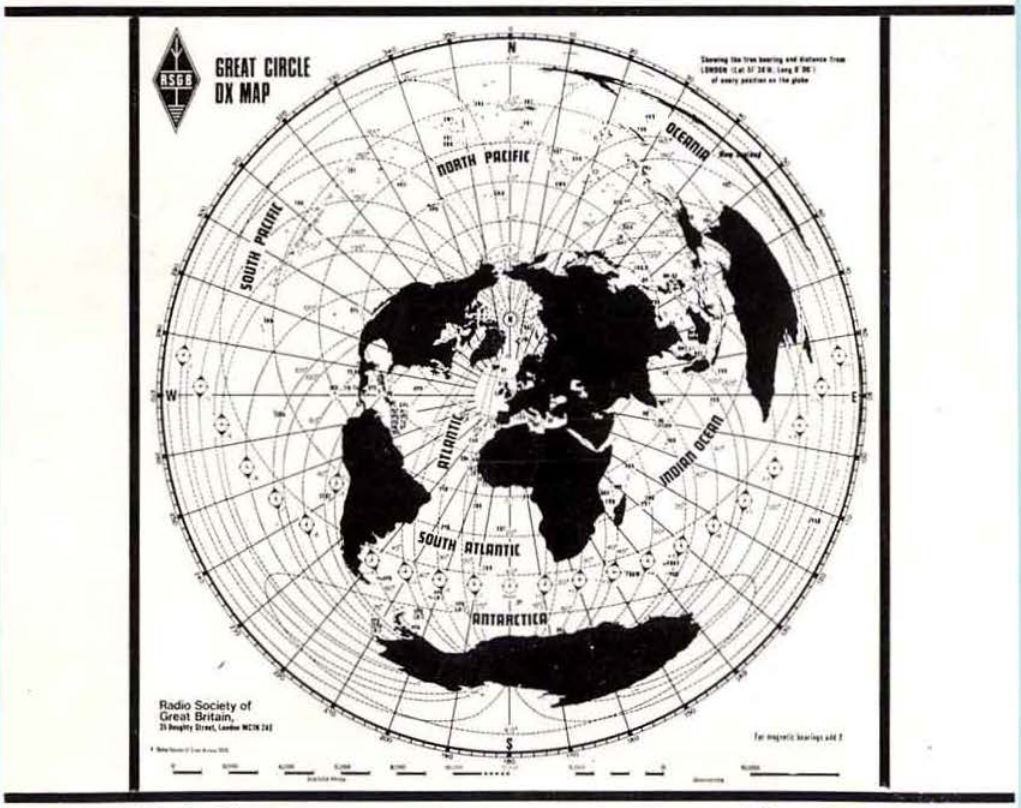
radio communication

August 1974

RSGB GREAT CIRCLE DX MAP



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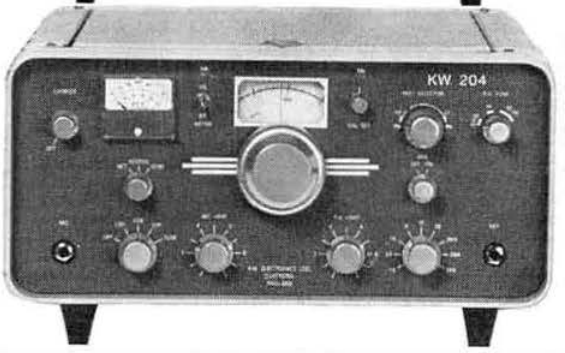

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radio communication

Volume 50 No 8 **August 1974** Price 40p

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CONTENTS

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ABC
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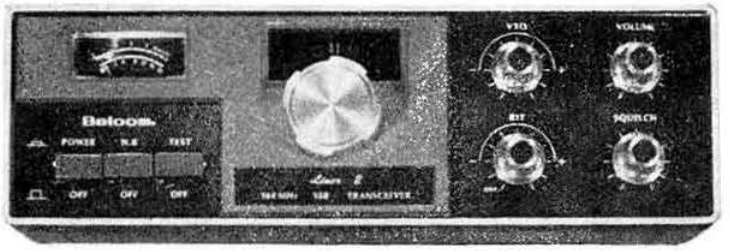

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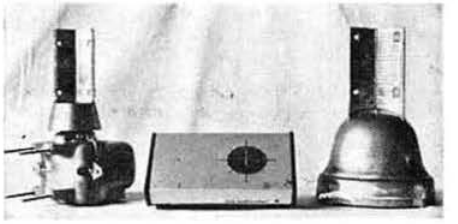

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Frequency error at 144MHz: 3kHz max.
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116MHz o/p power: 5mW min (LO o/p version)

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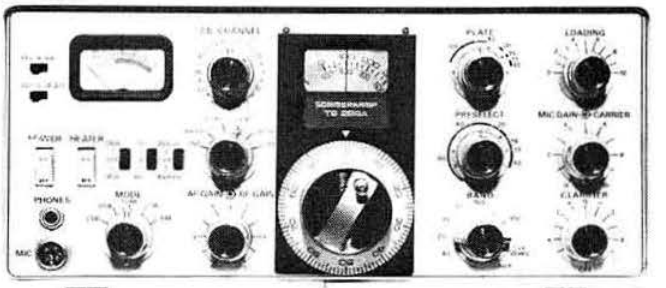

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FR 50B	**RECEIVER**	**80–10m**
FRDX 500sp	**RECEIVER**	**80–10m**
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Frequency range:	3·5–4·0MHz 7·0–7·3MHz 14·0–14·6MHz 21·0–21·9MHz
Modes of Operation:	USB, LSB, CW, AM
Power:	240V. A.V. 50–60Hz $\frac{1}{8}$A or 12V D.C. 35mA
Sensitivity:	Less than 1μV provides readable signal
Stability:	Less than 100Hz drift. No warm up.
Audio Output:	3 volts across 1000 ohm load
Antenna Impedance:	50–75 ohms unbalanced
Circuit:	Direct conversion. Synchrodyne
Selectivity:	2kHz at 6db down
Size:	10$\frac{3}{8}$in wide, 4$\frac{1}{2}$in high, 6$\frac{5}{8}$in deep

PRICE £25 complete with High impedance Headset and ex-government morse key

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ROBOT SSTV

Monitor 70A
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Macro Lens f1·4

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

CURRENT COMMENT

SUBSCRIPTION ALTERATIONS

No action required!

In future the subscription paid by members will be VAT **inclusive**. This applies from the date of the Council meeting of 8 July. The corporate member who previously paid a subscription of £5 **plus 50p VAT**, will from that date pay a subscription of £5.50, which will **include VAT**. In other words he will continue to pay the same amount as before.

This decision has been taken very quickly for two reasons:

(1) If Customs and Excise agree (they are being very tardy at the moment) that part of the subscription is zero-rated, then the former subscription plus VAT would have dropped to approximately £5.20.

(2) There was talk of the VAT rate being reduced in the next "mini-budget" and this would again necessitate a change in bankers' orders.

Both would cause chaos in the already over-stretched subscription department.

So no action by members is required.

However, it must be said that if zero-rating is applied or the VAT rate reduced, the subscription payable by UK members will have increased but because we live in the Gilbertian world of politicians, the cash payable remains unchanged—only that the Society will have a larger share and the Government a smaller one.

J. O. Brown, G3DVV
Honorary Treasurer

QTC AMATEUR RADIO NEWS

430—432MHz band

The Home Office advises us that "there is no objection to amateurs situated within the prohibited area defined in the Footnotes to the Schedules of the Amateur (Sound) Licences receiving messages transmitted on the band by amateur stations located outside the prohibited area."

The Footnote referred to is: (7) 430–432MHz. "This band is not available for use within the area bounded by 53°N 02E, 55°N 02E, 55°N 03W and 53°N 03W".

Facts and figures

The Home Office advises that the following numbers of amateur licences were in force at 31 May 1974:

Class A 15,078	Class B/M 1,296
Class B 4,515	Television 263
Class A/M 3,205	

The Callsign Record received from the Home Office, dated 29 June, gives the latest callsigns issued in the G4 and G8 series as G4DEU and G8IUU respectively.

At the end of June RSGB membership totalled 17,057, made up of 14,387 UK corporate, 1,040 UK associate members and 1,630 overseas members.

RSGB President, 1975

At its meeting on 8 July, RSGB Council unanimously elected Mr C. H. Parsons, GW8NP, to be the Society's President during 1975. Mr Parsons, who is this year's Executive Vice-President, will be the first holder of a GW prefix to be President of RSGB.

Certification of claims

The HF Awards manager, Mr C. R. Emary, G5GH, frequently receives requests for certification of claims for non-RSGB awards without an sae or return postage being included. Such claims must always include sufficient postage for the return of the QSL cards.

Reciprocal licensing

Members who apply for a reciprocal licence to operate abroad should ensure that they can produce a receipt for the payment of the current licence fee in addition to a copy of their licence.

Similarly, amateurs from abroad applying for a UK reciprocal licence should make sure that they have a receipt or statement to prove that their licence is current.

ITU news

The Republic of Gambia has become the 147th member country of the ITU.

The following callsign blocks have been allocated: A9A–A9Z, Bahrain; C4A–C4Z, Cyprus (Republic of); H3A–H3Z, Panama (Republic of).

In a recent operational bulletin it was notified that the stations XV5AA, XV5AB and XB5AC have been authorized to exchange radiocommunications with other amateur radio stations outside the Republic of Viet-Nam.

Solar eclipse of 30 June 1973

The Ionospheric Research Group of the French National Centre of Telecommunications Studies is making a study of the behaviour of the equatorial ionosphere during the 30 June 1973 solar eclipse and particularly of ionization transport phenomena.

It is requested that all radio amateurs who had contacts with stations located either in Central or South Africa during the periods 27 to 29 June 1973 and 1 to 4 July 1973 should send extracts of their logs for these periods giving date, callsign and QTH of the calling station, callsign and QTH of the called station, time (ut) of the QSO, signal level (rst code), and peculiarities of the QSO (QSB, QRM, QRN etc). Reports from listeners of signals coming from the same areas would also be welcome.

This data should be sent to: S. Canivenc, F8SH, 6 rue de Pont-hele, 22700 Perros-Guirec, France, who will act as co-ordinator and will transmit the reports to the Ionospheric Research Group.

RSGB Diary

As there seems to be little demand for an *RSGB Diary*, and because it is necessary to order a large quantity in order to maintain a reasonable selling price, a Society diary will not be available for 1975.

Scottish VHF Convention
and
Region 12 ORM

University of Dundee Tower Block

Saturday 28 September 1974

PROGRAMME

10am University Electronics Laboratory open to delegates. RSGB Zone G Representatives Conference.

2pm Opening ceremony followed by ORM. G6JP, G3FZL and GM3AEL will represent RSGB Council.

2.45pm "VHF/UHF Affairs"—Geoff Stone, G3FZL, RSGB VHF Manager.

3.30pm Tea and biscuits.

4pm "Aerial systems"—Andrews Corporation.

4.45pm "The sun and its effects on earth and radio propagation"—A. J. Oliphant, GM3SFH. *In Tower Extension Theatre.*

"Microwaves"—Tom Holbert, GM3DXJ, and George Burt, GM3OXX. *In Tower Room T6.*

5.30pm Informal discussion and end of convention lectures.

6.30pm Convention dinner in nearby Angus Hotel.

During the convention there will be the usual bookstall and, it is hoped, a display of commercial and home-built equipment—bring your prize gear along.

TICKETS

Convention only .... 40p Dinner only £2

Convention and dinner £2.25

Available from Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR, to whom remittances should be made payable. Stamped addressed envelope with remittance please. Please book well in advance.

Overnight accommodation and breakfast may be available at reasonable cost within the University. Let GM8BZX know your requirements.

Full information available from GM8BZX on request

GW6GW
Welsh Amateur Radio Convention

Community College, Oakdale,
Nr Blackwood, Gwent

1000–1800,

Sunday 22nd September 1974

PROGRAMME

0930 Talk-in commences with GW6GW on 3·765MHz ssb, and GW3WTZ/A on 2m–144·210MHz ssb, and autoscan of fm channels 144·48, 145·00, 145·500 and 145·550. Also talk-in through GB3BC repeater on channel R6 (1,750Hz tone access).

1000 Doors open. Admission charge 30p.

1100 Official opening by Mr C. H. Parsons, GW8NP, RSGB Executive Vice-President.

1105 Trade exhibition and RSGB bookstall in hall.

1200 DX contest starts—GW6GW available for use by visitors (400W to beam at 60ft).

1410 "Aerial design techniques"—Roy Powers, G8CKN, of ANTEC.

Lecture stream "A"

1515 "FM and repeaters in the UK and USA"—Graham Packer, G3UUS.

1610 "Amateur television" (incorporating fast and slow scan tv, and video tape recording techniques)—Gwent BATC Group.

Lecture stream "B"

1500 *Hams Wide World*—an ARRL 30min colour film.

1545 "PJ9GIW—Curacao—1973". (82 colour slides and 37·5min cassette tape by Van Fair, W4GIW. Tape/slide lecture of 1973 CQ WW Phone Contest operation from Curacao.)

1715 Results of raffle and dx contest.

Further information available from S. W. Rees, 10 Tudor Crescent, High Cross, Gwent NP19BS; S. R. Cole, GW4BLE, 87 Thornbury Park, High Cross, Newport, Gwent NP1 9DR, tel Rhiwderin (0633 43) 2030; or R. B. Davies, GW3KYA, 16 Vancouver Drive, Penmaen, Blackwood, Gwent NP2 0UQ.

Equipment stolen

A Barlow Wadley XCR30 receiver, model 0747, serial number XR800, the property of Mr A. C. Halliday, was stolen from 32 Broad Road, Sale, Cheshire, on 31 May.

A Pye Cambridge single-channel dash-mount set AM10D, serial number 36641CD, designed to operate in the 68-88MHz band was stolen during the weekend 21-24 June from a vehicle parked in Cambridge. Any information to Cambridge police, tel Cambridge (0223) 58966.

A frequency standard SD11 was stolen from the stand of Burns Electronics during the final hour of the Longleat Mobile Rally on 7 July. Any information to Burns Electronics, 43a Chipstead Valley Road, Coulsdon, Surrey CR3 2RB, who are offering a reward of ten per cent of the value of the instrument.

Can you help?

A group of enthusiasts renovating the interior of the famous Lancaster bomber S-for-Sugar at the RAF Museum, Hendon, would like to obtain the following equipment to instal in the aircraft: an 1154/1155 plus rotary, a Gee set and an early HTS set.

Anyone who can help is asked to contact B. M. Johnson, G3LOX, 10 California Lane, Bushey Heath, Watford, Herts.

Durham University Radio Society

Anyone interested in starting a radio society at Durham University are asked to contact Peter Whittle, G4BBU, QTHR; or c/o St Chad's College, South Bailey, Durham, during term time.

Southampton RSGB Group Convention and Region 17 ORM

Southampton College of Art

East Park Terrace

1400-2000

Saturday 21 September 1974

LECTURES

"New frontiers on 23cm"—M. Walters, G3JVL
"Aerial Circus"—Dud Charman, MBE, G6CJ
"VHF Topics"—M. Dormer, G3DAH
"Meteor Scatter"—J. Ludlow, GW3ZTH
"New solid-state units for the amateur"—P. Tunbridge, G8DEK
"HF contest working"—H. Perkins, G3NMH
"RTTY today"—D. E. Beattie, G3OZF, and D. Goacher, G3LLZ

Actual times of lectures will be announced later

Trade stands. Refreshments

Tickets 50p

Programme and tickets in advance from G8CEH QTHR. Cheques and POs to be made payable to Southampton Radio Club.

New company

Doram Electronics Ltd

The Electrocomponents Group, Britain's largest distributors of electronic components, has established a new subsidiary company dedicated to the needs of amateur radio, electronics and hi-fi enthusiasts. Named Doram Electronics Ltd, the new company will commence trading in September 1974 from PO Box TR8, Wellington Road Industrial Estate, Leeds LS12 2UF. Telephone: Leeds (0532) 34222. In addition to their administrative offices, Doram will have at their disposal a modern 7,500ft² warehouse in which, from the outset, they will hold in-depth stocks of more than 4,000 different product lines.

Drawing on the professional expertise and resources of their associate company, RS Components Ltd, Doram will aim to provide a "by-return-of-post" mail-order distribution service for electronic components, kits and accessories. They claim that this will be the first time that the private individual will have as fast and efficient a source of supply as that which, hitherto, has been available only to the trade and industry.

The entire Doram product range will be described in a 64-page catalogue which, priced at 25p including postage, will shortly be available from the Leeds address. The catalogue will incorporate full particulars of each product including, where applicable, circuit diagrams, operating parameters, photographs and dimensional diagrams, in addition to the price of each individual item.

In charge of the technical side will be electronics engineer and amateur, Andrew Dawes, G8HEW, who knows the problems experienced by amateurs waiting patiently for the one component to make it all work.

Doram Electronics will be on view to their potential customers for the first time at the Amateur Radio Retailers Exhibition at Leicester, from 31 October to 2 November 1974. During the event their stand will be visited by Brian Rix, G2DQU. Besides talking to people on the stand, G2DQU will be drawing 50 prize winners from all the names of those who purchased the catalogue before the opening date of the exhibition: 1st Prize—a £10 voucher, with 49 consolation prizes of £5 vouchers.

RAE COURSES, 1974-5

Acton, London W3. Acton Technical College, High Street, London W3 6RD. Wednesdays 6.30-9pm, commencing 25 September. Enrolment: 6.15-8.15pm, 12 and 18 September.

Bedford. Westfield School, Queens Park, Bedford. Wednesdays 7-9pm, commencing mid-September. Full details from the headmaster, Mr Kiggins, tel Bedford 67353, or G3YUQ, QTHR.

Birmingham B15. Central Institute of Further Education, Lea Mason Technical College, Birmingham B15. Commencing 23 September. Enrolment: week commencing 16 September. Instructors: G3NCX and G3KPT.

Bracknell. South-east Berkshire College of Further Education, Church Road, Bracknell RG12 1DJ. Mondays 7-9pm, commencing 23 September.

Brighton. Faculty of Engineering, Brighton Technical College, Richmond Terrace, Brighton. Full details from the college, tel 685971.

Chingford, London E4. Chingford Adult Education Centre, Friday Hill House, Simmons Lane, Chingford, London E4. Mondays 7.30-9.30pm, commencing 23 September. Enrolment: by post to The Registrar, Waltham Forest Education Service, 192 Vicarage Road, Leyton, London E10 5DX. Fee: £2.80 (28 weeks). Instructor: G2HR, tel 01-529 2932.

Crawley. Ifield Evening Centre, Crawley, Sussex. Mondays 7-9pm, commencing 23 September. Enrolment: 7-9pm 18 September. Further information from G3LNM, QTHR, tel Crawley 22540.

Durham. Durham Technical College. Fridays 6.30-9.30pm. Enquiries to Head of Engineering Department.

Eltham, London SE9. Eltham Art Centre, Haimo Road, London SE9. Tuesdays 7.30-9.30pm, commencing 24 September. Enrolment: week commencing 18 September, or by post before 31 August.

Hemel Hempstead. Dacorum College of Further Education, Marlowes, Hemel Hempstead, Herts. Tuesdays and Thursdays, 7-9pm. Course organizer G3VOZ, QTHR, tel HH 833300.

Hereford. Herefordshire Technical College, subject to a minimum of 12 persons enrolling. Enrolment: afternoon and evening, 3, 4 and 5 September.

Hockley, Birmingham. Holte Adult Education Centre, Hockley, Birmingham. Wednesdays (morse) and Thursdays (theory), 7.15pm, commencing September. Details from G4ABV, QTHR, tel 021-704 9131.

Ilford. County High School for Girls, Cranbrook Road, Ilford, Essex. Wednesdays, 7.15pm, commencing 25 September. Enrolment: 7-8.30 pm, 9-12 September. Fees: £3 (over 21); £1.50 (under 21).

Kirkaldy. Kirkaldy Technical College, St Brycedale Avenue, Kirkaldy KY1 1EX. For details contact the principal or GM8FXZ, QTHR.

Highgate Hill, London N19. Archway Annexe, Highgate Hill, London N19. Mondays 7-10pm, commencing 23 September. Enrolment: at Archway School, London N7, 7-9pm, week commencing 16 September. Details from G3ZKE, QTHR, tel 01-485 7065.

Slough. Slough College of Technology,Wellington Street, Slough, Berks SL1 1YG. Fridays 5-6.30pm (station operation and practice—optional), 6.30-8pm (morse), 8-9.30pm (theory). Enrolment: 10am-8pm, 10-12 September at the college.

The college is also running an advanced amateur radio course on Fridays, 7-9.15pm, for those who have already passed the RAE. As an option, students can enter for the College Diploma in Advanced Amateur Radio Communication at the end of the course. Outline course syllabus available on request.

Full details from Mr E. C. Palmer, BA, G3FVC, Department of General Studies.

A speech clipper for ssb transmitters

by Dr A. GSCHWINDT, HA5WH*

THIS article describes a simple speech clipper that can be used with any ssb transmitter without involving any modification to the transmitter circuitry, and also deals with the problems of providing a constant power supply to the transmitter under speech clipping conditions. It is assumed that readers are familiar with the basic principles of speech processing—those wishing to refresh their memories on up-to-date techniques are advised to take a look at "Technical Topics", *Radio Communication* May 1973.

As ssb transmitters now in use range in age, the most suitable way to apply speech processing is with an add-on unit that does not involve any modification to the transmitter circuitry. The most effective form of speech processing is rf clipping, and to be adaptable the circuit should have audio input and output voltages. The block diagram of the arrangement is shown in Fig 1. The sideband filter and the carrier oscillator are perfectly matched to ensure a good audio frequency response.

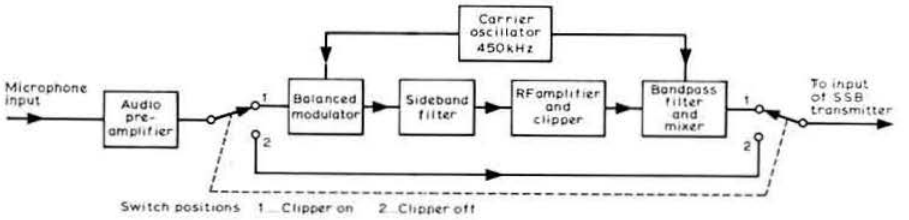


Fig 1. Block diagram of the rf speech clipper

Circuit description

Fig 2 shows the circuit of the rf clipper. The audio signal from the microphone is amplified by two stages: a fet amplifier and bipolar emitter follower. The output from the emitter follower drives the balanced modulator; alternatively it can be switched directly to the output of the unit when the clipper is not required.

The balanced modulator and carrier generator are built up round a single TAA661A integrated circuit. The ic consists of a limiter chain—which is used for carrier generation—and a multiplier, serving as balanced modulator on 450kHz. Carrier balance is adjustable with an external resistor located between pins 6 and 7 of the ic.

The output resistance of the ic is low (a few hundred ohms on 450kHz) so it is necessary to add an external series resistor in front of the mechanical filter to ensure a good source impedance. The mechanical or ceramic filter should have a 2·4–2·8kHz bandwidth at the –6dB points, with a shape factor lower than two. The filter feeds into an impedance of 2·7kΩ provided by the 4·7kΩ resistor and the transistor input impedance in parallel.

The expected rf level at the filter output is 120–150mV peak-to-peak, which is increased by the rf amplifier up to 2·8V peak-to-peak, at which point the clipper diodes will be opened. For 20dB clipping, more than 100 times amplification is needed from the rf amplifier.

The output of the BF173 transistor is connected to the limiter which consists of four diodes, two of them acting as rf limiters, and the other two as bias stabilizers for the rf limiter diodes. So the limiter diodes are reverse biased with 0·7V. The output from the limiters is filtered by a parallel tuned circuit, tuned to 449kHz. This eliminates harmonic distortion completely (appearing round the harmonics of 450kHz), and reduces the intermodulation distortion as well.

The clipped and filtered rf signal goes to the mixer input, while the carrier oscillator delivers the carrier to the mixer via a resistive attenuator. The limiter section of the mixer ic works as a buffer amplifier before the mixer, so the second ic is really a product detector. The output of the mixer ic can provide audio signals up to 1·5–2V peak-to-peak, which is more than enough for the input of an ssb transmitter.

With the mode switch in position 1, the limiter is switched on and in this case P2 acts as the control of the clipping level. In position 2, P2 determines the output peak level.

The capacitor Cd, located at the input of the balanced modulator, is useful when a microphone with very good low frequency response is used, in which case it will attenuate the lower frequences. The value should be chosen experimentally.

The best way to check the circuit is to feed a sine wave into the input (frequency range 500–600Hz) and increase its amplitude from zero to the clipping level and then further by 20dB. It is essential that the output is always a sine wave, and its value should increase by only 30 per cent after 20dB increase in the input signal level. The shape should also stay sinusoidal without distortion at 20dB of clipping.

How to use the adaptor

If the circuit is working perfectly, connect it to the transmitter and switch on the clipper, position 1. Speak into the microphone and watch the pa current increasing as the audio input adjusted by RV2 is increased. When the increase of pa current stops, it means the limiting level has been reached, then increase RV2 until 20dB clipping occurs.

An alternative method of checking the clipper is to feed it into an oscilloscope instead of a transmitter, watching the waveform as the audio input is adjusted. An audio amplifier could also be used to determine the 20dB limiting level, using RV3 to set the audio input level to the transmitter.

Without altering the setting of RV2, switch to position 2, ie with the clipper out of circuit, and adjust RV1 so that the

* Budapesti Muszaqi Egyetem, Garami erno ter 3, Budapest 11, Hungary.

audio level at the transmitter is the same as with the clipper in circuit. The alc indicator in the transmitter can be used to check that the signal level is the same in positions 1 and 2.

The pa plate power supply

To ensure that the expected improvement from the rf clipper is obtained it is necessary to keep the pa dc voltage at a constant level while the clipper is operating. It must be realised that the load of the pa power supply will be six to eight times higher than during normal operation. If the transmitter is unable to keep the pa dc voltages constant the value of the clipper will be lost.

The radiated p.e.p. is determined partly by the pa dc voltage. If the dc voltage drops by 30 per cent because of larger average dc current, the output p.e.p. decreases by 50 per cent. This effect, unfortunately, appears in a lot of factory made transceivers where the power supply is very simple. To give some help in overcoming these difficulties, the well-known tuned choke filter arrangement for power supplies is recommended.

A 640V/0·6A power supply

If the load current is high enough, the well-known choke input rectifier arrangement gives low source resistance. The high pre-load current can be reduced by the application of a large filter inductance, although a large choke is not the best solution for good dynamic properties. This tuned choke arrangement gives the advantages of a choke input and a simple rectifier circuit with only capacitors in the filter. The best way to improve the dynamic properties of the arrangement is to use a choke whose inductance reduces as the dc current is increased.

