For all two-way radio enthusiasts

Satellite communications
- an introduction

Bow-tie beam
- add an extra string

On test:
Icom ICF2001D portable Rx
Tune into Withers Bargain Centre!

### Products

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta 3000 10FM SW RPT/shift</td>
<td>£79</td>
</tr>
<tr>
<td>Rayco RS2000E Scanner</td>
<td>£225</td>
</tr>
<tr>
<td>Raycom RP Amplifiers 1-3W input</td>
<td>£45.95</td>
</tr>
<tr>
<td>V5PSF 25W</td>
<td>£62.50</td>
</tr>
<tr>
<td>V15L 15SW SSB</td>
<td>£49.50</td>
</tr>
<tr>
<td>V35L 35SW SSB</td>
<td>£29.50</td>
</tr>
<tr>
<td>10mtr FM BETA 3000 mod</td>
<td>£79</td>
</tr>
<tr>
<td>Unmodified BETA 3000</td>
<td>£69</td>
</tr>
<tr>
<td>10FM FBX/SANDYMO MO BOARD</td>
<td></td>
</tr>
<tr>
<td>fits into most CB's with the Sanyo LC71367 chip fitted</td>
<td>£22.50</td>
</tr>
<tr>
<td>or we can fit it for £30 inc post</td>
<td></td>
</tr>
<tr>
<td>FBX/SANDYMO 10FM kit of parts</td>
<td>£17.50</td>
</tr>
<tr>
<td>R Withers Communications</td>
<td></td>
</tr>
<tr>
<td><strong>R Withers Communications – agent to the stars!</strong></td>
<td></td>
</tr>
<tr>
<td>RWC are main agents/distributors for Yaesu, Icom,</td>
<td></td>
</tr>
<tr>
<td>Kenwood, M Modules, Jaybeam, Tonna, Revco,</td>
<td></td>
</tr>
<tr>
<td>Antennas, Clearstone, MuTek, AKD, Drea, FDK, Weitz,</td>
<td></td>
</tr>
<tr>
<td>Tait, and Neve Radiotelephones to name but a few!</td>
<td></td>
</tr>
<tr>
<td>We also stock a wide range of BT approved cordless</td>
<td></td>
</tr>
<tr>
<td>telephones and telephone systems!</td>
<td></td>
</tr>
<tr>
<td>Tune into our specialist service!</td>
<td></td>
</tr>
<tr>
<td>• We manufacture our own range of VHF/UHF beam</td>
<td></td>
</tr>
<tr>
<td>antennas, mobile antennas and fittings</td>
<td></td>
</tr>
<tr>
<td>• We’re the only company in the UK that produces</td>
<td></td>
</tr>
<tr>
<td>modular VHF/UHF Raycom power amplifiers (15-50</td>
<td></td>
</tr>
<tr>
<td>watts output)</td>
<td></td>
</tr>
<tr>
<td>• We supply a large range of power transistors/</td>
<td></td>
</tr>
<tr>
<td>modules imported directly from Japan</td>
<td></td>
</tr>
<tr>
<td>• We supply/repair amateur/business radio systems</td>
<td></td>
</tr>
<tr>
<td>• We check transceivers on our spectrum analyser –</td>
<td></td>
</tr>
<tr>
<td>£12.50 for a comprehensive report</td>
<td></td>
</tr>
<tr>
<td>• Only supplier of modified Revco RS2000 60-179 and</td>
<td></td>
</tr>
<tr>
<td>380-520MHz AM/FM extended coverage scanning receiver</td>
<td></td>
</tr>
<tr>
<td>modified by RWC</td>
<td></td>
</tr>
<tr>
<td>• Probably the UK’s largest seller of used radio</td>
<td></td>
</tr>
<tr>
<td>equipment, both business and amateur radio</td>
<td></td>
</tr>
<tr>
<td>• We offer the largest selection of radio allied</td>
<td></td>
</tr>
<tr>
<td>services under one roof, both trade and retail</td>
<td></td>
</tr>
<tr>
<td><strong>HAND HELDS</strong></td>
<td></td>
</tr>
<tr>
<td>WE’VE THE LARGEST SELECTION OF HAND-HELDS IN THE UK.</td>
<td></td>
</tr>
<tr>
<td>KENPNO KT202 6ch 2mtr XTAI</td>
<td>£16.90</td>
</tr>
<tr>
<td>KENPNO KT2000EE 2 mtr 2W</td>
<td>£14.90</td>
</tr>
<tr>
<td>KENPNO KT400EE 70cm 2W</td>
<td>£29.90</td>
</tr>
<tr>
<td>YAESU FT202HR 2mtr 3W</td>
<td>£26.90</td>
</tr>
<tr>
<td>YAESU FT202R 2mtr 2W</td>
<td>£21.90</td>
</tr>
<tr>
<td>YAESU FT700R 70cm 2W</td>
<td>£279.00</td>
</tr>
<tr>
<td>IC0M IC02E 2mtr 2W</td>
<td>£199.00</td>
</tr>
<tr>
<td>IC0M IC04E 70cm 2W</td>
<td>£279.00</td>
</tr>
<tr>
<td>IC0M IC08E 70cm 2W</td>
<td>£399.00</td>
</tr>
<tr>
<td>ALINCO ALM202E 2mtr 3W</td>
<td>£249.00</td>
</tr>
<tr>
<td>++ MANY MORE MODELS</td>
<td></td>
</tr>
<tr>
<td>AVAILABLE FREE PORTABLE ANTENNA</td>
<td></td>
</tr>
<tr>
<td>WITH EVERY HANDHELD PURCHASED.</td>
<td></td>
</tr>
<tr>
<td><strong>POWER SUPPLY UNITS</strong></td>
<td></td>
</tr>
<tr>
<td>3A G-Com (UK made)</td>
<td>£19.50</td>
</tr>
<tr>
<td>5A-Com (UK made)</td>
<td>£29.50</td>
</tr>
<tr>
<td>10A Bremi (Italy)</td>
<td>£32.50</td>
</tr>
<tr>
<td>10A Moorkramer (Italy)</td>
<td>£32.50</td>
</tr>
<tr>
<td>12-12A Moonraker (Italy)</td>
<td>£69.00</td>
</tr>
<tr>
<td>Yaesu FP757HD 20A Cont.</td>
<td>£175.00</td>
</tr>
<tr>
<td>Yaesu FP757DX 20A S/M</td>
<td>£140.00</td>
</tr>
<tr>
<td>Yaesu FP770 20A PSU</td>
<td>£150.00</td>
</tr>
<tr>
<td>ICOM PS55 matches IC 735</td>
<td></td>
</tr>
<tr>
<td><strong>ANTENNAS</strong></td>
<td></td>
</tr>
<tr>
<td>SUN ANTENNAS (JAPAN)</td>
<td></td>
</tr>
<tr>
<td>Gamma Twin</td>
<td>£9.50</td>
</tr>
<tr>
<td>HBSCV 2 metre</td>
<td>£6.99</td>
</tr>
<tr>
<td>HBSCV 70 centimetre</td>
<td>£5.99</td>
</tr>
<tr>
<td>10/11mtr loaded 1/4 wave</td>
<td>£13.50</td>
</tr>
<tr>
<td>2mtr 7/8 mobile tilt/over</td>
<td>£14.50</td>
</tr>
<tr>
<td>Gutter-Clip and cable ass</td>
<td>£3.95</td>
</tr>
<tr>
<td>REVCO (British Made)</td>
<td></td>
</tr>
<tr>
<td>2mtr 5/8 coil/whip/base</td>
<td>£11.89</td>
</tr>
<tr>
<td>10mtr 1/4 coil/whip/base</td>
<td>£10.99</td>
</tr>
<tr>
<td>70cm Colinear double 5/8</td>
<td>£12.50</td>
</tr>
<tr>
<td>REvco Discose scan/ant</td>
<td>£29.95</td>
</tr>
<tr>
<td>REvco NEW 2045 scan/ant</td>
<td>£39.00</td>
</tr>
<tr>
<td>SMC (Japan)</td>
<td></td>
</tr>
<tr>
<td>70/12M Dual band mobile</td>
<td>£20.95</td>
</tr>
<tr>
<td>358 70cm triple 5/8 mob</td>
<td>£30.95</td>
</tr>
<tr>
<td>HS70 diplexer &amp;70cms</td>
<td>£19.55</td>
</tr>
<tr>
<td>We have numerous types of antennas in stock include</td>
<td></td>
</tr>
<tr>
<td>full range jaybeam and tonna.</td>
<td></td>
</tr>
<tr>
<td><strong>OLD PRICES HELD ON EXISTING STOCK</strong></td>
<td></td>
</tr>
<tr>
<td><strong>HAND HELDS</strong></td>
<td></td>
</tr>
<tr>
<td>ARM MULTI-PS ANTENNA</td>
<td></td>
</tr>
<tr>
<td>SPECIAL OFFER</td>
<td></td>
</tr>
<tr>
<td>COMPARE COLINEAR ELEMENTS £35.00</td>
<td></td>
</tr>
<tr>
<td><strong>OLD PRICES HELD ON EXISTING STOCK</strong></td>
<td></td>
</tr>
<tr>
<td>£1000 INSTANT CREDIT. HP/PERSOAL LOANS AVAILABLE</td>
<td></td>
</tr>
<tr>
<td>RWC CREDITCARD (written details on request) CALL NOW</td>
<td></td>
</tr>
<tr>
<td><strong>GET YOUR LATEST BARGAIN</strong></td>
<td></td>
</tr>
<tr>
<td>USED LIST. SEND LARGE ENVELOPE NOW!</td>
<td></td>
</tr>
<tr>
<td>Even more basement bargains!</td>
<td></td>
</tr>
<tr>
<td><strong>R. WITHERS LTD</strong></td>
<td></td>
</tr>
<tr>
<td>584 Hagley Rd West, Quinton, Birmingham B66 8BS. Tel: 021 421 8201 (24hr) Telex: 334303 TXAGWM G</td>
<td></td>
</tr>
</tbody>
</table>
6 Straight and Level
All the latest news, comment and developments on the amateur radio scene

14 DX Diary
Don Field G3XTT with this month’s DX news

17 Angus Mckenzie Tests
This month the Sony ICF2001D portable receiver and the well established Yaesu FT757GX HF transceiver are sounded out

25 SWL
Trevor Mogan GW4OXB welcomes some newcomers to the airwaves and speculates on floor to ceiling award wallpaper

28 Simplified Reception
Old Ham offers a simple reception circuit for the novice constructor

30 Introducing Satellite Communications
In the first of his two part series, Joe Kasser G3ZCZ explains the theory behind the beacons in the sky

34 Bow-tie Beam for 15 and 20m
Not a hidden means of reception when attending a black tie affair, a beam for the DXer with a slim cheque book!

39 AmRad 10GHz System
Now you’ve learnt all the theory we move onto the electronics needed to make up the transmit side of the gear

42 Heathkit RA-1
This robust, all valve amateur bands communicators receiver is readily available secondhand and won’t torture the bank balance. Richard Marris G2BZQ supplies the gen

47 Morse Report
Tony Smith G4FAI begins his bimonthly column for those affected by the dahs and ditters

48 On the Beam
Glen Ross G8MWR with all the latest news from VHF, UHF and microwaves

49 Coming Next Month
What’s in store for you

50 Secondhand
Hugh Allison G3XSE offers some helpful hints for owners of non-stabilized valve receivers

53 Free Classified Ads
The market for buying and selling

SERVICES
32 Radio and Electronics World Subscription order form
38 Amateurs Handbook order form
44 Subscription order form
46 Newsagents order form
55 Free Classified Ad form
58 Advertisers index
58 Advertising rates and information
DESK POWER SUPPLY

The MRZ desk-top power supply is designed to be used in conjunction with the following items in the Icom range of hand portable radios: PMR series models H2 and H6; marine series models M2, M5 and M12; amateur series models IC2E, IC4E, IC02E and IC04E.

In one quick and easy operation, any icom portable's battery pack can be removed, allowing the body of the radio to slide firmly onto the mounting on the MRZ PSU. With an external microphone plugged into the miniature jack socket, the radio is ready for base station operation.

The MRZ desk power supply incorporates over-voltage protection and over-current shutdown. The unit's output voltage is regulated. Two models are available: the BPU, a desk dc supply for base station operations; and the BPU/BC, which is similar to the BPU but incorporates a battery charging system for BP3 packs.

For further information contact: MRZ Comms Ltd. Newton House, 248 Uttoxeter Rd, Longton, Stoke-on-Trent. Tel: (0782) 336221.

MAPLIN MAG

The March/May 1986 issue of Electronics – The Maplin Magazine is now available, and includes a variety of projects of interest.

Maplin research engineers have developed the world's first VHF weather satellite receiver, using a standard TV set, which will relay and convert the satellite weather signals into a map image. Full constructional details are provided within the magazine, including aerial requirements and details of how you can obtain your receiving licence, which is free.

Other project action points include high quality audio mixer modules, a sealed-lead-acid battery charger and a stepper motor driver.

An anticipated top seller is the new Maplin-developed Amstrad expansion system. With Amstrad micros riding high in the sales charts, this project is guaranteed to generate considerable interest among current and prospective Amstrad users.

Electronics will be presenting details of the latest range of Maplin 'Precision Gold' multimeters, which range from a high quality versatile multi-purpose unit to an easy-to-use hobby item, at an easy-to-afford price.

As usual, the issue includes a variety of regular features and Maplin news.

Electronics – The Maplin Magazine is available at newsagents, from Maplin stores, or from Maplin direct. The price is 75p.

For further information, please contact: Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (0702) 554155.
All the latest news, views, comment and developments on the amateur radio scene

AMCOMM 9000 ATU

The engineers at Amcomm have announced the Amcomm 9000 antenna coupler, which is a development of the popular Amtech 300, incorporating a 1:4 toroidal balun to permit connection of your transmitter to the antenna, via 300 ohm balanced feeder.

The antenna coupler utilises a capacitively tuned 'T' network for matching high impedance (300-600 ohm) or low impedance (50-75 ohm) antennas to low impedance transmitter outputs.

The antenna coupler is general coverage and will tune over the range 1.7MHz to 30MHz, frequency range being selected by a 12 position 'inductor' switch. Position 1 is for highest frequency of operation and position 12 for lowest frequency.

In operation the 'tune' and 'load' capacitors are adjusted to obtain minimum VSWR at the transmitter.

The components in the antenna coupler are rated for operation with power outputs of 100 watts.

Low impedance connections are made via PL259 sockets, while high impedance balanced feeder connections are made via insulated screw terminals.

For more information on the Amcomm 9000 contact: Amcomm/ARE, 373 Uxbridge Rd, Acton, London W3 9RN. Tel: 01-992 5765.

VHF PRE-AMP

A metal-house AM or FM radio pre-amplifier, giving a 22dB gain boost for improved reception, is now available in kit form from Electronic and Computer Workshop Ltd (ECW).

The kit, K2622, comprises a high quality PCB, all the necessary components and a strong metal housing, together with full constructional and operational instructions.

The kit is simple to build and will greatly improve the reception performance of VHF, FM or AM radio in the house or car.

The 22dB gain is from 10 to 150MHz and the amplifier operates from an unstabilized power supply of between 12 and 15V dc, which allows direct operation from a car supply if desired. The supply can be connected directly to the amplifier or, for use where the amplifier is mounted close to a loft or roof mounted antenna, can be fed by coaxial cable. Supply current requirement is 1 to 3mA.

ECW offers the K2622 kit at £8.84 including VAT and post/packing.

For further information please contact: Caroline Stewart, Electronic and Computer Workshop Ltd. Tel: (0245) 262149.

HIGH GAIN FETs

Covering the frequency bands from 7.5 to 15.3GHz, a new range of thin film, micro-wave FET amplifiers for communications and radar systems can now be supplied by Anglia Microwaves Ltd.

The Zeta 1523 range, comprising four models, is available on a 30-45 day delivery time and features low noise – typically 3.0dB maximum.

The 1523 amplifiers are designed to be efficient, giving an RF output power of +11dBm (%1dB compression) for an 85mA (+5V) input current.

All specifications are guaranteed over a temperature range from -54 to +71°C. Gain flatness is ±0.5dB and VSWR is 2.0:1 maximum.

For further information on any of their products please contact: Anglia Microwaves Ltd. Tel: (02774) 58955.

MINI-VAC

Mini-vac is a powerful handheld micro cleaner which operates from a single 9 volt battery (or suitable low voltage mains adaptor) to remove dust particles, fluff, etc from difficult-to-reach areas.

The Mini-vac is supplied complete with re-usable vacuum bag, one straight and one curved extension pipe, two fine hair brushes, and it can even be used to expel air as an alternative to vacuuming.

This precision tool enables expensive high tech equipment to be kept free of surface dirt for only a minimal outlay. Applications include computers, typewriters, TVs, videos, hi-fi, personal stereos, clock radios, cameras, calculators and telephones.

It will soon be available from leading stores and retail outlets or through mail order at £11.95, including postage and packing.

For further information please contact: Authenticity, PO Box 34 E, Worcester Park, Surrey KT4 7YH. Tel: 01-337 3352.
LASER COMMUNICATIONS

Northgate Associates Ltd have established a secure, yet transportable communications system.

Most existing radio systems are virtually non-directional, which makes interception by unauthorised listeners a major problem. Microwave links are meant to be more secure, but they are susceptible to jamming, and the equipment is often too large to be portable.

However, Northgate's new system uses the latest laser technology. Light is highly directional, so it can only be received by a unit that is in direct line of sight, greatly reducing the likelihood of interception. Also, jamming must involve a visible means, reducing covert action.

As semi-conductor lasers and high sensitivity avalanche PIN diode photomultiplier receivers are plentiful and inexpensive, the new system will be lightweight, reliable, and relatively cheap. For further information contact: Mr Dug Godfrey, Northgate Associates Ltd. Tel: (0462) 77396.

PORTABLE MULTIMETER

Electronic Brokers has introduced the Thandar TM451 bench portable multimeter, which has a 2000V range and a basic dc accuracy of 0.03%.

The instrument features a clear 4½-digit liquid-crystal display (LCD), with 1mm high characters, incorporating legends (mV, A, etc.) to indicate function selected. The display has a blinking overrange indication and low battery warning which activates when the battery is below 6V dc.

The TM451 has a sampling rate of 2.5 times per second, full autoranging, plus manual range selection, a sample hold function on all ranges, polarity indication, and audible continuity bleeper.

The TM451 has a basic price of $200, including a copy of a product leaflet contact: Cirkit Distribution, Park Lane, Broxbourne, Herts EN10 7NG. Tel: (0992) 444111.

NEW BEZELS

A new range of snap-in bezels, available from Cirkit Distribution, enables up to four components to be fitted into one panel cut-out, thereby simplifying assembly procedures and creating considerable cost savings.

Presently offering twenty-four component permutations from single and double pole switches, neon switches, fuse-holders, filament and unfiltered inlets the Bulgin 'Polysnap' range enables one part number purchasing and pre-assembly wiring. Additional component variations will be added in the future.

For further information and a copy of a product leaflet contact: Cirkit Distribution, Park Lane, Broxbourne, Herts EN10 7NG. Tel: (0992) 444111.

The actuator employs a ½ horsepower motor to provide a 2000lbf thrust rating through solid steel motor gears. Much attention has been given to weatherproofing.

The accuracy and repeatability of position is claimed to be excellent. The control console resets automatically to a zero count whenever the lower limit switch is tripped, and the sensor circuit gives a resolution of 0.0001 inch per digit count.

Two indoor control systems are offered. The manual version provides a 3-digit readout, displaying position, with two buttons to control movement. The programmable controller also has the 3-digit display and a manual facility, but also offers 16 preset positions, selectable at the touch of a button.

The outdoor actuator unit is available separately for those who might have requirements other than for a total system. For further information contact: Skidmore 4WD Ltd, 60 Sandwell Street, Walsall, West Midlands WS1 3EB. Tel: (0922) 613633.

COMPUTER DONATION

Rare historic computer and communications equipment was donated to the Communications and Electronics Museum, on 26 March 1986, by one of the museum's corporate supporters, Rank Xerox Limited.

The equipment included an early Solartron computer which was used for analogue circuit design, a Wayne-Kerr function generator which was used for circuit testing, and communications equipment ranging from Tannoy amplifiers through early recording instruments to Creed teleprinter and automatic Morse equipment.

Two private collections of civil and military communications equipment were amalgamated to form the Communications and Electronics Museum.

The first exhibition entitled 'Communications Across the Commonwealth' opened at the Edinburgh College of Art during the Commonwealth Games and the Edinburgh Festival from mid-July to the end of August.

For further information please contact: Dr Graham Winbolt. Tel: (0705) 382133.
**STRAIGHT & LEVEL**

**CLUB NEWS**

**The UK 6m Group**

This group was formed many years ago by dedicated amateurs who were interested in propagation on the 6m band. In its early days it encouraged crossband QSOs between 6, 10 and 4 metres where there was no 6m transmitting licence available in that band.

They have just held their annual general meeting at the RSGB annual convention at Sandown Park, Esher, at which Brian Bower G3COJ was re-elected chairman, Angus McKenzie G3OSS vice chairman, Alan Wright G3LDH secretary, Maureen Wright G3ZCP magazine editor, and Peter Turner G2VTH treasurer. Several times a year the group publishes *Six News*, an interesting and informative newsletter which should interest all 6m band enthusiasts. The subscription is £3pa.

If you wish to join contact: Alan Wright G3LDH, 6 Cwm Eithin, Wrexham, Clwyd LL11 8JY.

**SPRAT**

The spring edition of the G-QRP club journal, SPRAT, includes details of club events and competitions. There are also many interesting articles by club members on such diverse subjects as RF pre-amps and 'dandelion seeds in the wind' (a comparison with the Alaskan radio station KL7DG). Photographs of past activities are also included.

For more information contact: Rev George Dobbs G3RJV, St Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE. Tel: (0706) 31812.

**MARS probe**

Probe, the journal of the Midland Amateur Radio Society, has brought to our attention the Drayton Manor Mobile Radio Rally. This event will be held at Drayton Manor Park, Tamworth, on Sunday 11 May, at 11am.

The rally will feature trade stands, Raynet, repeater groups, children's entertainment, side shows, and a zoo. You're also invited to take your own equipment along for the fun.

For further details contact the organiser: N Gutteridge G8BHE. Tel: (021) 422 9787.

Hamster

The spring edition of Hamster, produced by Cheshunt and District Amateur Radio Club, is packed with useful information and interesting topics. Receiving members' news, an article on computing and amateur radio and designs for a Bandpass filter and a low-pass filter.

The club meets every Wednesday evening at the Church Room, Church Lane, Wormley, near Cheshunt, Herts.

If you want further information contact: John and Terry Ann Watkins G4VMR/G4VSL, 'One Ash', Frogs Hall Lane, Haultwick, Herts SG11 1JH. Tel: Dane End 250.

**CQ-TV**

The May edition of the CQ-TV magazine includes several interesting articles on such diverse subjects as the new FM-TV modules, 'how wide is wide' questioning the bandwidth taken up by transmis- sion, and TVI. Also featured are regular articles and a letters page.

For more information about membership contact: D Law- ton, Greenheurth, Pinewood Road, High Wycombe HP12 4DD. Tel: (0494) 28899.

CQ-TV have also produced a book entitled *The Best of CQ-TV*. Since membership has increased so drastically over the past few years, back issues of the magazine have run out. Consequently this new book contains the best of the old articles, often updated, in a comprehensive 100 page form. It can be obtained at a cost of £3.50 (including post and packing) from: BATC Publications, 1 Lilac Avenue, Leicester LE5 1FN.

**BARC (woof) programme**

BARC (woof) programme

The BARC meets at the Forest Ring Community Centre, Sycamore Way, Winkby, Louth, Lincolnshire.

The main monthly meeting is held on the first Monday in each month, commencing at 7.30pm.

Activities planned for future meetings include a lecture on home construction which takes place on 5 May and contest operator training on 17/18 May.

In addition, a 2m DF 'Foxhunt' is scheduled for the last Sunday in every month, starting at 2pm from the club premises, but this is subject to weather and sufficient support. Normally a brief 2m net is held at 12 noon to decide whether to 'go/no go'. Non-members are always welcome and should contact Dave Burleigh G4WIZ for rules, etc., if required, or join in the 2m net.

The club also holds ad hoc meetings, mostly informal, on a Tuesday every month or so, but these are arranged only a month ahead so it is difficult to publicise these meetings in advance.

Anyone requiring further information should contact: Dave Burleigh G4WIZ, 14 Winchfield Gardens, Tedley, Basingstoke, Hampshire RG26 6TX. Tel: (07356) 5185.

**EARS**

Eschelford Amateur Radio Society meets at The Hall, St Martin's Court, Kingston Crescent, Ashford, on the second Monday and last Thursday of the month, at 7.30pm.

Future meetings will include lectures on CW contest operating on 27 May, receiver parameters on 24 April, the Racal VHF receiver system on 6 June. On Sunday at 10.00 local time, on 1.980MHz±QRM (AM/SSB) and at 21.00 local time on 2m (S20 and QSY) FM, the club radio nets will be operating. Participation is welcomed from both members and non-members.

For further details contact the secretary: Peter Coleson G4VAZ, 122 Green Street, Sunbury on Thames. Tel: (0937) 38932.

**CARS**

Coventry Amateur Radio Society meets every Friday at 8.00pm, at Baden Powell House, 121 St Nicholaes Street, Radford, Coventry.

Their current programme of events includes a 2m direction finding contest on 25 April, a talk on FAX and packet radio by G6VHI (which starts at 7.40pm) on 9 May and an evening out at Hartshill Hayes Country Park on 23 May. Visitors are always welcome.

For further information contact: Robin Tew G4JDO, 4 Chetwode Close, Coventry CV3 9NA. Tel: (0203) 73999.

