NOVEMBER 1969

RADIO COMMUNICATION

RSGB SHOW REPORT

page 763

Journal of the Radio Society of Great Britain

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A

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LOWE ELECTRONICS

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Once again, footsore, aching and dreadfully weary, we have arrived back home after the Show. With, needless to say, a truckload of bread which all you nice people just insisted I take from you. One of the snags of the Show is that I am so busy taking money I don't have time to stop and chat! Sounds too stupid to laugh at, but it's quite true. The stand was always thronged with chaps buying bits and pieces that all of us had a full time job keeping pace. This, unfortunately doesn't allow time to shoot the breeze with old friends and makes us seem very rude. We don't want to be, but we have to be! The light-fingered gentlemen were fairly busy—odd bits and pieces missing. Ah well, part of the game I suppose. The absence of the London junk boys meant that I had the only junk stand—that's why I did a roaring trade. To them, I suppose, with high wages and overheads, it maybe wouldn't pay off, but it certainly did me a power of good! Anyway, you could at least see the Sommerkamp and Inoue gear along with all sorts of goodies even if we didn't have time to get you into a corner and give you the hard sell routine. I had the sense to order up bags of Sommerkamp and Inoue stuff so although the show pretty well cleaned us out, we are now back to normal and all is ex stock.

Another funny thing about the Show. A manufacturer comes out with something new and good—you order it in bags of time for the Show, allowing plenty to check it and give it a thrashing so that you have the pleasure of unveiling a new world beater to the expectant throngs at the Show. This is the theory, but it never seems to work —the new world beater arrives Friday night, too late to clear Customs. Happens every year! ! Anyway, for those of you who have managed to wade through the waffle thus far, let me just whisper in your expectant lug 'ole that I have a new Tx built to a very high standard which is as TVI-free as one can reasonably expect. The makers claim harmonics down 80dB. Yes, eighty decibels, sir. That's indeed going some. Mind you, nothing very clever really—any designer can do it given enough money. He just bangs in extra filtering and tuned circuits all over the place and knocks the harmonics out long before they ever get to the PA. Just like they do with commercial Tx's. In this case the joke is that the price, although high, is still well within reason—just under a couple of hundred quid. O.K., O.K., O.K., I agree it's a lot of bread—but if you want the harmonic suppression of a commercial rig, you've got to pay for it! Anyway, to those of you who've tried all TVI cures without success—here's one more for you to try!

The other bit of new gear is the Sommerkamp FL-50 and FR-50. Actually this has been on the Japanese market for years, but in the past I've always reckoned that although it was cheap, it wasn't all that good and so haven't imported it (NOW do you believe I'm fairly honest? No? Ah well, bash on!) However, over the years the factory have incorporated a mod. here and a mod. there, minor improvements and so on and the present FR/FL-50 is vastly different from the early ones—so much so in fact that I reckon it ain't a bad buy at all, at all. Tx **£90.0.0** Rx **£85.0.0.** If you want any gen, drop me a s.a.e. I won't go overboard on advertising—if it's any good (and it is!) I'll let you find out for yourselves and start pushing the advertising when deliveries improve.

Well, that's about it—but for those who didn't get the following at the Show, we've completely sold out: Teisco DM-501 Mikes, Hansen S.W.R. Bridges, Katsumi Keyers. More on order, but it'll be a month or two before I get 'em. Rest of the stuff still in stock. Incidentally, do you remember many moons ago I ran a competition for the best classical quotation applicable to Amateur Radio? At the time I thought the Magazine would jump at the chance of publishing them, but to my sorrow the response was lukewarm. Anyway, the best of them are printed in my new catalogue of sundry amateur accessories. Yours if you send me a large s.a.e.

Cheers,

73, de Bill, G3UBO/VE8DP

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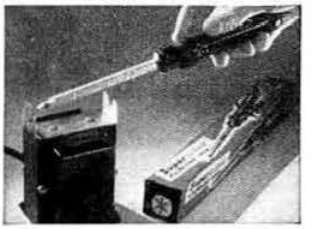

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QTC

AMATEUR RADIO NEWS

INTRODUCING

The new general manager

Mr R. G. B. Vaughan has been appointed general manager of the society with effect from 1 October.

Photo: Hutchinson

Mr R. G. B. Vaughan

He first became interested in amateur radio in 1946 at the age of 13, and was one of the earliest members of the Sutton and Cheam Radio Society. With the encouragement he received from members he became one of the youngest amateurs in the country when he obtained his licence two years later.

In 1949 he joined the GPO as a telephone maintenance engineer, this occupation being interrupted by two years' national service during which he was commissioned as a pilot officer in the GD Navigation Branch of the RAF. After national service he was appointed flight-lieutenant in the technical signals branch of the RAFVR, at the same time returning to amateur radio with phone and cw operation on 160, 80 and 40.

He joined Redifon in 1955 as a test engineer and subsequently moved to Crawley, Sussex, where he was instrumental in forming the Crawley Amateur Radio Club, of which he was honorary secretary for some ten years. Over the years he has become more and more active in the amateur radio field and in RSGB activities. This led to his becoming group controller of the embryo North Sussex RAEN Group recently, while prior to his new appointment he became secretary of the Society's Exhibition Committee, a member of the HF Contests Committee, and unofficial "foreman" of the exhibition station team.

Ron Vaughan's involvement in the amateur radio field was not allowed to interfere with his "bread and butter" activities, and prior to taking up his new appointment was a group leader development engineer at Redifon's and supervised many projects in the communications field.