Fig 3(a) shows the circuit diagram of a tuned choke input rectifier with a pre-load current of about 50mA. If the tuning capacitor were eliminated, the required pre-load current would be 350mA. The variation of the output dc voltage as a function of the tuning capacitor is shown in Fig 3(b). The

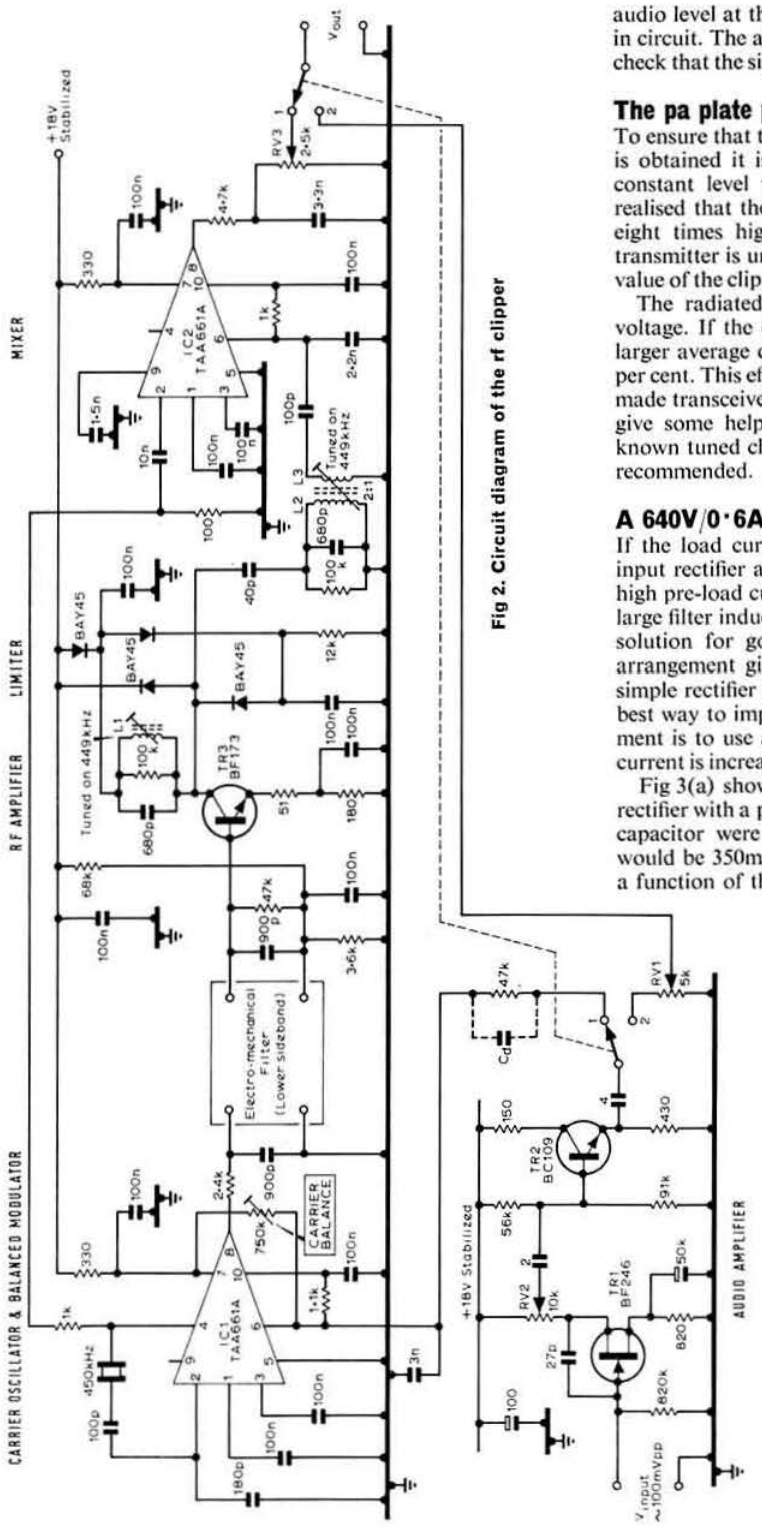


Fig 2. Circuit diagram of the rf clipper

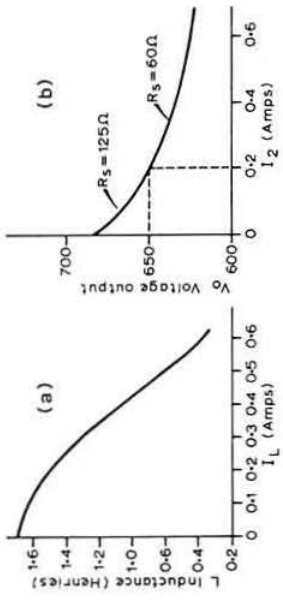


Fig 4. Variation of the choke inductance and the source resistance of the power supply with load current variation

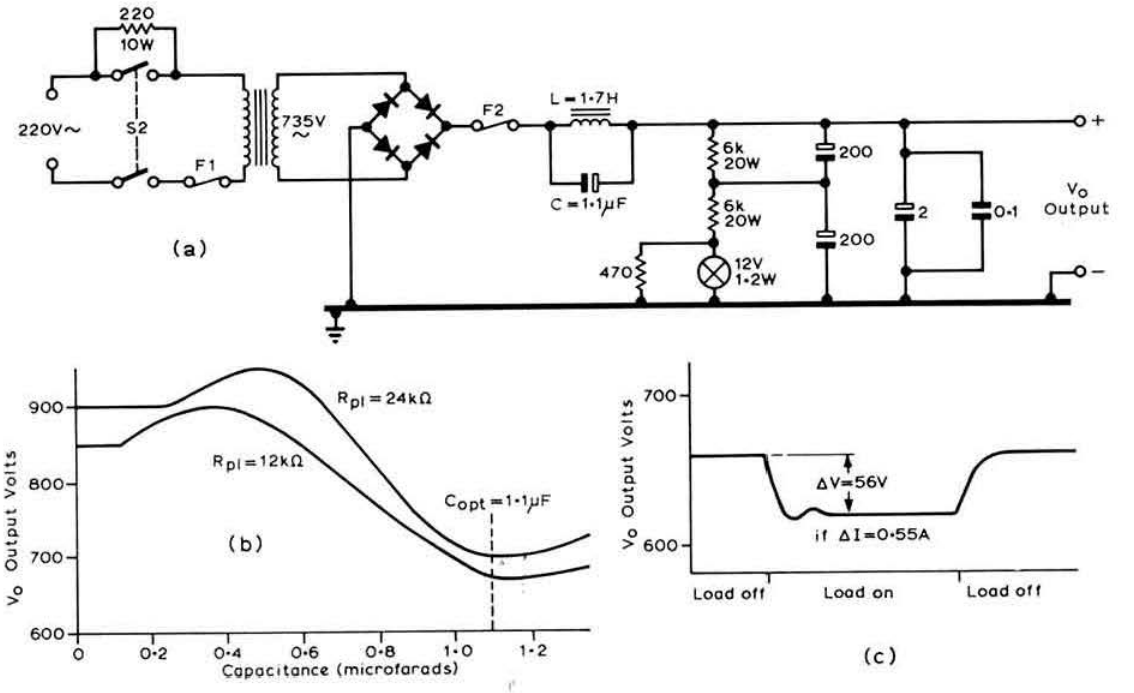


Fig 3. Circuit diagram and curves for a good power supply

parameter is the pre-load resistance. The dynamic properties were investigated with a current step having an amplitude of 0·55A. The transient behaviour is excellent and the output dc voltage variation is only 56V.

The inductance of the choke depends on the dc load current, and the curve, Fig 4(a), shows that the choke inductance will be one third of the low current value at 0·6A load. This is the reason for the good dynamic behaviour of the power supply. If the choke inductance stays the same during the variation of the load current, then the value of the transient voltage (peak-to-peak) will be 65V. The parameters of the curve, Fig 4(b), show the variation of the source resistance of the circuit. The resistance in the rectifier circuit (transformer primer and secondary diodes and choke) was measured at 55Ω.

The ripple amplitude is 12V peak-to-peak at 0·6A load at the output; if this is not adequate, higher value filter capacitors must be used. The 2μF and 0·1μF bypass capacitors reduce the amplitude of the higher ripple frequencies (above a few kilohertz) where the reactance of the electrolytic capacitors is too high.

To eliminate the high current and voltage transients when switching on the unit, a 220Ω 10W series resistor is inserted in the line. Switch on S1 first, followed a few seconds later by S2. F1 is a slow 3A fuse and F2 a fast 1A fuse. The diodes in the bridge are specified for 2A dc current. The piv was 1kV, and 330kΩ resistors were used to equalize the backwards resistances.

Results

The two circuits were tested in the same transmitter, and for comparison purposes an original FT250 transceiver was tested with the speech clipper only. With a good power supply the improvement to the transmitter was as expected. In the case of the FT250 the pa dc voltages came down, reducing the output p.e.p. from 120W to 90W on 14MHz with the rf clipper on, producing a considerable improvement.

The RSGB News Bulletin Service

The RSGB News Bulletin, callsign GB2RS, is broadcast every Sunday morning. This bulletin can be received on either vhf or hf, which gives almost complete coverage of the British Isles. It keeps radio amateurs up-to-date about happenings in the world of amateur radio and gives information on coming events, supplementing and bridging the gap between successive issues of *Radio Communication*.

SCHEDULE

Time	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3·6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	145·8	Aberdeen (NNW)
	145·095	Croydon, Surrey (NE)
1015	3·6	Belfast (N. Ireland)
	145·8	Bangor, Co Down (N)
1030	3·6	Derby (N. Midlands)
	144·337	Weston-super-Mare (NW)
	145·8	Aberdeen (SW)
	145·3	Brierley Hill (NW)
1045	145·89	Middlesbrough (NW)
	145·095	Croydon, Surrey (SW)
1100	3·6	Bridlington (NE England)
	144·3	Brierley Hill (SW)
1130	3·6	Motherwell (S Central Scotland)
1200	3·6	Aberdeen (NE Scotland)

EQUIPMENT REVIEW

by J. W. MATHEWS, G6LL, and
P. J. HORWOOD, G3FRB

Heathkit IM-1202 digital multimeter

THE multimeter was received as a kit and assembled by G6LL. Assembly took approximately eight hours, but this was preceded by almost an hour spent in incorporating modifications to the assembly manual, which was otherwise as clear and concise as one expects from Heathkit. It is not a kit for the absolute tyro; some previous pcb experience is desirable, and a $\frac{1}{8}$in-bit soldering iron essential.

The kit was of American origin and therefore incorporated the usual USA line plug; a mains fuse of $\frac{1}{8}$A was specified for 240V operation but not supplied. Normally a mains conversion kit is supplied with the cable having British standard colour code.

The IM-1202 is a multi-range electronic meter with a two-and-a-half digit display on side-reading Nixie tubes. It has a constant input impedance of 1MΩ on voltage ranges and a maximum voltage drop of 2V on current ranges. On the lowest resistance range (200Ω) the maximum current through an external resistance is 10mA, the open circuit voltage is 2V.

What it is not and does not pretend to be is a laboratory digital voltmeter. To fulfil this role at least a 4-digit display and considerably greater accuracy would be required. It should rightly be compared with a high-grade moving-coil multimeter; the kit price is very similar to that of the best British made conventional instrument.

In practice the meter was very convenient to use, the bright digital display being clearly visible in high ambient light and from several feet away. The readout is unambiguous, except for the unavoidable ±1 reading of the least significant digit.

Polarity reversal is carried out by a simple double-pole changeover switch, polarity being indicated by an illuminated + or − on the display panel.

By the very nature of the instrument the ranges have a 20dB spacing, only four being required to cover 2–2,000. An analogue meter with the desirable 10dB spacing would require six.

The reviewer had some misgivings concerning maximum over-ranges without damage, particularly the 1,000V limit on the "2,000V" dc range and 700V ac rms on the "2,000V" ac range. A user who was unaware of these limitations would

SPECIFICATION

Ranges	
DC volts	0–2, 20, 200, 1,000V
DC current	0–2, 20, 200, 2,000mA
AC volts	0–2, 20, 200, 700V rms (25Hz to 10kHz)
AC current	0–2, 20, 200, 2,000mA (25Hz to 10kHz)
Ohms	0–200, 2k, 20k, 200k, 2,000k
Over-range	25 per cent on all functions within maximum input limits
Maximum input without damage	
	3A into ac or dc mA and ohms (fuse protected)
	700V ac rms (except 2V range: 140V ac rms)
	1,000V dc into volts (except 2V range: 200V dc)
Accuracy (Full-scale ± 1 digit)	
	DC volts ± 1%. DC current ± 1·5%
	AC volts ± 1·5%. AC current ± 1·5%
	Ohms ± 2%
Price	£39·60 inc VAT, plus 44p p & p
Obtainable from	Heath (Gloucester) Ltd, Gloucester GL2 6 EE

MEASURED ACCURACY

DC RANGES

Voltage		Current	
Standard	**Heathkit**	**Standard**	**Heathkit**
2	1·99	2	1·99
20	19·8	20	19·8
200	198·0	200	199·0
500	0·49k	1,990	1·99k

AC RANGES

Volts		Current	
Standard	**Heathkit**	**Standard**	**Heathkit**
2	1·96	2	1·95
20	19·7	20	19·6
200	196	200	197
500	0·49k	1,980	1·99k

RESISTANCE

Standard	**Heathkit**
200	196
1,999	2,000
19·99k	20k
150k	152k
1M	1M

On the highest ac and dc volts ranges, the check measurement was made at 500V, this being the maximum output from the voltage standard.

quite reasonably expect to be able to apply up to 2,000V on both ranges.

However, with the exception of this point, provided one uses the same amount of caution one would apply to a moving-coil instrument no problems will arise. The IM-1202 should survive being dropped more readily than a D'Arsonoval movement.

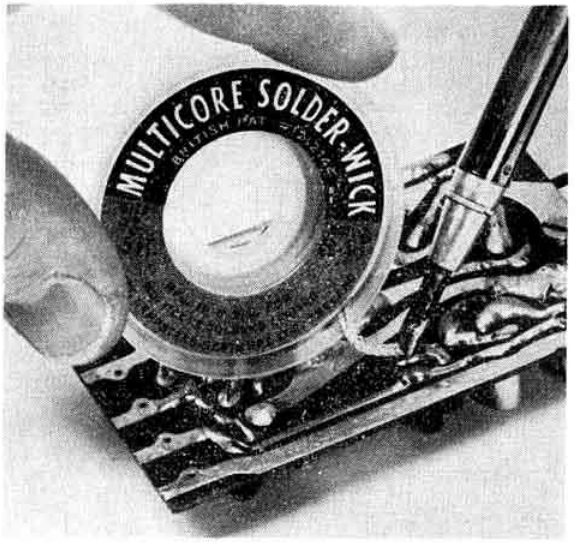
To return to the basic comparison; on the one hand the electronic meter display is clear and unambiguous, but the instrument requires a power connection. On the other, the conventional multimeter is completely self-contained and portable, but requires to be read with scale uppermost, needs close scrutiny and may require several seconds to interpolate a reading on the analogue display.

The reviewer is glad he does not have to specify a "best buy".

NEW PRODUCT

Multicore Solder-Wick

Multicore Solders Ltd announces the introduction of a high-quality range of Solder-Wicks. The range comprises six different sizes, each size specially colour-coded for easy identification, to meet the needs of every de-soldering operation, and is covered by British Patent No 1212144. Solder-Wick is claimed to be fast, simple and efficient to use and only takes a few seconds to de-solder any electronic or electrical joint. It also removes unwanted solder from printed circuit boards and de-solders plated-through holes. It is recommended that for best results a 40W or 50W soldering iron is used.



This new product will be distributed in the UK through a selected number of leading electronic industrial distributors. All enquiries should be sent to BIB Hi-Fi Accessories Ltd, PO Box 78, Hemel Hempstead, Herts, sole UK sales concessionaire.

Book Review

The Radio Amateur's Handbook, 1974 edition, by the headquarters staff of the ARRL. 704 pages, copiously illustrated and with many tabulations. Obtainable from RSGB, 35 Doughty Street, London, WC1N 2AE. Price £3, inclusive of postage and packing.

The fifty-first edition of this widely-known amateur radio text will make its appeal, as always, to both beginners and advanced devotees of the art, and they will not be disappointed. They will want to know in what way the new handbook differs from the last, for the encyclopaedic coverage of amateur radio techniques is annually brought up-to-date, and improved designs are offered. This is true of the present issue also.

In the earlier chapters one notices that valve-clipping circuits are absent: and the microwave valve favoured is the 723 reflex klystron, which is available from surplus sources. There is an expanded treatment of transistor arrays, and a practical illustration of the problems arising in the design of matching networks for solid-state rf power amplifiers.

A heavy-duty regulated supply for fm transceivers of about 25W is of interest: voltage 0–15V with 5A current limitation. It has short-circuit protection up to full voltage, and would also make a good bench supply for solid-state devices.

A two-band vfo-controlled transmitter (14 and 7MHz) of 10W and approximately 1A consumption at 12V has an interesting design. It includes a keyer circuit, drive control, swr inductor, break-in delay circuit, and side-tone oscillator, though most of these can be omitted if a simpler arrangement is desired.

There is a conduction-cooled 2kW amplifier using two 8873 conduction-cooled triodes, grounded-grid circuit, and untuned input circuit.

The varactor tripler for 420MHz has been redesigned; and mosfet preamplifiers for 10, 6 and 2m will appeal to those using older 10m receivers, as well as to the 2m man.

The converters for 50 and 144MHz, designed by the Rochester VHF Group, have an impressive list of good qualities, including freedom from the necessity of neutralization and the use of moderately priced transistors.

One notices a 2m $\frac{3}{4}\lambda$ vertical aerial for mobile work, and a redesigned transmatch for QRP, which should interest members of Raynet.

A de-luxe solid-state keyer using seven ttl integrated circuits is new; they are now available at low cost. It is a version of the WB4VVF Accu-Keyer, and incorporates an output driver; optionally there are a power supply, a keying monitor, and provision for solid-state keying of cathode-keyed transmitters. A less ambitious keyer is the single ic electronic keyer which has been given an amended circuit and batteries to reduce cost. It is suitable for grid-block-keyed transmitters.

There is a QRP solid-state ssb transmitter transceiver for 160m, which is a sophisticated miniature of engaging design: it is suitable for battery operation in the field, or fixed station use, and the output is about 1W.

In the fm mode there is a solid-state transmitter for 146MHz; this is a Mk2 version of the one in the 1972 Handbook and is smaller, largely due to the use of a transistor array instead of discrete components. Power output is below 2W at about 0·25A.

A new tester for npn and pnp transistors, junction fets, and dual-gate mosfets, but not audio or high-power rf transistors, is described; and a simpler tester for crystals and bipolar transistors is also new.

Other devices of note are a low-power rf wattmeter for 1–25W suitable for the range 1·8 to 30MHz, and a "rollerless ultimate" transmatch with a fixed value inductor for aerial matching from 3·5 to 21MHz.

Amateurs with limited space for hf aerials will be interested in an interlaced 20 and 15m short Yagi rotary beam using loading coils and being about 16ft square.

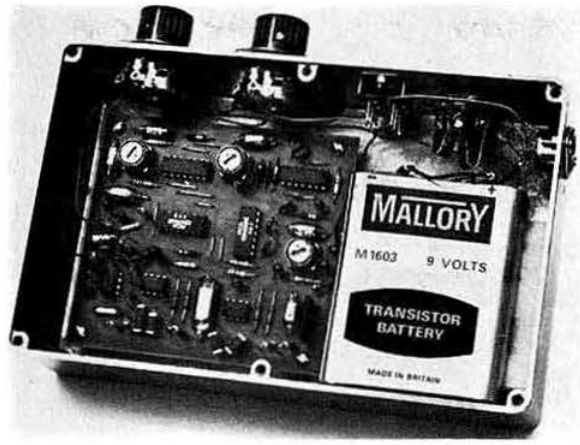
A book of this quality and standing recommends itself, but the foregoing necessarily brief notes on the new edition will indicate that the editors continue to fulfil most commendably the expectations which a new edition arouses.

T. P. A.

EQUIPMENT REVIEW

The Datong universal rf clipper

by P. J. HORWOOD, G3FRB



PROVIDED he is not the sorry owner of a pair of melted 6HF5s, if the reader is already using rf speech clipping he will not need convincing of its effectiveness. For the unconverted the reviewer is glad to bring to readers' attention this British-made "clip-on" unit.

The Datong modulation maximizer is an audio-rf-audio device designed to fit between microphone and transmitter. It is probably unique in using an all-ic circuit to produce an ssb signal at a nominal carrier frequency of 60kHz by the phasing method before final reconversion to audio. Ruggedly built in a die-cast box with plastic feet, it is small enough to sit unobtrusively on the operating table.

Several features are worthy of note. First, it has input and output level controls "external" to the circuit. The output control allows the signal levels with clipper "in" and "out" to be set to equality so that true comparisons can be made; the input control varies the amount of clipping without changing the output, once the threshold has been exceeded. Both knobs have useful arbitrary scales, permitting previously established conditions to be reset with reasonable accuracy.

As will be seen from the manufacturer's specification, within limits it is remarkably tolerant of supply voltage from external sources. A 9V PP9 is fitted internally and it was with this potential that the test measurements were made. The unit is diode-protected against polarity reversal.

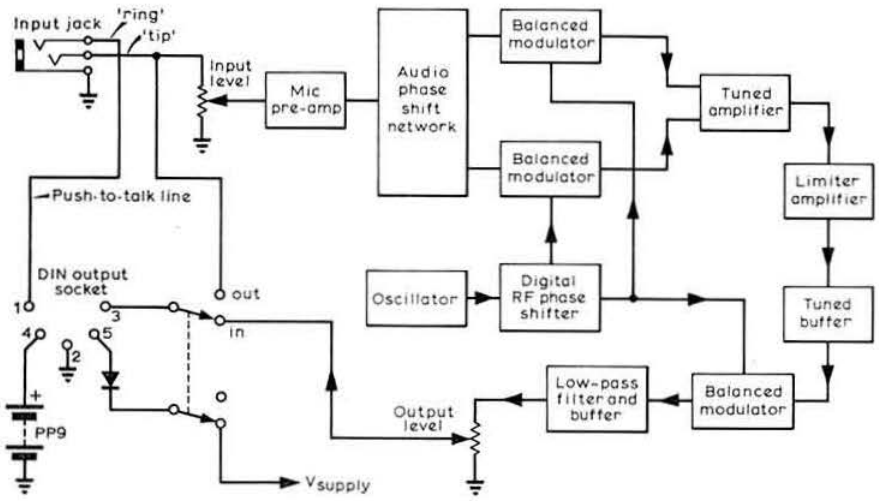
Output and push-to-talk connections are made via a five-pin DIN socket. When the clipper is switched "out" it is automatically switched off; the microphone signal passes straight through and is not affected by either level control.

A criticism general to the Datong and its competitors is the lack of provision for low-impedance microphones. It should not be assumed that all potential purchasers use Japanese "black boxes"; the reviewer happens to use a 200Ω balanced input to his home-built transmitter.

Sufficient has been written in the past of the advantages of rf clipping; compared with the alternative of a high-power linear amplifier, in current business parlance the clipper is more cost-effective.

Setting up without test gear

With the Datong clipper connected between microphone and transmitter but switched out, tune and load up normally. Depending on whether the microphone gain is set by whistling up the plate current (the preferred method) or by



Block diagram of the clipper

Manufacturer's specification

Input sensitivity at 1000Hz at clipping threshold (—3dB relative to maximum)	8m V peak-to-peak
Input impedance	60kΩ
Output at clipping threshold	400mV peak-to-peak
Maximum usable clipping	26dB
Noise level at threshold	—45dB
Frequency response for inputs Below threshold	—3dB at 500Hz and 2,400Hz —26dB at 6,000Hz (relative to 1,000Hz)
Supply voltage range	6·5–15·5V
Supply current	3mA at 6·5V to 12mA at 15·5V
Minimum external load	4kΩ
Dimensions	185mm wide, 62mm high, 118mm deep
Weight, less battery	880gm
Price	£45 plus VAT

Available from Datong Electronics Ltd, 11 Moor Park Avenue, Leeds LS6 4BT.

Measured performance

Input sensitivity (1,000Hz) at threshold	2·5mV rms
Maximum output at threshold	160mV rms
Maximum usable clipping	24dB
Carrier leakage (60kHz) no input, all controls max	2mV peak-to-peak
Frequency response with inputs below threshold	—3dB at 380Hz and 2,100Hz (+ 1dB at 600 to 700Hz) relative to 1,000Hz
Supply current	5·6mA at 9V
Two tone input (1,100 and 1,775-Hz). Tone levels at maximum input sensitivity, no peak flattening	1mV rms each tone
Tone levels for threshold of visible peak flattening	1·5mV rms each tone
Tone levels for maximum peak flattening	15mV rms each tone

Approximate calibration of input control

0 —30dB	**4** —12dB	**8** —1dB
1 —30dB	**5** —8dB	**9** —0dB
2 —23dB	**6** —5dB	**10**—0dB
3 —17dB	**7** —2·5dB	

using the Continental "aaallo" method, note the reading. Now switch in the clipper, input level control near maximum.

Do not readjust the transmitter microphone gain. Modulate, and adjust the clipper output control for the previously noted plate current. If not out of breath, gradually reduce the input level control to the point where plate current just starts to fall. This is the clipping threshold.

Refer to the input control calibration table under **Measured performance**. For example, if the dial reads 3 (—17dB), and is advanced to 5 (—8dB), 9dBs of clipping will be obtained. Finally, inspect the colour of the pa anodes and proceed to work the dx.

Manufacturer's comment

The frequency response figures obtained for the clipper sent for review are correct, but later clippers have been aligned to obtain the results shown in the specification. Typical units in current production have the 3dB points at 450 and 2,600Hz.

1,296MHz beacon GB3DD

This new beacon, first reported in the July issue of *Radio Communication*, p453, was the culmination of nine months' intense effort by members of the Dunstable Downs Radio Club to provide a standard transmission against which they could check their progress when developing receivers and converters for the 23cm band. The club agreed to adopt the project as a part of its programme and gave considerable backing, making approaches to the RSGB, to the MPT for licensing and site permission, and providing money from club funds for the purchase of parts.

The transmitter comprises two main parts; the exciter, built by club members, and the power amplifier, which was produced as a special development project by the RF Applications Division of RCA, Sunbury-on-Thames.