**2m foxhunt**

The Pontefract and District Amateur Radio Society will be holding a 2m foxhunt on 22 May. Other events include a Raynet exercise on 8 May and a visit to Spencer Valley junk sale on 5 June.

Details about membership and events can be obtained from: Colin Milis G3AOO, 27 Penman and Bergen, supported the annual Scandinavian VHF/UHF meeting to be held at Geilo over the weekend of 6/9 June.

Food and lodging will be organised by Halling- dalsgruppen AV NRRL (the Hallingdal ARS), whilst the Asker and Baerum ARS, LÅBYB, are arranging the technical side of the programme.

Visitors are expected from all over Europe and the USA. The main language will be English. The programme includes talks on antenna measurements, packet radio, receiver front-end design, and much more. There are even opportunities for DXpeditioning.

Geilo is midway between Oslo and Bergen, and about 250km (3½ hours by rail) from Oslo. Accommodation will be in apartments, and will cost NOK60. Payments must be received by 1 May.

For further details contact: Lars Breie LA9BM, N3580, Geilo, Norway.

**Anglo-Scottish rally**

Following yet another highly successful event last year, Kelso, Borders and Galashiels Amateur Radio Societies will be hosting the third Anglo-Scottish Rally in Kelso's Tait Hall on Sunday 4 May, from 11am to 5pm.

There will be the usual talk-in on S22, bring and buy and club and traders' stalls, bar, hot and cold snacks, raffles and hopefully a Morse test room.

Entrance will be £1.00, but junior ops and accompanying non-licensed YLs and XYLs will be most welcome and admitted free. There is something to do for everyone, so why not spend the bank holiday weekend in the Scottish Borders?

For further information, including accommodation, contact: Saunders GM3VLB, tel: (0573) 24664, or Bruce Cavers GM4UIB, tel: (0573) 24654 any evening.
The Vale Royal Award

A new award entitled The Vale Royal Award is being sponsored jointly by the Vale Royal District Council and the Mid-Cheshire Amateur Radio Society.

The objective of the award is to publicise the district of Vale Royal in the Heart of Cheshire, and to encourage radio amateur activity within the district.

The printing of the certificate has been financed by the council and any surplus remaining, after the costs of administering the award have been met, will be distributed between the Radio Amateur Invalid and Blind Club (RAIBC) and Hebbden Green Special School for Handicapped Children in Winsford, Cheshire.

There are two classes of award: Class A – single band, multimode and Class B – multiband, multimode. To qualify for the award amateur stations must either: 1. Have worked nine stations situated in the district of Vale Royal or who are members of the Mid-Cheshire Amateur Radio Society, plus one Mid-Cheshire Amateur Radio Society station (G3ZTT, G4ZTT), or 2. Have worked both Mid-Cheshire Amateur Radio Society stations (G3ZTT, G4ZTT), plus the Vale Royal Contest Group station (G6Z2T).

Applications should be sent to Hans M Field, Awards Manager, Mid-Cheshire Amateur Radio Society, 6 Llandovery Close, Winsford, Cheshire CW7 1NA. An extract of your log showing the details of the contacts claimed, signed by yourself and one other licensed radio amateur to confirm that the extract is a true copy of your log; a £1 cheque or postal order made payable to the Mid-Cheshire Amateur Radio Society, or 5 IRCs for non-United Kingdom countries; and an A4 sized stamped addressed envelope (UK only) should be enclosed with your application.

For further information please contact: Dr EJ Loader, 13 Vale Road, Hartford, Northwich, Cheshire CW8 1PL. Tel: (0606) 75660.

Mayfair GB event station

A special event station will be held at the St John’s middle school ‘Mayfair’ in Kenilworth, Warwickshire on 18 May.

The station (GB6STJ) will be operating on 144MHz and 432MHz between 9.00-16.00 hours. Details and QSLs are available from: Mike Newell G1HGD, 11 Lancaster Place, Kenilworth, Warwickshire, or through the RSGB Bureau.

GB2GF

On the weekend of 14/15 June the above station will be operated by the Cray Valley Radio Society on behalf of the Greenwich Festival. Activity will be on HF and VHF and special QSL cards will be available for all contacts.

For further details contact: Owen Cross G4DFI, 28 Garden Avenue, Bexleyheath, Kent DA7 4LF.

SKE86

Edgware and District Radio Society will be holding their fifth annual straight key evening on Thursday, 29 May, from 7pm on 80m CW around 3.55MHz. SKE86 is for all CW operators of any standard.

Other events on the society agenda include: an informal, round table discussion on ‘Antennas in the Small Garden’ by John G3SJE on 24 April; a construction contest on 22 May; and an NFD at Copthall SG on 7/8 June.

For more information about the Society and events please contact: The Secretary, John Coyle G4RMD, 4 Briars Close, Hatfield. Tel: 65707.

Plymouth mobile rally

On 25 May the Plymouth Mobile Rally will be held at Plymouth Comprehensive School, Plymouth, from 10am until 5pm. Features will include a bring and buy stall, trade stands and a talk-in on S22. Ample parking will be available for visitors.

Details can be obtained from: Mervyn Collcott G0BNT. Tel: (0752) 777777.

Swindon rally

Swindon and District Amateur Radio Society is holding its annual rally on Sunday 11 May at Oakfield School, Marlowe Avenue, Swindon, Wiltshire. Doors open at 10.00am and there is an admission fee of 50p.

There will be a large variety of equipment and components for sale on the trade stands and many RSGB books will be available on the club stand. There will also be a bring-and-buy stall.

Further details can be had from: The secretary, 19 Trasna Way, Lurgan, Craigavon, Co Armagh BT66 8DL. Tel: (0762) 22855.

Southend & District RS rally

The Southend & District Radio Society meets at the Rocheway Centre, Rocheway, Rochford, Essex every Friday at 7.30pm, and all are welcome.

On 1 June 1986, SDRS holds Amateur Radio & Electronics Rally at Rocheway, with talk-in on S22. Trade stands, bring and buy, RTTY, refreshments, and a licensed bar are included among the many attractions, so bring the family as they too will be catered for.

For further information contact: Ron G6SOH, 1 Eastwood Road, Leigh-on-Sea, SS9 3AJ; or Brian G4RDS, 27 Fernlea Road, South Benfleet, Essex.

Mobile rally

The Mid-Ulster Amateur Radio Club will be holding its annual mobile radio rally on Sunday 19 May, starting at 12.00 noon, in the grounds of Parkanour House located approximately 6 miles from Dungannon on the main Balligally Road.

There will be a talk-in station on S22 FM 144.500MHz, and the usual trade stands and bring and buy stall will be featured.

The monthly meetings of the club are held on the second Sunday of each month at 3.00pm in The Guide Hall, Castle Hill, Gilford. There is usually a talk or demonstration of interest to radio amateurs and everyone is welcome.

Further details can be had from: The secretary, 19 Trasna Way, Lurgan, Craigavon, Co Armagh BT66 8DL. Tel: (0762) 22855.
**STRAIGHT & LEVEL**

**Stroud ARS**

Stroud Amateur Radio Society meets on alternate Wednesdays at 8pm at Nelson School, Stratford Rd, Stroud. The club holds regular Morse classes, has an operational HF station using the club callsign G4SRK, and will be hosting a number of lectures and guest speakers.

For further information contact: PK GaineY G0DZM. Tel: (045) 383 2773.

**WACRAL**

Formerly known as Wamrac, the World Association of Christian Radio Amateurs and Listeners have just produced their latest newsletter. It includes articles by members, reports on activities and details of WACRAL nets and skeds.

For more information contact: Len Colley G3AGX, Micasa, 13 Ferry Road, Wavene, NR Hull HU7 5XU. Tel: (0482) 822276.

**Natter nights**

Sutton and Cheam Radio Society meets at Downs Lawn Tennis Club on the third Friday of every month at 7.30pm. Forthcoming events include several 'natter nights' in the Downs bar, the 5 May and 2 June being the dates for your diary. The members are also looking forward to the HF National Field Day on 7/8 June.

For further information contact: Alan Keech G4BOX, 26 St Albans Road, Cheam.

**Skiffles**

A sample of the events detailed in the Stourbridge and District Amateur Radio Society Newsletter include a C-Q-MIR contest which will take place over 10/11 May, and an all Asia SSB contest on 14/15 June.

For further details about membership and venues, please contact: Derek Pear- son G3ZOM. Tel: Kilmelford 288900.

**Bury Radio Society**

The club's activities, instruction, junk sales and raffles etc., have been arranged, including a lecture on dealing with TVI by GM4FFX on 9 May.

Anyone who would like further information on the club's activities, or membership, should contact: Don Travis on Pitcaple (04676) 251.

**Crime prevention**

A lecture on crime prevention by the local police force on 30 April is one of the activities on the South Bristol ARC calendar.

On offer include lectures and demonstrations, the modification of CB radios for 10m being scheduled for the 4 June.

The club meets every Wednesday at the Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol.

For further details contact: Len Baker G4RYZ. Tel: Whitchurch 834828.

**Correction**

In our April issue's Straight & Level we reported on a Scottish Raynet on 3 May. However, the venue will be the Royal Hotel in Fort William, rather than Fort William as was previously stated.

Further information is available from: D Garrington. Tel: (0397) 3833.

---

**THE START OF SOMETHING NEW**

If you are leaving College and planning a career in modern communications or your present job lacks interest and challenge why not join us in GCHQ? We are recruiting RADIO OFFICERS who are after initial training will become members of an organisation that is at the forefront of communications technology. Government Communications Headquarters can offer you a satisfying and rewarding career in the wide field of communications. Training involves a 3 week course (38 weeks if you come straight from Nautical College) which will fit you for appointment to RADIO OFFICER.

Not only will you find the work an R O extremely interesting but there are also good prospects for promotion opportunities for overseas travel and a good salary. Add to this the security of working for an important Government Department and you could really have the start of something new.

The basic requirement for the job is 2 years radio operating experience or hold a PMG, MPT or MRGC or be about to start of something new.

For full details and application form phone 0242 32912/3 or write to:

GCHQ
The Recruitment Office A/1108
Prior's Road
CHELTENHAM
Glos GL52 SAJ

---

**STRAIGHT & LEVEL**

**THE START OF SOMETHING NEW**

If you are leaving College and planning a career in modern communications or your present job lacks interest and challenge why not join us in GCHQ? We are recruiting RADIO OFFICERS who are after initial training will become members of an organisation that is at the forefront of communications technology. Government Communications Headquarters can offer you a satisfying and rewarding career in the wide field of communications. Training involves a 3 week course (38 weeks if you come straight from Nautical College) which will fit you for appointment to RADIO OFFICER.

Not only will you find the work an R O extremely interesting but there are also good prospects for promotion opportunities for overseas travel and a good salary. Add to this the security of working for an important Government Department and you could really have the start of something new.

The basic requirement for the job is 2 years radio operating experience or hold a PMG, MPT or MRGC or be about to start of something new.

For full details and application form phone 0242 32912/3 or write to:

GCHQ
The Recruitment Office A/1108
Prior's Road
CHELTENHAM
Glos GL52 SAJ

---

**THE START OF SOMETHING NEW**

If you are leaving College and planning a career in modern communications or your present job lacks interest and challenge why not join us in GCHQ? We are recruiting RADIO OFFICERS who are after initial training will become members of an organisation that is at the forefront of communications technology. Government Communications Headquarters can offer you a satisfying and rewarding career in the wide field of communications. Training involves a 3 week course (38 weeks if you come straight from Nautical College) which will fit you for appointment to RADIO OFFICER.

Not only will you find the work an R O extremely interesting but there are also good prospects for promotion opportunities for overseas travel and a good salary. Add to this the security of working for an important Government Department and you could really have the start of something new.

The basic requirement for the job is 2 years radio operating experience or hold a PMG, MPT or MRGC or be about to start of something new.

For full details and application form phone 0242 32912/3 or write to:

GCHQ
The Recruitment Office A/1108
Prior's Road
CHELTENHAM
Glos GL52 SAJ

---

**THE START OF SOMETHING NEW**

If you are leaving College and planning a career in modern communications or your present job lacks interest and challenge why not join us in GCHQ? We are recruiting RADIO OFFICERS who are after initial training will become members of an organisation that is at the forefront of communications technology. Government Communications Headquarters can offer you a satisfying and rewarding career in the wide field of communications. Training involves a 3 week course (38 weeks if you come straight from Nautical College) which will fit you for appointment to RADIO OFFICER.

Not only will you find the work an R O extremely interesting but there are also good prospects for promotion opportunities for overseas travel and a good salary. Add to this the security of working for an important Government Department and you could really have the start of something new.

The basic requirement for the job is 2 years radio operating experience or hold a PMG, MPT or MRGC or be about to start of something new.
ICOM are proud to launch their new flagship. The IC-751 was good, the new ICOM IC-751A is even better. With a general coverage receiver 100KHz - 30MHz it is a full featured all-mode solid state transceiver that covers all the WARC bands. The IC-751A has an excellent 105db dynamic range and features pass band tuning, notch filter, adjustable AGC, noise blanker and RIT. A receiver pre-amp provides additional sensitivity when required. On C.W. the electronic keyer is standard and 40 w.p.m. at full break-in is possible. The FL32 500Hz C.W. filter is fitted as is sidetone on receive mode. On SSB the new FL80 2.4KHz high shape factor filter is fitted.

The high reliability transmitter, full 100% duty cycle designed for SSB, CW, AM, FM, RTTY and Amtor, with a high performance speech processor to enhance the IC-751A transmitters operation. With 32 memory channels and twin V.F.O.’s, scanning of frequencies and memory are possible from the transceiver or from the HM12 mic supplied. The IC-751A is fully compatible with ICOM auto units such as the AT500 automatic antenna tuner and the IC-2KL linear amplifier. Options available: PS35 internal A.C. P.S.U., PS15 external A.C. P.S.U., EX310 voice synthesizer, SM8 and SM10 desk mics and various filter options.

please mention AMATEUR RADIO when replying to any advertisement
IC-02E/04E Handportables

These direct entry micro-processor controlled handhelds, one for 2 metres, the other for 70 centimetres. Scanning, 10 memories, duplex offset storage in memory and odd offsets also stored in memory. Keyboard entry is made through the 16 button pad allowing easy access to frequencies, duplex, memories, memory scan and priority. They have a LCD readout indicating frequency, memory channel, signal strength, transmitter/output and scanning functions. A range of accessories include the HS10 Headset and boom microphone, HS10SA PTT switch box with pre-amp, HS1OSA voice operated (VOX) switch box. The IC-2E and IC-4E still continue to be available.

New Retail Shop

We are pleased to announce that we have moved to a new larger retail shop. This will be managed by Andy O6MRI and is situated on the corner of Stanley Road and Kings Road, Herne Bay, Kent. Tel (0227) 389454. Give it a visit for demonstrations and advice on anything to do with your shack. BCNU.

You can get what you want just by picking up the telephone. Our Mail Order department offers you free same day despatch whenever possible. instant credit, interest free H.P. Telephone Barclaycard and Access facility. 24 hr answerphone service.

WANT TO LEARN MORE?
Telephone us free-of-charge on:
HELPLINE 0800-521145.
— Mon–Fri 09.00–13.00 and 1400–17.30 —
This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for repair enquiries and parts orders. Thank you.

IC-290D/25 Watt Mobile

290D is the state of the art 2 meter mobile. it has 5 memories and VFO’s to store your favourite repeaters and priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5KHz or 1KHz. The squelch on SSB silently scans for signals, while VFO’s with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1KHz or 100Hz tuning/CW sidetone. AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.
The hottest news of the month is that Clipperton Island should be on the air again from Friday May 2nd for five or six days. The operators will be W6SZN, W6RRG, W6OAT, N7NG and A16V. They hope to run two stations on a round-the-clock basis, paying particular attention to Europe, which was unfortunately neglected on last year’s expedition.

The background to the above announcement is quite fascinating. A French group mounted the first major expedition to uninhabited Clipperton Island (see DX Diary, March 1984) in the spring of 1978, and made 29,000 contacts; at that time a new record for a DXpedition operation. A joint French/ American group planned an operation in 1984 but suffered a series of misfortunes (chronicled at the time in this column) which prevented the operation from taking place. Eventually the group made it to the island in April 1985 making nearly 31,000 contacts in 130 countries in six days of operation (see DX Diary June 1985).

Europe went without
Despite the high QSO total, many amateurs, especially in Europe, went without a contact. There were reports of the DXpedition operating RTTY, or even being off the air altogether, at the times when propagation to Europe was at its best. For my own part, I remember hearing them on 80 metres with an excellent signal working the USA and failing to stand by for Europe. At least I managed to work them on 40 metres CW (though the QSL card has only recently arrived!), but for those who missed out there was the prospect of a long wait before Clipperton reappeared again.

Why go back?
Why go back so soon? The DX Bulletin, a US publication, reports that the 1985 operators were only too well aware of the criticisms levelled against them. Although they succeeded in taking Clipperton from 20th to 94th place in the ‘US Most Wanted Country poll’, it remained in 18th place in Europe, ahead of Afghanistan and Libya. This year’s operators will be seeking the co-operation of US amateurs in standing by to allow European amateurs to get through.

Another reason for the return trip is the availability of transport in the form of the Royal Polaris fishing boat (the same boat as last year). This year’s operators will be seeking the co-operation of US amateurs in standing by to allow European amateurs to get through.

Europe was at
Wait before Clipperton reappeared. The unanswered question is: how have the group managed to obtain permission for their operation? Previously, the French authorities in Tahiti (who administer the island) have insisted on French participation in any expedition. What seems to have happened is that French support has been forthcoming from the Paris-based Clipperton DX Club (formed after the 1978 expedition), and this involvement has satisfied the powers that be.

F0OXX
The callsign used this time will be F0OXX, the same as last year. I can only assume that the QSL route will be the same, i.e. via the YASME Foundation. If not, I will publish a correction next month. In terms of when and where to look for them, I would suggest mornings from about 0530GMT on 40 and 80 metres, and evenings from about 1600GMT on 20 metres.

Compared with Clipperton, other recent happenings seem less important. Nevertheless, March proved to be interesting. ZL1AMO turned up at last from A35EA and ZK3RW. In Tokelau he was joined by Roly ZL1BQD, who operated as ZK3RR. Baldur DJ6SI had another stint from Ghana as DL0MAR/9G. The Colvins were on from Zambia as 9J2LC. J11TZK showed up from various spots in the Pacific, including A3SKZ and C21NI. DL7FT caused a furor by operating as DL7FT/5V/A, supposedly from Mt Athos, but almost certainly without a proper permit.

Only doing my job
Well, Angelika, I can but report on what is happening in the amateur radio world, and I believe the new award is important in that it goes further than 5 band DXCC in allowing endorsements for a multi-band award based on the same basic principles. Nevertheless, I would urge readers of Amateur Radio to show restraint in their use of the 10MHz band. The exact nature of the sensitivities
regarding this band has never been made public, but it may well be wise to err on the side of caution. At least we should always be aware that we are secondary users and should always strive to avoid interference to non-amateur users of the band.

10 metre activity

From David Whitaker BRS25429 comes news of the 10 metre Activity Days being organised by the White Rose Amateur Radio Society of Leeds. These will take place on the last Sunday of May, June, July and August, and in each case will run for 8 hours commencing at 0900GMT. A prime aim of the activity days is to aid studies into propagation on the band at the bottom of the sunspot cycle, so participants are encouraged to note any unusual propagation effects and to report on beacons heard as well as stations contacted. The organisers will be awarding prizes in the following categories:

To the entry providing the most useful information to the RSGB in its propagation studies.

To the station working the most WRARS members (including the club station G3EXP). Stations within 50km of Leeds will not be eligible for this prize.

To the SWL presenting a log showing the most different stations/countries heard. Details of both sides of a QSO must be shown.

All entries should go to the WRARS, PO Box 73, Leeds LS1 5AR, and should detail date/time, callsign of station worked, and RS(T). They should arrive no later than one week after each activity day.

What's on?

Now to news of what else may be on the bands during the month. S79CW is reported to be active daily from the Seychelles from 1800GMT on 14188kHz. ZC4AK and ZC4MR frequent 14227kHz most days from 1530 to 1930GMT. 5R8AL is to be found Mondays and Fridays on 14168kHz from 1800GMT. F6AJN should be active throughout the month on 80 through 10 metres as TT8CW, mainly on CW. G3CWJ (ex G3CWI) is currently working in Nigeria and will be there until the autumn. He hopes to operate from 80 through 10 metres as TF8CW, mainly on CW.

What's on?

Some of the adjacent countries during his trip. The determining factor will be the availability of licences. AH3AC, who has been active from Iceland until recently, should now have transferred to Lampedusa Island (IG9) and, on past experience, is likely to be very active.

Finally, for the Islands on the Air enthusiasts, F6HJM hopes to be active from Brehat Island during the first two weeks of May, and FF6KTI/P should be QRV from the Lerin Islands (IOTA reference EU58) from 17-19 May.

A couple of other items of interest. Visitors to Mongolia now operate with their own callsigns (IJT) rather than being issued with a JT0 prefix. So, for instance, JT0XC is now signing OK1XCJ/ JT. If you have sent cards to G3NBE for recent operations by VE3FXT from various parts of the world, you may have a long wait for a reply. Ken has not heard from George for several months, and doesn’t even know which country he is in at the moment. Hopefully the logs will show up eventually.

Contests

The major events are the Russian CO-M contest (a 24 hour event starting at 2100GMT on 10 May) and the CO WPX CW Contest (24/25 May). Both of them are of the ‘everybody work everybody’ variety. The first includes both CW and SSB, the second is of course CW only.

Going to the USA?

There has been a reciprocal licensing agreement between the UK and the USA for many years, and reciprocal licences are easy to obtain. However, there are some minor snags. The terms of the reciprocal licence state that the licence holder can only use those US sub-bands which his home licence allows him to use.

This puts the top half of 2 metres (146-148MHz) and the 220MHz bands out of action, as well as parts of 160, 80 and 40 metres. Furthermore, because the US does not have a no-code licence, Class B licensees are unable to get a reciprocal licence (although a few seem to have slipped through the net over the years).

Now comes news that there is an alternative way forward for intending visitors to the USA. Several of the FCC’s volunteer examiners are currently resident in the UK and are preparing to examine UK amateurs for the various classes of US licence (Novice, Technician, General, Advanced and Extra). All of these require the passing of both theory and Morse tests.

In contrast to the secrecy of the UK City & Guilds examination, the pool of questions for the US examinations is freely available, as are books of answers.

As for the Morse test, the speeds vary from 5 to 20 words per minute according to licence class, but the test is receive only and requires the candidate to be able to answer some simple questions on the text or to have copied at least half of it.

If you plan to travel to the USA, or its overseas territories, you may wish to take advantage of the above. In the first instance, enquiries should be made via the RSGB membership services department. If demand is sufficient I suppose we may even see test facilities being made available at the various UK Conventions.

RTTY

I reported last month on some of the RTTY DX to be found on 20 metres. In addition to the stations I reported then, the following have also been active recently: CE2IBN, CO2BB, EA8AAT, FG5X5A, HC1SC, HH2BZ, HP1AC, J37BG, KP2N, KP41G, OA4ADB, OD5IG, PZ1AP, TA1B, VU2JU, 3C1MB, 8R1RPN and 9Q5YB.

Rumours

The rumour mill is as active as ever; the latest of which concern Afghanistan and Albania. I won’t even bother to pass the rumours on because, frankly, I don’t think anything will come of them. If any of the schemes start to look firm, I will pass the information on. For interest, though, you may like to be reminded that the last acceptable operation from Albania was in June of 1971, and from Afghanistan in 1973.

Does that seem a long time ago? South Yemen has not been on since 1967, Burma not since the late 60s, Vietnam was last on in 1974, and North Yemen in 1975.

The moral seems to be that if you wanted to work them all you should have come into the hobby a long time ago! However, the true blue DXer is always full of optimism.

Until next month, 73 and good DXing.
The ALLADIN’S CAVE OF COMPUTER AND ELECTRONIC EQUIPMENT

DON'T MISS THE CPM DEAL OF THE CENTURY

The FABULOUS CPM TATUNG PC2000 Professional Business System

A cancelled export order and months of negotiation enables us to offer this professional CPM system, recently on sale at OVER £1400 at a SCOOOP price just over the cost of the equipment.

Not a toy, the BIG BROTHER of the EINSTIEN computer, the DUAL PROCESSOR PC2000 comprises a modern system for the small business, industrial, educational or hobbyist user. With the THOUSANDS of drivers available, there's no need to worry about compatibility or wordprocessing, FAST, BASE, etc., the PC2000 specification, at our prices, CANNOT BE BEATEN!

The central processor contains the 64K, Z80A processor, DUAL 555's, CEN-TRONICS and system expansion, plus and if felt the need to plug into STANDARD DIODES, fourPc, four outputs.

Many features including: keypad, manual definable key, integral computer and touch screen, and test and editing keys, system update, even its own integral microprocessor which allows the main Z80A device expansion, all on a total of 149 256K bytes, or 149 256K in total.

These attractive, detachable 12" monitor combines a CPM in standard color or monochrome, or 12" monochrome, with full serial and swivel movement for maximum user comfort. Supplied BRAND NEW with CPM...

PC2000 Processor System with CPM and LCD 149 256K

NOW only £199

PC2000 Processor System with CPM, LCD 149 256K and Ready to Run FAST Sales and Purchase ledger, with over 9000 Accounts, VAT etc

NOW only £299

Don't miss this opportunity to...

computer

2000's OF BARGAINS FOR CALLERS

1600's OF SPECIALS AND ULTRASPECIALS

AC Power Supply Specials

Power supply Specials

Add up to 60% over the original equipment suppliers

Manufacturers' Brand new supplies.