The new editor

Mr A. W. Hutchinson has been appointed editor of *Radio Communication* and will later become responsible for editorial work on other Society publications.

A native of Shipley, Yorkshire, he is an old boy of the Salt Grammar School and of the North-Eastern School of Wireless Telegraphy. After obtaining a PMG Certificate at the latter school he joined the seagoing staff of the Marconi International Marine Company in 1941 as a radio officer in the Merchant Navy. His war service took him to most theatres of hostilities and included several years in the Far East.

In 1946 he returned to radio college and after obtaining a further PMG Certificate, continued in the employ of Marconi Marine as a seagoing radio officer. During the next 17 years he served in vessels of all types, sailed to most parts of the world, and saw maritime mobile communications forge ahead from simple two-valve receivers and three-valve transmitters to embrace sophisticated electronic navigational aids in addition to advanced communications equipment.

Following appointment to the head office staff of Marconi Marine in Chelmsford in 1963, Mr Hutchinson joined their publicity department, having, while at sea, done some free-lance writing and photography. In 1964 he was appointed editor of *Mariner*, the Marconi Marine Company's house journal,

Mr A. W. Hutchinson

and became an associate member of the British Association of Industrial Editors. He continued as editor of *Mariner*, for which he was awarded a Certificate of Merit in the 1968 National House Journal Competition, until taking up his new appointment with the Society.

Television interference: its causes and remedies

The author, D. M. Thomas, GW3RWX, of the above article which appeared in the October issue of *Radio Communication* has drawn attention to two errors. The second sentence of the third paragraph in the second column conveys an incorrect impression and should read *the mis-match between the line and the aerial will be tuned by the atu, offering a matched condition between the atu and transmitter*. The last paragraph on page 712, which continues to the top of page 713, should be deleted entirely.

Rank-Bush-Murphy modification kit

Arising from GW3RWX's article the TVI Clinic asked the manufacturer for further details. These are available to dealers in *Service Skill* for April 1968. The affected sets are the TV161, TV166 series and V1910, V2310 series. The cure is a choke, Part No CS42673, to be fitted by the dealer.

Handle with care

Mr A. J. Hardy, BRS26292, of the department of forensic medicine, London Hospital Medical College, has drawn attention to the care needed when using epoxy resins for the encapsulation of circuits.

He says, "I should like to take the opportunity to point out that extreme care should be taken in handling the catalyst issued with these resins as some are considered carcinogenic and contact with skin must be avoided. Should contamination occur adequate washing of the skin should be carried out immediately. Should any unusual skin eruptions be seen at any time after, a doctor should be consulted."

Another warning comes from Mr V. Allison, G3TNX, who says, "I do not think it wise for our members to open transistors indiscriminately in view of the fact that many semiconductors contain beryllium oxide for the purpose of heat conduction and insulation. The dust from this substance is toxic.

"Certain manufacturers state this on the packages and in their data sheets, but this is not so in many cases. They are contemplating colour coding relevant transistors, but until then, once they have been installed in equipment there is no means of telling which devices have this substance.

"I think members should be warned of the hazards accompanying mechanical damage to transistors, and also that they should not be disposed of in ordinary domestic or industrial waste."

Calling G3BJ

DL1FZ (ex-YM4AV, Danzig), is anxious to trace G3BJ, John Weaver, who lived in the London area before the war. If anyone has information he would be grateful to receive it. Write to: Dr.-Ing. Freidrich von Rautenfeld, Gustav-Leo-Strasse, 7, Hamburg 20, German Federal Republic.

. . . and another call

Mr E. J. Cluff, BRS 23130, 18 The Crescent, Hadleigh, Essex, would like to correspond with any member interested in low power transmitters in the 1W range. Please contact Mr Cluff at the above address.

HQ building fund

Although the Society has been in occupation of its own headquarters for nearly a year, there is still a need for contributions to the building fund.

We are therefore pleased to acknowledge gratefully two donations. The first, for £4 12s 4d, was the proceeds of a raffle held at a privately organised mobile rally held at Pangbourne on 10 July. The second, amounting to £5, represents a further "bounty" from the Verulam ARC "Piggy Bank."

A total of £13 17s was collected for the building fund from donations placed in the " bottle " on the Society's stand at the RSGB Exhibition.

The " guess the contents " competition was won by Mr P. G. Smith, 93 Whitehouse Avenue, Boreham Wood, Herts. His estimate of £15 was the nearest to the actual amount collected, and he has been presented with publications to the value of £3 3s.

Equipment stolen

Doug Findlay, G3BZG, reports the theft of a TW4 Communicator from Kings Langley station car park on 9 October. Anyone offered this set, or with knowledge of it, is asked to contact Doug or the local police.

Mr M. J. Rogers, G3VOG, also reports the theft of equipment from his car in a public car park in the centre of Fareham on 16 October. This equipment was an Eddystone EC10 transistorized communications receiver, serial No. HPO 125; a Shure 202 microphone, and a B44 Mk 2 modified by having a separate power supply connected to the transceiver by Plessey type connectors and cables, and by the introduction internally of two miniature relays wired so that transceive is possible on 70·260 and 70·375MHz, plus an alternative crystal position. Again, any information would be welcomed by the owner and the local police.