The exciter uses a "G8ARV" board as described in *Radio Communication* December 1969, modified to operate with a 54MHz crystal, doubling in two stages to produce an output of 65mW at 216MHz. The crystal is a specially-aged type operating in an evacuated glass case to minimize long-term drift. The output of the 8ARV board is fed to a two-stage amplifier; a 2N3553, producing 950mW, which drives a 2N3632 to give 5W output. This supplies a varactor multiplier using a MA4661 diode to provide 600mW at 1,296MHz as drive to the power amplifier. It is fed through a tuned-line filter to reduce spurii to a low level. The power amplifier is followed by a similar filter to ensure that the output is clean. Examination of the transmitter output was done with a professional grade spectrum analyser and levels of —45dB and —50dB were measured for the second and third harmonics at 2,592MHz and 3,888MHz. All other responses were more than 45dB below the level of the 1,296MHz output.

The power amplifier uses a 2N6265 transistor in the predriver stage, a 2N6266 driver, and development type TA8695 final amplifier; it employs printed circuit strip-line construction for the tuned lines and matching sections. The development was done as an experimental project at the special request of DDRC and the unit is not likely to be produced for sale as a commercial item.

The keyer provides an 800Hz shift of frequency to provide identification, the callsign being repeated every 15s. A plug-in diode matrix provides the facility to change the keying format should this be found necessary.

The aerial is a scaled-down version of the HB9CV two-element Yagi enclosed in a protective glass-fibre sphere which is mounted at 130ft above ground level on a site 675ft above sea level. The site is somewhat screened to the south-west and this, with the aerial directed to the north, may give poor results in this area.

Power supplies are conventional, a 28V supply controlled by an integrated-circuit regulator for the low-power stages and a bridge rectifier and high-power zener diode to supply 22V at 4A to the power amplifier.

The project has required over 1,000 hours of work by club members and others, the co-ordination of the separate parts and system testing being done by G4CPE and G3ZFP. They also made the 8ARV board and driver stages. The varactor multiplier was the work of G8ADC, G3NUE made the keyer, and the filters were made by SWL Len Bates.

And it can be done . . . !

The fm repeater station DB0VK (city repeater Cologne) on Channels R3 and 17

AS it has always been stated in the past that a filter allowing 600kHz separation between input and output could not be constructed with materials available to the amateur, the following is a description of the repeater station DB0VK in Cologne.

After confirming that Belgium and the Netherlands were constructing their repeaters to the 600kHz separation standard, it was decided in January 1973 to re-equip the repeater DB0VK in this way. An abrupt change-over of the operating channel was avoided by installing a second receiver on Channel 17 (calling frequency 145·175MHz) in the repeater. The repeater can be used during part of the change-over period on both Channel R3 (144·175MHz) and on Channel 17: the output frequency of 145·775MHz is the same for both channels.

As an inducement to change-over to Channel 17, the receiver for this channel has unlimited contact time. In addition, the 600kHz channel is from 6 to 8dB more sensitive than the 1·6MHz channel because of the existence of a mosfet amplifier. Both receivers are connected via an isolating filter to the same aerial. This isolating filter was salvaged from a defunct signal station (1958 vintage), fitted with $\lambda/4$ line and feeds both receivers. The receiver signal for R3 then travels via a retrimmed former aerial filter (from a 160 D2S set) connected as a filter at the receiver input.

Using parallel tuned circuits, this filter selects the receiving frequency and cuts off the unwanted frequencies at the receiver input with series circuits. A Brown Boveri isolating switch acts as a filter in the receiver, and the signal then travels via the mosfet amplifier already mentioned to the receiver. Both receivers have relay-controlled noise filters and their operating contacts can always be connected in parallel.

The transmitter output is 10W and a vertical dipole is used as the aerial. The receiver aerial is a vertical omni-directional aerial consisting of four folded dipoles. For purely local reasons the transmitter aerial had to be erected on a second mast 7m distant from the receiver aerial. This arrangement means about 30dB isolation at 7m horizontal and 4m vertical distance from the aerial centre point. It would be preferable to mount the aerials above each other.

The cross-talk attenuation filter in the connections to both receivers attenuates unwanted frequencies in the 1·6MHz channel by about 60dB, and in the 600kHz channel by about 80dB, so that at the receiver input the transmitter frequency will always be attenuated by 90 or 110dB.

In arithmetical terms it appears that of the hf voltage (about 24V at 60Ω from 10W transmitter power) only about 7μV (600kHz receiver) or about 6μV (1·6MHz receiver) are present at the receiver apart from the usable signal. These external voltages are within the selectivity of the now usual Noebl receiver. DB0VK uses two Pye 8702 receivers, with their original 50kHz channel spacing converted to 20kHz. A reduction in receiver sensitivity when a keyed transmitter is used is not noticeable at the transmitter power now used. Trials showed that the first noticeable reduction in the quality of reception occurred at a (not permitted) transmitting power of 20W.

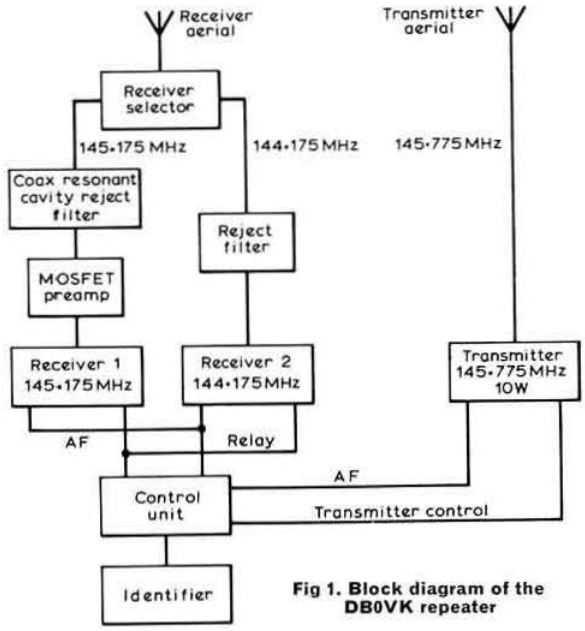


Fig 1. Block diagram of the DB0VK repeater

The expense of the filter equipment came to DM50, the whole amount being used for bnc and pl plugs as well as for hf cable for connections and $\lambda/4$ cable lengths. The signal station where the filters originated was scrapped years ago. It should now be easy, with the beginning of the change-over in Germany of the automatic telephone system to the Oebl-B net with 20kHz channel pattern and std, to find an old automatic exchange. The filters are also easily constructed by the amateur.

Now a word about the function of such a filter. Automatic telephone switches consist, as a rule, of two coaxial line resonators of high quality, one for the receiver frequency, the other for the transmitting frequency. Transmitter and receiver work via these switches with one aerial, the commercial switch separation being 4·5 or 4·6MHz. The transmitter-receiver isolation of the switches is originally about 80dB. Both coaxial line resonators are connected to the aerial input by $\lambda/4$ line. The $\lambda/4$ lines fulfil an important function which can be explained.

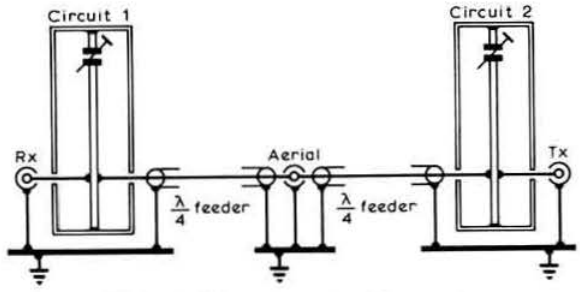


Fig 2. Aerial arrangement of the repeater

The receiving signal on f_{REC} travels from the aerial input via the $\lambda/4$ line to the circuit tuned to the f_{REC} in front of the receiver input. As the circuit is a parallel tuned circuit, the receiver signal reaches the receiver unchanged, whereas the transmitting signal through circuit 1 is shorted. This represents a continuous coaxial line for the receiver frequency f_{RX} and a shorted $\lambda/4$ line for the transmitting frequency. Therefore the total transmitting power can only flow from the transmitter over circuit 2 and the aerial input towards the aerial. Circuit 2 is tuned to the transmitting frequency f_{TX}. The transmitter power flows unrestricted via circuit 2 and line 2 towards the aerial. Circuit 2 acts as short circuit for the receiving voltage coming from the aerial, and together with line 2 represents a short-circuited $\lambda/4$ line for the receiving frequency. The received signal, therefore, cannot flow into the transmitter portion of the separating filter, only in the direction of the receiver.

If used for amateur repeater transmitting stations, the existing $\lambda/4$ lines in the automatic telephone switches must be exchanged for cable suitable for 145MHz. In most cases no alterations are necessary for the coaxial line resonators, apart from re-alignment. The coaxial connection originally used for the transmitter remains free. The part with line 2 and circuit 2 now only acts as a series tuned wave-trap on the transmitter frequency. Circuit 1 is aligned with f_{RX} and again filters the receiver frequency. With the original 4·6MHz filter it is possible, with suitable alignment, to achieve rejection of from 70 to 80dB to the unwanted transmitting frequency. The mechanical and electrical quality of the material is of course of great importance.

Performance of transistorized car ignition

by B. PRIESTLEY, G3JGO*

THE author's interest in transistorized ignition was aroused by a friend who claimed a consistent 10 per cent improvement in petrol consumption by its use. Admittedly his was a sports car, so the question was what sort of improvement would be seen for the average saloon car. Five per cent seemed a reasonable minimum estimate, and this was confirmed by Mr Sample, co-author of one of the earliest articles on the subject, [1]. That article is unique in that the engine performance was measured under standardized laboratory conditions so there was no question of the author's enthusiasm causing him to forget that the before and after consumptions were not on strictly comparable journeys.

Using the system, the author's experience so far is that there seems to be an approximate five per cent improvement (although an average over at least a year would be desirable before making a comparison) and the cold starting is considerably improved.

The principle of electronic ignition is that a transistor inverter is used to produce some 3–400V which charges up a capacitor. This is discharged into the coil primary when an scr is turned on by the contact breaker—this considerably reduces contact breaker point wear. The coil is now used simply as a pulse transformer and steps up the voltage applied to its primary to produce the spark.

One common objection is the "unreliability" of electronics compared with mechanics. However, since the contact breaker points need regular adjustment and in some cars replacement four times a year, this argument needs to be clarified. If the ignition unit is made from good quality components used sensibly, it should outlast the rest of the car. One manufacturer obviously believes this as he will give a five-year guarantee. On the other hand, if one uses cheap components of dubious origin outside their ratings, or takes no precaution against damp and heat, failure will occur.

Unfortunately even the best components can include an odd defective one, so it is advisable to be prepared for failure by making provision for a quick changeover, and not increasing the plug gaps for the first few months. Warming up the unit with a hair dryer may also expose a failure in the garage rather than on the road. The *Wireless World* unit [2] does have the possibility of such a failure built in because TR3 receives a large reverse base-emitter voltage. The device specified is rated to stand this, but most modern devices will not so it is essential to protect them with a diode and resistor, Fig 1.

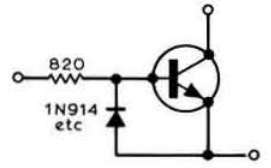


Fig 1. Using a diode and resistor to protect TR3 from damaging reverse base emitter voltage

Ignition interference is another area of doubt. So far the author has not been able to detect any interference at 145MHz, although if the general noise from other cars in the surrounding area were less it might be possible. This is with resistor plug connections and primary suppression built into the ignition unit. Since most SCRs have a maximum rate of rise of current, a series choke may be important to prevent scr failure as well as suppress interference. The conclusion is that interference is curable without too much trouble.

References

[1] "Electronic ignition", Sample and Alexander. *Electronic Engineering* December 1964.

[2] "Capacitor-discharge ignition system", R. M. Marston. *Wireless World* January 1970.

Reference [1] is a good account of results on a test bed; it is not a do-it-yourself article, but reference [2] describes practical units for both positive and negative earth. Complete units and kits are also available with prices ranging between £8 and £16, and it is understood Lucas are on the point of marketing a unit fitting inside the distributor. It would be interesting to hear of any member's long-term experience, good and bad.

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TECHNICAL TOPICS

by PAT HAWKER, G3VA

THE amateur seeking a high-performance communications receiver has several choices open to him. He could spend several thousand pounds on such models as the Racal RA1772, or the Rohde & Schwarz EK56 with its variable selectivity based on low-pass filters (*TT* December 1969) and currently being advertised in *QST* discreetly without its price tag which is in the region of £10,000. He could buy one of the late generation of professional/military valved receivers such as the Collins 51J or R390/URR series or the SP600 Super-pro or the now vintage AR88. He could buy one of the current generation of receivers designed specifically for the amateur market; or he could take courage in both hands and build one himself to meet his own specific requirements. Our first item explores some aspects of this perennial topic in the light of some recent articles.

Building receivers

Although one must admit frankly that for many years the percentage of home-built hf communications receivers in use on the amateur bands has been very low, it is important that we should not forget that there are still many valid reasons in favour of do-it-yourself, quite apart from any natural sense of achievement that comes from such a project. Two recent articles on the subject thus deserve more than passing attention.

In *QST* Doug De Maw, W1CER, (Part I, June 1974) presents some of the design considerations behind a new design being developed for the ARRL *Handbook*. He emphasises that "one need not go to extremes in circuit complexity when building a high performance receiver". His design is basically a 1,800-1,900kHz tunable receiver/i.f. strip intended to be used in conjunction with built-in converters for other bands, based on a mixture of mosfets, jfets, bipolars and integrated circuits and balanced diode product detector. No rf stage, 40673 dual-gate mosfet mixer with conversion to 455kHz, Colpitts vfo with buffer amplifier, 400Hz mechanical filter for cw, two CA3028A i.f. amplifiers, crystal-controlled bfo and a simple muting agc system and S-meter amplifier to provide a lightweight receiver for vacation and portable use, drawing less than 100mA from a 12V supply.

In *Ham Radio* (June 1974) Ray Moore, ex-K1DBR, uses his valve design (intended primarily for hf broadcast reception) as a peg on which to hang a number of thoughts on the advantages that the home builder has over those designing for factory production. He states bluntly: "The individual amateur can no more hope to beat the professional receiver designer at his own game than he can hope to build a better and cheaper family sedan in his backyard . . . the catch is that the professional's game is *not* to design the ultimate performance set but to design a mass-market, multi-band, multi-mode, decorator-styled receiver that can sell at a popular price." Just as teenagers can build a performance car that will outperform Detroit's creations on the drag strip, many an amateur can build a better receiver than he can afford to buy. Yet too many of the designs in amateur journals are imitations of commercial designs and although giving their builders valuable experience too often may result in an inferior receiver at a higher cost.

What Ray Moore advocates is that the amateur should set out to build a receiver that meets his own specialized needs with no compromises. He points to the difference in performance standards between the military and professional receivers built to sell at many thousands of dollars or pounds and the factory-built receivers built to a price the amateur can afford. The $400 receiver may have a budget of less than $100 for the cabinet and all the parts which go into it; and only $50 for all direct labour including assembly, alignment, testing and troubleshooting. Admittedly a manufacturer buying in large quantities will get more than an amateur buying new components, but the amateur can use one-of-a-kind high-quality surplus and salvaged items that no manufacturer could afford to put into a low-budget receiver.

Some of the points he makes are extremely sensible. He notes that it is in the mechanical details that most modern receivers are inadequate, using the lightest possible material for chassis and cabinet and far from ideal tuning mechanisms. He uses ⅛in aluminium panel bolted into a ⅛in chassis plate which is then bolted into an old Meissner Signal Shifter (vfo) welded steel cabinet—"when completely buttoned up the whole thing is almost a solid cube". For dial and drive he has salvaged an old National PW (HRO) mechanism and he also uses HRO-derived plug-in coil assemblies. These are not of course the only solutions but make a change from some of the flimsy mechanisms that the designer who builds down to a price is often forced to adopt. They also indicate why magazine designs (which cannot specify one-off surplus items) are not always the best guide to value for money.

"One of the delights of home-building," he avers, "is that you can over-design. You can start out with ⅛in aluminium plate . . . you automatically insert parasitic suppressors . . . you can double decouple every stage and put in extensive

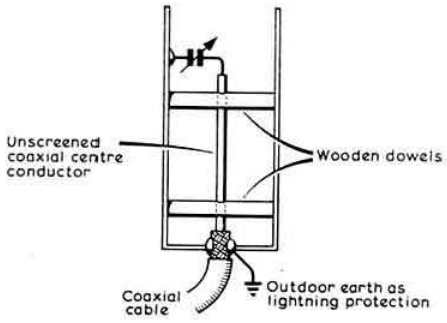


Fig 1. ZS6BT's arrangement for matching coaxial feeder to a short-circuited stub

shielding . . . where the professional runs two i.f. stages on the verge of oscillation, you can run three that quietly loaf along . . . you can use circuits that require considerable diddling and alignment . . . you can use the latest components without worrying about obsoleting a large inventory of parts . . . you can design for a particular band and activity."

In describing his own special-purpose receiver he says: "It is superior to any receiver available commercially for the purpose for which it was designed and built and in the environment in which it is used. It is superior *only* because the market for such a receiver is so limited that no manufacturer could afford to design and build a receiver for that purpose. The future of home-built receivers is in those designed for a specific, limited task."

ZS6BT gamma-derived stub match

Ted Cook, ZS6BT, notes that among the various balun arrangements used to facilitate the feeding of balanced aerials from unbalanced coaxial line there is one omission. He has never seen a balun for matching coaxial to a quarter-wave closed stub, used in conjunction with a centre-fed aerial. While I suppose it could be argued that the stub itself would represent a form of balun, this clearly does not satisfy ZS6BT. He is also keen (for lightning protection) to effectively earth down the aerial directly at the feedpoint.

Thinking the subject out, ZS6BT has come up with an ingenious solution to both his problems and he now regards the closed stub and coaxial as virtually made for each other. He simply takes over the principle of the gamma-match.

To quote ZS6BT: "Recently I erected a four-halfwave co-linear array for 21MHz using the traditional twin feeder. This meant that I had to use an atu to provide a connection to my reflectometer and transmitter via coaxial cable, and I wondered why I could not use coaxial all the way. Then the penny dropped: see Fig 1. The tapping-point is not critical (roughly one-fifth of the way up the stub). The capacitor setting is sharp but when adjusted will provide unity swr.

"The fact that the coaxial leaves the stub at the bottom point gives an excellent mechanical arrangement; as regards simplicity, it is better than using a twisted pair to feed a dipole.

"I feel that for those who used closed stubs and want to feed them—including vhf co-linear enthusiasts—this is a winner. For the inverted-V enthusiast who wishes to use half-wave legs, this is an almost ideal arrangement. Unless someone has beaten me to it, is this one for the book?"

RF-actuated vox

B. Zwerver, PA0ZH, in *Electron* (June 1974) provides an interesting use for the mosfet/bipolar TAA320 ic and at the same time comes up with an rf-actuated switch which he uses in conjunction with an add-on amplifier with one of the popular low-power nbfm rigs. To increase the power of his Kenwood (Trio) TR2200, with its nominal 1W, he uses a transistor amplifier (BLY87, BLY89) but needed some way of voice switching this unit. Fig 2 shows his solution, using an rf switching voltage. The system would be equally suitable for other bands and other rigs. The relay used by PA0ZH was a Siemens unit with a 750Ω coil but this should not be unduly critical.

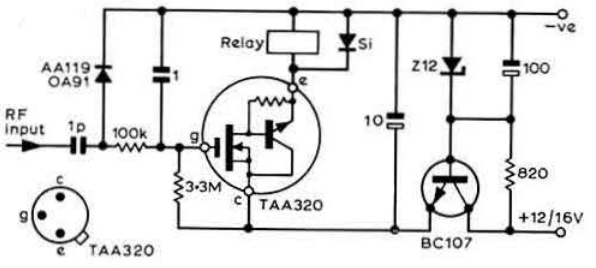


Fig 2. The PA0ZH rf-actuated vox

Synchronous noise blanker

First, a couple of quick definitions. A noise limiter is a device which slices off noise pulses exceeding some fixed value on the incoming signal. A noise blanker short-circuits or switches off the signal during periods when there is a noise pulse. Quite effective noise limiters can be designed for a.m. but they tend to be less effective with ssb or cw.

One of the problems with noise blankers is that there is no easy way of ensuring that the blanking element operates at the very instant that the noise pulse reaches it. We need to delay the signal to give time for the noise blanker circuits to function, otherwise at least some part of the noise pulse will get past the blanker, usually in the form of a transient.

In 1972 Professor W. Gosling (then of University College Swansea but now at Bath University) outlined a system in which a PAL colour television delay line was used to delay the 5·2MHz i.f. signal for 64μs to give the blanker a chance to get ready for the noise spike. But his paper shows that he was by no means satisfied with the results achieved even with this technique.

He stressed that although impulsive noise is quite different in character to dsb and ssb radio signals the design of a receiver that will discriminate against the former and in favour of the latter "is not easy". He added: "It is critically important that the noise blanking operation should be carried out on the received signal before it passes through the narrow i.f. filter, and hence blanking must operate at very low level. The use of a signal delay line is essential, both to permit the blanking circuit to come into operation before any of the noise pulse energy reaches the following filter, and also to allow the operation of the blanker to be relatively slow, thus reducing the component of i.f. energy passed to the filter which is due to the blanking operation itself. Results obtained experimentally suggest that further progress will be made only if some means of noise cancellation less crude than simple blanking can be employed. The aim of any new approach must be to reduce the disturbance to the wanted signal by the operation of noise cancelling circuits."

Later, in a private communication, he wrote: "Our ideas have gone a lot further than the IERE paper. We are now thinking in terms of receivers using synchronous demodulation at a rather low level so that a substantial part of the selectivity, but not all of it, is obtained post-demodulation. In this way we can operate noise blankers at a fairly low level and yet on an a.f. signal. We have also developed a rather ingenious new way of obtaining a noise blanking signal but this is subject to patent considerations."

In *Electronics* (13 June, 1974) M. J. Salvati describes an interesting "add-on" noise blanker that acts on audio signals: Fig 3. Unfortunately this system cannot cope with random noise spikes, but only with regular noise pulses such

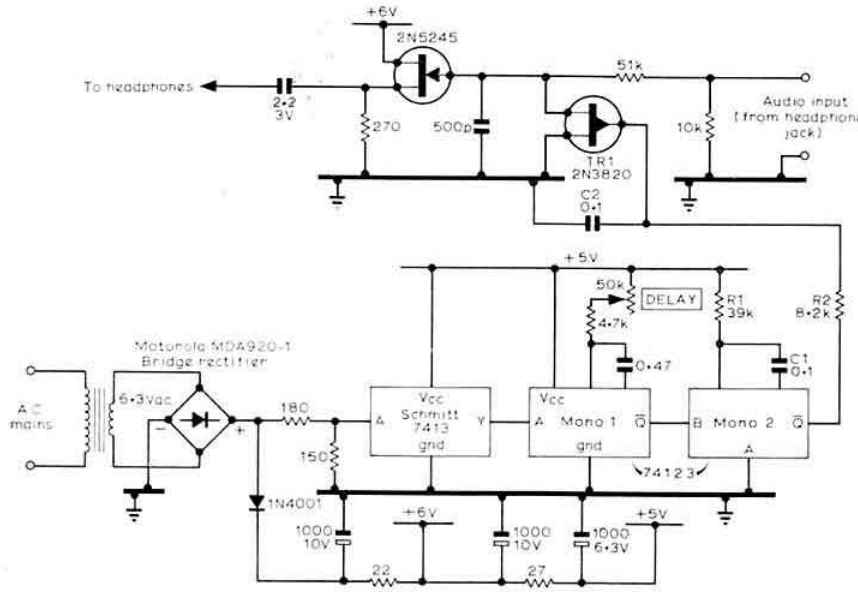


Fig 3. Synchronous noise blanker (*Electronics*) which generates blanking pulses to cancel one dominant local source of electrical interference producing a pulse at twice mains frequency. The noise pulses and blanking pulses can be brought into synchronization by the variable delay associated with Mono 1. Values are for 60Hz mains, and may require slight modification for 50Hz supplies

as are often produced by a single dominant nearby noise source.

This limitation does not mean that his system has only little value to the amateur. All of us—certainly those in urban and suburban environments—know how often reception is spoilt by the regular noise spikes of an offending fluorescent lamp or the thyristor and triac regulators that produce substantial rf signals that radiate through the electricity mains. Such interference usually has a repetition rate exactly twice mains frequency (100/s in Europe, 120/s in the USA and countries having 60Hz mains).

In this system the pulses to initiate blanking are derived from the mains waveform at a point following a full-wave bridge rectifier so that one obtains 100 or 120 switches per second. Since the fet blanking element acts on the headphone output of the receiver, the whole unit is thus entirely independent of the receiver, can be readily used on different receivers, and requires absolutely no modification or even connection to the receiver circuits.

Because the blanking pulses are not derived from rf signals, their timing does not depend on the shape or rise time of the noise pulses, nor are they affected by any characteristics of the wanted signal (though it should be noted that where the pulses have passed through narrow i.f. filters their character will have been changed to some degree).

The 100Hz (120Hz) output from the bridge rectifier is shaped by a 7413 Schmitt trigger which is used to drive a 74123 dual monostable ic. Mono 1 delays the blanking pulse, which is actually produced by Mono 2, so that Mono 2 fires at any desired instant relative to the waveform at the output of the bridge rectifier. The delay control can be used to ensure that blanking coincides with the onset of the repetitive noise pulses.

The width of the blanking pulses is determined by R1, C1. The fast rise-time of the blanking pulse from Mono 2 is slowed down by the low-pass filter R2, C2 to minimize distortion of the audio signal.

Provided that it is clearly recognized that the system is able to cope only with interference from one dominant and regular source radiating at twice mains frequency (and the noise pulses are not much affected by ringing in the narrow filters) it would seem to have interesting possibilities. M. J. Salvati claims that it significantly improves audio intelligibility when used on a communications receiver. The circuitry could also be of interest to those investigating more sophisticated forms of noise blanking.

Hybrid gate-dip oscillator

Many types of oscillators have been used in grid and gate dip oscillators, but surprisingly few of them are really ideal from the viewpoint of the constructor. Some require tapped coils and three-pin plugs, some a second feedback winding, others a capacitive divider that may reduce the range covered by each coil, still others use a two-pin coil but with each side "hot".

In *QST* (June 1974), Benjamin Clark, WB4OBZ, has come up with an unusual answer to all these problems: Fig 4. He uses what, in effect, is the equivalent of a source-coupled fet oscillator but with one fet replaced by a bipolar transistor. This means that, as in the original Franklin oscillator from which it derives, one has a simple two-pin coil with one side earthed. In the WB4OBZ prototype, seven coils provide a range of from 80kHz to 35MHz.

The original unit includes a two-stage audio amplifier (not shown) to listen to an incoming signal or to aid its display on an oscilloscope. The Skt1 socket has three functions: (1) a short aerial can be plugged in to allow the unit to act as a field-strength indicator; (2) it allows the unit (coil removed) to be connected to any external resonant circuit that has dc continuity; (3) a capacitor of about 5pF can be used to couple the gdo to circuits that cannot easily be inductively coupled to the unit (eg toroids, shield coils etc).