DEC LA34 F7000, DEC LA34, VMEbus, DEC LA34 Unboxed card with all 68720, DEC LA34, 78720, DEC LA34 68720, DEC LA34, 78720, DEC LA34

 unmarried, 68720, DEC LA34, 78720, DEC LA34, 78720, DEC LA34

Carbone and insurance on all supplies £10.00

PC AND MONITOR SPECIALS

Add up to 60% over the original equipment supplies.

Manufacturers' Brand new supplies.

DEC LA34 Unboxed card with all 68720, DEC LA34, 78720, DEC LA34, 78720, DEC LA34

Carbone and insurance on all supplies £10.00

LOW PRICE DEBUGgers

LOW PRICE DEBUGgers

Add up to 60% over the original equipment supplies.

Manufacturers' Brand new supplies.

DEC LA34 Unboxed card with all 68720, DEC LA34, 78720, DEC LA34, 78720, DEC LA34

Carbone and insurance on all supplies £10.00

32 Biggin Way, Upper Norwood, London SE19 3XF
Telephone 01-679 4414 Telex 85408 Data 01-679 1888

please mention AMATEUR RADIO when replying to any advertisement

MAY 1986

World Radio History
ANGUS McKENZIE

TESTS

Both radio amateurs and hi-fi enthusiasts have frequently asked me to recommend a transistor radio with a good short wave receiving capability which must include a BFO or SSB product detector. FM on Band II was also a requisite, and the wireless should not be too large. I have looked at dozens of candidates over the last few years, and have rejected every one of them for one reason or another, some having bad synthesizer noise whilst others had wobbly BFOs! Most of them had intolerable image response and spurious reception problems.

Previous model

The previous model to the one under review was rejected because of poor tuning ergonomics, amongst other things, and the advice I had to give in the past was that I could not recommend anything, but that you might find one of the less expensive Sonys useful if you were prepared to abandon the reception of SSB.

It has always seemed to me that sets having several bandspread bands were a lot easier to use than ones with unnecessary general coverage, one of the main points being that the majority of the sets that I have played with had appalling backlash, making tuning extremely awkward unless the required broadcast band was spread right out across the dial.

My attention was drawn to the Sony ICF2001D as the result of a friend, Roddy G3CDK, asking me to try and find something for him to take abroad. He had already tried a Philips set and his existing Sony with bandspread had not only developed a fault, but omitted a BFO anyway. I asked Sony if they could send me the ICF2001D, so that I could briefly review it to see if it was good enough for radio amateurs to use for SSB reception when on holiday. I found the set to have many unique features, and offers a lot more than its immediate predecessor.

Facilities and the front panel

The set tunes from 150kHz to 29.9999MHz in 100Hz or 1kHz steps with a normal AM detector, or with the synchronous one, whilst separate but- tons are provided for lower and upper sidebands, the SSB filter being set at the appropriate offset.

Thirty-two direct access memories are provided, which can memorise frequency and mode, including the chosen filter, and I programmed in a vast array of frequencies which could be accessed at a single touch after switch on. This is one of the most convenient functions of the radio, but a lot more is included.

You can either tune with your thumb on the side of a fat tuning wheel, or on the end of it; this part has a finger hole, the end being countersunk into the right side cheek. There is no backlash on this control, which runs beautifully smoothly, and just below it is a three position switch giving 1kHz and 100Hz steps with a lock position to stop you accidentally losing a required frequency. A shift key is provided, allowing the memory keys to have second functions such as the selection of LW, MW and any of the well known SW broadcast bands, including 120, 90, 75, 60, 49, 41, 31, 25, 21, 19, 16, 13, 11, FM or Air. When you select any of these, the internal microprocessor selects the bottom frequency on the chosen band.

Search facility

A general search facility is provided to scan a complete band, or you can define the frequencies over which the set scans. You can switch the scan to stop on the next station found, or to stop on stations for just 1.5 seconds, after which scanning continues. The defined scan function is very useful since, for example, you can leave it churning away from 88 to 108MHz in a holiday location and it will show you what stations can be picked up. At any time you can stop the scanning on an interesting station.

There is also a timer mode which can switch the set onto a required station at up to four separate times during each day. The set can be programmed to turn off again after 15, 30 or 60 minutes. There is a built in digital clock and also a sleep facility which allows you to attempt to go to sleep while the radio is playing, with the knowledge that it will turn off after 15 minutes etc.

ONY ICF2001D

A useful tranny portable to take on holiday
There is a light switch which turns on a very poor illumination for 15 seconds, but if any control is touched, it turns off 15 seconds after the last touch, in order to save the batteries. The degree of illumination has to be strongly criticised, for it was only just possible to read frequency, etc., in the dark, and during the day we thought the light was not working at all.

Audio gain control
The main audio gain control is quite a reasonable up/down slider, and there is a battery check button which gives a fairly good battery indication. The digital frequency display gives the tuned frequency, together with the obvious status functions. Although this display is fairly easy to read, you do have to get on a level with it, which can be a problem when using the set in the upright position.

On the top of the set a large whip antenna is mounted, with six long telescopic sections. The whip is very well made and is quite robust, staying put in any required direction, but folding over across the top of the set into a clip for storage. On the left side cheek is an external power socket requiring 4.5V dc, either from a mains adaptor which is supplied, or from a car battery lead which is an accessory. 3.5mm jacks are provided to connect external short wave or FM antennas, and the set worked well with these. On the right cheek is a slider RF gain control and a tone switch with three positions: full response, HF cut and both HF and LF cut, which is particularly suitable for SSB and CW reception.

Front-end antenna circuit
The ferrite rod antenna feeds into its own RF amplifier, which then feeds a second RF stage to the first mixer, having an IF output at 55.845MHz. The whip antenna is used for short wave, FM and air band; short wave signals being taken to the second RF stage input. The external antenna jack is immediately prior to the second RF amplifier, and thus an external antenna connection disconnects both the internal whip and the output of the ferrite rod amplifier.

On FM the whip's signal can again be disconnected by inserting an external antenna into a separate socket. The FM signal then proceeds via a separate RF mixer and IF to its discriminator; the 55MHz IF strip not being used for this. The air band signals yet again have their own RF stage and the amplified signals then feed directly into the first AM mixer.

The frequency calibration was very good, without any noticeable drift. The set picked up the 10m beacon GB3RAL quite well, although I have to admit that, here and there, there were more RFIM problems from very strong signals than on a dedicated receiver such as the Yaesu FRG8800 which costs a lot more.

Please mention AMATEUR RADIO when replying to any advertisement
455kHz for the second one. The SSB filter however, whilst having reasonably steep skirts down to around -50dB, does open out a bit at the bottom so that strong CW or RTTY signals on the LF bands do hold down the RF gain by affecting the AGC line if you are trying to receive a weak station.

The general ergonomics were superb, and I particularly liked the tuning wheel, which is a genuine improvement over many older models. The predecessor’s dreadful up/down tuning buttons.

**Improvements and changes**

You may be familiar with the previous model, and so it might be useful to detail some more of the improvements and changes. The ICF2001D now includes the synchronous detector, and has a fully programmable timer. This timer allows different stations to be programmed in for the four selected time periods.

Sony claim an extended battery life of 45 hours by employing circuitry which has a considerably lower current drain.

The front panel is covered with buttons, switches and controls. The inclusion of the 28MHz band covered in four sections. However, if you press the 500kHz button, the rig transfers to the general coverage mode and the up and down buttons then step the rig in 500kHz jumps, allowing you to select any frequency, including the broadcast bands etc.

The instruction manual is very basic and contains only the minimum of technical information, unfortunately, but along with it comes a superb 120 page booklet called Wave Handbook, including the broadcasting times and frequencies of the majority of broadcasting stations around the World, and details of the languages used. An Aviation Guide leaflet is also included with details of some of the special language used by pilots and air traffic control. Also included in the package is a lugplug of the usual fairly poor quality, a carrying strap and a long wire antenna. The wireless costs typically around £300 including VAT.

It is perhaps a little surprising that after issuing new HF rigs at the rate of at least one a year for over a decade, Yaesu have not announced any new mobile HF transceivers for two and a half years, and the FT757 has now been available for well over two years. There are rumours about a new Yaesu main station HF transceiver, but its introduction seems to be about six months late, as it was first rumoured over a year ago for release at the beginning of last winter. At the time of its original introduction, the FT757’s main competition was the Trio TS430S, and the earlier Icom IC720, 730 and 740 models.

Unlike earlier Yaesu mobile transceivers, the FT757 is completely microprocessor operated and fully synthesized. This allows many additional functions, including general coverage on receive from 500kHz to 30MHz, eight memories (holding frequency only though), two VFOs, which could be split between Tx and Rx if required and comprehensive VFO to memory and memory to VFO facilities. Continuously tunable RIIT is a useful feature, allowing you to split between Tx and Rx without using the second VFO. The rig is capable of delivering 100W peak output on CW, SSB and FM, although in the latter mode you are recommended to hold the power down to around 50W with the switched mode power supply in use. The FP757HD PSU does however allow for a higher duty cycle. The receiver includes narrow and wide CW filters and a proper AM filter, which allows a reasonable AM quality. Too many older rigs used the SSB filter for AM, which was understandably almost useless!

The VFO tunes on SSB/CW in 100Hz increments at a tuning rate of 10kHz per revolution, but it has one serious snag: the single tuning rate means that you have to turn it round 25 times to QSY just 250kHz. This is extremely laborious and it would have been more useful if a 100kHz per rev tuning rate selectable alternative had been provided. In normal use the up and down band controls select the next 250kHz wide amateur band, i.e. allowing you to step up the bands, with the whole of the 28MHz band covered in four sections. However, if you press the 500kHz button, the rig transfers to the general coverage mode and the up and
processor can be switched in and out on Tx, while a switchable noise blanker is available for Rx.

Although there is a switch for fast or slow AGC, the AGC cannot be switched off, which is a disadvantage, although there is an RF gain control mounted concentrically with the audio gain. A MOX Tx/Rx switch which duplicates a PTT facility on the mic and Tx control on the rear sockets is useful. VOX control can be switched in and the rig includes VOX sensitivity, anti-VOX and hold time. There is a rotary mode switch which selects CW, SSB, AM or FM.

Split concentrics are provided for passband tuning combined with variable selectivity, squelch and noise blanker levels (squelch works on all modes), and Tx mic gain combined with power output drive level. There is one quirk to the microphone gain: it operates on SSB only, the gain being fixed on FM, which is a nuisance.

Programmable search

There is a programmable search facility which searches from a chosen memorised frequency to the one in the next higher numbered channel. One useful function is the rig's ability to be switched from VFO to memory, tune away from the memory frequency and then return to the main VFO setting. One often wants to use this type of function to keep a watch on a DX net on another portion of the band whilst in the middle of a QSO.

The front panel has an eight pin DIN socket for the microphone, but no mic is actually supplied with the rig. Two options were suggested to me, however: the MH18B hand-held includes PTT and fast and slow up/down stepping buttons, and a table stand mic type MD18B with similar facilities, but including Tx lock-on and a two position audio response switch. A quarter inch jack socket gives headphone interconnection.

The front panel digital display is in 100Hz increments, and several status indications are also given. On the top of the rig is a large heatsink, including air ducts and a cooling fan, which is thermostatically controlled and very quiet in operation. The internal loudspeaker is positioned at the top of the front panel, and faces upwards. By its side are additional controls for selecting full or semi-break in keying for CW, manual or auto keying and keying speed (a slider providing the adjustment).

Rear panel

The rear panel is covered with sockets and additional facilities. The main antenna connection is on an SO239 socket, and a four pin 13V dc power socket is provided with the appropriate plug. A switch on the rear panel selects normal or break-in linear operation; the latter being used with an appropriate external linear amplifier. A small push-button on the back panel brings in a 25kHz marker, which can be used for calibration purposes. It does seem a little odd, though, that this could not have been on the front panel where it would have been particularly useful for blind or partially sighted amateurs.

There are also many pre-sets providing adjustment of VOX parameters, Tx compression level and AM inserted carrier level, which allows you to reduce the carrier so that you can achieve appropriate AM modulation within the capability of the linear power amplifier stage. The latter is recessed, requiring screwdriver adjustment. The front panel meter can also be switched with a mini switch on the rear panel to read SWR, a pre-set adjusting the sensitivity of the SWR metering. Whilst the pre-set is correctly on the back, surely the switch for enabling SWR reading should have been on the front panel.

There are a number of phono jacks on the back panel which provide for the following functions: external PTT, phone patch input to Tx (this can be used for inputting RTTY/Amotor etc), external ALC input (AF output coming from before the receive gain control at an approximate peak level of 200mV for feeding a tape recorder, Amotor terminal or other data equipment), low power transverter drive (approximately 100mV which is satisfactory for driving muTek transverters, for example), and two dc sources (8V at 100mA and 12V at 500mA). A stereo jack socket is provided for interconnection with either a conventional Morse key or a paddle, which can be used with the internal auto keyer. An external loudspeaker can be plugged into a 3.5mm jack socket.

Accessory ATU

The accessory Yaesu 757AT automatic antenna tuning unit has an interconnection socket provided on the back of the transceiver which gives dc for the ATU circuits, and band data signals so that the ATU changes band automatically when bands are changed on the main transceiver. This ATU worked very well, although it was rather slower than the Icom AT500 and could take the output of a linear.

A three pin computer data socket is provided for use with an optional accessory interface, FIF232C, which allows computer operation of many of the transceiver's functions, including frequency and memory selection, for example.

There are two optional PSUs available, which are designed to work with the FT757. The FP757 is a switched mode power supply and is fairly small. It can only accommodate a 50% duty cycle and is therefore not suitable for running high power FM. RTTY or data transmissions would also require you to reduce data output power with this PSU. The FP757HD is a more conventional, larger power supply, which allows for a 100% duty cycle to be transmitted, and the rig is capable of this for up to 30 minutes, with care. This PSU also has an extension speaker and a cooling fan.

The rig is well presented, with a carrying handle on the right, and a bail stand underneath the front can lift the front up if required. The tuning knob tension can be varied by adjusting a preset screw underneath the tuning mechanism. Since the rig was first introduced the mechanics of the tuning assembly have been improved for better reliability, as a result of some user complaints in the early days. The rig weighs 5.5kg and measures 238 x 93 x 238mm. A mobile mount is available as an accessory.

Subjective tests

I first tested this rig in early 1984 and, although I enjoyed using it, there were a number of points that I was rather dissatisfied with. I used it on 10m FM, and also with a transverter up to 2m, and I found that the received bandwidth of the FM filter was much too wide, making weak FM signals difficult to copy. Channel separation on this band is 10kHz, but the filter is not really suitable.
for separations of less than 20kHz if you want to receive a fairly weak station when there is a much stronger one on the next channel up or down.

The setting of the Tx deviation on FM was also too high and 10kHz channelling requires an absolute maximum of around 2.5kHz, with audio extending to 3kHz modulation followed by an extremely steep cut off. The first roofing filter on the receiver was also too wide, so that on the LF bands on SSB or CW very strong off-channel stations tended to cause LF bands on SSB or CW very strong.

steep cut off. The first roofing filter on the receiver was also too wide, so that on the LF bands on SSB or CW very strong off-channel stations tended to cause blocking. This effect was exaggerated by what was obviously a poor reciprocal mixing performance, as the synthesizer noise extended quite a way out from the local oscillator carrier.

Reception problems

By the time I looked at the rig again in late 1985, when a friend had brought one round for me to check, I confirmed my previous opinion that many amateurs are likely to get trouble when receiving the 1.8MHz band if they are anywhere near local and BBC network medium wave transmitters. The FT757 does not seem to have a steep high-pass filter coming in below 1.8MHz, and strong medium wave signals around 1.5MHz, for example, can cause overloading of the front-end. Even switching out the RF pre-amp and switching in the antenna attenuator is insufficient to cope with the problem at my QTH, and many purchasers of the rig have had exactly the same problem. It is therefore essential for many users to make up an external high-pass filter, with its knee just below 1.8MHz, or to use an ATU, such as the SPC300, marketed by Capco, which has an extremely steep high-pass filter action inherently in the design of the circuit.

If you want to use the rig to drive a transverter, matters are just slightly awkward. The transverter drive socket is live on Tx only and gives enough level for most modern transverters, but is insufficient for some earlier models. The return from the transverter feeds into the SO239 main antenna socket, so you can imagine what happens if you inadvertently go to transmit without the PA disabled!

Terrible shame

One amateur, north of Watford, did just this to his brand new mUtek transverter and blew out his entire output section, which was a terrible shame. The 4-pin dc socket requires two of the pins to be open circuit to shut down the PA. This then makes the rig safe, but it is so easy to forget this if you are frequently changing from HF to VHF. It is probably a good idea to have a coaxial relay in the antenna circuit to select HF, or a transverter connection, with the relay controlled by a 2-pole switch to change over all the connections and energise the relay and the transverter from an external 13V source. Thus the PA will only be on when you have switched to HF. You will have to remember that the switch pole which passes the current back to the PA will have to carry a very appreciable current, thus requiring a very meaty switch. The best and most suitable transverter for use with the FT757 is the new muTek 2m model which has an ALC output that can be interconnected with the ALC socket on the rig's rear panel. This makes it impossible to overdrive the transverter drive stage in the 757 by applying ALC to the IF strip in the absence of a PA ALC.

Control layout

The actual layout of the controls on the FT775 is good, and all the functions worked as they should. However, I found the absence of a higher tuning rate to be most annoying, especially on 20m where I like to QSY up and down the band quite frequently.

The transmitted and received audio quality was appreciated, and the FM quality particularly good, even if the deviation is rather too high. I did not note any particular audio problems with the mic input stage, but I do not like the sound quality of the Yaesu microphones, so I tried a Heil microphone, which was much more punchy for DX and has improved intelligibility, helping the signal to cut through the QRM in a fairly spectacular way. These microphones are available from Amcomm/ARE Ltd.

The Tx audio processor worked very well and helped intelligibility further. The transmitted audio response was ideal.

The received quality on AM was quite good throughout, although distortion at peak modulation seemed a little higher than I would have liked. The slow AGC speed was just as I like it for SSB, but if you are in a net with signals of greatly varying strength, you may need to switch AGC to 'fast' in order to hear quick break-ins by weak stations.

The fast speed was ideal for CW, and at least it is good to have the choice as well as an RF gain control, although unfortunately you can not switch the AGC off.

The received response on FM was well controlled and most certainly not muffled, a failing of some other rigs. However, some transmitters are inclined to be far too toppy on Tx and, as there is no tone control on the FT757, you may find some transmissions much too edgy.

The SSB received response was excellent, being controlled primarily by the position and shape of the main SSB filter. Only one birdie might be annoying on the amateur bands, for it seemed to be fairly marked at 28.822MHz.

I hope readers will understand, however, that I baulked at tuning all the way from 500kHz to 30MHz looking for birdies on other than amateur bands, for I would have had to turn the tuning knob just under 3000 revolutions! Since the finger hole has a higher than average friction quotient, I would have ended up with a burnt finger tip!

Ergonomics were generally good, but the absence of a centre indent on the passband tuning was a little annoying. Although the programming facilities worked well, searching was painfully slow, and so it was only appropriate for SSB. The Tx power control varied the output power from below 1W up to 100W, which is extremely useful. The frequency readout in 100Hz steps with the basic status information was much appreciated. The VOX controls worked very well and I liked all the keying facilities.

Laboratory tests

The receiver sensitivity was excellent on all bands up to 21MHz, but the 28MHz band performance was only just adequate. However, it has to be said that the sensitivity on the LF bands was needlessly good, and you would certainly not need to use the RF pre-amp below 14MHz. The RF attenuator gave around 18dB attenuation at 1.9MHz and the FM sensitivity on 10m was rather poor, partly...
Yaesu FT757GX Laboratory Results

<table>
<thead>
<tr>
<th>Transmitter results</th>
<th>Maximum output power: CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.81MHz</td>
<td>114W</td>
</tr>
<tr>
<td>3.75MHz</td>
<td>107W</td>
</tr>
<tr>
<td>10.1MHz</td>
<td>110W</td>
</tr>
<tr>
<td>21.3MHz</td>
<td>115W</td>
</tr>
<tr>
<td>29.6MHz</td>
<td>110W</td>
</tr>
<tr>
<td>FM peak deviation</td>
<td>6.5kHz</td>
</tr>
<tr>
<td>Transmitter carrier accuracy: FM</td>
<td></td>
</tr>
<tr>
<td>+1kHz</td>
<td></td>
</tr>
<tr>
<td>SSB</td>
<td>within 100Hz</td>
</tr>
<tr>
<td>SSB peak signal to carrier and background noise breakthrough: better than 50dB</td>
<td></td>
</tr>
<tr>
<td>Worst RF harmonics: below –50dB on 10MHz band, other bands below –60dB</td>
<td></td>
</tr>
<tr>
<td>Worst spurii: 24MHz band ±2.5MHz at approximately –45dB</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Receiver results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity: SSB for 12dB sinad</td>
</tr>
<tr>
<td>1.95MHz</td>
</tr>
<tr>
<td>3.65MHz</td>
</tr>
<tr>
<td>7.05MHz</td>
</tr>
<tr>
<td>14.05MHz</td>
</tr>
<tr>
<td>21.25MHz</td>
</tr>
<tr>
<td>26.4MHz</td>
</tr>
<tr>
<td>Sensitivity: FM (4kHz deviation)</td>
</tr>
<tr>
<td>29.6MHz</td>
</tr>
<tr>
<td>Calculated intercept point: S5 method</td>
</tr>
<tr>
<td>+5/+10kHz spacing</td>
</tr>
<tr>
<td>+10/+20kHz</td>
</tr>
<tr>
<td>+20/+40kHz</td>
</tr>
<tr>
<td>+100/+200kHz</td>
</tr>
<tr>
<td>Selectivity: SSB bandwidth for given level drop</td>
</tr>
<tr>
<td>3dB</td>
</tr>
<tr>
<td>6dB</td>
</tr>
<tr>
<td>40dB</td>
</tr>
<tr>
<td>60dB</td>
</tr>
<tr>
<td>80dB</td>
</tr>
<tr>
<td>Selectivity: FM off-channel blank carriers</td>
</tr>
<tr>
<td>±12.5kHz spacing</td>
</tr>
<tr>
<td>±25kHz</td>
</tr>
<tr>
<td>Reciprocal mixing: SSB</td>
</tr>
<tr>
<td>+20kHz offset</td>
</tr>
<tr>
<td>+50kHz</td>
</tr>
<tr>
<td>+100kHz</td>
</tr>
<tr>
<td>S-Meter</td>
</tr>
<tr>
<td>SSB</td>
</tr>
<tr>
<td>S9</td>
</tr>
<tr>
<td>S9+20</td>
</tr>
<tr>
<td>S9+40</td>
</tr>
<tr>
<td>SSB product detector distortion: 0.6%</td>
</tr>
<tr>
<td>FM audio distortion</td>
</tr>
<tr>
<td>2kHz deviation</td>
</tr>
<tr>
<td>4kHz deviation</td>
</tr>
<tr>
<td>FM quieting</td>
</tr>
<tr>
<td>13.4dB at 12dB sinad point</td>
</tr>
<tr>
<td>Maximum audio output power</td>
</tr>
<tr>
<td>8 ohms 2.7W (10% THD)</td>
</tr>
<tr>
<td>Size 238 x93 x238mm, weight 5.5kg</td>
</tr>
</tbody>
</table>

Unfortunately, the incorporation of the FM facility therefore contributes to blocking problems on SSB and CW, and this does reinforce the importance of having a much narrower first IF roofing filter. Thus, the effective input intercept point started collapsing, becoming very poor for close in separations. Since AGC is only applied by the signal passing through the final IF filter, strong off channel signals cause distortion at the second mixer, giving a blocking effect that I have previously commented on with such rigs as the I745.

The transmitted SSB response showed the FM facility to be set at about the right distance from the carrier, but the FM TX response was clearly not appropriate for 10kHz channelling. When we checked it into the Marconi 2305 deviation meter, with 750uS de-emphasis, the response was only 5dB down at 5kHz, whereas it should have attenuated far more rapidly above 3kHz. The extended HF response clearly contributes to marked spreading, and this result ties in with typical FT757s on 10m FM that I have heard. The bass due to the overwide FM filter. The reciprocal mixing performance was not at all good near the carrier, and because of this the measurements of the SSB selectivity were only appropriate down to around -60dB, below which reciprocal mixing effects took their toll. The CW 600Hz filter had quite a good shape, but the FM filter was far too wide and was more appropriate to 25kHz channelling than to 10kHz.

The front-end intermodulation performance measured well for carriers far out, but once one of them was anywhere near the passband of the first roofing filter, the effective input intercept point started collapsing, becoming very poor for close in separations. Since AGC is only applied by the signal passing through the final IF filter, strong off channel signals cause distortion at the second mixer, giving a blocking effect that I have previously commented on with such rigs as the I745.
end was just about right though, with LF rolling off below 300Hz. No frequency drift problems were noted during testing. RF harmonics were generally below -60dB, but on 10MHz we noted the harmonics to be just below -50dB, which is good enough. On the 24MHz band we noted two sprogs at ±2.5MHz approximately, at a level of around -45dB, and I could not find any reason for this, so perhaps it was a sample fault. Brief two-tone tests showed the intermodulation characteristic can be much improved.

Conclusions

When I initially reviewed this product, quite a time ago, I was impressed with it despite the niggles mentioned here. When it was first released it represented good value for money, its main competition being made by any stations able, no adverse comments about performance of the PA to be quite satisfactory, and spreading tests on air approximately, at a level of around -45dB, and I consider waiting until next month to see what I think of the new TS440, which I understand has a very similar RX circuitry to the superb TS940S, whilst omitting some of the latter’s facilities.

Sadly, it would seem that the Yaesu FT757GX has been overtaken by modern developments, so I don’t think it is particularly good value for money now, and as there are a lot of them around and they are often seen advertised second-hand, you would be well advised to weigh up the secondhand price against a new Icom 735 or Trio TS440.

