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RADIO

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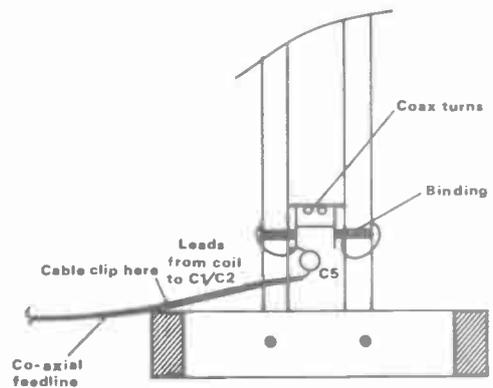
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STRAIGHT & LEVEL



MET ON THE MOVE

MET Antennas, formerly based in Dover, have announced that there has been a change in ownership.

The aerials are now manufactured in Worcestershire under the watchful eye of Alan Kelly.

Alan, who is a well-known amateur in the area and proprietor of a well established emporium, is already a familiar face at most rallies throughout the UK.

He and his staff would like to assure the amateur fraternity that MET's reputation for quality, reliability and friendly service will continue.

MET's popular range of NBS yagis will still be available from all reputable dealers nationwide, or direct from the manufacturers.

Please enclose an SAE for the current catalogue and price list, available from: *A Kelly Communications, 3 Stoke Road, Aston Fields, Bromsgrove, Worcs B60 3EQ.*

CALLING OLD-TIMERS

On 7th January the Department of Trade and Industry announced a change in policy regarding the re-issuing of lapsed amateur radio

licences with the original callsigns.

After consideration of several individual cases and representations from the RSGB, it has been decided to permit any previously held licences to be re-issued to the legitimate holders - even where the original qualifications were not based on the current City and Guilds Radio Amateur Examination.

The one exception concerns licences which had callsigns in the G5 + three letters series; this has already been withdrawn for re-use so will not be available.

In order to reduce the administrative burden on the department, the onus will be firmly on the applicant to provide evidence that he/she did in fact hold a particular licence and to satisfactorily provide confirmation of identity.

Applications for the reissue of lapsed licences should be made in writing, fully supported by the necessary documentary evidence, to: *Department of Trade and Industry, Radiocommunications Division, Amateur Radio Section, Room 613, Waterloo Bridge House, Waterloo Road, London SE1 8UA.*

RRD REPORT

On the 18th December 1986 the Department of Trade and Industry published the first report of the Radio Regulatory Division (RRD), the DTI'S frequency allocation and enforcement section.

The division is effectively the only UK dispenser of radio spectrum, and the report is designed to familiarise current and potential spectrum users with the RRD's work. It covers the activities of the division during the financial year 1985/86 and includes details on the future plans for the spectrum and background material on the international framework.

The report has been produced in response to a recommendation in the Merriman Report (Independent Review of the Radio Spectrum 30-960MHz), presented to Parliament in July 1983.

Publication of the report coincides with a change of name for the RRD to Radiocommunications Division.

Copies are available from: *The Library, Radiocommunications Division, Room 605, Waterloo Bridge House, Waterloo Road, London SE1 8UA.*

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

POWER SUPPLY METERING

Electronic Brokers has introduced the Thurlby PL series of laboratory bench power supplies, which are capable of operation in constant current or constant voltage modes and can provide simultaneous digital metering of voltage and current.

The PL series of units incorporates a digital readout with a 3¼ digital scale length, to provide a 0.1% accuracy and a resolution of 0.01 volts and 0.001 amps. Bright, wide angle 12.5mm light emitting diodes (LEDs) give a clear, unambiguous display, free from problems of parallax error or scale interpretation.

Two meters give a simultaneous display of voltage and current and eliminate the need for meter function and range switches.

A damping switch for the current meter simplifies measurements on rapidly

varying load currents.

Coarse and fine voltage controls, together with a voltmeter resolution of 10mV, enable setting to better than 0.05%.

A semi logarithmic conductive plastic potentiometer allows the current level to be set down to the meter resolution of 1mA.

The PL series dc output switch enables voltage and current levels to be set before the load is connected. This feature offers protection by accurately setting current limits before connecting the supply to delicate circuitry.

The PL series is designed and manufactured to comply with IEC348 Class 1 standards and has an operating temperature range of 0 to 40°C.

For further information contact: *Electronic Brokers Limited, 140-146 Camden St, London NW1 9PB.*



LOW-COST SCOPE

Now available from Thurlby Electronics is the Hitachi V425, a 40MHz, two-channel oscilloscope.

A major feature of this instrument is its digital CRT readout of voltage/time differences whereby the user simply adjusts the cursor to obtain a direct digital readout of the voltage difference and time difference between two points on the display. The panel setting display provides a digital CRT display of the CH1 sensitivity and the sweep time, thus preventing errors.

The V425 has an 8 × 10cm high resolution display with an internal graticule. 0%, 10%, 90% and 100% scale markings are provided to simplify pulse measurements.

Other features include a dc offset function which enables high-accuracy, vertically expanded measurements of any desired portion of a waveform; an alternate magnification facility whereby simultaneous observation of the ×10 magnified waveform and the original waveform is possible; and stable triggering on both channels, even if

the signal frequencies of CH1 and CH2 differ.

The V425 also has a guaranteed ±3% accuracy for voltage and time over the 10°-35°C operating temperature range and a vertical sensitivity of 1mV/div, thereby enabling accurate measurement of the low level signals often encountered in microcompu-

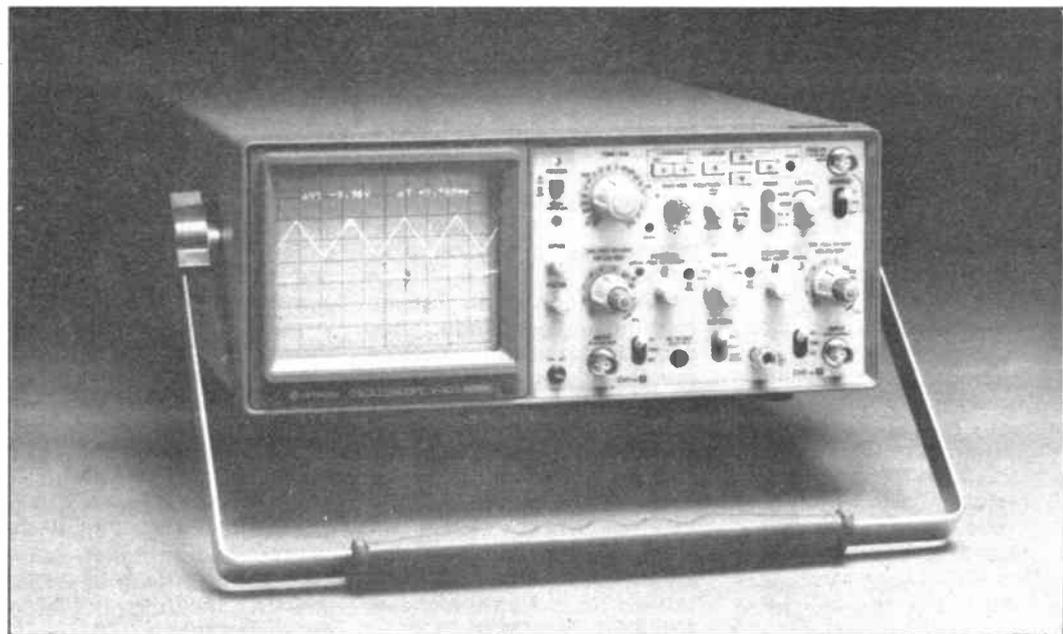
ter test and measurement applications.

Other features include eight divisions of dynamic range; a dedicated TV sync separation circuit which speeds up measurements of video signals; a built-in signal delay line, enabling measurement of the leading edge of fast rise-time signals; and an

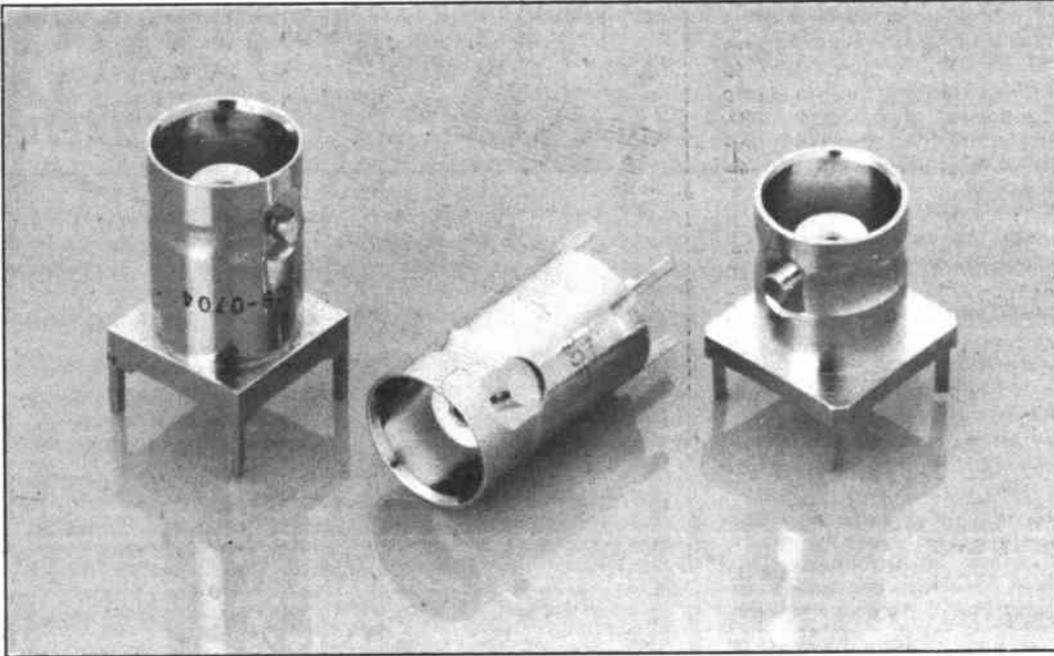
X-Y mode which enables accurate phase-difference measurements.

The Hitachi V425 measures just 310 × 130 × 370cm and weighs only 7kg.

More details are available from: *Thurlby Electronics Ltd, New Road, St Ives, Huntingdon, Cambs PE17 4BG. Tel: (0480) 63570.*



STRAIGHT & LEVEL



COAX-TO-PCB MOUNTING

Amphenol's 31 series BNC receptacles are designed for PCB mounting when circuit design dictates direct interface between coaxial cable and printed circuit boards.

Application areas include instrumentation and test equipment, communications equipment, and computer mainframes and peripherals.

These cost-effective, high-performance products are easily soldered to the PCB and feature 2-stud bayonet lock coupling, intermatable with all other BNC-type connectors. They are available in a variety of mounting configurations.

Nominal impedance is 50 ohms. Working frequency is 3GHz max, working voltage 500V (peak) max. Centre contact resistance is 1.5Mohm max.

The connectors can be operated over a temperature range -55 to 199°C, and meet MIL-STD-202 environmental specifications.

For further information contact: *Amphenol Limited, Thanet Way, Whitstable, Kent CT5 3JF. Tel: (0227) 264411.*

TOGGLE SWITCHES

Diamond H Controls recently introduced the Otto T1 series of toggle switches, which utilise the Otto B2 and B3 series of basic switches, in a choice of unsealed, sealed and panel sealed versions.

Unsealed versions are available in a choice of five styles. Types offered include

4-position, 6-pole; 4-position, 4-pole; 3-position, 2-pole; and 3-pole versions. The switches have an electrical rating per pole of 7A resistive at 28V dc and a mechanical life of 25,000 cycles.

Sealed versions are offered in five styles including 4-position, 3-pole; 3-position, 8-pole, with and without lever lock; 3-position, 4-pole with lever lock; and 2-position, 3-pole with lever lock. Type dependent, the switch enclosures are sealed to MIL-SPEC-8805 or MIL-SPEC-83731 and have an electrical rating at 28V dc of 5A or 8A resistive.

Panel sealed toggle switches are also available in five versions. These include 3-position, 6-pole; 2-position, 2-pole; 2-position, 12-pole; 3-position, 4-pole, locking; and 2-way toggle. With a mechanical life of 25,000 cycles, the panel sealed T1 switches have an electrical rating per pole of, type dependent, 1A or 7A resistive and 1A, 4A or 5A inductive at 28V dc.

The 2 and 3-position switches have bezel, bracket, bushing and bat handle fabricated in stainless steel, while the 2-way toggle has a black ryton switch body with black anodised aluminium housing and a black nylon button. The 2-way toggle is moisture proof and dust-tight to MIL-SPEC-9419.

For further information contact: *Diamond H Controls, Vulcan Road North, Norwich NR6 6AH. Tel: (0603) 45291.*

MINI OSCILLOSCOPE

The Hitachi V-209, available ex-stock from Thurlby Electronics, is a dual-trace 20MHz mini-portable oscilloscope which incorporates a highly versatile 3-way power supply system.

The oscilloscope can be operated from internal rechargeable batteries (supplied), an external dc supply (11-14V) or an external ac supply (95-265V). This enables the V-209 to be used in field service applications anywhere in the world, including areas where no power source is conveniently available.

The V-209 has a 3½in rectangular CRT with an internal, parallax-free graticule of 8 x 10 divisions. Autofocus maintains an ultra-sharp trace and allows full use to be made of the oscilloscope's 3% measurement accuracy.

In line with its 20MHz bandwidth, the V-209 incorporates a wide range of professional features including 1mV/div sensitivity, 50 nanoseconds (nS)/div sweep speed, add and subtract facilities, and an active sync separator for video waveforms. These features make the V-209 suitable for applications within computer, video and instrumentation service applications as well as research and development.

The V-209 measures 110 x 215 x 350mm (4¼ x 8½ x 13½in) and weighs under 4½kg (10lbs). The price is £680 plus VAT, including the internal rechargeable batteries.

Further details are available from: *Thurlby Electronics Ltd, New Road, St Ives, Huntingdon, Cambs.*

KIT CAT

Greenweld Electronic Components have announced the availability of their new catalogue, *Kit-Cat*, which is free on request.

It offers an extensive range of electronic kits catering for all abilities, from the novice to the professional. Kits include amplifiers, pre-amps, transmitters, receivers, power supplies, panel meters, timers, doorbells, running lights, sound to light units, dimmers and computer interfaces.

The catalogues can be obtained by contacting: *Greenweld Electronic Components, 443 Millbrook Road, Southampton SO1 0HX. Tel: (0703) 772501.*

MINI SOLDERING IRON

No larger than a felt-tip pen and offering a range of outputs from 10 to 60W, a completely portable miniature soldering iron called Portosol is now available from Electronic and Computer Workshop Ltd (ECW).

Refilled from cigarette lighter butane gas containers, the iron is suitable for all types of precision soldering, with a choice of tip diameters (2.4mm, 3.2mm or 4.8mm). Maximum tip temperature is 400°C.

Designed to be safe and reliable, the soldering iron runs for approximately one hour on a single refill. The clip-on cover has a built-in igniter, and when in position allows the Portosol to be carried like a pen in a top-pocket.

The portability of the iron frees the user from having to work near a mains power point, or bother with extension cables. Its powerful gas operated heater offers a controlled output that is more stable and generally superior to battery operated portable types.

ECW offers the Portosol for mail order at an all in price of £36.98, including post/packing and VAT.

For further information please contact: *Electronic and Computer Workshop Ltd, 171 Broomfield Road, Chelmsford, Essex CM1 1RY. Tel: (0245) 262149.*

COMEX PRODUCTS

Comex Systems Ltd of Leicester have increased their range of satellite products to include complete, ready built systems, a wider range of dishes and a full range of accessories, whilst still maintaining their full range of excellent DIY satellite kits.

The new range includes: The CR100 satellite receiver, a full band receiver with dual dish inputs, switched IF bandwidth, an auto set-up facility to allow for easy dish alignment, tunable sound and a built-in polarrotator control. It has baseband output, composite video, audio at line level and RF out on channel E36. The CR100 is a high sensitivity, high video quality receiver for the most discerning satellite user.

The CC25 SMATV receiver, which is designed for the budget cable operator, is rack mounted with multi-function control and includes a full frequency synthesizer tuning control for spot on reception. The SF1000 sync processor, which has been developed for use with some satellite channels and long distance television use, where the video synchronising signals have become confused and distorted. The unit analyses the video and replaces the syncs, whilst preserving the sound and colour information.

In addition Comex have recently started work on a whole new range of products for the radio and television amateur, covering audio and RF add-ons, 70cm and 24cm television transmitters and receivers and 70cm and 24cm power amplifiers and preamplifiers. We will, of course, keep you in touch with all of the new developments.

If you require any further information please contact: *Comex Systems Ltd, Comet House, Unit 4, Bath Lane, Leicester LE3 5BF. Tel: (0533) 250840.*

RADIO & RTTY BOOKS

Interbooks have produced a new free catalogue, entitled *Radio and RTTY Books*, which outlines the selection of books of interest to the British radio enthusiast.

Most of the books they offer are of UK or European origin, so that frequencies covered are the ones that will be heard

by UK operators.

There are many new titles and editions, including the 1987 edition of the *Guide to Utility Stations* and the *Radio Database International 1987*, in addition to the well balanced stable Interbooks have built up over the years.

The books listed are not available through bookshops, but Interbooks provide an efficient mail order service and will accept telephone orders and payment by credit card.

For a copy of their free catalogue please contact: *Interbooks, Short wave, Amateur and Satellite Radio Publications, Lynton, Stanley, Perth, Scotland PH1 4QQ. Tel: (0738) 828575.*

NEW CONNECTORS

A new combination of 'D' subminiature connectors and a flexible jumper is now being manufactured by Southampton based St Cross Electronics Ltd. Code named Flexi 'D', this low cost product is designed to give total flexibility in the application of D connectors to PC boards and panels.

It also allows greater freedom in the PC layout, as the pin-out may be taken to 2 (or 3 in the case of 50 way) completely different locations on the PC board, or to separate boards.

This easy to use quality product has polyester constructed plug and socket insulators, with connector shells of steel plated zinc/yellow passivate. Conductor spacing is .100 inches, with jumper conductors manufactured in pre-bonded stranded 26awg, and lengths and permutations made to customer requirements. This connector has many applications in the electronic/electrical, computer, communication, engineering and manufacturing industries.

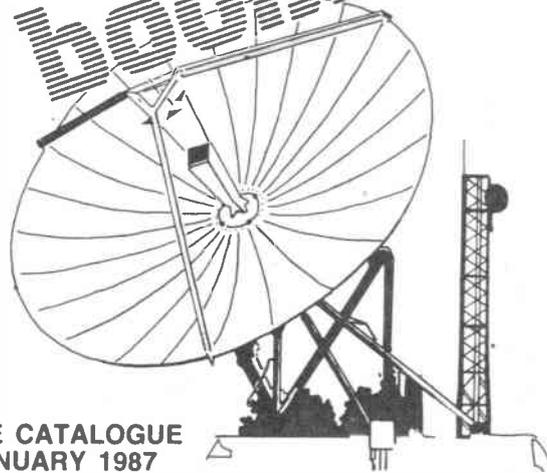
For further information contact: *St Cross Electronics Ltd, Unit 14, Mount Pleasant Industrial Park, Southampton SO2 0SP. Tel: (0703) 227636.*

CHARGER/PSU

The ability to supply electronic equipment from the mains, and from a float charged battery if there is a mains failure, is provided by the Supercharge 3 from Avel-Lindberg.

Radio
and
RTTY
books

- More new books
- Shortwave listening and amateur radio
- Wide range of subjects



FREE CATALOGUE
JANUARY 1987

The unit can be used as a nominal 27V dc, 43A max power supply, or as a battery charger with 10 to 39A adjustable charging current; and also in a combination of these roles as long as the input current of the 240V ac supply does not exceed 7.5A, using the charge current limit to set the total load. The basic elements of a dc UPS system are available in the Supercharge 3, with the options of additional switching circuits for changeover and maintenance if required.

The efficiency is between 85% and 90%; the output regulation is better than 0.5% from no load to full load, which provides fast battery recharge; and the 50kHz switching frequency enables magnetic components to be reduced considerably in weight and size.

The total weight of the unit is only 7kg.

For further information please contact: *Avel-Lindberg Ltd, South Ockendon, Essex RM15 5TL. Tel: (0708) 853444.*

MAPLIN CARD

Many customers of Maplin Electronic Supplies Ltd will now be receiving their Priority Service Club cards, designed to simplify ordering.

With Maplin guaranteeing same day despatch for orders received before 5pm, the speedy ability to identify callers - by direct keying-in of the customer reference number - could save vital moments. The Maplin Club Card can also be used as an identity card in any of the five Maplin stores.

On the reverse of the card, Maplin have provided some useful and relevant information, which is likely to be of use to both the home and professional electronics user. Material featured includes: metric measurements, electronic tables, resistor colour codes and resistor tolerances.

For further information please contact: *Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (0702) 554155.*

CLUB NEWS

New repeater

The Stoke-on-Trent microwave repeater/beacon, GB3SE (RM3), became operational on 21st November 1986. It can be found on 1297.075MHz, and its receive input frequency is on 1291.075MHz.

When not in use as a repeater the transmitter stays on air as a beacon. Identification is by frequency shift keying at a rate of one callsign every 35 seconds, each eighth callsign being transmitted using MCW.

Repeater use is obtained by the usual method of transmitting a 1750Hz toneburst. To acknowledge the fact that GB3SE has switched from beacon to repeater, a letter 'T' in Morse code is transmitted. Alternatively a letter 'H' or 'L' is transmitted if the carrier frequency on the input is more than ± 5 kHz from the nominal input frequency. This is followed by the repeater callsign, GB3SE in MCW. For an indication of when the repeater mode has finished (ie the through audio is inhibited), a tone of 1 second duration and 400Hz audio frequency is transmitted. The carrier will, of course, continue to radiate and the next identification callsign will be sent using FSK.

Apart from the beacon facility a number of other unusual features are incorporated. Frequency stability at 1.3GHz can be a problem, so with this in mind it was necessary to develop and build an electronic oven to house the crystal, making it possible to maintain the crystal temperature to better than $\pm 0.2^\circ\text{C}$ regardless of the exterior air temperature.

The transmit and receive frequencies are separated by 6MHz, but are frequency locked together. Thus only one crystal is used, this being shared between both Tx and Rx. Therefore, the 6MHz difference is always exact. Should the transmitter move in frequency, the receiver would move by the same amount and in the same

direction, making split frequency operating much easier.

The repeater uses a phase locked loop type of audio discriminator, which has the useful feature of following off-channel signals and reproducing the recovered audio with minimum distortion (restricted only by the sides of the receiver band-pass IF filter).

At the moment GB3SE is running 6 watts ERP. The aerials in use are two Alford slots (horizontal polarisation omnidirectional). During the first 24 hours of use a total of 12 different callsigns were monitored using the repeater facility.

More information can be obtained from G8DZJ QTHR.

Packet relay stations

The Department of Trade and Industry has cleared the establishment of ten experimental amateur radio packet relay stations. These new relay stations will extend the distance over which Britain's 57,000 radio amateurs can exchange short duration 'packets' of information.

The new packet relay stations use high technology hardware and software to enable a number of UK radio amateurs to operate on one radio channel. As a result, this type of transmission extends the use of computer technology in radio frequency experimentation and leads to increased frequency utilisation.

Another first, which comes with the introduction of these repeaters, is the ability to pass communications from relay station to relay station around the UK. The Radio Society of Great Britain, who have planned a 14 month experiment with the DTI, believe that packet communication will eventually be possible throughout the UK, with links via HF and satellites to other similar national networks in other countries.

Within the UK plans are in hand to provide microwave linked packet switching relay stations as a means of handling a greater number of messages. The satellite team at Surrey University plan to use their amateur radio and educational satellite (UoSAT 11) to retransmit packets to overseas stations.

The packet system provides the UK industry with an

opportunity to develop and manufacture digital hardware, software and VHF microwave hardware. A new type of antenna has already been developed in the UK for packet radio. The availability of relatively cheap and powerful micro computers can be combined with experimental radio technology to encourage radio amateurs to develop their expertise in the most up to date methods of communications.

The Radio Society of Great Britain's packet relay station, located at their headquarters in Potters Bar, Herts, was recently officially switched on by the DTI's Head of Radio Amateur Licensing Section, Barry Maxwell.

McMichael Rally

The Burnham Beeches Amateur Radio Club, in conjunction with the Maidenhead and District Amateur Radio Club and the Chiltern Amateur Radio Club, is staging the fifth McMichael Rally at the Haymill centre, Burnham, near Slough. The date is Sunday 19th July and the doors open at 10.30am (10.15 for the disabled).

A large number of national and local traders have been invited and a car boot sale area has been set aside for those with a few items to sell.

It is hoped that many demonstrations and attractions, including a mini fairground, radio controlled models and the Camra Beer Bar, will be in attendance.

There will be an amateur television station in operation, in addition to an HF special event station using the callsign GB4MR. All contacts will receive a special QSL card.

Further details are available from G0BTY, 70 Herbert Road, High Wycombe, Bucks HP13 7HN.

Wythall Rally

The second annual Wythall Radio Club Rally is being held at Wythall Park, Silver Street, Wythall, South of Birmingham on the A435, on Sunday 8th March. Doors open at 12 noon and admission is 50p (OAPs and accompanied children free).

The rally will consist of 3 halls enclosing 20 trade and club stands, a giant bring and buy, bar and snack facilities and RSGB Morse testing. There will be ample free

parking and talk-in on S22.

Further details of the rally are available from Chris G0EYO on (021) 430 7267, and Morse test application forms are available from the RSGB at Potters Bar.

Mid Devon Rally

The Tiverton Short Wave Radio Club plans to hold its 1987 Mid Devon Rally on 22nd March, at the Pannier Market in Tiverton.

The doors open at 10.00am and talk-in will be on S22. Parking facilities are described as 'excellent'.

All enquiries concerning this event should go to G4TSW, PO Box 3, Tiverton, Devon EX16 6RS.

A bonny idea

The Aberdeen Amateur Radio Society kicks off its February schedule with a junk sale on the 6th, followed on the 13th by a debate: 'Amateur radio would improve if all amateur repeaters were closed down tomorrow'. Speakers for and against the motion are invited.

A useful lecture, 'DXing on UHF/VHF with a less than average station', will be presented on February 20th by Graham Sangster GM4OBD. Last but not least, Alan Duncan takes the club's regular Beginners' Night with a talk, 'A newcomer's guide to 4m'.

The society is responsible for the WASR (Worked All Scottish Regions) award, which has been running since 1975. It is available to all amateurs showing proof of 2-way contact with one station in each Scottish region (Borders, Central, Dumfries and Galloway, Fife, Grampian, Highlands or Islands, Lothian, Strathclyde, Tayside). Contact with the Aberdeen Amateur Radio Society, GM3BSQ, may be used as a substitute for any one region. There is also an award for SWLs.

The award costs £1 or the equivalent in IRCs.

For more details of the award or society events contact Don GM4GXD on (04676) 251.

Magazine exchange

There is lots of activity at the South Bristol Amateur Radio Club in the coming weeks, beginning with a photography activity evening on 28th January.

Jim G4VBU presents a lec-

ture called 'Can I repair it?' on 4th February, followed on the 11th by a 70cm activity evening. February 18th is the time to drag out those dusty old boxes of radio magazines (you just can't throw them out, even though you'll never read them again) and take them to the club for a 'swap shop'.

An HF activity evening on the 25th winds up the club's event schedule for February.

The South Bristol ARC meets every Wednesday at the Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. For more information contact Len Baker G4RZY on Whitchurch 834282.

Alive and kicking

At the recent AGM of the Reading and District Radio Club, Stephen Coleman G4YFB was elected to the post of secretary. As he feels that the club did not exist to the outside world last year, he had asked us to point out that it is, in fact, alive and kicking.

The club meets on alternate Tuesdays in the clubroom at the White Horse public house in Emmer Green, at 2000 hrs local time. The first meeting of the year is on Tuesday 6th, so it is an easy matter to calculate the next meeting date from there. Details about the club and its activities are available from Stephen at 16 Wincanton Road, Reading, Berks RG2 8PB, or by telephone in the evenings on Reading 867820.

ISWL net

The ISWL net is in regular operation every Saturday morning at 1030hrs on 3685kHz. Among those currently participating are G2IZ, G2UK, G2WQ, G3NOF, G4ICC, G4IUF, G0FLL and GM4AIE. The net controller is G2BRR. All league members are invited to take part.

Membership details of the International Short Wave League '87 may be obtained from the hon secretary, J May G1GWG, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

Memorial lecture

The Verulam Amateur Radio Club meets at the RAF Association Headquarters, New Kent Road, off Marlborough Road, St Albans, on the second and fourth Tuesdays in each month.

On Tuesday 10th March

they have an 'Activity Evening' and on Tuesday 24th March, at 7.30 for 8.00pm, they will be holding the 1987 G3PAO Memorial Lecture.

This event is held annually to commemorate the late George Slaughter G3PAO, a founder member, past chairman and secretary of the club. This year's lecture, entitled 'Antennas for Small Gardens' will be delivered by our very own Don Field G3XTT. Visitors are welcome at all club meetings.

Further information is available from the honorary secretary, Gerry Wimpenny G4OBH, at 30 Faircross Way, St Albans. Tel: 52003.

Stirling and District

Stirling and District Amateur Radio Club meetings are held in the Argul Centre, Princes Street, Stirling, on the 2nd and 4th Thursdays in each month. Meetings start at 7.30pm and details of activities are available from the secretary, Fiona GM0BFS on (0259) 217702.

Fareham news

The Fareham and District Amateur Radio Club have a variety of activities on the agenda for the next couple of months.

The club meets every Wednesday evening at the Porchester Community Centre, Westlands Grove, Porchester, Hants at 7.30pm, with Morse practice at 7.00pm. Every other meeting is a natter night, but on alternative Wednesdays they have a variety of lectures scheduled. These include a lecture on 'Noise and Rx specs' on 11th February, a talk entitled 'Telecomms within Electricity Supply' by Steve G4VNM on the 25th and a 'Junk Sale' on 11th March.

For further information on club membership and activities contact A S Chester at 'Deva Wood', 44 The Ridgeway, Down End, Farnham, Hants PO16 8RE.

Fun at Felixstowe

The Felixstowe and District Amateur Radio Society recently changed the venue of its regular club meetings. The place to go is now the Scout Hut, Bath Road, Felixstowe, Suffolk.

On the society's February schedule is a visit to the Raynet Communications Centre in Ipswich. For further



Purrfect packet radio for Kismet and Trevor G6TJT of AMRAC. He is active on the GB3HP digipeater on 144.650.

details of this event contact the secretary, Paul J Whiting G4YQC, c/o R8.3.4, British Telecom Research Labs, Martlesham Heath, Ipswich IP5 7RE. Tel: (0473) 642595.

