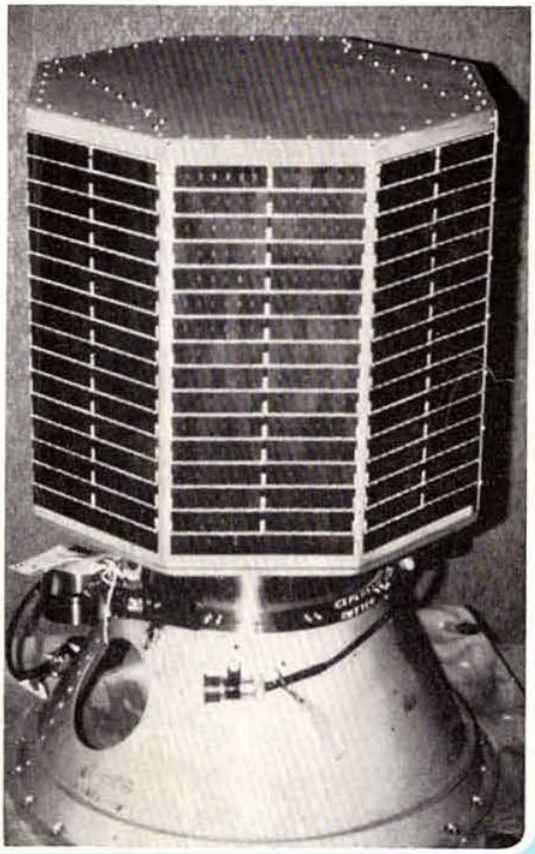
radio communication

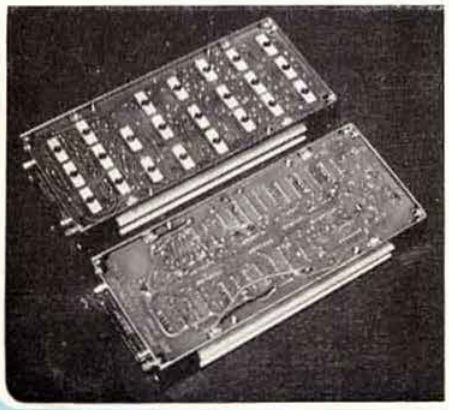
February 1974

AMSAT OSCAR-B (Oscar 7)

Photographed during a solar panel fit check, the eight-sided structure (*right*) is 90 per cent covered with solar cells, sufficient to provide over 15W when illuminated by the sun



The teletype telemetry encoder (*below*) designed and built in Australia by P. Hammer, VK3ZPI, and E. Schoell, VK3BDS, of the WIA-Project Australis group. The unit transmits 60 channels of telemetry data as five-digit numbers in standard 850Hz shift teletype format. Nearly 100 cos/mos ICs provided by RCA are used



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radio communication

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CONTENTS

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Mobile Mounts	£6.60
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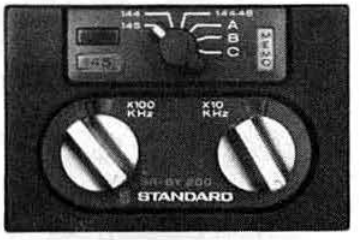
144MHz CV110 VFO

The CV110 is a remote VFO for the C140 Transceiver and has a centre tuning meter plus RIT(± 5kHz) and CAL position to accurately calibrate the VFO.

C140 TRANSCEIVER

The C140 is a 10w 12 channel transceiver + 1 Memory Channel and measures only 3½" wide × 2½" high! The microphone has two switches, the normal PTT switch plus the MEMO switch. A flick of the switch and the transceiver overrides the channel selector and you can transmit or receive on another frequency. The C140 takes the CV110 Remote VFO or SY-200 Synthesizer and comes complete with microphone, line filter and mounting hardware.

SY-200 SYNTHESIZER



The SY-200 is a 200 channel synthesizer unit plus 1 priority channel and 3 MEMO channels. The size of this is the same as that of the C140.

C826M3 TRANSCEIVER

CV100 DUAL VFO

The C826MB is a 12 channel 10w o/p unit. Tone burst and separate transmit and receive crystals permit repeater operation and are readily accessible via a hinged lid underneath. Receiver sensitivity is excellent being 0·47μ or less (20-dB quleting). Transmitter and receiver test sockets are fitted at the rear for servicing. The C826MB has provision for the CV100 dual VFO giving separate VFO's for transmitter and receiver operation. Each 826MB carries its own test certificates so you get guaranteed performance. Line filter and microphone are included. The CV100 has a centre signal meter and calibrate (CAL) position to zero the transmitter on to the receiver's frequency.

C146A ia a 2w 5Ch. Hand transceiver with tone burst and the capability of repeater operation. Ni-cad batteries and many accessories are available (but not fitted) making this superbly built unit the finest available. Complete with leather case and fitted crystals on 145·00 and 145·15.

The C432 is a UHF 2W 5 channel hand receiver with a full range of accessories as the C146A. The C430 is a 10W 12 channel highly compact and efficient unit of the same size as the C140. This is the first professional 70cm tranceiver available and will enable you to get going on 70cm with the advantage of smaller antennas and greater band space.

PRICES (Carr./VAT Paid).	
CV100. VFO for C826MB	**£33.50**
CV110. VFO for C140	**£45.50**
C140. 2m Transceiver	**£119.90**
C146A. 2m Hand. T.cvr. 5ch	**£89.90**
C 826MB 2m Transceiver	**£135.00**
SY-200 Synthesizer	**£96.00**
C 430 UHF Transceiver	**£159.00**
C 432 UHF Hand T.cvr. 5ch.	**£114.00**

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C—12/230-6E AC CHARGER for C146A and C432	**£3.00**
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CATO8E. Rubber flexible antenna	**£2.75**
CMPO8 External microphone for C146A and C432	**£9.00**
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The Standard Radio Corporation produce only VHF/UHF communications equipment and in this field they excel. All transceivers have automatic final protection circuits and are very well engineered. Because of the quality, the units are not cheap but nevertheless you will find their prices highly competitive and you have many advanced design features not found elsewhere. Delivery is ex-stock at the time of going to press but some callers at Totton have alteady "snapped-up" some of our initial stock! We regret the Standard accessories are only available to purchasers of Standard Transceivers.

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Bipolar RF stages + MOSFET mixer for low noise and reasonable gain. 9 volt supply. Any IF from 2-30MHz.

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Kit £5.70. M & T £7.00.

AF I/P 0·5mV (min.) O/P 1 volt RMS at low Z. Contains preamp, limiter, amplifier and active L.P. filter. Suitable for AM, FM, SSB, AFSK etc. May be used with PM-1.

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Kit £5.00. M & T £6.20.

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NBFM Generator FMT-1 = SP-1 plus PM-1. (add price!).

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Resistors ¼ & ½W 10ohms to 1Meg (E12) **1½p** ea, Polystyrene capacitors 10pF to 4700pF from **3½p**, Disc ceramics 1pF to 10,000pF **2½p**, Polyester capacitors 0·01μF to 2·2μF from **3p**, Miniature electrolytics from **7p.**

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STOP PRESS!

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The 116MHz crystal oscillator is zener stabilised to protect against supply voltage variations and is guaranteed by us to have an accuracy of better than ±3kHz. The oscillator drives one buffer stage which provides injection to the mixer, and also drives a FET buffer stage which produces an output power of 5 milliwatts at 116MHz from an additional coaxial socket. The converter operates from a nominal 12 volt supply, and is housed in the same sturdy case as the rest of our converter range.

Available ex-stock— Price inc VAT **£17.93**

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Transistors OC28, OC35, NKT404, 2G220, ADY23 all ex. **12p,** any 5 for **50p.**
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186 Ω coil 4 pole c.o. 8amp ex **20p**
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14k Ω coil 2 pole make, 4 break **25p**
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Base station (quick heat QQZ06–40) 7 windings: 232V, 276V, 60V, 50V, 2·1V, 17·5V, 12·6V (11·5lb) **£3.80**
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515–450–0–450–515V at 300mA, 50V at 50mA, 5V at 4A, 6·6V at 6A (12lb) **£3.80**
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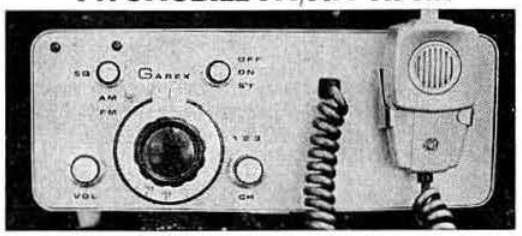
INTRODUCING THE GAREX Mk II TWOMOBILE FM/AM Tx-Rx



Based on a successful design, the **Mk II Twomobile** incorporates improved features to keep abreast of changing fashions on the 2 metre band, especially the growth of FM and mobile working.
Brief technical details:
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Tx Transistorised crystal oscillator (8MHz), multipliers and modulator, quick-heat tetrodes YL1080 driver and PA. No standby current. 3 switched crystal positions. Fist mic. with press-to-talk. Switched AM or FM.
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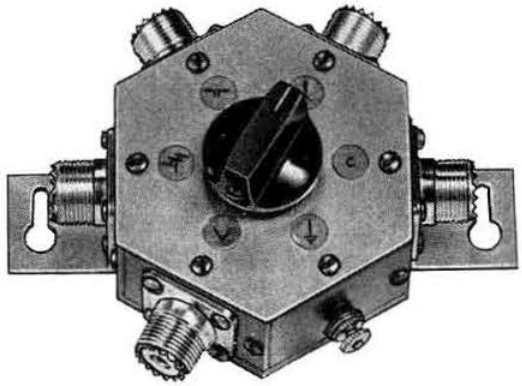

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2638 2854 2868 2875 2876 2889 2910 2931 2938 2945 2952 2954 2966 2980 2987 3008 3081 3023 3102 3105 3250 3255 3270 3285 3298 3302 3404 3411 3425 3432 3446 3453 3460 3467 3481 3496 3800 3805 3950 3985 3993 3995 3997 4031 4195 4220 4516 4570 4575 4595 4654 4668 4675 4689 4703 4745 4781 4808 5010 5060 5105 5420 5480 5491 5499 5506 5514 5521 5548 5551 5566 5581 5584 5589 5604 5611 5619 5621 5625 5626 5630 5641 5642 5644 5649 5650 5659 5671 5680 5687 5690 5691 5692 5695 5697 5701 5710 5711 5714 5730 6210 6270 6337 6440 6500 6510 6537 6540 6552 6557 6563 6567 6577 6580 6582 6590 6597 6612 6627 6634 6637 6640 6642 6647 6649 6650 6652 6657 6659 6662 6667 6672 6677 6679 6720 6753 6810 7585 7770 7992 8160 8280 8364 8820 8837 8839 8841 8845 8854 8862 8864 8871 8879 8885 8888 8896 8913 8930 8947 8953 8956 8961 8967 8971 8973 8983 322 324 329 338 339 342 kHz 2184 2638 2844 2854 4868 2875 2889 2910 2924 2931 2938 2945 2950 2952 2966 2968 2980 2987 3008 3023

3072 3081 3102 3142 3278 3403 3411 3432 3446 3460 3467 3474 3881 3495 3841 3921 4140 4182 4257 4399 4410 4415 4417 4418 4420 4422 4427 4431 4435 4444 4465 4469 4473 4478 4654 4689 4703 4710 4724 4808 4860 4889 4966 5010 5491 5499 5506 5514 5521 5551 5566 5589 5599 5604 5611 6619 5626 5630 5641 5642 5649 5654 5659 5671 5680 5687 5692 5695 5697 6337 7537 6540 6552 6557 6559 6567 5682 6590 6597 6612 6627 6634 6637 6640 6642 6647 6649 6652 6657 6659 6662 6664 6667 6672 6677 6791 8364 8439 8837 8839 8854 8862 8864 8871 8888 8913 8953 8956 8967 8971 8983

12237 12250 12262 12287 12312 12337 12357 12362 12387 12412 12437 12462 12487 12512 12357 12652 12587 12612 12637 12662 12687 12712 12737 12762 12787 12837 13062 13087 13112 13137 13162 13187 13212 13237 13262 13272 13312 13337 13387 13412 13437 13462 13487 13540 13590 13640 13690 13740 13790 13840 13890 13940 13990 14848 14898 14948 14998 15048 15098 15148 15198 15248 15298 18347 18372 18497 18662 18747 18872 18997 19122 19247 19372 19497 19662 19747 19872 7533 7550 7566 7583 7600 7616 7633 7650 7666 7683 7700 7716 7733 7750 7766 7866 7875 7883 7900 7916 7933 7950 7966 7983 8118 8150 8166 8183 8216 8250 8266 8283 8300 8316 8333 8350 8366 8416 8433

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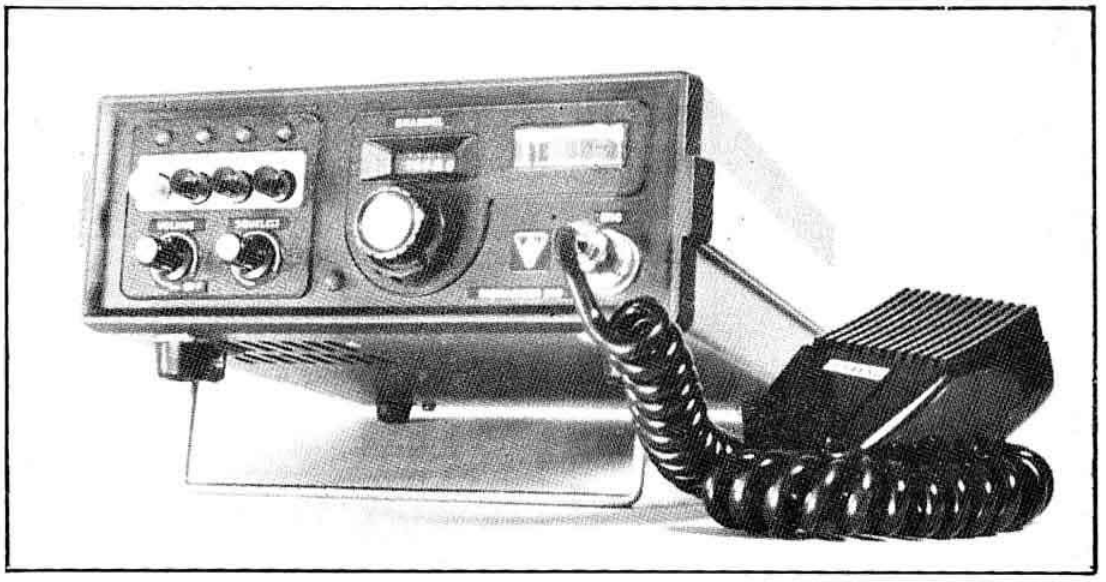

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Intruder Watch Organizer	C. J. Thomas, G3PSM, 73 Mexborough Avenue, Leeds LS7 3ED.
QSL Bureau Manager	A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent BR2 7NH.
Slow Morse Practice Transmissions Organizer	M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.
Society Historian	L. E. Newnham, G6NZ, 17 Washington Road, Emsworth, Hants.
Taped Lecture Library Curator	G. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford.
Trophies Manager	P. Carey, G3UXH, 99 Bell's Lane, Hoo St Werburgh, Rochester, Kent.
VHF Manager	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23.

Membership rates: UK—£5.50 per year (Unlicensed members under 18 years of age—£2). Overseas—£5 (USA $12). Members are asked to notify changes of address without delay.

QTC AMATEUR RADIO NEWS

Fuel emergency
While the present fuel emergency regulations are in force, RSGB headquarters will be open from 9am to 3.30pm (or later if natural light permits) on Mondays, Tuesdays and Wednesdays; and from 9am to 5.30pm on Thursdays and Fridays. The headquarters will remain closed as usual on Saturdays.

Production of "Radio Communication"
During the present fuel emergency, delay to the production of *Radio Communication* will no doubt occur as a result of restricted working at the printers. Every effort will be made, however, to ensure that copies are despatched as near as possible to the scheduled date (Friday prior to the first Tuesday of the month).

AGM photographs
Because of circumstances beyond our control, it has not been possible to include in this issue photographs of presentations made at the RSGB Annual General Meeting last December. It is hoped to include them in our next issue.

Deputy RR for Region 10
Mr R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam, has been appointed deputy regional representative for RSGB Region 10.

"The G2DAF Mark 2 receiver"
The author apologizes for two small circuit errors in Part 2 of this article which appeared in the December 1973 issue of *Radio Communication*.

In Fig 5a the 5pF capacitor should connect to pin 5 of V15, and not to pin 6 as shown. In Fig 5b the OFF contact of S19B should be connected to the FAST contact, which ensures that there is a return path for the agc line when the agc switch is in the OFF position.

Central Scotland FM Group
This group has been formed in order to encourage the use of fm in the Forth and Clyde valleys. Enquiries should be addressed to the secretary, J. H. Shankland, GM8FM, 28 Craigmount Crescent, Edinburgh EH12 8DG, enclosing an sae.

Oscar 6 users
AMSAT is anxious to obtain telemetry data copied from the 29·45MHz transmission of the satellite. This is usually good copy on near-overhead passes. Any operator copying this data may send it direct to AMSAT or via G2BVN from whom suitable forms are available. It is generally found that crossed dipoles yield superior results to a beam or normal dipole while obviating tracking difficulties on a high angle pass.

Mr C. H. Parsons, GW8NP
Executive Vice-President, 1974

At its meeting on 3 January 1974, the RSGB Council unanimously elected Mr C. H. Parsons, GW8NP, to be the Society's Executive Vice-President for 1974.

Mr Parsons, who is zonal member of Council for Zone E (Wales), is the first GW to hold this office.

There are many operators who are known to have worked through Oscar 6 but whose calls have not been recorded in the master list of users. This information is essential to those representing the amateur service at future ITU conferences. If you have worked through Oscar 6 and have not yet reported to AMSAT or Region 1 IARU will you please do so now. All that is necessary is a QSL card giving the basic details of one contact through Oscar 6. Operators in Region 1 (Europe and Africa) may send this information to G2BVN (QTHR).

New prefixes
The ITU advises that the following callsign series have been allocated provisionally in accordance with the Radio Regulations of Geneva:

P2A-P2Z Papua New Guinea
S6A-S6Z Singapore (Republic of)

Radio Amateurs' Examination
The next RAE will be held on Thursday 16 May 1974 and applications to sit this examination should be made to the candidate's local examination centre.

The RSGB will provide an examination centre at University College, London WC1. Application forms to sit the examination at this centre are available from RSGB HQ. The fee is £2.20 for RSGB members and £2.70 for non-members. Completed application forms along with the appropriate payment must reach the Society before Friday 1 March 1974.

"Simple low-cost wire antennas for radio amateurs"
W. I. Orr, W6SAI, is well known as an author of numerous amateur radio books, including several specifically dealing with aerial systems. The latest addition to the range covers the theory and practice of wire aerials. Included in this volume are chapters dealing with feeder selection, the importance or otherwise of the swr meter, and a section suggesting methods of erecting an invisible aerial. Most of the well-known designs are covered, although the reviewer failed to spot any material on the very successful G5RV multiband system. However, the author has included in this volume a very considerable amount of relevant information on a subject of great interest to many radio amateurs. Published by Radio Publications Inc, USA. 192 pp, 5½in by 8¼in, soft covers.

Obtainable from RSGB price £1.75 (including postage and packing).

Radio Amateur Old Timers' Association

Membership of RAOTA is open to all persons who have held a UK amateur transmitting licence for a period of not less than 25 years. Details can be obtained from the hon secretary, Miss M. Gadsden, 79 New River Crescent, London N13 5RQ. Tel: 01-882 1272.

The present officers and committee of RAOTA are:
President—W. K. Alford, G2DX;
Vice-president—F. J. H. Charman, BEM, G6CJ;
Hon treasurer—G. R. Jessop, G6JP;
Hon secretary—Miss M. Gadsden;
Committee—W. E. F. Corsham, G2UV; D. C. Jardine, G5DJ, and L. E. Newnham, G6NZ.

Members are asked to note that the next reunion will be held on Friday 17 May 1974, at the Bonnington Hotel, Southampton Row, London WC1.

Full details have not yet been finalized but it should follow the lines of the 1973 event.

Stolen equipment

An FT2F, serial No 20658, was stolen on 11 January from a car at the home QTH of C. Hollins, G8BOU, 24 Saffron Road, Bracknell, Berks; Tel 25043. The equipment has an a.m./fm switch at the top left-hand corner of the front panel.

Catalogues received

Josty kits

A look at the Josty catalogue reveals several kits of possible interest to the radio amateur—various amplifiers, some power supplies, two aerial pre-amplifiers, and an interesting system of equipment housing called "Modul Box". There are also some receiver kits which are of interest, although perhaps more suitable for the young experimenter rather than the serious radio amateur.

Basically, the kits are designed and put together in Denmark, and imported into this country for distribution by Radio Supplies of Hartlepool, Co Durham. In contrast with some other electronic kits, the Josty range is designed to provide the basic modules only, and leaves such matters as cases, connections and so on up to the constructor.

Each kit is visible in a tough polythene envelope, and comes complete with instructions and circuit diagram(s), glass fibre printed circuit board, all components, a reel of multicore solder, and a one-year guarantee. The pcb is coated with a transparent film so that only the copper immediately around each component hole is exposed and available for soldering; a useful feature for the less dextrous constructor. Prices of kits range from £1.94 for a broadband aerial preamplifier to £25.53 for a quality fm tuner unit.

The importers offer a technical back-up service for the kits, and say that any kit sent to them not working correctly will normally be put right within 24 hours.

Catalogue, 6 by 8½in, obtainable (send sae) from Radio Supplies, (Josty kits), PO Box 27, 39 Whitby Street, Hartlepool, Co Durham.

West Hyde Developments Ltd

The latest edition of the West Hyde catalogue contains 86 pages devoted to a comprehensive listing of components and supplies ranging from adhesive to Veroboard. A section gives full information on the extensive range of Contil cases available in a variety of sizes and types and providing an ideal housing for home-constructed projects.

This catalogue will be found invaluable to both the professional engineer and the radio amateur and is available from West Hyde Developments Ltd, Ryefield Crescent, Northwood Hills, Northwood, Middlesex HA6 1NN.

Electrovalue

The seventh edition of the Electrovalue catalogue contains details of the increased range of components now stocked, and some 58 pages are now devoted to discrete devices and integrated circuits. The reference data section has been enlarged and the catalogue contains a classified index for ease of use.

Copies may be obtained from Electrovalue Ltd, 28 St Judes Road, Englefield Green, Egham, Surrey TW20 0HB.

Top Band conversion for the KW Viceroy IIIa

by J. HALIBURTON, GM4AQO*

WITH the marine services changing from a.m. to ssb by 1975, and amateur users of the band being advised to do likewise, there must be many amateurs with 80–10m rigs and an a.m./cw transmitter for Top Band wondering how best to fall in line with this recommendation. Although construction of a transverter is one solution, it means a separate chassis and usually another power pack, which is not very tidy, apart from some other troubles that may be encountered. In the case of the KW Viceroy IIIa, a suitable conversion is easy and inexpensive, and can be done without defacing in any way the front panel. Viceroys are now of such an age that most owners would have no objection to this type of modification.

Viceroy circuit and operation

The IIIa has a vfo with an overall range of 600kHz (from 3·065 to 3·665MHz), which when added to the carrier frequency of 435kHz covers the 80m band with transmission on lower sideband. For the other bands, various crystals are switched in, and by heterodyning the output of the crystal oscillator with the output of the first mixer, 40m, 20m, 15m and two 600kHz portions of the 10m band are covered. In the process the signal is automatically inverted to upper sideband, except on 40m when the difference frequency between the carrier crystal and the vfo is used so that when the signal is heterodyned the lsb is available. When heterodyning to 160m, it is also essential to use this difference frequency to obtain the lower sideband. How this is done will be explained later in the article under the section dealing with modifications to the bandswitch wafers.

The 160m conversion utilizes the second 10m portion of the bandswitch but the full range on 10m can still be obtained by simply changing one 10m crystal for the other. At this stage it should be pointed out to owners of other models of the Viceroy, which have slightly different ranges etc, that conversion in the manner to be described may not be possible.

Alternatively, if 40m is not used, this range could be converted to 160m with less changes to the switch wiring. It is assumed that the owner has the circuit diagram for the transmitter, which should be perused along with this article. The relevant portions of the circuitry (crystal oscillator V12, second mixer stage V4, driver stage V5, and the pi-tank coil assembly) after modification are provided, for those readers who may wish to apply the conversion to other sets. Three coils, one capacitor and a trimmer are the only components required but it is preferable (though not essential) to obtain a 4,730kHz crystal so that the calibration on 160m coincides with the 100kHz markings on the dial. A slim soldering iron is necessary and one with a right-angled bit would be a great asset.

* 71 Harris Drive. Kirkcaldy, Fife

PA modifications

While examining the pa bandswitch when this project was first conceived, it was found that there was a spare unmarked position to the left of the 3·5MHz marking. The switch must not be moved while the transmitter is on as in the author's model the two tags were not strapped, with the result that the coil was open circuited from the loading capacitor and aerial. Unfortunately the switch fitted was of the progressively shorting type so that the usual 600pF capacitor could not be connected to the 160m tag as it would have been in circuit on the other bands as well. It was found in practice that when used in conjunction with a top band Z-match coupler no difficulty was experienced in loading.

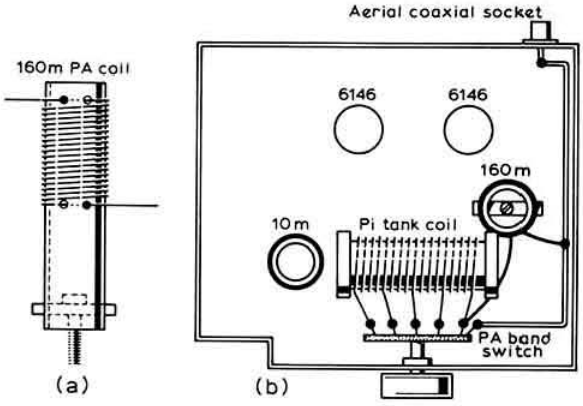


Fig 1. The Top Band pa loading coil; (a) shows the method of construction, (b) shows the positioning of the coil in the chassis

For the Top Band pa loading coil, 35 turns of 22swg enamelled-copper wire, close-wound on a $\frac{3}{8}$in diameter former about 4$\frac{1}{2}$in long, were used. It is usually recommended that a ceramic former be used here but these are somewhat difficult to mount. The writer used part of the plastic barrel of a cycle inflator with two small horizontal slots made on opposite sides of the tube and a small piece of thin metal ($\frac{1}{4}$in wide), with a 4BA clearance hole drilled in the centre, inserted. The tube may then be mounted vertically by clamping it to the base with a 4BA screw through the centre hole. (See Fig 1(a) for details.) Two small holes about $\frac{1}{4}$in apart are drilled at the start and finish of the winding, and the wire ends are threaded in and out of these holes to keep the wire taut. The finished winding should then be sprayed with an insulating varnish to prevent movement of the wire. This coil should then be mounted in the pa box in the position shown in Fig 1(b). Solder between the end wire on

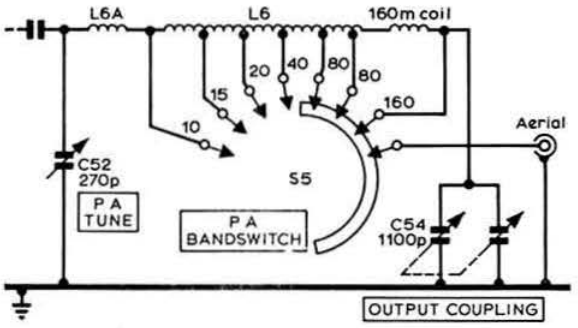


Fig 2. The pa bandswitching circuitry after modification, showing the location of the 160m loading coil

the pi-tank and the wire to the output socket (a shorter coil former could be mounted horizontally at right angles to the main pa coil but this would probably mean drilling a hole in the front panel).

To complete the work in the pa section, a toggle switch is mounted on the rear apron immediately below the key jack to switch off the heater of the outermost 6146 and reduce the power on Top Band. Any wiring on this base that supplies the heaters of some of the other valves should be transferred to the valveholder of the operating 6146, otherwise these valves also would be cut off. Consideration was given to using a spare section of wafer switch in the mixing compartment so that it would break the heater circuit on the 160m position only, but it was thought that the current might be too high and cause the switch to break down. Similarly, using this wafer to switch the pa ht from 700V to the lower voltage and keep both pa valves in circuit was discounted for two reasons: firstly, the lower ht supply could not provide the extra current, and secondly, harmonics might be introduced into or out of the pa compartment.

Bandswitch wafer modifications

For the rest of the conversion, the transmitter should be placed upside down with the front panel facing forwards as shown in Fig 3(a), when the switch wafers for band changing will appear as in Fig 3(b). To commence at the front wafer, the 10pF (C80) capacitor should be transferred to the first 10m position to leave the last tag on the switch clear for 160m. Working on the right-hand side of the switch is awkward as the tag to be soldered is next to the chassis, and it is at this stage that a right-angled bit on the soldering iron would be handy. A 10—115pF ceramic trimmer (or any 100pF trimmer) and a 600pF silver-mica capacitor are fitted in parallel as shown in Fig 3(a), care being taken not to foul the spindle of C35. One wire from the capacitors is taken to the tag on switch wafer 6a formerly used for 10m, and the other wire connected to the trimmer common point on the second wafer.

On 40m a 4,965kHz crystal is used, working on its second harmonic, and the same crystal can be used on its fundamental for Top Band working. When the difference frequency between the carrier crystal and the vfo is used, the output from the first mixer stage is from 2,630 to 3,230kHz, so when this is subtracted from the fundamental frequency of the 40m crystal, an output is obtainable on Top Band, appearing on the dial between 28,065 and 28,265kHz. Using a crystal on any one of the frequencies 5,030, 4,930, 4,830, 4,730 or 4,630kHz would align Top Band to the 100kHz markings on the dial; a surplus 4,730kHz crystal in a HC/6U base is available at reasonable cost from an advertiser in *Radio Communication*.