Many thanks to Amcomm ARE Ltd for the loan of the rig for photography purposes, from whom further information on the FT757GX can be obtained.

FT757GX IMPROVED TUNING MODIFICATION

Following a visit to the workshop QTH of R Withers Communications near Birmingham, West Midlands, we are pleased to report on a development for the Yaesu FT757GX transceiver.

During a period of several months, Colin Horrabin G3SBI, the late Bill Sparks G8FBX and Ray Withers G4KZH designed an improvement for the tuning circuit of the FT757GX.

'Synthesiser glitch'

Some owners of this rig may have noticed the ‘synthesizer glitch’ effect when tuning, especially across CW or RTTY transmissions anywhere in the range 500kHz-30MHz. This means that the frequency does not move smoothly in 10Hz steps, but jumps somewhat irregularly as the tuning knob is rotated.

Ray Withers and associates have produced a small printed circuit board, 56 x 16mm, carrying two integrated circuits and very few additional components, so that with no more than eight short wires to the existing transceiver circuitry and a quarter hour of labour adjacent to Tr67, the MC14680SG2 microprocessor, the tuning performance characteristic can be much improved. There is also an added advantage: that of being able to tune the receiver/transmitter at the rate of approximately 50kHz per knob revolution as an alternative or addition to the 5kHz per rotation with which users are already familiar.

Mr Withers and associates are providing the modification facility on all FT757GX radios bought from them at no extra charge to the basic cost, and having been in touch with the Japanese manufacturers, are assured that this circuit improvement performed by them will not invalidate the normal guarantee on the equipment.

Handling the receiver synthesized tuning on this set thus becomes more like riding along a tar-macadam road surface instead of along a bumpy cobbled surface!

Further information on the modification can be obtained from R Withers Ltd, 564 Hagle Rd West, Quinton, Birmingham B68 9BS. Tel: (021) 421 8201.
**Co-Ax Plugs, Sockets, Adaptors**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 standard 50 OHM BNC plug</td>
<td>£0.88</td>
</tr>
<tr>
<td>P2 50 OHM solderless crim type BNC</td>
<td>£1.00</td>
</tr>
<tr>
<td>P3 chassis mounting BNC socket</td>
<td>£0.94</td>
</tr>
<tr>
<td>P4 single hole chassis mounting BNC socket for panels up to 4mm thick</td>
<td>£0.88</td>
</tr>
<tr>
<td>P5 single chassis mounting BNC socket for panels up to 7mm thick</td>
<td>£1.26</td>
</tr>
<tr>
<td>P6 double ended BNC female socket</td>
<td>£1.19</td>
</tr>
<tr>
<td>P7 double ended BNC plug/plug</td>
<td>£0.83</td>
</tr>
<tr>
<td>P8 BNC T connector socket/plug/socket</td>
<td>£2.83</td>
</tr>
<tr>
<td>P9 BNC T connector socket/socket</td>
<td>£2.23</td>
</tr>
<tr>
<td>P10 elbow BNC socket/plug</td>
<td>£2.32</td>
</tr>
<tr>
<td>P11 BNC line socket female/female</td>
<td>£1.13</td>
</tr>
<tr>
<td>P12 PL259 standard plug 9.5mm internal dia.</td>
<td>£0.55</td>
</tr>
<tr>
<td>P13 Reducer for PL259 5.2 internal dia.</td>
<td>£0.15</td>
</tr>
<tr>
<td>P15 standard PL259 with built in reducer 5.2mm internal dia.</td>
<td>£0.45</td>
</tr>
<tr>
<td>P16 Right angle PL259 for RG58/U</td>
<td>£0.88</td>
</tr>
<tr>
<td>P17 Solderless PL259 with built in reducer for RG58/U</td>
<td>£0.88</td>
</tr>
<tr>
<td>P18 SO239 4 hole mounting chassis socket</td>
<td>£0.44</td>
</tr>
<tr>
<td>P19 SO239 female/female coupler</td>
<td>£0.72</td>
</tr>
<tr>
<td>P20 PL259 male/male coupler</td>
<td>£0.68</td>
</tr>
<tr>
<td>P21 PL259 (push on) SO239 quick disconnect</td>
<td>£0.95</td>
</tr>
<tr>
<td>P22 right angle PL259/ SO239</td>
<td>£1.16</td>
</tr>
<tr>
<td>P23 PL259 T connector female/male/female</td>
<td>£1.37</td>
</tr>
<tr>
<td>P24 SO239 T connector female/male/female</td>
<td>£1.44</td>
</tr>
<tr>
<td>P25 N type plug to BNC socket</td>
<td>£2.42</td>
</tr>
<tr>
<td>P26 BNC plug to N type socket</td>
<td>£1.87</td>
</tr>
<tr>
<td>P27 N type plug to SO239</td>
<td>£2.50</td>
</tr>
<tr>
<td>P28 PL259 to N type socket</td>
<td>£2.28</td>
</tr>
<tr>
<td>P29 Phono plug to SO239</td>
<td>£0.55</td>
</tr>
<tr>
<td>P30 3.5mm plug to SO239</td>
<td>£0.75</td>
</tr>
<tr>
<td>P31 BNC plug to SO239</td>
<td>£1.20</td>
</tr>
<tr>
<td>P32 PL259 to BNC socket</td>
<td>£1.20</td>
</tr>
<tr>
<td>P33 standard co-ax plug to BNC socket</td>
<td>£1.02</td>
</tr>
<tr>
<td>P34 Phono plug to BNC socket</td>
<td>£1.35</td>
</tr>
<tr>
<td>P35 Phono plug to F type socket</td>
<td>£0.59</td>
</tr>
<tr>
<td>P36 pus in F type plug to F type socket</td>
<td>£0.57</td>
</tr>
<tr>
<td>P37 PL259 to phono socket</td>
<td>£0.75</td>
</tr>
<tr>
<td>P38BNC plug to phono socket</td>
<td>£0.84</td>
</tr>
<tr>
<td>P39 F type plug to phono socket</td>
<td>£0.64</td>
</tr>
<tr>
<td>P40 F type plug to BNC socket</td>
<td>£1.13</td>
</tr>
<tr>
<td>P41 F type socket to phono socket</td>
<td>£0.60</td>
</tr>
<tr>
<td>P42 PL259 plug to plug</td>
<td>£2.10</td>
</tr>
<tr>
<td>P43 F type socket to 3.5mm jack</td>
<td>£0.68</td>
</tr>
<tr>
<td>P44 phono socket to standard co-ax socket</td>
<td>£0.52</td>
</tr>
<tr>
<td>P45 standard co-ax plug to phono socket</td>
<td>£0.66</td>
</tr>
<tr>
<td>P46 TNC plug</td>
<td>£2.75</td>
</tr>
<tr>
<td>P47 N type in line socket for RG8/9U</td>
<td>£1.54</td>
</tr>
<tr>
<td>P48 N type in line socket for RG58</td>
<td>£1.54</td>
</tr>
<tr>
<td>P49 N type T connector female/male/female</td>
<td>£3.45</td>
</tr>
<tr>
<td>P50 N type single hole mounting chassis socket</td>
<td>£1.20</td>
</tr>
<tr>
<td>P51 N type four hole mounting chassis socket</td>
<td>£1.68</td>
</tr>
<tr>
<td>P52 N type elbow male/female</td>
<td>£3.11</td>
</tr>
<tr>
<td>P53 N type T connector female/female</td>
<td>£3.45</td>
</tr>
<tr>
<td>P54 N type double ended female/female</td>
<td>£2.00</td>
</tr>
<tr>
<td>P55 N type double ended male/male</td>
<td>£2.40</td>
</tr>
<tr>
<td>P56 N type plug for RG58 cable</td>
<td>£1.52</td>
</tr>
<tr>
<td>P57 N type plug for RG8 cable</td>
<td>£1.56</td>
</tr>
</tbody>
</table>

**Co-Ax Relays**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR1 PCB type co-ax 50 OHM maximum input 150w PEP at 500MHz maximum operating frequency 2.5GHZ insertion loss .2db at 2.5GHZ supply 12VDC VSWR 1.2-1</td>
<td>£16.95</td>
</tr>
<tr>
<td>CR2 Mast Head changeover relay 3 N type terminated socket 2 in 1 out completely waterproof complete with DC cable and changeover box. Frequency 1MHZ-1.2GHZ VSWR 1.2-1 at 500MHz VSWR less than 1.3-1 at 1.2GHZ insertion loss .3dbat 500MHZ .6db at 1.2GHZ power handling 50w max</td>
<td>£79.95</td>
</tr>
</tbody>
</table>

**Mike and Power connectors**

Please note that it is the line socket on the end of the mike:

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC1 2 pin in line socket</td>
<td>£0.65</td>
</tr>
<tr>
<td>MC2 2 pin chassis mounting plug</td>
<td>£0.65</td>
</tr>
<tr>
<td>MC3 2 pin in line plug</td>
<td>£1.40</td>
</tr>
<tr>
<td>MC4 3 pin in line socket</td>
<td>£0.65</td>
</tr>
<tr>
<td>MC5 3 pin chassis mounting plug</td>
<td>£0.65</td>
</tr>
<tr>
<td>MC6 3 pin in line plug</td>
<td>£1.45</td>
</tr>
<tr>
<td>MC7 4 pin in line socket</td>
<td>£0.70</td>
</tr>
<tr>
<td>MC8 4 pin chassis mounting plug</td>
<td>£0.75</td>
</tr>
<tr>
<td>MC9 4 pin in line plug</td>
<td>£1.65</td>
</tr>
<tr>
<td>MC10 4 pin right angle line socket</td>
<td>£1.40</td>
</tr>
<tr>
<td>MC11 5 pin in line socket</td>
<td>£0.80</td>
</tr>
<tr>
<td>MC12 5 pin chassis mounting plug</td>
<td>£0.75</td>
</tr>
<tr>
<td>MC13 5 pin in line plug</td>
<td>£1.65</td>
</tr>
<tr>
<td>MC14 6 pin chassis mounting plug</td>
<td>£0.80</td>
</tr>
<tr>
<td>MC15 6 pin chassis mounting plug</td>
<td>£0.80</td>
</tr>
<tr>
<td>MC16 6 pin in line plug</td>
<td>£2.30</td>
</tr>
<tr>
<td>MC17 7 pin in line socket</td>
<td>£1.35</td>
</tr>
<tr>
<td>MC18 7 pin chassis mounting plug</td>
<td>£1.15</td>
</tr>
<tr>
<td>MC19 7 pin in line plug</td>
<td>£2.05</td>
</tr>
<tr>
<td>MC20 8 pin in line socket</td>
<td>£1.45</td>
</tr>
<tr>
<td>MC21 8 pin chassis mounting plug</td>
<td>£1.20</td>
</tr>
<tr>
<td>MC22 8 pin in line plug</td>
<td>£2.80</td>
</tr>
</tbody>
</table>

**Co-axil Cable**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 pope H100</td>
<td>£0.75</td>
</tr>
<tr>
<td>C2 pope RG58C/U</td>
<td>£0.30</td>
</tr>
</tbody>
</table>

**Telephone Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 modular telephone t adaptors</td>
<td>£2.50</td>
</tr>
<tr>
<td>T2/4a telephone master socket</td>
<td>£3.50</td>
</tr>
<tr>
<td>T3/2/6A slave ext socket</td>
<td>£3.00</td>
</tr>
<tr>
<td>T4 5m ext leads with modular plug and socket</td>
<td>£2.50</td>
</tr>
<tr>
<td>T5 10m ext leads with modular plug and socket</td>
<td>£4.00</td>
</tr>
</tbody>
</table>

**AC Power leads**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1 3 pin IEC plug and lead right angle with 2m cable 250v Ac 6 amp Yaesu Trio mains lead</td>
<td>£2.50</td>
</tr>
<tr>
<td>AC2 3 pin IEC plug and lead straight with 2m cable 250v Ac 6 amp Yaesu Trio mains lead</td>
<td>£2.50</td>
</tr>
<tr>
<td>AC3 2 pin fig 8 type plug with 2m cable 250v Ac 6 amp Yaesu Trio mains lead</td>
<td>£2.50</td>
</tr>
</tbody>
</table>

**Trimming Tools**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 complete set of 4 double ended trimming tools Hexagonal and rectangular heads</td>
<td>£1.75</td>
</tr>
</tbody>
</table>

**DC Power Sockets**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 centre hole 2.1mm dia shaft length 10mm</td>
<td>£0.25</td>
</tr>
<tr>
<td>DC2 centre hole 2.5mm dia shaft length 10mm</td>
<td>£0.25</td>
</tr>
<tr>
<td>DC3 centre hole 2.1mm dia shaft length 14mm</td>
<td>£0.25</td>
</tr>
<tr>
<td>DC4 centre hole 2.5mm dia shaft length 14mm</td>
<td>£0.25</td>
</tr>
</tbody>
</table>

P&P £1.00. Co-ax 10p p.m. All mail will be sent by normal post unless otherwise requested.
It's not really surprising that listeners are often oblivious of others with similar interests living nearby. After all, listeners like philatelists and astronomers among others, can and do carry on their chosen hobby, content to go it alone with no other contact with fellow hobbyists save through books and magazines.

There are, however, times when a helping hand can be useful, like when you're trying to heave up a mast with one hand and fasten the guys with the other and stop the aerial feeder wrapping itself round itself in all sorts of trouble after wiring up his new receiver and length of wire only to find he has no signals coming through.

**Good timing**

Fortunately I was available when such an incident happened recently. A local listener had purchased a nice new receiver and wasn't sure if he had connected it up properly, as he was getting very little audio. The receiver was a Trio R2000 and a random wire had been connected to the antenna socket correctly. The trouble was, as soon as a signal appeared on the band the squelch cut it out. As it was a new receiver, we returned to the shop and explained the problem. We were told that the set would have to go for repair.

Now, I'm not going to say who the retailer was, but it took a concerted effort to get an eventual replacement. This brings up the point that, under the sale of goods acts, if a shop supplies you with equipment that is not up to standard, you are legally entitled to a replacement or a refund. If the dealer refuses (if it's a branch of a big concern, go to the head office first) contact your local Consumer Protection office.

![Image](https://via.placeholder.com/150)

Our local newcomer is now enjoying his listening and is pleased with his purchase.

Mind you, I had to recommend a decent ATU (something the salesmen should have done) and help him with his aerial, but it gave me the opportunity to have a tune round some of those frequencies I had forgotten about since being licensed.

Our first correspondent this month is not having any difficulty listening either. Goff Curtis wrote in from South Harrow to say that VQ9CI and VQ9CM had been detected on twenty metres. Goff says that the transmitted signal sounded the same so it seems they were on the same team in Diego Garcia (on the Chagos Archipelago, British Oceanic Territory). QSL information was given as via W4QM (VQ90GM) or W66SKL (VQ9CI).

Next in the postbag was Angela Sitton from Stevenage, who was having her leg pulled by someone who told her that a licence was required for listening. Well, 'twas the case some years ago Angela, but all its for free nowdays. Mind you, if you hear anything on any of those 'naughty' frequencies that sounds peculiar, don't go telling your friends or you might finish up having a visit from those nice men with bulges in their jackets!

This advice also goes to those of you who have scanners on VHF. It is quite true that, technically, you can listen anywhere on the bands but it is not the done thing to listen in on embassies or government frequencies. Just to make sure you don't, there are books on the market telling you all the forbidden frequencies so that you can avoid them.

Just when I thought that the 1985 Jamboree was behind me, I received two claims for the GB2WFF award. Silly me! The first one was from Harcerski Klub Lacznosi in Lubin, Poland. Their claim was for 56 points and included contacts with America and Africa over three bands. I wonder if the copy of *Amateur Radio* will get there.

The second claim was from Rudolf Darmadi Sewoyo in Indonesia. Rudolf sent in some very nice pictures of the scout station he is involved in and a mass of information about the set-up there, including the operators' roster and log sheets. I wonder, do you see the callign YD3NOI and it appears that two metres is used extensively in Indonesia, as most of the contacts were on 144MHz with stations in that country.

**New to the scene**

A hearty welcome to another newcomer to the listening scene, David Armitage of Leeds. David is presently concentrating on the broadcast bands with a Vega 204 receiver, and required a bit of advice on how to QSL etc, but he'll soon get into the swing of it.

Another new listener has joined us this month. Jean Mullany G4GIG, of Birmingham, has invested in a Philips D2935 and finds it is doing an excellent job, despite a problem with overloading the front-end when using an external aerial. This is quite a common problem with the less sophisticated receivers. An RF attenuator might do the trick by cutting back some of those strong ones. Jean is also QRV on eighty with the DS860 with 2.5 watts.

Mike Baker of Carlisle wrote to ask if there were any of you folks interested in starting a national HRO user group. Mike uses one of these old-timers and thinks they are remarkable sets considering their age. If you are interested in forming such a group, please drop Mike a line at 13 Chertsey Mount, Carlisle, Cumbria.

I have received a nice letter from Don Robertson of Wick stating that the DX has been around on eighty and quotes JA, LU, PY, CX, PJ2 and contacts with six ZLs in a row. Forty has also been fruitful around 1330 with BV0, HLI and KLT. Don is collecting dollar bills from JAs who want QSL cards (I'm collecting pound notes Don!).

Sten Stenstrom wrote from Algeria (one of his IA locations) after picking up his *Amateur Radio* at Heathrow Airport on his way out. Sten is on the look out for an Icom IC720A or similar to use on his beautiful new sailing boat, *Westerly Conway*. Anyone who is able to help can have a trip on the boat when he picks her up in the Solent. Contact Sten through H Atrill & Sons, The Duer, St Helens, Isle of Wight.

Eric Franks of Paignton has written regarding his newly installed Amstrad 464 computer, which he is hoping to link into his receiver for CW/RTTY reception. The Trio R600 has been giving excellent service but is now backed up by the SX200N scanner and a Slim Jim for the VHF bands. Eric would like information on radio programmes for the 464, which seem to be a bit thin on the ground at present. Eric can be contacted at 54 Berry Road, Paignton, South Devon.

There is another new computer on the scene in the shack of Stuart Trew of Barningham, who has installed the Commodore 64 with software for RTTY, CW and Amtor. Stuart is another of those 'lucky' people with breakthrough of the computer onto the FRG7700.

As well as being RS67096, Stuart is member number NL9060 of the Dutch radio society 'Veron', which is responsible for the excellent slow Morse transmissions on eighty metres. Stuart has also been busy on the antenna farm and a new 40m dipole has been added with some more copper wire buried in the garden (hope the plants don't object Stuart!).

It had to happen! Someone, in the guise of Andy Silence G4MYS, of Cofxord, has revamped the OXB mast mentioned in the February issue. Andy bolted insulators to the outriggers to give him a half-wave end-fed for Top Band
and replaced the guys to give him inverted V for forty, twenty and fifteen metres. The mast also acts as a support for his G5RV and 2m half-wave dipole. The whole lot, including the mast and feeders, cost him less than £100 which, when compared with the cost of a single element beam and rotator of over £150 plus the cost of a mast, sounds pretty good.

Redecorating
Did you know that in going for the Bronze and Silver prefix awards for each band and mode, you can paper the bedroom and still leave room for the Gold plaques? This seems to be the aim of Don Robertson who, not satisfied with his Gold for working the 1000 prefixes, is well on the way for the Premier award. Don says he's found the awards so much of a challenge that he was getting withdrawal symptoms until I announced the Premier award. There's no pleasing some people!

I'm pretty easily pleased, especially when I receive claims for the awards from readers. A neat computer produced list from Jane Mul-lany this month gets her on the roll for her Bronze. Despite her reservations regarding the Philips D2935, it has managed to pull in 3A2, AJ3, HC1, PT7, VK7, VP2, YB0 and ZB2 among a fine list.

John Upsher also managed to find them with his Yaesu FT908 and promptly entered in a claim for the Silver with A71, V9P, D44, VE7, FY7, VS5, HZ1 among the crowd. Some nice comments in the last column of his log sheets too, like '5 in rain in first 6 months of the year...now a drought (VK2EEE)'.

The Listeners Information Bureau has got off to a flying start this year with over fifty members. Full information sheets have gone out to those who sent in the card from the magazine and enquiries have been received from Belgium, South Africa, Finland and Jamaica, so it looks like we'll have an international group.

I'm in the process of getting the first newsletter made up and it should be out by the time this article is published. Mail has already started to flow between members, so if you are interested in the group please send a foolscap sized sae to 1 Jersey Street, Hafod, Swansea SA1 2HF, and I'll send you the information pack.

So to our featured listener who, this month, is Jim Mar-chant RS87371 from North-fleet, who became a listener in July 1985 and purchased a Trio R600 after he read good reviews of the receiver. Unfortunately Sod's Law took a hand and he had to go away on a course to Derby, so he was separated from his new toy for a while. Nevertheless, on his return home a quick lash-up of ten metres of stranded wire got him on the air, and Radio Moscow echoed round the room. After the induction, local radio stations were picked out and then 'GB0BBC you're 5/9 from 4GBP...'. the first amateurs. A special event on the air. He was hooked.

A quick spin round what turned out to be eighty metres revealed more G stations and excitement mounted. Later, on twenty metres, UZ24FWO sent Jim frantically searching for his magazines to find where this 'exotica' was located. A Rus-sian club station had 'appeared' in his bedroom! These first stations were the prelude to many hours logging stations in places only previously heard of in those geography lessons. Jim had never paid much atten-tion to years ago.

After the first two weeks it was obvious that a decent aerial was required. So the Datong Active antenna was obtained. The same stations were received but were much clearer, with the occasional exotic ones being blocked by Europeans. The answer was a home-brew variable attenuator which enabled him to cut out some of the stronger signals.

It was about then that the WAB net was discovered on eighty metres. Departing with a crisp fiver, Jim received his WAB book from G4KSQ and quickly became a square hun-ter, achieving five awards. He found that with WAB during the day and DX at night, his spare time is well used.

Owing to Jim's shift work he can't make RAE classes, and his twelve mile journey to the nearest club is out. Neverthe-less, Jim is enjoying his hobby immensely and that is what it's all about.

Listening bug
Many listeners start in the same way as Jim, as did Dave Armitage, with a receiver that is, to him, a metal box full of electrical bits that, somehow, manages to receive signals from all parts of the world. Quite often those without interest in the hobby ask what one sees in listening to foreign stations and writing details down in a book. Who can say? How do you explain the pleasure one gets from logging stations, or the excitement of hearing your first real DX station or getting your first award? It's a dif-ferent thing when you have plodded through the RAE and gone through the terror of your first QSO.

Listeners are unique in that they are usually totally inexperienced in radio and everything that happens is new. They don't care about the technicalities of the hobby and are free to experi-ence the fun in experimenting with aerials, add-ons and so on without the restraints of the transmitting amateur.

For those with even the simplest receiver, like the Vega 204, there is a lot of pleasure to be had from carefully and very slowly tuning round each band in turn, listening to the enormous variety of stations using the air to carry their messages around the world. Politics and religion play a large part, but there are programmes on almost any subject one can imagine, from stamp collecting to natural history and all free at the turn of the dial. You don't have to be technically minded to enjoy them.

Gradually you'll begin to recognise the call tunes of the various stations and, per-haps, begin to make up your first record of the stations you've heard and where they can be found. Careful listening will give you an idea of the best times to listen for the different stations, and all this information can be noted down for future reference.

This is where it all starts and next month we'll look at some of the additions you can make to your station to make listen-ing easier and more efficient. Until then, happy listening.
JUST PUBLISHED

3rd EDITION OF

U.K. LISTENERS CONFIDENTIAL

FREQUENCY LIST

50% LARGER, SMARTLY BOUND

with semi-stiff cover.

Completely revised:- Now includes lots more

information on MILITARY, CIVIL, AIR,

MARITIME, PRESS BULLETINS, RTTY etc.

£5.95 + p.p 75p

4 PUBLICATIONS

YOU SHOULDN‘T BE WITHOUT!

UK LISTENERS CONFIDENTIAL

FREQUENCY LIST NEW EDITION

This publication has now sold well over 2500 copies since it was advertised only

a few months ago. Now the recent updated version is selling even better. No

self respecting listener should be without a copy. If you enjoy exploring the

short wave bands then this publication will add to your enjoyment. It covers the

hf spectrum from 2 to 30 mHz and gives details of transmissions outside the

amateur bands. Specially designed for the UK and European listener it sets out

in a very easy way a comprehensive list of hundreds of interesting

transmissions that will keep you occupied for days on endl Only a fraction of

the cost of other similar publications it contains details of Marine, Air, Military,

Embassy, Press and News agencies. Many listings have time schedules

included together with comprehensive RTTY details. It tells you the

frequencies used by civil and military aircraft whilst flying the Atlantic, when

and where to pick up the press bulletins, long distance marine traffic etc and

much more. Send today for your copy of this worthwhile publication.

£5.95 p&p 75p

VHF-UHF AIRBAND

FREQUENCY LIST

This frequency manual is without doubt the most comprehensive list of

VHF/UHF aircraft listings available in the UK. Of vital importance to the airband

enthusiast or indeed any keen VHF/UHF listener it sets out in a very easy to

follow manner full details of a whole host of stations. Every known UK airfield

quotencies, etc. Included are Civil RAF, USAF, MOD, Naval fields on both VHF

and UHF bands. There are also air to air frequencies, the Red Arrows

frequency, and much more. Send today for your copy and find out just how

much you have been missing!

£3.95 p&p 40p

WATERSTAN

STANTON

ELECTRONICS

SCANNER OPERATORS GUIDE

to the VHF-UHF SPECTRUM

Many listeners have asked for a guide to th wide VHF/UHF spectrum and to

meet this request we have recently published this frequency manual. It covers

the range 27 to 1300 MHz and has been specially prepared for the UK listener.