Feedback

The Bury Radio Society meets every Tuesday evening at 8.00pm in the club room of the Mosses Youth and Community Centre, Cecil Street, Bury, North Yorkshire.

The society produces a monthly journal, *Feedback*, which is distributed to members. It includes news, chat, technical articles and construction projects.

If you would like to find out more about the society, contact the Honorary Secretary, M Sivieri G4ZTB, 47 Ramsay Avenue, Bacup, Nr Manchester, or telephone (061 764) 5018.

QTI-TNA

After a successful year working with *QTI-TNA*, the radio magazine for the blind, Shirley Evans is moving on to pastures new. Her position has been filled by Janine Gillingham.

Enquiries should now be directed to Janine at 2 Cartmel Walk, North Anston, Sheffield S31 7TU. Telephone (0909) 566301.

Technofun

An interesting lecture is planned this month by the Southgate Amateur Radio Club (G3SFG), 'Computer technology', to be presented by John Young G4KZD. February 12th is the date and the venue is the Holy Trinity Church Hall (Upper), Green Lanes, Winchmore Hill, London N21.

Further details are avail-

able from Dave Elson G4YLL, 200 Churchgate Road, Cheshunt, Herts EN8 9EL. Telephone (0992) 30051.

A classic

The Rolls Royce Amateur Radio Club (G3RR) is holding a social evening with Harry Garbick on 4th February at 8.00pm.

A month later, on 4th March, a construction contest is scheduled, so get cracking on your next piece of wonder gear.

Additionally, morse classes run every Monday at 7.30pm. The venue is the same for all events: The Rolls Royce Social Club, Barnoldswick, Colne, Lancs. Further details are available from L Logan G4ILG on (0282) 812288.

Radio controlled

Two events planned by the Verulam Amateur Radio Club are an activity evening on 10th February and a talk entitled 'Radio control of models' on the 24th.

The club meets on the second and fourth Tuesdays of each month at the RAF Association Headquarters, New Kent Road, off Marlborough Road, St Albans.

The Honorary Secretary is Gerry Wimpenny G4OBH and he can be contacted at 30 Faircross Way, St Albans.

Ham news

Edgware Ham News, the monthly bulletin of the Edgware and District Radio Society, reports that a talk on electromagnetic compatibility (EMC) is to be held by Ian G4IUZ on 12th February.

The venue is the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

L·E·T·T·E·R·S

POSTAGE PRECAUTION

Like a great number of your readers I have bought goods through your readers' adverts. This has all been fine until now. A valve type transverter arrived in early November.

It was COD and after paying the Post Office I hurried home to unwrap my new toy, eager to explore the delights of 70MHz. Alas my delight was short-lived. On opening the box, and searching through the vast amount of straw inside, I found that the transverter's chassis was bent.

After filling in the appropriate forms for compensation, for which an extra fee had been paid by the sender, I eventually had a visit from a Post Office bod to inspect the damage. These inspectors, however, seem to work strange, unsociable hours, as they are only available until midday or before 9.30am on Saturdays. A difficult arrangement for the average working ham.

Now, a month later, I have

received a letter informing me that they are unable to compensate me as, in the opinion of the enquiry officer, the initial packing was unsuitable!

Naturally, on further inspection, I found the small print stating that the post office is not responsible for failing to detect any 'unsuitable' packing at the time they take your money for carriage and compensation.

As the goods were sent by someone who works with radio/electronic equipment, I think he must have an idea of what constitutes sufficient packing. As a former lorry driver, who has on occasion handled very delicate loads, I have an idea of the normal precautions taken with items marked 'fragile' and the way such warnings can be ignored. No matter how you pack things, a drop from the lorry etc is not something we usually anticipate!

I am the first to recognise the difficulty in handling items with PSUs in them. I nearly fell over once trying to

lift an old HF linear in a shop, but this is no comfort when faced with the sad sight of a damaged transverter.

So, a word to all readers. Don't feel too sure as you send off that trusty FT/TS??? a that it will all be OK. The responsibility is on you to protect against acts of God, nuclear holocaust or plain bad handling. Be warned.

Martyn Bolt, West Yorks

POSTAL VOTING

I read with interest your article on the RSGB AGM/EGM since I have had some correspondence with Potters Bar about it. I was unable to attend the meeting due to other commitments, but I still wished to register my notes on the four amendments proposed by council. I therefore contacted Potters Bar to find out how I could make my views known, only to be told that since the RSGB operates to the letter of Company Law it has no obligation to provide postal

voting facilities.

Since the RSGB claims to reflect the views of all amateurs, and not just those able to attend their AGM, I was amazed at their complacent, undemocratic attitude. Council obviously does not want or expect all its membership to attend its meetings, since the Institute hall would not hold even one thirtieth of the RSGB membership.

Ross Burton says there is no use grumbling if you don't attend. This same argument has been used for years by those few left-dominated trade unions who organised their meetings when most of their members were at work—and we all know what happened to them when postal ballots were enforced.

It is up to the RSGB to prove its claims and provide proper postal voting facilities for all important issues. If they can do it for council elections, they can do it for constitutional issues.
Steve Mitchell G1WBN, Lincoln

THE G3GZT SAGA

Prior to the war I was a keen amateur radio experimenter, with a desire to obtain an amateur transmitting licence. However, not knowing what was required or how to go about obtaining it, I was unable to proceed further!

Along came the war when I was trained in electrical engineering, whilst employed by Allen West in the experimental test department. I was working on

secret degaussing equipment for the Navy and later anti-acoustic mine defence oscillators, etc. I later volunteered for the RAF and finished as a top flight engineer, flying for Coastal Command on Liberators and Mitchells (B24s and B25s).

When hostilities finished I found myself involved in show business. Still keen to obtain a licence—I had already been a member of the RSGB and the local radio club for some

time—I took the Morse test at the local head post office (in the days when telegraphic officers worked there and were authorised to test candidates).

The RAE was next, but this caused problems. At the time this was only taken once a year, in May, but *only* in the evening, and due to my contract of work I was not able to attend. I got in touch with the RSGB, who were then in Little Russell Street,

London, and the City & Guilds Institute, trying to find some way of taking it during the day, with paid invigilators taking care to see that confidentiality was adhered to. This was refused.

However, in the next year (1950) I took the exam at the expense of turning down a contract. This resulted in my being unemployed for some 10 months. The licence G3GZT was granted and I went 'on the air' for the

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This is to record that

Reginald Moores

passed the Institute's RADIO AMATEURS' EXAMINATION
in the year 1950.

B. Moore

Letters		Figures	
Corrected	Uncorrected	Corrected	Uncorrected
Sending	3	0	2
Receiving	0	0	0

This is to certify that Mr Reginald Moores has today taken the Amateur Radio Morse test at the session detailed above and has been adjudged:

Date: 19/5/50

FAIL	PASS
Examiner 1: <i>[Signature]</i>	Examiner 1: <i>[Signature]</i>
Examiner 2: <i>[Signature]</i>	Examiner 2: <i>[Signature]</i>
Date: <i>[Signature]</i>	Date: <i>14/1/1950</i>
Validated: <i>[Signature]</i>	Validated: <i>[Signature]</i>

21059

L·E·T·T·E·R·S

required 12 months. At the end of this period I applied for a 150W phone licence but was informed that, because there were some gaps in the operating year, I would have to continue for another 6 months and attend a further review, even though I had worked many countries and stations; far more than would normally be expected.

Later, after operating for some time, I went to work in Hong Kong obtaining a VS6CD licence to work from there. After 1954 I again found myself abroad and allowed my licence to lapse unintentionally. Upon reapplying I was informed that I would have to sit the Morse test again. Not unnaturally, having already taken it and knowing so many other amateurs who had been granted licences without having taken either the Morse test or the RAE, I left the matter 'in limbo', so to speak.

I am now retiring, and

decided to reapply for my call as I felt I would be able to put it to good use, in addition to keeping up with the several languages that I have learned during my travels.

I applied for a Morse test, although it had been announced that any Morse test now taken would be 'valid for life' (nothing being announced by the DTI about it being 'retrospective' - this was published later in *Radcom*). Anyhow, I wrote many letters to the DTI about renewal and eventually a form arrived marked 'reissue of G3GZT'. This was returned at once with the required cheque on 16th September 1986.

In the meantime, very many others were getting their 'tickets' without any problems, but despite further letters and phone calls, nothing! Then one day I had a call, left on an answering machine, saying that as the C&G did not do the RAE in

1950, my RAE cert was invalid. After several more letters I have now received a letter saying that although I don't need to take the Morse test again (I've already done this - again), 'I will have to resit the RAE.'

Well, what should I do? Should I put on my blindfold and take my pin to complete the multi-answer exam, or what? Maybe it's some sort of vendetta by the civil servants, ensconced in their well-paid, inflation-proof, early retirement jobs, trying to prevent legitimate licence issue, whilst paying no heed to the masses of illegal transmissions that have been taking place for years (ie pop radio stations, secretarian stations, etc).

Incidentally, I am a world known scientist and have presented papers in universities around the globe (Moscow, Osaka, Florida, Pisa, Toulouse, Darmstadt, London, Kingston Ont). Two

examples of my work are displayed in the Science Museum, London, and my invention, the radio microphone, is listed next to Marconi in the *Guinness Book of Records*. My papers and work have appeared in *Radio Spectroscopy*, and I advise universities worldwide. *Radio Spectroscopy* involves the communication with atomic particles - the DTI are not involved with licensing this, as yet!
G3GZT, Brighton

The DTI have just announced that licences issued before 1958 are now valid for life to bring the licence requirements in line with the new 'life' Morse test (see page 6)

Consequently, G3GZT will now be able to renew his licence without sitting the Radio Amateurs' Exam, and need not have suffered this frustration. Still - all's well that ends well?



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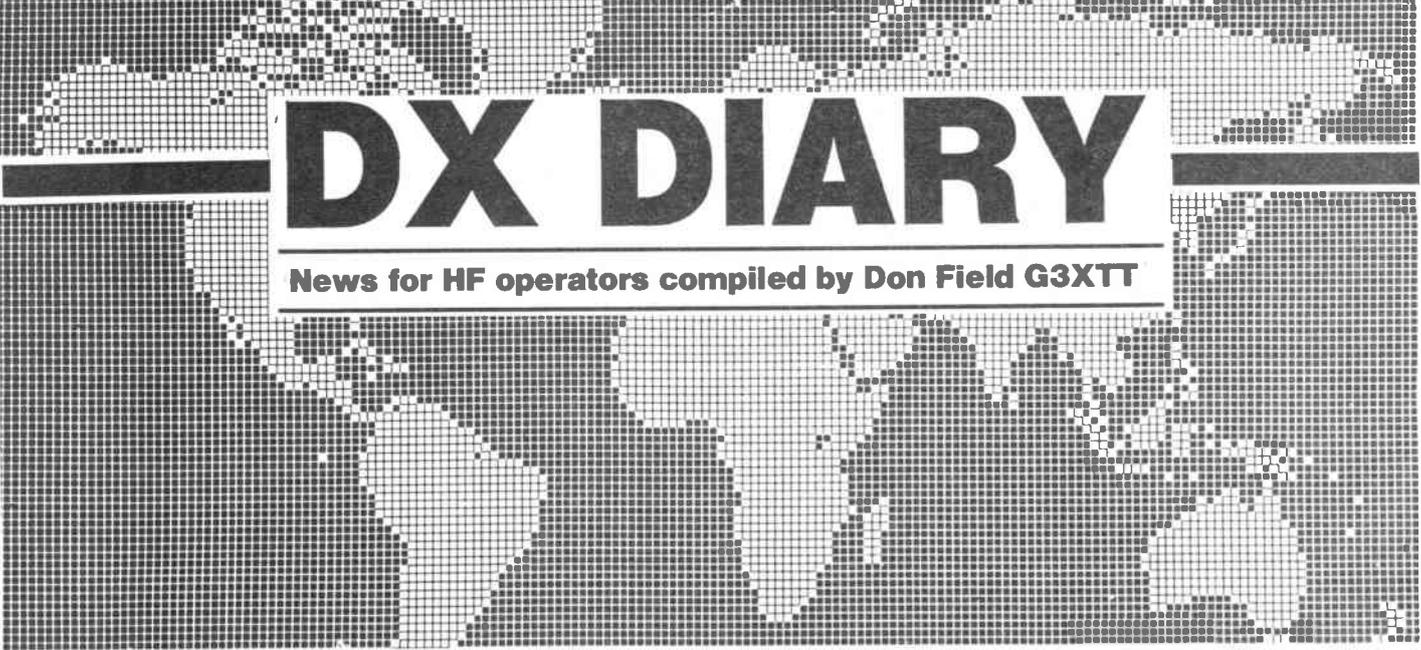
■ **ANGUS McKENZIE TESTS**

G3OSS takes a close look at the Icom ICu2 144MHz FM hand-held and the IC275 144MHz multimode base station

■ **TEACHING MORSE**

In the concluding chapters of his article Roger Alban GW3SPA gives construction details for a Morse oscillator, a head end amplifier, headphone amplifier and power supply for the Morse class

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DX DIARY

News for HF operators compiled by Don Field G3XTT

First this month, news of attempts to put Peter 1st Island on the air for the first time. Remember, if this one comes off, the island will be added to the DXCC list as a new country, so it will be one that no self-respecting DXer or SWL can afford to ignore.

KD7P failed to land on the island in late December, despite getting within 80km of the place, as unfortunately one of the two helicopters on the ship on which he was travelling was out of action and the captain was not prepared to send the other ashore without back-up.

Fly the flag

However, despite my pessimism in an earlier column, it still looks as though an early operation from the island might take place. As I write this piece a group of Norwegian DXers are busily trying to raise funds to join a major mapping and research operation to be carried out by the Norwegian government, one of the aims of which is to 'Fly the Norwegian flag on Peter I'. At the time of writing a considerable sum of money had already been pledged by various DX foundations and clubs, including the UK's Chiltern DX Club.

The most likely dates for an operation are from about 28th January until 5th February, so I hope you are prompt in reading this column! The two Norwegian amateurs who will travel out to the island are LA2GV and LA1EE, and the most likely callsigns to be used while there are 3Y2GV and 3Y1EE. If the operation takes place, I'm sure you will

have no trouble finding them on the bands. Just listen for the pandemonium! Working them will be another matter entirely. For the latest information remember to check the Hambank telephone number: 01-725 7373.

Comoros/Mayotte

Lloyd and Iris Colvin are still active from the Comoros (D68QL) as I write this, after operating as FH/W6KG from Mayotte during November and from Reunion as FR/W6QL prior to that, from where they made 8,000 contacts with 148 countries. By the time you read this column they will have moved on again, possibly to the Seychelles or the Maldives.

Until 1975 the Comoros group of four volcanic islands in the Mozambique channel counted as a single DXCC country with the prefix FH8. In 1975, after a referendum, the islanders of Mayotte voted overwhelmingly to continue their links with France, while the other islands voted for independence.

Mayotte was, in fact, the first of the four islands to be occupied by the French, who later offered protection to the Sultans of the other islands when they found themselves under frequent attack. Protection turned, in due course, to protectorate. Nevertheless, France would have dearly liked to give all the islands their independence and is under continuing pressure from the United Nations and other bodies to do just that. On the other hand, the islanders of Mayotte are pressing for even

closer ties with France in the form of becoming a full département of France, in the same way as, for example, Reunion and Guadeloupe.

Mayotte's population is just 67,000 and that of the other islands about 400,000. Nevertheless, these islands are the most densely populated region in Africa and the population is expected to double by the end of the century. The prime export is scented leaves from the local trees which are a principal ingredient in several leading French perfumes! The islands continue to have some political notoriety offering, for example, one of the few staging posts available to aircraft flying north from South Africa.

Despite being off the beaten track, there are resident radio amateurs on both Mayotte and the Comoros and, as I write, FH4ED is active from yet another French Indian Ocean island, Glorioso, as FR/G/FH4ED. He was due to be there until mid-January, at which time FH4EC was due to take his place for at least another month. Check 14110kHz in the afternoons (in French!), or 14060kHz on CW.

If you would like to read more about the Comoros, an interesting article about them appeared in the October issue of *The Geographical Magazine*.

Marion Island

If you look well south of the Comoros on your map, you will eventually find Marion and Prince Edward islands, which belong to South Africa (see my December column). I

note from the TV news that South Africa is contemplating building a runway on Marion Island, which should make it more accessible. The bad news is that this is because they plan to use the island for nuclear testing, in which case I can't see many radio amateurs being allowed out there. We shall have to wait and see.

Meanwhile, there is an unconfirmed report that the ZS2 prefix previously used from the island is to be replaced with ZS8 to avoid confusion with mainland ZS2 stations.

Libya

Having said last month that further authorised operations from Libya seem very unlikely, 5A0A has recently been very active in the mornings on 15 metre CW, albeit with a very weak signal. The operator is Herbert SP6RT, who teaches at Benghazi University. According to *DX News Sheet* he has been able to obtain an amateur licence for the purpose of 'investigation into ionospheric radio wave propagation'.

He appears to be confined to 21005kHz and is not allowed to enter into an exchange of anything other than signal reports. Several DX foundations have offered to help with gear and antennas if Herbert's activities are accepted by the DXCC desk. He should be there for another year or two, so keep your fingers crossed!

Heard Island

Frank VK0DA was surprisingly active on 20 metres

SSB in late December, often with a good signal into Europe, and getting very few takers. This is really quite remarkable given that Heard Island must still be regarded as one of the rarest DXCC countries. If you managed to catch him, the QSL route is via VK9NS.

Cocos Island(s)

T19W appeared unexpectedly from Cocos Island in late December, apparently with T12KD as the operator. There were also rumours that T12CF and T12J were due to operate from there during February, so keep an ear to the usual DX frequencies.

Cres Thursby-Pelham VK9YC has written to *DX News Sheet* from the other Cocos Island, Cocos (Keeling) in the Indian Ocean. Cres has returned there after a spell in the UK and can now offer what he calls 'The Cocos DXperience' - holidays for radio amateurs and their families in luxurious accommodation in this remote and idyllic spot, along with the use of a fully equipped HF station. Further details are available from Cres at Oceania House, Home Island, Cocos (Keeling) Island, Indian Ocean 6799.

Indian Ocean

While on the subject of the Indian Ocean, which seems to be featuring quite prominently this month, Joe WA6VNR and his wife KB6MME will be touring the area by boat during March. Their itinerary is not yet finalised, but they hope to operate from various locations, mainly on CW on 7002 and 14005kHz.

Yoland FR5AI hopes to operate from Tromelin Island during March and from Europa Island later in the year (possibly in September). It is some time since either of these were activated, so keep an ear to the bands. As evidenced by the recent operations from FH, FR/G and D6, propagation down that way tends to be quite reliable on 15, 20 and 40 metres. All that we need is the activity.

The Caribbean

Turning our attention to the Caribbean, FS5IPA will be activated by a group of French amateurs from February 26th until March 12th. QSLs go to F5SX. I find the use of the FS prefix quite

surprising as it is not officially recognised by the French authorities. Normally FG call-signs are issued (St Martin is part of the French department of Guadeloupe) and /FF appended by amateurs to indicate their actual location.

The Venezuelan national society is mounting an expedition to uninhabited Aves Island (the island of birds) to celebrate its 20th anniversary. The operation will take place from 16-22 March, with the call sign 4M0ARV. Frequencies to check are 1825, 3525, 7025, 14025, etc on CW, and 1825, 3795, 7095, 14195, etc on SSB. The QSL route will be PO Box 3636, Caracas 1010-A, Venezuela.

Sudan

Back now to Africa, where PA0GAM will be commencing an 18 month spell in the Sudan during March. He expects to be active on 80-10 metres SSB/CW/AMTOR and will also try to obtain operating permission for Top Band (ST2AY, alias G3UPK, was the last amateur to operate on 160 from the Sudan back in the early '70s). PA0GAM has also been involved recently in supplying information to the Bhutan PTT to help them frame new amateur licence regulations. However, there is no immediate prospect of any activity from there.

Vatican

Some sad news to the effect that HV2VO, the station at the Vatican Observatory, is no longer in existence. I believe this leaves just two stations active from the Vatican - HV1CN and HV3SJ.

Prefixes

The autumn contests brought a crop of unusual prefixes to the bands. IU0 was used by ISO stations during December, ZL2AG/ZF8 was active from Little Cayman Island, VI5AQZ from Australia, ZV8WAS from Brazil, ZB40ANV from Gibraltar, 3G9SBY from the South Shetlands and many others. It is also possible that the prefixes for KX6 (Marshall Islands) and KC6 (Caroline Islands) may change soon following full independence for these island groups from 1st January.

CX0XY will be operational during February from King George Island in the South

Shetlands. LU6UO was also due to be active from South Shetland during January and February. There have also been reports of some VP8 activity from the South Sandwich group, but I view this with extreme suspicion. It is many years since any British amateurs operated from there, though it would certainly be nice if something could be done about that.

Japan

The Japanese allocation at the top end of 80 metres now extends down to 3791kHz, which should make life easier for all concerned. *DX News Sheet* reports that the Japanese PTT will soon start reissuing old call signs, as it is running short of suitable new ones. Japan now boasts over 600,000 amateurs, which must make amateur radio one of the country's most popular hobbies. The majority live in the Tokyo area, which must make life difficult. It's a wonder, with all that potential QRM, that Japanese manufacturers don't pay more attention to the intermodulation performance of their transceivers, seeming instead to concentrate on all the bells and whistles.

Keep clear of JA

While on the subject of Japan, GM3WTA makes a plea that UK amateurs keep clear of the JA 'window', 1907.5-1912.5kHz, at JA sunrise (between 2100 and 2200GMT during the DX season). Some UK amateurs have become very abusive when asked if they would mind moving, which seems very unreasonable considering that much of the top end of 160 is usually void of activity. Mind you, my own experience is that a bigger problem is caused by the Russian amateurs who persist in calling JA stations co-channel, making it impossible to hear the weak JAs in Western Europe. The usual practice is to work 'split' with stations at the European end of the path transmitting around 1825 or 1835kHz, while listening in the JA window.

Split operation on Top Band seems to have gone out of favour in recent years, as far as working across the Atlantic is concerned, mainly because there are now more well equipped stations and signals are stronger in both directions, but the overland path to

Asia is a different matter altogether. In fact, although the transatlantic path on Top Band was cracked even before the last war, the first Europe to Japan QSO only took place in the early '70s, with OK1ATP at the European end.

Incidentally, I have in the past tried to compile a list of UK 'firsts' on Top Band, but Top Band DXers are a shy lot and there are still many gaps in my list. If any readers know of what they believe to be 'firsts', I would be delighted to hear about them.

Pacific

KL7LF/KH3 is now active from Johnston Island, and will be there for a year. WB4MJH/KH3 has also been reported working the UK on 40 metres.

Nets

An informal group of DXers meets at 2230GMT daily on 7049kHz. DK0DX operates a DX information net on 3745kHz each Friday from 1800GMT, and Bill G3MCS runs a DX get-together on 3773kHz on Mondays from 1900GMT.

Contests

Finally, the February contest calendar includes the Dutch PACC Contest from 1400GMT on the 14th to 1700GMT on the 15th, and the French SSB Contest runs from 0600GMT on the 21st to 1800GMT on the 22nd. The latter includes all the French overseas territories and ex-territories, so it can be a good opportunity to pick up some rare ones. The main event of the month though is the ARRL CW Contest, a full 48 hour event on 21st/22nd February.

Golden opportunity

The ARRL contests are a golden opportunity to work rare states, and many UK stations take part every year. Basically the idea is to work as many US stations as possible, with states acting as multipliers. Logs go to the ARRL. The SSB leg is over the weekend of 7/8th March. Also, book early with the wife for 21st/22nd March, the weekend of the Bermuda Contest. The leading UK station wins a holiday in Bermuda, which must make it *the* contest to enter.

Good luck with all the above. 73 for another month.

AKD

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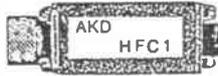
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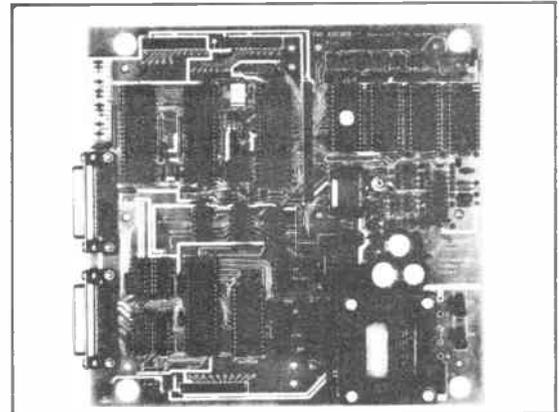
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TEACHING MORSE

Roger Alban GW3SPA solves the problem of finding a local Morse class – he shows you exactly how to start your own!

In the period of the low sunspot cycle, DX contacts on phone prove difficult to obtain on the HF bands. Consequently, a large number of amateurs have been turning to CW to obtain DX contacts, and the SWLs and class B licence holders appear to be taking a greater interest in learning the Morse code. This has arisen partly as a result of the RSGB being appointed by the DTI to take over the running of the UK radio amateur Morse testing and test centres being set up in each county, and partly because the examination fee has been reduced. Further interest in the use of CW has arisen with the introduction of the use of CW by class B licence holders on 2 metres.

With the upsurge in interest shown in the use of CW, many students have experienced difficulty in finding local Morse classes and are faced with the arduous task of self tuition using Morse records, tapes, and electronic Morse tutors. The objective of this series is to encourage local radio clubs to train their members in the use and practice of Morse.

To this end this series will commence with the development and use of the Morse code, and then provide detailed information on the techniques required by club members who are telegraphists to assist with the training of other members in the use of the code. The series will conclude by providing details of a universal Morse practice oscillator that can be built by club members as a constructional project, and provide the required equipment for the teaching of Morse.

CW advantages

If you listen to the short wave bands you will hear a band full of exotic sounding CW call signs at any time of day or night. When the bands appear to be dead, and you can just copy weak phone signals, the band will still be alive with many CW signals. Why should this be so? The answer is quite simple: to communicate human speech requires a wider bandwidth than that required for a CW signal. With a smaller bandwidth the signal to noise ratio of the receiver is significantly improved, and the threshold at which signals can still be received above the noise level is therefore extended.

Also, it is possible for the human ear to

be able to resolve CW signals which are only marginally above the noise level, whereas SSB signals of the same signal level could not be copied. It has been suggested that CW has an advantage of approximately 20dB over SSB signals. Consequently, it is important for the receiver to contain a narrow bandpass filter for CW reception.

For example, I have purchased a 250Hz, 8 pole crystal filter, from IQD Ltd, for my Yaesu FT902 transceiver, which makes a tremendous difference when receiving CW signals. Bandwidths of less than 150Hz are not recommended because of the increased tendency of the filter to ring; ie the dits and dahs tend to become a continuous tone. So, why aren't more amateurs using CW and upgrading their class B licences by sitting and passing the Morse test?

Inbuilt fear

The answer can be found in the correspondence columns of many amateur radio magazines. There seems to be a large number of newcomers to the hobby who would like to abolish the 'tiresome' Morse test as a pre-requisite for HF operation. The grass root feeling is that the words *Morse code* strike such fear into the hearts of class B licensees and SWLs that they allow it to become a block to obtaining the amateur class A licence. This is unfortunate as the Morse code is the key to an untapped field of radio pleasure.

Make no mistake about this – it can be mastered very quickly, easily, and pleasantly, and it is not some form of self inflicted punishment, but rather an additional source of enjoyment which can be yours for very little outlay. The benefits received will far outweigh the self discipline involved, so why not take the plunge now and jump in with both your eyes open; you will never regret it. All it takes is some basic learning principles, then practice, practice and more practice.

Learning CW

How do you go about learning CW, you may well ask yourself? Isn't it a task that requires the assistance of a second interested party? The short answer to this question is no, this venture is a purely personal one that can be embarked upon by you alone. If you own a short wave receiver you can listen to

slow Morse transmissions organised by the RSGB.

To receive a CW signal your receiver must have either a device for detecting SSB signals, or a beat frequency oscillator (BFO). There are many SWLs who do their listening on an ordinary broadcast receiver which will require a BFO, for without one the incoming CW signal will be heard only as clicks in the loudspeaker. This requirement is easily fulfilled by the addition of a simple external transistorised BFO, as described in the December 1985 issue of *Amateur Radio*. This BFO was intended for use with the Eddystone EB35 receiver, but can easily be modified for a wide range of different receivers.

Another possibility is to buy one of the pre-recorded Morse courses which are available on cassette or variable speed records. In addition to this there are a number of electronic Morse tutors which can send various groups of letters and numbers. Although both of these are very helpful, they both have disadvantages. When using the pre-recorded tapes they have to be played several times, and it is surprising how easy it is to learn what is coming next. The electronic Morse tutors do not suffer from this as they send random letters, however they still do not send plain language. To overcome this problem it is worth trying to obtain, or record, several tapes of plain language, using them as long as the contents are not remembered.

The role of the radio club

The task of learning Morse can be made easier and more enjoyable by learning and practising the skill in a class amongst other students. This is where the large number of amateur radio clubs scattered across the country can play an important role. It is the responsibility of the club chairman and the committee to see that a balanced programme of events is arranged to provide further learning in the skills of construction and Morse tuition.

Many club secretaries will complain that it is difficult to find members who are prepared to turn up week after week to teach Morse. The solution is for the club to offer some inducement; perhaps a small payment out of the club funds. After all, the club member is paying an annual subscription and will expect to receive something in return, besides the



opportunity to meet on a club night with other enthusiasts of the hobby and natter about the DX that got away!

The technique of teaching Morse

Many amateurs have learnt their Morse by themselves, and although they now consider themselves to be proficient telegraphists, have little or no idea how to set about teaching Morse if asked to do so. I was fortunate enough to learn Morse during a course for the then Post Master General Certificate to become a Radio Officer in the Merchant Navy. The teaching technique used in this series is based on the experience gained on this course, and should help those telegraphists who would like to assist others to master the Morse code. The speed at which the student learns can obviously be improved by adopting the correct teaching technique.

First of all, obtain a sheet of peg board and number the horizontal rows from zero to 25. This will represent the Morse speed obtained by each student. Now here is an unexpected twist! Along the bottom of the peg board use self-adhesive tape to include the name of every paid up member of the club, and this includes the chairman and committee members. Why should the score board be restricted to students in your Morse class! This will encourage all your club members to become actively involved in improving their own individual Morse speed. Finally, attach the peg board to a wall giving prominence for everyone to see.

The individual speed of members can be indicated on the peg board with plugs, using a different colour for the plain language Morse speed, and another colour for the receiving speed for figures. Each member should receive a Morse speed test at least every two months, if not sooner. This will also help to prepare the student to control his or her nerves when sitting the official test. Do not be alarmed if students seem to reach a plateau with their receiving speed; this is a common event, and encouragement must be given to the student to offset the difficulty.