In the author's transmitter, the mixing crystals had a mixture of FT243 and HC/6U bases, with the former being used for the 10m bands, so a base would also be required but is easily fitted in place of the existing one. With the 4,730kHz crystal, Top Band appeared between 7·0 and 7·2MHz on the dial. If making do with the 40m crystal, disconnect the white wire from the 8,175kHz crystal and connect it to the 4,965kHz one. Note the colour coding of the wiring to each crystal as it is repeated for each band in the other stages and helps identification. If a general-coverage receiver is available, the fundamental frequency of the crystal can be heard, and when the trimmer in the anode circuit of the crystal oscillator is adjusted an increase in strength is noted when it passes through resonance. If resonance cannot be obtained, the 600pF capacitor should be replaced by one lower or higher in capacitance by about 100pF until the correct value is found.

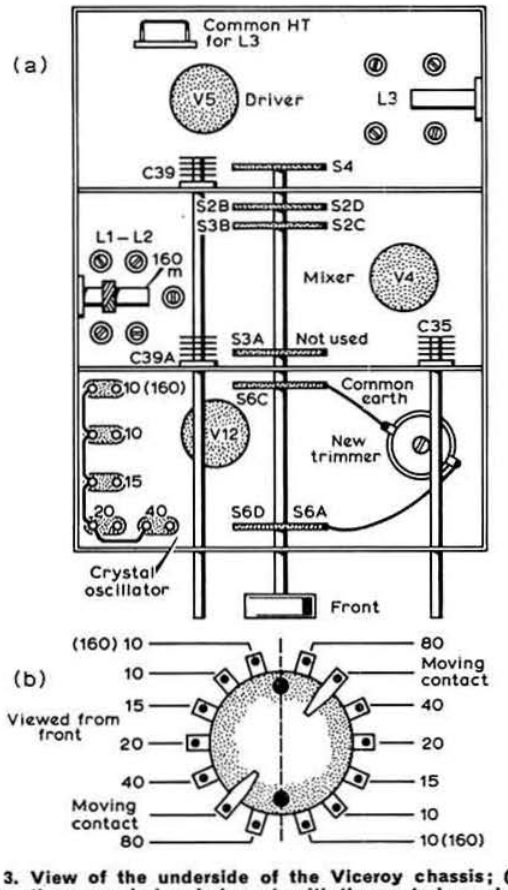


Fig 3. View of the underside of the Viceroy chassis; (a) shows the general chassis layout, with the control panel to the front, (b) gives the position of wafers for band changing, as viewed from the front

Going on to the mixer compartment, disconnect the link between the two 10m positions on switch wafer 3a and connect one end of the primary of the 160m coil L1 to the appropriate tag and the other wire to the common ht point. The secondary is connected between the same tag on wafer 3b, after breaking the link, and the common earth point.

To obtain the difference frequency previously mentioned as being required for 160m, it is necessary to bridge the 40m contacts (the only ones with wires connected) on switch wafers 2b, 2c and 2d to the 10m (now 160m) contacts. Fig 3(a) does not show a contact 2a; this part of the modification is not required if the 40m position is used for 160m.

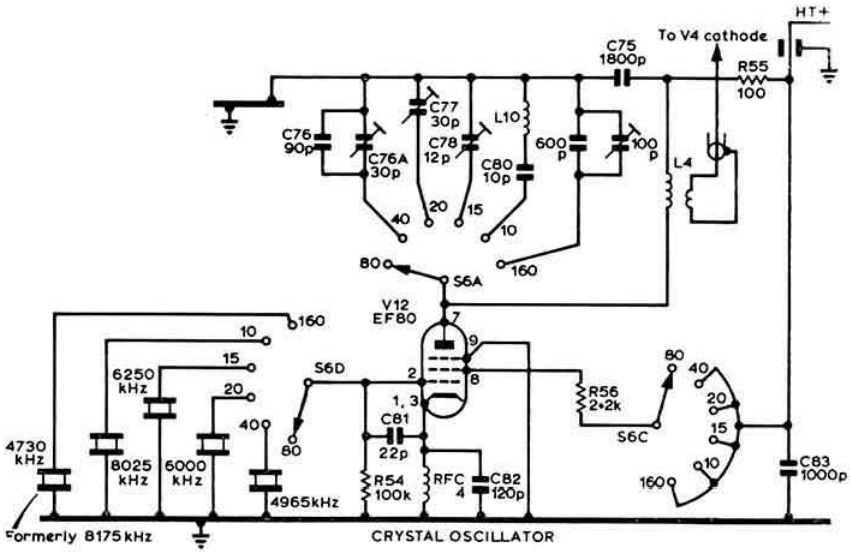


Fig 4. The crystal oscillator portion of the circuit, showing the positioning of the 600pF and 100pF capacitors in the anode of V12, and also the alteration to the crystal line-up

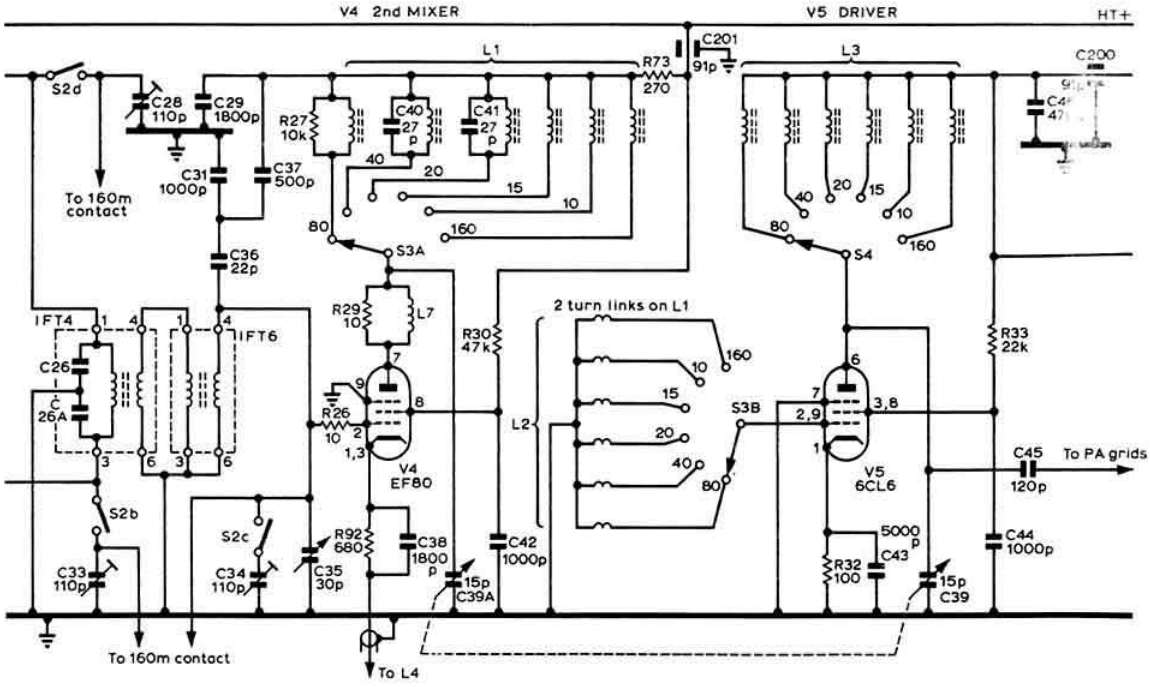


Fig 5. Mixer and driver circuitry after modification; coil winding details and tuning instructions are given in the text

The coils L1 and L3 are identical, and the author used some medium wave oscillator coils obtained from a switched station medium wave superhet receiver, but commercial coils for medium wave oscillators for use with a 470kHz i.f. would suit, particularly the single-hole fixing type. The coupling windings are removed, leaving the tuned windings.The secondary L2 consists of two turns of insulated single-strand wire wound next to the tuned winding on L1 in a manner similar to that on the coils for the other ranges.

A word of warning here about obtaining the correct resonant frequency for coils L1 and L3. The author connected the coils in parallel with a small capacitor in a transistor oscillator circuit and removed turns until it was oscillating on 1·9MHz. The coils were then fitted to the transmitter and given a final tune by adjusting the dust cores. Although there was plenty of drive appearing on the transmitter grid current meter, output on the station receiver was low. A quick tune along the dial soon revealed the trouble—the coils were tuned to the difference frequency of the carrier and the vfo, which in this case was about 2·8MHz. In the absence of a gdo, a signal generator was connected to the grid of V5 and set for 1·9MHz. The coil L3 was then brought to resonance by putting extra capacitance across it and tuning to maximum on the grid current meter. L1 was then dealt with in a similar manner. Another small snag then revealed itself, namely the capacitance swing of C39 and C39a with the extra capacitance in parallel was not enough to give sufficient drive over the whole band.

So to sum up, the following procedure is recommended. Coils should be tuned in situ, with a gdo or signal generator set to 1·9MHz and capacitors C39 and C39a set to mid-position to avoid the trouble the author experienced. With commercially-made medium wave oscillator coils the only adjustment that should be required is to the dust cores.

The coils should be fitted horizontally as shown in Fig 3(a), taking care in the case of L1/L2 not to foul the coupling between C39 and C39a. The winding on L3 is connected between wafer 4 (break the 10m link again) and the common ht point for the coils in the anode circuit of V5. If the 40m position is used, coils L1 and L3 could be mounted vertically in place of the existing coils.

Keeping within the power limit

The conversion is now complete, but it must be borne in mind that the power limit for 160m should not be exceeded. This can be done by keeping the audio control turned back, fitting a drive control to V5, or, even better, by reducing the drive automatically by inserting a resistor between the hot end of the 160m coil L2 and switch S3b. The value of this resistor would have to be found by experiment as it would depend upon the coils used for the conversion, and the gain of the earlier stages of the transmitter, which may vary between different models. A 1kΩ resistor could be used for a start, and with the audio gain adjusted to its normal position the pa anode current noted when normal voice level is used. With only one pa valve operating, the standing current should be 25mA, and when the correct value of resistor is fitted, speech peaks should not exceed 50mA.

If a suitable relay is available, it should also be possible to utilize the spare contacts on switch S3 to operate the relay in the 160m position, which in turn could break the heater circuit to one of the pa valves.

RSGB QSL BUREAU SUB-MANAGERS

(At 1 January 1974)

G2:	J. W. Russell, G2ZR, 45 Shakespeare Avenue, Bath.
G3, 4 and 5 two-letter calls and GC:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G6 two and three-letter calls; G8 two-letter calls:	A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham, GL51 5BT.
G3EAA-HZZ	W. J. Green, G3FBA, 29 Oaklands, Old Buckenham, Attleborough, Norfolk.
G3IAA-KZZ:	G. L. V. Butler, G2BUL, 9 The Heath, Chaldon, Caterham, Surrey, CR3 5DJ.
G3LAA-NZZ:	C. A. P. Henderson, 76c The Avenue, Beckenham, Kent.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-RZZ:	D. Dell, G3PQF, 6 Rye Close, Cove, Farnborough, Hants.
G3SAA-TZZ:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G3UAA-VZZ:	M. Newton, G3UKW, 2 Marlowe Court, Garforth, Leeds, LS25 1PR.
G3WAA-XZZ:	F. G. Rylands, G2VF, 39 Parkside Avenue, Millbrook, Southampton, Hants, SO1 9AF.
G3YAA-ZZZ:	F. G. Hoare, G2DP, 63 Mill Road, Three Bridges, Crawley, Sussex.
G4AAA-AZZ:	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, Worcs B67 6NG.
G4BAA-CZZ:	R. F. Rawlings, G3WBV, 74 The Lindens, Field Way, New Addington, Surrey.
G5AAA series, all prefixes:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London, SW20.
G8AAA-EZZ:	A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
G8FAA-GZZ:	R. E. Parkes, G3REP, 10 Hill Top Road, Cheltenham, Glos, GL50 4NN.
G8HAA series:	Mrs A. J. Mathews, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
GB series:	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs, BL8 3HL.
GD:	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI:	R. R. Parsons, GI3HXV, 45 Erinvale Avenue, Finaghy, Belfast.
GM:	D. Macadie, GM6MD, 154 Kingsacre Road, Glasgow, G44 4LY.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff.
BRS and A numbers:	J. W. Garrett, G3YOU, 201 Bishops Oak Ride, Tonbridge, Kent.

The 5-Square

A new aerial for vhf and uhf

by J. R. HEY, Tech (CEI), MSERT, G3TDZ*

LONG the favourite of the hf man, the cubical quad has also proved to be an excellent aerial at vhf, and a four-element version only 48in in length out-performed the author's eight-element yagi. A two-element quad had been successfully used for portable work for over a year, and with only 1W of rf surprised many a listener, and it was while the author was wondering how more than one quad could be parallel connected that the new configuration was born.

Supposing four quads were spaced out in a square formation, separated by the length of one side, that is 20in, their combined phase relationship should, with luck, be in harmony. The problem of their connection would still remain. If fed at their corners by another quad formation, no change in phase relationship should result provided the wires did not become crossed, thus following the wrong route. The result would be five wavelengths of wire in a single loop.

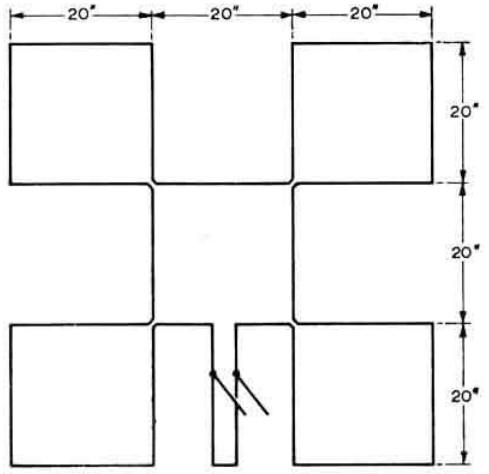
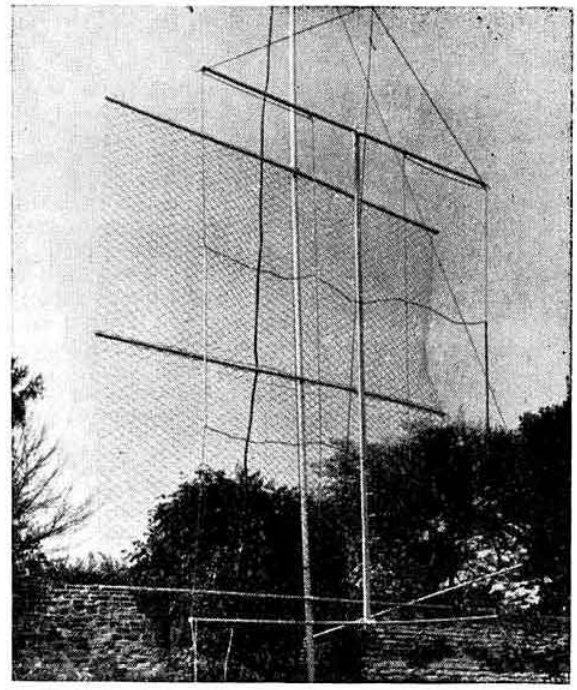


Fig 1. Configuration and dimensions of 5-Square aerial

* 8 Armley Grange Crescent, Leeds LS12 3QL.



One of the problems of a radiator of greater than one wavelength is that interference creates a series of strong lobes with deep nulls between. With the proposed system, however, each time the point was reached where an out-of-phase component could cause irregularity, the wire turned through 90°, overcoming the problem. When the wire next turned through 90°, it would be back in phase again.

A working model was built using thick stranded pvc wire supported by a wooden dowel frame, the centre square cut in the centre of its lower leg to connect a feeder. Feeding with a 75Ω coaxial line resulted in a hopeless swr. A closed

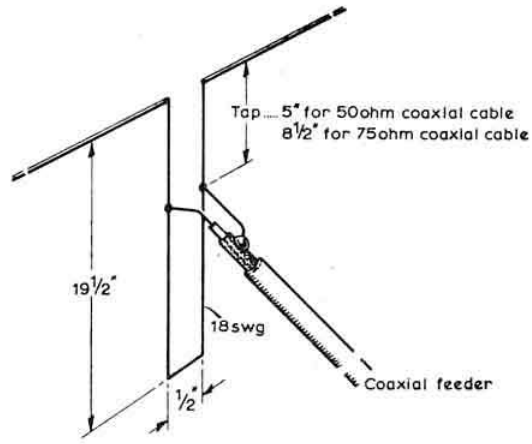


Fig 2. Matching stub

quarter-wave stub was connected, as it was guessed that the impedance would be high; using crocodile clips, a point was found where the 75Ω feeder matched, giving a low swr indication. Fig 1 shows the configuration reached.

A few QSOs were made with the 5-Square indoors, if anyone can imagine a 5ft square indoors! An ordinary quad fed in the centre of one horizontal leg displays marked horizontal polarization, but what of this new contraption? It was with some relief if not surprise that a received station was observed to fall in strength by some three S-points as the square was rotated through 90°.

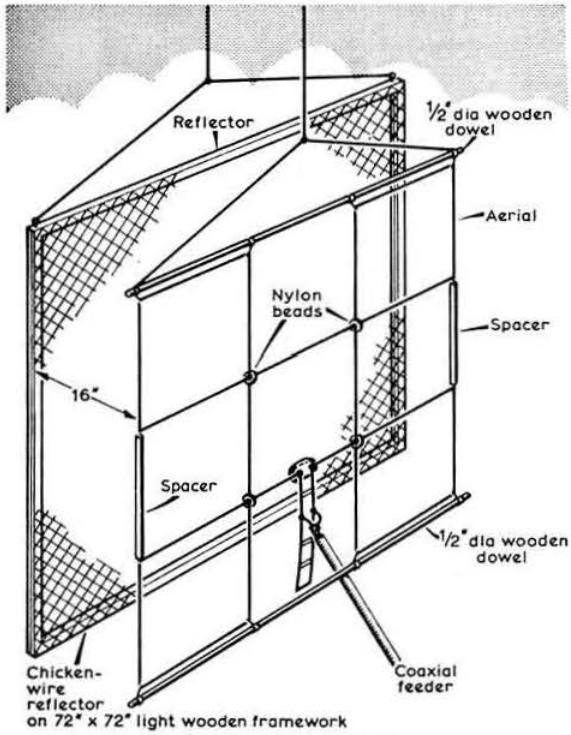


Fig 3. Aerial and reflector

Designing a reflector posed a few problems: should one use five over-lapping closed loops, a continuous loop about five per cent oversize, or what? The problem was resolved by the purchase of four square yards of 1in chicken wire which could be supported by a wooden frame and spaced 16in behind the 5-Square. It was thought the addition of a reflector would throw the matching so far out that the stub would require readjustment, but in fact the swr improved even more.

Enlisting the assistance of local amateurs, a field test was planned. One fine but windy afternoon, four stout souls arrived in a small field, armed with a 16ft mast, miles of coaxial cable, step-ladder, two reference dipoles, two-element quad, four-element quad, swr bridge, field strength meter, ball of string, the specimen aerial, and a camera to record this momentous event. The field strength meter was first set up on two reference dipoles.

As expected, the two-element quad showed a 7dB gain over the test dipole using 1W from the G3TDZ Mk4 transmitter. The four-element quad sent the needle right off the end stop and an attenuator had to be added. With some apprehension the 5-Square was plugged in. Its gain fell somewhere in between that of the two- and four-element quads; the table below shows the figures obtained.

Dipole	2-el quad	5-Square	4-el quad
0dB	6dB	10dB	15dB

A polar diagram had now to be plotted to assess the 5-Square's directivity. Rotating the aerial about a vertical axis in a strong wind with any degree of precision seemed impracticable. Instead, the aerial was anchored on a fixed heading and the field strength meter moved round the aerial, kept at a fixed distance by a string tether. Fig 4 shows the resultant polar diagram. There were no irregular peaks or nulls but a smooth and sharp forward major loop; zero reading at 90° and a circular −23dB rear response. Perhaps a finer grade of chicken wire would improve this but the basic performance is easily seen from the graph.

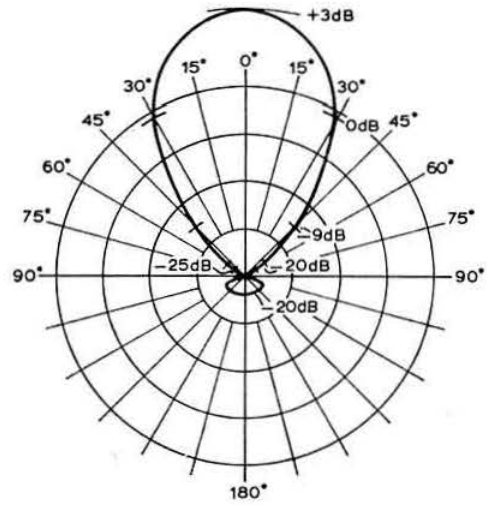


Fig 4. 5-Square polar diagram

The 5-Square aerial was designed for and operated at 145MHz in order to test the idea. It is not claimed this new aerial has anything extra special to offer that existing systems lack, but the idea is put forward for others to kick around. While the 5-Square is a little unwieldy at 145MHz, it could be made into a robust construction for 70cm, where not only a reflector but directors might be added, producing even greater gain.

If any lack of professionalism offends the aerial experts in our midst, the author offers apologies, pointing out that this was essentially an amateur project for other amateurs to play with.

* * *

The author wishes to thank G8BXZ, G8HJO and SWL George for their valuable help in carrying out the field tests.

A digital morse code generator

by P. W. BACON, G3ZSS*

RADIO communication using meteor scatter demands a fast rate of morse transmission if the fleeting chance of a contact is not to be lost, and the required morse speed may be beyond the ability of the transmitting amateur. An automatic morse keyer can greatly improve the chance of a successful contact simply by providing a faster (and perhaps consistently more accurate) transmission.

Beacon and vhf repeater operation also presupposes the availability of a suitable morse generator which can be programmed to generate a simple message.

This article presents a fairly straightforward design of morse code generator, using digital techniques, and with a capacity of a 128-bit message. TTL integrated circuits are used, to take advantage of the compactness, simplicity, and low cost associated with these components, and the keyer can successfully be constructed on Veroboard.

Morse code generation lends itself to digital techniques, as morse is itself a digital language. For the purposes of this keyer, the relationship between the lengths of characters and the spaces between them are taken as follows: one dash is equivalent to three dots, the space between dots and dashes in any letter are each equal to one dot, the space between letters is equal to three dots, and the space between words is equal to five dots.

Circuitry

The sequence of circuits in the keyer are: pulse generator, counter, diode matrix and multiplexer.

The pulse generator uses an SN7413. One of the Schmitt triggers is used as a multivibrator with the addition of a variable resistor and a capacitor selected to give the correct time constant for the pulses. The second Schmitt trigger acts as a pulse shaper. The circuit for this part of the keyer is given in Fig 1; detail of pin connections for the SN7413 are given in Fig 4, the complete circuit diagram.

The pulse train is fed into an SN7493 connected as a 4-bit ripple-through counter, so that divisions of the input of 2, 4, 8 and 16 appear at the outputs A, B, C and D. These binary outputs are fed straight into an SN74154 4-to-16 line decoder. The net result of this is that at the outputs of the SN74154, pulses appear sequentially, ie a pulse at pin 1, followed by a pulse at pin 2, and so on.

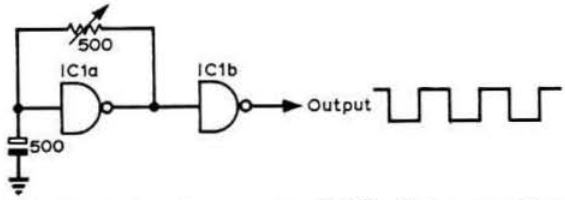


Fig 1. The basic pulse generator, Details of pin connections for the integrated circuit are given in Fig 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	1	1	1	0	1	0	1	1	1	0	1	0	0	0	1
2	1	1	0	1	1	1	0	1	0	1	1	1	0	0	0	0
3	0	1	1	1	0	1	0	1	0	0	0	1	0	0	0	0
4	0	1	1	1	0	1	1	1	0	1	0	0	0	1	0	1
5	0	1	0	1	1	1	0	1	1	1	0	0	0	1	1	1
6	0	1	1	1	0	1	0	1	0	0	0	1	0	1	0	1
7	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig 2. Truth table for the message *CQ de G3ZSS*. This is the first stage in working out diode positioning for any particular message to be stored in the matrix

These pulses are fed directly to the 16 by 8 diode matrix, which is the part of the keyer that holds the message. Any message of not more than 128 "bits" can be stored in the matrix—the example shown in Figs 2 and 3 is *CQ de G3ZSS*. When calculating how many words can be stored, remember that one "bit" means a signal of length equal to one dot, so that a dash uses up three bits, a word space five bits, and so on.

To work out the diode matrix necessary for any particular message, first construct a truth table as shown in Fig 2. Starting at the top left-hand corner, and moving to the right, put a "0" wherever a single-bit space is to appear, and a "1" for each single-bit signal. Thus, in the example shown, positions 2 to 12 indicate *dash space dot space dash space dot* (ie the letter C), followed by a three-bit space showing an interval between two letters. It is then a simple matter, once the truth table has been completed, to build up the diode matrix, inserting a diode wherever a "1" appears in the truth table. Fig 3 shows the diode matrix corresponding to the truth table of Fig 2.

It should be clear by now that the SN74154 decoder which produces pulses sequentially across the 16 vertical grids of the matrix, will give a pulse at the output of the horizontal grid only when a diode is present, and that pulses can be available at all the horizontal outputs simultaneously. To extract meaningful information it is necessary to read the output of line 1 for the first 16 pulses, line 2 for the next 16 pulses, and so on, so that the entire message held by the matrix is produced.

This is achieved by the 8-input multiplexer IC5, an SN74151, which is driven by IC4, a 4-bit binary counter type SN7493. The eight inputs of IC5 are scanned sequentially at one sixteenth the scanning rate of the outputs of IC3.

The output of IC5 is fed to a buffer transistor TR1, which can be any silicon npn type such as a BC107, with a reed relay in its collector. Alternatively, the output can be used to operate a simple tone generator using a couple of NAND gates, IC6 in Fig 4 (an SN7400).

Construction

The diode matrix is made as a separate module, and is most conveniently assembled by using two pieces of Veroboard mounted side by side, but with the copper strips at right angles, so that the diodes (type 1N914) can be fixed

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Fig 3. Diode matrix built up from the truth table of Fig 2

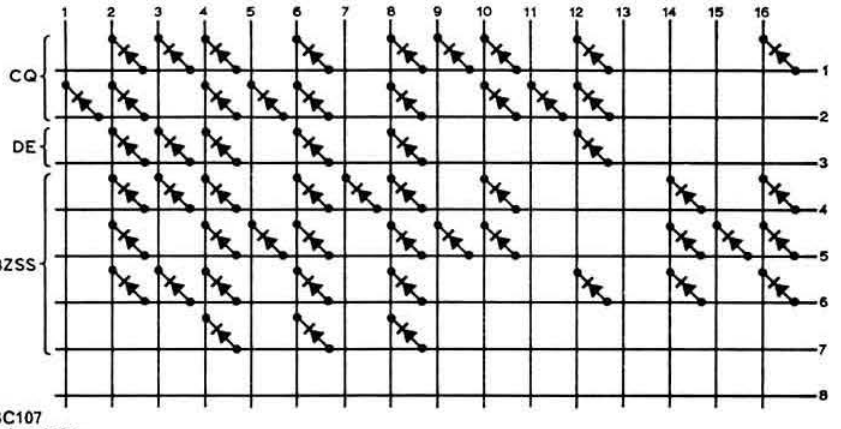
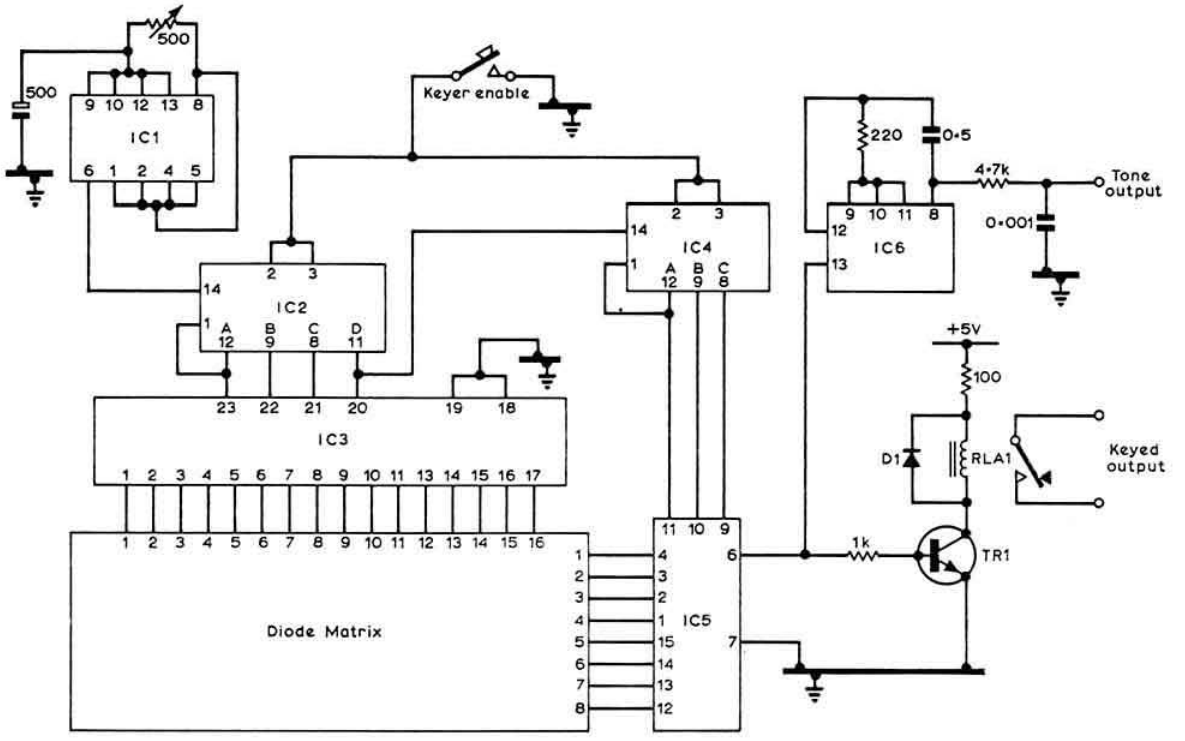
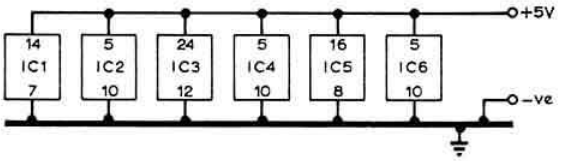


Fig 4. The complete digital morse keyer, with pin numberings for the integrated circuits

IC1	SN7413 Schmitt trigger
IC2	SN7493 Counter
IC3	SN74154 Decoder
IC4	SN7493 Counter
IC5	SN74151 Multiplexer
IC6	SN7400 NAND gates
D1	Any silicon diode
TR1	Any silicon npn transistor, eg BC107
RLA1	Single-pole, single-throw reed relay, 150Ω





between the two boards. Actual assembly in this way requires patience but the end product can be quickly interchanged so that different message matrices can be plugged into the keyer. The rest of the keyer is also assembled on Veroboard.