Anybody who has used a scanning receiver will know that the wide frequency

range involved means that it is difficult to know exactly where to listen. This

guide takes all the guessing out of monitoring. It lists all the services

throughout the spectrum together with both simplex and duplex frequency

splits. If you’ve spent your hard earned money on a scanning receiver or are

considering buying one you’ll find that this publication contains a wealth of

information that has previously remained un-published!

£3.95 p&p 40p

HF OCEANIC AIRBAND

RADIO SUPPLEMENT

Prepared in response to many requests for more information about the air

traffic on the hf bands this little guide sets out to explain to the beginner how

the hf band works in relation to air traffic. It contains full details of the world

aircraft frequency bands in the range 2 to 23 mHz together with control

frequencies and those commonly used for Oceanic control. Also included are

many VOLMET frequencies, the Search and Rescue frequencies used by RAF

helicopters and Nimrods, the Hf RT network, London Company frequencies,

European control centres etc. An ideal companion for the hf airband listener.

Send today for your copy.

£1.95 p&p 35p

18.20 MAIN ROAD, HOCKLEY, ESSEX - 12 NORTH STREET, HORNCHURCH, ESSEX.

MAIL ORDER TO: 18.20 MAIN ROAD, HOCKLEY, ESSEX TEL: (0702) 206835

MAY 1986 please mention AMATEUR RADIO when replying to any advertisement
SIMPLIFIED

—RECEPTION

A BEGINNERS’ CIRCUIT

by Old Ham G3SYX

Supposing someone gave you the circuit diagram shown in Figure 1, and after a few words of encouragement left you to build it. Even the most recent novice would have his doubts about the success of the project, for no amount of practice would make it function as it is.

Now look at the block diagram in Figure 2! At first sight this may convey little, but after a few seconds the majority will have rumbled the writer’s ruse. But forgive the alliteration and take Figure 2, fitting it into the spaces marked A, B and C. The puzzle is now complete and the reader will quickly realise that the diagram is, in effect, that of a simple TRF receiver; the integrated circuit. This IC is the ZN414, manufactured by Ferranti and incorporated into the TO-18 package, normally used for transistors.

Three features

This small but useful product of CDI technology offers the constructor a complete RF amplifier in three stages: a detector, an AGC circuit, and a high impedance input stage. The main advantage is obvious to all: few external components are required. Indeed, it can be constructed with as few as half a dozen small components, if one wishes to leave out the switch and two ferrite rod aerials.

Shown in Figure 3 is the underside view of the ZN414. Three simple connections complete the circuit and one has an effective radio receiver which can be used with a crystal earpiece or fed to an existing amplifier, care being taken not to use an obsolete ac/dc, otherwise known as the universal type.

Action of the AGC system is really effective, adjustment being facilitated by the correct choice of resistance, which is in the order of 470 to 500 ohms. The writer’s experiment with a 1k potentiometer determined that 475 ohms proved to be a good value, but not being endowed with excessive patience the nearest fixed preferred value of 470 ohms was quickly substituted to considerable effect.

Quality is not difficult to achieve, as the audio current consumption is very low, being in the order of a mere 0.3mA typical to 0.5mA when receiving strong signals. For the more knowledgeable and ambitious constructor, the following information on the ZN414 will be of interest.

Supply voltage range is from 1.2 to 1.6 volts, 1.3 being recommended. Operating temperature is very wide, being of the order of 0 to 70 degrees centigrade. As stated, the supply current is low (0.3 to 0.5mA), the lower figure being consistent with quality reproduction. Useful frequency range is from 150kHz to 3MHz, but if found that frequencies above and below this range were tunable, this being due to careful construction and adjustment vis-a-vis short leads etc. No alignment is required, this being an additional bonus to experimenters who possess little equipment.

Operating conditions

In correct operating circumstances, output is set at ≥ 30mV whilst power gain is typically 72dB. Total harmonic distortion is claimed to be < 2.0 per cent under correct operating conditions, that is with $R_{AGC}$ set to 470 ohms, thus allowing a 20dB AGC range. Manufacturers claim that a 4kHz bandwidth can be achieved, with a threshold sensitivity of 50µV, but it must be stressed that good quality inductances with the correct

$$Q = \frac{R_{AGC}}{2\pi f C}$$

must be used, this being commensurate with the correct supply voltage. Input resistance is high, being in the order of 4Mohms.

Layout is important, particularly when one considers the practical application of the higher end of the frequency spectrum. Leads must be kept short, and the output decoupling capacitor should be soldered as close as possible to the output and earth leads of the IC, care being taken to use a heat shunt during such operations. Once more, for the aficionado. The value of the output decoupling capacitor in conjunction with the AGC resistor should be calculated for a break point at ~4kHz. This equation will be of use:

$$C = \frac{1}{2\pi f R_{AGC} C}$$

During layout of the tuning assembly, care should be taken to ensure that all components are placed at some distance from the voltage supplies and output circuits. The moving plates of the tuning capacitor should ideally be connected to the junction of the 100k resistor and the 0.01µF capacitor.

In both TRF and superhet receivers, good quality is an all important factor. Essential then is the use of high Q inductors, in conjunction with a tuning capacitor of good quality and a low loss wide band range. Once again, the weakest link is at the point of minimal lead-length is stressed, and in these circumstances the simple little TRF receiver will compare favourably (from aspects of selectivity and sensitivity) with many a superhet, some of which can be indistinguishable in operation. One disadvantage is that, despite an excellent AGC system, very strong signals are apt to cause swamping. This was one reason for the experiment with the AGC resistor.

There is no reason why a ferrite rod assembly, or individual ferrite rods, should be used. In fact, the writer has tried the circuit with normal coils and an aerial, but if the more convenient components are utilised the set should be rotated for a ‘null-out’ or strong signal. Better control of tuning was accomplished by the use of a reduction drive. From an aspect of gain, the ZN414 is said to be voltage sensitive, and it follows that less operating voltage will be required in areas of high signal levels. In such circumstances, AGC setting may differ slightly from the preferred value. If an excessive signal does swamp the receiver, resulting in the occupation of a
SIMPLIFIED RECEPTION

wide bandwidth, it may be necessary to try another AGC resistor value. Extreme cases of this often result in the saturation of the RF stages of the IC, prior to limitation. Bad swamping will reduce the audio.

Ferrite rods
When considering these, the ratio of diameter to length should be considered. This should be large in order to ensure preservation of better directional properties. Measurements from 1½ to 8 inches may be tried with varying results. A combined long and medium wave assembly can also be used if required.

The writer has used the ZN414 to great advantage in other circuits. Those interested in further experiments can obtain information from the manufacturers. There can be no doubt of the adaptability of this tiny, yet monolithic 'chip'. It is suggested that the enthusiast can try his own layout, having been guided by the foregoing information. The author used a piece of 8 x 5 inch wood for the first experiments, but a small piece of Veroboard is far superior.

An add-on amplifier
Following the author's ideas on simplified reception, it was thought that an amplifier of a similar nature might be a useful exercise in audio unit construction. The unit shown in Figure 4 is easy to construct on a piece of Veroboard, although the author quickly completed the circuit on a wood base. It will be noticed in the circuitry on the left hand side of the screen that the 1k resistor (R_AG) has been increased in value from 470 ohms, which was used in the previous article. This is approximately twice as high as the manufacturer's recommended value, but it is suggested that a 1k linear potentiometer be used and adjusted for optimum results, after which it may be removed, measured and replaced with a fixed resistor of the measured value.

As stated previously, the ZN414 is a voltage sensitive device, and in areas of strong signals less supply voltage will be required to ensure correct AGC action. Therefore, any station which occupies an unusually wide bandwidth may be the result of an incorrect AGC adjustment. Extreme cases will cause a high degree of saturation in the RF stages in the ZN414. When amplified this will sound unpleasant and distorted, effective audio being lost.

Once the correct adjustment has been obtained, the rest is plain sailing. One will have to search diligently to find such a fine little amplifier with such a low battery drain. Good reception was obtained at all levels of volume setting, except when a mere 6mA was being consumed when a loud signal was evident. One watt can easily be obtained, this being conditional upon some 16 to 25mA being consumed. It is important that heatsink tabs should be used with the TBA800 IC.

Fig 2 A linear integrated circuit

Fig 3 Underside view of ZN414

Fig 4 A one chip amplifier for the beginner’s ZN414 Rx
Do you want to access a new amateur band that is always open when it is supposed to be, a band that does not fade away without warning, a band that makes DX contacts sound like locals and has no skip zones? No this article is not about to describe one of the new WARC bands, this article deals with the satellite communications bands.

Listening to or working through amateur communications spacecraft is not difficult in itself. However, most beginners don't know how to go about it properly. Not knowing what they are doing, they usually achieve indifferent results and because they put in so much effort without achieving any significant results they give up and go back to their regular haunts, where they can usually at least find someone to talk to.

This is a shame because satellites have come of age. Commercial equipment is readily available for the satellite bands just as for the regular HF or VHF bands. You can thus buy or roll your own. In either case, just like on 20 metres or the other HF bands, you have to have some knowledge of what is going on in order to get the maximum enjoyment out of the equipment.

**Basic satellite jargon**

A communications satellite is a repeater in the sky. It receives signals transmitted up from the ground on one amateur band, and re-transmits the same signals down to Earth on a second amateur band. It is part of a communications link between two radio amateur stations on the ground, as shown in Figure 1. Signals on their way up to the satellite are being 'uplinked' by stations on the ground, while the corresponding signals coming down from the satellite are being 'downlinked'. Communications satellites travel around the earth in fixed paths. These paths are called 'orbits', because the spacecraft is in orbit around the Earth. As the satellite travels around the globe it passes over different places. The point on the surface of the Earth immediately beneath the satellite at any time is called the 'sub-satellite point'.

**Altitude dependent**

The area of the globe that the satellite can see will depend on its altitude. Just as when a person climbs up a tower, the higher that person is, the more of the Earth he can see. A commercial communications satellite in a high altitude over the equator can see about one third of the surface of the world. A satellite in a low altitude can see much less. Most orbits are not circular but are elliptical. The highest point above the surface of the Earth in the orbit is known as the 'apogee', and the lowest point of that same orbit is known as the 'perigee'.

Any station that can be seen by the spacecraft can also see it. When a station can see the spacecraft it is said to be 'in range' of it. Thus, any two stations who are in range of the satellite at the same time can communicate through it. These stations are said to have a 'window' into the satellite. The orbit of the satellite is fixed, but the Earth rotates beneath it.

The time taken for the satellite to travel once around its orbit, from the place where the sub-satellite point crosses the equator to the next time the sub-satellite point crosses the equator going in the same direction, is called the 'period' of the orbit. When the sub-satellite point has returned to the equator, the point on the surface of the globe that was under it before will have moved away due to the rotation of the Earth, and a new location will be beneath it. The amount of degrees of longitude that have gone by are known as the 'orbital increment' (see Figure 2). The first orbit of the day is known as the 'reference orbit'.

Stations on the surface of the Earth will see different parts of different orbits, as shown in Figure 3 (Table). The azimuth, or horizontal bearing and elevation of the spacecraft, will change with the orbit. The spacecraft will appear to rise above the horizon when it enters
UCING WIRELESS COMMUNICATIONS

Joe Kasser G3ZCZ

Communications can be enjoyed by everybody

The range of the ground station. The time that the spacecraft rises above the horizon is called AOS, or Acquisition Of Signals. The position of the satellite in the sky as seen by the ground observer will change as it passes along its orbit, rising higher in the sky, passing across the sky, getting lower, and then finally setting on the horizon.

The time that the satellite sets beneath the horizon of the ground station is called LOS or Loss Of Signals. The path traced by the satellite in the sky as seen by that ground station will be different for different types of orbits. The path traced by satellites in circular orbits will usually approximate a section or ‘chord’ of a circle. The path traced by satellites in elliptical orbits will depend on the apogee and perigee of the orbit, and how close the observer is to the sub-satellite point.

Characteristics of satellite signals

In order to copy signals from satellites, we first need to know a little about the types of signals we are trying to receive. At any particular time, an observer on the ground may see the satellite in any direction with respect to the horizon (azimuth), and at any altitude between the horizon and directly overhead (elevation). This means that signals from various satellites arrive at a receiving station from any angle in any direction.

Radio waves are generated in a polarised manner. Conventional amateur radio station aerials may generate vertically or horizontally polarised signals, depending on the position of the aerial with respect to the ground. If the radiating elements are horizontal, the aerial is said to be generating horizontally polarised signals, and conversely if the elements are vertical, the aerial is vertically polarised. The same polarisation also holds for reception. Thus vertical aerials receive vertically polarised signals best and horizontal aerials receive horizontally polarised signals best. True vertically polarised aerials will copy few or no horizontally polarised signals.

Two metre and other VHF/UHF FM aerials are vertically polarised, while base stations working SSB/CW use horizontal aerials. This is because car aerials are vertically polarised, and the mobile stations put weak signals into horizontal aerials. In the early days of mobile radio communications, amateurs fitted ‘halo’ aerials on their cars to send and receive horizontally polarised signals so as to be compatible with the base stations.

Verticals rule

When the mobiles using FM began to outnumber the fixed stations, there was no need for them to use horizontal polarisation and verticals became the rule. Nowadays, any base station who wants to use FM has to use vertical polarisation.

On the high frequencies, both types of aerials are used interchangeably and everyone manages to work everybody. This is because the polarisation of the radio waves changes as the signals pass through the ionosphere. A process known as ‘Faraday Rotation’ rotates the polarisation of the signals. The signal as received on the ground is not entirely vertically or horizontally polarised, and as such may be copied at somewhat lower signal strength on any aerial. Perhaps the good performance of verticals as such may be copied at somewhat lower signal strength on any aerial. Perhaps the good performance of verticals is due to the leaving both vertical and horizontal elements. When conditions in the ionosphere are changing, the received signals may appear to fade, ie, get weaker and stronger as the plane of polarisation is rotated by the ionosphere.

Satellite orbits are outside the ionosphere, which means that the signals from the spacecraft are affected by the ionosphere in a similar manner to conventional terrestrial signals, ie, the polarisation of their signals will be changed.

The ionosphere is not a constant layer

ASORTED SATELLITE PASSES FOR 1 DECEMBER 1985

<table>
<thead>
<tr>
<th>UTC</th>
<th>Azimuth</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degrees</td>
<td>Degrees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1748:00</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>1750:00</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>1752:00</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>1754:00</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>1756:00</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>1758:00</td>
<td>62</td>
<td>41</td>
</tr>
<tr>
<td>1800:00</td>
<td>91</td>
<td>42</td>
</tr>
<tr>
<td>1802:00</td>
<td>115</td>
<td>35</td>
</tr>
<tr>
<td>1804:00</td>
<td>131</td>
<td>26</td>
</tr>
<tr>
<td>1806:00</td>
<td>140</td>
<td>17</td>
</tr>
<tr>
<td>1808:00</td>
<td>147</td>
<td>10</td>
</tr>
<tr>
<td>1810:00</td>
<td>151</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTC</th>
<th>Azimuth</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degrees</td>
<td>Degrees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1856:00</td>
<td>347</td>
<td>5</td>
</tr>
<tr>
<td>1858:00</td>
<td>344</td>
<td>12</td>
</tr>
<tr>
<td>1900:00</td>
<td>340</td>
<td>21</td>
</tr>
<tr>
<td>1902:00</td>
<td>333</td>
<td>32</td>
</tr>
<tr>
<td>1904:00</td>
<td>318</td>
<td>45</td>
</tr>
<tr>
<td>1906:00</td>
<td>286</td>
<td>56</td>
</tr>
<tr>
<td>1908:00</td>
<td>242</td>
<td>54</td>
</tr>
<tr>
<td>1910:00</td>
<td>217</td>
<td>41</td>
</tr>
<tr>
<td>1912:00</td>
<td>205</td>
<td>28</td>
</tr>
<tr>
<td>1914:00</td>
<td>199</td>
<td>18</td>
</tr>
<tr>
<td>1916:00</td>
<td>195</td>
<td>10</td>
</tr>
<tr>
<td>1918:00</td>
<td>192</td>
<td>3</td>
</tr>
</tbody>
</table>

Space shuttle Challenger

<table>
<thead>
<tr>
<th>UTC</th>
<th>Azimuth</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degrees</td>
<td>Degrees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0625:00</td>
<td>325</td>
<td>0</td>
</tr>
<tr>
<td>0628:00</td>
<td>330</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UTC</th>
<th>Azimuth</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degrees</td>
<td>Degrees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0627:00</td>
<td>334</td>
<td>10</td>
</tr>
<tr>
<td>0628:00</td>
<td>343</td>
<td>20</td>
</tr>
<tr>
<td>0629:00</td>
<td>7</td>
<td>37</td>
</tr>
<tr>
<td>0630:00</td>
<td>77</td>
<td>43</td>
</tr>
<tr>
<td>0631:00</td>
<td>113</td>
<td>24</td>
</tr>
<tr>
<td>0632:00</td>
<td>124</td>
<td>13</td>
</tr>
<tr>
<td>0633:00</td>
<td>129</td>
<td>6</td>
</tr>
</tbody>
</table>

Show are azimuth and elevation angles from the ground station to the different spacecraft at different times of the day. It can be seen that in order to adequately copy signals from the spacecraft, the ground station must be able to receive signals coming from any azimuth or elevation. This figure only lists data for one of the passes for each satellite. As a rule they will be audible at other times of the day with signals coming from other directions.

MAY 1986

please mention AMATEUR RADIO when replying to any advertisement
above the Earth but is made up of patches or clouds. Since the satellite is moving, the uplink and downlink signals will pass through different parts of the ionosphere at different times, and the effect of the ionosphere on the signals will be different as time passes, as shown in Figure 4.

**Low power**

Now, not only does the ionosphere refract radio waves and change their polarisation, it may also attenuate the signals, or even absorb them. As the spacecraft travels along its orbit, it may be spinning and tumbling, or the satellite itself may shield the on-board aerial from the receiving station. It is also probable that due to the constraints of the onboard equipment, the transmitter on board the space vehicle is transmitting at a power of less than 10 watts.

The bottom line is that signals from satellites may arrive at the ground from any direction in azimuth or elevation, with any polarisation and at any signal strength (usually very weak), all of which may (and usually do) vary as a function of time.

**Next Month**

Aerials, those in common use and their characteristics. Receiving signals and locating the satellite. Joe Kasser will explain all of this and more.

---

**Fig 4** Some factors affecting satellite communications

1. 'Clouds' move around and change shape
2. Effects are different at different frequencies
3. The satellite itself may shield on-board antenna from one or more ground stations. Such shielding was first noted on Oscar 6
4. Clouds attenuate or rotate signals

---

**THE PERFECT COMPLEMENT TO AMATEUR RADIO**

Packed with construction projects and the latest technology plus pages of readers' classified ads

Take out a POST-FREE (UK) sub while offer lasts

- Delivery to your door by publication date each month
- Inflation proof – price guaranteed for 12 months

On sale NOW at your newsagent and at equipment dealers
The Archer Z80 SBC

The SDS ARCHER — The Z80 based single board computer chosen by professionals and OEM users.
- High quality double sided plated through PCB
- 4 Bytewide memory sockets — upto 64k
- Power-fail and watchdog timer circuits
- 2 Serial ports with full flow control
- 4 Parallel ports with handshaking
- Bus expansion connector
- CMOS battery back-up
- Counter-timer chip
- 4 MHz. Z80A

OPTIONS:
- SDS BASIC with ROMable autostarting user code
- The powerful 8k byte SDS DEBUG MONITOR
- On board 120 / 240 volt MAINS POWER SUPPLY
- Attractive INSTRUMENT CASE — see photo.
- 64k / 128k byte DYNAMIC RAM card
- 4 socket RAM — ROM EXPANSION card
- DISC INTERFACE card

Sherwood Data Systems Ltd
Sherwood House, The Avenue, Farnham Common. Slough SL2 3JX. Tel. 02814-5067

SELETRONIIC

ANOTHER FIRST FROM THE UK's LEADING SUPPLIER OF 934 MHz PERSONAL RADIO EQUIPMENT MT 370-934 MHz HAND HELD TRANSCEIVER

* FEATURES *
- 20 CHANNELS
- 10 MEMORY CHANNELS
- FULL SCAN FACILITY
- HIGH PERFORMANCE RF OUTPUT
- 5w + 2w SWITCHABLE
- VERY SENSITIVE RECEIVER
- OUTSTANDING AUDIO QUALITY
- HIGH CAPACITY BATTERY PACK
- HALF WAVE WHIP ANTENNA

MOBILE ADAPTOR WD-3
Use this adaptor for a more permanent installation. The handset plugs into the adaptor without the battery pack.

NICAD CHARGER. PF-34A
Mains battery charger for 7.2v nicad pack.

NICAD PACK
7.2v 1500mah replacement nicad battery pack.

203 HIGH STREET, CANVEY ISLAND, ESSEX.
Telephone: Canvey Island 691481

MAY 1986 please mention AMATEUR RADIO when replying to any advertisement
AN INVERTED BOW-TIE BEAM FOR 15 AND 20 METRES

A compromise between the chequebook and the DX bands

by DV Pritchard G4GVO

In these days of uncertain prices the new class A licensee often faces problems when considering the purchase of a commercial beam. Of course, the problem is not only confined to him but to others whose resources may be similarly slender, and very often a compromise has to be reached between the cheque book and the DX bands. This usually results in a dipole or a vertical or, in some cases, a long-wire if space permits. The construction of a high-gain beam is therefore not only a solution to these problems, but an attractive proposition for most amateurs who enjoy making antennas and look for encouraging results.

Among the antennas designed by Fred Caton VK2ABO/G3ONC, one in particular deserves more prominence than it seems to have received in recent years.

His 'Bow-tie' beam, although originally designed as a monobander for 20 metres, works extremely well when elements for 15 metres are incorporated: 10 metres being difficult to achieve owing to the proximity of the elements.

Original design

The original design requires a boom length of 24 feet, crossed 6 feet from each end by 12 foot spacers, and while this size may suit some locations it may be too large for others. However, the author discovered that it works quite well when erected in an inverted vee configuration, when it not only has the advantage of a reduced boom length of 20 feet, but the feed-point being close to the masthead gives a high current distribution point, which is an even greater advantage.

Undoubtedly however, its most desirable features are its 6dB forward gain (reference dipole) and its front-to-back ratio of between 20 and 24dB; figures which, for today’s crowded bands, speak for themselves.

The principle of the beam

Figure 1 shows the layout of the beam when viewed from above, where it can be seen that 2 sets of elements are employed. Each element is a half-wave dipole resonant at the LF end of each band and corresponds approximately to the formula:

\[
\text{Length (feet)} = \frac{492}{f(\text{MHz})}
\]

which is used to provide sufficient wire lengths for trimming later on.

If complete loops of wire were employed, the antenna would provide bi-directional radiation, but by inserting insulators where indicated it results in a
pair of closely-coupled high-Q circuits, the rear elements acting as voltage-driven reflectors with a 90° phase shift. The physical angle of the elements, however, tends to reduce an otherwise double-humped response and provides a very useful forward lobe for DX working.

**Construction**

Figure 2 shows the appearance of the beam when erected, and although its construction may seem formidable, in reality it is quite simple. The array is suspended with “Polyprop” plastic clothes-line (no metal inside) from a small wooden gantry attached to the halliard of the mast.

In Figure 3 details are given for the construction of this item, 2 x 2in prepared timber is used and rings, or saddles, mounted as mast guides, although U-bolts would serve just as well if wider timber was used.

The feedpoint on the front may be made from any suitable material and a cover made to fit snugly over it, weatherproofing being effected with an appropriate sealant. A similar size block is required for the back but it should be fitted with a brass or copper strip to provide continuity for the reflector elements.

**Beam constructions**

Figure 4 shows details of the front or rear view of the assembly. The 20 foot boom is 2 x 1in prepared timber, although two 12 foot lengths overlapped and joined together will serve just as well.

A hole is drilled 2 inches from each end to admit the plastic line, and two more 9 inches from the ends for a pair of threaded hooks and nuts. A 2 foot length of 2 x 1in timber is bolted in position at the centre as shown, and fitted with mast guides as in the gantry.

The element spacers are made from 12 foot lengths of bamboo, which may be obtainable from nurserymen, but an 8 foot and two 4 foot lengths overlapped and securely taped together will serve quite well. At this point it should be remembered that bamboo is a poor insulator when wet and that undesirable electrostatic fields may be set up as a result.

Les Moxon G6XN draws attention to this in his excellent *HF Antennas for All Locations* (Radio Society of Great Britain). Bamboo also develops splits and cracks unless it is well protected. For a first-class job, wrapping it with fibreglass matting and dressing it with the appropriate resin is recommended, but this is a costly procedure and a winding of insulating tape well applied will do very well. It is also suggested that the elements should not be attached directly to the bamboo but supported by fine nylon line, which makes an excellent insulator.

Lightweight plastic stranded wire is recommended for the elements, and the suggested method of assembly is as follows.

---

*Please mention AMATEUR RADIO when replying to any advertisement*

**MAY 1986**

---

*World Radio History*
**Supporting gantry**

The supporting gantry is assembled round the mast and pushed up two or three feet, where it is temporarily secured in position by any convenient means. The boom is then laid out at the bottom with its guides round the mast but not secured to it, to allow for vertical movement when required. The halliard is made off securely to the gantry, together with the Polyprop lines. About 18 feet of line should be used for each side, the ends being passed through the holes in the boom with loose knots tied in them to prevent them from slipping out.

The wire for the elements is cut to the required length and secured to the bamboo spacers as shown in Figure 1, ensuring that symmetry is maintained at all times.

Each half is assembled separately and it is useful to fix the spacer in a straight line on the ground and crossed at its centre position with a straight edge.