Unlicensed stations

Members in many areas of the UK will have heard the activities of a particularly obnoxious group whose time is spent in causing interference and annoyance to licensed amateur stations operating in the 1·8 and 3·5MHz bands. In addition to obscene language and deliberate interference, contacts between amateur stations are recorded and subsequently replayed on frequencies outside the amateur bands. Fortunately the identities of most of the offenders are known and in due time their activities will be curtailed. The illegal transmissions are however causing the Post Office a great deal of additional work.

In a letter to the Society concerning unlicensed operation, the Post Office writes as follows—*We do appreciate and share your concern about this matter, particularly as some of the illicit transmissions over the last year or so have been a potential hazard to safety-of-life services. I know you will realise that we are not able to send you a very informative reply, however our engineering officers are actively engaged in tracing these incidents of illicit transmission, and we are always grateful for information that will assist in apprehending the persons concerned.*

So far in this year, 1969, we have successfully prosecuted 71 different persons (obtaining fines of up to £100 with forfeiture of the transmitting apparatus) and warned 48 others, for offences involving wireless transmitting apparatus contrary to Section 1 of the Wirelesss Telegraphy Act.

RAE courses

The following additional courses, arranged by the Cornish Radio Amateur Club, have been notified:

St. Ives County Secondary School. Classes are held on Monday evenings, and started 6 October. Further information may be obtained from the headmaster, Mr D. Blackford, G3NPB, at the school. Telephone, St Ives 5606. Late enrolments welcomed.

Cornwall Technical College, Camborne. Classes will be held on Monday evenings, starting 10 November. Enrol same evening. Further information may be obtained from the tutor, Mr C.Bowden, G3OCB, Telephone, Stithians 480—or for either course from Mr W. Locke, G3NKE, PRO Cornish Radio Amateur Club.

Oscar-Australis satellite

The Society is pleased to acknowledge the valuable assistance of **Marconi Instruments Ltd** in loaning a type TF2414 counter/timer for use in interpreting the telemetry signals from the satellite. Due to be placed in orbit in October, the appearance of *Australis* has been delayed due to launching difficulties. However, it is hoped that the vehicle will be available during the coming month, and orbit data will then be provided by W. Browning, G2AOX, for the assistance of members. It is in this connection that the availability of the counter timer will be invaluable.

Distinguished visitor

Senator Barry Goldwater, K3UIG/K7UGA, a member of the US senate and a former contender for the presidency of the USA, paid a visit to RSGB Headquarters during a flying visit to the UK in mid-September. An amateur radio enthusiast well-known on the air-waves, he was welcomed by the Society's President, Mr J. W. Swinnerton, and members of Council, and met members of the staff at an informal reception.

The photographs show the President greeting Senator Goldwater at Society HQ, and presenting him with a copy of *Radio Communication Handbook*.

Society awards

The Council has approved the following awards:

The Founders' Trophy for distinguished services to the Society, to Frank Green, G3GMY.

The ROTAB Trophy, for outstanding and consistent dx work, to John Allaway, G3FKM, and

The Calcutta Key, for outstanding service to the cause of international friendship through the medium of amateur radio, to Renè Vanmuysen, ON4VY.

Engineers' Amateur Radio Society

Considerable interest has been expressed by a number of operators in a proposal by G3WET to establish an Engineers' Amateur Radio Society.

The conditions of membership have not yet been declared but applicants must be active in some branch of engineering—or retired therefrom—and association with a recognised engineering institution may be required.

It is not intended to restrict the Society to amateurs in the UK, but to include members from all countries.

Interested readers are most cordially invited to write to John G. Evans, G3WET, at 4 Temple Row, Birmingham 2, with constructive comments and with brief details of their association in any branch of engineering.

Affiliated societies

The following societies are now affiliated to the RSGB:

Parmiters Amateur Radio Society. Secretary: P. Morris, 166 Old Ford Road, Tower Hamlets, London, E2.

Kingston and Malden Scout Radio and Electronics Group. Secretary: D. R. Shepherd, 27 Fairmead, Tolworth, Surrey.

Royal Air Force Lyneham Amateur Radio and Electronics Club. Secretary: Sgt I. Harris, G3WAE, RAF Lyneham, Chippenham, Wiltshire.

Swansea Telephone Area Radio Society. Secretary: M. D. E. Connor, 54 Talley Road, Penlan, Swansea, Glam, SA5 7EU.

Silent keys

It is with sorrow that we record the passing of the following radio amateurs:

W. B. Hartog, G3JEJ, of Louth, Lincs.

H. J. Johnson, BRS25137, of Gt Missenden, Bucks.

T. G. Woollett, BRS 27296, of Cheam, Surrey.

A. G. Dunn, G3PL, of Hull, E. Yorks.

Eric Robinson, G3UCG, blind member of the RAIBC, of Brighouse, Yorks.

Steve Cutler, G2OZ, life member of the RSGB, of Ealing, London W5.