Comments and conclusions

For repeater or beacon use, the "keyer enable" switch could be replaced by a timer such as the Signetics NE555.

Various modifications to the basic keyer as shown in Fig 4 are possible: the diode matrix could be replaced by a user-programmable read-only memory (rom), although this substitution is not for the novice; the multiplexer could be replaced by an SN74150, which is a 16-input device and would allow a larger 256-bit matrix to be used; or, if the user wishes to key a continuous tone, a spare input to IC5, when grounded, will give a continuous keyed condition for the duration of that particular line scan.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

THIS month an unusually wide and diverse selection of topics—ranging from new ideas for domestic radios to suggestions which might allow you legally to run the equivalent of 160kW erp, or break the Japanese component code, or measure rf power to an accuracy of ± 1 per cent, or . . . well why not read on and find out? You may even come across something that *you* can use or develop.

New approaches to a.m. reception

From time to time we have referred to the work going on in various parts of Europe in an effort to develop domestic receivers which would be suitable for either ssb or a.m. broadcasting. Most of these systems use synchronous (product) detection either by the use of phase-locked loops or the reconstitution of a phase-coherent carrier from the incoming signal. While I feel that widespread use of ssb broadcasting is still some way away, there is no doubt that some very interesting techniques are emerging from this work.

One of the centres for this work in the UK is at University College of Swansea where one of those concerned is J. F. Crane, GW (GD)3XNU. One of his contributions represents an independent development of the huff-and-puff type of oscillator stabilization as a means of overcoming the problem of expecting broadcast listeners to tune to ssb signals (for music this needs to be to an accuracy of about 2 to 5Hz compared with the 50Hz which is about adequate for speech communication). The stepwise-tuned oscillator would be arranged to automatically pull the receiver (Fig 1) into tune on those regularly-spaced frequencies at which the mf broadcast stations would operate. In an experimental receiver this is arranged to be at 5kHz intervals. His ideas were outlined in papers written jointly with Dr R. C. V. Macario in: *EBU Review—Technical*, No 131 (February 1972) and *The Radio & Electronic Engineer*, Vol 43, No 5, May 1973 (which also reviews ideas put forward by other workers in this field).

The Swansea receiver uses a 7·2MHz crystal oscillator divided by 16 to give 450kHz and then by 90 to give 5kHz pulses into a sample-and-hold circuit. When tuned, the receiver "steps" from one channel to the next in a small fraction of a second and it is impossible to mistune the receiver in the conventional sense.

A further point of interest in this design is the use of digital 90° signals from the synchronous detectors, derived from the 450kHz output from the reference crystal.

GW3XNU brings the story up-to-date by revealing that since the papers were written, a Mark 2 receiver has been built in which all the logic, the matched pair of detectors and the sample-and-hold circuit are incorporated in a few standard cmos (complementary metal oxide semiconductor) integrated circuits having a total consumption of only a few milliamps.

The phasing networks used in these designs are produced using a simple computer program which optimizes the amount of attenuation of the undesired sideband attainable for a given complexity of circuit and defined frequency limits. The individual time constants can be adjusted independently using an accurately calibrated audio signal generator and a simple test circuit. The accuracy of calibration of the signal generator determines the accuracy of the resulting circuit and the degree of attenuation of the unwanted sideband that can be achieved. The test frequencies are listed by the computer program.

The passive synchrodyne

Another receiver developed with an eye to ssb broadcasting is a passive synchrodyne described by G. Hentschel of Nordmende in an article with the formidable title of "The passive synchrodyne receiver and its possibilities for amplitude-modulated compatible double-sideband and single-sideband reception" (*EBU Review, Technical Part*, No 133, June 1972). In effect this is a combination of superhet and homodyne receiver techniques in which the carrier for synchronous demodulation is obtained at i.f. using a narrow-band filter (crystal or ceramic) plus limiter. This approach assumes there will be sufficient pilot carrier (ie carrier suppression "would not be too much") with ssb. It is claimed that this approach (which has interesting applications for communications work) retains the advantages of the classic synchrodyne in eliminating the need for

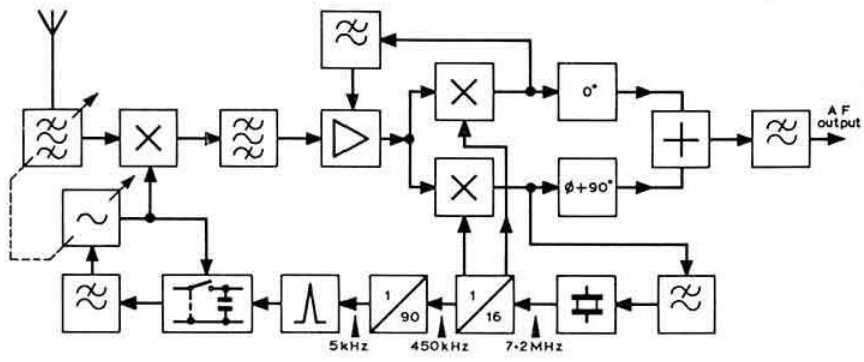


Fig 1. The experimental Swansea receiver using step-wise tuning providing 5kHz increments throughout the mf band and based on a 7·2MHz crystal providing 5kHz into a "sample and hold" arrangement and achieving 50dB suppression of spurious outputs from the local oscillator (excluding harmonics). The receiver has 450kHz i.f. with phasing-type ssb demodulator for which the quadrature carriers with 90° phase-shift are obtained digitally from the 7·2MHz crystal oscillator. The tuning system is thus another form of huff and puff vfo stabilization

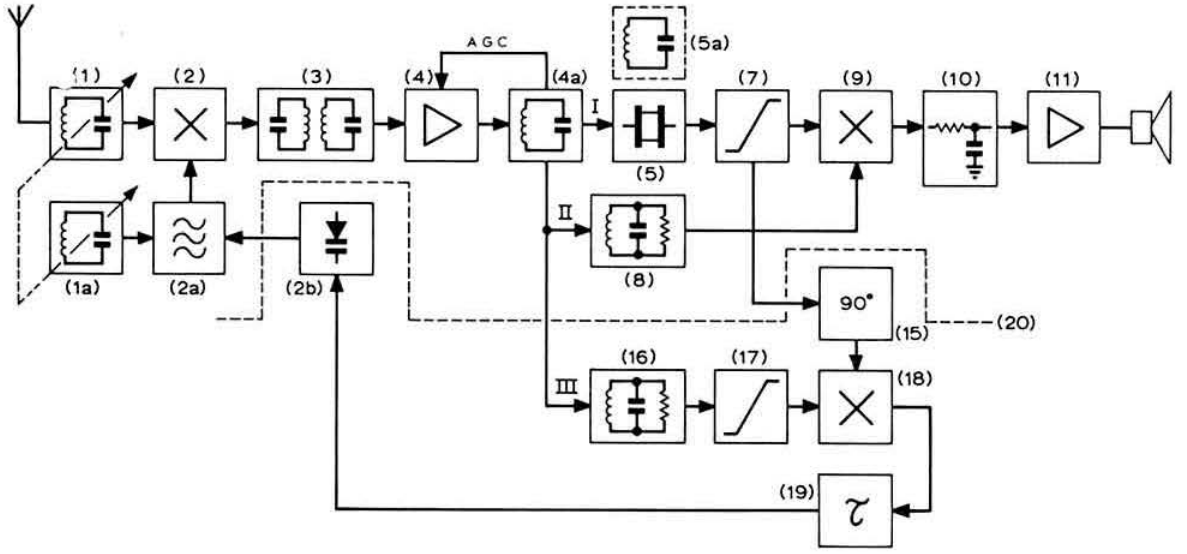


Fig 2. The Nordmende experimental "passive synchrodyne" receiver including automatic precise tuning system. 1, rf tuned circuit; 1(a), local oscillator tuning circuit; 2, rf mixer; 2(a), oscillator; 2(b), varicap diode; 3, filter; 4, i.f. preamplifier; 4(a), wide-band resonant circuit; 5, narrow-band quartz filter for carrier; 7, limiter; 8, phase-correction; 9, synchronous demodulator; 10, af selectivity filter; 11, af amplifier; 15, phase-shift; 16, matching; 17, limiter-amplifier; 18, synchronous demodulator; 19, integrator. The broken line encloses those stages that provide automatic tuning control

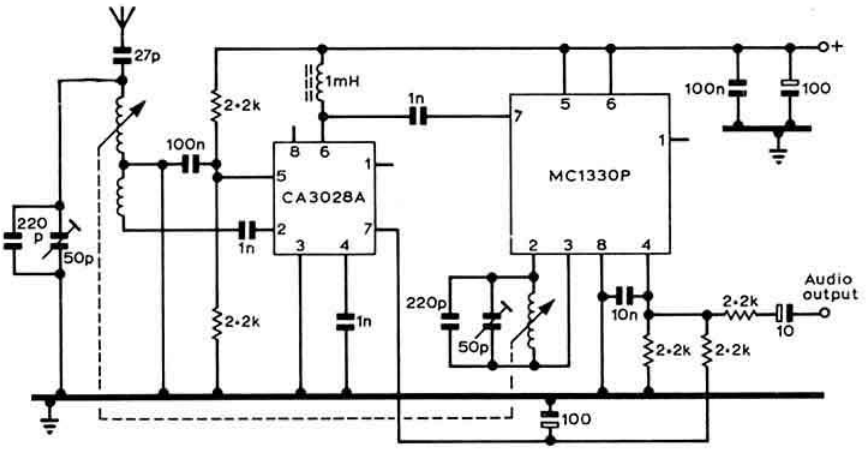


Fig 3. The complete "homodyne" type of broadcast tuner based on MC1330P synchronous demodulator with CA3028A rf amplifier as described by J. W. Herbert (*Wireless World* September 1973)

costly rf and i.f. selectivity devices (except for the one narrow-band carrier filter) and allows selectivity to be fashioned in the af stages as in direct-conversion receivers. This German receiver has been implemented using a third i.f. channel to provide a form of automatic tuning control: Fig 2.

An mf homodyne or direct-conversion broadcast tuner has been described by J. W. Herbert, ZL2BDB, New Zealand, in *Wireless World* September 1973. This is based on the Motorola MC1330P ic for synchronous demodulation plus an RCA 3028A ic as rf amplifier: see Fig 3. This type of tuner can give a total harmonic distortion (at 1kHz with 50 per cent modulation) of less than 5 per cent. ZL2BDB has published another version (*Electronics Australia* November 1973) using discrete components since the MC1330P is in short supply in the Antipodes.

Low distortion synchronous detector

Another ic device which, like the MC1330P, can provide synchronous demodulation of a.m. signals is the LM3067 or CA3067 ic developed as the chroma demodulator for colour television receivers. In *Electronic Design* 22 November 1973, Thomas B. Mills of National Semiconductor points out that with a few external components, plus the use of some parts of the LM3067, one obtains all the classic advantages of synchronous demodulation such as very low distortion,

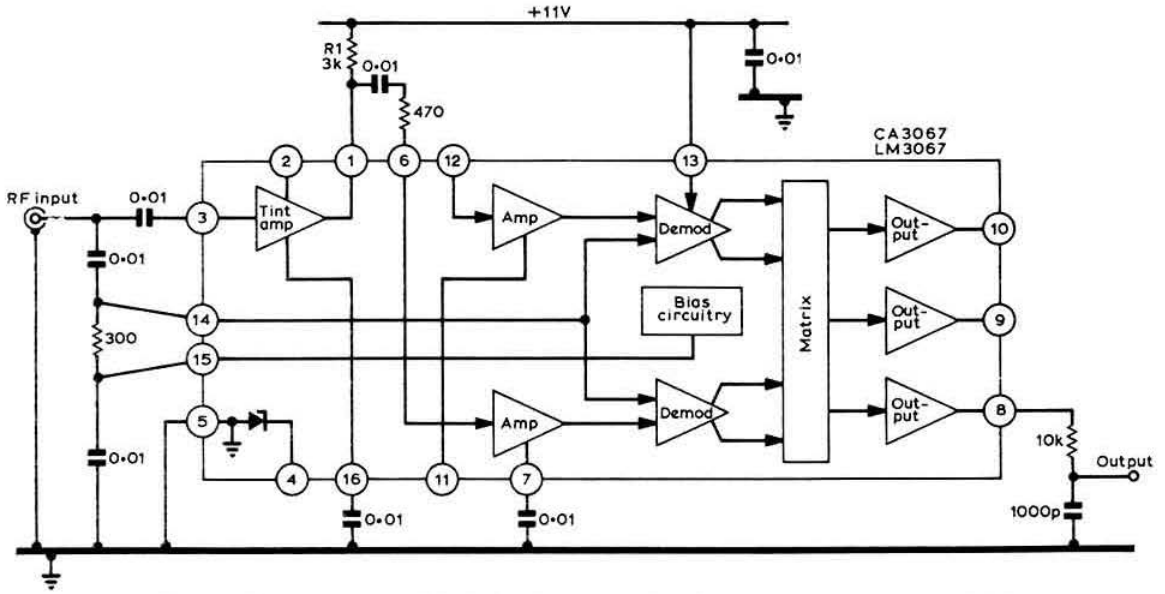


Fig 4. Use of a chroma demodulator ic chip to form low-distortion a.m. synchronous demodulator

ability to follow fast modulation waveforms and ability to provide circuit gain: Fig 4. The two double-balanced demodulators perform the synchronous detection using the original carrier amplified through the tint amplifier and supplying sufficient drive to ensure low distortion during modulation dips. It is claimed that the circuit works with rf inputs from 3 to 35mV and could be used either at the end of a low-gain i.f. amplifier or (with an rf amplifier) in the homodyne form of receiver mentioned above.

With a 35mV (rms) carrier an 0·45V af signal is obtained with less than 0·7 per cent distortion with 80 per cent modulation. The circuit as given is able to cope with carrier frequencies from 10kHz to 10MHz without modification; above 10MHz it is suggested that a tuned circuit be substituted for R1 to allow adjustment of carrier phase.

For communications the advantages of synchronous demodulation have long been recognized on ssb in the form of product detectors which, unlike envelope detection, preserve signal-to-noise ratio on very weak signals. It really does seem that these modern ic devices allow us to obtain similar benefits on a.m.

Since preparing the above notes a letter from Rick Sterry, G4BLT, has come in with suggestions on using Mullard and Plessey tv ics for similar applications; we hope to refer to these shortly.

50W one per cent rf wattmeter

Most of the rf power meters built by or available to amateurs have accuracies of the order of ± 10 per cent of full-scale-deflection. This, when you come to think of it, is useful enough as a first approximation (and decidely better than the traditional electric light bulb), but is not going to mean all that much when investigating pa efficiency and the like. To get an accurate system it seems to be necessary to go back to first principles and measure voltage and current and then multiply them together.

Details of a compact direct-reading rf wattmeter with a claimed accuracy of ± 1 per cent of full scale for power levels up to 50W have been given by Fred C. Gabriel in *Electronics* (8 November 1973, page 122): Fig 5. The rf transmission line current is sensed by a ferrite toroid current transformer, while rf line voltage is sensed by means of a voltage divider. The sensors forming this part of the circuitry can conveniently be located away from the meter and its single printed-circuit card of electronics.

To quote the original description: "Signal voltages representing the load current and the load voltage appear across the 51Ω terminating resistors at the far ends of each of the two equal lengths of miniature coaxial cable. These signal voltages drive the inputs of the ic balanced mixer which functions as a four-quadrant analogue multiplier operating at rf. The averaged product of voltage and current appears as a dc reading on the microammeter. The meter scale can be read directly in watts. It can be set to full scale (50μA) when the circuit is driving a 50Ω dummy load at an rf power level of 50W as read on a calorimetric wattmeter."

The remaining components serve to trim the residual phase and amplitude errors of the current and voltage sensors. The preset capacitors are set to produce a zero reading when a short circuit, open circuit, or purely capacitive load is placed on the output. The design was for operation at 27·12MHz but it is stated that it seems likely that it could be adapted for any frequency up to about 100MHz.

Speech processing again

It is now several months since the last mention in *TT* of speech processing for a.m. and ssb (April 1973). This is not because of any change in heart about the view that, in a

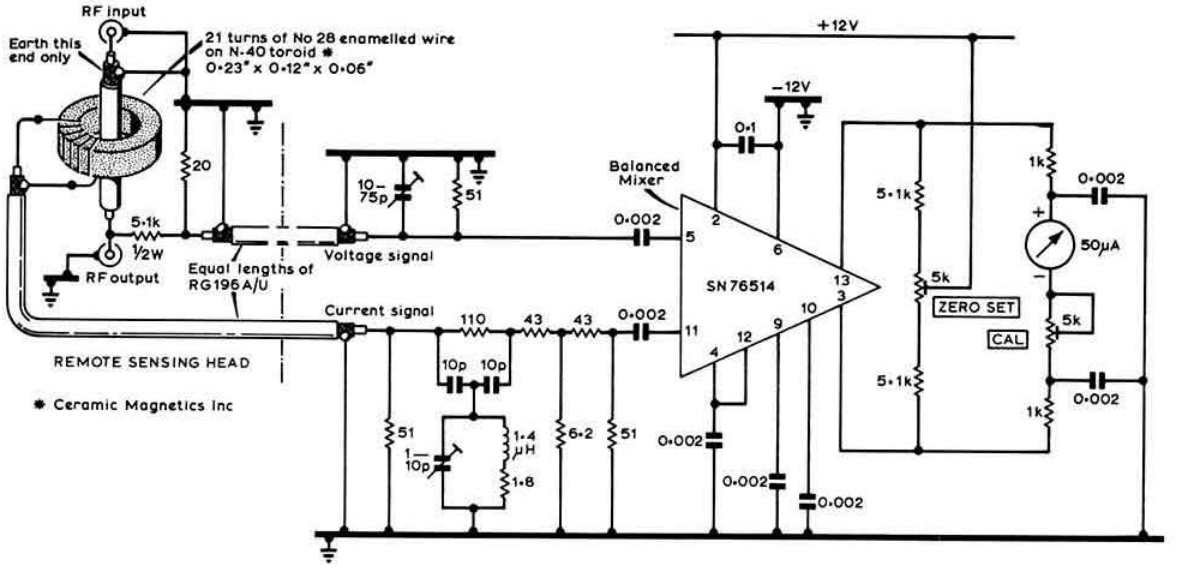


Fig 5. An rf wattmeter capable of measuring rf power outputs to 50W developed for use at 27·12MHz using ic balanced mixer as an analogue multiplier to generate a signal that represents true average power

power-limited system such as amateur radio, this is a most effective way of pushing up the punch of a phone transmission, provided that it is carefully and skilfully done. Indeed if one wanted to be controversial it would be possible to advance the view that a well processed a.m. signal should significantly out-perform a non-processed ssb one.

The basics have been fairly well aired but I cannot resist returning briefly to the subject if only on the grounds that G. M. Ward, G3BOB, corrects the idea (*TT* April 1973) that one of the most useful references to professional investigations into the subject, first brought to notice in his highly informative "New techniques for amateurs" article in *Radio Communication*, September 1969, is available only in the German language. The paper concerned is the one by H. Rupp on "Optimum compression of the dynamic of speech by means of amplitude clipping", and this was subsequently published in full in the English-language edition of *Nachrichtenstechnischen Zeitschrift* (*NTZ-CJ*, No 5, 1963).

G3BOB kindly sent me a copy of this paper and it seems to me to answer fairly clearly a point that still puzzles a number of amateurs concerning the relative merits of: (1) af clipping after pre-emphasis (ie with the optimum 6dB/octave tone correction); (2) rf clipping without pre-emphasis; and (3) rf clipping with pre-emphasis. The important conclusion is that the superior method is (3) and that pre-emphasis is still beneficial even when the clipping is at rf. In practice it often seems that while most amateurs nowadays agree as to the value of a 6dB/octave pre-emphasis on the less effective af clipping systems, it is often omitted for rf clipping systems.

To quote Heinrich Rupp: "The clipping system with pre-emphasis and frequency-conversion (ie clipping at rf) distinguished itself in a special manner over the other methods. It yielded good intelligibility values and a usable speech quality for very high clipping factors (40 to 50dB of clipping) and, further, this system belongs to those systems which permit, even with small clipping factors, the attainment of complete dynamic range restriction and thus full improvement of the s/n ratio. For practical amplitude clipping in transmission systems, therefore, this method appears to be particularly appropriate."

It should be noted that in his paper, Rupp talks about improvements equivalent to an increase in transmitter power of the order of 100 times. Taking 400W pep, adding an aerial gain of 6dB to give 1·6kW and then multiplying this by 100 we are now talking about transmissions equal to 160kW on a dipole aerial!

Speech processing is thus a very powerful aid indeed though, as G6XN has made clear, it needs careful engineering to achieve anything like the full possible benefit.

Rupp also briefly considers the question of quiescent noise suppression—the problem that severe clipping brings up the ambient noise during speech intervals—and outlines a fast-acting threshold level-controlled noise suppressor; in other words a sort of very quick acting vox to cut out except during speech.

Simple transmitter for df hunting

From *Radio-ZS* (September 1973) comes the design of a simple transistor transmitter used by the East London branch of SARL for df contests on 3·5MHz, but which could readily be adapted for 1·8MHz, or possibly for other general applications. The whole unit is based on just two AUY10 transistors with modulation provided either by a carbon microphone or by a carbon microphone/feedback tone generator for A2 transmissions. In the form shown, the output circuit is suitable for feeding half-wave voltage-fed aerials.

Peter Dieterich, ZS2D, writes: "Since most of those taking part in the df work are using ordinary portables with loop aerials, it was found necessary to include a simple means of amplitude modulating the transmitter as well as to modulate it with a tone for easier identification under low signal conditions.

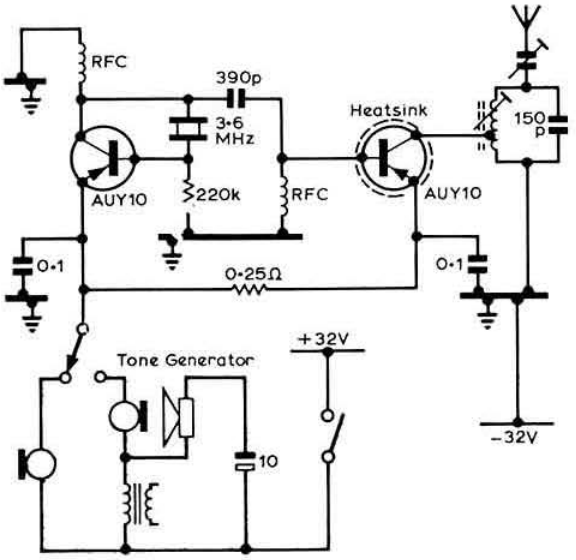


Fig 6. Simple transistor transmitter built by ZS2D for df hunts

"Another consideration was the available battery power and the rf power needed to cover the area with improvised aerials; after several attempts this design emerged. As Fig 6 shows, only two transistors are used; both of the power-type AUY10 now cheaply available. The two rf chokes are 0·1mH types. The output stage works in Class C, making the biasing very simple; since there is no impedance matching between oscillator collector and the base of the pa transistor it pays to have a large transistor in the oscillator stage so as to have enough drive power. The aerial coupling for half-wire aerials works better than the more usual quarter-wave arrangement since power is not wasted in earth losses. The tap on the output coil may need some adjustment; with 25 turns on a 2cm diameter former the tap is at the fifth turn from the 'cold' end. When adjusting the transmitter connect a flash-bulb to a one-turn loop wound over the cold end of the output coil. This coil has then to be brought into resonance with the help of a short piece of ferrite material stuck into the former and adjusted to maximum brightness; and then the tap can be maximized. It is advisable to reduce the supply voltage during setting up to avoid possible damage to the output transistor.

"The modulation problem has been solved by simply connecting a carbon microphone in series with the power supply. The same basic arrangement is used for the tone modulation, but in this case a carbon microphone (telephone type) has been glued on to a small loudspeaker and both connected in series. When switched into circuit this oscillates due to acoustic feedback and provides a tone which seems just right for this application. The secondary coil of a small output transformer was connected in parallel with the loudspeaker and the loudspeaker decoupled from the dc path by an electrolytic capacitor to avoid damage to the speaker. Power supply consisted of four PM9 batteries in series, providing 32V. Input power can be up to about 5 or 7W providing a good signal all over East London."

Oscillators, discrete and ic

In the Swedish *QTC* of January 1973 two oscillator ideas were noted. Fig 7 shows an idea credited to SM0ACY for a 100kHz crystal oscillator without inductors. The perceptive will notice that this arrangement is a variation on a popular ic "clock" circuit but using discrete transistors.

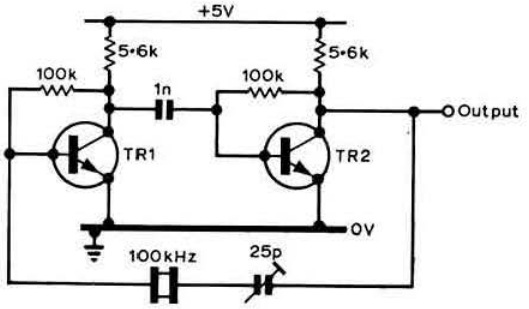


Fig 7. SM0ACY's suggested 100kHz crystal oscillator

Figure 8 on the other hand shows how SM6DTN uses a single ic plus a few external components to provide a handy morse practice oscillator which can be run from a 4·5V battery or other low voltage supply. This uses a "quad two-input positive NAND gate" or, in more popular terms, the well-known SN7400 or equivalent ic.

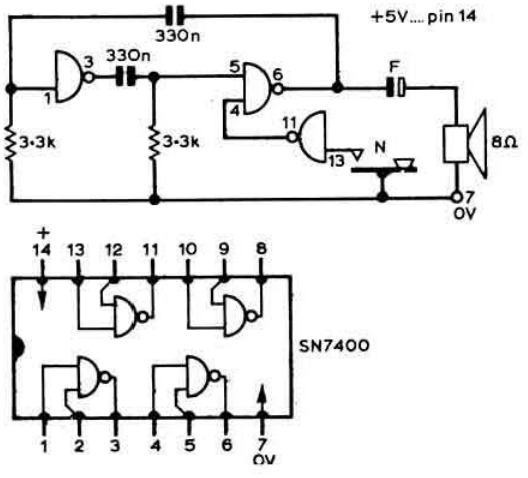


Fig 8. This morse practice oscillator can be run from 4·5V battery

Japanese component markings

Noel B. Eaton, VE3CJ, in "Hinks and Kinks" (*QST* November 1973) provides useful information on the way that the Japanese component manufacturers use the standard colour code on fixed resistors, inductors and capacitors: see Fig 9. The code provides values in ohms, microhenries and picofarads. As an example he quotes an inductor marked brown, red and black as 12 × 10° or 12μH. A ceramic capacitor with the marking 301K5 represents a value of 300pF, 10 per cent tolerance and 500V. He adds that in general the working voltage for Japanese ceramic capacitors is usually 500V unless otherwise indicated.

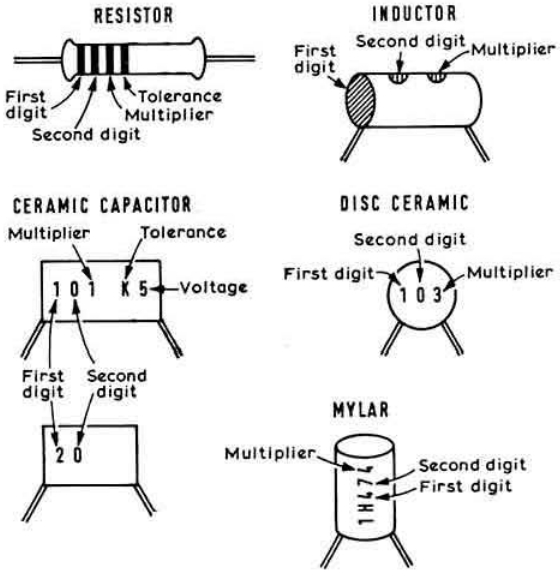


Fig 9. Component markings for Japanese components

High-pass tvi filters using printed circuit boards

Some time ago we drew attention to the use of double-sided copper laminate boards for the construction of low-pass filters to reduce harmonic output from transmitters. K. S. Beddoe, G3YOM, has sent along details of simple high-pass tvi filters for uhf television receivers and made from similar double-sided board. He points out that the use of a high-pass filter in the aerial lead forms a very effective way of eliminating breakthrough from amateur transmitters, provided that the insertion loss is not too great.

He writes: "For most cases a single-section filter should be adequate, but for the more difficult cases a double-section design is given. Termination of such filters is by means of standard tv plugs and sockets, so making installation easy.

"In view of the small size of the filters they can easily be hidden behind the tv receiver without trailing leads. I believe that in the majority of cases where tvi is being caused by a signal picked up on the aerial or downlead, this type of filter will prove effective in reducing or eliminating the trouble.

"Insertion loss of a single-section filter is typically: 500MHz, 2dB; 144MHz, 25dB; 70MHz, 33dB; below 70MHz, > 33dB (not measured). For a double-section filter typical figures are: 500MHz, 3·5dB; 144MHz, 30dB; 70MHz, 45dB; below 70MHz, > 45dB (not measured)."