By this means the wires can be set out accurately. On completion, each side is connected to the feedpoint and the connecting strip at the back. The co-ax feeder is connected at the same time. Figure 5 shows the side view of the array.

**Raising the boom**

Thin nylon line is loosely attached to the hooks and made off at the insulators, which may be between 2 and 12 inches from the boom. The wires are passed through them and temporarily secured with a foot or so of wire left dangling from each for trimming at a later stage.

When complete the assembly is gently raised to take up the slack, but on no account should the elements be allowed to take the whole strain. Just enough tension should be applied to ensure that the array is symmetrical, then the Polyprop should be fastened securely to the boom. The centres of the spacers may now be fastened to the Polyprop and the nylon bracing lines fixed in place.

**Trimming the elements**

A GDO or its transistor equivalent is required for this and the following points...
should be noted. Early methods of trimming suggested that a 2 or 3 turn pick-up coil should be connected across the feedpoint and the measurements carried out there.

In the author's experience this is not good practice as the presence of a person in close proximity to the loops may lead to inaccurate measurements. A better method is to connect the pick-up coil across the ends of the co-ax and place this on a non-conducting surface, such as a table, placed a few feet away from the antenna. The co-ax may conveniently be spread around, but not directly under the beam in a heap. Although this method entails some activity, the results are worth it. If help is at hand, so much the better, but in any case it can be done quite easily by one person.

Temporary connection
The ends of the wires are stripped of their insulation and temporarily connected to make loops. Ensure that the correct wires have been connected. (The author mentions this because on one occasion, long ago, a friend was the source of much innocent merriment. He had been GDOing for about four hours and getting nowhere. Inspection revealed something we've all done at times - he had cross-connected the wires.) Push the connected ends well apart from each other, raise the beam to its full height and check the reading on the GDO.

Good exercise
It may take a little while (and some useful exercise) before the midband positions are found, but when they are, the beam is lowered to a convenient position and the wire connection points noted and prominently marked. The ends are then made off to the insulators, ensuring that the marks appear at the proper place, and the remaining wire is twisted for about an inch and soldered. The surplus wire is removed and any bare wire left exposed is taped in the usual way.

Polyprop lines secured to the boom ends will not only rotate the assembly but serve as guys at the same time. A coat of primer followed by a couple of coats of paint to the woodwork will preserve it, and a light grey-blue shade was found to be very effective against the sky. It is astonishing how this appears to reduce the apparent lengths of the boom and spacers.

Conclusion
Although no mention of a balun has been made, it would probably be a useful refinement to employ one, bearing in mind that a high-gain balanced system is being fed with unbalanced line. Alternatively, 75 ohm twin feeder into an ATU would probably answer just as well, although the author has not tried it. In any event, the antenna was used for over a year at the author's QTH without a balun and the results were excellent. Another point ought to be mentioned regarding the element lengths. While those described were found to be correct at the author's QTH, some difference may be found in other locations according to the height above ground of the boom, the effect of the earth itself and, in certain instances, the thickness of the wire. These differences are not likely to be very great, but it may mean a slight extension in the lengths of perhaps a few inches. Should this be the case it will obviously entail some extra work but, as mentioned earlier, the end result is worth it.

Easy DX
During the period that this antenna was used world-wide DX was worked with ease. Comparison tests using a VK2ABQ 'Coat-Button Quad' against the 'Bow-tie' with Stateside stations for over a month revealed the forward gain to be an average 6dB, and the front-to-back ratio between 20 and 24dB. Both antennas were mounted at 30 feet and well apart. It is hoped that these findings will encourage readers to build the beam and discover its potential for themselves.
presents the brilliant ALINCO
2 METRE TRANSCEIVERS
ALR-206E  25 WATTS  2 METRE MOBILE
- 144-146 MHz FM
- 25 watts output
- 10 memory channels, band scan
- All programming from keypad on microphone
- Back lit LCD frequency display with LCD 'S' metre
- Frequency selection from front panel or microphone
- Mobile mount included
The ALR-206E features microprocessor controlled versatility and programming from the microphone in a compact package.
ALR-206E Price: £295 inc VAT. (p & p £2.50)
Isopole 144 omni-directional antenna: Price £39.95 (p & p £2.50)

ALM-203E
3/5 WATTS  2 METRE HANDHELD
- 144-146 MHz FM
- 3 watts with NiCad, 5 watts with DC/DC converter
- 10 memory channels
- Programmable band scan
ALM203E Price: £239 inc VAT (p & p £2.50)

ELH-24B
30 watt amplifier
Built in Ga As FET Pre-amp
INCREDBLE OFFER save OVER £58.00 purchase ALM-203E and ELH-24B together for just £249.95 (p & p £4)

ICS Electronics Ltd.
PO Box 2
Arundel
West Sussex BN18 0NX
Telephone: 0243 655 590

THE THREE PART AMATEURS HANDBOOK
is available as a complete set for only £2.50 (including post and packing).

The Handbook is an informative guide to the world of the amateur radio enthusiast. It contains a multitude of useful facts and figures designed to benefit both the novice and the licensed amateur.

To: Radio & Electronics World • Sovereign House • Brentwood • Essex • CM14 4SE
NAME
ADDRESS
Postcode

PLEASE SUPPLY:
1 set of R&EW AMATEURS HANDBOOK
PAYMENT ENCLOSED: £2 — 50
CREDIT CARD PAYMENT
Signature

To: Radio & Electronics World • Sovereign House • Brentwood • Essex • CM14 4SE
NAME
ADDRESS
Postcode

PLEASE SUPPLY:
1 set of R&EW AMATEURS HANDBOOK
PAYMENT ENCLOSED: £2 — 50
CREDIT CARD PAYMENT
Signature

World Radio History
So far in this series we have looked at the basic requirements for the system and the different types of heads that are available to save the hard work of doing our own mechanical engineering. This month we move on to the electronics that are needed to make up the transmit side of the gear.

**Voltages**

In an earlier article we saw that the Gunn diode, which generates the microwave energy, is susceptible to changes in voltage and that this provides an easy method of obtaining FM. It also means that unless precautions are taken to minimise drifting supply line voltages, we will also have a problem with long term stability. This is particularly important when considering portable gear that may be run from dry cells. Another important point is that the Gunn diode is actually a negative resistance device and so takes more current as the voltage is reduced.

The diode should never be operated at a supply of less than five volts (the present design making it impossible to do so). When testing a unit on the bench with a variable supply, do not start as you would with most circuits at zero volts and slowly increase them; this is a sure way of destroying the diode. In this design the supply is stabilized at not less than five volts by the use of a 7805 regulator. As the Gunn diode only requires around 100mA there is no need to provide a heatsink, and the regulator is simply mounted on the board.

**Tuning**

Because nearly all activity is now in the area from 10.37 to 10.4GHz, it is possible to dispense with any form of mechanical tuning. This range and more can be achieved using electrical pushing of the Gunn diode. The actual range achievable will depend on the individual diode and the cavity in which it is mounted, but with a supply adjustable from five to nine volts the tuning range of the oscillator will usually be at least 50MHz, and extreme cases of over 100MHz range have been found.

The power output, which is usually around 8 milliwatts, will vary somewhat over this tuning range, but this is not a problem in practice. The tuning control is shown in the circuit diagram as VR2 and should ideally be a ten-turn potentiometer. A ten-turn counting dial is not really required as it is not possible to calibrate the control, it simply acts as mechanical bandspread.

**Alternatives**

These pots are not always easy to find, and can be expensive if purchased new. It is possible to use other values however, down to around 200 ohms or up to 2kohms, and the modifications to the original circuit are shown in Figure 2. In the case of a higher value pot, simply use parallel resistance to reduce the effective value to that required. If using a lower value we have to resort to a little trickery!

The current flowing in the earth lead of the regulator is around three milliamps, which is not sufficient to give enough 'jack-up' voltage when using a low value pot, so we use the pre-set (Rx) to shunt extra current through the tuning control from the main supply line. To set this up first set Rx at maximum resistance and the tuning control to give the highest available voltage on the Gunn supply line, then carefully adjust Rx until the Gunn voltage rises to nine volts.

**Modulation**

We have now got to the point where we have an oscillator tunable over the section of the band we require, giving a presentable amount of power; the next requirement is to get some audio on to it. This is easily achieved using a single BC108 audio amplifier stage. There is nothing unusual in the design, it is intended to take input from a 600 ohm dynamic microphone and the output is taken from the slider of VR1, which acts as the deviation control. The audio is then taken via a capacitor to the top of the tuning control and feeds through the regulator to appear on the Gunn supply line.

The amount of voltage swing to produce 300kHz deviation varies considerably with different Gunn diodes, but is usually somewhere in the region of 75 millivolts peak-to-peak. If a scope is
available this level can be set up as a starting point, although it will need to be finally set in tests with a station at a few miles distance. It is all too easy to get misleading results using across the bench testing.

Gain
Most commonly available microphones will have more than enough output for use with this circuit, but if you have one which has very low output, the gain of the modulator can be considerably increased by decoupling the emitter of the BC108 to earth using a 10µF capacitor. The modulator will handle data, RTTY and slow-scan TV signals without difficulty.

Tone oscillator
When the station you are trying to contact is looking for your signal, the obvious way of identifying it is to keep talking.

If he is having some difficulty this can take some time, and an easier answer is to provide a small audio oscillator to keep the signal modulated. This uses a TIS43 unijunction, with the circuit constants designed to give an audio tone of around 800 Hertz.

Several other circuits were tried but it was found that the very peaky pulsed output of this circuit gave a signal that was both distinctive and, more importantly, very easy to find, even when your signal is buried deep in the noise. The output and hence tone deviation level is set using VR3. It appears from the circuit that the same result could be achieved using a 100 ohm preset, instead of the fixed resistor, but this should not be tried. The tone deviation control is normally set about one third of the way up from the earth end, and the top end of the track acts as a series resistor to stop the audio from the modulator going to earth.

Tone override
The problem with using a tone oscillator is that when the man at the other end calls you and says that he has a signal from you, you tend to get excited and start talking without turning the oscillator off. One of the peculiarities of 10GHz gear of this type is that you do not have any transmit-receive switching to worry about, in fact you can do both at the same time. Because of this the press-to-talk switch on the microphone is redundant for its normal purpose, and so can be pressed into service as an automatic tone defeat switch.

Construction
There aren’t any special precautions to be taken when building the circuit, except that it is preferable to use good quality components. You do not want the gear to let you down when you are operating on a hill top 50 miles from home. The two .47µF capacitors, connecting the audio and tone circuits to the top of the tuning control, should be checked to ensure that there isn’t dc leakage through them, as this could cause a slight change in transmit frequency when going from tone to audio.

The unit could be built on a piece of Veroboard, but a special PCB for the circuit is available at a cost of £3 including post and packing from the Microwave Society, at 81 Ringwood Highway, Coventry CV2 2GT. This board is designed to fit on the side face of a standard die-cast box, and matches in size the receiver board, which will be described in next month’s article. By mounting both boards on the side faces of the box, enough space is left in the centre of the enclosure to accommodate the microwave head, loudspeaker and the controls, making a very compact unit.

<table>
<thead>
<tr>
<th>COMPONENTS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IC1</strong></td>
</tr>
<tr>
<td><strong>T1</strong></td>
</tr>
<tr>
<td><strong>T2</strong></td>
</tr>
<tr>
<td><strong>D1</strong></td>
</tr>
<tr>
<td><strong>C1,9</strong></td>
</tr>
<tr>
<td><strong>C2</strong></td>
</tr>
<tr>
<td><strong>C3</strong></td>
</tr>
<tr>
<td><strong>C4,7</strong></td>
</tr>
<tr>
<td><strong>C5,8</strong></td>
</tr>
<tr>
<td><strong>C8</strong></td>
</tr>
<tr>
<td><strong>R1</strong></td>
</tr>
<tr>
<td><strong>R2,4</strong></td>
</tr>
<tr>
<td><strong>R3,5,6</strong></td>
</tr>
<tr>
<td><strong>R7,8</strong></td>
</tr>
<tr>
<td><strong>VR1,3</strong></td>
</tr>
<tr>
<td><strong>VR2</strong></td>
</tr>
<tr>
<td><strong>S1</strong></td>
</tr>
</tbody>
</table>
ARE YOU A BUDDING WRITER?

We are particularly keen to receive construction articles, so if you have designed and built a project which you think could be of interest to fellow radio amateurs we would be pleased to receive your contribution. You do not need to be an expert writer to see your name in print. Accuracy in the design of your project is far more important. If you can put your ideas down on paper, typewritten if possible, and illustrate them with clear drawings and photographs where appropriate, the Amateur Radio editorial team will sort out the style, grammar, spelling, etc.

If you have an idea which you wish to discuss with the Editor before submitting in article form, she will be pleased to receive your call. We will, of course, pay for all articles which are accepted for publication.
HEATHKIT RA-1 RECEIVER

This excellent, robust, all valve amateur bands communications receiver is readily available secondhand. Richard Marris G2BZQ comments on its facilities.

Valves are those funny vintage glass things which plug into sockets, can quickly be extracted and replaced, and bought at a reasonable price from advertisers in this journal. They can be over-run, abused and ill treated, and still keep on working! Drop one on the floor and it will probably still work! Give one a sharp tap when it is located in its socket, and it will invariably shatter; a fact which can probably be attributed to an unknown law by a near relation of that well known lawgiver — Mr Murphy!

If fitted with battleworthy valves, and carefully re-aligned (if necessary), the RA-1 will take a lot of beating by one of the current oriental black box receivers purchased at a high price.

At its introduction, over twenty years ago, the writer purchased a Heathkit RA-1 in kit form. It was assembled, with the aid of the more than excellent instruction manual, and used until it was sold (with subsequent regret) when the writer moved his working QTH to W0-land in the USA.

Just a few years ago, having returned from the USA, another RA-1, with matching xtal calibrator, was purchased secondhand at a reasonable price. It was re-aligned using a BC221 — this, or a very accurate signal generator, is absolutely necessary to re-align the IF stages. A new EF183 RF amplifier valve was installed and it has given yeoman’s service ever since.

A surplus RA-1 (complete with 100kHz xtal calibrator) can be purchased for between £20 and £50. If it is in redeemable condition, then it is a bargain!

Would you believe that on 80 metre CW the writer’s RA-1 (IFs accurately lined up) is in such a state that the variable RF/LF gain control is seldom more than 50/75% of the maximum position. The AF gain control is usually around the 50% position. Headphones are used.

‘Ah yes’, it will be said, ‘but G2BZQ probably has a multi-element super dooper, mumbo-jumbo, fantastika, gold plated beam antenna, right on the top of the local mountain!’

This rumour is completely unfounded. Actually, an indoor antenna is used for transmitting and receiving in an apartment block, in a built up area. On 20 metres an all valve transceiver is used with an indoor antenna. On 80 metres CW an indoor antenna is also used, together with a Tx which can be ‘wound up’ to about 12 watts, but is usually running at 10 watts. The RA-1 Rx is used, again with an indoor antenna, on 80 metres.

Buying one?

So — buy a secondhand RA-1! Make certain that it comes complete with instruction manual, that it is physically and mechanically sound and that it is actually working, efficiently or otherwise.

The manual is superb. It includes specification, circuit description, parts list, step by step assembly, many detailed drawings and diagrams, alignment, testing and operating. If the receiver does not work, then there is a trouble-shooting section.

If you buy a surplus RA-1 complete with manual, and it is 100% all there whether working or not, starting at page 1 of the manual and checking every connection and operation — stage by stage — until you reach the last page will ensure that you will have a first class receiver.

The RA-1 receiver covers the following frequencies:

- 1.7 to 2.0MHz
- 3.5 to 4.0MHz
- 7.0 to 7.3MHz
- 14.0 to 14.45MHz
- 21.0 to 21.50MHz
- 28.0 to 30.00MHz

In other words it covers the 160, 80, 40, 20, 15 and 10 metre bands.

The sensitivity is quoted as 2 microvolts for 10dB S/N ratio or better (if you have the gear, and the knowhow, then it can be better).

The antenna input impedance is quoted as 75 ohms coaxial. The writer uses a 50 ohm antenna system with the front panel Ant Trim adjustment, and this is quite satisfactory.

The audio output is 2 watts via a 3 ohm loudspeaker (not included), or 600 ohm impedance headphones. The writer has tried both 1000 ohm and 400 ohm headphones and, frankly, in practice it is impossible to detect any difference.

The image rejection is quoted as 40dB or better, and this can be achieved with careful alignment. The RA-1 employs 7 valves, 2 semiconductor diodes and a

Heathkit RA-1 circuit diagram (courtesy Heathkit)
Front panel controls

- AF gain (and on/off switch)
- Tuning control/dial
- On/off BFO switch
- Upper and lower sideband switch
- S-meter
- Antenna trimmer
- RF gain control
- Band change switch
- AVC on/off switch
- Crystal calibrator on/off push button switch (every 100kHz markers)
- Noise limiter variable control

Voltage stabiliser. The front panel controls are shown in the table.

It will be noted that the question of IF frequency and selectivity has been carefully avoided so far. This is because it has to be explained in some detail.

There are two IF stages using EF183 and ECF82 valves and the IF frequency is 1621kHz. The anode of the frequency changer is coupled to the grid of the first IF amplifier valve via a half lattice crystal filter in the secondary winding of the IF transformer. The half lattice crystal filter provides a narrow bandpass for suppression of adjacent unwanted signals, which gives the RA-1 excellent selectivity. The crystals are 1.6214 and 1.6197MHz respectively. Here lies the biggest pitfall!

Your secondhand RA-1 should come with the IFs already accurately aligned. Resist the temptation to just give the dust cores of the IFs a little 'twiddle' — that is fatal! If you have reason to suspect that the IFs are incorrectly aligned, then get a highly accurate signal source on 1621kHz and carefully make a check. Spend some time studying the circuit specification and the handbook. If you are absolutely convinced that the IFs have been twiddled by a previous owner, and are 'off tune', then proceed to realign with care and do not hurry. Make a pencil mark on the IF can and on the chassis, so that if you move one of the dust cores you can get back to the original point. If need be, do just that. Messing about with the IFs can be a bit dodgy!

Testing and troubleshooting

Apart from the above remarks, it will be found that the manual adequately covers testing and troubleshooting.

If your RA-1 has had plenty of hours in service over its life, then it is a must to replace the RF amplifier valve, type EF183 (V1 on the circuit diagram). Copies of the circuit diagram and the block diagram are shown below.

The illustration shows the general panel and chassis layout, with the cover and baseplate removed. The cabinet size is $13\frac{3}{4} \times 11\frac{1}{2} \times 6\frac{1}{2}$ins high, and its weight is 8lbs.

An optional extra is a 100kHz crystal calibrator, which plugs into an octal socket on the chassis. This gives a frequency coverage of up to 30MHz in 100kHz harmonic steps. It is activated by
HEATHKIT RA-1

a small red push-button on the front panel, and is a must for calibration purposes. The Heathkit type number for the crystal calibrator is model CL-1, and hopefully it will be fitted to the RA-1 already.

Make your own
If you cannot get one, then the circuit diagram and component values are given below, and it would not be difficult to make up your own crystal calibrator. The crystal is 100kHz with .005% tolerance. The valve is shown as a 6AU6, but an EF94 can be used. Trimmer C2 is to adjust the frequency to exactly 100kHz, providing you can find an instrument accurate enough to measure closer than a .005% tolerance!

In conclusion it can be confirmed that the Heathkit RA-1 receiver is an attractively styled, well built and robust instrument. Remember that originally they were sold as kits for home assembly, so the one you buy will depend a lot on the standard of soldering by the original constructor. It is a good idea to have a good look at all soldered joints, and carefully re-solder if and when required. The performance of the RA-1 more than favourably compares with many present day, expensive black box receivers. What is more, everything is nice and cleanly spaced out and can be located on the chassis, which is more than can be said for most of the electronic jungles in the aforesaid black box Rxs.

SWL interest
A point of interest to the SWL in particular, is that Heathkit also made a general coverage cousin to the RA-1. This is the RG-1 general coverage communication receiver, and is an excellent job which can often be bought at a reasonable price. Once again, if you buy one, make certain you get the handbook/manual!
I HAVE YOU HEARD?

LOOKING FOR A HANDHELD? READ ON!

KT200 EE UHF Transceiver — less nicads/charger.
Empty battery case ........................................ £149 + £5.00 p&p

KT200 EE VHF Transceiver 140/150 MHz
................................................................. £169 + £5.00 p&p

KT400 EE UHF Transceiver 430-440 MHz
................................................................. £189.00 + £5.00 p&p

$1000 INSTANT CREDIT
HP/PERSONAL LOANS AVAILABLE
RWC CREDITCARD (written details on request)

Hi-Tec Worldwide Limited
584 Hagley Road West, Quinton, Birmingham B68 OBS
Tel: 021-421 8201 (24hrs) Telex: 334303 TXAGWM-G

SP—TOWARDS THE RAE 1986

This new book is prepared specifically for the City and Guilds of London Institute’s new RAE Syllabus 1986. In 26 topics it summarises the basic material and relevant theory for City and Guilds subject 785.

Author: John Bowyer (G4KGS) Principal Lecturer in Electrical Engineering at Polytechnic, Huddersfield.

Advisor: David Pratt (G4DMP) member of the City and Guilds Advisory Committee and Examiner for Editor: the RAE

Price: £3.95 inc p&p. (Money with order please)

Available direct from the Publishers, Bookshops or selected Radio Amateur dealers. Allow 14 days delivery

STAM PRESS LTD,
TRADE ENQUIRIES
Raans Road, Amersham, Bucks HP6 6JJ
Phone 024 03 28595/6

SSTV — RTTY — AMTOR — CW
The BEST is now even BETTER

The RX-6 Multimode receive program has been improved to make it even better value for the SWL/High performance reception of four modes in one easy-to-use program.

Features include:

CW software filters and controllable autotrack to 250wpm.
RTTY selectable unshift-on-space and nonreverse polarity. The tones are directly displayed on a tuning scale for really easy and accurate tuning.
BSTV any picture standard, grey scale adjust from keyboard.

Text and pictures stored for recall to screen, picture dump or saving on tape or disc.

Spectrum needs no hardware, BBC-B, CBM64, VIC20 use the same interface as our RTTY and CW transceive program, see below.

Tape £25, disc £27 (BBC: state 40 or 80 track)

RTTY AND CW TRANSCIEVE

RTTY and CW transceive for Spectrum (no hardware needed) £12

Lots of other programs. see March issue.

+ technical software (AR)
Fron, Upper Llandrrog, Caernarvon, Gwynedd LL54 7RF. Tel 0288 881886

W.H. Westlake
Clawton, Holsworthy, Devon.
(0409) 253768

1 H100 50 ohm Low Loss COAX 80p per m
50m – 10% 100m – 20% (p 5p p/m)

2 500 Double screened UR67 – 5mm dia 25p per m (post 3p p/m)

3 UR76 10.3mm Low Loss 50 ohm 60p per m (p 6p p/m)

4 UR76 50 ohm stranded conductor Coax 25p per m (p 5p p/m)

5 POPES RG58C/U with NC PVC 23p per m (p 3p p/m)

6 Mini Coax RG174/U 50 ohm 25p per m (p 1p p/m)

7 UR70 6mm 75 ohm Coax 23p per m (p 3p p/m)

8 UR57 10.5mm low loss 75 ohm COAX 60p per m (p 6p p/m)

9 75 ohm Double Screened 8mm 75 ohm Coax 35p per m (p 4p p/m)

10 Low Loss UHF TV Coax 75 ohm 20p per m (p 3p p/m)

11 75 ohm Twin Feeder 18p per m (p 2p p/m)

12 NEW! RG62AU 95/77mm dia Coax 50p per m
(p 5p p/m)

13 BOFA GMP6 Slotted 300 ohm Feeder 25 per m (p 3p p/m)

14 Strong PVC covered Aerial Wire 6p per m
(p 2½p p/m)

15 14 SWG Copper HD Aerial Wire 20p per m
(p 2½p p/m)

16 200m Mixed equipment Wire on Reels £5
(p £1,40)

17 50 ohm BNC plugs for UR67/H100 £3.60 each

18 50 ohm BNC plugs for UR67/H100 £2.50 each

19 50 ohm N line Sockets H100/UR67/213 £2.30 each

20 50 ohm N Chassis Sockets £1.80 each

21 50 ohm N Plugs for UR43/76 £2.50 each

— Post on plugs, 50p per order
ATTENTION ALL RTTY OPERATORS!!

DID YOU KNOW that 'Software-only approaches may demonstrate some elegant programming, but for reliability you can't beat a terminal unit' REW March '86.

WELL SCARAB SYSTEMS ARE PLEASED TO ANNOUNCE THE NEXT BEST THING.

SCARAB SYSTEMS are pleased to announce the NITE-2 RTTY filter unit. This is a new concept in RTTY filters as it not only improves filtering on conventional terminal units but also provides the computer operator who is operating a software only package with substantial signal enhancement. The NITE-2 features a pre-amplifier, limiter, tuneable bandpass filter and output amplifier. The output from the unit is variable so allowing maximum drive for users of non interfaced programs. An audio isolating transformer is included, this has been found to reduce the noise fed back into the transceiver from the computer. The NITE-2 is a must for all RTTY operators and especially for those computer users still running programs requiring no terminal unit.

The NITE-2 is supplied either ready boxed (matching the MPTU-1) or as a ready assembled PCB excluding switches, LEDs and case.

The fully cased NITE-2 is available at £34.95 + £1.00 P&P.

The unboxed fully assembled NITE-2 is available at £24.95 + 50p P&P.

PLEASE NOTE. Software is not provided.

SCARAB SYSTEMS produce many other high quality software programs for other computers – please write for further details.

