

*Amateur*

# RAID

## For all two-way radio enthusiasts

### Yaesu FT290R III reviewed

### Across the pond

### Pitfalls in processing



## On test: Yaesu FT727R 2m/70cm dual band hand-held FM transceiver

**MORSE REPORT**

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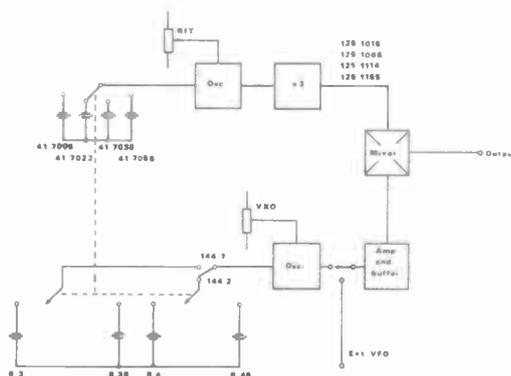
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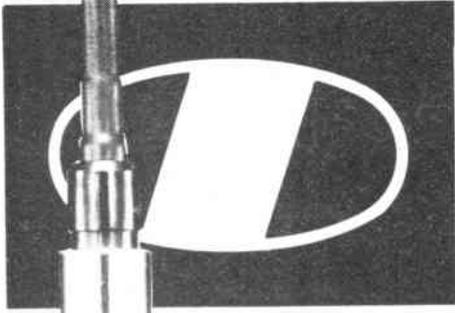
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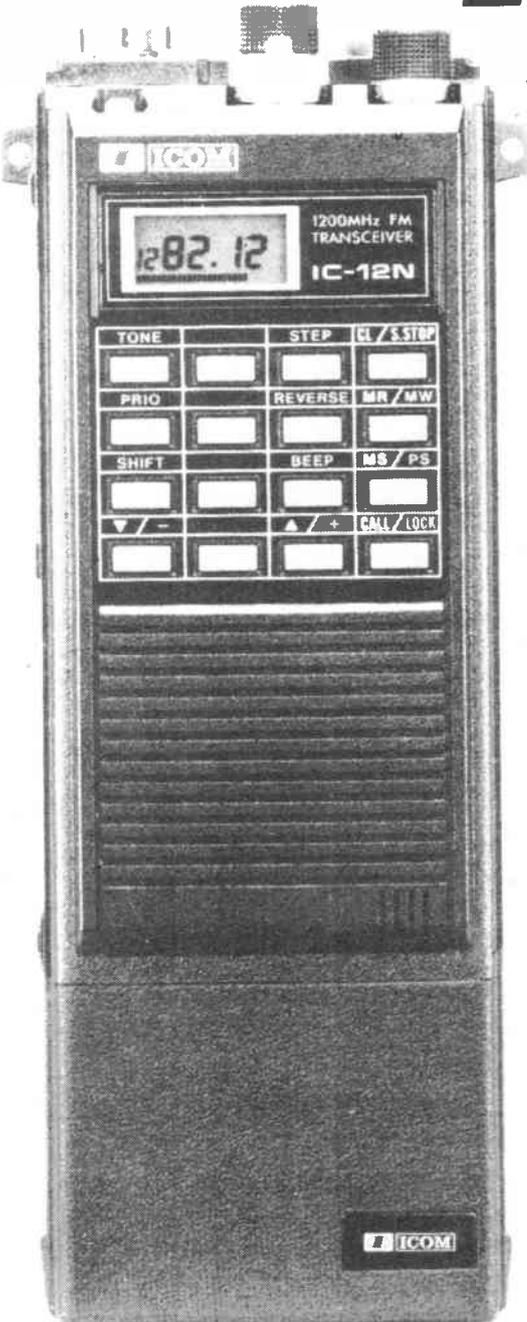
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# ICOM

## 2 NEW Exciting ICOM to give you that m



### NEW! IC-12E, 1200MHz FM Handportable.

ICOM technology is on the move again, continuing to explore the Amateur Radio field, as a result ICOM present the IC-12E, 23cm. Amateur band, handheld transceiver.

The IC-12E has a 16 button keypad allowing direct access to frequencies, memories and scanning facilities. Ten memory channels store operating frequency as well as simplex/duplex and duplex offset frequency. A priority function allows another frequency such as a repeater or calling frequency to be monitored for activity. The memory scan function continuously scans all ten memories in sequence whilst a programmed scan searches between two limits.

The IC-12E is equipped with a 1750Hz tone generator for initial access to a repeater. Frequency coverage 1260-1299.9875Mhz with 5 frequency step rates. An internal power module provides 1 watt or LOW 100mw. as standard. This handheld is supplied complete with an IC-BP3 nicad battery pack, flexible antenna, A.C. wall charger, belt clip, wrist strap, personal earpiece and full operating instructions.

Also available for the IC-12E and other ICOM Handportables are a large range of optional extras including a variety of rechargeable nicad power packs, dry cell battery pack, desk charger, headset and boom mic, speaker mic, leatherette cases and mobile mounting brackets.

For more information on this handportable and other ICOM Amateur Equipment contact your local ICOM dealer or Thanet Electronics Limited.





# STRAIGHT & LEVEL

## SETTING STANDARDS

The Seaward Check Box 500 is a certified readily portable, self-contained unit for checking the calibration of insulation and continuity testers, voltmeters, RCCB testers, and the linearity of line earth loop testers, ensuring that high standards are always maintained.

Each box is supplied complete with a calibration certificate, which if returned at regular intervals to a recognised standards centre will help to avoid inconvenience and consequential expense.

The Check Box 500 is safe and simple to operate, its compact and ruggedly constructed polycarbonate case allowing easy hand-held operation. There are no moving controls; calibration checks on instruments in the field are accurately determined by simply connecting to the appropriate terminals.

Continuity and insulation tests are secured by high precision resistors, whilst a special timing system accurately measures RCCB testers. Voltage test points and a loop test check facility complete

a comprehensive package which is guaranteed for two years.

A custom built 'Test Centre' case is also available, which is fully fitted with a moulded insert to take four standard Seaward test instruments, including a Check Box and all the leads and probes necessary. A battery charger can also be incorporated in the case to enable instruments which are self-powered to be topped up at any convenient mains point.

The Check Box, complete with full instructions and certificate, costs £68.

For further information contact: *Seaward Electronics Ltd, 18 Bracken Hill, South West Industrial Estate, Peterlee, Co Durham SR8 2JJ. Tel: (0783) 863511.*

## CHALLENGER

The Challenger analogue multimeter can be used while fixed to any magnetic surface, hung round the operator's neck using a special sling, or on its desk-top tilt stand. Available from Electronic and Computer Workshop Ltd

(ECW), these features make the Challenger simple to use and place its display and controls in the operator's field of view.

Offering 10 measurement functions and a total of 48 ranges, Challenger has a voltage sensitivity of 40kohms/volt, dc/ac, and can measure voltages from 0.25 to 1000V dc and from 5 to 1000V ac. Current is measured from 25 $\mu$ A to 10A dc and from 0.5 to 10A ac. Accuracy is  $\pm 2\%$  at 20°C. Measurement of resistance and dB output are offered as well as VbF and capacitance.

The instrument utilises a moving coil analogue meter movement, insensitive to external magnetic fields, and is contained in a high impact polycarbonate case. The rear panel has a magnet to allow the meter to be fixed to any flat metallic surface.

The Challenger is offered at a mail order price of £60.38, including P&P and VAT.

For further information contact: *Electronic and Computer Workshop Ltd, 171 Broomfield Rd, Chelmsford, Essex. Tel: (0245) 262149.*



# All the latest news, views, comment and developments on the amateur radio scene

## ONE SOLUTION

Fieldtech Heathrow Ltd has introduced a new product, the PSA-35 portable spectrum analyser.

The Avcom PSA-35 is a possible solution to your TVRO installations and service problems. It is a light-weight portable instrument, which operates from ac line or internal rechargeable batteries. The frequency coverage of the Avcom PSA-35 is from less than 10 to over 1500MHz and from 3.7 to 4.2GHz in 6 bands (including the current 12GHz for LNBS). The instrument has a built-in power block and power for LNAs and BDCs.

The PSA-35 will accurately measure wideband signals commonly used in the TVRO industry. Optional extras include a signal sampler, a terrestrial interference survey horn and a portable carry case.

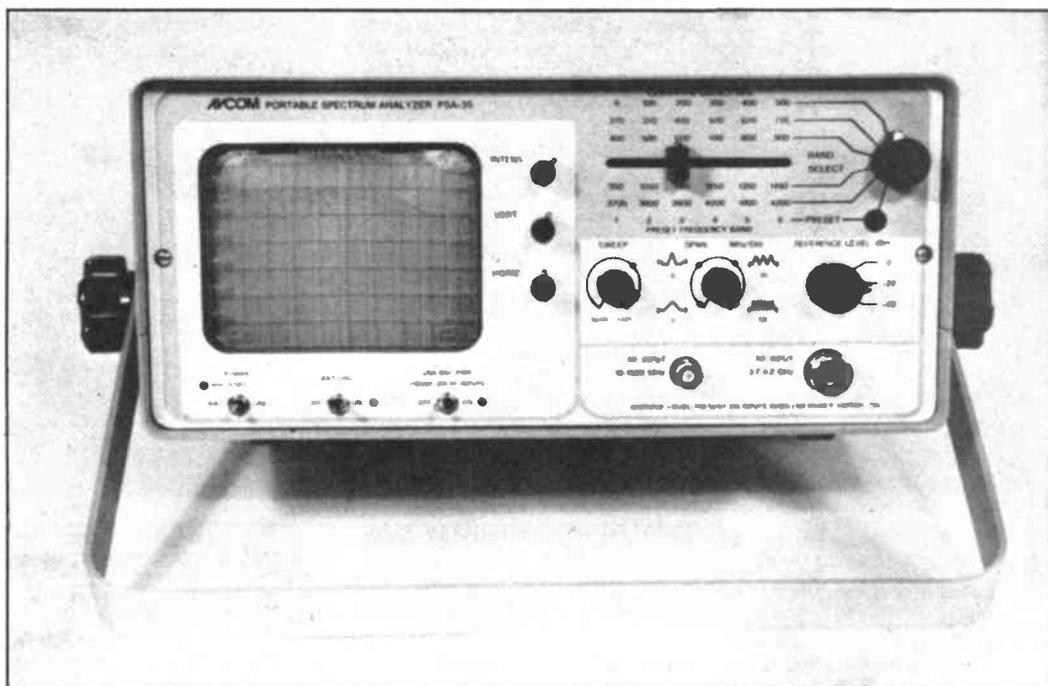
For further details contact: *Fieldtech Heathrow Ltd, Hunsbury House, 420 Bath Road, Longford, Middlesex UB7 0LL. Tel: 01-897 6446.*

## 60MHz SCOPE

Available from Thurlby Electronics is the new Hitachi V-680, which incorporates a sophisticated cursor measurement system to provide a direct on-screen read-out of voltage difference, time difference and equivalent frequency.

The V-680 is a lightweight, low profile instrument which takes up surprisingly little bench space and is very easily transportable.

Other features of the instrument include three-channel, six-trace operation with alternate sweep facilities; full dual timebase with a digital read-out of delay time; and separate B-sweep trigger control. The vertical sensitivity extends to 1mV/division and the electronically set dual timebases have a maximum sweep speed of 5nS/division. The large, rectangular CRT has an internal graticule with 0, 10, 90 and 100% markers and uses an acceleration poten-



tial of 12kV to give a sharp, bright trace.

The CRT read-out system gives an on-screen display of vertical sensitivity, timebase speeds, probe sensitivity and sweep delay, as well as the cursor measurement information. Read-out information can be adjusted in brightness independently of the trace or can be turned off altogether.

The V-680 weighs approximately 8kg and measures 130 x 310 x 370mm. It costs £1,295 plus VAT and is available ex-stock.

For further details contact: *Thurlby Electronics Ltd, New Road, St Ives, Huntingdon, Cambs PE17 4BG. Tel: (0480) 63570.*

## HAND-HELD DMM

A recent addition to the Levell Electronics range of instruments is a 4½-digit hand-held DMM, type HC4510. This meter has a 0.4 inch high liquid crystal display with polarity and low battery indication. dc ranges are from 200mV to 1000V and 2mA to 10A with a basic accuracy on dc volts of 0.05%. ac ranges are from 200mV to 750V and 2mA to 10A with a

response from 45Hz to 1kHz. Resistance ranges are from 200 ohms to 20Mohms. Ranges for testing continuity (with buzzer) and diode forward voltage drop are also incorporated. A further feature is the data hold switch which locks the display.

The instrument is housed in a robust ABS case 170 x 87 x 42mm and weighing 360gm. It costs £69 + VAT including mainland UK delivery.

Further information can be obtained from: *Levell Electronics Ltd, Moxon Street, Barnet, Herts EN5 5SD. Tel: 01-449 5028.*

## SWITCHED ON

Wavecom's latest switch development is an RF coaxial matrix switch that offers up to 45 selectable I/O paths.

Available in the UK from Anglia Microwaves Ltd, the matrix switch is guaranteed for 1,000,000 switching cycles for each position, in versions with from four to ten I/O channels. This option allows from six to 45 RF paths, selected by a TTL-compatible control port. Models can be specified with frequency ranges up to 18.5GHz.

Typical applications for this

product include the selection and interconnection of multiple receive and transmit antennas, filters, amplifiers, spectrum analysers and other instrumentation in development or test laboratories.

For further information contact: *Anglia Microwaves Ltd, Radford Business Centre, Radford Way, Billericay, Essex CM12 0BZ. Tel: (0277) 630000.*

## COAXIAL CABLE

A new product from Geefor Enterprises is the RA519 coaxial cable, of particular benefit to users of VHF and above.

This 50 ohm semi-airspaced (5 cell extrusion) cable has a solid centre conductor. The outer conductor has both a foil screen and copper braid.

The attenuation in dB per 100 metres is: 100MHz - 3.2; 200MHz - 5.4; 400MHz - 7.2; 1000MHz - 13. The cable is easy to work with, with a minimum bending radius of 55mm. It costs 80p per metre, with discounts available for bulk purchases.

More information is available from: *Geefor Enterprises, 112 Leeds Road, Mirfield, West Yorkshire.*



## SCREW LOOSE?

Amateur electronics and precision engineering enthusiasts will appreciate the quality and design of the new range of Gebra 'Profi' electronic screwdrivers.

The range was originally designed for use in the electronic and precision engineering industries, being particularly suitable for assembly work. However, these screwdrivers will also be of interest to amateur engineers. They are intended for use on small screws up to 4mm, where low torque is to be applied. The small octagonal handles are shaped to give easy thumb rotation. The flats on the handles prevent rolling.

The special chrome vanadium silicon blades are fully hardened, with black precision tips, and are chrome plated. The range comprises plain slot, pozi/supa drive, Philips X-slot and Torx versions.

The anti-static properties of the thermo-plastic cellulose acetate used for the handles are an important feature for work with static-sensitive electronic components.

Prices range from £1.38 to £5.33 plus VAT, and the range is distributed solely by The Goport Company Ltd.

For further details contact: *The Goport Company Ltd,*

*York House, Empire Way, Wembley, Middlesex HA9 0QH. Tel: 01-903 2065.*

## SUNLITE

The new Sunlite solar powered torch from Chronar Ltd offers you freedom from the nuisance of 'dud' batteries. It is supplied complete with three rechargeable NiCad batteries and has a handy wrist strap.

The Sunlite is useful for camping and other outdoor activities, especially where travelling and mobility are necessary. Unlike traditional torches, the strong 4 watt tubular fluorescent bulb in the Sunlite has the advantage of shining light over a wide area.

The three NiCad batteries are solar charged, thereby eliminating the need for a continuous supply of new batteries. They will reach full charge after 4 days in bright sun, and it is possible to use the adaptor socket to charge from a 4.5 volt mains adaptor if desired. Shelf life from full charge in total darkness averages 3 months and the batteries will last for between 1000-1500 full recharges.

For further details contact: *Chronar Ltd, 49 Albemarle Street, London W1X 3FE. Tel: 01-491 0535.*

## SOLAR POWERED

The Chronar MiniCharger (Model CH-330) provides a means of battery charging for personal stereo users. Supplied with two AA (or HP7) size rechargeable NiCad batteries, the MiniCharger can be used to run a radio or cassette directly, as well as cameras, electronic flash guns, portable shavers and small torches.

Designed to provide portability and independence from a mains power supply, the MiniCharger is suited for

use with the new generation of dc appliances. Using the two NiCad batteries supplied, the solar cells will recharge in about the same time (12-14 hours) as a conventional mains charger, even in artificial light, although best results are obtained by placing the panel in direct sunlight.

The MiniCharger saves on battery costs and is small and light enough to fit into a pocket or rucksack. Its construction is rugged and versatile, the front cover doubling as a tilted stand. Also included is a connector lead with multi-way adaptor.

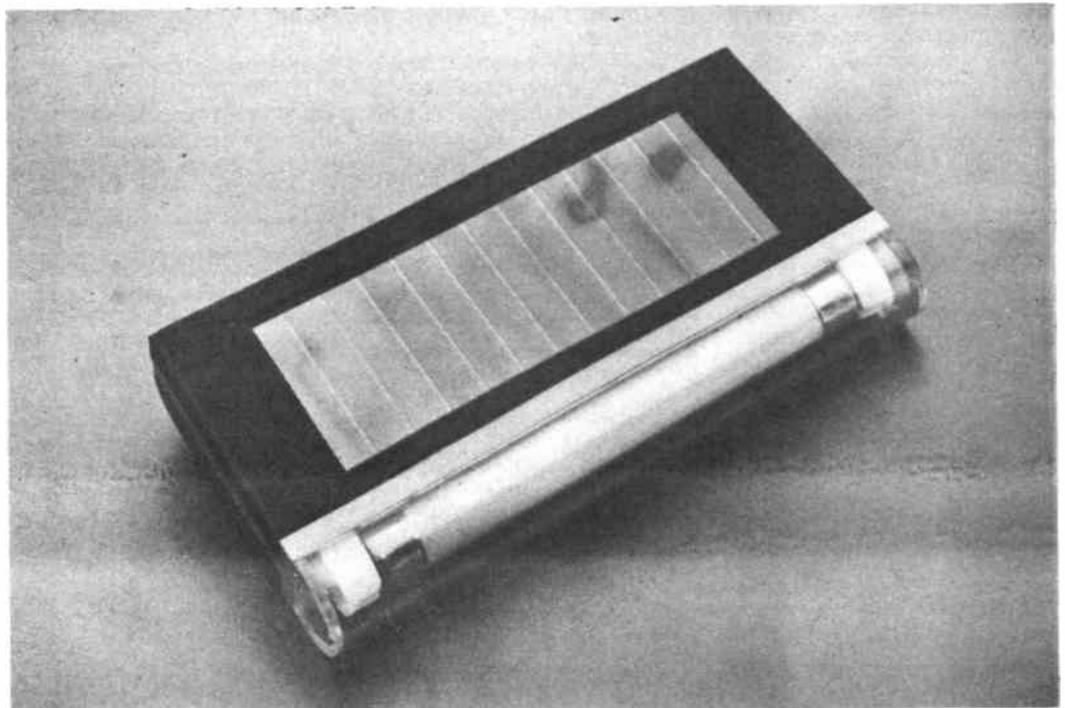
This product costs £19.95.

Chronar manufacture a range of solar products including solar clocks, torches, garden lights and 12 volt battery charger packages suitable for cars, boats or caravans.

For further details contact: *Chronar Ltd, 49 Albemarle Street, London W1X 3FE. Tel: 01-491 0535.*

## FEEL THE FORCE

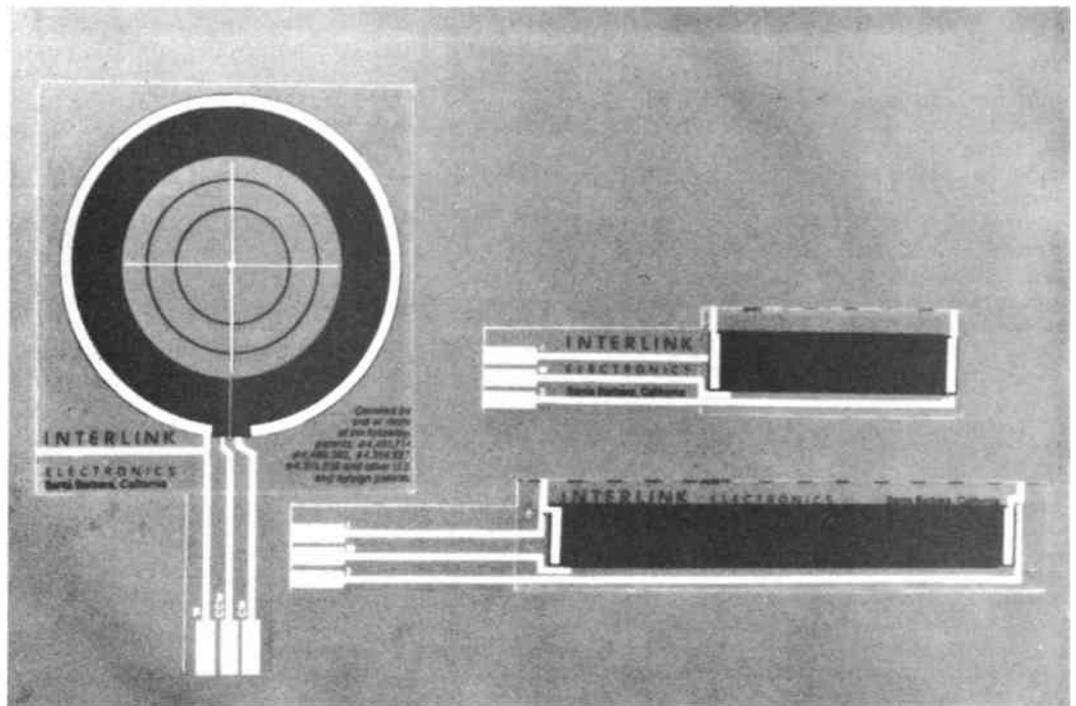
Interlink Electronics have announced the development of a thick film linear potentiometer which provides a unique solution for a low cost, very low profile position and pressure sensor. Measuring only 0.015 inches high, the linear potentiometer may be integrated within a membrane panel or into any design where space is criti



cal. The device employs Interlink Electronic's proprietary force sensing resistor technology to measure both the position of an object and its pressure upon the surface. Simple interface electronics convert the resistance change to dc voltages which may be used to control external circuitry or equipment.

The following electrical specifications are provided to enable the Interlink linear potentiometer to be integrated into various products: maximum working voltage - 1.5V; maximum dc current - 1mA; typical no load resistance - 10M $\Omega$ ; typical force range - 20gm/sq cm to 10kgm/sq cm; typical resistance range - 10M $\Omega$  to 1000 $\Omega$ .

For further details contact: Interlink Electronics, 535 East Montecito Street, Santa Barbara, CA 93103, USA.



## DIGITAL PROCESSING

ITT Semiconductors has announced the APU2470 programmable digital real-time signal processor for digitised sound signals. It contains a range of mask-programmed functions, and can be controlled from a central control unit via the serial IM bus.

A typical feature set, depending on the application, would include dc offset suppression, pre-emphasis, de-matrixing for stereo or bilingual TV, loudness, bass and treble control, stereo basewidth enlargement, balance and volume control. The circuit may also be programmed to decode a TV channel ident signal and switch itself automatically to mono, stereo or bilingual mode, as appropriate.

The main DSP task of the APU2740 is filtering, performed by combinations of add, multiply, and delay circuits. Even a simple first order filter needs three multiplications and a three-term addition, plus associated data transfer.

For real time operation at audio frequencies the circuit must provide about one hundred such filters, working within the sampling period of 28 microseconds (for a 35kHz sampling rate). A clock frequency of about 20MHz is used with the real time program memory. Several calculations and move operations are handled

simultaneously, with pipelining to ensure continuous operation of the ALU. This results in a maximum capability of 4.4 million sum of products operations per second.

Special hardware is required for such high processing speeds. The APU2470 has an arithmetic logic unit which comprises a fast 16x8 bit multiplier, adder, 20-bit accumulator, shift register and overflow logic.

There is a 51x16 bit data RAM for intermediate results, and a 256x14 bit mask-programmed ROM for programs, in addition to the 32x8 bit RAM and 28x8 bit ROM for coefficients.

The IC also contains the IM bus interface, two digital filters for input conversion to PCM, output DAC, bus separator, program counter, control unit, and four 16 bit serial I/O channels.

A separate analogue volume adjustment provides high signal-to-noise ratio even with low input level or extreme filter settings.

Applications are envisaged in satellite TV receivers and high quality audio/video equipment.

The APU2470 is an N-channel MOS circuit housed in a 24 pin DIL plastic package, and consumes typically 200mA at  $V_{DD} = 5V$ .

Enquiries should go to: ITT Semiconductors, 145-147 Ewell Road, Surbiton, Surrey KT6 6AW.

## CHIPS WITH EVERYTHING

Now available from RR Electronics are details of three new chips in Motorola's digital signal processing (DSP) family. All are fabricated in HCMOS.

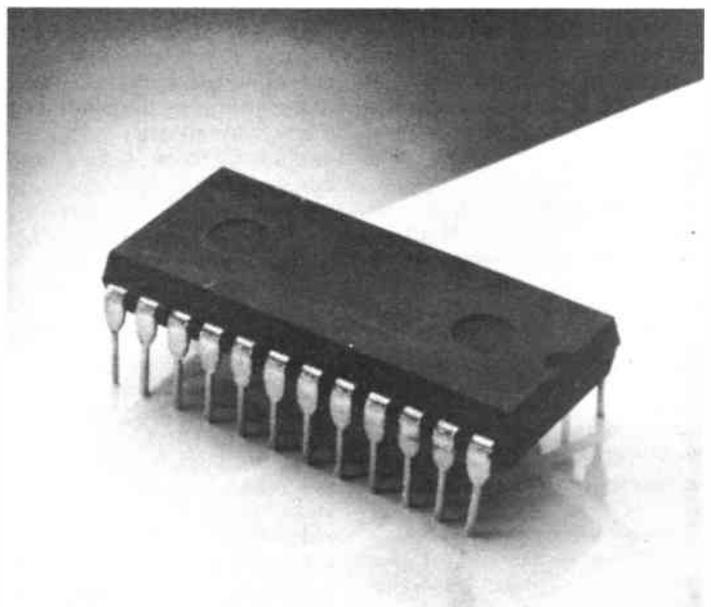
The DSP56000 is a 56 bit general purpose, user-programmable DSP. It comprises 3 execution units in parallel: the data and, the address ALU and the program controller.

This DSP has MCU-style on-chip peripherals, program and data memory, plus memory expansion port. Other features include 10.25 million instructions per second (MIPS); single cycle ALU; 24x24 56 bit parallel multiply/accumulate; and a 2Kx24

bit program ROM. The DSP56001 chip is identical except that it includes RAM instead of ROM for user flexibility.

The third chip, the DSP56200, is a cascadable adaptive finite impulse response (CAFIR) digital filter. It is a DSP peripheral for computationally intensive tasks associated with digital filtering. It fulfils two main functions: FIR filtering and adaptive FIR filtering using the least mean square (LMS) algorithm.

More details will be provided by: RR Electronics Ltd, St Martins Way, Cambridge Road, Bedford MK42 0LF. Tel: (0234) 47211.



## DESIGNER AWARDS

Two British companies are to fund technology awards for students to the tune of £100,000. In a major new initiative aimed at encouraging innovation and the development of technological skills at educational establishments around the country, Texas Instruments Ltd and Cirkit Holdings plc have come together to help set up the YEDA (Young Electronic Designer Awards) Trust.

The principle objective of the Young Electronic Designer Awards is to promote the development of world-beating products in pursuit of future (British) success in international markets, together with the creation of more jobs. Both Cirkit and Texas have been concerned about the steady decline of the manufacturing industry and its ability to compete in world markets.

The companies teamed up with Professor Eggleston of Warwick University a little over two years ago to create the Awards scheme. Now they

have set up the YEDA Trust to secure the scheme's future development with the influential support of a top level multi-vocational board of trustees.

Texas and Cirkit are contributing jointly some £100,000 in resources to the YEDA scheme, providing students and participating institutions with the opportunity to win a scholarship, cash awards and equipment as well as career prospects.

To enter, applicants in full-time education have to complete an electronic design project, which has a useful and viable application in everyday life, for assessment by a panel of experts. The judges assess not only innovative and technical merit but the commercial potential of the projects. Preliminary judging will take place in May and the finals in June/July.

In addition to the awards to be won, there is the potential for successful applicants to have their designs taken up for commercial manufacture through the help of the

sponsoring organisations.

For further information contact: *The YEDA Trust, 3rd Floor, Standard House, 16-22 Epworth Street, London EC2A 4SX. Tel: 01-628 7651.*

## GUIDING LIGHT

The latest edition of *Guide to Utility Stations*, which is updated annually, contains thousands of stations transmitting anything from data from a remote Arctic weather station to Interpol.

*Guide to Utility Stations* is compiled from Joerg Klingefuss's own monitoring of the radio spectrum according to an exact schedule which covers all frequencies at all times during a four monthly turn.

Like his other books, *Guide to Utility Stations* is compiled with his own computer-controlled database and word-processor. It automatically deletes all entries which are older than fifteen months.

The 1987 edition contains 14,817 frequencies from 0 to 30MHz in the entire VLF and HF spectrum. Full information

on the types of transmissions used include radioteletype, CW, SSB, FAX, Amtor, SITOR, VFT, etc, plus the unusual forms of RTTY using the Arabic or Cyrillic alphabets. There are 4,593 RTTY and 44 FAX stations listed.

In another section 2,931 callsigns are listed alphabetically, with the station name, country and frequencies.

Moreover, an additional section covers 274 stations operating without complete official callsigns, and gives an explanation of the NATO Routing Indicator System.

There are chapters on Q codes, including all special air/maritime groups, Z-codes both civil and military, SINPO and SNPFEMO signal reporting codes, 82 meteorological RTTY stations on 232 frequencies, 3 large maps, and much more.

This book will be of great help to the British short wave enthusiast. It costs £19.95 + £1.65 P&P and is now available from the importers: *Interbooks, Stanley, Perth PH1 4QQ. Tel: (0738) 828575.*

## CLUB NEWS

### Licence renewal

According to the Radio Amateur Licensing Unit (RALU) a number of problems concerning radio amateurs' records have arisen. These problems are mainly due to amateurs using old application forms when renewing their licence and readers are requested to note the following:

'When reapplying for a lapsed licence or when making a new application, radio amateurs should ensure that they are using an up to date application form (available in the latest *How to Become a Radio Amateur*, August 1986, or on request from the DTI or RALU), otherwise they may find that their details will be withheld and their stations will not be included in the *Call Book*.

'With the passing of the Data Protection Act, 1984, the application form used by

radio amateurs was updated so that they could say in a positive way that they wanted their details published. Many amateurs are still using old application forms which do not meet this need for positive affirmation of intention. This is in spite of the fact that copies of the new application form were circulated to colleges which run RAE courses, and in spite of the *How to Become a Radio Amateur* booklet being updated. Because applications made on the old forms will automatically be marked 'details to be withheld', unfortunately many amateurs will be excluded from future call books when they wish to be included.

'If this has already happened in your case, write to the Radio Amateur Licensing Unit with a positive statement that you would like to see your personal details published in any future call books.

'A number of amateurs' standing orders have not been kept up to date. Many are made out to the wrong amount (in which case the licence will not be issued) or they are made out to old Home Office and DTI accounts (which delays the

issue of licences). If you are in any doubt about your standing order details, please contact the RALU to confirm the correct details, and then inform your bank of any alterations necessary.

'Some old application forms also show the accounts address as Tolworth Tower. In fact, all payments should be made out to the Post Office and sent to the Radio Amateur Licensing Unit, The Post Office, Postal Headquarters, Chetwynd House, Chesterfield, Derbyshire S49 1PF. Tel: (0246) 217555.

### Hampshire digipeater

The packet radio digipeater GB3HP, located at Oliver's Battery near Winchester, Hants, is now operational. It was constructed by members of AMRAC (AMateur Radio And Computer club) and operates on 144.650MHz using the AX.25 packet protocol.

The hardware consists of a standard PK-80 terminal node controller, supplied at a discount by ICS, and a 25 watt FM PMR rig donated by Pace Mobile Radio. The antenna is an Isopole supplied by ICS. It is hoped, licence permitting, to add an IBM PC clone to the

repeater to provide a mail-box/bulletin board service.

The digipeater is expected to provide good coverage of Hampshire and AMRAC would welcome any reception reports from amateurs and SWLs. They should be sent to the GB3HP project leader, Lloyd Arrow G1JAR QTHR.

AMRAC publish a bi-monthly newsletter dealing with all forms of computer communications, such as Amtor, ASCII and RTTY as well as packet radio. Membership is currently £5 in the UK and £8 in Europe. Further details may be obtained by sending an SAE to the secretary, Phil Bridges G6DLJ, 9 Hollydene Villas, Hythe, Hants SO4 5HU. Tel: (0703) 847754 or use Prestel Mailbox 703847754.

### QSL service

The newsletter of the Irish Radio Transmitters Society reports that the IRTS has decided to make the incoming QSL bureau available to non-members. It has been suggested that an annual fee be charged for this service, although how much this will be has yet to be announced.

For further info contact the IRTS, PO Box 462, Dublin 9.

## Have a heart

Many readers will have heard of the valuable work of Professor Magdi Yacoub and staff at the Harefield Hospital, which is currently being established as the world's first heart transplant centre for children. However, this advancement has resulted in a desperate need for a major extension to the children's wards and a special play centre.

The play centre has now become the object of the Mayor of Hillingdon's Charity Appeal for 1986/7 and it is hoped to raise £20,000. A special event station, GB2HHT, is being run from Friday, 16 to Sunday, 18 January in support of this target. It is hoped to locate the station in the hospital grounds.

The station will operate on 80m and 2m, and will ask contacts to support this worthwhile cause by enclosing a donation with their QSL cards. These should be sent to the London Borough of Hillingdon, Mayor's Parlour, Civic Centre, Uxbridge, Middlesex UB8 1UW and cheques should be made payable to The Mayor's Charity Appeal 1986/7. A special QSL card will be sent to any amateur station responding in this way.

