station comprising Yaesu FT1012D, MkII with Xtal CW filter; KW dual dummy load; KW E21-match; KW 3 way coax antenna switch; Model 110 3 function power, SWR field strength meter £460. H. Gregory, G3GIY, QRTH. Phone 4041 73.

DIAMOND 33 Combo, full size portable two manual electric organ, nice instrument; exchange Yaesu 7700, Trio 2000 or similar communication receiver or Realistic DX302 with cash adjustment or sell £395. Tel. 0484 537838.

KW500 Linear amplifier antenna relay fitted and restored almost like new £200 ono; matched pair QY4-400, not new, but guaranteed tested; GWO offers. new lightweight Halda one HP petrol engine suitable mobile generator £65. GOGGI QTHR Cumbria. Tel. 0229 89635, anytime.

FOR SALE: Icom IC720A transceiver BNOS PSU £600 ono, mint. GW4ZXD phone 09916-509.

BELCOM LS102L IOM, all mode, vgc, £185; also Trio 9R-590S, in vgc, £80. Phone Beds 0234 266761, evenings only.

FOR SALE: Icom IC245E 2m FM SSB CW transceiver, £300. Tel. 0706 814501.

LOWE NF-125 tech manual £5; 1934 short wave manual (re-

print) £5; Post free. Wanted from JR310 Xtal 19.955MHz AF-RF gain control or would swap for books or buy old JR310. Harmer, 9 Park Square, East Jaywick, Essex CO15 2NL.

ROTATOR CDE AR-40 with 25ft control cable £35; seven element 2m Yagi £10; CR300/1 ex service receiver 15kHz to 15MHz; Heathkit twin paddle keyer HD1410 2MHz to 150MHz £20. G4CNC. 01-363 1653 QTHR.

FRG-7 receiver in very good working order, + antenna, £65 only. Write to: 50 Harpou Road, Barking, Essex IG11 8RL.

YAESU FT-7B HF transceiver with PSU and manual £300; Ham International Multimode II 28.515MHz-28.305MHz, no gaps, all mode, £100 ono; Zegati 150 watt linear £60 ono; Maxcom 30E 40ch FM 27/81, mint condition, £40. Tel. Ian on (0224) 324808.

PORSCHE 924 personal Reg. No 1979 vgc 55,000 miles £2,500 or exchange good full VHF UHF, e.g. Yaesu 736 with options etc; good deal for complete station as drink drive forces car out. Contact Stewart (Bolton) 0204 697053, anytime.

EXCHANGE 2 metre FM FDK 144-148 Multi 700AX 25 watt out for base station scanner, in good condition. A. Hopkinson, 104 Everill Gate Lane, Broomhill, Wombwell, Barnsley, Sth Yorks S73 0YJ.

FOR SALE: Drake R4245 gc rx mint £800. Drake R4C revalved, bc xtals £250. Liniplex F2 OSCi sync am rx £800. Hammarlund HQ180 £50. Stuart Senior, 78 Palace Road, London SW2 3JX, 01-674 6452.

FOR SALE: TS940S with ATU, MC85, SP940, SM220, RS232, cw filter, hi-stab osc, Lowe mods £1950. Drake TR4130 (commercial TR7A) with BNOS 40A psu £1200. Mizuho 80m handheld £140. Stuart Senior, 78 Palace Road, London SW2 3JX, 01-674 6452.

FOR SALE: Tono 5000E Amtor, RTTY terminal £500. Tono 9100E Amtor RTTY ter-

minal with vdu £450. FC301 scope £75. Stuart Senior, 78 Palace Road, London SW2 3JX, 01-674 6452.

FOR SALE: Yaesu communications receiver FRG8800 plus Yaesu FRT7700 tuner unit, as new, £435 ono. Tel. 0430 440332, evenings.

CANON EOS 650 35-105EF lens, 70-210ED exchange Kenwood R2000 or other receiver same quality; cash adjustment. Hemel Hempstead 0442 55069.

PRO 32 scanner 68-88 108-174, 380-512 for sale. £145. J. Hawkins, 285 Stowmarket Road, Needham Market, Ipswich, Suffolk IP6 8DS.

SONY hand held Air Seven Scanner four channel Air PSB FM AM, fully progammable, £150 ono. Tel. 0968 78191.

BBC 'B' computer, DFS, Wordwise, chip, cassette recorder, manuals, leads, 40 trk disk drive, over £100 worth of software, £270. Phone 0443 683912, after 6pm.

MAJOR M588 suitable for 10m or 6m conversion £130; 100W mains linear £70; 250W mobile linear £70; 20A PSU £30. Mark (0296) 88064 or (02967 86511, ext 228.