WB4OBZ also has an ingenious form of individual calibration scales attached to a sheet of metal fastened to

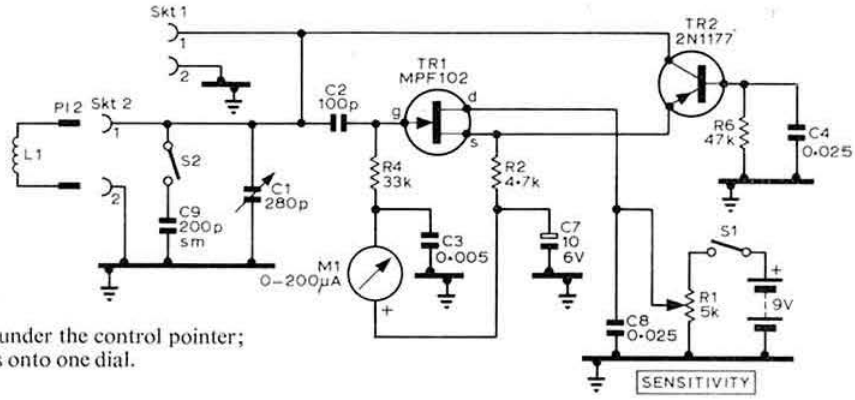


Fig 4. WB4OBZ's hybrid gate-dip-oscillator. The circuit has been simplified by omission of the two-stage audio amplifier. Alternative types for TR2 include 2N1177, 2N1178 or 2N1179. Almost any of the usual fet devices could be used for TR1

each coil form, bent so that it lies under the control pointer; this avoids cramming several scales onto one dial.

PA0AGE huff and puff

Important though I believe the technique of huff and puff vfo stabilization to be—offering as it does many of the benefits of frequency synthesis without the disadvantage of the spectral impurity found in the simpler synthesizers—I had intended to leave the subject alone for a bit. But now PA0SE in *Reflecties* (*Electron* June 1974) publishes the arrangement used by PA0AGE. This includes the frequency timing chain and showing incidentally how the basic unit can have several applications: in this case to provide 100kHz, 50kHz and 25kHz calibration markers. (In passing it has been pointed out that digital counters can be used quite simply to provide the timing chain for a stabilizer). He also includes a clamping technique to prevent the control voltage from exceeding a desired value. And finally, although it follows the basic PA0KSB system, it makes use of a different selection of integrated circuits. So, breaking all my resolutions, Fig 5 shows the complete PA0AGE huff and puff system.

Communications 74

The success of the second communications conference/exhibition at Brighton suggests that these events have come to stay. Not able to get along, I have been reading through the conference book of papers. Although concerned with professional and military communications, it is interesting to see how many of the authors are equally well known in the amateur field.

And not unnaturally quite a number of the papers this time are of interest to amateurs—including incidentally the strong case put forward by J. R. Brinkley that ten per cent or more of all vehicles should carry two-way radio linked to a national radiotelephone service to help save the fuel now wasted in unnecessary journeys. These could be eliminated if the driver was not isolated from his office and home. Just think what that would mean in terms of the

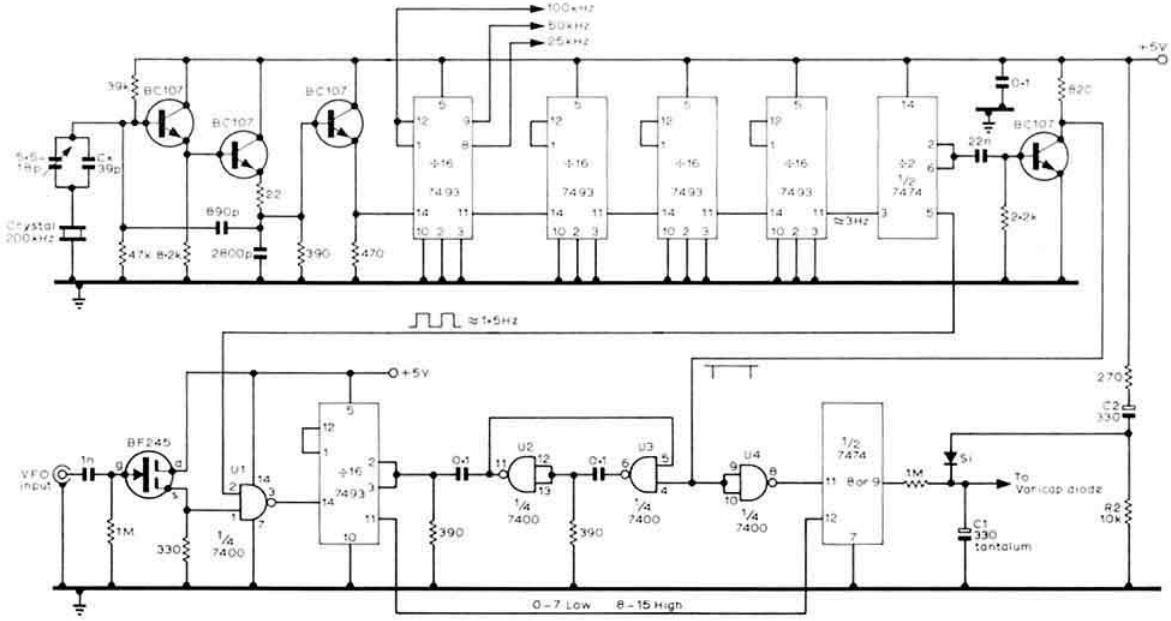


Fig 5. The PA0AGE huff and puff stabilizer based on the system originally outlined by PA0KSB.

vhf/uhf spectrum! (In the USA the FCC have just approved an *extra* 115MHz for business and public service mobiles.)

But we are concerned here with the technical items. So here is a very brief summary of a few of the papers.

"Design of ssb exciters for the marine band using the third method with digital quadrature generation" by A. Turner, G3UFP, (Hatfield Polytechnic). A further discussion of the techniques described in *Wireless World* (September 1973 and see *TT* October 1973).

"Loop antennas for hf reception" by B. S. Collins, (C & S Antennas Ltd). Some interesting directional receiving arrays based on small (0·8m diameter) active loop aerials. The loops are made from aluminium strip embedded in fibreglass and used to form endfire, broadside and radial arrays. The basic idea is much the same as the EMI-Cossor aperiodic loop aerial array (*TT* July 1968). The main problem is stated to be intermodulation products in the matching amplifiers that make the loops "active". (The EMI-Cossor design, now marketed by Hermes, adopted overlay rf power transistors to minimize this problem).

"Mismatched diode modulator-demodulators" by M. C. Hately, GM3HAT/GM3TDI, (Robert Gordon's Institute of Technology). A very interesting paper on new circuit techniques for ssb modulators and demodulators showing how better linearity can be achieved at the cost of efficiency which can easily be made good in these days of cheap gain. We will refer to this paper separately, another time.

"The evaluation of personal radio aerials for the police" by R. W. Smith (BAC). This continues and expands the assessment of the effects of the human body on radiation from small hand-held or body-carried personal portables, on the lines of the earlier paper by Z. Krupka to which we have referred in *TT* (September 1968). It again emphasises that if such an aerial is close to the body up to 90 per cent of the signal may be lost. Measurements have shown that the most significant factor is the position of the aerial with respect to the limbs of the operator and not the choice of aerial, size of operator or his clothing. So if you want to get the best results from hand portables, keep your distance from the aerial otherwise you form a highly effective dummy load!

"The use of phase lock loops in receiver design" Stephen W. Watkinson (Pye Telecomms). An interesting discussion on pll techniques including a description of a new 60-channel uhf portable receiver using a dual p11 system and providing afc that can correct for tuning errors of up to ± 5kHz.

Speech processing round-up

Another subject that has been deliberately put aside of late is that of speech processing and rf clipping. It seemed to me that so much had already been written on the very real advantages it gives provided that the system is carefully engineered that little remained to be said. Those who have not been convinced by now are never likely to be convinced by any words of mine! But several letters have been piling up and deserve mention, if only to indicate that the amateur now has a number of black box systems to choose from, apart from the Comdel CSP-11 that has been well-covered already.

For instance, Harry Leeming, G3LLL, of Holdings Photo Audio Centre wrote pointing out the value, as part of the processing, of using a suitable microphone. He has great faith in the Shure 444 which itself can provide much of the 6dB/octave rise over at least part of the main spectrum. This of course is in line with the comments in the February *TT*, stemming from the paper by H. Rupp. G3LLL writes: "Frankly, fitting any rf clipper without using a microphone with a rising response just does not make economic sense. In fact (dare I say it) at times it might even be more sensible to do without a clipper but just swap the microphone."

Since G3LLL's firm markets an rf clipper specifically for use with the FT101 that must be counted as an unbiased statement. He believes that even the 444 response can be improved (a little) by extra base cut, and he recommends the use of a 2,000pF capacitor in series with the microphone lead. He is so convinced of the need for proper audio pre-emphasis that his firm states that their claim for rf clipping of up to six times or more effective power gain applies only with this specified microphone. Of course the response of other (good) microphones can be tailored by a simple pre-emphasis tone circuit but for those who like it ready made the tip about the 444 seems a valid one.

Harmonic distortion with clippers

Another point that Harry Leeming, G3LLL, mentions is that one seldom sees discussed in notes about clippers the need for a high standard of audio fidelity (approaching hi-fi standards) before the clipping. Instead of thinking of the process as inserting, say, 25dB of rf clipping he suggests we should think of it as boosting low-level signals by 25dB. In normal amateur practice harmonic and intermodulation distortion levels of 5 or 10 per cent are quite acceptable for communication. But if the low-level signals are boosted by 25dB this applies equally to any distortion, resulting in a signal where distortion products may be virtually of the same level as the wanted audio. Where this happens it is easy to blame the distortion on the rf clipping whereas what is happening is that the process is simply amplifying distortion already present. In their FT101 clipper they have found it necessary to run it at fairly high gain so that the af gain on the transceiver can be kept relatively low, even when using high levels of clipping.

But it is worth remembering that while rf clipping will vastly improve a good ssb signal, it can produce very "ropey" results indeed on any equipment having only marginal audio performance.

Switched-mode power supplies

Recently we had a chance to look around the Mullard factory at Crossens, near Southport, the largest magnetic materials plant in Europe, where they make Ferroxcube, Magnadur and Ticonal. This involves manufacturing processes very different from those usually associated with an electronics factory. Motoring-buffs with very long memories may be interested to learn that up to about 1926 the old Vulcan cars were made on the site.

In the applications laboratory I had a chance to see a prototype of a new type of power supply that may prove to be of considerable interest to amateurs: switched-mode units. This type of system has been described in *Australian Electronics Engineering* (September 1973).

It takes advantage of a very simple principle. Remember all those old surplus airborne equipments that used to have very small transformers because they were designed to work at about 400Hz? Well, you could carry this principle a lot further and use compact ferrite transformers (not unlike

those used in tv set eht supplies) if the ac supplies were at 20kHz. And since the electricity board is hardly likely to oblige, why not make your own? You can do this by first rectifying the 50Hz ac into dc and then using the same dc-inverter techniques that are used in some mobile rigs by switching or chopping up the dc with transistor switches.

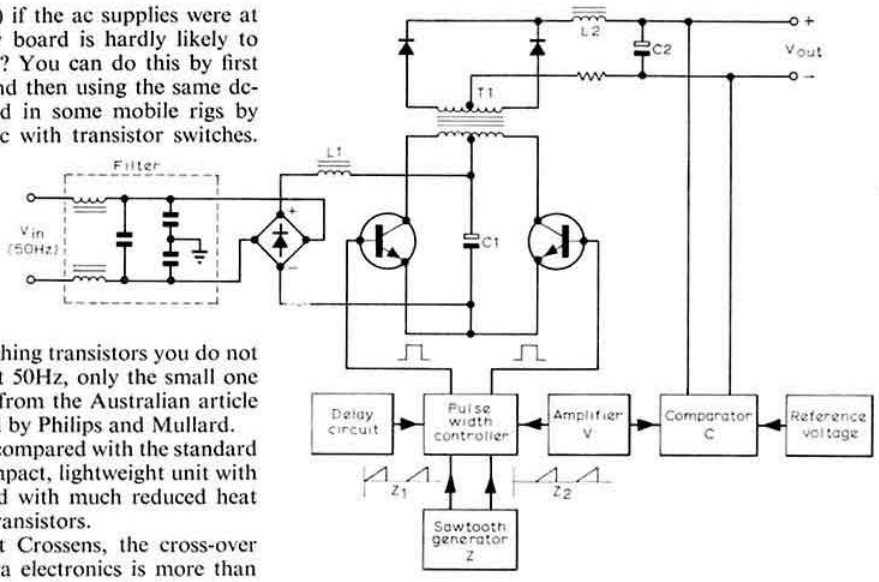


Fig 6. Switched-mode power supply arrangement described in *Australian Electronics Engineering*

And if you use high-voltage switching transistors you do not need any transformer working at 50Hz, only the small one at 20kHz. Fig 6 shows a design from the Australian article illustrating one arrangement used by Philips and Mullard.

It may seem a bit complicated compared with the standard power unit but the result is a compact, lightweight unit with none of the traditional iron, and with much reduced heat sinks for the voltage regulating transistors.

According to the engineers at Crossens, the cross-over point where the cost of the extra electronics is more than paid for by the elimination of the transformer is of the order of 100W; the reduction in weight and volume can be of the order of three to four times.

There is one snag, so far as radio amateurs are concerned: the 20kHz switching produces a waveform very rich in harmonics that can cause rf interference unless good suppression is used. So although the system could bring about a marked reduction in the weight of high-wattage power supplies, I feel a shade concerned at the prospect of large numbers of these systems coming into use and possibly some of them adding to the growing radio pollution.

Watch those cleaning solvents

The first transmitters that I built used a component now long forgotten: the open type of crystal holder where to change frequency one lifted off the top plate, removed the quartz plate and inserted another crystal (which if "active" would promptly slide along the brass or copper base plate). The main snag was that constant handling of the plates (even when lifting them carefully by the edges) soon contaminated them and they would often not oscillate unless cleaned frequently. So, following the advice usually given in the literature in those days, a young G3VA/2BUH duly trotted off to the local chemist, paid a few pennies for a little bottle of carbon tetrachloride and soon found it effective not only for cleaning crystals but also for switch contacts and the like. Nobody ever warned me to go carefully with it—and it was not until many years later that I had the slightest idea that it is highly risky stuff to use. In fact today it is known that carbon tetrachloride is extremely toxic and can be absorbed through unbroken skin; it has a threshold limit value (maximum safe concentration for human exposure) as low as ten parts per million. Most electronics labs and workshops have turned firmly against carbon tet in favour of one of the less toxic solvents—for example, Inhibisol spray which claims to be the safest known replacement for toxic chlorinated solvents. Even then, the makers (The Penetone Company Ltd) warn that with all fast evaporating solvents, no matter how safe, there should be adequate ventilation when spraying and that prolonged breathing of the vapour and contact with the skin should be avoided.

The whole question of cleaning solvents for different types of contamination is discussed in detail in an article by Jeremy Agnew in *Electronic Design*, 5, 1 March 1974, pp54–57. He points out that there are two general types of contamination that need to be considered when removing dirt from switch contacts, flux from soldered assemblies, grease from a machined part or etching residues from a printed circuit board: ionic (or chemically polar) contamination from etching or plating salts, perspiration, fingerprints or acid flux; and non-ionic contamination from grease and oil, rosin soldering flux, wax, hair oil and the like. They may require different cleaning processes and it is advisable to take the non-ionic cleaning step first; this usually requires the use of an organic solvent. Non-ionic dirt usually responds well to de-ionized water. Some solvents will cope with both ionic and non-ionic cleaning.

The article includes a detailed table covering such solvents as acetone, benzene, carbon tetrachloride, ethyl alcohol, isopropyl alcohol, methylene chloride, perchloroethelene, toluene, 1,1,1-trichloroethane, trichloroethylene, trichlorotrifluoroethane and xylene. The author warns that all organic solvents are harmful to some degree, and some are very harmful; most are highly flammable and the vapours can form dangerously explosive mixtures with air and may attack internal organs and the nervous system. Trichlorotrifluoroethane vapour, though not considered toxic, can displace enough room air to cause suffocation. When heated, some solvents are especially dangerous: chlorinated and fluorinated hydrocarbon fumes decompose into hydrochloric acid and phosgene, both highly toxic and corrosive to eyes, throat and lungs.

Of course most amateurs use solvents only pretty infrequently, nevertheless it is worth noting the final warning in the *Electronic Design* article: "With all chemicals, consult the manufacturer for full information, read the labels and instructions, and follow them."

Building blocks for the novice

by SVEN WEBER, G8ACC*

Diodes, diodes and diodes — and some experiments with them

(Part 5)

Constant voltage devices—(1)

Part 1 included a series of graphs of voltage across a diode against forward current through it, and in the part of particular interest the voltage across the diode ranged from about 500 to 800mV, with currents ranging in value from 1mA to 1A. The change of 300mV on a 500mV base, some 60 per cent, seems rather excessive if any form of voltage stabilization or reference is wanted. But is it? If in Fig 29, 10mA is available to pass through the diode and R_L in parallel, and this load resistance needs a varying range of current from, say, 0 to 1mA, then the voltage across it and the diode will only change by about 5mV, just under one per cent. If the current is altered to 100mA available, and load current required to 0-10mA, the percentage change would be even less. With 100mA available current but with the load changed to require 50mA, the figures, while worse, would still be only three per cent.

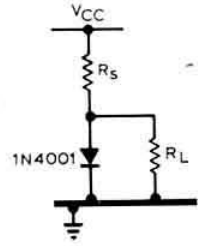


Fig 29. Simple diode stabilizer

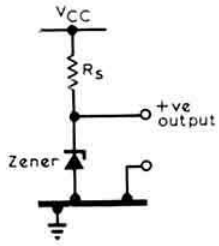


Fig 30. Simple zener stabilizer

This is where the ac resistance of the diode comes in (Fig 12, Part 2) as the curve for this quantity can give the change in voltage if the current is changed by a small amount. At 10mA, the figure was about 4Ω and at 100mA, 0·4Ω. That is, inversely proportional to current: $\frac{0{\cdot}039}{I}$ with the diode that was used (type 1N4001).

Voltages of 0·5 or 0·75 are normally too small to be of much use—except for a power supply feeding tunnel diodes, but forward-biased diodes can be used in series to provide greater voltages, although for purely practical reasons the number that can be so used is limited. However, a series of forward-biased diodes can certainly be used, especially in integrated circuits, to give a local voltage reference for part of the circuit.

* 132 Murray Road, Rugby, Warwickshire.

In Part 2 the reverse characteristics were investigated and in the group of diodes chosen for test (a group of 1N4001s), the turnover voltage was between 140 and 180V—which is certainly high enough for practical use. Unfortunately, with diodes that are not designed for this kind of operation (avalanche breakdown) there are several disadvantages. For example, the breakdown voltage can differ from one diode to the next by as much as 100 per cent, or even more, the ac resistance is rather high, temperature effects are magnified, and the total current that may be passed through the diode is severely limited by dissipation. This would be about 3 to 4mA for a diode of this type, if the diode is to be safeguarded, otherwise it will have to be replaced rather frequently.

So design criteria become rather difficult if the diode is not fed from a constant current source; that is, a high impedance source where the current is more or less independent of the dc potential difference, which is the opposite to a constant voltage source that does not change voltage when the load across it changes. This means that a constant voltage source should have an impedance of 0Ω and a constant current source of $\infty\Omega$. It is not possible to obtain either perfectly, but they can be made approximately over certain ranges of current and voltage.

Even if this high voltage circuit (using a 1N4001) is used, and the author would be rather wary of it, there is still the gap between 3V and 150V to fill up. But there is a type of semiconductor device that will cope safely with a selected voltage within this range—the zener diode. Actually this is a misnomer, because for the greater part of this voltage range (above about 5V), zener diodes work by avalanche breakdown instead of zener breakdown. In fact, they work by being reverse biased. These diodes are normally silicon junction types with normal forward characteristics but with the reverse turn-over voltage deliberately set at some predetermined voltage.

Modern zener diodes are readily available to stabilize voltage from about 3·3V to 200V with a five per cent (or 10 per cent) tolerance and in 20 per cent steps (some diodes are available in 10 per cent steps), similar to resistors (ie with multipliers of 1, 1·2, 1·5, 1·8, 2·2, 2·7, 3·3, 3·9, 4·7, 5·6, 6·8, 8·2) and in various power dissipations from 200mW to 20W. They are represented in circuit diagrams as in Fig 30. With a zener diode it is possible to make a simple voltage reference or constant voltage source, but it will be a rather rough and ready one unless some precautions are understood and observed.

In the simplest case it can be assumed that the input voltage is more or less stable and of a higher voltage than the diode turn-over voltage, so a suitable current can be chosen for the diode, and Ohm's Law provides the means of

working out the value of R_s. If the source is 15V, the diode turn-over voltage 4·7V, and a suitable current 10mA, R_s will be $\frac{15 - 4{\cdot}7}{0{\cdot}01}\Omega$ or 1kΩ approximately (within three per cent). Trouble will come if the load current varies considerably, or if the source voltage is not stable or is only slightly above the diode turn-over voltage. These problems are worth investigating.

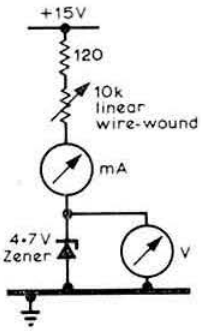


Fig 31. Circuit for plotting zener voltage against current

Take a 4·7V zener diode, 400mW version (such as a BZY88-C4V7) and a 15V supply. By calculation: 400mW at 4·7V means about 85mA, so that must be the maximum; 10·3V pd across R_s at 85mA means a resistance of 120Ω and that must be the minimum value of R_s (Fig 31). The voltage across the diode can now be plotted from 1mA to 80mA at 1, 2, 3, 5, 8, 10, 20, 30, 50 and 80mA points and a graph drawn (as in Part 1) on linear and semi-log paper. The result should look like Fig 32, which shows that it alters considerably at low current but becomes more stable when the current is increased. And, of course, the slope of the curve gives the diode ac resistance, or actually the dc slope

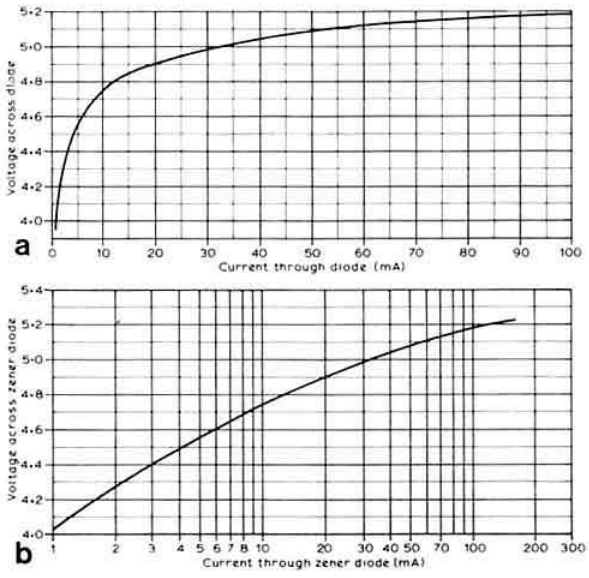


Fig 32. (a) Reverse current through diode on a linear graph. (b) Reverse current through diode on a semi-log graph

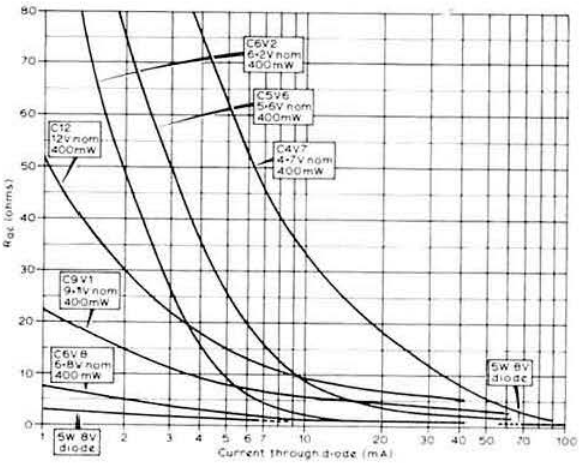


Fig 33. Dynamic resistance plotted against current for various diodes

resistance which is very near to the ac slope or dynamic resistance where the junction temperature stays constant. As with ordinary diodes, this goes down as the current goes up. Comparing diodes of differing turn-over voltages, the diodes with the lowest ac resistance (in other words, the diodes where the voltage alters least with change in current) are those rated at around 6·8V for small diodes and 8·2V for more substantial units (Fig 33).

Part 6 will deal with temperature effects and the designing of a stabilizer.

Ron Ham, FRAS, BRS15744, reports from his radio observatory

Severe radio noise from the sun, associated with a large sunspot, was recorded early in July as follows:

1 July. Many individual bursts and an increase of noise at 95MHz, bursts and noise storm at 136MHz.

2 July. Solar radio noise so strong that both pens, 95 and 136MHz, were sent to fsd throughout observation. Many strong bursts heard in the 10m band.

3 July. At 0831gmt a spectacular and very rare solar burst started at 136MHz and rapidly spread downward through the radio spectrum until it reached 8MHz. This noise remained very strong for about 6min, overpowering all radio signals in that range. It started to fade at 8MHz, died away back up through the spectrum and finished where it began at 0839gmt.

Throughout the day, strong bursts of radio noise were heard in the 4, 6 and 10m bands. Both noise and bursts were recorded at 95 and 136MHz during the routine observation.

4 July. A few individual bursts at 95MHz, and at 136MHz solar noise and smaller bursts were recorded.

5 July. Several large individual bursts recorded at 95 and 136MHz, and many bursts heard in the 4, 6 and 10m bands.

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Sonorous E-string

Strings of contacts via sporadic-E looked likely when the expected mid-year manifestations were advertised by heavy European interference to BBC Band 2 broadcasting, and right on midsummer day target ZB2VHF emerged on 70·26 in the beacon mode. On the hour ZB2BL checked the band and at 1405gmt worked G5DF for the first contact of the season. Even earlier, G2DN had logged ZB2BL at 0910gmt at 579 on an indoor 4-el, and followed '2BL's several telegraphy QSOs, getting one in himself before the usual "out like a light" sporadic-E habit at 1505gmt. Frequency check was 70·311. Reports welcomed by J. Bruzon, ZB2BL, PO Box 292, 27 Flat Bastion Road, Gibraltar.

Two days later the ZB signal was covering much of the UK. From Leeds G4BRK notched a 59 contact on phone. The form looked likely to continue throughout the week, according to observations at Ron Ham's listening post in Sussex (to get the latest information on these, listen to GB2RS every Sunday morning), and by 30 June there must have been scores of 4m enthusiasts waiting from mid-morning onwards for ZB2VHF to vacate the beacon mode and come alive.