## Follow the BEARS

The Borehamwood and Elstree Amateur Radio Society (BEARS) operated special event station GB2TV during the weekend of 19-21 September 1986. It is thought that this was the first special event station to celebrate the 50th anniversary of high definition television. The station QTH was the BBC TV Centre at Elstree.

GB2TV began operation, after a minor hiccup, at 1300 hours. The very first QSO was between Tony King G0DDJ and Ray Herbert G2KU. This was a particularly nostalgic contact for Ray Herbert, who operated the original experimental 2TV station back in 1926.

During the following 36 hours many stations were contacted, particularly on VHF which was enjoying lift conditions and 80 metres which was open. GB2TV was also operating ATV and a number of contacts were made in this mode. Many old-timers were contacted, and a surprisingly large number expressed great delight in



TV weatherman, Jim Bacon G3YLA, visited Chesham and District Amateur Radio Society recently, and unravelled some of the mysteries of lift conditions and weather forecasting to the members of the club. During the evening Jim also cut the ribbon to officially open the club's new extension to the premises. Chesham and District ARS meets every Wednesday at Bury Farm, Pednor Road, Chesham, Bucks. For more information please ring Liz on (09278) 3911

the fact that this anniversary was being recognised.

The station antenna system comprised a trap dipole, a 20m delta loop and multi-element yagis for VHF and UHF. Equipment was kindly loaned by North London Communications Ltd and from G0CNO. Special QSL cards are being printed and will be sent to all stations worked, and all short wave listener reports will be answered.

The BEARS meets on the second Monday of each month and details of club activities are available from Tony G0DDJ after 7pm. Tel: 01-207 3809.

## ISWL return

Owing to financial difficulties, the ISWL ceased activities in June 1986, but we are advised that the league has now resumed operation 'on a new and durable basis'.

The officers are President Frank Baldwin, Honorary Secretary Jim May G1GWG, Assistant Secretary Evelyn May G1OFC, Treasurer Mike Gater G4ICC, and council members Dick Rugg G2BRR,

Bernard Hughs and Ivor Davies.

The total refloatation cost and immediate working capital have been donated by council members. The QSL bureau has been reactivated and the league's journal, *Monitor*, is planned to reappear early this year.

Information on the organisation and membership details can be obtained from ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

## Watch out . . .

Of interest to all amateurs with a shack full of expensive communications equipment will be a talk on crime prevention by the Metropolitan Police, hosted by the Wimbledon and District ARS and scheduled for 30 January.

All meetings are held at St Andrew's Church Hall, Herbert Road, Wimbledon, London SW19 at 7.30pm. Regular meetings are on the second and last Fridays of each month.

Enquiries concerning WDARS activities should go

to the Honorary Secretary, George Cripps, 115 Bushey Road, Raynes Park, London SW20 8DG. Tel: 01-540 2180.

## . . .there's a thief about

As Roy Bailey G6WLE of Berks discovered recently to his cost.

The following equipment was stolen from Roy's shack on the night of 7/8 November 1986:

- Yaesu FT208R 2m hand-held (serial no. 2C081428), with speaker/microphone and NiCad battery pack. The case that holds the battery has recently been renewed and the internal resistor to the ear socket has been shorted; giving an improved audio level to an external speaker;
- Alinco ELH-203E 2m linear amp (serial no. 31106083), housed in a silver case which is very scratched on one surface;
- Oscar dual-band mobile antenna;
- Ham International MS50 extension speaker. A small, black speaker of about 2in diameter with a dent on the front metal grille, complete

with a lead terminating in a miniature jack plug.

A home-made power adaptor was also stolen. It consists of a bank of phono sockets mounted on a small, black plastic box with a metal back, attached to a vehicle lighter socket plug.

If you are offered any of these items for sale or repair, please contact your local police station and/or Roy on (048839) 441. There is a £25 reward for information leading to the recovery of all this equipment.

## Broadcasting

The Verulam Amateur Radio Club will host a talk entitled 'Broadcasting developments' on 27 January, to be given by N Davies. All visitors are welcome.

The venue is the RAF Association Headquarters, New Kent Road, off Marlborough Road, St Albans. Club nights are on the second and fourth Tuesdays of the month.

Further details are available from Gerry Wimpenny G4OBH, 30 Faircross Way, St Albans. Tel: (0727) 52003.

## 'Media Monitor'

The radio bulletin *Media Monitor*, produced by Roger Tidy for SWLs and DX enthusiasts, is now published weekly.

The annual subscription rates are £25 for 52 issues or £12.50 for 26 issues. Subscription orders should be sent to Roger Tidy, 11 St Philip House, Lloyd Baker Street, London WC1X 9BA. Tel: 01-833 0978.

## Errata

In Jim Smith P29JS's article *World of Awards*, published in the November issue, the addresses given for the ISWL (International Short Wave League) were out of date.

The secretary can now be contacted at the ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA and the awards manager at 14 Derwent Avenue, Rayleigh, Essex SS6 8LE.

## A good talking to

The January programme of the Southgate Amateur Radio Club (G3SFG) includes a talk on phase locked loops and frequency synthesis on the 8th, presented by Brian Oughton G4AEZ, and an informal evening on the 22nd.

All meetings have the same venue: the Holy Trinity Church Hall (Upper), Green Lanes, Winchmore Hill, London N21.

Information on club activities is available from Dave Elson G4YLL, 200 Churchgate Road, Cheshunt, Herts EN8 9EL. Tel: (0992) 30051.

## VHF contest

The first Derby and District ARS National 144-145MHz Contest will take place on Sunday 15 March between 1.00 and 5.00pm. It is hoped that this will become an annual VHF contest.

All modes permitted by the operator's licence may be used, but the band plan must be observed. Fixed, alternative and portable entries are permitted.

There will be three sections in the contest: 1) full legal limit; 2) low power 25W maximum output; and 3) SWL. The winner and runner-up in each section will receive a special certificate.

For a full copy of the rules send an SAE to the society at 119 Green Lane, Derby DE1 1RZ.

## Short film

The Loughton and District Amateur Radio Society has a film show scheduled for 16 January, presented by John Short G1DJI. An informal open evening follows on the 30th, when the society welcomes visitors to come for a chat.

All meetings are held at 8.00pm in Room 20 of Loughton Hall, Rectory Lane, Loughton, Essex IG10 3RU. Full details of club activities can be obtained from David Thorpe G4FKI, 44 Townfield Road, Flitwick, Beds MK45 1JF.

## Duff prezies

A brilliant idea from the Worksop Amateur Radio Society comes in the form of a 'Duff Prezies Sale' on 13 January - a chance to get rid of any unwanted junk accumulated over the festive season (numerous gaudy ties, handkerchiefs and revolting socks, no doubt!)

This will be followed on the 27th by a talk on home-brew solid-state from Bernard G4SHU.

The society meets at the Woodhouse Inn, Woodend, Rhodesia, Worksop, Notts on Tuesday each week at 8.00pm.

Information on club activities can be obtained from Mrs C S Gee G4ZUN, 100 Plantation Hill, Worksop, Notts. Tel: (0909) 486614.

## Alka-Seltzer

Just when you thought the party season was over, the North Bristol Amateur Radio Club decides to continue the festivities by holding its Christmas party on 2 January! Oh well, it will make a change from watching *National Velvet* on the TV for the umpteenth time (or *White Christmas*, or other film 'classics' dragged out and dusted down for the holiday period...)

Details are available from Alan Booth G4YQQ at 656 Southmead Road, Filton Park, Bristol BS12 7RD.

## Go for your guns!

Two interesting lectures are scheduled for January by the Spen Valley Amateur Radio Society. Rod Bass G4IPH will present one on the subject of 'Rifle Shooting' on the 8th, and on the 22nd the 'Development of Sound Recording' will be Tom Anderson G6DLA's topic.

Both events will take place at the Old Bank Working Men's Club, Mirfield, West Yorkshire, at 8.00pm.

For more details of the club and its activities contact the secretary, Ian Jones G4MLW, 54 Milton Road, Heckmondwike, West Yorkshire.

## Top Band construction

The Maltby Amateur Radio Society has the following events lined up:

2 January - Activity night on the air;

9 January - Building a multi-mode transmitter for Top Band;

16 January - Contest organisation and operating;

23 January - Computers in amateur radio;

30 January - Simple absorption wavemeter for 144MHz and higher.

All meetings are held at 7.30pm at the Community Centre, Clifford Road, Hellaby, just off the M18 (Junction 1) between Rotherham and Maltby.

If you would like information on these and the society's other activities, contact Keith Johnson G1PQW (Secretary), 20 Rolling Dales Close, Maltby, Rotherham, South Yorkshire S66 8EJ. Tel: (0709) 814135.

## Something different

There is plenty of activity down at the South Bristol Amateur Radio Club this month, beginning with a lecture on club projects on the 7th by Kevin G8BDZ. A VHF activity evening is planned for 14 January, followed on the 21st by a bring-and-buy sale. On the 28th there is something completely different: a photography activity evening, introduced by W Pipping.

The club meets every Wednesday evening at 7.30pm, at the Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Further details are available from Len Baker G4RZY on (0272) 834282.

## DTI info

On 30 January, the Mid Lanark Amateur Radio Society will have a visit from Cliff Jones of the DTI, who will provide an update on the work of the department and answer questions.

The society meets every Friday at 7.30pm at the Wrangholm Hall Community Centre, New Stevenston, Motherwell. An RAE class and constructor's club also run at this time.

Information is available from David Williams GM1SSA (Secretary), 32/34 Carfin Street, New Stevenston, Motherwell ML1 4JL. Tel: Holytown 732403.

## Satellite update

The January schedule of the Fareham and District Amateur Radio Club kicks off with a natter night on the 7th, followed on the 14th by Morse testing with Peter G3TZL. The 28th of the month sees a talk by David G6XHR, entitled 'Satellite update'.

Meetings are held on Wednesdays at 7.30pm, with Morse classes at 7.00pm. The venue is the Porchester Community Centre, Westlands Grove, Porchester, Hants.

Contact A S Chester G3CCB for details, at 'Deva Wood', 44 The Ridgeway, Down End, Fareham, Hants PO16 8RE. Tel: (0329) 288139.

**Promote your club's event by sending the details to us at the address on the contents page**

# L·E·T·T·E·R·S

## NO PAPERWORK

A few years ago I felt that home computers were becoming powerful enough to act as the 'honorary secretary' of a club or small organisation. The reason for this was the difficulty of getting people to turn up at an annual general meeting for fear of being dragged onto a committee, for many small local organisations seem to be failing due to the lack of volunteers to do the work of keeping the society going and meeting members' demands.

It seemed to me that a good database could contain all the information of membership records, programme details and minutes, and built-in instructions could circulate the members to make sure they paid the subs and remind them of meetings, etc. Further, if we put the system 'on-line' via the telephone network, then anybody with a home computer could input new information or check on the latest details. In other words, the perfect secretary to keep the wheels running smoothly; one who would never get hazy, lazy or cross.

There was no enthusiasm for the idea, however, and I moved onto other things. In particular the cost of telephone calls meant that data transmission by that medium was unattractive, particularly as I have an amateur radio licence and can communicate with like minds at little cost.

Just recently I woke up to the fact that using a computer in this way had more or less happened in a different context, without my realising it. Recently, we set up a club and held meetings and issued minutes with virtually no paperwork at all by using amateur packet radio.

It arose like this. A number of amateurs in the Thames Valley area started exchanging files of data over the air using telephone modems. This led to news items and reports of meetings in the form of a regular bulletin and a regular Sunday evening 'net'. In turn, this led to experimenting with 'packet' and this mode is now taking precedence over the telephone line practice

with modems.

The subject of packet had a great boost early this year when the Amateur Radio and Computer Club, AMRAC, imported a number of units from abroad and made these available to members. This led to a significant membership in the Thames Valley and the following transcript from a resulting Bulletin Board will describe what has happened so far.

'The Amateur Radio and Computer Club, AMRAC, based on the south coast, has been very formative in getting packet radio in operation in the UK and many interested amateurs are members. Because of the difficulty of attending meetings on the south coast, most of the members are 'postal' ones. The idea of a lower subscription allows any area to make its own arrangements to hold local meetings and finance them at their own choice.

'Discussions on the air suggest we have enough AMRAC members to have a local section, and the purpose of the meeting on 3 October is to decide how this might be run and what it should aim to do.

'We could have a formal club, in which case we could elect a steering committee, chairman, secretary and so on and arrange subscriptions, or we could have an informal club where activities result from voluntary efforts with little structure and make each event pay for itself. I favour the latter because we have a new and powerful means of communication which could cut out much of the usual paperwork and committee meetings, and result in an open club where what matters is intelligent participation'.

**R J Redding G3VMR, Berks**

*Let us know what you think about this concept. AMRAC can be contacted via the secretary, Trevor Tugwell, 50 Mayridge, Fareham, Hants.*

## AD SUCCESS

A little while back I took advantage of your generous offer of free advertising space in *Amateur Radio*. I had

some receivers for sale prior to returning to transmitting after a spell off the air.

I also advertised the equipment in my local radio club newsletter. In the event, all the equipment was bought up by fellow club members quite quickly.

Your magazine was then published and the response was little short of astounding. I lost count of the number of telephone calls I received. I am, of course, not complaining, but felt you would be interested to know of this response.

One enquirer phoned from London willing to pay the carriage on a receiver, another phoned from South Wales and was prepared to motor up here to collect the receiver he was interested in. An American lady, touring England, offered to buy a receiver just to 'listen round whilst we are here'. Another letter recently arrived from the Lake District offering to pay any carriage necessary.

I was sorry to disappoint so many people, but I did have many pleasant conversations with fellow amateurs who rang up, including some local contacts which we have followed up.

I felt you would be interested in this response. There is little doubt I could have sold the equipment several times over.

**H V Young G3LCI, Merseyside**

## GB QSLs

A little over a year ago I took over as the QSL Sub-Manager for GB callsigns on behalf of the RSGB. Although this information was published in *RadCom* and subsequently printed in the 1986 *Callbook*, envelopes are still being sent to the address of my predecessor, the late Mr Newman, and occasionally to his predecessor. Mrs Newman has now moved. Whilst temporary arrangements have been made to forward any mail to me, this arrangement cannot continue indefinitely.

I would be grateful if I could use your letters column to make the following points to your readers in respect of GB QSLs:

■ All envelopes for the collection of cards for GB stations should be sent to me, G4RVV. I am QTHR in the 1985 and subsequent *Callbooks*.

■ Send envelopes as soon as possible after the event when you have some idea how many cards there will be to collect. A 5 x 7.5 inch envelope at 13p will hold about 20 cards.

■ Send in cards for GB stations as soon as possible. *Do not wait* until your card arrives from the GB station. Cards arriving with me a year after the event may well not be collected if it was a 'one off' event.

■ Cards are to be sent to the main bureau, G3DRN. Cards for GB stations *only* may be sent direct to me.

■ GB Station Managers please note that I can only hold uncollected cards for the statutory three months. They are then destroyed.

Good QSLing.

**MW Stoneham G4RVV, Kent**

## DISCIPLINED

This summer I was once again QRV on 2m and 70cm with the call G1/DH3AAE, from Taunton in Somerset. I was very surprised at the good discipline I found on the SSB bands! Even with the band being very busy, I was still able to have a lot of 'quiet' QSOs. Another thing that struck me was the fact that 144.300MHz was only used for calling CQ. You won't find this in my country (DL).

This winter I will be QRV on 2m between 20 December 1986 and 3 January 1987 from my G-QTH in Taunton.  
**Thomas Pohl DH3AAE, Somerset.**

***If you have an opinion, controversial or otherwise, on any subject related to the radio hobby, then we would like to hear about it***

***Write to Amateur Radio Magazine, Sovereign House, Brentwood, Essex CM14 4SE***

# RSGB

## YOU CAN'T PLEASE EVERYBODY ALL OF THE TIME. BUT

Following the Annual General Meeting of the RSGB on 6th December, an Extraordinary General Meeting was held to consider four amendments to the Articles of Association put forward by the society's general council. Two of these amendments, one enabling presidents of the society to remain in office for a second year and the other increasing the size of a quorum in the council from seven to eleven, were approved without too much fuss.

It was a different story, however, with the other two amendments. One sought to prevent newcomers from nominating candidates for election to the council until they had been members of the society for five years, and the other to increase from three to five years the minimum period of membership necessary before a candidate could stand for election.

In putting these proposals forward the council said, 'at present Article 52 permits a member immediately joining the society to nominate a candidate for election to the council. In the view of the council this could lead to abuse, with the possibility of people joining the society at the instigation of someone who wished to stand for council, but who could not find the support of 10 members in any other way. The council believes that it is in the interests of the society that the 'qualifying period' should be extended, and should apply to both members standing for council, and to their nominators'.

### Bizarre

The hierarchy of the society was taken by surprise at the reaction to these rather bizarre comments. The idea that there might be some sinister plot to take over the RSGB by such means, or that it might even be successful, was just not acceptable. Member after member stood up in what must have been one of the best debates for years, to express opposition to this idea.

Were newcomers to be second-class members with limited rights for their five years? Why couldn't the membership itself decide who could stand for council, and who would be elected – by the simple process of voting? Why had the council made these proposals? Were they just being defensive against recent criticisms? It was an undemocratic proposal. Membership over five years

proved nothing of a member's understanding of the society's affairs, or suitability to take part in the election process . . .

Hanging over this discussion was the known fact that the president, the executive vice-president, and the immediate past president held between them 1203 proxy votes which, if used in a poll vote, would ensure that voting went in favour of the council's proposals no matter what the feeling was in the meeting itself. When the vote was taken on the membership qualifications of candidates there was a three-to-one majority against the council. To the obvious satisfaction of the meeting, no poll vote was asked for and a vote was then taken on the membership qualifications for proposers of candidates.

Again, the same majority voted against the council's proposal, and it was quite noticeable that members of council sitting together raised their hands 'en bloc' voting one way, while virtually everyone else voted the other way.

### Poll vote

At this point a member of council demanded a poll vote. One by one, the names of the proxy holders were called out and they indicated how they cast their proxy votes. Most held a handful of proxies and voted against the council. Everything hung on the decision of the two major proxy holders, who held 1107 votes between them, and who would normally be expected to support the council since they were members of it. Both, however, apparently swayed by the strong feelings expressed in the meeting, abstained from voting. The required two-thirds majority was not obtained, and again the proposal was rejected.

The arrangements for proxy voting were also the subject of considerable comment. As provided for in the society's long-standing rules, members unable to attend the meeting may appoint another member to vote for them, and the official proxy form contains an invitation to members to appoint one of the presidential office holders as their proxy.

It was pointed out that other organisations providing such facilities under company law gave proxy voters the opportunity to instruct their proxies

to vote for or against particular proposals on the agenda of a meeting and did not, as in the case of the RSGB, give proxies a free hand to use the votes as they wished.

### Questions

Following the AGM and the EGM, a society open meeting was held where council members, committee chairmen, and officers responded to questions raised about the work of the society and other matters of practical interest to radio amateurs. This is the part of the gathering that most members come for, and what they look forward to once the 'formal' business is out of the way.

Increasingly, in recent years, the points of order, the recriminations, the counts and the recounts, have tended to take up more time than they should and the time available for the open meeting has been dramatically eroded. This year there were a considerable number of members' questions not dealt with by the time the hall had to be vacated, despite the proceedings lasting a full five hours.

### Frustration

The feeling continues among many members that the RSGB is not an 'open' society and that it does not tell its members what is going on much of the time. Whether this is true or not, it is the frustration arising from such a belief that causes much of the criticism and bad feeling evinced at the AGM and EGM.

Something less than 10% of members bother to vote in the elections, and only a small proportion of those attend the AGM. Normally, in the face of criticism of the society, most of these rally round and support the hierarchy, recognising the enormous amount of work they undertake in the interests of amateur radio. This year, even these loyalists found it difficult to support the council.

Unfortunately, the reaction of the 'establishment' to what they see as an attack is to go on the defensive, and to close ranks, making the situation even worse. If only they would recognise that some of their critics at least, are expressing genuine concern about particular matters. It is all a question of effective communication, and I always understood that was something radio amateurs were supposed to be particularly good at . . .

**by Tony Smith G4FAI**

# ANNUAL GENERAL MEETING

## WHAT HAPPENED TO SOME OF THE TIME?

I wouldn't miss the AGM of the RSGB for all the tea in China. For the last three years, ever since I joined the society, it has been the highlight of my social whirl. This year I was looking forward, as usual, to the sight of the members, who seem to be steadily growing more and more dissatisfied, at loggerheads with the council, who seem to be growing further and further away from the needs of the average grass roots amateur.

Of course, we expected 1984 to be a troublesome year, after having seen the film of that name. That was my first AGM and I seem to remember that a vote of no confidence in the leadership was proposed from the floor, amid cries of approval, only to be steamrolled into nothing by several hundred proxy votes held by the chairman.

### Better or worse

Last year things were even better (or should I say worse?). I half expected to see one or two disgruntled and frustrated members leap onto the platform and wreak vengeance on the block vote wielding committee, who seemed to be loftily soaring above the problems of their members. What did they care that it took months to get an answer from headquarters to any queries sent in by amateurs with problems? Why should they bother that club secretaries had to get club news in to *RadComm* a couple of months before it was published? Who was going to bring them to account for the relation of the steadily rising fees to the steadily decreasing efficiency, when they could sweep any question from the floor out of existence with a massive tide of proxy votes?

### Great expectations

Naturally, I arrived at the Institute of Electrical Engineering, a dignified Victorian building down by the River Thames, anticipating mayhem, excitement, maybe even a good punch-up. I expected the hall, which seats at least a thousand, to be packed to overflowing with determined, angry men (and maybe even a few women. When a woman has held the office of president only two years ago, and has already been voted into the presidency again next year, the fairer sex can hardly complain of discrimination in this largely male-dominated society. In fact, I reckon ours must be one of the most all-embracing,

all-welcoming hobbies in the world. King or commoner, millionaire or on the dole, we all talk to each other without any sign of prejudice).

Anyway, back to the battlefield. What a let-down. Out of a membership of about thirty thousand, a magnificent one hundred and seventy (and I'll put that in figures so that you can see what it looks like: 170!!) bothered to turn up for the AGM. In fact, most of the expected fireworks turned out to be damp squibs. I have never been so disappointed in my life.

### Promising beginnings

It all began promisingly enough, with plenty of aggro from the floor and soothing, non-committal replies from the platform. The meaningless and repetitive wrangling got quite heated at times, when it became clear that the council, running true to form, was not prepared to give clear cut answers to the many awkward questions posed by members. I think that some of the top table have been taking lessons from a certain blue lady in Downing Street in how to give a long and involved answer which says absolutely nothing but leaves its hearers 'intoxicated with the exuberance of its verbosity', as we used to say at school. In fact, certain questions, such as a request for an explanation of the delay in publishing scientific books, obviously took the platform unawares and resulted in a few moments of panic-stricken silence while they marshalled their wits. All in all, though, the AGM part of the proceedings passed off much as might have been expected, with the easily resistable force of a few rebellious members ranged against the immovable object of the committee, backed by the apathetic majority of proxy voters.

### A victory for democracy

The EGM held immediately afterwards produced even less excitement, actually showing a victory for democracy, which has suffered more than a little over the last few years. Of the four motions proposed, discussed and put to the vote, two were passed and two defeated. Greatest surprise of all, the two holders of mighty blocks of proxy votes, Willie McClintock and Joan Heathershaw, actually refrained from using them. Perhaps they were deferring to the very

obvious feelings of the majority in the hall. Anyway, the only proxy vote holder who did use his power, the Scottish representative, was heavily defeated by the majority, which was even seen to include some council members.

One big source of discontent over the last few years has been the way in which questions are selected for the open forum, the third part of the meeting. Rather than accept questions from the floor, the council decided that it would save time if questions were written out beforehand and put into a box. Of course, this gave rise to the suspicion that questions which the council did not want raised could be weeded out before proceedings began and only uncontroversial questions chosen. This year, however, all was shown to be whiter than white. Caesar's wife must be above suspicion, so the box was brought in and questions taken out at random, just as your raffle tickets are pulled out for the Christmas draw. We were assured that all questions would be answered; those which were not answered verbally on the spot would be answered in writing. I wonder how long this will take and whether the answers will ever be made public!

### Give them their due

To give the council their due, though, more questions did get a public airing this way, in the brief amount of time left before the caretaker was ready to throw us out. I think a lot of people left feeling more satisfied this year than for some time past. But let's see a lot more members there and voting next year. There is no use grumbling and doing nothing about it. Remember, it's more exciting than watching Alex Higgins play Steve Davies!

I wouldn't miss the AGM for anything.

by Ross Borton

*Were you at this year's AGM? If so, we would be interested to hear of your impressions of the event. Write to the Editor at the address on the contents page. The more controversy the better!*



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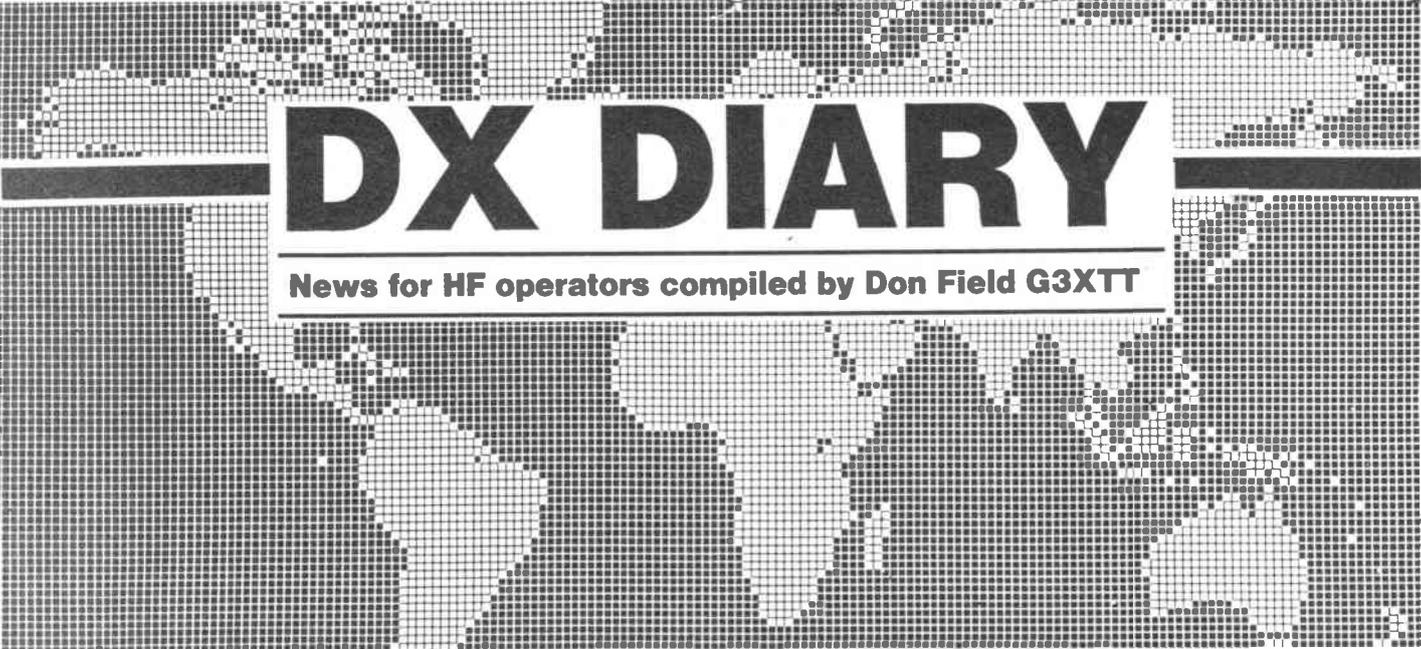
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A1714 24.50	EBC91 0.90	EL95 1.75	M8163 5.50	QV003-20A 25.00	U50 2.00	2C39A 29.50	6AK6 2.50	6GK5 1.50	12BH7A 2.50	40A4 10.95
A1998 11.50	EB91 0.60	EL153 1.25	M8190 4.50	QV003-20B 32.00	U82 3.00	2C39BA 29.50	6AL5 0.80	6GK6 1.95	12BL6 1.75	425A5 8.00
A2087 11.50	EBF80 0.65	EL183E 3.50	M8195 6.50	QV006-40A 27.50	U192 1.00	2C42 26.50	6AM5 0.60	6G57 2.15	12BY4 2.75	431U 4.50
A2134 14.95	EBF83 0.65	EL183P 3.50	M8196 5.50	QV007-50 27.50	U193 0.65	2C51 0.75	6AM6 1.85	6G67 2.50	12CX6 1.20	72B 55.00
A2426 35.00	EBF85 0.95	EL500 1.40	M8204 5.80	QV007-50 27.50	U251 1.00	2C55 1.50	6AN5 4.80	6G68 0.80	12DQ6B 3.50	146A 7.50
A2599 37.80	EBF93 0.95	EL509 5.25	M8224 2.00	QV007-50 27.50	U801 0.75	2B7 1.50	6AN8A 3.50	6H1 0.80	12DQ6A 3.50	1558 3.20
A2792 27.50	EBL1 2.50	EL519 6.65	M8225 3.50	QV007-50 27.50	UABC80 0.65	2D21 2.80	6A05 2.15	6H3N 2.50	12DQ7 2.50	6386 14.50
A2900 11.50	EBL21 2.00	EL802 3.65	ME1401 29.50	QV007-50 27.50	UAF42 1.00	2D21W 1.95	6A08 0.85	6H6 1.95	12E14 1.95	6883B 9.95
A3042 24.00	EC52 0.75	EL822 12.85	ME1402 29.50	QV007-50 27.50	UB41 2.25	2E22GY 45.00	6AR5 5.95	6HG7 1.95	12G7 1.95	6973 5.95
A3283 24.00	EC70 1.75	EM1 9.00	ME1501 14.00	QV007-50 27.50	UBC81 1.50	2E26 7.95	6AS5 1.50	6H5F 5.50	12HG7A 4.50	705A 8.00
AC/THI 4.00	EC90 9.50	EM4 9.00	MHLD6 4.00	QV007-50 27.50	UBF80 0.65	2E26 7.95	6AS6 2.50	6H6T 0.95	12IG7 4.50	715C 45.00
ACT72 59.75	EC81 7.95	EM80 0.70	MS4B 5.50	QV007-50 27.50	UBF89 1.00	2K25 35.00	6AS7G 4.50	6H8 1.95	12JG7G 1.95	725A 275.00
AC/S2/PEN 8.50	EC88 1.00	EM81 0.70	MJ14 3.50	QV007-50 27.50	UBL21 1.75	2K25 Ray 75.00	6AT6 0.78	6H8S 1.95	12K7G 1.50	7527 89.50
AH221 30.00	EC90 1.10	EM84 1.65	MJ23 12.50	QV007-50 27.50	UCH41 2.50	2K26 95.00	6AT8 1.75	6H8T 1.95	12K8 1.95	395.00
AH238 39.00	EC91 5.50	EM85 3.95	M8224 4.50	QV007-50 27.50	UCH42 5.00	2K29 250.00	6AU4 2.00	6J4 2.15	12SA7GT 1.95	805 39.00
AL60 6.00	EC92 1.95	EM87 2.50	N78 9.85	QV007-50 27.50	UCH81 1.00	2K29 250.00	6AU6 0.95	6J4W 3.15	12SG7 4.75	807 1.95
AN1 14.00	EC93 1.50	EN32 16.50	OA2 0.85	QV007-50 27.50	UCL82 1.75	3A108A 9.00	6AV6 0.78	6J5 2.50	12SH7 1.95	810 85.00
AZ11 4.00	EC95 7.00	EN91 1.95	OA2WA 2.50	QV007-50 27.50	UCL83 2.50	3A107B 12.00	6AV8 1.95	6J6 2.05	12SK7 1.95	811A 15.00
BL63 67.00	EC97 1.10	EN92 4.50	OA3 2.50	QV007-50 27.50	UCL83 2.50	3A1107B 12.00	6B05 0.85	6J6B 1.95	12SL7 1.50	813 23.50
BS450 85.00	EC157 475.00	ESU150 14.95	OB2 0.85	QV007-50 27.50	UCL83 2.50	3A1108A 9.00	6B06 0.95	6J6C 4.95	12SR7 2.50	832A 14.50
BS810 55.00	EC8010 12.00	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1109B 11.00	6B07 1.95	6J6D 2.50	12SR7 2.50	833A 95.00
BS914 55.00	EC802 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1110B 12.00	6B08 1.95	6J6E 2.50	12SR7 2.50	834 8.00
CIK 19.00	EC803 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1111A 11.00	6B09 1.95	6J6F 2.50	12SR7 2.50	835 20.00
C3JA 20.00	EC804 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1112A 11.00	6B10 1.95	6J6G 2.50	12SR7 2.50	836 60.00
BS814 55.00	EC805 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1113A 11.00	6B11 1.95	6J6H 2.50	12SR7 2.50	837 87.00
BS814 55.00	EC806 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1114A 11.00	6B12 1.95	6J6I 2.50	12SR7 2.50	838 14.50
BS814 55.00	EC807 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1115A 11.00	6B13 1.95	6J6J 2.50	12SR7 2.50	839 15.00
BS814 55.00	EC808 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1116A 11.00	6B14 1.95	6J6K 2.50	12SR7 2.50	840 15.00
BS814 55.00	EC809 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1117A 11.00	6B15 1.95	6J6L 2.50	12SR7 2.50	841 15.00
BS814 55.00	EC810 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1118A 11.00	6B16 1.95	6J6M 2.50	12SR7 2.50	842 15.00
BS814 55.00	EC811 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1119A 11.00	6B17 1.95	6J6N 2.50	12SR7 2.50	843 15.00
BS814 55.00	EC812 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1120A 11.00	6B18 1.95	6J6O 2.50	12SR7 2.50	844 15.00
BS814 55.00	EC813 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1121A 11.00	6B19 1.95	6J6P 2.50	12SR7 2.50	845 15.00
BS814 55.00	EC814 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1122A 11.00	6B20 1.95	6J6Q 2.50	12SR7 2.50	846 15.00
BS814 55.00	EC815 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1123A 11.00	6B21 1.95	6J6R 2.50	12SR7 2.50	847 15.00
BS814 55.00	EC816 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1124A 11.00	6B22 1.95	6J6S 2.50	12SR7 2.50	848 15.00
BS814 55.00	EC817 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1125A 11.00	6B23 1.95	6J6T 2.50	12SR7 2.50	849 15.00
BS814 55.00	EC818 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1126A 11.00	6B24 1.95	6J6U 2.50	12SR7 2.50	850 15.00
BS814 55.00	EC819 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1127A 11.00	6B25 1.95	6J6V 2.50	12SR7 2.50	851 15.00
BS814 55.00	EC820 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1128A 11.00	6B26 1.95	6J6W 2.50	12SR7 2.50	852 15.00
BS814 55.00	EC821 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1129A 11.00	6B27 1.95	6J6X 2.50	12SR7 2.50	853 15.00
BS814 55.00	EC822 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1130A 11.00	6B28 1.95	6J6Y 2.50	12SR7 2.50	854 15.00
BS814 55.00	EC823 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1131A 11.00	6B29 1.95	6J6Z 2.50	12SR7 2.50	855 15.00
BS814 55.00	EC824 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1132A 11.00	6B30 1.95	6J7A 2.50	12SR7 2.50	856 15.00
BS814 55.00	EC825 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1133A 11.00	6B31 1.95	6J7B 2.50	12SR7 2.50	857 15.00
BS814 55.00	EC826 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1134A 11.00	6B32 1.95	6J7C 2.50	12SR7 2.50	858 15.00
BS814 55.00	EC827 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1135A 11.00	6B33 1.95	6J7D 2.50	12SR7 2.50	859 15.00
BS814 55.00	EC828 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1136A 11.00	6B34 1.95	6J7E 2.50	12SR7 2.50	860 15.00
BS814 55.00	EC829 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1137A 11.00	6B35 1.95	6J7F 2.50	12SR7 2.50	861 15.00
BS814 55.00	EC830 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1138A 11.00	6B36 1.95	6J7G 2.50	12SR7 2.50	862 15.00
BS814 55.00	EC831 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1139A 11.00	6B37 1.95	6J7H 2.50	12SR7 2.50	863 15.00
BS814 55.00	EC832 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1140A 11.00	6B38 1.95	6J7I 2.50	12SR7 2.50	864 15.00
BS814 55.00	EC833 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1141A 11.00	6B39 1.95	6J7J 2.50	12SR7 2.50	865 15.00
BS814 55.00	EC834 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1142A 11.00	6B40 1.95	6J7K 2.50	12SR7 2.50	866 15.00
BS814 55.00	EC835 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1143A 11.00	6B41 1.95	6J7L 2.50	12SR7 2.50	867 15.00
BS814 55.00	EC836 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1144A 11.00	6B42 1.95	6J7M 2.50	12SR7 2.50	868 15.00
BS814 55.00	EC837 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1145A 11.00	6B43 1.95	6J7N 2.50	12SR7 2.50	869 15.00
BS814 55.00	EC838 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1146A 11.00	6B44 1.95	6J7O 2.50	12SR7 2.50	870 15.00
BS814 55.00	EC839 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1147A 11.00	6B45 1.95	6J7P 2.50	12SR7 2.50	871 15.00
BS814 55.00	EC840 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1148A 11.00	6B46 1.95	6J7Q 2.50	12SR7 2.50	872 15.00
BS814 55.00	EC841 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1149A 11.00	6B47 1.95	6J7R 2.50	12SR7 2.50	873 15.00
BS814 55.00	EC842 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1150A 11.00	6B48 1.95	6J7S 2.50	12SR7 2.50	874 15.00
BS814 55.00	EC843 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1151A 11.00	6B49 1.95	6J7T 2.50	12SR7 2.50	875 15.00
BS814 55.00	EC844 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1152A 11.00	6B50 1.95	6J7U 2.50	12SR7 2.50	876 15.00
BS814 55.00	EC845 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1153A 11.00	6B51 1.95	6J7V 2.50	12SR7 2.50	877 15.00
BS814 55.00	EC846 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3A1154A 11.00	6B52 1.95	6J7W 2.50	12SR7 2.50	878 15.00
BS814 55.00	EC847 3.50	ESU272 25.00	OC2 2.50	QV007-50 27.50	UCL83 2.50	3				



# DX DIARY

News for HF operators compiled by Don Field G3XTT

A happy New Year to you all. For the HF DXer 1987 holds promise of (fingers crossed) an improvement in band conditions over last year, together with some interesting DXpedition operations. Revilla Gigedo (XF4ZU) and Mellish Reef (VK9MW) look strong possibilities for DXpeditions and I, for one, need both of these.