Teaching technique

The next problem is which teaching technique should be used? Firstly, throw away any fancy keys, such as bug or electronic keys, as such devices are strictly for the shack or club competition. It is the prerogative of the teacher to show encouragement to the student by sending perfect Morse, at any speed up to 25wpm, using an ordinary straight hand key. However, the student should not be allowed to use any form of key initially, as your immediate aim is to teach the student to receive Morse.

Perfect Morse or mechanical Morse used to be called Post Office Morse, because the timing elements of each dit,

dah, and space would be correct. For the timing to agree with the international standard for Morse code signals, a dah should be equal to three dits, the space between the signals forming the same letter equal to one dit, the space between two letters equal to three dits, and the space between two words equal to seven dits.

Before running a Morse class it is worth-while sending a suitable piece of text which contains no numbers using a straight key, varying speeds from 1wpm to 12wpm. Use a pencil and mark off each group of five letters, each group representing a 'Morse' word. Depending upon what speed you will send at, pencil in timing marks every fifteen seconds of sending time. With the aid of a stopwatch you should be able to keep to the sending speed you have chosen.

Having blown the cobwebs off of your straight hand key, and gained some confidence, the time has arrived to examine the technique of teaching Morse. Initially you will require a blackboard together with a Morse oscillator. The Morse code for each individual word can be broken down into smaller groups of letters. It is wise to teach the student groups of letters at a time, not passing onto the next group until everyone has mastered and remembered the first. It is also important that the student recognises the individual sounds that the Morse code makes for each individual letter, rather than have the student learn the code for each letter parrot fashion.

First letter group

The first group of letters will comprise E, I, S and H. Write these letters in large capital letters on the left hand side of the blackboard in a vertical column, with E at the top. Alongside write the Morse code for each letter. With the straight key plugged into the Morse oscillator, key each letter slowly, starting with E and repeating it several times. Make sure that the student recognises each letter in this group by asking them to write down the letter they hear. After a while you can start to make it interesting by making up a number of complete words, such as IS, HIS and SHE. When each student has mastered this group of letters, move onto the next group, which comprises T, M and O and repeat the process.

You can now make up a number of words, such as TOM, TISH, SOME, IT, MISS, THE etc. Leave plenty of long gaps between sending each letter to allow the student to absorb the sounds for each letter separately. Do not move onto the next group until everyone in the class is able to recognise these two groups of letters. When you are happy that everyone is with you, add the next group (A and N). Do not, for whatever reason, be encouraged to move onto the next group

of letters because a small percentage of your class have quickly mastered this group. The next group of letters consists of K and R, followed by D and U, and G and W.

What is now left to learn is letters in which the Morse code comprises 4 elements. Start with the group B and V, then include P and X, followed by Q and Y, F and L, and finally C, J and Z. It is important to remember to keep each group learnt written on the blackboard for students to examine if they experience difficulty in remembering a particular letter. It is also important to ensure that students do not get left behind at this stage. Take your time, as you will find that occasionally some students will miss a session because of outside commitments.

Practice and more . . .

The next stage in the learning cycle is to provide practice for the student. It would be useful if each radio club could find more than one teacher to assist with this task, as not only will it lighten the burden but it will also give the student experience of another operator. At the end of each teaching session, set a number of speed tests in which every student will participate, and record the results on the peg board.

Teaching sessions should not last for more than one hour, as the student is likely to become tired and the speed of learning will consequently suffer. It is worth holding a post Morse class after the earlier session has ended to save packing the equipment away. When starting a post Morse session, the sending speed should be at the rate of the slowest member of the class. The starting speed is likely to be less than 12wpm, because the last thing you will want to do is frighten members away by sending at a speed far faster than they can read. For those speed merchants in your class hold a speed test towards the end of the session, and record the results of these on the peg board with the other results.

Be lenient

Be fair when examining the Morse receiving papers of students, and attempt to mark on the lenient side to give further encouragement. For a student to pass a receiving test, he or she is permitted to make up to 4 errors. A word in which more than one letter is incorrect counts as a maximum of 2 errors. This conforms with the test procedure used in the official Morse test. When the beginner has reached a Morse receiving speed of approximately 5wpm, the student can continue the Morse receiving practice at home using either tapes or an electronic Morse tutor.

When sending a passage of text, always commence with CT and terminate the text with AR. This will also help the



student to become acquainted with the procedures that are used in the official test.

Sending

When the student has reached a sending speed of approximately 10wpm they can be taught the correct way in which to send Morse code using a straight key. Up to this point in time the student should be encouraged not to touch the Morse key, because any bad habits picked up at this point will prove difficult to correct. The student should be encouraged to obtain his or her own personal key, and taught to sit comfortably at a table with the key positioned at the table edge, close by the right hand. The height of the chair should be adjusted, if possible, to ensure that the wrist and forearm are horizontal when the index finger and forefinger are resting on the tip of the key.

The way in which the key is held will depend upon the preferences of the student, but DK1BP produced a QSL card, shown above, which shows the numerous ways of using and holding a typical German style flat knob key. I prefer to rest the tip of the index and forefinger on the top of the key knob, and position the thumb to rest on the front underside. The student will tend to grip the key at first, but should be persuaded to let the weight of the wrist to fall downwards to depress the key.

Avoiding the 'glass arm'

The correct motion is for the wrist to move up and down without undue movement of the forearm and elbow, with a gentle pressure of the forefinger. Provided the key return spring is not too tight, nor the gap too great, this style produces least fatigue. If this technique is not adopted, the student will find difficulty in sending for a period of up to three minutes, as required by the official test, and will suffer from fatigue, which is commonly known as developing a 'glass arm'. The student should not try and hurry his sending, but be encouraged to send slow rhythmic Morse rather than stilted fast Morse. Keying practice is of great benefit as it impresses the true sounds of the student's fist. Practice at home should be encouraged and, if possible, a recording of his or her own sending made. This can be played back at a later date so that the student can determine his or her own faults. In general the good telegraphist is the one whose Morse is easy to read and who does not try to impress by sending faster than they are really capable of doing properly. It is important that the student should be watched in the early days of key practice to ensure that the correct style is maintained and that bad habits do not develop.

It is only too often that one hears of a student who has passed the Morse test

and confesses, over the air on phone, that they have not continued with using Morse because they suffer from some medical complaint which results in fatigue after only a few minutes of sending. The probable reason for this is that they have not adopted the correct style. How many instructors have witnessed the student bunching over the key and the keying action actually bouncing the key across the table! Even in the post Morse class I would recommend that members should only use a straight key. As mentioned earlier, bug and electronic keys should only be used in the shack and during club competitions.

In the post Morse class, and in the beginners' class when the average receiving speed of the class has reached about 10wpm, an individual can be encouraged to send Morse to his fellow

station with other club members available to render assistance if required.

Figure learning

The teaching of figures can commence when the student has mastered at least 5wpm plain language. Again, the use of the blackboard will be required. In a vertical column on the left hand side of the board print the numerals, commencing with 1 at the top and zero at the bottom. Alongside the numerals write in the corresponding code for the Morse character. The teaching technique is similar to that used in first teaching the student the Morse code alphabet. At a later stage, and only after the student is thoroughly familiar with the alphabet and numerals, you should include punctuation, and possibly accented letters.

Before a student is encouraged to apply to sit the official Morse test, it is wise to attempt to get the student's receiving speed up to at least 14wpm. This will help the student to settle in more comfortably when the dreaded day for the test arrives.

The Morse class room

Having mastered the technique of teaching the student Morse, the most difficult obstacle to overcome will be finding the right room in which to hold the class. Most club premises are either college buildings, public houses, or leisure centres, and it is not always possible to find a room that provides the required degree of silence for Morse to be taught.

Ideally the room selected should be quiet, and should contain a number of tables and chairs so that the students can be seated at a reasonable writing height. Sufficient space should be available for the instructor to set up the Morse practice oscillator and for the students to be reasonably spaced.

The selected room should also be in easy reach of the other members of the club, that is if you are going to stand a chance of capturing the interest of the remaining club members, and have them participate in the peg board scheme.

If you intend using a loudspeaker with your Morse practice oscillator, then the acoustics of the room will play an important part. For example, a lack of carpets and wallpaper will make the sound reverberate around the room, adding to the difficulties of the student. In a large number of educational establishments you will experience difficulty in finding a room that has the required acoustics for the teaching of Morse. The solution is for the student to wear headphones.

Next month

Build your own Morse oscillator, head end amp, headphone amp, and power supply. Don't miss it!

COMMON ABBREVIATIONS

ABT about	NR number
AGN again	OM old man
ANT antenna	OP operator
BCNU be seeing you	OT old time
CFM confirm	PA power amplifier
CLD called	PSE please
CONDX conditions	RPRT report
CUD could	RPT repeat
CUL see you later	RX receive/receiver
CUAGN see you again	SA say again
DE from	SED said
DR dear	SIG signal
DX long distance	SKED schedule
ES and	SN soon
FB fine business	SRI sorry
FER for	STN station
FONE phone	SUM some
FREQ frequency	TKS/TNX thanks
GA good afternoon	TMW tomorrow
GB goodbye/God bless	TU to you
GD good day	TX transmitter
GE good evening	UR your
GLD glad	VY very
GM good morning	WID with
GN good night	WKD worked
GND ground	WKG working
HI laugh	WL will
HPE hope	WUD would
HR here	WX weather
HRD heard	XYL wife
HV have	YL young lady
HW how	73 best regards
MNI many	88 love and kisses
ND nothing doing	

students. It will give the student confidence and expose the other students to the Morse fist of another.

To make the class session interesting, the students can be introduced to the common abbreviations listed in the table, which he or she is likely to encounter when working CW. Mock QSOs can be held using fictitious call signs, which will prepare the student for the day when the class A licence pops through the letterbox. Some students do not use CW after obtaining their class A licence because, although they are familiar with the technique of conducting a QSO on CW, they have not actually had one and therefore lack confidence. As soon as a club member obtains the class A licence, he or she should be encouraged to work the club radio

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ANGUS MCKENZIE

TESTS

Yaesu are continuing to expand their range of hand-helds with the introduction of the FT23R for 144MHz FM, and the FT43 for 432MHz. The FT23R is a very fascinating little rig and offers over 3W output on the normal FNB10 NiCad battery supplied with it, whilst the optional FNB11 increases the available power output to 5W. The rig costs £249 including VAT and the FNB10 (7.2V and 600mAH), whilst the FNB11 (12V and 600mAH) costs an additional £42. Although a 110mm rubber duck is supplied, you have to pay an additional £11 for the NC28C trickle charger, thus in reality making the system cost £260, virtually the same price as the new Icom μ 2 which I will review next month.

Useful features

The FT23 does have some novel and most useful features. Most unusually for a hand-held, a mini tuning knob on the top panel clicks round in either 12.5 or 25kHz steps from one end of the band to the other, but when the rig is set to the memory mode it can click round the ten memories. A matrix pad of eight buttons on the fascia provides dual functions for most of the buttons.

To obtain the second function you have to press 'F' first, followed within four seconds by one of the other buttons, which then engages it in its alternative mode. The buttons have the following functions, the second function being in brackets: access memory 0 (priority memory 1), step up (step 1MHz), step down (step 1MHz), dial/memory recall (memory write), repeater \pm /simplex (dial lock), reverse repeater (12.5/25kHz stepping), and subaudible tone squelch (T set) used with optional accessory.

On the top of the rig is a rigidly mounted 50 ohm BNC socket, an audio gain control with on/off switch, a squelch control, a high/low power button, and the stepped tuning knob. Two miniature jack sockets are provided for external mic input with PTT, and a drive to an external headphone or loudspeaker. An optional accessory loudspeaker mic type MH12A2B is available (priced at £22.50) which has a PTT, although it unfortunately excludes up and down stepping buttons.

The fascia of the rig includes the built-in miniature loudspeaker and microphone and a digital display giving frequency, memory channel and status indications, and a bar graph S meter. On the left side cheek is a rubbery PTT button above which is a 1750Hz tone button. I found the PTT and tone rather awkward to use, for if I put my finger slightly too high up the side the toneburst held on all the time during an over, without my realising it. The right side cheek includes a loop through which you can attach a wrist strap.

FEBRUARY 1987



YAESU FT23R

144MHz FM hand-held

The chosen battery slides onto the bottom of the case, and a smaller NiCad is available which gives 7.2V at 250mAH capacity. The transceiver is housed in a zinc and aluminium die-cast chassis case, and the battery cases are made of high impact polycarbonate plastic. There are rubber gasket seals around the controls, to give a degree of waterproofing. The FT23R measures 55 x 139 x

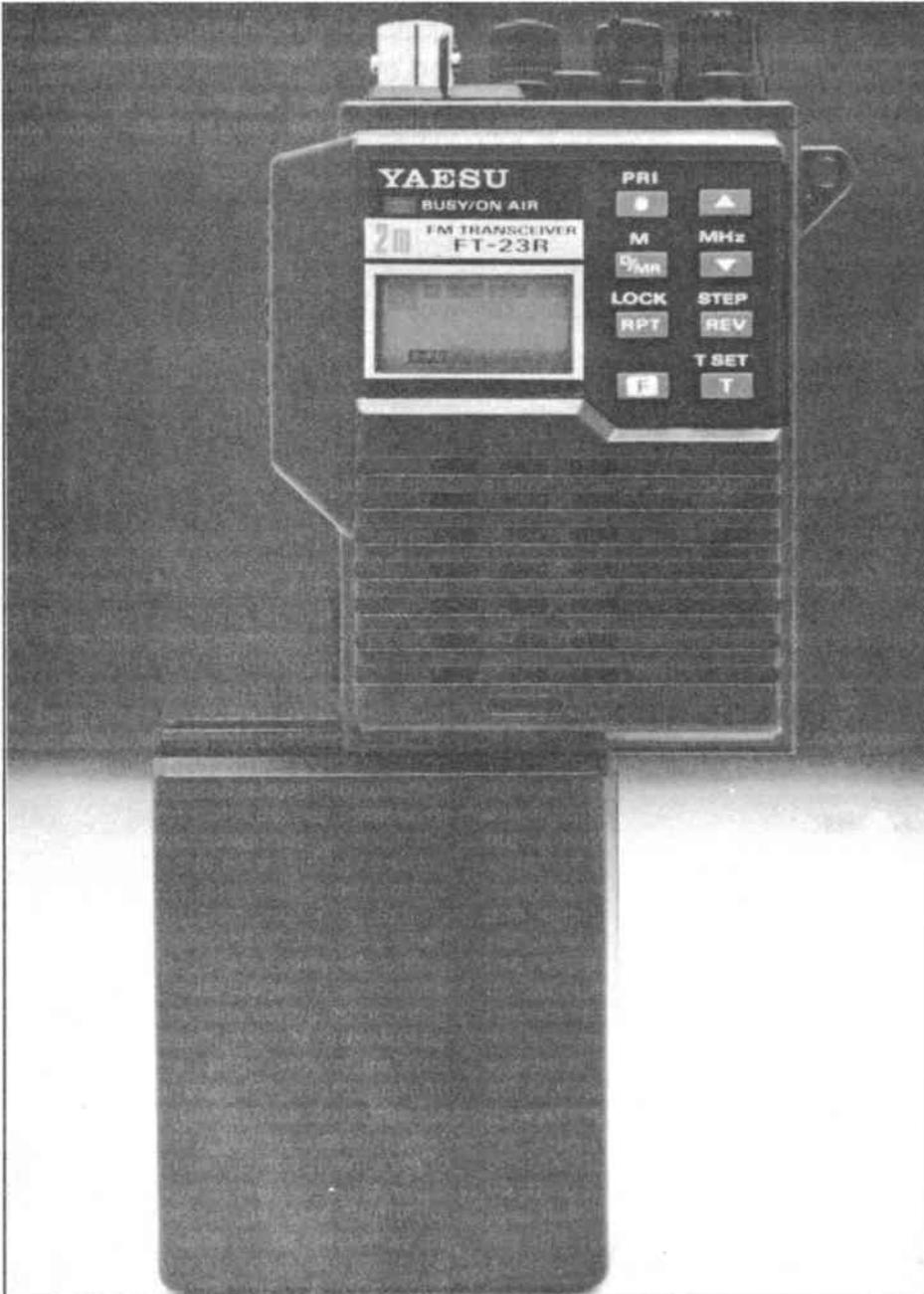
32mm, including FBA10 battery, and weighs 430g.

Subjective tests

I used this rig for a while and obtained some very good reports on the transmitted audio quality. The speech quality was clear, and the transmitted signal to noise ratio good. The optimum distance between the mouth and the rig's fascia

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was about 10cm for an average voice, and if I spoke a lot closer the modulation went into limiting and the transmission became somewhat muffled, which is to be expected as the limiter is before the pre-emphasis.

Good Rx quality

On Rx, the quality was very good for a hand-held, the response being very wide however. This allowed more hiss to come through on weak stations, but improved the clarity of strong ones if the transmitted response was wide.

The maximum acoustic power produced was very limited, there barely being enough volume for normal reproduction at a distance of one metre from the set, and the onset of clipping on the output audio stage was quite marked.

The actual RF sensitivity seemed quite good and I did not note any particular

intermod problems on a dual band collinear, but problems would show up on a higher gain antenna. The selectivity seemed to be rather poor and wider than most other hand-helds, and it was completely inappropriate for 12.5kHz channelling.

Ergonomics

Although the rubber duck was surprisingly short, it was quite efficient and I had no trouble accessing some repeaters from inside my house, even though my location is fairly poor at ground level. I found the rig a little heavy in the hand and I felt it to be rather a mid-way compromise between rigs such as the FT203 and 209 and the real minis such as the Trio TH21E. However, having a 3W capability in a fairly small unit, and as much as 5W with the extremely expensive alternative 12V battery, is quite a benefit.

Convenience of controls

The controls are very well laid out and I rather liked the facility of stepping frequency up and down with buttons, or with the tuning knob. The repeater/simplex button is cyclic in operation and includes both positive and negative repeater shifts. The tone/tone-set key would not normally be used in the UK, but is used with the optional tone squelch board for special applications. A modification is available to allow the receiver coverage to be very wide indeed, covering around 40MHz of the band. This is where the 1MHz up and down second functions are useful.

I noted that you can immediately access memory 0, which you can set to any desired frequency as with the other memories, in addition to the microprocessor allowing you to QSY from the memory 0 frequency in the preset steps in the normal way. You can also QSY from other memories, which were extremely easy to set and use; they also store repeater shifts if required. If repeaters are frequently accessed the reverse repeater function will be much liked, as it is very simple to use.

Sometimes, when stepping with the tuning knob, or even with the buttons, the rig undershot, so it appears that the microprocessor does not step quite fast enough on occasions. The charger takes 15 hours to cope with a flat battery, which I think is too long, possibly forcing you to buy a second battery. The display was quite easy to see at a glance and is very useful on such a small rig.

Although the instruction book is perfectly adequate, I felt that it followed the modern trend of omitting a clearly laid out and easy to read matrix pad button function detail, which I have noticed with too many recent rigs. We had to hunt through the manual each time we wanted to find out what a particular button did, so anyone using the rig for the first time in an emergency could also find this rather frustrating. Of course some of the buttons are obvious, but others, for example '.', are not obvious, this particular example actually giving direct access to memory 0.

Lab tests

The RF input sensitivity was about the same as that of the FT272R and the FT209R models, and I would describe it as being quite good. Bearing in mind the very wide received response, the actual front end noise figure would be somewhat better than the measurement would suggest. The front end intermodulation performance is not very good, the intercept point being rather poor in comparison with other recent rigs. There was also slight evidence of some reciprocal mixing noise up to ± 25 kHz, although this is not really a problem. The selectivity was extremely poor for 12.5kHz channelling, but quite good at 25kHz, and I fail to understand why Yaesu have still not changed to a narrower, say F, filter, bearing in mind that they have been accommodating 12.5kHz steps on

all their rigs for years. A change of filter, incidentally, could slightly improve the subjective sensitivity.

Audio distortion was just about what one would expect, but the maximum audio output power was extremely limited, to around only 300mW. Received frequency accuracy was excellent and the transmit frequency error was only a maximum of 100Hz, which is very remarkable. I was somewhat surprised to note a 5Hz error in the toneburst frequency, although this is well within the limits of UK repeaters.

FM limiting was excellent, the audio output level remaining absolutely constant right down to the threshold of audibility. The frequency response of the receiver was unusually wide, being almost flat from 200Hz to 4kHz, with 5kHz less than 6dB down. However, the bass roll-off below 200Hz was quite steep, and I would have greatly preferred a much steeper roll-off above 3kHz to reduce receiver noise, which would improve the sensitivity measurements.

The S meter is in the form of pairs of black dots on a green background, which start coming on at around 0.5µV, a difference of approximately 12dB being noted between the first indication and one which could be guessed at being equivalent to S9. Around 5µV (EMF/2) produced a full scale quantity of black dots. There is no S meter scaling and it is very difficult to estimate an actual reading, although we have attempted this for the purpose of taking measurements.

Transmit performance

With a fully charged 7.2V battery, we obtained marginally over 3W output, falling back to 3W quite rapidly. When the battery was a long way down we still obtained 2.8W, but this began falling very rapidly near exhaustion. With low power switched in the average output was around 220mW, power being fairly even across the frequency range covered. We did not note any RF harmonic problems, and frequency stability was superb.

With considerable physical exertion required to hoot at a very high level into the front of the rig, I managed to provoke an absolute maximum deviation of just over 6kHz, but the average speech deviation was at around 5.5kHz, just a little on the high side; the toneburst deviation was just about right, however. We also had a look for spurious between 120 and 170MHz, but none was detected above -70dB. We actually measured the second harmonic at 290MHz to be at -70dBc, which is excellent.

Conclusions

This is certainly a hand-held I prefer, for it offers a very good overall performance and is not too large. It is very convenient to operate and gives a high output power for such a small rig. I feel sure that it will become very popular, but I feel that you should consider asking for an F filter for it, which would greatly improve the selectivity. Its closest com-



petition is, in my opinion, the Trio TH21E, which is smaller, lighter and a lot cheaper, but not so convenient to use, and the Icom µ2A, which I will review next month and which looks very promising at around the same price as the Yaesu.

Very many thanks to Alec Allan of Amcomm/ARE, London, for the loan of the review sample, and to Fiona for helping me with all the measurements and beavering away at the word processor.

Yaesu FT23R Laboratory Measurements

Receiver Tests

RF sensitivity	-122.5dBm average
12dB sinad ref 3kHz deviation	-28dBm
RF input intercept point	+8dB average
Selectivity ±12.5kHz	+65dB average
±25kHz	3.8dB
Capture ratio	3%
Audio distortion at 3kHz deviation	
Maximum audio output power for 10% THD,	0.32W
8 and 4 ohms	-129dBm
3dB limiting threshold	

Transmitter Tests (using FNB10 NICad)

Maximum Tx output power	3.2W, average 3.0W
Low power output	220mW
Toneburst frequency	1755Hz
Toneburst deviation	3.8kHz
Maximum possible speech deviation	6kHz
Typical speech peak deviation	5.5kHz
Tx carrier frequency accuracy	+100Hz



ICOM AT150

Automatic Antenna Tuning Unit

Icom has a family of four automatic antenna tuning units, and this is the latest one in their series. Designed specifically to work with the IC735, it can also be used with many other Icom HF rigs, including the IC751, with which I used it for testing.

The ATU can be used to correct VSWR from frequencies of 1.81 up to 29.7MHz. On the back panel are SO239s for interconnection with the transceiver, and for connections to three separate co-ax fed antennas. A fourth antenna, which can be a long wire, can be connected to a clamp terminal for use in the general coverage mode. The ATU is bypassed for antenna 4. Also on the back panel are two parallel seven pin DIN sockets labelled 'accessory'. These should be interconnected with the IC735 with the special lead provided. To allow the tuner to be used with other Icom rigs, an additional accessory adaptor lead, with the normal multi-pin oblong plug on one end and two line DIN sockets on the other, is available which I used for reviewing the tuner.

On the front of the tuner are two buttons: the left one switching in the ATU, and the right one selecting the fourth antenna for Rx. A display on the front panel shows you which band has been selected for operation, the actual band selection being in the form of

appropriate dc levels on one of the wires to the accessory socket. These band data voltages are generated within the Icom transceiver and are standard on all Icom rigs.

The legend 'wait' also brightens up when the ATU is in the course of changing band after the rig has been changed from one band to another. You must not transmit through the ATU when 'wait' is lit up.

Hidden switches

On the top there is a bug-hutch cover which can be unclipped to reveal a series of switches, presets and LEDs. One switch is provided for each band or group of bands, allowing antenna sockets 1, 2 or 3 to be selected independently for each band. This is much easier to use than the method incorporated in the AT500, which required you to solder internal links to get the appropriate antenna through for each band. There are two mini presets for each band, which can be used to obtain a 1:1 SWR at your favourite working point on the band. A switch labelled 'auto/preset' selects completely automatic operation, or the preset position. When in this position, you can look at four LEDs to help you tune for an acceptable SWR. Two of the LEDs work with each preset, either one or the other being lit up to show you which way

to turn the preset for optimum match. When both LEDs go out, the appropriate preset is approximately in its correct position. You can then switch to auto, and every time you re-access the band that you have just set up the ATU selects the preset position first, and then the match is improved to very nearly perfection within two seconds (and often as little as one second) after RF has passed through on Tx. A short whistle, or even speech on SSB, can be enough to allow the tuner to match correctly. You should carry out this procedure on each band, having selected the appropriate antenna.

Better in practice

Although the Icom is specified as matching SWRs of 3:1 or better, I found that it can cope with far worse than this in practice. The ATU is designed to handle up to 100W of continuous carrier, but the manual infers that it can also take a maximum of 200W PEP. The minimum input power to operate the matching circuits is 8W. The time taken to switch bands is a maximum of 3 seconds, with tuning accomplished in 2 seconds or less.

The insertion loss is quoted as 0.5dB maximum, but I noted substantially less loss than this in practice. The ATU takes a maximum of 0.5A at 13.8V dc during operation, measures 94 x 180 x 239mm and weighs 3.1kg. It is finished in grey and is housed in a metal cabinet with two feet at the back and a pull-out bail stand at the front.

How it operates

A detector circuit measures the degree to which the resistive component of the antenna and transmission line differs from 50 ohms when RF passes through the ATU. Lower resistive values generate a positive voltage, whilst higher values than 50 ohms generate negative voltages. Similarly, another circuit looks at the lead or lag of current reference voltage, again generating appropriate dc voltages. Zero voltage is generated when current and voltage are in phase. These voltages are amplified and pass through circuitry which allows motors to drive two variable capacitors to positions which correct the resistive and reactive components. The basic circuit is a T match, with the two capacitors in the top part of the T, and the switched inductance from the centre of the T to earth.

Complex circuitry controls relays which switch the coils appropriately for each band. The circuitry also operates the 'wait' sign until the ATU is ready for operation. The band data from the main rig is in the form of continuous dc voltages within fairly tight borderlines, the actual centre voltage changing for each band. A comparator IC detects the band and operates the coil switching circuits. The amazing part of this type of design is that it is extremely rapid in operation in comparison to other makes of automatic tuner that I have checked.

Subjective performance

I normally use my Icom IC751 with the IC2KL linear and IC-AT500 tuner system as an alternative to the Trio TS940S in my shack, and the AT500 works extremely well at the maximum rated power of the system (500W PEP throughput). However, the AT500 is very expensive and if you only require an ATU with a 100W capability, either the AT100 or the 150 will be suitable for Icom equipment. I interconnected the AT150 with my main antenna system, inserting a Bird throughline wattmeter in between the 751 and the AT150 tuner.

I first checked the AT150 on Rx and automatic band and antenna changing was just as fast as it is on the AT500, an average of 2 to 3 seconds being taken. Having checked out that everything was working normally, I tried the tuner on all bands from 1.8 to 28MHz except the 18 and 24MHz bands, for which I do not have a suitable antenna. On the 1.8MHz band (one which probably gives the ATU the most difficult job to do) I noted that an SWR better than 1.1:1 was achieved from around 1.85 to 1.99MHz in less than 2 seconds, even if I jumped frequency from the bottom to the top very quickly.

Below 1.85MHz I noted that the ATU progressively gave an inferior match, the worst situation being at 1.81MHz where the best match attained was 1.7:1. It seems that there was not quite enough inductance in the bottom of the T for this very low frequency, which is only rarely used anyway. On 3.5MHz SWRs better than 1.1:1 were obtained across the entire band, a similar situation occurring on 7MHz. The actual SWR of the antenna was up to 6:1 at worst at band edges, and yet the ATU had no trouble at all in achieving its optimum match amazingly rapidly. This is far better than its specification, which is for matching SWRs up to 3:1.

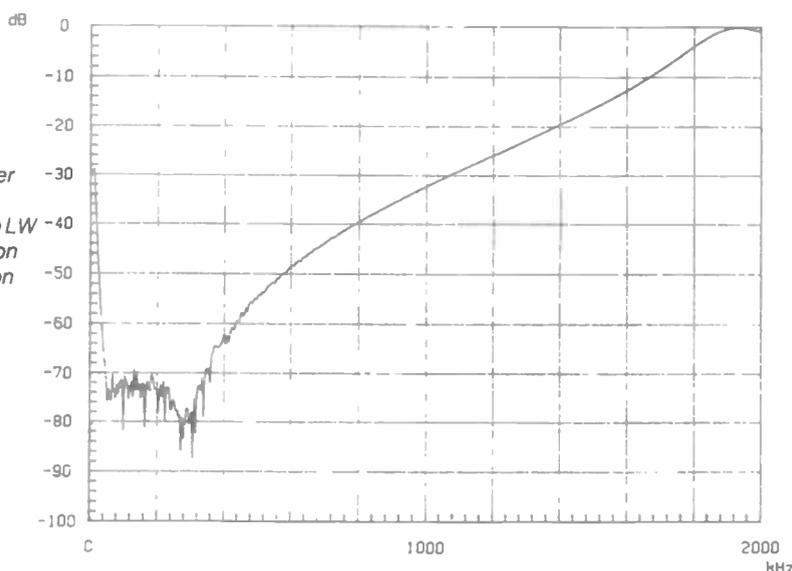
Matching performance

Results on my TH6 beam were just the same on the 14, 21 and 28MHz bands, and at 29.6MHz, where the beam is way off resonance, an SWR of around 5:1 was achieved, the match again being better than 1.1:1 after a matter of only two seconds! I then switched over to a ½ vertical resonant on 29.4MHz, and it matched virtually perfectly right down to 28.05MHz. Furthermore, I only needed 10W of RF for the matching system to work perfectly, but it did not seem to mind the full power of 100W going through it whilst matching.

I thought I would give it a particularly hard job to do, by attempting to match the 29MHz ½ antenna at 14.2MHz. To my astonishment it matched at 1.1:1, again within 2 seconds, so what more can one ask? A similar, and excellent, performance was obtained when matching into my 10MHz dipole. There was only a very minor power drop through the ATU (less than 0.5dB on all its ranges) which would never be noted in practice.