A large proportion of the watchers were ready to pounce on 70·26 with A3J; weekly, the numbers equipped for ssb increase noticeably, confounding the "old hat" criticisms earlier in the year.

Updating 70MHz with ssb

Evident to all on 2m is the ssb revolution promoted by the conjunct appearance of "Europa" transverter and Liner 2. On 4m the revolution gathers momentum more slowly ". . . because all 4m ssb gear is home built and there is not yet any commercial equipment for the band", as G3OUF observes, adding "For this reason I think 4m ssb deserves more encouragement than perhaps 2m ssb."

But "commercia's" may be on the way if G3ZYC procedure is an indication: Ian Sneap has adapted a Yaesu 50MHz ssb rig as used in thousands by the Japanese and Americans lucky enough to have the 6m band, and he finds it goes well at 70 MHz.

At G3LVP a discarded Pye transmitter provided the hardware for a 70MHz transverter with two EF91s in the oscillator chain to produce 49MHz to mix with 21MHz output from an hf bands A3J source: mixer, a 3/10, final a 6/40A delivering 50W on ssb or 25W on telegraphy, which Ken Eastty uses a great deal.

Fortunate to live in a video Channel 1 area, 'LVP recognizes the problems of the majority who do not and who for this reason hesitate to give 4m a whirl. But the nationwide swing to 625/uhf suggests that few 405-only boxes now remain: "The only way to assess the situation is to get on the 4m band and await reaction!" he proposes. Not all 625 is clean, in his own experience; the BRC1500, 625 black and white only, which has been on the market for a couple of years, has no tuning before the first transistor and no screening around the i.f. tuned circuits, and even braid breakers, a cure in most 625/tvi cases, effect little abatement.

Worth adding is that G3LVP has worked six countries on 4m this year, helped by the obliging ZB2. Aerial: a 4-over-4 (". . . not that big compared with some of the 2m long Yagis around here, and the extra decibels are well worth having").

Another Essex "four meteorite" to comment on the impetus given to 4m occupancy by the spread of A3J is G3PGN. Howard Buckenham remarks: "It is only necessary to cough on 70·2MHz most evenings at 2230-2300 clock-time to find someone to work. Nests of operators exist up and down the country, and 70·2 brings them together . . . in ten years on 'Four' I have not noticed such a vast change in operating techniques until ssb really put a shot in the arm about a year ago."

He has been spurred to install A3J in the mobile mode as well as at the home station as a result of hearing the American 6m band in operation during a visit to the USA last year. "Mobile to mobile contacts on ssb over distances up to 300 miles on 50MHz appeared to be commonplace".

He does not of course suggest that similar results are likely to be reproduced here, with our lower power levels and the fact that 4m, being a "higher vhf", does not have the carrying power of 6m. Even so, the thought remains that the remarkable results being logged daily by Liner 2 mobile men on 144MHz could be emulated on 70MHz, at twice the range.

Super-dx on 2m

First of all, congratulations to Peter Cutler for putting G3DAO into the headphones at LZ2FA on 23 June in a 599 exchange at the height of the sporadic-E lift. Path distance is 1,350 miles; if the Bulgarian sends a QSL it should help G3DAO towards that coveted 144MHz Senior Transmitting entirely on telegraphy.

On the same day G4CZP sited at zero feet at Carnforth, Lancashire, was heard on 144MHz ssb by 9H1CD at RS57, again evidently sporadic-E induced—and *this* QRB is about 1,500 miles. This was at 1319gmt when 'CZP was working PA0VV by tropo. Power level at Carnforth was 120W p.e.p. to a 10-el at 30ft. The Malta man said he "bawled his head off, to try to raise 'CZP" but 1W of rf was not enough for the job.

Then on 9 July a sporadic-E opening so intense as to surpass the historic one of July 1965. It began at 0937gmt, says G4CZP, and in the next 2½ hours gave him 25 contacts spread over YU, HG, OE, OK and D in the proportion 60 per cent ssb to 40 per cent a.m. In fact, it was hearing a.m. voices speaking "foreign English" that alerted Richard Crossley to the imminence of the opening.

The manifestation extended well north and west: "BBC apologies for interference to Scottish tv was the sign to me to fire up the 2m ssb rig," says GM3SZP of Glasgow. To

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

Roderick Paton the critical reflecting distance of the sporadic-E layer was evident from the fact that no G signals were heard except GB3DM at its customary 539. With him the lift began more than an hour later than at G4CZP down in Lancashire: "At 1055gmt the 2m band opened up just as if someone had switched it on", and YU, DJ and OE were "two-wayed" into the 'SZP log.

From the Isle of Man GD8EXI worked YU2CDS at 1,250 miles for his best of many Eu contacts, and by working HG5AIR established what may have been the first GD-HG on 144MHz. He reports that GI3RXV in Co Londonderry may have hoisted a new European dx record during the opening (it will be interesting to see when QRBs are confirmed if it exceeds the G3DAO/LZ record reported above).

From all quarters people comment on the fantastic strengths of the sporadic-E-induced East Europeans. "OE3WEB was S9 + 40 on the meter even after I'd put in 20dB of attenuation," says G3NAC, Shropshire; "DJ7AN and OE3GWC were S8 using an electrical screwdriver as aerial," observes G4CZP; "Worked HG5AIR from behind a hill in Dudley while on the move," says G8DYY/M; while G8BCL/M and G8FQE/M were other mobiles whose vertical vehicle-aerials earned high level contacts with horizontally-polarized East Europeans.

Much of scientific value will doubtless be distilled from the events of 9 July, eg anomalous beam headings, predominantly east to work SE Mid-Europe, or, at G3NAC, a GD station's signal registering five S-points better with beam NNE than when pointed at the island.

The eastabout origin of the sporadic-E layer is evident from most reports: southabout there was no sign of the Gibraltar beacon on 70·26MHz, even allowing for the fact that 4m was solid with S9 foreign fm broadcasting.

Earlier observations (afternoon 30 June) on 4m by G3TMG from high spots in Hampshire produced sporadic-E reception from a foreign broadcaster on 70·8MHz which from programme content could have emanated from Greece, Turkey, West Pakistan or even out as far as 8-9,000 miles path distance. Can anyone suggest its identity?

An auroral opening on 6 July began at the unusually early hour of 0620gmt, reports G2CIW, when—most rarely without benefit of meteor scatter—UK2AAA was logged at 53A, regrettably no QSO—another European record just missed; Jack Moseley gives fade-out time as 0700gmt. A second phase was observed by G3IPV (Norfolk) who logged 10 countries on 2m telegraphy out as far as SP with beam NE and all "Tone A"; Peter Haylett, too, heard a Russian, UA3ACY in PO16C during an Ar the previous afternoon.

At Horsham, G3WZT enlists the help of a very different natural phenomenon to work behind the Iron Curtain on 2m: meteor scatter. On 8 June an ms contact with SP2DX at Gdansk was helped by the Arietids meteor shower. Picking the optimum time is critical: for SP2DX it was 0700-0900. The value of the Arietids was further demonstrated by contacts with DL7QY, SM5AII and SM5BSZ, the QSO with the latter being completed in the surprisingly short period of 40min and producing 155 recorded reflections from the Swede. Says John Matthews: "This proved that the maximum did occur at the predicted time. For SM to G working the radiant point was midway at 0700gmt on 8 June, but a subsequent sked with DL7QY only a few hours after the mid-point culmination time was a failure, with only a few very weak reflections".

Elsewhere in Sweden the family team of SM7AED/SM7FJE keeps ms observations every day in conjunction with schedules with many stations throughout Europe, set up precisely as to frequency and time. Some of the most distant produce enough regular bursts for intelligence to be conveyed, eg GW3ZTH and G8DNK.

Purchasing points

A source of supply of hard-to-get ptfe is recommended by G8FPT. "I've found R. Klinger, Klingerit Works, Sidcup, Kent DA14 5AG, most helpful and speedy with delivery," he says. Needing 10-thou ptfe sheeting he got it from Klinger's at £1.05 per ft², and says it can be had for £4.20 per ft² at $\frac{1}{16}$in thick. The company expects a minimum order of £10.

Further to dull QSLs, G4BHY now includes a natural colour view of the Houses of Parliament and Westminster Bridge on the front of his, plus no more than the callsign overprinted, all other information on reverse. "Cost very small, and publishers John Hinde (Distributor) Ltd, 3/5 Dunn St, London E8," says Harry Kleeman.

G3MHF of Eastbourne suggests that users of the Trio 2200 who experience long delays in obtaining crystals for it can get them by joining the Southern FM Group, who bulk-buy them. Man to contact is G8IH, 9 Yellowhammers, Wooteys, Alton, Hants. G3MHF adds: "Anybody wishing to have the crystals at a higher price but sooner can contact ELFA, Sysslomansgatan, Box 12086, 102 23 Stockholm". Typically, a crystal for 145MHz costs £3 from the SM source.

Cards for Class B men

The QSL service for the entire corpus of Class B stations is now handled by the Mathews family of Cheltenham: Bert, G6QM, processes G8AAA to G8GZZ, and wife Florrie attends to G8HAA onwards. They are faced with two problems: a mass of unclaimed cards addressed to G8-plus-3 men who have lodged no envelopes, and secondly numerous understamped envelopes.

All cards which were in the Mathews's files at 1 July and remain unclaimed by 30 September will go to paper salvage. As for those understampings, will all G8/Class B licensees please send a supply of halfpenny stamps to G6QM at 62 Ashlands Road, Cheltenham, to be added to held envelopes? Any excess stamps supplied will come back to you in your next packet of cards.

Postage rates went up on 24 June: most envelopes which were in bureaux before that date will be understamped.

"Now where was I?" continued

Picking up last month's locator point raised by G8BQX, Ray Martin of Coleshill checked his G3RWM licence to confirm that it really did say "When the station is used /A or /P particulars of the temporary location or address of the temporary premises shall be sent at the beginning and end of the establishment of communication . . .". It did.

In his view portables and "alternatives" are obliged to give the QTH for each contact made, which, he feels, puts them at a slight disadvantage compared with fixed stations, who are under no such compulsion (though there is a moral compunction for them to do so if they are not in the latest *RSGB Callbook*).

And a comment from G8CXV of Nottingham: "Do keep plugging operating techniques in *FMD*, especially the giving of QTH during CQs . . . essential."

Cards in, parchments back

In checking the latest batch of FMD Certificate claims we noted a practical system used by G3RWM to get verifications back. He sends a form which includes a tear-off coupon on which the recipient is invited to enter the QSO details if he does not use QSL cards himself. This is perfectly acceptable if turned in with an FMD claim, so long as essential details such as date, time and frequency are shown. On Ray Martin's coupon they are.

The G3RWM claim was for a 70MHz Standard Award. He gets No 110, endorsed "All three countries and 20 counties were worked on ssb", a feat achieved in less than a year from the Coleshill site, and the first such on 4m. To another well-known "four meteorite", G3NHE of Sheffield, goes Certificate No 111. In the same envelope went his Certificate No 19 in the 432MHz Senior Transmitting category.

Even rarer than a 70cm Senior is any kind of 432MHz claim from the listening fraternity. Plaudits, then, to BRS 15822 of London E5 who has earned No 4. On many of the cards which R. W. Thomas submitted with his claim, operators expressed pleasurable surprise at getting a listener report. There is a wide field for Bob Treacher's followers on 70cm, an important band worth more of their attention.

In the 144MHz clip, Certificate No 388 is now with G4APJ/P, No 389 to G8GOX, 390 to G8GXA and 391 to GD8DMA.

Contest commentary

A reminder comes from G3ZUL, who in the present context is G6AGT/T, that next month's International Amateur Television Contest is open not only to those who can transmit video but to those who can only receive. Brian Kennedy adds that the BATC are trying to secure a record entry for this year's event, and invites attention to the rules printed in "Contest News" this month. Keep 14-15 September free. The winner of last April's *national* atv contest made 19 video QSOs. Given an equinoctial lift on 70cm next month, plus activity from the Continent, this impressive total could be surpassed.

Also next month, coincident with VHF NFD, is the customary IARU Eurocontest, rules, bands and logs as ours but scoring on the basis of one point/km. Host nation this year is SRJ, whose VHF Manager, YU2REJ, invites British participation in this event. How to enter: see VHF NFD rule 19, p182, March. The IARU uhf/shf contest on 5–6 October has rules compatible with our own event the same weekend. See p254, April.

The ARI have arranged the Marconi Memorial Contest to coincide with our 144MHz cw event on 2–3 November, except that theirs takes in 432 and 1,296MHz as well. British telegraphists need only add the kilometre QRB of each contact to their log sheets sent to the VHF Contests Committee and ask that they be forwarded to ARI as entries in the "Marconi Memorial". A "Marconi Plate" will be awarded to the winners, fixed and portable, of the 2m, 70cm and 23cm sections.

Travellers

Hinckley's G3HGY, visiting son GM4BKO at Thurso from 12 August until the end of September, seeks 2m contacts with Orkney/Shetland vhf men.

Lichfield club's GM-trip is now 24–31 August. Team of four will activate six NE Scotland counties 144·17 high power ssb.

Team of two, G3FDW and son G8ILI, will activate Border counties 1–8 September including VHF NFD from a prime site. Full power on 70·1MHz, ssb, cw, with 144MHz as secondary band. Skeds 7–8am or 8pm onwards (but not both) are offered.

Every Sunday in September and October there will be activity on 3,000ft mountain tops in AL, DU, BU, PH and SG by the GM3VTB/XWJ-4BGS/COX team using a Liner 2 plus 8-el.

A chance to work rare Orkney on 144: Colin Shaw of Coventry will put GM8FRA/P on to 144·2 ssb most evenings 19–30 August, wind strengths dictating aerial erecting, and therefore activity.

And an airborne traveller: on 1 September look for Mirabel III from 1400ut onwards, to be launched from Nancy (DI21C). On 438·5MHz a beacon will be video modulated with the caption "MIRABEL". On 145·2 another beacon will be fsk-modulated with "Mirabel". On 145·6 there will be a QRP unmodulated beacon. A transponder will receive on 432·1–432·4 and transmit on 145·6–145·9, A1 and A3J. Reports to André Jungbluth, 3 rue des Tulipes, F-67380, Lingolsheim, France, and of course to *FMD*.

Skedspots

Look for GM4CXP in Roxburgh on weekdays from 7.15 to 7.45am on 144·215MHz ssb.

Cardigan on 4m? Skeds are offered by GW3MHW (Glanyrafon Farm, Bontnewydd, nr Aberystwyth) preferably on ssb. "All contacts QSLd if requested," says John Baker.

Round-up

Back from the Falklands is G3VPW. Settling in at Nottingham with, for the present, just a Liner 2, he notes the enormous change in the state of 2m; no Class B men were on the band last time he used it.

Big pile-ups on 2m made the Region 1 contest (NW England and thereabouts) a huge success on 23 June. In the 4m leg you could work several countries. G3NHE did: G, GW, GD and GM.

"Sad to say, the A9 repeater test was a failure," reports Bill Jarvis. It had two aims: to ascertain interest in a 2m repeater along the A9 trunk road 1,200ft asl near Blair Atholl, using GM8APX/M as a test signal source (Answer: none) and to estimate coverage for a future BBC uhf/tv station there (Answer: only a few miles' range).

Almost-last-reminder about the Scottish VHF Convention (University of Dundee) and dinner (Angus Hotel) on 28 September; all information from GM8BZX, Frank Hall, the area representative.

25 YEARS BACK

"Writing in a recent issue of *Nature* Mr D. W. Heightman, G6DH, suggests that tropospheric effects should not be ignored even on frequencies below 1,000kc/s. Generally the effect is referred to as occurring over 30Mc/s. Mr Heightman mentions pre-war tests on 59Mc/s between his station in Clacton and F8ZF at Boulogne . . . in these tests 3·6Mc/s was used for communication. Results obtained were sufficient to show an undoubted correlation between the 3·6 and 59Mc/ signals and meteorological conditions".

RSGB Bulletin, August 1949.

MICROWAVES—1,000MHz and up

by DAIN EVANS, G3RPE*

The GB3DD beacon

A measurement by G3COJ made under difficult conditions put its frequency at 1,296·0475 ± 0·0005MHz. It has been heard off the back of its 2-element Yagi aerial in PA0, although details are not available.

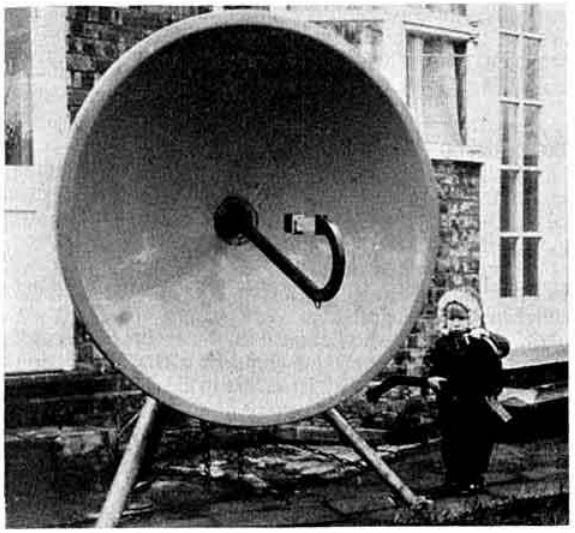
Microwave round table

As mentioned last month, a successful meeting of microwave enthusiasts was recently held in Winchester. The main points arising from the discussions were:

Operating frequencies. A suggestion that wide-band equipment now operated in the bottom 100MHz of the band should be moved up to 10,368MHz produced a very unsympathetic reaction. It was generally felt that narrow-band equipment should be operated as near as possible to the lower edge of the sub-band, that is on 2,304·0MHz, 10,368·0 MHz and so on. There was little interest in specifying frequencies for duplex operation, for example 29MHz above these frequencies.

Since the meeting a suggestion has been made that the operating frequencies should be related not to 1,296MHz but to the frequency of GB3DD as this is widely available as a standard. The driver for the microwave bands would, on this basis, be on 1,152·042MHz rather than 1,152·0MHz.

Talk-back frequencies. The general feeling was that 70cm was the best band, especially for contest working, and a calling frequency of 432·9MHz was suggested. However, it was recognized that 2m would be widely used because of availability of equipment, and a calling channel on 144·3MHz for all modes was proposed. G3KSU in particular strongly recommended the use of 4m, which many agreed with, and a calling frequency on 70·6MHz was suggested. The G8 – – – s are the problem with the latter band, of course, which otherwise would be very useful. On long hauls over certain paths it may be necessary to use a hf band —there have been a few occasions when 10GHz has been used almost as a talk-back for vhf.



"Big 3cm dish, small 60cm daughter." G3WJG's 10GHz dish and mount as used on the recent GC expedition

Activity periods. There was not a great deal of enthusiasm for formal activity periods: our experience of a few years ago, admittedly when activity was not so high as now, was that people did little more than return to their contest sites and repeat contacts. A more profitable approach seemed to be that when any special activity was planned it should be possible to notify others quickly so that they would have the opportunity of joining in. A system by which each person phones a limited number of people was suggested as a practical method by which information could be circulated within a day or two and this will be organized.

Newsletter. There seems to be a real need for some form of newsletter in which items of general microwave interest can be circulated, and particularly those which *Radio Communication* cannot cope with, such as "one-offs" which perhaps should not work but do, supplies of surplus equipment, and odd ideas not completely thought out. G3JHM has offered to deal with the organizing. Items sent to him will be circulated at approximately monthly intervals.

Contests. The main problem with the two main contests is that usually two or three people have to cope with transporting and operating equipment for perhaps five or more bands, which is getting just a bit too masochistic. There naturally are strong feelings about the inclusion of 70cm as a contest band in the October contest, but as this is also an IARU contest the rules are less easy to change. Suggestions made in discussion were that the June contest should cover the "waveguide" bands at 5·6 and 10GHz, and 24GHz when people eventually receive their licences, and a new contest early in August for the "coaxial" bands, 1,296, 2,304 and 3,456MHz.

Experimental work. There was much interest in some of the more unusual forms of propagation. Some of those mentioned were: 9·4GHz radar signals in which, for example, the French and Belgian coasts, Cornwall and South Wales are seen from the Isle of Wight on most summer mornings before 9am especially when there is mist about; successful attempts to reflect 10GHz signals from a tall chimney; sub- and super-refraction; systematic monitoring of beacons over more than one path at a time; and the effect of rain on the polarization of signals. The possibility of amateurs monitoring 11 and 14GHz signals from a satellite geostationary over Rome was noted. This is due to be launched at the end of 1976.

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

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

INDICATIONS are that the separate phone DXCC Award is to be discontinued in the near future, a decision which your scribe personally applauds. A few years ago, when a.m. was the commonest form of telephony transmission, dx contacts made on phone were rather more difficult to effect than those made using cw. However, the extensive use of ssb has meant that there is now little difference and if some operators can be encouraged to go back to using a mode which requires rather more skill than brute force this will be a step in the right direction.

Propagation data

The Verona section of the Italian national society, ARI, publishes an excellent monthly booklet of propagation information. This is in the Italian language and is edited by Piva Luciano, I3LPL, Via Alberti, 37045 Legnago (Vr). The annual subscription is Lira 1500. The contents include sunspot and propagation information with data for calculation of path performance.

5B4CY

5B4WR has asked for the incorrect information on the Cyprus hf beacon which has been appearing in *MOTA* to be put right. The beacon on 28,180kHz is operated by CARS under the callsign 5B4CY and not ZC4CY. The beacon keeper is Totos Theodossiou, 5B4AP, who is also responsible for the vhf beacon and who may be reached at PO Box 1267, Limassol, and not PO Box 216, Famagusta, which is the address of the 5B4 QSL bureau. 5B4CY is located at Zyyi, on the south coast of Cyprus about 20 miles east of Limassol and has been operational for 18 months.

DX news

The Fifth Caribbean Jamboree will take place in Surinam between 20 and 30 August, and it is expected that some 5,000 Scouts will take part. VRAS will be operating a special amateur station, PZ0CJ, and contacts will be confirmed by special QSL card. A diploma will be awarded to those who contact PZ0CJ and three other PZ stations during the period, and may be obtained by sending log details and 10 IRCs (or $1) to PZ1BK, Secretary VRAS, PO Box 566, Paramaribo, Surinam.

JA0CUV/1 reports the arrival of logs from 3B6CF covering the period 24 April 1973 to 26 May 1974 and hopes that QSLs for contacts during this period will be despatched soon. Jacky is now on all bands 3·5 to 28MHz but seems to favour 14,040 and 14,260kHz. He has an FTDX 400, dipoles, and a TH3Jr beam which has been provided by VQ9R.

Anyone still needing QSL cards for contacts made during the Don Miller (W9WNV) expeditions of a few years ago will be interested to know that the logs are now in the hands of W0BN, 8713 Charlton Lane, Affton, Mo, 63123, USA.

OE2HZL/UN and OE2EM/UN have been active regularly from the Suez area and have been heard on 14,295kHz at around 1715 many days. PA0IWH/S2 will be in Dacca for another year or so and has a schedule every Sunday at 1500 on 14,280kHz; he is also often on 14,235kHz at 1700.

5U7AZ has left Niger and all further correspondence should be sent to his F6BCL address. CR3ON is newly active from Portuguese Guinea and will be in Bissau for two years. His home callsigns are CT1ON/CT1WW and QSLs go to CT1BH. G4AJJ (ex-MP4QHY) is in Mauritius and has the callsign 3B8DQ.

It is understood that the former practice of using the callsigns FB8WW, FB8XX and FB8ZZ whoever the operator should be is to be changed. In future each operator will have his own callsign in the FB8WA-WZ, FB8XA-XZ and FB8ZA-ZZ sequences. FB8YY is under military control and will continue as at present.

SV0WKK is newly active from Crete. VK2BKE/LH has been reported and it is said that he will be on Lord Howe Is for a year but no further details are available.

News from overseas

Friends of Eric Lomax, ex-5N2ABG, will be pleased to know that he is now back home in the UK and on the air as G4DGR (see *QTH Corner*). He offers to QSL any unconfirmed 5N2ABG contacts, although he has always sent out cards for each station worked. Eric Sherlock, 5N2ESH/G3BQH, reports that no new Nigerian individual licences are being issued yet, and the only known active 5N2s now are AAE, AAJ, (possibly AAV) and ESH. Angus Murray-Stone, 9G1GG, is in the UK on extended leave, and 9G1DY is also home until the end of August.

Dxpeditions

SV1GA/A is hoping to be on the air from Mt Athos for several days commencing about 18 August. Operators will be OH2BH, OH2MM and SV1GA, and their equipment will include an SB220 linear and three-element beam.

Three members of the SE DX Club of Atlanta, Ga, will be using the callsign VP2EEB from Anguilla for three days commencing 24 August.

Jim Henderson, who has been on the air previously from Tonga and Nauru, is making enquiries concerning a trip to Tokelau Is, ZM7. Transport seems to be one of his chief problems.

Stan Kohn, KC6SK, is about to leave the Caroline Is on the yacht *Seque* on a two-year cruise. He will visit Japan and then move towards the Indian Ocean and hopes to get on the air from some of the places he calls at.

G4BJM and WB2EZG will be on the air from Monaco (3A0) from 25 August to 2 September using cw and ssb and most likely around the following frequencies: 7,030 14,050, 14,250, 21,050 and 21,250kHz. Activity on 3·5 and 28MHz will depend on aerial space available and conditions.

* 10 Knightlow Road, Birmingham B17 8QB

They will use a TS520 and dipoles. The callsign will not be known until arrival in Monaco, Special QSLs will be available from WB2EZG (Vince Biancomano, 1569 Richmond Rd, Staten Island, NY, 10304, USA) via the bureaux or direct on receipt of return postage.

The tentative opening date for the expedition to Des Roches Is by VQ9s BP, D and DM is 3 September. They will use their own callsigns/D, and VQ9BP expects to work on 28 and 21MHz, VQ9D on 14MHz, and VQ9DM on 7MHz. They will be there until 17 September.

Top Band news

G4BNH advises that VP8NP (see photo) is operational on 1,805kHz from Galindez Is, Antarctica, and usually begins transmissions on cw at about 2300, listening in the "dx window" for replies. He is using a weather balloon and a 130ft wire with radials as aerials and has made what he thinks is the first Antarctic contacts on 160m with PA0HIP and OK1ATP. Ian's equipment enables him to keep almost nightly contact with G4BNH on 14MHz ssb.

Ian, VP8NP, operates with this £13,000 worth of Racal equipment from Galindez Is, Antarctica

The only report of dx signals being received on this band has been received from G3WIE who notes CP1EU being received at RST 579 at 0100 on 29 June, and EP2BQ at the same time the following day at RST 589. Also on the 30th W1HGT (0155), W2DEO (0330), WB8APH (0355), and W2QD (0420) were logged at strengths up to 589. Equipment at the University of Southampton RC station consists of a KW2000B and half-wave inverted-V aerial running NNW-SSE with its centre at 170ft.

Contests

The RCA 1974 DX Contest

0000 10 August to 2400 11 August.