I hope 1987 will also see a continuing increase in activity on the 10, 18 and 24MHz bands. After a promising start a few years ago, when they were first released to amateurs, activity has declined considerably. However, over the last month or so I have had a lot of fun operating on 10MHz, working many of the USSR prefixes, as well as Caribbean and some of the rarer European countries (T7, ZB2, KP4, etc). These bands are certainly a valuable diversion at the weekends if you want to avoid the contest QRM, which often occupies the main HF bands, and are a good place to practice your CW or try out a QRP rig.

## QSLing

In my October column I listed a number of countries without an official QSL bureau. Since then I have been engaged in correspondence with the RSGB's QSL Bureau Manager, G3DRN, and several interesting points have come to light. He tells me that for RSGB members the picture is somewhat rosier than I suggested. Of the prefixes I listed, Ted says that in four cases the QSL chore is handled by the local amateur, and in 22 others the

cards have traditionally been handled by bureaux in other countries. Finally, where there is no other option, the RSGB will send cards direct to the amateur concerned. This has happened in recent years, for instance, with HZ1HZ and A71AD.

I still worry, however, about Ted's comments on getting your cards to the relevant DX stations. This is by no means a guarantee that they will reply. If there is no local bureau incoming cards may well arrive by other means, but the amateurs concerned may be unable or unwilling to fund the cost of mailing hundreds or even thousands of outgoing cards. So, in cases where you really are anxious to get a confirmation, the final solution must still be to QSL direct or to a QSL manager, enclosing sufficient return postage.

## Return to sender

There is also the situation where the amateur to whom you are sending the card is not a member of his local society. G3DRN believes that there was once an agreement by IARU member societies that they would handle incoming cards for non-members. Some societies, however, no longer do so and cards are either destroyed or returned to the sender.

Where you do use the outgoing bureau (RSGB members only), Ted makes the plea that cards should be sorted into countries, which makes his job a lot easier. As the number of outgoing cards through the RSGB numbers millions each year, one can

only sympathise with this request.

One suggestion I have seen to tackle the problem of sorting cards is that all QSLs should be bar-coded to enable the process to be automated. Somehow I have a feeling that this could take rather a long time to catch on.

## Back in the USSR

There has also been quite a lot in the various DX newsletters of late, regarding QSLing to stations in the USSR. Recently some addresses for USSR stations have been appearing for the first time in the International Callbook, although the proper procedure has always been to QSL through Box 88, Moscow. One report suggests that there is a group of staff at Box 88 whose job is to chase up missing QSL cards on behalf of amateurs elsewhere in the world, so if you have failed to get a card from that rare oblast it might be worth writing to Box 88 (unfortunately any replies from there tend to be in Russian!).

W3HNK can also help with many of the hard to get USSR QSL cards. Send him the QSLs, a business size SAE, and enough funds for postage to the USSR and return postage to yourself. His address is Joe Arcure Jr, PO Box 73, Edgemont, PA 19028, USA.

## Top Band

The RSGB's *Radio Communication* magazine lists a number of frequencies used by commercial stations within our 160 metre band. I don't propose to list all of them, but it is worth noting that the

frequencies which most frequently suffer from interference from amateurs are 1820kHz (OST, Ostend and FFC, Bordeaux), 1841kHz (GLD, Land's End, GCC, Cultercoats and EJM, Malin Head), 1852kHz (GIL, Ilfracombe) and 1953kHz (assigned to all UK coastal stations). The last of these is most commonly affected. Top Band operators should, of course, always remember that our use of the band is on the basis that we do not cause problems to these commercial users, so take care to avoid them at all times.

The other side of the coin is that OSN on 1830kHz has been criticised recently by amateur users of the band for having a poor note and spreading across the band, though I haven't noticed this in my own listening. I was interested to see a comment by ON4UN, in the Canadian *Radiosporting* magazine, that Belgium is now the only country in Europe without 160 metre privileges. John finds this surprising given that OSN is the only Belgian coastal station in the 1830-1850kHz window (yes, the ON amateurs do at least know that when they finally get an allocation this is what it will be).

## Contests

Early January is fairly quiet as far as contests are concerned. The Hungarian HA-DX Contest (a CW event) is not until the 17th, starting at 2200 and running for 24 hours. The French CW Contest is the following weekend, starting at 0600 on the Saturday and

running for 36 hours.

Finally, the month ends with the CQWW 160 CW Contest, which starts at 2200 on 23rd January and finishes at 1600 on the 25th. For the latter the contest exchange is just RST, except for US and Canadian stations who send their state or province. Two points are scored for contacts with your own country, five points for contacts with other stations in the same continent, and ten points for contacts with other continents.

The multiplier is the total number of US states, VE provinces and DXCC countries worked. Logs go to the 160 Meter Contest Director, D McClennon N4IN, 3075 Florida Avenue, Melbourne, FL 32904, USA. The SSB leg of the contest falls on the last full weekend in February. In all other respects the details are the same as for the CW leg.

## Applause

While on the subject of contests, I was delighted to see that Steve GW4BLE won the European plaque in the ARRL Phone Contest with a score of 654,456 points, the second place going to EA2QU with a mere 566,244 points. It's not often that a UK station does this well in a major contest, especially as stations further south in Europe always enjoy a propagation advantage.

Steve was also the highest scoring UK single operator entry in the 1985 CQWW Phone Contest, with a score of 3,221,380 points.

In the same event A1/G3FXB took the world second spot for his single band entry on 14MHz, achieving a score of 1,217,178 points and working 2,646 stations in 133 countries and 38 zones in the process. Another excellent effort by probably the UK's finest contest operator.

In the 1985 CQWW CW event John A25/G3HCT was world fourth on 21MHz with a score of 329,360 points, and Phil G4OBK was world fifth on Top Band with a score of 63,411 points. Congratulations to all concerned.

## From last time

Last month I mentioned the YASME Supreme Award. For both this and the basic award (30 YASME callsigns), the YASME callsigns which qualify are not only those of Lloyd

and Iris Colvin on their various travels, but also the various operations of OH2BH, as well as calls held by YASME officials. In total this represents almost 170 callsigns which count towards the award. I have a list (not very legible I'm afraid) if anyone is interested, or you could write to G McKercher, WOMLY, RFO1, Perry, IA 50220, USA.

Another news item last month concerned Eric SM0AGD. I didn't have my brain entirely in gear at the time. Eric has, of course, operated from many different countries all over the world. SM3CXS has handled the QSL chores for the last 14 years, sending out over 200,000 cards, and has now decided to call it a day. So if you still need a card for any of Eric's operations, the new address is E Sjolund, Radjursvagen 13, S-134 00 Gutavsberg, Sweden.

With a final reference to last month's column, KD7P's plans have changed yet again. His Pacific trip is now off, but he will be returning via Chile to the Antarctic in the near future. On top of this, his request to Norway for permission to land on and operate from Peter 1st Island was finally granted. There's many a slip, and all that, but let's keep our fingers crossed that he can take advantage of this turn of events.

## Libya

In the good old days Libya was one of the easier countries for British amateurs to work, but all this has changed in recent years. One who did make it on to the bands was Arthur G3JKI/5A, back in 1980. Since then the ARRL have equivocated over whether to accept his operation for DXCC credit, but Arthur has recently sent some further documentation along and the DXCC desk has now given the green light. So, if you have a G3JKI/5A card gathering dust in the shack, now is the time to bring it out again. The political situation in that country being what it is, it certainly looks unlikely that any further authorised operations will take place for quite some time.

While on the subject of DXCC status, the German bulletin reports that the ARRL have finally decided not to accord Aruba the status of a separate country. At the



The two Steves GW4BKG (left) and GW4BLE

moment I am unable to confirm the accuracy of this report.

## The diary

JA8RUZ/4S7 was due to appear on the bands from December 31st to January 3rd. Apart from that, January is looking distinctly quiet. However, K4LTA has already given notice that he will operate as J37TA from 19-28th February, and as J70A from 1st-11th March. Bill is a good CW operator and always pays particular attention to 1.8 and 10MHz. However, if you are not fussy about which band you work him on, a look around 14025kHz during the evening may well lead you to him.

Alan T30AT leaves Kiribati for good during January, to settle in Western Australia. His QSL manager, G4GED, will continue to deal with cards only until the present batch run out. So, if you still need one it would be worth getting in there quickly.

As for the rumours of a Spratly expedition during January or February, at least one US bulletin says these are total nonsense. All I can do is suggest that you keep your ear to the bands just in case.

## Other news

As I write this, the Colvins are active from Mayotte as FH/W6KG, and VK0DA has put in some brief appearances from Heard Island. Unfortunately, he doesn't seem very keen on pile-ups, so it seems unlikely that many QSOs will be made.

Phil VS6CT, who recently returned to Hong Kong after a world tour, now finds himself unable to re-erect his antennas at his apartment block

and expects to be QRT for some years. In the last seven years he has made over 100,000 contacts.

S92LB has recently been putting in an appearance on 14160kHz around 2100GMT, after an absence of some months. A61AB has also appeared from time to time on the bands, and could well turn out to be genuine. FT8WA is now active from Crozet Island as promised.

OH1RY's operation from the Pacific turned out to be one of the highlights of 1986. Pekka made 12,000 contacts including many with Europe on both 40 and 80 metres from his stops in 3D2, T2, 5W1 and A35. He is already talking about a return visit during 1987 to activate some of the islands he missed this time.

## The big time

Finally, some snippets about the *real* DXers. During the CQWW CW Contest, Finnish amateurs were due to operate as follows: OH2MM from PT7CB, OH2BBM from FY5YE, OH2DQL from XF0L, OH2KI from ZB2X and OH2BH from EA9AM! On the aerial front, YU3ACP is reported to be using a 6 element delta loop on 80 metres, while David G3FPQ now has a 2 element quad for that band! As WA6AUD likes to say, DXers divide into the 'big guns' and the 'little pistols'. Compared with that lot, I know which category I fall into... Until next time, best 73.

Don't miss all the latest DX news in **Amateur Radio** every month! Use the newsagents order form on page 40 and be sure of your copy!

# PITFALLS IN PROC

Some people always use speech processing, whilst others avoid it at all costs. On the one hand speech processing can give a large amount of gain and enable the best use to be made of the available power. On the other, it can introduce large amounts of distortion, making the signal sound unpleasant and more difficult to copy. To prove this one only has to listen on the HF bands. Some stations have signals which not only sound pleasant, but can also be copied when they are right down in the noise. Others are difficult to copy despite their strength, and on more than one occasion I have heard stations turn their processors off to find them become far more readable.

Obviously, a speech processor should be used to make a station more readable and not less so. In most cases there will be a certain 'processed' quality to it, but if the signal is properly processed and the operator is not trying to get too much gain then the signal should still sound fairly pleasant.

There are several problems which can arise with processors, but in order to understand them more fully it is worth recapping on some of the ways in which signals can be processed.

## Methods of speech processing

If the waveform of some speech is displayed on an oscilloscope it can be seen to have a number of transient peaks, but the major part of the waveform is much lower in amplitude. This means that the average power content is low when compared with the peaks. Therefore, unless some processing is used, the average level of modulation will be very low as the system will have to be able to handle the peaks without over modulating. In a single sideband transmitter this means that the average power output will be low.

There are several ways in which audio

signals can be processed to raise the average power level. One such way is to use a compressor. Although compressors often imply slightly different things to different people they are always devices whose gain reduces with an increase in signal level. This can be done instantaneously so that the peaks are amplified less than the lower levels. Alternatively, it can be accomplished by using a form of audio AGC so that the gain varies according to the envelope of the audio. It is this second type of compression which is more commonly used in amateur radio. Sometimes it is also referred to as VOGAD, which stands for Voice Operated Gain Adjusting Device. By using this form of compression the audio can be maintained at a constant level. However, unless very fast attack and decay times are used the ratio of peak to average over the short term remains the same.

## Common applications

The most common way for audio to be processed in amateur applications is by clipping. By doing this, any signal above a certain level is limited, thereby increasing the average level. Unfortunately, this produces distortion in the form of harmonic and intermodulation distortion. Because of this the output from an audio clipper is always passed through a low pass filter so that any products which lie outside the wanted audio bandwidth are removed. However, there will always be some distortion products which lie within the wanted bandwidth and these cannot be removed. They make the speech sound harsh and distorted and limit the amount of clipping which can be usefully employed.

In order to overcome this problem, RF clipping has to be used. This has always struck me as being a very clever and ingenious way of removing the unwanted

distortion. Essentially, this method requires a single sideband signal to be generated at a convenient frequency. This signal is clipped, filtered and demodulated to provide the processed audio. In this case, when the signal is clipped the harmonic distortion products which are generated will lie at multiples of the RF frequency and can easily be removed. Unfortunately, these processors are more complicated and more costly, but they do offer a much better performance.

## Excessive processing

When an audio signal is clipped, distortion products are produced and some of these remain in the audio bandwidth. If only a few dB of clipping are applied then the distortion will go almost unnoticed, especially in a communications system. The only change will be a slight increase in the apparent signal level. However, as the amount of clipping is increased the distortion becomes progressively more noticeable, until finally it starts to make the signal sound unpleasant and reduces the intelligibility. When using a processor which clips at audio frequencies the maximum amount of clipping which can be used is around 15dB. After this the signal becomes more distorted and less intelligible.

It is far better to resist the temptation to use more clipping and settle for a signal which sounds cleaner but has less clipping. However, it is difficult to set exact limits on the amount of clipping which should be used. This is due to several factors, like the operator's voice, the microphone, the frequency response of the system and so forth. In addition to this, there are also the likes and dislikes of the listener to be taken into consideration.

One way in which the situation can be improved slightly is to use a technique

Fig 1 Diagrams showing waveform of processed and unprocessed audio

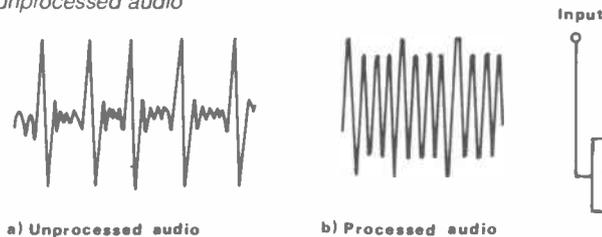
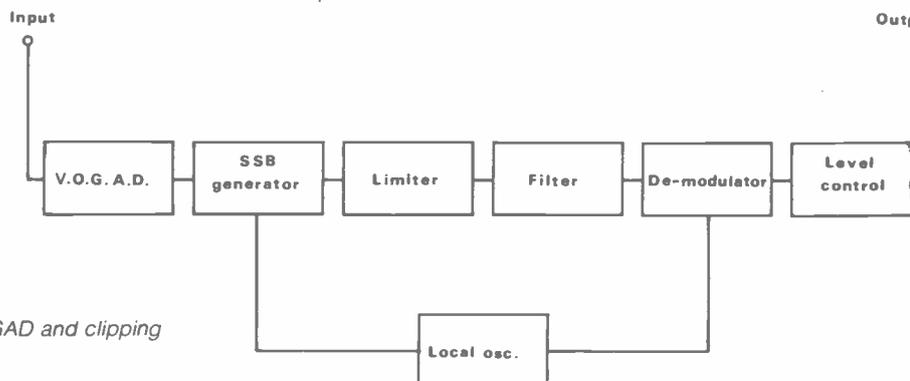


Fig 2 Block diagram of processor which uses both VOGAD and clipping



Fig 3 Block diagram of RF processor



known as pre-emphasis. This involves altering the audio frequency response from the standard 300Hz to 2.6kHz, so that the lower frequencies are attenuated and the higher ones accentuated. This has two effects: not only does it make the signal more punchy by the very nature of the frequency response, it also reduces the amount of in-band harmonics. This is because the lower frequencies which produce these harmonics have been attenuated. It can be well worthwhile experimenting with the lower break point of an RC filter to obtain the best results.

Turning now to RF processing, here the amount of clipping is considerably less critical. Again, the first few dB of clipping only give an apparent change in level and no change in quality is noticeable. However, as the degree of clipping is increased the signal takes on more of a processed quality. This is because the lower level sounds tend to be amplified more, whilst the higher level ones are amplified less. This means that some of the softer fricative sounds like 'f', 'th' and so forth become considerably more prominent, but in spite of this the signal does not become distorted in the same way that one processed at audio frequencies does. In fact, it is possible to obtain much higher degrees of clipping using RF processing. Some clippers use up to 30dB of clipping, and it is quite possible to use even higher amounts of clipping in theory. In practice, however, very little further gain could be achieved.

### Flexible clipping

Despite the fact that it is possible to use very large amounts of RF clipping, it is wise to tailor the amount of clipping to the conditions – reducing it under good conditions and increasing it when the going becomes bad.

There is always the temptation to get

an extra dB or so out of the transmitter by driving it just a little bit harder with the possibility of splatter up and down the band if no ALC is used. It is particularly difficult not to overdrive the transmitter sometimes, especially if there is a rare DX station around. This is made even easier to do if a processor is used, because it just requires turning up the output level a little more. In fact, this indicates that it is not as easy to set up the correct output level from a processor as one might think. Probably the most obvious way is to use a scope, but very few people possess one. However, it is possible to get round the problem by using a little ingenuity.

One solution is based on the simple fact that when the processor gives its peak output the transmitter should give its peak power output. This can be utilised by applying a single low level audio tone to the input of the clipper so that it clips.

The level controls on the output of the clipper and input of the transmitter can then be adjusted so that the transmitter gives the required output. This would normally be the peak power of the transmitter. This adjustment would obviously have to be done quickly because the transmitter final is unlikely to be designed to handle its peak power continuously.

Another point which is worth remembering is that some transmitters built in the late 1960s and early 1970s used TV line output valves in their power amplifiers. Whilst these are perfectly adequate for use without processors, the increased duty cycle caused by the processor can reduce their life. So when using valves like the 6LQ6 in the final it is worth reducing the power slightly. However, if the final uses a valve intended for use in a transmitter, such as the famous 6146, there should be no problem.

### RF feedback

One problem which many processors fall foul of is RF feedback. This is hardly surprising since there is a large amount of audio gain provided in the processor which means that even a small amount of pick-up can have disastrous results. Sometimes the pick-up can cause the whole system to 'howl', but if it is less severe it can just result in the speech becoming very distorted.

This problem can be overcome in two ways. The first is to ensure that there is as little RF in the shack as possible by siting the aerial a reasonable distance away from the shack. This is also a wise precaution from the point of view of health if high powers are used. The second way is to ensure that RF does not enter the processor. It is most likely that RF will cause problems if it is picked up on the microphone signal lead. This should be filtered immediately it enters the processor, using an LC or RC filter. The capacitor should be taken to ground using leads which are as short as possible. If a single stage filter is not sufficient then an extra section can be added to the filter.

It is also possible that RF can enter along the other lines to and from the processor. Of these the power line, if there is one, is the most likely to cause problems and this should be well decoupled.

### Conclusion

If speech processing is used wisely it can make the best use of the available power, giving up to nine or ten dB gain in some instances. This can save the cost of having to put up a larger aerial or buy a linear. However, if it is used badly it can reduce the intelligibility of the signal and have exactly the opposite of the desired effect. Because of this it is worth spending some time to ensure that the processor is set up and working properly.

Fig 4 Diagram showing harmonics for AF and RF clipping

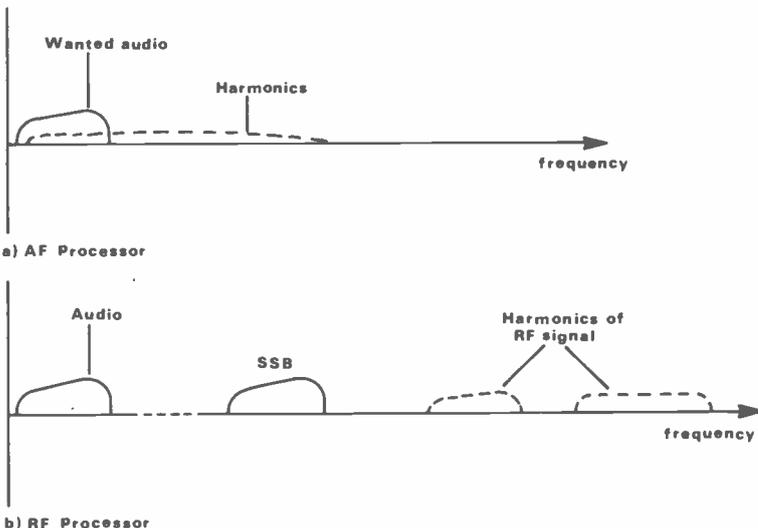


Fig 5 Simple filter for high impedance system

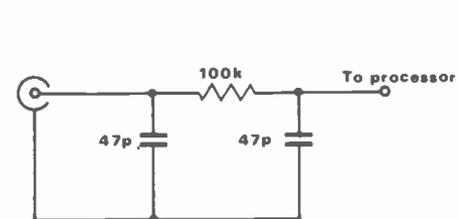
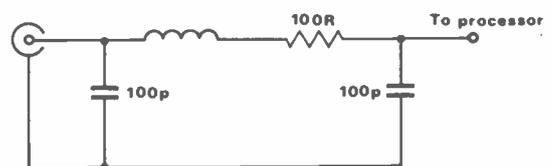
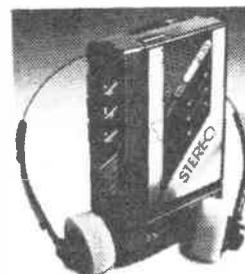


Fig 6 Simple filter for low impedance systems



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# ANGUS MCKENZIE

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## TESTS

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This is the first dual band FM hand-held that I have encountered, and is the successor to Yaesu's very popular FT209 and FT709 mono band models. The styling of this new model is almost identical to that of its predecessors, but there are some subtle but important changes in its facilities and operation.

The UK version covers 144 to 146MHz and 430 to 439.9875MHz, and you can select 12.5 or 25kHz channelling on both bands. The rig is supplied with a dual band thin rubber duck and an FNB4A 12V NiCad slide-on battery pack. Also supplied is a case, a wrist strap, and the rig has a belt clip on the back. Accessories include two types of charger, the NC18C at £10.50 requiring a long overnight charge, whilst the base mains charger, the NC15 costing £75, not only charges in a maximum of 1.5 hours, but can also operate the rig at the same time. After fast charging the charger automatically switches to a trickle charge mode to keep the battery topped up.

An external loudspeaker microphone is available, the MH12A2B at £22.50, in which two mini jacks connect to the earphone and mic jacks on the top of the rig. The mic includes PTT, but not up and down buttons.

### Facilities

On the top of the rig are a number of important features, a BNC 50 ohm socket being fitted for antenna connection. On the front row there are two press buttons to select low and high power and dial illumination on/off. A miniature rotary is used for the squelch control, whilst another one is the audio gain control combined with an on/off switch. Along the back of the top panel is a VOX on/off switch for use with an optional YH2 headset, and to the right of this are three sockets for connecting an external mic with PTT, an earpiece, headphones, or even an external speaker. Finally, there is a special three-pin jack for use with a computer interface, the socket providing S-meter information and almost full digital control of facilities.

On the front panel is the loudspeaker, the microphone being at the top, below which is a display giving frequency and all basic status indications. Below this is a 5x4 matrix, providing most of the functions. These include numerical keys from 1 through 9 to 0, with \* and #, manual up/down channel changing, memory write and recall, clear and reverse repeater buttons, and finally VHF/UHF and dial buttons.

All these front panel buttons have second functions, selected by first pushing a large rubbery button on the right side cheek. These functions include - and + repeater shifts; simplex; battery save; vari-save time; various tone squelch operations if an optional tone

squelch unit is fitted; scan on/off; select call frequency instantly (separate call channels programmable for VHF and UHF); battery indication (shows battery voltage in 0.5V increments when selected); beep on/off; programmable scanning set and operation controls; memory Tx write; memory channel scan; memory channel clear; odd duplex shift set; split VHF/UHF on Tx/Rx; and channelling selector.

By the side of the belt clip on the back

is a pull-off cover which exposes a VOX low/high sensitivity switch, which is useful if you want to use VOX control on occasions where there is a high ambient noise present, in which case you would select low sensitivity. On the left side cheek are PTT and toneburst buttons. If you slide the battery off, you can reach the tiny inset lithium battery back-up switch, which should normally be left on. If you are going to leave the equipment unused for a long period, however, you

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## YAESU FT727R

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### 2m/70cm dual band hand-held FM Tx



could switch this off to lengthen the life of the lithium battery.

At the bottom of the slide-on battery there are sockets for interconnection with external dc for both charging and running the rig, separate contacts being provided which make connection to contacts inside the base charger accessory. The power adaptor socket will take voltages of up to at least 14V dc, thus allowing the rig to be used in a car, a car adaptor type PA3 also being available.

### Operation

When you turn the rig on, you will note that the displayed frequency corresponds to that last in use when the rig was turned off. Even a repeater shift is held during a switch off period, as are both frequencies on VHF and UHF. If you wish to change the frequency, there are a number of access methods for a new one. You first have to select 2m or 70cm, and then you press three figures on the number pad, the final MHz digit, followed by hundreds of kHz and then 10s of kHz. The rig then goes to the closest 12.5kHz channel, if you have selected the correct 10kHz integer. On UHF, for example, you might press 335, followed by dial, and you would be on 433.350MHz.

The 12.5/25kHz facility allows you to step channels from this start channel, so if you first put in a frequency such as 144.8375, then you will go up and down 25kHz, and thus select only the 12.5kHz channels in between the normal 25kHz ones. This can be a nuisance unless you look at the display, for by mistake you might well find the band to be extremely quiet! In order to get a repeater shift, you press the function button on the right side cheek, followed by 3 for + on Tx (or 1 for - on Tx), the pre-programmed repeater shifts being 600kHz for 2m and 1.6MHz for 70cm.

You can return to simplex by pressing 'function' followed by 2. When on repeater shift you can press the reverse repeater button, which allows you to

listen on input and transmit on output. You can store frequencies in 10 separate memories, but you can only have a separate Tx frequency in stores 1 to 4, which is a little annoying. Furthermore, you have to store both Rx and Tx frequencies separately in the same memory, as the rig will not store the selected repeater shift in a memory, which is an unfortunate software oversight.

You cannot have simplex on 2m, but repeater shift is on UHF as when this is selected it is retained when you change band, and this is another ergonomic snag. What is useful is that having selected a repeater shift on a band, you can go up and down the channels by pushing appropriate buttons with the repeater shift retained, and here the rig scores over earlier samples of IC02E and IC04E, although in the last year Icom have put their problem right.

Yaesu seem to have redesigned many of the ways in which the functions are controlled by the microprocessor in the FT727, as compared with those in the 209 and 709. A typical example of this is in the access to a memory frequency. In the 209, for example, you press the required memory channel number, followed by 'memory recall', whereas in the FT727 you first press 'memory recall' then the required channel.

The FT727 can instantaneously be put onto a pre-programmed calling channel, the rig storing separate frequencies for the two bands. Since the rig cannot store a repeater offset on this channel, you have to follow the call channel selection by putting in repeater shift if your call channel is for a repeater. However, you can store a repeater shift on the call frequency on the FT209.

## Scanning

Not only has the FT727 excellent VFO dial and memory scanning functions, but a programmable scan is included, which allows you to scan any pre-determined number of channels from the dialled VFO frequency. If you select 24 channels, and 433.00, then the rig scans up to 433.6 and down again continuously until a signal is found. The rig then stops on this channel. If you had started from 145.2, then it would scan up to the top of the repeater section and back.

I found this extremely useful, except for the fact that once the scanning had stopped, either automatically or by you pressing the PTT or D button, you had to re-enter the start frequency, eg 145.2MHz, if you wanted to scan the same section of band. I could not find a way of continuing the scan over the original range once it had stopped on an unwanted station: starting the scan by pressing function and PMS starts the scan from the previous stop point upwards for 24 channels, returning to the stop point. Perhaps Yaesu should have spent a little more time in designing their software more ergonomically, for they have got so much right in this rig. I am probably trying to gild the lily, but it

would not have taken a very much more complex program to achieve a significantly better operational system.

## Priority and save time

A priority channel can be selected from the memories, and when the function is chosen the rig will monitor memory every now and then when you are on the dial mode, and will stay on memory once a station comes up on it. This can be very useful, and it is very quick to cancel.

As with the FT209, there is a very useful battery saving circuit when the receiver is squelched. By selecting the save mode, the rig is almost completely asleep for a pre-determined number of seconds up to 9, and wakes up for just half a second to check if a station has appeared on the channel. If not, it goes dormant again. You can select the dormant time to be from 1 second to 9 seconds, and probably around 6 seconds is a fair compromise between battery con-

sumption saving, and the possibility of missing a station putting out a short CQ.

This function would be of great use for Raynet purposes, for you could then select 9 seconds dormant, and request that any station requiring you must call for, say, 10 seconds. This would allow a fully charged battery to be sufficient for a whole day's average intermittent use, as the dormant battery consumption is so low (14mA).

## Subjective performance

I used the rig for about a fortnight before I carried out any measurements, my first main use of it being in my car when I went up to the Telford VHF Rally in October. I was most impressed with its performance, when interconnected with a Trio dual band mobile antenna, and I could get into almost every repeater I heard on both 2m and 70cm.

Operation was simple and effective, and I definitely preferred the function button on the right instead of on the keypad, as with the older models. There is one slight difference when using the function button – you have to hold it down whilst pressing a second function, rather than pressing the function button first followed by the required second function button. I actually found this easier, although some will probably prefer the old method of access.

Sensitivity seemed quite good on both bands, and the 5W power output was quite adequate for most simplex QSOs. Everyone liked the modulation quality very much, the received quality being good as well considering the very small internal speaker. The headphone socket will actually drive an external speaker to an adequate, but not very high, level, provided the speaker is reasonably sensitive.

## Good ergonomics

I seemed to get used to it very quickly, and found the ergonomics to be at least as good, if not better than earlier models, but I was constantly irritated by the lack of a separate memory for simplex or duplex on VHF and UHF. I almost invariably had to select or remove repeater shift when changing from one band to the other. The battery seemed to last very well, and I strongly recommend the fast charging base adaptor, which is so very convenient.