G. G. Allcock, GM6OVO/T, of Forres, Morayshire.

Photos: Hutchinson

RSGB Show Report

We sometimes hear complaints about the RSGB International Radio Engineering and Communications Exhibition, but nevertheless it still attracts far more amateurs and enthusiasts than any other single amateur radio event in this country. There is of course a commercial presence, but this has been justfied on the grounds that it is essential in order to keep the finances at such a level that the show can stay in a roomy place like the New Horticultural Hall; exhibitors tending towards the industrial market are supposed to supplement, not detract from, the down to earth amateur exhibits. The only problem, which this year was more apparent, is that the firms which everyone would like to see there are priced out of the show—the cost of stand space is such that the person who sells a wide range of components, produces one or two equipments of his own, and takes an eighth or quarter page ad in Radio Communication *just does not stand a chance.*

Nearly everyone likes *to walk round a large, comprehensive exhibition associated with his or her hobby, however, and so we wonder what the support would be if it were to be publicised that every single amateur radio equipment manufacturer, no matter how small (within reason) were to be there next year. It is just conceivable that these little firms, provided no-one dropped out, might just pay their way.*

We must not forget that the show, by its very purpose, must remain associated with amateur radio (the hobby), or there is no point in maintaining it unless its sponsorship will bring financial benefits to the RSGB.

The four-day exhibition was opened at noon on 1 October by Mr R. J. Halsey, CMG, FCGI, DIC, B.Sc.(Eng), FIL, who is a Director of Cable and Wireless Ltd. His first words formed an apology for the absence of his company's chairman, Col. Donald Macmillan, who originally intended to open the show, but who was abroad on a tour of the latest C & W satellite station in Hong Kong. Mr Halsey mentioned his slender association with amateur radio, which dates back to 1921 when he acquired an experimental licence and built equipment to receive the early broadcasting stations.

Mr G. R. Jessop (*r*) receives the G4KD plaque awarded for his home-constructed 144MHz transmitter/receiver from the President, Mr J. W. Swinnerton

The President, Mr R. J. Halsey and Dr W. J. Bray at the RSGB bookstall during their tour of the exhibition

After that time most of his activities became professionally associated with cables, rather than radio. However, his work now extends to vhf and uhf radio propagation and the latest semiconductor techniques, which he believes provides serious research for the professional and amateur alike. He described Cable and Wireless's latest fields of development, which all aspire to the ideal communication "where a personal telephone number is issued with each birth certificate and a service so perfect that the individual can be reached on that number at any time throughout his life, wherever he may be —and that no reply can only mean that he is dead."

Trophies were then awarded, and Mr Halsey was taken on a conducted tour of the exhibition.

Around the stands

The exhibition being opened by a director of **Cable and Wireless** enabled this company to have pride of place for its exhibit: the stage. Only a hint of the communications activities of Cable and Wireless could be compressed into the available space, but it was possible to visualize the extensive facilities available to its customers. Cable and Wireless is an independent, commercial organization which rents cable and radio time to companies and government departments. It is finding, for example, expanding demands for computer links between head offices and branches of banks in other parts of the world, and one method of tying them together is Selectocall S626. This employs a transmitter at the central point which "invites" the other stations in turn to transmit any data available; as soon as transmission is complete, ie after a three-second delay, the central transmitter will commence scanning the other stations. There is, of course, a more conventional version of this system which is used for any form of message distribution or collection from inter-office networks to inter-country systems. Getting the signals about is of paramount importance, and so development of new radio equipment is an important part of C & W's programme, and there were many examples of prototype units based on the very latest semiconductor techniques to be seen. Investigation of propagation phenomena is yet another facet, and to illustrate one type, tropospheric propagation, a model of part of the earth's surface, complete with curvature and a Perspex

The RNARS stand

"reflector," formed the basis of a scaled-down radio link using microwaves for convenience. It is not generally known that predictions of propagation conditions and recordings of past conditions flow between all the Cable and Wireless stations throughout the world.

Working around the main floor of the exhibition first in order of stand numbers was the **Royal Naval Amateur Radio Society.** Here was the usual opportunity to test your ability to handle the Morse code, an automatic Morse sender and several sets of headphones being at your disposal. Although its use is not considered official practice, round the corner was a selection of automatic keys for playing with.

Next was a very familiar range of kits for amateur radio, hi-fi and servicing, all bearing the name **Heathkit.** The most interestingly versatile device seemed to be the SB-101 ssb transceiver, which can provide 180W pep input on the 80-10m bands at a cost of £200 14s. You get a filter shape of 2·1kHz at 6dB to 5kHz at 60dB, and radiated harmonics better than 45dB below rated output. Facilities include a pre-assembled linear master oscillator, and optional crystal-controlled transmitter, triple action level control, switched selection of usb and lsb, a built-in crystal oscillator, and ptt or vox. Its cheaper brother is the HW-100 ssb transceiver, costing £137 8s. The specification seems very similar to the SB-101, and the panel layout is almost identical, save the omission of a

One part of the "Practical" stand

frequency mode selection control and the meter switch with only three positions instead of five. The HW-17A is reasonably new; it is a solid-state 2m am transceiver delivering 8 to 10W output. It covers 143·2 to 148·2MHz, the receiver dropping this to fixed ifs of 24·965 and 2MHz. The transmitter is crystal controlled, working up through transistor multipliers to an 8156 pa. The whole transceiver weighs but 13lb, and consumes a maximum of 100W on transmit. The price: £80 4s. Other popular lines are the SB310 10 band receiver, SB301E amateur band only receiver, SB401E ssb transmitter, and the SB-200 1kW linear amplifier.

Wireless World, apart from promoting the magazine and a companion range of books, displayed three subjects of recent articles: an 80-10m communication receiver by G3LUB, a 12W stereo transistor amplifier, and a 10W transistor amplifier which operates completely in class A and possesses a high level of negative feedback.

Next door, also selling books, was **Pergamon Press** which publishes a wide range of technical books and magazines.