Distributors
UK Ward Electronics, D W Electronics, S P Electronics.
Australasia. Essex Mellor Pty Adelaide.
Or available directly from:-

SCARAB SYSTEMS
39 STAFFORD ST, GILLINGHAM, KENT ME7 5EN
TEL: MEDWAY (0634) 570441

Amateur Radio – the monthly magazine for all two-way radio enthusiasts

Don't take a chance on being unable to get your copy

AVOID DISAPPOINTMENT
Place a regular order with your newsagent

Should you have any difficulties obtaining a copy, phone (0277) 219876 or write to Circulation Department, Amateur Radio, Sovereign House, Brentwood, Essex, CM14 4SE.

NEWSAGENT ORDER FORM

To (name of newsagent) ____________________________________________________________
Please order a copy of Amateur Radio for me every month
NAME ____________________________ ADDRESS ____________________________ POSTCODE ________________

Newstrade distributors: Argus Press Sales & Distribution Ltd, 12-18 Paul Street, London EC2A 4JS. (Tel: 01-247 8233)

ECW for KITS

Audio Amplifiers
* 2.5W Ultra – Miniature Amplifier kit
Pre + power stages – 4 to 15V d.c. supply
measures just 42x32x27mm

20W Power Amplifier kit
High quality, fully protected, easy – build

Power Supplies
* 1A general purpose supply kit
1.2 to 35V output, IC – controlled,
good line + load regulation
suits many equipment applications

* High quality 3A adjustable supply
0 to 24V output
Ideal for bench – top applications

Prices include VAT & Postage, For your order, please make cheques payable to ELECTRONIC & COMPUTER WORKSHOP LTD
171 Broomfield Road, Chelmsford, Essex, CM1 1RY Telephone (0245) 262149

please mention AMATEUR RADIO when replying to any advertisement

MAY 1986
Hello!
Welcome to the new column, which will appear bi-monthly. Many amateurs still use, and enjoy, Morse on the air, and I aim to provide something of interest for enthusiasts at all levels of achievement.
I hope to show beginners something of the fascination and pleasure of Morse operating, to discuss matters of current interest, to invite comment and advice from the more experienced practitioners of the art, and to look back from time to time to earlier days.
Anything about Morse will be the order of the day here, and correspondence will always be welcome. I will try to answer all letters through the column, and will occasionally reply directly on matters of special interest.

**OK G-QRP tests**

Over the weekend of 1-2 February, the G-QRP Club put up two teams of operators, one in England and one in Scotland, to give Czech amateurs the opportunity to test their GQR equipment over the path to the UK on a number of frequencies. Operation was entirely in CW, and a comprehensive schedule covered the 1.8, 3.5, 7, 10, 14, and 21MHz bands. Conditions were reasonable considering the low sunspot activity, and the only bands providing no contacts were 1.8 and 21MHz.

Nearly fifty contacts were made with powers ranging from one to four watts output, the major surprise being that almost half of all contacts were on 10MHz. All but six of the contacts were made by stations south of a line drawn east from London. The UK co-ordinator, G8PG, feels this adds further confirmation to previous evidence that on such east/west paths the further north one of the stations is, the more difficult it becomes to make contact.

Owing to unforeseen circumstances, the tests were not well publicised in either country, which would have given other operators a chance to take part. Nevertheless, they provided a meaningful and enjoyable CW activity. G8PG hoped to have operators of known ability prove the path thoroughly in preparation for the tests becoming an annual event.

This, he considers, '...was fully achieved, so next time it should be much bigger and better'.

**That's DX!**

GM stations may not have too good a path to OK, but during the QRP Winter Sports in the week after Christmas CW optimised QRP contacts in a different direction when GM4XX/A, with one watt, worked WB2RZU (5W) on 14MHz on three separate days, and a number of other G-QRPers also worked the American station.

On the same band, lain Robertson G3QVV, using the new G-QRP-C 'One T x (1 x 1W) and G3QGF with a carefully tuned half-wave dipole at 48ft, and receiving he used a shielded loop. Who said QRP needed sunspots? What it does need, for results like these, is careful preparation, a very good antenna system, an even better operator ... and Morse!

**Morse history**

I greatly enjoy researching the origins of Morse, and occasionally give a talk on the subject (next one at the Leighton-Linslade Radio Club on 7 July, if anyone is interested). I am currently trying to find details of the Berlin Conference of 1851, where international Morse as we know it today is said to have been devised.

This conference is often mentioned, but a closer look at the records shows an 1851 conference in Vienna, not in Berlin. It was agreed in Vienna that the Morse telegraph system should be adopted for use in Austria and Germany. It was also agreed that telegraph wires should henceforth cross frontiers to avoid the need for telegraph clerks to physically hand messages over the border line for onward transmission!

I already have some information about how the new code was constructed from a number of existing codes, and why it was thought necessary, but I can't get hold of the full details. If readers have more information, or any suggestions I could follow up, I should be delighted to hear from them. I will report progress in due course.

**Morse tests**

The RSGB's 'Year in Review', in RadCom, November 1985, discussed the relationship between the society and the media, saying, 'it is preferable to have little publicity than the wrong sort of publicity'. This was in reference to general press coverage, and may well be right, but is the RSGB extending this attitude to amateur radio magazines?

**New arrangements**

I mention this in relation to the new Morse testing arrangements, effective from 1 April. At the time of writing, just three weeks before the 'off', the booklet for prospective examiners had not appeared.

On behalf of this column, I asked the RSGB for information, such as details of the 20wpm test for examiners, what were the society's interim plans in the light of the unexpected delay, and how was the scheme to be administered?

All perfectly reasonable questions from a column actually specialising in Morse and, at that late stage, information which would, presumably, be readily available. Regrettably, no one seemed to know anything, and several promises to 'ring back' were not honoured. All this over a period of four days.

I don't know if it was incompetence, indifference, or whether I simply expected too much. I had actually planned different copy for this piece, full of enthusiasm for the new scheme, which I certainly hope will be successful. The RSGB must be prepared, however, for discussion and judgement by interested parties in the light of both its performance and the image it presents.

**No time!**

On a previous occasion I asked if they ever issued press statements, and was told, 'Oh, we don't have time for anything like that!' Maybe not, but when anything else comes up of interest, I hope they will have learned to respond more positively to responsible enquiries, even if only to avoid further uncomplimentary comments!

By the time this appears in print, no doubt the scheme will have swung into action. In the light of its shaky start, I imagine it will be a subject for discussion for some time to come.
Interference

The problems of TVI neither go away, nor are they always easily dealt with, but some very disturbing news is starting to circulate as to the sort of treatment amateurs are receiving from the authorities.

The normal procedure now seems to be for the RIS to assume that you are causing the interference and to send you a letter stating that a complaint has been received.

It continues by saying 'let me know within the next month if you have resolved the problem' because if you have not done so they may have to vary your licence. In practical terms this usually means putting you on to reduced power or even closing you down for a given period.

Because a copy of this correspondence also goes to your complaining neighbour, and the RIS is already threatening to close you down if the interference is not cleared, it does not encourage him to assist in sorting the problem out.

Your protestation that it is not your gear at fault but his poorly designed equipment is not going to go far in this situation.

Prolongation

Reports are already coming in of amateurs being closed down for say, a month on the basis of one incident and then being closed down for a further period as a result of other complaints that were made at the same time as the original one. Obviously this could be continued indefinitely and is intolerable to the VHF fraternity.

Unbelievable

The RSGB represents the amateur radio hobby in this country and one has no hesitation in saying that, in general, it does an excellent job. Yet, by its own admission, it was not consulted before the interference immunity and that they were not on the mailing list for such information.

Refusal

The Dti have refused to accept the RSGB request to set aside the new guidelines, although they did offer to reword the offending letters. One thing is absolutely certain; the Society is now getting its teeth firmly into the problem and is in fact using it as a publicity campaign to gain new members.

Immunity

There was a new standard being introduced. It was also not consulted before the new licence schedule was introduced. Surely one is entitled to ask why not? The RSGB have been in existence for so long now that a really watertight working arrangement with the authorities should have been obtained many years ago.

Can one imagine a trades union not being aware of a new legislation that was to be introduced? Some two years ago the RSGB admitted that it was not aware of a British standard relating to interference immunity and that they were not on the mailing list for such information.

Geography

A letter from Irwin G11JUS mentions that our hobby is an excellent way to learn geography and takes me to task for saying that GW1FOF must be one of our most westerly stations. The problem is that I tend to think in terms of beam headings from my QTH in the centre of England, and whilst as he says many stations in Cornwall, Ireland and Scotland are further west of the Greenwich meridian, they are far from a westerly beam heading to me.

The real point I was trying to make is that, apart from openings, the usual beam headings in the UK are roughly north and south, and anyone living along the western coasts gets a thin time. This is a pity as a contact from, say, London into Cornwall is much better DX than one into F or ON.

Morse tests

The responsibility for Morse testing was taken over by the RSGB as of 1 April and they intend to set up test centres at some seventy locations. I have received a report from a member who tried to book a test from them and was told that it was going to take some time to get the whole thing properly organised. They informed him that they hoped it could be arranged by June or July.

The person concerned lives in the centre of Europe, not in some remote area, and whilst it is reasonable to concede that it may take time to set up the national network, these problems were apparent right from the start.

Matter of urgency

Surely centres in London, Bristol, Birmingham, Manchester, and a few other similar large towns with a reasonable geographical spread, should have been set up as a matter of urgency. This would still have meant people travelling some distance to take the test, but with the understanding of the problem most people would have accepted it, and at least the facilities would have been up and running.

Sateillites

One of the few things that can be reported about these devices is that they are still up there. The amount of use that...
they get seems to be minimal and most magazines comment on the lack of activity reports.

Even AMSAT admit that although they have a large membership only a minute fraction of those members are actually active on the things.

What a waste?

Yet we still go on putting them up there and, in the near future, we should have a couple of new Russian units and one built by the Japanese. In fact most of the constructional work has been done by the huge NEC conglomerate at a cost of over one million pounds. As well as the usual transponder arrangements, the satellite will also have a digital store which will enable you to put messages into its memory which can be heard later by the station you wish to communicate with.

Specifications

The unit is a polyhedron (26 faces), covered with solar cells and is roughly fifteen inches across, weighing in at fifty pounds.

It is due to be launched in August and will be placed in a circular orbit at a height of 1500kms, which means it will come round once every two hours. The inclination will be 50 degrees and its anticipated life is three years.

The details for the transponder system are: input between 145.9 and 146MHz, with output between 435.9 and 435.8MHz, the output having inverted sidebands to counteract doppler shift. The required uplink radiated power is estimated at 100 watts and the downlink will be running 2 watts.

The digital transponder will have four input frequencies of 145.85, .87, .89 and .91MHz, but only a single downlink on 435.91MHz. The uplink ERP is again 100 watts and the downlink will run 1 watt. The digital signal format will be 1200 baud PSK.

Beacons

There will be two beacons on the unit: the first will run 100 milliwatts of CW or PSK and will be on 435.975MHz; the telemetry beacon will be on 435.91MHz running 1 watt of PSK. The aerial system is a monopole for receiving, which will be mounted on the upper surface, while the two transmit systems will each have four monopole elements spaced around the satellite. These will be phased in such a way as to provide left-hand circular polarisation when, as the Japanese handout so neatly puts it, you are looking at the satellite 'up its bottom'.

Let's hope that all this work and expense gets a lot more use than previous units, at least you have all the details currently available to enable you to give it a try.

Things to do

For the contest operator May provides several opportunities to join the fray. For the two metre man the big contest is on the 17th and 18th of the month. For 23cms the Trophy contest is held on the 31st, whilst over the weekend of the 3rd and 4th you can have a crack at working any band between 432MHz and 24GHz. The specific microwave contests are run concurrently on the 11th, which will see the second leg of the 10GHz cumulative and also a dedicated contest on 5.7GHz.

Looking a little ahead, 1 June is the date for the 432MHz Trophy and SWL contest. The VHF bands are a great place for the SWL and there are several contests aimed specifically at them.

Closedown

News is coming in of VHF contests being organised that will only accept old type squares; I will pass on details as I get them. There seems to be some open warfare brewing up over the operation of the MH repeater, with the possibility of a rival group putting in a take over bid for it, although it is thought that Rupert Murdoch is not involved — yet.

Don't forget that most of the information and comments in this feature come from our readers and we want to hear from you. Please contact me at 81 Ringwood Highway, Coventry, or on Prestel 203616941.
A few months ago I made a comment about the frequency stability of a certain Codar receiver, which seemed to touch a raw nerve with quite a lot of readers. Although a few of the letters were specific to the Codar under discussion, most were of a more general nature. Please note that the following will only be of interest to the owners of non-stabilized valve receivers: don't go motoring in with 'a valve' stabilizer if you own an all bells and whistles synthesized Japanese wonderbox. Also remember that valve receivers can kill, so if you don't know what you're doing, don't do it.

**Codar problems**

The problem with the Codar was the extremely poor HT regulation. This makes the resolving of SSB signals difficult because the audio level rises and falls in your receiver as the transmitting station speaks. This can only come about by the audio output valve taking more (or less) current, causing the HT voltage to go up and down as the current varies. The local oscillator runs more or less directly from the HT rail, so as the voltage goes up and down the tuning appears to go for a wander. To a certain extent the BFO frequency will go walkies as well, just to make things worse.

A good guide to poor voltage regulation is to try resolving an SSB station whilst wearing headphones. The audio will be at a much lower level and thus the HT rail will not wander so much and stability should be better. Whilst wearing the headphones try gently whacking the case of the receiver. If reception is affected then microphony is your problem — maybe a dodgy valve in the local oscillator or BFO position.

**Aggravating the situation**

The reason microphony shows up when wearing headphones is that the receiver's internal speaker, which may be aggravating the situation, is now disconnected.

If, however, the resolution of SSB is much improved at low levels and is unaffected by a whack, then HT stabilization is probably your problem. A voltmeter across the HT supply to the local oscillator stage (and/or BFO) should stay stable to within a volt or so when the volume control is varied between silence and a moderate amount of audio coming out of the speaker. If you find a change over, say, five volts, then you have probably found the problem.

The solution is a valve stabilizer tube, more correctly called a cold cathode stabilizer. These are gas filled tubes which will maintain a constant voltage across them, whilst the supply varies. Examples of these, such as the old VR105 and VR150, can only be picked up secondhand now, at junk sales and rallies for a few pence.

**Common circuit**

If you refer to Figure 1, the 50k resistor forms the anode load of the oscillator valve. This is a fairly common type of circuit for the basic valve receivers we are talking about. To stabilize the HT you will have to disconnect the 50k resistor (or whatever you have in your receiver) from the HT and connect it up to the stabilizer, as per Figure 2. To calculate the resistor value $R$, you have to know the voltage across it. This is the HT rail voltage minus the stabilizer tube voltage ie, say 350 volts HT minus the 150 of the tube equals 200 volts.

We now need to know the current drawn by the oscillator and BFO stage if we plan to stabilize this as well, which can be measured (stick an ammeter in series with the 50k resistor plus BFO) at, say, 15mA. Most of the cold cathode tubes worked with about 5mA passing through them to keep them running, so this is a fair figure to use as a starter. Add this 5mA to the oscillator current, ie 5+15 = 20mA.

Mr Ohm I presume...

Although a gentleman called Ohm gave us a nice little law to enable us to work out the resistor value ($V=IR$ therefore $200=20/1000R$, therefore $R=10,000$ or 10k), I prefer to use the 1 volt, 1mA, 1k rule, which says that 1 volt across a 1k resistor will result in 1mA flowing, so 200 volts across a 1k will give 200mA, so 10k will give the required 20mA. Connect it all up and try it. The stabilizer tube should light a moderate to gentle violet/pink/orangey colour. A really brilliant light means that you have worked your load resistor value out wrong. They should also run cool to the touch. Check that it doesn't go out on any band; if it does, come down a few $k$ to up the stabilizer current.

The problem with stabilizing like this is that the oscillator is now, of course, running on a lower voltage. Check that it starts up and runs reliably on all bands and that calibration has not been affected. If it has, try lowering the value of the oscillator load resistor — the 50k in Figure 1 — although I wouldn't expect it to have to go lower than half of its original value.

*One band dead* receivers

In addition to a couple of letters asking about stability, there were a few from readers asking for advice on receivers that were dead on one band. The first thing to do is to establish whether the local oscillator is running. This is quite simple to do; all you need is another receiver capable of receiving on the band that the dead receiver isn't working on. Connect the aerial sockets of the two receivers together and try and find a strong, unmodulated carrier, either plus or minus the IF frequency of the 'dead' receiver, on the good one. Check that the carrier moves as you tune the dead receiver.

To get an idea of what you are looking for (and how far away to look), try and find this carrier on a known working band. Incidentally, I often use this trick when repairing dead medium wave portables. Just place the dead set tuned to about 1MHz (ie, roughly Radio 2. I know this is about 100kHz out, but it's near enough) next to a working medium wave portable tuned 'up the Luxembourg end'. Again a strong, unmodulated carrier indicates all's well in the local oscillator department.

Let us assume that the local oscillator is not running. An analysis of how the receiver stopped working on the dead band may give a clue as to what's wrong.

If the receiver doesn't work on the lowest frequency band and stopped working first at the low frequency end of that range, ie, it bursts into life half way up that band, then a good guess might be that a capacitor has gone low in value: either the cathode decoupler or the anode dc blocking one would be worth a look. Check by connecting a known good one in parallel. Dying out at the top end of the range, particularly on the top frequency range, probably means there is a low valve emission.

Here yesterday, gone today

If, however, the receiver just doesn't work one day on one band, then it's probably a more mechanical fault. For the time it takes it's worth analysing the feel of the bandchange switch. If it feels grunchy when selecting the dead band, a good look at the appropriate switch wafer should reveal the problem.

If it isn't that, then a quick check of the appropriate coil with an AVO is worth-
who wrote in about the above and didn't
while. No results by now means real
agro, you have to start working. Check
that the HT remains on the anode of the
oscillator valve on the dead band, and
doesn't go low. One real sod of a
receiver, that drove me up the wall, had a
pentode as the local oscillator and it
eventually turned out that someone had
changed the resistor feeding grid 2 for a
wire-wound variant, which just hap-
pended to resonate with its 'decoupling'
capacitor on its lowest band.

RF stage
If the receiver does have the local
oscillator running on its dead band, then
it's the RF stage that's playing up. In
a simple receiver this will just be the aerial
input coil. Note that this is often a ferrite
aerial, especially on the medium and
long wave bands, and has to be located
outside the metal case as this would
otherwise screen it from the incoming
signal.

Very often either the coil has been
damaged or the long wires to it have
suffered. It is unusual for a valve in
the RF stage to cause total deafness
on one band — you can normally hear
something. Your best bet is to examine
the aerial input coil or the wafer switch.

Poor performance, especially on the
HF band, or noise, can often be put down
to failing valve emissions etc, but rarely
dead on one band. I apologise to readers
who wrote in about the above and didn't
receive a personal reply; there were so
many letters that it wasn't practical. I
hope the above answers your collective
queries.

IC255
A couple of queries on this fairly
reliable two metre FM work-horse. Low,
intermittent or no reading on the
S-meter on receive is the pot inside. It's
marked 'set RF' on the board, and a good
way of dealing with this one is to note its
position, give it a blast of cleaning fluid,
turn the pot from end to end several
times, then re-set it to its previously
noted position.

The other problem recently encoun-
tered in the 255 concerns the 2SB529
(marked, true to Japanese form, B529).
This is in series with the output power
module and is the only power transistor
visible in the PA 'lump' on the rear when
you've got it out. Its job in life is to deal
with the power reduction circuit. If it
goes open circuit (rare) you get the
symptoms of a dead module, ie, no RF out
on transmit.

Common shortage
If it is being shorted (common) you get
no low power facility, ie, it gives 25 watts
out on low and high positions. Be
warned, the 2SB529 is PNP. Any 5 amp
device that will fit seems OK here if you
can't get the right one, but if you fit an
NP in by mistake (what fool would do
that?) then the high/low switch works
backwards (ie, high power in low, and
low power in high). We all make mistakes
occasionally!

Nokia SV1300
I bet you don't recognise the name of
this one, but these are rather nice, all
solid-state, high band FM rigs that are
now appearing on the secondhand
market, normally covered in Marconi
labels. Most of those appearing are on
about 160MHz and will come down nicely
onto two metres. The receiver front-end
incorporates a varicap tuning system to
give extended frequency coverage
between channels; not necessary on two
FM but useful on Marine (naughty!).
Talking of receive, the specification
gives receiver sensitivity as 2µV for 20dB,
which isn't exciting, but everyone I have
played with has comfortably exceeded
this, normally only requiring about
0.75µV for 20dB quietening.

Tx is rated at 10 watts and the PA strip,
built like the proverbial small brick
establishment, will happily chuck out 12
watts on two.

Construction is really weird, but quite
practical in a funny sort of way. As well as
for mobile use, these rigs are designed
for portable use, although I wouldn't like
to carry one too far as their weight
(quoted as 5.5kg with battery) is a little
excessive.

The back bit of the case can hold U2 size
cells for portable power. Another quirk
of the design is the front panel, which
quite neatly swings off for remote use. It
is thus fairly easy to install this rig in the
smallest of cars by mounting the 'head'
in the cabin and the gubbins in the boot.
Another nicety is the 3 watts audio
output; this is even enough to overcome
the racket in my noisy van.

Well equipped
Most of the examples that are poised to
come onto the secondhand market are
quite well equipped, coming complete
with a pair of crystals fitted (useful to
check its working before you go shifting
its frequency), mobile mount, mike,
'head' extension lead and a handbook.
Unfortunately, they will not work! This is
because the selcall board will have been
removed; at least it has been on all the
examples I have come across. Link pin
'G' on the motherboard to pin 'V17', and
another link from pin 'F' to the top of C43
and you are in business. At about £35,
which is the price I am told they should
be selling for at the rallies by the time
this is in print, they are well worth
looking out for.

Fig 1 Common type of circuit for basic valve receivers

Fig 2 The stabilizer

please mention AMATEUR RADIO when replying to any advertisement
LATEST NEWS

**ICOM R7000**
SCANNING RECEIVER
25MHz-2GHz
Full SSB, AM, FM & Memories

**YAESU FT-757GX**
+ FP757 HD PSU
+ FC757 ATU

**TRIO-KENWOOD**
**TS-940**
INCLUDING
AUTO-ATU £1,825

**YAESU FT-757GX**

**ICOM R71**

**YAESU FRG-8800**
+ OPTIONAL FRV8000 CONVERTER
GEN. COV.

**TRIO KENWOOD**
**TH-211/41**
ARA 500
ACTIVE ANTENNA
50MHz to 1300MHz
Gain 17dB Typical
TECHNICAL SPECIFICATIONS
FOR ARA 500
Gain 17dB Typical (14-17dB)
Frequency Range 50-1300MHz
Noise Figure 1dB at 50-180MHz
1.5dB below 300MHz
2.0dB below 400MHz
3.0dB below 500MHz
3.6dB below 900MHz

£110.00
Operation is possible up to 1300MHz
with gain of 10dB
Noise 4dB
Intercept Point 3rd Order + 18dBm at Input

**DRESSLER**
ARA 500
ACTIVE ANTENNA
50MHz to 1300MHz
Gain 17dB Typical

**CALCULATING CIRCUITS**
**350-2GHz**
Amplification 1 dB
1.25-1.3GHz
500W PEP
600W SSB
2.0kHz-2.1GHz
1000W PEP
2.5GHz-3.0GHz
500W PEP
3.5GHz-4.0GHz
100W PEP

**LINEARS**
D200 2 MTR 500W SSB £749
D200S 2 MTR 750W SSB £799
D70 70 CMS 550W SSB £399

**MUTEK SPECIALISTS**

**DATONG P.C.I.**
Fit the PCI with the R7000 or FRG9600
It have 1300 to 20 MHz coverage HF, US/LSB/AM-FM IF

Only £137.00
or with the FRG9600 and all power supplies
£757.00

**DATONG P.C.I.**

**YAESU FRG-9600**
£430
60-905MHz
AM- FM- SSB

**AOR 2002**
25-550 MHz
+ 800MHz-1.3GHz

**VA 2000E**
An excellent handheld scanner
50-500MHz
118-136MHz
390-450MHz
540-525MHz

**RECEIVE PRE-AMPS**

**MET ANTENNAS**

**JAYBEAM ANTENNAS**

please mention AMATEUR RADIO when replying to any advertisement

MAY 1986

World Radio History
FOR SALE

- Signal generator AF, five watts output, bargain, £30 ono. Tel: (021 354) 3850.

- Yaesu 7700 general coverage receiver, 0-30MHz, with memory unit, LED readout display with built-in news, £30, AGAVE920 scanner, new, £370, 456K VHF colour television, remote control, £100. Panasonic vhs video, modern, £20. Swap Drake for R7000 local oscillator, £80.


- TS940S, AT940, SP940, VSI board, 500MHz filter, £400, 2m multiband, new, 7 months old, £1,400, 80m multiband, £1,100. AMATECH CB-18 with all hardware and leads, £180. Doctor DX contest trainer for CW, (excel-

- Drake TR7 general coverage digital processor, barrier strip, VFO, £1,000. Sony ICD201, £290. Ferrograph series 6 stereo + 2 AKG mics, retail of tape, £30. Commodore +4 computer, 10 games, ace, £30, AGATE6002 scanner, new, £370, 26in ITT colour television, remote control, £100. Panasonic vhs video, modern, £20. Swap Drake for R7000 local oscillator, £80.

- Yaesu F7900D active antenna, mint, £31. Alital DIO K6, GDO as new, with 6 plus in coils, 1.5MHz-250MHz, as new, £41. CW transceiver program for Spectrum 48K (Technical Software), no hardware needed, £7, VHF/ UHF manual, 3rd edition, unmarked, £4.50. Kodak EK160 camera for great instant colour photos, used for only one film, carries case, £10. All above ono. Tel: (021 771) 6086.