AMSTRAD CB901 transceiver, complete with kit for conversion to ten metres and circuit diagrams etc; requires RF driver transistor hence the price of £45. Commodore 64 Prestel Modem complete with Mustang software £50. Cyril G6XTY, Hunstanton, Norfolk 04853 2920.

SOMMERCAMP FT767DX (FT707) with Spectrum FM, Datong automatic speech processor, all rubber mounted mobile cradle, G-whip tribander 10m thru 80m mounted on roof rack, Heatherlite mike makes ideal mobile outfit, demo given 60 miles London. £450 ono. Ring GOANC, 01-247 6097, daytime.

YAESU FT707 3-30MHz FP707 PSU and FC707 ATU, excellent condition (boxed), £675. Telephone 0860 558184 (Cheshire).

SELL or Exchange: Standard C58 2m Multimode portable with slide mount 25 watt

linear, 2 mounting brackets, fist scanning mike, shoulder strap, 30 ni-cads, 3 portable antennas, 2 power leads, homebrew 2mtr ATU, 15dB 2mtr pre-amp, original boxes and owners manual. Sale price £380, or Exchange for any of FL21001 or similar HF linear, HF al band rig (FT101ZD), 50MHz base rig, 2mtr base rig, 70cm base rig. Also have Belcom LS102L plus Zetag B300PS 200W linear, offers. G4XPP QTHR.

FOR SALE: 55XLT Bearcat handheld scanner with 10 memories, covers 29-54MHz, 136-174MHz, 136-512MH, 170. A. Davies, 42 Everest Way, Hemel Hempstead, Herts. Tel. 0442 216776.

JVC TV, CX-610GB obtained via this magazine, but less the owners manual, a possible photo-copy would be most welcome, wanted, the "Battery Charge lead" (not 3.1mm DC power plug), any reviews, test reports, mods, etc, particularly to Secam L, also welcomed; will reimburse for any trouble taken. Tel. (01) 505 6303; Mike Evans.

FOR SALE: Dragon 32 computer plus RTTY/CW TX/RX tapes, £40; STSMC terminal unit, £35. Contact Geoff GOGWLW, 0344 52601.

TS700 2 metre multi mode base station, manual and Ring Ranger antenna complete station in excellent condition, £230. 0484 645923.

ICOM 730 PS15 P.sup HM7 mic, CW filter plus options, mint; DX302 gen coverage 10Hz-30MHz triple conversion ideal for SWL £165; Rascal TA940B 100W solid state linear P.sup £135. Wanted Collins "S" line Drake R7ARX. G4LW QTHR. Trowbridge 0225 753166.

DATONG Morse Tutor, excellent condition, £40; Datong active antenna AD370 (outdoor type) with power supply/preamp, £40 ono; RTTY terminal unit, Maplin TU1000 for TTL interface (BBC B) complete with cables including BBC B user port connector etc, offers. (0227) 458970, after 6pm.

MATSUI Radio MR4099 150kHz to 30MHz AM SSB CW plus FM stereo broadcast, direct entry memories; also continuous tuning; purchased Jan 1989, receipt available,

also service manual, £65 including carriage, or £60 if collected. Peter (0268) 287176.

FT690R MkII 6m transceiver, absolutely mint, still under guarantee. Also 15W 6m linear amplifier. Family reasons force sale. £350 ono or would exchange for any receiver plus cash adjustment. Phone Bodenhams 843, G1JWD QTHR (or W.H.Y?)

YAESU 2100B linear amplifier, 1.2K PEP, handbook, circuit. Must sell. No valves, £320 ono. A good buy. A. G. Fisher, G4VBH, 108 Heston Grange, Heston, Hounslow TW5 0HD. 572 0465, evenings.

FT290 MkI Mutek front end 50ft case, nicads, charger, handbook, Yaesu speaker/mike, 144 to 148MHz, immac condition, never mobile, £270. Tokyo Hi-power 30 watt linear 2m amp £30. G1ZZM, 021 308 2171 (West Midlands).

CLARK & SMITH RX model 88/12, long, medium, FM, pristine condition and performance. Sensible offer. S.A.E. please, collectors item, not many made. W. Lee, 8 Bronheulog, Bodffordd, Anglesey LL77 7SU.

FOR SALE: Trio TS8305 as new condition and unused, bargain at £695. You won't find another at this price. Matthew, 2 Old Milnafua Road, Alness, Ross-shire IV17 0TW. Phone 0349 882941.