One of the few irritations with the FT209 was that its receiver front end seemed to have a very wide bandpass characteristic. If you used the rig with a vertical beam over the house, strong out of band signals caused a form of mush across the band, combined with some intermodulation on weakish signals. This disappeared when I inserted an external muTek 144MHz bandpass filter. There was no sign of this trouble with the FT727, either with my 8/8 vertical beam, or with a dual band Trio vertical antenna which I have at around 12m agl. A direct comparison with the 209 proved the point again and again, and so quite clearly the FT727 is more suitable for running as a



simple home base station.

The reverse repeater facility was particularly effective, enabling me to go to simplex with many stations after picking them up via a repeater. On some of the alternative models this facility is either missing, or more awkward to use, although it is also excellent on the FT209 and 709 rigs.

### Slightly heavy

As with its predecessor, the rig is on the heavy side, and it does seem rather a burden when hanging on your trousers with the belt clip. On the other hand, its 5W capability will allow you to be heard on many occasions where a lighter, but lower powered rig would not get through. The dual band rubber duck antenna is remarkably small, containing all the matching in a base section. The BNC antenna socket is very simple to use, and seems ruggedly mounted.

I did not try the computer link system, but this will make the rig even more attractive for home station use if you have the patience to do all the programming! I see no reason why the rig could not be used for packet radio, although it would not be quite fast enough at changing over for Amtor. You can lock the keyboard by pressing function and \*, this system replacing the slide switch on the earlier models. This will prevent accidental keyboard touching when you are on standby.

Just before writing this review, I tried one fun experiment: I plugged my Trio MA4000 dual band mobile whip into the top of the FT727 using a simple SO239/BNC adaptor. I had to be extremely careful to avoid too much side force being placed on the socket, but I did find the performance of the system to be utterly remarkable. Most stations were an S-point or two stronger, and from my landing window I accessed seven UHF repeaters successfully, which I have never been able to do before with a hand-held at my home. In an emergency it is useful to be able to do this, but it does bring up the point that Yaesu should make a whip with more gain than their little rubber duck as an extra accessory for this rig.

### Laboratory tests

12dB sinad sensitivities of the front end were almost identical to those measured in 1984 on the FT209RH, and later on the FT709R models, which is really astonishing as the FT727 has to cope with both bands. I would describe this sensitivity as being quite good, although one or two hand-helds are just slightly better. The input intercept point is again almost identical to that of its predecessors, and thus rather better than that of most other hand-helds, making it more suitable for mobile and base station use. I confirmed in the lab that the front end selectivity on 2m was better than that of the 209. The IF selectivity was not really adequate for 12.5kHz channeling, as the rig has the wider 'E' filter fitted, and I would have preferred to have

seen an 'F' or even a 'G' filter, to cope with today's more crowded bands. However, 25kHz selectivity was adequate, although it had been slightly better on the older models.

The S-meter had only a very small

range displayed, of around 11dB between minimum indication and S9, the latter being just under 1µV, which represents a weakish signal. S9 was very similar on the two bands.

The capture ratio measured partic-

## Yaesu FT727R Laboratory Test Results

Where results for two bands are appropriate, 2m is followed by an oblique stroke and the 70cm result

### Receiver Tests

Sensitivity for 12dB sinad  
 (144.95/433.4MHz) -122/-122dBm (0.18µV)  
 (144.025/432.025MHz) -121/-121.5dBm  
 (145.975/439.975MHz) -122.5/-120.5dBm

RF input intercept point -22/-19dBm

IF selectivity  
 12.5kHz spacing average 11dB  
 25kHz spacing average 57dB

S-meter  
 S3 -120/-117dBm  
 S5 -118/-115dBm  
 S7 -115/-113dBm  
 S9 -109/-109dBm  
 S9+ -107/-106dBm

Capture ratio 3dB

Discriminator distortion 1kHz mod  
 5kHz deviation 6.6%  
 3kHz deviation 5.1%  
 1kHz deviation 2.7%

Max audio output power/10% THD  
 8 ohms 0.9W  
 4 ohms 1.4W

Rx response ref 1kHz  
 100Hz -22dB  
 200Hz -12dB  
 400Hz -5dB  
 500Hz -3dB  
 2kHz 0dB  
 2.5kHz -1dB  
 3.2kHz -2dB  
 4kHz -4dB  
 5kHz -7dB

Current consumption:  
 Rx squelch 55mA  
 Rx normal 70mA  
 Rx battery save 14mA

### Transmitter Tests

Tx output power  
 high setting 5W/5W  
 low setting 0.75W/0.8W

Max deviation 5.1kHz  
 Toneburst frequency 1750.1Hz  
 Toneburst deviation 3.7kHz  
 Max frequency error 50/100Hz

Current consumption  
 Tx high power 1.1/1.5A  
 low power 0.6/0.8A

Case dimensions 71W × 200.5H × 38D with FNB4A  
 Weight 557g with FNB3A 616g with FNB4A

Nicad battery  
 FNB3A 10.8V 425mAH  
 FNB4A 12V 500mAH

# G3OSS TESTS

ularly well, showing that the rig pulls out a strong station clearly, with less interference than usual from a weaker one on the same channel.

Audio distortion of the discriminator and audio amplifier section was adequate, but could have been a little better, though plenty of volume was available into both the internal and external speakers, considering the rig was a hand-held. However you may find that the maximum volume for use in the car would be a little bit limited. However, you could get a useful increase in power into a 4 ohm speaker.

The frequency response on the headphone socket was surprisingly flat from around 300Hz to 3kHz, but whilst LF attenuated very rapidly indeed below 300Hz, which is excellent, there was nowhere near enough HF roll-off above 3kHz, and 5kHz was only just over 6dB down. More rapid attenuation would have given an improved sensitivity measurement, thus tying in with the fact that the rig actually sounded marginally more sensitive than the FT209.

Frequency accuracy on receive was quite good on 2m, and only a very marginal improvement was gained when the generator was offset slightly. However, I noted a 2kHz error on 70cm, as the sinad improved from 12 to 15.7dB with a 2kHz offset, showing the rig to be potentially sensitive on this band.

## Battery consumption

When the receiver was reproducing a typical audio level, it took 70mA from the battery, which reduced to 55mA when squelched. This is rather on the high side, but don't forget the battery save circuit which reduces the current drain to only 14mA. When transmitting on 2m, the rig took 1.1A on high power, and 0.6A on low, but on 433MHz the consumption was a lot higher at 1.5/0.8A respectively. I would therefore advise you to use low power whenever you can when using the battery, especially on 70cm. These currents were measured when using a 13.8V dc external supply.

## Transmitter tests

I obtained a healthy 5W output on both bands when on high power, and slightly less than 1W on low power, and I think in practice these power levels are well chosen. The transmitted frequency accuracy was amazingly good, being within  $\pm 50$ Hz on 145MHz (drifting within these boundaries during warm up), and within 100Hz on 433MHz. Both the repeater shift and toneburst frequencies were extremely accurate. Maximum deviation was virtually at 5kHz, and the toneburst deviation was at 3.7kHz, which is just about right. The microphone sensitivity was also well optimised for an average voice a few inches back from the front of the rig.

In using the rig under mobile conditions on a long journey, I did note that it got very warm, but not too hot to touch, and it did not seem to be harmed in any way when running at this high temperature from the car electrics.

## Conclusions

I am impressed with this new rig from Yaesu, since I feel it has a far wider appeal than many other hand-helds. It will be very useful as a simple base station and a mobile, and I am most attracted to the high power output. Its provision for the two bands, with the dual band rubber duck, will save you taking two rigs with you all the time. I was also very surprised at the efficiency of the rubber duck. Of course, one of the dedicated mono band whips, such as the Diamond models, would show the rig at its best.

Yaesu's addition of the computer interface will be an added attraction, and whilst this rig is fairly expensive (£399 at the time of writing), when you consider what it has in it and that it replaces two separate rigs with a combined cost so much higher, it really is good value for money.

Bouquets to Yaesu for an excellent new rig, and many thanks to both Amcomm for the loan of the review sample and my wife, Fiona, for helping me with all the measurements.

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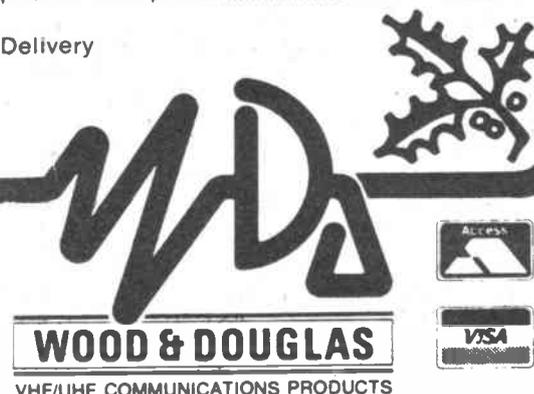
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VHF/UHF COMMUNICATIONS PRODUCTS

The original FT290 was introduced quite a few years ago, and has become one of the most popular rigs for the 144MHz band that has ever been produced. Many thousands of them have been sold, but it is curious that the rig has been far more popular in the UK than in almost any other country. I reviewed the original version in May 1983, and arrived at the conclusion that it was an excellent rig for its originally designed purpose: that of a portable rather than a home base station.

My review sample was rather deaf, but I did manage to improve it quite a lot with very careful tweaking. The transmitting section on SSB was originally very poor, and much spreading was produced, but after extremely careful realignment in 1985 I proved that it was possible to make it extremely clean, producing around 2.5W PEP output, with 3rd order IM products as low as -30dB. The tune up procedure involved the extremely careful adjustment of the trimmers around the PA stage, as well as turning the ALC preset down to limit the output properly to no more than 2.5W.

During 1984 muTek installed their front end for me, and this dramatically improved the receiver's sensitivity, both on SSB and FM. However, it degraded the input intercept point from what had originally been very poor to one that I could only describe as bad, from a home station point of view. This did not concern me, however, since I normally used the rig for its intended purpose - portable operation. I also found the receiver rather plummy, so I increased the high frequency audio output by clipping out a capacitor in the audio section, thus dramatically improving readability.

### The new model

As I indicated in a recent article on running high power, the FT290 has been the cause (indirectly) of many complaints about spreading, and this has often been the result of inappropriate tweaking by well meaning amateurs who do not possess the appropriate test equipment. This resulted in linears being over driven, and hence spreading. I wish to emphasise that a carefully set up FT290 Mk1 should not cause any appreciable spreading when properly used with a linear, such as a BNOS that is correctly adjusted. However, there are too many linears on the market that have measured performances totally different to their specified ones, a typical example being one which requires just 1.5W input to give 200W out, instead of its claimed 3W input. It is this type of linear that contributes to spreading when driven by the full output of an FT290.

I received the review sample of the FT290R11 during October, and it was very evident that it had not only been restyled completely, but that many new features had been added.

There are just nine memories in the new version, and these can memorise both frequency and mode. The separate



## YAESU FT290R11

### 144MHz portable multimode

memory channel switch has been removed and replaced by memory access with up/down stepping buttons, or tuning memories with the VFO knob or with the up/down buttons on the supplied mic. Both writing and reading memories are simple, but whilst you can transfer from VFO to memory, there is unfortunately still no way of transferring the memory frequency into the VFO, which is a pity.

Seven of the ten microprocessor control buttons have second functions, and to get these you have to press function first, followed by another button within three seconds, as otherwise the second function mode is cancelled. Microprocessor control provides cyclic operation for some of the buttons, ie the repeater button cycles between simplex and repeater + and - shifts, the step button between 25Hz, 100Hz and 2.5kHz steps on CW/SSB, and 12.5, 25 and 50kHz steps on FM.

### Other functions

Other buttons select reverse repeater, memory write, memory recall, VFO A or B, call (puts carrier output on FM with continuous 1750Hz tone for repeater access), and up. This last function steps the frequency 100kHz higher on CW/SSB, or 1MHz higher or to the bottom end of the band when pressed. If the button is pressed when the frequency up is above 146MHz, the kHz reverts to nominal 0, so if you want to go from 145.5 to 144.5, you have to use the same button, but with function first, in which case steps are downwards instead of upwards. I would have preferred the frequency, including the kHz, to shift by 1MHz, or to the bottom of the band, plus the kHz, but

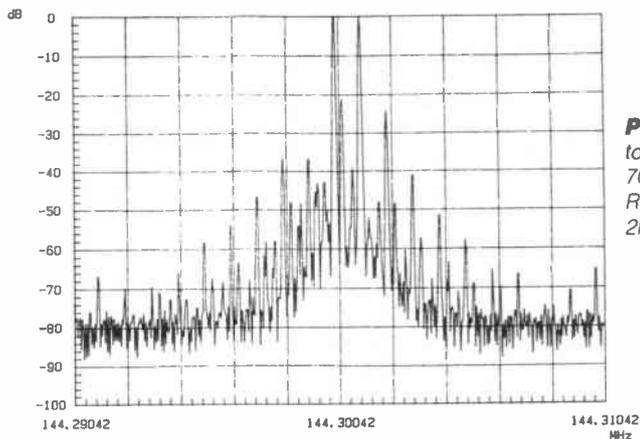
Yaesu think otherwise!

Other second functions include low power operation in all modes, semi-duplex operation (VFO A and B set Rx and Tx frequencies), noise blanker enable/disable, tone squelch (if option is fitted), programmable scan (between memories 1 and 2), and priority operation (intermittently monitors the chosen memory channel when on the VFO mode). The audio gain control is mounted concentrically with the squelch control, the latter including a little pointer for making it easier to use. An RIT pot, centre indented, allows the receive frequency to be varied by just over  $\pm 1$ kHz.

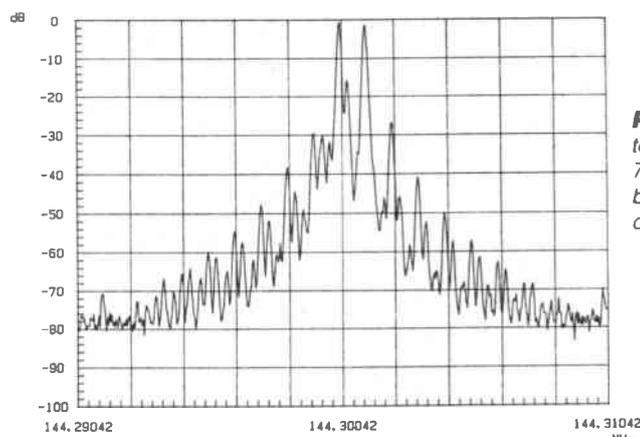
### On top

On the top of the rig is a standard 8 pin mic socket, wired to the standard Yaesu format, a Yaesu MH10E8 mic being supplied which includes PTT and up and down stepping buttons. These buttons can provide scanning or frequency stepping, or can also step between memories. Note that the older model has a 7 pin mic socket, which is totally incompatible, so mic accessories cannot be interchanged unless you rewire to a new plug.

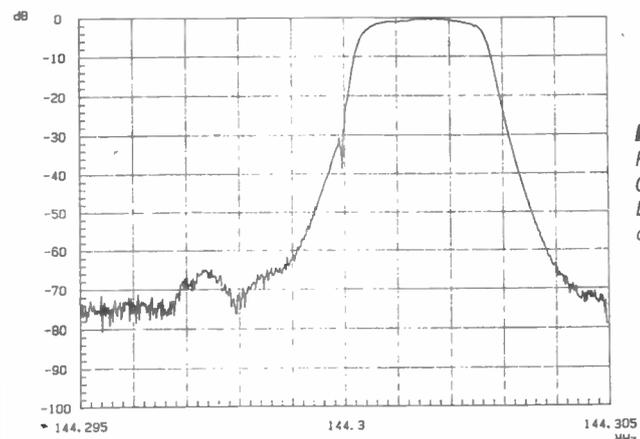
In the old model, a pull out whip antenna on the top was complemented by a partly recessed SO239 socket on the bottom, which was rather difficult to use. In the R11 version the antenna socket is a 50 ohm BNC and a rubber duck is supplied, which is far more convenient. Furthermore, the battery box can be unclipped from the bottom of the rig, making it much smaller, and you can purchase a linear amplifier, type FL2025, which can deliver 25W PEP. This needs



**Plot 1** Yaesu FT290R II two-tone SSB plot, 2.6W PEP 700/1700Hz into ALC. Resolution bandwidth 30Hz. 2kHz per division



**Plot 2** Yaesu FT290R II two-tone SSB plot, 0.75W PEP 700/1700Hz. Resolution bandwidth 100Hz. 2kHz per division



**Plot 3** Yaesu FT290R II AF/RF Tx plot. Max output power 0.25W USB. Resolution bandwidth 30Hz. 1kHz per division

an external 13.8V supply but was not supplied for review. A mobile mounting frame type MMB31 is also available, which houses the amplifier as well.

If you unclip the battery box from the rig you will see various interconnections exposed. These include spring contacts for the dc feed, a phono socket for the RF feed to the linear, and locating holes. A lithium battery back-up on/off switch is also included to switch the back-up off when the rig is being stored for a while. It

is a pity that there is no 13.8V dc input socket on the main part of the rig, and you would have to clip crocks onto the dc spring contacts to operate the rig without the battery box connected. However, the battery box itself does have both a charging socket and a dc input socket. This means that you can use the rig on external dc when the battery box is clipped on.

On one of the side cheeks there are miniature jack sockets for CW key and

external loudspeaker connections. Semi break-in keying is provided on CW, with a hold time of around 0.5 seconds. The rig even includes a fixed CW side-tone, allowing you to set the pitch to be the same as that of the received signal for perfect netting. A socket on the base is provided for ALC and PTT connections with the companion linear, but I could not find any instructions in the book about the use of these with other equipment.

## Digital display

The digital display on the front panel gives frequency in 100Hz increments, as well as all the important status functions, including memory frequency, VFO and mode etc. This was easy to read without the lamp on in a good light, as was the S-meter, but there is also an internal illumination button which provides a very even and bright green light on the display, making it very easy to see in the dark, although it did not light up the S-meter very well. My XYL said that she could not see the S-meter indications in the dark, with back illumination, even with her brand new specs!

Included with the rig, as well as the rubber duck, mic and battery box (no batteries supplied), is a carrying strap and two accessory jack plugs. I thought the instruction book was quite helpful, and somewhat better than that supplied with the FT727. Additional accessories available are NiCads at £2.50 per cell, a 15 hour trickle charger at £11 (NC26), a carrying case type CSC19 (£7), the FL2025 linear at £115, and a mobile boom mic MF1A3B at £25, which is used with the SB10 switch at £21. Many other accessories will be available shortly.

## Subjective and ergonomics tests

I first tried the rig directly interconnected with my 17 element Tonna antenna, and obtained some good quality reports on Tx. The transmission was heard to be reasonably narrow and well controlled. Whilst the receive quality was quite acceptable, I found the AGC speed to be much too fast, and since there is no RF gain control and there is a lot of IF gain, stronger stations tended to cause considerable noise pumping, which was just a little tiresome. The front end sensitivity was a lot better than that of an average old model, although the muTek front end fitted to the Mk1 was noticeably superior to the unmodified new model. Adequate volume was available from the internal speaker, but maximum output on the external jack was just a little limited.

The 25Hz steps on Rx combined with the RIT control are far more satisfactory than the 100Hz steps of the old version, and I was much more comfortable when tuning in SSB signals. The noise blanker was satisfactory and all the functions worked as they should, everything being more obvious than in the old rig. Selectivity was quite good on SSB but was much too wide on FM, making it difficult to separate 12.5kHz channelled

stations properly. The inclusion of the CW facility will be very useful, for the old model did not have it.

It will be rather awkward to interface the new model with linears other than the Yaesu one, unless you tinker about with the linear control socket in between the rig and the battery box. However, you could parallel off a wire from the mic plug, but this is not altogether satisfactory. Be careful that you do not blow the rig up if you do some unconventional fiddling, and avoid any attempt to use hard PTT switching with linears developing a high PTT current on Tx. If you are not sure about this, use the linear's RF switching system.

## Laboratory tests

The SSB sinad sensitivity measured quite well, and was typically 3dB or so more sensitive than an average older model, although the muTek front end would improve the latter so that it would be nearly 3dB more sensitive than the new model. On FM, the sensitivity was about the same as that of the FT727. Front end intermodulation distortion was very much better than that of the old model, the intercept point being just about the same as that of the old Microwave Modules transverter, which I would describe as quite adequate but not particularly good.

The intercept point in fact is some 11dB better than that of the Mk1. You should therefore notice an improved performance under home station operation, but you might still get trouble if there are more than one or two very strong local signals around. SSB selectivity was acceptable at around 2.6kHz for 6dB down, and 4kHz for -40dB. FM selectivity was very good indeed for 25kHz channelling, but nowhere near good enough to reject 12.5kHz channelled stations. Consequently, I feel Yaesu would have done better to have installed the 'F' filter rather than the 'E' type.

The S-meter gave 19dB difference between S1 and S9 on SSB, a 15dB increase from S9 being required to achieve full scale deflection. On FM, the S-meter indications were slightly less sensitive, but offered a similar range.

## Clean output audio

The capture ratio on FM measured very well and received frequency accuracy was very good, although just slightly out on SSB. The distortion of the product detector on SSB was very low, giving a good clean audio to the output stage. A maximum audio output level of just over 1W was available into 8 ohms, and just marginally more into 4 ohms.

The distortion of the FM discriminator was quite acceptable, even fairly high deviations being moderately clean. We checked the FM received response from a 750µS pre-emphasised signal and I felt that this was just about right, for whilst the response was very flat from 300Hz to around 2.5kHz, there was a fairly rapid attenuation outside these limits. The SSB response was virtually

Yaesu FT290RII Laboratory Test Results		
<b>Receiver tests</b>		
RF input sensitivity for 12dB sinad		
FM	144.025MHz	-121.5dBm
	144.95MHz	-122dBm
	145.975MHz	-122dBm
SSB	144.3MHz	-123dBm
RF input intercept point average SSB/FM 100/200kHz spacing -19.5dBm		
Reciprocal mixing ratios (noise floor/input signal level for 3dB noise increase)		
5kHz		72dB
11kHz		80dB
21kHz		89dB
50kHz		100dB
100kHz		114dB
IF selectivity SSB		
-3dB		2.4kHz bandwidth
-6dB		2.6kHz bandwidth
-40dB		4kHz bandwidth
-60dB		7kHz bandwidth
RIT range -1.25/+1.07kHz offset maximum		
FM selectivity		
12.5kHz average		+10.5dB
25kHz average		+69.5dB
S-meter		
SSB	S1	-116dBm
	S3	-113dBm
	S5	-108dBm
	S7	-104dBm
	S9	-97dBm
	S9+	-83dBm
FM	S1	-111dBm
	S3	-108dBm
	S5	-103dBm
	S7	-99dBm
	S9	-93dBm
	S9+	-76dBm
FM capture ratio 4dB		
SSB product detector distortion 0.7%		
FM discriminator distortion of 1kHz tone		
5kHz deviation		3.8%
3kHz deviation		2.9%
1kHz deviation		3.9%
Max audio output power for 10% THD		
8 ohms		1.1W
4 ohms		1.3W
Receive frequency accuracy -0.33kHz		
Rx dc current consumption		
Rx squelch		90mA
Rx typical for 125mW output		140mA
RX FM frequency response ref 1kHz at 0dB		
100Hz		-11dB
200Hz		-5.5dB
400Hz		-2dB
2.5kHz		-1.5dB
3.2kHz		-4.5dB
4kHz		-9dB
5kHz		-14dB

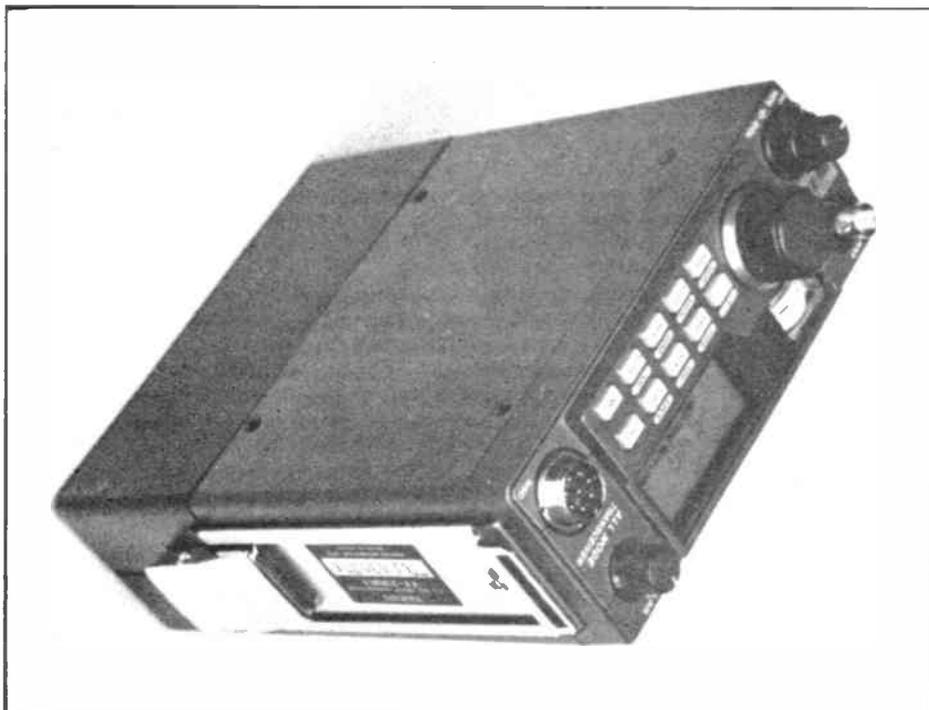
entirely dependent on the IF filter characteristics.

I checked the reciprocal mixing performance of the front end by using my muTek low noise crystal oscillator source, and although close-in spacing oscillator noise was just slightly on the high side for a VHF rig, noise reduced well at spacings further out. The 5kHz measurement was around 4dB better than that of Yaesu's FT767 HF transceiver. However, I did note very slight

whistles at 10kHz intervals from an extremely strong carrier, which prevented measurements at precisely +10 and +20kHz.

When we checked the transmitter we found that it gave just under 3W output on FM and slightly less PEP on SSB. Two-tone tests on SSB Tx showed a quite remarkable performance, vastly superior to the old model as originally delivered, and good by any standard. If you look at *Plot 1* you will see high order products

# G3OSS TESTS



attenuate well, with low order ones close in to the carriers surprisingly low down, except for the third order half a division HF of the upper tone. I suggest that this product is generated almost entirely in the audio circuitry, as there is also an audio IM product between the two tones at the equivalent of 9% distortion.

Plot 2 shows the performance with the input tones at a reduced level so that the output at 0.75W is way below the ALC threshold. The high order products are again very well suppressed, whereas the low order ones are actually marginally worse, showing that there was slight distortion cancellation at the original

higher power level. What is important here is that there is no sign of crossover distortion, which was a problem with my original Mk1 when I first had it. I therefore have no hesitation in suggesting that the new model should be a clean source to put into a linear, and the transmitted performance will depend almost entirely on the quality of the linear used.

I did not notice any RF harmonic problems with the rig, and I did not have any other problems on transmit.

The AF/RF SSB transmitted response (Plot 3) was taken on USB and shows a fairly wide passband with moderately

steep skirts. The characteristics are ideal for normal use, but the filter is not as sharp as those in a more expensive HF transceiver. Carrier suppression was good, and alternate sideband suppression excellent. On FM, maximum achievable deviation was 5.3kHz, but under typical conditions it measured around 4kHz, peaking 5% distortion. Lower deviations were cleaner. 1750 toneburst deviation was correct at 3.4kHz, and its frequency was within 0.2Hz. The transmitted signal to noise ratio was typically 40dB, including a slight synthesizer whine, referred to 5kHz deviation. Transmitted frequency accuracy was fairly good on FM (-320Hz), but very slightly out on SSB (similar to Rx and FM).

We also checked the transmitted frequency response on FM. This was very flat indeed from 400Hz to 3kHz when checked with 750µS de-emphasis in the modulation test meter. Bass and HF roll-offs were moderately steep. The quality seemed very good, incidentally, up to around 3.5kHz deviation, but was just slightly rough when driven into limiting.

The receiving section took 90mA from the batteries when squelched, which rose to a typical value of 140mA when delivering 125mW into the speaker. The transmitter took marginally over 1A on FM Tx with high power, falling to 0.4A on low power. On SSB the battery consumption on Tx would typically average around 0.4A, or possibly less if you keep back from the mic.

## Conclusions

The Yaesu FT290R II is quite clearly a considerable advance over the old Mk1 version, and the transmitter section is quite clearly very good indeed, especially for a little portable. The receiver, although a lot better than the old model, does not compare all that well with mobile rigs such as the Trio 751E, but it is excellent for its main purpose – portable and easy mobile use.

For base station use you will be paying almost as much for an FT290R II with its linear as you would for a better 25W rig. However, the FT290R II has tremendous flexibility, since it is such fun to use out in the open, especially on SSB. You could have a lot of fun walking with it and a beam antenna, or even an HB9CV, to the top of a high hill, and you will find that the batteries last a very long time on SSB.

Ergonomics are generally very good, and I very much enjoyed using the rig, with just the odd reservation here and there. Its price of £429 is a lot more than its predecessor, but it is reasonably good value for money and will undoubtedly be very popular. I can imagine that there might well be many of the old Mk1 versions on the secondhand market, as I predict that quite a few will want to trade in the old one for the new. I recommend purchase quite highly, provided you want its portability.

Very many thanks to Amcomm for the loan of the review sample, and to my wife, Fiona, for helping with all the measurements.

## Yaesu FT290R II Laboratory Test Results

### Transmitter Tests

Tx output power FM 2.8W (high power) 0.4W (low power)  
SSB output power 2.6W PEP

Maximum FM deviation 5.3kHz

Toneburst frequency 1750.2Hz

Toneburst deviation 3.4kHz

Transmitted s/n ratio ref 5kHz deviation 40dB

Tx frequency error -0.32kHz

Tx FM response ref 1kHz at 0dB, de-emphasised in modulation test meter

100Hz	-15dB
200Hz	-7dB
300Hz	-4dB
500Hz	-2dB
2kHz	+1dB
2.5kHz	+0.5dB
3kHz	-1dB
4kHz	-6dB
5kHz	-11.5dB

Tx current consumption FM  
High power 1.05A Low power 0.56A

Dimensions 150 × 57 × 194mm including battery pack of linear  
Weight excluding battery pack 1.2kg, including battery case and NiCads, typically 2kg

# DIPOLE OF DISASTER . . .

Very recently I had the opportunity of testing many modern colour TVs for their susceptibility to interference. In a month or two I hope to be writing up the project in its entirety for publication. It was an enormous task, and I will probably be shocking the reader by detailing the vast differences between the best and worst sets.

One of the tests involved grading the TVs for chassis pick-up of interference from 144MHz transmissions. It was vitally important for me to know the actual field strength produced around the TV, and I ordered two bottom fed dipoles from Bantex Ltd, having discussed the precise specifications with them on the telephone. In my written order I stated that they were for use on the 145MHz band.

There are useful formulae for predicting a field strength produced at a given distance from an antenna whose gain is known, and also if the efficiency is good when a given amount of power is presented to the antenna. Another formula gives the output EMF produced by an efficient dipole, presented to a field of known strength and frequency. Corrections can be made for the impedance of the dipole and for loading the output.

I placed the two Bantex dipoles 3m apart and first drove the Tx one with 5W, with the Rx one interconnected with my Marconi spectrum analyser. Readings seemed to be very inconsistent, and when I attempted to check interference on a Grundig TV the results varied, even over a period of tens of seconds. After much experimentation, my friends and I noted that for the first second or so the combined efficiency of the Bantex dipoles was some 4dB down on what it should have been for perfect dipoles. What was far more serious, however, was that the efficiency dropped by a further 6dB over a period of only one minute, most of the degradation occurring in the first 20 seconds.

## Unacceptable

An overall efficiency which is 10dB below par is, of course, completely unacceptable on 144MHz, so we tried the dipoles the other way round, with identical results being obtained. A similar situation occurred with higher power levels, these always being well within the levels agreed on the telephone. SWR was poor but not grossly excessive, but it did change with time. Having wasted about three hours with my team of helpers, we all had a long sulk and decided that we would have to make our own dipoles at only 24 hours notice to keep within the time schedule of the tests.

John Armstrong G8MVH, of AKD Ltd, and I quickly designed a suitable antenna with a balun made from co-ax, and John very kindly made a pair of them

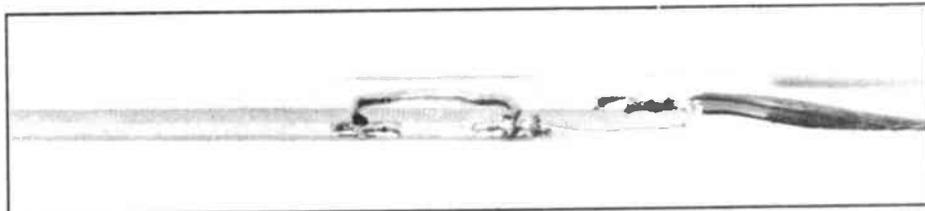
on wooden stands the following day at work. We then tested these, back to back, and obtained around 95% calculated efficiency, measured in an identical way to that of the Bantex antennas. We noted that there was no trace of efficiency drop with time, so these antennas were used for the TVI tests.

We opened up one of the Bantex antennas, having noted that about one third of the way up from the base a major heat build-up had occurred, the fibreglass surround becoming quite hot to touch after the transmitter had been turned off. An examination of the design showed that a hairpin loop at the base was connected across the screen and inner of the co-ax feed, and the inner also fed one edge of a PCB which ran up the inside of the fibreglass tube. The other copper edge of the PCB was only fed by induction with a short term loop near the top of the PCB, but at the top end this same edge was then connected to what looked like Bell wire up to the end of the antenna.

