

HAM

SEPTEMBER 1990 £1.50

RADIO

TODAY

Add-on board to build
**CTCSS SUB-TONE
CONTROLLER**

**FREE
SCANNERS
SUPPLEMENT
inside**

**EXCLUSIVE REVIEW
IC-R72 - ICOM'S NEW
FLAGSHIP GENERAL
COVERAGE HF RECEIVER**

Review:
DIGIPROM TNC EPROM
A cheap way into Packet

BUILD A 'NEST'
Using parallel-
fed dipoles



THE COMPANY THAT BRINGS YOU THE LATEST TECHNOLOGY - FIRST !

SALES HOTLINE 021 552 0073 and HELPLINE 021 552 0051 (Office Hours)

ANOTHER RAYCOM PACKAGE

The **TOKYO HX240** HF Transverter when coupled to an all-mode 2m rig will give you 50W on 80 to 10m. RAYCOM have put together this unique unit with the new YAESU FT290RII.

IT WORKS GREAT !



FT290R II £429.00
 TOKYO HX240 £249.00
 1/2 Size G5RV £ 14.95
 12 Amp PSU £ 59.95
 Nicads & Wall Charger £ 31.30
 Total regular price £784.20

RAYCOM PACKAGE .. £699.00

YOU SAVE £85.20 !

Includes ALL D.C. and Co-ax leads
EXCELLENT HF AND VHF STARTER PACK
COME IN AND TRY IT FOR YOURSELF - YOU
WILL NOT BE DISAPPOINTED
 FULL RANGE OF YAESU AND ICOM ALSO STOCKED

HP100E/AR1000

Exclusive to RAYCOM
Short wave converter Module

Made in the UK by AKD
Coverage 200KHz to 30MHz

HP100E with converter £299.00
 HP100E no converter £249.00
 Converter only £ 59.00

NOTE
 HP100/AR1000 not purchased from RAYCOM requires modification to work with the converter Cost £15.00

THE UK SCANNER EXPERTS

WE HAVE SECURED LIMITED QUANTITIES OF THE NEW ICOM SCANNERS DIRECT FROM JAPAN - HURRY TO RESERVE YOUR ONE NOW !

The FANTASTIC ICOM ICR1 and ICR100

IC-R1 500KHz to 1300 MHz £399.00
 IC-R100 500KHz to 1800 MHz £499.00

OTHER HIGH QUALITY SCANNERS FROM RAYCOM

BEARCAT UBC 50/55XL 66-88/136-174/406-512MHz £99.95
 10 memories, channel review, including FREE charger worth £4.95
 BEARCAT BC 70XLT 66-88/136-174/406-512MHz £149.99
 20 memories, full frequency display, with FREE car charger kit worth £4.50
 BEARCAT UBC 100XLT 66-88/118-174/406-512MHz £199.99
 100 memories, airband, search, including FREE car charger kit worth £4.50
 BEARCAT UBC 200XLT 66-88/118-174/406-512/806-956MHz £229.99
 200 memories, top of the range, including FREE car charger kit worth £4.50
 BEARCAT UBC760XLT 66-88/108-174/350-512/806-956MHz MOBILE £229.99
 100 memories, 5 search bands, including FREE mains adapter worth £4.95
NEW JUPITER MVT 6000 mobile ONLY £329.00
 25 to 550 MHz and 800 to 1300MHz, 100 Memories
JUPITER MVT 5000 Hand-held ONLY £249.00
 25 to 550MHz and 800 to 1300MHz, 100 Memories
AOR 3000 base Limited Supplies available £699.00
 0.1 to 2036 MHz, 400 mems, LSB/USB/CW/WFM/NFM/AM

MANY OTHER TYPES AND MODELS STOCKED - NEW AND USED.

SEND AN SAE FOR OUR LATEST USED LIST

URGENTLY WANTED - USED SCANNERS AND HAM GEAR, WORKING OR NOT.

ICOM IC-R7000



Listen to weather, fire, coastguard, TV, airband and many, many more. Wide frequency coverage provides you with all the channels you need to become a VHF and UHF listener. Frequency coverage is guaranteed from 25 to 1300MHz, but may extend on individual units to 2GHz! Features include:

- USB, LSB, FM, FM-N, AM
- 99 memory channels, keypad entry
- optional infra-red remote control
- variable speed scan and delay
- optional voice synthesizer
- six tuning steps
- sensitivity < 0.3µV for 10dB SINAD

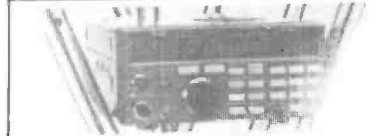
Save £108! Raycom price £925

Including FREE Royal 1300/AH7000 25 - 1300MHz discase complete with co-ax and plugs.

CHARGE IT!

Why not take advantage of the **RAYCOM Credit Card** and spread the payment for that scanner you've always wanted. Example: Yaesu FRG9600 MKV package £70 deposit and £28 per month (APR 36%). Call for a quote and written details! Licensed credit broker.

YAESU FRG9600



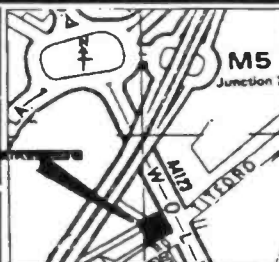
9600 standard 60-905MHz £469.00
 9600 MkII 60-950MHz £499.00
 9600 MkII pack 60-950MHz .. £545.00
 9600 MkV 0.2-950MHz £625.00
 9600 MkV pack 0.2-950MHz .. £699.00
 Standard to MkII .. Upgrade £ 40.00
 Standard to MkV .. Upgrade £149.00
 MkII to MkV Upgrade £129.00
 Packs include PSU and ROYAL 1300!

RAYCOM COMMUNICATIONS SYSTEMS LIMITED, INTERNATIONAL HOUSE, 963 WOLVERHAMPTON RD, OLDBURY, WEST MIDLANDS B69 4RJ. TEL 021-544-6767, Fax 021-544-7124, Telex 336483 IDENTI G

RAYCOM

COMMUNICATIONS SYSTEMS LIMITED

Telephone 021 - 544 6767



RAYCOM gives you more BUYING POWER

ALL MAJOR CREDIT CARDS ACCEPTED. BC, ACCESS, DINERS. INSTANT CREDIT UP TO £1000 (SUBJECT TO STATUS) WITH RAYCOM CREDIT CARD (APR 36%). INTEREST FREE CREDIT ON CERTAIN ITEMS AT MRP. CALL FOR MORE DETAILS.

ORDERING INFORMATION

WE STOCK ICOM, YAESU, BEARCAT, MFJ, BUTTERNUT, CUSHCRAFT, AEA, NAVICO, STANDARD, TEN-TEC AND WELZ AMONG MANY OTHERS. SEND SAE FOR FULL LIST.

TEL: 021-522-0073

PHONE BEFORE 4PM FOR NEXT DAY DELIVERY BY COURIER (£15.00) - OR 2PM FOR DELIVERY BY POST (£10.00). PLEASE ALLOW TIME FOR CHEQUES TO CLEAR. MANY OTHER ITEMS IN STOCK. PLEASE CALL FOR MORE INFO AND FOR EXTRA SPECIAL DEALS!

INFOLINE 0836-771500 5-9pm (week days)

OPENING HOURS 9-5.30 MON TO SAT.
 73 DE RAY G4KZH, PETER G4EWD
 COLIN and JOHN on the phone.

HAM RADIO TODAY

CONTENTS

VOLUME 8 NO 9 SEPTEMBER 1990

Editor
Helen Armstrong BA
Technical Editor
Andrew Armstrong BSc CEng G3YZW
Reviews Consultant
Chris Lorek BSc (ENG) G4HCL
Technical Illustrator
Jerry Fowler
Advertisement Manager
Cass Gilroy
Classified Sales Executive
John Brasier

Published by:
Argus Specialist
Publications
Distributed by
SM Distribution Ltd
Printed & bound by:
Acorn Web Offset, Bradford

Design by
ASP Design Studio
Editorial and Advertising:
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,
Select Subscriptions 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



Ham Radio Today is normally published on the first Friday in the month preceding cover date. The contents of this publication including all articles, designs, plans, drawings and programs and all copyright and other intellectual property rights therein belong to Argus Specialist Publications. All rights conferred by the Law of Copyright and other intellectual property rights and by virtue of international copyright conventions are specifically reserved to Argus Specialist Publications and any reproduction requires the prior consent of the Company © 1990 Argus Specialist Publications.

All reasonable care is taken in the preparation of the magazine contents, but the publishers cannot be held legally responsible for errors. Where mistakes do occur, a correction will normally be published as soon as possible afterwards. All prices and data contained in advertisements are accepted by us in good faith as correct at the time of going to press. Neither the advertisers nor the publishers can be held responsible, however, for any variations affecting price or availability which may occur after the publication has closed for press.

REGULAR COLUMNS

READERS' LETTERS	4
Where to get your HRTs from?	
RADIO TODAY	6
A Committee to examine the Microwave spectrum.	
PACKET RADIO ROUNDUP	22
Now they catch CW idents speeding.	
MORSE FORUM	34
Coming up to the Morse bicentenary.	
50MHz MESSAGE	48
A landmark DXCC is close at hand.	
RADIO TOMORROW	50
Huntingdon Junk and Bristol Great Train Shed.	

FEATURES

NEWS REPORT AND COMMENT: DTI ACTIVITY	12
Packet radio is the main target of DTI cleanups.	
HAMFEST IN DAYTON, OHIO	46
The rally from Dayton, not Drayton.	
QRZ	42
The return of Yemen to the amateur community.	

CONSTRUCTION

A NEST OF DIPOLES	16
Several dipoles in the space of one by parallel feeding.	
CONTINUOUS TONE CONTROLLED SQUELCH SYSTEM	30
A sub-tone call controller in DIY or basic kit.	

REVIEWS

THE IC-R72, ICOM'S LATEST HF RECEIVER	26
The new flagship cuts a few corners to hold its price.	
DIGIPROM CARTRIDGE TNC FOR COMMODORES	36
Low-cost packet on a prom for the C64 and 128.	

SUBSCRIPTION INFORMATION	25,41
FREE READERS' ADVERTISERS	53
ADVERTISERS' INDEX	56

LETTERS

Letter of the Month

Can you tell me why I can't find Ham Radio Today in my local newsagents? An old-timer like myself doesn't have the cash to subscribe a year in advance, but now I am faced with subscribing for a whole year or missing many issues. I can't always get to the big newsagents in time to pick up the latest magazines.

— B. Carswell, Middleton, Leeds.

I'm glad you raised that subject again, as we have been discussing it here. Getting specialist magazines into a broad range of newsagents is a challenge.

It's said that if you gave every

magazine produced in the UK a ticket to Wembley Stadium, most of them would have to stand. Small newsagents have little display space, and special interest magazines tend to lose out. Even the big newsagents like W H Smith have limited space and regional policies about what they will display and for how long.

Subscribing is a reliable way of getting issues, but if you don't want to subscribe, try asking your newsagent to order a copy for you every month. Many newsagents will do this; you can then pay by the month. They may even deliver, although most seem to prefer customers to collect special orders.

If you want to subscribe, the £10 for letter of the month may help.

shows that they work best as a surplus sale, ie the less the readers have to pay to get the gear to market, the more readers will want to sell their surplus equipment, the more ads we will get and the more interesting the pages will become.

However, because we receive a large and unpredictable quantity of ads., we can't guarantee a publication date. There is also the standard three month lead time (by cover date) which becomes four months if we have to hold some over, and so on.

For this reason, if we have ads running over, the Classified department will phone advertisers who have a lot of gear to sell, to tell them that they can advertise in a guaranteed issue at a minimum cost of just over £8 (inc. VAT). Classified set fewer ads., so they also have a slightly shorter lead time.

Log Rolling, with ADditions

With all this talk about CW being obsolete and a waste of time, what about that other ancient crock, the Log Book? As a G1 of about six years when I first became licensed I kept a log religiously for about six months, then I started to miss the odd entry and now I don't fill it in at all. I know there are going to be a few people out there who will throw their arms up in horror, but if a secret poll was taken, I think that most people would prefer the log book to be an option rather than compulsory. This is the system used in America, where you only keep a log if you are causing interference, and then stop when you are cleared of causing the problem.

Most of the rules regarding amateur radio are taken from an outdated Naval system which has changed a lot in the last few years. For example, Naval wireless officers no longer need to know Morse, as most of the information passed uses digital and satellite systems.

And now a more personal matter. Lots of people take publications for their ads selling surplus equipment. I have carried out my own survey.

I have noticed that when using your Free Ads column I get you telephoning me to sell me classified ad space (which you charge for) and I feel this is an infringement on my privacy and wish you would stop it.

Also, I sent an ad in from the November 1989 issue and it is not even in the February issue. Can't you get your act together?

— G1 . . . (for the obvious reasons).

We understand — we are sure you are more concerned about the possibility of getting a stern letter from the licencing authority than the likelihood that we will let the HRT rottys loose upon you. We don't keep the coupons after they have been set, anyway, so you can come out from behind that transmitter.

If the Navy abandons something, it usually abandons it for a reason. It is time the official role of the log book was looked at again, if only to see what it is actually achieving against what it should be achieving in theory.

We run the Free Readers Ads as a free service, because experience

Read It Again, Sam

Re. your item in Radio Today, February 1990 issue, Capco's Own Words.

The inference in your write-up is that magnetic loops are something new. May I suggest you read *Jane's Military Communications*, any issue, and note they have been in use for over 40 years, even during the war, on planes and ships, etc.

I use an ex-army loop I bought 15 years ago, for £20, so how can G4OGP by the UK leading authority? I think a re-write is in order. I would have thought you would have known about these things. PS Check the Linilex, by Phase Track.

— R. Trent, Lomax Farm, Pilsworth.

Come on, fair's fair. What the news

£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.

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



actually said was that G4OGP is "one of the UK's leading authorities on the subject." There are people all over the world doing development and making changes to the basic design of magnetic loops. Thank you for the Linex tip.

Why Are We Paying?

My driving licence is for "life". My aeronautical radio licence is for "life". Why do I have to pay annually for my amateur radio licence? It's not as if we get any service for the payment. The Radio Interference Service has to be paid for on callout, now. It probably costs £12 to administer the charge, so let's get it dropped.
— Hugh Allison G3XSE, Bishops Stortford.

Personally, I would rather see the DTI take more responsibility for investigating interference and serious contraventions of the amateur radio licence, and keep charging the money. If they don't, then they shouldn't be charging. The RSGB may now be treated as their agents in many matters, but the RSGB is not a government body, and they seem to have their hands full enough already.

De Facto Morse

With reference to the letter in your May 1990 issue from M R Clarke regarding the Morse test for an amateur A licence, I think that Mr. Clarke is wrong in his assumption that CW is an "outdated form of communication", but even if he is correct, he will still have to pass this simple test, so why does he not apply himself to the task?

After passing the test, Mr. Clarke could then, perhaps, have the rules

amended for the benefit of other aspiring amateurs.

Lastly, I see that Mr. Clarke cannot resist a snide remark about A licensees using SSB on the hf bands, but that is their privilege, and not all do so exclusively.

— D Morrison GM0BCQ, Berwick-upon-Tweed.

Morse Can Be Trying

After HRT published a letter of mine some time ago, concerning the problems inherent in learning morse, I received quite a number of letters from hams with this problem, and I thank them for their letters. It would seem that the majority of amateurs experience some difficulty at two or three critical stages: (a) going from written symbols to sounds (b) 5 to 8wpm (c) 10 to 12wpm.

All seem to hit the 10-12wpm barrier and 'bounce', sort of like crashing through the sound barrier. Most eventually get over it, some get stuck and fail repeatedly. One chap told me that he had gone for the test the sixth time, "knowing" he would fail. "I wasn't nervous when I went in," he said, "As I knew I'd fail." I was puzzled as he looked sort of pasty-faced and glassy-eyed. I asked him how it went. He said "I got 100%, no bl* *dy error." He'd only been trying for 15 years.

So there is hope for everyone. I personally don't understand why amateurs are nervous at morse tests. Service men and women, commercial radio ops, that I understand; it's their jobs, promotion and salary that increase with success. For the ham all it means is a lost trip and trying again, but no real penalties. So try not to

worry about it, it's just a hobby. As the song says, "If at first you don't succeed, try try and try again." You'll win through.

PS Morse can drive you mad taken in large quantities.
— John D. Bolton, Timperley, Cheshire.

Only 15 years? There really is hope for us all yet. It's worth remembering that they thought the sound barrier was a brick wall, till they found out that all they were hitting was their own pressure wave. Very metaphysical, what? Er, yes, the wings did fall off... with Morse, you don't have to leave the ground, so, as JD says, why worry?

World Events

Poll tax, prison uprisings, tumult in East Europe, and now a covert punch-up at Radcom. Where will it end? The connecting link is an urgent need for reform, that's clear. As organised now, the RSGB would make East Germany seem avant-garde, slopping out trendy and poll tax state-of-the-art.

— Trevor M Artingstoll G0JOE, Portugal

Well, well... we thought you were going to blame them for global warming!

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 TODAY

Microwave Committee

The Secretary for Trade and Industry, Nicholas Ridley, is to set up a new Committee to examine current and future uses of the microwave radio spectrum. The terms of reference for the Stage 2 committee include looking at the current uses of the spectrum from 3400MHz to 30GHz, its anticipated growth, and other changes affecting it which are happening or likely to happen.

In reply to a Parliamentary Question, Mr Ridley said: "The report of the Stage 1 Civil Spectrum Review Committee, published in April last year, has been widely welcomed as making a major contribution towards our commitment to make more efficient use of the radio spectrum and to provide more information regarding current use."

He continued by saying that the findings of the Stage 1 Committee had been assessed and that "measures will be taken to follow up all of the recommendations." A schedule of the steps being taken is available from the DTI Radiocommunications Agency at Waterloo House. He added that "Frequency planning ought to maintain a long-term perspective . . .", Sir Kenneth Corfield, chairman of the first stage review of Defence spectrum usage, will chair the combined Stage 2 Review Committee.

The Committee are asking for evidence from people having an interest in the use of the radio spectrum between 3200MHz and 30GHz, to be addressed to the **Radio Spectrum Review Secretariat, Room 508, RA, Waterloo Bridge House, Waterloo Rd., London SE1 8UA, by 31 October.**

Field 'Scope

Electronic and Computer Workshop have a 'fully portable' battery/mains oscilloscope designed for field and test applications. The Crotech 3044 dual-trace 20 MHz scope costs £530. The vertical sensitivity for both channels is from 5mV to 20mV per division, but x5 and x10 magnifiers are incorporated, plus time base sweep speeds from 0.5µs/div to 0.2s/div.

95mm (diagonal) display, 8 x 10 unit graticule and triggering facilities one would expect from a mains operated unit'. The power supply gives 100/200/240 vac mains input, with built in 12V 1.9Ah nicad or external 12V supply. For more information contact **Electronic and Computer Workshop, Unit 1, Cromwell Centre, Stepfield, Witham, Essex CM8 3TH, tel. 0376 517413.**



Scanner Power

The picture shows a new combined power unit and stand for handheld scanners, from Nevada. Designed for the Fairmate HP-100E, and can also be

used with the AR-1000, a close relative of the Fairmate model, and the Yupiteru (Jupiter) MVT-5000, Bearcat 50XLT and Bearcat 55XLT.

The JIM PSU-101 supplies 12V DC at 250mA from a 220 to 240V mains input, to keep its inmate powered for desktop use, and recharge any internal nicads for portable use. The unit has a mains on/off switch, around 1.7m of cable, and a dual-purpose led indicator which glows softly to indicate that the unit is switched on, and brightly to show that it is powering the radio parked in it.

Made in the UK by SSE, the PSU-101 is built to UK safety standards, and costs £26. Enquiries to Nevada, **189 London Rd., North End, Portsmouth, Hants PO2 9AE. Tel. 0705 662145.**

Manual Service

Mauritron Technical Services (MTS) is a specialist company supplying workshop service manuals, mainly for television- and radio-related equipment of any age, on a sale or library basis. Proprietor Maurice Small G0HJC, who runs the service from Chinnor, Oxford, says that MTS has a very good section on amateur and CD radio, and that they can operate a search and trace service for manuals and information that they do not already hold in their 100,000-item reference library "from the earliest vintage valve wireless to the latest tvs and videos."

As well as supplying information for specific needs, MTS runs a 'loosely-knit worldwide association of people ... centred around the electrical/electronic industry' to provide help and information. Membership of the Mauritron Technical Society is currently £15 in the first year, to cover life membership registration, and £5 a year thereafter, which brings the member copies of the current catalogue as it becomes available, a certain amount of technical help before further charges arise, information on firms known to the Society, some spare parts at Trade terms, a free publication, a free small ad in a current catalogue, and any other discounts or benefits arising during the year from MTS's activities. MTS, of course, also buys manuals and similar information.

Further information from Maurice Small, MTS, 8 Cherry Tree Road, Chinnor, Oxon OX9 4QY, tel. 0844 51694, fax 0844 52554.

Whirr'd In The Hand

Incastec Associates Ltd., known for their marine electronics, are now the distributors for the "Windy" hand-held, battery-operated anemometer. Running on a PP3, the anemometer gives a digital readout switchable between knots or meters per second, with comparison scales for Beaufort of

km/hr.

Windy's compact size make it useful in a mobile/portable environment, and the distributors suggest that it would be very appropriate for amateur radio use. The retail price is £75 inclusive of VAT. For more information, contact Incastec, 75/77 Christchurch Road, Ringwood, Hants BH24 1DH, tel. 0425 476211.

Wise Young Owls

Jim Kimpton G4WAO of Chichester DARC is one active radio amateur who has successfully put his 'class' of 13 young Brownies and would-be Guides, between the ages of 6 and 11, through their Radio Communication Badge Course for the First Hunston Brownie Pack.

The syllabus for the badge included knowing and using the Radio Phonetic Alphabet, attending a Thinking Day SES and writing a report or designing a QSL card, tuning in a receiver and a simple discussion on other uses of two-way radio.

The test may be simple, but 13 youngsters who might otherwise never have encountered 'live' radio have now taken a first step to appreciating how radio technology works. Considering that many people including at least one MP, cannot wire a plug or program a video recorder properly, this is a big step.

Congratulations to Jim G4WAO and his pupils.

RAE Courses

Fareham Morse Workshop, Neville Lovett Community School, from Monday 24 September, 7-9pm. Enquiries: School 0329 823471, or G3CCB, 0329 288139.

RAE, Green Lodge Adult Education Centre, Clacton-on-Sea, enrolment during week commencing 10 September. Enquiries to G3LWM, 21 Waltham Way, Frinton on Sea, or Clacton Radio Club, Reg Taylor GONIP, 14 Meadow Way, Clacton on Sea, Essex, tel. 0255 430466.

RAE/Morse, City of Westminster College (formerly Paddington College), starting early September for May 1990 exam. Please contact Ann James at Science and Technology

Department tel. 071 723 8826 for details.

RAE/Morse/Electronics, Joseph Priestly Institute, Morley, Leeds. RAE Wednesday 7-9pm, Morse Tuesday 7-9pm, Electronics to GCSE 7-9pm Thursdays. Enrolment from 3 Sept, details from the college, tel. Leeds (0532) 532782.

RAE, Henley College, Henley on Thames, enrolment during the first week of September at the Science and Technology Dept., Henley College, Deanfield Ave., Henley on Thames. Tel. 0491 579 988 ex 298. Wednesdays 7-9, £30.15 for the year. Lecturer is David Bowman GOMRF, who can be contacted at the college. This is Henley's pilot year with the RAE, so support is welcome.

Handy Booklet

If you're an swl who wants to make the very best use of your day-to-day portable radio, take a look at Dial-Search. Dial-Search (6th edition), subtitled The Listener's Check-List and Guide to European Radio Broadcasting, is a handy booklet. Published every two years, its stated aim is to "provide the essential information for anyone using a portable radio with its own normal aerial . . . to make the most of their set and vary their listening, whether . . . in news, music, languages or whatever."

Author George Wilcox likens his book to a phone directory, but unlike a phone directory it also offers plain non-technical advice on getting the best reception, and also two pasted-in coloured station maps, one of the British Isles and one of Europe and the Mediterranean.

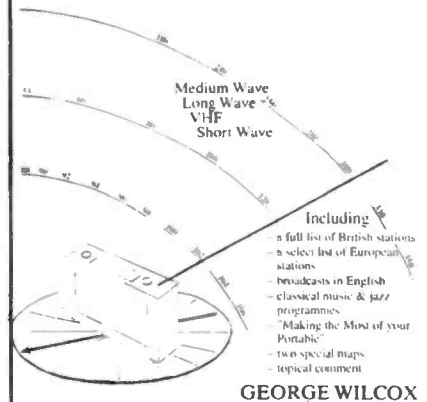
The information is arranged in easy-to-follow indexes, including frequency bands, long wave, medium wave by area (including North American), VHF FM, short wave and specific guides to English language broadcasts, classical and jazz music programmes, and recent

1990/91

Sixth Edition

DIAL-SEARCH

The Listener's Check-list and Guide to European Radio Broadcasting



changes in broadcasting law.

The book has a full listing of British stations, including community radio, updated to February 1990, and a select list of European stations as monitored by the author.

The A5, card-covered book has 54 pages, plus the two maps, and is available for mail-order, priced £4.50 (UK) or £5 (abroad), or £3.95 if obtained in person, for instance through a bookseller. Mail orders to **George Wilcox, 9 Thurrock Close, Eastbourne, E. Sussex BN20 9NF, UK.**

Travels in Germany

The Loughborough and District ARC will be visiting Schwabisch Hall (which is twinned with Loughborough) in West Germany, from 28 August to 3 September. Eight members will be travelling through Holland and Belgium en route and will be using a PA or ON prefix with the G3RAL/P club call, and DL in Germany. They expect to be operating on CW, SSB, rtty, sstv and 2/4m FM.

The club is issuing an award certificate for 75 points-worth of contacts with G3RAL, viz: on rtty or sstv, 15 points; SSB/CW QRO (5W+) 5 points; QRP (3W max) 15 points; in QSO with: PA/G3RAL or ON/G3RAL, 15 points; DL/G3RAL 10 points; and plain old G3RAL (UK) 5 points. Claims with certified log entries for checking, plus SAE, to P. Southwart G4RVW, 2 Alan Moss Road, Loughborough, Leics.

Scotland Calling

YAGIS is the superbly appropriate acronym of the Young Amateurs Group In Scotland — occupied by “young people and some of the young at heart”. Aiming to encourage younger people into amateur radio, the group have so far run projects in tuning up Pye Cabridges for 70 and 144 MHz and FM, setting up Stornos and Burndepts for

70m and Four respectively.

Much of their pmr great has been kindly donated, but the group also recently raised £80 on a repeater run, and organised a trip to the NEC for the RSGB Convention. Projects in the planning stage include a VHF SES expedition up Ben Lomond, and foxhunting. Based near Glasgow, the club contact is David Martin GM7BPA.

New Base for Garex

Garex Electronics is on the move again. Complete with its well-known stock of scanners, weather satellite systems, mobile antennas and reconditioned radiotelephone equipment among others, it moves to new and larger premises in South Brent, Devon, as of 6 August 1990 — that's Monday opening time to readers.

MD Peter Longhurst sees the move as a milestone. “Since 1963 when Garex started up, we have seen enormous changes in both products and marketing and this move to our own

custom designed building in Devon will enable us to improve our service to customers and meet the competition of the 1990s” says Peter.

Handily located just off the main A38 between Exeter and Plymouth, the new base extends a welcome to visitors to the retail counter between 10am and 5pm Monday to Friday.

Find Garex at Station yard, South Brent, Devon, TQ10 9AL. Tel. 0364 73394, fax 0364 72007. Ham Radio Today wishes Peter and his team the very best and a smooth move from Dorking to Devon.

Tools Move

The UK interests of EPE, the American hand-tool manufacturer, have been taken over by Ungar, specialists in soldering and desoldering tools, with a view to broaden their ability

to supply a complete range of benchtop equipment from a single source.

Enquiries to Eldon Industries UK Ltd., Unit 1, Clifton., Shefford, Beds SG17 5AB. Tel. 0462 814914.

Multi Measurements

The Maplin Precision Gold multipurpose dip meter covers 1.5 MHz to 250 M.Hz in six overlapping ranges. The unit can also be used as an absorption wavemeter, and is calibrated 0 to 10 in 10 steps. In wavemeter mode it can also be used for short-wave receiver testing with CW signals. With AM signals, the unit can be set to ‘Mod’ and a tone will be added to the carrier frequency. An audio signal output is provided for connection to a crystal earpiece. The meter also has a battery check function. The Maplin part number is YN48C Dip Meter, price £49.95 in. VAT but ex. carriage.

Maplin are also stocking a world calendar/clock alarm which keeps the time in 35 cities, accessible from a touch-sensitive map on the clock face. The desktop-style 24-hour clock shows date, day, month and year from 1988 to 2037 on an 85mm wide lcd. The world map displays 27 time zones. A special zone handles British summer time. The clock is powered by two AA size batteries. Maplin part number is YT97F World Clock, priced £27.95 inc. Vat ex. carriage.

Both items available from Maplin Electronics by mail order tel. 0702 554161 or Maplin shops in major cities, for which see your phone book or Maplin catalogue.

Carry On, International Traveller

One radio amateur has concluded that it is better not to volunteer information about ham radio gear travelling in hand-baggage unless specifically requested.

Reporting on the packet radio network, Irish operator G14FUM described how he arrived at the airport security check at Brussels carrying his jacket over his arm.

To his surprise, although his hand luggage was not searched, security officials told him to pass his jacket through the baggage X-ray scanner. He remarked that he had an amateur radio in the pocket. Although he had a licence validation document with him, confirming his status as a radio amateur, they refused to allow him to carry the radio, a Sony ICF7600D, in his hand-baggage.

As he had no other luggage in which to stow it, the airport authorities first offered to send the radio on to him in Ireland (to Dublin, although he was travelling to the North), then, when he protested, gave the radio to the cabin crew to carry.

Shortly after take-off, G14FUM had his rig returned

to him by a member of the cabin staff, expressing surprise that it had been given to them. G14FUM's companion carried a dual-band hand-portable through in his hand-luggage without attracting comment.

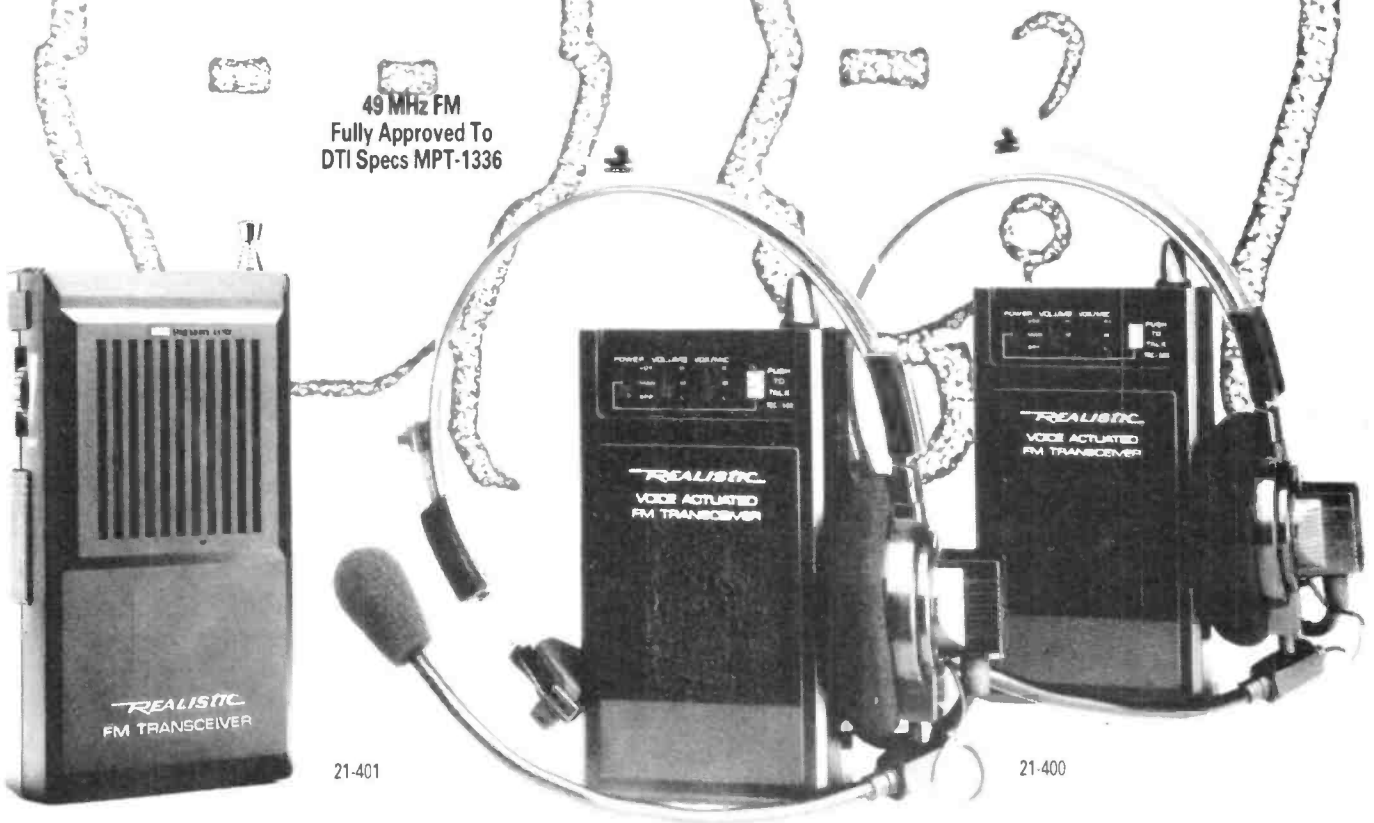
Experienced travellers have noticed that excessive concern about individual items at airports, and inappropriate means of dealing with them, often indicate the absence of a technically experienced official. This in a major airport must cause worry at a time when explosives and detonators are known to have been smuggled onto aircraft in radios.

It is standard practice in many international airports, including Heathrow, not to permit electrical equipment, including radios, computers and cameras, to board aircraft except in the owner's hand-baggage, so that it remains with the individual concerned.

Pan Am Flight 103, which exploded over the Scottish town of Lockerbie in December 1988, gave rise to a new generation of security measures at airports worldwide. It was destroyed by Semtex explosive packed into a tabletop-style general-coverage receiver in the aircraft's cargo hold, thought to have been placed there either by terrorists posing as baggage-handlers, or by an innocent passenger.

REALISTIC®

Walkie talkies



£24⁹⁵ EACH

• Licence Not Required

Realistic TRC-501. Only 1 inch thick and five ounces light! Call button transmits a tone signal. Low-battery indicator, push-to-talk button, telescopic aerial. Includes belt clip. Requires one 9v battery.

£59⁹⁵ PAIR

• Licence Not Required

Realistic TRC-500. Voice-actuation gives you hands free communication. Dual-conversion superhets for high sensitivity and clear 2-way communication. Volume switch. With belt clips. Each headset requires 9v battery.

Tandy®

Over 400 Tandy Stores And
Dealerships Nationwide. See
Yellow Pages For Address Of
Store Nearest You.

InterTAN U.K. Ltd., Tandy Centre, Leamore Lane, Walsall, West Midlands. WS2 7PS
Tel: 0922 710000

ICOM

NEW MULTIBAND IC-970E Base Station



Designed for the serious operator on the 144, 430 and 1200MHz bands, Icom's new IC-970E has up-to-date technology for DX, digital and satellite communications.

The IC-970E is supplied as an all mode dual-bander for 144 and 430MHz bands. Optional units expand its capabilities to 1200MHz or wideband receiving from 50-905MHz.

Communications via satellites has never been easier. The IC-970E automatically tracks uplink and downlink frequencies as the tuning control is rotated also, ten specific memory channels for satellite frequencies.

The dual-band watch allows you to receive both MAIN and SUB band audio simultaneously, multiple scanning systems on the MAIN and SUB bands plus 99 memories, an easy to read central display and Icom's DDS system make this one of the most comprehensive multi-band transceivers available.

For more detailed information on the IC-970E Base Station or any other Icom radio equipment contact your local authorised dealer or call Icom (UK) Ltd.

Icom (UK) Ltd.