The switches and preset tuning for each band were very easy to set, and the

IC-AT150 Rx response after tuning at 1.93MHz. Nb LW & MW rejection when tuned on Top Band



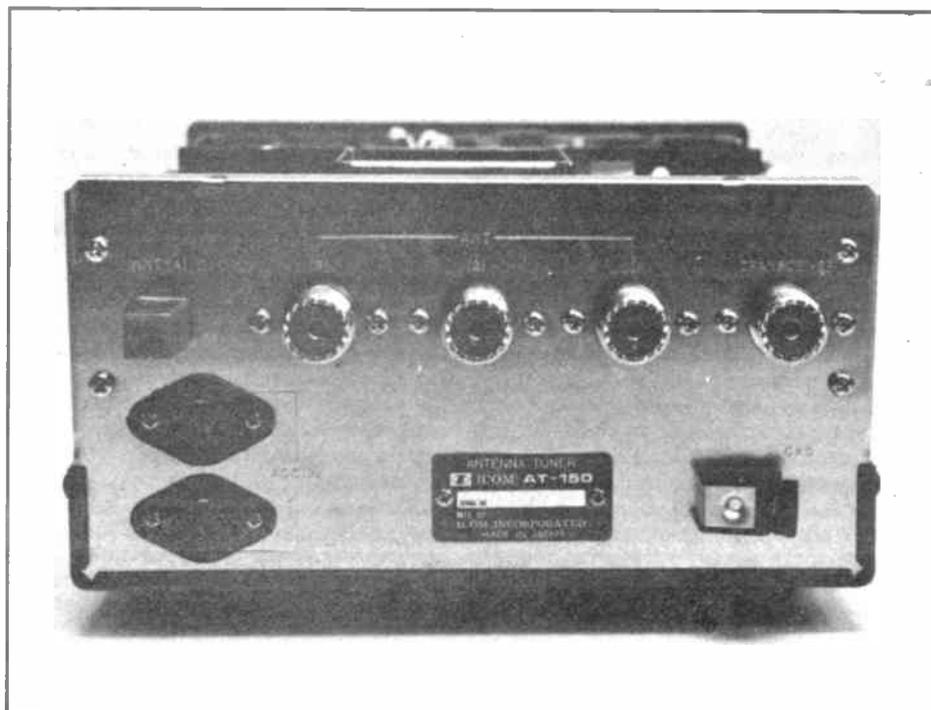
instructions adequate. However, this ATU is specifically for co-ax fed antenna matching and is not designed to match into other antennas which have transmission lines as part of the matching network, requiring an ATU to match an SWR of, say, 10:1 referred to 50 ohms. For this type of application probably the CapCo range using roller coaster inductors would be much more suitable, as I have previously written that they can match anything from an anglepoise lamp to a 2m beam on the 160m band!

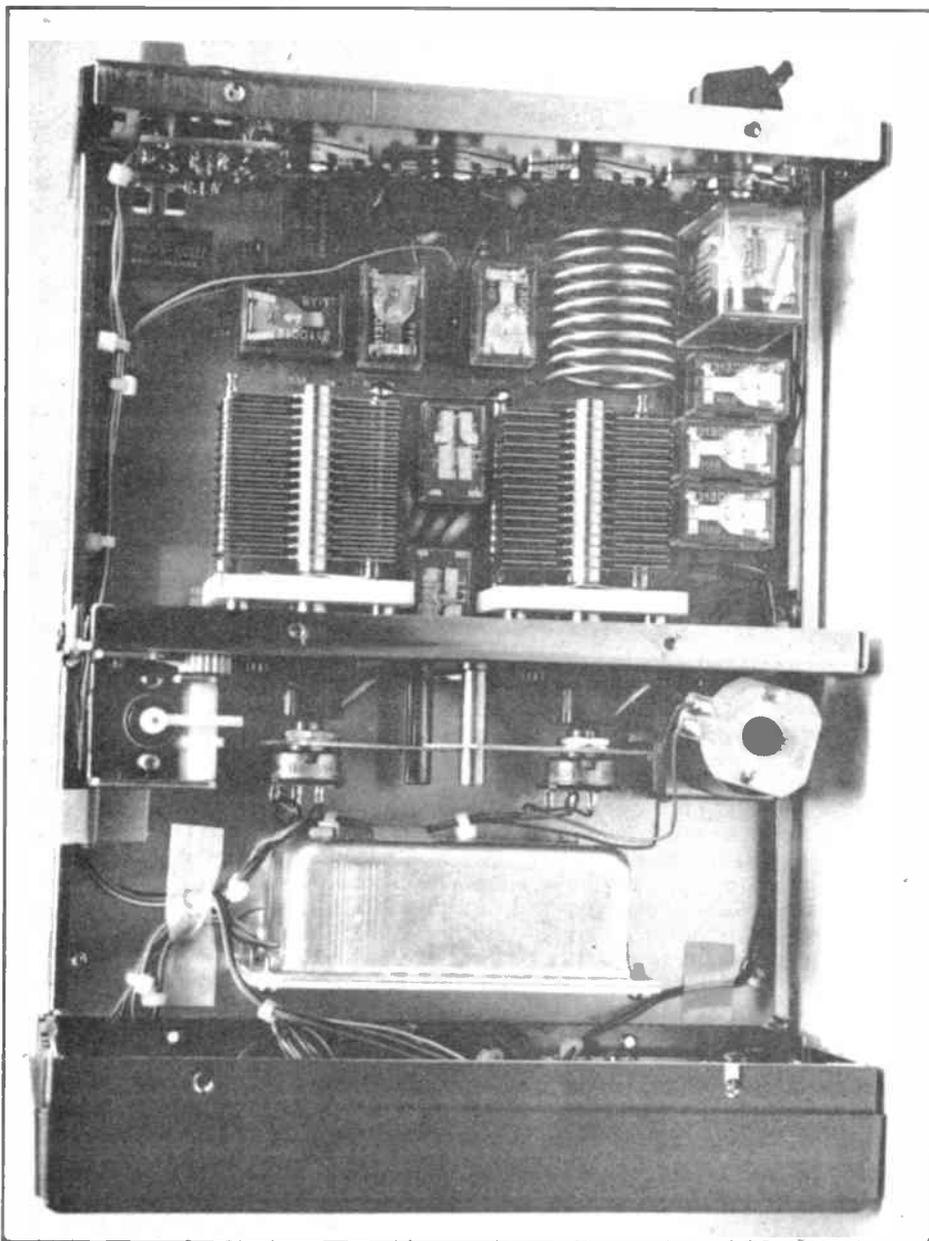
The IC-AT150 is not suitable for use with other makes of transmitter, as it requires band changing data to the Icom standard. If you have another make, I most strongly recommend the AT100 or 500 models which have a mains power supply built in and a band change switch which allows you to bypass the band changing data input. This works fine, as long as you remember to put them on the right band!

High pass filter action

A T filter, such as the example employed in this tuner, has a good high pass filter action, and this can be most useful when you are using the 1.8MHz band. I noted that there was less interference from medium wave stations when the tuner was switched in, and so having loaded up the transmitter through the tuner into a 50 ohm dummy load at 1.93MHz, we plotted the response that would be given in the receive mode from 0 to 2MHz. The accompanying plot shows that there is a fair degree of rejection, even at the top end of medium wave, this rejection improving as the disturbing frequency is lowered.

The general effect of this type of tuner is that you will get much less interference from local and strong medium wave stations than you would without the tuner. We checked the response above the tuned frequency, and although it fell there was no significant low pass filter





action. Consequently, this type of network will not inherently reduce harmonic radiation, and if you really do need a harmonic filter you should install one with a low pass above 30MHz in between the transmitter and the ATU. Modern transceivers, however, have significantly better harmonic rejection than older ones and will probably not need a low pass filter.

Conclusions

If you have an Icom IC735, then the AT150 is the ideal automatic ATU for it. I most strongly recommend purchase of this excellent unit, its price of £315 including VAT being very reasonable when you consider how much complex circuitry there is in it. It does not require an external power supply as it takes its power from the main rig, but there is an earth clamp terminal on the back which should be connected to a good external earth.

For other rigs the IC-AT100 (£365) is useful as it can be operated from mains or an external 13.8V dc supply, and also includes band switching over-ride allowing it to be used with other makes of transceiver.

If you wish to use a linear in the installation, you will have to go to the AT500 (£506), which can accommodate up to 1kW PEP and which I use very successfully either with my Trio 940S/Drake L7 or IC751/IC2KL.

Built-in ATUs

It has to be said that the Icom automatic ATUs are so much quicker than the Yaesu models, but you should note that several rigs are now available with automatic ATUs built in, including the Yaesu FT767 and Trio 930S, 940S and 440S models. Please see the separate review of the Icom AH2 mobile auto ATU. Many thanks to Thanet Electronics for the loan of the review sample, and to my wife Fiona for assisting with all the tests.

ICOM AH2 MOBILE ATU WHIP

If you want to go mobile on the LF and HF bands, you will have a number of different options to consider when choosing the mobile antenna. In my experience, a mono band whip with centre or top loading coil gives the best overall performance, but you may find it extremely tiresome when you are on a motorway and find that as there are no interesting signals on the chosen band you wish you had put on the appropriate top section for another band.

By far the best mobile antenna I have ever used is the Hustler Neutronics whip, which has a long tilt-over base section and a choice of various screw on top sections, with whips for the six main LF and HF bands. It is very restrictive, however, so I sometimes use an old Markmobile triband antenna with two HF

coils sticking out horizontally near the top, and an HF or LF band coil with whip sticking out vertically. This monstrosity works very well, and I have frequently chosen 80, 20 and 10 metre sections, allowing considerable flexibility on a long journey without having to stop the car. However, it is not quite as efficient as the Hustler and I have frequently had aggro when a low bridge has been approaching rather rapidly!

You can even choose a G whip installation, and there is a model that allows you to operate on four bands. However, in my own experience, the multiband G whips are not as efficient as I would like.

With all the previously mentioned systems, the Q is so sharp that the SWR degrades very rapidly as you QSY from

the whip's resonant frequency. Using the Hustler on 80m, for example, only gives an acceptable performance within $\pm 10\text{kHz}$ from resonance. A QSY of 50kHz can typically lose you 2 S points, which is totally unacceptable.

The Icom system

The AH2 system incorporates a small control unit which can be fixed to the side of the IC735 (for which it was primarily designed), or under the dashboard somewhere, and an automatic antenna tuning unit which is waterproofed and has to be mounted fairly close to the base of a whip antenna. An optional 8ft whip is available (AH2b), which is supplied with many different types of mounting bracket, allowing flexibility in installation.

When used with the IC735, the connecting lead from the control box to the rig includes connections for operating Tx, for supplying 13.8V dc to the CPU etc from the rig and for returning an ALC voltage back to the transceiver. A flying co-ax lead, having a PL259 on the end, takes the RF from the rig into the control unit, whilst an SO239 socket is provided to feed RF through to the antenna tuning unit box. A special multipin socket on the control unit interconnects with a long lead to the tuning unit. A 13.8V coaxial socket on the side of the control box is used to accept dc from an external source, if it is not available from the transceiver. There is also a very small socket on the side for interconnection with the IC735 to change the rig from the chosen mode to an FM carrier mode during tuning.

Front panel controls

On the front of the control unit are two buttons labelled 'tune' and 'through'. The latter permits you to select a direct through path or signal via ATU, whilst the other button engages the automatic tuning sequence. There are two LEDs on this panel, one of them shining either green or red whilst the other is yellow. This control box includes a CPU which controls the IC735 when tuning. After you have selected your required frequency in any mode, depressing the tune button puts the rig into a carrier mode on Tx, and the ALC from the control box feeds back to the rig to keep the tuning power down to around 10W. There is a user preset to get this absolutely right for your particular rig.

Having pressed the tune button, RF passes through to the automatic tuner near the base of the whip or long wire antenna, and the tuner attempts to match. Whilst this is in progress, you may hear rapid clicks as the microprocessor in the tuner unit switches various coil and capacitor combinations in and out as it is trying to obtain the best match. Whilst this matching is in progress, a red LED shines on the control unit. If a reasonable match is obtained, the red light goes out, the green comes on and the rig reverts to Rx, awaiting your PTT to be used on the mic. If the match at best is too poor, a yellow LED comes on with the red to warn you that the situation is 'no go'.

Circuit type

The ATU circuit is a T type matching network, with six different values of capacitor in each of the top parts of the T and switchable inductors from the centre to earth, as in the AT150 circuit.

The tuning unit includes resistance and reactance detector circuitry similar to that in the AT150, but there are also eight memorised coil/capacitor combinations which are automatically stored. When selecting a particular frequency and pressing the 'tune' button, the ATU first checks the eight memorised settings with their resultant L/C combinations to see if any of these

are appropriate. This is achieved extremely rapidly, but if none of them are adequate, the ATU clicks away for up to 20 seconds or so in an attempt to find a suitable match.

Although the system was primarily designed for the 735 it can be used with other Icom rigs, but you have to select a carrier mode on these. Only the IC735 has the completely compatible AH2 protocol. Other rigs could work with it, but you must take great care to keep the tuning power down to 10W. After tuning is completed, however, you can use the full 100W capability of the Icom rigs.

Installing the ATU

On the ATU itself all inputs and outputs are extremely well waterproofed. At a glance the unit resembles a surrealistic electronic sandwich box, having large metal fixing plates underneath either end and a large beehive insulator onto which you fix the feed wire which connects to the base of the whip. At the opposite end of the box is a wing nut earth terminal which should be connected to a suitable earth point on the vehicle, Icom recommending really thick braiding for this. You should also ensure that the earth contact at the vehicle end is very low resistance in order to get the best efficiency.

You have to make up your own interconnection leads for the required length to interconnect the control box with the tuner, and there are ample instructions to assist you with this, the connections at the tuner end being fixed ones. The instruction book is reasonably good, although I could have done with a little more detail. Unfortunately, there is no technical description of the circuitry, although there are block diagrams of the tuner and control unit.

Subjective tests

I was only able to try this unit with my own IC751 and the later review sample of the 751A. However, I did check it out on all bands and found that it worked extremely well from 3.5 to 29.6MHz. My initial tests were very crude, using the 8ft whip with the base at floor level and the whip at a slight angle resting against a lab bench in my shack at ground level on the back of the house. SWR was usually better than 1.2:1, but I did not expect much efficiency from inside the house at ground level! Imagine my surprise when I called CQ on 3.7MHz as a joke and immediately got a reply from the Cambridge area. I subsequently had QSOs with stations all round the country who stated that the signal strengths were only slightly lower than they would expect from an 80m mobile station.

However, I could only match the whip at the very top end of the 1.8MHz band, and Icom do not recommend the unit for this band unless you attach a wire to the whip and toss it up into a passing tree! All the same, I am sure that it would be satisfactory for Top Band if you were to add a very low resistance coil in between the tuner and the base of the whip,

although the efficiency might not be very high and you would be restricted to mono band operation with the coil inserted. You could of course add a 13V shorting relay across such a coil and switch it on when you were using the other bands.

Several stations who are using the AH2 mobile with Icom transceivers have told me that they get a very good performance out of the installation. The convenience of using any band from the top end of Top Band up to 10 metres and at any frequency within the bands 80 to 10 metres is absolutely marvellous, and the only other antenna that I can remember having a similar facility was the Webster Bandspanner. I do not think this antenna is available now, though.

Field strength check

After the initial tests, I set the whip up in the middle of my music room and checked the field strength that it produced at a distance of approximately 3 metres, using a professional active antenna system made by Surrey Electronics for field strength detection. I was quite surprised to find that the efficiency was quite high for a whip from 80 to 10 metres, although you will have to remember that the system is essentially base loaded, which is less efficient than top loading. If you fit the whip to the roof of your car, you will have to be careful about low bridges, and it is probably better to mount it on the rear bumper. Icom do point out that extremely high RF voltages will be present on parts of the whip when you are transmitting, so beware of people touching it.

Conclusions

From the reports that I have received from users, the system can be highly recommended if you require multiband operation without aggro, especially if you have the IC735. However, the system is extremely expensive, costing £514 including VAT, but excluding the whip (IC-AH2b), which with all its accessories costs £184. It could also be very useful if you want to transmit from inside a hotel or boarding house when you are on holiday, provided there is a convenient cold water pipe which is earthed.

However, you will have to be careful that you do not cause TVI in some hotels having distribution type TV systems. It would be wise to ask the hotelier or landlord's permission before attempting to use it in your bedroom, in order to avoid chaos! The whip should be put as far away from the rig as possible, as I did get some RF feedback into the 751 until I increased the spacing between the rig and antenna to around 30ft. I am sure the IC735 would be a lot better, however.

The ATU would probably work well into long wire antennas when installed in small gardens. A commendable product, but unfortunately at a price which only a few amateurs could justify.

I would like to thank Thanet Electronics for supplying the review sample and for their considerable assistance when discussing its various operations.

FRITZEL BALUN SERIES 83

Definitely a superior balun

I recently put up a new double trapped dipole for 40, 80 and 160 metres, made for me by KW Ten-Tec Ltd, which replaced an older version (of another make) which had virtually fallen to pieces. As before, the new dipole included traps at 40 and 80 metres, the overall length being around 180ft. The traps are heavy duty and very well weatherproofed, and the wire was thick enamelled copper. Rowley Shears, of KW Ten-Tec, had managed to obtain some very thick 72 ohm twin balanced feeder for the antenna, which has a very low loss.

Not good enough

Initially, I tried the antenna with a W2AU balun and then with two other types that I had around, but I was convinced that when running full licensed power near the band edges on both 160m and 80m, these various baluns were not operating as well as I would have liked.

Upon investigation I found that most of the current balun designs are only specified to give their full performance down to 3.6MHz or so, some having power limitations below 3.8MHz when feeding a poor SWR.

I asked Rowley Shears if he knew of any balun specified to work into poor SWRs right down to 1.8MHz, my principle being that I rather like 'over-kill' if a piece of equipment is going to be thoroughly reliable. Furthermore, I like to listen to long and medium wave stations, and all the baluns I have tried in the past give a very poor performance on Rx below around 1.5MHz.

Recommended

I was recommended to try a Fritzel balun from their series 83, and the one I finally chose had a 1:1 ratio, specified to operate from 1 to 50MHz. The transmit power specification was 700W CW and

1.4kW SSB into SWRs better than 2:1, although the down rating for inferior SWRs was not quoted. Since the antenna on 80m reaches around 4.5:1 at band edges, it seemed reasonable that the Fritzel should accommodate 400W PEP, and indeed it most certainly does.

Different models

The loss is specified as less than 0.2dB, and the phase characteristics are tightly controlled. There are many different models accommodating ratios of 1:1, 1:2, 1:4, 1:6 and 1:12, the unbalanced input being 50 ohms nominal. The input socket can be supplied as either an SO239 or an N-type, whilst the outputs are normally supplied on screw terminals.

The box is made of very strong plastic and includes eight large holes around the perimeter through which you can put harnesses of one form or another. The maximum allowable pull to the casing is quoted as 4.5 kilo newtons, which should be strong enough for most of us mortals, being equivalent to a force of just under half a ton.

Good MW reception

In combination with the new trap dipole, I have found that the SWR throughout all three LF bands is well within the automatic tuning range of the IC-AT500, and there seems to be no sign of saturation. What is particularly fascinating is that the output from the balun directly connected to my TS940S gives extremely good medium wave reception, and even long wave reception is adequate. Introducing a Yaesu 7700 ATU, however, improves LW tremendously. Results are far superior to any that I have previously had from other baluns.

Fritzel quote their baluns as being either simplex or duplex models. Several of the models include an isolating

transformer which gives improved common mode rejection, and there is only a centre tap earth connection from the output through to the screen of the input co-ax. With many conventional baluns there is an indirect or direct connection between the co-ax inner and one of the legs of the outer. Unfortunately, my German is so bad that I was not able to disentangle many of the technical German words, the full description being in this language.

Highly recommended

I have no doubt that the Fritzel baluns can be highly recommended, although they are somewhat pricey. Prices range from £25 to £70 approximately, and they do vary with the £/DM fluctuations. KW Ten-Tec can also supply double trapped dipoles similar to my own one, for 40, 80 and Top Band use. Fritzel also make a large range of HF antennas, their beams being either triband for 14, 21 and 28MHz, or six band including the new WARC bands. Versions are available from two to seven elements, the larger arrays having quite spectacular claimed performances. They also make mono-band antennas. All details from KW Ten-Tec Ltd, Vanguard Works, Jenkins Dale, Chatham, Kent ME4 5RT. Telephone: (0634) 815173.

NEXT MONTH

G3OSS puts the new Icom IC μ 2 144MHz FM hand-held and the IC275 144MHz multimode base station through their paces. Don't miss it!

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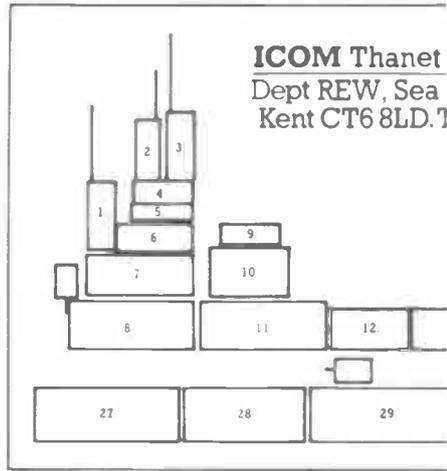
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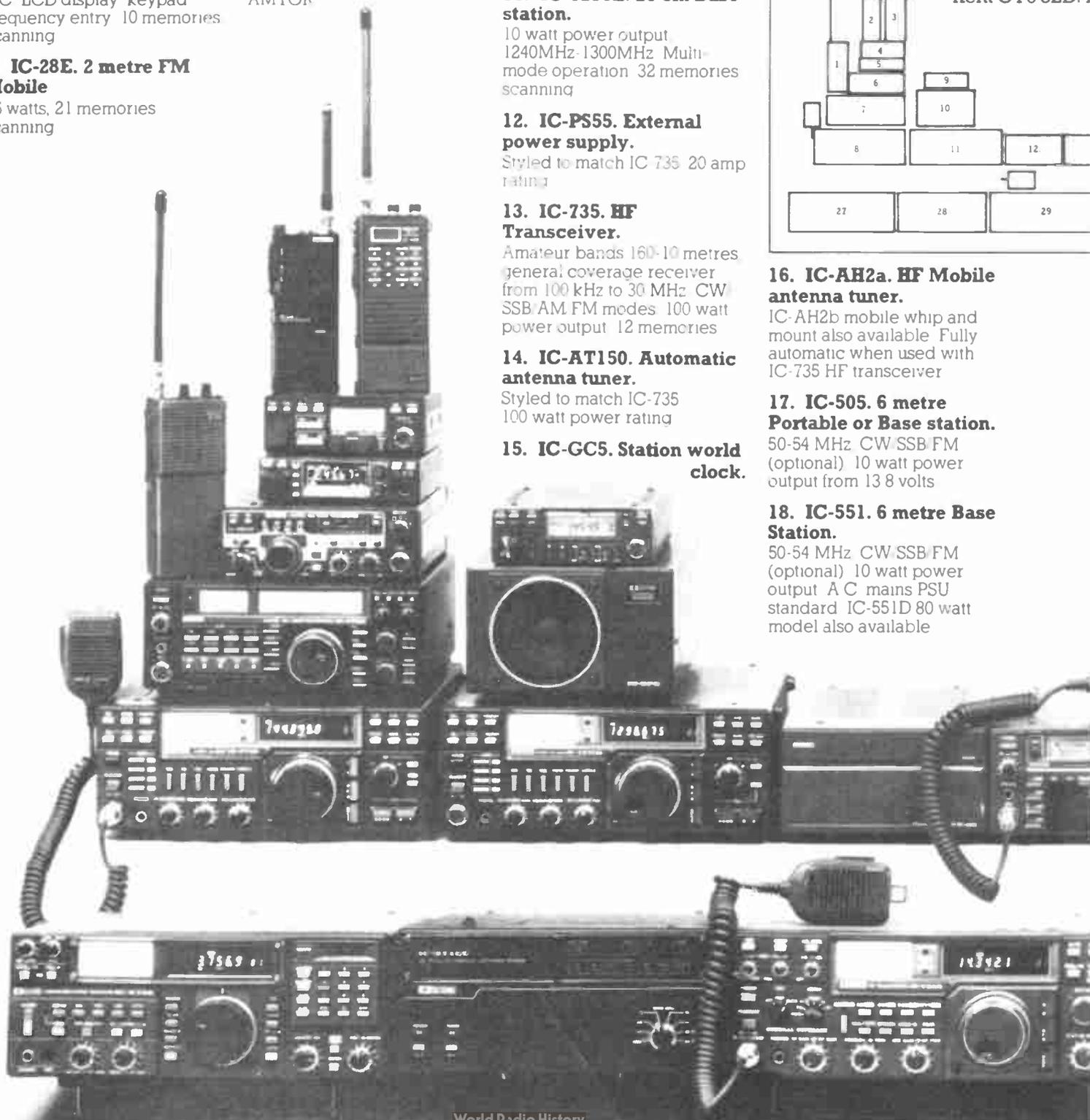
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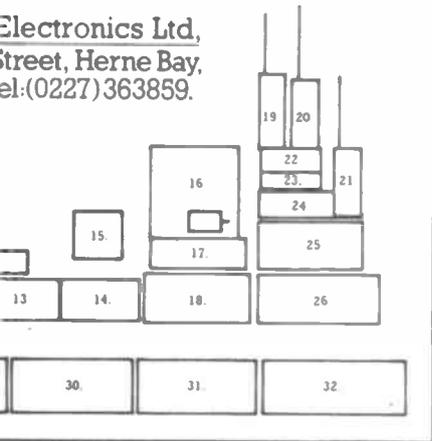
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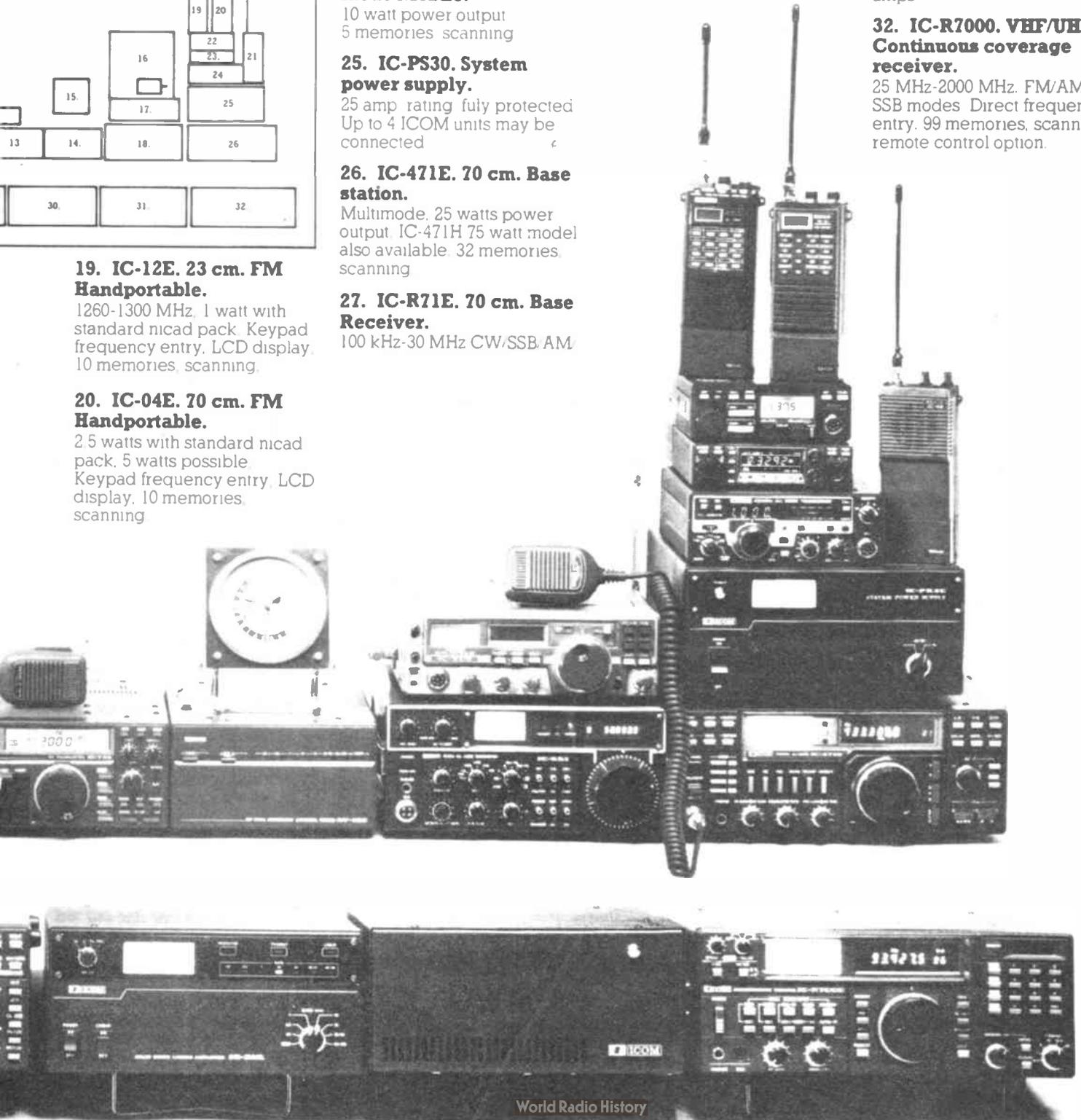
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THE CM HOWES MTX20 Tx

QRP operation is becoming increasingly popular. Over the last few years many more people have become interested in this aspect of the hobby. In fact most of the people interested in QRP not only operate low power rigs, but because they can be built by the home constructor, find they can have a lot of enjoyment from building their own equipment as well. This, of course, makes the contact far more rewarding, particularly when you can say over the air that you built it.

Designs for QRP transmitters using a minimum number of components which can be built in an evening are fairly common.

However, a few more sophisticated designs are appearing as kits. CM Howes Communications is one manufacturer who offers a wide range of kits, from QRP transmitters, through direct conversion receivers and ATUs to 2 to 20 metre transverters.

The MTX20

One of Howes's transmitters, the MTX20, is for use on 20 metres. It offers a variable output enabling the power to be controlled over the range from 2 watts to 10 watts output, and boasts 50dB suppression of spurious outputs. Although

the transmitter is crystal controlled, its frequency can be pulled by about 10kHz using an external variable capacitor. Alternatively, a companion VFO can be used, allowing the frequency to be fully variable and enabling the transmitter to be used to its full capacity. In fact, looking at the sales write-up for it, this little transmitter appears to have great potential for a very reasonable price.