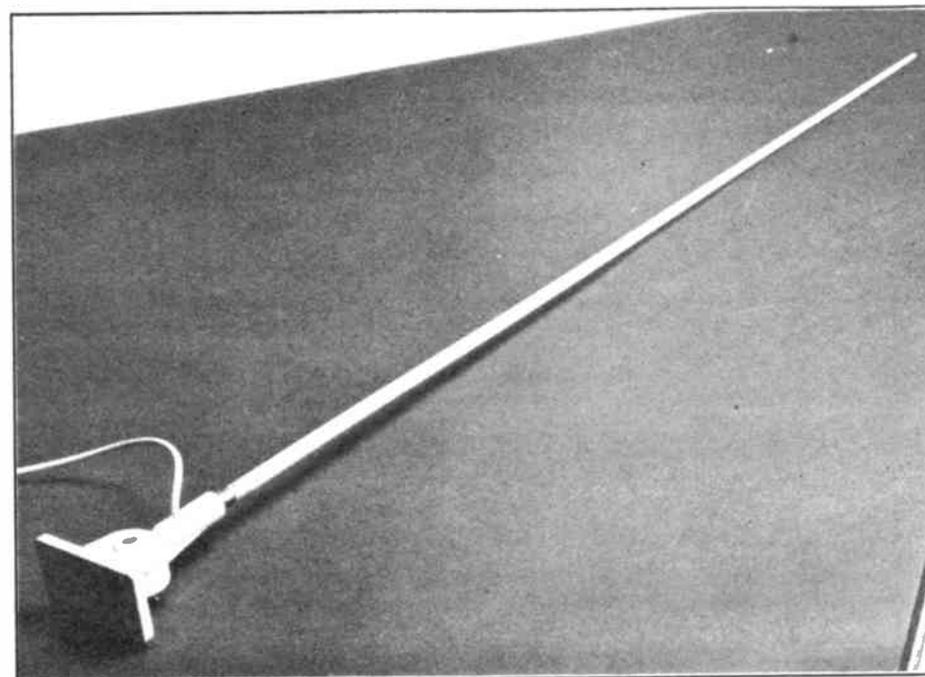
It seemed to us that the dielectric in the PCB was inadequate, being the cause of the heating up and some of the losses, and that the design was also somewhat odd. A Bantex employee, who eventually collected the antennas and gave me my money back, suggested that they must have been marine antennas developed for the 156MHz band, and supplied perhaps in error. The company were apparently unable to find the engineer who had made them up, so there seems to be a mystery somewhere.

This sad tale shows that one has to be very careful to ensure that an antenna specified for 145MHz is not one designed for another band, and this quite probably applies to many a rubber duck as well as whips sold for 145MHz. The magazine would be interested to hear of any other cases in which incorrect antennas have been supplied in this way. The photographs show both the Bantex antenna as supplied and as revealed by withdrawing the fibreglass tube.

by Angus McKenzie G3OSS



Inside the Bantex (above) and detail of the Bantex (below)



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# THE TOP BAND FERRITER

by Richard Marris G2BZQ

Casually mention that you have an antenna, just 16 inches long, which has received Top Band (160 metre) CW signals from 'across the pond', and you will probably get an old-fashioned look! Then mention that it is a fully rotatable 16 inch ferrite rod Rx antenna, with QRM/QRN eliminating/reduction facilities, and you may well receive dubious comments like 'You cannot purchase ferrite rod 16 inches long', or be asked 'Why not use a conventional frame loop antenna, a long wire, a 1/4 wave or a dipole?'

Firstly, you can *make* a 16 inch ferrite rod - even if you cannot buy one! Secondly, an efficient Top Band frame loop antenna is in use at the home QTH, on a table near the Rx. The snag is that, because of its size, it has to be stored away when not in use, and set up when needed (only to find that the band is dead anyway on some occasions!).

On the question of a long wire, 1/4 wave or dipole, similar problems arise in each case. For example, a 1/4 wave for mid-band is approximately 130 feet, and a 1/2 wave dipole is about 260 feet long. How many of us have the space to erect such a device? Very few! Even if we do, if we live in an urban area then we are likely to

come up against the planning people, neighbours, etc.

Of course, the above antennas could be shortened with loading coils or similar, which would no doubt enable more people to make use of them, but most people only have a postage stamp size garden which, in Top Band antenna dimension terms, is inadequate. Others live in apartments or houses where visible exterior antennas are just not possible or allowed. Even assuming that you have managed to put up a long wire, 1/4 or 1/2 wave antenna for 160 metres, you will probably be assailed by a high ambient noise eliminating that DX signal. Top Band is noisy! This is usually a mixture of atmospheric QRN plus 'man-made' noise.

A good 160 metre loop antenna will give you the opportunity to eliminate, or at least greatly reduce, much of the ambient noise plus QRM. The signal level will be lower but so will the noise level - much lower - and a great improvement can be made by rotating the loop.

Little seems to appear in textbooks on the subject of the design of ferrite rod antennas, which are usually associated with MW/LW transistor radios. Even less

appears about how to get maximum results from them. So, over a long period of time, I have conducted many experiments with a view to improving ferrite rod antenna performance. The initial experiments were carried out with the aim of producing a long wave DX antenna which used an 18 inch rod.

During these experiments it was established that as the length of a ferrite rod is increased, with a given inductance, the sensitivity also increases, along with the coil inductance and the Q. Furthermore, the narrower the coil winding in comparison with the rod length, the greater the Q. These conclusions were again confirmed with a long range MW ferrite antenna using an 11 inch rod.

## Description

The Top Band Ferriter is a 160 metre band ferrite rod receiving antenna using a 16 inch ferrite rod. It has fully rotating/directional facilities, and is so small that it can be stored in a drawer when not in use, or even in a suitcase to take on holiday!

The front view of the antenna is shown in *Figure 1a*, and the circuit in *Figure 1b*. The circuit consists of a ferrite rod onto

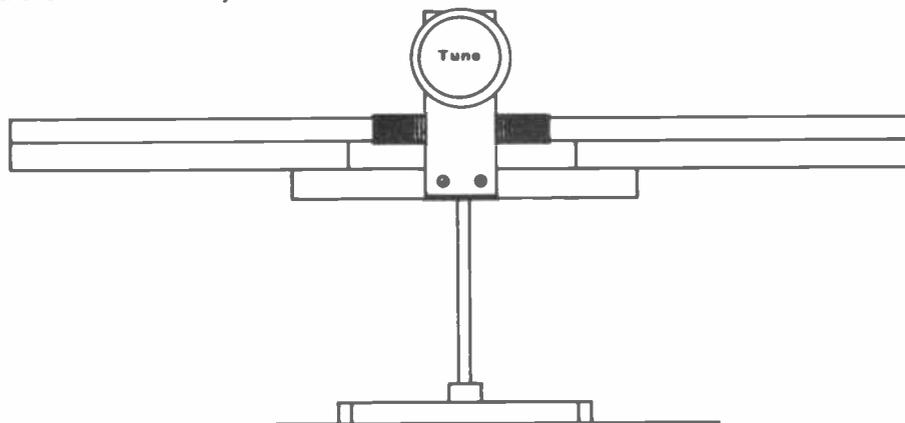


Fig 1a The Top Band Ferriter

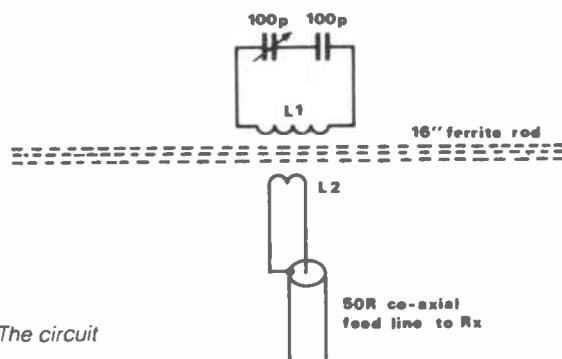


Fig 1b The circuit

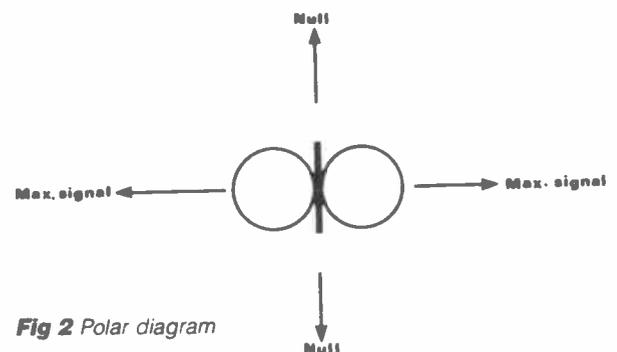


Fig 2 Polar diagram

# TOP BAND FERRITER

which is wound an inductance, L1, resonated by a 100pF variable capacitor with an optional 100pF capacitor, in series, to give alternative ranges and adjustment (this will become clear later). Coupling coil L2 is wound over L1 and connected with a 50 ohm coaxial feedline to the Rx or pre-amplifier. Alternative coupling methods for other impedances and bandwidths will be discussed later.

From Figure 1a it will be seen that the rod/coil assembly and VC are fastened to a crossboom, which is supported on a small diameter vertical rod in a suitable base.

The polar diagram of a typical ferrite rod antenna is shown in Figure 2, though it is stressed that the Ferriter has much sharper directivity. Maximum signal is received on the broad side and maximum nulling off the ends.

## Construction

The basis of the antenna is the rod/coil assembly (Figure 4). It consists of a 16 inch ferrite rod of 5/16 inch diameter, over which L1/L2 are wound onto a Paxolin tube. With care it is possible to Superglue two 8 inch rods, end to end, to make one 16 inch rod! The individual rods used are Denco grade F ferrite rods, each 8 inches long x 5/16 inch in diameter. Before Superglueing them together, it is essential that the two ends should be thoroughly cleaned. Great care should be taken to ensure that the two rods are aligned correctly, because Superglue sets so quickly that you do not get a second go at it!

The coil former is a piece of Paxolin tubing, 3 inches long x 7/16 inch o/d and 3/8 inch i/d. A liberal application of quick setting Araldite should be applied over the centre 3 inches of the rod, and the Paxolin tube slipped into position. Quick setting Araldite takes longer to set than

Superglue, and gives you time to line up the tube accurately at the centre of the rod. When the Araldite is really hard and cured, L1 can be wound onto the Paxolin tube.

L1 consists of 60 turns of 22swg enamelled copper wire, spaced at 1/2 wire thickness between turns, and takes up just under the 3 inch tube length. 4 inch lead-outs should be left for connection purposes later. Wire ends should be held in position on the tube with a blob of Superglue. L2 is overwound at the centre of L1. It consists of 4 turns of PVC covered 7/0.2mm wire (1.2mm o/d), closewound with lead-outs for connections. This finishes the rod/coil assembly, which should be stored with care, as ferrite rods are brittle and easily fragmented.

The wood crossboom (Figure 3) consists of 3 pieces of wood, each 6 inches long x 7/8 inch x 9/16 inch, glued together with a 1 inch overlap, as shown. A 1/4 inch diameter hole should be drilled in the centre of the boom, and a 4 1/2 inch length x 1/4 inch diameter rod (brass or steel) should be inserted and held in position with Araldite.

The variable capacitor is mounted on a small plain Paxolin (or fibre glass) board, 3 1/2 inches x 1 1/4 inches, drilled and screwed to the crossboom as shown in Figure 3. A large diameter knob should be used with the VC to avoid hand capacity effects. Otherwise an insulated extension spindle is needed. At the rear of the assembly, a small tag strip is fitted for anchoring L2 and the coaxial feedline.

The rod/coil assembly can now be placed on the crossboom, as shown, and held in position with rubber bands. When all tests are completed the rod can be adhered to the boom with Araldite.

L1 should now be connected to the VC

and the 100pF series capacitor and L2 to the co-ax, coil lead-outs being cut back as necessary.

The simple base unit consists of a 2 1/2 inch diameter cord drum (Denco or salvage), secured to a woodbase with Araldite, as shown in Figure 5. The cord drum screws are not required. The complete rod/coil/crossboom assembly (Figure 3) can now be inserted into the base and freely rotated through 360 degrees as required. You now have a 360 degree rotational Ferriter.

## Testing and operation

Reference to the circuit in Figure 1b shows a good quality 100pF variable resonating capacitor in series with a 100pF fixed capacitor (silver mica or disc ceramic). This combination gives a frequency range on the prototype of 1613kHz (186 metres) to 3000kHz (100 metres). No slow motion drive is needed. This is the range combination used at G2BZQ with a communications Rx (1700 to 2000 band) for use on Top Band.

Deletion of the 100pF fixed capacitor produces 1100kHz (270 metres) to 3000kHz (100 metres) and therefore also takes in the HF end of the MW broadcast band. This range would probably be attractive to the SWL with a general coverage Rx. The resonating VC adjustment is quite critical, and a simple slow motion drive is advisable.

The antenna coupling winding, L2, has been worked out experimentally for 50 ohms coaxial feedline and has 4 turns. The optimum coupling is the point where it gives maximum sensitivity and minimum bandwidth. Too much coupling (say 5 turns) and the bandwidth increases rapidly. Too little coupling (say 3 turns) means low sensitivity.

Tests indicate that for 70 ohms coaxial cable 4 coupling turns are still optimum,

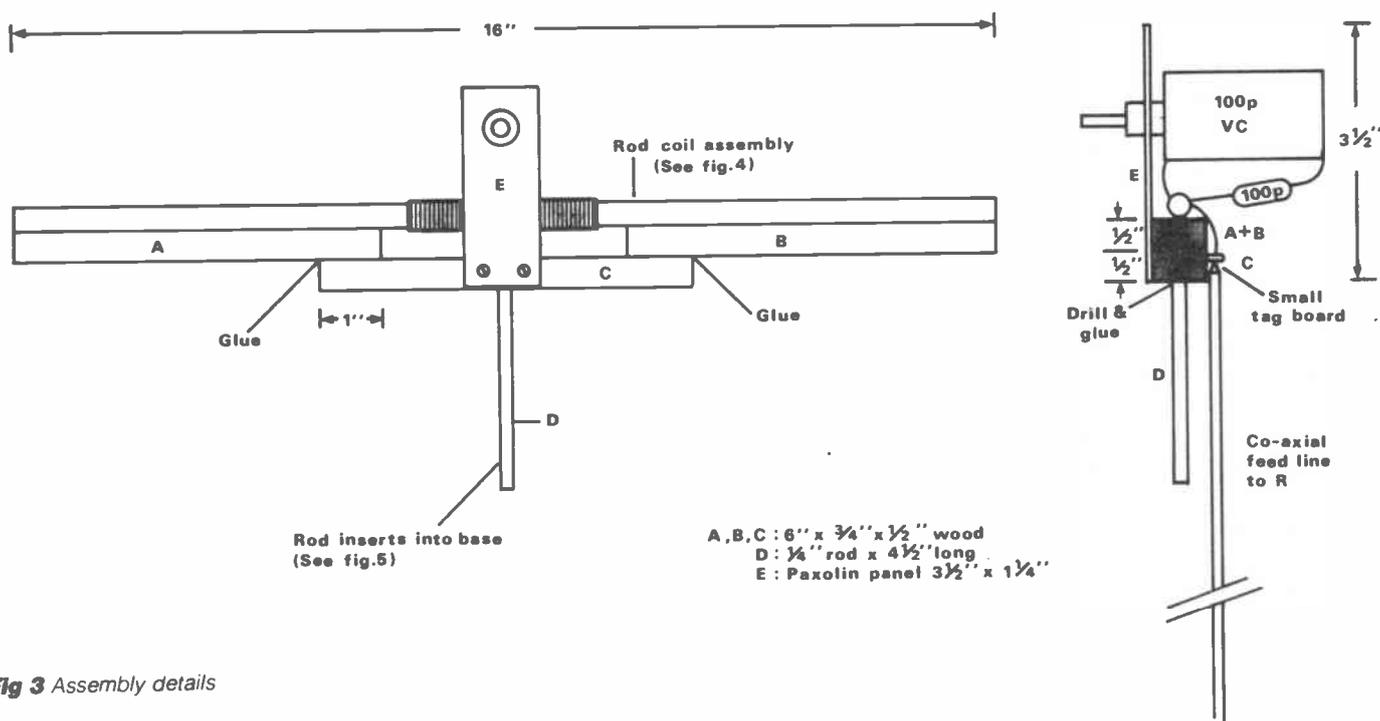


Fig 3 Assembly details

# TOP BAND FERRITER

though bandwidth can be narrowed slightly by the insertion of a 750pF ceramic disc capacitor between the centre wire of the coaxial and the end of L2 (see Figure 6). For other impedances no work has been carried out, so some experimentation with L2 turns would be necessary.

'To amp or not to amp? That is the question' (sorry Mr Shakespeare). With a communications Rx, with a good RF amplification, it has been found that a pre-amplifier is quite unnecessary. After all, a good communications Rx should have good RF amplification on the 160 metre band.

The Ferriter is usually used with an oldish all valve re-aligned Heathkit RA-1 Rx, which was reviewed in *Amateur Radio* in the May 1986 issue. With the RA-1, no pre-amplifier is necessary. With a much more modern (and expensive) Rx, a pre-amplifier will be necessary.

If this is the case, a wideband amplifier can be purchased or constructed. A good buy is one of the old Codar preselectors which are of the variable tuned variety. They are advertised, from time to time, in the Free Classified Ads for a few pounds.

To test the Ferriter, simply select a strong signal on the Rx, with its usual antenna, around mid-band (1900kHz). A commercial station which operates continuously is ideal, or if available, a captive signal source such as a signal generator with a small wire radiator attached is a good alternative.

Substitute the Ferriter for your usual antenna, and resonate the VC for maximum signal. At the same time, rotate the Ferriter in its base for maximum signal. Rotate to 90 degrees to check nulling (see the polar diagram in Figure 2). Repeat the operation near the HF and LF ends of the band (2000 and 1800kHz). On the prototype midband is at approximately half capacity on the VC.

## Results

The thing that becomes immediately apparent is a dramatic reduction in ambient noise – atmospheric QRN and man-made noise. This and adjacent household electrical noise can be further reduced by Ferriter rotation.

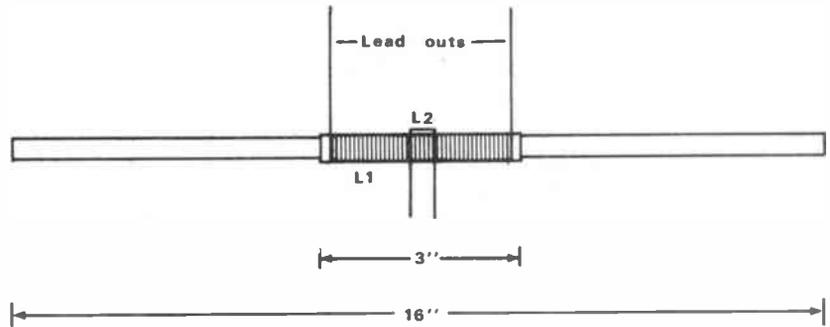


Fig 4 Rod/coil assembly (see text)

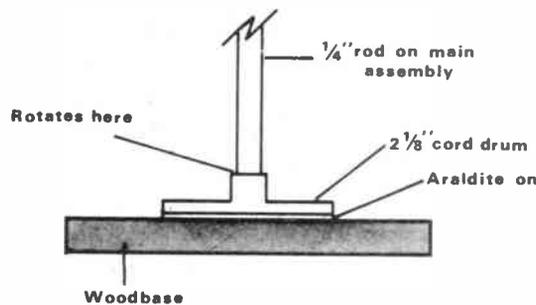


Fig 5 Base unit (see text)

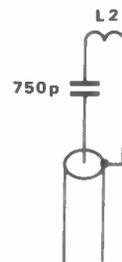


Fig 6

Secondly, the comparatively narrow bandwidth of the device means that the Ferriter tuning 'off resonance' eliminates all signals. It takes a little time to get used to this phenomena.

Thirdly, it will be found that rotation of the Ferriter, in its base, through 90 degrees will null out, or greatly reduce, even the most powerful signal (especially ground wave). For example, when listening to a local Sunday morning AM net some 20/30 miles away on about 1990kHz, it has been found that even the strongest signals can be totally erased

by Ferriter rotation. QRM can be eliminated or reduced except where the interfering signal is on a direct or reciprocal bearing with the wanted signal.

## Conclusion

The Ferriter is an excellent little antenna, which is easily stored away and can eliminate or reduce QRM/QRN. Bearing in mind that CW signals have been received from North America, then it must have DX potential for those who are DX fanatics with little space.

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# SHORT WAVE LISTENER

TREVOR MORGAN GW40XB

I shall open this column by recapping the events of 1986. It has not been a very good year weather wise and, for the most part, much the same can be said for radio conditions. By now, most readers must be aware that we are presently at a time when, due to conditions outside our control, propagation of radio waves is low. Regardless of how much we are prepared to spend on our equipment, or how big and efficient we make our aerials, the laws of science and the universe have the last say on how much DX can be worked.

The propagation of radio waves is very much affected by what is happening to our sun. Activity on this immense fireball can be seen by us as areas of discolouration, or sunspots. Over an eleven year (approximately) period, these areas of activity can be seen to rise from zero to quite intense levels. When activity is low, radio wave propagation is difficult due to the resulting effects on our ionosphere and the current low period of sunspot activity is why we are finding DXing more difficult than it was a few years ago.

Those of you who came onto the radio scene in the late 1970s or early 1980s will have found it quite easy to log plenty of stations in the most distant locations using simple aerials. In fact, at that time there was an influx of imported CB transceivers into the country from the United States, and users of this illegal equipment were able to talk easily to distant stations, even in Australia, using simple vertical antennas and low power.

As the sunspot activity decreased, propagation conditions deteriorated and many amateurs attracted to radio in recent times have opted for big linear amplifiers and enormous beam antennas to get their signals to these same areas. The trouble is, many of these newcomers switch the linear on when first opening up the station

and leave it on even when making local contacts. What their power consumption must be, goodness knows, but the effect is to wipe out any chance that the bare foot operator has of making his contact.

This was especially evident during the Jamboree on the Air this year, when some of the stations were not only using high power for short distance contacts, but in some cases were spreading their signals over very wide areas of the already crowded bands. Quite apart from being unfair to other users, it doesn't say much for their own operating techniques.

## Very successful

Despite the bad conditions this past year, many of our listeners have been very successful in their hunt for prefixes, and claims for *Amateur Radio* awards have continued to arrive at my QTH. Many readers claimed for the first time and some commented on the way award hunting had improved their technique and encouraged them to try different aerials and accessories to improve their reception.

It has also been my pleasure to present the first Lifeboat awards this year. Although many of you are finding this award a stiff challenge, reports reflect the keenness and enthusiasm of those having a go.

1986 saw another increase in the number of radio rallies being held throughout the country. Most were up to their usual high standard and I had the pleasure of attending some of them and receiving reports of others from readers. However, there seems to be an increase in the number of non radio stands at many of the busier rallies and one wonders if this is a good thing. It is obvious from your letters that many feel that these stands not only detract from the principles of rallies but also take up valuable space. What do you think? Is it necessary to promote the

sales of toys and household goods at radio rallies?

For the most part, the rallies I attended were very well organised and the clubs had obviously put in a lot of hard work to get them set up, but it was a point to note that a lot of the major companies had reduced the sizes of their stands or displays. Some of these companies, on being asked, stated that they thought there were too many rallies in a given area and that it would be a good idea for the clubs in a county to get together to present a combined rally rather than have two or three in the same area over the year. . . makes sense to me.

It was with a touch of sadness that we heard of the closing of the International Short Wave League. Many of our readers had, at one time or another, been members of that society during its forty odd years in existence and gained a lot of pleasure and assistance from the folks there. For what ever reason the ISWL closed, it is sad to see the end of such a well supported society and it will be missed by many listeners world-wide. I can only express my regrets to those who worked so hard (*Stop press! See Straight & Level for the latest ISWL news!*).

On a brighter note, I am pleased to say that my QTH is nearing the completion of the extensive renovations that have caused chaos over the past six months. After being left with only three walls of the original building, it has been a struggle to keep sane and I thank all of you for being so patient when waiting for replies to your letters or verification of your award claims. Early in 1987, my new shack will be completed and I will be pleased to welcome anyone who wishes to pop in for a chat and noggin (and play with the gear!). As the shack will be regarded as the headquarters of the International Listeners' Association, I hope to christen it by operating GB2ILA from there

on 31 January/1 February, so if you are around that weekend and hear me please send in a report. A very nice QSL card will be available for correct reports. If you happen to be in the area, please drop in and wet the 'baby's' head!

And so to this month's mailbag, with Elmer Liddicoat of St Austell who sent in his claim for the Gold prefix award for logging 1,000 prefixes. Despite retiring last April, he has found that his spare time has been taken up with those domestic chores he'd been putting off for so long, so his air time has not been quite as much as he expected. Nevertheless, with AA2, AZ6, BY2, CP5, CX6, HH2, HK3, HZ1, KC7/5N6, KSO/P/KH2, LU6, VU2, VY1, XP6, YB6, 3D6, 5B25 and 7Q7 among a super list, he must have found a bit of time between the odd jobs to warm his ears up under the phones! Elmer also gives the airbuds a listen with his Bush Sigma 2A, which cost the princely sum of £12 in 1978 and is still going great guns! Now he's retired, he is studying for the RAE and hopes to be QRV on CW/QRP.

## New entry

Malcolm Element G0EBD, of Shrewsbury, entered the lists with his claim for the Bronze award. With his TS930S and G5RV, Malcolm managed to log CU3, CX4, C31, HH7, H13, LU8, 5Z4, 9L7, 4N2, PT7, VP9, VK5 (10MHz SSB!), VQ1 and ZP5. Unfortunately, his computer disc decided to play up and he had to list them long hand, but he promises that the Silver claim will be 'properly' presented.

No claims from Tony Blackburn, of Stratford upon Avon, but his efforts at the RSGB Listener Contest this year improved his score to 205,000 points! That Lifeboat Award has him stumped, though (giggles of evil mirth!). Tony says he got so tied up with that and the Heard All Britain, that he was neglecting his UBA Contest entry . . . bad lad. Still, he's topped his personal best, so all is forgiven!

He's now experimenting with aerials again, the latest being a 134ft Marconi round the eaves of the house. It appeared to be a bit deaf on the HF end at the time of writing but, knowing Tony, he'll have something sorted in no time flat! Some nice loggings from his QTH including OD5, FM4, VK9, HK1, ZL7, HD8 (Galapagos Isle) on 40m, A35, 5N6, 9J2, 5V7, J87, KL7, on 20m, TZ6, YC0, 6W1, T77, CE3 on 15 and the odd DX like 3A2, TI2, KP4, UO5, and ZL1 on 80m. Shows that the DX is around if you've a mind to chase it... got to burn the midnight oil a bit though!

Peter Wood of Crowborough, having obtained his nice new call sign (G1UTH), has been getting his 2m equipment set up and was thrilled to bits when he made a QSO with the chap who got him interested in radio in the first place. He's now working on the dots and dashes, so should be QRV on HF by the spring. Meanwhile, he's still listening when time permits.

Now over to Grasse in France where Darrell Jacobs has been award hunting and gets his first claim in for the Bronze... well done, Darrell! The shack over there consists of the Yaesu FRG7700 with an end-fed inverted 'L' and an eighteen foot vertical covering the upper bands. With the QTH about 400m asl in the French Riviera, it must be nice getting a tan and logging the DX!

When Frank Brown of Redcar sent in his claim for the Gold award for 20m, I must have had a brainstorm as I thought that would get him off my back for a while! Oh no! Twenty-six days later... Bronze claim for 40m... Silver

claim for 15m... and, to add insult to injury, a claim for the JOTA Award! He's only been listening since 1985, too! Joking aside, this is an example of really keen listening and I congratulate Frank on his hard work.

Among the 20m offerings were C30, CU3, PI5, TK5, VK7, YV5, 5B4, 5N3/MM, while on 15m there were AA1, CS8, P36, PY7, XE1, YB9, YT2, ZC4, 3C0, 5N4, 5N9 and 5Z4. The Gold claim also included A92, AZ1, BY4, CP6, KT8, KZ4, PY8, TK0, YB0, YT3, ZD9, ZV2, 4N9, 4X8, 5W1, 6W6, 7S4 and 9Y4, to name just a few. Meanwhile, during his spare moments, Frank has passed the RAE and the Morse test and is now G0FLR. However, he has one small grouse about the QSL return rate as he sends many of his reports direct and, in fact, has only received *one* reply (from V85BS), despite sending IRCs.

**Slow returns**

I can understand Frank's disappointment, but should mention that QSL returns are often very slow. New listeners should realise that the rare station they've just logged has also been logged by thousands of other listeners and probably thousands more amateurs, all of whom are after his QSL card. Even if the operator has assistance (and many do not) it will take him weeks or even months to write out the cards for his contacts before he starts on incoming listener reports.

Once he has written the cards, they have to go to his bureau to be sorted along with cards from hundreds of other operators and forwarded to your bureau where they are again sorted. When

there are enough for the individual envelopes, they are sent out. When you take into consideration postage delays, air or sea traffic, holidays and any number of other delays, if you get your cards within a year you can consider yourself fortunate!

If you've ever been on the working end of a special event station, you will be aware of the size of the problem.

Even the average operator often has a set date each month when he sends his cards to the bureau or a set quantity that is economical. So, please be patient and don't bombard the poor old amateur with repeat letters about that QSL card... he's got enough problems as it is!

Over to Angela Sitton, RS88639, in Stevenage who is also on the single band awards hunt and has just claimed the Bronze for fifteen metres. Well done, Angie!

Angie is now using a B28 receiver alongside her Philips, thanks to the local ARS, and is getting well into the Morse now. With her receive speed at well over test requirement she was confident enough to try her hand in the recent RSGB CQWW challenge. Angela found conditions very good and she logged JAs at 5/5 to 5/9 on the Sunday morning on fifteen, although ten did not seem so good previously. However, she managed over twenty countries, while fifteen captured 49 plus most of the US call areas. Twenty came up trumps again, with 53 countries and *all* the US areas. Top Band yielded well over twenty countries, too! With a score of nearly 84,000 we should see Angela in the top half of the

list, so the hard work has really paid off. A very creditable effort with simple equipment.

Stan Porter, in Malawi, was pleased to receive his Gold award and will, no doubt, be sending further claims before long. Stan mentions the East African Network on the airbands around 8.800, which include Lusaka, Nairobi, Dar es Salaam Mauritius, Mogadishu, Harare, Entebbe and the Seychelles. Well worth a listen. He is also on the dreaded Lifeboat trail but his problem is hearing the UK at all for most of the time! Between catching exotic DX like J59UAB, J40DX, YM3KA, SJ9WL, YQ0A, DPOGVN, etc, Stan enjoys sailing his Tiger Fish class dinghy around the local 'pond' (about the size of Wales, most likely... envy!) and has been casting a beady eye on a pal's Autogyro, but fears the locals may think it's a big bird and shoot it down for 'njama' (meat)!

**LF bands contest**

I must mention the White Rose ARS seventh SWL LF Bands Contest. This takes place from 12.00GMT on 17 January to 12.00GMT on 18 January with a maximum 18 hours logging. Logs should show date, time (GMT), band, station heard, station worked and report at SWL station. Full details are available from G3XEP or G8LVQ, both QTHR.

Well, that's about it for this month. I'm sorry there's no feature this time but I'm sure you understand the conditions here at the moment. Until next month, may I wish you all the best for the New Year. I hope to hear from you all in the coming months. Good listening!

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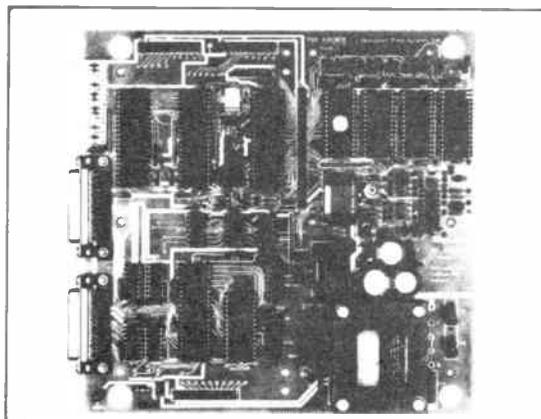
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# PCs BYTE BACK . . . .

Kirsti Jenkins-Smith VK9NL struggles with some chips and 32 bits of bus!

Being so far from the maddening crowd, it took a while for Norfolk Island to enter the computer age. However, now it is all happening. True to form, the majority of computer owners in the area have taught themselves how to use their machines. We have no access to proper courses so it is a matter of learning the hard way.

Our computer is not going to let me into its secrets easily. It starts off politely enough, asking me with a smirk what I want to do. Well, I want to create a file, and that is okay, so off we go. Harmony reigns while I enter data, feeling confident that this is no big deal. The arguments start when I want to put the file to practical use.

'What file?' asks the computer, grumpily. There is only one file on the whole disc, but I shall have to spell it out.

## Triumphant machine

'Not found!' declares the computer, triumphantly, to my chagrin. I check the filename carefully. Okay, so I left out a dot or a space or something. A few more tries and up comes the file. Bingo! I want it sorted in alphabetical order, and with one eye in the manual, I type in the necessary commands. But oh no, not so fast.

'Disc is full', says the computer, blinking its green eyes disapprovingly. I know it is lying through its teeth, but will give it another chance just to be agreeable. I go through the motions

again, but again I get this bold-faced lie slung at me.

'No, it is not full', I type furiously. 'I don't know what you are talking about', yawns the computer haughtily. It is so superior in its attitude that I realise it knows something that I don't.

Deflated, I start from scratch, asking it to sort my file. We soon arrive at the same old argument about the full disc. I am worried. There is something wrong with the disc, I tell myself, giving the computer the benefit of the doubt. Or something is wrong with the computer...or the mains voltage is down...or up, who knows? I decide to give it another try.

## The penny drops

Late in the afternoon the penny drops and I leap the 'disc full' hurdle. It turns out that we have not been talking about the same disc, so there! But I can't help feeling that it would have been of some help if the beast had told me so in the first place, instead of sitting there laughing at me.

All this messing around has done things to my file. It is no longer complete, so I spend time filling in the gaps that have mysteriously appeared. All the same, I feel that I am at last on the winning side.

I have learnt how to create a file, call it up, patch it up and sort it. All I have to remember is that my opponent is not overly bright so I have to spell

everything out in detail down to the last dot and only use words it understands (which are few.)

The screen shows a clear alphabetical file, and I feel pleased with my efforts, so I ask the computer to print it.

'Print?' it says. 'What's that?'