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

**AS FROM THE 1st SEPTEMBER OUR SHOWROOM OPENING TIMES WILL BE:
MONDAY-FRIDAY 0900-1300 AND 1400-1750.**

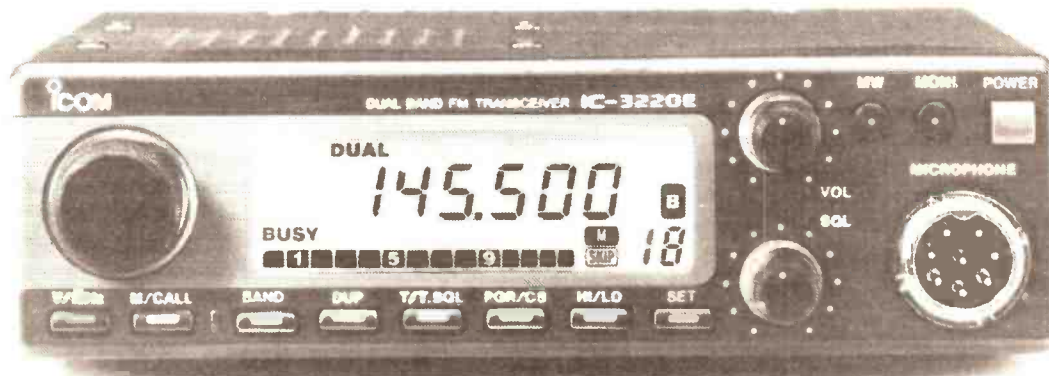
Count on us!

NEW MOBILES

IC-229E/449E
2M, FM Mobiles



IC-3220E
Dual-Band
Mobile



Icom have built a range of ultra compact FM mobile transceivers. Similar in style, easy to operate and perfect for driving safety. Advanced features include a variety of tuning steps, memories, scan functions, adjustable R.F. power, optional pager and tone squelch units for selective calling. All these models include the HM-59 hand microphone with up/down and 1750Hz tone call for repeater operation. The unique simple operation enables each function to be operated with one switch. Illuminated switches and controls give complete night time operation.

IC-229E VHF Mobile. This VHF 25 watt transceiver measure just 140(w) x 40(h) x 105(d) mm. No need to worry about installation, its small enough to fit most vehicles. Also available the IC-229H 50 watt version where extra high power is required.

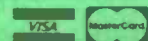
IC-449E UHF Mobile. High sensitivity with GaAs FET's and 35w output power provide optimum performance with this UHF transceiver. 20 Memory channels and a programmable call channel can be used to store most used frequencies.

IC-3220E Dual Band Mobile. Enjoy complete dual-band operation. In addition to cross band duplex operation this transceiver can receive both MAIN and SUB bands simultaneously. One of the smallest dual-band mobile transceivers available, the IC-3220E has a 25 Watt output on both bands. Where higher power is required the IC-3220H offers 45 watts on the 144MHz band and 35 watts on the 430MHz band.

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.



HRT Special News Report

THE DTI, PACKET RADIO AND THE LAW

DTI Threatens Packet

The DTI has written to the Radio Society of Great Britain threatening the future of the packet radio network if certain types of message continue to appear.

Reported in the July 1990 issue of *Radio Communication*, the journal of the RSGB, the letter, from the head of the Radiocommunications Agency, pinpoints "messages inciting others to join particular dispute" and "message(s) ... where amateurs offer items for sale via packet radio" as unacceptable. It continues by drawing attention to the terms of the Wireless Telegraphy Act and the Telecommunications Act under which the amateur licence is issued. The clause in question is well known to all amateurs and reads:

"(4) The Licensee shall address Messages only to other licensed amateurs or the stations of licensed amateurs and shall send only:

(a) Messages relating to technical investigations or remarks of a personal nature."

The DTI is concerned that the messages described above do not comply with the terms of the licence under the Wireless Telegraphy Act, which, as the letter stresses, "...do, of course, reflect into the dispensation for amateur radio under the Telecommunications Act licence..." In fact they put it rather more strongly than mere concern: the letter concludes "... if the sort of traffic described above continues or increases then the Department would have to give serious consideration to the continuation of the packet network in its present form..."

Baffling as some of these statements appear when inspected closely, the message is clear.

To combat abuses, the DTI is asking the RSGB to "issue a general reminder to amateurs generally and mailbox operators in particular," and further, without actually stating that they must do so, points out to mailbox operators that it is in order for them to review and delete unacceptable messages.

The RSGB draws attention to the fact that advice to mailbox users, and a set of draft guidelines, is available from the Packet Working Group. The draft guidelines have been published on the Packet network in the past, and have now been sent to the RA for comment and discussion.

The RSGB PWG Chairman is Ian Suart GM4AUP, 37 Meldrum Mains, Glemnavis, Airdrie, Lanarkshire ML6 0QG, and we are sure that he would appreciate an SAE with enquiries.

A Personal Question

One question which this statement has already raised is: what is and is not a remark of a personal nature? "I'm fine today"? "I went to church this morning"? "I want to sell my transmitter..."? "I think the RSGB/DTI/Ham Radio Today are doing a good job..."? Spot the non-personal remark. Can you?

As well as the clause quoted above, the licence also states: "3. (3) The Licensee shall:

(a) have no pecuniary interest (direct or indirect) in any operations conducted under this licence; and

(b) except as provided by sub-clauses 1 (2) and (3) and except in the case of activities on behalf of a non-profit organisation established for the furtherance of amateur radio, not use the Station for business, advertisement or propaganda purposes including (without limiting the generality of the foregoing) the sending of news or messages of, or on behalf of, or for the benefit or information of, any social, political, religious or commercial organisation."

Like many a regulation, the clause in question is broadly as we would wish it. It protects the interests of organisations representing and run by radio amateurs, while preventing the facilities from being hi-jacked by business or political interests, or indeed any organisation which might find amateur radio a cheap and effective way of putting across messages external to the interests of radio amateurs, the proper users of the band. Squatters, in other words. This is important and necessary.

The main non-profit organisation in question must be the RSGB, which does not trade in order to make a profit, despite its fund-raising sales and the fact that it does compete in the commercial market for trade advertising, through RadCom. The others are the radio clubs.

Unfortunately, a side effect of this is that, while RSGB can run a news service on the bands, while special event stations and competitions sponsored by the amateur radio press from time to time are permitted (although the journals in question are not, at least not voluntarily, non-profit making) and statements broadly supporting RSGB and DTI activities are well tolerated, rallying cries in disagreement with official policies are less well received. And ordinary amateurs cannot legally offer for sale personal radio gear.

Interpretation

Things, we may deduce, are open to interpretation. Referring to a letter from D N Raynes of the RIS, published in HRT July 1990, in response to an enquiry on behalf of readers about the right to make and later sell on, personal 10m gear:

"The intention of the Authority ... is to allow licensed radio amateurs to manufacture apparatus for their personal use. However, the occasional sale or supply of such apparatus to another licensed amateur, where there is no element of gain... would be unlikely to be interpreted as being in contravention of the Authority, although actual interpretation of the Order is, of course, a matter for the courts."

But leaving interpretation there, what about the purpose of amateur radio? Self-training is the stated aim, but is this sufficient? In May 1990 Mike Coolican, then Head of the Licensing branch at the DTI, wrote a very welcome letter to the RSGB stressing the Secretary of State's readiness to take action against licensed amateurs "where the abuse of radio and interference with the rights of other radio users make it necessary. I do not want any radio amateur licensees to be under the slightest illusion about our readiness to act vigorously and forcefully against the irresponsible minority who spoil the enjoyment of other licensees", the letter continues.

RSGB Chairman Frank Hall GM8BZX spoke up strongly in agreement with this statement at the VHF National Convention

Editorial Comment

The DTI's move against certain types of message on packet radio is everything a good DTI move should be.

It is prompt, firm and fully in line with the terms and conditions of our licence. Advance warning is being given before action is taken. The RSGB is advised, and is to interact with the DTI on our behalf.

The clauses examined in this month's news reports exist to prevent Amateur Radio becoming, as all too many organisations are, a medium for commercial and political interests, which would be utterly destructive to the spirit of amateur radio.

Nevertheless the DTI's move raises an Issue lurking behind one of the most hallowed traditions of Amateur Radio.

Self-training: the given purpose of amateur radio, enshrined in the legislation, is that radio-amateurs should train themselves in radio technology.

Rightly so. The wide freedom which amateurs have in many parts of the world to use the radio spectrum would be meaningless if radio amateurs did not have qualifications which require a considerable basic training (self or otherwise) and constant attention to propagation and emc conditions. Without this amateur radio would be an undignified and destructive scramble such as is sometimes heard on the CB bands.

But the emphasis laid on self-training as the purpose of amateur radio, instead of as a mandatory duty of radio amateurs, obscures the fact that the radio spectrum is not a private commodity within the gift of governments. It is a natural resource, like land, air and water. It was here before we were.

Civilised nations have governments to legislate, ration, licence and charge for natural resources in the interests of fair and effective distribution. But they cannot, in justice, withhold them.

Self-training as a 'justification' for amateur radio is highly respectable and has always been the most potent argument of radio hobbyists for their band allocations, but it can make radio hobbyists appear as petitioners justifying a share of bands which should "rightly" belong to commercial or security organisations.

This ain't so. We have a right to our share, which we should only forfeit on the grounds of anti-social behaviour.

Parting company with privately-owned radio equipment at second-hand prices, and the discussion of matters of interest to the amateur radio community, no matter how non-technical, within the bounds of acceptable public behaviour, is not on the face of it ethically contrary to the rights of radio amateurs.

They are, however, legally so.

The law must be obeyed. Without the law, rights quickly become so much hot air.

But there is a discrepancy. It should receive attention.

at Sandown Park in May, concluding "either our bands will be cleaned up or the DTI will clean them up."

But, we wonder, how does banning users' small-ads and "messages inciting others to join a particular dispute" actually contribute to the enjoyment of other licensees? As such, most of the evidence coming our way suggests that other licensees see it as spoiling their fun. Does it contribute to their welfare? If so, how? Is it legal to impose such a ban? Yes, it is.

For completeness, we should mention the interpretation occasionally advanced that this is all a roundabout way of shutting

up gadfly ex-RLO Ian Abel G3ZHI, invited (with thanks) to step down from his RLOship shortly after remarks about the RSGB's VAT payments (reported later in Radcom) appeared on the packet network.

HRT thinks that this is an extreme, not to say convoluted, interpretation, especially as the terms of our licence largely predate the G3ZHI's activities, but a case in point arises: nobody could argue, from the RSGB's point of view, that causing details of their internal management problems to appear on a semi-public radio network is either 'on their behalf' or that it would not bring G3ZHI's "work as an RLO and his other public activities" into conflict. (Whether or not this was the cause of the dispute, which has not been stated by the RSGB.) The non-profit status of the RSGB notwithstanding. Many a management runs into organisation problems; when they do, it is painful, and it does not necessarily make their job easier if everybody hears about it.

However, whether this publicity was or was not in the interests of other radio amateurs, especially RSGB members, is not so clear-cut. People generally like to know, as promptly as possible, what is being done with their money.

But, leaving that also aside, information about an organisation's finances, however carefully worded, are tricky to pass off as "remarks of a personal nature."

So we would like to put forward one thought at this point: one subject which bears personally on the lives of every licensed radio amateur is amateur radio. The licence, the laws, the administration of the national radio Society, the actions and attitudes of the DTI the RA and all their departments are of immediate personal importance to radio amateurs.

But the radio amateur has no universal, immediate organ through which he or she can disseminate or discuss these issues. The national society is compelled to a considerable extent to remain (publicly at least, generally we hope) on very amicable terms with the DTI; it and its journal represents a very large membership, and by virtue of its position a possibly equal number of non-members, but (despite the gallant efforts of RF Byrne, the man who — occasionally — throws custard at the custodians) it would be more than normally open if it bared its breast every time things went wrong. The monthlies do their best, but even Radcom has a considerable time lapse before news can be brought to members, and perforce even longer before it can be discussed in print, quite apart from considerations of space. Radio amateurs have no 'dailies'. The only 'radio station', GB2RS, must first report and represent the doings of the RSGB and its members. The nearest thing amateurs have to a news medium is the packet network.

We don't understand why, in principle and so long as it is conducted within the normal rules of civilised communication and the keeping of the peace, radio amateurs should not call on others to make their opinions known in particular disputes. In practice, the answers is "because the licence says so," but should it?

This is not an invitation to make free with the packet or other radio bands. This is a question which should be clarified over a period of time, and if necessary, re-legislated. The RSGB is taking the first steps by sending their Working Guidelines to the RSGB.

But why, we wonder (yet again), in view of Mike Coolican's statement and our own meditations, is the new statement from the DTI targeting comparatively trivial points? There are other aspects — statistically small but significantly large, and, of course, representing much effort for members of the RA and RSI — of both packet and the bands in general which need serious attention.

Over page: The DTI in East Anglia

The DTI in East Anglia

Information reached Ham Radio Today in a roundabout way (no, not from the packet radio network) that the Radio Investigation Service had closed a number of stations in the King's Lynn area in late June.

"Seven to my knowledge" said one informant. "I heard the log books have to be right to one minute", said another. "The main reason is for not having a wavemeter as laid down in the Licensing conditions," continues the tale.

"There is no help that you would expect to have from the DTI in these conditions — not that most amateurs would expect any favours." "The DTI are just having a crackdown to show that they are doing something," the voices say.

How does the DTI see it? HRT was unable to make contact directly with the local RIS office in time for this report, and if we had we would probably have been told to talk to Waterloo House. In the event, that was what we did. They confirmed that there had been several close-downs and some equipment seized. What! For not having a wavemeter? Seriously?

No, not seriously. The department contacted the local area for us, and came back with the news that six stations had been closed from that area, and one had had equipment removed.

According to the DTI, an unlicensed packet radio repeater had been closed down, (this was the first inkling we had that packet was the main target) and three packet stations in communication with the repeater had been checked out "to see if they were aware that the repeater was unlicensed" and pinched for minor infringements — among them, "not having proper emission checking equipment". All three were said to be back on the air as of the first week in July.

Two other packet stations operating in unattended mode in the wrong part of the band had their packet sections closed, "but not the rest of the station."

Was it necessary to close stations for log-keeping and test equipment? What about the quiet word in the ear? "Our emphasis is always on minimum enforcement. People talk about closedowns, but the quiet word in the ear goes unrecorded," said the man from the department sadly.

And — not strictly to the point, because we know what the Licence says, but how aware were they that most wavemeters register severe spurious, but are unlikely to register lower levels which can still cause problems in today's crowded bands. Modern commercial amateur equipment is unlikely to deteriorate far enough to emit spurious strong enough to register on an ordinary wavemeter. The tests and calibration carried out by manufacturers and dealers can be expected to render anything less than a spectrum analyser insufficient for serious spurious monitoring. Are we abreast of the technology?

"There have been a lot of amendments to the licence recently. People have been working on it, and we hope that people are trying to keep up with the technology," he said.

Too Difficult?

The man from the RIS's lot is not necessarily a happy one. The phone number of the local area office was not available on request "for security reasons." Security reasons? "Yes. These people receive a lot of threatening phone calls."

This is not to imply that the DTI thinks that amateurs threaten RIS inspectors. On the contrary, they have comparatively little contact. One thing that people from the DTI will tell you with unfailing regularity is that they can't and don't spend very much time on amateur radio. This is an official decision made some years back under pressure of the increasing workload of

In that odd, serendipitous way in which one thinks of a person and they crop up shortly afterwards, as I was adding comments about Ian Abel G3ZHI to the above report, it would appear that Ian Abel was adding Ham Radio Today to one of his missives on packet radio.

"In this month's HRT", goes the message, "they have published more about background information as to what is happening over abuse on our bands than RSGB publish in a year... as far as the RSGB are concerned we are told to ignore it."

While we can't confirm or deny the factual content of this, we must in fairness point out that, apart from a couple of paragraphs containing general comments — not data — based on the wider picture, the majority of the item G3ZHI refers to is reporting Mike Coolican's landmark letter to the RSGB, and as such the meat of that matter has already appeared in Radcom.

However, to paraphrase the current DTI communication to the RSGB, "I am sure that you are equally aware as to the type of background information we mean."

commercial communications.

I am inclined to take this at face value. So many things to see to, so few pairs of hands; as in offices everywhere, the manpower does not exist to see to everything. The more tricky the case, the more time and grey matter it uses up. Routine matters have to be seen to, and it is easier, not to say imperative at times, to get on with the bread and butter work and not take up arms against a sea of licence abusers. Actual abusers, that is, rather than infringers.

This is not to bring out the violins for the DTI, but to give a perspective. The DTI, like everybody else, moves slowly and uneasily against things in the "too difficult" tray.

The only answer is to keep asking for their assistance where it is needed. And keep asking. And keep on asking. And avoid getting into harangues. Radio amateurs love a good say-so, but a licence abuser or a representative of the DTI are inappropriate people to conduct one with.

If we should persist politely with the RIS, what should we do with the abusers? Once again, the RSGB recommends — quoting the Australian DoTC — that we should "... ignore them. Under no circumstances should you respond or comment in any way on a transmission that is not identified by a legal callsign... if you respond in any way to such antisocial behaviour, the perpetrator... will be encouraged to continue his abnormal behaviour."

RadCom continues: "... whilst publicly ignoring the culprit, anyone local to him or her should gather as much information as possible and pass it on to the Society's Amateur Radio Observation Service Coordinator, who is Geoff Griffiths G3STG, QTHR."

What happens then?

Radio amateurs will have different tales to tell from their own experiences. All we can add are: keep copies of everything you gather — you may wish to show it somebody else in the fullness of time, such as the DTI (local or otherwise), your MP, the press (local or otherwise), and maybe the RSGB again. Be careful with non-specialists (like MPs) as they get the wrong end of the stick very easily and can be panicked into over-reacting if they react at all. Remember that broad or unsubstantiated complaints are almost impossible to act on; if you have heard something unacceptable, they need to know when, where and what the content was, as accurately as possible.

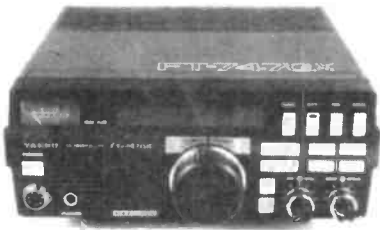
As a general rule, don't expect anything to happen quickly. If offensive materials keeps occurring, keep logging it and keep complaining. And keep copies.

TEST THESE RIGS 'ON AIR' BEFORE YOU BUY, AT THE

KW 'EMPORIUM'!!

+ KW MAIL/PHONE ORDER SERVICE

Backed by 35 years of supplying the radio amateur
— worldwide



YAESU FT-747 GX

Complete with the excellent CW and AM filters, this compact HF transceiver offers 100 watts (PEP) of SSB/CW/AM on all bands, plus receive from 100KHz-30MHz, 20 memories and dual VFOs.

£655



ICOM IC-725

Budget HF transceiver, 100 watts output, DDS system for fast TX/RX switching (ideal for data), 26 memories and a really good general coverage Rx. CI-V computer control.

£759



KENWOOD TS-140S

All mode, all band HF transceiver (inc. FM), full break-in CW, 100 watts output and a first class, general coverage receiver.

£862

AVAILABLE FROM STOCK NOW!

We also stock — Antennas: Hy-Gain, Butternut, Cushcraft, 'J'Beam, KW. ATU's — MFJ, TenTec, KW, Kenwood, Yaesu, ICOM. Amp Linear Amplifier, Rotators, Books, Cables, Wire, Scanners, Airband Receivers, Microphones, Morse Keys, Full range of accessories. Baluns, Traps, Headphones, AKD Filters, Antenna Switches, SWR Meters, Dummy Loads, etc.

TEN TEC

OMNI V Transceiver Amateur Bands 10-160M.....	£1,900.00
PARAGON Transceiver + General Coverage.....	£1,839.00
TITAN Linear Amp 1.500W 10-160M.....	£2,171.00
HERCULES II Linear Amp 500W 13.8V.....	£839.00
HERCULES II PSU 100 Amp.....	£660.00

YAESU

FT1000 Transceiver.....	£2995.00
FT767GX Transceiver Gen. Cov. RX.....	£1,599.00
FT747GX HF Transceiver SSB/FM/AM.....	£655.00
FT757GX HF Transceiver 10-160M.....	£969.00
FT212RH Transceiver 2M, 45W.....	£309.00
FT290R2 Mobile 2M, Multimode.....	£429.00
FRG8800 Receiver 0.15-30MHz.....	£649.00
FRG9600M Scanning RX 60-950MHz.....	£509.00
2M/70EM Mobiles & Handhelds in stock etc.	

ICOM

IC751A HF Transceiver Gen. Cov. RX.....	£1,500.00
IC735 HF Transceiver Gen. Cov. RX.....	£979.00
IC725 HF Transceiver Gen. Cov. RX.....	£759.00
IC7000 Receiver 25-1000+1025-2000MHz.....	£989.00

Prices correct at time of going to press

Lots more "Goodies" — Trade-in equipment, servicing, EXPERT ADVICE is FREE. Write or phone for brochures. VISA, ACCESS, RSGB Cards, H.P. All the above prices are correct at the time of going to press and include VAT. Check prices when ordering. Post/Carriage charged at cost. Orders of £200 or over, free delivery within UK.

Open 9am-5pm Tuesday-Friday, 9am-4.30 Saturdays — Write, phone or fax for further details

KW COMMUNICATIONS LTD

Communications Centre, Chatham Road, Sandling, nr Maidstone, Kent ME14 3AY

Tel: 0622-692773

Fax: 0622 764614

Telex: 965834

ICR71E Receiver 0.1-30MHz.....	£855.00
2M/70EM Mobile & Handhelds in stock etc	

KENWOOD

TS940S HF Transceiver, Gen Coverage.....	£1,995.00
TS140S HF Transceiver 10-160.....	£862.00
TS680S Transceiver 10-160+6M.....	£985.00
TS440S HF Transceiver Gen. Coverage.....	£1,138.00
TL922 Linear Amp.....	£1,495.00
TS790E Allmode Tcvt 2M/70CM + 1296 MHz.....	£1,495.00
2M/70CM Mobiles & Base, Receivers & Handhelds in stock etc	

TS950S HF Transceiver.....	£2,499.00
TS950SD HF Transceiver.....	£3,199.00

THE KW POLICY

KW's policy continues as it has done for the past 36 years — to give the customer value for money including the best service available. Every unit is tested in our TEST DEPT before delivery. We do not believe in sending out sealed packages.

HOW TO FIND US!

We are near to A229. Turn off M20 to Rochester/Chatham, Chatham Road, Sandling runs parallel to Bluebell Hill (A229). Just follow signs to Sandling.

An experiment with Parallel Fed Dipoles

Once I had put up a 30ft telescopic mast and made sure that it wasn't going to terrify the neighbours, my next task was to construct an antenna system to hang off it.

This presented no problem. I had an old matching stub and feeder from a G5RV, and having cut and fitted new elements I blithely assumed I would be QRV within a couple of hours. So up it all went. However, standing back to admire my latest creation, I felt distinctly agoraphobic: for the first time I had put up an aerial without having to bend the elements. Even the matching stub hung

A) Coverage of the 80,40 and 30 metre bands, and if possible 160 as well.

B) Some way of feeding the system — since the centre of the system was some 90 feet away.

C) As usual, it had to be cheap.

Scratching around at the back of my mental archives bought back memories of a configuration that I had learnt about in the RAE classroom, but of which I had no practical experience: parallel fed dipoles, also called "The Nest of Dipoles".

The principle of the parallel fed dipole

is excited with a 3.5MHz signal, the voltage and current distributions across the 80m dipole will present a 50 ohm load, while the 40m element will present a far higher load impedance; so the 80m element will radiate most of the power. The situation may also be reversed: the array fed with a 7.05MHz signal will show the 40m dipole radiating the majority of the power, while the 80m dipole, presenting a mismatch, will radiate far less (Figs. 1 and 2).

The reader familiar with the design will remember that it is usually discussed in connection with parallel elements with an even-order harmonic relationship. This is necessary, since odd-order elements will tend to load one another. Indeed, this characteristic is often exploited in text books when discussing this particular system. The usual idea is to use the 40m element to radiate also on 15m. This avoids the necessity for cutting a separate 15m element for the array.

Everything appeared fine for 80m and 40m, and by the looks of it I was getting a usable 15m element as well. But what about 30m? There is no harmonic relationship between this band and 80m

When Gee Goodrich G4NLA got a new garden, he decided to build himself a new nest . . .

vertically in true textbook fashion. What made the feeling even worse was that, rather than the tie off points and element ends being separated by a few centimetres, there were metres . . . several of them.

"Could get an 80 metre dipole in there . . ." I mused, ever alert to an opportunity.

The main reason for erecting the G5RV had been to cover the 80, 40 and new(ish) 30m bands, and I had grandiose plans for the higher HF bands, so a G5RV had seemed the obvious choice at the time.

The G5RV is a simple and very reliable design. I have been using the system on and off for several years. I had even spent a bit of time looking into how the design works, which is an exercise to be recommended. However the study also reveals that, as with most multiband systems, there must be certain compromises. In the end the resonant dipoles seemed so much more appropriate for the space at my QTH that I dismantled the G5RV.

Thought Process

So the G4NLA intellectual process started fumbling around for alternative systems that would meet my basic set of requirements, which were:

set hinges around the nature of the feed impedances of dipoles at different frequencies. Consider an 80m dipole and a 40m dipole fed in parallel from the same feeder. Theory suggests that if this array

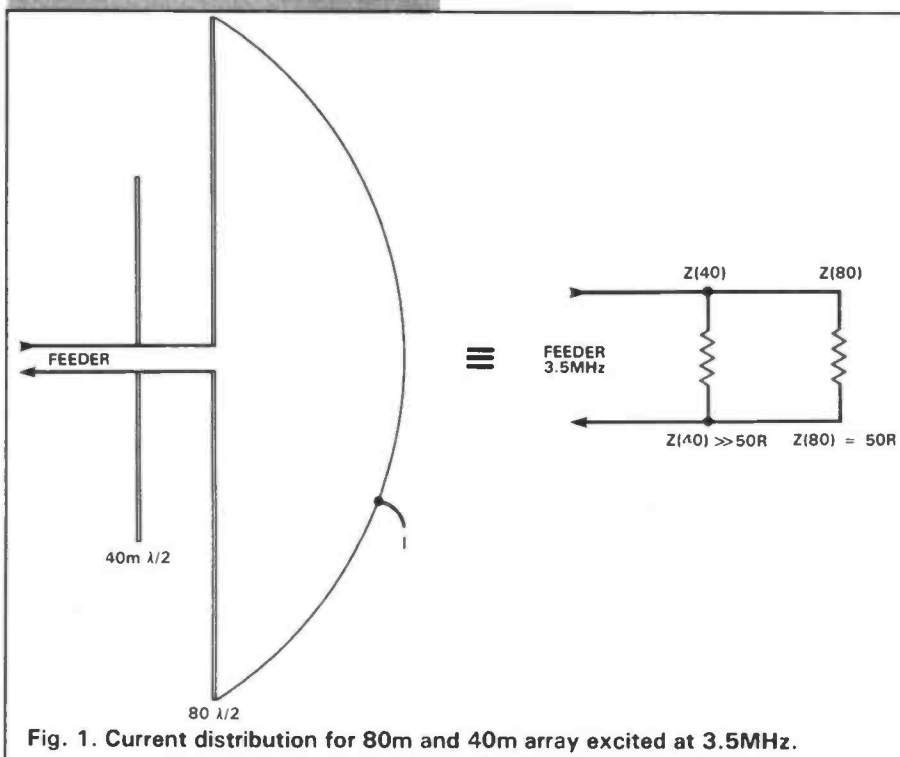


Fig. 1. Current distribution for 80m and 40m array excited at 3.5MHz.

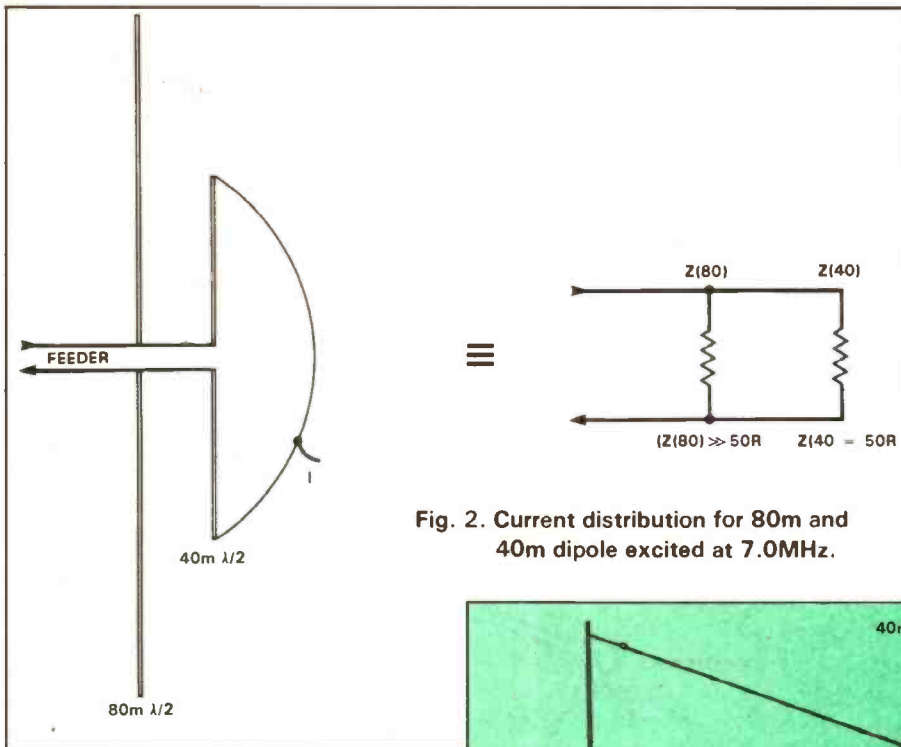


Fig. 2. Current distribution for 80m and 40m dipole excited at 7.0MHz.

and 40m. In fact, I had to guess that it would appear as a reactive load at these frequencies. I was not too worried about the reactive components of the load, since reactance does not absorb power. I was concerned about the resistive part of the load, but I did some calculations which indicated that loading would not be significant (experiment later vindicated this).

I am a bit of an empiricist as far as aerial systems are concerned. However, the research indicated that an experimental system should be worthwhile.

There are two methods of spacing parallel dipoles in general use, either radially around the central feed point (Fig. 3) or parallel, using the longest element to support the other dipoles below it with the aid of spacers (Fig. 4). I was obliged to adopt the second method because I have a long garden, not a wide one.

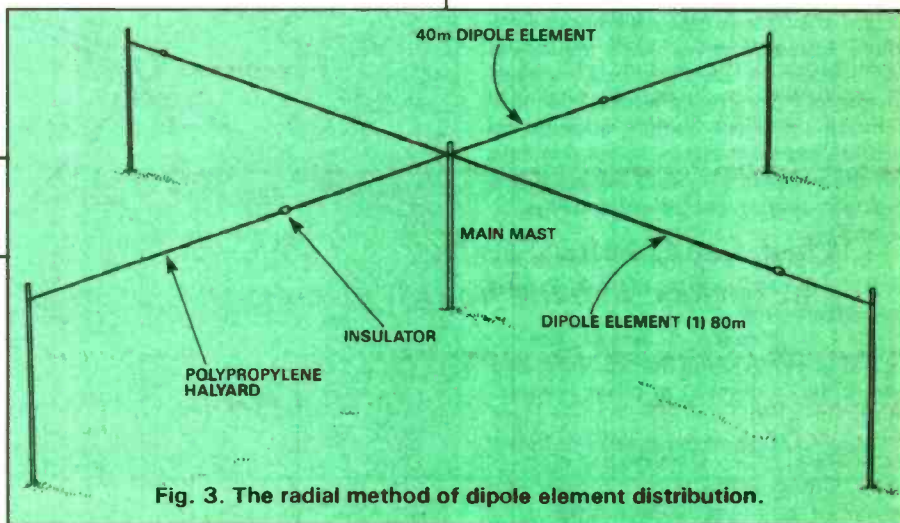


Fig. 3. The radial method of dipole element distribution.

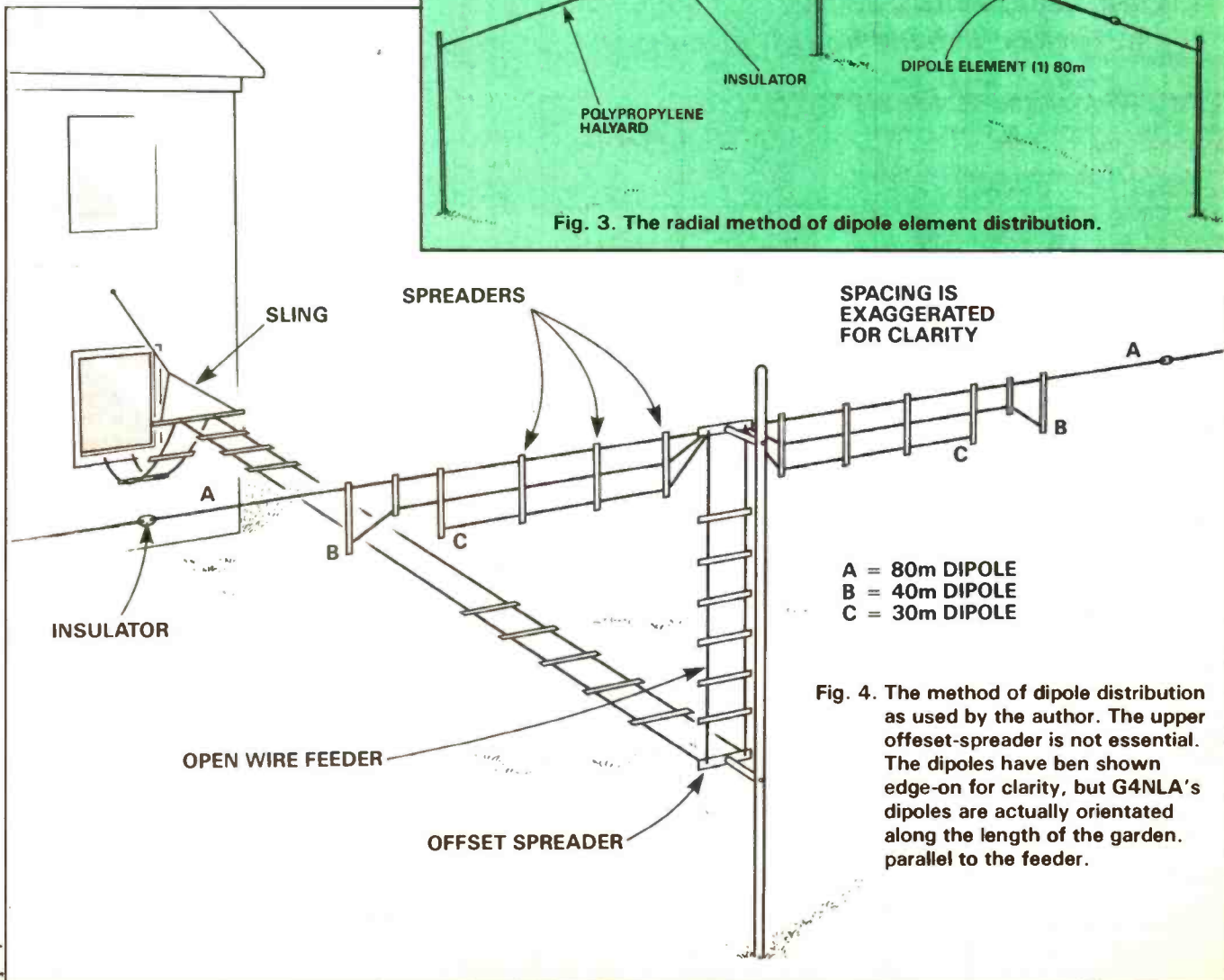
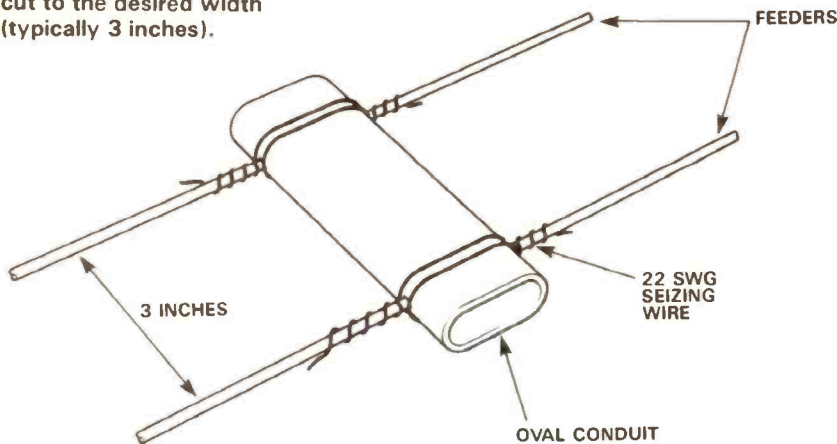


Fig. 4. The method of dipole distribution as used by the author. The upper offset-spreader is not essential. The dipoles have been shown edge-on for clarity, but G4NLA's dipoles are actually orientated along the length of the garden, parallel to the feeder.