FOR SALE: Yaesu FT77 with CW narrow plus FM board plus matching Yaesu FTV-700 transverter frame with 6 metre module, all VGC with handbooks, boxed, £675 ovno. Tel. 0278 456292, after 6pm.

YAESU FT-221 144MHz all-mode transceiver, mint condition with manual, microwave modules, 1/3-30W linear amplifier, 6-element Quad ant. 0268 412274, Chris G6DYB, offers.

ASTRID automatic satellite telemetry receiver and information decoder, plus tapes and aerial and instruction book, £50. Bath 21218.

GRUNDIG Satellit International 650 computer controlled running systems, 60 channel memories, mint condition, boxed, £265. 01-571 5759, Southall.

SONY ICF20Q1D system including active antenna AN1. The entire kit is brand new and

unused in the original gift box. A bargain at £270. Telephone Mr. Young on 01-381 5851.

EXCHANGE: Complete QRP DSB80 TX/RX station, seven made-up Howes QRP 20m kits, plus meters, valves, etc., for complete QRO all-bands set-up. Write quickly to Mr. A. Beglin, 20 Francis Bastin House, North Pethererton, Somerset TA6 6SD (part exchange considered) Urgent!
BBC B computer, Watford DFS, ATPL ROM board, perfect, £200. Yaesu MD1B8 base microphone (new) £50; Tokyo Hy-Power HLL60V 2 metre PA, 3-10W in 180W out, perfect, £160. Phone Paul G4XHF (QTHR) (0293) 515201.

FT290R YAESU multimode £225, with charger, case. 30 watt amplifier, £50. Headset adaptor SB2, never used, £12.50. Mutek front end fitted. Also J.V.C. turntable brand new £35. Special offer on the lot. Phone, anytime, 01-302 8858.
VALVES Ex equipment, QQVO3/10's, 6BH6s, EF91's, EL91's, 6CH6's, EC91's, 12 volt series 12BE6 etc, 6 volt htr and 12 volt htr metal 9002, 9004, Acorn EL37, EL35, etc. Super 8mm sound and silent films (exchanged). G8BSK, 290 Priory Road, St. Denys, Southampton SO2 1LS.

DISH 10ft dia, on mount, £250; Rascal RA17 with book £110; Trailer mounted 60ft Clarke Mast, less compressor £250; Trio 7730 2 metre mobile, with scanning mic, etc, £195. Sorry, no cheques, and buyers collect. Tel. 0203 343159.

BBC B, disc-drive, fax/weather satellite interface and ROM software, RX-4 (SSTV, RTTY, CW, Amtor) software and interface, Ceefax adaptor, 80 column dot-matrix printer, manuals and leads. all vgc. Can demonstrate, £390. Derby (0332) 792515.

AOR-2001 25-550MHz continuous cover including civil and military air bands. Mint condition with accessories and manual. Still boxed, £240. Halifax 59680.

MATCH that antenna properly! S.E.M. transmatch ATU, £75; mint condition; Hansen 1kw power SWR bridge also mint £35. 03646 233 (Haytor, Devon).

SUPERSTAR 2000 26.30MGz AM, FM, SSB, CW etc, cost

£200, accept £150, no offers. 5/7 amp PSU £10, 100m thick coax £20. Please phone Mark, 938-1011 (work number) days only Monday to Friday.

MARCONI TV5, circa 1950, 2MHz (trawler band), CW/AM, three units TX/RX/PSU, handset, morse key, drawings, PA valve missing (KT8), £50 ono; or exchange Marine VHF, EG Seavoice RT100, any handheld. Buyer collect. G4EUW, Brightlingsea (020630) 3071.
SUPERSTAR 360 for sale, converted to 10 metres, professional conversion. Excellent condition with mic and mobile bracket. 28-30MHz, repeater shifts, multimode, variable power to 17 watts, £95. 0679 64393, evenings and weekends, G4YAZ QTHR.

WOOD and Douglas 1250 DC50 24CM downconverter module, video demodulator, video PRE/DE emphasis board TV modulator, 6MHz sound subcarrier board, unwanted new equipment, bought for £170, will sell for £110 inc p&p ono. Contact Michael, 58 Baylis Road, Slough, Berkshire SL1 3PJ.

AR2001 Receiver A1 condition, £195 ovno or preferably exchange for 70cms and 6m modules for FT767 (cash diff E.W.), would consider exchange for variable HF (0-30MHz) linear amp as alternative. Telephone Ted 0742 694654 (anytime).

BELCOM Transceiver model LS102L 26MHz-30MHz CW, USB/LSB, FM and Am, £150. Tel. 01-578 7069.