Solartron Ltd appear to be new to the RSGB Show, and were able to show amateurs the proper way of measuring electrical quantities. Attracting special attention was a solid-state vhf/uhf synthesizer signal generator—any carrier between 300kHz and 470MHz could be selected with an accuracy of better than 0·1Hz. In case you are rich, its type number is FSM535.

Electroniques had by their usual standards a very compact stand. Owing to the fantastic problems in keeping stocks of components to do justice to their past vast catalogues, the range is being cut somewhat, and a revised catalogue is expected in December. The stand publicized ready-made equipment in preference to components, with a Star Roamer inexpensive receiver kit, the Hallicrafter SX130 receiver (£86 15s) and the SR400 Cyclone transmitter.

The Radio Amateur Invalid and Bedfast Club took space at the exhibition, presumably by courtesy of the organiser, and so they were able to show the type of talking book machines which are available to the blind. Very worthwhile work is undertaken for the benefit of the incapacitated, and help is always welcomed. If you think that you can in any way help the RAIBC please contact G3LWY.

Bill Lowe (alias "The Bandit", who runs **Lowe Electronics**), must have had a fantastic turnover of parts and equipment. As always, he apparently just missed the boat with a new line of Japanese communication equipment, and had to content himself with semi-new units like the FT250 by Sommerkamp (the German importer's brand name). This is a very compact transceiver at a comparatively low(e) price of £160. For this you have 240W pep output on 80 to 10m from a pair of 6JS6As, and a selectivity of 2·1kHz at 6dB claiming a shape factor of 1·62:1! It has a high proportion of transistors in its line-up, doing task as crystal calibrator, vfo, buffer, heterodyne oscillator, etc. It has a neat vfo tuning dial calibrated 0-500, and so needs only one switch position for each band except 10m, which has an auxiliary switch needing three extra crystals for full coverage. There was much more in the Japanese line to be seen: the FT150 transistor transceiver (£215) which seems ideal for mobile, being fully transistorized; the FLDX500 transmitter (£145) giving 240W, plus a companion receiver, the FRDX 500 (£160). The FT500 is a high power transmitter (£250), and to do even better there is an FLDX2000 linear amplifier. One interesting but not new line is the Tavasu mobile whip. This costs £12 10s when equipped with coils for all bands, but individually the aerial is £2 12s 6d plus £2 10s for the 160 and 80m coils, and £2 for 40, 20 and 15m coils.

Practical Wireless, Practical Electronics and **Practical Television** had a joint stand. PW showed some interesting projects yet to be published, including a transmitter and a receiver, but of special interest was a working demonstration of an inexpensive panoramic receiver. **Practical Electronics** had a rather sophisticated alarm clock, using semiconductor logic circuitry for timing, a communication receiver and there was even an electronic machine for playing dominoes.

"If someone would buy from the stand one of our professional aerials, it would double the takings," was an interesting comment by **J-Beam Aerials Ltd.** Adorning the stand were one or two very impressive and superbly durable arrays which are being manufactured to stringent demands of industry. Naturally these are expensive, and few amateurs would be tempted, but there are plenty of other more applicable types which would be very difficult to fault. J-Beam is getting even further away from vhf with the new Triple-3, a three-element beam for 10, 15 and 20m. Overall dimensions are 17ft 2in for the boom length, and 35ft for the reflector length. A ferrite core balun is incorporated, together with a clamp for mounting

The RSGB bookstall

to a 2in diameter mast. Price: £60. The firm has not rested at the Parabeam on 70cm. for a new Multibeam has appeared giving a performance twice as good as its predecessor. The price, however, is only half as much again, at £8 8s for the 46 element aerial. Its horizontal band width at the half power points is quoted as being 24°. A couple of new rotators were also seen, one being an automatic transistorized aerial rotator at £18 10s, and the Memomatic stepping control and mast-head motor at £14 10s.

A few months back the famous KW2000 line **(KW Electronics Ltd)** received another face lift, the new model being designated the KW2000B. The more obvious advantages this model has over the KW2000A ssb transceiver is a better dial with two-speed drive and a wider bandspread with a dial swing of 345°. The general specification is of a high quality transceiver covering all bands from top to 10 in 200kHz segments, delivering 180W pep on ssb and 150W on cw, and measuring roughly 14 × 6 × 13in. Power supplies come separately, ac mains and low voltage dc versions being available. If selectivity is, incidentally, shaped by a mechanical filter, the width at 6dB being 2·3kHz and at 60dB 6kHz. The basic price of the '2000B is £200, plus £40 for the ac supply and £44 for the dc unit. The KW2000A is apparently still available. Production figures for the Atlanta, a high power transceiver also for fixed or mobile, are gaining ground as it is available in this country now that export orders are being satisfied. Selectivity is better than the KW2000B through use of a 5·2MHz crystal filter. A couple of 6LQ6s run at 500W input, with distortion products 30dB down. On am it runs 125W and 350W on cw. The price with power supply is £250. A new matching vfo has been brought out, costing £23.

An interesting new transmitter from Italy is on trial sale by KW. The power input is 600W on ssb, bands covered are 80m to 10m and filtering is by a four pole lattice filter with a bandwidth of 2·7kHz at 6dB. It seems to be very well built (a cast aluminium frame encloses the whole transmitter including the psu) and uses quite sophisticated semiconductors. It is the ERE T600 and costs about £160. Manager of ERE is, incidentally, I1LIG.