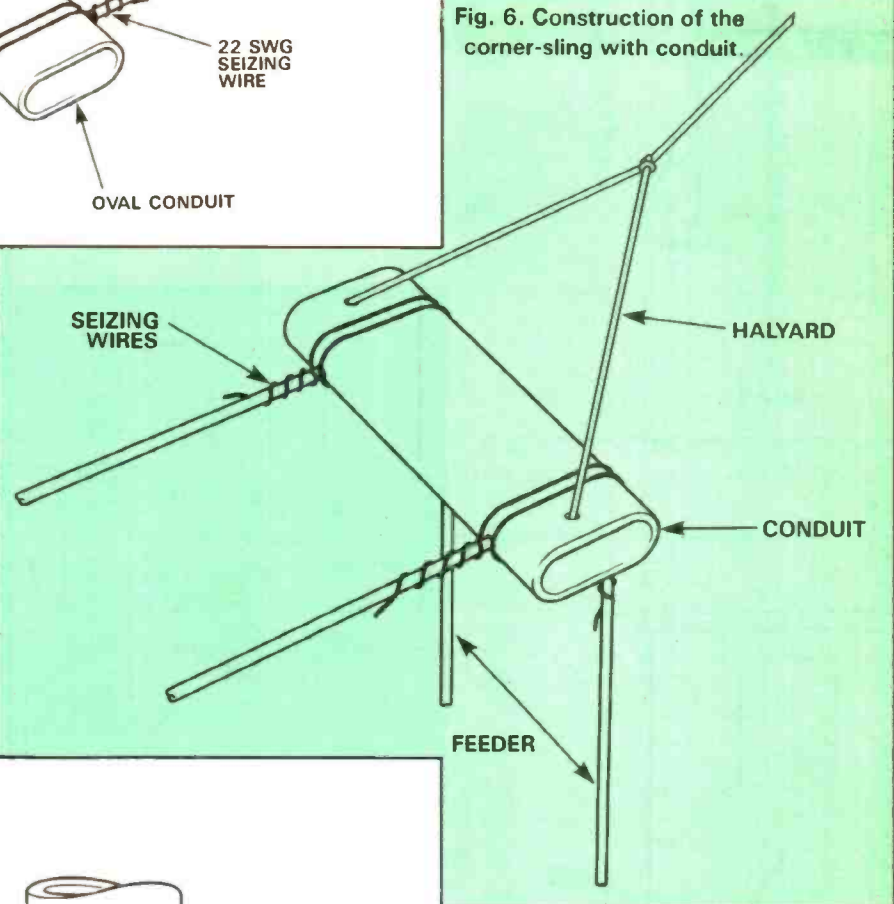
Fig. 5. Construction of spacers from conduit, cut to the desired width (typically 3 inches).



array, the next matter was the feeder. As I indicated earlier, the run to the mast top from the shack is about 90ft. This is by no means insignificant, and losses could be a problem if cheap coaxial cable were used. Minimising losses implied expensive coax – and I wasn't inclined to pay nearly £30 for that privilege.

A better solution is to use good old

Fig. 6. Construction of the corner-sling with conduit.



Initially, in my impatience to try the system, the various dipole elements were simply taped together with insulating tape! After the system had worked satisfactorily for several weeks, I decided to make up some simple spacers to separate the elements by about 3 inches (like the spacers I used to separate the open wire feeder, see below and Figs. 5, 6 and 7).

In fact, the 'improved' spacers did not make the slightest bit of difference to the performance.

If I had room, I would like to experiment with radial 60° spacing, and I would be interested in other readers' results.

Having decided to proceed with the

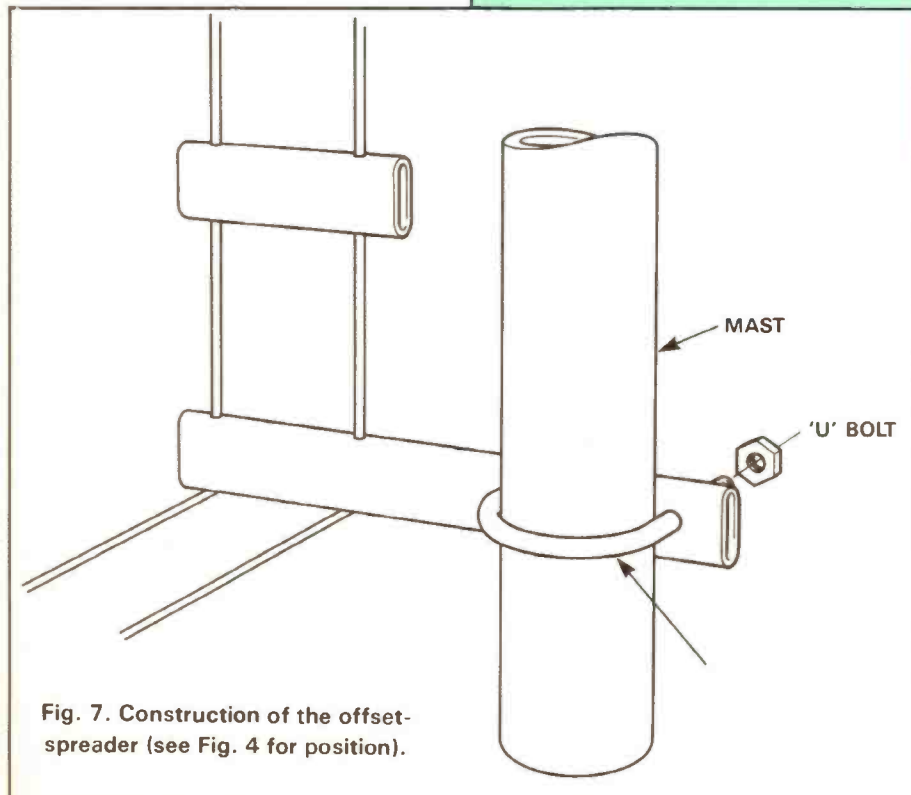


Fig. 7. Construction of the offset-spreader (see Fig. 4 for position).

open wire feeder a) Because it is very low loss b) it remains very low loss even with high levels of vswr, and c) it is simple to manufacture at home very cheaply.

Of course, you don't get something for nothing and making 90ft of open wire feeder could be regarded as a bit of a chore. However, the result is well worthwhile, and will last for years if it's made properly. Another advantage is that it doesn't 'fill up' with water the way coax does, and even if a section does become weathered, it is easy to splice a new section of line in.

I have always constructed open wire feeder along the same broad pattern, which I will outline here:

For the spacers I use electrical conduit (Fig. 5 again), and for this project I purchased two 2m lengths from the DIY shop. (Skips containing discarded offcuts are another good source, but they can't always deliver on time.) A quick trip to the local junk shop saw the purchase of two

100m reels of multistrand wire for about a quid. I use multistrand wire in my feeders now, because they seem less prone to fatigue induced by the wind blowing the feeder around.

The conduit had an oval cross-section rather than round. I cut most of it up into 4m lengths. Each of the 35 spacers was then drilled twice across the longer axis to accommodate the feeder wire. I also cut two longer sections of conduit, one to be used as a sling just outside the shack (Fig. 6) and the other as an offset spreader at the mast end (Fig. 7).

To assemble the feeder, two lengths of wire about 100ft long were laid out along the garden, with the ends held in place by a couple of bricks. The spacers and, where appropriate, the sling and offset spreader were then threaded onto each wire. Take care not to twist the wires during this process.

Once this is complete, and the wires have been checked for twists, the spreaders should be fastened to the feeder wires using short pieces of approximately 22SWG wire. Junior ops and YL/Ms should definitely be commended for this boring task.

Once it is complete, it is advisable to raise the feeder, both to prevent it being inadvertently stepped on, and to gauge the reactions of family and neighbours.

Tuning

At resonance, the dipoles forming the nest should present an impedance of 50Ω to the feeder. Because this represents a mismatch, there will be standing waves on the feeder, the impedance seen at the shack end is unlikely to be 50Ω on any band, and it will depend on the length of the feeder. The standing waves on the open wire feeder do no matter, so long as they do not affect the transmitter. The losses on a well-made open wire feeder are lower than good quality coax, so the extra loss caused by the presence of standing waves is immaterial. It is partly for this reason that the BBC use open wire feeder rather than coax.

It is possible to match the feeder to the transmitter almost regardless of the impedance seen at the end, of course, but the best efficiency will be obtained when the aerial system is at resonance.

In a single band system, one could

use a feeder of the correct length to give the same impedance at one end as is applied to the other (an even number of quarter wavelengths). This cannot possibly work in a system using non-harmonically related dipoles and covering so many bands. The obvious approach, therefore, is to connect a 50Ω resistor to the end of the feeder and adjust the length of dipoles to give the same impedance at the shack end of the feeder as the resistor on each band.

The initial method used involved measuring the swr at the centre frequency of each band, and then adjusting the dipole to give the same swr. A balun (Fig. 8) and atu (aerial tuning unit) (Fig. 9)

were then added to match the feeder to the transmitter. There are two snags to this approach. First of all, the measurement of an equal amount of reflected power cannot prove that the reflection is caused by a 50Ω resistive load. Specific reactive loads could reflect the same amount of power.

The second problem is that the feeder length must be adjusted so that the swr is of an accurately measurable value on all bands. This can involve a long time spent in trial, error, error, and error to bring the swr on all bands to the range measurable on normal analogue swr indicators.

Accurate Match

An approach subsequently tried was to connect the balun and atu (Fig. 10) and adjust the atu to achieve as close as possible to 1:1 swr at the transmitter with a 50Ω load connected. Then connect the aerial and prune to achieve the same low swr, and the aerial will very likely be resonant. Certainly the atu will only match a specific impedance to the transmitter, and is unlikely to match by chance a different impedance which would reflect the same amount of power.

This procedure must be carried out on each band, either by noting the atu settings for all bands before disconnecting the 50Ω load, or by swapping back and forth between aerial and load once for each different band. It is quite possible that the length of feeder appropriate to reach the shack will be suitable for this process without the need to adjust its length.

It is possible that the impedance at the shack end of the feeder may not be possible to match to the transmitter on one or more bands, in which case the feeder length may still need to be adjusted. This adjustment, however, is less critical than that required for the other method. In case it is needed, the method of feeder length adjustment, as originally applied, is described here.

Line Length

Calibrating the line is, in theory, simple: connect the 50Ω load to the far end of the feeder, and an swr meter to the shack end. Measure the swr on all bands, and make a table of the readings. This may not work in practice, because the swr

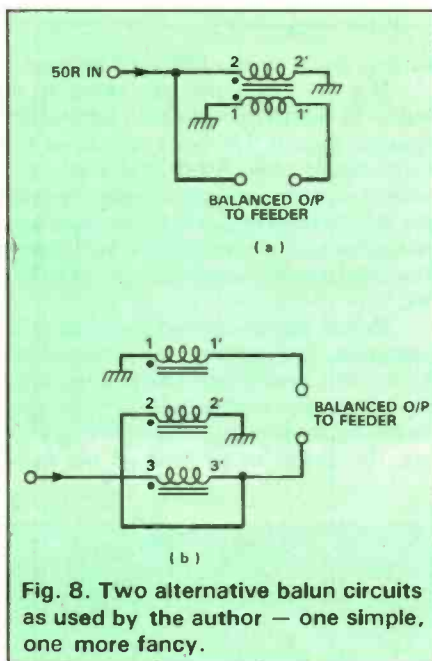


Fig. 8. Two alternative balun circuits as used by the author — one simple, one more fancy.

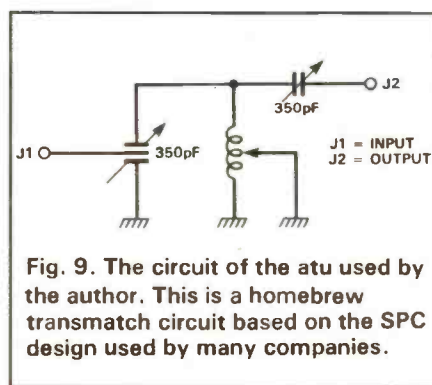


Fig. 9. The circuit of the atu used by the author. This is a homebrew transmatch circuit based on the SPC design used by many companies.

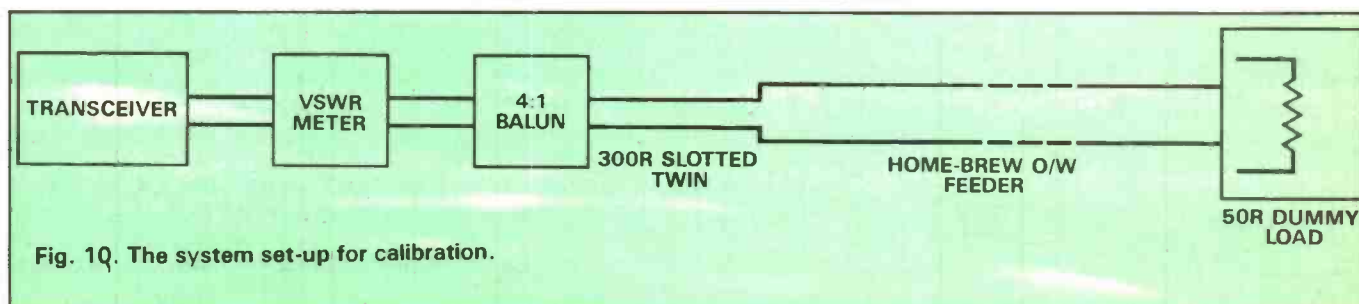


Fig. 10. The system set-up for calibration.

on one or more bands may exceed the maximum useful reading on the swr indicator.

If this is the case, add about 5m of commercial 300Ω twin feeder at the shack end and prune this to bring swr measurements within an acceptable range. The only dimensions you need to avoid are odd-order multiples of the wavelength. (Table 1.)

all, even after the extra cable had been coiled and tidied away behind the operating position.

The feeder was now ready for me to disconnect the 50Ω dummy load and erect the dipole elements attached to the feeder. Remembering that the vswr meter must be in the same relative position as for the calibration trials, each dipole can be pruned to give the same swr

system. The balun should be watched for signs of overheating. If it does not overheat, it is reasonable to assume that everything is working properly. If it does overheat, I have generally found that there is something amiss somewhere along the line.

Part of the motivation behind this project was to find how the system would behave with a 30m element. I therefore went to the trouble of calibrating my transmission line, and attaching the dipole elements in order to see whether the performance matched my predictions. They did, and the system is providing me with results consistent with ¼ wave dipoles on all three bands.

In practice, it is quite possible that dipoles cut to length and slung up without careful pruning would, in some instances, work as well as this system did. The extra effort was applied to make sure it was working at the best available efficiency.

Does the system work? Let me put it this way, I successfully worked JA on the first trial of the 30m system. DX working on both 80m and 40m has proved both encouraging and consistent. I simply cannot believe it was all luck . . .

Finally, I ended up with two extra bands. 160 is catered for and the system has proved adequate for inter-G working. And I got (in theory at least) 15m too, although I have found that my HF5 vertical at ground level produces more consistent results on 15m.

Band	x1	x3	x5 (multiples of λ)
80m	19.55	58.65	97.75 etc.
40m	10.16	30.48	50.80
30m	7.05	21.15	35.25

Odd order feeder lengths to avoid when calibrating the system.

On my first attempt even this proved fruitless, so I constructed a 4:1 balun transformer to get the impedance down further. The line was then re-tweaked until all bands demonstrated vswr characteristics of better than 10:1.

Having achieved this state of affairs, I was left with about three metres of feeder on the shack floor. I had always been under the impression that you have to be careful with open wire feeder in terms of proximity to other objects, coiling it up, etc. I coiled the remaining feeder loosely, watching the vswr meter with interest. To my relief (and frankly, surprise) the vswr meter barely moved at

as was given by the 50Ω load resistor.

If a 4:1 balun was not obtained in order to achieve sensible calibration results, then a 1:1 units needs to be constructed now. A balun is important here to convert the unbalanced output of the station matching unit to the balanced characteristic of the open wire feeder. The total system setup is illustrated Fig. 11.

Before assuming that the system is complete, one further test is required. Again, this test is somewhat empirical, but has always worked here. Choosing a clear frequency on each band of interest, run 100 watts or so through the new

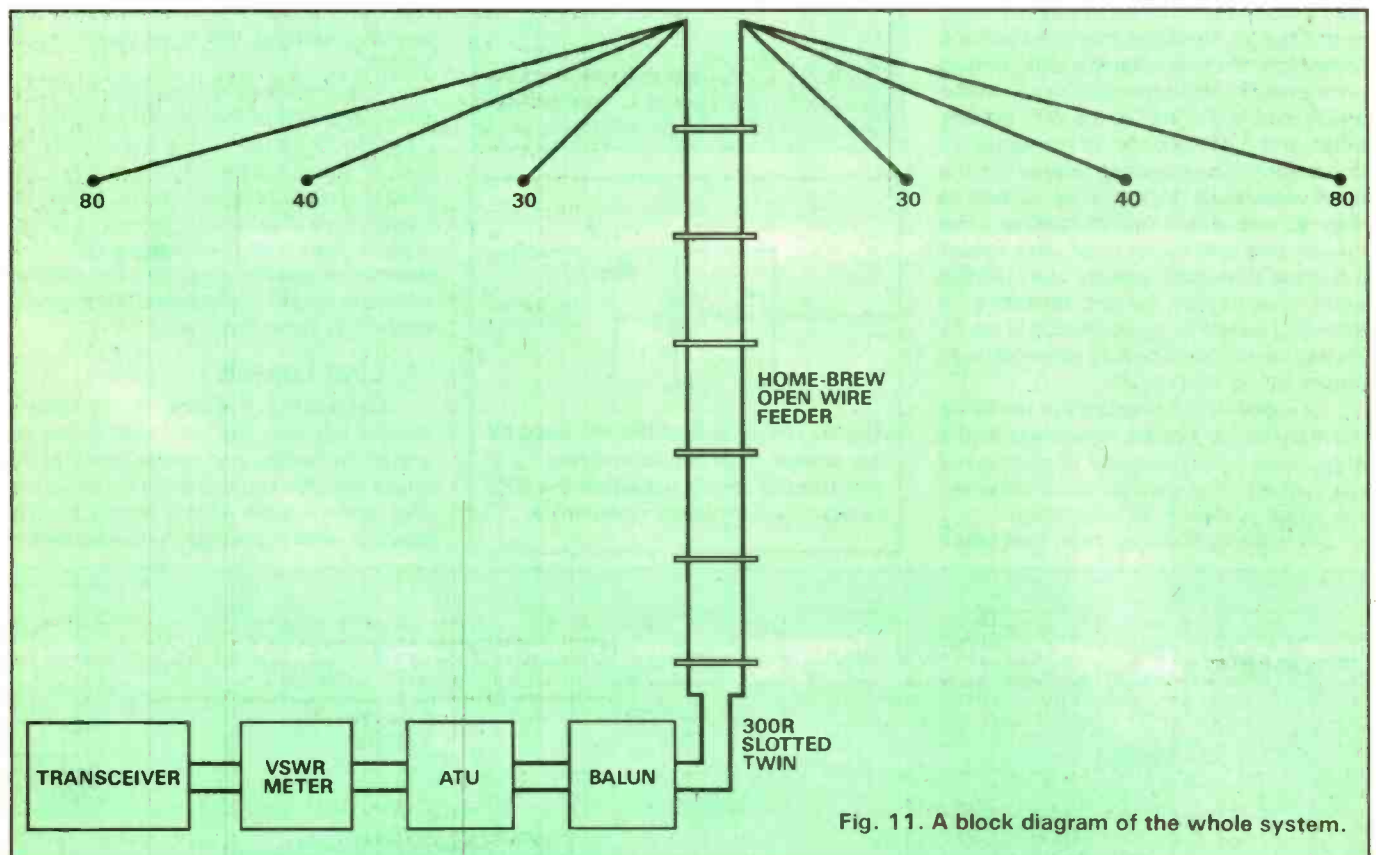


Fig. 11. A block diagram of the whole system.

LOWE ELECTRONICS LTD.



TS-950S. THE BEST JUST GOT BETTER!

NO APOLOGIES for showing the TS-950S once again, because this is a transceiver of which to be proud. The Kenwood design team are quietly satisfied with their work, we are proud to be selling it, and any owner MUST be pleased as Punch, knowing that he has one of the finest HF transceivers in the world.

Designed to be the new flagship of the Kenwood range, the TS-950S represents several real advances on previous models. Perhaps the most important of these is the optional DSP-10 digital signal processor unit which gives enormous advantages in use, such as an immediate improvement of 10dB in carrier and unwanted sideband suppression; selectable signal bandwidths; clickless CW keying with selectable rise times of the keying waveform; digital audio filtering which is synchronised with the IF slope tuning; and digitally derived FSK.

Equally important are notable advances in receiver performance, and the inclusion of a second receiver which will receive any signal within +/- 500kHz of the operating frequency.

The transmit power is raised to 150W, and the use of PA devices running from a 50V supply line improves the transmit 3rd order IMD to better than before achieved; so important in today's crowded band conditions. This, coupled with the digital processing of the transmit audio permits a speech bandwidth of 200-3100Hz which means excellent audio without annoying Joe who is operating 5kHz down the band.

Designed as a complete station, the TS-950S is an all-in-one transceiver, operating from its own in-built power supply. An automatic ATU is fitted, and a wide range of carefully matched filters can be fitted to tailor the transceiver to your own requirements.

In the words of the old song, "Memories, memories". What rig these days does not have them? In the case of the TS-950S there are 100 memories, each capable of storing independent transmit and receive frequencies, mode, filter data, antenna tuner data, and tone frequencies. 10 memories are provided to store upper and lower programmable band edge limits to prevent out of band operation. Don't tell me that everyone can remember the band edges of our new 18MHz band!!!

Needless to say, any memory can be instantly recalled and its data transferred to the working VFO, and full memory scan facilities are provided, together with variable scanning speed.

Enough of this – "What will the TS-950S do for me?" I hear you cry. My answer has to be that it will make your amateur radio operating infinitely more pleasurable, whether you are chasing rare DX or just chatting on 80 metres. Everything about the TS-950S has been designed to push forward the limits of performance and ease of use which Kenwood owners already enjoy. If you don't believe this, simply contact us for further details, and come to see the TS-950S in use. You will not be disappointed.

TS950SD	Fitted DSP-10, SO-2, all filters	£3199
TS950S		£2499
DSP-10	Digital signal processor	£399
SO-2	High stability master oscillator	£99
SM-230	Station monitor scope/spectrum display	£773

For the past 26 years Lowe Electronics have specialised in seeking out the best in radio and bringing it to our customers. Those customers will also tell you that we have another speciality – looking after them. Whatever is best in radio, we sell. Whatever we sell, we back with really expert advice and service. WE are pleased to represent the best companies in the receiver world, and in addition to the AOR range shown here, we also distribute receivers from Signal Communications and WIN, two of the top names in Airband radio. For full information and a copy of our Airband Guide, simply send us four first class stamps and mention that you saw our ad. in Ham Radio Today. Happy Listening.

Shops in **GLASGOW** Telephone 041-945 2626, **DARLINGTON** Telephone 0325 486121, **CAMBRIDGE** Telephone 0223 311230, **BARRY** Telephone 0446 721304, **LONDON** Telephone 081-429 3256, **BOURNEMOUTH** Telephone 0202 577760
All branches are closed all day Monday.

Packet Radio

Roundup

The latest licence amendments tell us we've got to slow our CW idents down! As many readers will know, at least those who read their amateur licences, when operating on packet we need to periodically identify ourselves in either CW or speech, in addition to the packet callsign identifications we transmit on every packet sent. As many packet operators realise, congestion is prevalent in many areas of the country on packet, with 'beacons' and the like actively discouraged. Due to this congestion, the mandatory CW idents did rather

scrapped in many countries (did you know that 1,200,000 licensed Japanese amateurs are active on the HF bands without the need for a CW test?), are we in the UK going backwards instead of forwards? Maybe it's to give the officials time to get themselves set up with terminal node controllers to check out the new space age technologies in which we amateurs are, as usual, leading the world.

Meanwhile, excuse me while I bang my head against the wall before I readjust all my CW ident speeds,

seen, although it was a while before it appeared in the UK (I faxed the ARRL book division in the States with my credit card number for an early copy). Topics covered in the second edition include the history of packet, selecting and using tncs, operating procedures, hg, vhg and uhg communications including satellite communications up to and including Fuji Oscar 12, plus brief information on the microsats that hadn't come into operation when the book was written. The network and applications sections detail digipeaters, Net/Rom nodes and the KA Node, TexNet and TCP/IP, the ROSE system, DOSgate and some packet conferencing systems. This second edition repeats a considerable amount of information presented in the first edition, but expands and adds a good deal of up-to-date information on networks and their applications. Well worth reading, in my opinion, for the beginner, although being heavily American it doesn't guide you in some aspects of European packet such as G8BPQ and G1NNA systems and the like. After ordering and receiving my air-mail copy from the ARRL, I yesterday found that Poole Logic, of 49, Kingston Rd, Poole, Dorset (0202 683093) have them in stock, directly imported from the USA at a far lower cost than I paid!

It's "go slow" for CW idents, and a more useful rearrangement of packet 'aliases' is evolving, as G4HCL reports.

tend to be sent at very high speeds, sometimes to the extent of them sounding just like a quick screech rather than a recognisable CW stream. This of course couldn't be read manually, so now we've all got to send them at no more than 20wpm.

With the presence of far more packet than CW activity in the UK (ie more packets being sent in a given period than CW operation), with every single packet having a callsign identification present in the mode of communication, one wonders why we have to send a CW ident at this slow speed? With CW being

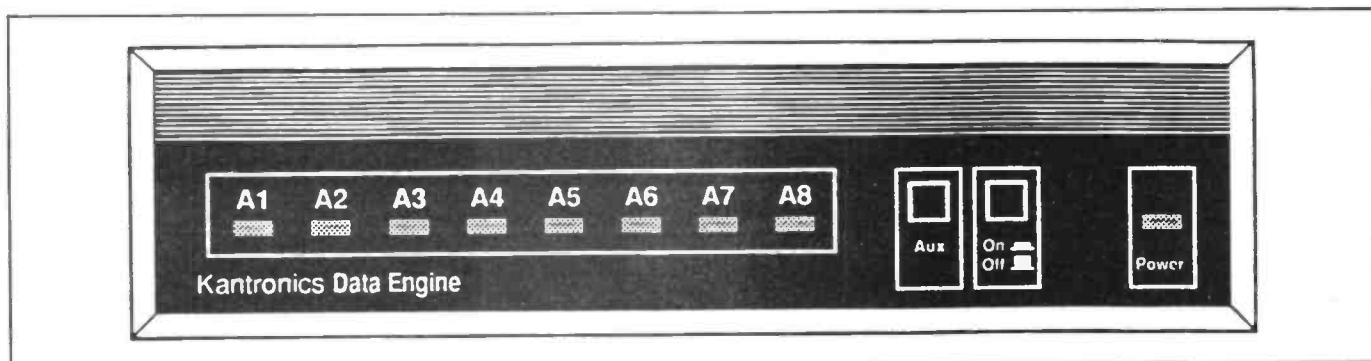
they'll give the USA space shuttle and USSR MIR space station amateurs something else to listen to while everyone is trying to have QSOs. I wonder what speed of synthesised speech ident I'll get away with?

Your Gateway

The latest guide to packet radio on the market comes from Stan Horzepa WA1LOU, in the form of the second edition of 'Your Gateway to Packet Radio'. The first edition in my opinion was a great guide for the beginner, one of the most comprehensive and up-to-date guides I'd

New 'Data Engine'

Remember the Kantronics 'Data Engine' I mentioned in the roundup a couple of months ago? Well, the first



models have just arrived in the UK as I write this, and next month in HRT I'll be taking a closer look at one 'in the flesh'. The hot news on this unit is that following yet another phone chat with the president of Kantronics, Phil Anderson, it was revealed that John Wiseman G8BPQ has incorporated his popular node system into a plug-in eprom for use with the Data Engine. So as well as getting a 'future-proof' tnc capable of high data rates, groups or even individual users may also use the Data Engine as a node system to benefit other amateurs in their area.

John tells me his prototype versions are currently working well, and by the time this appears in print the software code will be available on a free basis for non-commercial amateur use — thanks, John. James G3RUH is also currently working on a plug-in 9600 baud modem for the unit, so a typical arrangement could employ both 1200 baud and 9600 baud operation using the two fitted ports in the unit. It certainly looks interesting, maybe I'll have to get my credit card out. Next month will reveal all!

Node SSIDs

If you connect to a network node and issue a 'Nodes' or 'N' command, you'll be greeted with a listing of the 'known nodes' to the one you're currently using. The callsigns listed are the actual callsigns and ssids (secondary station identifiers) of the nodes of course, but what does the corresponding 'alias' on each one give you? At the start of the network evolution, this often gave you an idea of the location of the node together with the frequency of operation on an informally used basis. My node CFORD6:G4HCL-6 for example was a node on 6m operating from Chandler's Ford, likewise CFORD2:G4HCL-2 was a 2m node operating from the same location. However now that the national system is becoming more organised, with several frequencies often used on each band, a formal system of numbering has been agreed. This is gradually being introduced to operational nodes. Net/Rom and TheNet nodes require a new eprom for this, so gradual introduction rather than an 'overnight' change is the realistic way to do it.

Table 1 gives the numbering

Table 1 — Node SSIDs

Freq (MHz)	Alias	SSID
50.650	60	-6
50.670	61	-6
50.690	62	-6
50.710	63	-6
50.730	64	-6
50.750	65	-6
70.4875	40	-4
70.3250	41	-4
144.625	20	-1
144.650	21	-2
144.675	22	-3
432.625	70	-7
432.650	71	-7
432.675	72	-7
433.625	73	-7
433.650	74	-7
433.675	75	-7
1296.675	10	-1
1299.000	11	-1
1299.xxx	12	-1
1299.xxx	13	-1

The final two 23cm frequencies are yet to be allocated, and alias identifiers of 90 to 93 and SSIDs of -9 to -14 will be used for frequencies not covered by those shown.

system agreed, so when you connect through into a distant node you'll instantly know what frequency it's operational on. With last months' 'cellular' suggestion this could be quite useful in the future, especially on 70cm. To give an example, a node on 144.675MHz operating from Chandler's Ford would typically have the identification CFD22:G4HCL-3, likewise a 23cm node on 1299.000MHz would be CFD11:G4HCL-1. The Node (G8BPQ) systems use the callsign only without an SSID together with an alias that indicates the location, eg NOTTS:G8BPQ. So when you find you suddenly can't access your local node, check its details haven't changed!

Group of the Month — Peterborough

The Peterborough Packet Group is at the moment going through what their secretary Robert G4PYR describes as a 'trauma' in setting up their packet node in Peterborough. It's a multi-band, multi-port affair under the callsign BG7PE, and will be situated on a block of flats just outside the city centre. With the block being 14 storeys high, and the contracted access to the roof being by ladder only, their technical man Dick

G8YXE may have to have a good head for heights as well as being very fit with all the climbing.

Your scribe was told by the group that minor points such as the £750 costs in setting the nodes up are currently taking up many evenings of discussions in the pub. Their Treasurer, Nigel G1ARV, during sober periods thrives on generating various fund raising schemes, and the local Peterborough Radio and Electronics Society have also helped out with a donation. If you fancy joining in, either with supporting the group or joining in the evenings as well, then contact G4PYR @ GB7PET, you can even call him on his poserphone on 0836 542630.

Remember someone has to pay for the nodes — no nodes, no packet network — and the man hours of work in running them comes free.

RUDAK-2

The Soviet GEOS geological research satellite which flies in July will carry Rudak-2, a second-generation packet radio experiment complementing the original Rudak. Rudak-2 is a joint project of Amsat-U-Orbita, the Adventure Clubes in Moscow, and the Amsat-DL/Rudak Group in Marbur, Munich and Hannover. As well as a Mode-B linear transponder for SSB and CW communication, various packet radio modes will be supported on the satellite. These together with the frequencies used are given in Table 2, and as you can see there should be something in there for everyone with five different data rates employed. Two on-board computers are used to control the system, and the normal AX-25 packet radio protocol is used. Hence if you've got the gear for FO-20, Pacsat, Lusat or AO-13, you should be able to effectively use Rudak-2 as well. My thanks go to Connect International and Amsat-DL for this information.

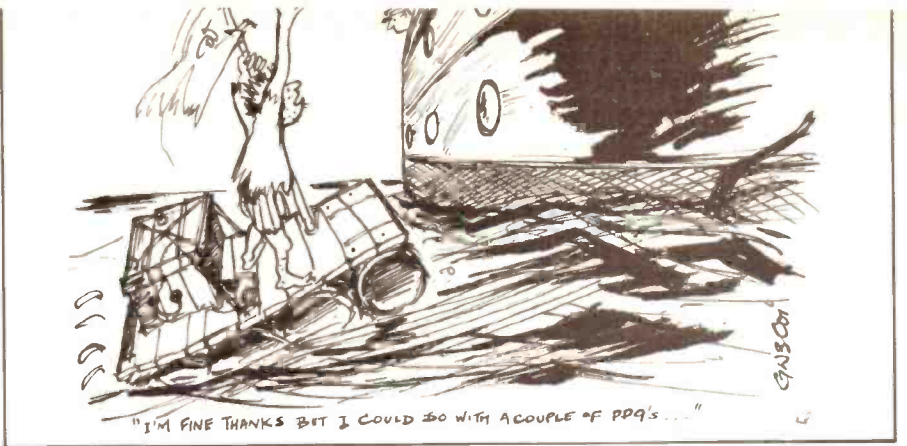
If you fancy contacting the Moscow Adventure Club, look out for the club callsign RK3KP currently active on Fuji-Oscar-20. At the station you'll find Leo, UA3CR who's the chief operator of the station, as well as being the joing Amsat-DL/Amsat-U Project Radio-M1 (RS14) satellite co-ordinator. Leo uses an FT-736R transceiver with an MFJ-1274 TNC and an IBM XT clone

to operate into FO-20, his address is PO Box 82, Moscow 101000, USSR.

CTRL-Z — End of Message

I'm now off to re-program my five TheNet eproms to the agreed ssids and aliases, to temporarily confuse the amateurs in the Southampton areas using the network node system. One use of packet nodes in my area is to connect into the DX packet cluster system, giving DXers the chance to keep updated on happenings on the bands. Ian G4LJF who runs such a cluster from Wokingham now has his system licensed as GB7DXI, this currently operates on 144.675MHz but will soon shift over to 70.325MHz. Try it sometime, you may be surprised at the power of packet.

Thanks again for your letters and packet messages. If you'd like to air your views on the network, or of course tell us about your packet group's activities, a message sent to me via the GB7XJZ BBS will guarantee a reply. Letters, club newsletters etc. are of course very welcome, sent to my address of PO Box 73, Eastleigh, Hants SO5 5WG, or to my Fax



"I'M FINE THANKS BUT I COULD DO WITH A COUPLE OF PPA'S..."

on 0703 263429. Personal communication on 0703 262105 also works sometimes. Until next month, 73 de Chris G4HCL @ GB7XHZ.

Table 2 — Rudak-2 Features

General: Two on-board computers with IPS operating systems for AX-25, mailbox, and DSP telecommunications up to 20kHz. 1Mb ram, four separate uplink channels.

Linear Transponder Uplink: 435.030MHz-435.120MHz (90kHz)

Linear Transponder Downlink: 145.880MHz-145.970MHz (Inverted)

Power Output: 12W max.