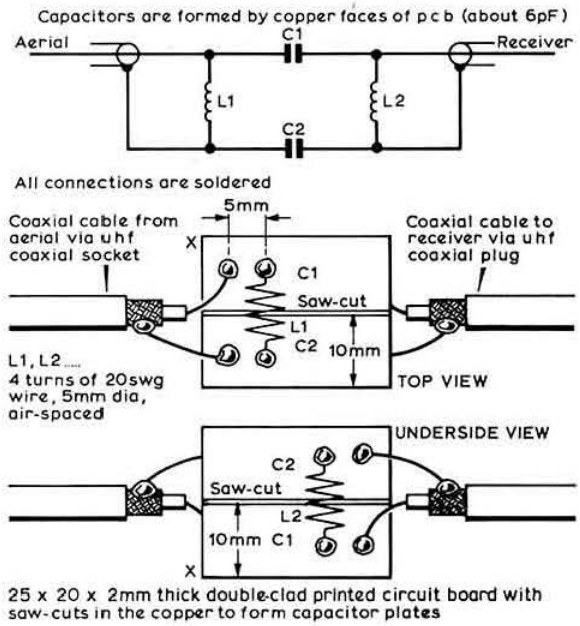


Fig 10. G3YOM's method of constructing uhf high-pass filters using double-sided copper laminate board. Single-section filter suitable for most cases of tvi

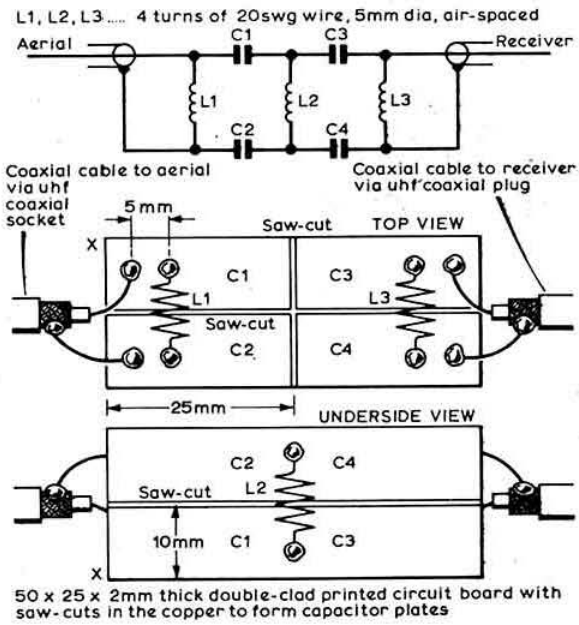


Fig 11. Double-section high-pass filter for the difficult cases

MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

Lost letter from PA0

In November I received a letter from a PA0 living near Amsterdam (by the name of Nick, I believe) requesting information on 3cm activity in the UK. Regrettably, I have since lost it. Please will he write again giving his address.

Nick, in reporting the local activity, said that there were enthusiastically searching for suitable high sites such as church steeples. *That's* Holland.

Klystrons for 3cm

Since last month's column on a waveguide mount for klystrons of the 723A/B type, GW4AMV and G3GWL have said that they have spares available together with associated bits and pieces. Other possible sources are G3KSU and G8PN. G2RY has two spare klystron mounts (presumably with klystrons) very similar to that described in the column.

Like many others, G3KSU is interested in obtaining a klystron or travelling wave tube at the 1W level or greater. When he wrote, it *was* about Christmas time! Does anyone know of a source?

23cm activity

G3JHM reports a steady growth in Friday evening activity on this band from the south coast. This started on 70cm but has gradually spread to the higher frequency. Much of the activity is with French stations including F3LP and F9XG (Le Havre), F1RJ (Trouville) and F8OD (Nantes).

The recent activities of G3JVL show what can be done on this band from a difficult site provided appropriate equipment is used. His aerial, 4 × 18-element Yagis, is a mere 36ft asl at Hayling Island, but his transmitter (30W from a 2C39A type) and receiver (NF of 4dB) are significantly more potent than the average station. Apart from French stations, G3JVL is able to work G3COJ (High Wycombe) regularly over a most difficult path, and has also worked G3LTF (Chelmsford) when a lift was around.

G8DIC (Portsmouth) is also active on this band only, using 400mW from a 2N5917 to 2 × 18-element Yagis at 90ft asl, and has had several contacts with F3LP. Other stations interested in 23cm in that area are G8EPJ (Bognor) G8BDJ (Brighton) and G8CFZ (Hastings).

Activity on 3cm

Since the October Microwave Contest, there has been a little activity on this band despite the discouraging weather. GW4AMV (Cardiff) reports that he is now using Gunn oscillator equipment similar to that described in the October column, but with an i.f. at 106MHz using a 40673 mosfet as the head amplifier. His best dx with GW3PPF is now 43 miles with at least 10dB in hand. This is just sufficient reserve to make the trip to Dartmoor and Prescelly a worthwhile gamble, and this is being planned.

As if to prove that this well-worn path is not *that* easy, it was tried again by an experienced group with proven 3cm equipment: the attempt failed due to dense fog at both ends. Now this type of hill-top operating on 3cm has certainly sharpened up amateurs' abilities in determining suitable paths, physically finding the sites and in pointing aerials in the right direction. But dense fog is a tantalising new ingredient with which we may have to cope. How does one find the way precisely to a site miles from anywhere and point aerials perhaps within a few degrees when visibility is down to a few yards? A nice armchair problem.

Starting off the new year in a proper way, G3KSU/P on St Catherines Hill on the Isle of Wight had good contacts with G2RY and G3VPF both /P at Hardy's Monument in Dorset, an 88km path. G2RY and G3KSU used 5–8mW Gunn oscillators to 27dB horns, while G3VPF used a 1W klystron to a 10dB horn. G3KSU is still looking for schedules with anyone prepared to make a line-of-sight path to the IoW. His earlier offer to calibrate microwave wavemeters is still open.

Finally, GM3DXJ has sent in a list of locals active on 3cm: GM3VBB (Balerno), GM3DXJ (Currie), GM4BHA (Edinburgh), GM3FYB (Dunfermline), with GM8BKE in Glasgow. GM3OXX is being reactivated, and there are half a dozen others interested but not yet active. Most stations use the "standard" design of a Gunn oscillator or small klystron feeding horns or small dishes, but there is a tendency to use Japanese portables tuning 110 to 170MHz as a tunable i.f.

Microwaves 1973

Last year again saw steady progress on the microwave bands with an expansion in the general level of activity rather than in significant technical advances. While we seem to be falling behind other countries in some areas, there is probably more activity on the microwave bands in the UK than in the rest of the world put together.

There were, however, a number of striking events during the year worth noting. I like to remember the G3BNL/G3EEZ expedition to Dartmoor/Prescelly early in the year in which during one morning they broke their existing UK records on 9cm and 6cm, and also picked up their Microwave Awards. This coming on top of their 21GHz world record established in the previous November, which now stands for all time, adds up to a fine achievement. Another fine achievement was that of G4BEL getting his Supreme Award for his activities on 2m, 70cm and 23cm. He and G3MCS are the only recipients so far.

I hope I am being detached in recalling the 3cm 183km contact reported in the September column. This was made using moderate power equipment operated at sea level and seems to acquire more significance as time passes.

Few, I think, would disagree about the microwave event of the year; the G8AZU/G8CKT 3cm contact over a 212km path from Snowdon to Cairnsmore of Fleet which well and truly beat the existing UK record of 154km. Few also would

*4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

disagree with the biggest non-event of the year: the refusal so far of the MPT to licence activity on our new 24GHz band.

What of 1974? My guess is that many will make a start on significantly increasing the power of their equipment. There is still a fair way to go: just using existing amateur techniques there is at least 30dB waiting to be picked up which could lead to some quite startling results. Where to make a start?

(*a*) Increase aerial gain. Doubling or trebling the size of dishes would pick up 12 or 18dB. Note that one 12ft diameter dish was in use in this year's VHF NFD, and dishes 10 to 20ft in diameter are not uncommon in the USA for both this band and 2,304MHz.

(*b*) Pick up at least 6dB on receiver noise factor by the use of a preamplifier, and another few decibels by mounting the preamplifier up the mast.

(*c*) Reduce the receiver bandwidth: either 1MHz to 10kHz or 10kHz to 100Hz is worth 20dB.

(*d*) Increase transmitter power: 50W on 1,296 and 100mW to 1W on 3cm ought to be a target and would pick up a further 10–20dB.

(*e*) Operating techniques: you name it.

The other point that should be made is that the biggest factor limiting microwave activity is simply lack of information. May I make my annual plea to those developing equipment to pass on their information, bearing in mind that what may be obvious and straightforward to them is just what *somebody* is looking for.

EQUIPMENT REVIEW

by R. F. STEVENS, G2BVN

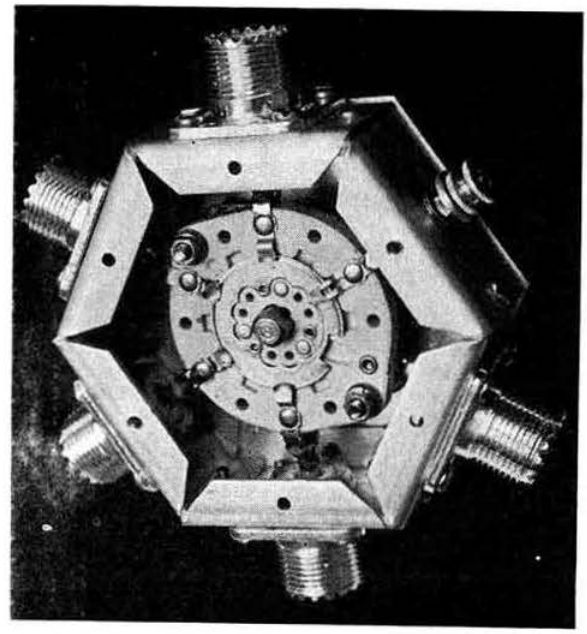
Heathkit coaxial switch HD-1234

THIS switch is designed to select one of several aerials for connection to a receiver, or to switch a transmitter to various aerials or a dummy load. There is provision for up to four aerials, with an additional socket for equipment input. A screw terminal accepts an earth connection which should be made to a low resistance source other than the mains earth. The switch automatically earths the unused connectors. One switch may be used in conjunction with a single piece of equipment while two switches will enable both equipment and aerials to be selected.

Specification

SWR (to 250MHz)	1 : 1·1 maximum
Power capability	1,000W (2,000 p.e.p.) maximum
Weight	8oz
Case	3in diameter, 1⅛in deep
Function	single-pole, four-way with automatic earthing

Obtainable from Heath (Gloucester) Ltd, Bristol Road, Gloucester, GL2 6EE, price £6.60 (inc vat) plus 35p carriage



Internal view of the coaxial switch. A mounting strip (supplied) may be fixed to the rear cover plate

Assembly of the unit was a simple matter, with the instruction booklet giving all necessary guidance. The time taken should not normally exceed 45min. The sockets are designed to accept the type UHF plugs which are of a nominal 50Ω impedance and suitable for use up to at least 200MHz. The switch specification states a power capability of 1,000W (2,000W p.e.p.) maximum, while the plug/socket series specification gives a peak working voltage of 500. Line discontinuity is noticeable, but acceptable, when using the switch at 144MHz.

At first sight a coaxial switch seemed to be an unusual item to include in the range of Heathkits; however, the excellent quality and economical price should make this an attractive proposition for a number of applications.

New product

Metrum II equipment

Modar Electronics Inc, a subsidiary of Motorola Inc, has entered the USA amateur radio market with the introduction of the Metrum II operating in the 144–148 (USA) band. This is a completely solid-state unit with 12-channel capability and there are versions with outputs of 10W or 25W. Both incorporate a low power output of 1W as a switchable facility. All units include built-in aerial mismatch protection and safeguards against reverse polarity connection. There are several optional accessories which can be used with this unit. Further information can be obtained from: Modar Electronics Inc, 2100 N Meacham Road, Schaumberg, Ill 60172, USA.

FOUR METRES AND DOWN

by JACK HUM, G5UM*

More about A3J on 432

Of course it always *has* been possible and permissible to use ssb in 70cm contests, but few people did because few people had it. Not until this year was it considered to be worth while organizing an ssb contest for 432MHz: last month's event, therefore, was in a sense historical, and it bore out much of what was said on this subject here last month.

It did something else: it vindicated the value of putting dx modes at the bottom end of the band, giving cw operators a chance to work the sidebanders and the sidebanders a chance to collect extra points from the key-men. See Rule 9 (c) last month (and for that matter re-read *all* the vhf contest rules for 1974: there are several mods).

Outside the contest arena (though both of them were in it last month) G8AGU in Devon and G3ZYC in Derbyshire have been demonstrating the remarkable talk power which 70cm sideband enjoys, by keeping a schedule on 432·15MHz most evenings at 2215gmt, well worth checking by other operators on the route as an indication of propagation characteristics. Each uses a fair amount of erp, but the 'ZYC signal even with 10W has been RS52 down in Devon.

Which brings us by easy stages to the latest 432MHz Cumulatives of which the first session occurred on 5 February, with six to go (again, rules last month). What is quite evident is that if your 70cm i.f. strip has no bfo, get one fitted soon, or you will miss out on the ssb dx which will probably be calling you during these periods of enhanced 70cm activity.

Another "seventy centimentalist" who will change to 23cm at short notice is G8BDJ of Southwick, Sussex. Look for him on Mondays and Fridays after 8pm on 70cm—but he says that being at sea level he finds F3LP easier to work than G on 23cm.

. . . and on 2m

Using 100W when 10W will adequately sustain communication is a waste of 90W, socially unnecessary in a fuel-hungry world, and electronically unnecessary when high-gain beams give most operators all the erp they need for most of the time.

For the majority of 2m sideband men, content with the 10W norm which seems to have become established, these words need no underlining. Example: while Christmas-holidaying in Pembrokeshire, Alan Webb set up GW8FQE/M feeding a Liner 2 into a 4-el mounted on the car roof rack in an attempt to work back home to the Midlands where G3SVT/M was waiting near Coventry. Reports were RS54 both ways. Later a link was established to G3SVT at his home QTH, and GW3KGD also joined in from Haverfordwest to make it a three way (all Liner 2s): QRB 145 miles.

Now the other side of the coin, exhibited by G8FEV, who writes: "One of the things that worries me very much about 2m is the use of excessive power by many ssb operators. Are some people daft? The various blasting matches (especially from the Surrey hills) exemplify childish, pointless behaviour many of us thought was confined to the hf bands. It reflects badly on the rest of us who try (however ineptly) to use our available erp within the limits of the International Radio Regulations and hence the licence. High power is sometimes necessary but anyone using 400W to work 10 or even 50 miles is probably verging on criminality. In fact, it may be timely to remind members that the licence schedule limits output on 2m A3J to 400W pep *under linear conditions*. It is illegal to exceed this."

Strong words, but words which in the opinion of many observers of the 145MHz sideband scene certainly needed to be said.

Pings and things

The Geminids meteor shower, processing regularly into the earth's atmosphere every mid-December, produce the highest potential return rate from earthlings trying to work vhf dx by means of its aid. And many of them were lying in wait as the Geminids came round in December of 1973.

But were the Geminids late in their 1973 appearance? The query comes from G8FEV and is substantiated by the fact that GB3ANG was producing good pings on 16 December, two days after the predicted peak rate. On 11 and 12 December Chris Bartram nearly made it with F1AUQ in Dijon on 145·36 with sideband, the Frenchman being identifiable on both days, but sadly no final "roger" received.

Bradford's G8DNK, encouraged by good bursts from OH5NW and SM7FJE during the earlier Orionids, set up the A3J transmitter on 145·35 to attempt to clinch it with the Finn. On 13 December the final "Roger, I get you 45" came through on a good burst maximizing at S8. Next day the OH was just audible, but no contact developed. Both stations run a pair of 4CX250B into a 14-el at the Bradford end and four 11-el at the OH end. And the QRB? No less than 1,200 miles (yes, we are talking about 2m!).

From Cardiff the 500W erp at GW3NJW completed a fine ms contact with SM5LE in 55min from an aerial only 25ft asl, but frustratingly near-missed DL7QY by no more than the final "R" required to record a complete via meteor QSO. Clive Whelan reports back-scatter effects from G3LTF when Peter Blair was sending "25" to UT5DL. Another phenomenon: during the tests with DL7QY a good ms burst occurred when the beam was aimed 45° off the great circle path. "Perhaps we should try these off-beat paths more often," surmises 'NJW.

Farther along the South Wales coast, GW3ZTH was another who raised SM5LE plus SM5AII for good measure (both Stockholm). Joe Ludlow planned skeds with SM7AED and SP2DX (Gdansk) during the late December Ursids (about eight times more difficult than the Geminids), and copied parts of the former's cw but no sign of the SP, with a follow on during the Quadrantids of early January.

The Quadrantids did indeed turn up trumps for both 'ZTH (he worked UT5DL on 4 January) and 'NJW, who on

* Houghton-on-the-Hill, Leicester LE7 9JJ.

3 January had a marathon with EA4AO (Madrid) from 0100 and a final satisfying "RRR" at 0422gmt, plus for good measure DL7QY (Berlin) after 15 previous frustratingly nil schedules. That same evening 'ZTH also made it with the DL, who was at S9 on some bursts. Unlike G8FEV Clive Whelan noted an *early* arrival for the Geminids, with the peak possibly as early as 11 December.

Noting last month's piece by G3WZT on ms keying speeds related to audio tone received, 'NJW recommends the use of a receiver with a variable frequency bfo in contrast to the conventional ssb receiving procedure, or alternatively one of the Drake series with variable bandpass about a fixed bfo: he uses a 2B or 4B, but because the FR500 transceives with the main FL500 exciter he tends to use this most, audio tone at 750Hz.

Convinced that keying speed requirements for ms are over-stressed, Clive Whelan remarks that generally bursts are sufficiently long that the difference between the slowest operator at 30 words/min and another at 60 words/min is almost insignificant—and few can take 60 even under good conditions.

Now for the GW3ZTH/UT5DL first-ever on 4 January: the contact was the fruit of 10 previous attempts by meteor scatter, and lasted from 0300 to 0435gmt across a QRB of 1,863km from Bridgend to Uszgorod in the western Ukraine. It was monitored by DL7QY who went on to work the Russian himself.

Joe Ludlow asks if this was the first GW-to-USSR contact on 2m. He may also hold the first GW-to-Italy record, if what I4BER tells him is right, in respect of their contact on 21 October last. Any other claimants?

* * *

From meteors to eme: we learn from W6FZJ that the G3LTF signals on 432 were heard by him in California during the December tests. "He has a good eme signal for a 16ft dish," says Joe Reisert, adding that he would be interested to hear from other European operators keen to try for this kind of super-dx, and will be glad to send a list of "requirements necessary to do eme work". QTH is 2614 Media Way, San Jose, Calif 95125.

"What kind of people . . .", again

Well, what, after all, is wrong with talking over the air about cars, and life in general, with an occasional interjection of humour? (See *FMD* last month.) "The licensing conditions are so prohibitive that they remove a lot of subjects from the amateur bands which would be the subject of normal interesting discussion," says G3VMB. Left with a choice of subjects the amateur must choose technical matters related to radio (not easy when "most amateurs are singularly non-technical") or pick a subject of interest to both parties in a QSO.

G3VMB has some strong words to say about the monologue-mongers—and we have all met them: "To hear some of the amateur fraternity spending their evenings engaged in a series of 15min monologues in an attempt to clarify their own meagre technical knowledge to their own satisfaction —and self-righteously at that—I am surprised we still have licences at all. It is not even communication, which by definition is the two-way process for which we are licensed."

Coming back to fatuities heard on 2m, mentioned here when this discussion started in November, G3UBX has

Two thirds of the Swedish ms menage: left, Birgit Nillson, SM7DBI, with OM Arne, SM7AED. Their son Bo is SM7FJE. Outside, a 60ft lattice tower supports four 10-el Skybeams: above them a 70cm array will appear soon to allow the team's frequent ms contacts on 2m with the UK to be supplemented by attempts with "the next band up"

"K somebody please" as his pet inanity. "It gives me the almost irresistible temptation to reply to the station with K-K-K-K-K!"

Repeater plans

For members who may have missed hearing the GB2RS broadcasts about 2m repeater applications, here is the situation at the time of writing:

South Wales: proposal approved by MPT and callsign GB3BC allocated. Should be on-air when local organizational jobs completed.

Mid Severn Valley. Repeater Group proposal is with MPT, as are proposals from London FM Group for a repeater at **BBC Crystal Palace** and Southern FM Group for one in **Hampshire.**

Five other groups, including two in Scotland and one in GI, have made enquiries with the VHF Committee about repeater planning needs. The response to any repeater proposal must be: What is the justification locally for a repeater beacon? (it may well be topographical), and; Do facilities exist to guarantee the same kind of reliability that the beacons provide (plus of course immediate switch-off capability)?

. . . and beacons

By now GB3VHF, the beacon daddy of them all and successor to GB3IGY of the International Geophysical Year of the 'fifties, should have moved to its new frequency of 144·15MHz in accordance with the revised bandplan that puts dx modes at the bottom end of 2m. Watch this space (and GB2RS) for the news of planned QSY for the rest of the chain.

Further to our remark about " . . . the kind of reliability that beacons provide", we learn that when GB3DM was taken out of service for a couple of weeks for overhaul at the end of 1973 it had done 28,000 hours on-air radiating without a fault. Its keyer will actuate the companion 70cm beacon when this goes on the air (soon, we trust) with 5W into the aerial. Both senders are all solid state.

Oscar newsletter planned

To keep through-Oscar operators updated with current information, G3WPO, in conjunction with G3IOR (who is the European AMSAT news bulletin station), plans to provide a newsletter service at an interval of approximately two months. The newsletter will contain information about new launches (eg Oscar 7), predictions, satellite status, operating methods and other relevant details to the limit of the available paper.

Tony Bailey, G3WPO, 5 Erin Way, Burgess Hill, Sussex RH15 9PN, invites all interested to lodge with him half a dozen stamped addressed envelopes of 9 by 4in size. He hopes the first bulletin will reach operators early in February.

Tech corner

From G3WSN (Keith Fisher, Great Baddow, Essex)

Noticing further comments in *FMD* about keying speeds for ms operation, I feel that the circuit used at G3WSN for ms keying using tape recorder input may be of interest.

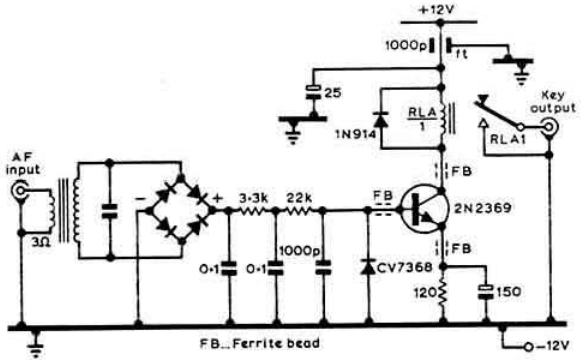


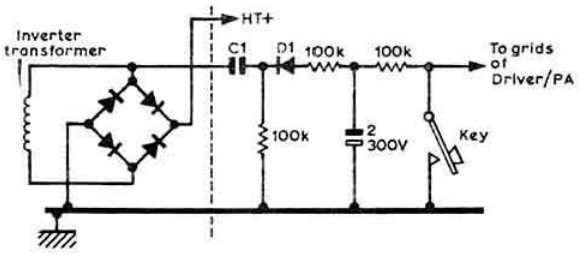
Fig 1. Circuit diagram of the keyer unit built by G3WSN for ms operation. The CV7368 is a 6.8V zener diode, and RLA1 is a small plastic 700Ω relay

The circuitry must be contained within a good screened box, and screened leads used for the af input and key output. Audio is fed in at the 3Ω position shown on the diagram, stepped up by any old output transformer the constructor may have around, and dc produced by the four diodes. This is filtered for rf and shaped by the following CR network to provide good clean switching. The dc is fed to the base of the 2N2369 via a 22kΩ resistor so that the impedance to the base is high. The base is prevented from going above 6·8V by the zener diode (to protect the transistor).

Once the system is running, the keying shape may be adjusted for best sound by regulating the af level. At G3WSN this information is recorded on tape at half speed and played at double speed to give the 40-50 words/min required for ms transmission at 144MHz.

From G3LVP (Ken Eastty of Benfleet)

I do not agree with the arguments that ex-commercial vehicle transmitters have disadvantages for amateur applications. Most of them are probably better than home-constructed ones, and they are of course subject to type approval testing before they can be sold. And many of those offered at quite reasonable prices by *Radio Communication*



advertisers even have output filters after the pa. How many home-built ones can claim this?

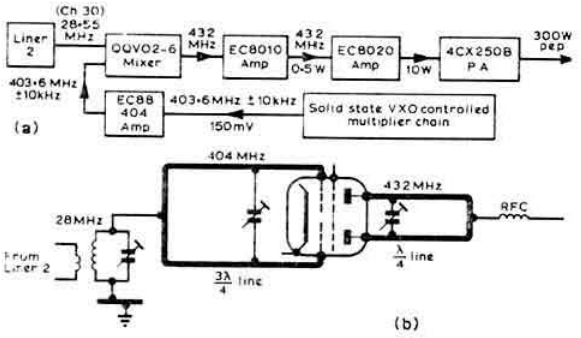
When these ex-vehicle transmitters are adapted for the 4m band it is important that the cw facility should be added, which naturally they do not have. Bias protection for the pa which then becomes necessary can be provided by the circuit shown here. The value of C1 depends on the voltage and frequency delivered by the inverter (typically it could be 0·002 at 600V rating), while D1 needs to be rated at 400V piv.

While on the subject of 4m, one deduces from page 14.3 of the *Radio Communication Handbook* that on "receive" a 70MHz beam has a 6dB (power) gain over a beam with the same basic-gain-compared-with-a-dipole at 144MHz, due to the larger capture area of the 4m beam.

From G8AGU (Paul Widger, S. Molton, Devon)

I was interested to read (*FMD* December) the comment by G3ZOD about transverting commercial ssb rigs to 70cm. I have got going on 70cm by taking the output of a Liner 2 on 28MHz and mixing with 404MHz, as shown in the block diagram.

The multiplier chain starts with a surplus 8409kHz crystal, double-tuned circuits throughout and a trough line filter at 403·6MHz. Output is 150mV into 50Ω. The grids of the QQV02/6 are driven with both 404 and 28MHz. Attempts to inject 404MHz at the screen were unsuccessful. The hot end of the 28MHz input inductor goes to the centre tap of the 404MHz three-quarter-wave lines to the 2/6, and the 404MHz is coupled in with a loop. Cathode bias is provided by a 200Ω decoupled resistor.

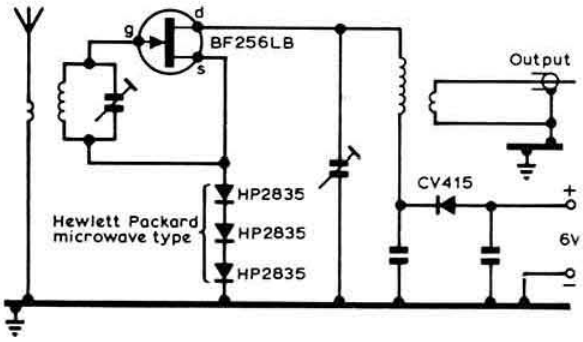


The design may seem odd in the day of the transistor, but I have tried several transistor mixers with little success.

For receive there is no difficulty in adapting a converter to feed a Liner 2 at 28MHz for transceive operating. The

28MHz can be extracted from the Liner 2 in two ways: the feed to the final mixer may be broken completely so that the whole 28MHz output is available for 70cm, the supply to the Liner 2 vxo being broken to prevent 2m operation when 70cm alone is desired; alternatively, a 4·7kΩ resistor at the 28MHz output point on the main pcb to a miniature coaxial socket on the back of the Liner 2 will allow 28MHz to be taken out at low level—as before, switch off the Liner 2 vxo to prevent output at 2m.

From G3IPV (Peter Haylett, Bacton-on-Sea, Norfolk)
Further to the writer's item about 2m front ends (Tech Corner, December), a "final and ultimate" version with a different arrangement of diodes has now been developed and is illustrated in the accompanying diagram. The three diodes are Hewlett Packard microwave devices. The advantage of this diode-decoupled/diode neutralized rf stage is that it is broad band and holds its neutralization over a wide vhf spectrum. Supply volts are kept down to 6V. Above this the circuit will oscillate in the mf part of the spectrum. My version does oscillate when the aerial is disconnected.



FMD Certificates away to . . .

. . . one of the UK's senior radio societies, the City of Belfast YMCA Radio Club, who put GI6YM/P on a couple of different sites in Co Antrim to secure 144MHz Certificate No 372, which, says hon sec GI8EWM, they particularly wanted to do in 1973: it was the club's Golden Jubilee Year. To Peter Barville at his new QTH in Bucks went No 373 for the G3XJS radio room. And at Northampton G8GHZ garnered the needful five-plus-30 in only eight months ("Does anyone collect for WAB?" asks Stephen Purser. He would like to hear from anybody interested in reactivating the WAB net on 145·45).

In the 432MHz Transmitting bracket G3JXN won his No 101 by the use of an 8-over-8 fixed NW. The rare dx of PA, GW and ON were worked using the 2m beam! Soon the Multibeam will be aloft with a 23cm job above that, which ought to put John Tindle among the 1,296MHz claimants in due course. To Brian Robertson in Cambridgeshire consecutive Nos 102 and 103 go on behalf of G3TTV and G3TTV/P.

Here and there

It is G4ALN not G4ACN who is organizing "the last foray to Rutland" on 30-31 March (sorry for the error last month, and hope G4ACN has not been inundated with sked-spot requests). If you have never worked RD on 427-plus-23, this will be your last chance. So contact 'ALN instanter.

"It's like tasting forbidden fruit," murmured G4BGZ as he joined a seven-way on 4m on 19 December. He was one of a score of Channel 4/5 residents who kept off 4m when video was on, but can now use the band while the 2230 gmt television close-down continues. Now "Wednesday night is 4m night" in all hitherto affected areas.

G3WW thanks all who responded to his request via this page for info about slow scan television on 2m. As a result an immense amount of sstv technicalia has been exchanged between many members. If interested in the mode look for G3WW, G2BAR *et al* on the sstv net 145·468MHz.

"The Sheffield Contest 1974" takes place on 21 February, 0900-1200 gmt. The Sheffield ARC offers attractive parchments to stations outside the city who work their members on 2m, and also to listening men. Send sae to G3PHO, 39 St Albans Road, Sheffield S10 4DN, for a copy of the rules.

More sked-offers for 23cm men. Saturday and Sunday forays to high spots around Sheffield are planned by G3WXI and G4AGQ for the next several weekends, talkback on 70·26 and 145MHz, and a G8AZM tripler on 1,297MHz nominal.