## Spelling it out

I am flabbergasted. Print as in P-R-I-N-T, you dummy! Why must you argue all the time? Don't you understand English? I dive for my Thesaurus in case it is my own English that is at fault. After all, I remind myself, I am not basically of the English-speaking tongue. The computer may well be programmed only to recognise some other word meaning 'print'. None the wiser, I consult the manual, looking desperately for clues on how to tell the computer that I want a printout. There is little to go on. The manual seems to assume that such basic commands are unnecessary. It would only insult the intelligence of the user to actually describe how this function comes about. I experiment with a few words, to no avail.

'Ha, ha, ha, try again', giggles the computer. 'Try changing a word', it taunts.

I say 'OK, let's change that word'. 'What do you want to change it to?' splutters the computer, its mirth barely suppressed. I suggest another word, and it asks if I want any more changes. 'No', I say firmly.



## PCs BYTE BACK

'Ho, ho, ho, that was fun! Try again, try changing a word', it mocks. It never tires of this game. It really is very childish, so I ask it to shut up.

### Pleading Ignorance

'Shut up?' it blinks. 'I don't know that word. Try changing a word, yes or no?' I must give it credit for persistence, if nothing else.

Over a cup of coffee, I find a clue in the manual. 'REPORT', it says. Aha, so that's it.

'Report', I command sternly to the computer after coffee break. It blinks, all businesslike all of a sudden. I have the printer switched on, ready for my beautiful alphabetical file. But not so. Not yet! There are questions to be asked and answered. I am tired of all this nagging. Why can't it get off my back and just print my file? I don't really care if it comes out upside down, as long as I can get to see something on paper. I refrain from typing 'Don't ask stupid questions, just get on with it'. I have learnt by now that it will just withdraw haughtily and refuse to cooperate except by its own rules. We go through the questions one by one. Do you want this or do you want that? How about such and such, and what about so and so? I default everything to let it have its own way. It seems to think it knows everything better than I do, anyway.

Suddenly the screen fills with my file in report form. It looks good, but there is no action at the printer. It just sits there as if it does not belong. It is all very disappointing. I search the manual for further clues. It is not on my side, so much is evident. It actually tells me that if I had included the print command in the first place, I would now have had a printout. I realise the manual is in league with the beast and that I am on my own, out in the cold, barred from sharing their little secrets.

### Looking for clues

I thumb through the manual to see if I should inadvertently have made a slip somewhere and let the secret out. Can it be that this is such an advanced system that no printout is required? Maybe it is specially made only for computers talking to each other.

I have heard of such things where the computers take over, yacking away to each other, leaving the human element out of it. But no, the manual had said something elusive about if I had done such and such, indicating that paper is not yet obsolete.

On page 94 of the manual I come across what I am looking for: 'SET PRINT ON/OFF' it says. Well, here we are. I follow the command to turn the printer on and quickly ask for my file to be printed. The printer jerks into action,

feeding reams of paper through with no print on it except page numbers. Turning the printer off seems to be the only way to stop this colossal waste of good paper. So, back to the manual. Aha, I had forgotten to tell thickhead which drive I was using. Okay, so off we go. Only now we are back to the guessing game.

'I don't know what you are talking about. Do you want to change a word, yes or no?'

'You know very well what I am talking about', I mumble. 'SET PRINTER ON'. I can't see anything wrong with that. But, no, the computer wants to play. It does not know the word 'printer'.

'Try another word', it invites, full of self importance. What is wrong with the word 'printer' for goodness sake? It must be having me on. I consult the manual again on page 94. Smiling apologetically to the green lights, I type 'yes'. I want to change the word 'printer'.

'Change to what?' blinks the computer, not knowing that it is about to be checkmated.

### Outsmarted

'Print' I type quickly, before the beast realises it has been outsmarted. This time I remember all the little details required, and in a moment I have my alphabetical file in print.

It really is quite simple – if you know how to do it.

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## Hpe cuagn sn

Amateur Morse operators understand the abbreviations in this heading, and a good many more besides, but where do they come from? Many are from commercial telegraph practice, some from military sources and others were originated by amateurs themselves.

In 1879, Walter P Phillips devised a form of telegraphic shorthand, known as the Phillips Code, to speed up the process of sending lengthy press copy by Morse. Originally copied by hand, the advent of the typewriter enabled speeds of over 50wpm to be achieved, and transmitted abbreviations were typed out in full as they came off the wire.

The code contained about 3,000 abbreviations of words, groups of words, or complete sentences. For example, IWR TT T SCOUTS YA CFMD would have been typed out as 'it was reported that the Supreme Court of the United States yesterday confirmed'. Commentators at big sporting events would take a telegrapher with them who, using Phillips Code, would key the commentary back to their newspapers as it was made. On occasions, the telegrapher acted as the commentator as well!

## Where the action was

In the 1930s in America, Morse code was used rather as TV and radio is today to cover important events. Telegraphers with their wire crews were wherever the action was, getting the news back and even providing emergency communications when necessary.

Phillips abbreviations used by amateurs today include agn, btr, evg, hr, hw, nr, nw, sn, thru, u, ur, and vy. The popular es (and) is also from the code and was originally '&' in American Morse, the symbols being the same as the letters e and s. Perhaps we should look closer at the Phillips Code to see if we could use more of it today?

J H Bunnell's 1884 manual of telegraphy for private telegraph lines lists a few more abbreviations which are familiar today: gm, good morning; gn, good night; 73, accept my compliments; ok, alright; opr, operator. Others, which don't seem to have come down to amateur use, include: 1, wait a minute; 5, have you anything for me?; 13, do you understand?; 18, what is the matter?; 77, I have a message for you; and (I like this one!) 134, who are you at the key?

## The big one

Of course, 73 is the big one. Everyone knows it, and everyone uses it. The question of its origin has been debated and written about endlessly. One story has it that 73 was the secret sign of the Railroad Telegraphers' Union. Another reminds us that in the Wild West a man needed a horse, a good woman and his Winchester 73 to survive – hence the greeting to wish you all the best.

According to telegraphic historian Louise Moreau W3WRE, writing in *Morsum Magnificat*, Western Union introduced the '92' code in 1859. This was 92 numbered codes, each representing a special message which could be sent over the wire by customers. At that time



# Tony Smith G4FAI takes his bimonthly look at the world of dots and dashes

73 meant 'my love to you'. It is easy to see how it has been modified over the years to reach its present meaning.

Incidentally, a friend of mine, who was a railroad telegrapher in the USA until the 1960s, tells me that he and his colleagues never used 73 when operating. They never saw the need for it.

If anyone has other authentic examples of early Morse abbreviations, whether used today or not, I would be pleased to hear from them. Also, does anyone have a copy of the original Q Code please?

## OK-G QRP tests

Following the pilot tests carried out last February, the G-QRP Club and the Czech QRP Group have arranged a further series of tests to be held on 31 January and 1 February 1987. Operation is CW only and all UK QRP operators are invited to participate, using a power not exceeding 5 watts RF output.

OK-QRP stations will be QRV for contacts with G stations at the times and frequencies in the table on both days.

Logs may be sent to A D Taylor G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND. This is not a contest, but merit certificates will be awarded for outstanding logs.

### OK-QRP STATION DETAILS

GMT	Frequency
0800-0900	7030
0900-1100	10106
1100-1200	14060
1200-1300	21060
1300-1430	14060
1430-1600	10106
1600-1700	7030
1700-1900	Rest period
1900-2100	3560 (3570-80 if QRM bad)
2100-2300	1900 (1840 & 1815 if QRM)

## Morse tests

There are a lot of conflicting reports about the arrangements made for the new Morse tests – mostly at second or third-hand. Everything is new of course, and the system has to settle down. It would be interesting, however, to know what is really happening, from those it is happening to.

If you have taken the Morse test since 1 April, why not write and tell me about it? If you had a bad experience say so, but equally, if you were fully satisfied let me know that too. Either way, be sure to say if you passed the test or not!

## New book

I have been looking at *Morse Code, the Essential Language*, by L Peter Carron Jr W3DKV, which is currently available from the RSGB. It covers the history of telegraphy in a 'popular' style (not entirely accurately); learning to receive and send Morse; high speed operation; distress signals (US practice); and has some useful lists and appendices covering abbreviations, UTC, books, periodicals, organisations and museums (again USA) of interest to the Morse enthusiast.

For the beginner, there is good guidance on learning the code, including a number of practice exercises. For those who have passed the test, there is useful advice on attaining higher speeds. There is also advice on using mechanical bugs, electronic keyers, keyboards and so on.

Looking through the index, one sees references to various things that newcomers to Morse would like to know about – from audio filters, through learning aids, to keyer weighting controls.

Morse operating is sadly neglected in literature published today, and this book does at least partly fill the gap. If you think there's still a lot you need to know about Morse then this book could be a help. It would make quite an acceptable Christmas present at the modest price of £3.39 to RSGB members, or £3.99 for non-members.



# Across t

During the night of 27/28 November 1923, Leon Deloy (F)8AB commenced his third successive period of operating from his QTH just outside Nice. On the two previous evenings his CW signals had been copied on the east coast of the USA, but no 2-way QSO had materialised. Would it be third time lucky? He started sending and continued for an hour with gaps to listen for any replies. Then he took a break.

Going outside for a few breaths of fresh air he could see the first signs of dawn. Returning to his equipment he switched on again and checked his output on the aerial ammeter. After a long call he paused, and pressing the phones to his head, strained his ears for a reply. In a fleeting moment he realised he'd made it. John Reinartz (W)1XAM was responding and a few moments later Fred Schnell (W)1MO in Connecticut also reported the Frenchman's signals.

On a wavelength of 100 metres (3MHz) this was the first contact between radio hams from opposite sides of the Atlantic.

This achievement of 2-way transatlantic communication by amateurs represented the culmination of two years of tests and a decade of dreams.

The inventor Hiram Percy Maxim, founder of the ARRL (American Radio Relay League), had challenged amateurs to bridge the Atlantic as far back as 1914. Regular commercial traffic was, of course, being handled in both directions. A commercial service between Nova Scotia and Cornwall had been initiated in 1907. But these stations used very high power and also extremely long wavelengths of 6,000 metres (50kHz). Amateurs were confined to 200 metres and below and restricted in the way of power levels. However, in the autumn of 1921, after collaboration between the ARRL and what was to become the RSGB, American and European amateurs conducted scheduled tests. Up until this time, only occasionally were signals from one continent heard by the other, and no 2-way contact had been achieved.

An American, E H Armstrong, had invented the superheterodyne receiver a few years earlier, and many US amateurs were already incorporating this principle in their home-brew receivers.

In the autumn of 1921 the ARRL sponsored the visit of Paul Godley (W)2ZE to the UK.

An acknowledged expert on receivers, he brought with him the most modern items of equipment, as well as the technical know-how. Godley arrived at Southampton on the *Aquitania* on 22 November, and the following evening addressed a meeting of the Wireless Society of London, forerunner of the RSGB.

After lengthy discussions with many UK hams he eventually decided on a site on the west coast of Scotland. Erecting a tent a few miles from Ardrossan, in Strathclyde, he began unpacking his equipment and setting up the station. He had brought with him the latest Armstrong superheterodyne, but also the then more usual regenerative, 'straight' receiver. He received useful assistance from the local dignitaries and erected an aerial of nearly 1300ft in length, supported on 10ft poles, 12ft apart. A non-inductive resistor was used to terminate the distant end and the input inductively coupled into whichever receiver he was using.

He commenced listening on 21 December and was at first appalled at what the UK amateur had to contend with. QRM from the high powered Nauen transmitter just outside Berlin, as well as the harmonics of the Clifden and Poldhu spark transmissions. He could copy Paris with no aerial! With these conditions and a power restriction of 10 watts, it was

by  
**Stan Crabtree**  
**G3OXC**

# he Pond

little wonder that no contact had so far been possible with the United States. However, within days he had copied 30 American stations operating between 1.1MHz and 1.5MHz. He was particularly surprised to hear the clear tones of CW transmitters among the raucous notes of spark emissions. He knew that the valve transmitters were using less than 100 watts and yet they were easier to copy.

Marconi offered the use of his Carnarvon transmitter to relay Godley's results to North America. American hams anxiously monitored the signals to see if they had been heard in Scotland. During his final few days in the UK Godley visited many leading amateurs and gave demonstrations of his receiver. (G)2DX was one who speedily mastered the intricacies of the superheterodyne principle and subsequently published articles on his experiments.

Further transatlantic experiments were scheduled during the winter of 1922. With improved receivers, many US stations were received in Europe, some as far afield as the west coast. The USA operators heard two UK stations and one in France. But the sought after 2-way Atlantic QSO still eluded the contestants. Many factors contributed to this. Calibration even at this time was never certain and with the amount of home constructed components this is understandable. Regenerative receivers in use were inclined to drift into self oscillation and emanate low power transmitters. Harmonics from the now numerous high powered commercial transmitters added to the confusion. Sizeable portions of the available spectrum were obliterated and completely unusable.

One of the keenest European amateurs aiming to achieve a transatlantic contact was Leon Deloy (F)8AB. Operating from Nice, his transmissions were regularly heard in the US during the winter of 1922. The following summer, Deloy made a special trip to the United States to study the American ham scene. He was welcomed by the ARRL and visited many east coast stations. After purchasing the latest items of US equipment, he returned to France in the autumn, determined to be the first European to make the 2-way contact.

Having cabled the ARRL with details of his future schedules, he commenced operating on 25 November. In three days he had achieved his burning ambition.

British amateurs were also geared up for Atlantic contacts in 1923. The RSGB had applied to the GPO and certain UK stations had been granted dispensation to use more than their allocated 10 watts.

Over 2,000 'W' stations had been copied in the UK during the previous winter and there was an air of optimism during local QSOs whenever the coming tests were discussed.

The RSGB had been in contact with the ARRL and a schedule of operating times had been drawn up 3 weeks from 22 December 1923, between the hours of 0100-0600 GMT. However, success was to come before the tests started.

(G) 2KF had followed 8AB's successful QSO on 28 November, although he had not heard the American stations. He discussed techniques with the Frenchman and Deloy agreed to relay details of 2KF's wavelength and note the characteristics of his now regular QSOs with the east coast stations. This procedure brought results. Contact was established between J A Partridge 2KF, of Merton, SW London and 1MO in Hartford, Connecticut on 8 December 1923 at 0545 hours GMT.

At the key of 1MO was KB Warner, the secretary of the ARRL. He was obviously as thrilled as 2KF as he transmitted: **SOME MORE AMATEUR HISTORY IN THE MAKING.** 2KF was surprised to note that signals from 1MO were actually increasing as daylight arrived. There was one diversion. When the aerial current started wavering 2KF darted outside to find an adventurous hen from a neighbour's run perched on his counterpoise and bringing the wire into contact with some wet timber. A few random shots with half a brick soon reinstated 2KF's operational capability! He returned to find 1MO still at good strength. In fact, the QSO lasted for 2½ hours. 1MO finally signed with **AM GOING NOW OM - VERY QRZ - THIS IS THE END OF A WONDERFUL NIGHT. GOODBYE.** Thus ended the first W-G 2-way QSO.

It is doubtful if any 3rd party traffic restrictions were in force in the UK at this time. In any case, during subsequent contacts H P Maxim, President of the ARRL, sent congratulatory messages via the amateur bands to Sir Henry Jackson, who had been President of the RSGB the previous year, and also to Señor Marconi. Jackson heartily reciprocated over the same channels. A few days later (G)2SH, operated by F L Hogg from Highgate, North London, also contacted 1MO and maintained communication between 0445 and 0810GMT.

The equipment in use at 2KF was a 2 valve, Det/LF receiver, but his transmitter operated with an HT of 1500 volts obtained from a Mackie generator driven by a ½ HP dc motor. Aerial current was

reported at 1.8 amps. The aerial consisted of a 3 wire top section, 60ft long and supported between two 50ft steel masts. A counterpoise, 7ft above the ground, was also in use. The station at the ARRL HQ, 1MO, also used a simple 2 valve receiver. The aerial was an inverted 'L' forming a cage of 6 wires. It ran for 127ft to a 72ft mast at the far end, sloping to 45ft at the input feedpoint. An 85ft counterpoise was also used some 8ft above ground. The input power was 400 watts. A separate receiver aerial was used consisting of a single wire, 150ft long and 20ft high. Providing tips for other would-be transatlantic contestants, 2KF said patience was perhaps the chief attribute. He also suggested that operators should be prepared to arrange schedules via other stations (as he had done). Finally, he stressed that there was no need to increase the HT to the receiver valves in the hope of improving reception. 50-70 volts, as quoted in the valve characteristic data, was quite sufficient and should not be exceeded!

# TRIO TR7010

## A USER REPORT



by Ian Poole G3YWX

Over the years a number of excellent two metre designs have come out of the Trio stable. One of the earlier ones is the TR7010, a mobile SSB and CW transceiver capable of developing about 8 watts output. It is neat, compact and well designed, possessing among other things an unusually clean output and very robust PA. These features are not surprising since the design is based on the very popular TS700, which is much sought after even now. This makes the 7010 ideal for anyone wanting to get onto two metres using these modes but without having to spend a fortune. In fact, they are frequently seen advertised for prices as low as seventy or eighty pounds. At this sort of price they are a very good buy, and they can be put to good use either in car or base stations like many of today's multimodes.

### The circuit

The structure of the 7010 is fairly straightforward. It uses a single conversion with the local oscillator provided by a crystal mixer synthesizer and an IF of 10.7MHz. The output from the transceiver is made very clean by the use of balanced mixers throughout, coupled with the liberal use of filters to ensure that any undesired outputs are adequately attenuated. Another reason for the clean output is that a crystal mixer or direct form of frequency synthesizer is used.

A crystal oscillator is many orders of magnitude better than a phase locked loop or indirect synthesizer in terms of phase noise. In the receiver this means that strong signals on nearby channels do not mix with the oscillator phase noise to produce in-band splatter. Similarly, the transmitter output will be much cleaner and will cause less annoyance to locals.

### Receiver

Looking more closely at the receiver, the signal first passes through a filter before passing through the antenna switch in to the RF amplifier which consists of a 3SK4 FET. It is again filtered and then mixed directly down to the 10.7MHz IF, when it is filtered by various LC tuned circuits and a crystal filter as well as being amplified. Finally, the signal is mixed with the output of the carrier oscillator to produce the audio, which is amplified and passed to the loudspeaker.

In the transmitter section, the audio from the microphone is converted into double sideband by mixing it with the output of the carrier oscillator in a double diode balanced mixer. This signal is then buffered, filtered to produce single sideband and buffered again before being mixed directly up to the final output frequency.

Following this mixer, there is a band-

pass mixer to catch any unwanted spurious outputs. The signal is then amplified in three stages before reaching the final amplifier, which is a single 2SC1242A. This transistor has a capability of 30 watts but is only run up to 20 watts input, giving it a large safety margin.

The description of the synthesizer has been left until last because it warrants looking at separately. It has been designed in a particularly cunning way using techniques which, despite not being in vogue these days, still work very well. It is based around the direct or mixer type of synthesizer technique and does not use the phase locked loops which all of today's rigs employ. A direct form of synthesizer does not have the flexibility of a PLL based one and it can be prone to unwanted harmonic or mixer products if it is not well filtered. However, it does have the advantage of a vastly superior phase noise performance and this can be particularly useful when there are strong local signals.

### Synthesizer

Essentially, the synthesizer is based around two oscillators: one operating at around 41MHz and the other at around 8MHz, as shown in *Figure 1*. The output from the 41MHz oscillator is multiplied and the third harmonic is taken. It can be seen from the figures in the diagram that these frequencies, when they are multiplied, vary by 5kHz (or very nearly). This 125MHz signal is then mixed with the 8MHz output to produce the required local oscillator frequency.

The main tuning switch is designed to switch the crystals in both of these oscillators in such a way that 5kHz steps can be obtained using a minimum number of crystals. In order to see how this is done, take the example where the tuning switch is in the '00' position. In this case the lowest frequency 41MHz crystal is selected, together with the lowest 8MHz crystal for whichever band is selected. When the tuning switch is turned to the '05' position only the 41MHz crystal is changed, so that a 5kHz frequency change is obtained. The same 8MHz crystal is used until the frequency is switched from '15' to '20', when the next 8MHz crystal is selected and the first 41MHz crystal is used again. This process is repeated until the top frequency in the band is selected.

The VXO and RIT functions are obtained by varying the frequencies of the two crystal oscillators. The VXO shifts the 8MHz oscillator whilst the RIT acts on the 41MHz one, but obviously not during transmit!

If an external VFO is used the switch on the back panel switches off the 8MHz oscillator and enables the lowest 41MHz crystal. This means that the main tuning switch and VXO are disabled but the RIT still remains functional. In order to obtain the full 144 to 145MHz frequency coverage the VFO has to tune 8.2 to 9.2MHz and, although there are not many VFOs that cover this range, the one made for the TS700 can be used provided that a suitable lead is made up. Alternatively, one could be built but calibrating it to the

required accuracy may present a small problem.

The front panel is neat and uncluttered by today's standards. All the controls are fairly easy to use, although it is obvious that the trend to smaller controls had started when this unit was designed.

### The controls

The main control is, of course, the main tuning switch which selects the frequency in 5kHz steps from 00 to 95kHz. These two digits are, in fact, displayed on the dial together with four extra positions marked A, B, C and D, which are used for the additional channels determined by two extra crystals which can be added. Normally crystals are added which give coverage from 144.300 to 144.335. However, it is an easy matter to change them.

The band switch is located in the top right-hand corner of the front panel. This selects the required band, either 144.1 or 144.2MHz, and when it is used with the main control it gives the complete frequency readout.

The two sets of controls at the bottom of the panel and to the left of the tuning control contain two sets of concentric controls. These are for the receiver incremental tuning, VXO tuning, RF gain and AF gain. They are arranged in what may seem to be a rather odd way. The left-hand control contains the RIT and the AF gain with on/off switch, whilst the right-hand control contains the RF gain and VXO tuning. The VXO tuning gives changes to the frequency by slightly more than  $\pm 2.5\text{kHz}$ , so this means that continuous tuning over the whole range is possible. The RIT control also gives about the same amount of tuning, and this is quite enough to cope with all but the most extreme cases of bad netting!

Above the gain and tuning controls there are three switches. They are used to switch between SSB and CW, switch the noise blander in or out and enable or disable the RIT.

The final component on the front panel is the meter. This is used to give an indication of the RF power output on transmit and the S-meter on receive. The output power indication was found to be quite useful, especially to ensure that one was speaking close enough to the microphone and so forth. However, the S-meter, like most others, is somewhat inaccurate, but it does serve as a useful indication of relative levels.

Turning to the back panel there is a combination of six connectors and switches. The most obvious one of these is, of course, the aerial, which is a standard UHF or SO239 type connector. The other important one is for the power and there is a suitable lead with connector and in-line fuse supplied with the rig.

There is also a B9A type socket which is intended primarily for connection to an external VFO. This is particularly useful as it carries the PTT line, which can be used for switching external linears or pre-amps.

In addition to all of these connectors there are two miniature jack sockets. One of these is located next to the aerial socket and is used for a Morse key, and the other is used for an external speaker.

Finally, there is a small sliding switch. This is used to switch between the external VFO and internal 'synthesizer' and for normal operation it should be set in the 'down' position.

### On the air

The little 7010 performed admirably. It obviously does not have the voice of someone with a linear or the ears of someone with a muTek front end, but it is quite adequate to work some reasonable DX. On the whole it gave a very good account of itself.

On the receiver side the sensitivity can be improved by adding a suitable preamplifier. Ideally, it should be possible to switch the pre-amp in or out to prevent overloading the front end.

Having said this, it did prove to be very resilient to overload. The other factor which was particularly noticeable was its immunity to reciprocal mixing, due to the very low phase noise characteristics of the synthesizer. This was often demonstrated by the fact that one very strong local whose rig was also not synthesized could operate within a few kilohertz without causing undue problems.

On the negative side it must be said that the tuning does leave a little to be desired. Tuning up and down the band really required the use of both the main tuning switch and the VXO control. However, one can grow to live with it or if not an external VFO. If really necessary, a synthesizer could be used.

The transmitter also gave very good results. Reports always noted that the audio was quite punchy without being distorted. As well as this, the signal showed no signs of splatter. Even locals who would expect the signal to be wide in view of the strength were surprised by its quality.

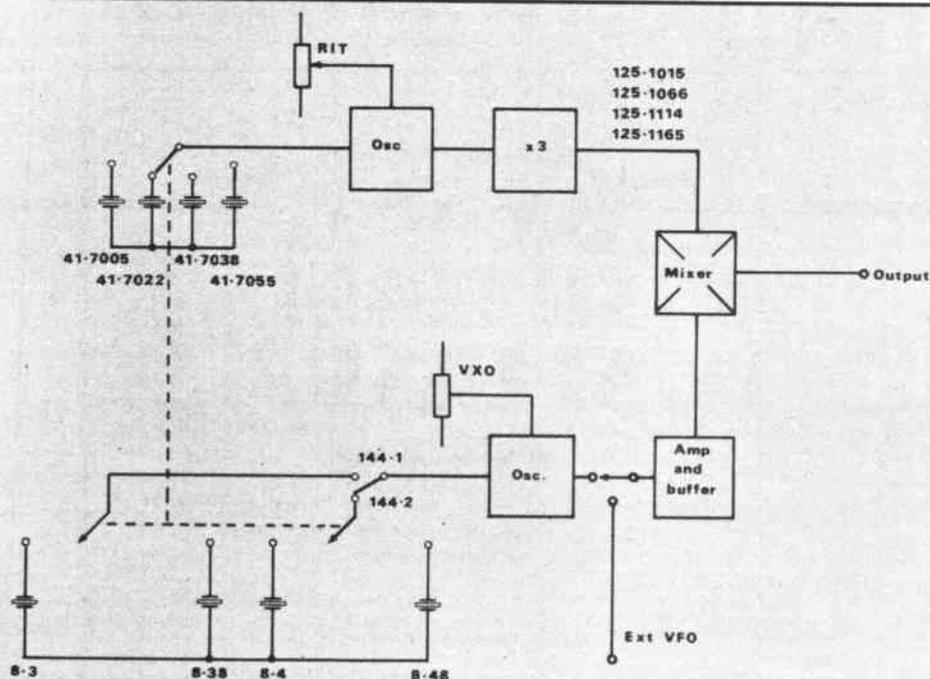
Turning to CW, the signal was again very clean. There was no sign of any chirp and key clicks, which many rigs seem to have these days, were well suppressed.

Finally, the proof of the pudding must be in the eating. This little rig with no pre-amp or linear and just an indoor dipole or halo has heard stations as far away as Spain and Germany and worked around the UK, across the channel and half-way down France.

### Conclusion

This little rig is obviously not state of the art now, but it still has many features which strongly commend it. The conservatively rated PA, the use of balanced mixers and the liberal inclusion of filters all contribute to its good design. It must represent an excellent buy for anyone wanting to get onto two metres SSB or CW, and it is certainly in another league to the notorious Tiner 2. For seventy or eighty pounds who can go wrong?

Fig 1 Block diagram of TR7010 synthesizer



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# David Lazell opens an unsolved mystery or two **THEY HAD UNCANNY RADIO**

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You can make many friends among the older amateur radio magazines—and I do not refer merely to those dusty chums who flip through those *Wireless Constructor* monthlies from the 1930s. Some time ago FRENEX, the ever readable monthly from NASWA (North American Short Wave Association), revived interest in the legendary Charlie Loudenboomer, whose adventures appeared from an anonymous pen a decade or two ago.

Loudenboomer was eager to share the secrets of short wave (since *he* knew all about it, and *you* didn't). Indeed, after his disappearance from the pages of FRENEX, it was assumed that he was now getting NASWA organised, or producing a master plan for giving all American CB users an instant college education!

I think I caught sight of the check-trousered Loudenboomer in a well-known amateur radio emporium not far from London. He was eager to be photographed with the proprietor and this would have been readily done, had

Loudenboomer not insisted on wearing his T-shirt emblazoned with 'Loudenboomer Knows Best'. British radio amateurs are properly modest you know.

This light relief in the pages of FRENEX was anticipated by the British periodicals. In the 1930s, that excellent monthly, *The Wireless Constructor*, contained features about Professor Goop and his friends, who tackled everything from water-driven radiograms to 'sideband splash'. It should be noted that sideband splash was a real enough problem, discussed as earnestly as the more recently discovered 'Russian Woodpecker'. Professor Goop suggested that as the Continental Europeans used guttural languages, some sideband splash was to be expected.

But the 1930s, like the 1980s, were full of mysteries reported by and to the dedicated amateur.

#### Uncanny voices

Bedside teamakers and electric clock/radios have an occasional inclination to

pick up CB, and I heard of one alarmed lady who fell out of bed after getting a quick bout of cussing from her model. But, as *The Wireless Constructor* magazine enquired in October 1933, 'have you ever known a street lamp to burst into song?' The journal reported that 'a lamp in one of London's main streets caused a sensation by suddenly reproducing a London BBC radio programme'. Maybe it was *The Light Programme*, since the classical music you hear on Radio 3 only comes through on Georgian sideboards...

The street lamp, by the way, was a tall, elegant, metal, two-bowl model. All you would get from the ghastly grey concrete pillar-type lamp posts today would be a distant DX from someone eager to 'cement' international friendship!

Experts on the subject of radio waves tell many tall tales. J C Jevons, writing in the radio magazine already mentioned, must have anticipated the Club Bore we all know and love: 'One should discount some statements', he said, 'as in the

THE WIRELESS CONSTRUCTOR

May, 1933



*Although a receiver may be sufficiently selective to separate two broadcasting stations working in adjacent channels, interference in the form of unintelligible "spitting" noises may still occur. In this article our contributor lucidly explains the reasons for this irritating trouble.*

*In 1933 The Wireless Constructor reported on the mysterious problem of 'sideband splash'*

# UNCANNY RADIO

case, for instance, of a correspondent who claimed that he was the perfect 'human aerial', and could tune himself to all the BBC stations and hear the programmes distinctly without even requiring a pair of headphones, to say nothing of crystals, valves or other impediments'. Obviously, he was born with a silver SWR meter in his mouth.

Mr Jevons, an acknowledged authority, had other phenomena in mind. Take this report, entitled *Music on Tap*. 'Many other instances of phantom speech and music have been recorded from time to time. In one case, turning on a water tap was sufficient to reproduce the local broadcast programme at quite considerable strength. If the programme was not up to the mark, one could dry it up, quite literally, by turning off the tap'.

To avoid an outbreak of migraine among the hobbyists, some explanation was provided: 'The water pipe no doubt served to collect the radiated energy, and the flow of water may have acted as a loudspeaker. Pulsating air speakers are actually in use for handling heavy volume - more or less on the principle of the siren - and a variable gush of water might easily act in the same way. But exactly how the HF currents were rectified, or how they acted to vary the pressure of

the water coming from the tap so as to produce sound waves, are mysteries still waiting to be solved.

'The radiator of a hot water (central heating) system has also been used to reproduce a broadcast programme. In fact, whenever one has a metallic conductor which can act as a pick-up, a high resistance contact between different substances to act as a detector (ie a tuner) and some free-moving part to play the role of a diaphragm, it is always possible that the combination may function after the fashion of a wireless (radio) receiver'.

So, if the missus wants central heating and you want to spend the money on radio gear, cheer up; you might both get your wishes. The moral here: choose a plumber who promises instant DX communication on the back boiler.

*The Wireless Constructor* was a serious enough journal, with frequent features for short wave listeners. But radio mysteries seemed to have a fascination at the editorial offices in Fleetway House, London. Mystery just might be the inability to keep up with progress - an aspect of life we all experience. Well, it's a thought.

J C Jevons recalled that in the early days of the First World War, 'an Irish

operator, who was keeping watch for the usual Morse signals, got the fright of his life when, for the first time, he heard his headphones suddenly break out with harsh speech. It came, in fact, from an aeroplane telephony set overhead. But from the operator's yelp of amazement, he had evidently formed the opinion that it came straight from the nether regions'.

In this case, 'nether regions' does not refer to the cellars of a local hostelry, wherein some very enthusiastic radio hams get into Civil Defence training.

These merrier aspects of an important hobby add a worthy perspective. We should never take ourselves too seriously, whether we are economists or just plain amateurs. As Professor Goop and the worthies of the Mudbury Wallow Club argue about pseudo-brimbulation, we may be grateful for something. At least Charlie Loudenboomer was not around to explain how it's really done. . .

May, 1933

THE WIRELESS CONSTRUCTOR

## IN LIGHTER VEIN "Q.P.P." EXPLAINED

**W**HAT," inquired the Professor, "is your opinion of Q.P.P.?"

"Q.P.P.," I mused. "Let me see. H.V.P., R.P.P., S.P.Q.R. . . Somehow it did not seem to strike a responsive chord in that fine brain of mine. However, we Wayfarers are never at a loss, and I gave on to the reader free gratis and for nothing a little tip which I have found of inestimable value in the course of a long and, though I say it myself, successful career."

**Staving Off Disaster**

Provided that the other fellow knows the answer to the question that he is asking, you can always stave off disaster by making him furnish it himself if only you go the right way about it. Remember that he is an opinion ruler burning not to bear your opinion, but to impart information himself.

"Don't you rather hate these strings of initials and things?" I said. "I always wonder whose full name?"

"Oh, well, Quiescent Push-Pull, if you prefer it," smiled the Professor. "There you are, you see."

**DIFFICULT TO HIDE**

"Even here pockets don't conceal their . . ."

And here's another tip. Directly a fellow starts asking questions on a subject which is not one of your best, carry the war into the enemy's camp by asking some yourself.

"Before we can criticise," I remarked, "the best thing is to know exactly what are the claims made for it. Now suppose that you just enumerate these."

"Why," said the Professor, "it enables battery sets to produce twice the power without any more high-tension current."

"That," I murmured, "shows at

wayside adventures to obtain information concerning Q.P.P. from Professor Goop, who doesn't find the explanation a very easy task. As a result, Mrs. Goop is twice called in to render first-aid and the Goop ladies suffer in consequence. So take Wayfarer's tip, and don't ask your pal "how it works."

over how it got its name. In electricity and wireless names usually go by opposites. A 'condenser' is so called because it doesn't condense; a 'microphone' because micro stands for a millionth, and it is obviously the for a millionth of a phone; and 'earth' because it is usually a gasp; and the books show that current flows from positive to negative because it really flows from negative to positive. Hence, when a circuit makes more noise they call it quiescent. Jolly good!"