Beacon: 145.880MHz, CW telemetry

Digital Transponders: Uplinks:

SAT-RX-1: 435.016MHz ± 10kHz, bits/s FSK, NRZIC/Biphase-M (JAS, Pacsat).

SAT-RX-2: 435.155MHz ± 10kHz (AFC), 2400 bits/s, BIT/SK Biphase-S.

SAT-RX-3a: 435.193MHz ± 10kHz (AFC), 4800 bits/s, RSM NRZIC/

Biphase-M.

SAT-RX-3b: 435.193MHz ± 10kHz (AFC), 9600 bits/s, RSM NRZI (NRZ-S) + scrambler.

SAT-RX-4: 435.041MHz ± (Digital AFC), RX for RTX-DSP experiments.

Downlink: (Transmit frequency 145.983MHz).

Mode 1: 1200 bits/s BIT/SK NRZI (NRZ-S, ie as FO-20).

Mode 2: 400 bits/s BIT/SK Biphase-S (Amsat mode for AO-13 beacon).

Mode 3: 2400 bits/s RSM BIT/SK Biphase-S (planned for AO-13).

Mode 4: 4800 bits/s RSM NRZIC (Biphase-M) (as 4800 bits/s uplink).

Mode 5: 9600 bits/s RSM NRZI (NRZ-S) + scrambler (as 9600 bits/s uplink).

Mode 6: CW Keying (only for special events).

Mode 7: FSK (F1 or F2B), eg Rtty, sstv, fax etc. (only for special events).

Mode 8: FM modulated by D/A signals from DSP-RISC processor, eg speech.

Bredhurst electronics



BREDHURST ELECTRONICS LTD.

High St, Handcross, W. Sx. RH17 6BW

(0444) 400786

SITUATED AT SOUTHERN END OF M23 — EASY ACCESS TO M25 AND SOUTH LONDON

Receivers	
HF225	£425
ICR71	£855
R2000	£595
VC10 VHF Converter	£161
FRG9800	£649
FRV9800 VHF Converter	£100
RS000	£875

HF Transceivers	
TS950SD	£3195
TS940S	£1995
TS440S	£1138
TS140S	£862
TS680S	£985
FT767GX	£1599
FT757GX2	£960
FT47GX	£659
IC765	£2499
IC751A	£1500
IC735	£979
IC725	£759

2M Transceivers	
TH25E	£258
TH205E	£199
TH215E	£228
TH26E	£249
TR751E	£599
TM213E	£289
FT411+FNB10	£259
FT290RII	£429
FT211RH	£309
FT212RH	£349
IC2GE	£275
IC2SE	£275
IC2SET	£295
IC228H	£385
IC275E Inc PSU	£1069

70cms Transceivers	
TH431E	£318
TH405E	£245
TH415E	£268
FT811+FNB10	£273
FT790RII	£499
FT711RH	£349
FT712RH	£375
ICAGE	£299
IC448E	£429

Dual Band Transceivers	
TM721E	£699
TS790E	£1495
FT470R+FNB10	£384
FT736R	£1199
FT4700RH	£499
IC32E	£399
IC3210E	£499
IC24ET	£385

Scanning Receivers	
ICR7000	£989
FRG9600M	£509
Icom ICR100	£499
AR2002	£487
RS35 Airband	£249

Antenna Tuner Units	
FRT7700	£59
FC757AT	£349
AT230	£208
AT250	£366
ICAT100	£379
MFJ941D	£133
MFJ949C	£165

Datong		p&p	
AD370 Active Antenna	£77.62	£3.00	
FL3 Multimode filter	£145.54	£2.00	
D70 Morse Tuler	£63.40	£2.00	
ASP Speech processor	£93.15	£2.00	

Coaxial Switches		p&p	
SA450 2way SO239	£19.49	£1.50	
SA450N 2way N	£26.99	£1.50	
Drae 3way SO239	£20.18	£1.50	
Drae 3way N	£26.11	£1.50	
C54 4way BNC	£30.39	£1.50	
MFJ-1701 6way SO239	£38.35	£1.50	

Power Supplies		p&p	
BNOS 12/5E	£74.75	£5.00	
BNOS 12/20E	£178.28	£5.00	
DRAE 6amp	£84.99	£3.00	
DRAE 12amp	£113.10	£5.00	
DRAE 24amp	£163.42	£5.00	

Hand Held Receivers		p&p	
RS37S Airband	£69.00	£2.00	
AOR AR100	£249.00	£2.00	
Win108 Air band	£175.00	£2.00	
AOR AR900	£199.00	£2.00	
ICOM ICR1	£399.00	£2.00	

Palomar Antenna Products		p&p	
Antenna Noise Bridge — up to 100mHz	£59.95		
Tuner Tuner — Tune your ATU without transmitting	£99.95		
LED SWR Meter — Auto SWR up to 2KW PEP	£124.95		
9:1 Balun for th 2TFD antenna	£23.95		

Goods normally despatched within 24 hours
Prices correct at time of going to press E&OE
MAIL ORDER & RETAIL

Antennas Range		p&p	
J Beam 'Mimimax'	£378.35		
J Beam TB3 Mk3	£365.70		
Butternut HF6VX	£182.85		
Butternut HF2v	£163.00		
Cushcraft A3 Beam	£329.00		
Cushcraft 2M 215WB	£99.00		
Tonna 20505 5 ele 50MHz	£50.72		
Tonna 20809 9 ele 140MHz	£33.12		
G Whip Tribander 10/15/20m	£44.39		

Morse Keys		p&p	
Kent Morse key kits	£33.50	£2.50	
Kent twin-paddle kits	£42.50	£2.50	
Hi Mound MK704	£20.00	£2.00	
Hi Mound MH706	£22.00	£2.00	
Bencher BY1 Black Base	£67.42	£2.50	
Bencher BY2 Chrome Base	£76.97	£2.50	

Filters		p&p	
AKD HPF1	£7.85	£1.00	
AKD Braid Breaker	£7.85	£1.00	
AKD Notch Filter	£8.75	£1.00	
AKD High Pass Filter	£8.25	£1.00	
LF30A Low Pass Filter	£32.26	£2.00	

Antenna Bits		p&p	
Bricom Balun 1:1 1kW	£15.26	£1.50	
Bricom Balun 4:1 1kW	£16.25	£1.50	
Bricom 21MHz Epoxy Traps (pair)	£13.55	£1.50	
Self Amalgamating Tape 10mx 25mm	£4.25	£0.75	
T-piece polyprop Dipole centre	£1.60	£0.25	
Small ceramic egg insulators	£0.65	£0.20	
Large ceramic egg insulators	£0.85	£0.20	

Cables Etc.		p&p	
URM67 low loss coax 50ohm per metre	£0.95	£0.25	
UR76 50ohm coax dia. 5mm per metre	£0.35	£0.10	
UR70 70ohm coax dia. 2.3mm per metre	£0.40	£0.10	
UR95 50ohm coax dia. 2.3mm per metre	£0.40	£0.10	
4mm Polyester Guy Rope (400kg) per metre	£0.28	£0.10	
50mtrs 16swg hard drawn copper wire	£10.95	£2.50	
75ohm Twin Feeder Light Duty per metre	£0.20	£0.10	

BREDHURST ELECTRONICS LTD HIGH ST, HANDCROSS, W. SX. RH17 6BW (0444) 400786
Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm

TX-3 RTTY CW ASCII TRANSCEIVE

High performance, low cost. Unbeatable features. BBC, CBM64 tape £20, disc £22. SPECTRUM tape £35 +3 disc £37 inc adaptor board. VIC20 RTTY CW program tape £20. All need our TIFI interface or a terminal unit.

GX-2 FAX SSTV TRANSCEIVE

All modes of FAX and colour/mono SSTV. Review in March 90 Amateur Radio. BBC only. Complete system only £99 or £119 with FAX direct printing option.

RX-8 MULTIMODE RECEIVE SYSTEM

FAX to screen and printer, colour SSTV, HF and VHF PACKET, RTTY, AMTOR, CW, ASCII, UoSAT. Every feature. Full disc, printer support. Reviews Oct 89 Ham Radio Today & March 90 Amateur Radio. BBC only. Complete system only £259. DISCOUNT for RX-4 users.

RX-4 RTTY CW SSTV AMTOR RECEIVE

Still a best-seller. BBC, CBM64 tape £25, disc £27. VIC20 tape £25. SPECTRUM tape £40, +3 disc £42 inc adaptor board. All need our TIFI interface. SPECTRUM software-only version £25.

TIFI INTERFACE for best HF & VHF performance with our software. Kit £25, ready-made & boxed £40. Only with TX-3 or RX-4 software.

APT-1 WEATHER SATELLITE RECEIVE MODULE

Converts satellite signal for display on any FAX system. £59, for use with RX-8, all connections included and price only £39 if ordered at same time as RX-8.

Also MORSE TUTOR £6, LOGBOOK £8, RAE MATHS £9 for BBC, CBM64, VIC20, SPECTRUM, BBC LOCATOR with UK, Europe, World maps £10. All available on disc £2 extra.

Full information available on everything. Please ask.

Prices include VAT and p&p by return

technical software (HRT)

Fron, Upper Llandwrog, Caernarfon LL54 7RF

Tel: 0286 881886



HAM RADIO TODAY

Introduces An Easier Way To Pay For Your Subscription

You can now subscribe to HAM RADIO TODAY by Direct Debit, a new service we are able to offer to our readers.

Paying for your subscription by Direct Debit is quick and easy and has advantages:

- ★ ONLY ONE PIECE OF PAPER TO SIGN — SIMPLY COMPLETE THE DIRECT DEBIT INSTRUCTION.
- ★ YOUR BANK DOES ALL THE WORK — THEY WILL MAKE PAYMENTS ON YOUR BEHALF.
- ★ AUTOMATIC RENEWAL OF YOUR SUBSCRIPTION — NO MORE DELAYS AND ISSUES MISSED.
- ★ POST FREE SUBSCRIPTIONS.
- ★ SPECIAL SUBSCRIBER ONLY OFFERS.

If you've been thinking about subscribing to HAM RADIO TODAY then now is the time to do so — it's never been easier and it only costs £18.00 a year!

If you want to receive a regular supply of the best magazine for amateur radio users available, then subscribe today by Direct Debit.

The Direct Debit payment facility can only be offered to UK subscribers only.

The "SRW Kilowatt"

An easy 400watts O/P, Mains Powered HF Linear

Covers all 9 Bands — 1.8 to 30MHz

Only 14" wide, 10" deep and 5" high. Fits on desk!

Built-in mains PSU

Total weight under 7Kg

Drive with any 50 to 100watt O/P HF rig

Quick and simple to tune. Dip C1, Load C2!

Now in full production at last!

Would you like to run the full 'Legal Limit' and:

- Keep that daily *sked* with VK, even when the band seems dead?
- Work all the DX, even without a beam, tower and rotator? (The 6dB power gain of a linear is much more cost effective.)
- Beat the pile ups, get that DX station first call?
- Be 2 'S' points stronger, the strongest signal on the band?
- Conduct 'tests' and QSOs on frequencies being used by *illegal* intruders? A great service to amateur radio!
- Be heard via ionospheric *Backscatter*? No more QRM caused by skip zone Gs getting into QSO on the same frequency.
- Present a 50ohm load to your rig, and maintain the full 400watts O/P power up to band edges, with no ATU?

Then help yourself . . . ORDER AN "SRW KILOWATT!"

Only £499+VAT

direct from the designers/manufacturers

S. R. W. Communications Ltd.,

Astrid House, The Green, Swinton,
Malton, North Yorkshire YO17 0SY

Tel: Malton (0653) 697513

Please write or phone Steve Webb, G3TPW, for more details and leaflets.

I wish to subscribe to HAM RADIO TODAY at the annual rate of £18.00.

INSTRUCTIONS TO YOUR BANK TO PAY DIRECT DEBITS
Please complete Parts 1 to 5 to instruct your Bank to make payments directly from your account.

Originator Identification Number

8 5 2 9 2 7

1. The Manager Bank plc

(Full address of your Bank Branch)

Banks may refuse to accept instructions to pay Direct Debits from some types of accounts.

2. Name of Account Holder

3. Account Number

4. Bank Sorting Code

5. Your instructions to the bank and signature.

- I instruct you to pay Direct Debits from my account at the request of Argus Specialist Publications in respect of my Subscription Advice.
- The amounts are variable and may be debited on various dates.
- I understand that Argus Specialist Publications may change the amounts and dates only after giving me prior notice.
- I will inform the bank in writing if I wish to cancel this instruction.
- I understand that if any Direct Debit is paid which breaks the terms of this instruction, the bank will make a refund.

Signature(s) Date

Title Mr/Mrs/Miss

Address

Postcode

Return this form to: Select Subscriptions Ltd., 5 River Park Estate,
Billet Lane, BERKHAMSTED, Herts HP4 1HL HRT/3

EXCLUSIVE: ICOM's IC-R72 HF Receiver



HRT's exclusive first-time review of Icom's latest hf receiver, from G4HCL.

The Icom IC-R72 was first revealed at the NEC show this year, and was exclusively featured in our show report. We told you to watch out for the first ever review, and do we ever let our readers down? Claiming a wide dynamic range coupled with direct digital synthesis, we put it through its paces to see what it was made of...

HF Attractions

Short Wave listeners will know that there's a lot happening on the hf bands as well as just amateurs chatting to each other. A general coverage hf receiver is found in many an amateur's shack, either as a stand-alone receiver for general monitoring or as a second receiver for cross-band and full duplex satellite

amateur operation. To complement this use, a good hf receiver is often the first choice for many newcomers upgrading their equipment in the world of radio, to listen in more seriously to the wide and diverse range of signals HF has to offer.

Receiver Features

The IC-R72 covers the entire HF spectrum, indeed from hf upwards, giving continuous tuning over the range 30kHz - 30MHz although this is internally restricted to 150kHz - 26.1MHz in West German models of the set. The modes of operation provided are USB (Upper sideband), LSB (lower sideband), CW (morse), and AM (amplitude modulation). An optional plug-in board is available to

give narrow band reception, so you can listen to 10m FM signals as well as European CB operators and the like as well as down-converted VHF signals with an external converter.

For those who like microprocessors with everything, various memory channels coupled with a direct frequency entry keypad on the front panel, this lets you directly key in the reception frequency down to the last 10Hz for spot-on accuracy. As well as this, a large flywheel weighted tuning knob is fitted for general tuning around, and together with various button depressions this can step the receive frequency in 1MHz steps, pre-set steps in 1kHz increments between 10kHz and 1kHz, and finally 10Hz steps for SSB, data, and CW tuning.

The set operates from both ac mains and 12V dc (again West Germans forgo the dc option), and a novel feature is that of an internal 1.8Ah 12V rechargeable battery which keeps the receiver powered up for around an hour when switched on in the absence of mains voltage. The set

measures 241mm by 94mm by 229mm deep, and weighs 4.8kg without the battery, which would bring the weight up to 5.5kg.

Memories

99 memories are available for you to store frequencies and modes, these being stored in memory from a pre-selected mode and frequency already entered in VFO mode, by a single button press. Similarly, transferring between memory and VFO mode is a simple operation, likewise with transferring memory information into VFO mode for you to tune away from with the main tuning knob. Memory channel numbers 01 through to 79 are used for 'normal' storage, and channels 80 to 99 are also used for a potentially useful 'Auto Memory Write Scan', described later, as well for as normal frequency and mode storage.

Interference Rejection

As the hf bands are often full of mega-strength signals with relatively weak stations interleaved, the ability to receive the latter with minimum interference is often the goal of hf communication receivers. To this end, the IC-R72 has been designed with several interference-fighting sections of circuitry as well as a high dynamic range front end stage, employing a direct feed mixer for good linearity. For weak signal reception where absolute sensitivity rather than the utmost in strong signal rejection is important, a front end preamplifier operating above 1.6MHz may be switched into circuit from the front panel. If band conditions either get too busy or you need to connect a monster aerial onto the set, individual 10dB and 20dB attenuators can also be switched in from the front panel, and these can be cascaded if needed to provide a total of 30dB attenuation.

A dual level noise blanker may be switched in from the front panel to give a degree of suppression against impulse noise, the 'High' button below the noise blanker switch controlling the level of the internal blanking threshold. Depending on the strength of the received and adjacent signals, the noise blanker level may be controlled to prevent other band signals affecting its operation. The reason for this is that some receivers just curl up in busy band conditions when you try to use the noise blanker, the circuitry attempting to blank on the strong signals as well and leading to signal distortion.

To prevent damage to the front end from nearby transmitters and the like, and optional 'receiver protector unit' may be internally fitted, which provides an open circuit in the presence of extremely strong signals. To cope with varying modes of communication as well as the prevailing

band and interference conditions, the built-in agc (automatic gain control) may be independently switched to either fast or slow decay, fast being useful for when you're either listening for weak signals beneath stronger ones or for data reception, and slow decay useful for SSB reception and the like to prevent the receiver gain from increasing between every received syllable.

Scanning

The IC-R72 has four modes of scanning: Programmed Scan, Memory Scan, Selected Memory Scan and the Auto-Write Memory Scan. The Programmed Scan repeatedly searches between any two user-programmed frequencies, these being stored in two dedicated memory channels P1 and P2. The scan is initiated by a single button press, halting whenever the signal is received. A handy feature here is a centre-tune facility to allow the receiver to halt at the centre tune position when searching for FM or AM signals, which also lights up a front panel led when correctly tuned, a helpful extra general tuning aid.

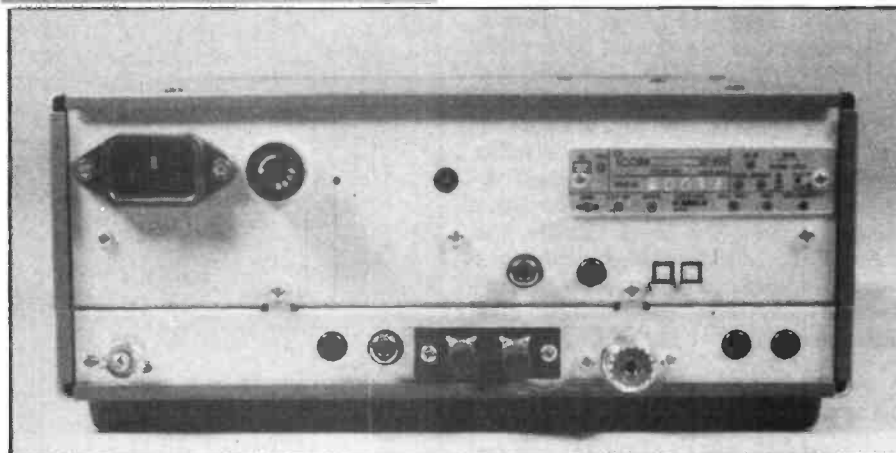
By pre-setting a switch position on the rear panel, the scan may either be

the selected memory scan mode where the set only samples the channels you've previously pressed the Sel button against.

Tape Recording

Many experienced listeners will know the value of a tape recorder coupled to their receiver, and the IC-R72 has an auxiliary audio output on the rear panel for this. A useful extra is a further remote connector to control the tape motor control, which switches the recorder on when the IC-R72 squelch raises on detecting a signal. This facility is controlled by an internal on/off switch, a small internal relay providing the switching contacts.

As many Short Wave broadcasting stations transmit in different languages at various times of the day, being next to the receiver to listen to these at the appropriate times may of course not be convenient. The IC-R72 overcomes this with an internal clock and timer, automatically switching itself on and off at the times you've entered. Coupled to the remote tape record facility, this for example would let you record programmes in the middle of the night, to listen to in your car cassette player on the way to work. This facility could of course also be useful on



automatically resumed after 10 seconds of continuous signal has been received (or 2 seconds after a signal has disappeared), or the scan may be set to stop on the Frequency indefinitely until you again press the 'Scan' button on the front panel keypad. The auto-write memory scan mode goes one step further by automatically scanning the same programmed range, and then storing the first twenty received AM or FM frequencies into memory channels 80-99, the scan halting when these channels have been filled.

Once you've stored frequencies into the various memory channels, either manually or automatically, you can scan through the memory channels one by one, with the receiver again halting when a signal appears and with a resume mode dependent upon how you've set the rear panel Resume switch. If scanning every channel gets a bit too much, you can use

FM when the receiver is used with a VHF or UHF converter plugged in, to automatically record received signals any time you're away from the set.

Options

As well as the optional FM unit described, priced at around the £45 mark, add-on narrow filters are available for CW use. The FL-100 filter at £57 gives 500Hz bandwidth, and for really narrow operation the FL-101 at £56 gives you 250Hz bandwidth. If you'd like better frequency stability either for long term reception on a given frequency, or for repeatability when dialling up the frequencies of weather fax or data signals, the solder-in CR-64 high-stability crystal unit at £69 gives you ± 0.5 ppm stability (± 15 Hz maximum) as opposed to the ± 350 Hz standard receiver stability. A speech synthesiser is also available,

which indicates the current receive frequency at the push of a button.

If you fancy your hand at computer software programming, or alternatively when commercial software becomes available, with a CT-17 level converter (£72) you can interface the set to the RS-232 port of your computer to command it to do all sorts of things such as frequency, mode, and memory changes. Other options such as a mobile mounting bracket, speakers, headphones etc, right down to a screw-on carrying handle, are also available.

Insides

The set is based on a metal plate chassis with top and bottom lids, the upper section housing the power supply and rechargeable battery. The large main lower section pcb carries all the radio frequency, intermediate frequency, and audio frequency circuitry together with spare slots for options such as the CW filter, FM unit, and receiver protector unit. Housed between the upper and lower sections is the equally large pll (phase lock loop) unit providing the frequency generation stages of the receiver. This employs a combination of direct digital synthesis and normal synthesisers controlling voltage controlled oscillators. The receiver uses a double conversion superhet circuit with ifs of 70.45MHz and 9.01MHz, the optional FM unit adding a third if of 455kHz used on FM only.

Two small internal backup batteries are fitted in addition to the main rechargeable pack. The first has a two year life and powers the clock circuits, the other with a five year life provides memory backup. These are clip-in batteries with clear instructions on their replacement given in the supplied manual.

On The Air

I started around 12.00 GMT one day by connecting the receiver up to my loft-mounted 20m dipole to take a listen around the amateur DX bands, to see what the set was like in pulling in weak DX stations. Well, the very station I tuned to was the ZL40D coming in at a good Q5, and you can't get much further than New Zealand to the UK received with an indoor aerial! I later connected my large remotely tuned inverted V affair with its extensive copper ground plane, taking a listen around the lower frequency bands as well as the evening drew in.

I rarely needed the pre-amp switched in except to give me a bit of confidence in the S-meter which I often thought read a little low, although on 10m the pre-amp came in handy for pulling in the occasional SSB satellite signals which otherwise were often fairly weak. The set gave good reception down to 60kHz and below, where the pre-amp was inopera-

tive, with many 'utility' stations being received. On more crowded bands I found the receiver held its own in strong signal conditions, on 40m in the evening I didn't need the attenuator at all. Quite frankly I found little difference with the pre-amp switched in except the higher S-meter reading, no extra 'mush' being received from mixing effects and the like which beset many receivers. Overall this was a very good performance using the set-up I'm used to, although some users of monster aerials may need to play around with the attenuator!

Using the noise blanker to try and suppress next door's computer hash wasn't very effective, but then it couldn't really be classed as impulse noise (I eventually phased it out with an SEM black box). Throughout the review period I didn't come across one over-the-horizon radar signal, characterised by their 'Woodpecker' type impulse noise, so I couldn't try the noise blanker for this. Listening around the Short Wave broadcast bands showed the receiver to have

was all I needed to search for further activity, very handy indeed. When having an initial tune around a band, I found storing potentially interesting frequencies for further listening was very simple. This was due to a sensible indication of a 'bar' above the displayed memory channel number whenever that memory was clear of information, so there was no risk of overwriting something I'd previously stored, even though I was in VFO mode and couldn't check the memory without a few button-pushing operations.

In all, I found the receiver quite easy to operate in voice modes. Coupling my KAM all-mode terminal unit to the set and tuning around the various utility frequencies proved an absorbing pastime. The fine 10Hz steps provided accurate tuning, and as the set appeared to keep the tuned frequency for long periods, I could simply tune in and leave it, rather than constantly re-tuning. By downloading the received information to computer disk I could then return to the set later to see what weather pictures etc had been



a sharp 'nose' selectivity separating strong closely spaced stations nicely, although I did find slightly indifferent rejection of strong adjacent AM signals when listening to a weak on-channel broadcast station.

After repeatedly tapping frequencies and modes in to change between amateur and broadcast bands, I latched on to a very handy use for the memories: storing frequencies in my favourite band segments together with their associated modes, eg LSB on 14.099MHz for data, USB on 14.200MHz for SSB, 29.600MHz FM, 7.200MHz and the like, enabled me to use the memories as a flexible 'band change' switching system.

After recalling the memory required using the up/down buttons, a quick tune

received.

About the real negative point I found is that the set appears to be rather 'cut down' aesthetically, with a plastic-looking fascia and several empty screw holes in the side panels where optional mountings fit. The back panel also is plain bare metal rather than having a painted finish, and this overall finish could detract from the perceived value of the set.

Laboratory Results

The sensitivity was very level at around 0.27 μ V pd across the entire frequency range, and switching in the pre-amplifier showed this to have almost exactly 10dB voltage gain. The S-meter was rather 'mean' at the lower signal levels, confirming my on-air findings. I

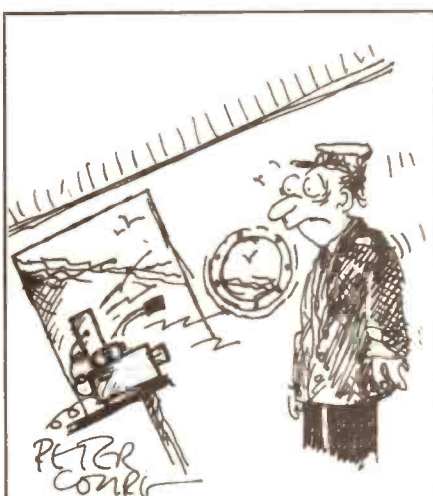
found it strange at first trying to measure the receiver's blocking performance due to the set's good performance, and likewise with the intermodulation rejection. In measuring the blocking I just carried on cranking my cavity tuned signal generators up in level without the set batting much of an eyelid, and after finding relative levels of 110dB I decided the set was good enough in this respect!

The AM selectivity as found on air was narrow at the top, but this widened somewhat over the 'skirt' section. Inspection of the manufacturer's specifications for this (20kHz at -50dB) showed that this was to be expected. On SSB and CW, due to the crystal filter employed, the selectivity shape factor was better, although it started widening out around the -55dB mark due to reciprocal mixing effects from the synthesiser. However tuning through a strong signal didn't bring the rough hacksaw noise associated with many synthesised sets.

Conclusions

Icom's new receiver is very easy to use, and overall it provides a good technical performance, especially in terms of strong signal handling at larger signal separations. The internal 12V battery is a novel facility which could provide a backup power supply where required. The selling price of £645 doesn't include various options such as FM or a CW filter, both of which I feel would be useful when incorporated in a receiver in this price range, but then combined with other options which may be added if needed, it keeps the overall cost down somewhat.

My thanks go to Icom (UK) for the loan of the review set.



NOT SURE IF THAT'S 9450S OR 9850S, ANYWAY, AS I WAS SAYING, WHEN I BUILT MY FIRST RECEIVER BACK IN 1937

Sensitivity: Input level required to give 12dB sinad:

Freq. MHz	SSB/CW	FM
1.8	0.26 μ V pd	0.66 μ V pd
3.5	0.28 μ V pd	0.68 μ V pd
7.0	0.27 μ V pd	0.65 μ V pd
10.0	0.25 μ V pd	0.63 μ V pd
14.0	0.28 μ V pd	0.69 μ V pd
18.0	0.27 μ V pd	0.68 μ V pd
21.0	0.28 μ V pd	0.70 μ V pd
24.5	0.27 μ V pd	0.69 μ V pd
28.5	0.29 μ V pd	0.70 μ V pd
29.5	0.29 μ V pd	0.70 μ V pd

Selectivity: Single signal selectivity, measured at 21.4MHz:

	CW/SSB/AM(N)	AM
-3dB:	1.47kHz	4.98kHz
-6dB:	2.19kHz	6.87kHz
-40dB:	2.85kHz	14.04kHz
-60dB:	4.69kHz	17.90kHz

Blocking: Measured as increase over 12dB sinad level of interfering signal, unmodulated carrier (SSB/CW, pre-amp), causing 6dB degradation in 12dB sinad on-channel signal:

+/- 50kHz:	99dB
+/- 100kHz:	105dB
+/- 200kHz:	>110dB

3rd Order Intermodulation Rejection: Increase over 12dB sinad level of two interfering signals giving identical 12dB sinad on-channel 3rd order intermodulation product, (SSB/CW, pre-amp off):

50/100kHz spacing:	91dB
100/200kHz spacing:	92dB

Image Rejection: Increase in level of signals at first if image frequency, and the if frequency itself, over level of on-channel signal to give identical 12dB sinad signals:

Freq. MHz	1st Image Rej.	1st IF Ref.
10.0	94dB	87dB
20.0	96dB	87dB
30.0	93dB	89dB

S-Meter Linearity, 14.25MHz:

Indication	Sig. Level	Rel. Level
S1	10.8 μ V pd	-18.5dB
S2	12.0 μ V pd	-17.6dB
S3	14.9 μ V pd	-15.7dB
S4	18.1 μ V pd	-14.0dB
S5	22.6 μ V pd	-12.0dB
S6	28.5 μ V pd	-10.0dB
S7	38.7 μ V pd	-7.4dB
S8	56.3 μ V pd	-4.1dB
S9	91.0 μ V pd	0dB ref.
S9 + 20dB	0.81mV pd	+19.0dB
S9 + 40dB	4.20mV pd	+33.2dB
S9 + 60dB	46.1mV pd	+54.0dB

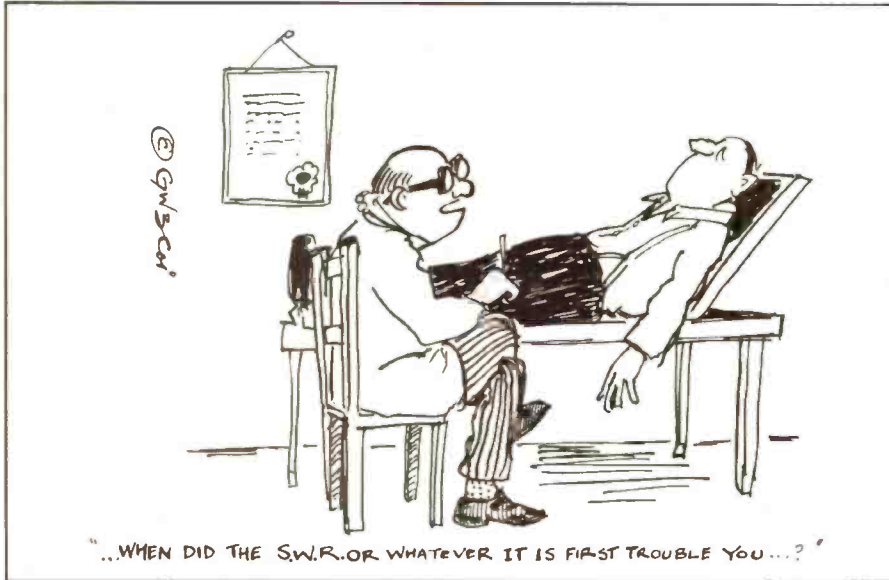
Pre-amp Gain: Tested on 14.25MHz:

10.2dB

Attenuator Levels: Tested on 14.25MHz:

10dB Attenuator - 9.8dB
20dB Attenuator - 20.1dB

HRT HOMEBREW SUB-TONE CONTROLLER



Many amateur 'black box' FM transceivers have a sub-audible tone or Continuous Tone Controlled Squelch System (CTCSS) facility, either fitted as standard or available as an option. But what about the owner of either a home-brew or a modified ex-commercial rig who'd like sub-tone facilities as well? In commercial rigs it's all under microprocessor control, and building a separate oscillator and tone decoder the 'traditional way' for each

for speech communication. In use, a low-level sub-tone is transmitted along with the carrier, this tone being detected at the distant receiver and then controlling the audio squelch gate or other circuitry in the receiver. Regular HRT readers may remember, from our feature on CTCSS in the October 1989 issue, that many and varied uses are made of sub-tone on the amateur bands.

A typical common use may occur

Chris G4HCL and Andrew G3YZW have a little device which lets you listen for the callers you want and ignore the rest

one of the multitude of sub-tone frequencies used would of course put many people off. Well, here's the simple answer: a self-contained, single-ic project that you can put together in an evening, giving you all the 38 sub-tone frequencies with quartz precision!

What is Sub-Tone?

Sub-tone is just what the name suggests: a tone frequency below the normal audio frequency range used

where a group of amateurs wish to permanently monitor a prearranged FM channel for calls from other members of their own group, in an emergency call-out application for example. Here the 'on call' group members wouldn't want their receivers all bursting to life when other amateurs were simply using the channel for a ragchew. We all have a right to all the frequencies we're licensed for, and moans of 'Please keep this frequency clear as we're

using it tomorrow for a net' often don't go down very well! Sub-tone circuitry controlling each receiver squelch is a good solution here.

Several FM repeaters also use sub-tone to control or modify their operation. On 10m FM, because propagation effects could give unintended repeater access, sub-tone controlled squelch is often used on the receivers of repeaters, so you need a given sub-tone to access some repeaters, and it can be quite frustrating if you can't generate this!

Many 23cm FM beacon/repeaters generate a 100Hz sub-tone along with the transmitted signal when the unit is in talkthrough mode, ie when activity appears. This can be useful to save you from listening to a possibly noisy signal at all times due to the constantly keyed transmitters which also act as beacons.

The use of sub-tone on vhf and uhf repeaters is growing also, an example being a Midlands 2m FM unit which adds sub-tone squelch during 'lift' conditions. This is fitted to the repeater receiver and is switched in when required to allow local amateurs with the correct transmitted sub-tone to operate without restriction. It presents higher squelch level signals from distant amateurs operating into other repeaters on the same channel, giving a degree of 'local filtering'. My semi-local 2m repeater suffers from this effect nearly every morning, and the technical group were recently making noises about using sub-tone for that as well!

Circuit Description

As you'll see from the accompanying circuit diagram (Fig. 1.) the arrangement really is simple, but don't be misled because there's a lot in there. It's based around a powerful ic, the CML FX365, which is a cmos large scale integration (lsi) chip intended for CTCSS use in radio communications. Although it's designed specifically for microprocessor controlled multichannel equip-

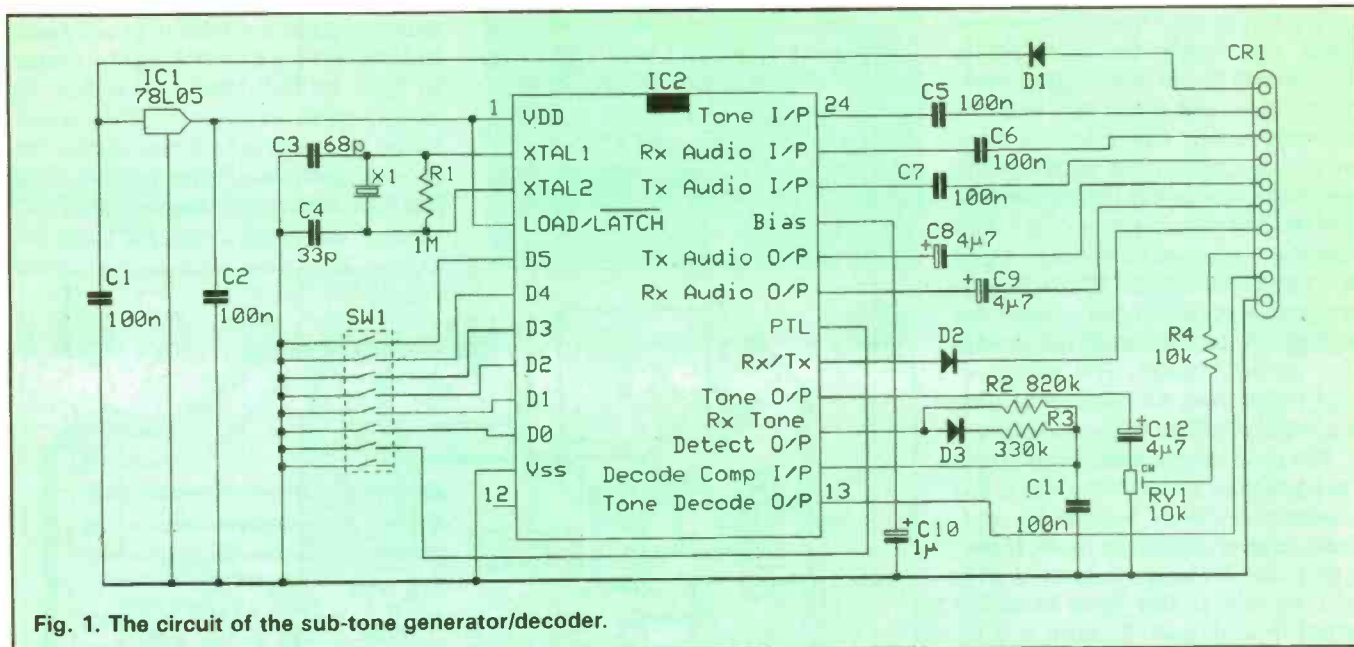


Fig. 1. The circuit of the sub-tone generator/decoder.

ment, to allow a stand-alone circuit I've used a parallel-loading technique for tone frequency selection. Hence all you need are either wire links for a given tone, or a switch arrangement to let you manually change the tone frequency as required.