Birmingham's G8AYY asked RSW Electronics of Solihull to make him up a 432MHz high-Q break as per the *VHF/UHF Manual*, and following successful tests he recommended that they make a batch for sale. Now they have: will be marketed through Mark Equipment soon (watch advertisement spaces).

The last Mirabel balloon flight from France on 28 October gave QSOs to G3LTF via the 432—144 translater, and fleeting signals were logged from believed-G2AUD and a GM8H??, we are told by F6APU.

What they say

". . . . heartily support efforts to promote 70MHz activity after 1030pm Wednesday nights. Will be happy to arrange skeds on this band or 70cm at this time or early evenings"—G3BA.

"Perhaps a move towards the operating standards set on 80m might improve vhf"—G3VMB.

"Looking at the new bandplan I was surprised to see the absence of a cw calling channel on 2m . . . would suggest 144·025MHz so that people can easily set frequencies precisely with the 25kHz markers now popular"—G4CDF.

"Although I can copy solid 40 words/min on paper and 60 words/min in my head it requires a good signal and no QRM. With a half-second meteor scatter burst at plus 10dB above noise and rapid fading it is altogether a different matter, especially at 0300 when the grey matter is a little viscous!"—GW3NJW.

25 Years Back

"The Aurora Effect is well known to workers on the 60Mc/s band, and when it is present all signals irrespective of their true bearing appear to originate from a northerly direction. So far, no observations of this effect have been made on 144Mc/s, and it has been stated in American publications that it does not extend to so high a frequency."
From "Around the VHFs" by G2UJ. *RSGB Bulletin*, **February 1949.**

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

THE new ARRL 10m Contest which took place in December, and the Ten-Ten QSO party (mentioned later) mark the beginning of a very desirable trend to try to encourage the use of the 28MHz band. At most times it is possible to tune across the entire 1,700kHz allocation without detecting trace of an amateur signal. At the same time, listening on the lower frequency bands reveals local and semi-local contacts taking place under diabolically uncomfortable conditions with endless interference from non-amateur signals. Why the all-too-wide-open spaces of the 10m band are not being used as a more pleasant alternative escapes the writer's logic. Arguments in favour of increased amateur allocations would also be strengthened if we could show that we were fully using those we already have.

Top Band news

An error under this heading in October has been pointed out by Arthur, VK3CZ. His own frequency is usually 1,802·5kHz and he uses 1,825kHz in the "dx-window" when working into the USA. Arthur has found conditions to be much inferior to last season, with even DHJ much below strength most days, but he contacted EI8H on 22 December and heard GM3UPK and G3ZEM at RST559 on the same day.

A later letter from VK3CZ reports excellent conditions on 30 December when he contacted EI8H, G3s XVY, YUV and ZEM, and OK1ATP—the G stations being received at RST 579!

Congratulations to W1BB on working his 116th country on 1·8MHz. This was during the ARRL 160 contest when he contacted 4X4NJ. The latter also contacted PY1RO and heard KV4FZ and WA2WLN/2. Riki then developed trouble with his transmitter and was unable to continue; however, the Israeli authorities have given him permission to operate during tests in the future.

DX news

It is reported that the Ministry of Communications in Athens has said that it knows nothing of any station licensed to use the call SY5MA and has not issued such a call. The USA embassy has confirmed that only the SV0 prefix is allocated to USA personnel and from W4KA, SY5MA's QSL manager, comes news that the latter has closed down because of the unstable conditions. All contacts will be confirmed but there are no logs previous to 25 October and any contacts made before were with a pirate. Bill, SY5MA, is returning to the USA.

New prefix allocations by ITU include P2A-P2Z, which is now being used by former VK9s in Papua New Guinea, and S6A-S6Z which has been given to Singapore.

The C31CQ who asked for QSLs via W2OEH is not known by the latter, and GW3AHN wishes it to be known that he is not QSL manager for HC0HM. W6ANN has given up trying to deal with QSL requests on behalf of YJ8GH as he has never received any logs.

French personnel in Germany were allowed to use the prefixes DA20 and DL50 from 15 November to 15 December last to celebrate the 50th anniversary of transatlantic radio. Philippine stations used the DX prefix instead of DU between 26 November and 2 December—this to mark the 41st anniversary of the PARA. 4D50BSP was also in the Philippines and operated from the Mt Makiling Boy Scouts Reservation Golden Jubilee celebrations between 28 December and 4 January. Prefixes in the JG series are now being used in Japan.

VK0DM should now have replaced VK0WW on Macquarie Is. FB8WA is a new operator on Crozet Is and has a TR4 and beam aerial. He has been reported on 14 and 21MHz and it is believed that the use of French is needed to make contact with him.

W5QBM will be living in Grenada (VP2G) for about a year and his QSLs will be dispatched by W5MYA. WB2VUO will be in Chagos for a year and will probably operate as /VQ9 on 14, 21 and 28MHz. He hopes to use the lf bands later. 3D6AZ is new on the air from Swaziland and was formerly 3B8CZ, he has an NCX5 transceiver and Classic 33 beam. 7P8AY was formerly ZD3D. 9G1AR may visit Mali this spring and hopes to obtain a TZ call. Another visitor to that country is HB9TZ who will be there during January and February, and again in August. He has an SR150 and two-element beam and may be more active during his second visit—14,002 and 14,028kHz have been mentioned as possible favourite frequencies. Those needing a contact with Upper Volta could try listening for XT2AE who stands by for Europeans each Friday at 1700 on 14,310kHz.

Some of the operators who visited Farquhar Is in October are considering a trip to Desroches Is in July, and 3B8DL is reported to be interested in making an expedition to Rodrigues Is (3B9) but at present is lacking suitable equipment.

WA5ZWC is now acting as QSL manager for EL4D, HL9WI, FO8DF and 3B8DL.

A number of Russian amateurs operated as 4L0K during December and early January from some of the New Siberian Islands. This was to commemorate the 70th anniversary of Ernst Krenkel's (RAEM) birth. 4L8A was on the air from Turkoman (UH8) during the cw section of the CQ WW DX Contest.

XW8FB has closed down and returned to the USA, but he has left his aerials for use by XW8EO on 7 and 3·5MHz. 4W1GM was formerly SV0WUU.

WA4WTG is able to provide QSL cards for contacts with TJ1BF during 1972 and up to March 1973. It seems that there is another user of the call who gives his name as Peter, and WA4WTG is unable to help with these contacts. W1JFL has received logs from A51PN for the period 12 August to 6 September 1973, but the others covering the period April to early November are still in the mail.

* 10 Knightlow Road, Birmingham B17 8QB

The much rumoured visit of WB5BID to Bouvet Is during February 1974 will not be materializing as no transport is available. VP8MH has left South Orkney and his replacement does not hold an amateur licence. Mike Harris, G3VUI, is now on Argentine Is but his callsign was not known at the time of writing.

Readers will be sorry to know that Dick Spenceley, KV4AA, has suffered a heart attack and has had a spell in hospital. Dick was closely involved in the exploits of Danny Weil, VP2VB, some years ago.

DXCC

Official Bulletin no 461 from ARRL contains the information that the investigation into the dxpedition to Mellish Reef by VK4FJ/Mellish and VK9JW has been concluded, and that DXCC credits will be given for both operations. QSLs will be accepted starting 1 April 1974.

Dxpeditions

The A55KV operation from Bhutan, due to take place in January, was delayed and may now materialize during February or March.

W6LUV will be on British Phoenix Is for two months commencing 7 January and hopes to use his VR1PD call on all bands including 3·5MHz.

The Bajo Nuevo expedition which should have taken place at Christmas may now take place around Easter or in June.

ZF1BR will be operated by W9ABA for about two weeks commencing about 24 February. All bands 3·5 to 28MHz will be used, ssb only.

WAC

West Coast DX Bulletin notes that in 1969 Lloyd Calvin, W6KG, recorded a six-minute WAC while working from 5L2KG. A plaque, to be donated by Jacques Bonet, will be awarded to anyone who can produce a new world record during 1974. The feat must be confirmed by two other amateurs and applications submitted to *West Coast DX Bulletin*, 77 Coleman Drive, San Rafael, Cal, 94901, USA.

Morokulien

Morokulien is a fictitious country on the border between Norway and Sweden, established in 1959 during International Refugee Year in connection with a series of radio and television programmes promoting contributions to various charity funds. Stamps of both nations are sold in Morokulien, and among other leisure facilities is an amateur station which has the callsigns SJ9WL and LG5LG. The cottage in which this is located may be rented by any licensed amateur—it has four beds, well-furnished kitchen, and a large radio room. The station is run by ARIM (N-2242 Morokulien, Norway, or S-67044 Morokulien, Sweden), and certificates of "citizenship" may be ordered by mail and cost N.Kr 25 or Sw.Kr. 20—these are in Norwegian, Swedish or English. Note that the SJ9 prefix is unique and that the old SK9WL call is now obsolete, QSLs for both calls may be obtained from the SSA QSL Bureau. Three IRCs should be sent for QSL via the bureau, four for surface mail, and five for airmail reply. Surplus IRCs go to the SM5WL fund for handicapped radio amateurs. Cards for LG5LG contacts go to LA4YF accompanied by a similar number of IRCs.

The chairman of ARIM, LA2ZN, Ulf A. Strandberg, operating the Morokulien rig

Contests

The 1974 WAB Contests

HF phone (10 March), HF cw (24 March)—14, 21 and 28MHz.

LF phone (7 April), LF cw (14 April)—1·8, 3·5 and 7MHz.

Each contest lasts from 0900 to 2100. Each contact counts five points and stations may be contacted once on each band. The multiplier is the number of different WAB areas plus DXCC countries contacted—each is counted only once. Note that all British prefixes count as one "country" for UK competititors. Overseas entrants use only WAB areas as multiplier. Exchanges consist of RS/T plus serial QSO number (starting from 001) followed by WAB area and county. In the lower frequency contests, owners of WAB books should also give their book number. Overseas entrants should give RS/T and serial number

The Ten-Ten Net QSO Party

0000 9 February to 2400 10 February.

This is the annual QSO party organised by the Ten-Ten International Net of Southern California. The net's monitoring frequency is 28,800kHz. No details of scoring are available at the time of going to print but logs go to Grace Dunlop, K5MRU, Box 445, La Feria, Texas, 78559, USA, before 15 March. Certificates are promised to 11 continental leaders and sub-continental leaders throughout the world.

The Sheffield Contest 1974

0900 to 1200 21 February.

3·5 and 144MHz bands *only*. Operation limited to one band. Object is to contact as many Sheffield stations as possible and each non-Sheffield entrant gains two points for each contact unless it is with a new postal district which counts five. Contacts with mobile or portable stations count one extra point. Exchanges consist of RS/T, serial QSO number (from 001) and QTH (including county). Sheffield stations will give the first half of their postal code. Single-operator entries only and stations may only be worked once. Activity on 3·5MHz will be confined to the 3,650–3,750kHz section of the band to reduce interference to other users. Logs should indicate time, station worked, number sent, number received, points claimed. New postal districts should be underlined. Logs should reach G3PHO, 39 St Albans Road, Sheffield S10 4DN,

no later than 29 March. Listeners may also take part. Full rule sheets may be obtained from G3PHO (sae, please).

The World SSTV Contest

1500 to 2200 9 February and 0700 to 1400 10 February. SSTV contacts only, 3·5–28MHz. Exchange signal report and serial QSO number. One point for each contact except those on 28MHz which count two points. Multiplier is five for each continent, two for each DXCC country and one for each W and VE call area contacted on each band. Include summary sheet and station details with logs, which should reach Prof Franco Fanti, Via A. Dallolio n. 19, 40139 Bologna, Italy, before 21 March.

The Bermuda Contests

0001 20 April to 0200 21 April (phone).
0001 4 May to 0200 5 May (cw).
Full details of this contest will be given later but G3RZI (QTHR) kindly offers to supply information to anyone requiring it (sae, please).

Mick Moss, G3RZI, left, and Gordon Brown of G3SSO, winners of last year's Bermuda Contest, pictured in Bermuda when they received their prizes

Awards

A number of changes have been announced in the requirements for some DARC awards. For the **EU Diploma** East Germany and Mt Athos have been added to the list of eligible countries. The same has happened in the case of the WAE Award, and in addition GC has been split into GC (Guernsey) and GC (Jersey). Henceforth 4U1 will count separately from HB9, and OJ0 (Market Reef) is added. UA2 (Kaliningrad) now counts separately from UA1/3/4/6. Trieste and Saar have been deleted. This now makes the total of countries in the WAE list 66. DL3RK has informed G5GH that new lists are being printed. Note that there are no date limitations on the changes except where the award rules apply.

The CQ CA Award

This is given for proof of contact with a minimum of 500 USA countries. There are no date limitations. A special record book is needed for this award and is obtainable from *CQ Magazine*, 14 Vanderventer Av, Port Washington, LI, NY, 11050, USA, price $1.25 or 11 IRCs. Completed applications (without QSL cards) should be sent with eight IRCs to Ed Hopper, W2GT, Postbox 73, Rochelle Park, NJ, 07662, USA. County identities are determined by the official USA publication POD26. In addition to the basic award, seals are given for 1,000, 1,500, 2,000, 2,500 and 3,000 counties confirmed, and a special all counties plaque for having all 3,079! The certificate is most attractive is appearance and in your scribe's opinion the preparation of the application is not as daunting as would appear at first glance.

Bristol Activity Award

Please note that applications for this certificate should now be sent to the Award Manager, E. C. Halliday, G3JMY, 4 Parkside Ave, Winterbourne, Bristol BS17 1LU, accompanied by six IRCs, $1 or 30p. Requirements are contacts with all Bristol postal districts (B1 to B20) since December 31 1972. To date 18 have been won, 14 in Bristol, three in the UK and one by VP8FL. There is no time limit (see *Radio Communication* December 1972, page 826).

The WAVO Award

Revised rules for this certificate have just arrived from VO1FG. It is now available to amateurs resident outside VO1/VO2 who have proof of contact with 40 stations in the province, including at least one in Labrador, VO2, since 1 June 1946. Log entries, certified by an executive of a recognized club, or two licensed amateurs, should be submitted and list call of station worked, date, time, band, mode and reports given and received. No endorsements are available. Applications go to VO1FG, Awards Chairman, PO Box 501, Carbonear, Nfd, A0A, 1TO, Canada. Note that these requirements become effective on 1 July 1974.

The Arabian Knights Award

G5GH reports that the requirements for this have also been changed. It is necessary to submit QSLs for contacts made since 1 January 1971 with 10 Arab countries one of which must be with JY1, JY1/B or JY2. The other countries are: CN (Morocco), HZ (Saudi Arabia), 7Z (Saudi Arabia), MP4B (Bahrain), MP4D (Das), MP4M (Muscat & Oman),

QTH Corner

AP2MR	via HB9MX, K. Bindschedler, Strahleggweg 28, CH 8400, Winterthur, ZH, Switzerland.
AP2ZR	Zubair Ahmed Rajput, c/o R. M. Iqbal Bros & Co, Saharan Rd, Chiniot, Pakistan.
CR3AH	Box 200, Bissau, Portuguese Guinea.
EL7F	via DK5BH, Tidemannstr. 13, 282 Bremen-Grohn, Germany.
FB8WA	via F5QE, 14 Rue des Lys, 78 Neauphie-Le-Chateau, France.
FB8ZB	via F8US, 28 Rue Des Poilus, 78 Mesnil-Le-Roi, France.
FH8CI	BP 7, Dzaoudzi, Mayotte, Comoro Is.
GM3ZBG	G. A. Moorfield, c/o Jaguar Flight Simulator Sqd'n, RAF Lossiemouth, Morayshire.
HH2WF	via WA2JDT, 59 Buttonwood Drive, Prin, NJ, 08859, USA.
VE3AII/SU	via VE1AL, 200 Willett St-Apt 525, Halifax, NS, Canada.
TA2QR	via DJ0JO, Schellingstr 58, 8000 Muenchen 13, Germany.
VK9XX	PO Box 21, Christmas Is, Indian Ocean.
WB2KEA/VP7 **WB2KLL/VP7**	via WA1HAA, 238 Slater St, Attleboro, Mass, 02703, USA.
WJ5SKY	Johnson Space Centre ARC, NASA, Houston, Texas, 77058, USA.
YJ8DE	PO Box 56, Vila, New Hebrides.
ZF1AG	via K8SWW, 860 S Main St, Milford, Mich, 48042, USA.
ZF1TW	via WB2JYM, 699 Linden Avenue, Teaneck, NJ, 07666, USA.
ZK1CU	P. J. Martin, ZL2BAG, Palmer Rd, RD 29, Kapanga, New Zealand.
3D6AZ	D. Mather, Box 626, Manzini, Swaziland.
4C5AA	via W2GHK, PO Box 7388, Newark, NJ, 07107, USA.
4W1GM	via W3HNK, Box 14, Norwood, Pa, 19074, USA.
4W1PM	via IT9AF, Via G Garibaldi 490, 95045 Misterbianco CT, Sicily.
8R1CB	via W2MIG, 47 Palisade Rd, Elizabeth, NJ, 07208, USA.
9G1GG	via WA2MVQ, 404 O'Brien Ct, Wyckoff, NJ, 07481, USA.
9H3M	via G3CDK, 153 Boundary Rd, Wallington, Surrey.
9L1JT	via G3SGK, 13 Earls Terrace, London, W8 6LP.

RSGB QSL Bureau, G2MI, Bromley, Kent, BR2 7NH.

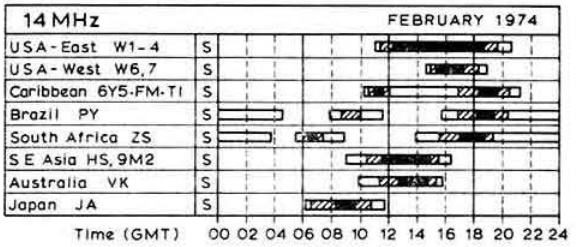
Propagation Predictions

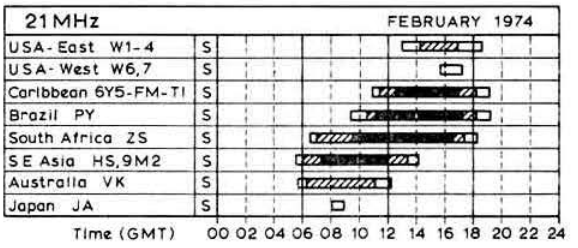
During February, days slowly lengthen and towards the end of the month **14** and **21MHz** will remain open longer than in previous months. Solar activity is coming to a close, so **28MHz** will be practically of little importance. Only on exceptional days (days with above average F2 MUFs) will some dx traffic be possible. This decrease in solar activity will also be noticed on **21MHz** and it will probably be difficult to reach all continents with certainty. Western North America and Japan will only seldom be heard. With reference to the forthcoming ARRL DX contest it should be noted that Hawaii and Alaska will not be heard. DX traffic to Africa and South America will almost cease because of static and aurora borealis.

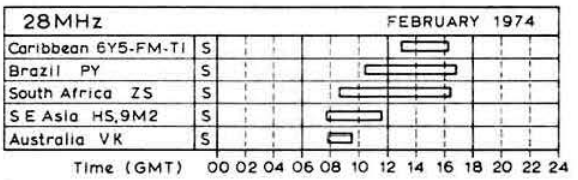
14MHz will remain open until about 2030gmt towards the end of the month for traffic with Central and South America. Not until May will dx be possible throughout the night. Chances for dx on the indirect path will decrease from now on. Traffic with Alaska and Hawaii will only be possible on very favourable days between 1645 and 1800gmt via the indirect path.

There will be no great changes on **7** and **3·5MHz** compared to the previous month. QRM permitting, traffic with eastern North America should be possible on 7MHz from about 2100gmt. During the second half of the night traffic may cease because of low frequencies. On 3·5MHz, traffic can also be interrupted for various reasons. Local traffic will be affected by the dead zone and largely cease on 3·5MHz in the latter half of the night.

The mean provisional sunspot number from the Swiss Federal Observatory for December 1973 was 24·2. The period of highest solar activity lay between 16 and 28 December, with several days in the first half of the month showing zero activity. The predicted smoothed sunspot numbers for April, May and June are 32, 22 and 21 respectively.







MP4Q (Qatar), MP4T (Trucial States), OD (Lebanon), JY (Jordan), ST (Sudan), YK (Syria), SU (Egypt), 9K2 (Kuwait), 3V8 (Tunisia), 4W1 (Yemen), 5A (Libya) and 7X (Algeria). Send the QSLs, plus 10 IRCs, to JY1, PO Box 1055, Amman, Jordan.

Odds and ends

G3RHL left the UK in January and will be in New Zealand and on the air with a ZL call in March. He will be looking for UK contacts via the short path, and his new address will be B. W. Rous, c/o The Bank of New Zealand, 125–129 Queen St, Auckland, New Zealand.

GW3ZBG is now GM3ZBG and may be reached at the address in *QTH Corner*.

The sum raised by the Ockenden Venture Award was over £300—not £100 as given in December *MOTA*.

For the benefit of those looking for a contact with the Orkney Is, GM3CFS says that he is usually to be found on 3,512kHz after 2230, and on all bands during major contests.

Sid May, VP2KH, is a keen rtty operator as well as being a familiar signal on the hf bands with his ssb equipment

Band reports

After last month's lack of reports your scribe is happy to thank all the regulars for returning to the flock! Conditions seem to have been very much as expected on the hf bands, but the lf experts seem to think that conditions on the lower bands are not as good as they were last winter.

Very many thanks to all who sent in information and especially to the following: G2HKU, G3HB, G4RZ, G5JL, G6GH, G8MY, GM3CFS, G3EVE, G3GVV, G3IZJ, G3NKQ, G3ORP, G3RZI, G3UOL, G3XWZ, G3ZDF, G3ZZD, GW4BLE, BRSs 17567, 17991, 25429, 30371, 31301 and 34364, and As 7056, 7785, 8306, and 8312.

Stations listed in italics were using cw, the rest ssb.

1·8MHz. 0000 *EP2BQ*. **0100** *VE3AZE, VO1KE*, K2ANR, W2HCW, W3GJQ, *W4EX*. **0200** *W2LWI, WA4LDM, WA4SGF*. **0500** *K1NOL, K1PBW, K1RQE, W1PL, W1TX, W2PV, W2UEZ, WA2WLN/2*. **0600** KV4FZ, *VO1KE, W1BB, WA8IJI, WB8APH*. **2200** *EP2BQ*.

3·5MHz. 0000 JY3ZH, KH4NCA, UV9BB, VP9HM, *ZC4BI*. **0100** CT2BG, KV4AB, VP2KH. **0200** *EA9EU*, HP1XIS, PJ1MI, 4X4NJ. **0300** PJ2CW, VP2VBU, 5X5NK. **0500** TI8PE. **0600** M1C, TU2DO, K6AHV, W6TSQ, ZLs. **0700** CN8HD, FG7XT, LU2AFH, K6s HN, SEN, W6MAR, WA7GWU (Utah), W7KW (Ariz), WA7PMI (Oreg), W7RM, W7YM (Wash), *W9YLZ*, WA0GQI (N.D.), WA2WMT/0 (Colo), YS1AG. **0900** ZL2BT. **1500** EP2TW. **1600** EP2WB, 4Z4LM, 9H1CD. **1700** JY6IMH, OX3LW. **1800** EA9EJ, JX2FL, OD5BA, ZC4LC. **1900** 7X0AA. **2000** CT2BJ, FP8CT (QSL to VE5NW), UJ8SAJ, VE2XF. **2100** MP4BJS. **2200** CT3AB, EA6BT, EL7D, FP8DH (QSL

to VE6AYU), KV4CI, TA2BK/1, VP9HH, 6W8DY. **2300** CR3WB, CR4BS, EA9ES, OA4OS, VU2s ABV, BX, ZB2CH, 5B4FF, 9K2AR, *9L1JT*.

7MHz. 0000 ZS6ZE. **0600** EL8G, HC2TV, TU2DO. **0700** CE3ED, CR4BS, CX3CJ, JA/JHs, OA4SO, W7GVA, ZLs, 5U7BA. **0800** CT2AB, JAs, LUs, TG8IA, VKs, 8R1AG. **0900** JAs, *JA5ACF*, *W6MTJ*, XE1LC, *ZL2AJJ*. **1000** JH1URI. **1500** *AX2BQQ*, *UA0QAA*, *K6DC*, *W9JK*. **1600** *HS3AIG*, *HS4AGN*, *VU2DK*. **1700** *VE7UZ*. **2100** *5B4PW*. **2200** CR6TP, JA4FCR, JA0OM, 4Z4ME, 5U7BB. **2300** *W7COB*, YVs.

14MHz. 0700 KX6BU. **0800** 5N2ESH. **0900** EA9EJ, KG6AAY, HZ1AB, *JT1KAA*, MP4BJR, VKs, *VK0AM*, VP2EP, VP8KF, ZLs. **1000** DU1CM, *LU5SF*, XW8FY. **1100** FY7AQ, 8P6AZ. **1200** PJ9BB, VE3AII/SU, 9Y4PL. **1300** XV5AC. **1400** *A4XFD*, HV3SJ, *HZ3TYQ*, XU1AA, *YK1KAS*, 9G1BF. **1500** *FB8XA*, FB8ZB, *FP8AP*, *FR7ZW*, 4W1BC, 5T5LO, 5X5NK. **1600** TU2DR (QSL to VE2BXA), W6s, XT2AJ, *3B8DA*, *4K1A*. **1700** KH6BB, W6/W7s. **1800** VQ9s HCS, MC, 4W1GM. **1900** FY7YF, YA1OT (QSL to K3KON), ZD7SD, *3D6AX*. **2000** VP2AA, VP8ML, ZS1ANT, 9L1GT. **2100** KC4USV, VP8s. **2200** HZ1HZ, ZD3M. **2300** CP, CX, LU, OA, W9UCW/HK0, W6/W7 (on 2 January for one hour).

21MHz. 0900 A6XB. **1000** A2CCY, TR8SS (QSL to DJ5IO), VKs, *VU2LO*, XU1AA, ZL3UY, 9G1BY, 9K2DC. **1100** AP2s, KV, ZR, ET3DS, TJ1EZ, 3E1KC, *6W8EX*. **1300** *FR7AI*. **1400** *CO2BM*, *FL8CE*, VQ9HCS, *DL1DH/YV6*, 3B8s AX, BG, DG, DX. **1500** 4W1GM. **1600** *LU9CV*, WS3SKY. **1700** CX, 5U7BA.

28MHz. 1000 ZE8PN. **1100** ZE8JN (uses 8-el quad). **1400** *CR6AI*, *3B8MS*. **1500** WB3VUP, 5U7BA. **1900** *DL0IGI*.

Many thanks to the authors of the following publications for information obtained therefrom: **DX'press** (*PA0INA/PA0TO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*George Allen*), **World Radio News**, the **DXers Magazine** (*W4BPD*), **Long Skip** (*Nick Sawchuk*), and the **West Coast DX Bulletin** (*WA6AUD*).

Please send all items for the **March** issue **to reach G3FKM** no later than **6 February**, and for **April** issue by **6 March.**

SWL NEWS

by BOB TREACHER, BRS32525*

FIRSTLY may I tender apologies for the non-appearance of this column in the January 1974 issue of *Radio Communication*. This was due to a number of reasons, the most important being revision for the December RAE. As a result much of the comment relayed by letter is now dated and cannot be used in this column, therefore a much shorter *SWL News* appears this month.

Russian prefixes

Many listeners have commented on the breakdown of the UK prefixes used by Russian club stations. The following should act as a guide. UK1, RSFSR Europe (UA1); UK1ZFI Franzjosef land; UK1N, Karel-Finnish Republic; UK2A-C-I-L-O-S-W, White Russia (UC2); UK2B and P Lithuania (UP2); UK2F Kaliningrad (UA2); UK2G and Q, Latvia (UQ2); UK2R & T Estonia (UR2); UK3 and UK4 RSFSR Europe; (UA3 and UA4); UK5, except UK50 which is Moldavia (UO5), Ukraine (UB5); UK6A-E-H-I-J-L-P-U-W-X-Y RSFSR Europe (UA6); UK6C-D-K, Azerbaijan (UD6); UK6F-O-Q-V, Georgia (UF6); UK6G, Armenia (UG6); UK7, Kazakh (UL7); UK8A-C-D-F-G-I-L-O-T-U-Z, Uzbek (UI8); UK8H, Turkoman (UH8); UK8J & R, Tadzhik (UJ8); UK8M & N, Kirghiz (UM8); UK9 and UK0 RSFSR Asia (UA9 and UA0).

A "censored" mail . . . !

Because of the time difference between receipt of letters and actual printing your scribe has got his blue pencil out in an attempt to keep the column topical. Les Poole, BRS33558, appears to be in an unassailable position on top of the 1973 Countries table, while Chris Henderson, A7460, is just managing to retain second place. P. Barker, A8037, seems to be becoming an sstv addict and has so far received the following countries—CT1, DL, EA, F, G, HA, I, JA, OD5, OZ, VE, VP9 and W; his best verification to date coming from Bermuda in the form of VP9GE.

Neville Medcalf, BRS33629, has now got his son Martyn, A8153, interested in amateur radio to the extent that he has purchased an SR300 receiver. They have separate operating shacks and both seem to enjoy trying to outdo each other. Neville seems to have acquired the taste for collecting awards and is at present trying to make the required number of points for five awards issued by different clubs in England.

"Tam" Large, A8374, thrilled at coming eighth in the Jubilee Contest, has now set his sights on much grander positions in this year's RSGB hf contests. It was Tam's first serious effort at contest participation and he thoroughly enjoyed it and obtained some satisfying reward for his efforts. XV5AC has a QSL manager—W1YRC and the address is R. G. Beaudet, 30 Rocky Crest Road, Cumberland, 02864, Rhode Island, USA.

Another callsign which needs expounding on is IC8TRA which was active during 1973 from the Italian island of Capri. For country purposes this counts simply as Italy.

The quote of the year must surely rest with Les Poole who, reflecting on 1973 and the number of hours he had spent listening on the amateur bands, says that to be a successful dxer—either transmitting or swl—one must have one quality above all others—persistence. Listening for a vast number of hours increases the luck of course but Les has had his luck without burning the midnight oil, which must go to prove how much time Les has listened this year to obtain the excellent success he has achieved during 1973.

Letters and updated scores for the 1973 Countries Table are acknowledged from A7511, 8179, 8320 and 8482, and from BRS25901, 33211 and 33823.

News, comment, photographs and table scores for inclusion in the March *Radio Communication* should reach your scribe before 5 February 1974.