Telephony only, multi-band single operator. Amateurs outside Argentina try to work as many LUs as possible, and also stations in other countries but at least 10 LUs must be contacted. Each LU contact counts three points, others one point. One QSO per station on each band, own country counts only for multiplier points. Each Argentinian province and each DXCC country is a multiplier on each band. Exchanges should consist of RS and serial number of contact (from 001). Post logs before 28 September to: RCA, PO Box 97, Buenos Aires, Argentina. They should show date, time, station worked, serial sent and received, band, points, and if multiplier, and be accompanied by the usual declaration and a summary sheet. Certificates will be sent to top scorers in each country, and a medal to continental leaders.

QTH Corner

A9XP	R. K. Hollow, PO Box 14, Manama, Bahrain.
A9XU	PO Box 14, Awali, Bahrain.
A9XW	via WA5ZNY, 12301 Zavalla St, Houston, Texas, 77045, USA.
CR3ON	via CT1BH, Rua D Pedro V 92, Vila Nova de Gaia, Portugal.
F0AHY/FC	via DJ0UP, 6 Frankfurt 1, Hellerhofstr 41, Germany.
FG0AYZ	S. Hutson, Box 2588, Hot Springs, Ark, 71901, USA.
SM2EOB/SU	via SM2CEV, Mjolkuddsvegen 237, 95100 Lulea, Sweden.
SM4ARJ/SU	via SM4CIM.
SV0WKK	Box 658, APO, NY, 09291, USA.
VK2BK/LH	Dr Ken Hicks, Lord Howe Is, Australia, 2898.
K5QHS/VP2D	(see FG0AYZ).
VP2GFA	via KL7FA, Box 949, Juneau, Alaska, 99801.
VP2MKH	PO Box 175, Montserrat.
VP8NS	via G3PUU, R. Atkinson, 11 The Poplars, Guiseley, Yorks LS20 9PS.
VP8NU	PO Box 112, Port Stanley, Falkland Is.
VQ9BP/D **VQ9D/D** **VQ9DM/D**	Bill Pomeroy, Box 220, Mahe, Seychelles Is.
VR3AG	via W6WX, Box 717, Oakland, Cal, 94604, USA.
VR3AL	via KH6CHC, 59-611 Akanoho Place, Haleiwa, Hawaii, 96712, USA.
WM2ARS	via WA2CCF, 303 Tenafly Rd, Englewood, NJ, 07613, USA.
WY6FDA	via WA6WMT, 14417, S Mercado Av, La Miranda, Cal, 90638, USA.
3B8DQ	via G4AJJ, Upper Bank, 161 Stepney Rd, Scarborough, Yorks.
3D2FC	C. Svard, PO Box 1250, Suva, Fiji.
ex-5N2ABG	Eric Lomax, G4DGR, West End TSO, Accrington, Lancs BP5 4NQ

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

The European DX Contest

0000 10 August to 2400 11 August (cw)

0000 14 September to 2400 15 September (phone).

All bands 3·5 to 28MHz. Single-operator all band and multi-operator single transmitter sections. Only 36 hours operation may be undertaken by single-operator entrants and the 12 hours rest may be taken in up to three periods. Exchanges consist of RS/T and serial QSO number (from 001). Each contact counts one point and stations may be contacted once on each band. The multiplier for European entrants is the number of DXCC countries and JA, PY, VE, VO, VK, W/K, ZL, ZS and UA9/0 call areas worked on each band added together. Final score is total of QSO points times the total of multipliers on each band added together. Extra points are gained by QTCs—these are details of previous contacts given by non-Europeans to Europeans and each counts for one point. A QTC contains the time, call, and QSO number of the station being reported (eg 1300/DA1AA/134), only 10 QTCs can be accepted from any one station which may be worked several times to make up to the maximum of 10. Certificates will be awarded to the leaders in each country provided that at least 100 contacts or 10,000 points are scored. Send logs to: WAEDC Committee, D-895 Kaufbeuren, Postbox 262, Germany, before 15 September (cw) or 15 October (phone). G3FKM hopes to have a *small* supply of summary sheets and sample log sheets (sae please). (Note that separate log sheets should be used for each band).

In the **1973 WAEDC** contests UK scores were as follows: (CW) **GM3CFS** (90,725 points), **G3ESF** (61,824), G2AJB (5,418) and G8QZ (960). Multi-operator entrants were **G4BTJ** (173,237) and G4AMT (32,226); (Phone) all were multi-operator: **G3FXB/A** (511,638), G3RCV (230,790), G4BUE (153,824), G4AMJ (53,130) and **GW3ZIT** (50,204).

The SARTG RTTY Contest

0000-0800 and 1600-2400 17 August, and 0800-1600 18 August.

All bands 3·5 to 28MHz. Stations may be worked once on each band. Single-operator above or below 100W input and

multi-operator single transmitter (any power) classes. Exchange RST and QSO number. Contacts with own country count five points, with others in same continent 10, and the rest 15 points. Multiplier is DXCC/WAE countries list and W/K and VE/VO call areas. Post logs before 18 September to: SARTG Contest Manager, OZ2CJ, C. J. Jensen, Meisnersgade 5, DK-8900 Randers, Denmark.

DXCC

Official Bulletin No 490 from ARRL HQ announces the addition of Kingman Reef to the ARRL Countries List. This addition is made because its administration is separate from that which is in charge of Palmyra Is, some 30 miles away. DXCC credits may be claimed starting 1 October 1974.

Odds and ends

G4CLN reports that his callsign is being pirated on 3·5MHz cw and ssb. The pirate gives the name Len and his location as near London. The genuine G4CLN operates mostly on 1·8 and 14MHz.

G3WW has made what is thought to be the first two-way mobile sstv contact in the UK when he contacted G3IAD/M, when G3WW/M, from the Longleat Mobile Rally on 7 July.

Band reports

Not a very good month on the hf bands, but a sudden burst of sunspot activity around the weekend of 30 June enabled a number of European stations to contact the KP6KR expedition. The *Sunday Express* of 7 July reported "one of the largest X-ray solar flares ever observed by scientists at the national atmospheric station at Boulder, Colorado" on 6 July, and this resulted in very disturbed propagation.

Many thanks to the following for information used in this part of *MOTA*: G2HKU, G4RZ, G5JL, G6GH, G3GVV, G3RNV, G3SVH, G4CLN, G4DFN, BRSs 17567, 17991, 31301, 34507 and 34775, As 8306, 8313, 8431 and 8594, ORS 31016.

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

1·8MHz. 0000 *EP2BQ, KV4FZ, PY9DM.*

3·5MHz. 0000 CE6EZ, *CN8CX, Ws,* 7X2AH. **0100** PYs. **0500** *LU8AHW.* **2100** ZS5LB. **2200** PY2FOT, VP8NP, 9GIDY, 9L1JT, 9M2DQ. **2300** *CT2BG,* CR3ON, EL7F, KP4AN, 4X4MK.

7MHz. 0000 *FP8BR,* YN8JES. **0500** *CX7BBB, FC0VN, FG7AN, KH6BTH, M1C, TI2BEV* (QSL to K4VW), *VK3MR, XE3FAS, YVs,* ZP9AF. **2200** CR7II, LU2BOU, OX3LW. **2300** CE3ED, *C31DV* (3W input), PY7YH.

14MHz. 0100 VP2VBH. **0500** W6/W7s. **0600** A7XK. **0700** *JT1KAA,* KH6s, W6LUV/KB6, KP6KR, OJ0MA, YB1KW, **0800** FO8DO, KL7s, KS6EZ, VR1AC/KB6EU, 5V7AR. 0900 3D2AN. **1200** TA2SC. **1400** G3VDK/MM (nr Cocos Keeling), FR7ZL/T, VU2DK, XV5AB, VE6CBJ/SU. **1500** HM1AQ, *SU1IM.* **1600** A9XW, *JT1AT,* VS5MC. **1800** AP2AD, JAs, JYs, KG6JAR, XE1FH. **1900** A6XT, HS1WR, HZ1SH, TL8ET. **2000** VE8DC, 9L1JM. **2100** CE3AKD, *TR8PB,* ZD3AY, ZL4BX, *5T5FP.* **2200** FM0AYZ, VP2s DM, MC. **2300** YNs.

21MHz. 0700 *3A2FQ.* **0800** *F0AHY/FC, VK6SA.* **0900** 9J2DT. **1100** KS6DH, *3B8s DM, DP.* **1300** HM1s GN, GX, *ZD7PS,* 5X5NK. **1500** CR6s, 5R8SD. **1600** CR7s, OY5NS, VS9MHC, ZSs, 3B6CF. **1700** W6PSB (5W input). **1800** *TR8CQ,* VQ9BP, W6/W7s, 5Z4s, 7X3OM. **1900** 9L1JM. **2000** CE, CX, HC, OA, PY, VP9, YV, 9Y4. **2100** FM7AQ, HC2YL, JY9GR, ZD7SD, WB9ILW/ZP5, 8R1J. **2300** *ZF1MF.*

28MHz. 1100 *EA8BK.* **1300** W2KDI, W2RP and W4IWZ (all on 22 June). **1400** CR7s, F0AHY/FC, JY5TAS, ZS3AW. **1700** LU5EJI, PYs. **1800** LUs, PYs, OE2SJL/SU, *5B4CY,* 9X5JC. **1900** EL2AK. **2100** W2HCW (S8).

Very many thanks to all correspondents, and especially to the authors of the following publications for information extracted: the **DXers Magazine** (*W4BPD*), **Long Skip** (*Nick Sawchuk*), the **West Coast DX Bulletin** (*WA6AUD*), **DX'press** (*PA0INA/PA0TO*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*George Allen*), and the **World Radio News.**

Please send all items for **September** issue to reach G3FKM by **5 August,** and for **October** issue no later than **5 September.**

Propagation Predictions

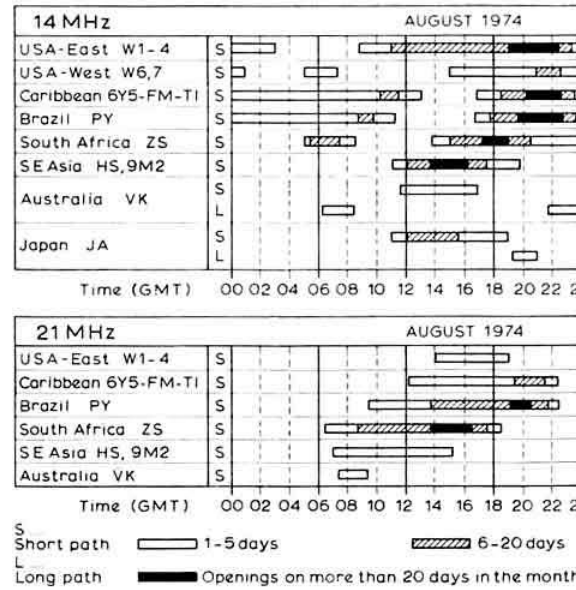
August is the last month of summer-time conditions, but short-skip contacts over distances of about 500–2,000km will be still possible.

28MHz will only seldom be open for dx and then mainly to South America (1400–1930gmt) and Africa (about 0930–1700gmt). Traffic with South America and Africa will be certain on **21MHz,** and North America, South-East Asia and Australia will be heard under exceptional circumstances.

14MHz will remain the main dx band. Night-time conditions on this band will be inferior compared to the two previous months. With the occurrence of spring in the southern hemisphere the path to South Africa will remain open longer on 14 and 21MHz. There will be less possibility of dx via the indirect path because of seasonal changes.

On **3·5** and **7MHz** conditions will remain the same as during the two previous months. 3·5MHz will be interrupted occasionally by the dead zone during the latter half of the night.

The mean provisional sunspot number for June 1974 from the Swiss Federal Observatory was 38·7. The greatest amount of solar activity occurred during the first half of the month when the highest daily was 80 on June 4. The predicted smoothed sunspot numbers for October, November and December are 24, 23 and 22 respectively. From the telecommunications forecast provided by the Telecommunications Services Centre at Boulder, Colorado, USA, it is noted that the 12-month moving average Zurich sunspot numbers for March, April and May 1975 are 15, 15 and 14 respectively, showing no sign of an upward movement into the next sunspot cycle.



COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 6 May 1974

Present: *Mr G. R. Jessop (President, in the Chair), Dr J. A. Saxton, Messrs R. J. Baker, J. O. Brown, D. Byrne, W. J. Green, L. E. Newnham, C. H. Parsons, J. R. Petty, W. F. McGonigle, F. C. Ward, W. A. Scarr, (members of Council), D. A. Findlay, general Manager, and A. W. Hutchinson, editor.*

Apologies for absence had been received from Dr E. J. Allaway, and Messrs P. Balestrini, R. F. Stevens and G. M. C. Stone.

1973 President's Committee report
The following recommendations of the committee were discussed: (i) "The formal organization of the various committees should be restructured", and (ii) "Two new honorary posts should be created, those of Publications Manager and MPT Liaison Officer".

A chart had been provided showing the recommended new structure (i) in which committees, honorary officers and headquarters organization were variously grouped under four main committees: (*a*) Membership Services Committee, (*b*) Finance & Staff Committee, (*c*) Publications Committee and (*d*) Specialist Group Co-ordination Committee. From the discussion it seemed that Council members were not wholly convinced that the reconstructing was necessary or even desirable and it was agreed unanimously that the new committee structure should be tried for one year.

The future of the Society
The President had circulated to all members of Council a chart showing the relationship between the number of members of the society and the number of licence holders, together with comments.

A discussion took place on the effect on recruitment of exhibitions, conventions and similar events, and it was agreed that further consideration be given to the subject.

Rates of subscriptions, and in particular the subscription payable by students, was discussed. It was noted that the Finance & Staff Committee had recommended that members under the age of 18 should pay a reduced rate of subscription regardless of whether they held a transmitting licence or not. Those over the age of 18 but under the age of 21 should pay at a reduced rate provided they were engaged in full-time education and produced a certificate from the principals of their colleges to this effect.

Finance report
The Honorary Treasurer commented on the interim accounts for the nine months to 31 March, 1974. Income was almost exactly in line with the budget but expenses were over budget. Headquarters salaries were a cause of great concern as the inclusion of the amounts payable for temporary staff meant that expenditure was increasing each month. It was gratifying to note that advertising revenue had increased.

Membership and affiliation
It was resolved:

(i) to approve the applications for membership, transfers and reinstatements for April and accordingly elect 179 new members;
(ii) to accept reduced subscriptions from 19 members;
(iii) to wave the subscription of 20 members on the grounds of blindness or other disability;
(iv) to grant affiliation to Mid-Lanark Amateur Radio Society, North West Amateur Radio Club and Denby Dale Amateur Radio Society.

Contests—availability of specialized equipment
Council discussed a resolution from a meeting of representatives in Region 1 concerning the advantage in contests possessed by amateur radio groups which are supported by industrial organizations and educational establishments. It was agreed that further consideration be given to this matter.

International Amateur Radio Club Convention
This was scheduled to take place at ITU Headquarters, Geneva, from 20 to 22 July 1974 and Council agreed that Mr R. J. Hughes, chairman of the IARU Working Group, should be asked to attend the convention on behalf of the RSGB.

"World at their Fingertips"
Council considered that it was desirable that the "follow-up" to *World at their Fingertips*, which would cover the history of amateur radio in more recent years, should be put in hand as soon as possible.

It was agreed that Mr R. Ham be asked to proceed with the preparatory work.

Committee minutes and recommendations
Council received the minutes of the following committee meetings: Finance & Staff (7/2/74), Education (9/2/74 and 23/3/74), IARU (14/2/74), Technical & Publications (21/2/74), HF Contests (21/2/74 and 4/4/74), VHF Contests (28/2/74 and 25/4/74), Mobile & Exhibition (6/3/74 and 2/4/74), Scientific Studies (9/3/74), Raynet (9/3/74), VHF (13/3/74 and 17/4/74), Membership & Representation (20/3/74), MPT Liaison (28/3/74), Interference (29/3/74).

Correspondence
Mr S. Boakes, G3HXN, had advised the President that Frances and Joe Woolley, due to health reasons, were no longer able to deal with the RAIBC organization. Mr Boakes and his wife had agreed to do whatever was posssible to maintain some degree of continuity.

Region 12
Council approved the holding of a Region 12 ORM during the Scottish VHF Convention at Dundee on 28 September 1974 and the President confirmed that he would be attending this meeting. Mr Smith had asked that Mr Stone should attend and any other Council members whom Council wished to nominate.

The appointment of Mr D. W. Dalrymple, GM3OLK, as an Area Representative was confirmed.

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr L. Cooper, G5LC
Leslie Cooper, one of the country's best-known amateurs and a Past-President of RSGB, died on 8 June. He was first licensed in 1933 and in 1936 joined the Thames Valley ARS, being president of that society from 1946 until his death.

A staunch supporter of RSGB, he was the Society's President in 1953; a vice-president of the Sutton & Cheam RS; a vice-president of the Kingston RS: a past-president of FOC, and a member of RAOTA. He was a founder member of the Radio Fraternity Lodge of Freemasons and was its second Master in 1966.

Professionally employed in the electronics field, he was a director of the Phoenix Telephone Company of Hendon on retirement, then going to South Africa for the Plessey Company for two years during which he held the call of ZS6BDO. Shortly before his death he had spent six months in New Zealand.

Mr J. Corkill, G3WGD
John Corkill died on 11 June at the age of 55. A Manxman by birth, he had lived in Leicester since the end of the second world war and was a member of Leicester RS. A former BEA radio operator, he was well known on the amateur bands with his weekly slow morse transmission on 160m.

Miss N. Corry, BEM, G2YL
Nell Corry, one of that select band of YLs who achieved distinction in her hobby, died on 25 June. She was a pioneer operator on the 40, 20 and 10m bands in the 'thirties, and from 1936 to 1939 contributed the monthly "28Mc" feature in the *T & R Bulletin* (now *Radio*

Communication). Her active participation, meticulous records and reports on those bands are a valuable legacy.

Mr R. A. J. Gale, G8FWN
Dick Gale died on 30 June at the age of 54. Previously licensed as G3GPA and ZB1AX, he had only recently returned to amateur radio. He became well known on 2m fm and was active in vhf and shf portable events.

Mr W. C. Holley, G5TN
Bill Holley, an active amateur for over 35 years, died on 17 June aged 54. He was president of the Weston-super-Mare RS for many years, and as lecturer on electronics and head of his department at the Weston-super-Mare Technical College he guided many amateurs through RAE and morse.

Dr J. B. Parke, DSc, GI8PA
Joseph Parke, who was first licensed in 1936 and became a life member of the RSGB in 1953, died on 3 April. As head of the Department of Physics, Methodist College, Belfast, before the second world war, he held the call GI3FH for one of the earliest school radio clubs. Although less active in recent years he was a popular figure on the bands and in amateur circles.

Mr M. W. Pearce, G3BSR
"Morrie" Pearce died at the age of 52 on 25 June. A long-time amateur since his youth in the Royal Navy, illness prevented active participation in recent years.

Mr H. G. Rance, G8AGZ
Harry Rance, who was 71 years of age, died on 15 May. He was a member of the Weston-super-Mare RS and during the past six to seven years he made many friends on the 2m band.

We have also been advised of the deaths of:
Mr S. R. Deard, G5PA, on 13 June;
Mr C. T. C. Foster, G3XUR, on 31 May;
Mr G. Hall, G3UBQ, on 27 May;
Mr R. Pollock;
Mr F. H. Simkiss, BRS16664;
Mr D. Stevens, G4AAP, on 3 June.

YOUR OPINION

The Editor
Radio Communication
Sir—Although an item headed "DX news" on page 172 of the March issue would appear to be the authoritative and final solution of a problem facing many of us, namely obtaining confirmation of a contact with Mount Athos, the isolated religious community in northern Greece, I am afraid we are in for a disappointment as regards the legality of the whole affair.

Photo-copies of correspondence between the licensing authorities in Greece and the President of the Radio Amateur Association of Greece (member society of the IARU), have recently been sent to me for translation and transmission to you, together with a letter from the President to yourself which I enclose herewith.

The first letter from the Greek Ministry, dated 28 March 1973, states: "In reply to your application of the 13th March we have the honour to inform you that we are the authority empowered to issue callsigns for amateur radio stations. Up to the present day we have received no application whatsoever for the issue of a callsign for the operation of an amateur radio station on Mount Athos, consequently no such callsign has been issued or registered."

The second letter, also from the ministry, is dated 1 October 1973 and relates specifically to the issue of amateur licences to foreign nationals. It says: "Law 1244/72 (covering amateur and other radio services) foresees the granting of licences for the installation and operation of amateur wireless stations to foreign nationals, but only on the basis of the principle of reciprocity. This law will only become valid after the issue of a presidential decree laying down regulations. In view of the above, and in reply to your specific question regarding the issue of amateur radio licences to German and Swiss nationals by our department, we have to inform you that no such licence was ever issued, or will be issued to foreign nationals before the publication of the presidential decree mentioned above."

There is also a photo-copy of a document relating to an earlier "Dxcapade" to Mount Athos in September 1973. This document was submitted to the ARRL as proof that V. Daniels had been authorized to operate an amateur radio station on Mount Athos. Of course it is nothing but an ordinary Sojourn Permit of the kind issued to all tourists and visitors to the holy mountain. A letter from the authorities on Mount Athos dated 13 September 1973 states categorically: "In reply to your letter ref 411 of 21/9 we have the honour to inform you that the installation and operation of an amateur radio station in the area of the Holy Mountain (Athos) is prohibited."

Norman Joly, G3FNJ

The Editor
Radio Communication
Sir—*Use of 2·4MHz tunable i.f. receivers to cover* 144-146*MHz.*

Some five years ago, the changeover from usage of the 70 and 170MHz vhf bands to a new band with base stations centred around 139MHz was commenced by the nationalized power industries.

Among the earliest of these stations to become operational was one sited at Radnor Forest in eastern Mid-Wales at a height of 2,135ft asl. Commissioning tests revealed that its coverage was such that the poor image rejection of the front end conversion of any amateur receiving station tuning the 144-146MHz amateur band with a 2-4MHz tunable i.f. resulted in apparently strong professional traffic appearing within the amateur band.

Being closely associated with the professional system planning for an electricity board at that time, I realized as a radio amateur the hazard this could pose if amateurs were not discouraged from building or purchasing equipment utilizing a tunable i.f. in this range.

We now face a situation where there are approximately 1,000 139MHz band 25W transmitters in use or planned to come into use throughout the UK, the majority of which are well sited to provide good overall coverage. Recently a considerable amount of time has been wasted attempting to track down alleged interference by a Wales Gas transmitter situated on the Werfa mountain at approximately 2,000ft asl when, in fact, the amateur concerned was using a 2 to 4MHz tunable i.f.

A. G. Blackmore, GW3FKO,
Communications and Instrument Engineer,
for Wales region of British Gas.

The Editor
Radio Communication
Sir—I do not know if anyone else has commented on the subject, but I would like to congratulate you on the way *Radio Communication* turns up with unfailing regularity, month by month. Even here in GD my copy arrives about the 7th or 8th.

Popular journals like *Practical Wireless* are often weeks late, and the sacred pages of *Wireless World* have been missing for months at a time!

Good luck and keep up the good work.

Fred Ness, GD3ESV

The Editor
Radio Communication
Sir—May I sound out the potential demand for an amateur radio group in this area. There are, of course, one or two clubs in the Croydon area, plus Purley and Reigate, but a quick check of the latest callbook showed something like 40 licensed amateurs within a six-mile radius of Oxted who have no club facilities in the immediate vicinity.

If anyone reading this letter is keen to get a local group going I should be very glad to hear from them. There are a number of halls in the area for holding meetings. Given enough interest I shall be glad to organize something.

Alan Dawson, G3ZVU

The Editor
Radio Communication
Sir—I would like to thank those stations on 70.26MHz during a recent 4m contest who showed the true spirit of amateur radio by not causing any interference with an important Raynet exercise which was unavoidably going on at the time.

The Deeside Raynet Control GW3ITZ did not even have to ask for QRT; but says that as soon as the exercise ended, all hell was let loose on the channel!

P. C. Mullineaux, G3XEN,
Group Controller, Cumbria

CONTEST NEWS

IARU Region 1 VHF and UHF/SHF Contests

As in 1973 the September event will be held on 144MHz only, and we would like to see a much larger entry from UK stations. As in previous years, the UK entries for the October contest will be judged and published as for any domestic events, and the RSGB will award its own certificates to the UK winners.

The **RSGB October UHF/SHF Contest** (see p 254, April issue) will take place at the same time as part of the IARU contest.

This year's organizing society is the Yugoslav national society SRJ.

September 1974 IARU Region 1 VHF Contest rules

The following rules have been extracted from the general rules for IARU Region 1 vhf/uhf contests:

1. Eligible entrants. All licensed radio amateurs resident in Region 1. Multiple operator entries will be accepted provided only one callsign is used. Contestants must operate within the letter and spirit of the contest and at no greater power than permitted in the ordinary licences of their country. Stations operating under special high power licences do so *hors concours* and cannot be placed in the contest proper.

2. Sections.

(i) Fixed stations 144MHz

(ii) Portable/mobile stations 144MHz.

Portable/mobile stations may not change their location during the event.

3. Date and time. 1600gmt on 7 September to 1600gmt on 8 September.

4. Number of contacts. Each station can be worked once only, whether fixed, portable or mobile. If a station is worked again only one contact will count for points, but any duplicate contacts should be logged without claim for points and should be clearly marked as duplicates.

5. Types of emission. Contacts may be made on A1, A3, A3j, F2 or F3.

6. Contest exchanges. Code numbers exchanged during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for each band and increasing by one for each successive contact. This exchange must be immediately followed by the QRA Locator of the sending station. (Example 579021YG46E.) QTHs may also be exchanged if desired.

7. Scoring. Points will be scored on the basis of one point per kilometre. The final claimed score must be shown at the top part of the first sheet.

8. Entries. Entries must be set out as shown in the example below. (See notes and VHF NFD Rule 19). They must be postmarked not later than 23 September and must be addressed to: The Chairman, VHF Contests Committee, 20 Harcourt Road, Wantage OX12 7DQ. Late entries will not be accepted.

9. Disqualification. Entrants deliberately contravening any of these rules will be disqualified. Minor errors may result in loss of points. Errors in callsigns and code numbers will be penalized by deducting the following percentage of claimed scores for both stations.

One error: 25 per cent. Two errors: 50 per cent. Three or more errors: 100 per cent.

The claimed contact will be disqualified for

(*a*) an obviously wrongly stated QTH when no QRA Locator is exchanged, or (*b*) a time error of more than 10 minutes.

10. Judging. Submission of a log implies acceptance of the rules. The decision of the organizing society is final.

11. Awards. The winner of each section will receive a certificate. The top scorer, whether fixed or portable, will be awarded the Region 1 VHF Trophy. The winner in the remaining category will be awarded the PZK Cup.