A 5V dc supply at around 3.5mA is all that's needed to power the chip. This may be supplied by a source of regulated 5V already present in the rig, but it is safer to use a separate 78L05 regulator to provide power. The input to the 78L05 can be in the range 7V to 35V for proper functioning. Decoupling capacitors on input and output keep the regulator stable, and provide some protection against power supply spikes. Protection against inadvertent reverse connection is provided by D1.

The completed board will give you accurate sub-tone generation and decoding facilities, with frequencies referenced from the 1MHz crystal oscillator. I've arranged this oscillator to use an on-board cmos inverter gate in the ic as a high-gain amplifier, with feedback arrangement to complete the oscillation path. The output of this inverter is fed directly to the internal clock generator in the ic. Receive and transmit audio filtering is also provided on the ic, together with audio switching on correct tone decode. This allows you to feed the demodulated receive audio following the tone decoder tap-off point through the ic to filter out low audio frequencies in the sub-tone range. This stops received signals with sub-

tone signals all sounding like having a bad case of mains hum. Also on transmit, a filter path is available for pre-filtering your transmit audio prior to injecting the sub-tone, which prevents mixing effect problems if your original transmitter audio circuitry lets frequencies below 300Hz through as well.

Universal Circuitry

As different amateurs will have similar different uses for this circuit, I've made it as universal as possible without adding a large amount of associated circuitry for individual applications which may not be required. If you only require one sub-tone frequency, the programming lines for tone frequency setting may be simply hardwired in the required arrangement. If you'd like the facility to easily change to a further pre-set frequency at some later date, then the pcb has also been arranged for a standard dip switch to be fitted, providing on-board programming without the need for a soldering iron.

For those amateurs who'd like everything, external switches may of course be added; for example a pair of binary thumbwheel switches may be wired in to provide front-panel selection of every tone frequency available. A 'look up' table would then be used to manually convert the required tone frequency to the appropriate switch settings. Future expansion can also be performed to allow serial programming with the use of a digital display, but that's

another project.

Pin Functions

The six programming inputs D0 through to D5 are used to set the required tone frequency; pin 4 is the Load/Latch line for serial programming use and is permanently linked to +5V for our application. Demodulated receive audio is fed to pin 24 which is the tone decoder input. This should ideally be taken from the receiver discriminator output, ie prior to any audio tailoring. Using the decoder circuit just in the receive speaker line is almost guaranteed to bring failure due to this filtering, so be warned! You'll have to experiment with the audio input point for this, as it will be dependent upon the receiver you use. You may find that simply taking the tone input from the top (ie not the slider) of the volume potentiometer will often be quite satisfactory, this point normally being easily accessible. This is also an ideal place to break the receive audio path in your set to connect to pins 23 and 19, which are the receive audio input and output lines respectively. Remember to connect the tone input prior to the audio 'break' though! Capacitors are provided on the layout on all these pins to prevent the dc bias levels on the chip from being affected or from affecting anything else.

The transmit sub-tone encoder on pin 16 will need to be fed directly to the transmit modulator to prevent the transmitter audio tailoring from affecting the sub-tone. Simply con-

necting this to your microphone connector will rarely be satisfactory because the audio shaping on most transmitters will filter out the low frequency tone. The transmit tone may be injected at the slider of the transmitter deviation potentiometer using the potentiometer on the board to set the tone level independently of the modulation level. Alternatively, the signal may be fed, via a capacitor and resistor, to the top of the modulation potentiometer. The series resistor must then be chosen to give the correct depth of tone modulation.

The tone output level given on pin 16 is nominally 775mV rms into a 1k Ω impedance, which would be sufficient to overmodulate most transmitters. An on-board preset is provided to adjust the tone level for correct modulation. If there is a dc offset at the point where the signal is injected, then an extra capacitor should be added so that the potentiometer will not affect this. If the connection point is of a specially high or low impedance, it may be necessary to alter the value of R4, though the value shown should work in most cases. In a few cases an extra summing resistor from the slider of the main deviation potentiometer will be required.

The tone output potentiometer should be set to provide approximately 15 to 20% of nominal deviation, ie 750Hz to 1kHz deviation for a 5kHz deviation system. If you choose to break the transmit path to use the built-in transmit audio filter on the board, again the point of the transmit deviation potentiometer is often satisfactory for this in most transmitters. Capacitors C7 and C8 are provided on the layout to prevent dc offsets from causing a problem if the transmit filter is used. The use of this filter is recommended in order to prevent lower frequencies picked up by the microphone from interfering with correct subtone operation. The filter is suitable for signal levels between microphone level and approximately 775mV.

Construction

No special constructional practices are required apart from the usual cmos handling precautions. The ic is supplied in anti-static wrapping, and before you handle it I'd advise you briefly 'ground' yourself to avoid

zapping an expensive ic. I'd also strongly advise the use of an ic socket, for the small extra cost it could be well worthwhile. In either case, mount and solder all the components with the exception of the ic onto the pcb as shown in the accompanying layout diagram (Fig. 2). Add

external audio switching, or even just to simply drive a switching transistor to light an led, then use ic pin 13 which goes to logic 0 (0V) when either a correct tone is decoded or no tone is selected on the switch. This line then shows the 'speaker enabled' state. If you wish to use the transmit

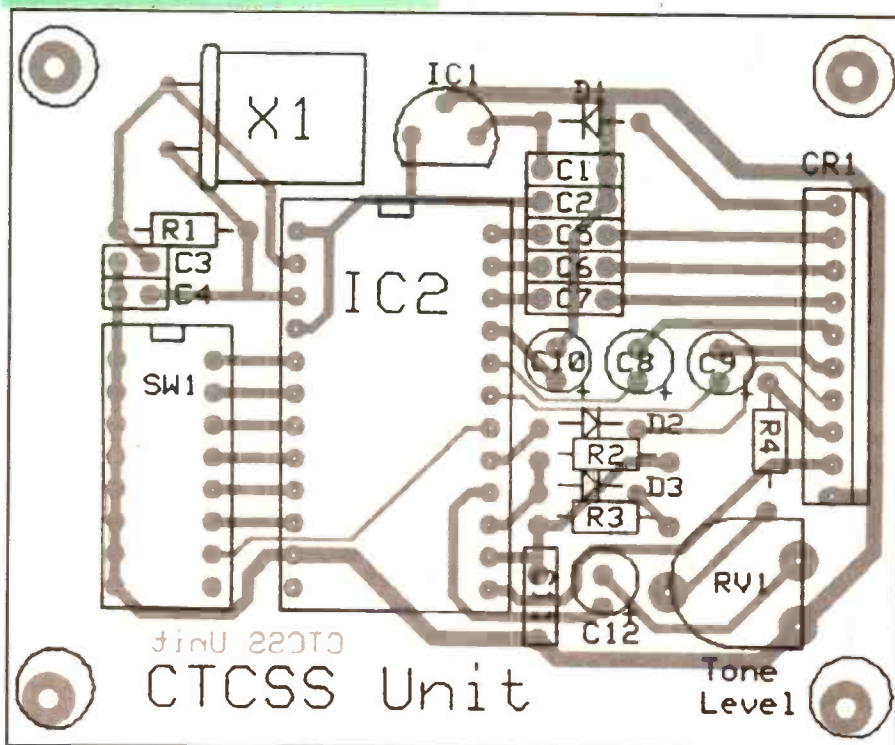


Fig. 2. The layout of the components.

your connecting leads for power and audio lines, then check and recheck that your supply is 5V dc, before switching the power off and then plugging or soldering the ic into the circuit.

Do not try to use any other voltage apart from 5V to supply the chip! If you are in any doubt about using a nominally 5V supply in the transceiver, then fit the regulator. A 78L05 is far cheaper than an FX365.

Connections to the pcb may be made by soldering wires to the pads, or by using a 10 way Molex connector, for which the pads are laid out.

In Use

Table 2 shows the various input/output arrangements possible. Hence connecting the PTL line, pin 18 to ground, (pin 17 is pulled to logic 1 when not connected) provides automatic receive tone decoding and audio switching through the internal audio circuit. If you'd prefer to use

tone encoder and/or the transmit filter circuit, you'll need to pull pin 17 down to logic 0 (0V) on transmit. The easiest way to do this is to fit a diode in series to your microphone 'ptt to ground' line. Pin 17 is internally pulled up to 5V via an internal 1M Ω resistor. This is unlikely to affect the remainder of your transceiver's circuitry but if in doubt, check.

Component Sources

All the components with the exception of the ic should be available from the usual component suppliers. Component values are not particularly critical apart from the frequency of the 1MHz crystal, all resistors are any low wattage type with $\pm 10\%$ tolerance, capacitor tolerances being $\pm 20\%$. Either a normal 1MHz clock crystal, or a 1MHz ceramic resonator may be used. The ic is available by mail order directly from Consumer Microcircuits Ltd., Wheaton Road, Industrial Estate East, Witham, Essex CM8 3TD, tel. 0376 513833. It is priced £15.89 inc. p&p and VAT. It is the FX365J Cerdip (dip).

Table 2 — Functional Circuit Operation

Inputs		Output		Result			
D0- D5	RX/ TX	PTL	Inv. RX Tone det. o/p	TX Tone enabled	TX AF path enabled	RX detect enabled	RX AF path enabled
Tone	0V	0V	5V	Yes	Yes	No	No
Tone	0V	0V	5V	Yes	Yes	No	No
No Tone	0V	0/5V	5V	No	Yes	No	No
Tone	5V	0V	5V	No	No	Yes	No
Tone	5V	5V	5V	No	No	Yes	Yes
Tone	5V	0/5V	0V	No	No	Yes	Yes
No Tone	5V	0/5V	0V	No	No	Yes	Yes

Parts List

RESISTORS (¼W ±10% unless otherwise stated)

R1.....	1M
R2.....	820k
R3.....	330k
R4.....	10k
RV1.....	10k

CAPACITORS

C1,2,5,6,7,11.....	100n non-polarised 0.2in pin spacing
C3.....	68pF ceramic 0.1in pin spacing ±10%
C4.....	33pF ceramic 0.1in pin spacing ±20%
C8,9,12.....	4µ electrolytic 0.1in pin spacing
C10.....	1µ electrolytic 0.1in pin spacing

SEMICONDUCTORS

D1,2,3.....	1N4148 or similar
IC1.....	78L05
IC2.....	FX385

MISCELLANEOUS

X1.....	1.0MHz crystal
PCB	
Dil switch (8 way)	
10 way Molex socket if required.	

Chip and Kits

As stated in the article, the heart of this device, the CML FX385 chip itself, is ONLY available from Consumer Microcircuits Ltd., for £15.89 inc. p&p. To save money and shopping around for the OTHER components, a Support Kit containing all the components EXCEPT the FX385 chip is available direct from **A. Armstrong, 423 Bideford Green, Linslade, Leighton Buzzard, Beds LU7 7TY.**

The Support Kit includes the printed circuit board, crystal and a six-way DIL switch (only six ways are needed for programming), and costs £15.47 inclusive of post, packing and VAT.

Please do not send orders for the FX385 chip to this address. We can however supply unaccompanied printed circuit boards for £4.45 inclusive of P&P and VAT.

The total cost of building the controller from these sources is just over £30.

Fig. 3. The same-size pcb tracks.

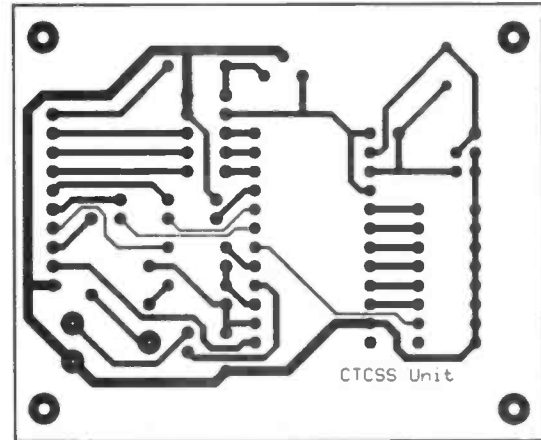


Table 1 — Tone frequencies/Program inputs

Tone Freq	D0	D1	D2	D3	D4	D5
67.0Hz	1	1	1	1	1	1
71.9Hz	1	1	1	1	1	0
74.4Hz	0	1	1	1	1	1
77.0Hz	1	1	1	1	0	0
79.7Hz	1	0	1	1	1	1
82.5Hz	0	1	1	1	1	0
85.4Hz	0	0	1	1	1	1
88.5Hz	0	1	1	1	0	0
91.5Hz	1	1	0	1	1	1
94.8Hz	1	0	1	1	1	0
97.4Hz	0	1	0	1	1	1
100.0Hz	1	0	1	1	0	0
103.2Hz	0	0	1	1	1	0
107.2Hz	0	0	1	1	0	0
110.9Hz	1	1	0	1	1	0
114.8Hz	1	1	0	1	0	0
118.8Hz	0	1	0	1	1	0
123.0Hz	0	1	0	1	0	0
127.3Hz	1	0	0	1	1	0
131.8Hz	1	0	0	1	0	0
136.5Hz	0	0	0	1	1	0
141.3Hz	0	0	0	1	0	0
146.2Hz	1	1	1	0	1	0
151.4Hz	1	1	1	0	0	0
156.7Hz	0	1	1	0	1	0
162.2Hz	0	1	1	0	0	0
167.9Hz	1	0	1	0	1	0
173.8Hz	1	0	1	0	0	0
179.9Hz	0	0	1	0	1	0
186.2Hz	0	0	1	0	0	0
192.8Hz	1	1	0	0	1	0
203.5Hz	1	1	0	0	0	0
210.7Hz	0	1	0	0	1	0
218.1Hz	0	1	0	0	0	0
225.7Hz	1	0	0	0	1	0
233.6Hz	1	0	0	0	0	0
241.8Hz	0	0	0	0	1	0
250.3Hz	0	0	0	0	0	0
No Tone	0	0	0	0	1	1

MORSE FORUM

The major item of news this month must be that the DTI has announced that it intends to introduce the novice licence in the UK in the New Year. Unfortunately the news came a day or two too late for inclusion in the last Morse Forum.

As most people will be aware there are two levels of licence. One is for VHF only, and does not require a morse test and the other class of licence requires a morse test of 5 words a minute, and gives additional limited access to certain of the HF bands. With the introduction of the licence there will be a number of young people getting onto the air on CW who will need encouragement and understanding if they are to go on in the hobby. A certain amount of help for them will ensure they have an

reason for this was that he not only had a lot of painting commitments but he also lectured on the subject, and this left him with very little time.

Once Morse did start work on his telegraph system he devoted himself to it fully and gave up his painting. Unfortunately things did not progress smoothly as the various institutions to whom Morse and his helpers demonstrated the system did not see its possibilities. It was only later when Morse himself gave demonstrations to the American Congress that they gave him \$30,000 to set up an experimental link between Baltimore and Washington. This was opened on the 28th May 1844 and it was the turning point for his new system.

Having proved that it could work, others saw its possibilities and Morse

speech.

I must agree, and go on to say that even though CW is the oldest form of communication used over the airwaves it still possesses several advantages which the other modes do not. Apart from the narrower bandwidth it occupies it can also be copied at lower signal strengths and on top of this the equipment needed to transmit it can be made more easily. QRP enthusiasts are only too well aware of this. Often transmitters can be made up using two or three transistors and they can be successfully used to make contacts over many thousand of miles.

Fred Jarvis writes to say that he is finding difficulty copying some of the high speed transmissions, while others are very much easier to copy. I think everyone has noticed the difference between operators who take time to develop a good "fist" whether it is on a straight key or with a bug. Good operating is an art to be learnt and developed, and it pays off because the person at the other end can copy what is being sent. Sometimes it is a bit harder to spend the extra little bit of effort ensuring that the morse which is being sent is well spaced and easy to read but it pays off in the end.

Another query came from Hugh Nichol G1RHN who wondered if there were any residential morse courses available. As far as I know, having made a few enquiries, there do not appear to be any. However if anyone does know of any I would be very pleased to hear of them and pass on the details.

In addition to this, if there are any people who organise morse courses in general I would be more than willing to include details in future installments of Morse Forum. But please give enough time for me to include it by allowing a couple of months or more before it is published.

Slow Morse Transmissions

While on the subject of learning morse, the RSGB has announced that from June 1st all the slow morse transmissions will use the callsign

Ian Poole G3YWX follows the trail from Samuel Morse to a Key Kit.

interest in CW operation and it will help to secure the future of CW on the bands in the years to come.

Samuel Morse

With the bi-centenary of the birth of Samuel Morse coming fast upon us next year it is worth taking a very short look at this truly remarkable man who was able to combine a number of talents and become famous in two fields. To most people Morse is known for his morse code, but very few people this side of the Atlantic know he was a highly successful artist. Morse trained as an artist in England before he started out his career in America as an itinerant artist painting the portraits of anyone who wanted a picture produced for them. As Morse's career improved he wanted to travel back to Europe to learn more about different styles of painting. It was on the return journey across the Atlantic on board ship that the idea of a telegraph system came to him.

Even then it took him a few years to develop a working model. The

received many further orders. The new system was installed along many of the new railways which were being built at the time and this meant that there was a revolution in communications. Other electrical systems suffered many problems and were not nearly as successful. Now Morse's new system meant that messages could be passed across the continent in next to no time. Previously riders on horses were the only method which could be used and they could take several days to pass their messages through, assuming they got through alive.

Correspondence

This month Arthur Wardell GODKJ wrote in to say that he was a bit distressed about the prize letter in the May issue of HRT which came from someone who thought CW is an outmoded form of communication. Arthur quite correctly goes on to say that CW takes up a lot less space than SSB and FM, or for that matter the other data modes which can occupy a channel the width of one used for

GB2CW. The arrangement will be similar to that used for the RSGB news service in that morse senders use their own station with the GB callsign for the broadcast. Afterwards they can answer queries and offer help or advice using their own callsign. The idea behind using the GB2CW callsign is to make the slow morse transmission a more recognised service and to improve the organisation.

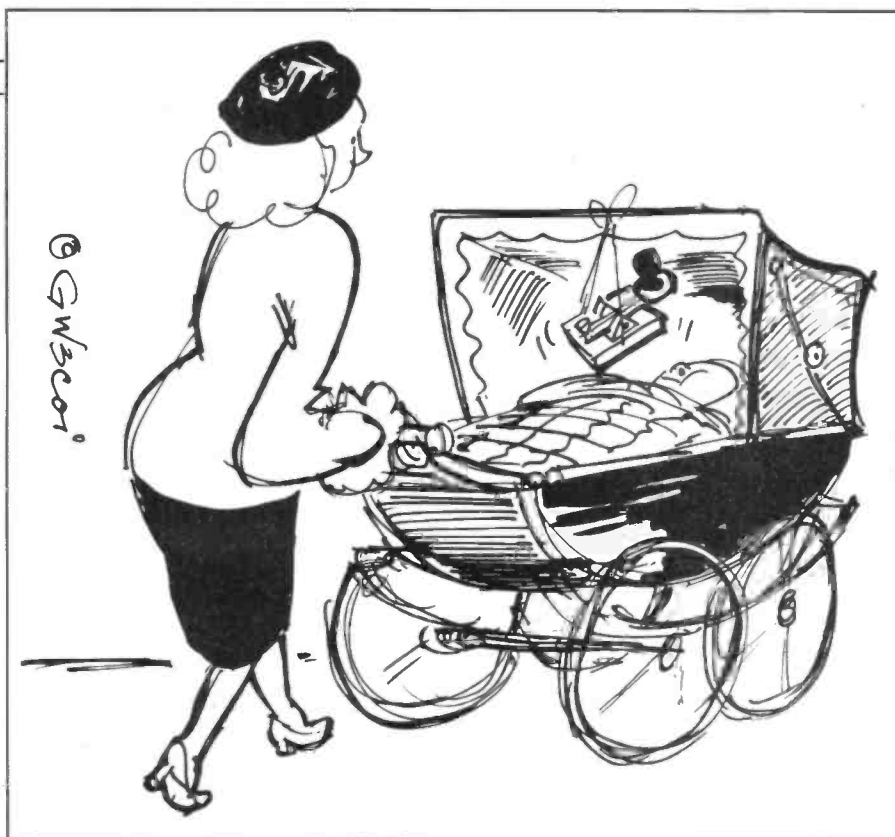
Anyone wanting to obtain a copy of the schedule for the slow morse transmission can obtain one by contacting the RSGB slow Morse coordinator **Mike Thayne G3GMS**, 14 Tynesdale Avenue, Monkseaton, Whitley Bay, Tyne & Wear NE26 3BA. Please remember to enclose a self addressed stamped envelope.

Shop Window

Morse key kits are becoming increasingly popular these days. They seem to offer very good value for money as well as providing some interest in actually building them up. Recently G4ZPY, who has a very extensive range of ready made keys has introduced a kit key. It is based on the Marconi "American Wireless Key" and it is designed particularly with enthusiasts of the early types of key in mind.

The key comes complete with instructions and it is partly assembled. This means that it should not take very long at all to finish. The metalwork is of satin brass to give it a pleasing finish. The arm is six inches long by half an inch square and is pivoted between two self-lubricating brush type bearings. In turn these are mounted in a brass yoke. The adjustable contact has a fine screw pitch of 40 threads per inch to give an exact adjustment and it is locked in position by a knurled nut. The base contact is a large anvil type. The forward stop is not adjustable because this was found to be unnecessary. However the spring tensioner is mounted discreetly here, and it can be set using a knurled nut on the top of the key arm.

The base of the key is made of mahogany and can be either light or dark in colour (specify when ordering) and measures 7 by 4 by 1 inches. The underside of the base is finished with a piece of 2mm thick steel finished with green baize. With this base the overall weight of the key is



2lbs, which means that it is unlikely to move very much during operation. The key is priced at £27.95 with the base or £19.95 without it. Postage and insurance for the whole unit is £3.00 in the UK or £1.60 for the key without the base (no insurance). They key itself or further details can be obtained from **G4ZPY Paddle Keys**, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG or telephone 0704 894299.

Contests

Even though summer is at its height there are still as many contest as ever for the CW enthusiasts. The two major ones are the WAE (Worked All Europe) CW and the All Asia CW.

The WAE DC contest is being held this year over the weekend of the 11th and 12th of August. It is a full 48 hour contest starting at 0000GMT on Saturday morning and finishing at 2400 GMT on the Sunday night.

The idea is for European stations to work as many non-Europeans as possible and vice versa. Contest exchanges consist of report and contact serial number. One aspect of the contest I always find frustrating is the QTC where extra points can be picked up by giving details of previous contacts (NB each contact can only be used in a QTC once). To my mind it slows down the contact rates and can prevent people making contacts

with that rare country they have always wanted.

The All Asia contest is another large one and it can be quite useful for picking up a few extra countries in Asia. Normally there are plenty of JAs to be worked as well as stations from the Asian Republics in the USSR. The contest starts at 0000GMT on the 25th August and finishes at 2400 GMT on Sunday the 26th. Even though this is another 48 hour contest it is normally quite convenient because the following Monday is a bank holiday and it can be used for recovering. Also, who wants to go out over a bank holiday weekend to join everybody else parking on the M25 or in traffic jams elsewhere! Contact exchanges consist of the report plus the operator's age, and the aim is to contact as many Asian prefixes as possible.

Sign Off

So that is all for this month. It is nice to see a steady trickle of letters coming in. Please keep them coming so if you have any news views or just anything you want to say about the world of morse please let me know. You can contact me either via the Editorial Offices at HRT or you can write directly to me. I am QTHR or if you don't have the call book the address is **144 Worple Road, Staines, Middx TW18 1EQ**. So 'till the next time 73s es BCNU de Ian.

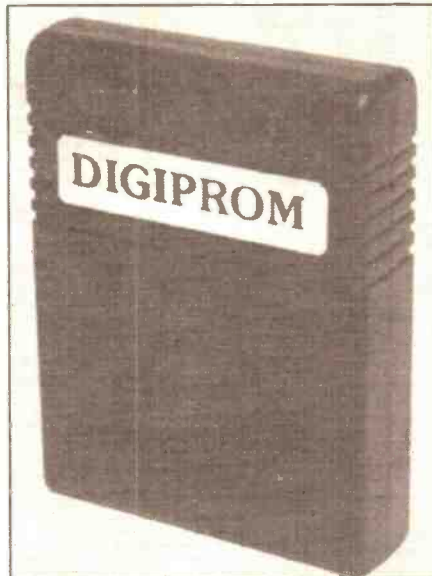
Digiprom for Packet

You don't need a tnc to get into packet radio when you use Digiprom! Designed for the Commodore computers, it gets you operational with high performance and low cost.

Are you put off getting going on packet because you think you need to buy an expensive terminal node controller (tnc)? How about just adding an £18 plug-in cartridge to your Commodore 64 or 128 computer and using a £25 modem kit to interface the computer with your existing hf, vhf or uhf radio? That's all you need to get going on packet, and there are many amateurs around Europe already doing this with the help of Digiprom.

Novice Project

Due to the inherent simplicity, low cost, and optional constructional element (the modems are also available ready built), this could make an ideal project for



resulting digital signals to tones and vice-versa to link with your radio. Currently Bill G6WWW, Pete G7AMW, and Ron G1SFK who make up JSM Electronics spend much of their free time in getting these Digiprom systems together. They claim to make a small profit, but taking a close look at what you get for your money in my opinion shows they can only be doing it for the benefit of other amateurs rather than themselves. For example, I calculated that the components alone in the £25 modem kit would actually cost me over £32 to buy outright, plus at least £5 extra for the cost of a pcb and the associated chemicals in making it!

The Cartridge

The plug-in Digiprom cartridge fits on to the rear of the computer and contains an eprom holding all the operating software needed for the packet emulator program, routines for 'Help' files and a node, and even a personal mailbox operating system and simple word processor for use if you have a disk drive fitted for text storage. JSM Electronics tell me a ram/rom version of Digiprom, ie everything fitted on a plug-in cartridge, is a little way off yet! A 5.25 inch floppy disk comes with the cartridge, which holds another 100 help files and details every parameter in Digiprom, including the default settings and an explanation of how each one can be changed. If you don't have the luxury of a disk drive then don't worry, as the paperwork, 18 pages with over 10,000 words, gives you all the information you need.

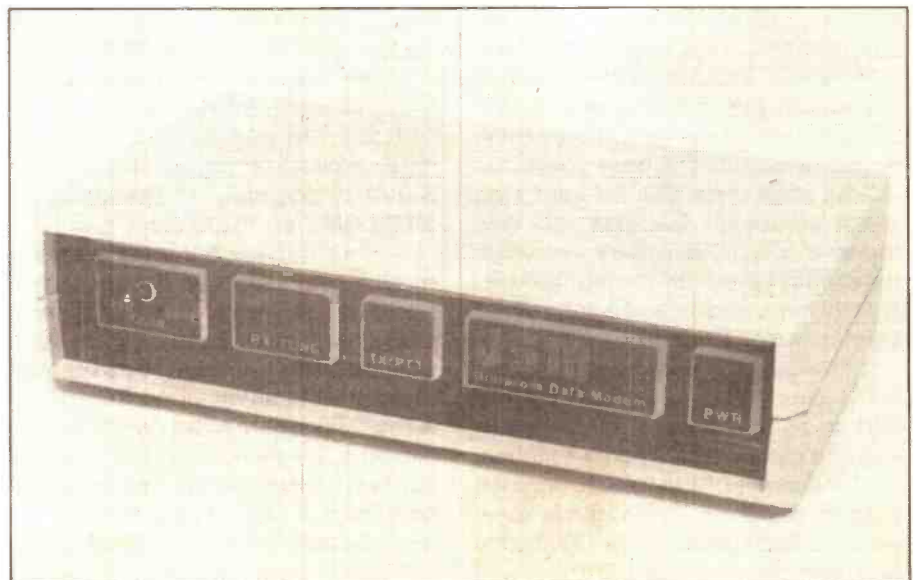
Chris Lorek G4HCL finds an even cheaper, more effective way for ambitious novices to get started on Packet Radio.

the budding novice who already owns a Commodore 64 or 128, as indeed many teenagers or their parents already do. Surplus Commodore 64s are also in abundance at rallies throughout the country, selling at well under their original retail prices.

Readers of *Packet Radio Roundup* will already know that when you link your packet system to a low-power 2m transceiver or the like, world-wide 100% error free communication is easily possible, including satellite communication. The country is already networked with interlinked nodes (automatic packet 'repeater' stations) and bulletin board stations for world-wide message routing between amateurs. Several amateur satellites orbit the Earth carrying packet data, and 'ground stations' with automatic tracking and satellite communication equipment are linked to the node network for the free use of all amateurs on packet. Even the occasional Space Shuttle astronaut takes a packet station up with him for automatic QSOs with earth-based amateurs, this mode commonly being used nowadays instead of the FM speech communication of early Shuttle flights.

Digiprom

So what's Digiprom, then? It's a system designed by amateurs, for amateurs, and consists of a plug-in cartridge containing the software, and a modem to convert the computer's





The Modem

The kit version at £25 is called the JSM M7910CP modem, and comes with simple assembly instructions, a circuit diagram and component overlays, all components, a pre-drilled pcb, and even a pre-drilled plastic case ready to accept the completed assembly. It should take an average constructor around a couple of evenings or so to put together, and if you can't get the completed circuit going, JSM offer a free backup advice service through the post. The AM-7910 'World Chip' is used in the modem, which plugs into a supplied 28 pin ic socket on the pcb. A further three dual-in-line ics are used together with a 5V regulator, a handful of components and a 2.4576MHz crystal. The modem can be powered either from an external 9-12V dc supply, or more usefully directly from the cassette port of the computer. The current drain is in the order of 115mA.

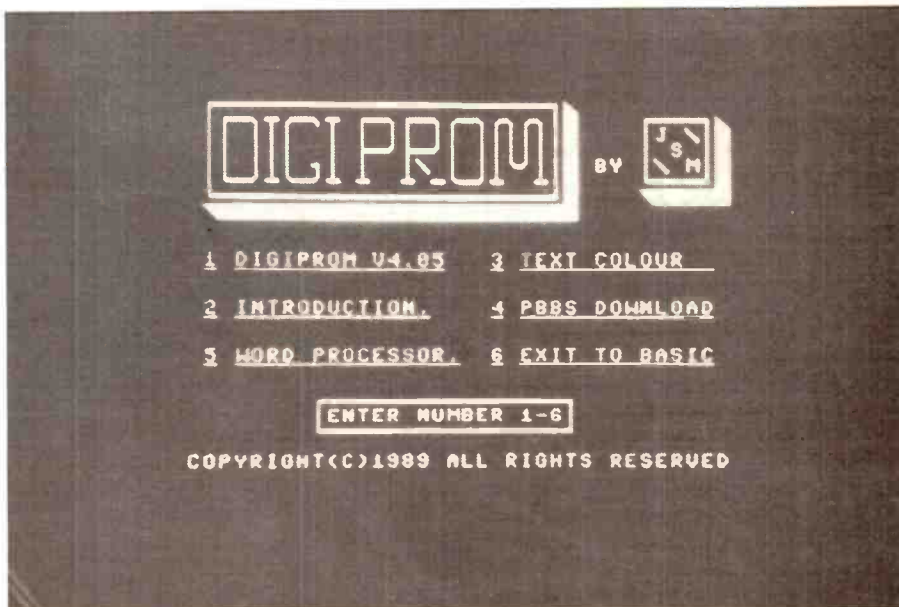
All connections to the computer apart from dc power are made through opto-isolators on board the modem itself. The reason for this is that the Tx data is actually sent down the cassette motor line, which I'm sure is not what Commodore originally had in mind when they designed the computers!

An example of a completed modem kit can be seen in the accompanying

photograph. If you doubt your constructional skills, JSM can supply a built, tested and guaranteed modem in the same enclosure for £39. If you want your packet system to look very smart, then a nice looking Vero boxed modem as shown is also available, again ready built and tested its designated the M7910E and costs £48.50.

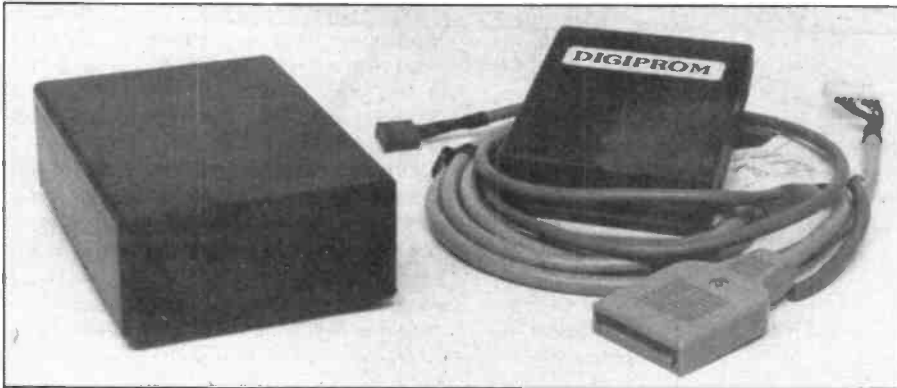
Connections

The modem is supplied with a pair of plug-in multi-way leads, the lead connecting the modem to the cassette port is supplied ready-terminated at both ends with the correct plug types. A further lead to link between the modem and your transceiver is terminated at the modem end, and just needs you to add a



suitable connector to match your transceiver.

On the modem pcb itself, three jumper connectors and two potentiometers are fitted. The two pin jumper towards the front is used for selecting the modem band rate and equalisation and selects either 300 baud (for hf use) or 1200 baud for vhf/uhf use, with the 1200 baud tones either equalised or not to suit the audio linking point on your transceiver. An external two-way centre-off switch may of course be fitted into the case if you want to change between baud rates regularly, and on the Vero cased unit an external switch is fitted as standard for this.



The required transceiver connections are very simple, these being the ptt, Tx audio, Rx audio, and Ground connections. Some transceivers already have the receive audio available on the microphone socket which simplifies matters further, others have it available on the rear panel such as on the external speaker connector. Solid state ptt switching is normally used in the modem, however, a 14 pin ic socket is fitted on the pcb to allow an optional di1 relay to be plugged in for relay controlled switching if required. In most cases this won't be needed unless you use a rig with positive voltage ptt switching such as the Pye Europa and Olympic series, or indeed if you just like having the little 'clicks' indicating your solid state transceiver is being keyed.

Four leds are fitted on the modem case facia, used to indicate dc Power On, Tx ptt, plus two leds for data received (dcd). These latter leds flash alternatively with received mark and space data tones, so on hf packet they can be useful as a tuning aid as you move your receiver vfo knob carefully from side to side.

In Use

After plugging the Digiprom cartridge into the rear of the computer, all I needed to do was switch the computer on, to be instantly greeted with the Digiprom sign-on screen as shown. no tape or disk loading to mess about with, very simple!

The Commodore 64 I used, in common with many hobbyist computers, has a modulated uhf output to feed a normal tv as well as a baseband composite video output. For 80 column text use, as required for sensible packet bbs use, you'll find that a true video monitor works far better than trying to squint at narrow characters on a tv screen, surplus monitors of course being commonly available at around £10 a time. However for low cost use, eg employing the teenage bedroom tv, Digiprom usefully allows either 40 or 80 column mode operation with the built-in 'SCR80 On/Off' command to save your eyesight. Likewise the word-wrap on the built-in

word processor may be varied thus giving either 40 or 80 column use at the 'other end'.