B. H. Morris and Co (Radio) Ltd are main agents for Trio in the UK, and also for TTC equipment—an unfamiliar name which often retails under other brand names. One of the new TTC products is an swr and power meter reading right up to 75MHz; it has two panel meters, one reading power and the other for swr. There was also a field strength meter very similar in appearance to the established Hansen unit. Among the communications equipment there is a brand new receiver from Trio, the JR-310. This covers all amateur bands from 3·5 to 29·1MHz, plus WWV, in eight switched ranges, and incorporates a crystal controlled bfo, S-meter, RIT circuit, and costs £77 10s. The slightly older TS.510 transceiver is the only Trio transmitter available, and covers all bands 3·5MHz to 29·7MHz. It has an internal vfo, plus provision for an additional external oscillator, and features vox, double conversion and a calibrator. The price is £212.

The Royal Air Force (90 Signals Group) laid out a very large and impressive hemisphere of the world to demonstrate their Skynet communication system. Astride this 15ft model were small scale reproductions of a British transmitting station (RAF Oakhanger) and one of the overseas stations, possibly at Singapore. By means of coloured lights over the hemisphere, transmission paths using ordinary hf bands could be shown. When the satellite communication system comes into operation this was shown to replace the normal paths, which stood by for emergency use only. The Skynet satellite is due to be launched early next year and will go into a 23,000 mile high synchronous orbit over the Indian Ocean.

The British Amateur Television Club always gives the impression of being composed of a group of highly industrious individuals. For example, Tony Pattinson, who was on the stand, has built a very professional looking camera and video generating console, and this was used throughout the duration of the show to provide signals for the monitors. The stand had also managed to acquire (we know not how) a video recording machine with a small inscription bearing the letters BBC. At the beginning of the show several club members were interviewed and their images replayed frequently thereafter.

Nombrex (1969) Ltd was another new face at the show and also filled the stand with a range of test equipment. Three types of signal generator, an audio generator, capacitance and resistance bridge, inductance bridge and a stabilized power supply were all quite within the means of many amateurs' pockets. The model 29S rf generator is, by the way, fully transistorized and has a 40in slide-rule scale. Model 29X is similar but has an integral crystal callibrator.

Bantex Ltd made their debut last year and have since sold many 2m and 4m mobile whips to amateurs. The only new item we could find which would interest you was a compact magnetic base which could be fitted to all models. The standard whip plus base costs £7 6s. It took most of our strength to part this base from a flat steel sheet.

Belding and Bennett Ltd, G3HSC, which up to now has made its name with Morse instruction records, has extended its activities to the detection of police radar signals. The firm is sole agent for Radatec 3cm receivers which clip on to a car sun visor; the price of these devices is £13 5s. It is marketing also a "Speed Set"; this gives an audible warning when any of the five present speed limits are being exceeded.

Rather overshadowed by the back of the RAF stand were **Suhner Electronics.** Here was seen a remarkably large stock of coaxial connectors of all types, such as TNC, UHF, BNC, C, etc. Coaxial cable of most diameters and impedances are also stocked by this firm, which says it is quite willing to supply small quantities to radio amateurs.

Adcola Products Ltd, manufacturers of soldering irons, were able to show a new low voltage iron which at the time had not even appeared in any advertisements. This is a very light and manageable model, designated L20, and will soon be available in 24, 50 and 110V versions in addition to the 12V 12W samples seen on the stand. Adcola have also introduced a range of service sheets for all their irons to enable customers to specify precisely which spare parts are required.

The exhibition weekend coincided with the change of name of the licensing departments of the GPO, and so this stand bore the very "foreign" sounding name **Ministry of Posts and Telecommunications.** The staff, however, were basically the same and so were the subjects discussed. The main feature this year was the detection of unlicensed television sets, and a working model depicted the operation of the latest type of detector van. This carries a couple of phased aerials covering a bandwidth of 460 to 900MHz,

which encompasses all uhf local oscillator frequencies and usable harmonics of Band I and III sets. The van drives slowly along a road, and as it approaches a house with a working tv set, vertical responses appear on an oscilloscope screen corresponding to (known) lobes of the aerial system. The trace, which is scanned very slowly in synchronism with the van's speed, is recorded on a polaroid camera to produce a picture of the set of responses. The centre lobe obviously corresponds to the position of the van when it passes the relevant house, and the distance between lobes gives an indication of the distance the aerials are away from the set. As a set of records relating to licence holders in each road are carried, the team can jump on you on the spot to investigate how law-abiding you are; if you are not, it seems that the only way of avoiding the van is to encapsulate the whole set in gold-film glass. One aside—this Ministry department is striving to keep local oscillator radiation high, while other branches are doing their utmost to keep it down! The aerials, incidentally, are each twin-start helices forming a log spiral, which covers the 450MHz band very smoothly.

Peak Sound (Harrow) Ltd had nothing to offer the radio amateur directly, but have an interesting new range of modules for an fm receiver. First in line is the FET/4G, a twin dual-gate fet plus one bipolar tuner using a 4-gang capacitor and claiming a 2 to 2·5μV sensitivity at 30dB quieting. This costs £10 10s. The FET/3G is a single dual-gate fet plus two bipolars costing £9. The IFA/4S if amplifier has four tuned stages for £10 10s. The SCU/400 stereo preamplifier module costs £15 15s, and this can be followed either by the PA12-15 amplifier at £5 19s 6d per channel or the PA25-15 amplifier at £11 15s. An IC/MPX multiplex adaptor is available for £11 5s.