The transmitter kit

On arrival, the kit contained the printed circuit board, a bag of components including a crystal, another bag containing the wire for winding the coils together, with a heatsink washer for use with the output transistor, and a set of instructions.

Despite the truth behind the saying 'When all else fails, read the instructions', it was decided that it would probably be best to read them first. In fact, they were found to be very comprehensive, outlining everything from soldering to the final set-up of the transmitter. They even suggested that it would be best to read them twice before putting the kit together – not a bad piece of advice.

Not only did the instructions include guidance on how to build the transmitter,

they also included several other useful sheets. There was a parts list which identified the components so that they could be easily distinguished and checked off as they were inserted. Then, at the end of the parts list, there were the details for winding the coils, together with a few hints on how to make it as easy as possible. Other sheets included a description of the transmitter circuit with a few ideas on how to get the best out of it, a circuit diagram and an interconnection diagram. Together, these instructions made a good set which should enable the transmitter to be built and operated with few problems.

The first of the components to be inspected was the printed circuit board. This was nicely made, and had plenty of space on it for the components. One feature which I felt was especially good was that there were markings for all of the components. This made the construction much easier and quicker, and means that fewer mistakes are likely to be made.

All of the remaining components were good quality types. Certainly, when the kit was built and used no problems were found. The crystal which was included was for 14.060MHz, which is the QRP calling frequency. However, if other frequencies are desired then the circuit board includes space for them, and they are not too expensive to buy. One possible supplier is Gollidge Electronics, Merriott, Somerset.

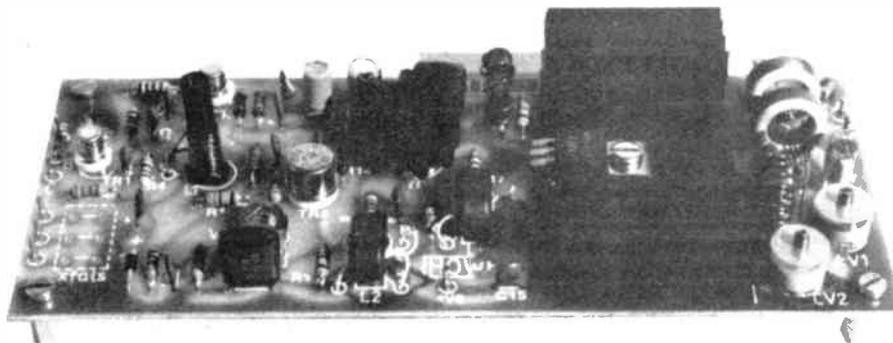
The circuit

The circuit of the transmitter is more complex than most designs these days. It includes five transistors, starting with a BSX20 oscillator and finishing with a beefy MRF475 or equivalent. The first transistor is used as a crystal oscillator, or a buffer if an external VFO is used. The output is tuned using a straight coil with adjustable core. It is the only coil of this type used in the circuit as all the others use various forms of toroids.

The output from the first stage is applied to an untuned buffer in the form of another BSX20. It is here that the signal is keyed and filtered to ensure that any key clicks are adequately removed. The current drawn by this stage is only a matter of a few milliamps, and so any keyer can be used without any worry about its current handling capacity.

The next stage is based around a 2N3053. This is quite straightforward, but includes a preset variable resistor in the bias chain. This is used to adjust the output power which can be throttled back from the full ten watts to less than two watts. The output from this stage is applied via a toroidal transformer to the final buffer. This is another 2N3053, but in view of the higher power it has a small heatsink. The output from this buffer is transformed before reaching the final amplifier stage. This consists of an

The MTX20 transmitter board under construction



MTX20 specification

Output power	Adjustable from 2 to 10W RF (approximately)
Spurious outputs	Harmonics better than 50dB down Filter included to remove key clicks
Frequencies	14.060MHz crystal supplied Provision for two other crystals on PCB or external VFO
Output impedance	50 ohms unbalanced
VSWR	Better than 1.5:1 recommended but PA will survive severe mismatch
Supply	Nominal 13.8V. Supply capability of 3A is recommended

AND CVF20 VFO

A kit review
by Ian Poole G3YWX

MRF475 or equivalent in a TO220 package. This transistor is bolted to a large heatsink to enable it to run quite cool under all conditions. Having been amplified by this transistor, the signal passes through a matching network and low pass filter before reaching the aerial.

Building the board

The actual construction of the transmitter circuit board was very straightforward. For most constructors with a fair degree of experience it would take less than an evening, and for those with less experience possibly a little longer. Basically, for anyone who can wield a soldering iron the project should present few difficulties.

Despite one's enthusiasm to get to work on the board itself, when building the transmitter the first stage is to wind all the coils. It is best to do this first because some of them have to be varnished to keep the windings in place. Then, whilst the varnish is drying, the remainder of the circuit board can be built.

On the whole, the coil winding went smoothly. It was made even easier by following the suggestions in the instructions and knocking a couple of nails into some wood to hold the coil former and its winding.

Having completed the coils, the remainder of the components can be soldered into the board. This was very easy. Aided by the markings on the board and check-list with the component descriptions, each component was slotted into place and soldered in. Having completed this, the board was checked and the coils were fitted. In actual fact, these were left over night to dry, but in some cases it might be possible to fit them sooner, depending upon what varnish is used and how thickly it is put on.

When fitting the coils it is very wise to follow the precautions outlined in the instructions about soldering the enamelled wire. Although the wire is the self-fluxing type which should not need to have the insulation scraped off, this is not always satisfactory and can lead to bad joints. A little extra time taken in scraping off the insulation and pretinning the ends of the wire will ensure a good joint. Now that the board is complete it is ready to test.

On the air

Once the circuit board has been checked it is ready to be connected up to a power supply and load. At this stage it is necessary to have some means of measuring the output level. This could be just a VSWR meter, a power meter, or even a simple voltage level detector which could be made up using a couple of diodes and a capacitor.

Having connected everything up and double checked it, the power supply can

be turned on and the key depressed. First the power level potentiometer should be set about fully clockwise. Then the oscillator coil and the two variable capacitors on the output can be adjusted for maximum output. When this has been done, the power level potentiometer can be set to the required level and tried on the air.

Although it is best to mount the transmitter board in a metal case to prevent RF feedback, in most cases it will operate satisfactorily on the bench. If this is done then it is well worth keeping all leads associated with the oscillator as short as possible to prevent any unnecessary pick-up. With the transmitter operating in this fashion it worked very well, enabling contacts to be made throughout Europe and into Asia and the States. All these contacts were made using a very modest antenna, and stations were very complimentary about the signal.

Measured performance

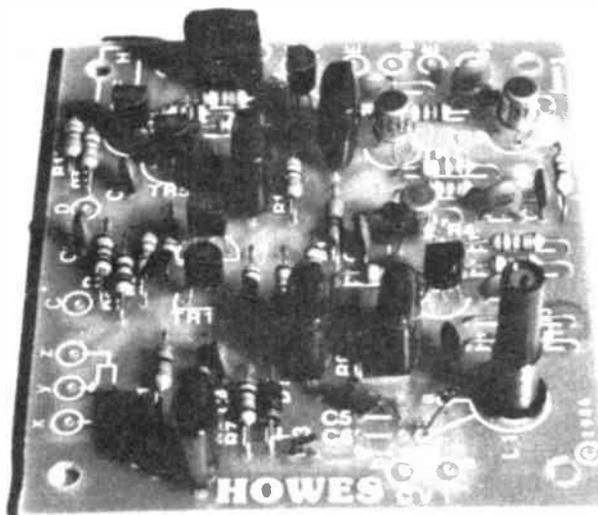
The measured performance was equally good. The MTX20 gave a good ten watts output, and this could be reduced to well below the two watt level, although component tolerances may mean that the lowest level varies between virtually

zero and two watts. The harmonic suppression appeared to be good – the transmitter caused no problems on nearby televisions or FM radios. Then the frequency shift which could be obtained was found to be slightly less than ten kilohertz, but this figure will vary slightly dependent upon the actual crystal used and the position of the tuning slug in the oscillator coil former.

If a greater tuning range is required, experiments could be tried using a small inductor as well as a capacitor to vary the crystal frequency. Another point which was monitored was the temperature rise on the output device. As this was mounted on a very adequate heatsink it ran very cool. However, when it was operated using a high VSWR the temperature did rise, but not alarmingly so. This also proved the robustness of the output device, although it is not recommended that this is done normally!

The major restraint of the basic MTX20 was the limited frequency coverage. Although there are spaces for two more crystals, it is a dead cert that the station you want to work is on a frequency that cannot be reached. In order to overcome this and make the transmitter far more versatile, a VFO is now available – the CVF20.

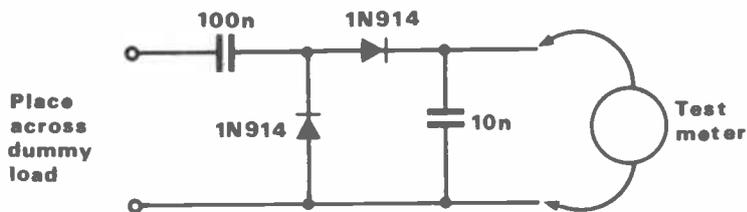
The CVF20 VFO board under construction



CVF20 specification

Tuning range	14.00 to 14.35 can be tuned with 50pF tuning capacitor VFO can be set between 9.0 and 14.5MHz
IRT range	Typically 4kHz total variation, but at least ± 1.5 kHz
Outputs	Two independently buffered outputs Load impedance >1 kohm, approximately 2V _{ptp}
Modulation input	High impedance flat response from 60Hz to 6kHz
Supply voltage	11 to 15V

NB FSK is possible by keying IRT switching circuitry



A simple RF voltage detector for monitoring RF output

VFO

The VFO kit was similar in many respects to the main transmitter. Once again the instruction sheets were very comprehensive, giving the instructions themselves as well as a parts list, interconnection diagram, circuit description and circuit diagram. The board was of a similar standard, but it was rather more compact so that it could be fitted into a small screened box. However, it was not much more compact than many other kits which are around and it should not present too much difficulty to the majority of people.

All the components for the board were supplied, including a prewound coil. Also, a potentiometer for the IRT (incremental receiver tuning) is supplied, in spite of the fact that it is not a PCB mounted component. The tuning capacitor is not supplied, though, but almost any reasonable 50pF variable should suffice, giving full coverage of the 20 metre band. If less coverage is required then a smaller capacitor could be used.

The VFO circuit

The CVF20 VFO incorporates a number of useful features, including IRT (incremental receiver tuning), two independent outputs, and also the facility to add frequency modulation.

The oscillator is based around the popular 2N3819 FET which runs at the operating frequency. The circuit is fairly standard, but it gives good results and this is what is required. Then the output from the oscillator is buffered by a BSX20, which in turn drives two further buffers providing the two separate outputs.

IRT circuitry

The IRT circuitry takes up four transistors. The voltage from the centre of the potentiometer is applied to a two transistor circuit to put an offset voltage onto the tuning diode. Incidentally, the modulation is added onto this line to give the frequency modulation. Although FM would not normally be required on 20 metres, this facility may be useful if the VFO is used for something else.

Two further transistors are used to switch the IRT facility on or off. One turns it off when it is taken to +12 volts, whilst the other operates when it is held low. In this way, any switching arrangements in the transmitter should be accommodated. The final transistor is used as a voltage regulator. This removes any voltage variations there may be in the

supply which could cause chirp, drift or any other nasty effects.

Building the VFO

The construction of this board was even simpler than the main transmitter board, despite the fact that it was much more compact. Using the check-list, each component was slotted into place without any difficulty or query about it being the right component. First the resistors were inserted, then the capacitors, followed by the semiconductors. Finally, the coil was fitted. The fact that this did not have to be wound and varnished like the coils on the transmitter board saved quite a bit of time. In fact, it took less than one hour to build the board up, including the time taken by several interruptions by the children.

Does it work?

Having completed and checked the board it can be tried to see if it basically works. However, before it can be used with the transmitter board it does have to be mounted into a screened box to prevent RF pick-up. The box should be large enough to house both the VFO board and the tuning capacitor. Although boxes are available from many sources, the one I used was bought from Maplin - one of their low cost aluminium boxes with a fold-over lid. The size of it will depend on the size of the tuning capacitor being used, but it should be possible to put it into a box less than four inches square.

Whilst thinking about the mechanical side of the project, it is worth bearing in mind that the mechanical rigidity of the VFO is of great importance. The board should be firmly mounted on four metal spacers. The capacitor should also be mounted firmly and a short sturdy wire should be used to connect the capacitor to the board. Once the VFO is suitably mounted in its box it can be connected to the MTX20 board and the two tuned out together.

VFO operation

The VFO board was mounted in its small box together with the tuning capacitor. After the connections to the board were made and checked the power was turned on. In common with all the other Howes kits which I have built, it worked first time, only requiring the oscillator coil to be adjusted.

The core for the coil was fairly loose in the former and moved if the board was knocked. The CVF20 instructions recommend that some rubber solution, glue or

wax be used to hold the core in place. In fact, I used some of the special 'tape' I had which can be inserted into the former to prevent the core from moving when the coil is knocked. This worked well, allowing the setting to be re-adjusted several times.

Having set the VFO onto the correct frequency, the stability was monitored; there is nothing worse than a signal which has to be followed down the band! Once the circuit had 'warmed up' it appeared to be very good. In fact, it remained zero beat for a long time with my receiver, which I know is very stable.

It is recommended that the VFO should be left to run continuously. This is fine when it is used in a transceiver where the VFO is used on both transmit and receive, but if a separate receiver is used this might cause a problem. However, this can be overcome quite easily by linking the IRT control into the transmit/receive switching and offsetting the VFO during receive.

It must be sound

One point which became very clear was that the mechanical construction of the VFO with its interconnections was important. Initially, when the interconnection wires were only lashed together it was very susceptible to mechanical vibration. However, when everything was put together with short leads and fitted snugly into its box it performed well, and even survived being moved around the bench and knocked with no major effect.

Having connected it to the transmitter it was amazing what freedom there was after being crystal controlled. There were far more stations to call; previously they had all seemed to be on frequencies not covered by the crystals. The use of the VFO resulted in more contacts being made than before, even using the same modest aerial. Stations all over Europe, together with Ws, VEs and a UZ0 were contacted shortly after knocking it up. So, with a little more time on the band there is no reason why it would not be possible to net a good haul of DX.

Overview

The impression which the MTX20 and CVF20 kits created was very good. They were both easy and enjoyable to build and once on the air they performed well. The 10 watts of RF meant that it was possible to work the DX and get through some of the pile-ups. In fact, it should only be 10dB lower in strength than someone running the legal limit on CW.

Having completed the boards, they can be fitted into a suitable box. This will make not only a relatively cheap transmitter, but one which is also neat and effective.

The cost of the boards is quite reasonable: the MTX20 kit is £21.90 or £27.70 if assembled, and the CVF20 kit is £9.90 or £15.90 assembled. Postage and packing is 90 pence.

My thanks are due to C M Howes Communications who provided the kits for review.

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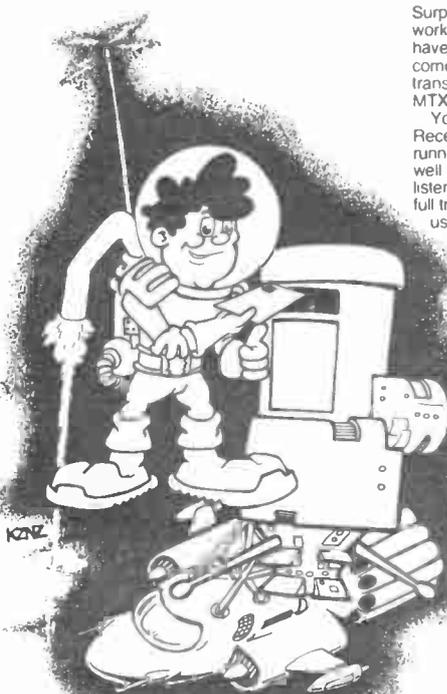
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73 from **Dave G4KQH, Technical Manager.**



EASY TO BUILD KITS BY MAIL ORDER

Farne Islands Foray

by Don Field G3XTT



When it was first announced on the WAB net that G3ZAY and myself would be conducting the very first expedition operation from the Farne Islands some of those on frequency expressed surprise, saying that they had already worked the islands, in some cases on more than one occasion. Where had I gone wrong?

In practice, nowhere. I soon realised that to those who are not acquainted with this lovely stretch of the Northumbria coastline, there is confusion between Lindisfarne (Holy Island) which is joined to the mainland via a causeway which floods at high tide, and the Farne Islands, which lie several miles to the south. Our operation really was to be the first, except perhaps for the occasional appearance on 2 metres using a hand-held. So, how had this operation come about?

Award chasing

Radio amateurs, like adherents to most hobbies, like to have some way of measuring their achievements. Hence the interest in chasing awards. One of the most prestigious UK awards programmes is the Islands on the Air series of awards, which I first became aware of some years ago but which has gained in popularity in the last couple of years.

The programme includes islands throughout the world, but those around the coast of Britain are naturally of particular interest to UK amateurs. Many have been activated on a regular basis, but the Farne Islands off the Northumberland coast never had, which set me wondering a few years ago, when on holiday in that part of the world, whether

I could do something to change the situation. The advent of the Worked All Britain Islands Award, creating even more interest in island chasing, increased my resolve.

Provisional application

An early letter to the warden (the islands are a designated nature reserve, owned and operated by the National Trust) received a polite but pessimistic response. The Farne Islands committee was anxious to protect the islands in all respects and was unlikely to sanction an operation of the sort I proposed. I began to understand why no previous operation had taken place.

Never daunted, I pressed on with my quest, eventually to be given the green light. The committee were happy for an operation to take place provided it was at the end of the season (in other words, after all the breeding birds were long gone), and provided we kept to the public areas and to the public opening times; overnight stays were definitely out of the question.

This seemed perfectly reasonable, but left me with the problem of organising an expedition to take place within about three weeks from receiving the go-ahead, or having to wait for the best part of a year.

My first move was to contact Martin G3ZAY who, despite having just returned from a similar expedition to the Treshnish Islands (off Mull), was very keen to participate. Later Cath G6OQA, who had also been on the Scottish trip, decided to join us.

Thus it was that we arrived in Seahouses late one Friday night in Septem-

ber (after an awful journey up the A1!), car laden with two generators, three rigs, one linear, tent, cables, triband beam, and as many poles as we could fit on the roof-rack.

One of the big concerns had been the weather. Although our destination was Inner Farne, the nearest of the 28 islands in the group, the boats will not set you ashore if there is any danger at all that they may not be able to take you off the island again later in the day. In addition to which, we had no wish to erect antennas in a howling gale. In the event, Saturday 20th September dawned bright and sunny with only a slight breeze, the boatman was at the quay as promised, and we were at sea by 8.30am for the short (20 minute) crossing. Unfortunately, the tide was at its lowest, so we had to be taken ashore by zodiac. All was well, though, none of the gear ending up in the sea.

Helpful assistance

A number of resident wardens live on the islands during the summer season to protect the wildlife and keep the tourists on the beaten track. Those on Inner Farne were extremely helpful in assisting us to carry the gear to the operating area and in providing a constant stream of hot drinks. They also gave us access to the roof of Prior Castell's Tower, the highest building on the island and famous as St Cuthbert's retreat during his time as a hermit on the Farnes. As a result our poles were not needed and we were able to install our antennas at 40ft. By 10am we had the 40 metre sloper up and were able to join the IOTA gang on 7095kHz, after a brief QSO with Cath's

father G4UHQ. From then on the contacts came thick and fast, with myself at the mike while Martin and Cath assembled the beam.

It was much later in the day before there was time for a breather and a chance to take a look around the island. Inner Farne is the largest island in the group, extending to 16 acres at low tide. There is a lighthouse, Prior Castell's Tower, a chapel and various ruins. Much more famous is the Longstone lighthouse on one of the outermost islands, because it was from here that William Darling and his daughter Grace rescued the survivors of the *Forfarshire* which struck the Harcar rocks in September of 1838. There is very little vegetation of any sort on the islands, although rabbits, birds and seals, as well as some 70 varieties of flowering plants, all manage to eke out a living there.

Pretty busy

For much of our stay on the islands we were able to keep two stations on the air; the main rig and linear (FT101ZD and KW1000) were driven by the generators and a TS120V, serving as the second station, was run from a car battery. With two stations on the air we were kept pretty busy, especially as conditions were good and there always seemed to be a healthy pile-up. Twenty metres opened well to the USA, and 15 metres produced some excellent short-skip conditions into Europe. As the weather was so mild we operated in the open air, leading to curious looks from the constant stream of tourists who landed at regular intervals during the day. Whoever was not operating at any given time was usually well and truly occupied explaining to the visitors what on earth we were up to! Running two stations simultaneously precluded using just one callsign for the operation so, for consistency, we allocated a callsign to each band. G2ZAY/P was used on 80 and 15,

Martin G3ZAY operates the main station



All set to embark. Martin unites the antenna hardware

G3XTT/P on 40, and G6UW/P (the Cambridge University Club callsign) on 20.

Time to relax

Back in Seahouses after the first day's operation we were able to relax, have a hot meal and, later, a drink with a couple of the local amateurs who drove up from Morpeth to see us. We were also interested to hear that the son of the guest-house owner where we were staying, a CB enthusiast, had been listening to us earlier in the day on a friend's general coverage receiver.

On Sunday it was time for another early start. Fortunately we had been able to leave the gear and the aerials on the island overnight, so we were able to get

on the air within minutes of landing. We were soon being hotly pursued by some of the French Islands on the Air enthusiasts who had been at the Clipper-ton DX Convention the previous day and who were therefore getting more and more anxious for a QSO. Less lucky was Ghis ON5NT, who had hoped to be back from a business trip to India in time to work us before we left the island, but who got detained there until early the following week.

Sunday's weather, while still mild, was much windier, and only one boatload of tourists braved the elements and landed on the island. Braving the winds atop the building to turn the beam was definitely not a job for the faint hearted.

By the time we finally had to close down and dismantle the antennas, after about 16 hours of operation, we had made a grand total of 912 QSOs with 44 countries, including such DX as VK, JA, 9M2, HK, W7 and J6. Probably the busiest spell, though, was the last hour or so on 80 metres. Once they realised we would soon be leaving, the G gang started queuing three or four deep for a contact, and the log filled up at the rate of several short QSOs a minute.

The inevitable anticlimax

It's always something of an anticlimax when a trip like that comes to an end which, for me, was at 3am the following morning, when I finally arrived home and collapsed into bed. All that remained was to organise the QSLs which, with the help of my father and his small printing machine, we were able to do within about 10 days. It was also a pleasure to go along to the HF Convention at Oxford the following weekend and have an 'eyeball' QSO with many of the people we had worked from the Farnes. Our thanks must go to the National Trust for allowing us to conduct the operation, and to all those who worked us for their patience and good operating. Here's to the next one!

SHORT WAVE LISTENER

TREVOR MORGAN GW40XB

Let's start this month with some news from the mailbag, and where better to start than St Austell, where Elmer Liddicoat, one of our earliest award winners, has been putting his retirement to good use, with those long put off jobs receiving first attention. However, the serious work of getting those all important prefixes into his log has not been abandoned and I was pleased to receive Elmer's claim for the Gold award.

Apart from the short waves, he has been using his 'el cheapo' Bush Sigma 2a to good effect on the airbands and, combined with the Oceanic frequencies on the old 1830/1, has been tracking Concorde from take-off at Kennedy to landing at Heathrow. He mentions that Concorde timetables are available from most travel agents.

Now studying for the May RAE, he's hoping to be QRV on CW before too long.

Next in our list of award winners is David Reynolds G3ZPF, of Kingswinford, who sent in a super claim for the Gold award. Although Dave used SSB exclusively at first, he now finds Morse more to his liking. He uses the junkers key, a choice made after a period of building and using the TTL types in the 1970s.

Dave started his radio activity on Top Band, but soon progressed to the busy ends of the spectrum with an FDX560, eventually swapping it for a TS520. He's now upgraded yet again to the TS930 running through a variety of aeriels, including inverted Vs, dipoles, etc, and now has the 5 band DXCC! Among the offerings for the Gold were AJ2, A5, HK1, KL7, JA3/MM, LU9, PY7, SL8/MM, T77, VP2, VK9, VS6, XX7, ZY7, 5T5, 8Q6, 9Q5, and a host of other choice catches. Well done, David!

Upgrade pays dividends

Upgrading his aerial set-up to a half-sized G5RV and a 256ft loaded end-fed has helped reception no end for Trevor Newstead of More-

cambe. Trev put in an all bands claim for the Silver award, which included such prefixes as AA4, AK1, AZ1, K2AAA/CU7, CX2, CX9, C31, EJ4 (Innis Bofin Is), IK3/IL3 (Tovcello Is), J49, PT2, PY4, PZ8, P40A, T77, VP8, V31, 4N3, 8P9 and 6Y5, just to mention a few! Now Trevor is QRV on RTTY with a Dragon 32, but is in search of suitable radio based programs. Drop him a line at 5 Farnlea Drive, Bare, Morecambe if you can be of assistance.

Hancock rides again . . .

Peter Wood G1UTH, of Crowborough, came across a four car pile-up near Tunbridge Wells recently and was able to summon the emergency services. Nice to know we still have our uses! Aside from saving lives, Pete has been getting his loft-mounted cubical quad operating and says it works a treat. He finally found out what the 9R59DE was all about. Apparently it was an earlier model than the 9R59DS which included some upgrades to improve performance. Meanwhile, he is concentrating on the Morse lessons and hopes to get that A licence soon.

Meanwhile, in the land of Bowls and Armadas and things (Plymouth, you ignorant lot!), Len Willford was involved with the Scout Jamboree. They had QSOs with Japan and Australia, as well as the regulars in the States and Europe, and they were still being called after closedown at 1600. Len will have taken his RAE by the time this goes to press so is at the nail biting stage. I wish you luck, Len! Meanwhile, he's been having fun setting up his nice new Welz CP5 vertical and getting his shack looking tidy for the big day.

Neil Latimir of Torpoint spent three weeks cruising (3 days of gales and one of rain!) around Brittany recently, but has now got back to the receiver and relates a QSO heard between W2HMY in New Jersey, run-

ning 2kW into a 4 element beam, and an Algerian station who stated that he was running just 80W into a half wave dipole. Neil swears he heard the W2 fall off his chair!

QSL question

Neil raises a question regarding QSLing. While it is OK to use the standard layout for QSL cards, it doesn't really give the station any more than the basic information, and if you want a better chance of getting that elusive card it is necessary to go to a little more effort to make the report of more use to the transmitting station. A simple report of date, time and RST is probably good enough between licensees, but to make your SWL report interesting and useful it is necessary to go to a bit more trouble.

Cards including all the appropriate information have been produced and will be available to ILA members in the new year.

Neil would like to thank those who wrote in regarding his request for an RA63 for his RA17L receiver. He has now obtained one.

It's nice to hear once more from our old mate, Chris Foreman G1VUD, of Gateshead, who has now recovered from the disastrous fire in his kitchen. His Howes DCRX has been working overtime lately during the CQWW contest, alongside the Grundig Satellit 2100. He has heard stations from all over the world, from Hong Kong to Africa.

Keeping his hand in

Just to keep his hand in, he's been building an active antenna and is listening hard for the final few hundred for his Premier award. As he is getting married in August this year, he is hoping to get a reciprocal licence to operate the Howes DCRX while on honeymoon (*you are joking!?* - Ed).

Jon Sales G0AZJ, of Lancaster, is working the key and says he's a bit fed up with the standard quickies. He

asks how he can get on to longer QSOs. The best method I have used is to make out a couple of 'crib cards' with one for the general information (shack details, etc) and another giving some personal information and location details. Once you have used them for a while, you soon get used to carrying out a worthwhile QSO. This is the method used by some of our foreign friends and it's a good idea to try a similar thing in different languages . . . this may help you to get a few more unusual contacts.

Good year for contests

Philip Davies, of Market Drayton, has been a busy lad over the past year and his band scores have soared due to some ardent listening during the annual contests.

CQ-WPX in March fed 256 stations into the log, including YW3 on 80m, ZF1 on 20m and YE0, L4, 3G3 and TR0 on 15m. The USSR MIR contest in May yielded 113 stations, including RD6, UZ0 and UV1 in the 'home' country and ZP6 and AZ1, all heard on 20m. The IARU's Field Day in September got another 113, with SJ9 on 10m, AL7 on 20m and OY9 on 80m.

0100 on 20m was fruitful, with NT6, AJ6 and KG7 coming into the net. The WAE DL contest the same month found 4X8 and 4X0 in Israel on 20m and GB9DB on 80m. Twenty-five Scandinavian prefixes were captured in the September contest, with LG5 and SK3 on 15m.

The RSGB event in October found fifteen alive, with RM8, Z24, PZ2 and KN6 being added to the list. CQWW logged 213 stations with fifteen again to the fore, and JH9, JR2, JJ3, JM3 and JR6 were captured during a very busy period. Other nice catches were HL9, BY1, ZV7 and P40. Later in the afternoon, twenty yielded PJ1 and HD2, ten opened up to U6, forty found P36 and ZY5, and even Top Band came up with UP9 and N0.

Aside from the contests, some choice ones logged

have been CP7, FY5, TI8 and ID8 on twenty, while forty found ZL4, ZX7, CU8 and IL3. Best 'getaway' was VK9 on Christmas Island, after Philip heard the QSO and missed the callsign!

Another claim has come in for the Silver award, this time from Peter Oliver RS85097, of Paisley, Strathclyde. Peter added AA1, AK4, HC1, HK1, J88, KC4, OA4, XT2, ZF1, 3C1, 4S7, 9LI and 9Y4, among many others, to his list, to bring it well over the required 500. Peter is also hoping to claim his first WAB award soon, so he's really been burning the midnight oil! He was at the Glenrothes Rally but didn't meet any of the gang there, despite announcing his presence on the Tannoy.

Yet another Silver claim comes to hand, but this time from across the Channel where Darrell Jacobs found the fifteen metre band lively from the USA, Africa and the Falklands. C31, VP2, VP8, WL7, WP4, CU2, A3, 9Y4, C30, TI2, 9H3, YC0 and V34 were among the new ones heard. Although tired after a hard day's work, he is still forcing himself to get on the air for a short period each day and is now going for the single band awards, as well as the Broadcast Century award. His ended came down at one end during recent storms, but it seems to be working as a sloper as the signals haven't suffered.

Michael Hurst of Droylsden gets in with his first claim for the Bronze award. The enthusiasm for radio seems to run in the family, as his brother is also getting in on the act by attending the local RAE class. Michael is, himself, taking a course on 'radio and television maintenance and has to squeeze his listening in between studying. However, he's done remarkably well with this claim, which was for all CW! Among the loggings were T77, LU3, HC5, P21, ZS6, Z51, A1, VP8, YT3, and a mass of US stations.