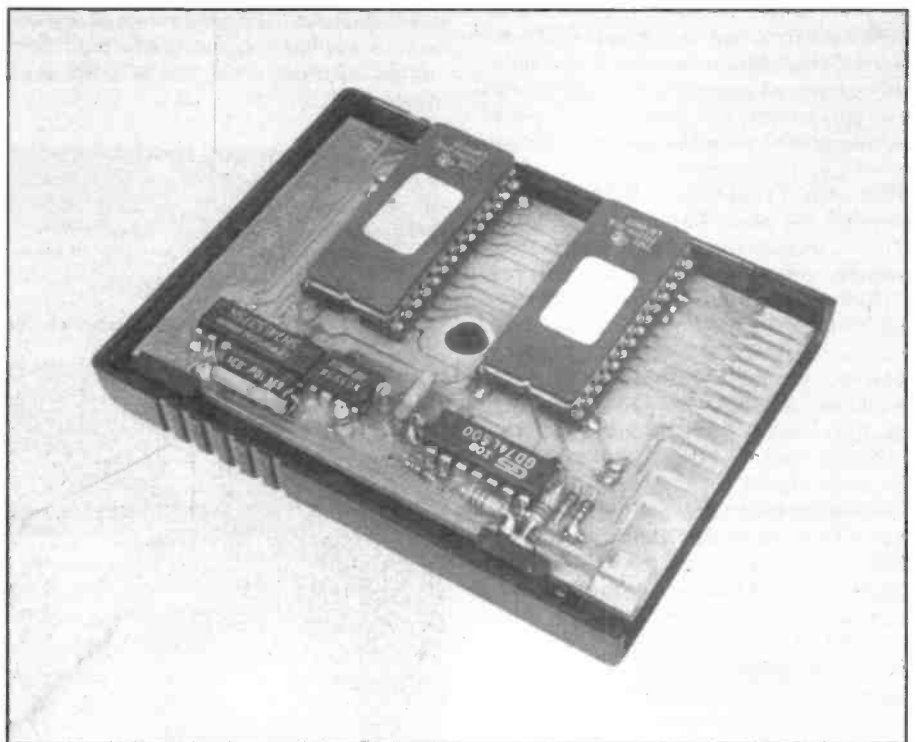
After switching on, the initial sign-on screen provides six options. Option 1 takes you straight into the Digiprom operating program, the one most

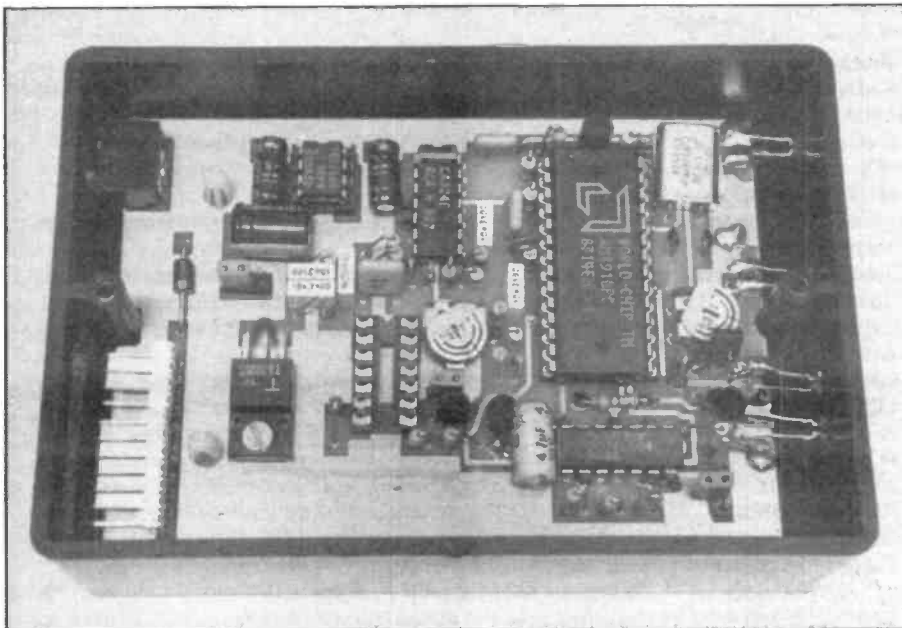
amateurs would select to get 'on air'. Option 2 gives a four page introduction and help file, which I found very useful in getting going quickly (why is it we amateurs only read the instruction manual as a last resort?). Option 3 changes the colour, or brightness with a mono monitor, of the displayed screen text, although I'm informed by JSM this may change during a future upgrade.

Option 4 selects the personal message store download if you have a disk drive attached to the computer. This takes you to another screen which allows you to either quit or continue with the download. What this does is format a disk and writes the necessary files onto it, making it ready for use as a mailbox. Option 5 selects a simple word processor option, usefully allowing you to compose messages 'off-air' for storage on the personal mailbox. Once in this option, the computer function keys are used for various commands such as callsign and message entry, text save and download with named files and the like. Option 6 simple gets you back to normal computer use.

Operation

After selecting Option 1, the display changes to a split-screen mode of operation, the upper section being used for transmitted text, the lower section displaying revealed text. A status line divides the two, and the position of this can be altered to whatever you like, giving you a choice of display. Most amateurs naturally prefer to have a larger received text area for bbs message use, so the





program defaults to eight lines of transmitted text with the remainder used for received messages. After switching on from 'cold', a flashing cursor prompts you for the current time to be entered, followed by a date prompt, to save you forgetting each time as I often do.

Four ports are provided, with call signs preprogrammed as default settings in the Digiprom cartridge. In my case Port 1 was G4HCL, Port 2 was also G4HCL with no ssid, so any port could then be used for personal mail storage, Port 3 was G4HCL-8, and Port 4 accessed via Port 3 was the node. A quick connection to myself resulted when I entered Port 2 by pressing CONTROL and two keys, the typing C G4HCL, this giving a screen display of the command list a station connecting to me would typically receive, ie:

B,C,H,I,J,K,K,M,L,N,R,RP,SPT,U,WS,WP?

Table 1 briefly shows the functions of these and a couple of other commands. Many of these will be familiar to users of network bbs stations as well as other personal mailboxes, although commands such as RP and WP are unfamiliar.

When operating normally at the keyboard, apart from the useful split screen facility the operation was very similar to other forms of packet, the extensive capabilities of the packet network of course being widely documented elsewhere. I found one or two other handy operating facilities present in Digiprom: pressing the Function-7 key for instance transmitted a '->>>' prompt for me to automatically follow my packet 'over'. Other facilities such as port switching, an instant disk file catalogue, a stations/time heard listing, and 40 column switching were also achieved with a single function key press.

Unique Commands

As well as many commands in the usual tnc command set, such as Connect, Disconnect and the like together with BText for Beacon Text, CBell for Connection Bell, DIGI On/Off Digipeater facility On/Off, MYcall for call sign entry and so on, many useful additional commands may be entered at the computer terminal by the Digiprom user. Several of these are specific to the computer in use, such as printer settings and file protocols, as the program was indeed written for a specific computer. Others such as the otherwise common 'Monitor' command though may usefully be set to various modes. These include modes such as monitoring all packets, monitoring when connected, monitoring your packets only, indication of the sender shown, digipeater chain shown, call sign of receiver shown, status of commands, UI frames shown, time of reception, plus any combination of these. Hence for example, entering MON MT AE U (it takes a look at the manual to find this one out) results in reception of only the 'MAIL FOR' beacon from your local bbs, so you know

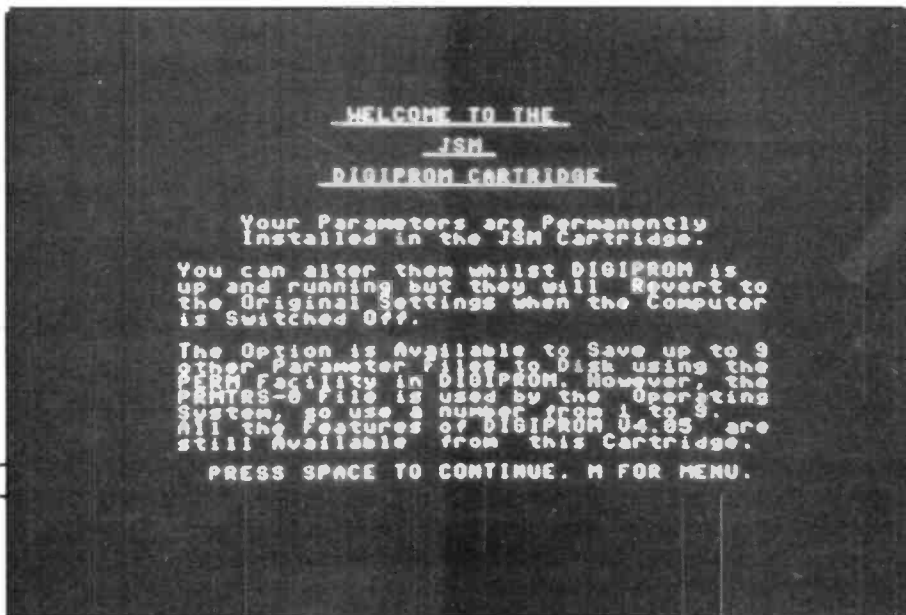
whenever there's a message waiting there for you.

As we in the UK all have to send a CW ident every 30 minutes while operating on packet, Digiprom can be set to automatically do this for us, and an immediate CW ident may be sent whenever required by the use of one of the computer function keys. The periodic CW ident facility may be inhibited when operating in countries where this isn't necessary to save all the locals moaning at you for clogging the airwaves up!

Mailbox Use

If you have a disk drive connected to the computer, as well as Digiprom providing a personal mailbox it may, by arrangement with your local Network bbs sysop, accept auto-forwarded messages to you from the network bbs thus saving you the need to constantly interrogate it just to read mail addressed to yourself. Subject to RA regulations or those in force in your particular country, the Digiprom mailbox can also automatically upload messages to the Network bbs when polled by it. Here you can enter messages to other stations on your personal mailbox using the built-in word processor, complete with .bbs destinations, for automatic routing through the world-wide network.

While you're manually connected to a network bbs, the Digiprom WS command may be used for downloading messages and bulletins to your disk for future reference, saving you frantic pen-scribbling actions to note interesting details down. In other words, it can emulate a comprehensive terminal program rather than the computer simply acting as a 'dumb terminal'. The 'View' command may be used to display the stored text at any time without transmission taking place from your station, which is again very useful during message reading/answering sessions on your local network bbs. To conform to UK RA regulations, third party mail may be inhibited as required, only allowing messages to be stored either to or from your call sign.



Conclusions

If you've already got a Commodore 64 or 128 computer, or can acquire one cheaply, then it looks as if you can get going on packet very quickly at a minimal cost. Coupled up to a re-tuned ex-pmr rig you thus get a complete packet station operational giving world-wide error-free communication very cheaply indeed. I believe this approach could be ideal for the novice amateurs of tomorrow as well as existing amateurs interested in having a go without too much initial outlay. The final system achieved is anything but inferior to that gained by a high cost computer and tnc combination, although unlike normal tnc use you do have to leave your computer switched on at all times for continuous unattended use. The result however is an extremely powerful standalone system with bells and whistles matching or exceeding that of a system costing several times the price.

I feel JSM must be praised for their devotion to the product. Further details on Digiprom are available from JSM Electronics, PO Box 26, Billingham, Cleveland TS23 3FT, to whom my thanks go for the loan of the several review products together with much help during testing. My thanks also go to Siskin Electronics, well known in the packet field, for the extended loan of their Commodore 64 computer.

Table 1. Digicom Remote Commands:

B (Bye) — Disconnects after all frames have been acknowledged by station connected to.
C (Connect) — Used for connecting to a third station via the Node.
/EX (Exit) — Closes a file on a Digiprom station's disk that you have opened.
H (Help) — Calls the help file.
I (info) — Calls the M file from Digiprom stations and shows information on the station to.
J (Heard) — Shows the stations heard by the station you are connected to.
KM (Kill Mine) — Will kill those messages addressed to your callsign.
L (List) — Lists any messages addressed to your callsign and those addressed to ALL.
LA (List Last) Will show the number of the last message on the message file.
LM (List Mine) — Shows messages addressed to your callsign.
N (Nodes Heard) — Provides a list of nodes heard by the station connected to.
R (Read Number) — Used to read a message addressed to ALL taken from the L command.
RM (Read Mine) — Used to read messages addressed to your callsign.
RP (Read Program) — Used for downloading a program from the remote. Digiprom computer to your disk.
SP (Send Personal) — To leave a message on a Digiprom personal mailbox this command followed by the callsign of the sysop is used. A /EX or Ctrl-Z is used to end the message.
T (Tone) — Sounds a tone at the Digiprom station to attract the sysop.
U (Users) Shows the four user ports of the Digiprom station and who is connected to which port.
WS (Write Sequential) — Used between Digiprom station for writing files from your disk to the other Digiprom station's disk.
WP (Write Program) — Used for opening a file on the Digiprom station's disk for program transfer.
? (Cmd) — Used by a connected station to call help from eprom.



D A T O N G
E L E C T R O N I C S L I M I T E D

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

**For products you can rely upon
to give amazing results**

For information on **Active Antennas, RF Amplifiers, Converters, Audio Filters, the Morse Tutor and Speech Processors** send or telephone for a free catalogue and selective data sheets as required.

All our products are designed and made in Britain.

Orders can be despatched within 48 hours subject to availability.



VISA AND ACCESS WELCOME



THINKING OF BUYING A NEW CAR? DON'T!

.....without consulting the

"Handy Little Booklet"

"Handy Little Booklet" is the essential reference book for everyone buying a new car.

It lists the main car manufacturers alphabetically, together with each car's current retail price, insurance group, engine size, urban mpg, unleaded compatibility, Service/Maintenance/Repair costs - based on 50,000 mileage - and tax bracket - for company car drivers.

So before you invest thousands of pounds in a new car invest just £2 in the "Handy Little Booklet" to help you make the right choice.

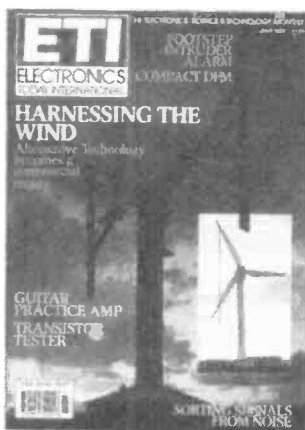
To get your copy send £2 plus 25 pence (for postage and packaging) to: Kim Cleary, Company Car, International Trade Publications Ltd., Queensway House, 2 Queensway, Redhill, Surrey RH1 1QS, or telephone her on (0737) 768611 for further details.

Registered no: 2246951



ETI is Britain's leading magazine for the electronics enthusiast and is renowned for its ability to keep pace with the leading edge of technology. It has built its reputation with quality DIY projects giving detailed technical explanations, tutorial features of the world of electronics, and general features covering current affairs in science and technology. A single source guide to electronics today - and tomorrow.

Cover Price £1.60



Published: 1st Friday of each month

Why not subscribe?
Telephone 0442 66551 ext 210
for further information

Order
your copy
NOW!



HAM RADIO TODAY Introduces An Easier Way To Pay For Your Subscription

You can now subscribe to HAM RADIO TODAY by Direct Debit, a new service we are able to offer to our readers.

Paying for your subscription by Direct Debit is quick and easy and has advantages:

- ★ ONLY ONE PIECE OF PAPER TO SIGN — SIMPLY COMPLETE THE DIRECT DEBIT INSTRUCTION.
- ★ YOUR BANK DOES ALL THE WORK — THEY WILL MAKE PAYMENTS ON YOUR BEHALF.
- ★ AUTOMATIC RENEWAL OF YOUR SUBSCRIPTION — NO MORE DELAYS AND ISSUES MISSED.
- ★ POST FREE SUBSCRIPTIONS.
- ★ SPECIAL SUBSCRIBER ONLY OFFERS.

If you've been thinking about subscribing to HAM RADIO TODAY then now is the time to do so — it's never been easier and it only costs £18.00 a year!

If you want to receive a regular supply of the best magazine for amateur radio users available, then subscribe today by Direct Debit.

The Direct Debit payment facility can only be offered to UK subscribers only.

I wish to subscribe to HAM RADIO TODAY at the annual rate of £18.00.

INSTRUCTIONS TO YOUR BANK TO PAY DIRECT DEBITS
Please complete Parts 1 to 5 to instruct your Bank to make payments directly from your account.

Originator Identification Number

8 5 2 9 2 7

1. The Manager Bank plc

(Full address of your Bank Branch)

Banks may refuse to accept instructions to pay Direct Debits from some types of accounts.

2. Name of Account Holder

3. Account Number

4. Bank Sorting Code

5. Your instructions to the bank and signature.

- I instruct you to pay Direct Debits from my account at the request of Argus Specialist Publications in respect of my Subscription Advice.
- The amounts are variable and may be debited on various dates.
- I understand that Argus Specialist Publications may change the amounts and dates only after giving me prior notice.
- I will inform the bank in writing if I wish to cancel this instruction.
- I understand that if any Direct Debit is paid which breaks the terms of this instruction, the bank will make a refund.

Signature(s) Date

Title Mr/Mrs/Miss

Address

Postcode

Return this form to: Select Subscriptions Ltd., 5 River Park Estate, Billet Lane, BERKHAMSTED, Herts HP4 1HL HRTDD/2

Q R Z

Once again, the last couple of months have provided the HF DX chaser with dozens of interesting expeditions and DX stations to chase after. Conditions have, on the whole, been very good, often with very strong signals from the Pacific or the West Coast of the USA on 20 metres and 15 metres and on occasions even 10

10 metres. When 10 metres has been good, signals from the USA have been very strong until several hours after darkness, but it has not been as consistently good as the last sunspot maximum, and the openings to VK and ZL short path on 28 MHz have been far fewer and far weaker than last time. Neverthe-

less, DX activity has hardly ever been higher, and especially the quantity and quality (in terms of DX "rarity value") of DXpeditions is amazing compared with a few years ago.

Yemen has been united and activated, reports Steve Telenius-Lowe G4JVG. Now we need Albania ...

metres staying "wide open" until very late at night. If anything, though, this sunspot cycle has been a little disappointing in terms of very long distance openings on

Jarvis Success

The DXpedition to Jarvis Island in the Pacific has come and gone. I found them very easy to work indeed on both 14 and 21 MHz SSB after the initial pile-ups of the first few days of the operation. Once again, Martti Laine OH2BH was involved with this new one and was a good signal almost every day during the expedition around 0700-0800 GMT on 14185 kHz. One of the other operators, Pete AH3C,

wrote the following account of the trip which was kindly forwarded on by Jarmo

OH2BN, who has become the semi-official publicity officer of the Finnish DX gang. Pete writes:

"Our team is now scattered around the globe, each of us is recovering from the adventure in our domestic luxury. We look back.

Sunday morning, April

1: The running around Honolulu to find and check out our equipment is stopped abruptly

as we gently lower our 6kW power plant into the hold of our precious chartered boat,

the 71 foot ketch, Makaanalani.

Moments later

the lonely 1200 mile journey on the high seas is under way.

Monday April 9: We arrive at T32 (Kiribati) two days ahead of schedule in time to arrange customs, island transport and meet our most precious cargo.

Wednesday April 11: Martti OH2BH,



Two QSLs: for recent DXpeditions by Finnish operators: top: EA8AGD with (l to r) OH8PF, OH1CN, OH1EB, OH6EI, OH1EH, OH6LK and Marko, and below: ZB2X, operated by OH2KI.

ZB2X

Wayne N7NG, Jim WA6AUE, Eric K3NA, Toni KN3T, Masa JG2BRI and Mark Rauzon from the US Fish and Wildlife Service all arrive at T32 aboard the once-per-week 737 from KH6-land. Four hours later our captain weighs anchor for Jarvis.

Early Friday morning, April 13: Calm seas require a run on engine power the entire trip. Pin-point navigation and perfect weather lead us to Jarvis, a new DXCC country, dead ahead.

2000 UTC, April 13: Wayne and Mark are the first landing party: Camp construction and station set-up puts everyone into high gear - all day and into the night. Finally, we have one vertical and one station ready to go.

0620 UTC, April 14: We're late. Everyone is asking about us on 14185. First in the log? It's Kan, JA1BK. First US - W6KTE, and just a few minutes later, first Europe - DJ6OV. OH2BH, OH2RF and AH3C keep SSB going through the night while N7NG, WA6AUE, K3NA and KN3T get the CW camp on by 0900 UTC.

Sunday April 15: The SSB site overlooks the shoreline at about 25 feet elevation. 3-el tribander at 35 feet, 4-band vertical, 7-el 6 metres and 3-el 10 metres. HF talk power is provided by two Icom 735s and Ameritron amplifiers. We experience some power distribution problems at first. This is resolved after a couple of days. The CW camp is 800 feet separated from SSB. 3-el 20 metres, 3-el 10 metre, 10-80 vertical and 40-160 vertical. Same complement of rigs as at SSB site.

Thursday April 18: We awake to find our boat completely beyond the horizon. The wind has shifted and essentially shuts down any thoughts for emergency

departure. There is high surf at the only break in the reef.

Friday April 19: The Makanalani returns. We are approaching 40,000 QSOs as our concerned captain plans our departure. Our 50,000 goal was in jeopardy. It is time to negotiate and pray for good weather. We are taking great risk if we cannot meet the weekly flight from T32 back to civilisation.

Saturday April 20: By evening, camp 2 is completely dis-assembled.

Sunday April 21: Camp 1 continues through the night with excellent propagation and catches a nice 10 metre Europe SSB opening from midnight to 3am local time. Our last QSO WB6RFI at 1600 UTC.

On top of all the radio success, we learn from Mark that he has discovered three new bird species on this sanctuary. Having the extra time to study the island, he was also able to create a new map which shows the locations of all the colonies for the various species of rare tropical birds."

The final tally of QSOs from the AH3C/KH5J Jarvis Island expedition was 54,880, of which 10,000 were with Europe - a remarkable achievement considering the difficulties of propagation from the central Pacific to Europe, not to mention the achievement in actually getting to the place.

No sooner had Martti, Wayne and Masa returned to "civilisation" than they were off on another expedition, this time joined by SM7PKK, OH1RY, VE7SV and VE7CT. This time their destinations was Conway Reef, one of the outlying Fijian Islands, and a separate DXCC country from both Fiji and Rotuma. This time the boat used to transport the intrepid ex-

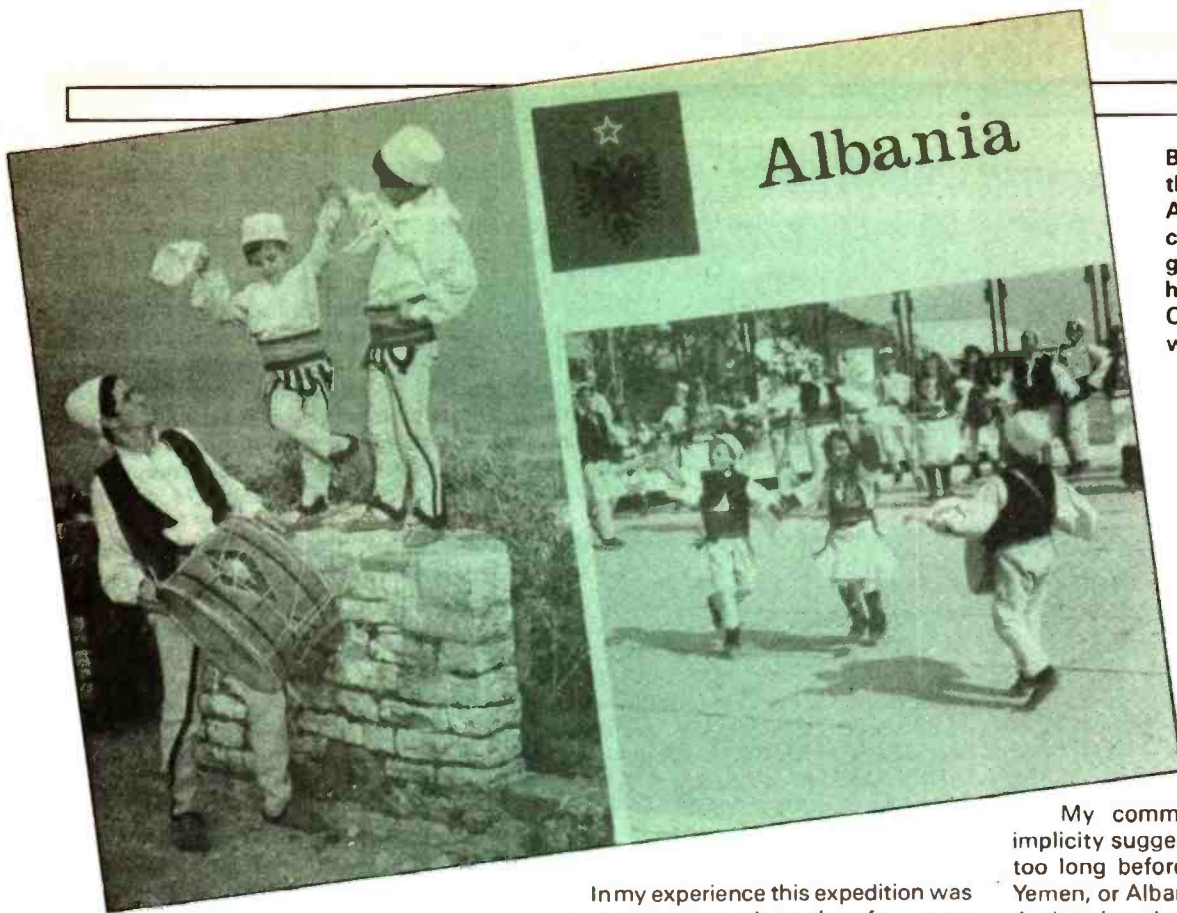
peditioners to this remote location was "Yasme", a 66-foot schooner which was once famous as the boat used by Danny Weil, a radio amateur who sailed around the world in the early 60s, putting on many rare countries in the process. I for one did not realise that the "Yasme" was still around, but it obviously is, and it is nice to see this piece of amateur radio history still being put to good use by DXpeditioners. The expedition team to Conway Reef used the callsign 3D2AM for about nine days from 18th May. Again, I worked them with ease (this is not self-

congratulatory - more a testament to the skill of the expedition operators in picking out a very averagely-equipped station's callsign from the multitude calling!) on 14185 kHz at 0730 GMT - a good time for mid-Pacific QSOs.

As if two good DXpeditions to the Pacific were not enough, another of the rarest DXCC countries in the world has also recently been activated. This is the Spratly Islands, off the coast of Vietnam and the Philippines, a group of islands which had not been successfully activated for many years. A group of Soviet DXers, including Romeo who has operated for some time as 3W3RR from Vietnam, put on a highly successful operation from Spratly using the callsign 1S0XV and, after a few weeks, also 1S1RR. The various teams were active on and off for about a month, with several days silence at a time when they returned to Vietnam for more fuel and other supplies. A total of some 33000 QSOs were made from Spratley and once again they were extremely easy to work, once the initial pile-ups had calmed down. This was particularly the case on 18 and 24 MHz, where many people reported working them with QRP and/or non-resonant antennas. I worked them using a Butter-nut HF6V vertical, which is not supposed to work on either of those bands, and just 100 watts.

Yemen Activated

Two months ago in "QRZ" I commented that there were now only three countries which came to mind which absolutely forbade amateur radio - Albania and North and South Yemen (there are others such as Angola where there has been almost no activity for quite a few years. Well, at the end of May, North and South Yemen unified into a single country, and within days there was an all-



By the time this is read, the first DXpedition to Albania for many years could have come and gone. If not, DL7FT was hoping to visit Albania in October — perhaps with a radio?

calling frequency which sounded relatively quiet and take pot luck. Eventually getting through very quickly, but this was not the case for those of us with only "average" signals.

My comments two months ago implicitly suggested that it would not be too long before either North or South Yemen, or Albania, was on the air again. At that time there was no indication that any of these would appear on the air. Now we have had a good operation from Yemen and, at the time of writing (early June) the rumours are rife of an expedition to Albania in the near future. The Hungarian DX group, who were so successful at putting on Vietnam, Laos and Cambodia in the last eighteen months, are believed to have been negotiating with the Albanian authorities for some time.

By the time this appears in print we will all know whether or not the Hungarians have been able to pull off another

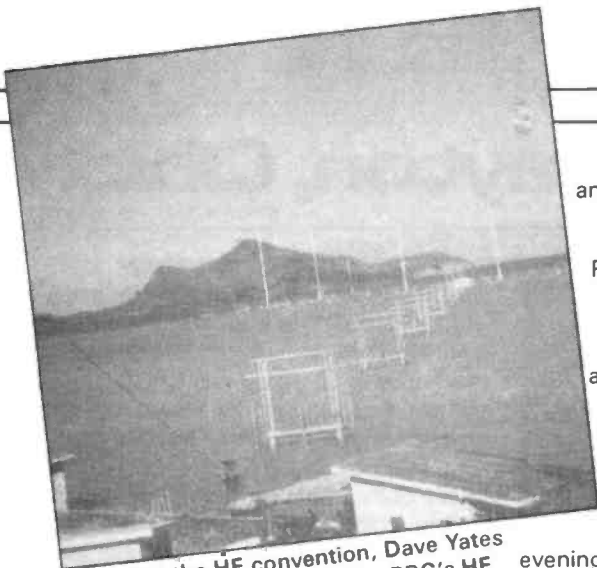
Arab expedition to the new Republic of Yemen, using the call 701AA.

The operators, three Kuwaitis, were inexperienced pile-up operators, but they very quickly learned the technique and within a few days were handling the pile-ups in fine style. They had intended to operate mainly in nets and to lists, but the first day's excursion on to a net resulted in such chaos and pandemonium that they apparently soon realised that it would be much easier and efficient to work the stations calling "solo". And so it proved.

In my experience this expedition was not as easy to work as the afore-mentioned Pacific operations, largely because the operators seemed to pick out callsigns from the pile-up in a completely random fashion, rather than taking several callers on or around the same frequency and then moving their receive frequency slightly. With 701AA they took one station on, say, 28502, the next on 28530 and the next on 28511 and so on, so the clever DXer never really knew where 701AA was listening. In the end the best way to work him was to sit on a



Einar Enderud, LA1EE (right) will be giving a presentation on the 3Y5X Bouvet expedition at the RSGB HF convention on 29th September.



Also at the HF convention, Dave Yates G3PGQ, will talk about the BBC's HF stations. This antenna set-up is at the BBC's newest relay station in the Seychelles.

great coup, or if this is just yet another rumour of an impending Albanian operation (such rumours regularly do the rounds of the bands). For the record, Frank Turek DL7FT who was recently operating as S79FT from the Seychelles (lucky fellow!) was also saying that he hoped to be active from Albania perhaps in October this year. Frank is one of the very few who have operated from Albania in the past, so perhaps his hope is not misplaced, although I do know that Frank has tried to get permission since his last operation, but without success. We shall just have to wait and see.

It is almost time for the annual RSGB HF Convention, the main British event of

the year for the HF DXer, or anyone interested in HF operation.

This year, for the first time, it will be taking place at the Penguin Hotel, Daventry (instead of Oxford) — a decision which should please the many GMs and north-country Gs who always make a point of attending — over the weekend of 28th — 29th September. During the Saturday there will be guided tours of the BBC World Service transmitting station nearby and, in the

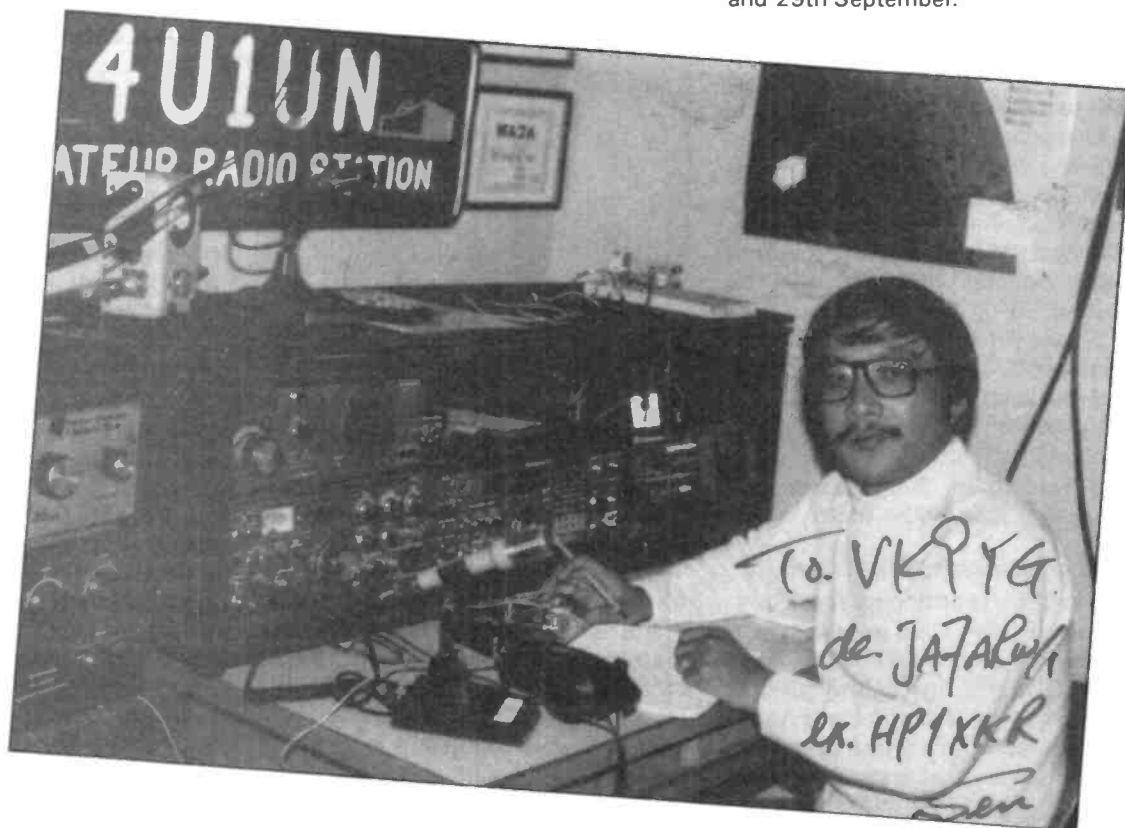
evening, a banquet dinner at £18.50 per head. After-dinner speaker will be Lawrence Howell GM4DMA famous for his expeditions with Sir Ranulph Fiennes, who will talk about their most recent exploits in the Arctic, during which Lawrence and his wife Morag operated as GB0MSS/JAO, raising a lot of money for the Multiple Sclerosis Society in so doing. On the Sunday there will be two lecture streams, including DX presentations by Einar LA1EE on the 3Y5X Bouvet Island DXpedition, Jim Smith VK9NS on the A51JS Bhutan operation and a question and answer session on HF and DX matters.

G3XTT will give a demonstration of the many computer software packages available of use to the HF operator, including propagation predictions, antenna design packages and contest logging programmes. G3PGQ, Dave Yates, of the BBC Engineering Training Department

will give a lecture on the BBC's HF transmitting stations, with particular emphasis on the Daventry site and its antennas, so this should be a must for anyone who visited the station on the Saturday. Another highlight will be G4LJF, Ian Shepherd's, presentation on the DX Packet Cluster system, which is proving to be a revolutionary aid to HF DXers who have packet facilities.

Other attractions during the Sunday include the RSGB's presentation of the Young Amateur of the Year and the presentation of awards and trophies to RSGB Contest winners. On top of all this is the social side of things, with much swapping of DX stories in the bars of the hotel. I have not visited the "Penguin" yet, but those that have tell me that there is a lot more space than at the previous venue near Oxford. Rooms are available at the hotel at a special convention price of £25 - book now direct with the hotel. If you would like to visit the BBC Daventry station, or attend the banquet on the Saturday evening, please contact me asap on 0734-722538 or write (with sase please) to Steve Telenius-Lowe, "Penworth", Tokers Green Lane, Tokers Green, Reading, RG4 9EB. This is also the address to send any contributions to "QRZ" — especially welcome are photos of your shack or antennas or write-ups on special event station activity, or just what DX you have been working recently. I look forward to hearing from you, and to seeing many "Ham Radio Today" readers at the Penguin Hotel, Daventry, on 28th and 29th September.