* 392 Rochester Way, Eltham, London SE9 6LH.

YOUR OPINION

The Editor
Radio Communication
Sir—Is any useful purpose really served when you devote so much space to telling us how to behave in order to protect our image? And why lay so much emphasis on the 2m band? Bad behaviour is by no means confined to VHF operation.

At risk of being accused of repeating what has been said so often, I must say that amateur radio is a hobby and should be enjoyed as such. It is not a rat-race in spite of what we hear on contest days.

Most of us do enjoy our amateur radio but from what one hears on the air and reads in *Radio Communication*, quite a few seem to spend a lot of time complaining about the behaviour of others. Until such time that human nature changes we shall always have those who object to the rules and devise their own; those who must behave differently. This "being different" syndrome is not confined to our hobby by any means, we have it in all sports and pastimes and in all walks of life. Regardless of what you say and how often you say it, we shall always have the few who will behave in an anti-social manner. But most of us will play the game.

We are all aware that others are listening and not only on the 2m band, and for this very reason most of us do take care of what we say or do when operating.

I do not think that the swl, the man in the ministry or the man in the street, and certainly not the transmitting amateur, will judge us merely on the bad behaviour of a few. Surely they are all more intelligent than that.

If, as you repeatedly suggest, bad manners are more prevalent on the 2m band, than I would say that this is because it is too easy to obtain a licence for VHF operation. One seldom shows respect for what is easily obtained.

So please let us get on with enjoying our chosen hobby, stop worrying about the bad boys (and perhaps girls) and use the space saved for something of interest to us all.

Eric O. Wright, G3ICX

The Editor
Radio Communication
Sir—Once again, in "Four Metres and Down" (*Radio Communication*, January 1974), vhf operators are castigated for unacceptable operating procedure.

Perhaps, for a change, some of the experts and oldtimers such as G5UM, who presumably uses impeccable procedure, would care to instruct newcomers like myself (recently licensed in 1966) just what we should say when: (a) Making a CQ call; (b) Answering a CQ call; (c) Terminating a QSO.

Examples in each case would be most helpful as I view with some trepidation the day I make contact with some of the members who have complained of what they hear, in case I say the wrong thing. Maybe I shall have to confine my remarks to signal strength report, QTH and beam heading.

J. P. Chettle, G8ATA

The Editor
Radio Communication
Sir—There must be many amateurs like myself who are uninterested in contests. Nevertheless weekend after weekend the air is plagued by contestants holding five-second pointless QSOs. It is almost impossible to hold a normal conversation during this period, which is most annoying.

Would it not be possible to reserve a small portion of each band to be excluded from contest use? I am writing to you as the referee for the UK with a powerful international voice. If this exclusion were a requirement by those regulating contests, the reduction in bandwidth for "prefix-hunters" would be negligible and the increase in freedom for other amateurs would be appreciated.

H. Kleeman, G4BHY

The Editor
Radio Communication
Sir—I should like, through your columns, to express my appreciation to the MPT for the way in which they have cleared up the deliberate interference menace on 80m.

Laurie Margolis, G3UML

The Editor
Radio Communication
Sir—In my opinion 80m is an extremely good band for late at night and early in the morning. But there is one aspect that spoils it—stations rag-chewing in the last of the band when there are many free channels lower in the band perfectly suitable for it. These stations may not realize that under good conditions dx is audible until 0900gmt in the last 10kHz and that stations working dx have enough trouble from QRM without locals chatting also. So I would ask rag-chewers, if they hear stations trying to work dx, to please QSY to a lower frequency.

R. A. Stratford, A7818

The Editor
Radio Communication
Sir—The people concerned are to be congratulated on the new VHF/UHF Band Plans.

Obviously a great deal of thought must have gone into what, like all other clever ideas, seems an obvious move with hindsight. There should now be no conflict of interests with the various devotees; local chat, dx, repeaters and serious experimental work can all co-exist with a little co-operation all round.

A. M. Allan, GM3ZBE
G. Knight, GM8FFX

Mobile Rallies Calendar

12 May—South Leicestershire MR, 11am, Westfield Activity Centre, Westfield Road, Hinkley, Leics. Organized by Hinkley ARC; details from G4CAJ, QTHR.
19 May—Northern MR, Victoria Park Hall, Keighley. Organized by Otley RS; details from G8BZY, QTHR.
19 May—Amateur Radio Mobile Society's MR, RAF Cosford, Shropshire.
26 May—Hull MR, Bishops Burton.
9 June—Alveston Castle MR, Alveston Castle, Nr Derby.
30 June—Upton MR. Organized by Worcester and D ARC; details from G8ASO, QTHR.
8 July—South Shields MR, Redwell School, Prince Edward Road, South Shields. Organized by SS & D ARC; details from G3SFL, QTHR.
21 July—Cornish Radio Amateur Club MR.

NEW BOOKS

"Mullard Data Book 1973–4"

The latest edition of this annual publication gives abridged data on the range of Mullard valves, picture tubes, semiconductors, capacitors and resistors. Useful tables of comparables and equivalents are provided. 160 pp, 4in by 5¼in, soft covers.

Obtainable from RSGB price 35p (including postage and packing).

"Guide to Broadcasting Stations"

The lastest (17th) edition of this well-known publication contains completely updated information on long and medium wave European stations, short-wave stations of the world and European vhf broadcasting stations. These listings are prefaced by a useful guide to listening for those interested in the reception of distant stations. 201 pp, 4½in by 7¼in, soft covers. Published for *Wireless World* by Iliffe books.

Obtainable from RSGB price 85p (including postage and packing).

COUNCIL PROCEEDINGS

A brief report of the Council meetings held on 8 October and 6 December 1973

Present: (8 October) *Dr J. A. Saxton (President, in the Chair), Dr E. J. Allaway, Messrs B. D. A. Armstrong, J. C. Brown, R. W. Fisher, W. J. Green, R. J. Hughes, E. G. Ingram, G. R. Jessop, W. F. McGonigle, L. E. Newnham, C. H. Parsons, W. A Scarr, R. F. Stevens, G. M. C. Stone, F. C. Ward (members of Council), D. A. Findlay (general manager) and A. W. Hutchinson (editor).*

Apologies for absence had been received from Messrs J. R. Petty, G4JW, and A. W. Smith, GM3AEL.

Present: (6 December) *Dr J. A. Saxton (President, in the Chair) Dr E. J. Allaway, Messrs B. D. A. Armstrong, J. O. Brown, R. W. Fisher, W. J. Green, R. J. Hughes, E. G. Ingram, G. R. Jessop, W. F. McGonigle, L. E. Newnham, C. H. Parsons, J. R. Petty, W. A. Scarr, A. W. Smith, R. F. Stevens, G. M. C. Stone, F. C. Ward (members of Council) D. A. Findlay (general manager), A. W. Hutchinson (editor).*

VHF Managers Conference
Mr Stone reported that the papers on the 2m and 70cm band plans which would be presented to the VHF Managers Conference in Germany on 13-14 October 1973 had been discussed at the Edinburgh VHF Convention and that there had been a large majority in favour of the Society's proposals.

Finance report
The Honorary Treasurer reported on the financial results for the year ended 30 June 1973.

It was noted that the revenue from advertisers in *Radio Communication* had increased very considerably and this was due to an increase in volume rather than higher advertising rates. Mr Brown pointed out that because of increased costs it had been decided to increase advertising rates from 1 October 1973.

The imposition of VAT on subscriptions was discussed in view of the decision by the VAT Tribunal in the Automobile Association case. Mr Brown pointed out that the Society had already reserved its position as to the payment of VAT, but the AA case would go to appeal and a decision was unlikely for some considerable time.

The Honorary Treasurer reported that the accounts for the three months to 30 September had been circulated to Council members. Preliminary figures for the five months to 30 November 1973 had been produced and these indicated a slightly greater deficiency than forecast.

It had been mentioned at the previous meeting that the Society had already notified HM Customs and Excise of an interest in the Automobile Association/VAT case and Mr Brown advised that he had submitted proposals to HM Customs and Excise suggesting that VAT should only be payable on a part of the subscription.

Mr Brown also reported that the request to the Inland Revenue that the Society should be registered as a charity for taxation purposes had been refused. The matter was still being pursued.

President's Ad Hoc Committee
The committee had proposed a finite period of service for members of Council. This proposal would not bar a member from accepting nomination for re-election after a break of one or more years.

Report of Council 1972-3—Year in Review
The report, subject to editing, was approved for publication.

A further report to cover the activities of the Society up to the end of November 1973 would be prepared and this report would be read at the Annual General Meeting.

Membership and affiliation
It was resolved:

(i) to approve the applications for membership, transfers and reinstatements for September, October and November and accordingly elect 513 new members;

(ii) to accept reduced subscriptions from 44 members;

(iii) to waive the subscription for 1973-4 of 29 members on the grounds of blindness or other disability;

(iv) To grant affiliation to: Kent Coast Radio Club; 11th (Craigavon) Bn Ulster Defence Regiment Amateur Radio Club; Blackwood and District Amateur Radio Society; 1st Newport "Old Guard" Scout Group; Goole and District Amateur Radio Society; Kelly College Amateur Radio Society (Tavistock); Newquay and District Amateur Radio Society; UK FM Group (Northern), and West Dorset VHF Group.

President
Council unanimously approved the appointment of Mr G. R. Jessop, G6JP, as President for 1974.

Regional and Area Representatives
Council accepted the nomination of Mr E. T. Jacobs, BRS32513, as Representative for Region 16 (East Anglia) and confirmed Mr Jacob's appointment.

Council confirmed the appointment of Mr J. C. Wratten (GM4CAU) as Area Representative for Aberdeen and Kincardine.

IARC Station, Geneva
Council accepted Mr Hughes' proposal that the sum of £30 be allocated for the provision of two clocks for use in the IARC amateur station in Geneva.

Council Awards
Calcutta Key—It was agreed to award the key to Mr Frank Fletcher, G2FUX,

Rotab Trophy—It was agreed to award this trophy to Mr E. H. Trowell, G2HKU.

Official Regional Meetings
Mr Parsons would be submitting a report on the Region 10 ORM in Cardiff on 22 September 1973. In addition to Mr Parsons, Mr Jessop and Mr Stevens had been present at this meeting, which had been most successful.

Mr Hughes reported that he had attended the Region 13 ORM in Edinburgh on 22 September 1973. The meeting had been well organized and had been satisfactory in every way. Mr Stone had also attended the meeting, and both he and Mr Hughes felt that it had been an enthusiastic and friendly meeting and that the visit of Council members had been appreciated.

It was agreed that Messrs Scarr, Ward and Findlay should attend the Region 9 ORM proposed to be held in Plymouth on 3 November.

Braaten and Milne Trophies
The results of the 39th International DX Contest (ARRL) had now been published and accordingly Council agreed to award the Braaten Trophy to Mr M. A. Birch, G3KMO, as leading G station and the Milne Trophy to Mr R. Jones, GW3JI, the leading UK station other than G.

Repeaters
Mr Stone confirmed that there were now four firm repeater proposals in addition to the GB3PI project, the others being Bristol Channel, Crystal Palace, Four Marks (Alton) and Mid-Severn Valley (Malvern Hills).

Committee minutes and recommendations
Council accepted the minutes of the following committees:
HF Contests (19/7/73 and 20/9/73), Raynet (21/7/73 and 8/9/73), Finance & Staff (14/8/73, 18/9/73 and 30/10/73), Interference (7/9/73), Mobile & Exhibition (11/9/73 and 16/10/73), VHF Contests (24/9/73 and 29/10/73). MPT liaison (27/9/73), Technical & Publications (9/10/73), VHF (10/10/73), Scientific Studies (23/10/73) and Education (15/9/73 and 3/11/73).

Council accepted the recommendation of the Interference Committee that the Varney Trophy be awarded to Mr Ian Jackson, G3OHX, for his article *Practical braid breakers using stock materials.*

1974 VHF Convention
Mr Stone reported that Mr R. Hills, G3HRH, had accepted the invitation to be guest of honour this year.

Honoraria
It was agreed that honoraria could be dealt with on the same basis as for 1973 provided the expenditure in each section of that year was not exceeded. Payments would be approved by the Honorary Treasurer.

Retiring Council members
The President reminded Council that three members, Mr R. J. Hughes, G3GVV, Mr Brian Armstrong, G3EDD, and Mr E. G. Ingram, GM6IZ, would not be serving on Council next year and he knew that Council would wish to join him in thanking these gentlemen for their most valued services to the Society.

Mr Armstrong thanked the President for his kind remarks and for the indulgence he had shown over the past year and said that Council were honoured to have the President with them.

OBITUARIES

Mr L. N. Goldsbrough, MA, BSc(Oxon) G3ERB
Les Goldsbrough, a former RSGB Council member for Zone A, died on 8 September 1973. He was an active radio amateur for many years and was a member of the Wirral Amateur Radio Society. His widow holds the call G3WOP.

Mr F. Inchley, G3AG
Frank Inchley, who died on 10 December 1973, was a member of RAFARS and a frequent controller of the 80m WAB net. He kept in touch with his daughter in Nepal through amateur radio and was a collector of vintage radio apparatus.

Mr A. E. Parsons, G3AIX
Arthur Parsons died on 16 December. Interested in radio from his early days, he was with Marconi's for many years and became an active amateur between the two world wars. After the second world war he was an active operator on Top Band and 80m and in later years extended his interest to vhf. He was associated with the Midland Amateur Radio Society and the Sutton Coldfield Radio Society, and was an active participant in several 80m morning nets.

Mr F. Stapleton, G3BGH
Frank Stapleton died on 15 December 1973. In his younger days he was a sea-going radio officer, and for some years before his retirement some six years ago he was with the Post Office. He worked only cw in the amateur bands.

We have also been advised of the deaths of:
Mr P. G. Hester, G5HS, of Thame, Oxfordshire;
Mr George Piekarski, BRS34005, of Haddington, East Lothian, and
Mr A. A. Smith, WODMA, of Caledonia, Minnesota.

Seen at the 1973 Ipswich Rally: Jane Ballestrini (left) and "Taff" Crane, the former and present Raynet registrations secretaries respectively

RAYNET

by S. W. LAW, G3PAZ*

Owing to the fuel situation and the difficulties of rail transport prevailing at the time, the Raynet committee meeting scheduled for 5 January was cancelled. Two later dates were provisionally selected and the transport problem will determine the position according to developments in the situation. The secretary will keep members informed.

Naturally all groups in the UK are affected by the fuel problem, although this appears to be more acute in the south-east than elsewhere. We have no doubt, however, that controllers will evolve some schemes for exercises which do not involve too great a burden on the mobile units under their control. The conservation of our energy resources is of prime importance at the moment, but we are sure that a little forethought will soon reveal ways and means of keeping in practice, even if /M rigs have to be driven by batteries (charged in off-peak hours, of course) at the home QTH.

All members will, we are sure, join in congratulating our hard-working chairman, Peter Balestrini, G3BPT, on his being elected to the RSGB Council. There is no need to enumerate the sterling qualities which have led to this honour and we wish him every success in his new post wherein we are sure his talents will prove a great asset. He will, of course, continue to provide us with his expert guidance as Raynet Committee chairman.

A commemorative certificate for Exercise Diamond will be issued this year to all who took part in this Jubilee event. We sincerely hope that group controllers will by now have sent the committee a complete list of names and callsigns of all members of their group who took part. Members should check with their controllers to ensure that this was done by 1 January to be sure of receiving their certificate.

Flood technique
At the risk of being accused of repetition, may we once again remind newer members in particular that this month traditionally starts the flood season. It may well be that mobiles will have to traverse flooded roads and it is as well that a few pointers be borne in mind. *Never* attempt to rush a flooded road. The trick is to change to low gear in order to maintain the engine revs as high as possible, thus ensuring that the water does not enter the exhaust pipe; this would stop your engine by back pressure. If you should be foolhardy enough to rush the water at speed it will eventually be splashed up into the fan and be spread all over the ignition system, bringing you to an ignominious and embarrassing standstill. If you know the water to be rather deep it is still possible to be on the safe side by stopping and temporarily removing the fan by unbolting it or, if this is not possible, removing the fan belt if this can be done. Most cars will tolerate this for a short period in cold weather; in fact we have driven cars where the makers have actually recommended the removal of the fan during the wintertime and provided a stowage position in the engine compartment! In any case, hasten slowly is the watchword in the wet at all times.

People in glass houses....
As many members may recollect, there has been criticism in the past from prospective user services that what has been heard on the amateur bands has led them to believe that the "procedure" heard would be totally unsuitable for emergency communications! We of Raynet are fully aware of the fallacy of this in that the observation was not specific but mistakenly general. However, it has been mooted that certain services are not above reproach; we cannot emphasize too strongly that the expression of any such opinions by our members must be rigorously suppressed, as untold damage could be caused to our image by a word in the wrong place.

Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.

* 130 Alexandra Road, Croydon, Surrey, CR0 6EW

CONTEST NEWS

Rules for NFD 1974

Entrants should note that Rules 9 and 10 have been revised.

1. The General Rules for RSGB HF contests, published in the January 1974 issue of *Radio Communication*, will apply. The provisions of General Rules 4b and 8 are amended by NFD Rules 7 and 13 respectively.

2. Applications. Each group intending to compete must send in a properly completed application form to the RSGB HF Contests Committee, c/o D. Thom, G3NKS, 20 Bramble Close, Copthorne, Sussex RH10 3QB, not later than 30 April 1974. Application forms are available from RSGB headquarters (ask for Form HFC 10/74); entries made other than on those forms will not be accepted.

The information required on the application form includes the following:

(*a*) Callsign of station(s).
(*b*) Name and address of the RSGB member responsible for the entry.
(*c*) Exact site location six figure National or Irish Grid Reference. In addition, entrants are required to give full site access information to enable a site to be located by station inspectors who may not be familiar with the district. Incorrect or inadequate information may be grounds for disqualification.

3. When. From 1700gmt Saturday 8 June to 1700gmt Sunday 9 June 1974.

4. Eligible entrants. All clubs, affiliated societies and RSGB Groups within the prefix zones G, GC, GD, GI, GM and GW. NFD is a multi-operator contest as provided for in General Rule 5b.

5. Contacts. CW (A1) only in the 1·8, 3·5, 7, 14, 21 and 28MHz bands.

6. Sections.

(a) Double station. Each competing group must operate two portable stations; the one using the lowest frequency shall be called the "A" station, and the other the "B" station.

Each "A" station may operate on a maximum of three of the above bands; and up to three of the remaining bands may be allocated to the "B" station.

The "A" and "B" stations need not be operated from the same site provided that they are located within the same RSGB region.

(b) Single station. Each competing group must operate one portable station on one or more of the above six frequency bands.

7. Apparatus. General Rule 4b applies, and in addition the site must not be used for any portable activity for the seven days prior to the contest.

8. Aerials. No part of any aerial shall be higher than 45ft above the ground.

9. Equipment

(*a*) Only one transmitter and one receiver, or one transceiver, may be used at any one time at each station.

(*b*) Monitoring stations, ie stations specifically nominated to observe and report on band conditions, activity, etc during the contest for the benefit of competing stations, are not permitted.

10. Power. The valve(s) energizing the aerial shall have a total maximum rated anode dissipation not exceeding 13·5W.

When semiconductor devices are used, the total maximum rated dissipation (at an ambient temperature of 25°C) of the device(s) energizing the aerial shall not exceed 35W. Manufacturers' published ratings only will be accepted for this purpose.

11. Scoring. Points will be scored as follows:

(*a*) Fixed station in the British Isles	1 point
(*b*) Fixed stations in the rest of Europe including Eire	2 points
(*c*) Fixed stations outside Europe	3 points
(*d*) Fixed stations in the British Commonwealth	6 points
(*e*) Portable and mobile stations in the British Isles	3 points
(*f*) Portable and mobile stations in the rest of Europe including Eire	4 points
(*g*) Portable and mobile stations outside Europe	6 points
(*h*) Portable and mobile stations in the British Commonwealth	12 points

A multiplier of two will be applied to the total claimed score for contacts on the 1·8MHz band only.

12. Group contacts. Points must not be claimed for contacts made by a competing station with members of its own group, whether fixed, mobile or portable.

13. Entries. These are to be in accordance with General Rule 8, with the following exceptions:

(*a*) The normal cover sheet will not be used. Special cover and summary sheets will be sent to the person responsible for the entry.

(*b*) Points claimed must be totalled separately for each band.

(*c*) Entries must be sent to the RSGB HF Contests Committee, c/o D. Thom, G3NKS, 20 Bramble Close, Copthorne, Sussex RH10 3QB.

Entries sent to RSGB Headquarters will not be accepted.

14. Trophies.

(*a*) National Field Day Trophy to the group obtaining the highest combined score.

(*b*) Gravesend Trophy to the group obtaining the second highest combined score.

(*c*) The Scottish NFD Trophy to the Scottish group scoring the highest number of points.

(*d*) The Frank Hoosen Memorial Trophy to the group with the highest score on the 14MHz band.

(*e*) The Bristol Trophy to the group having the highest score in the single-station section.

(*f*) Commemorative certificates to the groups having the highest scores on the 1·8, 3·5, 7, 21 and 28MHz bands.

15. Check logs. While overseas stations are not eligible to enter NFD, check logs are very welcome. A certificate will be awarded to the overseas station in each continent whose check log shows that he has contributed the most points to competitors.

16. Inspections. All stations are subject to inspection by nominated representatives of the HF Contests Committee.

These representatives will make every endeavour to interfere as little as possible with the stations' operation, and to assist them entrants should make it easy for the inspectors to see the final stage(s) of the transmitters.

Groups who refuse to allow the inspector to examine their transmitters will be disqualified.

June 1974 Microwave Contest rules

Date: 15–16 June 1974.

Times: 1600 to 1600gmt.

All entries and checklogs must be sent to: VHF Contests Committee, c/o 11 Liphook Crescent, LONDON SE23 3BN.

1. Scoring contacts may be made on any amateur frequency above 1GHz, but lower frequencies may be used for setting up contacts

2. Contest exchange will be as follows:

On the 1,296MHz band; RS or RST report followed by a serial number, QTH Locator and QTH.

On each of the other bands: RS or RST report followed by a serial number and a code word of the operator's own choosing (eg "Centimetric Overture"). The same code word cannot be used on more than one band. Contestants must record their code word clearly on the 427 Cover Sheet accompanying the entry log for each band. If the station has not already been contacted on the 1,296MHz band, the QTH Locator and QTH may be substituted for the code word. Serial numbers shall begin at 001 for each band, and information should be passed on the band for which points are claimed. All data should be recorded on the log.

3. Scoring will be as follows:

1,296MHz band: two points per kilometre.
2·3GHz band: three points per kilometre.
Other bands: five points per kilometre.

4. The same callsign must be used on all bands for all scoring contacts.

5. Unless superseded by the above, the following General Rules will apply: 1, 2, 3, 4b, 6b, 7b, 8b, 9a, 10a, 11–26.

144MHz Open and Listeners' contest rules

Date: 2-3 March.

Times: 1600-1600gmt.

All entries and checklogs to: VHF Contests Committee, c/o G8ACJ. "Easedale", Woodway, Merrow, Guildford GU1 2TF.

The following general rules, published in the January issue of *Radio Communication*, will apply. Transmitting contest: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11-26. SWL contest: 1-6.

The Mitchell-Milling trophy will be awarded to the leading station in the transmitting contest.

November 144/432MHz CW Contest Results

This contest brought the VHF Contests Committee its largest bag of comment for some time, more than half the entrants finding the urge to write. Many were enthusiastic about the timing, a few unhappy. All, however, requested that the event be included in the 1974 calendar. It will, but is likely to be 2m only. *G5HD*

Posn	Callsign	Points Total	Points 144MHz	QSOs 144	QSOs 432	Best dx	Km	Pwr
1	G3NHE	579	159	23	12	ON5QW	420	60
2	G3LTF	507	157	21	10	GD2HDZ	425	150W
3	G3NNG	345	150	34	9	ON5FF	350	25W*
4	G5UM	338	118	28	10	G3JYP	223	24
5	G3COJ	277	22	8	13	ON5FF	310	150
6	G3IMV	256	256	50	—	F9FT	450	90
7	G3LAS	249	249	43	—	G3IUD	430	50
8	G8GP	232	232	42	—	GD2HDZ	415	100
9	G5DF	228	83	19	9	G3JYP	310	100
10	G3SHY	190	95	21	5	GD2HDZ	272	15
11	G3JYP	173	173	19	—	G5DF	367	90
12	G3YYF/P	165	105	19	2	F9AN	300	40
13	G4ABR/P	163	163	33	—	F2YT	355	30
14	G3VPS/P	160	—		6	G3NHE	280	8*
	GW3MFY	160	160	20	—	G3BHW	340	90
16	G3YZQ/P	155	155	37	—	G3BHW	243	150
17	G3TQZ	141	141	27	—	G3IUD	311	141
18	G3WUX	135	135	21	—	G2CIW	324	30
19	G3ZUL	119	119	26		GD2HDZ	265	25½
20	G4AWA	96	96	23		GD2HDZ	255	120
21	G3KMI	85	85	19		G6PG	290	60
22	G3LCH	70	70	22		G3OHH		90
23	G4CIB	47	47	15		G3WUX	214	24
24	G4BKY	38	38	12		G3OHH	155	10
25	G4BZD	32	32	8		G3BHW	295	100

* Power output

2nd 1·8MHz Contest 1973 results

The 2nd 1·8MHz Contest 1973 proved to be the best-supported Top Band event for some time, with 50 entrants and nine check logs, eight of these from overseas stations. Conditions were also good, with calls from 10 countries appearing in the logs.

First place is taken by R. Henderson, G3ZEM, whose almost faultless entry contained 31 non-UK calls. In second place is S. Wilson, G3VMW. Harry "Jack" Box, although 140 points behind the leader takes third place comfortably, to put G6BQ back among the awards. G3ORP, in sixth place, deserves a special mention for working KV4FZ, no mean feat at any time, but a very tall order during the chaos of a Top Band contest. Congratulations also to G4BJM, the leading entrant in the under-18 section, who achieved ninth place overall.

Comments

Five hours is civilized—G3VMW
Conditions good, rules good—G3ORP
Where do they all go between contests?—G4CEN

Subject to the approval of Council, the Victor Desmond Trophy will be awarded to G3ZEM, and certificates of merit to G3VMW and G6BQ. A certificate will also be awarded to G4BJM, as the leading station under 18 years of age. S. K.

Posn	Callsign	QSOs	Cnty	Pts	Posn	Callsign	QSOs	Cnty	Pts
1	G3ZEM	154	DH	872	26	G3TVW	71	EX	414
2	G3VMW	143	YS	804	27	GM3PFQ	67	FE	384
3	G6BQ	129	KT	730	28	G3GC	67	MX	379
4	G3SSO	117	GR	668	29	G3YMC/A	65	BE	347
5	GW3UCB	113	CV	641	30	G3BUO*	59	KT	339
6	G3ORP	115	KT	640	31	G3TLF	53	YS	318
7	G3XDY/A	100	LE	589	32	G3OUR/A	52	OX	306
8	G3XWZ	104	NM	577	33	G4AEM	54	HF	294
9	G4BJM*	103	BS	565	34	G3PDL/P	52	YS	290
10	G3JEQ	100	SY	562	35	G3ATF	49	MX	285
11	G3TR	101	SY	557	36	G3XJO	48	SY	283
12	G3SKC	98	MX	544	37	GW4BCA*	48	CV	276
13	G6PD	94	CE	535	38	G4BMK	48	LD	257
14	G3UFY	93	SY	505	39	G2FNK	43	MX	236
15	G3NIS	86	EX	497	40	GM4ALK	40	FE	224
16	G3SJE	86	MX	476	41	GI2FHN	38	DW	208
17	G3TIR	82	SX	468	42	G3VLX	40	KT	194
18	G3WKH/A	83	GR	462	43	G3ZNH	32	WE	178
19	GM3YOR	81	FE	454	44	GM3FXM	37	FE	174
	G3LCH	83	LD	454	45	G8QZ	29	DY	172
21	G3KKQ	80	MX	452	46	G3YRZ	32	CE	170
22	G3XDV	80	KT	429	47	G4BWP*	29	BD	168
23	G3VIP	72	LN	426	48	G4CEN*	33	HE	158
24	G3PWY	72	HD	417	49	GM3OLK	21	FE	122
25	G3DCZ	75	SY	415	50	G4CMY	20	GR	120

* Entrant under 18 years of age

The HF Contests Committee gratefully acknowledge check logs from the following stations:

Callsign	QSOs	Callsign	QSOs	Callsign	QSOs
G6CJ	50	OK1IDK	33	OL6AQP	15
OK1AXD	13	OL5AQC	23	OL9CBM	9
OK1HBT	11	OL6AQJ	20	PA0HIP	64

National Amateur Television Contest 1974

Organized by the British Amateur Television Club (BATC)

When. 1900–2300gmt 27 April (1st session).
1000–1400gmt 28 April (2nd session).

Eligible entrants. All amateurs licensed to transmit and/or receive amateur television. All entrants must operate strictly within the terms of their licence.

There will be three sections:

A Fixed or /A stations
B Portable
C Licensed stations (other than /T licensees) who can transmit sound only and receive video.

Frequencies and modes:

(*a*) Sound on 114, 432 or 1,296MHz A3, F3, A3H or A3J.
(*b*) Vision on 432 or 1,296MHz A5 only.

Contest exchange shall consist of:

(i) Callsign
(ii) Vision signal report based on the BATC vision reporting chart of 0–5.
(iii) Serial number which shall start at 001 and increase by one per contact throughout the entire contest.
(iv) QTH (QRA) Locator.
(v) QTH
(vi) A code group of *four* non-consecutive numbers (eg 9724) which must be sent *by vision only*. The code group must change for each session of the contest.

Scoring. Stations entering sections A or B score at 2 points per km
Stations entering section C score at 1 point per km.

A multiplier of 6 should be applied to *all* contacts on 1,296MHz. Incomplete or one-way contacts should be claimed and will be allowed at the adjudicator's discretion.

All logs, which should preferably be on the BATC contest log sheet, should be sent to: The Adjudicator, 10 Pilgrim Road, Droitwich, Worcs WR9 8QA, postmarked not later than 19 May 1974.

BATC contest log sheets are obtainable from the above addres s. Please include a large sae.