MORSE RTTY decoder can be used as morse tutor, Code-master GWR610E plugs into TV or monitor, £100; Tandata Prestel computer plugs into TV and phone line, £90. Wanted: Rascal HF Radio equipment RA1771 or others. Brian, phone 041-242 4529; 0475-83700.
SONY Air 7 receiver, Air 108 to 136, PSB 144 to 174, AM-FM 76 to 108. Brand new — unwanted gift. New cost £250, will accept £160 inc. Securicor deliver. Phone 091 5844352, after 6pm.

REALISTIC PRO-2004 scanner 25-520, 720-1300MHz, AM, WFM, NFM, vgc, need cash, hence £200. Contact Mark on Bourne End 06285 20811, eves only.

BBC B 7 £150; colour monitor, med res £175; Sideways Rom/

Ram bat backup £27; Data-corder £15; Graphics Pad £27; Modems 2 @ £15; Sideways 64K Ram £25; Roms: Print £15, Slave, Speech £20 ea. Books and software (disc and tape); long list, 2 joysticks £8 pr. Phone with offers or for full list, 01-751 1865.

HAM Condorde MkII, suitable for ten metre conversion, 26.065 to 28.305 no gaps, excellent condition; also Sadelta Echo Master 5/8 wave silver rod and PSU, £140. Phone 0290 24859.

SEM six metre Tranzmatch, new, £21. G3FDP QTHR 0403 723205.

ATARI 1040 STFm plus disks, j/stick etc, £300 ono or exchange for HF TCVR (cash adjustment). Mike G6GUF (0703) 254836.

MICROWAVE modules advanced morse trainer with synthesised speech response £90; also 512K or extra Ram for your Apricot computer £80; or will swap one of the above for Packet tnc on 70cm hand held. Phone Phill on 0478 352086.

DATONG morse tutor £28; hi-mound NK 704 key £14; both £60, post free. 0745 570 209. **FT1012D** FM, WARC fan, boxed, like new, £450. Tel 0606 45584, Northwich, Cheshire.

FIFTY-FIVE Marconi, HMV, service manuals, 105 models covered, 1934 to 1940; also forty-five duplicate manuals. Exchange for any radio gear. W.E. Stedman, 133B Lynton Road, Bermondsey, London SE1 5QX.

SMALL Avometer £25; Fluke digital meter £50; earth loop tester £100; clamp meter digital £25; Hr prove £10. 01554 2913, 6-8pm.

W15FM 70MHz C/W mic service manual; SP30; .22 Air Rifle; Mod HW35 SP90; Prone mat and shooting jacket by Andrew Tucker SP15 & 20; Green Cat Scope SP30; wanted: FT290R mic cable or mic & cable, mine faulty; W.H.Y.; also oscilloscope probe x1/x10 1 med/40PF. Ask for Patrick Tel Caernarfon 5468, after 5pm please.

FOR SALE: KW2000 SSB transceiver with instruction manual, AC power supply, 12V mobile supply plus verticle dipole antenna for 10, 15, 20M; all good condition £150. Phone G3RQB, 09274 24441.

DISABLED Operator has something for sale and help required to install some antennas; item for sale Kenwood 140 transceiver, little used, £700. Phone 0277 823434, Brentwood area.

FOR SALE: Eddystone EA12 amateur bands receiver, as new condition with manual, £170; Eddystone 730/4 ex condition with manual £120; Brenell reel-to-reel tape-recorder with new mike, ex condition, £65; receipts for overhauls on above are available, two new mains transformers + 100 valves for above receivers, £80. Phone 699-4413, after 6pm.

FOR SALE: PRO32 pocket scanner £100; also AOR800 pocket scanner £120; both very good condition. Contact Tom Valentine, 38 Grampian View, Montrose, Angus DD10 9SX. Tel. 0674-76503.

WANTED

HELP wanted, circuit diagram/manual for Ajax A20DL transceiver; Also Ajax SSB Mod wanted for FRG7; DFM Mod or details; also wanted, old Sony FM receiver STR6045L, any condition provided works! Phone 040484 448, after 7pm.

WANTED: Kenwood TM421E 70cms mobile transceiver, must be absolutely mint, with all accessories original packing. Phone Paul G4XHF (0293) 515201 (evenings) preferred.

WANTED: Any Ham International Concorde or Jumbo, must cover CB channels. Also Midland 6001 CB for sale, offers? Ring Andy after 5.30pm on (0234) 65343 Bedford.

WANTED: Collins or Kokusai valve-type mechanical filter, 455kHz 2kHz bandwidth preferred. Any reasonable price paid. Telephone David, Leeds (0532) 446299, extension 436, before 5pm.