Broadcast bands

Chris Gibbs, of Camberley, has been giving the general coverage bit of his receiver a run, claiming the Broadcast Listeners Award. Not satisfied with just getting the necessary hundred countries logged, he went on to log 194 of them... and all verified, too! Chris also found time to

get his entry in for the Jamboree award, which he found an enjoyable effort. Now he has an NRD525, I expect we shall be seeing his name in the listings even more often!

Claims are still coming in for the GB2WFF Jamboree Award and it looks like being a close thing this year. One thing is sure, the Children in Need Appeal will benefit from your efforts!

Contest logging

Another fine report on contest loggings comes from Tony Blackburn of Stratford upon Avon. Tony had been to the Leicester Rally on the Friday and got down to the RSGB contest at midnight. From the start it was obvious that it was going to be a winner as far as loggings went, and his extracts prove the case. Top Band found TA2BK, UC2LB, J48CS, UG6GAF, VP2MU, SV5ADM, EA9CA and 4X4NJ. Eighty got RO5ROW, 4U1ITU, 4U1VIC, TF11PS, OY6FRA, PJ2FR and OX3ZM in the log. Forty added VP2EC, HK1HHX, TI1C, 8R1X, JY7Z, PJ1B, RL8PYL, YB0ARA and P36P. Twenty got CR2BOH, CE0ZIJ, HP3BED, D44BC, ZF2FL, ZS3HL, VP2MU, HD2HA and NS4F/VP, plus the German base at DP0GVN/Ant. Fifteen came into its own with ZS6BRZ, J49A, VO9GB, 4N3U, RL8PYL, L4D, TA1KA/P, JG1FVZ/P5N26, VK2KL, YC0FTE, VP2MU, FY5YE, ZP5JCY, A22BW and many others. Even ten metres showed, with WC4E, YB2IDX, J28DN, ZS3BI, J49A, 7Q7LW and VK6HK.

Altogether an interesting collection showing how useful these contests can be to the prefix hunter, even if he isn't interested in the contest as such. Of course, the Trio R2000 really showed its worth, but the results prove that the resonant dipole can really show form. Although the total scores have yet to be calculated, Tony had already passed last year's RSGB contest winner at the time of reporting. Well done!

The Derby and District Amateur Radio Society is to hold its first annual VHF contest on Sunday, 15th March, from 1300 to 1700GMT. Entries are welcome from SWLs as well as licensed amateurs. Logs should show time, station heard, station

worked, RS(T) sent and the county sent. There will be certificates for the winners and runners up in each section. For a full copy of the rules, send a stamped SAE to B A Sharp, 119 Green Lane, Derby DE1 1RZ.

Having read a review of the Sony Air 7 receiver, Jim Blakeley of Clevedon decided to test it on air. The only 'rock crushing' signal is BBC Radio 2 on 909kHz with 50kW, from which he found a harmonic at 1818kHz... the transmitter is only half a mile away!

The frequency steps are fixed, which is OK on the airband, but on the PS bands some users have 12.5kHz steps, and if you key 162.0125 it comes out as 162.010. Also, this band is NBFM and some utilities use AM. However, the receiver works very well on the amateur and marine bands with excellent sensitivity. Local repeaters WR and BC, Bristol Lulsgate and Cardiff airports and BRT Belgium on 1512kHz AM are all readable using the helical from indoors.

Jim reckons it is well worth the money, even if a little heavy on battery use.

In the swing

Stan Porter ILA0062, in Malawi, got into the swing of things on the JOTA weekend and looks good for another award this year! He mentioned that European stations became unheard after about 1600Z. Continental QRM was horrific at times, especially from Italy and the USSR. He found it peculiar that Yves, operating HB9S from Geneva, suddenly went QRT while dozens were calling him! 3D6 was very active, as was ZS3DPS where the Scouts were dressed in period costume dating from the German Colonial days. Jenny ZS6WRS kept the station going with OM David all night Saturday/Sunday, from close to the Mozambique border.

By the time this is in print, Stan and family will be on their holidays in SV, 5B4 and 4X4, where their son is coaching squash, so I'm looking forward to some interesting news again next month.

New to the column, but by no means new to listening, comes Jim Blakeley of Clevedon. Jim, now 65 years young, got interested in radio

matters during the Suez campaign in the '50s, when a pal gave him a Philips receiver on which he heard a couple of hams. Finding the RAE a bit complicated, he drifted into tape correspondence, which made him friends world-wide. After leaving the army, he became interested in radio again and some home-brewing and wire stringing found him QSLing the broadcast stations.

Having to abandon his first love, photography, due to health problems, his radio interest took off and he now boasts a very up to date shack, complete with computer. RTTY, aircraft communications and WAB should make Jim's retirement an interesting one.

Goodies galore

Something I look forward to every year is the new Maplin catalogue. Always full of goodies, this year's edition is no exception - especially for the SWL! Thumbing through the 470 odd pages, there are some new items for the listener to consider. The first to catch my attention was the HD1424 active SWL antenna from the Heathkit stable. This also acts as an HF pre-amp on 50 ohm antennas and as a preselector for indoor and outdoor antennas. Priced at £49.95, it seems good value for money.

The TU1000 terminal unit for RTTY sells in kit form for £54.95 (plus case). It converts the RTTY into the RS232 logic required by computers and can also be used for transmitting RTTY.

The LM06G is an ATU kit going for £29.95 (plus case), using the 'T' match circuit suitable for end-fed wires. It covers 600Hz to 30MHz and can be bypassed.

The DXer's audio processor is still available at £9.95 (plus case). An 80m direct conversion receiver sells for £19.95 (plus case) and an active aerial is marketed under Maplin's own label, selling for £49.95 (plus case). It can be used in circuit with the ATU previously mentioned.

At a cover price of £1.50, this catalogue is well worth having in the shack. I have found their mail order service excellent.

Since the formation of the International Listeners' Association early in 1985, I have had the pleasure of

welcoming over 150 members. As a result I have been able to give assistance to many newcomers to the hobby, or have been able to put them in contact with others who could be of assistance when I couldn't. Members are exchanging information and ideas on a 'mutual help' basis, and I'm pleased to hear of many friendships springing up as a result.

As most of my correspondents know, I have been

having extensive work done to my home which has caused a few delays in replying to letters. However, things will be getting back to normal by the time you read this, and I thank all of you for your patience and good wishes.

As a result of the building work, the new custom built shack will shortly be in service as ILA headquarters, and should come 'on air' with GB2ILA over the weekend of 31st January/1st February.

Any member who is in the area during that weekend is welcome to pop in. A new mailing system is being planned which will make it more efficient and easier to control and a word processor will help with the newsletter compilation.

Any listener who is interested in the ILA can drop me a line at 1 Jersey Street, Hafod, Swansea SA1 2HF, or phone (0792) 467541 and I'll let you have all the information.

If any licensed members would like to have a QSO, I am usually on the air at 0900Z around 3685 following G4MUA's regular sked. Listen for G4SUP calling me and I will call for contacts immediately after our Sunday chat.

Meanwhile, keep the letters coming and good luck with the award hunting. Next month I'll announce the winners in the 1986 Jamboree Awards. Good listening!

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3 x 70 collinear	£30.00	£22.00	£4.00	6mtr etc.
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10 EL yagi				single band 20/15/11/10 mtr
6 EL crossed				from £50.00
10 EL crossed				Weather satt aerials 137/1690
				etc
430/70 omc				P.M.R. suppliers to BBC/ITV
4 + fibreglass collinear	£25.00	—	£3.00	M.O.D. Telemetry/vidio links
23 element yagi				etc.
8 turn helical				Fibreglass/aluminium
				Masts/tubing
				SAE for Full Lists
1200/23 CMB/34/32 omc				
Mobile collinear 4+	£12.00	—	£2.50	
Base collinear 4+	£25.00	—	£2.50	
20 turn helical	£33.00	—	£3.00	
18 EL loop yagi	£40.00	£30.00	£3.00	
27 EL loop yagi	£50.00	£40.00	£3.00	
Para Delta	£40.00	—	£4.00	

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Please note it is illegal to operate a transmitter without a licence. The following equipment does not meet DTI approval, all sets are sold without crystals and sold as seen and without warranty.

IS THERE LIFE AFTER THE RAE?

There will come a day (yes, fear not; it comes to all of us eventually, if we wait long and patiently enough) when your RAE results arrive. You have the letter in your hand, you gaze at it trembling with fear, but dare you open it? We'll take all the rest for granted: the ballyhoo, the champagne all round at the pub that evening, the flowers, the telegram from the Queen...oh no, that's in a few years' time, isn't it. Anyway, you can operate legally as soon as your shiny new call sign arrives. No more wicked pirating with an unofficial call sign...you didn't know I was listening, did you? Now you're officially certified, and so you should be!

What next?

So what comes next? Join in the local nets every evening, and spend hours transmitting late into the night. But after the first rosy flush of enthusiasm has died down, what is there left? How do you become one of the great brethren of the air? You join the Radio Society of Great Britain.

We amateurs are a down-trodden lot: browbeaten by our neighbours who swear that we're interfering with their TV enjoyment, when we know perfectly well that it's that CBer down the road with his burner on again; harried from our repeaters by squeakies and IQ zeros (have any of you tried using some of the London repeaters recently? Useless! The minute you put out a call you are swamped by the fools); edged in on all sides of our allocated bands as other services need the air space, and so on. We need to get some clout somehow, and the only way to do it is to band together and make ourselves heard.

Our representation

That's exactly what the RSGB is for. Originally the London Wireless Society, the RSGB has always acted on our behalf when dealing with the Department of Trade and Industry, which issues licences and looks after any changes in licensing conditions, and the Ministry of Defence, which shares some of our bands. The society also states our case when the International Telecommunications Union has one of its periodic band reallocations.

There's more

It publishes all manner of helpful books and pamphlets on amateur radio, from beginners' guides like *How to Pass the RAE* to more technical information. To get some idea of the variety of books the RSGB offers take a look at its

bookstand the next time you go to one of the big rallies, such as its own rally at the NEC (to be held this year on 28th/29th March).

Once a member you will have every right to be bewildered by the range of services offered. From Class A licensees on the HF bands to microwavers on 10, 24 or even higher, you will find a committee ready to offer you help and advice. If you write with a query, don't forget that an SAE is always appreciated.

The society smooths the path for many of us with special applications, too. Staff will help you tread the dizzy maze of local planning regulations when you want to put up a forty foot tower. They look after special event station applications, and will lend you a pile of posters and hand-outs to improve the look of your temporary shack at the show. They will even give you advice on how to cope with particularly stroppy neighbours who just will not believe that the wide open front end of their damned cheapo TV set is to blame for the interference, not your beautifully filtered transmitter.

Help yourself

Not only will the RSGB help you to pass the RAE first time, they will also help you to upgrade to a Class A licence. By 'they', I don't just mean the council or the committee; I mean grass roots members like you and me. Many members do a tremendous amount of unpaid volunteer work purely for the satisfaction of helping other amateurs. For example, around the country are volunteer experts who are prepared to transmit slow Morse on a regular basis, so that if you want plenty of practice before you sit your test you have only to switch on your gear, pencil in hand, and listen.

Talking of Morse, the RSGB has now taken over the organisation of Morse testing, and is gradually organising a network of testing stations all over the country.

A more personal level

Around the country, working on our behalf is a happy band of amateurs known as Regional Representatives. They are constantly in touch with the RSGB headquarters and are always available to answer queries, offer help and advice, or put you in touch with the right department of the RSGB at Potters Bar. As these reps are volunteers, working for nothing and recouping merely their expenses, the dedication varies a lot, but if your area has a good rep he can be a tremendous help on both

a personal and a social level, to local amateurs and clubs.

I've known reps to write to bereaved widows on behalf of the society, and organise local help in clearing out the shack and getting the best price for the silent key's gear.

What's in it for you?

What can the RSGB offer you personally? Well, if you have made your best contact ever and want to exchange QSL cards, the QSL bureau is at your service and will receive and pass on cards for members who send a large SAE. This saves a lot of postage and time spent looking up addresses, and that goes for overseas contacts, too.

If you want to keep up to date with all the latest club news, including dates of events and contests and a list of all the affiliated clubs in Britain, the society sends all members a copy of *Radcom*, its own magazine, every month. Articles from members are always welcome.

If you are worried about burglars (and who isn't, nowadays?), the RSGB can put you in touch with an insurance company offering special rates to members when insuring their valuable gear. Is there nothing they haven't thought of? They're even into shack decoration! Who needs wallpaper any more when you can have floor-to-ceiling certificates organised, signed and issued by guess who?

Special awards

Don't run away with the idea that these certificates are all easy to get, though. Some awards are fantastically difficult to obtain. On the other hand, don't feel discouraged if you are a newcomer to the hobby and not too sure of yourself yet. The awards start easy, within anyone's capabilities, and work up steadily.

You'll find yourself in the very best of company in the RSGB, too. Not only is our patron HRH Prince Philip, the Duke of Edinburgh, but our most distinguished grass roots member is JY1, King Hussein at Jordan.

Over to you

I could continue to list the services provided by the RSGB, such as competitions throughout the summer, beacons and repeater back-up all around the country, pages on Prestel, etc, but I've got a better idea. Why don't you join and find out for yourself? The address is: *RSGB Headquarters, Lambda House, Cranbourne Road, Potters Bar, Hertfordshire EN6 3JW. Tel: (0707) 59015.*

by Val Rogers

THE TABLE TOPPER

by Richard Marris G2BZQ

The Table Topper is a small dimension experimental loop transmitting antenna designed for use on the 80 metre band. Although an experimental design, it was felt that other amateurs might like to try their hand with it as it has proved very successful.

80 metres was selected initially, as from experience it has been found that an idea that works on this band could readily be adapted for similar structures on higher frequency bands. Versions for the HF bands and suggestions made for those who are prepared to spend a little time carrying out the necessary experimental and construction work will be discussed at the end of the article.

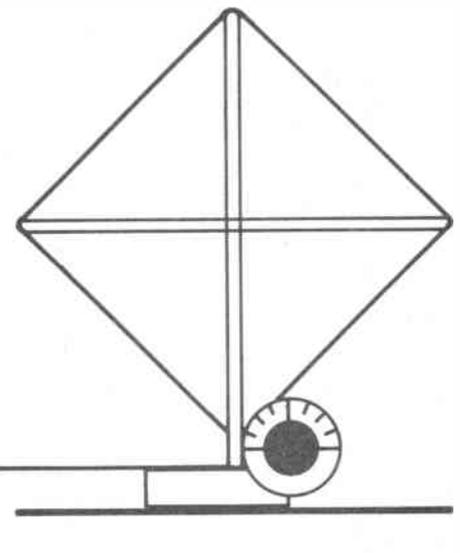
The antenna is the end result of a long period of experimentation carried out with various designs and ideas. The

results have been most interesting and exceeded initial expectations.

When designing the Table Topper, the maximum size of the device was initially determined by the operating space available, which just happened to be a table. The other important point was that it *had* to fit into available storage space when not in use, and be assembled and connected in a couple of minutes. It also had to be simple to use, and above all it had to work!

It was considered that a fair test of effectiveness was to use it with a 10 watt (input) CW Tx. In other words, what was needed was a very small Tx loop that would fit on a table indoors, with only 10 watts input! Quite a cruel specification.

It is essential that this loop antenna should not be confused with a receiving



loop antenna, where the chief requirement is the elimination/reduction of incoming QRM/QRN – hence the sharp nulling required. The Table Topper is directional but with a broader lobe, so that it is not too critical to use on transmit.

Description

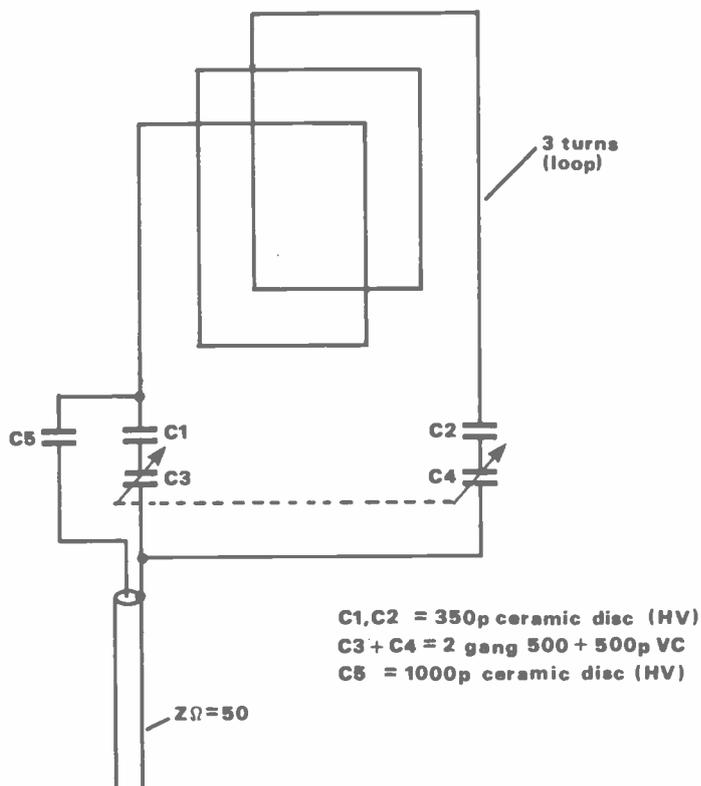
Figure 1 shows a front view of the loop which consists of an X-boom mounted on a base, with a resonating control and coaxial feedline to the Tx/Rx. Initially it was fitted with its own inbuilt ball race rotating system, but this was removed as it was found that the weight of the coaxial feedline was sufficient to rotate the loop, usually at the most inconvenient moment! If required, the loop is now placed on a simple turntable which needs some manual pressure to turn it.

The circuit is shown in Figure 2, and consists of 3 turns, approximately $22\frac{1}{2} \times 22\frac{1}{2}$ in in size, of UHF TV coaxial cable of 6mm outside diameter (see parts list). The loop is resonated with a 2 gang, 500pF per section variable capacitor, C3/C4, which must be air-spaced, of good quality and have ceramic insulation. This can either be salvaged from an old valve Rx (remove all dust!) or obtained from a supplier (see parts list). The VC C3/C4 is fitted with an extension spindle – an epicyclic slow motion drive and large knob (see Figure 6b). Ceramic disc 8kV pulse capacitors, C1/C2 (each 350pF), are used in series with C3/C4 and are readily obtainable (see parts list); without C1/C2 the tuning would be far too sharp. The values were selected so that the 80 metre band came into resonance with the C3/C4 VC rotor blades 50% enmeshed.

Coupling capacitor

The coupling capacitor to the coaxial 50 ohm feedline is a 1000pF ceramic disc (1kV). Initially a VC was used, but later it was found that only one selected position was needed for the whole 80 metre CW band, so it was replaced with a fixed capacitor, making one less control knob to twiddle. 50 ohm coaxial feedline is used from the loop to the Tx/Rx. The overall dimension of the device is approximately $34\frac{1}{2}$ in high \times 30in wide.

Fig 2 The circuit



THE TABLE TOPPER

Construction

Initially, it is necessary to make the basic X-boom with 2 pieces of wood, dovetailed (at right angles) and glued at the centre. Each piece is 30 inches long and $1\frac{5}{16} \times \frac{5}{16}$ in (see *Figure 3*). Secured by screws to one limb of the X-boom are two pieces of wood $10\frac{1}{4}$ in long and $1\frac{3}{16} \times \frac{5}{16}$ in, as shown in *Figure 4*. To this a piece of plain circuit board is screwed (only one side metallised), with the copper surface against the wooden uprights. The board is needed to mount the variable capacitors later, and should be removed again before the winding of the loop commences.

Using the specified UHF TV cable, three complete turns are wound around the outside of the 30×30 in X-boom, with the turns spaced approximately $\frac{1}{16}$ in apart. Before winding, remove approximately $\frac{3}{4}$ in of the outer PVC from one end of the cable. Bend the end down approximately $1\frac{1}{2}$ in and securely bind to one side of one wood 'prong', as shown in *Figure 4*. Strong thread or tape can be used.

Winding the cable

Wind three complete turns of cable around the X-boom and terminate the free end in the same manner as the start. Carefully space the turns $\frac{1}{16}$ in apart and then apply a liberal application of quick setting Araldite over the two bindings, and over the turns where they make contact with the wood. Allow the Araldite to thoroughly harden.

Next make the simple 'H' shaped base unit as shown in *Figure 5*. All wooden

parts can be given an application of spirit wood dye before assembly. The frame assembly should now be securely glued and screwed to the base unit (see *Figure 6*). Note that the circuit board is not fitted until this has been completed. Screw on the circuit board and check that there is a gap of at least $\frac{3}{16}$ in between the bottom of the winding and the top edge of the board.

Slow motion drive

Study *Figure 6b* carefully and fit the variable capacitor, extension spindle and slow motion drive as shown; the slow motion drive is secured to the wood with a small screw. The exact position of the VC will depend on the type used, but all types can be fastened to the circuit board by fixing screws. If the VC is of the type fitted with postage stamp trimmers, then these should carefully be removed.

A 52 inch length of 50 ohm RG58 coaxial feedline should be secured to the base unit with a cable clip, as shown in *Figure 6a*. The outer cable screening should be soldered directly to the circuit board copper, and C5 soldered between the coaxial centre conductor and the junction of the winding end and C1, which should be connected to C3 (refer to *Figure 2*). It is essential that the C3 section of the VC should be the one next to the control spindle. Connect C2 and C4 and then the rotor plates of the VC, which should be connected directly to the circuit board.

When fitting C1 and C2, the leads should be extended as required, covered with thick polythene sleeving and

brought around the outside of the vertical prongs of the frame, from the winding ends to the VC (C3 and C4).

Operation

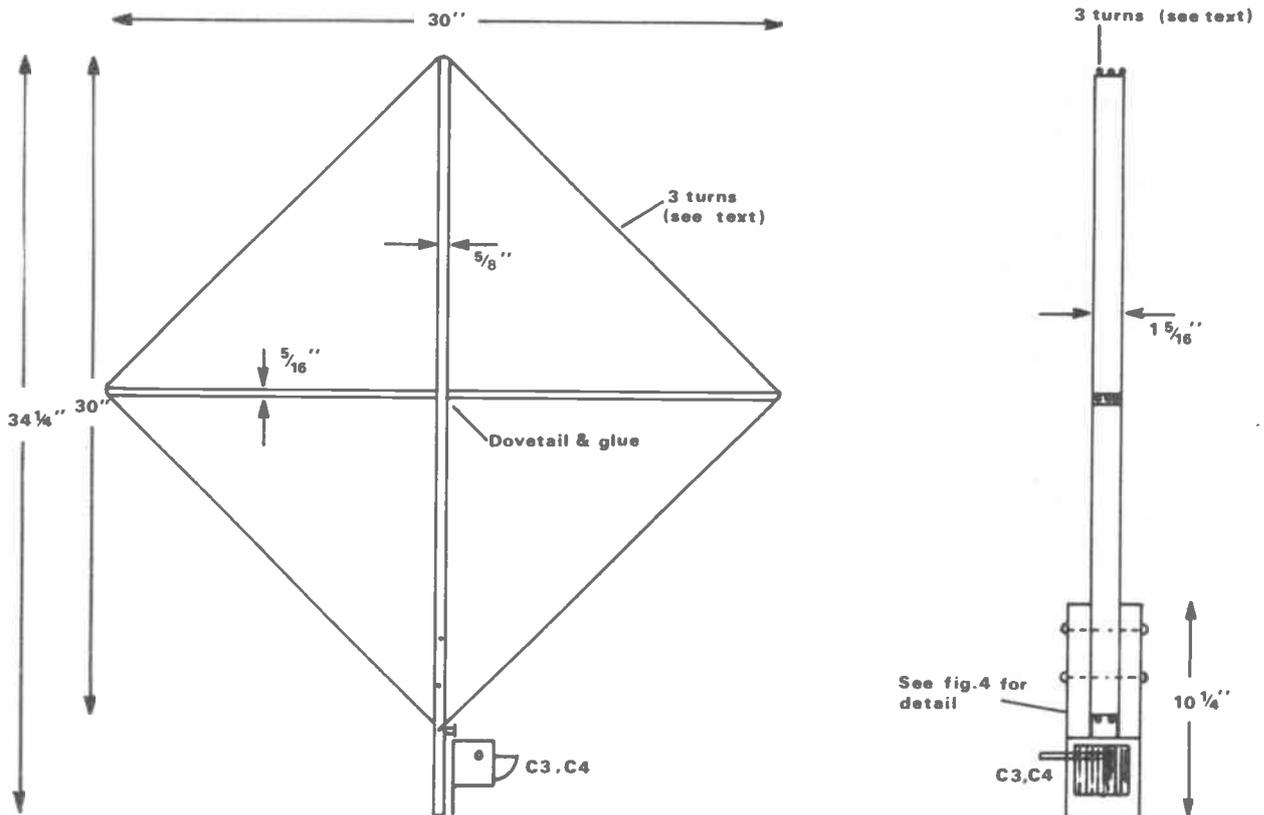
The Table Topper has been used exclusively on the 80 metre CW band between 3505 and 3580kHz, but it will resonate over the whole of the 80 metre band. The AT5 transmitter used has the usual Pi-network output circuit, modified for an output impedance of 50 ohms. The Rx input is also 50 ohms.

The initial test is to tune the Rx to about 3540kHz and slowly rotate the resonating VC on the Table Topper. When the VC plates are approximately 50% enmeshed the signal and noise level will come to a peak. Rotation of the loop should indicate that it is directional, with a fairly wide lobe. Maximum signal strength will be received at the end of the loop and the minimum at the wide side. The loop should be checked on signals near each end of the band. If your Tx and Rx are both 50 ohms terminated, then the resonating point on the VC will very conveniently be practically the same on both Tx and Rx.

Test on transmit

To test on transmit the Rx should again be tuned to about 3540kHz and the loop resonating peaked. The Tx should also be set up on 3540kHz, using a dummy load, and the loop connected. With a minor adjustment of the loop VC, the Tx loading can be adjusted, as with the dummy load, without retuning the Tx controls. A simple radiation test is to use

Fig 3 Frame assembly with winding



THE TABLE TOPPER

Fig 4 Bottom of frame assembly

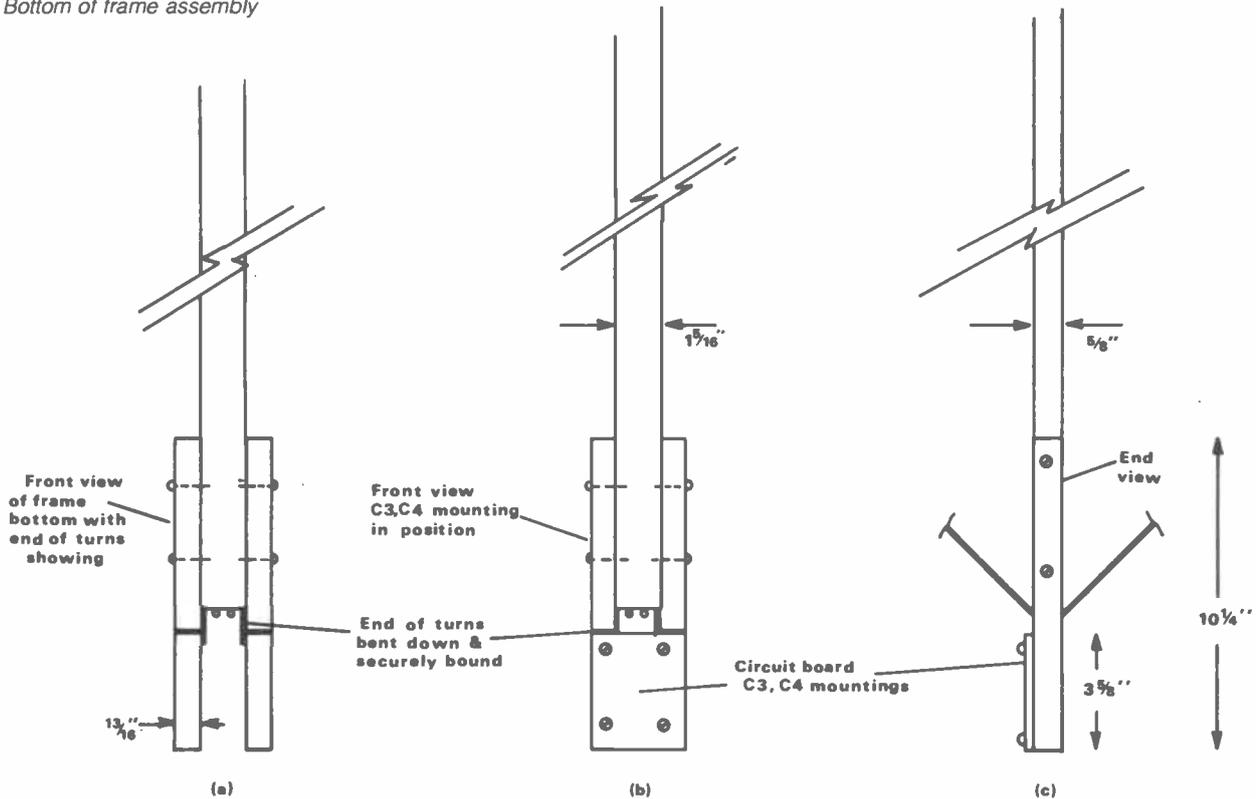
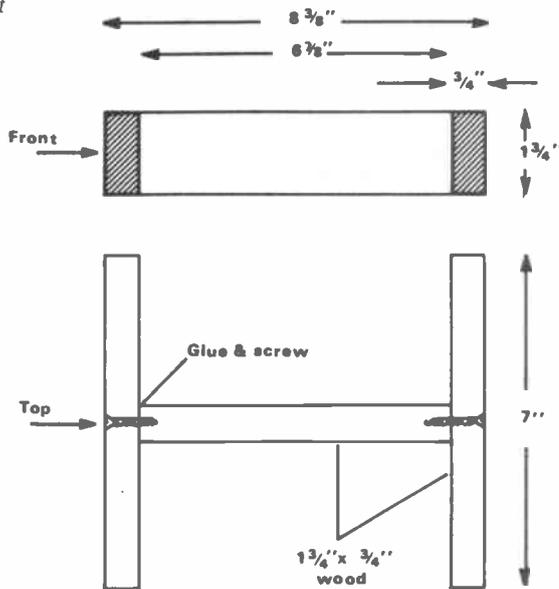


Fig 5 The base unit



a good old-fashioned neon bulb, which should indicate maximum brilliance (voltage maximum) at the side of the loop connected to C2. At the C1 end of the loop the neon should not 'strike', thus indicating current maximum. A neon bulb is the best method of checking this as, due to the small size of the antenna, it is impossible to get a sensible result using a field strength meter.