**Something to be Desired**

"Don't let's waste time over mere words," snapped the Professor. "There are, of course, two entirely different kinds of quiescent push-pull, different kinds of quiescent, or Q.P.P., as I shall call it, despite your objection. With ordinary Q.P.P. a very high negative bias is employed. The second kind calls for no grid bias at all on the output valve, and is named Class B."

"Class B seems familiar somehow," said I. "Quite reminds me of the old days when we built six-valves with general purpose valves throughout and didn't know what grid bias was. We got volume enough to rattle up our old horn loudspeakers, but though I should hate to be hypercritical, the quality always seemed to me to leave something to be desired."

**When He's Not Looking**

"This is quite different. Just think for a moment. What happens if you don't bias your output valve, or rather, I should say, you give it zero grid bias?"

"That's an easy one. The valve becomes second-hand in about two

ticks and you have all the leather of sticking it into Goshington-Crump's set, and taking his in exchange when he isn't looking. Then the high-tension battery gets such a kick in the neck that it also requires replacement. And believe me or not, high-tension batteries are difficult things to swap without the owner's knowledge; heavy things to carry about, and even here pockets don't conceal them. So, I am all against zero grid bias on the last valve."

**THE OLD DAYS**

"He got enough volume to rattle up our old horn loudspeakers."

"But this," said the Professor, "is quite different. You see, there are special valves made for the purpose. You see, at zero grid volts they pass hardly any current at all."

**Out for a Walk**

"I know all about that. I made one myself the other day. It was lent to me by Puddley whilst we were out for a walk. I don't mean that we were walking together. He had gone out into the country and my certain extremely interesting experience might have gone a lot better if I hadn't discovered that the grid-bias wander plug had come out of its socket, that valve was doing just what you've said. I believe Puddley is still having an interesting correspondence with the makers."

"No, no," sighed the Professor. "These valves are definitely designed to pass hardly any current under the conditions that I have outlined. I am not referring to perfectly good valves of other types wrecked by your mishandling."

"By my WHAT?"

"Mishandling was the operative word."

Professor Goop advises . . .

H.F. INTER-VALVE COUPLINGS

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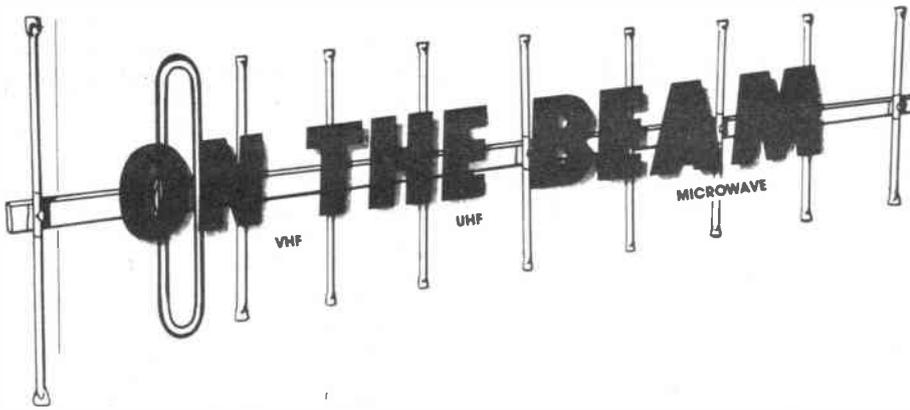
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## News and comment from Glen Ross G8MWR

### Happy birthday

December 12th was the twenty-fifth anniversary of amateur satellite communication. On that day in 1963 Oscar 1 was launched and many amateurs heard its cheerful 'HI' message come down in Morse. No actual communication was possible because it did not carry a transponder, but it certainly initiated new ideas on what future operating might be like.

Twenty-five years later the idea of satellite communication does not seem to have caught on to any large extent. Many people have played with them, but have become discouraged and left the scene.

### Why?

Possibly the main deterrent for the ordinary operator is the necessity to always keep track of the position of satellites and when they are available. Then there is the drag of keeping up with non-operational days, QRP only days and finally deciding which mode they are in and what the correct up and downlink frequencies are. Other problems include finding out where they come over the horizon, where the path is going to be, the angle in the vertical direction that it is going to be at and then keeping your aerial swinging to get all this lot up together.

### Marketing

If you were trying to promote a product to the public (in our case read 'radio amateurs' for 'public') and you were to put all those obstacles in the way, you would not be surprised if you had little success; yet this is just what the Oscar programme has done. Let us not be hard on the people behind the programme; they are having to learn the tricks of the trade as they go along and it is not easy. Nothing but praise should go to them for what they have achieved. The point is that if you have lost your orbital calendar or have never had one, then you are operating in the dark.

### Permanent parameters

Geostationary units are what is really required, so that you can be sure that when you swing your aerial in the right direction you are then going to be able to get contacts. One objection to this is that the satellite will only cover one third of the Earth's surface area and this has always been seen as a problem. But is it?

### Majority interest

It may be so from the fund raising aspect of the job, but surely if the satellite was well placed to cover the majority of interested amateurs, and this probably means the USA and Europe as a starter, then surely the funds would be forthcoming? Perhaps from those who at the moment have no interest because of the costs involved?

### Orbiting

If this is not considered possible, then how about a unit that circles the globe in a regular number of hours, say two or three, and always covers the same track? This could be calculated to give coverage to the greatest number of operators, and the advantage would be that although the unit would only be available for perhaps half an hour at a time you would at least know that at your QTH it would come up at the same times every day on the same bearings. Perhaps this is not possible because of problems that I am not aware of? If so, perhaps someone from AMSAT would care to let me know their views on the subject?

### Negative attitude?

What is certain is that until some semblance of common sense and regular, easy operating becomes available then Joe Operator is not going to make much use of all the effort that is put into the programme. As a last word on the subject, perhaps AMSAT does not want too many people operating because of all the problems with interference and overloading that might be caused? There's a thought!

### Common licence

Some more news has come to hand about the new CEPT or international style licence, with the news that the DTI has come to an informal arrangement with the German officials. The latter will now accept a letter of authority from the DTI to allow operation in Germany. Any such operation must be within the terms of the German licence structure. We have previously mentioned the Norwegians' new reciprocal scheme that also comes close to the CEPT concept, and both advances are welcome news.

### Back on again

The good news about Oscar 10 is that there is some life left yet. The activity is only on mode B and AMSAT insist that only QRP operation should be undertaken. You can tell if it is in action, as when the transponder is on the beacon is switched off to conserve power. To even things up a bit, Oscar 12 was switched off for a few days to allow the batteries to recharge. Just a few more hazards to add to the list given earlier and deter a few more users.

### From the top

During the past year I have made several comments about the way that the RSGB was running the new Morse testing system, and this has brought a response from Keith Townsend G4PZA, the society's senior news and information officer. His letter is of great interest as it places a different angle on the whole affair, and because of this I intend to quote fairly extensively from it.

He states that the RSGB took over the responsibility for the test on 1st April 1986 and that since that time more than 200 examiners have been appointed. Each of them, of course, had to be tested for suitability for the job, which in itself was a time consuming process. These examiners have set up a total of 133 different testing centres around the country and they are also able to make special visits to radio clubs and the like to administer tests. Another aspect of the work is that special test facilities can be made available for disabled people who take the test.

### The results

Up until early November the examiners had administered 1,198 tests at the various centres and the pass rate was 65%. Keith states that this figure is almost exactly equal to the pass rate when the tests were run by British Telecom during recent years. An interesting point is that since April the test centres could have coped with an additional 1,063 candidates, but these places were not taken up.

The next section of his letter covers many interesting points, and I quote: 'It is, of course, inevitable that the number of successful candidates will vary, dependent upon the ability of the individual applicants, but in our experience examiners invariably offer the benefit of any doubt to the candidate, taking into account the likelihood of 'exam nerves'.

He goes on to say: 'It should be

remembered that each test is conducted by two examiners, thus achieving a balance of opinion as to each candidate's proficiency... some groups show a higher pass rate than others... it has been known for a whole group to pass... Conversely we have known... every candidate within a group to fail'. He finishes by saying that it is the RSGB's policy to send out application forms for Morse tests by second class post on the day they are received.

## Information

Keith has certainly given us something to go on and it is a great pity that similar feedback has not been forthcoming on some of the comments we have made on other subjects recently. What he does not explain, however, is why so many people who have tried the system have become less than happy about it all.

A common complaint is that it can take anything up to eight weeks to get an application form. That does not tie up with Keith's statement about sending them by return of post. One can accept that there will occasionally be delays, but the incidence of complaints is really rather high for that to be a satisfactory answer. Never mind, let us not carp about it, but rather hope that with the initial bugs now ironed out things will go from strength to strength. Thank you Keith for your interest.

## 50MHz

Looking back over the year, the general level of activity has been extremely low, but at least there is news of the possibility of more activity from Norway from 1st January 1987. The stations will operate on a similar system to our old permits but with a power level of 25 watts. There will be two small areas of the country where no operation will be permitted but the signs are all looking good.

## General release

Also looking good is the possibility of a general release of the band to UK operators. The first year of use will soon be up and that will be followed by a review of any interference problems. As I recently reported, these are virtually non-existent and so things seem to be in our favour.

There have been a few unexpected openings to the States this year and as we leave the sunspot minimum behind (sounds like the HF column!) things should get more exciting for us. Even if you can't operate on the band, a receive converter and a simple dipole could provide some interesting listening.

## VHF listeners

I get very few reports from VHF listeners and this also seems to be true of our SWL column. This seems strange,

because the listener can often get more fun out of an opening than his licensed brothers. While they are sitting patiently in a pile-up, he has logged the station and moved on to see what else he can find. One listener has written to ask if our VHF awards are available to listeners and the answer is that they are.

## When I were a lad . . .

Back in the 1950s there was a VHF listeners' society organised by *Short Wave Magazine*, such was the interest then in this side of the hobby. I was member 24 and still have my original certificate, dated September 1949. I wonder how many of those early members are still around? I know of only two others who, like myself, are now licensed and I wonder if there are any who are still active as listeners? Write and let me know.

## Sign off

Do not forget that I am still hoping to hear your views on the subject of novice licensing in the UK and would also like to hear from you on the subject of the Morse tests. Keep all your information and comments coming to me at 81 Ringwood Highway, Coventry or on Prestel 203616941. You may not actually get mentioned in the column but your views and input help to shape the contents.

**NEXT MONTH**

# Amateur RADIO

## all the regulars. . .

DX Diary  
On the Beam  
Secondhand  
SWL  
Straight and Level  
Your letters and  
features covering  
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Amateur Radio

## ■ ANGUS MCKENZIE TESTS

A comprehensive review of the FT23 2m hand-held from Yaesu plus Icom's AT50 HF fully automatic ATU

## ■ KITS FOR QRP

Ian Poole constructs the MTX20 transmitter and CVF20 VFO kits from C M Howes

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# SECONDHAND EQUIPMENT GUIDE

by Hugh Allison G3XSE

I had an interesting letter from an understandably confused reader the other day. The (as yet) unlicensed enthusiast had visited his local club junk sale and had seen Pye Reporters going for fifty pence a time, one of which he had bought. He had then seen adverts for Pye Reporters at £50 a go and was asking about the 100 to 1 difference in price.

The truth is that he hadn't bought the bargain of a lifetime. Old Reporters were heavy, many valved things, roughly the size and weight of a breeze block. You certainly wouldn't like to carry one down the pub with you. Although designed for mobile use, these transceivers really are not a lot of use these days. In fact, the only half decent thing in them is the aerial changeover relay, which is sort of useful up to 150MHz, just. The situation is, of course, further confused. The original Reporter had a vibrator power supply which was eventually replaced by an OC35 type transistor inverter. This was then called the transistorised Reporter, but remained full of valves.

The £50 Reporter that the reader had seen advertised was probably an *all* transistor rig, and very fine they are, too. You can tell the difference at a glance; the new one is the size of a library book. Nearly all the secondhand versions of these that I have seen on the amateur market have been single channel, although multi-channel versions have been produced.

Given that the transmitter doesn't give out a lot of poke (5 or 6 watts out – if you've got more it might be hooting) and they are expensive for a single channel box, what is the attraction? The answer is the receiver: bomb proof for adjacent channel, and selective, but it is the sensitivity that is mind blowing.  $0.2\mu\text{V}$  pd and well over 12dB signal noise is easy to achieve. Couple that with good AM rejection (on the FM variant), so there are few ignition noise troubles, and you have a marvellous repeater box for use in the car.

## Icom IC215

There seem to be a lot of these portable rigs of the mid 70s coming onto the secondhand market of late, yet a year or two ago they were a real rarity. For those not in the know, these were 15 channel, crystal controlled, two crystals per channel, three watt two metre FM transceivers. When originally offered for sale these were in competition with the 2200GX from Trio, and an interesting fight it was too. All the examples of the 215 that I came across would lose points

to Trio in sensitivity terms – the Icom wanting typically a microvolt pd for 15dB signal noise, whereas the Trio was much better, but the Icom won on power out, 3 watts, and battery endurance, due to it having U11 type batteries fitted.

The Icom is certainly strongly built, with an aluminium die-cast frame that shrugs off hard knocks (indeed, I've never come across a physically damaged one, come to think of it). There is an LED that goes out just prior to the batteries giving up and a switchable dial lamp, for what it's worth.

You've got high and low power plus a built-in toneburst, and I quite like the fairly punchy, crisp audio the Tx gives out. £45 seems fair for an example in reasonable nick with a few channels (four or five) and ordinary batteries. The most expensive one I've seen change hands was £65 and that had NiCads, charger and all 15 channels.

## STE Milan VHF equipment

I've come across quite a few people dithering over these products at rallies. The gear in question was an interesting mixture of good and bad. First, the good. The ARAC102 receiver covered both 28 to 30 and 144 to 146MHz by continuous tuning. Costing exactly a ton in the mid 70s, you got an AM, FM, SSB receiver, with S-meter. It is a good investment for a SWL these days at about £30 secondhand. If you have an HF Rx of the HRO or AR88 vintage you will probably be quite pleasantly surprised at the ARAC's performance on 10, and the two metre performance is adequate too.

The company's crystal controlled transceiver was the AK20. These didn't sell too well, probably more a reflection of their high price new than any indication of their performance. I quite like them; the few that have come my way have been reliable and worked well. Incidentally, all STE's gear is easy to work on, no hidden corners you can't get a soldering iron into, etc. The AK20 seems to sell for about £30 to £40 secondhand. I've seen too few change hands to be more specific. Be warned, the AK20 was available ready built or as a kit so inter-board wiring may be dodgy.

The 'bad' one of the range is the ATAL228 transmitter. This was the companion to the ARAC102 above. Stable and 10 watts of AM or FM sounds OK, but the reason for their frequent appearance at rallies is that the transmitter is continuously tunable. The dial indications look accurate, and to an extent they are. You could reasonably expect to get

within 5kHz of where you want to be, but this can cause problems. A lot of repeaters will reject you at that sort of offset, and whilst your mate across town will probably hear you and 'guide you in' after your initial call on a simplex channel, you really are a bit stuck for making 'blind' transmissions. Obviously, if you wish to go back to someone who has already transmitted then you can net on them and away you go. Great for CW through the two in, ten out satellites. Expect to pay £35 for a good 'un.

STE also sold a fair range of 'bare' PCBs, ie boards fully built up with components but no cases. A surprising number of these keep surfacing, often unused, at bargain prices. I recently bought an unused AR10 board for a fiver, which was a magnificent MosFET 38/30MHz fully tunable AM/SSB double conversion superhet. Other boards frequently seen are the AT222, which is roughly a 1 watt bare board version of the ATAL228 transmitter above, with the same (or worse, depending on your mechanical skills) netting accuracy trouble, and the AT23 which is a 12 channel FM 3 watt Tx, quite good, with excellent audio sensitivity. All the 'bare' boards are extremely well made.

STE also sold an ARAC107, which was a 430 to 440MHz receiver. These are as rare as scuba divers with umbrellas, which is a shame since they were all mode and quite sensitive. If you see one for under £45 and you want it, grab it.

Occasionally, I see an ARAC102 plus ATAL228 plus ASP154 (matching PSU) transceiver set up for sale, often in the £60 to £70 range. The frequency setting accuracy problem is a bit compounded here since the receiver might be 5kHz off, and so might the Tx. OK, you can net one to the other, but you can never be sure you are on channel. Only AM (if you're brave), FM or CW, but again, great for the satellites since you have the built-in 10 metre Rx on hand.

## Early Commodore Pets

A few months ago I mentioned my bargain £2 Pet computer. A couple of readers have since mentioned the exploding keyboard problem and asked if I had any solution.

What happens is that you may be innocently typing away on the funny pink and blue mini keyboard that these machines had, when 'ping' – a keyboard top whizzes off, often getting you in the eye, and the thin, inch long spring disappears. Having dragged the carpet with a magnet to find the spring again,





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## FOR SALE

■ Hallicrafters SX24 Rx, Eddystone 640S Rx, PCR1/2 Rx, all in working order. No reasonable offer refused, or exchange for a more modern receiver. H V Overy, 8 Albertus Drive, Hayle, Cornwall TR27 4QY. Tel: (0736) 754097 after 18.00 please

■ SX200 scanning receiver with instruction manual and power supply unit. Good condition, boxed, £150. Tel: (0392) 214007 after 6pm

■ Yaesu FT290R, 2 metre, all mode, £200 ono. Tel: (0406) 25333

■ Collins TCS12 Tx, with H/B PSU, in working condx, with circuit diagrams, £30. Trio 2300 2m FM, with NiCads charger and 15W PA, boxed, £110. Yaesu FC700 ATU (suitable for FT707, FT77, FT757, etc) with pp meter, boxed and good condx, £80. Tel: Mick, Mansfield (0623) 811681

■ Swap 25 domestic valve radios, some wood cases, some plastic, for Racal RA17 receiver or collection of unused boxed valves, or will sell. Tel: Horringer 441 (Suffolk)

■ Four service manuals for Tandy scanners: PRO30, PRO31, PRO32, PRO2021 and Thandar TC200 freq counter, £5 + postage for photo copy. I want a copy of h/port Motorola MT700 please. I also have many UK freq's in thousands of lists now in book form. Ring for any of above. Tel: (0473) 85526 anytime

■ FT790 multi-mode for 70cm, NiCads, charger and half wave flexi whip. Mint condition, £250. Tonna for 70cm, 21 elements, £10. 80 metre direct conversion Rx, £5. Offers on part built 23cm transverter. Tel: Andrew (0305) 62238

■ FDK M700EX 25W 2m FM tcvr. 1 to 25W variable, mobile mounting bracket, as new, £110. Tono MR150 2m linear, 130W out 10W in, £75. G3MEW QTHR. Tel: Portsmouth (0705) 820315

■ Trio TR2500 h/held with dc-dc converter, £150 or exchange for VHF/UHF scanner or portable Sony HF receiver, ICF7600 or 2001. Write please, no phone. J Young, 22 Hallmeadow Place, Annan DG12 6BZ

■ 8-track player, Teleton model STP812, 240V mains, stereo with two speakers and approx 20 x 8-track cartridges, £16 plus p&p. Home computer course and advanced computer course, 120 issues complete in 10 binders, offers. Radio Comm h-book vols 1&2 1978, and Radio Amateurs h-book 1982. All hard covers. £7.50 plus p&p. Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London W12 7BL

■ Icom IC25E 2 metre mobile Tx/Rx, 5/8 whip antenna, magnetic mount, £200. G4HHR QTHR. Tel: Andy (0293) 885137

■ Sommerkamp FT902DM HF tcvr, all new bands, dc-dc converter and cord fan, £550 ono. G0BGY QTHR. Tel: 01-942 7094

■ TS530S with CW filter fitted, 230 ATU, 230 speaker with filters, remote VFO, dummy load, 5 band vertical antenna, mike etc, mint condition, little used, £500 or exchange 2mtr station. Tel: Jeff (0484) 645923

■ Icom 720A HF 100W Rx/Tx, 0-30MHz, £550. IC5M5, £25. 934MHz Deltai 40ch, £295. Co-linear, £20. Twin/beam, £25. Rotator, £30. Pre-amp, £65. 27MHz silver rod, £12. SWR/pwr meter, £10. 7 amp PSU, £20. 3 amp, £12. Tel: (021) 476 6121 after 6pm

■ TET HB433DX three element, four band beam for 10, 15, 20, 40 meters, HF, £175 ovno. Tel: Bromsgrove 79636

■ Yaesu FT290R 2m all mode transceiver, fitted muTek board, including battery charger, batteries, carry case and strap, rubber antenna, mobile mount and Sliim Jim home base antenna, £265 ono. J A Bagshaw, 14 Saxelby Gardens, Bulwell, Nottingham NG6 8JZ. Tel: (0602) 275945

■ Yaesu FRG7 comms rcvr, 500kHz to 30MHz, good condition with manual, carriage extra, local buyer collect, £100 ono. Yaesu FRG7700M comms

rcvr, 500kHz to 30MHz, with Yaesu FRV7700 converter and FRT7700 antenna tuner, excellent condition with manuals, £350. Tel: Pete (0223) 61861 evenings

■ Trio TS530SP transceiver, as new, current model, £595. National HRO-M, 9 coils, power, v clean, £75. Hallicrafter S72, mains/battery, 8 valves, £50. Echophone commercial 500kHz/30MHz, £45. 1934 McMichael 135, mains, £35. Ferranti UNA 1934 battery set, £25. 1938 GEC, mains, £18. 1929 Rolls-Caydon suitcase portable, £35. 1928 Marconi portable, £20. Large collection early radios for disposal or exchange. Want early wireless, crystal sets. Also want TS930 for cash. Jim Taylor G4ERU, 5 Luther Road, Winton, Bournemouth. Tel: (0202) 510400

■ Yaesu FT-One superb all-band HF multi-mode tcvr, all options fitted, except auto-keyer, complete with MD1 base scanning mike, offers around £1,250. Jerry G4NYC. Tel: (0529) 21327 after 9.30pm

■ Icom R7000, mint, boxed, manual, £790 or would exchange for Icom R71. Mr A C Burge, 657 Lisburn Road, Belfast BT9 7GT

■ FRG7 Rx, LED freq readout, Burns FM mod fitted, better quality, SSB filter fitted, pristine cond, complete with manual, £160 ono. Tel: (0623) 552912, Mansfield, Notts

■ Yaesu FT101EE, excellent condition, complete with manual, leads and microphone, £275. Tel: (0264) 64404

■ Realistic PRO2021 programmable AM/FM scanner, 68/88, 108/136, 138/174, 380/512MHz, hardly used, in mint condition, £175 or px for good HF transceiver. Tel: (0925) 821414 after 6pm

■ Yaesu FT107S HF SSB/CW/FSK/AM tcvr, a rare opportunity to obtain the 10W version of this excellent solid-state rig, £345. Wanted: TS700 or FT221, etc, 2m multi plus linear. Neil G4SEN. Tel: (0260) 275192 (Congleton, Cheshire)

■ Yaesu FRG9600 VHF/UHF all mode scanning receiver, 60 to 950MHz, extended frequency coverage, only 6 months old, mint, boxed with operating manual, £385 carriage extra. Realistic PRO2002 50 channel VHF/UHF programmable scanner, 68-88MHz, 108-136MHz, 138-174MHz, 410-512MHz, good condition with operating manual, £150. National Panasonic communications receiver, model RF4800 (DR48), LW, MW and seven shortwave bands covering frequencies 1.6MHz to 27.3MHz, digital frequency display, FM, AM, CW & SSB modes, £125, carriage extra. Tel: Stourbridge 390335 evenings or weekends

■ HW7, £60. 10m FM rigs, require work, £15 each. Pye Pocketfone, 3 channels, with battery charger and spare battery, 144MHz crystals fitted. Also required 10m all mode Tx/Rx. G4RBP. Tel: (0705) 553551 for details

■ Scope Dynanco 71 with handbooks, £70. Avometer, £50. Weller temp controlled iron, £20. Oscillator Venner TSA625, £20. AVO valve data manual, £15. AVO valve characteristic meter handbook, £5. Solartron CD140D scope handbook, £15. Farnells stabilised PSU, R series, 10 amp variable voltage tapings, £40, 27 meg AM SSB 40ch, £20. Olivetti Golf Ball t/type spares/repair, £10. Tel: Fleet 629329

■ Trio R2000, mint condition, boxed, with manual, 100kHz-30MHz, £325 ovno. Securicor paid. Tel: Elgin (0343) 45478

■ One SR9 two metre receiver, £30. Wanted: one working antenna tuning unit, must be in good condition. Tel: Wood, Clochan 378

■ Yaesu FRG7 mint condition, little used, boxed and instructions, £130. Tel: 01-979 1229 evenings

■ SPC3000 super transmatch 3kW ATU with 10m conversion, 1-6 reduction drive and 2:1 balun. Tel: Rodney on Farnborough, Kent 58825

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■ ST5MC RTTY terminal, plus Creed 444 plinth, manual, paper and spare ribbons, £95. Bargain: FAX machine, Casio FAX 80, £40. DX-TV band III aerial, £10. John Hayward, 191 Allesley Old Road, Coventry CV5 8FL. Tel: (0203) 72253

■ DSB-2 transceiver for 160m. Fully built and tested, c/w digital display, £100 ono. Pye W15AM, crystallised 70.26, £30 ono. WPO Comms VHF minisynth, fully built, tested, all crystals, £45 ono. Ex-WD HF156 Tx/Rx, with antenna, handset and haversack, £40 ono. Pye Bantam high band FM, c/w mic and case, untested but complete, handbook available, £20. Redifon GR674 marine VHF, 24 channels, c/w antenna, £95. Delivery possible SE England or postage extra. Tel: Aldeby (Norfolk) 622 or G3VKM QTHR

■ Short wave general coverage receiver, digital readout, two speed tuning scan, nine freq memory, full coverage, 1.6110-29.999, 10 key direct access tuning, a quality rig, cost £500, accept £250. Complete with Microwave 2 metre converter, both boxed and in mint condition. First to see and hear will buy. Tel: (0262) 606184

■ Icom 290D 25W mobile multi-mode, vgc, an excellent 2m rig, £295. AOR2001 scanner, good condition, £195. Yaesu FT404R 6ch UHF hand-held, with speaker mike, leather carrier, mobile PSU, 15W PA with workshop manual, radio and s/p mic, new, £145. Will split last items. Mr C Mennan G6IHN. Tel: (095245) 2711

■ HRO National with eight coils, power supply, has built-in speaker, £45. Buyer to inspect and collect. Also Belcom LS102L all mode transceiver, has been professionally modified to include 11 metre and 2m bands, boxed, manual and mobile mount, £150, no offers. David Bragg, 2 The Croft, Fleetwood, Lancs FY7 8DY. Tel: (03917) 78395

■ Yaesu 290R multi-mode 2m tncr, mobile brkt, NiCads + charger, carry case, excellent condition, £250. Tel: (0285) 68368 (Glos)

■ Silent key sale. Yaesu FT707, used only on 11 metre band, £250. 3 element beam for 11m, £50. Trio R600 Rx with G5RV, £150. Superstar 2000 11m transceiver, £100. TVR5D TV DX receiver, £120. VHF Rx, £60. AVOMeter, offers? Bremi BRL200 11m linear, £90. Lowe wavemeter, £25. Homebrew 11m Tx/Rx CW, only £30. Z-match offers? SX200N VHF receiver, £150. Spectrum computer with VDU and RTTY program, offers? RSGB books, 5 for £10. Solid brass Morse key, £10. 70cms ATV Rx, £60.

Reftec 934MHz Tx/Rx, with beam antenna, £200. Nato 2000 11m Tx/Rx, £100. Frequency counter, C50, £25. Z-Superstar 360's for spares, £5 each. Ham Int Jumbo, 11m and 10m, £130. Frequency counter plugs into ham models, £30. Manuals for all Ham International 11 metre transceivers, £5 each. Cobra 148GTL-DX 11 metre transceiver, with manual, £100. Homebrew SSVT receiver, £40. Homebrew transverter, 11m-45m £15. 15 years assorted radio mags, £10. 60ft tower with winch, offers? Please apply to Frank Jones YD533. Tel: Cardiff (0222) 693102 Wales

■ C5800E VHF multi-mode transceiver, good performer, £200. VHF pre-amp, MM, free with C5800E. C7900E UHF FM mobile, little used, £125. Datong Morse keyboard model MK, £60. G3BYX. Des Dowson, 19 Dundee Street, Darlington, Co Durham. Tel: (0325) 58315

■ Kenpro KR400 rotator and control unit, new (only unpacked), £115 ovno. Jaybeam D15/23 23cms yagi, new (in packing), £39. SSB 13cms Rx/Tx and local oscillator unit, plus 4W linear, £315. EME 13cms 2C39BA/7289 25W linear (with valve), PSU card, new, unused, due to QTH being poor, £315. Tel: Paul G4XHF (0293) 515201

■ Trio 9R59DS, mint condition, £40. Tel: 01-850 7656 (Eltham)

■ TS520S HF trans, ex cond, very little use - on transmit 160 - 10, 100W output, c/w Shure 444 box manual, £375. FT480R 2m multi, or 10W GC listen on input etc, £250. Wanted: TS430S or FT757, also 10-2m transverters. Tel: Reading (0734) 596485 after 8.30pm or w/ends

■ Heathkit HW8, QRP transceiver, complete with headphones and comprehensive manual, vgc, no mods, YL owner unable to use due to lack of time, £85 ono. Buyer collects. Also, wanted by my OM: complete HF station, FT101ZD, TS430S or similar WHY? Cash waiting. G0AMF or G0AMH. Tel: Seaford (0323) 898515

■ 934MHz Delta One with 3 amp PSU, Nevada base collinear, two mobile antennas, all co-ax, £350. Tel: (023373) 2601 after 6.00pm

■ Yaesu FT7B mobile tcvr, mint condition and working order, c/w hand mic and original manual + box. Offers around £240 please. J Carter. Tel: Hull (0482) 641319

■ Yaesu FT221R, muTek front end, remote change over relay direct to front end, very very sensitive, receive winner of many contests. Shore 444 mike insert, adjustable SSB power output, £340 ono. John. Tel: Nottingham 398403

■ Scanner owners: I have many thousands of UK freq's from 25MHz to 14GHz in book form. Ring for index and details. Also I have 4 Tandy service manuals for PRO30, PRO31, PRO32, PRO2021 and Thandar TC200 freq counter, £5 + postage. For photo copy ring any time. I want a Motorola MT700 h/port circuit. Can you help? Tel: (0473) 85526

■ Trio 9R59DS general coverage receiver with bandspread amateur bands. First class condition. Complete with speaker and manual. Guaranteed for one year, £80. Tel: (0554) 771722 any evening after 10pm

■ Trio 9R59DS Rx. SEM Transmatch ATU. B/cast chassis, suit M/W DXer. 2 ext spkrs. 2 Morse keys. 5 sets headphones. Faulty radio tape player. Giant variable capacitor. Electric wall clock. Twin meter SWR bridge. £99 lot. Shack clearance. Buyer collects. Peter. Tel: (0642) 456327, Cleveland (days)

■ Complete 11 metre station for sale. Yaesu FT77 converted to 11m, Cobra 148GTL DX 11m Tx/Rx, Bremi linear 200W PEP, digital frequency counter, 3 element beam for 11 metre band, PSU 13.8V, £350 the lot. Will split. Also RTTY CW equip. Trio R2000 Rx. Offers? 45m crystal for FT101, £10. 11m crystal for FT101, £15. 2 years *Amateur Radio* and *Radcom* mags, £10. Please phone Richard. Tel: Llantrisant 869401

■ Yaesu FRG7 general coverage Rx, 0-30MHz, comes with Yaesu FRT7700 ATU, no mods, both in excellent condition, in original box with instructions, £150. Tel: Tonbridge (0732) 358446

■ Yaesu FT757GX HF transceiver with Yaesu FP757HD PSU, Yaesu FC757AT ATU, fist mic, Yaesu headphones and Iambic Morse key. Only one month's transmit use! All items as new and boxed with free Jaybeam VR3 tribander vertical antenna, £975 ono the lot. Steve G4WBT, 97 Redland Drive, Northampton NN2 8UG

■ Icom IC751 with FL70 filter, speech synth, CR64

high stability unit computer conn. Perfect, importer checked, £850. G3FPD QTHR. Tel: (0403) 723205

■ FDK multi 725X, 144-148MHz, good cond, £180 ono. Reason for sale - HF mobile. Tel: 01-247 6097 daytime only.