80m Field Day 1974 rules

1. The General Rules for RSGB HF Contests, published in the January 1974 issue of *Radio Communication*, will apply.

2. When. 0900gmt to 1600gmt on Sunday 15 September 1974.

3. Eligible entrants. Multi-operator entries will be accepted. A maximum of two operators per station will be allowed.

4. Contacts. CW (A1) only in the 3.5-3.6MHz band. The location of the station must be sent.

5. Scoring. 15 points for a contact with another portable or mobile station, 5 points for a contact with a fixed station.

6. Power. The maximum power input to the pa stage must not exceed 10W. The power for all parts of the station must be derived from dry batteries or accumulators; the practice of "float" charging the batteries or accumulators is not permitted.

7. Trophy. The Houston Fergus Trophy will be awarded to the winning station.

8. Logs. Column (5) should be headed "Location of station contacted".

9. Entries must be addressed to the RSGB HF Contests Committee, c/o D. Thom, G3NKS, 20 Bramble Close, Copthorne, Crawley, Sussex, RH10 3QB.

DF Qualifying Round—Dartford Heath

Date: 1 September 1974.

Map: New 1-50000 series OS Sheet 188, Maidstone and Weald of Kent.

Assembly: 1300bst for start at 1320bst.

Location: Beechen Wood near Chelsfield, NGR 515636.

Intending competitors are asked to notify Mr P. Wells, 20 St David's Road, Hextable, Swanley, Kent (telephone Swanley 62726) of the numbers in their parties requiring tea, as soon as possible and not later than 24 August.

Practice Triple DF Contests rules

Competitors in the Final RSGB DF Contests are now required to locate three transmitters, and two additional practice events have been arranged under similar rules.

South Manchester

Date: 18 August.

Map: New 1:50000 series OS. Sheet 109, Manchester.

Assembly: 1230bst for start at 1250bst.

Location: Car park at Heaton Park just north of junction of A665 and A6044, NGR 827033.

Further details from G3WFT QTHR. Tel 061-962 2803.

High Wycombe

Date: 26 October

Map: New 1:50000 series OS. Sheet 175, Reading and Windsor.

Assembly: 1940bst for start at 2000bst (night event).

Location: Adjacent to Holtspur Cemetery, NGR 924894.

Supper will be served in Marlow at the conclusion of the contest at 0100bst 27 October. Intending competitors are asked to notify the organizer, Colin Vernon (business telephone High Wycombe 20411, home Bourne End 21005) of their requirements not later than 21 October.

May 144MHz Open Contest

Due to apparent anomalies in the logs of some stations, the results of this contest are being held over. It is hoped that they can appear in the September issue.

Slade DF Qualifying Round results

Seventeen teams assembled at Barr Beacon, near Birmingham, for the start, and good signals were heard from both stations. Because of the previous night's bad weather, both transmitting parties elected to use tents to keep dry but the rain that threatened kept off until after the contest. Most of the competitors descended first on station A, G3VFV/P, located eight miles north-east of the start on a public footpath near Shenstone, destroying most of the covering camouflage and the aerial by 1430. Station B, G3SRS/P, under the guidance of the Simmonds brothers, was located on a disused railway embankment 12 miles south-east near Coleshill.

Thirteen teams were successful in locating both stations and three others found only one. Thanks to all who took part, not forgetting the transmitting crews G3VFV, G3XRH, G4BRT, G8HBE and Cliff Simmonds.

Posn	Name	Club	Time of arrival Station A	Station B
1	M. P. Hawkins	Chelmsford	1423	1502
2	E. L. Mollart	Oxford	1423	1503
3	J. R. Vickers	Stratford	1420	1517
4	B. M. Bristow	Oxford	1432	1519
5	T. C. Gage	Oxford	1437	1523
6	A. W. Butcher	Chelmsford	1420	1525
7	R. J. Parsons	Essex University	1425	1526
8	D. E. Newman	Slade	1437	1527
9	G. Whenham	Coventry	1421	1537
10	P. Tyler	Oxford	1432	1544
11	M. Easterbrook	Dartford Heath	1416	1554
12	D. C. Holland	South Manchester	1432	1613
13	J. McBurney	South Manchester	1424	1624
14	W. J. North	Chiltern	1535	—
15	P. M. Williams	Slade	1606	—
16	C. D. McEwen	Chelmsford	—	1627
17	M. Sheridan	Stratford	—	—

Subject to confirmation, J. R. Vickers and B. M. Bristow qualify for the final.

May 1974 1,296MHz Open Contest results

Entries for this contest were split evenly between both sections. There seems to be a greater leaning these days towards the Yagi aerial in preference to the dish, while most stations still seem to prefer the diode instead of a transistor as a mixer. Maybe this is because of the cost of such devices at these frequencies. Although the level of activity was high once again, no Continental dx was worked and no records broken. New callsigns are showing up in the log sheets, so activity is on the increase.

The winner of the Portable Section was G3JQA, with G4CCC as runner-up. G4BEL headed the Fixed Station list with a commanding lead, with G3JVL as runner-up.

G4CUT

PORTABLE SECTION

Posn	Callsign	Score	QSOs	Cnty	Pwr	Mixer	Ae	Best dx	Km
1	G3JQA	1,540	18	ST	12*	D	Yagi	G8ATD/P	173
2	G4CCC	1,453	21	BE	6*	TR	Yagi	G4BEL	158
3	G3WDG	1,187	17	WE	10†	D	Dish	G4BEL	165
4	G4ALE	1,123	18	SY	5*	D	Y-D	G4BEL	120
5	G8ATD	970	16	BD	30	D	Dish	G3JQA/P	170
6	G4ALN	563	9	EX	40	D	Dish	G3JVL	130
7	G3RQZ	318	8	SY	0·5*	D	Yagi	G4CCC/P	84
8	G3VCT	308	7	OX	0·1*	D	Dish	G4AHH	51
9	G3TTV/A	298	7	EX	25	D	Dish	G4BEL	65
10	G8ADP	225	5	GR	2*	D	Dish	G4CCC/P	68
11	G3XOD	219	5	ST	3*	D	Dish	G4CCC/P	77
12	GW8ACG	158	2	FT	1.5*	D	Yagis	G3JQA/P	83
13	G8GCP	51	2	SX	2*	D	Dish	G3JVL/P	38

FIXED STATION

Posn	Callsign	Score	QSOs	Cnty	Pwr	Mixer	Ae	Best dx	Km
1	G4BEL	2,109	18	CE	150	TR	Dish	G3FYX	209
2	G3JVL	1,270	14	HE	10*	D	Yagis	G4BEL	193
3	G3JXN	677	15	LD	18	D	Yagi	G3DAH	102
4	G6XM	629	10	WE	25	D	Dish	G4BEL	152
5	G3FYX	565	8	GR	40*	D	Yagi	G4BEL	203
6	G3COJ	387	7	BS	7*	D	Col	93WDG/P	70
7	G8FMK	365	7	OX	0·4*	TR	Yagi	G4BEL	103
8	G8DKK	330	9	OX	3*	D	Yagi	G4ALE/P	69
9	G8EDL	288	9	MX	10*	D	Yagi	G4CCC/P	75
10	G3EHM	249	6	SD	150	D	Dish	GW8ACG/P	77
11	G3UBX	174	5	WK	10*	D	TR	G3JQA/P	64
12	G8C1T	34	2	MX	20	D	Yagi	G4ALE/P	31
13	G3HCW	25	1	YS	1*	D	Yagi	G8EOP	30
	G8EOP	25	1	YS	30	D	REF	G3HCW	30

* Power output. † P.e.p.

May 1974 432MHz Open Contest results

A good number of stations were active for this contest although the time was reduced, due to an error in the published rules. By the time this was noticed it was too late to inform all members who could have taken part in the contest; This pleased a lot of entrants, but other were very upset, particularly with the overnight gap between this contest and the 1,296MHz contest. The VHF Contests Committee deeply regrets that this happened.

The winner of the Portable Section was G3JQA/P, but there was no runner up as entries fell short of the minimum. The winner of the Fixed Station entries was G8ERW, with G8FMK as runner-up. Conditions were average and no Continental dx was worked.

G4CUT

PORTABLE SECTION

Posn	Callsign	Score	QSOs	Cnty	Pwr	Ae	Best dx	Km
1	G3JQA	149	33	ST	15*	2xMB	G3ORL	270
2	G5HD	145	35	WE	20	MB	G4BYV	240
3	G4CCC	119	37	BE	15*	64C	G4BYN	225
4	G4ALE	80	36	SY	15*	MB	GW3OCB/P	282
5	G3UUT	76	32	EX	150	P	GW3UCB/P	260
6	GW8ACG	72	20	FT	24	6/6	G8ERW	256
7	G8ATD	67	25	BD	24	2xMB	GW8ACG/P	220
8	G3XOD	35	11	ST	6*	P	G3DAH	265
9	G8ACE	16	8	CH	1	Dip	GD2HDZ	162

FIXED STATION

Posn	Callsign	Score	QSOs	Cnty	Pwr	Ae	Best dx	Km
1	G8ERW	71	27	HF	26	P	GW8ACG/P	258
2	G8FMK	63	21	OX	6	MB	GW3UCB/P	205
3	G4AGE	61	17	DY	4	P	GM8AGO/P	257
4	G4ASR	60	24	EX	150	MB	GW3UCB/P	225
5	G3UBX	54	18	WK	20*	MB	GM8AGU/P	280
6	G4BMM	45	19	BD	20	MB	GW3UCB/P	225
7	G5UM	44	16	LR	15	14E	G3LTF	131
8	G8CTT	42	18	KT	30	MB	G8AVH	150
9	G8C1T	38	18	MX	25	P	GW3UCB/P	276
10	G8EDL	33	19	MX	20*	MB	G5HD/P	86
11	G3SHY	29	9	NM	25	MB	GM8AGU/P	263
12	G3ORL	26	8	HE	30†	P	G3JQA/P	270
13	GM8BKE	16	2	DU	40	MB	GW3UCB/P	375

* Power out. † P.e.p. P = Parabeam. MB = Multi-beam C = Colinear. Dip = dipole

Checklog from GW3UCB/P acknowledged

G3MDG disqualified. (Rules 3 or 15).

International ATV Contest 1974, rules

Organized jointly by BATC, ATA and AGAF

When: 1900–2300gmt, 14 September 1974, Session 1.
0800–1200gmt, 15 September 1974, Session 2.

Eligible entrants: All amateurs licensed to transmit or receive ATV. All entrants must operate strictly within the terms of their licence.

Section A: Fixed or /A stations transmitting and receiving vision.

Mode	Score
(a) transmitting vision on 432, receiving vision on 432	2 pts/km
(b) transmitting vision on 1,296, receiving vision on 1,296	8 pts/km
(c) transmitting vision on 432, receiving on 1,296	4 pts/km
(d) transmitting vision on 1,296, receiving on 432	6 pts/km

Section B: /P stations transmitting and receiving vision. Scoring as for Section A.

Section C: Stations receiving vision only.

Mode	Score
(a) receiving vision on 432	2 pts/km
(b) receiving vision on 1,296	4 pts/km

Exchanges and log data: Each station may be contacted **once** in each session. Exchanges shall consist of callsign, vision signal report, serial number, QTH, QRA, code group. Serial number shall start at 001 and increase by one per contact throughout the entire contest. The code group shall consist of **four non-consecutive numbers** (eg 8471 in Session 1 and 1529 in Session 2). This code group **must** be changed for each session of the contest.

Log data shall consist of section entered, callsign, name, address, QRA, code group Session 1, code group Session 2, total score, best contact with distance, remarks.

Date, time (gmt), station worked, report sent, serial number sent, report received, code group received, QTH received, QRA received, band (cm) points/km, QRB (distance in kilometres), score.

All sections, all exchanges in A5

Logs must be postmarked not later than 15 October 1974 and sent to the adjudicator, B. Kennedy, 10 Pilgrim Rd. Droitwich, Worcs WR9 8QA. BATC contest and cover sheets may be obtained from the above address by sending a large sae.

Cray Valley RS SWL Contest rules

1. From 1800gmt 22 September to 1800gmt 23 September. Up to 18 hours logging may be done during this period by single-operator stations and the rest period must be clearly shown. Multi-operator stations may log during the entire contest.
2. The contest will be in two sections: phone and cw. No mixed mode entries will be accepted. There will be two categories: Single-operator and multi-operator. The second category is open to two or more listeners or to clubs, and more than one receiver can be used.
3. The 1·8, 3·5, 7, 14, 21 and 28MHz bands may be used.

4. The practice of logging a series of contacts made by one station is depreciated. Log entries must not include the same callsign in the "Station worked" column more than 20 times on each band.
5. The object of the contest is to log as many stations in as many countries as possible. Scores should be compiled as follows: one point for each station, *multiplied* by the number of different countries heard on each band added together. A list of countries heard on each band must be furnished and a separate log must be submitted for each band. In addition a bonus of up to 100 points will be awarded for neatness. Illegible logs will not be accepted.
6. All countries will be determined by the official RSGB countries list.
7. No station heard calling CQ or QRZ or similar call will be allowed to count for points. Stations must be in QSO. AM or MM stations are not to be included in entries.
8. Log sheets are available from Cris Henderson, who must be sent a large sae at the address below. It is desirable that entrants use official log sheets, but entries on "home-made" log sheets will be accepted as long as the following information is given: date, time (gmt), band, station heard, station being worked, report at SWLs QTH. Points may only be claimed for stations actually heard and the callsign must be shown in full. If points are claimed for both stations the callsign of each must appear in the "Station heard" column.
9. Entries must be addressed to the Contest Manager, Mr C. A. P. Henderson, 76c The Avenue, Beckenham, Kent BR3 2ES, England, *to arrive not later than 12 November 1974.*
10. Certificates of Merit will be awarded to the overall winner and runner-up of both sections and to the first contestant in each country placed among the top 25 entries.
11. The decision of the committee of the Cray Valley Radio Society will be final.

Contests calendar

18 August	—144MHz QRP (Rules in July issue)
18 August	—S Manchester Practice Triple DF (Rules in August issue)
24-25 August	—All Asian DX (CW)
1 September	—Dartford Heath DF Qualifying (Rules in August issue)
7-8 September	—VHF NFD & SWL (Rules in March issue)
7-8 September	—IARU Region 1 VHF (Rules in August issue)
14-15 September	—International ATV (Rules in August issue)
14-22 September	—6th BARTG VHF RTTY (Rules in July issue)
15 September	—80m Field Day
15,22,29 September	—1,296MHz Cumulative (Rules in July issue)
22 September	—DF Final—Coventry and Rugby
22-23 September	—Cray Valley RS SWL (Rules in August issue)
5-6 October	—UHF NFD & SWL (Rules in April issue)
5-6 October	—VK/ZL/Oceania (phone)
12-13 October	—VK/ZL/Oceania (CW)
12-13 October	—21/28MHz Telephony (Rules in May and July issues)
October	—Start of 70MHz Cumulative
October	—Start of 432MHz Cumulative
19-20 October	—7MHz CW (Rules in June issue)
20 October	—432MHz SSB
26 October	—High Wycombe Practice Triple DF (Rules in August issue)
2-3 November	—7MHz Phone (Rules in June issue)
2-3 November	—144MHz CW
9-10 November	—Second 1·8MHz
24 November	—Verulam ARC 144MHz
1 December	—Verulam ARC 1·8MHz
8 December	—144MHz Fixed

Mobile rally news

Preston Mobile Rally, 18 August
From 11am to 5pm at Deepdale County Primary School, St Stephen's Road, Preston. Organized by Preston ARS. Talk-in on 2m and Top Band. Trade stalls, bring and buy, refreshments. Secretary G3ZXC, QTHR.

Wessex Mobile Rally, 18 August
This rally, which was previously postponed, will now take place at Braemore House, near Fordingbridge, Hants. Organized by the Wessex Amateur Radio Group, it will have the usual trade stands and other attractions for visitors. Talk-in stations will operate on 2m, 4m and 80m. Further information from G. A. Moore, G8BBN, 108 Stewart Road, Bournemouth.

Harlow Mobile Rally, 22 September
Organized by the Harlow & District ARS, this rally will take place at Nettleswell School, Harlow, Essex. All the usual attractions including grand raffle and bring and buy stall. Talk-in on 80m, 160m, and 2m (145 MHz). Enquiries to B. G. Capper, G4DBC, 36 Woodhill, Harlow, Essex CM18 7JT.

Mobile rallies calendar

11 August—Torbay MR. Newton Abbot Rugby Club ground. (Details in July issue).
11 August—Derby MR. (Details in July issue).
18 August—Preston ARS MR. (Details in August issue).
18 August—Bromsgrove Mobile Picnic. Organised by Bromsgrove & DARS. Avoncroft Museum of Buildings.
18 August—Wessex MR. (Details in August issue).
22 September—Harlow MR. (Details in August issue).
29 September—Peterborough MR, Walton School. Talk-in on 160m and 2m. Details from G8GNV, QTHR.

NOTE: The Saltash MR scheduled to take place on 18 August has been cancelled.
NOTE: The date of the Peterborough rally has been changed to 29 September.

Special event stations

Boys' Brigade Camp, 8 August
During the annual camp of the Brighton and Hove battalion at Glynde, near Glyndebourne, a special event station will be operational during the open day on Thursday 8 August. The 10, 20 and 80m bands will be used between 1400 and 1900. Details from, and QSLs to, G3EDG QTHR.

Tollerton Horticultural Show, 17 August
The York Amateur Radio Society will be mounting an exhibition station, callsign GB2TS, at this show on Saturday 17 August.

Stoke-on-Trent Sea Cadets, 18 August
The North Staffs ARS will be operating an exhibition station for the Stoke-on-Trent Sea Cadets at Ivy House, Hanley, on Sunday 18 August. Using the callsign G4BEM/A, the station will be operational on 80 to 10m ssb/cw and 2m ssb/fm. QSL via bureaux or direct to G4BEM QTHR.

Silverthorn Annual Camp, 23-26 August
The Silverthorn Radio Club will be holding its customary annual camp at Mission Field, Lambourne End, Essex, for the period 23-26 August. GB3SCR will be operational on top band, hf and vhf bands.

GB3FM, 7-8 September
The UK FM Group (Northern) will be operating GB3FM in the 2m contest on 7-8 September from the proposed repeater site on Staine Cross Common, Barnsley.

Wycombe Show, 7 September
G3CAR, operated by the Chiltern Amateur Radio Club, will be on all bands, 80-10m cw/ssb, at this show to be held at the Rye, High Wycombe, Bucks, on Saturday 7 September. All contacts confirmed by club's special QSL card. Skeds, and visitors to the show, welcomed. Details from G3FSN QTHR.

GB3HFA ((Hobbies For All), 20-22 September
This station will be manned by the Grimsby ARS at a hobbies exhibition during the period 20-22 September. Operation on all bands, including 2m ssb on 144·23MHz. Special QSL cards. Details from, and QSLs to, G8HAE QTHR.

MEMBERS' ADS

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in 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 40p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No 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. Advertisements may be edited or abbreviated as necessary.

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

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

FOR SALE

HRO dial gearbox and tuning gang, perf, £8.50. Orig manuals: RA17, 51J3, £4 each; 75A3, 75S3, £3 each; CR300, £2.50, all plus postage. *Wanted:* AR88D in first-rate cond, also new boxed 6SG7s. G3GUU, QTHR.

Liner 2, 4 months old, offers please; Microwave Modules, 2m converter double conversion i.f. 4-6MHz, £12. G3ZOD, QTHR. Tel 061-480 0251.

Storno Viscount lowband with control unit cables mic, £17. Ultra Valiant all solid-state 4m tx/rx, rx vfo, tx xtal, £22. Rogers fet fm tuner cased and boxed, £22. G3ZDB, QTHR. Tel Epsom 24814.

Heathkit HW-17A tx/rx complete with dc psu, xtal and handbooks, £50 ono. Buyer collect. G8CYX, QTHR.

Early shocking coil 1912? collectors gem. 3½in electrostatic voltmeter 750V. Acos stick xtal mic. New enamel wire 20G 32G. GPO relays. 12E1 valves. Wire-wound resistors. Offers. G3DFS, QTHR. Tel 021-354 7769.

Eddystone rx 680X grey gen cov, fitted product detector, Eddystone spkr and tilt feet, £55. Hallicrafter SX122 gen cov, 10–80 bandspread, product detector, xtal calib, £75. G3OXV, QTHR. Tel Daventry 2265.

HW7 QRP cw rx, £25 or swap HRO. Mosley VTD-Jr ant, £2 *Wanted:* Bug key. Buyers must collect. G4HU, QTHR.

Quantity Vero PCBs 11½in by 3½in, 50p. 0·5μF 50V 100A coaxial suppression capacitors with clip, 60p post paid. Raytheon transformer 110V primary 4,000 VCT 600mA/s ceramic terminals, £2. Carriage extra. J. H. Lepper, 128 Sheephousehill, Fauldhouse, West Lothian, EH47 9EL. Tel Fauldhouse 433, evenings.

2m tx 40W input fm + series gate mod, £25. 70cm tx series gate mod c/w separate psu, £25. 2W 2m mobile tx, ic, modulator c/w ant relay + xtal for 145·0MHz, £12. G8DHA, QTHR.

Zygi 20m beam aerial (*Radcom* July '73) nicely built but never used offered at far less than cost of materials. SAE for details. G2KF, QTHR.

Cossor 1035 Mk2 dual-beam scope, first-class wkg order, comp with manual, £20. S. A. Fox, 1 Kitswell Way, Radlett, Herts. Tel Radlett 6016 evenings only.

Pye fm Vanguard 60W rf output on repeater frequency with toneburst generator, £35. Assembled and wkg with valves G8ATK transmit strip, £10. BSR 4-track tape recorder and 10 tapes, £25. G8FAK, QTHR.

FR50B xtal calibrator etc, careful use, full 28-30MHz, £60 ono. Eddystone 898 dial brand new + rx parts, £8. G8HNN, 8 Droitwich Road, Fernhill Heath, Worcester WR3 8RS. Tel Worcs 51956.

SB101 with SB600 spkr and HP23B ac supply, £130. SBA301-2 cw filter, £11. Pye Cambridge hi-band, remote tuning dash mount, £24. Murphy Rover hi-band complete except rx front end, £5. G3RUD, QTHR. Tel Coleshill 62222.

Drake 2C rx new cond little used orig pkg and manual, £90. Wiltshire, 71 Ferndale, Waterlooville. Tel Waterlooville 4146.

Telford TC7 Mk 2 tunable i.f., integral 2m converter, £40 ono. 2m tx fm, 3-20 pa in neat cabinet, metered vfo and xtal with mic, ht psu, £65 ono. 30W a.m. modulator 2N3055 pa solid state, £6. M. A. Kipp, 43 Southdown Cres, Sth Harrow, Middlesex HA2 0QT. Tel 01-864 1412.

2m and 70cm fm tx with converters, £60 ono. DJ6ZZ transverter partly aligned, £5. 2m portable tx and converter, £15. HA600A rx, £35. 20-30MHz diplexer. 75Ω low-pass filter, swr bridge, 1in dia crt, offers. G3XFW, QTHR.

Top Band tx fb cond, Geloso vfo, BC453, two power packs 500V and 350V, 100kHz xtl osc etc to clear shack, £10. G3JIC, QTHR. Tel St Helens 23916.

"Radio Communication" 1959–1973, *Practical Wireless* and *Practical Television* 1948–1966 comp vols unbound all 40p per vol. *Wireless World* bound vols 1951–1966 exc cond, £8 for comp set. Hills, 66 Richmond Road, London SW20. Tel 01-946 4573.

Solid State Modules 2m/4-6MHz converter, unused, £13 or will exch for 30ft pole or converter for 2m phone/28-29·7MHz or 4m/28-28·7MHz converter. Give price for 4m 28-28·7MHz converter if you will not exch. P. Morgan, 21 Trafalgar Rd, Portslade, Sussex BN4 1LD. Tel Brighton (0273) 415305 evenings.

Minimitter Mercury tx 150W, cw and a.m. with Heath RA1 rx. both vgc comp 80–10m station, £30. Buyer collects. G4CZS. Tel 061-428 8594.

Heathkit SB301 rx, £75. Heathkit HW17A 2m tx/rx cw dc psu, £45. Heathkit Mohican, £15. AR22R rotator, £15. Prefer buyer collects or could del up to 50 miles. G4AQK, QTHR. Macclesfield 20773.

Trio JR59DS rx with 6P5D spkr, £50 ono. Also LGK mosfet 2m converter i.f. 28–30MHz, £10 ono. Both in mint cond. David Hugo, 618 Wollaton Rd, Nottingham. Tel 0602 282374.

Scope Hartley 13A, comes complete with rf probe test leads and cover, also circuit diagram, wkg, £20, buyer collects preferred. 11 Langley Close, Headington, Oxford. Tel (0865) 68170 after 6pm.

Complete 2m rig Emsac 15W 5-chann a.m./fm tx + psu. Heath RA1 + Emsac converter 28–30 i.f. + Shure 201 mic, all fb cond, exc results worked PA0 etc dx, ideal home station rig, £60. Also CR100, £10. G8HDZ, 15 Swanne House, Gloucester Circus, Greenwich SE10.

60ft Hamtower comp masthead fittings but less base. AR22 rotator outfit. Mosley 3-el MP33 triband lightweight beam 2kW p.e.p. Offers and further details. J. M. Robson, Freswick Cottage, Dunbeath, Caithness KW6 6EA.

Valve voltmeter Marconi TF958 dc to 100MHz with manual, vgc, £12, buyer collects. G3VXZ, QTHR. Tel Maidenhead 27350.

R209 rx, exc cond 6V dc plus car battery if wanted, £16. *Wanted:* Class D wavemeter, state price, all letters replied to. I. Ross, 23 Jesmond Dr, Bury, Lancs. Tel 061-764 2624.

AVO mains electronic V/R/C with vhf probes and data, £10. SB1OU, good cond, £21. Sentinel mf conv 144/5-1·5, new, £12. 14MHz xtals, £1 each. Odd xtals, £1 for 12 plus postage. Sae details other items. G8FBX, QTHR. Tel Penketh 2044.

Collins mechanical filter 500Hz (cw) type F455FO5, £14—or exch for suitable 455kHz 2–3kHz passband filter, mechanical or xtal. G3NDM, QTHR. Tel Rugby 890174.

Transverter TW 2m phase II 28/30MHz, vgc, matching psu available. G3VGH, QTHR. Tel York 769245.

HRO mx, good c, psu rack 8 gc coils (No 14–30), 4 BS 80, 40, 20, 10 crystal S-meter spares, buyer collects, £22.50. Class D wavemeter, mains, £3. G8BDB, QTHR. Tel Grange over Sands 2485.

Pye base station, rx-tx on 2m c/w mic cabinet, remote control. Another base station rx on 2m. Both ex crystals. Best offer. GM8IEH, QTHR. Tel 224.