The loop should be at least 12 inches away from the wall at any point of rotation, as it has been found that closer proximity to the wall is likely to detune the loop slightly when rotated. It is also obvious that the direction of the loop for maximum reception of a station, is also

the direction of maximum radiation to that station on transmit. With my own Tx it has been found that if the transmitter and the loop are lined up initially on 3540kHz, then only a very small adjustment of the loop VC is required for operation between 3505 and 3580kHz, with no Tx adjustment necessary other than the VFO. There is also no detectable TVI with a TV (with rod antenna) within 4 feet of the loop when transmitting.

Results

No performance claims are made for the Table Topper, but the following results were obtained using it with an AT5 adjusted to 10 watts input, in a first

floor apartment, with the loop base an estimated 15 feet above ground level.

The first QSO was a response to a CQ from a DJ (about 500 miles), with RST 559 received and RST 569 sent. This was immediately followed by a QSO with an SM6 (about 900 miles), with RST 579 received and RST 559 sent. Early the next morning, when the band appeared to be devoid of amateur signals, an east coast 'W' came back to a random CQ. Strangely enough 'short haul' contacts of 50/100 miles only gave mediocre reports.

The writer is not a DX hunting enthusiast and only spends the odd hour on the air between 4.30 and 6.00am a few mornings per week, but the results obtained leave no doubt that a DX enthusiast could greatly increase the workable distances of the Table Topper by operating consistently at the right time of day.

Other bands

Below are a few ideas on how the loop may be adapted for other HF bands, where no doubt DX potential would be increased. A simplified circuit is shown in Figure 7.

40 metre/7MHz band

For operation on this band it is suggested that the two wooden components of the X-boom should be reduced from 30 inches to 29 inches long. The turns should *not* be secured with Araldite until the loop has been tested. Assuming that a 2 gang \times 500pF VC (C3/4) is still used (they are so readily available), the tuning will be too sharp. Consequently, the values of C1 and C2

THE TABLE TOPPER

Fig 6a Rear view of frame to base

Fig 6b Fitting C3/C4 and dial assembly

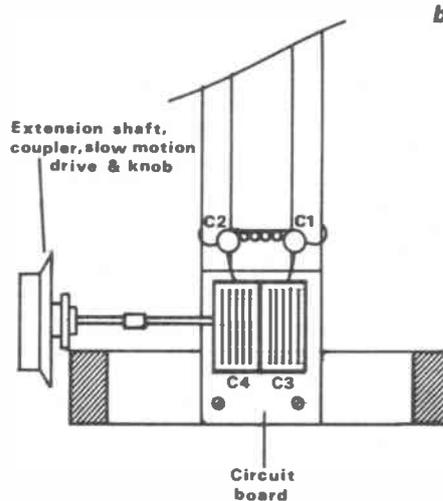
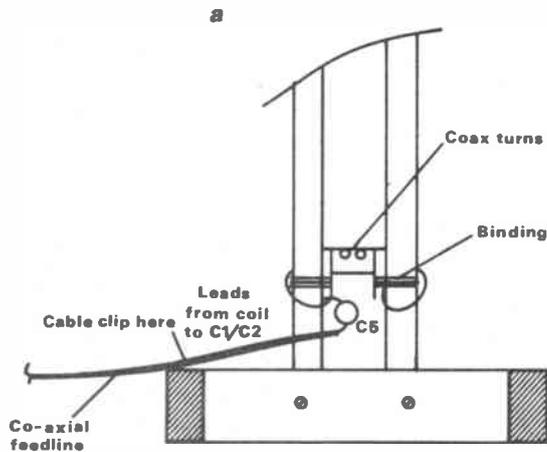
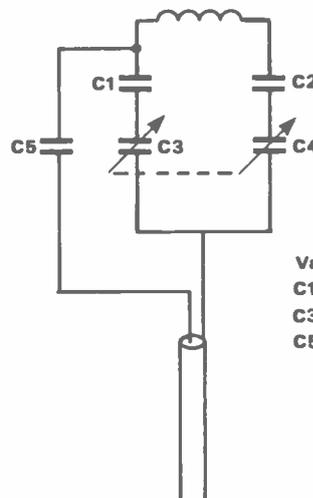


Fig 7 Simplified circuit configuration



Values for 80meter
C1,C2 350p
C3,C4 500p+500p VC
C5 1000p

have to be reduced to around 150/200pF, which could readily be achieved by putting two 350pF ceramics in series for each. This suggestion has been made because these capacity values are widely available.

The loop turns should be spaced as far apart as possible, and resonance on receive should be targeted at 50% enmeshment of C3/C4. A little experimentation using the Tx will be necessary to determine a new value for coupling capacitor C5, by temporarily using a variable capacitor (2 × 500pF in parallel). This should be rotated to give a similar Tx loading as that achieved with a dummy load. Replace the temporary VC (C5) with a fixed capacitor as near the resulting capacity value as possible and retest.

When happy with the results, tidy up the Table Topper and apply Araldite to the bindings and loop turns as in the original 80 metre version.

20 metre/14MHz band

Here the original 30 × 30in X-boom can be used, but the turns have to be reduced from 3 to 2. The procedure is then similar to that for the 40 metre version. The 2 turns can be moved further apart (less capacity), or closer (increased interturn capacity) to help achieve resonance. The values of C1/C2 can remain the same as those used for 40 metres, or determined experimentally. C5 has to be determined experimentally. The resulting 20 metre/14MHz antenna will probably be more or less non-directional.

It is stressed that the writer has not tried a finalised 40 or 20 metre version of

the Table Topper and the dimensions and components given are those which he would try as a starting point for such designs. Other unforeseen experimental work may be necessary, especially on 20 metres, and with this in mind it would be a good idea to start with the original 80 metre design to get the feel of the techniques involved.

All suggestions are made on the assumption that a practical 'cut and try' technique will be used, although the

technically experienced with the necessary test equipment can obviously take short cuts.

Other HF bands can be tried by anyone prepared to spend a little time experimenting using similar methods and ideas. Remember that if the resulting loop will resonate on 'receive' then it can probably be made to load on transmit by determining the optimum value for coupling capacitor C5, and sticking rigidly to the circuit.

COMPONENTS LIST

C3/C4	2 gang × 500pF per section variable capacitor	J Birkett or salvage
C1/C2	each 350pF 8kV ceramic 'pulse'	Radio Components Specialists
C5	1000pF 1kV ceramic disc	Radio Components Specialists
52in	50 ohm coaxial feedline	Marco Trading CBL/RG58C/U
8 metres	Coaxial cable 75 ohm UHF TV down lead	Marco Trading CBL/CXL75/Brw
	6 : 1 reduction drive	Cirkit No 21-04511
	Knob	
	Extension spindle and coupler	

UP A TREE IN '65

by Peter Wood G1UTH

Some time in 1965, I think it was, I found myself clambering up a tall tree outside a schoolfriend's house in Devon to tie up the end of an aerial. The other end was connected to an old and bulky domestic radio in the house, on which I knew my friend listened to the short wave bands. I had a vague idea about things called QSL cards and 'tuning the aerial', but the hobby did not inspire me then; it took another twenty years before I was bitten by the amateur radio bug.

My enthusiasm for it now is so strong that I think I must be going through a second adolescence!

Roger, that same friend, but now licensed as G4PMM, demonstrated the hobby anew to me during a brief stopover with his family in the summer of 1985. To put it simply, but to do the experience no justice at all, I was fascinated. For years I had been the recipient of broadcast radio signals, but the idea of two-way communication, and over great distances, was quite exhilarating. Why had I not heard about it before?

By the autumn I was knee deep in radio magazines. Most of them were incomprehensible to me, as was most of the talk at the local radio club I had joined. At that point all I knew was that I wanted a receiver. 'What sort?' People were asking me in a helpful sort of way, wondering perhaps if my 37 year old adolescent interest would last. How did I know what sort? What sorts were there? The explanations didn't help either!

Impatient

My friend loaned me a small VHF hand-held set whilst he and his family went abroad for three weeks. By the time they came back I was 'on the air'. Impatient for a secondhand receiver, I visited CM Howes' premises near Meopham in Kent and bought an 80m dc Rx kit from the man himself. I listened uncomprehendingly to his helpful comments and within a short space of time was listening seriously on something I could honestly say I had built myself.

The kit was easy to assemble – sort of painting-by-numbers for the radio amateur – and it worked first time at that! It was, and remains, a superb little set and I thoroughly recommend it. I began to learn things about aerials and earths, hand capacitance and DX.

I was excited and amazed at what I was hearing, like tracking a maritime mobile station from the Channel to Tunisia over a period of a week. Others in the family were not so impressed. My young daughter piped up in a local radio shop. 'Not another bit of your old junk, Daddy?'

Gradually a long wire crept down the garden and I later acquired an ageing Trio 9R59DE general coverage receiver. (I was able subsequently to trace its history. It turned out I was the fourth owner in 16 years, the first having paid £40-10s-0d for it). A G5RV and an ATU, the latter also built from a kit, followed so I was by now really into the big time with horizons broadening daily.

The disease spread

Like many others before mine, I suspect, the 'shack' was a corner of the dining room – a decision I took without consultation. Initially it was a small table and a chair, later supplemented by shelves and a bookcase for the growing number of reference books. A world map also appeared on the wall!

Through the local radio club I met Jim G4DRV, who rashly offered to prepare me for the Radio Amateur's Examination. He was very patient, but I have to say that I was not a very rewarding student. In my impatience to get on, I had the greatest difficulty in relating the theory to what actually happened in the radio.

I continued to buy magazines and began to find that some of those I had bought several months previously made a bit of sense to me. This was most encouraging, especially when I got my name in a couple of issues!

In the New Year my tutor became overburdened at work, so I completed my studies alone, going over my notes and doing sample RAE papers. As the May exam approached, just 10 months from Roger's demonstration, I began to weigh up the odds of passing. I reckoned I might pass Paper 1 but Paper 2 was in the lap of the Gods.

In the event, I sat my exam at a nearby college with a bevy of young would-be hairdressers (and a few would-be licensed amateurs too!). In the break between papers we joked about ending up with a licence to 'cut and blow dry'. This was not as unlikely as it might have

seemed in view of a mix-up that had occurred with the question papers.

During the ensuing weeks whilst I waited for the exam result I varied from believing I had just scraped through (it hadn't been a hard exam) to believing I would have to sit at least one paper again (I hadn't done enough work for it). An envelope eventually came from the college; it was quite large and was stiffened with cardboard. Surely they wouldn't go to this trouble just for a 'fail' slip? Inside was the pass slip and the certificate. I was so surprised and delighted – a credit in Paper 1 and a pass in Paper 2! It didn't seem right – I'd guessed too many answers!

I had already decided to apply for a B licence if I passed the exam, so off went the application form. Had there been a coincidence or was there a really sharp bod working at the RALU the day my callsign was issued? My address is Yew Tree House and my callsign ended up as G1UTH. Very neat.

In the end I bought an Icom IC2E 2m hand-held rig like the one I had been loaned. It has turned out to be a good buy, despite not having the performance of more recent (and more expensive) rigs.

Is there anybody there?

My first attempt at getting on the air involved going up alone onto nearby Ashdown Forest and tentatively putting out a call as per the *Amateur Radio Operating Manual*. There was no reply, and I had to agree with my wife that I could have achieved more by throwing open the front door and shouting 'Is there anybody there?' In the event I had been calling on a very obscure frequency owing to my misunderstanding of the thumbwheel frequency settings!

Eventually my first contact was conducted late at night (hoping no-one would hear me?) involving heart pounding, sweating, fumbling with callsigns and thumbwheels, and generally having difficulty remembering who and where I was. Unforgettable stuff. The other fellow seemed totally unaware of my state.

My second contact was with a sympathetic local who knew exactly what was happening and to whom I shall be eternally grateful. He helped me grapple

UP A TREE IN '65

with the local repeater, as I realised with great impact that I was right after all – I really knew nothing at all about amateur radio. Furthermore the following morning, to my embarrassment, I heard some locals laughing in a good-humoured way about the mess I had got into.

Don't talk about those!

Since then, my understanding of some of the material I have learned has improved in leaps and bounds. There remain some very basic gaps which I don't talk about at this stage. But I can say that one of my aerials is a home-brew Slim Jim; the matching being done with the assistance of a kind amateur I met whilst mobile. He was travelling from Devon (there's that West Country connection again) to visit his relatives in my home town. Len G0EOP also gave me my first taste of working on the HF bands under supervision, which enabled me to contact my old school pal again over the air.

In the last three months I have experienced an enormous amount of unexpected and spontaneous generosity from a host of amateurs. I am greatly indebted to Harold G4FDQ in Lancing for rescuing a cubical quad from the rubbish tip for me. It is now rotating gracefully in my loft as a result. Others, including Chris G4HCA and Frank G4LDJ,

have kindly fixed broken gear for me.

The equipment and library of books grows steadily, so that what was once a modest table with a small rig in the corner of the room is now acquiring the significance of an edifice. A linear amplifier, power/SWR meter, antenna rotator control box and assorted wires have all sprouted within a few months.

At this stage in the hobby, new experiences turn up every week. I've joined the RSGB, and have my callsign in the latest callbook, so I must be real! I have attended a rally and an exhibition and even worked an American station on 2m – albeit he was on the Newhaven to Dieppe Ferry! I have experienced 'lift' conditions, paid a trip to Mecca in Matlock and worked a JOTA station for the first time. The youngsters I spoke to were almost as excited as I was. It's clearly been a good time to start in the hobby with the sunspot cycle now generally thought to be at its lowest. Things can only improve.

A glorious waste of time

My car broke down recently, and during the one and a half hour wait for the recovery vehicle, I sat high up overlooking Eastbourne towards Dungeness working portable. It was there that a wise old amateur referred to the hobby as a glorious waste of time. He didn't believe it either, but at least I feel I

no longer have to justify the hobby to certain people (mentioning no names but she lives at our house!).

Just in case I should ever need to explain the value of the hobby I can talk about my 'Tony Hancock experience'. I responded to a request made over the air for emergency assistance at a four car road accident. I promise only to mention this if I am really in a corner!

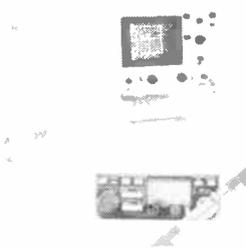
Morse next

I'm now studying for the Morse exam and feel a certain empathy for the mode. I look forward with great excitement to working on the HF bands and to linking up with people I have listened to on and off for about a year – a very short time in amateur radio terms. I'm trying not to forget what it felt like to want to get hold of a radio in order to have a listen and have loaned my original set out to others who have shown an interest. Likewise I try to acknowledge all those short wave listeners who listen with such great patience to my and others', not always enlightening, QSOs!

As time rolls on I hope to contribute to the fun and enjoyment of others new to the hobby, in the same way that people have done for me in these early days. I'll let you know how I get on and look forward to meeting you on the air some time. Meantime, I'm very pleased I climbed that tree in 1965!

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News and comment from Glen Ross G8MWR

Up in the air (Mk1)

In this case, for a period of nearly ten days and a complete circumnavigation of the world non stop, and without refuelling. What has all this to do with our hobby, you may well ask? The answer is simple: both the pilots involved were amateurs and they held the consecutive callsigns KB6LQR and KB6LQS. It is not known for certain if they managed to indulge in any true amateur operation, but they were heard on several occasions using the MARS (Military Amateur Radio Service) frequencies to keep in touch with base. Signals were particularly good on 11.407 and 13.312MHz from reports received. Another first in the air in more senses than one.

Giving your callsign

Two letters arrived recently bringing up the same point, which is, 'Just how often do you have to give your callsign out?' This stems from the current quick exchange technique which now seems so common on the VHF bands and in which the callsigns are only given every now and again. This style seems to be based on the belief that you only need to give your callsign every fifteen minutes, but this is not in fact the case. Your licence regulations are quite clear on this point, your callsign *must* be given at the start and end of each period of transmission.

Now it must be obvious that once your gear returns to the receive state, you have completed a period of transmission and so must give your call. The fact that, as an extreme case, you only said 'No' is beside the point. The bit about the fifteen minute period is to cover the times when you are involved in a single over that would run more than fifteen minutes. The powers that be do not want to sit around monitoring you for three hours before they can find out who you are, hence the requirement to give your call if you talk for over the prescribed period.

You do not have to give the call of the station you are talking to at any time during the QSO, and you certainly do not need to give those long lists of callsigns

that we hear on most of the nets. These really get stupid when, say, six people are working through a repeater and everyone insists on reading out the whole list at the start and finish of each transmission. This uses up most of the time the repeater allows you and normally ends up with the operator taking a 'K' so as to still have time to talk.

The point of identification using anything other than voice or CW is not quite so well defined. You might like to have a close look at your licence and see if you think that sending your call in ASCII at the end of a data transmission would comply with the terms of your licence. Also, what is the position if operating on VOX or full break-in on CW? The relevant section in my licence is paragraph 9, subsection 2.

Novice licence

I asked if you would send me your ideas on this one a couple of months ago, and the postman has been complaining ever since. The response was staggering in its quantity, but very disappointing in its quality. One thing that you nearly all had in common was a great reluctance for me to mention your callsign in the review of comments. Well you are safe on that one because there are far too many to mention. Predictably those who have callsigns were mainly against the idea and those who admitted to having already failed the RAE on one or more occasions were in favour. Very few people actually put forward any more concrete ideas than 'We had to suffer to get ours, why should they be let off the hook?' Or, from the opposite side off the fence, 'Why should we have to suffer to get a licence. They (the ubiquitous they!) ought to make it easier'.

What bands?

This is where most of those wanting a novice licence started to show true colours, with nearly everyone opting for 25 watts or so of SSB on the HF bands and, believe it or not, they nearly all wanted twenty metres included in the schedule. Virtually no one put forward the idea of a slow speed CW test as a

prerequisite for a licence, and no one mentioned a probationary period of, say, one year before you had to make the move to a full licence.

The idea was that the novice licence would be a lifetime job in the same way as the current class A and B are. There seemed to be no idea of it being a stepping stone to greater things, but simply a second class HF band licence. Most people also thought that the licence should be available on demand from, presumably, the Post Office down the road, and based on the fact that it only gave limited privileges the cost was generally put at around five pounds.

Specific ideas

G3ZHI, who has been one of the main agitators for a novice licence for many years, comes up with the idea of a licence allowing five watts of CW only on 28MHz. The equipment would be home built or made up from approved kits of parts. This would certainly put the home construction side back into the hobby. He also points out that of those recently taking the RAE, less than 10% were 18 years old or under. This is a group where unemployment is rife and he feels that the current trend towards a 'cheque book' hobby is probably driving people away.

G0CMV feels that the standards of the hobby are in decline and puts this down to the fact that few people seem to have come up through the ranks of the SWLs. He suggests that applicants for a call should have to show some proof of SWL activity in the form of log books and QSL cards to substantiate an interest. However, he does admit that listening to some operators might not give the type of knowledge that would be desired.

Get it right

Ian Duffin goes along with G0CMV to a point when he suggests that an applicant should in effect serve a six month probationary period, and should then have to demonstrate his abilities before being able to continue using a licence. He also says 'Surely the idea of amateur radio is to be able to pick up a mike and talk to other people?' Well, we may like to see it that way, but the authorities don't. They still stick to the bit about self training etc.

D M Harper did not vote for the usual demand for an HF band allocation, but feels that two metres would be the right place for a novice band (if only we could find enough space for it amongst all those dedicated spot frequencies).

There's more

So much in fact that we will have to leave it until next month, but one or two comments came up fairly frequently from both sides of the fence and are worth a quick mention. The comments boil down to 'It takes a lot of work to pass the RAE'. The pro-novice camp use it to justify a simpler licence and the anti-novice people see it as a useful screening device to weed out those who are not 'suitable'.

There is still time to get your ideas to me and I look forward to hearing from

ON THE BEAM

you. I am still sitting on the fence looking both ways, but feel that if you want something badly enough then you do not mind how much effort you have to put in to achieve the result. An old West Country saying states 'It is amazing how much work a man will do when he can call it something else'. How about calling all that work your hobby?

The awards

There have been a lot of letters asking for details of our awards. It is not possible to give all the details for all the bands, but the awards involve qualifying

on a basis of squares, counties, countries and a minimum distance, the actual requirements varying according to the band and class of award. As an example, the requirements for a 144MHz Bronze award are 7 countries, 20 counties, 20 squares and a minimum distance of 500kms.

A special category is also available to anyone who thinks they have made a contact that merits one. As an example of this, one was issued for the first known mobile to mobile contact on 24GHz. If you want all the details please send an SAE to the address below.

The big switch.

Time to go, and I leave you with this gem heard on seventy cms from a station located near Reading: 'I am really pleased with this new aerial. When I am beaming north I can still work stations in Devon'.

Keep up the supply of ideas and information, and in particular let me know your thoughts on the novice licence idea and how you think it might be organised. The contact point, as always, is 81 Ringwood Highway, Coventry CV2 2GT. Or you could use the magic Prestel service: 203616941.

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SECONDHAND EQUIPMENT GUIDE

by Hugh Allison G3XSE

A few months ago there was an interesting plea in the 'wanted' column of the Free Classified Ads section of this magazine. A reader wanted to know how to get the gubbins out of the case of his Sinclair mini-TV (old multi-standard type). The problem with a lot of consumer products is that the manufacturer often includes a hidden screw in the design to stop unauthorised tampering. Your small six transistor PP3 powered medium wave squawk box radio often has a back securing screw hidden under a bit of foam in the battery compartment. This ploy is also common in a lot of cheaper hand-held CB rigs, by the way.

To return to the Sinclair, there is a screw cunningly concealed under the identification label on the bottom. Some of these TVs also have a telescopic rod aerial that can be a real pain to get out – the early single standard one, also briefly sold under the Binatone trade name, is an example. The trick here is to slide a coin, a 20p one to start with, then a 10p, up hard against the hinge with the aerial up at, say, 45 degrees, ie you use the aerial as a lever on itself. Once it is about one eighth of an inch out you can normally pull the whole aerial assembly out with ease.

A common fault on the multi-standard Sinclair is a dead short NiCad pack, often brought about by severe overcharging, which would occur if it was left on charge all week. If you suspect this is the trouble, snip through any of the NiCad lead-outs and fire the set up from the external 6 volt socket (not the 12 volt one). Open circuit NiCads, on the other hand, can produce some interesting sound on vision patterns, since the NiCads act as the main smoothing capacitor, this phenomenon being particularly noticeable when powering up on 12 volts.

The good news is that the NiCads are four off standard Pencil size batteries, which are easily obtainable. Don't leave naff NiCads inside these TVs; they will eventually give off nasties that will not improve the set's internals.

Edge connectors are another pain on the multi-standard set, as they are often not inter-locked properly when new. It is also worth noting that this set can be fired up to display a blank raster with the tuner/IF board totally removed, useful if you suspect a short on it.

Early Sinclair mini-TVs (ie all except the flat pack, battery powered ones) are quite often seen at rallies. Non-workers are often available at £5 for the single standard, although these often have

scan faults. The tube is electrostatically scanned and the small transistors are not up to heaving lots of volts about for long periods of time. These should be replaced with bigger ones, ie TO5 size. Working single standards, including the Binatone, seem to go for about £20/25. Multi-standards are normally about £10 for a non-worker and £30 for a good one, perhaps £35 if boxed with all the goodies. These sets can be quite fun, especially for TV DXing with a decent beam.

One final point about these mini-TVs. After getting the chassis out of the case and repairing it, there is a great temptation to fire it up out of the case. Make sure you are not holding it when you do this. They all have really potent EHT generators in them. It is a terrible situation to be in; do you let it continue to hurt you and try and turn it off, or do you throw it!

A lot of domestic electronic equipment contains colour coded screws. Videos are a prime example here: quite a few of them have masses of screws all over the place, and the ones you need to undo for major servicing – to get at a motor, say, or to remove a major sub-assembly such as the front loading sub-assembly – are held in with red lacquered screws. Approximately 90% of the units I've repaired have had red screws which need undoing. However, there is the odd machine where red means never ever undo! The most common method I use is to try and see one or two lacquered screws from both sides. If they go into bushes or pillars and are obviously just holding in the sub-assembly, then it is probably safe to assume that they are the ones to undo. If they have big springs under them, beware.

TS830S crystal filters

Occasionally, I get the odd letter from confused readers about the advantages of fitting filters to the Trio TS830S. Firstly, you cannot fit narrower CW filters as easily to the TS830M as you can to the '830S. The reason is that the TS830M has AM in the mode switch, whereas the '830S has a CW narrow position. A point against 'grey' imports?

A second point that often comes up is the actual desirability of fitting a filter when there is already a variable bandwidth control and a notch filter. Personally, my '830S does *not* sport any additional CW filters, and I manage well enough (normal HF operation in my case is a 50/50 split of CW and SSB operation). I have, however, repaired other people's rigs which have been fitted with various

filter options, and must admit I quite like the more alive ring of the better filter to the slightly dead sound that VBT control gives. The rig is designed so that additional filters may be fitted at either the first (8.83MHz, YK88 series filter) the second (455kHz, YG455 series filter) or *both* stages, a feature that seems to cause readers the most confusion. In all cases the accessory filter, or filters, at whatever IF, are brought in *only* on the CW narrow position.

It must be remembered that all filters will have an insertion loss, so it could be argued that on, say, the fairly quiet 10 metre band, working an extremely weak signal, the 'wide' position should be used, aided perhaps by the VBT control. Personally, I have found the slight 'ting' imparted by a good sharp filter can sometimes help copy a weak CW signal.

There is also the counter argument that, although you have an insertion loss with an additional filter, the IF is running with a narrower bandwidth, thus giving a better signal to noise ratio plus better immunity to adjacent channel interference. Any CBer who has fitted a 'proper' 10.695MHz filter to his rig rather than the ceramic rubbish normally fitted can vouch for the spectacular improvement that this can bring about.

The options

All in all there are 8 possibilities:

■ YK88C 500Hz bandwidth 1st IF filter. Costs £43.10, works well with the existing VBT control and, all in all, is a good compromise. Very popular.

■ YK88CN 270Hz bandwidth 1st IF filter. Best selectivity for minimal(?) cost – £51.11. I like the sound of this one myself. VBT control doesn't do much with this one fitted.

■ YG455C 500Hz 2nd IF. Costs a staggering £103.00. Excellent shape, good for the unstable, warbly signals often heard on 20 metres. VBT not too handy.

■ YG455CN 270Hz 2nd IF filter. Costs £68.00, very sharp. VBT a waste of time.

The other options, for those of you with a lot of money, are combinations of the above.

■ YK88C plus YG455C. The best of both worlds. The first filter deals with adjacent channel aggro, the second sorts out the desired station. VBT works well.

■ YK88C plus YG455CN. Very selective, VBT poor. An acquaintance of mine bought this option and says he is amazed at how many stations will not fit into his receiver bandwidth with this switched in – they chirp or drift straight through it!