■ President Madison 11 metre base station, 80 channel, AM, FM, USB, LSB, digital clock and alarm, suitable for 10m conversion, matching extension speaker, £75 ono. Perfect condition. Crawsham, 51 Templeway, West Lydney, Glos. Graham G0ENF. Collect or plus postage. Tel: Dean 42917

■ Trio TS839S, immaculate condition, £650. Trio TR9130, boxed bracket, mic etc, £350. Can deliver 50 miles from Manchester. Tel: (0625) 527250 after 6pm

■ FDK700EX, 2m FM, 1-25W variable, mobile mount, h/book, PLL, 25-12½kHz scan and program, clean, boxed, little used, £140. Telequipment S54A, single beam scope, TV line, TV field, X1-X10 probe, circuit and instruction manual, £85. Cash only. Bert G6CTT QTHR. Tel: (0702) 348746

■ 'AVO' valve tester, many bases, d/manual, £60. Marconi sensitive valve voltmeter, no leads, £45. Advance signal generator, no leads, £45. Advance scope, OS12, leads, £50. Ac/dc. 9R59DE Rx, pwo, £50. Sharp CB4670 component mobile, 3 piece, £60. Concorde Tx/Rx, USB, LSB, AM, FM, ex adapt, £90. BRL200 linear, used once, £80. Trimphone used for modem, £25 only. Valves, modern, obsolete, tested, good order, 4 boxes full, £70 lot. Severely disabled person RAIBC, RSGB. Can deliver if in London area or exchange for FRG8800, R2000, RTTY. Contact Bob for address of Charles. Tel: 01-859 2649

■ Atlas 210X transceiver, 10m to 80m, with de luxe console and power supply, with external speaker and digital display. Owned since new, immaculate, £350. G2HJV QTHR. Tel: Leamington Spa 25395

■ BC221 mains charts manual, accurate, £20. Titan 12V high speed drill with stand, £15. Resio ribbon desk mike, £10. Admiralty Morse key, £25. Hayes, Great Pinnock Farm, Fowey, Cornwall PL23 1JZ. Tel: Fowey 3245

■ Trio TS130V, £345. FT290R with muTek NiCad charger, case, plus 25W linear, plus ¾ antenna, £320. CapCo SPC300 2kW ATU, £145. All in mint condition and little used. With free boxes of course. G4FPU QTHR. Tel: (0707) 320741

■ Sony ICF2001D receiver, 32 memories, synchronous tuning and detection etc, with mains adaptor, boxed, as new, with manual and accessories, £195, buyer collects. K Norton. Tel: 01-570 5603

■ Yaesu FT7 SSB/CW 10W mobile with bracket, good condition crystal required for 10 metres. Also linear amp, FL-110, 10-15-20-40-80-160 bands, 100 watts, vgc, manuals. Both items together, £275. Buyer collects or pays postage. Tel: 01-556 7759 Leyton, eves after 6pm

■ BSA Bantam 1954, with two spare engines, ideal for renovation. Swap for anything radio, no rubbish please. Mr Wright, 12 Norn Hill, Basingstoke, Hants RG21 2EP. Tel: (0256) 468649

■ Spectrum 48K with low profile keyboard. Kempson S printer interface. Sinclair printer (slight fault), with 2 rolls of paper. Some programs, including Tasword, Vu-Calc and Spectext, £75 ono. Ancient AVO, needs attention to battery compartment, £5. B/W 14 inch TV mains/12V, with lead £20 ono. BC348R Rx, with manual, mains powered, £25 ono. Would swap any or all for 2m accessories for recently re-licensed G8 following a serious illness. In particular Yaesu NC-2, charger a/c adaptor, or YM-24 speaker/microphone for a Yaesu FT207R. Purchasers must collect from South Staffordshire as seller is still not allowed to drive on medical grounds. Tel: Burton-on-Trent (0283) 790454 after 5pm

■ Trio R600 for sale, 9 months old, as new, excellent condition, many extras, cost £330 will sell £280 ono. Reason for selling - upgrading. Will arrange delivery if necessary. Tel: (0633) 853583

■ Trio TS780 dual band 2m, 70cm multimode trncvr, £680. Buyer arrange carriage. Elvin Bailey GM8BBA QTHR. Tel: (0698) 284861 weekdays

■ Realistic DX160 communication receiver, as new, boxed with speaker and manual, £65 ono. Tel: (0947) 604716

■ Scanners. Have thousands of interesting frequency allocations. Also many scanner and radio

mods, plus all sorts of bug circuits. For a list of what I've got send SAE to PO Box 71, Bourne-mouth, Dorset BF19 1DT

■ Hitachi stereo radio cassette recorder, large, portable, new and boxed, price £200. Swap for receiver, 0-3MHz, digital readout. Audioline CB radio, Ham Master mike, £70. Wanted: converter for HF receiver to receive 2m. Ladies tricycle, Raleigh, £50. Tel: 01-207 0706 or 01-207 2326

■ Yaesu FT270RH. 45 watt 2 metre mobile, vgc. Bargain at £290. Would exchange for cheaper 2 metre mobile with cash adjustment. Tel: (0249) 712009 Corsham, Wilts

■ Yaesu SC1 console for 480, 680, 780, with clock, tone pad, PSU etc, £75. Yaesu FTV107R c/w 2m and 70cms mod, first class cond, box, manual, £what. FL1000 HF linear amp, 550W out, PSU, £40. 48K Spectrum with RTTY, SSTV, CW progs, I/F TU by Scarab. Icom IC02 VHF hand-held plus many accs. Martyn Bolt, 112 Leeds Road, Mirfield, West Yorkshire WF14 0JE. Tel: (0924) 495916

■ Nearly four years of *Amateur Radio* mags and two binders, from end of 1982 to present. Cost approx £55. Sell £35. Tel: Moberley, Ches 3609

■ Home base Harvard CB, as new, boxed, £50. Saturn antenna, £12. Zetagi 500W antenna matcher, £12. Switched 25W power amplifier, £12. AOI power hand mike, £10. All as new. Separate or £80 the lot. Letters only please. Moore, 76 High Street, Ide, Exeter, Devon EX2 9RW

■ Yaesu FRG7700 Rx vgc, £240. Also Sinclair ZX Spectrum + computer, vgc, as new, and books, £70. Need money for BBC computer. Eddie GW4OME, Powys. Tel: (0544) 267140, evenings only please, after 7pm

■ Back numbers of RSGB bulletins - 97 copies spanning 1962 to 1972. Also handbook for AR88LF and numerous physics and radio textbooks. Offers please, any time. Tel: Northampton 61553

■ Polaroid Polavision instant movie outfit, c/w zoom lens movie camera replay monitor in new condition. Original makers box. Offers or swap for HF vert ant with radials or Rx in gwo. Or consider any HF gear, KW2000A or sim, WHY?. NW London. Tel: 01-906 4206

■ Kenwood SSB transceiver, TS520E, Kenwood antenna tuner, AT230, Kenwood speaker, SP230, Toya wideband dummy load, T200, Kenwood mic MC35S, Kenwood headphones, HS5, Datong Morse tutor, D70, used for receive only, first class condition. Realistic offers. Tel: (0803) 311115

■ Icom IC701PS, ICRM3, ICSM2, £400, or consider exchange deal for linear HF amp like 2100Z or WHY? Tel: G3CSE, QTHR, (0707) 328831

## WANTED

■ Belcom LS102L all mode transceiver wanted. High price paid for a fine example. Tel: (0241) 72273

■ Icom IC730 transceiver, good price paid for mint example. D Chapman, Ferrytrees, Fleet Lane, Twynning, Tewkesbury, Glos GL20 6DG. Tel: (0684) 296769

■ Liner 2, 2 metre SSB transceiver (unmod). Ten-Tec Argosy HF set, plus linears, for 'shoe-string' station. Single items or 'lots', equally considered. Also need 16K RAM pack for ZX81 computer. E J Shelmerdine, Flat 1, Park House, Park Road, Wem, Salop SY4 5DA. Tel: (0939) 33638

■ HF rig for impoverished SWL/RAE and Morse test candidate. Nothing too expensive as limited resources and husband is disabled. Prefer mobile but might consider base station. Examples of rigs interested in are FT707, TS500 series. Regret cannot accept any rig with 11m modification. Can view and collect within about 50 miles radius of Hertfordshire. Regret no phone but all letters will be answered. Angie Sitton BRS88639, 29 Hudson Road, Stevenage, Herts SG2 0ER

■ Has anyone got a spare HF wavemeter, 1.8MHz to 30MHz, good working order? Please forward details, price etc to Bob, 41 Poets Corner, Margate, Kent CT9 1TR. Tel: (0843) 225445. All correspondence answered

■ Portable HF, for example Yaesu FT757GX, Icom 735, Trio TS440S, or marine mobile MF/HF, for example Icom IC-M700. D V Smith, 7 Clos Gors, Fawr, Grovesend, Gorseinon, Swansea SA4 2GZ

■ Yaesu FT208R with speaker/mic to make up a set with my 708. Best price paid as I am shortly going abroad for a year. Tel: John G1OQV, (0488) 83562 evenings or weekends



# Amateur RADIO SMALL ADS

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Mic band and coax, no control box, circuit to make your own box ..... £7.00

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per single column centimetre:  
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COPY enclosed..... to follow.....

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COMPANY .....

ADDRESS .....

SIGNATURE ..... TELEPHONE.....

C P I

# NEXT ISSUE OF Amateur RADIO ON SALE Thursday 29th January

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263 x 394	double page	£830.00	£780.00	£740.00	£660.00

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issue	colour & mono proof ad	mono no proof & small ad	mono artwork	on sale thurs	
Feb 87	19 Dec 86	7 Jan 87	9 Jan 87	29 Jan 87	
Mar 87	29 Jan 87	4 Feb 87	6 Feb 87	26 Feb 87	
Apr 87	26 Feb 87	4 Mar 87	6 Mar 87	25 Mar 87	
May 87	2 Apr 87	8 Apr 87	10 Apr 87	30 Apr 87	

CONDITIONS & INFORMATION	
<p><b>SERIES RATES</b> Series rates also apply when larger or additional space to that initially booked is taken. An ad of at least the minimum space must appear in consecutive issues to qualify for series rates. Previous copy will automatically be repeated if no further copy is received. A 'hold ad' is acceptable for maintaining your series rate contract. This will automatically be inserted if no further copy is received. Display Ad and Small Ad series rate contracts are not interchangeable.</p>	<p>If series rate contract is cancelled, the advertiser will be liable to pay the unearned series discount already taken.</p> <p><b>COPY</b> Except for County Guides copy may be changed monthly. No additional charges for typesetting or illustrations (except for colour separations). For illustrations just send photograph or artwork. Colour Ad rates do not include the cost of separations. Printed - webb-offset.</p>
<p><b>PAYMENT</b> Above rates exclude VAT. All single insertion ads are accepted on a pre-payment basis only, unless an account is held. Accounts will be opened for series rate advertisers subject to satisfactory credit references. Accounts are strictly net and must be settled by the publication date. Overseas payments by International Money Order or credit card.</p> <p><b>FOR FURTHER INFORMATION CONTACT</b> Amateur Radio, Sovereign House, Brentwood, Essex CM14 4SE. (0277) 219876</p>	<p>Commission to approved advertising agencies is 10%.</p> <p><b>CONDITIONS</b> 10% discount if advertising in both Amateur Radio and Radio &amp; Electronics World. A voucher copy will be sent to Display and Colour advertisers only. Ads accepted subject to our standard conditions, available on request.</p>

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69. 2 - 25 watt pots 8 ohm
70. 2 - 25 watt pots 1000 ohm
71. 4 - wire wound pots - 18, 33, 50 and 100 ohm your choice
77. 1 - time reminder adjustable 1-60 mins clockwork
85. 1 - mains shaded pole motor 1/2" stack - 1/2" shaft
89. 1 - mains motor with gear box 1 rev per 24 hours
91. 2 - mains motors with gear box 16 rpm
96. 1 - thermostat for fridge
98. 1 - motorised stud switch (s.h.)
101. 1 - 2 1/2 hours delay switch
102. 1 - mains P.S.U. 9V DC
103. 1 - mains power supply unit - 6V DC
104. 1 - mains power supply unit - 4 1/2V DC
107. 1 - 5" speaker size radio cabinet with handle
111. 2 - musical boxes (less keys)
112. 1 - heating pad 200 watts mains
114. 1 - 1W amplifier Mullard 1172
115. 1 - wall mounting thermostat 24V
118. 1 - teak effect extension 5" speaker cabinet
120. 2 - p.c. boards with 2 amp full wave and 17 other recs
121. 4 - push push switches for table lamps etc.
122. 10 - mtrs twin screened flex white p.v.c. outer
124. 25 - clear plastic lenses 1 1/2" diameter
127. 4 - pilot bulb lamp metal clip on type
128. 10 - very fine drills for PCBs etc.
129. 4 - extra thin screw drivers for instruments
132. 2 - plastic boxes with windows, ideal for interrupted beam switch
134. 10 - model aircraft motor - require no on/off switch, just spin to start
136. 2 - car radio speakers 5" round 4 ohm made for Radiomobile
137. 1 - 6 1/2" 4 ohm 10 watt speaker and 3" tweeter
142. 10 - 4 BA spanners 1 end open, other end closed
145. 2 - 4 reed relay kits 3V coil normally open or c/o if magnets added
146. 20 - pilot bulbs 6.5V 3A Philips
154. 1 - 12V drip proof relay - ideal for car jobs
155. 3 - varicap push button tuners with knobs
169. 4 - short wave air spaced trimmers 2-30f
171. 1 - shocking coil with data - have fun with this
172. 10 - 12V 6W bulbs Philips m.e.s.
178. 3 - oblong amber indicators with lilliputs 12V
180. 6 - round amber indicators with neons 240V
181. 100 - p.v.c. grommets 1/8" hole size
182. 1 - short wave tuning condenser 50 pf with 1/2" spindle
184. 1 - three gang tuning condenser each section 500 pf with trimmers and good length 1/4" spindle
188. 1 - plastic box sloping metal front, 16 x 95mm average depth 45mm
193. 6 - 5 amp 3 pin flush sockets brown
195. 5 - B.C. lampholders brown bakelite threaded entry
196. 1 - in flex simmerstat for electric blanket soldering iron etc.
197. 2 - thermostats, spindle setting - adjustable range for ovens etc.
199. 1 - mains operated solenoid with plunger 1" travel
200. 1 - 10 digit switch pad for telephones etc.
201. 8 - computer keyboard switches with knobs, pcb or vero mounting
206. 20 - mtrs 80 ohm, standard type co-ax off white
211. 1 - electric clock mains driven, always right time - not cased
216. 1 - stereo pre-amp Mullard EP9001
232. 2 - 12V solenoids, small with plunger
236. 1 - mains transformer 9V 1 amp secondary C core construction
241. 1 - car door speaker (very flat) 6 1/2" 15 ohm made for Radiomobile
242. 2 - speakers 6" x 4" 4 ohm 5 watt made for Radiomobile
243. 2 - speakers 6" x 4" 16 ohm 5 watt made for Radiomobile
244. 1 - mains motor with gear-box very small, toothed output 1 rpm
245. 4 - standard size pots, 3 meg with dip switch
249. 1 - 13A switched socket on double plate with fused spur for water heater
266. 2 - mains transformers 9V 1/2 A secondary split primary so ok also for 115V
267. 1 - mains transformers 15V 1A secondary p.c.b. mounting
291. 1 - ten turns 3 watt pot 1/4 spindle 100 ohm
296. 3 - car cigar lighter socket plugs
298. 2 - 15 amp round pin plugs brown bakelite
300. 1 - mains solenoid with plunger compact type
301. 10 - ceramic magnets Mullard 1" x 3/8 x 5/16
303. 1 - 12 pole 3 way ceramic wave charge switch
304. 1 - stereo amp 1 watt per channel
305. 1 - tubular dynamic microphone with desk rest
308. 1 - T.V. turret tuner (black & white T.V.)
310. 2 - oven thermostats
311. 1 - Clare Elliot sealed relay 12V
312. 1 - pressure pad switch 24 x 18 (Trigger Mat)
313. 5 - sub miniature micro switches
314. 1 - 12" B watt min fluorescent tube white
315. 1 - 6" 4 watt min fluorescent tube white
316. 1 - round pin kettle plug with moulded on lead

## MULLARD UNILEX AMPLIFIERS

We are probably the only firm in the country with these now in stock. Although only four watts per channel, these give superb reproduction. We now offer the 4 Mullard modules - i.e. Mains power unit (EP9002) Pre amp module (EP9001) and two amplifier modules (EP9000) all for £6.00 plus £2 postage. For prices of modules bought separately see TWO POUNDERS.

## CAR STARTER/CHARGER KIT

Flat Battery! Don't worry you will start your car in a few minutes with this unit - 250 watt transformer 20 amp rectifiers, case and all parts with data £16.50 or without case £15.00 post paid.

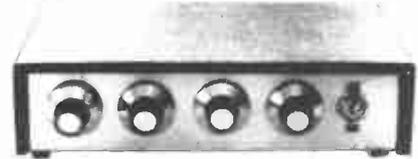


Ex-Electricity Board. Guaranteed 12 months.

## VENNER TIME SWITCH

Mains operated with 20 amp switch, one on and one off per 24 hrs. repeats daily automatically correcting for the lengthening or shortening day. An expensive time switch but you can have it for only £2.95 without case, metal case - £2.95, adaptor kit to convert this into a normal 24hr. time switch but with the added advantage of up to 12 on/off's per 24hrs. This makes an ideal controller for the immersion heater. Price of adaptor kit is £2.30.

## SOUND TO LIGHT UNIT



Complete kit of parts of a three channel sound to light unit controlling over 2000 watts of lighting. Use this at home if you wish but it is plenty rugged enough for disco work. The unit is housed in an attractive two tone metal case and has controls for each channel, and a master on/off. The audio input and output are by 1/4" sockets and three panel mounting fuse holders provide thyristor protection. A four pin plug and socket facilitate ease of connecting lamps. Special price is £14.95 in kit form.

## 12 volt MOTOR BY SMITHS

Made for use in cars, etc. these are very powerful and easily reversible. Size 3 1/2" long by 3" dia. They have a good length of 1/4" spindle - 1/10 hp £3.45 1/8 hp £5.75, 1/6 hp £7.50

## 25A ELECTRICAL PROGRAMMER

Learn in your sleep. Have radio playing and kettle boiling as you wake - switch on lights to ward off intruders - have a warm house to come home to. You can do all these and more. By a famous maker with 25 amp on/off switch. A beautiful unit at £2.50

## THIS MONTH'S SNIP

is a 13.5V DC power supply unit, plugs into a 13A socket and its output is OK to work 12V portable TVs, car radios etc. etc. Offered at £2 each, or 13 for £24 post paid. Our reference 2P110.

## MAKING SUNBEDS?

CHOKE AND STARTER for 6" 100uva tube £2, post £1 for 1 or 50p each in quantity. TUBE HOLDERS. Canopy type spring loaded, 4 pairs for £1, 100 pairs £20, 1,000 pairs £150, post paid.

## TANGENTIAL HEATERS?

We again have very good stocks of these quiet running instant heat units. They require only a simple case, or could easily be fitted into the bottom of a kitchen unit or book case etc. At present we have stocks of 1-2kw, 2kw, 2.5kw, and 3kw. Prices are £5 each for the first 3, and £6.95 for the 3k. Add post £1.50 per heater if not collecting. CONTROL SWITCH enabling full heat, half heat or cold blow, with connection diagram, 50p for 2kw, 75p for 3kw.

## FANS & BLOWERS

Woods extractors 5" £5 + £1.25 post. 6" £6 + £1.50 post 4" x 4" Muffin equipment cooling fan 115V £2.00 4" x 4" Muffin equipment cooling fan 230/240V £5.95 5" Planair extractor £5.50 9" Extractor or blower 115V supplied with 230 to 115V adaptor £9.50 + £2 post. All above are ex computers but guaranteed 12 months. 10" x 3" Tangential Blower. New. Very quiet - supplied with 230 to 115V adaptor on use two in series to give long blow £2.00 + £1.50 post or £4.00 + £2.00 post for two.

## IONISER KIT

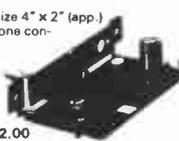
Refresh your home, office, shop, work room, etc. with a negative ION generator. Makes you feel better and work harder - a complete mains operated kit, case included. £11.95 plus £2.00 post.

## TELEPHONE BITS

Master socket (has surge arrester - ringing condenser etc) and takes B.T. plug £3.95 Extension socket £2.95 Dual adaptors (2 from one socket) £3.95 Cord terminating with B.T. plug 3 metres £2.95 Kit for converting old entry terminal box to new B.T. master socket, complete with 4 core cable, cable clips and B.T. extension sockets £11.50

## MINI MONO AMP

on p.c.b. size 4" x 2" (app.) Fitted volume control and a hole for a tone control should you require it. The amplifier has three transistors and we estimate the output to be 3W rms. More technical data will be included with the amp. Brand new, perfect condition, offered at the very low price of £1.15 each, or 13 for £12.00



## J & N BULL ELECTRICAL

Dept A.R., 128 PORTLAND ROAD, HOVE BRIGHTON, SUSSEX BN3 5QL

MAIL ORDER TERMS: Cash, P.O. or cheque with order. Orders under £20 add £1 service charge. Monthly account orders accepted from schools and public companies. Access & B/card orders accepted. Brighton 0273 734648. Bulk orders: write for quote.

## OVER 400 GIFTS YOU CAN CHOOSE FROM

There is a total of over 400 packs in our Baker's dozen range and you become entitled to a free gift with each dozen pounds you spend on these packs. A classified list of these packs and our latest 'News Letter' will be enclosed with your goods, and you will automatically receive our next news letters.

## TWO POUNDERS\*

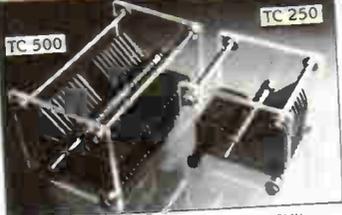
- 2P2 - Wall mounting thermostat, high precision with mercury switch and thermometer
- 2P3 - Variable and reversible 8-12v psu for model control
- 2P4 - 24 volt psu with separate channels for stereo made for Mullard UNILEX
- 2P6 - 100W mains to 115V auto-transformer with voltage tapping
- 2P8 - Mains motor with gear box and variable speed selector. Series wound so suitable for further speed control
- 2P9 - Time and set switch. Bored, glass fronted and with knobs. Controls up to 15 amps. Ideal to program electric heaters
- 2P10 - 12 volt 5 amp mains transformer - low volt winding on separate bobbin and easy to remove to convert to lower voltages for higher currents
- 2P12 - Disk or Tape precision motor - has balanced rotor and is reversible 230v mains operated 1500 rpm
- 2P14 - Mug Stop kit - when thrown emits piercing squawk
- 2P15 - Interrupted Beam kit for burglar alarms, counters, etc.
- 2P17 - 2 rev per minute mains driven motor with gear box, ideal to operate mirror ball
- 2P18 - Liquid/gas shut off valve mains solenoid operated
- 2P19 - Disco switch-motor drives 6 or more 10 amp change over micro switches supplied ready for mains operation
- 2P20 - 20 metres extension lead, 2 core - ideal most Black and Decker garden tools etc.
- 2P21 - 10 watt amplifier, Mullard module reference 1173
- 2P22 - Motor driven switch 20 secs on or off after push
- 2P26 - Counter resettable mains operated 3 digit
- 2P27 - Goodmans Speaker 6 inch round Bohm 12 watt
- 2P28 - Drill Pump - always useful couples to any make portable drill
- 2P31 - 4 metres 98 way interconnecting wire easy to strip
- 2P32 - Hot Wire amp meter - 4 1/2 round surface mounting 0-10A - old but working and definitely a bit of history
- 2P34 - Solenoid Air Valve mains operated
- 2P35 - Battery charger kit comprising mains transformer, full wave rectifier and meter, suitable for charging 6v or 12v
- 2P38 - 200 R.P.M. Geared Mains Motor 1" stack quite powerful, definitely large enough to drive a rotating aerial or a tumbler for polishing stones etc.
- 2P43 - Small type blower or extractor fan, motor inset so very compact, 230V
- 2P46 - Our famous drill control kit complete and with prepared case
- 2P49 - Fire Alarm break glass switch in heavy cast case
- 2P51 - Stereo Headphone amplifier, with pre-amp
- 2P55 - Mains motor, extra powerful has 1 1/2" stack and good length of spindle
- 2P62 - 1 pair Goodmans 15 ohm speakers for Unifox
- 2P64 - 1 live bladed fan 6 1/2" with mains motor
- 2P66 - 1 2Kw tangential heater 115v easily convertible for 230V
- 2P67 - 1 12v-0-12v 2 amp mains transformer
- 2P68 - 1 15v-0-15v 2 amp mains transformer
- 2P69 - 1 250v-0-250v 60 mA & 9v 5A mains transformer + 50p post
- 2P70 - 1 E.M.I. tape motor two speed and reversible
- 2P72 - 1 115v Muffin fan 4" x 4" approx. (s.h.)
- 2P75 - 1 2 hour timer, plugs into 13A socket
- 2P82 - 9v-0-9v 2 amp mains transformer
- 2P84 - Modem board with press keys for telephone redialler
- 2P85 - 20v-0-20v 4A Mains transformer
- 2P88 - Sangamo 24 hr time switch 20 amp (s.h.)
- 2P89 - 120 min. time switch with knob
- 2P90 - 90 min. time switch with adhesive engraved controller
- 2P94 - Telephone handset for EE home telephone circuit
- 2P95 - 13A socket on satin chrome plate
- 2P97 - Mains transformer 24V 2A upright mounting
- 2P98 - 20m 4 core telephone cable, white outer
- 2P99 - 500 hardened pin type staples for telephone cable
- 2P101 - 15V mains transformer 4A upright mounting
- 2P105 - capillary type thermostat for air temperature with c/o switch
- 2P107 - membrane keyboard, telephone type
- 2P108 - mains motor with gear box giving 110rpm
- 2P109 - 5" wide black adhesive pvc tape 33m, add £1 post if not collecting

## £5 POUNDERS\*

- 5P1 - 12 volt submersible pump complete with a tap which when brought over the basin switches on the pump and when pushed back switches off, an ideal caravan unit.
- 5P2 - Sound to light kit complete in case suitable for up to 750 watts.
- 5P3 - Silent sentinel ultra sonic transmitter and receive kit, complete with case.
- 5P5 - 250 watt isolating transformer to make your service bench safe, has voltage adj. taps, also as it has a 115V tapping it can be used to safely operate American or other 115V equipment which is often only insulated to 115V. Please add £3 postage if you can't collect as this is a heavy item.
- 5P6 - 12V alarm bell with heavy 6" gong, suitable for outside if protected from direct rainfall. Ex GPO but in perfect order and guaranteed.
- 5P12 - Equipment cooling fan - minin snail type mains operated.
- 5P13 - Ping pong ball blower - or for any job that requires a powerful stream of air - ex computer. Collect or add £2 post.
- 5P15 - Unselector 5 pole, 25 way 50 volt coil
- 5P18 - motor driven water pump as fitted to many washing machines
- 5P20 - 2 kits, matchbox size, surveillance transmitter and FM receiver
- 5P23 - miniature (appr. 2 1/2" wide) tangential ball heater, 1-2kw
- 5P24 - 3hp motor, ex computer, 230V, mains operation 1450rpm. If not collect add £3 post
- 5P25 - special effect lighting switch. Up to 6 channels of lamps can be on or off for varying time periods
- 5P26 - Audax woofer 8" 8ohm 35 watt
- 5P27 - cartridge player 12V, has high quality stereo amplifier
- 5P28 - gear pump, mains motor with inlet and outlet pipe connectors
- 5P32 - large mains operated push or pull solenoid. Heavy so add £1.50 post
- 5P34 - 24V 5A toroidal mains transformer
- 5P35 - modem board from telephone auto dialler, complete with keypad and all ICs
- 5P37 - 24 hour time switch, 2 on/off's and clockwork reserve, ex Elec. Board leading up to 50A. Add £1 post
- 5P41 - 5" extractor fan, very quiet runner (s.h.), gntd 12 mths.
- 5P45 - pack of 6 cooker clock switches
- 5P48 - telephone extension bell in black case, ex GPO
- 5P50 - box of 20 infra red quartz glass enclosed 360W heating elements
- 5P51 - 200W auto transformer 230V to 115V toroidal
- 5P52 - mains transformer 28V 10A upright mounting, add £2 post
- 5P54 - mains motor with gear box, final speed 5rpm
- 5P58 - Amstrad stereo tuner FM and LM and S.M
- 5P60 - DC Muffin type fan 18 to 27V, only 3W
- 5P61 - drill pump mounted on frame, coupled to mains motor
- 5P62 - 2 1/2kw tangential ball heater, add £1.50 post if not collecting
- LIGHT CHASER KIT motor driven switch bank with connection diagram, used in connection with 4 sets of xmas lights makes a very eye catching display for home, shop or disco, only £5 ref 5P56.
- VALVE PRE AMP described in the Aug E.T.I. it's a very interesting circuit if you intend trying it, we can supply many of the parts mains transformer 250-0-250 + 6-3V our ref 2P69 + £1 post B9A valve bases 4 for £1 B095 Double tag strips 3 lengths £2 2P100 Toggle switches dpst and 4p 4 way rotary switch BD394 1 meg single gang pot 4 for £1 BD391 100 + 100uf 320V electrolytic 2 for £1 BD392 4uf 300V 4 for £1 BD393

# NEVADA AMATEUR PRODUCTS

HIGH QUALITY BRITISH MADE  
HIGH POWER VARIABLE CAPACITORS



IDEAL FOR ATU'S OR AMPLIFIERS UP TO 3kW

**TC500** *Variable Capacitor*  
CAPACITY:- 26-500 pF  
VOLTAGE:- 78kV Max  
SIZE:- 101 x 105 x 165mm  
AIR GAP:- 2mm

**£28**  
plus £2 p&p

**TC250** *Variable Capacitor*  
CAPACITY:- 13-250 pF  
VOLTAGE:- 78kV Max  
SIZE:- 101 x 105 x 88mm  
AIR GAP:- 2mm

**£19.95**  
plus £1 p&p

## SCANNING RECEIVERS

### C.T.E. DISCONE WIDEBAND ANTENNA

RECEIVE 70-700 MHz  
TRANSMIT 70-500MHz  
MAX POWER 500W  
GAIN 35dB

WIDEBAND DISCONE RECEIVING ANTENNA (3 Element) 70-500MHz



£24.95

### NEW BEARCAT H/HELD SCANNING RX. MODEL 100XL

Receives 8 bands plus aircraft band. 16 Channels, priority keyboard lock and lighted display  
66-88 MHz 118-174 MHz 406-512 MHz

**£229**



### BEARCAT 175XL

Base receiver covers:-  
66-88MHz  
118-174MHz  
406-512MHz  
with 16 channel memory/scan



### BEARCAT DX1000 COMMUNICATIONS RECEIVER



Direct access communications 10KHz-30MHz with 10 channel micro-processor controlled memory

**£379**

CB ..... £1  
AMATEUR .... £1  
934 MHz ..... £1

Each catalogue is packed full of info. and includes a £2 voucher.

## 29 MHz BASE ANTENNAS

### NEVADA TC52 1/2 WAVE

This top class half wave uses high grade aluminium and a low loss coil handling up to 1 KW  
WIND RESISTANCE:-75 MPH  
GAIN:- 2.5 dB  
FREQ:- 28-30MHz  
plus £4 p&p

**£19.95**

### NEVADA TC58 3/8 WAVE

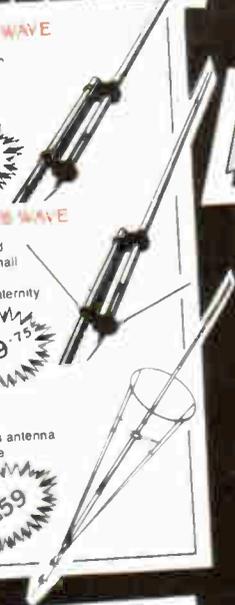
Using high grade aluminium and a low loss coil complete with small radials this antenna is our most popular amongst the 29MHz fraternity  
POWER:- 1kW  
GAIN:- 35 dB  
FREQ:- 28-30MHz  
LENGTH:- 6.6 MTRS  
plus £4 p&p

**£29.75**

### SALIUT 3/4 WAVE

Using a unique base hoop this antenna offers exceptional ground wave coverage on 10 FM  
POWER:- 2KW  
GAIN:- 4.5 dB  
FREQ:- 28-30MHz  
LENGTH:- 9.1 MTRS  
plus £4 p&p

**£59**



## 2 MTR EQUIPMENT

### 2 MTR HANDHELD

**CT1600** A superbly sensitive new handheld covering 142-149MHz  
● Repeater shift  
● High/low power 1.5/0.5 Watt  
● Thumbwheel selector  
Each set supplied CW re-chargable battery pack and free mains charger unit.

**£179**



### VHF MOBILE AMP

B110 144MHz 110 Watt W/Pre Amp. £169  
B42 144MHz 40 Watt £64.66  
LA05435 144MHz 45 Watt £69.75

Full range of 144 MHz mobile amplifiers in stock see our Ham Catalogue.

## R.F. AMPLIFIERS

All amplifiers except broadband models are tuned for 29.6MHz centre freq. Should you require a lower freq. i.e. 28.5MHz please state when ordering. Export models available for 26-30MHz.

### MOBILE AMPLIFIERS C.T.E. MOD 767

76 Watts FM  
INPUT:- 0.5-10 Watts  
SWITCHABLE:- Class AB Class C  
SUPPLY:- 13.8 Volt  
REMOTE CONTROL FACILITY



**£49.90**

C.T.E. MOD 737 50W FM AM/SSB/CW £44.76  
C.T.E. MOD 767 80W FM AM/SSB/CW £49.90  
C.T.E. MOD 757 150W FM Broadband £116.87  
ZETAGI B35 25W FM 26-30MHz £22.23  
ZETAGI B150 70W FM 26-30MHz £49.96  
ZETAGI B300 150W FM (2-30MHz) £136.00  
NEVADA TC35 30W FM 26-30MHz £23.75

### MAINS OPERATED AMPLIFIERS

C.T.E. DC9 Solid State 150W FM (Broadband) £199.31  
ZETAGI B132 150W FM Solid State (Broadband) £119.00

## TEST EQUIPMENT

### ZETAGI DL150 RF DUMMY LOAD AND POWER METER

A very accurate unit for the service dept. or discerning enthusiast.  
FREQ:- 0.5MHz-500MHz  
POWER:- 150 Watt Max in 3 ranges 0-3, 0-15, 0-150W.

**£85.19**



### ZETAGI 500 SWR AND POWER METER

For the enthusiast who wants the very best. A twin meter unit with push button control for either 75 OHM or 50 OHM cable.  
FREQ:- 3-200MHz  
POWER:- Up to 2kW

**£41.46**



### FD 1350 1.3GHz FREQUENCY COUNTER

FREQ:- 10Hz-1.35GHz  
SENSITIVITY:- 43mV at 1GHz  
DISPLAY:- 8 Digit  
SUPPLY:- 9-12 Volt DC

**£139.53**



## NEVADA

HIGH QUALITY BRITISH MADE  
29MHz FM PRODUCTS

### NEVADA TC35 DX

R.F. POWER AMP. WITH HARMONIC FILTER

INPUT:- 1-4 Watts  
OUTPUT:- 25-30 Watts  
SUPPLY:- 13.8V DC  
FREQ:- 26-30 MHz

Can be centred on 29.6 MHz or 28.5 MHz (state which). A new top quality amp, which now features harmonic filter to reduce harmonic O/P

**£23.75**



### NEVADA TC27 RX

RECEIVER PRE-AMP FOR 26-30MHz

A superior low noise pre-amplifier for 29MHz FM operation  
Variable gain -6dB's to -18dB's suitable for use with transceivers up to 25 Watts output

**£22.34**



# TELECOMMS

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