Hudson FM208 vhf transceiver 10W fm in good condition, rx converted to 2m. TX working complete with ptt microphone, £15 ono. M. Kahn, 19 Selborne Rd, Ilford, Essex. Tel 01-478 6180.

Codar T28 int spkr variable bfo, £14 inc post. Codar 250/S psu, new month ago, plus copy AT5 for 160, only £14 inc post etc. Please

phone. XYL will arrange junk for callers. G4AQY, QTHR. Tel 01-858 1448.

Slow scan Spacemark sstv monitor kit two-thirds comp inc tube and cabinet £65. 28/144 transverter comp and wkg, wired for use with FT101B but will suit most hf tx/rxs, £45. G3ZUL, QTHR. Tel 09057 4510.

J-Beam 2m 8-over-8 slot-fed Yagi, 75Ω, little used, £6. GM8HFK, QTHR. Tel Uddingston 5877.

Labgear quad elements comp but only one "spider", £5 cp. Variac 0–275V 12A out unused, £20. T. Biddlecombe, 27 Mandeville Close, Wyke Regis, Dorset. Tel Weymouth 71529.

Geloso tape recorder with spare tapes, mic etc, 10 years old but solid, sent postpaid, £6.75. Guidebooks leading Japanese electronics firms, £1.25. Jap frequency measuring instruments guidebook, £1.50. Brian Smith, PO Box 4, Uckfield, Sussex.

Yaesu FR50B, mint, 28–30MHz, topband, calibrator, Kokusai MF4551OCK mechanical filter (ssb), 2m converter psu, socket, £95 ono. Canadian R103 Mk1 rx 1–16MHz (bfo requires attention) with mains psu, £15 ono. G. Kaye, 12 Franklin Close, London N20. Tel 01-445 7074.

Heathkit RA1 amateur bands rx 100kHz xtal calibrator ½-lattice filter S-meter and manual, vgc, £23 or exch hand-held fm tx/rx on or convertible to 2m. G8FHN, QTHR. Tel Medway 63365 (Kent).

Tri-band mini quad, rotator, cables, mast, £30. Callers by appointment. G8AYM. Tel Bourne End 22304.

Gonset G76 a.m./cw tx/rx with psu, 120W cw, 90W a.m., all band dual conversion rx, £30. BC221 with psu, £18. Mechanical filters 455kHz, Kokusai MF455–10CK, £7. Collins 6kHz, 2·1kHz, 500Hz, £9 each. G3KDA, QTHR. Tel Bidford-on-Avon 2232.

Heathkit RA1 amateur bands rx built by Heath with spkr and calibrator, £30. Codar AT5 with homebrew ac/dc PSUs, £16. deliver 50 miles. Also junk boxes and magazines, sae lists. Helsby, 47 Canterbury Road, Newton Hall, Durham. Tel 66585.

AS96/TPX-1 lightweight 20ft sectional tubular mast with 2 × 2m folded dipoles and baluns on spreader in holdall, £5. Heayberd double-wound xformer 200/250 to 115V 1kVA, £5. Xformer 230 to 13/15V 60A, £3·50. G6ZH, QTHR. Tel Banwell 2119.

Eddystone 940 communication rx in vgc with handbook, £120. P. M. Cleaver, 86 Main Rd, Dovercourt, Essex. Tel Harwich 2195.

Pye base station PTC 703Z low band, £40. Pye base station, less case, rx F10-AMV, tx 3302-V high band, £40. Taylor 67A signal generator, £5 plus carriage or buyer collects. R. W. Abbott, 9 Hurstleigh Terrace, Harrogate, Yorks.

KW Atlanta exc cond, £150. G8HOO. Tel Erith 35142 after 6pm.

Creed 75R teleprinter, with verifier keyboard (separate with motor and 24 relays), perforator tape reader, and psu, computer code, but very nice piece of gear, OK for spares or conversion? £20 ono. G4COU, Upper Grange Farm, Markfield, Leics. Tel Markfield 2525.

Eagle RX-80 Communication rx, £20, buyer collect or pay carriage. G8HAO, QTHR. Tel Preston, Dorset, 832073.

New Marconi Marine morse key with transformer and oscillator, £12 lot. Heathkit 400Hz morse code filter, £10 or exchange for SB series communications spkr. A. West, 29 Halfmoon Lane, Herne Hill, London SE24 9JX.

Collins R390A/URR rx. Sensible offers please. G3LDI, QTHR. Tel Wymondham 3463.

Heath HW30 2m a.m. tx/rx, good cond, complete with psu, mic, xtal on 144·98MHz and handbook, £16 ono. Also FL-30HA absorption wavemeter, 1–300MHz nominal, new, unused, boxed, with all accessories, duplicated gift, £1.20. G8GZZ, QTHR. Tel Exeter (0392) 76952.

TC9 Mk1 (failed a.m. mod emitter res) TC7 (failed psu) otherwise in good cond at bargain price of £85. Will deliver reasonable distance. G8FWJ, QTHR. Tel 01-253 0329.

Cap dis ign -ve "E" with info, £6. 12AVQ vert with feeder and all gen, as new, £10. Amplivox headphones and morse osc free to any buyer. Post extra. G3ZLH. 3 Oerley Way, Oswestry, Salop. Tel 0691 5730.

Marconi hf rx CR150/2 + psu, handbook and spkr, high imp phones, few spare valves, £15 ono. Codar rx CR70A, PR30 preselector and spkr, £15 ono. Used cond. Pref buyer collects. C. Baker, 65 Crompton St, Chelmsford, Essex CM1 3BW.

Exchange: Fantastic value for spares, monoscope monitor Pye 4022. W/set No 31, W/S No 19 Mk3T, rf unit T266, Joymatch preselector. The lot, £40 or oscilloscope Heathkit 10–18U or similar, working cond. O. Mantovani, 94 Swansea Road, Llanelli, Carms. Tel Llan 05542 3030 (office hours).

KW2000B + psu vgc, £170. Marconi signal genny TF144G + manual 85kHz-25MHz, £8. Class "D" wavemeter No 2, mint, £8. Also manual and charts. *Wanted:* Trio 2200 portable, no mods. G3ZQR, QTHR. Tel 01-330 1128.

Heathkit SB301 rx 80m to 30m in 8 bands fitted ssb and cw filters, manual, assembled by manufacturers, clean appearance, £95. K. H. Smith, 37 Lonsdale Drive, Enfield, Middx. Tel 01-363 1653.

Trio JR500S with 160m in vgc, £40. KW Vanguard 80-10m scratched case but otherwise good, £25. Securicor delivery if requested. G4BRB, QTHR.

FET solid state rx UR1A, new cond, £15. Advance voltstat 190/260 in, 230 out, 150W, £9. DC motors 1/10hp 185/200V shunt wound. Transformer and rectifier for motor. Good cond. Offers, swap, why? *Wanted:* DX40 VF1U, G3FK, QTHR. Tel Breamore 436.

Trio 9R59DS gen cov rx 0·5MHz to 30MHz bandspread on 80, 40, 20, 15, 10m, fitted voltage stabilizer, £42.50. W. A. Collin, 69 Grand Avenue, Hassocks, Sussex. Tel Hassocks 4184.

"Radio Communication"; 1971, 1972, 1973, 60p per year. Postage extra. Also April to December 1970 at 5p each, postage extra. Morse key, £1. P. J. Deamer, 33 Ashbourne Grove, London SE22 8RN. Tel 01-693 3632.

Liner 2 2m ssb tx/rx 144·10-144·34 with pre-amp, £100. Also Microwave Modules 70cm converter i.f. 28-30MHz, £15. G8DDW, QTHR. Tel 01-858 3921.

Heathkit HW7, few hours use, £35. BC221 and psu, £10. Labgear LG50 10-80m a.m. cw, £10. 70cm varactor tripler, £5. 70cm 18 ele, £4. G4BKY, 57 The Quarry, Cam Dursley, Glos, GL11 6JA.

Complete station Sommerkamp 747 (Yaesu FTDX560), matching spkr, pair new 6KD6s, E-Z match, 14AVQ + LC80, 100ft 50Ω coaxial KW dummy load, aerial switch, swr meter, etc. Best offer secures, or will split. G3TJP, 28 Monmouth Place, Clayton, Newcastle, Staffs. Tel 0782 618855.

Travelling wave tube, English Electric type N1042M. Also some 4X150A, 2C39 2K25. Offers D. Wright, 3 Forth Crescent, Dalgety Bay, Fife.

KW2000B plus psu, £155. 14AVS vertical, £8. 4m 4-el Yagi beam, £5. G3TWJ, QTHR. Tel 01-689 1441 (office).

Yaesu FRDX400 as new all filters fitted 160 to 2m, £80. 14AVQ vertical aerial with 80m coil fitted, £15. Versatower WB40, £90. G3VKP, QTHR. Tel Cambridge 55341.

Solartron double-beam scope CD1014 manual, £25. 2A rf meter 2-pin, 75p. Valve bases 4 9 PIN, 4 8 PIN, 3 5 PIN, 40p. Null meter 1.0.1μA, £2. H. H. Seymour, 74 Harold Estate, Pages Walk, London SE1 4HW.

AR88 cabinet, £4. 25 vols *SWM* 1946–70, 75p per vol. Standard Radio Aircraft tx/rx STR9X 115–145MHz with handbook, £8. G3CGQ, QTHR. Tel 0582 25519.

Pye Cambridge a.m. dashmount on 2m good cond, £20. Hudson lowland base AM105 with rocket aerial and mobile AM108 comp, £10. Cook, 26 Thames Close, Chertsey, Surrey. Tel Chertsey 61393.

RF/IF units from R4187, circuits, details, £4.50. Homebrew vhf broadcast rx, circuit, £2. LW/MW portable, no spkr, case, £1. *Practical Wireless* '67–'71, some tatty, £1.50. Metal case 19in × 9in × 11in, £1. Arrange (sae), to collect. A. J. Bartlett, 4 Kelsall Close, Kidbrooke, London SE3.

Teleprinter, Creed model 7E, mains voltage ac motor, £18.50. Silence cover for above, £2. Regulated power supply, 19in rack mounted, fully metered, outputs: variable 0–500V + stabilized, + 750V unstabilized, 0–250V-bias. £7. Deliver locally. G4AFQ, QTHR. Tel Ashford (Mx) 54307.

Trio 9R59DS. Fitted stabilizer, perfect wkg order and cond, £42. *Radio Communications Handbook* 4th edn, perfect, £2.75. M. C. Walker, 23 Kelston Road, Bath. Tel Bath 23904.

Brand-new aerial tuning unit for only £3 post paid. Sae with enquiries. R. Hayward, "Sunnyfields", Lighthouse Road, St Margaret's Bay, Near Dover, Kent.

KW2000A—ac psu, £150. G3XRM, 106 Everest Rd, Scunthorpe.

Heathkit SB630 station console 250V ac 50Hz, very rare model, £45. SB-303, new fitted cw filter extra, full guarantee, best offer over £170. G3NMH, QTHR. Tel Totton 4930 office hours.

Rotator, cable and indicator, £12. Sentinel mf 144MHz converter £12.50. New BC221, £20. RF6337, £2. Sinclair Z50, £3. Buyer collects large items or will deliver Manchester area. *Wanted:* 100kHz HC6/U, state price. K. Haywood, 14 Lynton Ave, Flixton, Urmston, Manchester.

KW Viceroy Mk2, £50. HRO 8-coil packs, 6 B/S, £15. Pye Vanguard hi-band, handbook, control box, £7. G3ZBC, QTHR. Tel 0604 51422.

Shack clearance, sae lists, 813 + base, 2X813 fils xfmr, pa op coil multitap, 500pF, wide-spaced variable, offers. Mics: Grampian DP4, £2; Reslo RBT/L, £3. Various moving coil meters. GM8CJW, QTHR. Tel Falkirk (0324) 26367.

Valves: QQVO6-40A, QQVO3-20A, QQVO3-10, all tested manufacturers specification, also painted die-cast box and major parts (modulation transformer, valves, bases, meter, etc) suitable for 2m tx similar to Ranger line up—offers. G8DAY, QTHR. Tel Slough 24541 ext 67, or Worcester 423440.

Class A transistor stereo amplifier pa 10W channel, £12. New boxed 4X150s, £4 ea. BB113 v'caps 3×100pF, in 1 envelope, 25p ea. BF237 rf, 10p ea. BC301/3 comp. Pair 90V 6W. MPS AO6 low-noise audio 15, £1. BC251/3, 15p pair. G3WZT, QTHR. Tel Partridge Green 710565,

Marconi Electra rx, mechanical bandspread, amateur bands, converter for 10m, psu, handbook, £25 ono, buyer collects. Tel 01 648 5895.

Yaesu FLDX400 tx with full 10m coverage, offers around £118. Drake 2C, £80 or offers invited. HC6U xtals, 14·0, 14·5, 15·0, 15·5MHz HC18U, 27·125MHz (2), offers. *Wanted:* Liner 2. G4DCQ, Clyde House, Hamilton Road, Cromer, Nfk.

Redifon GR286/STR28. Full range of spare parts, valves, switches, channel xtals etc. Racal 1·4MHz usb filter comp with carrier xtal, circuit etc, £8. G3JMJ, QTHR. Tel 073-271 3467.

100/18kHz converter ssb/cw, £20. Various 4X/150 40X/250, £2. 7558 rf pentodes, 50p. 100kHz xtals, £1. S-meters r to l, £1. 15pF JB 3kV variables, 50p. Preference to callers. G6HL, QTHR. Tel Harvington 558.

Murphy Rover control box, £1. Murphy mics, ptt, 4103C insert (several), 50p each. Both items less leads and ono. TW 2m converter 28–30 i.f., £8. Codar preselector PR30, £2.50. *Wanted* 2m base station tx. G. Webb, 91 Gallows Hill Lane, Abbots Langley, Watford, Herts. Tel Kings Langley 64172.

KW Vespa Mk2 6LQ6 pa + alc ac psu and mic. Exc cond and performance, £95, carriage extra. Spare pa tubes available. G4AHI, QTHR. Tel Rayleigh 4195.

W. World desk calculator, £25. Adler 1210 calculator 14 digits/memory, £100. Large variety of gear, relics, books, manuals on radio etc. Send stamp for comprehensive lists. B. Carter, 14 Falmouth Road, Reading. Phone 883611.

Plessey PR155 rx, £500. Collins 75S-3B rx, £300. Collins 32S-3 tx, £350. Collins 75S-3C rx, £425. Eddystone 990R vhf rx, £300. Solartron dvm LM1240, £40. Racal 9520 counter, £55. J. Yu, 8 Basing St, London W11. Tel 01-229 1229.

WANTED

9MHz filter, SEI QC1246AX or XF9B with or without carrier xtals. Equipment fan. Remote vfo for KW Atlanta. SL402D and SL403D ICs 453·5kHz crystal. P. Smith, 49 Hucknall Ave, Ashgate, Chesterfield, Derbyshire S40 4BZ.

Urgent. Buy or borrow to copy. KW2000 instruction manual. Phone office daytime. W. Evans, 63 Dyers Hall Road, Leystonstone E11. Tel 01-829 3435.

SSB tx/rx or tx to cover marine hf band 3MHz 1·6MHz minimum five vxo-controlled channels inc 2·182MHz preferably 12-24V operation 100W p.e.p. GM3DFM, QTHR. Tel 031-554 1441.

Valves for hf band linear amplifier, 813 4-250 4-400 or why? Also suitable tuning capacitors, vacuum or air-spaced and variable inductor. State price, or have for exchange quantity 4X-250 4X-150 QQV06-40. J. Forward, 12 Clevedon Close, Pennsylvania, Exeter.

Set of mixer xtals for G2DAF Mk2 rx. Mechanical filter SEI1246AX and carrier xtals. G3LQB, QTHR. Tel 0905 820577.

Buy or borrow manual for Trio 9R-59D or similar. Andrew Brown, 56 Electric Avenue, Harrogate, Yorks HG1 2BB. Tel Harrogate 63135.

Balun also gen cov rx. G3VXS, QTHR.

J-Beam 2m plus-4 aerial extension or 8/9-el aerial. G4BOX, QTHR. Tel 01-644 4157 evenings, weekends.

Electroniques front end GC or HB valve or transistor urgently needed for next project. G3YRB, QTHR. Tel 684-3974.

Old Igranic or Gambrell 2-pin honeycomb plug-in coils. Also adjustable coil holder. Rotary coaxial aerial switch with 3 or more outlets. G6RF, QTHR. Tel Perranporth, Cornwall, 2149.

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RAYNET

by S. W. LAW, G3PAZ*

First, an apology to the new group at Wisbech and to P. W. Cousins, G8FCU, whose call appeared wrongly in this column last month. The writer accepts full responsibility and we trust that no inconvenience has been caused. Will prospective members in the area please contact G8FCU who is QTHR?

Also we failed to make it clear that in the Mid-Antrim group GI4BWM replaces the retiring controller GI3AEV and that Mr J. Smythe is handling the correspondence in the capacity of group secretary. So your communications please to GI3AOB, QTHR and not to the controller.

Nothing has been heard for some time from GM3PIP in connection with the Aberdeen group. We trust that all is well with them. In Colchester a change of controller is taking place with G4AQZ replacing the previous leader G3PED. Also in Northamptonshire group there is a new controller G8GHZ, QTHR for prospective members in that area. No further news has been received to date from the proposed Shetland Island formation, but we have hopes that something will transpire.

It seems a great pity that there appears to be no chance at the moment for the formation of a group on the Isle of Man despite the rise of interest after the disastrous fire some time ago. As an interim measure the Raynet Committee suggests that the interested parties on the island might find it advantageous to apply for membership of a group on the mainland in order to obtain the advantages of practice in Raynet communications. We feel sure that G3XEN of the Cumbria group would be glad to enrol them as "fringe" members. This set-up could lead to some interesting exercises.

The frequency problem

It is interesting to look back over the years and note the changes in outlook with regard to the frequencies used for Raynet purposes. At one time the use of 160 and 80m was quite normal but over the years there has been a general move to the higher frequencies. Now, oddly enough, there would seem to be a distinct resurgence at the lower end. Some groups even maintain a listening watch in their area on 80m. Speaking of which, groups which do maintain a virtually continuous watch would deem it a friendly gesture if local amateurs could remember to conduct their QSOs above or below the group watch frequency once it is known! The writer has had the disconcerting experience of being rudely awakened at 0330gmt when the mute dropped out on his standby rig to admit a 5/9+ signal from some dx-hunter burning the past-midnight oil on 4m. We intend no offence, for the bands are free to all, but we do have problems in trying to do our job properly and to the benefit of the user services.

Southern controllers meeting

It has been pointed out that no meeting has been held in the south for some time and the reasons have been queried why this should be so. This would seem to be a matter for liaison between the controllers concerned since the Raynet Committee can no more issue a mandate on such a matter than it would interfere with the internal economy of individual groups in matters which are the concern of the elected and approved controllers.

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

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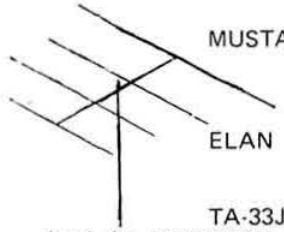

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DO YOU WANT TO RECEIVE AND TRANSMIT ON 2 METRES OR 4 METRES? NEW! 4 METRE EUROPA NOW IN STOCK

There is a lot of interest in 4 at the moment, as you can see from the VHF column in this magazine.

I'm pleased that I just sat down to write this piece, because as I tuned over 2 metres to find someone interesting to listen to, I caught the big sporadic E opening to Eastern Europe. A band full of 59+ stations many from over 1,000 miles in the middle of a Monday. To give you some idea of the level of QRM, the OK station I worked was on 144.35, we had to move up another 100kHz so that he could read me properly through the interference. Hard luck if your 2 metre gear finished at 144.34! It is perhaps not generally realised in this country how much the Continentals spread their SSB operations up the band, because of the greater levels of activity there.

A point to mention, an FT200 for example and a Europa, will give your high power operation on the H.F. bands and on 2 metres for about the same price as some 2 metre only transceivers. A point worth thinking about, even if you only want to listen on the H.F. bands.

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1296MHz Converters	144–146 IF	
144MHz Pre-Amp (2 outputs)		**£9.90**
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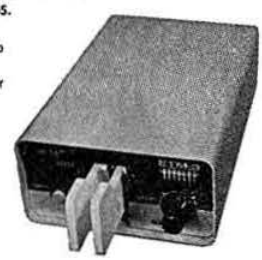

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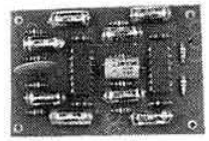

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Circuits and layouts for AM10B includes 6, 12, & 24V. **75p**. AM25B 12V. **60p**.

LC10FM HANDBOOKS £1.00.

PYE MICROPHONE INSERTS (dynamic) 300 ohm type 4103F, new, unused, **50p** each.

4 CORE TELEPHONE LEADS modern type these can be used as replacement for Pye mics. colours White, Brown or Black **25p** each.

LC10FM CONTROL BOXES £1.50 each.

MODULATION & DRIVER TRANSFORMER to match QQV03/10 to NKT404/OC28 ex Pye Cambridge with circuit **£1.25** also to match QQV03/20A to NKT404 **£2.00.**

INVERTER TRANSFORMER with circuit to make a transistorised inverter to give 380V DC out from 12V DC input **£1.75.**

GEC RC600 Radiotelephones high & low band 12½ KHz channel spacing dash mounting all solid state 5 watts RF output in new condition **£65.00** each.

STORNO CQL632 Radiotelephone low band FM dash mount (no mounting cradle) 12V DC input **£25.00.**

AIRMEC MODULATION METER type 201 frequency coverage 3 to 300MHz AM/FM in first class condition **£100.00.**

LABGEAR LINEAR type LS100 mains input 100 watts pep output for use with LSM100 exciter unit 2 to 15MHz (pre-set) one only **£15.00** buyer to collect by arrangement.

SONY CV2000B VIDEO RECORDER complete with monitor which can be used as a portable TV, std 405 line system the recorder is in new condition P.O.A.

VHF RF Tx POWER TRANSISTORS (all new, unused). 2N3926 7 watt RF output at 175 MHz with 13·5 volt supply, **£2.00** each.

BLY36 13 watts RF output at 175 MHz with 13·5 volt supply, **£2.50** each.

BLY89A 25 watts RF output at 175 MHz with 13·5 volt supply, **£6.00** each.

FET—2N3823, **20p** each.

2N708, **15p** each.

AF116 Transistors **15p** each.

DIODES BYX22/800 800plv — 1A, **10p** each.

BA141 DIODES (as used for AM10D mods) **28p** each.

SET 470 kHz TRANSISTOR IFT'S, set of three 1st double tuned, 2nd and 3rd single tuned, supplied with spare 1st or 2nd IFT your choice, for use with OC171 type transistors or can be used with any near equivalent, size 9/16" sq. with circuit for reference to pin conections, new, unused, **38p** set.

MULLARD FILTERS type LP1175/2 470 KHz, 7KHz B/W. OK for AM/FM receivers NEW at **75p.**

SINGLE TUNED 470 KHz 3/8" sq. — **5p** each.

BOX OF P.C. BOARDS (computer type) containing approx 65 boards, over 150 transistors **£2.00** post paid.

80 ohm **TWIN FEEDER**, **5p** yard.

TV SMOOTHING CAPACITORS 200 + 100 + 50 + 100 MFD at 325vw, **50p** each, 5 for **£2.00.**

1000MF 100vw (Erie) **40p** each.

2000 + 2000MFD 25vw Can type common neg **25p** each.

SMOOTHING CAPACITORS 700 MFD at 200vw. ideal to put in series for high voltage PSU can type, **20p** each or 10 for **£1.35** (all new and unused). P/p **20p.** Also 200MFD 275vw same price.

SPEAKERS. 8" × 5" 12 ohm (Goodmans) **£1.00**, 6" × 4" 3 ohm (Celestion) **80p**, 5" × 3" 5 ohm (Celestion) ideal for that portable rig. **70p.** All speakers are new and unused.

SPEAKER CABINETS to take EMI 13" × 8" speaker + tweeter, these are rejects & have been sprayed a brown/white mottled finish, they will be OK for halls etc. **£2.00** each, buyer to collect by arrangement.

ELLIOTT X band attenuator type 1621/1C new boxed **£3.50** (last few).

SLIDE SWITCHES 2 pole change over, small type new, **12p** each.

HC6/U PLUG IN CRYSTAL OVENS 80 deg. C, 6/12 volt with base, new, unused. **35p** each.

EDDYSTONE KNOBS. ¼" dia. ¼" spindle fitting (black), **10p** each, 6 for **50p.**

CRYSTAL FILTERS 21·4 MHz type TQF-3806 no gen., unused, **£1.75** each.

ELECTRONIQUES SLOW MOTION DIALS, type SMD2, size approx. 6½" × 4". 6-1 +, 36-1 reduction, **£2.75.**

B9A CERAMIC VALVE BASES, **8p** each, 10 for **55p.**

TRANSISTOR DISC CERAMIC CAPACITORS (50vw).

3·9pf	68pf	220pf	680pf	4700pf
18pf	82pf	270pf	820pf	6800pf
22pf	100pf	330pf	1000pf	0·01mfd
33pf	120pf	390pf	1500pf	0·015mfd
47pf	150pf	470pf	2200pf	0·022mfd
56pf	180pf	560pf	3300pf	0·033mfd

PRICES:—22 to 1000pf + **18p** for 10; 1500pf to 0·015mfd + **23p** for 10; 0·015 to 0·033mfd, **28p** for 10; or all above less than 10, **3p** each.

0·1MFD 3V discs 10 for **10p.**

MINIATURE AIR SPACED TRIMMERS 1–10pf ½" sq made by Oxley **15p** each **£1.25** for 10.

MIXED BAGS OF CAPACITORS, silver mica, tubular ceramic, metal foil, polystyrene, electrolytic, etc., a bargain at **75p** per bag containing over 300 pieces. Post 20p.

RESISTORS (carbon film) ⅛, ¼ and ½ watt types, 22 ohm to 1 megohmin E12 series, i.e. 1, 1·2, 1·8, 2·2 2·7, 3·3, 3·9, 4·7, 5·6, 6·8, 8·2, 10k. Prices: ⅛ and ¼ watt, **1p** each; ½ watt, 2 for **2½p** (All 5% tol.).
1000pf 500vw feed through capacitors, solder in type, ½" dia., **2p** each; **18p** for 10.

RADIOTELEPHONE 10·7 MHz CRYSTAL MARKER OSCILLATOR solid state and built into die cast box 3½" × 1½" × 1¼" high stability with voltage and temperature variations fibre-glass PC board and built-in battery, guaranteed 6 months with free calibration service to 12 months, brand new, our own make **£8.00** (VAT paid) + 20p post. Trade enquiries welcomed for quantity.

EQUIPMENT WIRE .028 (·711mm) multi & single colours to GPO spec on 4000 mtr & 500 mtr drums unused suit manufacturer POA.

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