Radio Shack Ltd had so much equipment for sale it is quite impossible to detail it all. The complete Drake line of 2-C, R-4B and SW-4A receivers, T-4XB transmitter, TR-4 transceiver, 2-4B linear and RV-4 vfo formed an important part of the stock, backed up by the Collins 75S3B receiver, 32S3 transmitter and 30L1 linear, plus Swan and National equipment and numerous accessories from the UK, America and Japan. The firm also handles second-hand equipment, much of which presumably results from trade-in deals.

LST Components Ltd was offering its comprehensive semiconductor catalogue and doing a brisk trade selling samples over the counter. This firm has been able to get hold of a limited quantity of Mullard modules for the audio amplifier and if strip used in a published receiver design. The pair only costs 45s which is considerably less than the normal list price.

D. T. Hayter (UKW) is acting as agent for the German *VHF Communications*, a quarterly magazine dealing solely with construction and use of vhf transmitting and receiving equipment. An all-English edition is printed, and subscriptions cost £1 10s 0d per year. On sale during the exhibition were printed circuit boards, plus the "difficult" components, relating to designs published in recent issues of *VHF Communications*.

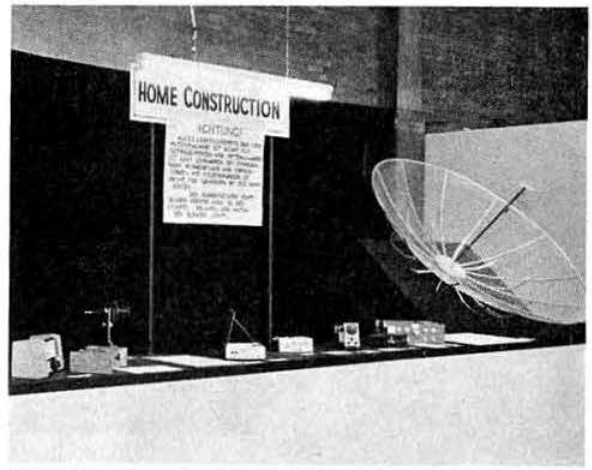
Weller's range of soldering instruments include an easy-to-use desoldering tool with a neat rubber bulb used for sucking surplus solder away from the joint to be destroyed. This is an attachment for a normal iron and costs £3 5s. We also learned that Weller are prepared to fabricate machined blocks for slipping on to an iron so that all lead joints of a device can be melted simultaneously. All shapes from valveholders to 16 lead dual-in-line ics cost £3 15s to order. A wide range of temperature-controlled irons is available at prices of from £4 18s to £9.

The Royal Signals HQ Station, G4RS, was on static display, showing the Heathkit system. A useful service was the provision of equipment for checking crystal frequencies using a highly accurate Marconi frequency counter.

RSGB Home-Constructed Equipment.

There were not so many things to see as last year, but the quality was at least as high. The first and most striking exhibit was shown by G8AOL. This was a 23cm dish aerial, apparently to the *Radio Communication Handbook* design, but its construction was particularly clever and simple. It was all-steel, and completely galvanized for protection. The diameter was 5ft 9in. Next along the bench was Arnold Mynett's (G3HBW), 160 to 2m ssb/cw transistor transceiver, which won an award of merit. It only measures 13 × 9 × 4¾in, and yet delivers 3W on 160m, 1W on 2m and 4m, with full transmit and receiver coverage on all bands. Alongside was a simple 2/4m ssb transmitter, which is the first stage of its more comprehensive companion.

P. Adams, A5967, aged 17, built a compact monitor oscilloscope with full three-dimensional techniques, earning him the John Rouse Memorial Trophy. A two-band 80 and 40m lsb exciter was displayed,



Part of the Home-Constructed Stand showing the 23cm dish aerial by G8AOL

by A. J. Binning, G3XIJ. It uses an original form of dial, and a Cathodeon block crystal filter.

The Horace Freeman Trophy winner was D. H. Guest, GM3TFY, who built a truly professional-in-appearance Droitwich-locked frequency standard. The beautifully brushed-aluminium case set off the neat assembly of about 25 transistors. Basically, a 200kHz signal is derived from a 1MHz stable oscillator and compared with the received 200kHz transmission. The resulting error signal is then used to trim the oscillator frequency. An interesting point is that when the oscillator is unlocked the receiver has a wide bandwidth to facilitate searching, and when switched to lock the bandwidth, after a delay the feedback loop bandwidth narrows.

R. P. Neave, BRS26474, showed a simple but useful coil winder for many former diameters. R. C. Marshall, G3SBA, showed a compact transistor transceiver for ssb, using a separate vfo/mixer.

There was yet another exhibit from G3HBW. This was a simple mosfet receiver for 160 to 2m, and is an extended version of the 2m mosfet converter published in the June 1969 issue of *Radio Communication*. It is complete with loudspeaker, S-meter and uses Mullard if/det and af modules for simplicity.

BRS16468 found himself with an award of merit for a 14MHz direct conversion receiver which accepts signals from 14 to 14·4MHz, mixes these with a local signal derived as a result of mixing a 4 to 4·4MHz vfo and a 10MHz crystal oscillator. An ic is used in the output stage.

The G4KD plaque winner was a 144MHz transmitter/receiver, transistorized, with an output of 1·5W. This was built by G6JP to a design by ZL4KU. G6JP also entered a 144MHz linear amplifier with an output of 50W.