International Amateur Television Contest 1973 results

SECTION A

Posn	Points	Station	Posn	Points	Station
1	1,970	ON4HV/T	13	679	ON5CX/T
2	1,720	G6ACR/T	14	618	DK3QG
3	1,432	G6AHJ/T	15	548	DL3DK
4	1,368	G6KQJ/T	16	457	G6AFK/T
5	1,248	DC6LCA	17	420	G6AEC/T
6	1,230	ON4UB/T	18	366	DC2FF
7	1,216	G6AHT/T	19	132	DJ6PI
8	1,168	DK1AQ	20	112	DJ6TA
9	1,034	DC6VY	21	48	G6RDZ/T
10	944	DK1VF	22	36	DK6TE
11	749	DJ6PC	23	20	DC8BF
12	703	DL2DW			

SECTION B

Posn	Points	Station	Posn	Points	Station
1	3,880	GW6AHR/T	4	1,112	DJ9PF/P
2	1,739	DJ6PI/P	5	910	DL2DW/P
3	1,407	DJ7RI/P			

SECTION C

Posn	Points	Station	Posn	Points	Station
1	1,171	DJ3TQ	6	202	ON4ZZ
2	358	G8DXD/A	7	194	G8DJM
3	342	DL2JT	8	174	DC4QN
4	209	ON5OO	9	54	DF1QX
5	203	ON4VT	10	46	DJ7RZ

SECTION D

Posn	Points	Station	Posn	Points	Station
1	168	DJ1YI	3	76	DB1PX
2	152	DC6VD			

Certificates are awarded to leading G stations in each section.

Mid-Severn Valley Teleprinter Group
1974 144MHz Radioteleprinter Contest rules

The RSGB General Rules for VHF contests 1974 will apply, except where superseded by the rules and amendments detailed below.

1. Time and date. 1000–1600gmt, Sunday 12 May 1974.

2. Entries to be sent to: R. W. Fisher, G3PWJ, 47 Elmhurst Drive, Kingswinford, Brierley Hill, Staffordshire.

3. The contest is open to radio amateurs holding a British licence.

4b.

5a. In the event of a tie, the entrant having the better average points per contact will take precedence.

6a, 7a, 8b.

9. Radioteleprinter only. (50Baud speed is recommended).

10a, 11.

12. Contest exchange shall consist of:

(1) RST and serial number
(2) Both QTH locator (QRA) and QTH containing county code letters
(3) Time of commencement of contact (GMT)

13. Entries. The Log shall be made out in the format of RSGB log sheets and tabulated as follows:

(1) Date and time (GMT)
(2) Callsign of station worked
(3) My report on his signals and serial number sent
(4) His report on my signals and serial number received
(5) QTH locator (QRA) received
(6) Time received
(7) My transmitting Baud speed
(8) QTH received
(9) Points claimed.

The log shall contain details of callsign, QTH Locator (QRA), and QTH as transmitted, together with a signed declaration that operation was within the rules and spirit of the contest.

14. 1 only, **15, 17, 18, 19, 20, 22, 23, 24, 25.**

26. The adjudicators' ruling shall be final in all cases of dispute. RSGB Rules and county code letters were published in the January issue of *Radio Communication*.

Grafton RS 144MHz Contest rules

1. The contest shall be open to all UK licensed amateurs (individuals only, club entries NOT accepted) and will be run in the 144MHz band on Saturday 16 February 1974 between 2100 and 2400gmt on all permitted modes. Entrants may not change the location of their station during the contest.

2. Scoring. Contact made between the distances tabulated below will score as indicated. Contacts on borders between scoring rings score low.

Km	Points	Km	Points	Km	Points
0–50	1	150–200	7	300–350	13
50–100	3	200–250	9	350–400	15
100–150	5	250–300	11	400–450	17

and pro rata

All radial rings are 50km wide, all scores odd numbers.

Only one contact with a specific station to count.

3. The contest exchange shall consist of RS or RST report followed by serial number and both QRA Locator and QTH.

4. Proof of contact may be required.

5. Contacts made by eme reflection, man-made satellites (active or passive) or any relaying device will not count for points.

6. Logs will only be accepted if submitted as follows:

GRAFTON RADIO SOCIETY 144MHz CONTEST 1974

Name ..... Call sign ..... Total point claims....

Postal Address .....

Date & time (gmt)	Callsign of station worked	Report & serial No sent	Report & serial No received	QRA Locator received	QTH received	Points claimed

After your last entry add: I declare that my station was operated strictly in accordance with the rules and spirit of the contest and agree that the ruling of the Management Committee of the Grafton Radio Society shall be final in all cases of dispute.

Signature ..... Date .....

7. Entries must be postmarked not later than 11 March 1974 and sent to the Grafton Contests Secretary: B. C. Bond, G3ZKE, 86 Agar Grove, London NW1, from whom additional copies of these rules may be obtained (sae please).

8. Certificates of Merit will be awarded to stations placed First and Second.

9. **A special certificate** will be awarded to the highest placed station first licensed within the six-month period prior to the date of the contest. If you qualify for this special certificate, please quote the date of your licence on your log heading.

Contests calendar

9-10 February	—First 1·8MHz (Rules in January issue)
16 February	—Grafton RS 144MHz (Rules in February issue)
16-17 February	—ARRL DX CW
23-24 February	—REF Phone
2-3 March	—144MHz Open & SWL (Rules in February issue)
2-3 March	—ARRL DX Phone
9-10 March	—BERU (Rules in November 1973 issue)
16-17 March	—ARRL DX CW
23-25 March	—BARTG Spring RTTY Contest (Rules in December issue)
30-31 March	—CQ WW WPX SSB
30-31 March	—432MHz Open
7 April	—80m Low Power
20-21 April	—Bermuda Contest (phone)
21 April	—70MHz Open
27-28 April	—National Amateur Television (Rules in February issue)
4-5 May	—144MHz Open & SWL
4-5 May	—Bermuda Contest (CW)
12 May	—Mid-Severn Valley Teleprinter (Rules in February issue)
25 May	—1,296MHz Open
26 May	—432MHz Open
8-9 June	—NFD (Rules in February issue)
9 June	—70MHz Portable
15-16 June	—Microwave Field Day (Rules in February issue)
22-23 June	—Summer 1·8MHz
25 June	—Start of 432MHz Summer Cumulative
6-7 July	—"Jubilee" VHF/UHF & SWL
13-14 July	—SSB Field Day
21 July	—432MHz Open
28 July	—70MHz Open
18 August	—144MHz QRP
7-8 September	—VHF NFD & SWL
15 September	—80m Field Day
5-6 October	—UHF NFD & SWL
October	—Start of 70MHz Cumulative
October	—Start of 432MHz Cumulative
19-20 October	—7MHz CW
2-3 November	—7MHz Phone
2-3 November	—144MHz CW
9-10 November	—Second 1·8MHz
8 December	—144MHz Fixed

For **432MHz Spring Cumulative Contest** rules, see January issue.

NOTE: The date of NFD is 8-9 June, not 1-2 June as previously shown in the calendar.

Looking ahead

6-7 April 1974—VHF Convention. "Winning Post", Whitton, Twickenham, Middlesex.
16 May—Radio Amateurs' Examination.
17 May—RAOTA reunion, Bonnington Hotel, Southampton Row, London WC1.
14-15 September—North-West Amateur Radio Convention, University of Lancaster, Bailrigg, Lancaster.

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each must be accompanied by a recent *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th of the preceding month but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

See the current order form on the last page for further details.

Post to : MEMBERS' ADS, "RADIO COMMUNICATION". 35 DOUGHTY STREET, LONDON WC1N 2AE

FOR SALE

Storno 10WRF bases, ok for 4, fm, several—£10–£17. UHF base, as new, £25, Racal RA218 isb/ssb adaptor with handbook, £30. Panadaptor, 28–30MHz input, £10. Buyer collects. G8AKA, QTHR. Tel Mortimer 332582.

FR50B rx as new still under guarantee, cost £75 sell for £60. RO5 dipole, £6. 30ft mast made up of two 15ft by 2in sections with wall bracket, £7.50. Six-element J-Beam, £2. R. D. Graves, 2 Banchory Road, Blackheath, London SE3. Tel 01-858 7912.

Complete 2m ssb rig including Heath HW32A and professionally-built transverter, £98. G8HDZ, 15 Swanne House, Gloucester Circus, Greenwich, London SE10.

VTR colour adaptor. Converts any helical scan tape recorder to colour. Encodes RGB to 3MHz composite video and decodes to RGB. Fully solid state. Philips type EL1801, £95. G3WJG, QTHR. Tel 01-997 0901.

FT101 mint condition with cooling fan, £210. GM6XW, QTHR. Tel Larbert 2604.

Pye Pocketfones, £20 pair tx/rx. Dash Cambridges lowband fm £15, and base £25. Pair lowband fm Bantams, £35 each. Also sundry base control units. R. Burrows, 144A Maney Hill Road, Sutton Coldfield. Tel 021 354 9736.

Pye Cambridge AM10D dash mount good condition, £20. W. Tee, 13 Barry Road, Bitterne, Southampton. Tel Southampton 445877.

Property late G3YPJ; KW Vanguard, £25. Heathkit RA-1 rx, £20. Codar AT5 with ac psu, £16. All c/w handbooks and all ono. Buyer collects, phone to view. G3WQF, QTHR. Tel Haverhill 2470.

Telford TC7 rx 28–30 i.f. brand new with bandsearch module, change of plans leaves this piece spare, save £24.50, bargain, £30. *Wanted* AR22, Telomast 30ft why. M. Shipton, 48 Clockhouse Lane, Romford, Essex. Tel Romford 67000.

Rtty Creed 7B teleprinter, £10; Creed 85R printer perforator, £6 each. 30-0-30V psu, £3. G8FPS, QTHR. Tel 097-62 2659.

Modulator high power pair 6146s UM2, complete with psu. All on chassis 19in × 10½in × 10½in, £15, ono. G3ZRM, QTHR. Tel Aldershot 26108.

2m tx 3·20 pa, £13.50. New QQVO640, £5. New 6 over 6 2m aerial, £3.50. G8GEN, QTHR.

KW204 with vox unit. Twelve months old, little used on cw only, £125. G3GQS, QTHR. Tel Helston 2158.

AM10D Cambridge with tunable receiver, also am base tx, both with mic and xtal. Eddystone S640, £21. G4ATS, QTHR. Tel Leeds 603823.

Exchange Trio TS515 new July 1973 for am/cw rx or tx equipment vhf or hf or why. *Wanted* HRO modified or otherwise with or without coils and psu. G5YV, QTHR. Tel Morley 7412.

Denco dp coils. Ranges 2, 3, 4, 5, blue, red, white, 15p each, new and canned. Still available, Q mult coils, state freq reqd, 50p each, add suff for post. G3LBT, QTHR. Tel 0268 412177.

KW Viceroy, £45, DX40 plus vfiu, £15. Codar CR70A plus PR30, £15. Buyer collects or deliver 30 miles. G3JVJ, QTHR. Tel 021-705 6584.

Yaesu FR400 SDX receiver 160-2m, as new with instruction manual, £140. Hallicrafters HA-1 keyer, £30, as new. GW3YGH, QTHR.

IC2F with xtals for 6 channels, build-in a.m. detector. Good working order, £55, plus postage, also Yaesu 2m converter 28–30MHz, as fitted FR400 series, £8.50. G3XWP, QTHR. Tel Stourport-on-Severn 3200.

Oscar 10m fet receiver converter i.f. 2·45–2·55MHz, £4 ono. Digital ic calibration spectrum generator, £10 ono. SSM pa3 2m preamp, £3. Tested valves 6146(4), £0.75 each; 6146B(2), £1 each, 2E26(2); 50p each. G8CEX, QTHR.

Class D wavemeter mains, £4.75. Hansen swr meter, £4.50. Medco lp filter, £4.50. Heath HP13 mobile power supply, £30. Carriage extra. A. F. Walton, 39 Oakdale Drive, Wrose, Shipley, Yorkshire. Tel Shipley 57490.

FTdx401, immaculate condition with hand mic. Free carriage by Securicor, £200. Write or phone (evening). P. Reed, 73 Dudley Road, Brighton, Sussex. Tel 0273-504634.

STC 10·7MHz crystal filters, modern miniature types, 923B, 920B, 15kHz, 920A, 25kHz bw, all £8.50. *Wanted* B2 tx/rx complete. G3NCR, 1 Lifford Street, Putney, SW15 1NY. Tel 01-789 6161.

Gotham cubical quad as new, unused in original box, unable to erect, £22. Also 35ft sectional mast in six 6ft sections, £8 ono. Prefer buyer collects. G3KYF, QTHR.

Trio TS-510, PS-510, good condition, £125 ono. AM10B 6-chan, Pye Cambridge, as new, all cables, cradle, control box, etc. 2m less xtals, £30 ono. G4BIK, QTHR. Tel 051-724 4229.

HRO RX, 7 coil packs, circuit, some spare valves, no psu, £10, plus carriage or collect. G8AKT, QTHR. Tel Potton 0767 260 462.

HW32 20m tx/rx complete with mains and mobile psu/speaker units, Shure mic, Tavasu /M aerial, all cables, etc. Excellent condition, £80. G3SJI, QTHR. Tel Bristol 623321. May also be seen at Burnham, Bucks.

QQV02-6, QQV03-10 Ex-equip, 50p. QQV03-20, £1. ECC88, 2C26, new 50p. G3HZP 1,000W Balun, 60p. Output meter 7in by 7in wood case £1.25. LA2503 Vinctors 950mHz, 50p. Various meters sae. Avo signal generator, £6.50. G3WBT, QTHR.

AM25B Vanguard, complete with control box, cables, crystals for 70.260 and manual, £15. G3ZZR, QTHR. Tel Witney 3792.

"Radio Comm" '71-'73 £6. Top Band "Command" set rx 1·5-3·0MHz, £5. 7W audio amp, 2EC182s in ult lin, £5. 6J7/6V6 audio amp, £3. Jason fm tuner £3. Top band tx, £5. TCS12 type rx 1·5–12MHz with psu, £10. 4-speed Collaro auto deck, £1.50. Offers considered. G3TQB, QTHR. Tel 061-483 7060.

1 Labgear 160 twin mod for 3·5 tx mic, key Labgear 12V, neg earth mobile psu Tavasu mobile aerial, with loading coils for 160 and 80m, sell complete or separate, £36 + carriage. Why. Robert Williamson, "Bavonmore", Antrim Road, Ballymena, Tel 41468.

House, four bedroom, detached, gas central heating, garage, modern, Kidderminster, £12,650. Contact G3MWQ, 3 Albert Road, Wellington, Salop. Tel 55735.

TW Communicator, £35 ono. AR88D, £30 ono. Sony recorder TC108, £40 ono. Joystick and Joymatch, £4. Class D No 1 wavemeter, £4. Crystal calibrator No 7, £2. Wheatstone Bridge, £2. Solarton digital voltmeter LM904, needs attention, offers. G3ZZY, QTHR. Tel Tavistock 2827.

RTTY tape reader, Creed model, 2F, £5. Receiver noise figure test set, including mains psu, noise source (with spare A2087) and receiver output meter, £10. *Wanted*, Heath HW7, preferably with psu. G3KSU, QTHR. Tel Ryde 5551.

Collapsible portable dark room, 6ft by 4ft by 4ft, 19 set; 19 set psu; PCR2 (works but looks tatty); PCR2 power supply, sold as seen, collect only, no reasonable offer refused. Seen by appointment, sae please. G3YAO, QTHR.

4X50Ds 150W 144MHz, £1.50. Approx 72 copies, *Radio Constructor* 1963/69, £5 as new. Buyer collect or postage extra. G8CJO, QTHR. Tel Bristol 72435.

Spinx ssb tx, good condition, complete with Delta control unit, £40 ono. G4AJO, QTHR.

EC10 Mark 1, £35. 70MHz a.m./cw tx, £9. KW2000 dc psu, £17. *Wanted* Eddystone 750 or similar. G3OHC, QTHR. Tel 021-308 2512.

432MHz varactor tripler, Microwave Modules, untouched, £15. 465KHz nbfm discriminator modules, 3 available, built on Veroboard using ic, £2 each. G8AGR, QTHR.

KW2000E and ac psu new, air tested only, originally purchased for a Canadian who bought the same thing locally. Not now required, £195. G3PGN, QTHR. Tel Blackmore (Essex) 822891.

Marconi multimode signal generator, 20–80MHz, £15. 2m fm base transmitter, £20, Matching STC vfo (2–5·5MHz), £20. DL6SW converter, £10. Codar CR66 rx, PR30,RQ10, £30. TW 70cm converter, £7. 30W hi-fi amplifier, £25. G8AOQ, QTHR. Tel Bolton 54679.

RX d conv ham bands and spkr, del 50 miles, £17. 2m convtr, 28MHz, i.f., £5. 8el Yagi, £1. Avo7 reqs atten, offers. TT21, 75p. 5B254M, 50p; and others. G3VFQ, QTHR. Tel 0532 757692.

Microwave Modules MMV432 tripler, good condition, £13. Heathkit GR64E general coverage receiver, £10. *Wanted* 10·7MHz nbfm filter. G3ZSS, QTHR. Tel 05432-22614.

Pye Westminster W25FM, lowband, 3 channel, as new, complete with mic, speaker, cables, cradle and handbook, offers, buyer collects. G3NPA, 9 Gunnis Close, Rainham, Kent, ME8 9TG. Tel Medway 35070.

Trio JR500s with 160m and 2m converter, £50 ono. Buyer collect. G. Park, 11 Ramsgreave Road, Blackburn, Lancs. Tel Blackburn 61796.

BC-625 2m a.m. tx, 12W o/p, £5. BC-624 2m tunable rx, £5. Large mains psu for above items, needs attention, £2.50. Buyers collect. Also 2m square halo, £1. G. Plucknett, 432 York Road, Stevenage, Herts.

On behalf of the Amateur Radio Club of Nottingham, Hy-Gain 18AVQ aerial, £15 ono. Carr extra. Contact G4AFT, QTHR. Tel Nottingham 246997.

KW Atlanta psu spare 6146s, Shure mic KW103 swr pwr meter Ezeematch trap dipole, complete 500W ssb station, £160. Consider separating. G3ZRJ, 49 Alwold Crescent, Lee, London, SE12 9AG.

Two HC6U xtals 8·060 and 8·104, or exchange for two in range, 8·028 to 8·056 and/or 8·0690 to 8·08335. G8ESK, QTHR. Tel Bradford 45611.

EC10 mk2 vgc, £45 ono. Would deliver reasonable distance, petrol permitting. P. J. Freeman,1 Littleworth, Towcester, Northants. Tel Towcester 50632.

G2DAF mk 2 transmitter with psu, £45 ono. R107 with S-meter, £12. Hi-band Murphy base station, transmitter retuned 144MHz, 40W, £15. Trio JR60 general coverage receiver + 2m, £35. TW2, 2m tx + psu, £15. G3XSO, 11 Hazell Way, Stoke Poges, Bucks SL2 4BW. Tel Farnham Common 2902.

Sentinel X de luxe 2m converter, 28–30MHz, integral psu, mint, £14. Heathkit RA1 receiver with speaker, xtal calibrator, handbook, £25. Two mains PSUs, 12V ac out, £1 each. CQ "Surplus conversion handbook", new, 90p. Cockbrain, Coplands, Dartington, Totnes, Devon. Tel: Totnes 2484.

Joystick VFA 1972 model, £4. Morse beginners course G3HSC. £2.50, electro-mechanical gearbox, £5. TCC multitest meter 18 ranges, needs repair, £2.50. Pair 18in stand-off brackets, new, £2. A. V. Neilson, 78 Ackers Hall Avenue, Liverpool. L14 2EA. Tel 051-220 5470.

KW Atlanta 500W p.e.p. with vfo and psu. KW107 atu system, Shure 444 ptt mic, all as new, the lot, £140 ono. G3PFD, QTHR. Tel Bristol 658689.

Hammarlund SP600JX 550kHz-54MHz, double conversion extremely good stability, superb condition with speaker and full handbook, £85 ono. *Wanted* SX42, Sony CRF230 or Barlow Wadley. S. A. Andrews, 12 Malton Way, York YO3 6SG. Tel York 59035.

Pye Cambridges dash mount, 15W output, mains blowers, few only, state tx frequency, £35. FR50B, £65 ono, carriage extra. Yaesu FR50B with calibrator and WWV, £60. 2m converter 28-30 i.f. £6. Ex-REME No 62 set. Class D, No 2 wavemeter, £10. Converter 20–90MHz, £2. All working, with spares, etc. *Wanted:* 144MHz rx, Telford, or Crewe, preferably 12V dc and mains. D. Hawkins, Rosedale, Snowden Cottage Lane, Chard, Som. Tel: 04606 (Chard) 2275.

SB102 built from kit, needs Heathkit check but physically perfect, nearest offer £200, or consider exchange colour television, audio equipment etc. Des Walsh, Ballylynch, Carrick-on-Suir, Eire.

Pye Cambridge tx/rx, rx needs attention on 2m, £15. Hallicrafters S-38D rx, £10 ono. Codar CR45, 2 coils, £5 ono. G8HXF, QTHR.

KW204 tx with vox unit, good condition, £105. Also Trio JR500SE rx professionally modified for 160m and fitted for full 10m coverage, built-in calibrator, good condition, £45. G4AEZ, QTHR. Tel 01-366 7166.

National NCX5 mk2 tx/rx with ac psu, and speaker ncxa, crystal calibrator, spare set valves, manual, excellent order, £150 ono. G6PD, QTHR. Tel Royston 60474.

2m fm mobiles. A few 12V Storno Viscounts with mic and control-box, ready converted for 2m. These are part transistorized and capable of 10W output, £20 each, less xtals, collect. G8AKA, QTHR. Tel 332582.

Pye base station 704, tx on 2m rx not working, £8; Pye Vanguard AM25B/V/12 high band no control equip, £10. Valves 5B/254M, £1; 2E26, 50p; buyer collects. G8CHN, QTHR. Tel Bradford 74836.

Mains transformers, 110V primary 4,000Vct 600mA/s, ceramic terminals, rugged, £5. 240V primarys, 1,000Vct 170mA/s, £2. 6V 8A, £1. Coutant stabilized psu type D200/24, 24V dc, 2A, with literature as new, £5.50. Carriage extra. J. H. Lepper, 128 Sheephousehill, Fauldhouse,West Lothian, EH47 9EL. Tel Fauldhouse 433 (Evenings)

Marconi CR100 rx, good condition, appearance, with spare valves, handbook, speaker, £6. Marconi 867, signal generator, £80. M. Kidman, 27 Norton Crescent, Towcester, Northants.

BC221 with calibration charts, ac psu, speaker, £16. SSM 2m convertor i.f. 9/11, £6. TF144C, £7. Generator 15Hz/50kHz sine/square, £6. R209 with transistor invertor, £10. B44, £4. Ring Claverdon 2541. G3XBY, QTHR.

1,200W desk top linear. Pair 572B grounded grid. Professionally engineered and sprayed to match FT101. Conservative rating of top quality components make this unit an excellent buy at £65. G3MSL, QTHR. Tel Fleet 21446.

Bird Thruline wattmeters, C type connectors, £20. Bird elements 1W, 425, 850MHz, prefer to swap why. Also Hewlett Packard counter, 524c (valve) DC-220MHz working £70, 8 digits with manual, buyer collects. G8BYL, QTHR.

CRT VCR 139 + mu-screen, £3. Hand-mic 100k, £1. Z-match split stator 300 pt per section, £3. Silver Grey instrument case, suitable to build scope in etc 4in by 7in by 12in, £2. Please add postage. G4AWJ, QTHR. Tel Heathfield 2454.

Pye Cambridge rx, hi-band, boot-mount, unconverted, with 2m xtal, manual and controls, (not control box), £10 plus £1 postage. Xtal unit, containing 13xtals freq approx 20MHz, £1.50 plus 25p postage. G8GLM, QTHR.

Record pen recorder, type 28A. speeds 1in and 6in/h, also spare, with only pen and ink trough missing, speed 6in and 12in/min, 3½in chart, offers. P. J. Clark, Eliot College, The University, Canterbury, Kent.

KW Electronics 2m QRO "one-off" transmitter 110W to QQV06/40A, tuned lines, a.m. and fm, 4 xtals (12MHz), internal power supplies, £35, carriage extra. 2m/M/P tx, G8ATK rf board QQV03/10 final, transistorized modulator and inverter, PTT mic metered, vxo, xtal, £12. 10 meters, £2, both carriage extra, sae for details. *Wanted:* circuit and pc layout of 2m linear using PT4176D (2N4128) transistors. Payment offered. 8·0555, 63·000, 44·7666, 2·602MHz xtals. Neville, 27 Newbury Close, Great Wyrley, Walsall, Staffs, Tel: Cheslyn Hay 415374.

Pocket calculator battery mains 12 digit case, £18.50. 160m transvertor 7MHz input 40W p.e.p., £20. AM10D 145·8MHz, £20. 2m 5/8 λ whip, £1.50. Two 19in by 21in, enclosed racks, £1.50 each. No 10 calibrator, £1.50. TS184A 432MHz frequency meter, £3. G8ESY/G4BXD, QTHR.

Pye Reporters, with handbooks, Bendix TA12 tx, Pye base rx, APS13, 70cm, tx/rx, TR2002s, for compact 2m conversion, £4 each. Hallicrafters S27CA (vhf) TR2002, 2W on 2m, £6 each, carriage extra. GW3EJR, QTHR. Tel Cardigan 2331.

R206 rx 0·55MHz-30MHz, modified front end E88CC, 6BA6, ECH81 xtal filter, £16, will deliver within 50 miles. Tel 01-866 8988.

70cm 14el Skybeam, loft use only, £3. Electrolytics unused, 280V, 200 + 200; 350V, 60 + 100; 20p each. Tripletone valve audio amplifier, £1.50. "Gramophone" 41 issues 60/63, £2 the lot. "Tape recorder", "tape recording", 96 issues 59/68, £12. G8CLG, QTHR. Tel 01-778 2739.

AM10D dash mounting Cambridge tuned to 145MHz, £25; AM10D with electronic tuning on rx and 6 channels tx, £30. HRO, coils, psu, £15. Many other items, clearing shack for space. G8EOL, QTHR. Tel 01-959 5051.

Trio JR500S, excellent amateur band receiver with SP-5D speaker, beautiful condition, £43. Telford TC7 mk2 tunable i.f. 28–30MHz, perfect, little used, £35. *Wanted* HA800 or Inoue IC700R in good condition. Price, Sherwood House, Brimpsfield, Gloucester.

UHF solid-state, tv tuners variable, £1.60. Valves PL504, PL508, PL509, 75p each. Mint mw command rx, £3.50. also command set spares BC453, BC454, BC455. SAE list valves, transformers, inverters and meters. G3LHA, QTHR. Tel 414333.

AR88D, £28. DX40u pius vfiu, £20. Lionel bug key, £5. Top band home-brew tx plus pp, £5. Taylor 65B signal gen, £8; or £60 the lot. G3DCN, QTHR. Tel Hemel Hempstead 56196.

Trio JR500S amateur bands rx, good condition, carefully looked after, ssb, a.m., cw, also anl, 10MHz WWV, 1kHz readout with good selectivity, £45. Murden, 93 Gillshill Road, Hull, Yorks. Tel 0482-78364.

KW E-Zee match atu, as new, £12. Walters type 51 morse key, unused, £6. Craig, 2 Blakehall Road, Carshalton Sy. Tel 01-387 2255.

FT401 immaculate inc mic, £195. Solartron CD513 scope, £20. 2,250V 565MA Collins transformer new, £6; + other components for kilowatt linear, Medco ldf, Kw swr, bridge + lots more, going QRT. G4BMH, QTHR. Tel Guilsborough 261.

Brandenburg psu, 200/250V ac + 6·3 ac at 3A, £4. 4m nuvistor converter + psu, £4. Lafayette capacitance/resistance analyser, £12. RF field strength meter, £1. Transistor tester, £6. Solid State Modules 2m converter, £11 ono. J. Owen, 76 The Glade, Croydon, Surrey. Tel 654 5741.

Two 19 sets one with "B" set, one without psu, leads etc, offers? Or would be interested in part exchange other army gear C13, C11, R210 etc, for acf use. Capt. M. Buckley, 62 Ballards Way, South Croydon, Surrey. Tel 01-b57 4778.

FR50B 160–10m, 9 months guarantee, mint condition, under 10hrs use, cost £81.50, £73 ono. CFS rtty converter psu manual, £12 ono. Sentienal 2m converter one week old, £13. *Wanted* SB301, offers. A. West, 29 Halfmoon Lane, Herne Hill, London SE24 95X.

FT-2 Auto plus receiver vfo, switched wide, narrow filters, a.m. detector. All eight channels with xtals including repeater, £200 p.a. G8GSZ, QTHR. Tel 37944.

Heathkit SB200 used only few hours, £95. G3KVH, QTHR. Tel Stourbridge 5893.

Complete clearance CR100, VR55 with inbuilt psu, wkg but need attention, mains tape recorder, 5in reel, £7. Furzehill, crystal calibrator with psu, £2.50. Wavemeter type W1270, £5. TU98 unused. Buyer collect. Rigg, 77 Prospect Mount Road, Scarborough.

18AVT/WB vertical, guys and radials, £25. Emsac 2m tx cw/a.m./fm, 5 xtals, £35. Heathkit RA1, calibrator, £25; AM10B unmodded, no mic, hi-band, £8. *Wanted* FT75 plus vfo. G4CHD, QTHR. Tel Cheltenham 53178.

Trio JR310, mint condition, complete with extra 10AZ filter and SP-5D speaker, original packing, £50. carriage extra. G8BTX, QTHR Tel 0502-3606.

Hudson AM10S base tx/rx on 2m, complete, £23. Eddystone 840A rx isolation transformer fitted, £28. Nombrex sign gen 31 160kHz–340MHz, £9. Tech 15 transistor gdo, £9. QRP 2m 20mW tx, including modulator xtal, £2.50. G8FHN, QTHR. Tel Medway 63365.

Scope, Hartley 13A, 5·5MHz, 33mV/cm, calibration markers at 100kHz and 1MHz, circuit diagram, in good working order, £14. *Wanted*: manual for Solatron CD711 scope. T. Bailey, Chaucer Lodge, Maresfield Pk, Uckfield, Sussex. Tel Uck 3165.

Trio, JR500SE rx amateur bands 3·5 to 29·7MHz in original carton with manual. Good cond, £42, prefer buyer collects. DM501 PTT hand mic, £2.75. G3JHK, QTHR.