■ YK88CN plus YG455C. Poor combina-

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■ Trio 2200G, very good cond, complete with NiCads, telescopic and rubber helical aerials, base charger, and mic. Channels inc S16, S17, S18, S19, S20, S21, S22, S23, R1, R3 plus others. Only £75, very good value. Tel: (09015) 8819 after 6pm. Ask for Zac, QTH nr Wetherby

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■ Trio TS780 VHF/UHF base rig, with mic, £670. Yaesu FT757GX, HF rig, with mic, £550. Yaesu 757HD heavy duty PSU, £120. Welz AC38M, ATU, £45. Trio MC-60 base mic with pre-amp, £40. Drake low pass filter, £10. G-whip six band antenna, £30. Large items must be collected. Brian G4TGN QTHR. Tel: 01-897 3794

■ Eddystone 840A receiver, 500kHz-30MHz, BFO, AVC, RF gain, noise limiter, excellent working order, ideal for beginner, £80. Patrolman 50 receiver, AM, FM, VHF lo (30-50MHz), VHF hi (108-174MHz), UHF (450-512MHz), squelch and tone control, battery, only £25. P Swansbury, The Castle, Palace Green, Durham

■ CTE International Speedy, 26-30MHz, 140 watts, RF amp, AM, FM, SSB, plate load controls, £40 plus postage. Also Zetagi B150 mobile, 180 watts, RF amp, AM, FM, SSB, switchable AM-SSB, £20 plus postage. Tel: Brian (0249) 816334 evenings or weekends

■ Belcom LS102 10m mobile rig, CW/AM, FM/USB, 100Hz/1kHz steps, manual and auto scan on Yaesu MH1B8 mike, batt back-up and internal charging for memory, covers 26-30MHz, output 10W, h/book, std mike, mobile bracket. FDK 700E 2m FM m/rig, 0-25W o/set, tone, mobile bracket, h/book. 8 element Yagi antenna. AEC SWR-50 SWR power meter. CO-85 antenna matcher. £375 ono. Brian G1UWV. Tel: (0425) 615860

■ FT290R c/w NiCads, charger, soft case, rubber duck whip, ¾ mobile whip with gutter mount, 25 watt linear, boxed unmodified, £275. G0CAK Martin. Tel: (0734) 700617

■ TS430S, PS430, mint, under guarantee, manual, £635 ono. BBC B OS1.2, 256K solidish, 2/4MHz switched, metal case, DFS, DS disc drive, wordwise plus, £320. Acorn Z80 2nd processor, £180. Novex Amber monitor, £35. All manuals, cpm discs etc, as new. Sam. Tel: (0480) 53775 after 5pm or weekends

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■ FT101ZD WARC new bands, complete with mic, fan, box and manual, £495. Tel: Terry (0462) 35248 after 6pm

■ Rascal RA17 rcvr, with handbook. G5RV full wave dipole aerial, plus Drake SSR-1 rcvr (not working) with FM and digital readout boards (not connected), £150 the lot. Mr R Robbins, Lymington, Hants. Tel: 22979 (after 5pm)

■ MM432/50, 50W, 70cm linear, new unused, £110. MM144/432R, 2m to 70cm transverter, 3W or 10W input. 12W output, recent realignment by MM, £100. G3MEW, Portsmouth. Tel: (0705) 820315

■ CWR6TSE, new in Feb 1986, reads Morse, RTTY, bargain, £300. Tel: Bognor Regis 826449, after 6pm

■ Icom IC02E VHF multi rig, max 5W out. 2 NiCad packs, soft case, spkr, mic, plus mobile boom mic, boxed with man, all vgc, £275. 20 amp PSU (switch mode), £50 for quick sale. 2m and 70cm ants to sell. Mirage 2m linear, 160W pre-amp, £180. Yaesu SC1 base console for two rigs, £75. 6m rig, £150. Martyn Bolt, 112 Leeds Road, Mirfield, West Yorks WF14 QJE. Tel: (0924) 495916

■ JIL SX200 VHF/UHF AM/FM scanner, with mains power supply, £150. Prism 2000 modem, V23, BT approved, with leads and software for BBC, £25. Philips N1700 video recorder, in good working order, with fifty cassettes, various lengths. Would swap for 2m FM mobile rig, or 70cm ATV transmitter, or best cash offer. Can deliver south-east. FTV-107 frame, no modules, any offers? Mike Gathergood G4KFK, not QTHR. Tel: (0753) 686178, answerphone

■ Hallicrafters Sky Challenger, believed circa 1938, working, £100. Yaesu FT2F two metre transceiver, 10 watts output, xtalled £20, 21, 22, 23, R0, R1, 2, 6, 7, S0, S24, £50. Various Spectrum games, 16K/48K, £1 each. Mike, 10 Doverfield Road, Brixton, London SW2 5NB. No telephone at present, awaiting installation

■ Russian all wave receiver, eight wave band, 13-60 metres, plus medium/long, vgc, model 204, 10 transistor. Tel: Brighton (0273) 737076

■ Icom 735 HF transceiver with power supply, mint condition, never used to transmit, £770 ono. Icom 3200 dual band FM mobile, with dual band antenna, less than 1 year old, £420 ono. Complete RTTY station, BBC B with sideways ROM, including RTTY ROM, monitor, high quality quiet printer, terminal, console etc. Valued at over £900, sell £600 ono. Tel: (0227) 276004

■ Linc 2 with mic and PSU, £100 ono. HW8 QRP Tx/Rx, HWA-7-1 PSU, including headphones, £120 ono. Converted FM Pyc Cambridge, PSU, mic, £40 ono. Tel: Lapworth (05643) 2702. G4NRP

■ Yaesu FT290R + muTek, carrying case, 35W linear, 9 ele tonna. The lot £295, may split. 19 ele 70cm MET, £10. All vgc. Carl G0FYG, Camb. Tel: (0223) 63684

■ Admiralty pattern amplifier, 117B A/S470 circa 1955. Inscribed target - own ship - torpedo, 2 large 220V armatures (navy?). Marconi control unit assembly, type 7227. Air ministry command units, tuning unit TU171 and control box IOL/239. Black crackle finish. Army RCU type E, suits WS19 and others. PSU No4 for WS22. Aerial connector type J, for WS22. Ministry of civil aviation set, type I16, ref 10D/CA1226, 15 valve (mainly octal), 95MHz to 150MHz tuning. 250V wooden case meggar, circa 1949. Naffi receiver, 6V supply, broadcast radio WW2. Air ministry Gyroscope, type 8112. Will swap for variety of military radio equipment. Wanted: R1155, T1154, R109, R209, WS19 etc (any condition considered). Also, original manuals, especially for R1155 required. Contact Tony Howard, Milton Keynes. Tel: (0908) 73114, 7pm-10pm, also Sunday am

■ Microwave Modules 70cm, 2mtr, 4mtr (with 4 ele beam) transverters, £60, £85, £80 (with ant). All 28MHz IFs. Kevin G4MDQ. Tel: (0909) 566724 after 5pm week days

■ BC221 with P-supply and charts, £16. Prefer buyer to collect. RSGB h-book in 2 vols 1978, and ARRL h-book 1982, hard covers, £5. P-paid. Wanted: Key with brass and glass cover. Septon, 16 Bloemfontein Avenue, Shepherds Bush, London W12 7BL. Tel: 01-749 1454

■ Modem Minor Miracles WS2000 with manual, excellent condition, £85. Also Tektronix 531A dual

beam scope, with manuals, £40. Buyer collects. Tel: Crowborough 63910

■ Electric lead guitar, veneered wood finish, Strat copy, coil tap, dual coil humbuckers, absolutely immaculate, comes with hard case and strap, also spotless, £120 ono. Electric lead amplifier (12W Marshall) original box and cover, immaculate both items, seldom used hence condition. Carriage arranged to anywhere. Sell complete at £160. P/ex bass speakers, bins, cabs etc, or WHY? Anything bass guitar considered. I'm a student so no reasonable offer refused! Tony D Sheach, 11A Brumsfield Cres, Merkchiston, Edinburgh, Scotland EH10 4EZ. Tel: (031) 447 0413 after 6pm

■ Japan radio company JST1000 transceiver, matching power supply and speaker, CW filter fitted, vgc, £875 ono. Consider TS120V or general coverage receiver in part exchange. Jaybeam 6 element 2 meter Quad, good condition, £20. A Eley G3GHB. Tel: (0386) 792582

■ FT980, SP980, FC757AT, keyer and filters installed in rig, one owner, excellent condition. All boxes and manuals, £1275. Tel: (0386) 832233

■ FDK Multi 700E 2m FM mobile transceiver, 1-25 watts, toneburst, 12.5kHz shift, PLL, excellent working order, £130. Realistic PRO32 programmable hand-held scanner, 200 channels air band marine, hams etc, couple of months old, still boxed with receipt, £180. Tel: Rob, Weybridge (0932) 40966

■ Eddystone EA12 amateur 180-10m band Rx, in very good condition, £140. Would exchange for Trio R1000 which must be in mint condition, cash adjustment. Tadley. Tel: (07356) 2476

■ Yaesu FT726R, includes 2m module, freq coverage from 144-148, 6 months old, mint condition, £800. Tel: Colin G6TXW (0707) 874616

■ Hallicrafters Sky Challenger, circa 1939, with manual, extension speaker. Also signal meter (broken), radio in working order, 0.5-34MHz, 120 volts (believed) no power supply, £100. Realistic DX302 receiver, 0.10-30MHz digital frequency readout, £175. Two metre transceiver, xtalled R1, 2, 6, 7, S20, S21, 22, 23, 144-480, R0, S0, S24. Yaesu FT2F, £50. Wanted: R600 or R1000 receiver, £150 offered. Discone 25, 1300MHz. Tel: 01-671 3545. Mike, 10, Doverfield Road, Brixton, London SW2 5NB. No callers please.

■ Have Polaroid Polavision instant movie outfit, playback monitor, movie camera zoom lens, as new, in original box, swap for HF Rx in vgc, or anything useful re amateur radio, or offers. Any deal considered. Tel: 01-906 4206 Edgware

■ Sony ICF6700W communications receiver, full short wave coverage, MW, FM, digital frequency readout, £100. Tel: Portsmouth 731962

■ Drake R4B receiver, first class condition, spare valves, crystals, for sale. Or exchange for 2 metre multi-mode, such as FT230R, FT480R or similar. Drake R4B has only been used SWL, speaker included. Must be Plymouth area. Mr R J H Cross, 9 Valley View Rd, Higher Compton, Plymouth PL3 6QJ. Tel: (0752) 703669

■ Blaupunkt New York car radio cassette system, including six speakers, graphic equaliser, 80 watt amplifier. Superb finest top quality system, cost over £900. Also 9in monitor, as new, exchange for HF linear, microdot, hand-helds or any amateur radio equipment. G4VNG. Tel: (0733) 231639

■ Philips D2999 receiver, covers 150-29999kHz and 87.5-108MHz, 16 memories, plus scan facilities, 4 months old, mint condition, many more facilities, too many to mention, offers? Looking for HF rig, so give us a ring and we can sort something out. Shaun Imms, 18 Lones Road, West Bromidge Tel: (021) 525 1254

■ Kenwood R600 general coverage receiver, mint condition, £200. Would like exchange with cash adjustment, for HF rig. Eg Icom 735, Icom 720A etc. Tel: Matthew (01) 527 7528

■ Trio 2m and 70cm dual band mobile, TW4000A, 9

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months old, never mobile, lack of interest reason for sale, £325. P/ex video or satellite dish. Also Trio 2mslim mobile, TM201A, £195. Both mint condition. Russ Pyne, 79 Highcroft Ave, Dadby, Leicester. Tel: (0533) 751660 if out (0860) 520589

■ Scanner SX200N, 26/88, 108/180, 380/514MHz, FM/AM, all bands, mint condition, only 18 months old, £160 plus p&p. Receiver, Panasonic, RF3100L, FM/LW/MW/SW, 1.6-30.0MHz, digital frequency with BFO, ac/dc, mint condition, £130 plus p&p. Tel: Keynsham 61589 (Bristol area)

■ Yaesu FTV902R transverter, 2 mtrs fitted, as new, all leads, manuals, etc, £225. S.J Boundy, Sha-Viste, Borsinney Lane, Tintagel, Cornwall PL34 0AU. Tel: (0804) 770542

■ Trio transceivers, TM211E mobile, 5/25W, as new, £225. Also TH21E hand-held, with VOX mike and spare battery, £165. Tel: Mike (0992) 32114 or (021) 430 6895, w/ends. Both sets boxed

■ Yaesu FT709R 70cm FM hand-held, 4 watts o/p, with FNB4 NiCads, CSC11 case, YHA44A ant. Mint condition and boxed, £245. Ken Ballance, 18 Rambleford Way, Parkside, Stafford ST16 1TW. Tel: Stafford (0785) 44964

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■ 5 band vertical ant, HF5, plus HF5A ground plane, works well, £60 ono. Also Pye PF2, working, 160MHz, 2mtr? offers. Exchange both plus cash diff for AT230 ATU. LP Downes. Tel: (0785) 47750 (Staffs)

■ Heathkit GR110 VHF scanner, Xtalld for S8 and 14 to 20, c/w manual, pwo, £25 ovno. M/M 70cm conv, pwo, £25. Tristar 747, pwo, £70 ovno. Slim Jim 2m ant, £3. Wanted: Cheap 2m h/h or h/h scanner, plus hints/tips or information for SWL hobby. BRS87801, Ricky. Tel: (0392) 31941 anytime after 6pm

■ Sweep signal generators, Telonic 2000 with 550/900MHz plug-in, covers all UHF TV freqs, £75. Telonic, model 1019, covers 80-108MHz plus 10-11MHz IF plus BC radio freqs and IFs, solid-state, £45. L Sharrock, 7 Clement Bois, Brackley, Northants NN136LH. Tel: (0280) 703512

■ TR9130 2 metre multi-mode, complete with mobile bracket and mike, boxed, £350. Seven element crossed Yagi, Gamma matched, boxed, £15. PSU 10 amp, £50. Eddystone 840C HF receiver, mint condition, £85. Mr C Richardson. Tel: (0723) 86305 after 6pm

■ Polaroid Polavision instant movie outfit, c/w zoom lens, movie camera replay monitor, in new condition, original makers box, offers or swap FR7 Rx in gwo or sim, or any deal considered re any amateur radio gear, WHY? NW London area. Tel: 01-906 4206

■ FDK100AX, 2m FM, 1-25W, variable, h/book and 130X, £140. Will consider part exchange for Trio ST2, SMC30, HMC1 and VB2530. Tel: (0623) 550914

■ FT290 with auto toneburst, listen on input, speaker microphone, carrying case, £195. Radio shack: 6ft x 4ft shed with fitted carpet, shelving, lighting and electrical sockets. Completely protected by Cuprinol, pristine condition, £95. G0B1K QTHR. Tel: Felixstowe 282526

■ Icom IC202S 2m SSB portable, fully crystallised, £125.00. Yaesu FT709R 70cms h/h with FNB3 power pack, soft carrying case, charger, £220. Trio TH41E 70cms h/h with VOX headset, dc/dc converter, charger, £200. All excellent condition. G4WND QTHR. Tel: Tamworth 894464

■ Sanyo hi-res green screen monitor, model CRT 36, 12inch P-31 tube, with 18MHz bandwidth composite video input. Ideal for RTTY, word processing, high definition work and general computing work. Boxed as new with manual, £45. Buyer collects. Tel: (061) 427 5931 Manchester

■ Quantity 14 type FT243 crystals between 7005 and 7040kHz, £24. Wanted: Marconi power units 889A and 966A, and Codar 250/S. RQ Marris, 35 Kingswood House, Farnham Road, Slough, Berks SL2 1DA

■ Sanyo VTC5150 video recorder, Beta, cost £289, £125. AOR2002, as new scanner, £325. Black Eagle mic, astatic, £35. 40ch CB81FM, £25. 40 watt 10 metre burner £25. Philips text 20 inch CTV, remote,

£150. Roberts portable wooden case mains battery, £25. Hi fi spkr, 15 watt, £10. Stereo 5+5 IC, amp PSU, £10. Wanted: CD player, R7000, Icom FST text CTV, Beta hi fi, letters from young lady operators, etc. Mr Barnes 31c Anerley Park, Penge SE20 8NF

■ Signal R517 hand-held airband receiver, 118-136MHz, plus 3 crystal controlled channels, £45. Price includes 3 crystals plus case. Very good condition. Also Amstrad 6010 multiband radio. Marine, FM/air, LW, MW, SW1 & SW2, likewise in very good condition, £15. Tel: (0952) 618761

■ Polaroid instant movie outfit, cw zoom lens, movie camera replay monitor, as new condition. Swap for HF rec or QRP R/Tx or consider any HF gear WHY? May consider 2 metre gear if in gwo. Tel: 01-906 4206

■ AR88LF (R1556B), working, good condition, with copy of manual with circuit diags, alignment procedures etc. Also sig gens TF144G and Type 71, offers. DJ Mayes, 2 Paynes Pitch, Churchdown, Gloucester. Tel: (0452) 713202

■ BBC computer, sideways RAM, Opus high resolution monitor, twin double sided 40/80 switchable disk drives, modem, Quinkey, BBC data recorder, Epson RX80 printer, view word processor chip, hundreds of programmes, books. £999 the lot. David Bowen, Weymouth. Tel: (0305) 871437

■ Amstrad PCW8256 with CPS8256, about 20 discs inc, spreadsheet, database, word processor and various public domain software. All gwo. £425.00 ono. Tel: (0734) 734263 evenings

■ 2 GPA 5/8 CB ants, work well on 10m. 1 new SWR meter and manual with circuit. Also have Sprint SP100 rotator with 20m of 5 core coax. Sell the lot for £60 ono, or will swap for a good PSU, that can run my FT230. Please write to 3 Windermere Ct, Lonsdale Road, Barnes, SW13 9AS

■ Sony 2001D full coverage receiver. 32 memories, 4 timers, superb SSB. Mint, boxed, £250. Tel: (0934) 732700

■ Trio 9000 2m multimode, £250. Standard C78 70cm portable, £150. A range of antennas and assorted bits. Tel: (061) 480 3402 between 6 and 8pm

■ Yaesu FT101Z, no mods, excellent condition, £375, no offers. Tel: (0203) 456128

■ Yaesu 7700, mint condition, memory, £300. Tel: (0283) 221876

■ Silent key sale: National HRO receiver, 9 coils, power supply, £60. Osker SWR power meter, £25. Prefer buyer inspects, collects. AR Brackenborough, 41 Poets Corner, Margate, Kent CT9 1TR. Tel: (0843) 225445

■ Marconi AM/FM auto radiogram, model RG81, walnut veneered cabinet in excellent condition, 33 inches high, 40 inches long, 16 inches wide. Monarch record changer, stereo facilities, full working order, offers. RC Salisbury, 81 Honey Hill Road, Bedford MK40 4ND. Tel: (0234) 59898 evenings

■ DX400 Realistic, only working SW & FM, needs Teil repair, for this reason only £50.00. Tel: 01-794 9790

■ MMT144/28 tvtr. New, hardly used, 2 months old, 10 watts output, will sell for £90. Would prefer to exchange for Yaesu FC700 tuner unit to match my FT77. Howard G1OYH. Tel: (0235) 813160

■ Yaesu FT708R 70cms portable, 10 memories, NiCads, charger, boxed with manual, £200 ono. Tel: Brighton (0273) 418345

■ FT200 in gwo, also pair of new spare PAs, £175. G3JXR. Tel: (0908) 642398

■ Trio commun receiver, model JR310, plus handbook. Mint condition both inside and out, ext speaker, Trio SP-5D. Will swap for any good radio gear, ariels, rigs etc, or £60. Will also consider CB gear. Tel: Shaun (021) 525 1254

■ Yaesu FT227RA 2m FM transceiver, memories, mike scanning etc, £120. Standard 2m 5 chnl hand-held, only 2 chnls xtalld, S20 & S22, case. £40. Superstar, converted 10m, AM/FM/SSB, top end requires stabilizing, £65. DNT, converted 10FM, £30. Electronica AM/SSB, 120 chnl, including 28.50 to 28.94, £45. WKS 1001, AM/SSB, 120 chnl including 28.365 to 28.805, £45. Lafayette .5 to 30 receiver, requires aligning, £25. Will haggle on most items. Tel: Ian G0BHQ. Tamworth (Staffs) 250038

■ Icom ICR7000 communications receiver, only three months old, used only twice and still under guarantee, £845 ono. Tel: Tadley (07356) 4111 extension 6176, 08:00 to 16:30 hrs, Mon to Fri (North Hampshire)

■ Trio TS430S, unmarked, fitted with FM board and AM filter. Handbook plus service manual with original packing, £590, carriage extra. FP757HD Yaesu PSU, £120 plus carriage. No offers but would take £700 for the two items. Prefer purchaser to inspect and collect. Also, Sony ICF2001D receiver, latest model with aircraft band, as new with guarantee, £245. Tel: Ron, Hemel Hempstead (0442) 59970

WANTED

■ Hitachi 14 inch black and white auto search TV, with FM/AM/MW radio and cassette. Cost £220 mint condition, will swap for Cobra 148 or any good CB rig or short wave receiver, or anything valued at £90. Steve, 19 Stone Cross Lane, Lowton Warr, Lancs WA3 2SD. Tel: (0942) 713411

■ On/off volume squelch switch for Cobra 148GTL DX. H Hume, 17 Langton Road, Edinburgh EH9 3DA

■ Lowe MK1024 electronic keyer with memory. Datong FL3 audio filter, must be in excellent condition. Tel: (0206) 394336 (Essex)

■ Urgently wanted: FM board for Yaesu 101ZD. Good price paid. Contact Dennis G6WZC. Tel: Slough 821862

■ Set of 6 parts, or complete volume of *Common Core, Basic Electronics and Basic Electricity* by Van Valkenburgh. Pub: by Technical Press, Oxford. AR Brack, 41 Poets Corner, Margate, Kent CT9 1TR. Tel: (0843) 225445

■ All service manuals for all amateur radio rigs, also radio books for club use and Heathkit manuals. Tel: (0288) 4892 after 6pm

■ Akai GX285D circuit diagram, any info, to buy or borrow, PG Reddin, 19 Kimberley Close, Gloucester GL2 0LH. Tel: (0452) 410157 or 23034

■ YC7B digital frequency display unit for Yaesu FT7B. Plus matching ATU. Would consider good homebrew ATU. Tel: (0482) 27908

■ Microscope slides of rocks and minerals in thin section. Amateur or commercial by Thos Murby, London etc. A L Taylor, 42 Runswick Avenue, Redcar. Tel: (0642) 486155

■ Handbooks, circuit diagrams for Bendix RA1 receiver and Rascal 509A scope. Purchase, or borrow, all expenses paid. GW4SRO, 65 Michaelston Road, Culverhouse Cross, Cardiff CF5 4SX. Tel: 593057

■ Rascal RA117. Working order not important. Tel: Taunton (0823) 75776 evenings

■ Can anyone help me? I have an SSM Europa two metre transverter. OK on receive, but no transmit. Any help or advice would be much appreciated. Tel: (0388) 662630 (Ian) Durham area

■ Trailer Tower or source of same. Can repair, can collect, must be reasonable. ATV contest group want anything to do with 24cms TV. Inc Tx/Rx gear, antennas (inc dishes), QRO gear - valves amps designs, etc. Ron Bentham G4SHC QTHR. Tel: (0706) 350748

■ Exchange mint condition FRG7, absolutely no mods, complete with 12V lead. Swap for any 2mtr equipment such as FM hand-held, but would love to swap it for an Icom IC202. Tel: Kevin G4MDQ. Tel: (0909) 566724 after 5pm week days.

■ Digital frequency counter wanted, must be in good working order. Duncan. G0EHZ. Tel: (0772) 725793 after 5.30pm

■ FT77 with PSU, gwo, collect local. A E Phelps, 2 Cecil Close, Corfe Mullen, Dorset. Tel: (0260) 4806

■ AR2001 or FRG9600 wanted. Also setting up information for Eddystone 840C. Please ring early evenings or anytime Sunday. If distance OK I will collect, otherwise I will pay mailing costs. Tel: Nottm (0602) 266334

■ Cobra 148, Superstar 360, Ham multi-mode, or Concord or any similar working or non working rig, up to £60 depending on condition. Must be London or surrounding areas. Tel: 01-805 1306

■ Trio or Kenwood R2000 receiver, and Yaesu FRT7700 antenna tuning unit at £30. Tel: Clochan 378

■ Man-pack Tx/Rx for HF bands. Solid-state only. Tel: Hereford (0432) 50226 evenings

■ Copies of *RSGB DX News Sheet*, any year. Also, have you any old QSL cards not required, I am interested in the history of radio and the sending of QSLs. Please reply to: BRS87259, also G1WMMJ, Mick Hudson, 71 Knight Avenue, Canterbury, Kent. CT2 8PY. Tel: 463130. All letters answered

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MB3705 £1.80, MB3712 £1.50, MB3722 £3.50, MB3730 £2.50, MB3731 £3.50,
MB3756 £2.60, MB8719 £3.85, STK461 £7.50, STK463 £8.40, TA7205AP
£1.00, TA7222AP £1.30, TA7229 £3.25, TA7240 £2.95, TA7607 £2.95, TA7614
£2.75, TA7626 £2.95, TA7640 £1.75, UPC375 £1.00, UPC1001 £2.20,
UPC1031 £1.95, UPC1158 95p, UPC1181 £1.10, UPC1182 £1.10, UPC1185
£2.50, UPC1188 £2.75, UPC1230 £2.50, UPC1277 £2.75, UPC1365 £3.60
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M57727 VHF/SSB 38W	£45.00
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Amateur RADIO

ADVERTISING RATES & INFORMATION

DISPLAY AD RATES		series rates for consecutive insertions			
depth mm x width mm	ad space	1 issue	3 issues	6 issues	12 issues
61 x 90	1/8 page	£66.00	£62.00	£59.00	£53.00
128 x 90 or 61 x 186	1/4 page	£115.00	£110.00	£105.00	£92.00
128 x 186 or 263 x 90	1/2 page	£225.00	£210.00	£200.00	£180.00
263 x 186	1 page	£430.00	£405.00	£385.00	£345.00
263 x 394	double page	£830.00	£780.00	£740.00	£660.00

COLOUR AD RATES		colour rates exclude cost of separations	series rates for consecutive insertions			
depth mm x width mm	ad space	1 issue	3 issues	6 issues	12 issues	
128 x 186 or 263 x 90	1/2 page	£305.00	£290.00	£275.00	£245.00	
263 x 186	1 page	£590.00	£550.00	£530.00	£470.00	
263 x 394	double page	£1,130.00	£1,070.00	£1,010.00	£900.00	

SPECIAL POSITIONS		Covers: Bleed Facing Matter	Outside back cover 20% extra, inside covers 10% extra 10% extra [Bleed area = 307 x 220] 15% extra
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DEADLINES		*Dates affected by public holidays			
issue	colour & mono proof ad	mono no proof & small ad	mono artwork	on sale thurs	
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	
Jun 87	30 Apr 87	6 May 87	8 May 87	28 May 87	

CONDITIONS & INFORMATION		
<p>SERIES RATES 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. COPY 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>PAYMENT 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. FOR FURTHER INFORMATION CONTACT Amateur Radio Sovereign House, Brentwood, Essex CM14 4SE (0277) 219876</p> <p>Commission to approved advertising agencies is 10%. CONDITIONS 10% discount if advertising in both Amateur Radio and Radio & 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>



£1 BAKERS DOZEN PACKS

Price per pack is £1.00. * Order 12 you may choose another free. Items marked (sh) are not new but guaranteed ok.

1. 5 - 13 amp ring main junction boxes
2. 5 - 13 amp ring main spur boxes
4. 5 - surface mounting
5. 3 - electrical switches intermediate type, will also replace 1 or 2 way switches, white flush mounting
7. 4 - in flex line switches with neons
9. 2 - mains transformers with 6V 1A secondaries
10. 2 - mains transformers with 12V 1A secondaries
11. 1 - extension speaker cabinet for 6 1/2" speaker
13. 12 - glass reed switches
14. 2 - ultra transmitters and 2 receivers with circuit
17. 2 - light dependent resistors
25. 4 - waler switches - Sp 2 way, 4p 3 way, 2p 6 way, 2p 5 way, 1p 12 way small one hold fixing and good length 1/2 spindle your choice
28. 1 - 6 digit counter mains voltage
30. 2 - Nicad battery chargers
31. 1 - key switch with key
33. 2 - aerosol cans of ICI Dry Lubricant
34. 96 - 1 metre lengths colour-coded connecting wire
39. 1 - long and medium wave tuner kit
41. 8 - rocker switch 10 amp mains SPST
45. 1 - 24 hour time switch mains operated
49. 10 - neon valves - make good night lights
50. 2 - 12V OC or 24V AC, 3 CO relays
51. 1 - 12V 2 CO miniature relay very sensitive
52. 1 - 12V 4 CO miniature relay
53. 2 - mains operated relays 3 x 8 amp changeover (s.h.)
54. 10 - rows of 32 gold plated IC sockets (total 320 sockets)
55. 1 - locking mechanism with 2 keys
56. 1 - miniature unisolver with circuit for electric jigsaw puzzle
60. 5 - ferrite rods 4" x 5/16" diameter aerials
61. 4 - ferrite slab aerials with L & M wave coils
63. 1 - Mullard thyristor trigger module
66. 1 - magnetic brake - stops rotation instantly
67. 1 - low pressure 3 level switch can be mouth operated
69. 2 - 25 watt pots 80hm
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 3/4" 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 OC
103. 1 - mains power supply unit - 6V OC
104. 1 - mains power supply unit - 4 1/2 V OC
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 rees
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 spm - 4 BA spm 1 and open, other end closed
145. 2 - 4 reel 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 kit 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 3/8 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 1/2" 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 1/2" 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
241. 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, 1/2 meg with dp 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 1/2 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 ceramic magnets Mullard 1 1/2" x 3/8 x 5/16
301. 10 - 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" 8 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.

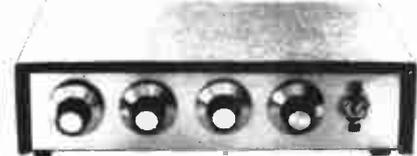


Ex-Electricity Board. Guaranteed 12 months.

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 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 1/2" sockets and three panel mounting bus 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 1/2" 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 for up to 12V portable TVs, car radios etc.. Offered at £2 each, or 13 for £24 post paid. Our reference 2P110.

MAKING SUNBEDS?

CHOKER 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 12kw, 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 230V/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

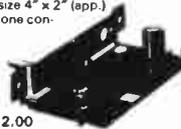
Refresh your home, office, shop, work room, etc. with a negative ION generator. Makes you feel better and work harder - a complete mains operated kit, case included. £11.95 plus £2.00 post.

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 2 BT 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*

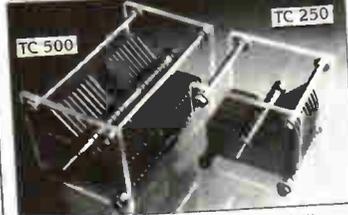
- 2P2 - Wall mounting thermostat, high precision with mercury switch and thermometer
- 2P3 - Variable and reversible 8-12v psu for model control
- 2P4 - 24 volt psu with separate channels for stereo made for Mullard UNILEX
- 2P6 - 100W mains to 115V auto-transformer with voltage tappings
- 2P8 - Mains 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 for Mullard UNILEX 15 amps. Ideal to program electric heaters
- 2P10 - 12 volt 5 amp mains transformer - low watt winding on separate bobbin and easy to remove to convert to lower voltages for higher currents
- 2P12 - Dist or Tape precision motor - has balanced rotor and is reversible 230v mains operated 1500 rpm
- 2P14 - Mug Stop kit - when thrown emits piercing squeak
- 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 - Onco switch-motor drives B 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 8ohm 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. Greed 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
- 2P72 - 1 1/2" Muffin fan 4" x 4" approx. (s.h.)
- 2P75 - 1 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 1A Mains transformer
- 2P88 - Sangamo 24 hr time switch 20 amp (s.h.)
- 2P89 - 120 mm. time switch with knob
- 2P90 - 90 min time switch with edgewise engraved controller
- 2P94 - Telephone handset for EE home telephone circuit
- 2P95 - 13A socket on setin chrome plate
- 2P97 - mains transformer 24V 24 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.
- 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 - Uniserial 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 blower, 1.2kw
- 5P24 - 1/2 hp motor, ex computer, 230V, mains operation 1450rpm. Hf not collect add £3 post
- 5P25 - special effects lighting switch. Up to 6 channels of lamps can be on or off for varying time periods
- 5P26 - Audax woofer 8" Bohm 35 watt
- 5P27 - cartridge player 12V, has high quality stereo amplifier
- 5P28 - gear pump, mains motor driven 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 loading up to 50A. Add £1 post
- 5P41 - 5" extractor fan, very quiet runner (s.h.), gntd 12 mths.
- 5P45 - pack of 6 cooler 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 - Armstad stereo tuner FM and LM and S. AM
- 5P60 - DC Muffin type fan 18 to 27V, only 3W
- 5P61 - drill pump mounted on frame, coupled to mains motor
- 5P62 - 2 1/2 kw tangential blower, 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 BD95
- 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
CAPACITY:- 26-500 pF
VOLTAGE:- 78kV Max
SIZE:- 101 x 105 x 165mm
AIR GAP:- 2mm

£28
plus £2 p&p

TC250
CAPACITY:- 13-250 pF
VOLTAGE:- 78kV Max
SIZE:- 101 x 105 x 88mm
AIR GAP:- 2mm

£19.95
plus £1 p&p

SCANNING RECEIVERS

£26

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:- 25 dB
FREQ:- 28-30MHz
plus £4 p&p

£19.95

NEVADA TC58 5/8 WAVE

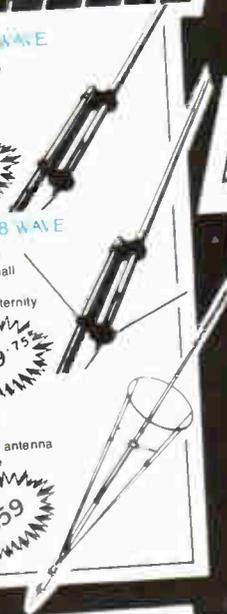
Using high grade aluminium and a low loss coil complete with small radials this antenna is our most popular amongst the 29MHz fraternity
POWER:- 1kW
GAIN:- 35 dB
FREQ:- 28-30MHz
LENGTH:- 6.6 METERS
plus £4 p&p

£29.75

SALITU 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 METERS
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 C/W re-chargeable 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.



RF 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:- 05-10 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

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

£22.31



TELECOMMS

HOTLINE (24 HOURS)
0705 662145

189 LONDON ROAD, PORTSMOUTH, HANTS, PO2 9AE.
TELEX 869107 TELCOM G

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