WANTED: Kenwood/Trio SP-230 external speaker for TS-530S; also external V.F.O., 230/240 for TS-530S. Urgent. S. Clifton, G4WBT, telephone Northampton (0604) 414498.

WANTED: FT290 2m rig or similar, exchange Sony 7" reel to reel cassette deck TC-1863D Sony turntable or

complete Durst darkroom with extras. Phone 0264 58950 evenings; cash adjustment if necessary.

WANTED: Transmitter tuning unit TU8B; ex USA TX BC-375-D. Also any info on receiver R5223. Ask for John on 0326 290711.

WANTED: Yaesu FR50B transmitter, must be in good condition. Send details to Mr Cyril Davey, 2 Gloucester Road, Lupset, Wakefield, Yorks WF2 8NF.

WANTED: Trio 9000 mobile mounting bracket Kenwood, part number MB9, no longer made. Or if anybody can suggest a bracket to be modified — please ring 061 339 7123 any day, after 6pm. Will pay reasonable price.

WANTED: Battery charger CM16 or BC16, 240V AC for Icom BP24 batteries. G. Barnes G3AOS, 14 Coalpit Lane, Langley, Macclesfield, Cheshire SK11 0DQ.

WANTED: All brand QRP transceiver Trio 120 Shimizu 102S or W.H.Y. C.W. only considered, must be in good working order. Cash waiting. Telephone Arthur G4FKZ, 061 624 2808.

WANTED: UPD858 synthesiser chip for Adams; also have Taylor model 62A AM FM signal generator, will swap for USB LSB AM FM rig, multi-mode etc. Contact Shane, 17 Pleasant Ave, Hillstown, Bolsover, Chesterfield, Derbyshire. Tel. 0246 827345.

WANTED: AH7000 wideband discone Icom SP3 ext speaker. Datong FL3 filter. Phone (0206) 394336 (Essex) after 7pm please.

WANTED: 40 channel AM/SSB CB President or Cobra in good condition preferred. PO Box 16, Heaton, Newcastle NE6 1AL.

WANTED: Bearcat 250 (FB) in good condition. Telephone 01-993 1540 anytime, if out leave message on answer phone.

WANTED: Sony CRT320 CRT330K, Panasonic RF9000, Icom ICR71E, Grundig Satellit 3400, professional or similar short wave receiver; condition unimportant; good cash price paid and transport arranged by collector. Please phone 0933 56087, evenings and weekends.

WANTED by keen beginner: C/W software tape or program

listing for Sinclair ZX81 (TX/RX or RX only). Telephone Paul Hiles, Leighton Buzzard (0525) 851678 (office) or Milton Keynes (0908) 666546 (home).

WANTED: Software to run the PK232 packet system with Amiga A5000. Any help would be appreciated. Ring 091 415 1550, after 6pm; Keith.

WANTED: HRT April, May, June 1983 or KW articles by G3TNO. Please contact G3SLN QTHR or 061 643 9014, thanks. All expenses paid.

WANTED: Harmsworth's Wireless Encyclopedia, Third Volume or complete set. Roger, evening, 0277-214406.

WANTED: HF SSB TX, not ex WD. Also 2m rig, oscilloscope; exchange camera 35mm Zeiss Werra f2.8, projector, automatic remote control. Eddystone EC10 RX with manual. All as new. Cash adjustment. Telephone, evenings, Phil 01-657 4030.

WANTED: Icom desk charger type BC35E; also dual band base station antenna. Norman, G4RYS tel. 0532 663846 or write 23 Moor Allerton Ave, Leeds 17.

WANTED: 62 set F.W.O. G/C. Contact: Geoff 0344 52601.

WANTED: Valve Bases, type B7A for valve QQVO-6-40 ex-equipment items acceptable. Tel. Jonh on 0293-783556, anytime.

WANTED: Information on how to get a reply from Backcopies Dept of HRT or a copy of Revue of FTDX401. All expenses covered. Ron G4DIY QTHR or 0744 57471.

WANTED: Two metre element for Bird Wattmeter, 50 or 100 watt rating. Write or phone with price required to:— Tom Valentine, 38 Grampian View, Montrose, Angus DD10 9SX. Tel. 0674 76503.

WANTED: service manual and or circuit diagram for Krumar Haven 61 portable electronic organ, good price would be paid. Photostat OK. Phone Bristol 512082.

WANTED: TS830S, preferably with remote V.F.O., but not important. G3VOF. Tel. 04023 73366 (Essex).

WANTED: FR-50B Yaesu receiver to join FL-50B transmitter. Previous FR-50B lost by B.P.O. Call Peter EI4GV, at 0223 843695.

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