It was good to receive this photo from Sen, JA7ARW/1 (ex-HP1XKR). Sen uses a Kenwood station, including a TS940S transceiver and TL-922 linear amplifier. He has obviously also visited 4U1UN in New York!



Hamvention 1990, Dayton, Ohio!



The "busy" RSGB stand.

Dick Pascoe G0BPS and the G-QRP Club report from the Big Show Country.

The promise of the biggest and best rally of all time didn't really mean much to me. After all, I had spent the last four years going to all the biggest and best rallies in the UK. The RSGB had 4000 people through the doors before midday on the first day of NEC 1990, and the NEC wasn't crowded! Loadsa people, yes, but not too crowded.

They told me that the Dayton Hamvention would be crowded. Naw! Couldn't be! But almost 700 stands indoors and about 1,000 (yes, one thousand) in the Flea Market (Boot Fair to us Brits) made me believe that it could be BIG!

The Hamvention

The British contingent representing the G-QRP Club was myself, George G3RJV and Ian G3ROO. We arrived in Dayton on a calm Thursday morning to find that the Hara Arena had gone wild. This arena covers an area of at least 20 acres and provided no more than five massive halls



The welcome sign at Dayton.

packed with traders.

Go down to your local sports centre and look at the size of the main hall. Hara boasts five halls of this size or bigger, plus all the cafeterias, lecture halls, bars etc you would expect to find.

Let us start at the beginning. Back in late January the RSGB contacted the G-QRP Club and asked if we would like to go to the Dayton Hamvention as part of the RSGB stand. Later conversations with officers at RSGB HQ indicated that the stand would be 30 feet long "so there would be plenty of room for you



John KN4H and Jack NG1G, helping to man the G-QRP Club stand during a quiet period.

low-power boys". The RSGB kindly shipped out all the advertising material that we were using on "our" stand, and we looked forward to a nice weekend advertising what was best of British.

Unfortunately, on arrival at Dayton we found that the total RSGB stand was only 10ft long, and we were not named on the RSGB list of exhibitors. Oops: We had to rent a stand? Yes, for 360 Dollars (£225). Luckily one of our group (me) had a few "spare" dollars, so we were in business.

The real business of the day (the indoor part of the show) didn't start until 1200 so we all dived into the flea market when it opened at 0600. Yes, six am. Loadsa goodies were seen, amplifiers up to 2kW for \$100 (£60), pmr, h/h rigs for 2m for \$100 (£60, easily convertible too), old broadcast radios, collectors items for peanuts. Goodies for silly prices to suit all tastes.



The Worked All Britain stand.

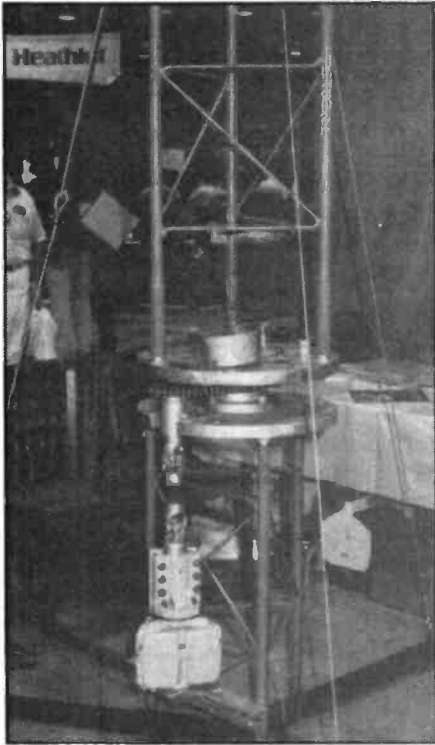
At 1200 as the doors of the indoor area opened and the flood of customers to this area was phenomenal. We found out later that there were 30,000 visitors to the show. You can understand why the Americans call our shows little!

What Was New?

There was very little in the way of new rigs to be seen. The main offering was from Icom, being their new VHF/UHF, all-singing, all-dancing rig, the IC970. It will be available in the UK very soon, and the display model looked extremely nice, but "hands on checking" was not permitted. It has all the usual facilities expected on a rig of this type, multi-memories, twin vfos etc. No price is available yet, watch the UK press for details.

Very little else in the way of new rigs was apparent from the league leaders, antennas and sundry equipment seeming more to the front at this show.

Several innovations appeared. The new multi band vertical antenna from GAP looked very nice. Called the GAP Challenger DX-VI, it was not inconspicuous. With an overall height of 31.5 feet, it should need guying in



Towercraft's tower rotation system.



"The Hazer" wound up by "CJ" KB8FRG.



About 10% of the flea market.

most areas of the UK. Available for the bands 80, 40, 20, 15 and 10m, what is unusual about this antenna is that it has no traps! The cost in the USA was \$219 (£125).

Another innovation was an Australian offer for the mobile antenna market, a rather strange beast that was loaded all the way through with various points on the antenna where one could insert a plug connected to the base to change bands, bypassing the non resonant part of the antenna. We didn't spend too much time with this one!

High towers are very popular in the 'States, as was brought home by the number of is quite common to see 100ft towers on a small plot. One photograph shows 'The Hazer'. Claimed by the designer to fit any tower, it is essentially a sleeve that fits over the outer of the tower so that external antennas can be mounted and raised without lowering the tower. Neat, too.

After looking carefully at the Hazer it was only natural to move on to the American rotator scene. Here they really know how to impress visitors. Why fit a rotator to the top of the tower to turn your antenna system? The easy way is to fit a Tower rotation system, and rotate your whole tower. The quoted price was \$2400 (£1500).

Having to 'work' during the show made it very difficult to see everything available indoors. The massive outdoor flea market was a real eye-opener, and a lot of it changed from day to day. It is worth the trip just to visit this area, we could have browsed throughout the day and not passed the same spot twice. As usual, the terms are 'buyer beware', and of course to remember that those strange folk are 110 volts over there.

We all came back to the UK with The Bargain of the show, George with some nice shiny components, Ian with ●●●●●●●● (wheelbarrows) collect old cameras I was very pleased to pick up three unusual cameras for the proverbial song. One vendor was heard to mutter "these English will buy anything". If only he knew the worth of the twin lens reflex he sold me for \$15 (£9).

The biggest surprise to us all was the large number of youngsters walking around with handhelds. The novice licence really works over there. Our hosts for the first two nights, Bill N8ET, holds the Extra class licence and his 12 year old son Bart KB8ERT has held a Novice licence for over a year.

If nothing else, the number of youngsters holding the American novice licence has totally convinced

me of the worth of having the same here — sooner rather than later.

During the whole of the duration of the show, various talks were taking place on subjects as varied as the goods to be seen. Eight rooms were in almost constant use for the Forums. Each forum takes the form of



The author giving his talk.

a group of talks on a similar subject. Very, very few non-American speakers appeared but I was one of those so honoured.

The organisers make all feel very welcome, giving all the exhibitors a nice green tassel to wear, and the speakers have yellow ones. Not many had both!

The other Brits "there" apart from us and the two on the RSGB stand were — the Worked All Britain group, and Robert Kent from Kent Keys, who sold almost all of his stock on the first day!

Travellers' Guide

For would-be travellers, we flew from Gatwick to Detroit on a DC10, the journey from home to N8ET's home took 22 hours including a traffic jam on the M25, a 2-hour stopover in Boston and the drive from Detroit to Mount Cory. The seats were very cramped on the plane but the staff made us welcome. The cost of the flight was just over £320 plus, of course, insurance £30, car hire £190, motels £30 per night (for three sharing). The motels varied from excellent to fair.

50 MHz MESSAGE

1990 will probably be remembered as the most successful Sporadic E season to date. Already many new countries have appeared on the band and excellent conditions have provided many DX openings. To date 100 countries have been worked by British Isles operators: the station with the top score being Geoff Brown GJ41CD Jersey CI with 92 worked and 85 confirmed. With several

agreed for Region 1; 50.185 to be centre for Crossband activity; 50.300 re-introduced for MS CW; 50.350 SSB MS; 51.410– 590 FM 20 kHs channel working.

The VHF Committee is working on the modification/withdrawal in UK of various irritating restrictions at present such as antenna height, removal of erp and increase of power. Several questions were answered.

9, Croft Bank, Penwortham, Lancs PR1 9BH takes over as Editor of *UK Six Newsletter* (from Maureen GW8ZCP, who has held the post successfully for over five years). The new contest manager will be Richard G4AHN, who was winner of the 1989 Contest and was awarded the Ellis Challenge Trophy.

1990 50 MHz Contest

This year the contest will be held during the F2 period in the autumn, and will be open to overseas operators. Details were discussed, but final details have yet to be decided—watch this column for further information.

If you are interested in joining the UK 6m Group, contact either Ted Collins G4UPS, 27 Parklands, Hemyock, Devon EX15 3RY, or Peter Turner G4IIL, Flat 6, 132 Marine Parade, Brighton, Sussex BN1 1DE.

News Update

Ted Collins G4UPS.

In French Guiana, on 2 May, FE1JKK/FY worked into Europe, including the UK for the first time. On 28885 he explained that he had been QRV on 6m for three months, but this had been his first opening. His name is Eric and he gave his QSL manager as FD1JMH.

Ken Ellis G5KW reports from close to home.

countries soon to be granted permits and some interesting DXpeditions planned for the near future Geoff is favourite to be the first to make DXCC outside the Americas.

AGM at Sandown

One of the highlights of the RSGB VHF Convention has always been the UK Six Metre Group AGM. This year was no exception: The event was opened by David Butler G4ASR, the RSGB VHF Manager, who was one of the UK delegates at the Region 1 conference in Torremolinos, Spain, in April 1990. David gave a brief resume of 50 MHz matters discussed: Relaxation of restrictions; RSGB bandplan

The Chairman, Steve Richardson G4JCC, gave a review of his year in office and the progress made in many directions. Most of Western Europe is now on Six; one exception is still Spain and its associated countries; a beacon is planned for Greece. Steve paid a tribute to two silent keys G2ANT and G2AOK, both active and well respected old timers with an excellent record. We shall miss them.

In recognition of the outstanding service to the group since its formation Steve was appointed as its first President. Ken Willis G8VR takes over as Chairman, Ted Collins G4UPS as Secretary, Peter Turner G4IIL remains Treasurer and John Livesey GOJLL of

Ted Collins G4UPS (ex ZD8TC) at his QTH in Hemyock, Devon.



The new group president Steve G4JCC and Chairman Ken G8VR with overseas guests — L to R: W3TCO, ZC4MK, OZ9QV, a friend, Steve, Ken, W6JKV and WA6BYA.



On May 2 I heard CT1DTQ work RB5FLE on CW at 1800z. Will try to find out who this station is.

Forthcoming OH expedition to **Aland Island**, OHO, from 3-8 June locator K009, callsign OH0BT, QSL via OH3FP, Box 116 SF-11101, Riihimaki 10, Finland. OH0BT is now on schedule and Midnight 2 June — many QSOs with GM and G stations.

Yet another OH expedition, this time to OHOM — **Market Reef** — from 28 July to 4 August 1990. Locator will be JP90 QSL. Route later.

A message from PY7ZZ regarding the delay in the ZFOW cards: they were posted from Japan on 29 December 1989, and arrived in PY mid April 1990. Already the cards have arrived in G and W.

Svalbard

Now, news of two expeditions to **Svalbard**: 10-14 May, and 24-28 May. Callsigns will be JW5QFA, JW1MFA, JW9VDA, JW9ZV. QSL via Box 88. N-1501.

Three PA stations will activate Svalbard on 6m from 27 July to 5 August, 1990, inclusive. They will operate on 50.110, with 100 watts to a 6-el beam. QSL via Box 3506, GL



6m personalities — Ray Cracknell GZAHU, Geoff Brown GJ41CD, David Butler G4ASR and Ken Ellis G5KW.

Utrecht, Netherlands. Locator is JQ78SG.

Dave Court G3SDL, using the special callsign **4U5ITU**, activated the Geneva Club Station over the weekend of 11/12 May 1990. Being confined, like the HB9s, to activity on 6m after tv hours, all the contacts he made were MS in the early hours of the morning. Over the two nights Dave had 34 QSOs and the lucky stations were; G3RFS, G4AHN, SM7CMV, G3WOS, G3HBR and SM&AED. QSL via Dave's home address.

100 Countries Worked by Gs

That golden figure of 100 countries worked by G stations was

achieved on 14 May, with the appearances of ISO on the band. The highest number reported to date is 92 by Geoff GJ41CD in Jersey. He has 85 confirmed, and is favourite for the first DXCC outside the Americas.

The **Ascension Island** HF beacon on 28.292 MHz is back on the air; first noted at 1830z on 17 May 1990.

West German stations are now allowed 25 watts erp on CW and SSB only with no /O or /M operations. No contest traffic will be allowed and the permits are for 12 months duration, when the position will be reviewed. About 300 stations have applied for six metre permits.

On 21 May, 23 QSOs took place between DL and GI during a tropo opening.

A meeting with the authorities was scheduled for week commencing 21 May — will report results when known.

Lichtenstein Pierre HB9QQ will be active from HBO as HBO/HB9QQ from 1 June 1990 to 4 June, locator JN47TC. QSL via home QTH. Due to the last minute nature of this information it will be of little value for operation purposes but is useful for the records.

ENTERPRISE ERADIO APPLICATIONS ALTD.



NOW WITH
VERSION 3
SOFTWARE

ERA LTD
26 CLARENDON COURT
WINWICK QUAY
WARRINGTON WA2 8QP

Tel: (0925) 573118.

All prices
include VAT
& P&P

£154.95



Price £99.50

BP34

The BP34 audio filter helps you hear weaker stations by eliminating adjacent channel & wide band noise interference. A must for SWLs/Contest groups/CW operators/Weather Fax users.

Easy to connect & use but despite it's apparent simplicity, the BP34 has the highest performance specification of any filter you can buy. Exceptionally sharp cutoff, 80dB of stopband rejection & less than 0.3dB passband ripple makes the BP34 more versatile than a whole set of expensive crystal filters!

SEE
REVIEW
PW SEPT 89

To order or for more information ring or write. We are open Saturdays for personal callers.

Also available from:

Electromart	— Swansea	Third Eye	— Aberdeen
Flightdeck	— Stockport	Wants	— Plymouth
Johnsons SW	— Worcester	Ward Ect	— Birmingham
R. A. S.	— Nottingham	Waters &	— Hornchurch
Star	— Tyne & Wear	Stanton	Essex

All Products unconditionally guaranteed for 2 years.



MKII MICROREADER

The Microreader is a small compact unit that allows anyone equipped with a suitable SW receiver, to read Morse & RTTY signals simply and without fuss. No computers, interfaces or program tapes are needed, just connect the Microreader to the ear or speaker socket & switch on. The decoded words appear on the built-in 16 character LCD display screen.

The Microreader contains all the filtering & noise blanking needed to allow reception even under bad conditions. A three colour bargraph tuning indicator makes precise tuning simple, while shift indicators take some of the guess work out of RTTY. Despite the fact the Microreader contains two fast processors (12MHz), it is extremely quiet generating virtually no RFI. The Micro-reader can also if you wish, transfer the decoded messages to any printer, computer or terminal unit equipped with an RS232 port.

In the tutor mode, the Microreader will send random groups of characters with variable speed & spacing, or plug in your own Morse key to check your sending. In both cases the characters are shown on the display.

The MKII Microreader comes complete with audio lead & demonstration tape. Full technical support & advice upgrade service.

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 has ceased, or 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. John G Campbell GM0AMB 0835 22686. Aug 26 Open Day/Mobile Rally, Focus Centre, Livingstone Place, Galashiels. Trade, bring and buy, refreshments. Talk in S22. 11am.
Glenrothes DARC. John Hardwick GM4ALA. 0592 742763 (hm) 0506 410677 (wk).
Helensburgh ARC. Barrie Spink GK0KZK 0309 64401. Thurs, The Basement, Cairndhu Nursing Home, Lower Rhu Road, Helensburgh, 7.30. Good facils. Inverness ARC. Brian. 0463 242463.
Lothians RS. P J Dick GM4DTH 21, West Maitland St., Edinburgh. Prestel (NOT phone) 314471210. 2,4 Thursdays 7.30pm Orwell Lodge Hotel, Polworth Terrace, Edinburgh.
Maxwelltown ARK. C Rogers GM4NNC 0387 721070 Rear of Lincluden Inn, Abbey Lane, Lincluden, Dumfries. 1,3 Weds etc. Morse, RAE training.
Mid Lanark ARS. David Williams GM1SSA, Holytown 732403.

NORTH EAST ENGLAND

- Barnsley ARC.** Ernie Bailey G4LUE. Barnsley 716339. Mons St. Mary's Church Hall, Laithes Lane, Barnsley.
Barton DRC. John Pullen G4TGE 0652 32811. Acc Club, Barton Upon Humber, Alt. Thurs.
Bishop Auckland ARC. Peter Fawcett G0FBK Bishop Auckland 606819. Most Thurs.
Bourne DARS. Vince Cawthorn G4ODG. 0778 422795.
Denby Dale DARC. Darran Chappell G0BWB, 221 Huddersfield Rd., Shelley, Huddersfield HD8 8LJ.
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.
Goole RES. Richard Sugden G0GLZ. Goole 769968. Fris, West Park Pavilion, Goole 8pm. Aug 10 Talk; Aug 17 Video evening; Aug 24 Social; Sep 7 Natter; Sep 14 Constructors' Trophy; Sep 21 AGM.
N. Ferriby ARS. Frank G3YCC 0482 650410. Fris. NFU Football Club Room, Church Rd., N. Ferriby, Yorks.
Halifax ARS. David Moss GOLDM 0422 202306. The Running Man, Pellon Lane, Halifax, 7.30, 3 Tue. 1 Tue "noggin and natter" informal; Aug 21 Propagation Charlie G2FKZ. Sep 18 AGM.
Hornsea RC. Jeff G4IGY. 0964 533331. The Mill, Atwick Rd., Hornsea, Weds 8pm. Aug 15 Rig test Clive G8EQZ; Aug 22 Planning Elohex; Aug 29 On air; Sep 5 Barbeque with Serendipity; Sep 12 Debate; Sep 19 Homebrew and alignment, Clive G8EQZ; Sep 28 On air; Oct 3 Aerials, Ted G3AZA; Oct 14 Elohex, Hornsea Floral Hall. Thanks Norman.
Hoyland ARC. M Wardle, 11 Sokell Ave, Wombwell, Nr. Barnsley 747407. Weds, West Bank House, opp Hoyland Leisure Centre.
Keighly ARS. K A Conton G1IGH. Bradford 496222. Thurs, 8pm, Ingrow Cricket Club, nr. Hainworth Village, Keighly. Aug 14 On air;

- Aug 28 Homebrew the right way G4YDI; Sep 18 Planning ses; Sep 19 Quiz/pie and peas with Northern Heights; Sep 22/23 SES Nat. Trust East Riddlesden Hall; Sep 25 Intruder alarms G8NWK. Other = natter.
Leeds DARS. G1EBS. 0274 665355.
Loughborough ARC. Philip. 0509 412043.
Maltby ARS. Keith Johnson G1PQW. Rotherham 814135. Fris, Hellaby Hall, Clifford Rd., Hellaby.
Mansfield ARS. J M Coates G4GYU. 0623 27257, Polish Catholic Club, Windmill Lane, Woodhouse Rd., Mansfield 1 Thurs 7.30.
Mexborough ARS. D Thomas G6FUM. Doncaster 859654. Fris, Harrop Hall, Mexborough.
Northern Heights ARS. Stan Catton G0IYR. 0274 673116. 1,3 Weds 8.15, Bradshaw Tavern, Nr. Queensbury, Bradford. Aug 15 DF foxhunt; Sep 5 Aircraft navigation Andy Rackham.
Pontefract DARS. Colin Mills G0AAO. 0977 43101. Carleton Community Centre, Pontefract.
Rotherham ARC. F Moody. Rotherham 552925.
Rugby ATS. Kevin G8TWH. 0203 441590. Tues Rugby Radio Station Cricket Pavilion (A5, Hillmorden), 7.30.
Scarborough ARS G4BP. I G Hunter G4UQP, 0723 376847. Jul 29 Rally, Spa, Scarborough, 11am. Trade, Bring and buy, Morse exams and demo. On seafront, good day out.
Sheffield ARC. M Sables. Sheffield 886083. Mons Firth Park Pavilion, Sheffield.
Spalding ARS. Dennis Houlst G400 075 750382 (acting). Old Fire Station, Albion St., Spalding, Linc. 7.30.
Stockton DARS. G Noble c/o Causeway Community Centre, Billingham, Stockton on Tees. Weds Causeway Community Centre 7.30. Regular RAE and Morse tuition.
Stoke on Trent ARS. D Wroe 0782 639476, Rose and Crown, Etruria, Stoke-on-Trent, 7.30 Fris.
Tyneside ARS. G Lindsay G4KOT, 12 Augusta Court, Harrian Park, Wallsend, Tyne & Wear.
UK FM Northern. L. Loughton 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.
Wigston ARC. G6HAJ. Leicester 403105.
Workshop ARS. John Huggins G0DZX. Sheffield 0909 565856. The Clubhouse, West St., Workshop.
Yorks ARS. Keith Cass G3WVO, 4 Heworth Village, York. Fris 7.30pm, United Service Clubroom, 61 Micklegate, York.

NORTH WEST ENGLAND

- Aire Valley RS.** G6NPT. 0532 44597.
Bolton ARC. Deane Sports Complex, New York, Junction Rd., Bolton Glenn Bates G6HFF 00204 63459.
Bury RS. C. D. W. Macroft G4JAG, Mosses Community Centre, Cecil St., Bury.
Carlisle DARS. Roy G0HMQ 0965 44766. Mons 7.30 Morton Community Centre, Wigton Rd., Carlisle. Weekly Morse class.
Cheshire: N. Cheshire RC. C Kirsop G6KSA, Morley Green Club, Wilmslow.
Fylde ARS. Frank G4CSA. St Annes 720867. South Shore Lawn

Tennis Club, Midgeland Road, Blackpool. 2,4 Thurs.
Isle of Man ARS. J Wrigley 0624 834257.
Kirkby ARS. Paul GOJIB 051 548 0452 Meets Weds, call for further information.
Lancaster: University of Lancaster ARS, S. Griffin G10HH 0524 64239. 2,4 Mons Assistant Staff House, University of Lancaster.
Liverpool DARC. W H G Metcalfe G6VS, 38 Kempton Rd., Wavertree, Liverpool. Tues, Conservative Club, Church Rd.
Morecambe Bay ARS. D H Wood G4ZJL. 0524 52042. Tues 7.30 Trimpell Sports and Social Club, Out Moss Lane, Morecambe, Lancs.
St. Helens DARC. Carol Wainwright GOCXT 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.
Trafford ARC. Graham 061 748 9804. Thurs 7.30, Sea Cadet Unit, Bradshaw Lane, Stretford, Manchester.
Todmorden DARC. E. Tyler GOAEC. Halifax 882038. 1,3 Thurs Queens Hotel, Todmorden.
Warrington ARC. Paul GOCBN. 0925 814005.
Wirral ARS. A Seed G3FOO. 051 644 6094. 1,3 Weds 7.45 Ivy Farm, Arrowe Park Rd., Birkenhead.
Wirral DARC. Gerry Scott G8TRY 051 630 1393. 2,4 Weds Irby Cricket Club, Mill Hill Rd., Irby, Wirral 8pm. Thurs Morse class 8 pm.
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. GWODPR. 023987 274.
Bridgend DARC D E George GW1OUP. 0656 723508.
Delyn RC. Stephen Studdart GW7AAV. 0244 819618. Daniel Owen Centre, Mold, Clwyd. Alt Tues.
Holyhead DARS. D Richards, 5 Queens Park Court, Holyhead, Gwynedd. Forrester's Arms, Kingsland Rd. 2,4 Suns, 7.30.
Newport ARS. GW7BSC. 0633 62488.
North Wales: Clwb Radio Amtatur Y DDraig GW4TTA. Tony Rees. 0248 600963. Four Crosses Hotel, Pentraeth Rd., Menai Bridge. 7.30pm, 1,3 Mons. Aug 20 VHF evening; Sep 3 Construction night; Sep 17 Technical demo; Oct 1 QRP George Dobbs G3RJV.
Pembrokeshire RS. Martin GW8ZMU, Haverfordwest 764009. Further Education Centre, Haverfordwest. Mons 7.30. RAE and Morse tuition.
Porthmadog DARS. Dave GW1EGQ 0766 770298. Harbour Cafe, Ffestiniog Railway, Porthmadog 7.30, 3 Thurs.

THE MIDLANDS

Atherstone ARC. J. R. Arrowsmith G4IWA 0827 713670. 1 Weds Bull Inn, Watling St., Witherley, nr. Atherstone 8pm. Phone to confirm.
Birmingham: Centre of England Rally 1990, Sep 23, British Motorcycle Museum, Bickenhill, opp. NEC, Birmingham (near M6 and M42). Bring and buy, raffle, traders, 3 halls, parking, ATV. £1 and concessions RAIBC, OAP. Joint rates for BMM visitors (500 cycles) 10.30. Frank G4UMF 0952 598173.
Coventry ARS. Johnathan Ward G4HHT. 0203 610408. Baden Powell House, 121 St. Nicholas St., Radford, Coventry. Regular On-air and morse tuition.
Midland ARS. Paul O'Connor G1ZCY. 021 443 5157. 3 Tues. Thurs natter. Computer night last Mon, mad morse night last Fri. Unit 16, 60 Regent Place, Hockley (Jewellery Quarter), Birmingham 7.30 Morse tuition Weds 7pm Raynet 4 Tues. Aug 21 Junk sale; Sep 18 Fox hunt.
Mid Warwickshire ARS. G4TIL Southam 4765.
North Cheshire RC. G6USA c/o Morley Green Club, Wilmslow, Cheshire SK9 5NT.
Nuneaton DARC. Paul Bicknell G4JFT. 0203 343412. 4 Tues, Etone Social Club, Meadow St., Abbey Green.
Redditch RC. R. J. Mutton G3EVT 0789 762041. 2 Tues WRVS Day Centre, Ludlow Rd., Redditch, Hereford.
Rugby ATS. Kevin Marriott G8TWH, 77 Lloyd Crescent, Stoke Hill, Coventry, Cricket Pavilion, BT1 Radio Station, B entrance, A5 Trunk Rd., Hillmorton, Rugby. Tues 7.30. Jul 29 Boot Sale, Lodge Farm, Walcote, Lutterworth, near M1. All day. Kevin G8TWH 0203 44159.

Salop ARS. Fred Hall G3NSY 0743 790457. 2,4 Thurs, The Olde Bucks Head, Frankwell, Shrewsbury, 8pm.
Sandwell ARC. Steve Jackson 021 544 4759. Mons 7.30. The Broadway, Warley, W. Midlands (doesn't actually state where). Weds evgs morse and general training.
Stourbridge DARS. C Williamson H4IEB 0384 396800. Robin Woods Centre, Beauty Bank, Stourbridge, Worcs. 1,3 Mons.
Stratford Upon Avon DARS. A Beasley GOCXJ. 060 882 495. 7.30 Baptist Church, Payton St., Stratford Upon Avon. Sep 10 Introductory meeting; Sep 24 Raynet Geoff Griffiths G3STG; Oct 8 Electrical Safety Ivor Bowen G0JJY.
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, real ale.
Wolverhampton ARS. Keith. 0902 24870.
Worcester DARC. D. Batchelor 0905 64173.
Wythall RC. Chris Pettitt GOEYO 021 430 7267.

SOUTH WEST ENGLAND

Axe Vale ARC. Pat Cross G0GHH. Balls Farm Cottage, Musbury Rd., Axminster.
Bath DARC. Howard G6Eiy 0225 428010.
Blackmore Vale ARS. Stuart Brunton G0EXI 0747 840558. 2,4 Tues 8pm Old Coach House, Bell & Crown, A303, Wilts.
Bristol: North Bristol ARC. Chris Budd G0LOJ 0454 616267. Sept 2 Motorama.
Bristol: South Bristol ARC. Len Baker G4RZY 0272 832222 during meetings. Whitchurch Folk House, East Bundry Rd., Whitchurch, Bristol. Weds. Aug 15 Dx broadcast tv activity; Aug 22 Top band activity; Aug 29 Library and committee meeting; **Sep 16 Rally at Temple Meads Station Great Train Shed, nr. M32, parking, traders, bring and buy, demonstrations and displays, disabled access, interesting site.**
Cornish RAC Rolf Little G7FKR 0872 72554. St. George's Hotel, St. George's Rd., Truro.
Evesham, Vale of, DARS. John G3DEF. Evesham 6407. 1 Thurs 7.30pm, MEB Club, Community Centre, St. David's Hill, Exeter.
Exeter ARS. R. J. Donno QTHR. Community Centre, St. David's Hill, Exeter. 7.30pm. 2 Mon.
Plymouth ARC. Bob Slater 0752 361842. Tues. Frederick St Community Centre, Plymouth (off King St.) 7.30. RAE, morse classes, library, reg. RAE exam centre.
Poole ARS. GOEQV 0202 674802.
Salisbury RES. Neil 0980 22809.
South Dorset RS. G. Gwilliam G4FJO QTHR 0305 781164. Wessex Lounge, Weymouth FC, Radipole Lane, Weymouth. 7.30 1 Tues.
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.
Torbay ARS. G3NJA, G8NJA. Wait G3HTX. 0803 526762. ECC Club, Ringslade Rd., Nr. Highweek. Club nights Fris 7.30.
Trowbridge DARC. Ian Carter G0GRA. 0380 830383. Most 4 Weds, 8pm, TA HQ, Bythesea Road, Trowbridge; Aug 1 Auroral prediction and magnetometers G1YPA; Sep 5 Mysteries of wire antennas and computer analysis G0DAB.
Yeovil ARC. David Bailey G1MNM, QTHR. Recreation Centre, Chilton Grove, Yeovil. 7.30pm, Thurs. Talks by G3MYM; Aug 9 Designing jfet oscillators; Aug 16 Tuned circuits; Aug 23 SSB; Aug 30 natter; Sep 6 Lambda diode projects.

SOUTH EAST ENGLAND

Aylesbury Vale RS. Martyn Baker G0GMB. 1,3 Weds 8pm (July, Aug 1 Wed only). Hardwick Village Hall (A413 N of Aylesbury).
Basingstoke ARC. Andy Wynn G1JTO 0256 64756. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. 7.30pm. 1 Mons.
Bedford DARC. Ray GOEYM. 0234 244506.
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. G0BRC, G7BRC. Kelvin Fay 0634 376991.
Brighton DARS. Peter. 0273 607737. 1,3 Weds, Roast Beef Bar, Brighton Racecourse, Elm Grove, 8pm.
Bromley DARC. (formerly Biggin Hill ARC) Geoff Milne G3UMI 081 462 2689 The Victory Social Club, Kechill Gardens, Hayes, Middx. 7.30 3 Tues. Aug 21 Operating evening; Sep 18 Basic

- electricity.
- Burnham Beeches RC. G3EIL 0628 25720.**
- Bury St. Edmunds ARS.** Ian Capon G0KRL 0359 70527. Upper School, Beetons Way, BSE 3 Tues.
- Cambridge DARC.** Brian Davy G4TRO 0223 353664. Audiovisual Aids Room, Coleridge Community College, Radegund Rd., Cambridge. 7.30 Fris.
- Canterbury: East Kent ARS.** Brian Tutt, Herne Bay 366232. Canterbury High School, Knight Ave. 1,3 Thurs, 7.30pm. Sep 20 tba; Oct 4 AGM.
- 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.
- Chichester DARC.** D. Clear G0KNU, Chichester 573541. 1,3 Tues, St. Pancras, Chichester 7.30. Aug 14, Sep 4 Club meetings; Aug 21 144MHz Trophy contest.
- Chingford: Silverthorn ARC.** Andrew Mowbray G0LWS 081-529 4489 5.30-6.30pm wkdays only. Chingford Community and Adult Education Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH, 7.30 Fris.
- Clifton ARS.** Martin Brown G0DGC. 081 691 2341.
- Coulsdon ATS.** Alan. 081 684 0610.
- Dover: South East Kent YMCA ARC.** Des Edwards 0304 203073. Dover YMCA, Godwynehurst, Leyburne Rd., Dover, Kent. Weds.
- Dunstable Downs RC.** M. Spacey 0582 30664. Room 3, Chews House, 77 High St. South, Dunstable, Beds. Fris.
- Eastbourne EARC.** G1BRC 0323 29913.
- 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 292312. 2, 4 Weds, Railway Enthusiasts Club, off Hawley Lane (M3 bridge), Farnborough, Hants.
- Gosport: Submarine ARC.** Open to submariners, ex-submariners. RNARS. HMS Dolphin, Gosport, Hants. Keith Bricknell G0MII, 1 Walker Place, Gosport, Hants PO13 OLU with SAE.
- Grafton RS.** Rod Harrigan G0JUJ. 071 368 8154. Holy Trinity Church Hall, Stapleton Hall Rd., LONDON N4. 2,4 Fris.
- Hastings ERC.** Dave Shirley. 0424 420608. 3 Weds. Westhill Community Centre, Croft Rd., Hastings. Also Fris (informal) Ashdown Farm Community Centre, Downey Close, Hastings from 7.30.
- Harlow DARS. Radio and Electronics Rally, 30 Sept, Harlow Sports Centre, Nr. M11. Traders, bring and buy, 1000 parking, disabled facilities, talk-in \$20. £1, accompanied children free. Alf 0279 418392 (day), Mike 0279 722569 (evgs/wknds).**
- Harrow RS.** Harrow Arts Centre, Uxbridge Rd., Hatch End 8pm, Fris.
- Horndean DARC.** F W Charrett G3COO. 0705 483676. Horndean Community School, Barton Cross, Catherington Lane, Horndean, Portsmouth, 7.30 1 Thurs. Sep 6 Army communications; Oct 4 AGM.
- 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, Conegeare Road, Huntingdon, Cambs 7.30. Aug 27 (Bank Holiday Monday) Huntingdon Junk Sale & Auction — now double the size: two halls and car boot sale space as well. Trade, junk, components, auction, bring and buy, food and drink. 10am to 4pm. G7DIU 0480 431333 day G8LRS 0489 456772 evgs.
- Isle of Wight: Binstead ARS.** Bob Griffiths G0ISB QTHR, packet G0ISB-2. Mons 7.30. Brickfields Shire Horse Centre, Newnham Rd., Binstead, Nr. Ryde. Packet, HF, ATV; Morse lessons and testing. Monthly auctions.
- Kettering DARC.** Barry Perrin G7CIV. Rockingham 770701. EMEB Social Club, Eskdale St., Kettering. Tues 8pm.
- Kingston DARS:** S Walters G31MK 01 397 6924.3 Weds "Alfriston", Berrylands Rd., Surbiton.
- Loughton DARS:** J D Ray G8DZH. 081 508 3434 (ev); 081-5083434 Micronet 800 mailbox, TeleGold 74:MIK1824; packet G8ZDH at GB7ESX. Room 14, Loughton Hall, Rectory Lane, Loughton 7.45pm. Fris.
- Maidstone YMCA ARS.** G0BUW. 0622 20544. YMCA Sports Centre, Melrose Close, Maidstone, Kent. Fris 8pm.
- Mid Sussex ARS.** G0GMC. 07918 2937.
- Milton Keynes DARS.** Mike G0ERE. 0234 750629.
- Norfolk ARC.** Steve Sewello G4VCE, 0508 78258 QTHR. Norfolk Dumpling, Livestock Market, Hall Road, Harford, Norwich. Weds 7.30. Aug 15 Real Radio evening; Aug 22 Radio computer software; Sep 1/2 HF SSB FD Cart Gapp, Happisburgh; Sep 9 **SES Town & Country Show, Royal Norfolk Showground, Costessey;** Sep 12 Quiz with Felixstowe and Leiston; Sep 19 Weather satellites Henry Neale G3REH; Sep 26 Informal/Cttee; Oct 3 RSGB Zonal Member John Greenwell G3AEZ.
- Northampton RC.** D J Linnell G7CMA 19 Beech Av., Northampton. Kingsthorpe Community Centre, Thornton Hall ("Kingsthorpe Hall"), Thornton Park, Kingsthorpe, near A508. Thurs.
- Peterborough RES.** Peter G4PNW QTHR.
- Reading DARC.** Mike Anthony G4THN. 7434 774042. 2,4 Thurs, Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. NEW VENUE. Aug 9 Club history with illustrations G4JTR; Aug 11 **SES Knowl Hill Steam Rally in aid of Reading Hospital Radio.**
- Reigate ATS (RATS).** Alan G1LNT 0883 44723, Peter G8ITY 0293 36193 after 7. Conservative Centre, Warwick Rd., Redhill, Surrey. 3 Tues, 8pm. Aug 21 DTI radio technology labs, John Mellish G4HUK, Steve Jones G0FMZ.
- St. Albans Verulam ARC.** Andy Ince G0BZS, Cottage No 1 Rounton, 28 Nascot Wood Rd., Watford WD1 3SD. RAF Association HQ, New Kent Rd., off Marlborough Rd., St. Albans. 7.30. 2,4 Tues (activity), 4 Tues. Aug 28 Bring and buy sale; Sep 25 Bygone radio display.
- Sevenoaks DARS.** Barry Leggett. 0732 741222 ext. 245 office hours. Meetings, Emergency Control Centre, Sevenoaks District Council Offices, Sevenoaks, Kent. 8pm 3 Mons.
- Shefford DARS.** Nigel Leaney G1JKF 0763 71149, Brian G4MEO 0767 80043. Church Hall, Amptill Rd., Shefford, Beds. Thurs 8pm.
- Southend DRS.** S. Blinkhorn G1XGP, 102 Lord Roberts Ave., Leigh-on-Sea, Essex.
- Southgate ARC.** Brian Shelton. 081-360 2453. Holy Trinity Church Hall, Winchmore Hill, London N21. 7.45pm. 2,4 Thurs. Aug 9 Nicam stereo Gerry Meek of Fergusons; Aug 23 DF equipment checking; Sep 13 Power distribution Roger Platt CEGB; Sep 27 Inter-club darts match.
- South East Kent (YMCA) ARC.** Brian Joyner 0304 852533. Dover YMCA, Godwynehurst, Leyburne Rd., Dover. Weds 7.30. Others = natter.
- Stevenage DARS.** Pete Daly G0GTE. 0438 724991 1,3 Tues. Ground Floor, D block, Ridgmond Training Centre, Telford Ave., Stevenage, Herts 7.30. Morse training 6.30.
- Sussex Repeater Group** (formerly W. Sussex ARS). M. Mundy, 142 Junction Road, Burgess Hill, W. Sussex, RH15 OPZ. Tel. 0444 241407.
- Sutton & Cheam RS.** John Puttock G0BWV. 081 644 9945. 3 Fris natter; 1 Mons 7.30. Downs Lawn Tennis Club, Holland Av. Cheam.
- Welwyn Hatfield ARC.** Roger Curtis G0CYC 0707 324958. Lemsford Village Hall, Brocket Rd., Welwyn Garden City, 1 Mons; Knightsfield Scout HQ, Knightsfield, WGC 3 Mons 8pm. Regular nets. Aug 20 tba; Sep 3 Birth of Radio Tim Wander on the Marconi archives; Sep 17 tba; Oct 1 Junk sale Jeff G6YIQ.
- West Kent ARS.** B. Guinnessy 0892 32877.
- Whitton ARC.** A Fisher G4VBH 081 572 0465. Whitton Community Centre, Percy Rd., Whitton, Richmond. 8pm Fris. Lectures and demos.
- Wimbledon DARS.** Nick Lawlor G6AJY. 071-330 2703. 2,4 Fris, St. Andrews Church Hall, Herbert Rd., Wimbledon, London. 7.30. Jul 13 Op-amps; Jul 22 DF Hunt; Jul 27 Pre-camp meeting.
- Woburn Park, Bedfordshire — RSGB Mobile Rally.** Traders, refreshments, parking, scenic parkland and gardens, garden centre. Stately home nearby. 0707 59015 (RSGB).