Sell or exchange, Braun T1000 coverage 160 to 10, a.m., bfo, and side band, medium wave, long wave, fm, cost £185, accept £100. *Wanted* FR400SDX or Trio JR599 mint condition; ring evenings. G. R. Crawford, 94 Bryw Cwnin Rd, Rhyl. Tel Rhyl 54506.

B28 rx, £12. dc-dc converter 6V to 12V, £4. 6V vhf tx/rx cossor type 108, £5. Cossor 339A db scope, £4. G3SIK, QTHR. Tel 01-883 1136.

Heathkit GR-78 receiver, factory built, includes built-in speaker, 150kHz-30MHz coverage with bandspread for 80m-10m, excellent condition, complete with handbook and matching headphones, £60 ono. J. R. Arrowsmith, 16 Mancetter Road, Mancetter, Atherstone Warwickshire CV9 1NZ.

FT75 plus mic, dc and ac PSUs, 3 xtals on 80 one xtal each other bands, consider exchange for sstv monitor, or good 2m tx/rx, or part exchange transverter suitable DX401, would sell, £110. G3WHQ, QTHR. Tel. Grimsby 823824.

Heathkit IM17 portable solid-state vvm, £10. Pye Ranger psu, £2. 500-0-500 170ma transformer, £2 ono. Electroniques 3·5 to 28MHz wide band couplers set, £2.50. G3TAZ, QTHR. Tel Potton 260540.

"Radio Communication" 1966–8, 70, 71, 72, 73; "SWM" 1971, "Ham" Radio 1973, Radio Comm Handbook 4th ed, offers with postage. J. Baldwinson, 33 Cherry Close, Tulse Hill Estate, London SW2 2EY.

FT100 (Similar to FT150) transceiver, 120W fixed or mobile, 160 thru 10m, £110. Will deliver Bristol or London. G3OLB, QTHR. Tel Oldbury 4559 weekends.

Hy-Gain 18AVT/WB vertical used four months only, as new, with setting up details, first £20, buyer collects. G3MAY, QTHR. Tel 01-808 0197.

Clearing shack. 2m communicator. All band home-brew a.m. cw tx. Rack mounted 200W mod. 1·5kW psu Numerous components new and sh. Enquiries, offers, phone Ilminster 2797. G3DTB, QTHR.

Army 62 set, £10. Motorola vhf rx R394/U, 152–174MHz, fm, £5. Pye marine tx type 100337 1·5–16MHz, £5. *Wanted* circuit or manual for Marconi marine tx/rx type TV5. GW3TKG, QTHR.

G2DAF Mk 1 rx good condition, £40 ono, buyer to inspect and collect or pay carriage. Sentinel converter i.f. 4-6MHz, £7 or exchange for same with 28-30MHz i.f. CR70A rx, £12. PR30X, £5. D. A. Johnson, 29 Chatburn Road, Clitheroe, Lancs.

Trio 9R59DE two months old, £42. Home-brew tx, xtal controlled, all-band 40W, £25. Exchange Codar /m psu for ac psu. Also required, any df gear, any cond, and tall telescopic mast. P. Jenkins, 30 Gainsborough Road, N Finchley, London N12.

Yaesu FR400SDX fitted all mods, as new, manual and circuit, new in April 1973, offers around £130, Securicor delivery included. J. M. Raynes, 32 Hawthorn Avenue, Immingham, Lincs. Tel Imm 4596.

Trio 9R-59DS, matching speaker, manual, original box, perfect condition, £40. Receiver uses Denco coils, will operate 160–10m (160m coils only), £4. D. Pollington, 27 Stoke Avenue, Hainault, Ilford, Essex. Tel 500 6922.

Eddystone EC10 rx, mains psu, £46 ono. Sentinel zm fet pre-amp, £5. Sentinel dual gate mosfet zm converter 28 to 30m i.f., £12. Cossor double beam scope 1049 (faulty) + handbook, £12. Geloso rx, £30. Home-brew 2m a.m. tx. QQV03/10 pa + cct, £5. G8FQE, QTHR. Tel Sapcote 3404.

Heathkit HW-32 vgc, £32. Pye Ranger, £8. Gem-quad 2-el, almost new, £50. G2DAF rx, fitted Collins filter, psu, 160–10m, fb, £50. Hy-gain TH3, mk3, brand new, boxed, offers. G3XTN, QTHR. Tel. Kenilworth 56828.

Eddystone EC10 mk1, very good cond, £30. Sentinel sm converter i.f. 4-6 MHz, £7, or both £35; buyer collects. R. Shilvock, Wolverhampton, 76 Queen St, Kingswinford, KWD 79661, or Wolverhampton 26262.

KW2000A ac psu, Shure mic, mint cond, £140. G3TFN, QTHR. Tel 061 761 2952.

FLDX400, FRDX400 and SP400 speaker, excellent condition, £230, but would consider splitting. Write for details. G. Foster, 45 Emperor's Gate, London SW7.

Eddystone EC10 mk2 fitted fm discriminator and 4-6 meg, 2m converter (Microwave modules) fab condition ideal 2m portable rx complete, £80, less convertor, £70, delivery by arrangement. G8GAG, QTHR. Tel Stratford-on-Avon 4718.

B28 (CR100) rx, offers, buyer collect or arrange transport. 2m a.m. tx QQV03–10 pa transistor modulator (bit low on mod) 12V. G8CVS, QTHR.

SSB 2m tx with Racal tx/rx exciter 100W rack mounting, £90. will split. 4m portable tx with converter, £10. 70cm converter, £5 transistor type as per handbook. G3WJG, QTHR. Tel 01-997 0901.

G2DAF mk2 rx pair Collins, usb/lsb mechanical filters 2·7kHz/bw, 500kHz, £25. SB102 professionally built, under 10 hours use, excellent, £230 ono. MP32A psu, mint, £32 ono. Hustler mobile whip 20m loading coil, mint, £16. G3HSR, QTHR. Tel Templecombe 551/ext 287.

Yaesu FR400SDX, rx 160m to 2m, new Feb 1973 in mint condition with handbook, original packing, connectors etc, £160 ono buyer to collect. G4BRW, QTHR. Tel Taunton 87406.

Heathkit 2m HW30 tx/rx, £15. Oscilloscope OS2, £18. Tape recorder, £5. Avo meter model 40, £5. 2m beam, £1. KW202 rx as new, £100. Liner 2, £100. G8CVR, QTHR. Tel Aldridge 52706.

Vespa mk2 with psu, £80. TA33 junior, £30. As new. Swop both for a Liner 2. Sell FT2FB immaculate, £80 or swop + cash for Liner 2, must be unmodified 2m 8/8, £5.50 ono. G8CVD, QTHR.

FT101 mk1 complete with all plugs/leads/box etc, 18 months faultless mobile/fixed operation, £170. Shure 444 mic new in box, £10. Heathkit Mohican rx, £12. G3LMO, QTHR.

TA33JR, £20. AR22R and control, £20. Approx 30yds 4-core cable, £4. Panda PR120V, £20. Will del to 40 miles or buyers collect. Hattersley, Hill Top, Holymoorside, Chesterfield. Tel 6040 after 6 pm.

FR400SDX fitted all options, little used, mint condition, original box with full instructions and circuit diagram, £140, onvo, part exchange considered. G. L. Baxter, 251 Harrogate Road, Eccleshill, Bradford, BD2 3RQ. Tel 0274 639823.

BC454 rx, £3.50 wide-spaced transmitting type variable capacitors, send for list. *Wanted*: 80m and 40m crystals for tx (10x or 10xj preferable). Mains transformer, secondaries: 350-0-350V, 100mA, 6·3V, 3A. R. Kell, 38 North Lane, Seahouses, Northumberland.

WANTED

Eddystone 888A. G8CDP, QTHR. Tel 0642, 38237.
Galvanized P60 tower Omega T bridge, G4AIR, QTHR. Tel Macclesfield 24839.
Communication rx 2–30MHz in reasonable cond for enthusiastic schoolboy of limited means. G3JLJ, QTHR.
Mobile psu for KW2000A. G3BZB, QTHR. Tel Tutbury 3209 or 3198.
Racal unit type MA161. G3PHA, QTHR. Tel Bolton 52384.
Electroniques transistorized coil pack, good price paid. S. O. Hesketh. Tel Chesham 5557.
Barograph for propagation prediction experiments. Willing to repair and calibrate as necessary. G8BOU, QTHR. Tel Bracknell 25043.
Electroniques coil pack, general coverage type, valved, reasonable condition. G3ZZO, QTHR. Tel Office 01-854 8888 ext 464.
R107 power supply module or complete receiver, also oscilloscope, anything considered. G8FUZ, QTHR.
Heathkit SB220 linear. G3TCC, QTHR. Tel 01-851 9300, evngs after 8pm.
Central Electronics 10A, 10B, or 20A tx. Also Drake 2B receiver and Drake 2LF converter. P. D. Coull, "Domel", Elham, Kent. Tel Elham 244.
Johnson Matchbox atu. G5LH, QTHR. Tel Newcastle upon Tyne 662490.
Small rotator and or hf beam and indicator. G3VXS, QTHR.
Centimetric signal generator TS-13/AP circuit diagram, loan to photocopy. G8DDT, QTHR. Tel Fleet (Hants) 21218.
Cathodeon crystals filter type BP4128/USB. 68·8MHz, 1·400MHz, HC/6U crystals. Reasonable price please. G8HNN, QTHR. Tel Worcester 51956.
Keyboard morse sender for disabled member unable to brass-pound. G4BBA, QTHR. Tel Peterboro' 65213.
Bird 43 wattmeter elements, 44MHz HC18 xtal. G3LQR, QTHR. Tel Rendham 493.
Buy or borrow servicing notes for HMV model 1121, mfr unable to supply. C. Mapp, 7 Lancaster Close, Fakenham, Norfolk. Tel 3442.
Mullard 5/10 amplifier. G3FTA, QTHR. Tel Hastings 3828.
KW Ezeematch. HRO coil 0·9-2·05MHz. G3NJP, Shandon, Willesley Pound, Cranbrook, Kent. Tel Sissinghurst (Kent) 482.
Xtal for Class D wavemeter. GM4BVC, 2 Baillieswells Crescent, Aberdeen. Tel 48202.
Ex-RAF signalling lamp—"pipe grip" handle with telescopic sight —other types considered,—full details please. G4AWT, QTHR. Tel 0302-55756.
Bases to fit QQV0320A xtals 48MHz for 2m xtals 10x fitting 8MHz for 2m. Collins 20W mod transformer 6,000Z CT. G8GBX, QTHR.
Geloso P1 network with switch assembly. 2–5MHz, 9MHz, 6·25MHz, 8MHz, 11·5MHz and 11·75MHz crystals. J. Smith, 47 Slieve Rua Drive, Lr Kilmacud Road, Stillorgan, Dublin, Ireland. Tel 01-888283.
2m tx/rxs any mode operation, would prefer commercial equipment. Also convtrs, varactors for 70cm operation. Pye pocketphones etc. P. Griffiths, Flat 3, 74 Wood Lane, Handsworth, Birmingham. B20 2AP.
Tx/rx in first-class condition. Swan, Drake, Heathkit etc. Please write with particulars incl price asked. Also mini beam aerial. G3WY, QTHR.
Purchase or loan to photocopy, manual or information on use of Windsor valve tester model 45B by Taylor Instruments. Also top band transistor tx, reasonable condn and price. G4BRX, QTHR.
FM 2m mobile tx/rx, single or multi-channel, must be working. Buy or trade you my working TW2 2m a.m./cw tx/rx. Will consider separate sale of TW2, £40 ono. G5ADJ, QTHR.
Hartley 13A oscilloscope handbook, or details of probe and pre-amplifier. Probe also wanted. Phone office hours. G3WZS, QTHR. Tel Southampton 559122, ext 2087.
Solartron CD 711 S2 very good spec, condition fair, £35. *Wanted*: buy or borrow manual Avo CT38, willing copy and return, postage paid. Robinson, 45 Maisemore Gardens, Emsworth, Hants, PO10 7JX.
FM 2m rig tx or tx/rx; anything from Pye fm base to ic 21XT considered, mains or 12V. Good performance and full 2m coverage essential, vfo or multi-channel. G8HAC, QTHR.
Mod transformer, one of those giant multi-tapped ex-marine tx type which handle about 500-1000W of audio or larger ok. 500pF × 1,000pF tx v/cs also wanted. P. Jenkins, 30 Gainsborough Road, N. Finchley London N.12.
School radio society requires a fairly cheap medium power radiotelephone or tx/rx rig working on 2m. The society will pay for carriage to Belfast or Derby. P. Boyd, Radio Society, Campbell College, Belmont, Belfast, BT4 2ND.
Racal junk sale. I purchased one BA22287 usb filter and one BA22286 lsb filter. I require either 2 usb or 2 lsb filters, will swap either or buy if you have spare. G3AQC, QTHR. Tel Camberley 21185.
Codar T28 receiver in good working order. Any reasonable offer considered. Will pay carriage. Phone during working hours only. P. Valteris, 5 Gent Close, Blandford, Dorset. Tel (work) Bfd 2410.
400μA, 300Ω meter, 3in square, for model 420SP multimeter surplus by Radio City Products Inc, NY, or redundant instrument for spares. A Gordon, 3 Rosemount Crescent, Annan, Dumfriesshire, DG12-6LF. BRS 25540.
Eddystone dial, 9MHz crystal filter with sideband crystals. 350pF 1kV variable capacitor. BC221 all in good condition. State condition and post-paid price. J. A. Young, Zoar, Wadbister, Girlsta, Shetland Isles.
"RSGB Bulletins". May and June 1946, August 1946 to April 1947. August 1952, August and September 1954, February 1955 and all between February 1956 to September 1967. Also complete years prior to 1945. M. J. L. Fadil, 26 Kingsley Place, London N.6. Tel (day) 01-668 2176 (evening) 01-348 4252.

INTERFERENCE PROBLEMS

Members accused of causing interference or who suffer interference from external sources are invited to seek the assistance of the Interference Committee in solving their problems.

Enquiries should be addressed to: The Chairman, Interference Committee, RSGB, 35 Doughty Street, London WC1N 2AE.

AMATEUR ELECTRONICS G3FIK

BIRMINGHAM 021-327 1497 021-327 6313

Despite the new credit restrictions we are still able to offer on-the-spot hire purchase facilities at excellent interest rates and whilst the deposit has now risen to one-third of the total purchase price please remember that your existing equipment taken in part exchange may well more than cover this.

This month we have a new selection of used equipment and have been successful in purchasing a complete batch of RACAL RA17 RECEIVERS and, as far as we know, are currently the only source in the country for these famous sets. To the RACAL enthusiast it would be unnecessary to extol the virtues of this incomparable receiver but for the uninitiated suffice to say that the RA17 is a professional general coverage communications receiver WITHOUT EQUAL regardless of price. This receiver has a superb specification as far as stability, selectivity, sensitivity, etc. etc. etc. but its one outstanding feature is a 1kHz read-out from 500kHz to 30MHz which coupled with its fantastic band spread gives the wonderful advantage of handling and performance on the amateur bands far superior to that found in many so-called amateur band sets—and all this in a general coverage receiver! For what it is worth, an RA17 has been the only RX in the shack of '3FIK for the last three years and it is as delightful to use now as the first day it was installed, which is an exceptional situation in our somewhat fickle hobby.

NEW EQUIPMENT

We would remind you that we have excellent stocks of the following manufacturers' lines:

SOMMERKAMP YAESU MUSEN TRIO KW COMMUNICATIONS SOLID STATE MODULES SPACEMARK

JUST ARRIVED! NEW STOCKS OF BELCOM LINER 2's (£120 + VAT).

FULL PRODUCT INFORMATION ON ALL OF THE ABOVE MAIN EQUIPMENTS BY RETURN UPON RECEIPT OF YOUR STAMPED ADDRESSED ENVELOPE.

NEW! NEW! NEW! A COMPLETE AND COMPREHENSIVE RANGE OF MARINE EQUIPMENT FROM RADAR TO ECHO SOUNDERS. By the time this appears in print we shall have full stocks of the above for the boating enthusiast. Full details on receipt of your s.a.e.

USED EQUIPMENT

Please note all prices include carriage but do NOT include VAT.

RACAL RA17 RECEIVERS. Fully serviced where necessary Grade C **£250.00**
RACAL RA17 RECEIVERS. Excellent condition. Grade B **£265.00**
RACAL RA17 RECEIVERS. Exceptionally good. Grade A **£275.00**
RACAL RA117 RECEIVERS. Excellent condition **£320.00**
RACAL ANCILLARY EQUIPMENT. A good selection in stock, an S.A.E. will bring you full details
EDDYSTONE EA12 RECEIVER. Brilliant condition **£150.00**
EDDYSTONE EA12 RECEIVER. Very good condition **£142.00**
EDDYSTONE 940 RECEIVER. First class condition throughout **£110.00**
EDDYSTONE 730/4 RECEIVERS. Stocks are now running low of this excellent model. Exceptional physical condition, fully bench checked and aligned etc. **£92.00**
HAMMARLUND SP600JX RECEIVER. Used condition with case **£90.00**
HAMMARLUND SP600JX RECEIVER. Excellent condition, with case **£97.50**
RCA 8516L RECEIVER. Very good condition indeed **£177.50**
EDDYSTONE 888A RECEIVER. Very good, unmarked **£75.00**
EDDYSTONE 840C RECEIVER. Excellent condition **£52.00**
KW201 RECEIVER. Very good condition indeed **£83.00**
EDDYSTONE EC10 MARK I RECEIVER. Excellent performance, soiled case **£36.50**
EDDYSTONE EC10 MARK I RECEIVER. Excellent throughout **£41.50**
TRIO TS510/PS510/and complete with separate VFO-5D, excellent **£157.50**
TRIO JR310 RECEIVER. Absolutely as new **£66.50**
TRIO 9R59DS RECEIVERS. A good selection **£41.50**
HEATH HW32 TRANSMITTER. Excellent, less PSU **£40.00**
CSE 2AR 160m RECEIVER. Unmarked **£25.00**
INOUE IC-700R RECEIVER. Beautiful condition **£60.00**
HEATH SW717 RECEIVER. Completely as new **£30.00**

COPAL CLOCKS VAT included and post paid

Model 222	£5.85
Model 227	£7.10
Model 401	£8.85
Model 601	£12.35
Model 702	£9.35

SOMMERKAMP 2 metre gear, post paid

IC 21 XT	£136.00
VF 21 VFO for above	£41.00
IC 20 XT	£104.00
IC 20	£90.00

ROTATORS, all post paid

Stolle Memomatic 3001	£23.70
Stolle Automatic 2010	£29.50
CDE AR20	£20.45
CDE AR22	£25.65
CDE TR44	£45.75
CDE HAM-M	£70.85

SOLID STATE MODULES, VAT included

Sentinel Dual Gate Mosfet Converters 2m, 4m and 70 cm.	£15.12
Europa 10m to 2m. Transverter less valves	£64.35
with valves	£78.09

Mosley Antennas

TA33 Jnr. E	£35.50

Hy-Gain Antennas

12AVQ Verticals	£16.50
14AVQ Vertical	£24.50
18AVT/WB	£35.50
LC80Q Loading Coil	£7.50
TH3 Jnr. 3 ele. beam	£51.50
TH3 Mk III 3 ele. beam	£75.00
TH6 DXX 6 ele. beam	£97.00
BN-86 Balun *(Carriage extra on Hy-Gain/Mosley)*	£8.00

TTC C3042 SWR Bridge

Single meter model	£5.50

TTC C3005 SWR Bridge

Twin meter model	£9.60

KW 103 SWR/Power

Bridge	£12.55

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FL50B 50 ohm Amphenol	£6.50
FL75A 75 ohm Belling	£6.00
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Amphenol Connectors each	30p
Amphenol reducers ea.	10p
Belling Coax plugs ea.	10p
50 ohm heavy duty coax yd.	22p
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Wightraps. Standard pairs	£2.90
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G-Whip Antennas
Catalogue by return against your S.A.E.

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Shure 201 Hand	£5.75
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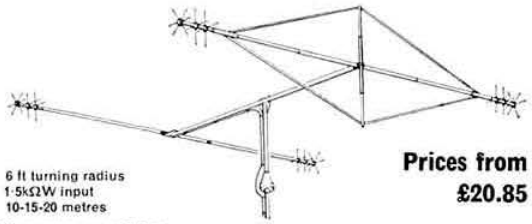

6 ft turning radius
1·5kΩW input
10-15-20 metres

Prices from £20.85

MINI-BEAMS are made by Mini-Products Inc. USA. This firm have been making compact antennas for over 15 years. In fact they make a complete range of antennas including the very popular C4 vertical that does not need radials. Send us an S.A.E. and we will send you details of their complete range.

VHF

MICROWAVE MODULES CONVERTERS
144MHz IF 4-6 or 28-30MHz **£16.72**
432MHz IF 28-30MHz **£19.91**

SOLID STATE MODULES CONVERTERS
144MHz IF 4-6 or 28-30MHz **£15.12**
70MHz IF 28-28·7MHz **£15.12**
432MHz IF 144MHz **£15.12**
144MHz pre amp **£7.15** PA3 **£5.50**

VHF ANTENNAS
144MHz whips **£2.40** 70MHz whips **£3.65** 'No hole boot mount' **£2.60**
J-Beams—most models normally in stock plus rotators, cable, coax 300 ohm feeder brackets etc.

ATTENTION HF OR VHF OPERATORS
400% EFFECTIVE POWER INCREASE

The Magnum Six RF speech processors illustrated above and reviewed in *QST* is now available from us as SOLE UK AGENTS. This is the only RF processor generally available in the UK and is selling fast! Test reports indicate a gain similar to that obtained with a linear. Models available for Collins, Drake, Yaesu, Heath and Trio. S.A.E. for technical brochure.

NEW 80/40 metre MINI-DIPOLE. Requires only 52ft of horizontal space. 50/75 ohm feed. 1200 watts pep. At last the answer for the small garden. MINI-DIPOLE comes complete and ready to erect with traps, matching stub, insulators and wire. Price **£9.90 (45p)**.

TRIO FOR VALUE We are able to offer the complete range of TRIO communication equipment including the superb TS515 transceiver which must be an all time best buy. See *Radio Communication* September. Send now for illustrated leaflets.

TS515 transceiver	**£231**	9R59DS receiver	**£51.75**	JR599 2-160 receiver	**£165**
TX599 transmitter	**£176**	TL911 linear	**£172.00**	7200 2M transceiver	**£142.45**

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X BAND GUNN DIODES @ £1.65.
MOTOROLA VARI-CAP DIODES Type MV 1626 @ 30p each.
PLASTIC VHF TRANSISTORS LS918 (2N918) @ 22p, 2N 3563 600 MHz @ 22p, 2N 3564 400MHz @ 12p, 2N 5130 450MHz @ 15p.
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MAMMOTH

TEST EQUIPMENT

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TF801A 10 to 375MHz, an early example, only **£30**
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TF801D/1 as above but current style case etc. **£200**

NARDA ATTENUATORS Gold seal series type 777C, N type connectors, 2 watts rating, the most accurate pads available, individual calibration to 0.01 dB at 6 frequencies, DC to 12·4GHz, 6 dB only available, as new condition, **£16** each.

HEWLETT PACKARD 778D directional coupler, 0·1 to 2·0GHz 20 dB, dual coupler, very fine component, as new **£120**.

HEWLETT PACKARD 430C power meter, 10MHz to 12·4GHz, measures up to 10mW full scale, supplied with thermistor head, type N connector. Complete instrument **£45**.

STC ATTENUATORS, push button type, ten steps 0 to 10 dB or 0 to 100 dB available, 75 ohm, TNC connectors, **£5.50** each

TELONIC SWEEPER SYSTEM SM 2000-1 mainframe with LH2-M plug-in. A very versatile sweeper set-up, plug-in covers 0.4 to 110MHz, with variable marker, frame has fixed markers, variable sweep rate, slope, etc. In very good condition **£100**.

OSCILLOSCOPES, Tek. 524AD, HP175A, HP150A, HP130B available. also Polyskops, HP microwave sweepers, Pegglemessers/senders, Airmec 858 oscillators, GR oscillators, etc. Send for lists.

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OSCILLOSCOPE, SOLATRON CD1212. 5" tube. TB 100 nanosecs to 5 secs. Input 200 mic/volts to 100 volts. Clean condition and working order, with 24 mc/s dual trace plug in unit, £80. Wide band 40 mc/s unit, £20 (only sold with 'scope).

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TRANSMITTER P.A. units STC T4188, tunes 2·8 to 18 Mc/s manual or 28V motor drive. 13" × 8" × 8". Pair CV2518 (4 × 150) 28v blower cooled. Bases are NOT UHF type. Ideal basis for Linear Amplifier construction, £8.75.

EX-MINISTRY quality wrist watches. **LEMANIA** stainless steel case, screw back Chronographs. 1/5th second. Start/stop/return button, minutes dial. Fully overhauled, new strap, £16.75 sent by insured CF post.

DOUBLE BEAM OSCILLOSCOPES CT436 (Military version of the Solatron CD1014) D.C. to 6Mc/s, 10Mv per Cm sensitivity, clean and good order. £54.50.

REED RELAY INSERTS. Overall length 1·85" body 1·1") Diameter 0·14", single pole, normally off. To switch up to 500ma at up to 250v DC, 69p per doz; £4.12 per 100; £30.25 per 1000; £275 for 10,000.

All receivers and Test Equipment are in working order at time of despatch. Carriage charges are for England and Wales only.

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SSB 144MHz MOBILE TRANSCEIVER

Liner 2

The brilliantly conceived and designed Liner 2 has revolutionised 2m sideband and is responsible for the enormous increase in activity. It combines the advantages of switched channels with direct frequency readout (e.g. Channel 41 is 145·41MHz) with the ability to tune between channels with the VXO. In addition the provision of R.I.T. which enables the rx to be tuned a kHz or two either side of the Tx frequency is a useful feature. The VXO gives, as one would expect, crystal stability which, coupled with an extremely effective noise blanker makes mobile operation a delight without detracting from its use (with an A.C. psu) as a base station.

Most important is the surprisingly low level of spurious emissions which sets a new standard. This low level is achieved by very careful design and alignment and owners are most strongly urged not to attempt alignment without a laboratory spectrum analyser.

For the first time, here is a completely solid state, fully tuneable 2m SSB rig with an electronically protected PA at a reasonable price which truly performs with the utmost reliability.

SPECIFICATIONS

Frequency Coverage:	145·25–145·49MHz*
Final Input:	20W (10W PEP output)
Carrier Suppression:	Better than —45dB rel. 10W
Side Band Suppression:	Better than —45dB rel. 10W
Spurious Emissions:	Better than —60dB rel. 10W
Audio Response:	300–2,700Hz (—6dB)
Selectivity:	2·4KHz (—6dB)
	±3KHz (—60dB)
AF output:	More than 2W (built-in speaker 4ohm)
Mode of Operation:	SSB (A3J)
Antenna Impedance:	50ohms
Microphone:	600ohm dynamic
Receiving Sensitivity:	Antenna input 0·5 microvolt for 10dB S + N/N ratio
Image Rejection:	Better than 60dB
Power Source:	12–16V DC (NEGATIVE EARTH ONLY)
Current drain:	200mA receive
	2·5A max transmit
Semiconductors:	27 transistors, 6 FETs, 1 IC, 44 diodes
Size:	220(W) × 70(H) × 250(D) mm
Weight:	3Kg

* Note that this coverage may be altered to any 240kHz within the band simply by altering the fourth oscillator crystal X12. As an optional extra we stock the crystal and perspex dial to enable coverage of 144·10 to 144·34MHz to conform with the I.A.R.U. Regional recommendation planned for 1975.

Price: Including microphone and bracket, spare d.c. power lead, mobile mount, spare dial lamp and fuse. **£132.**

Matching Mains Power Supply giving 13·8V DC. **£15**
Optional crystal and dial for 144·10 to 144·34MHz. **£4.40.**

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VILLAGE GENERAL STORES and sub Post Office with house attached, offers around 23K, owner retiring May. G4BHP, QTHR.

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MISCELLANEOUS

PATENTS and TRADE MARKS.—Booklet on request. Kings Patent Agency Ltd (B. T. King, Mem RSGB, Reg Pat Agent).—146A Queen Victoria Street, London, EC4. Tel: 01-248 7161. Telex: 883805. 60 years' refs.

COMMERCIAL RADIO INFORMATION BULLETIN. Packed with facts on the IBA local radio stations, Radio Luxembourg and the offshore stations. Send 20p for sample copy or £1.50 for 10 issues to Commercial Radio News Agency, 67–69 Chancery Lane, London WC2A 1AF.

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RACAL RA17 in "any" condition. C. Brett, G6AGZ/T, 4 Cambridge House, Ward Royal, Windsor, Berks. Tel 69129.

70cm £22: **J Fet** mixer **70cm** converter, band pass input filter, IF pre-amp, reverse polarity protected 28-30 MHz IF. **£14.**
20 watt input varactor triplers with built-in 70cm Hi Q break to minimise 2 metre feedthrough. **£9.85.**
The pair for only **£22** inclusive.
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ION ELECTRIC, 112 Stornoway Rd., Castle Bromwich, Birmingham B35 6NH

G8EPC **QM70** **G3ZUL**
28-432MHz transverter. All solid state 1W pep output. 12v negative earth operation. Includes full transmit and receive facility for fixed, mobile or portable operation. Single harness supply to your existing ssb transceiver. Particularly suitable for use with Liner 2's. Cost inclusive of p.p. **£55.50.**
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COLONIAL WAY, RADLETT ROAD, WATFORD
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ELECTRONICS TECHNICIAN

RADIO AMATEURS: There is now a vacancy for an electronics technician in the Department of Electrical and Electronic Engineering of this Polytechnic. The work includes the operation and maintenance of 1" × ¼" helical scan VTRs both colour and monochrome, colour monitors and ancillary equipment, and the maintenance and construction of equipment. Applicants must have considerable experience and knowledge of modern video recording techniques and be capable of servicing P.A.L. colour equipment.

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The post, appointment to which is subject to a satisfactory medical examination, is superannuable and carries a salary in the range of £1,644 to £1,926, with additions for appropriate qualifications. House prices in the Huddersfield area are still comparatively low.

For further details please write to:

J. T. Blackwood, BA, MSc, DPA, MBIM
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