- Realistic DX200 general coverage receiver up to 30MHz, SSB, CW, AM, excellent condition, £55 incl postage. Tel: Ash Bank 487.

- C5800E/W standard, the only rig that does not require a replacement front-end! 2SW, little used, based only. Dawes PS250M PSU, 12 amps, 3-15V, extended H/S for maximum op. Bargain package for guaranteed inter-continental QSOs, £420 ono. Tel: 01-866 3548 (eve), 01-224 1269 (day).

- X160 receiver, general coverage, 150kHz to 30MHz, with matching communications speaker SP150, 25W, 2 speakers, £20. Used product detector, all solid-state with manual, only £110.00 ono. Buyer collects. Leon, 12 Stockhurst Close, London SW18. Tel: 01-898 1549.

- TS120V tcvs 25/30 Vp, 28/144 new, 11 amp PSU. MC50 desk mic new. HFS vert: 8x, 2m before, £12. VHF, the inspiration invited, buyer collects. A good round starter package. C Knight, 130 Main St, Kinglassie, Fife.

- Icom FT290 (similar to FT480). Mirage 1016 31Mhz mobile transceiver, £40. Tel: (073) 6601148 (Reading).

- Yaesu FT7200 (similar to FT480). Mirage 1016 linear with remote head '10X5' almost new. Bearcat 220FB. I2CE with spare mic, battery pack etc. I have been out of the scene so long I don't know what to price. It is a sensible offer and we can haggle! Neil, ex G8WWB. Tel: 01-946 2827.

- Yaesu FT757GX HF transceiver, Yaesu FC757AT automatic ATU, Yaesu FT797DX PSU, Yaesu fist mic, headsets, iambic Morse key. Purchased new, November 1985, used for one month, all boxed etc, cost £1,200, sell for £375.00. G1WBT, 97 Redland Drive, Northampton NN2 8UG.

- Yaesu FT7700G HF transceiver, Yaesu FC757AT automatic ATU, Yaesu FT797DX PSU, Yaesu fist mic, headsets, iambic Morse key. Purchased new, November 1985, used for one month, all boxed etc, cost £1,200, sell for £375.00. G1WBT, 97 Redland Drive, Northampton NN2 8UG.

- £120. Ian. Tel: (021 472) 4275.

- £110. Mike Mundy, 142Junction Road, Burgess Hill, West Sussex. Tel: (04446) 41407.

- £225. 7.5 amp PSU, £17.50. Codar PR40 preselector, £12. Incomplete installation, £15.00 ono or swap any thing.

- £45. BNOS 12 amp volt PSU, £50. Yaesu 12 volt, 12 volt PSU, type FP12/CW speaker, £90. Datong + converter PDI2000 to 1MHz, £120. Datong 2 converter DC144/28, £80. Tel: Andy, Southampton 782545.


- £25. Sigma 4 antenna 26.0-30MHz, with super- scan unit and mobile mount bracket, £50. S Knight, 130 Main St, Kinglassie, Fife.

- £220. Doctor DX contest trainer for CW, (excel-

- £17.50. Codar PR40 preselector, £12. Incomplete installation, £15.00 ono or swap any thing.

- £420 ono. Tel: 01-866 3548 (eve), 01-224 1269 (day).

- £50. Star Mastey key with paddle and hi-

- £12. MX2 SSB hand-held with speaker mic, £50. Trio R2000 receiver, 9 months old, as new, little use. 2m transceiver, £400. Tel: (0290) 51491, 6-6.30pm.

- £15. Codar CBM64 with all hardware and leads, £180. Doctor DX contest trainer for CW, (excel-

- £200. Yaesu FT101E with RM3 remote keypad with

- £250. Suggest collection as very weighty! Ken. Tel: (0290) 51491, 6-6.30pm.

- £10.00. 24V dc fluorescent 20W units, £4 each. Phone: 01-582 7444, weekends.

- £10. 24V RF switched pre-amp ( Wood and Douglas), £120. Ian. Tel: (021 472) 4275.

- £120. Ian. Tel: (021 472) 4275.

- £17.50. Codar PR40 preselector, £12. Incomplete installation, £15.00 ono or swap any thing.

- £110. Mike Mundy, 142Junction Road, Burgess Hill, West Sussex. Tel: (04446) 41407.
FREE CLASSIFIED ADS

-Fi, Hy-gain 5 (8793x) boxed, complete in good condition, uses PFL02A phase lock loop on the Cybernet FTB-12544X board. It has 4 bands of 50 channels, 25mHz, 100mHz or spread spectrum, converted to 10m, £120. Tel: 01-471 0666 after 5pm, ask for Danny.

-I, RF transformer, good cond, can deliver up to 30 miles radius, £200. Creed teleprinter with reader and perf, £10. ST terminal unit, £20. Large computer power supply (TTL), £16. Will consider px02A phase lock loop for any item. Bill Ball G4RSA, 21 Redcave, Fleetwood, Lancs FY7 8DG. Tel: (0253) 41033 ext 28.


-K, Maplin frequency counter, 8 digit, 10Hz- 500MHz, 2 discrete time, mains/battery operation, fully calibrated, £140 ono. Also DSB-2 transceiver 80m, featured in Ham Radio Today. Direct from kit, complete with digital readout, case, mic, speaker and service manual. Not fully working: problem in output stage. Needs attention, but in good condition, hence price. £80 ono. Also two DR2350 complete components! D Pratt, Old Vicarage, Helme Village, Meltham, Huddersfield, West Yorkshire. Tel: (0946) 480806.

-L, Tri R2000 receiver with VC10 VHF converter, £350 Also Heathkit SW717 receiver, £60. LAR omni- direction, fully calibrated, £140 ono. Also DSB-2 transceiver 80m, featured in Ham Radio Today. Direct from kit, complete with digital readout, case, mic, speaker and service manual. Not fully working: problem in output stage. Needs attention, but in good condition, hence price. £80 ono. Also two DR2350 complete components! D Pratt, Old Vicarage, Helme Village, Meltham, Huddersfield, West Yorkshire. Tel: (0946) 480806.

-M, Yaesu FT101E new bands 350MHz CW filter, just 280E vgc, £130. MM TV Rx, £25. Handhelds by Icom:


-O, Yaesu FT77 100w tvr, £350. Yaesu FRG770X RX, £250. Both items as new in original Yaesu boxes, packed in crushproof boxes. Also Qaaker 400S (Slim Jim) for around £5. David Oxendale, 10 Mercia Gardens, Salford, Lancs M6 9JD. Tel: (0865) 56321 (Oxford).

-P, Yaesu FT29OR with muTek front-end fitted, also £350. With complete op guide and box. John Collier, 20 Southdown Road, Portslade, East Sussex BN4 2HJ. Tel: (0273) 650208.

-Q, Regency digital flightscan 108-136MHz 16 channel air band scanner, £80.00. Samatron-vorto VHF to UHF converter for air band, £40.00. Yaesu FT7000X transceiver, as new, £800. £900 for both. £1200 for complete system. Complete with manual. Best offer over £80. L G Slater, 8 Bankside, Moseley, Birmingham B13 9LU. Tel: (021) 768 1711.

-R, Yaesu FT290, IC202 and IC2E or TS7009 WHY? £150! £200 each. Tel: Slade, 8 Bankside, Moseley, Birmingham B13 9LU. Tel: (021) 768 1711.

-S, Yaesu FT290, IC202 and IC2E or TS7009 WHY? £150! £200 each. Tel: Slade, 8 Bankside, Moseley, Birmingham B13 9LU. Tel: (021) 768 1711.

-T, Yaesu FT101E new bands 350MHz CW filter, just 280E vgc, £130. MM TV Rx, £25. Handhelds by Icom:


-V, Yaesu FRG770X RX, £250. Both items as new in original Yaesu boxes, packed in crushproof boxes. Also Qaaker 400S (Slim Jim) for around £5. David Oxendale, 10 Mercia Gardens, Salford, Lancs M6 9JD. Tel: (0865) 56321 (Oxford).

-W, Yaesu FT77 100w tvr, £350. Yaesu FRG770X RX, £250. Both items as new in original Yaesu boxes, packed in crushproof boxes. Also Qaaker 400S (Slim Jim) for around £5. David Oxendale, 10 Mercia Gardens, Salford, Lancs M6 9JD. Tel: (0865) 56321 (Oxford).

-X, Yaesu FT101E new bands 350MHz CW filter, just 280E vgc, £130. MM TV Rx, £25. Handhelds by Icom:


-Z, Yaesu FT101E new bands 350MHz CW filter, just 280E vgc, £130. MM TV Rx, £25. Handhelds by Icom:
FREE CLASSIFIED ADS

TRA931, TRA967, PRM models, MA4222, MA968, units, spares, encryption units, brochures, WHY?

III Racal collector is interested in exchange or which may have been encountered, with the of ideas and information regarding any problems MA934, RA929, TA944, TA970, MA985, MA986, Omega constructors, with a view to creating a pool • I would be pleased to hear from all project good working condition. Tel: Wood Clochan 378.

Any circuit info on a QM70 electronics 2m Mr 5.00pm.

MAY 1986 please mention AMATEUR RADIO when replying to any advertisement 55

CONDITIONS: Ads will be published in the first available issue on a first come first served basis. We reserve the right to edit or exclude any ad. Trade advertisements are not accepted
MAXI – Q

COILS AND CHOKES PREVIOUSLY MADE BY DENO SAE PRICE LIST

8 BRUNEL UNITS, BRUNEL ROAD, GORSE LANE IND ESTATE, CLACTON, ESSEX C015 4LU.
TEL: (0255) 424152

PNP Communications
Communications Interface for RTTY – Morse – AMTOR

Our popular range of communication modules is now available, fully boxed and tested under the model number.

CTU 20
The CTU20R is RTTY only & costs £62.50 whilst the CTU20RM is for Morse as well and costs £75.25

For shortwave listeners the MF2-DX gives the option of 170Hz, 425Hz or 850Hz shift reception and costs £56.95

Send a large (A4) SAE for full Cat
Please add VAT at the current rate.
Access & Barclaycard (VISA) welcome.

62 Lawes Avenue, Newhaven East Sussex BN9 9SB
Tel: (0273) 514465

SP ELECTRONICS
48 Limby Road
Ruckhall, Nottingham
Tel: (0602) 640377
Open Monday-Saturday 8.30-5.30
RF DEVICES AT ROCK BOTTOM PRICES!
Nobody beats us!
Over 30,000 RF devices at low prices

**REPLACEMENT RF TRANSISTORS**
- MRF454 HF/SSB 80W: £18.20
- MRF450 HF/SSB 50W: £11.60
- MRF305 HF/SSB 25W: £12.00
- MRF475 HF/SSB 20W: £2.99
- 2SC1969 HF/SSB 18W: £2.50
- 2SC2043/1307 HF 16W: £1.60
- 2SC1946A VHF 32W: £2.75
- 2SC1969 HF/SSB 18W: £2.50
- 2SC2043/1307 HF 16W: £2.00
- 2SC1946A VHF 32W: £1.75

**REPLACEMENT RF POWER MODULES**
- M37704/SAU1 3UHF 15W: £36.00
- M37712/SAV7 VHF/FFM 25W: £39.00
- M37713/SAV8 VHF/FFSBB 15W: £39.00
- M37716/SAU4 UHF/SSB 15W: £49.00
- M37719 VHF/PMR 15W: £29.00
- M37727 VHF/FFSBB 38W: £45.00
- M37749/SAU1 3UHF 32W: £14.30

Send £1.00 p&p and SAE for full list
All prices inc. VAT
Many IC’s and other types in stock

RAYCOM LTD
DEPT AR 584 HAGLEY RD WEST QUINTON BIRMINGHAM B68 OBS
021 421 8201-3 (24hr answer phone)

JAPANESE IC’s (PART OF OUR RANGE)
- AN2140 E1-80 ANTHY E1-60 ANTHYG E1-80 BAS105 E1-75 BAS109 E1-50 HAT8009 E1-80 HAT8004 E1-80 HAT8016 E1-80 HAT8005 E1-80 HAT8012 E1-80 HAT8002 E1-80 HAT8001 E1-80 HAT8011 E1-80 HAT8003 E1-80
- LC717C75 E1-80 LC115 BSO1 E1-80 LSO16 SY651 E1-80 NSY641 E1-80
- 8040/300 RFI 15V 30W 8040/250 RFI 25V 30W 8040/150 RFI 15V 30W 8040/100 RFI 15V 30W 8040/50 RFI 10V 30W 8040/25 RFI 5V 30W 8040/10 RFI 2.5V 30W 8040/5 RFI 2.5V 30W 8040/2 RFI 1.25V 30W 8040/1 RFI 1.25V 30W 8040/0.5 RFI 0.625V 30W 8040/0.25 RFI 0.375V 30W 8040/0.1 RFI 0.1875V 30W 8040/0.05 RFI 0.09375V 30W 8040/0.025 RFI 0.046875V 30W A0550100 10V 10W 50% A0550200 10V 25W 50% A0550300 10V 50W 50% A0550400 10V 100W 50% A0550500 10V 200W 50% A0550600 10V 400W 50% A0550700 10V 800W 50%

**FILTERS**
- 2SC1946A VHF 32W: £1.75

Send £1.00 p&p and SAE for full list
All prices inc. VAT
Many IC’s and other types in stock

SCOTCOMMS
OPEN TUES-FRIDAY 10am-12.30pm, 2pm-5pm
SAT: 9am-1pm, 2pm-4pm. CLOSED MONDAY
25 Morton Street, Edinburgh 15
Tel: 031-657 2430

Please mention AMATEUR RADIO when replying to any advertisement
## ADVERTISERS INDEX

<table>
<thead>
<tr>
<th>Advertiser</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrie Electronic</td>
<td>11</td>
</tr>
<tr>
<td>Cirkit</td>
<td>41</td>
</tr>
<tr>
<td>P M Components</td>
<td>4, 5</td>
</tr>
<tr>
<td>Display Electronics</td>
<td>16</td>
</tr>
<tr>
<td>Dressler</td>
<td>52</td>
</tr>
<tr>
<td>Edwardschild</td>
<td>26</td>
</tr>
<tr>
<td>CGHQ</td>
<td>11</td>
</tr>
<tr>
<td>Hately Antenna</td>
<td>41</td>
</tr>
<tr>
<td>Hi-Tec Worldwide</td>
<td>45</td>
</tr>
<tr>
<td>ICS Electronic</td>
<td>38</td>
</tr>
<tr>
<td>Linkbrook</td>
<td>41</td>
</tr>
<tr>
<td>Marco Trading</td>
<td>59</td>
</tr>
<tr>
<td>Omega Power</td>
<td>24</td>
</tr>
<tr>
<td>Scarab Systems</td>
<td>46</td>
</tr>
<tr>
<td>Selectronic</td>
<td>33</td>
</tr>
<tr>
<td>Sherwood Data</td>
<td>33</td>
</tr>
<tr>
<td>Spectrum</td>
<td>41</td>
</tr>
<tr>
<td>Stam Press</td>
<td>45</td>
</tr>
<tr>
<td>Technical Software</td>
<td>45</td>
</tr>
<tr>
<td>Telecoms</td>
<td>60</td>
</tr>
<tr>
<td>Thanet</td>
<td>12, 13</td>
</tr>
<tr>
<td>Reg Ward</td>
<td>26</td>
</tr>
<tr>
<td>Waters &amp; Stanton</td>
<td>27</td>
</tr>
<tr>
<td>Henry Westlake</td>
<td>45</td>
</tr>
<tr>
<td>R Withers</td>
<td>2</td>
</tr>
</tbody>
</table>

## ADVERTISING RATES & INFORMATION

### DISPLAY AD RATES

<table>
<thead>
<tr>
<th>depth mm x width mm</th>
<th>ad space</th>
<th>1 issue</th>
<th>3 issues</th>
<th>6 issues</th>
<th>12 issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>253 x 394</td>
<td>double page</td>
<td>£115.00</td>
<td>£105.00</td>
<td>£95.00</td>
<td>£80.00</td>
</tr>
<tr>
<td>263 x 186</td>
<td>1 page</td>
<td>£255.00</td>
<td>£230.00</td>
<td>£205.00</td>
<td>£175.00</td>
</tr>
<tr>
<td>263 x 90</td>
<td>1/4 page</td>
<td>£405.00</td>
<td>£355.00</td>
<td>£305.00</td>
<td>£255.00</td>
</tr>
<tr>
<td>128 x 186 or 263 x 90</td>
<td>1/2 page</td>
<td>£660.00</td>
<td>£595.00</td>
<td>£530.00</td>
<td>£455.00</td>
</tr>
<tr>
<td>128 x 90 or 61 x 186</td>
<td>1/4 page</td>
<td>£40.00</td>
<td>£30.00</td>
<td>£25.00</td>
<td>£20.00</td>
</tr>
<tr>
<td>61 x 90</td>
<td>1/8 page</td>
<td>£10.00</td>
<td>£8.00</td>
<td>£6.00</td>
<td>£5.00</td>
</tr>
</tbody>
</table>

### COLOUR AD RATES

<table>
<thead>
<tr>
<th>depth mm x width mm</th>
<th>ad space</th>
<th>1 issue</th>
<th>3 issues</th>
<th>6 issues</th>
<th>12 issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>263 x 394</td>
<td>double page</td>
<td>£255.00</td>
<td>£230.00</td>
<td>£205.00</td>
<td>£175.00</td>
</tr>
<tr>
<td>263 x 186</td>
<td>1 page</td>
<td>£405.00</td>
<td>£355.00</td>
<td>£305.00</td>
<td>£255.00</td>
</tr>
<tr>
<td>263 x 90</td>
<td>1/4 page</td>
<td>£660.00</td>
<td>£595.00</td>
<td>£530.00</td>
<td>£455.00</td>
</tr>
<tr>
<td>128 x 186 or 263 x 90</td>
<td>1/2 page</td>
<td>£115.00</td>
<td>£105.00</td>
<td>£95.00</td>
<td>£80.00</td>
</tr>
<tr>
<td>128 x 90 or 61 x 186</td>
<td>1/4 page</td>
<td>£40.00</td>
<td>£30.00</td>
<td>£25.00</td>
<td>£20.00</td>
</tr>
</tbody>
</table>

### SPECIAL POSITIONS

<table>
<thead>
<tr>
<th>Cover</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleed</td>
<td>10% extra</td>
</tr>
<tr>
<td>Facing Matter</td>
<td>15% extra</td>
</tr>
<tr>
<td>Covers</td>
<td>10% extra</td>
</tr>
</tbody>
</table>

### DEADLINES

<table>
<thead>
<tr>
<th>issue</th>
<th>colour ad &amp; mono proof ad</th>
<th>mono no proof &amp; small ad</th>
<th>mono artwork</th>
<th>on sale thru</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 86</td>
<td>27 Feb 86</td>
<td>7 Mar 86</td>
<td>27 Mar 86</td>
<td></td>
</tr>
<tr>
<td>May 86</td>
<td>27 Mar 86</td>
<td>4 Apr 86</td>
<td>24 Apr 86</td>
<td></td>
</tr>
<tr>
<td>Jun 86</td>
<td>1 May 86</td>
<td>7 May 86</td>
<td>9 May 86</td>
<td></td>
</tr>
<tr>
<td>Jul 86</td>
<td>29 May 86</td>
<td>4 Jun 86</td>
<td>6 Jun 86</td>
<td></td>
</tr>
</tbody>
</table>
## ELECTRONIC COMPONENTS

**MAIL ORDER CATALOGUE**

### May Special Offer

**Telephone Change Over Kit**
- £1.85 p/p

### Order Form

**Soldering Station**
- 12 Volt rechargeable unit
- £5.99 each
- £1.85 p/p
- One kit available with any order of £10 and over

### Fuses

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Blow 20mm 20mA to 800mA</td>
<td>12p, 100 for £7.50</td>
</tr>
<tr>
<td>Push-To-Break 259</td>
<td>3.06</td>
</tr>
<tr>
<td>DPDT Centre off DPDT</td>
<td>2.45</td>
</tr>
<tr>
<td>DPDT</td>
<td>2.45</td>
</tr>
<tr>
<td>DPDT</td>
<td>2.45</td>
</tr>
<tr>
<td>DPDT</td>
<td>2.45</td>
</tr>
<tr>
<td>DPDT</td>
<td>2.45</td>
</tr>
</tbody>
</table>

### Electrolytic Capacitors

<table>
<thead>
<tr>
<th>Value</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33μF</td>
<td>0.40</td>
</tr>
<tr>
<td>1μF</td>
<td>0.12</td>
</tr>
<tr>
<td>0.1μF</td>
<td>0.12</td>
</tr>
<tr>
<td>0.01μF</td>
<td>0.12</td>
</tr>
</tbody>
</table>

### Resistors

<table>
<thead>
<tr>
<th>Value</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100Ω</td>
<td>0.12</td>
</tr>
<tr>
<td>1kΩ</td>
<td>0.12</td>
</tr>
<tr>
<td>10kΩ</td>
<td>0.12</td>
</tr>
</tbody>
</table>

### Transistors

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>741</td>
<td>0.25</td>
</tr>
<tr>
<td>7414</td>
<td>0.25</td>
</tr>
<tr>
<td>7415</td>
<td>0.25</td>
</tr>
<tr>
<td>7418</td>
<td>0.25</td>
</tr>
<tr>
<td>7430</td>
<td>0.25</td>
</tr>
</tbody>
</table>

### Switches

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPST</td>
<td>0.25</td>
</tr>
<tr>
<td>DPDT</td>
<td>0.25</td>
</tr>
<tr>
<td>DPST</td>
<td>0.25</td>
</tr>
</tbody>
</table>

### Diodes

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1N4001</td>
<td>0.12</td>
</tr>
<tr>
<td>1N4001</td>
<td>0.12</td>
</tr>
<tr>
<td>1N4001</td>
<td>0.12</td>
</tr>
<tr>
<td>1N4001</td>
<td>0.12</td>
</tr>
</tbody>
</table>

### Semiconductors

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>741</td>
<td>0.25</td>
</tr>
<tr>
<td>7414</td>
<td>0.25</td>
</tr>
<tr>
<td>7415</td>
<td>0.25</td>
</tr>
<tr>
<td>7418</td>
<td>0.25</td>
</tr>
<tr>
<td>7430</td>
<td>0.25</td>
</tr>
</tbody>
</table>

### Free Voucher

- ONLY £1.00
- PREPAID ENVELOPE
- SPECIAL OFFER
- 136 ORDER FORM PAGES
- INCLUDES 50p FREE VOUCHER

### Orders Over £10

- £1.85 p/p
- ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

### Contact Information

**The Maltings**
- HIGH STREET, WEM
- SHROPSHIRE SY4 5EN
- Tel: (0939) 32763, Telex: 35565

**NEW RETAIL 1000 sq.f. shop now open Mon-Fri 9.00-5.00, Sat 9-12.00.**

**May Special Offer**

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7W</td>
<td>0.47</td>
</tr>
<tr>
<td>10W</td>
<td>0.60</td>
</tr>
<tr>
<td>20W</td>
<td>0.60</td>
</tr>
</tbody>
</table>

**Service Aids**

<table>
<thead>
<tr>
<th>Type</th>
<th>Price (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuses</td>
<td>0.10</td>
</tr>
<tr>
<td>Potentiometer</td>
<td>0.40</td>
</tr>
<tr>
<td>Push-To-Reset</td>
<td>0.60</td>
</tr>
</tbody>
</table>

**Order by Post**

- Orders over £10.00 include 50p p&p
- Orders under £10.00 charged at current rates

**NEW RETAIL**

- 1000 sq. ft. shop now open Mon-Fri 9.00-5.00, Sat 9-12.00.
934 MHz PERSONAL RADIO

The Nevada Range

Join the growing number of people discovering this exciting radio band. 934 MHz offers 2 way high quality communications from 10 - 250 miles (according to location/weather conditions).

POWER SPLITTER
Enables the co-phasing of any two similar 934 MHz antennas to give an additional 2 dB gain.

£24.90

MRA 934 LIN-LINE GaAs FET PRE-AMP
A super new ultra-low noise pre-amp which fits in line on any base or mobile installation. Guaranteed to give a staggering increase in received range. Extremely low noise 0.7 dBNF. 20 dB gain.

£125

MRA 900 MASTHEAD PRE-AMPLIFIER
Super low noise GaAs FET pre-amplifier that mounts at the masthead. Low insertion loss and noise (typically 0.6 dB) coupled with 15x gain enable this unit to double the received range of many sets.

£139.95

SWR/POWER METER
This precise and extremely accurate meter features an illuminated scale, low loss ‘Y’ type connectors and both power and SWR measurement. Power 0-50 watts in two ranges.

£89.95

.remote Antenna SWITCH
High quality weatherproof masthead mounting switch. For switching 2 antennas with one cable feed.

£59.95

WH 900 SWR/POWER METER
A low cost unit measuring power to 100 watts in three ranges.

£49.95

ANTENNAS

1. P7-E BASE COLNEAR
Gain 7.14 dB (2 element Yagi).

£66

2. P7-RE
High gain gutter mount, mobile antenna.

£44

3. P7-ME
High gain mobile magnetic mount antenna.

£44

4. P7-E
High gain gutter mount mobile antenna.

£25

5. G900A
Low profile bolt thru mobile antenna.

£25

6. G900R
Low profile bolt thru mobile antenna in black.

£25

7. TC 12L MKII 12 ELEME NT BEAM
A new aluminium version of our successful 12 element loop quad. Gain: 18.6db.

£49

ASK YOUR DEALER FOR MORE INFORMATION OR CONTACT US DIRECT.

Nevada 934 MHz Catalogue with full details and specifications of the complete range is available from Telecomms £1.00.

Telecomms, 189 London Road, Portsmouth PO2 9AE. Tel: 0705 662145 Telex: 869107 TELCOM G

Professional Series