NATIONAL AND INTERNATIONAL

- AMRAC.** Phil G6DLJ. 0703 847754.
- British Amateur Television Club.** G8CJS or G8FOZP QTHR.
- British Amateur Radio Teledata Group.** Pat Beedie GW6MOJ, Ffynnonlas, Salem, Llandeilo, Dyfed. Tel: 0558 822286. 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.) **New Rally venue, Surrey Hall, Sandown Park Exhibition Centre, 16 September 1990.** Peter Nicholl 021 453 2676.

Free Readers Ads!

Please remember to put your phone number or address in the box if you want it in the ad.

Free Ads are for private wants and sales only. If you are a trader, please talk to our classified Ad department.

FOR SALE

COLLECTORS. Offers for Practical Wireless August 1946, July 1950, January 1973; Practical Television March 1952; Wireless World Golden Jubilee April 1961; Wireless World April 1974; also circuit diagram and description wireless set No. 19. Phone 0723 363825.

PYE Olympic high band AM, Marconi Kenilworth high band AM, Marconi Essex low band AM, GEC Kenilworth low band AM, all working OK but no mics, speakers or crystals. Suitable for conversion. Best offer secures. Phone 0522 546145 Ian (G1LSK).

ICOM IC2-SE handle, with speaker, mic, £240; Pac-Comm micropower 2 tnc, £100; Atari Portfolio pocket PC with serial interface and terminal program, £240; Casio CZ-2305 synthesizer keyboard, £75; Quad 33, 303, FM3 stereo amplifier and tuner, £120. Colchester 0206 210878.

FOR SALE, hand-held scanner, as new, £170 ovno; Belcom LS102 L, £225 ovno. 0283 221870.

MULTIMODE 5800, can be converted to 10MHz, £85. 0283 221870.

UNIDEN UST-7007 satellite receiver, £150 ono; Redifusion RSR-30 satellite receiver, £100 ono; two Tektronix 547 DC-50MHz oscilloscopes and a number of plug-in units, £200 ono; Marconi signal generator, 1.5-220MHz AM/FM, £100 ono. Tel. 01-471-0669 after 6pm, ask for Danny.

TRIO TS2300 2m transceiver, nicads charger, carrying case; two aerials, 144-146, £90; Kenwood TS530S HF transceiver, handbook, MC50, mic, as new, carriage extra, £550. Ipswich 49139 G3ZLN.

FOR SALE, Yaesu FT2700RH dual band rig, 2mtr/70ems 25 watts both bands, original mike, mobile mounting bracket, boxed, vgc, including handbook and duplexer, £350 ovno. Phone 0204 699336, weekends only please, Bob G0MOK.

NEED cash to buy dual bander so my TNC for sale, KPC2400, HF/VHF ports, nodes, wefax, etc, costs £195, sell for £135. Phone Jim Golway 0279 451129 (Essex).

FOR SALE, Kantronics KAM all mode controller, version 2.85UK ROM, £160; Kenwood TM221ES 2m 45 Watt FM transceiver, £180; Kenwood AT230 ATU/power meter, £100. Phone 0246 475551 after 6pm.

SALE, surplus to requirements, only about one month's use, TS440 PS50 HD power supply, AT440 fitted auto ATU, extra CW filter, MB430 mobile bracket, manuals, £1,000. G3BKL QTHR (Wilts) 0980 862489.

Original packing, carriage/delivery by mutual arrangement — "TRY" then "BUY".

EXCHANGE Marine MF radio telephone with QV08-100B TX value 24v for Racal LF converter RA137 etc, good working condition. Phone Huddersfield 0484 549249.

AR900UK, as new, £145 ovno; Superstar 2000, can convert to 10MHz, £120; Commitron legal CB, not been tampered with, £20; Belcom LS102L, not been used for two years, no scratches, perfect condition, £220, no offers; mics

for sale, power supplies, 13.5 5.7Ah; all must go. Phone 0283 221870.

TRIO 9R-59DS all band communications receiver, six spare valves, radio amateur's handbook, morse key, aerial tuning unit, £75 ono. Phone 061-654 8988.

TS130S, narrow CW and SSB filters, £465; VFO120, £45; SP120, £35; boxes and manuals; or the lot for £525 to include p&p plus hand and base mics, PSU available if needed. Kevin GI4SNC, QTHR, Limavady, 05047 66151.

FOR SALE, black Jaguar Mk III hand-held scanner, frequencies 26-29.995MHz 115-178MHz 410-520MHz 60-88MHz 210-260MHz, complete with charger instructions, £130 or near offer. Phone 01-692 0944.

YAESU FL2100Z linear warc bands 160-10m, 20 hours' use only, as new condition in original packing, £450 ono. Phone after 6.30 pm or w/ends G3UDU (027582) 2186 (Abson) QTHR.

FLUKE multimeter, £50; Meggen, £100; current clampmeter, £15; Avo Multimeter, £16. 01-554 2913 6-8pm.

ICOM IC202S, 144MHz SSB TX, boxed, with instructions, manual, £125. Also R.N. Electronics 6 meter transverter, 144MHz IF, 25 watts output, £110. Also Mutek SLNA 144MHz pre-amp, £20. Phone Pontypool 0495 757221.

SWAP Commodore 128-64 personal computer with datassette leads and joystick, books and trilogic, the expert cartridge, for a 19 set with control box variometer and other accessories.

SWAP new Yuasa sealed lead acid batteries, two at 12v 1-9Ah, cost £17 each;

wanted, 2v batteries, old equipment, valves, parts, WHY. Write Dave Blanchard, 141 Dunes Road, Greatstone-on-Sea, New Romney, Kent.

JRC-NRD 515, excellent condition, very powerful, bargain, £545; Philips D-2999 world band receiver, mint condition, £215. Phone 01-571 5759 Hounslow.

FOR SALE, Bearcat BC 200XLT 29-54MHz 118-136MHz 406-512MHz 806-824MHz 849-869MHz 894-956MHz, £153. 0475 26972 Weds/Thurs only after 6. Wanted, frequency of signal radio signalling on West Highland railway for photography purposes.

EDDYSTONE EC10 Rx, good working order, £50 plus carriage. Tel Alan 021-354 6652 or 0286 3887.

SWAN 350 HF TCVR with matching PS operation and maintenance manual and spare valves, 3.5 to 29MHz, 400w pep input, £240 Tel 0761 34224.

HRO and MX with PS & 18GC coils, 50KHz to 30MHz, £150 each; Drake 21312Q c/w speaker, Q multiplier, spare xtals, £135; Marconi B28, £25; £425 the lot, carriage extra. A. Roth, Langport 0458 251930.

YAESU FT270RH 45w high power FM mobile rig and mic, good condition, £220. G4UVQ 0462 674437 Herts.

SWAP 48K Spectrum, tape recorder, 12in b&w TV and PSU for Spectrum. Wanted, HF receiver with SSB facility, not too big, shortage of space.

ICOM IC735 TX-RX, with microphone, instructions, boxed, mint, never been

used on transmit, £730 or exchange IC7000 receiver; Diawa infra-red mobile microphone system with nicads and charger, used once only, £29. Mike, G6MNX QTHR York (0904) 422773 anytime.

YAESU FRT7700 ATU, £30, and FC965 DX 150k-60MHz frequency converter for FRG 9600, £45, both in mint condition, boxed, as new. Gosport 0705-521756.

FLUKE 77 multimeter, £50; **AVO** clampmeter, £15; **AVO** multiminer, £20; **HV** probe, £15; **Megger**, £100. 01-554 2913 6-8pm.

YAESU FT902, all filters fitted, £525; **Amstrad PCW8256** word processor, 512k fitted, many programs, £350 or exchange for Icom HF rig, IC720, IC740, etc. G3KLY QTHR Northampton 0604 648091 after 6pm.

SWAP Amstrad OC2086 computer, YGA colour, two 720k drives, IBM compatible, plus lots of software, for good quality GC receiver or transceiver. Tel 0248 602206 anytime.

YAESU FRG 7700 receiver, 150KHz-30MHz, all mode, plus FRT 7700 antenna tuner plus FRV 7700 VHF converter, 118MHz-150MHz, plus manuals, £300 ono. Tel Bristol 0272 649257.

FOR SALE, Tandy Realistic Pro-2005 programmable scanner, 6 weeks old, unable to use to full capacity, cost £340 new, will accept £250. Please phone 0252 375830.

YAESU FRN 7700 VHF converter for FRG 7700, 140-170MHz, instructions, £25; **Hamgear** pre-selector, 12v DC, £25. Ring Cardiff 0222 709456.

AUDIO and ultrasonic sensitive lock-in type signal

processor, tone detector, etc, DC to 150kHz, dual-phase sensitive detectors plus quadrature output, phase shifting facility, as new, little used, offers around £300. Phone Geoff on 0734 773003 days, 788515 evenings.

FOR SALE, TM411E 70cm FM TX/RX, 25w/5w, box, packing, £200. G4FQF QTHR, phone Romford 0708 747998.

STANDARD C8800 2m transceiver with mobile mounting bracket and manual, in excellent mint condition, £195. Tel 021-360 9307.

EX-WWII wireless operator requires general coverage transceiver or receiver, SSB/CW/AM, for use in old age (pensioner), non-digital preferred but not essential, cheap as possible. Phone 0742 649910 evenings.

SOLARTRON CT436

double beam oscilloscope, with technical manual, mains operated, exchange WHY. Phone 0494 20669.

FOR SALE, Sony ICF2001 FM/AM/SSB CW synthesised receiver, 76-108 FM, 150-29.999 AM & SSB CW, 6 memory preset, very good condition, no box, £95. Chippenham, phone 0249 658025 after 6pm.

LOWE Electronics marine VHF hand-held TX/RX, 2 watts output, SS6000 with crystals fitted, channels 6, 8, 10, 12, 16, 67, complete with antenna, case, nicads and charger, superb working order, bargain, £50. Mike, G6MNX QTHR York, 0904 422773 anytime.

SCANNER, Fairmate HP-100, 3 weeks old, including car aerial, £245 ono, cost new, £325, save £80, as reviewed in April's edition. Sheffield 463083.

SELL/SWAP, Casio 610 keyboard, cost £650, 61 keys, 20 inst., as new, for FT type transceiver or offer WHY. G3TFN, 061-761 2952.

FOR SALE, Swan 350 transceiver with PSU, SSb and CW, 80, 40, 20, 15, 10 metre amateur bands, with handbook. Tel 0504 51615.

DTV 20MHz dual-trace oscilloscope, brand new, complete with manual and test probes, TV trigger, 1mv sensitivity to 10 MHz, component/test variable scale illumination and more, £275 ono; also 10 amp power supply, brand new, linear type, with full protection, 12-14 volt variable, £120 ono; **Mitsubishi CCTV** camera, 8.5mm f1.3 lens and UHF modulator, brand new, £185. For details 061-633 0824.

AOR-2002 25-1300MHz all-mode scanner, £320; **AOR-2001** 25-550MHz all-mode scanner, £120; **Bearcat** 10KHz-30MHz all-mode s/w receiver, £170; 40-channel 4 watt hand-

held Tandy IC-1005 Realistic CB transceiver, £60. Phone 0889 563495 (Staffs).

SHARP PC5000 portable computer, bubble memory, plus 3½ inch external drive, internal printer, complete with manuals, spare bubbles, bargain, £250 ono. Tel Buckley 0244 550595 evenings after 7pm.

YAESU FT757GX, unused, £625; **BNOS 25A** supply, £100; **Sem Tranzmatch**, £70; **Telereader** data terminal, £95; **Trio TR2300** 2 metre mobile, including nicads, case, mount, charger, £125; **Icom IC2E** 2 metre handle, including case, nicads, charger, £105. Paul, G4XTA QTHR, phone 09313 359.

UHER 4400 "Report Stereo" 5in reel tape recorder, complete with charger/battery pack, vgc, £160; **Fergusson 3v 22** "Videostar" VHS video recorder, excellent condition £75, Rob, G2BKZ, Stevenage 721418.

WANTED

WANTED for Spectrum SIA-1, interface adaptor board, TIF1 transceiver interface; wanted, CB converters for 2m, 6m, etc; wanted, cheap dual-band transceiver, battery-powered air ioniser; sale, data acquisition unit, RS232 output, 60 inputs, sell £500. Tel Richard (Abingdon), 0235 529005.

WANTED, Cobra 148GTL DX, AM, FM, USB, LSB, urgent, must have legal frequency fixex. 0283 221870.

WANTED, ham radio related software to run on Amstrad PCW 9512 (CP/M3), public domain or copyright OK, will pay, pirates not considered — will grass! Phone Halifax 368021 (home) or Leeds 451819 (work), ask for Arthur.

WANTED, circuit drawings for K. W. Vanguard, Geloso VFO used in same, circuits

for RN.B40, B41, Pye mains base station transmitter and receiver. P. G. Robins, G8BSK, 290 Priory Road, St. Denys, Southampton SO2 1LS, phone 552247.

WANTED, Drake MN2700 aerial tuning unit, good price paid for the capture of the above item in good condition, 7 series accessories you may have! Phone 0494 29890 evenings.

WANTED, picture postcards relative to amateur radio, wirelasses, wireless stations, etc; also old QSL cards. Please contact Tom Valentine (GMIXHZ), 38 Grampian View, Montrose, Angus DD10 9SX, phone 0674 76503.

WANTED, tower or trailer mast, tower preferably winch-up, all designs considered; also wanted, any amateurs using Spectrum computers for radio communication, to contact on user basis. Please contact Barry, G7ELW, on 0908 666901 anytime.

R.A.S. (Nottingham)

G6XBH G1RAS G8UUS

Visit your Local Emporium
 Large selection of New/Used Equipment on Show
AGENTS FOR:
YAESU • AZDEN • ICOM • NAVICO • ALINCO
ACCESSORIES:
 Welz Range, Microwave Modules, Adonis Mics, Mutek Pre-Amps,
 Bareco Mast Supports, DRAE Products, BNOS Linears & P.S.U.'s
AERIALS, Tonna, New Diamond Range of Mobile Whips, Jaybeam
BRING YOUR S/H EQUIPMENT IN FOR SALE
JUST GIVE US A RING

Radio Amateur Supplies
 3 Farndon Green, Wollaton Park, Nottingham NG8 1DU
 Off Ring Rd., between A52 (Derby Road) & A609 (Ilkeston Road)
 Monday: CLOSED Tuesday-Saturday: 10.00 a.m. to 5.00 p.m.

Tel: 0602 280267

R.A.S. (Nottingham)

THE KITS WITH ALL THE BITS
Guaranteed complete to the last nut!
COMPACT 80m CW QRP Tx/Rx
 DTR3 Kit — £81.00 Ready Built — £130.00
 ★ Stable VFO ★ Sidetone ★ Audio Filter
 ★ Requires 12/14 VDC ★ Very detailed
 Instructions ★ Black steel case
 ★ Printed panel

**COMPANION ANTENNA
 TUNING UNITS**
 TU1 Kit — £39.25 Ready Built — £54.50
 TU2 Kit — £48.50 Ready Built — £68.50
 ★ Large dia. coil ★ High grade capacitor ★ Built in balun ★ Circuits to match
 your antenna ★ Up to 30 Watts of CW ★ TU2 has sensitive QRP/SWR meter
 Send SAE for brochure or call Alan G4DVW on 0602 382509


LAKE ELECTRONICS
 7 Middleton Close, Nuthall, Nottingham NG16 1BX
(callers by appointment only)



VISA Access

RUTLAND WINDCHARGERS

- ★ Free power from the wind
- ★ Independent battery charging systems
- ★ Charging commences at 4 mph (2m/s)
- ★ Charges 4 Amps at 22 mph (10m/s)
- ★ Ideal for remote telecoms, automatic feeders and lighting barns, sheds, etc.



For free brochure contact:

MARLEC ENGINEERING CO. LTD.
 Unit K, Cavendish Courtyard
 Sallow Road, Corby
 Northamptonshire
 NN17 1DZ, ENGLAND
 Tel: (0536) 201588 Fax: (0536) 400211

ADVERTISERS' INDEX

ARE	IBC	KW Comms	15
ASP binders	55	Lake	56
Bredhurst	24	Lowe	21
Datong	40	Lowe	OBC
Elliott	55	Marlec	56
ERA	49	RAS	56
ETI	41	Raycom	IFC
Garex	55	Skeleton Crew ...	56
ICOM	10,11	SRW	25
Intertan	9	Tech Soft	25

Skeleton Crew

THE MAGAZINE FOR THE WORLD OF HORROR

**FOR LOVERS OF THE
 HORROR GENRE**


This title will not be a light read!

Contributors include:
 Stephen King, Clive Barker
 and James Herbert.

Cover Price £1.95

Published: 3rd Friday of each month

or why not subscribe,
 telephone
 (0442) 66551
 ex 357 for further
 information



First issue on sale: 15th June

**AN ARGUS
 SPECIALIST PUBLICATION**

RETAIL NETWORK

BIRMINGHAM

HEWARD'S HOME STORES LTD.
(Est. 1963)
822/4 Kingstanding Rd., Birmingham B44 9RT.
Tel: 021-354 2083
G4RJM with over 40 years in The Radio Trade
Ham Equipment urgently wanted!
Open: Mon-Sat 9-6

DURHAM

BORDER Communications Centre
Units 8a to 8c
Orum Industrial Estate
Chester-le-Street
Co. Durham DH2 1SX
TEL: 091 4106969
VOICE & DATA COMMUNICATIONS
• Largest Display in the North East
• Opens 6 days a week - Ample Parking
• Mail Order - Large Secondhand Display

NORTHAMPTON

VANNER'S
Scanner and C.B. Centre
Sales, Service and Repairs of Scanners, C.Bs, Phones,
Answer Machines, Radios etc.
Agents for Garex, Revco, Bearcat, Uniden, Panasonic.
Part Exchange. All items welcome
34 Gloucester Avenue, Northampton
Telephone 0604 766704

BIRMINGHAM

RAYCOM COMMUNICATION SYSTEMS
International House,
963 Wolverhampton Road, Oldbury,
Warley, West Midlands B69 4RT.
Tel: 021 544 6767
Opening hours 9-5.30pm Late nights Thurs. -Fri.
Send just £1.00 (refundable against purchase)
for latest catalogue + our exclusive products & used list.

KENT

Icom (UK) Ltd.
Unit 8, Sea Street, Herne Bay, Kent CT6 8LD.
Tel: 0227 369464 Telex: 965179 ICOM G.
Fax: 0227 360155
Open: Mon-Sat. 9-5.30pm.
Lunch 1-2

Northampton Communications
Communication House, Staveley Way,
Brixworth Northampton NN6 9EU
For all those bits and pieces
Tel: (0604) 882133/882067
Fax: (0604) 880805

BIRMINGHAM

B&C ELECTRONICS
51 SIR HILTONS RD
WEST HEATH, BIRMINGHAM B31 3NH
New and Used
Amateur Radio and Computer Sales
Elite antenna main dealer and commission
sale items always required
BRUM'S PREMIER JUNK SHOP
Tel: (021) 4752426

LEICESTERSHIRE

ELLIOTT ELECTRONICS
for the Radio Enthusiast
26-28 BRAUNSTONE GATE,
LEICESTER.
TEL: 553293
Open: Mon-Sat 9.00am to 5.30pm

SURREY

GUILDFORD COMMUNICATIONS
34 Aldershot Rd., Guildford
Open Mon-Fri 8am-6.30pm
Sat 8am-5.30pm
Secondhand wanted
YAESU ICOM VISA
0483 505756

CAMBRIDGESHIRE

LOWE ELECTRONICS
CAMBRIDGE
Sole U.K. Distributor for KENWOOD
162 High Street, Chesterton
Cambridge CB4 1NL
Tel: 0223 311230

LANCASHIRE

AMATEUR ELECTRONICS/HOLDINGS G3LLL.
YAESU, JAYBEAM, DRAE, DATONG, BLACK STAR COUNTERS,
ETC. FT 101 EXPERTS.
6JS6C 6KD6 12BY7A Original type approved
valves & our own Double Balanced Mixer and
new band WARC Kits for original FT101 MK1-E.
S.A.E. List. Full Yaesu range. 15 mins Junction
31 M6. Free parking. Call and consult G3LLL
without obligation. Holidays? Phone, check we
are open before calling.
45 JOHNSTON STREET, BLACKBURN BB2 1EF.
(0254) 59595. CLOSED THURSDAY.

WEST SUSSEX

BREDHURST ELECTRONICS LTD
HIGH ST., HANDCROSS,
WEST SUSSEX.
TEL: (0444) 400786
Situated at the Southern end of M23. Easy access to M25
and South London. Open Mon-Fri 9am-5pm except Wed
9am-12.30pm. Sat 10am-4pm. YAESU
ICOM MAIL ORDER KENWOOD RETAIL

DEVON

AGRIMOTORS
Merton CB & Radio Centre
Merton Garage & Post Office, Merton,
Nr. Oskhampton EX20 3DZ. Tel: (08053) 200
Open 6 days 9-6. Lunch 1-2.15. Closed Thurs. 1pm.
(Sundays by appointment)
Specialists in 934MHz
Supplies of all 27MHz and 934MHz equipment
Amateur Radio Stocked.

LONDON

LOWE ELECTRONICS
LONDON
Sole U.K. Distributor for KENWOOD
223/225 Field End Road
Eastcote, Middlesex HA5 1QZ
Tel: 081 429 3256

TYNE & WEAR

ALYNTRONICS
For all amateur communications equipment and
accessories authorised dealers for
ICOM and YAESU
129 Chillingham Road, Heaton, Newcastle Upon
Tyne, NE6 5XL. Tel: 091 276 1002.
Open 10am-6pm Tues-Fri. 10am-5pm Sat.
Access & Visa accepted

DORSET

LOWE ELECTRONICS
BOURNEMOUTH
Sole U.K. Distributor for KENWOOD
27 Gillam Road, Northbourne
Bournemouth BH10 6BW
Tel: 0202 577760

MANCHESTER

ST COMMUNICATION SYSTEMS LTD. ZYCOMM
38 CLAREMONT ROAD,
SALFORD, MANCHESTER M6 7RS
AT LAST! Professional repairs service to your amateur radio
and CB equipment. Any make of radio or scanner.
Please telephone Steve, Andy or Neil to book in your radio.
061-736 1705 061-745 7389
After Hours 083-627 5005

WEST YORKSHIRE

AMATEUR RADIO SHOP
4 CROSS CHURCH STREET
HUDDERSFIELD HD1 3PT
Telephone 0484 420774
Good range of
YAESU & KENWOOD
plus quality second-
hand equipment

RETAIL NETWORK

NORTH WALES

NORTH WALES AMATEUR RADIO MART
 AMATEUR RADIO — CB RADIO — MARINE RADIO — P.M.R.
 25 ABBEY STREET, RHYL
 Open Monday-Saturday: 11am-5.30pm
 All repairs and accessories available ex stock. Mail order welcome.
 Tel: 0745-51579

NORTH WALES

T.M.P COMMUNICATIONS
 UNIT 27, PINFOLD INDUSTRIAL ESTATE
 PINFOLD LANE, BUCKLEY, CLWYD
 NORTH WALES 0244 549563
 ICOM
 LARGE STOCK OF SECONDHAND EQUIPMENT (Changing Daily)
 OPEN THROUGH THE WEEK 10-6pm except Tuesdays and Sundays
 EXTENSIVE REPAIR/CALIBRATION SERVICE

SCOTLAND

JAYCEE ELECTRONICS LTD
 20 Woodside Way Glenrothes
 Fife KY7 5DF
 Tel: 0592 756962 (Day or Night)
 Open: Tues-Fri 9-5; Sat 9-4; Sunday by appointment
 Good range Kenwood & Yaesu etc, plus ICOM Quality Secondhand Equipment

HAM RADIO TODAY

CLASSIFIED

Lineage: 55p per word + VAT (minimum 15 words) Semi Display: (minimum 2cms) £10.00 + VAT per single column centimetre. Ring for information on series bookings/discounts. All advertisements in this section must be prepaid. Advertisements are accepted subject to the terms and conditions printed on the advertisement rate card (available on request).



0442 66551

Send your requirements to:
 Ham Radio Today,
 Classified Department,
 Argus House, Boundary Way,
 Hemel Hempstead HP2 7ST

FOR SALE

COURSES

FOR MORE
 DETAILS ON
 ADVERTISEMENT
 RATES — CALL
0442 66551

TAR
 Aerials & Lashing Equipment
 TAR
 OFF-FREE COPY
 JUST SEND SAE 9" x 6"
TAR COMMUNICATIONS
 King William Street, Stourbridge
 W. Midlands DY8 4EY
 ☎ 0384 390944

Icom 781
 1 year old ultimate transceiver
£3,500 o.n.o.
 Contact: Romano Eisen
 Phone: Dublin 732380

COURSE FOR CITY & GUILDS RADIO AMATEURS EXAMINATION
 Pass this important examination and obtain your licence, with an RRC Home Study Course.
 For details of this and other courses (GCSE, Career and professional examinations, etc) write or phone:
THE RAPID RESULTS COLLEGE
 Dept JN100, Tuiton House, London SW19 4DS
 Tel: 081-947 7272 (9am-5pm) or use our 24hr Recordacall service 081-946 1102 quoting JN100

**TO ADVERTISE CALL
 0442 66551**

HAM RADIO TODAY

HAM RADIO TODAY, CLASSIFIED ADVERTISEMENT DEPARTMENT,
 ARGUS HOUSE, BOUNDARY WAY, HEMEL HEMPSTEAD HP2 7ST

PLEASE DEBIT MY ACCESS/BARCLAYCARD NO. _____ EXPIRY DATE _____

EXPIRY DATE



Rates: Lineage 55p per word + VAT, minimum £11.00. Semi-display £10.00 + VAT per single column, min. size 2cm x 1 column. No reimbursements for cancellations. All advertisements must be pre-paid.

CLASSIFIED COUPON

Name

Address

Daytime Tel. No:

Signature Date

FOR SALE SOFTWARE WANTED EQUIPMENT AERIALS OTHERWISE STATE

ARE COMMUNICATIONS

THE SHOP WITH THE SMILE

IC-R100



IC-R100 Mobile/Base Receiver now with SSB

For the enthusiast who prefers a more permanent installation the IC-R100 is ideal giving full frequency coverage of 500kHz-1800MHz and AM/FM. FM wide modes of operation. The IC-R100 boasts 100 memory channels to store your favourite stations and has features similar to the little pocket receiver. 48 monthly payments of £16.77

ONLY FROM
ARE — WITH SSB

£499

ICR7000HF Receiver 500kHz — 2GHz



Now available on super credit terms.
48 monthly payments of £33.23
Cash/cheque/credit card price.

£989.

YES, 500kHz to 2GHz CONTINUOUS receive in one unit. Using the ICR7000 multimode facilities, this probably makes the "2 in 1" ICR7000HF Receiver the most versatile scanner available today. Because of the enormous frequency coverage, the ICR7000HF has 200 mode sensitive channels for increased flexibility. Now a new additional mod available on SSB Mode tuning steps reduced to 10kHz increments. Supplied and fitted for **£65 including V.A.T.**



Brenda
G4VXL

Both Brenda
and Bernie
will be
pleased to
welcome you
at
Ealing



Bernie
G4AOG

PHONE 081-997 4476

SAVE OVER £150
**YAESU FT 747 NOW
£499 INC VAT.**

CW & AM FILTERS ARE AVAILABLE AT £35 EACH



AVAILABLE WITH NO DEPOSIT AND
48 MONTHS TO PAY — **£16.76 PER MONTH**

THE FT747 HF TRANSCEIVER SSB/CW/AM (AND OPTIONAL FM) 100 WATTS PEP OUTPUT ON ALL HF BANDS AND GENERAL COVERAGE ON RECEIVE 100kHz-30MHz, DUAL VFO 20 MEMORIES. ALTOGETHER A SUPER ECONOMICAL HF TRANSCEIVER.



Kenwood TS440S & Auto ATU

One of the finest HF transceivers ever produced by Kenwood. Whether used as a base station or mobile — its superb specification rates it high amongst its competitors.

TS440S with auto ATU **AND FREE** power supply at **£1,282** or 48 payments of £43.08.

WITHOUT PSU AND AUTO ATU £1039

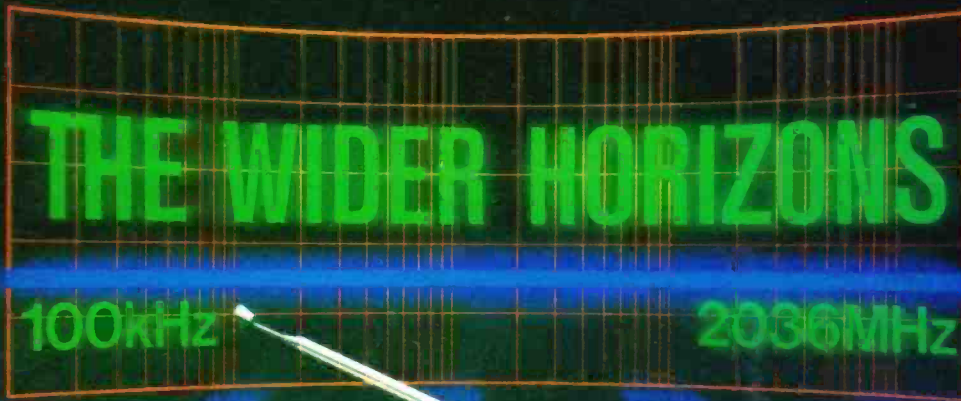
At our enlarged showroom at Ealing we offer full facilities for demonstrating all the equipment that we sell.

Opening Hours Monday-Friday 9.30 to 5.30
NOW OPEN SATURDAY 10.00am-5.00pm

ARE Communications Limited, 6 Royal Parade,
Hanger Lane, Ealing, London W5A 1ET, England
Tel: 081-997 4476 Fax: 081-991 2565



AR-3000 — The Ultimate Receiver



It is an acknowledged fact that AOR are the foremost manufacturer of VHF/UHF monitoring receivers in the world. In the AR-3000, even AOR have excelled themselves, because they have produced what is without doubt the ultimate receiver for wide band monitoring use.

Designed for the professional market, the AR-3000 is nevertheless affordable by the listening enthusiast, and the specification is enough to make any keen listener want this astounding receiver. Brief details:—

Imagine a frequency coverage from 100kHz to 2036Mhz: that's from below Radio 4 on the Long Wave to beyond satellites on 1.7GHz; and there are no gaps in the tuning range. Any frequency within this astounding range is yours to use as you wish.

Imagine all mode facilities, including AM, FM (communications), FM (broadcast), Upper Sideband, Lower Sideband, and even CW. Yours to command with the AR-3000.

Imagine tuning in 50Hz steps for accuracy on SSB/CW, with any step available at your choice from 50Hz to 100kHz, selectable in 50Hz increments. For really high speed tuning you can even increase all the steps by a factor of 10 by a touch of the main tuning knob.

Imagine 400 memory channels in 4 banks of 100, with each bank having its own priority channel, and each bank having its own programmable search system.

Imagine High speed scanning at 20 channels per second, with each memory channel having frequency, mode, and RF attenuator setting stored safely in it.

Imagine having a real time clock for accurate logging.

Imagine having a built in RS-232 computer interface for total control by a personal computer.

Imagine having all this with the outstanding performance which AOR built in to their famous AR-2002, but have now improved on for the AR-3000.

The AR-3000 is the monitor's dream receiver, and it is finally becoming available for general sale now that the Government orders have been fulfilled. Contact us right away for details of delivery schedules, and be prepared to own the best receiver anyone has yet produced.

AR-3000 — a dream come true.

AR-3000 £765 carr by Securicor £10

For the past 26 years Lowe Electronics have specialised in seeking out the best in radio and bringing it to our customers. Those customers will also tell you that we have another speciality — looking after them. Whatever is best in radio, we sell. Whatever we sell, we back with really expert advice and service. We are pleased to represent the best companies in the receiver world, and in addition to the AOR range shown here, we also distribute receivers from Signal Communications and WIN, two of the top names in Airband radio. For full information and a copy of our Airband Guide, simply send us four first class stamps and mention that you saw our advertisement in HRT/CB Scanner Supplement. Happy listening.

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines)

Shops in GLASGOW Telephone 041-945 2626. DARLINGTON Telephone 0325 486121. CAMBRIDGE Telephone 0223 311230.

BARRY Telephone 0446 721304. LONDON Telephone 081-429 3256. BOURNEMOUTH Telephone 0202 577760

All branches are closed all day Monday.