Three neat items were shown by R. Broadbent, G3AAJ. Centrepiece was a reflectometer using a toroidal pick-up coil slipped over a coaxial line, and beside this was a home-made bug key plus an aerial noise bridge. D. Clifton, G3WOK, entered an el-bug.

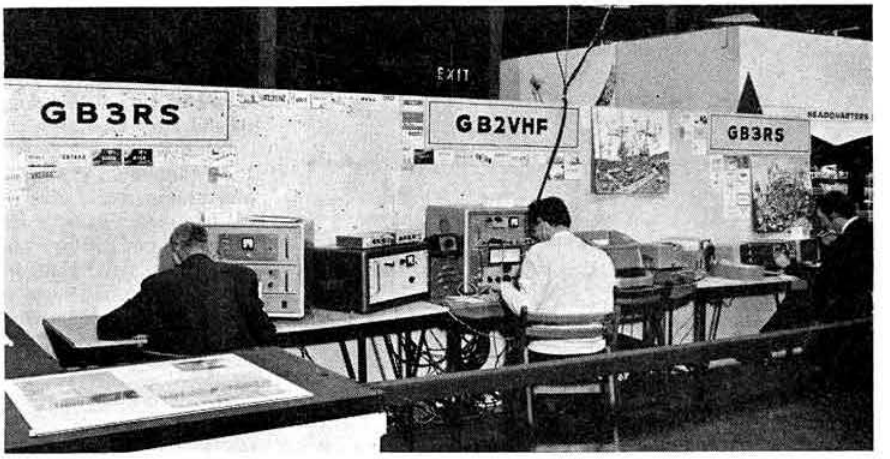
Nothing to do with amateur radio, but built by an amateur (G3SGK) was a discotheque sound control system. This was an ergonomically presented preamp-mixer, with agc channels and "priority" switching, fed to an output amplifier and full monitoring.

Exhibition Station

Well over 1,000 contacts were made over the four-day exhibition period from the three operating positions.

GB3RS on 80m used a Heathkit HW100 transceiver, together with power supply and a SB610 monitor oscilloscope. On the band, 570 QSOs were recorded, and the "pile-up" was at times unbelievable. The aerial was a KW trap dipole on the roof of the exhibition hall.

GB3RS on the dx band, operated from the club station of the Imperial College Radio Society in South Kensington, which kindly made space, aerial, and help available to the Society. A KW2000 and Heathkit linear drove the three element beams to give 250 contacts with an impressive list of callsigns. The station was linked into the



The Society's Exhibition station

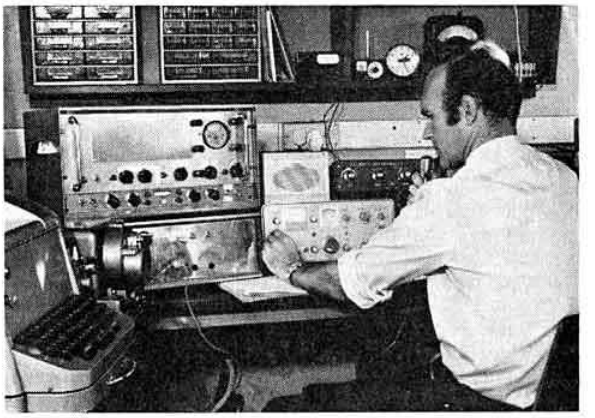
operating position at the show by a duplex uhf relay in the 440-450 MHz band, specially licensed by the Ministry of Posts and Telecommunications for the exhibition.

RTTY operation was also possible via the link, and the operators on the BARTG stand made a number of contacts, including W, I, and VK. The operators at the Imperial College, G3LHZ and G3NTT, were kept quite busy! Unhappily, the exhibition coincided with a spell of indifferent conditions on the dx bands.

GB2VHF on four and two made some 200 contacts, although the usual appalling noise level made operations very difficult at times. "Four" was nearly unusable, with an S8 noise level, and we must apologise to the many stations who probably called the exhibition without result. Two metres was a little better, and contacts into Northern France were made during a spell of good conditions. On both bands, the input was 25W; the "topsides rig" was a 4 element Yagi on 4m and a 10 element Yagi on 2m. The receiver used fet converters with a 28-30MHz tuneable if.

Acknowledgements are gratefully made to the Imperial College authorities and Radio Club, Daystrom Ltd, S.V.S. Masts, G3BPT, G3FRV, G3IIR, G3LHZ, G3NKS, G3NTT and G8AMU for the loan of equipment and facilities; and to many others who helped put the Show "on the air"!

Postscript. Ron Broadbent, the Society's stand manager, records his personal thanks to the 12 "strong men and true" who rendered invaluable service when the Exhibition closed and did not leave HQ for home until the early hours of Sunday morning.



M. J. Underhill, G3LHZ, operating the station at the Imperial College

The BARTG stand

PART 2

A 432 MHz Single Sideband Transmitter

By N. G. HYDE, CEng, AFRAeS, MIERE, FBIS, G2AIH*

Construction Details

Views of sub-assemblies 1 to 8 are shown in Fig. 7 to Fig. 19. With the exception of the control unit and the power amplifier all sub-assemblies are built on flat chassis of 18 swg half-hard aluminium sheet, 9 in. long. The underside of each chassis is protected by a dust cover made of 24 swg aluminium; the dust covers are attached to the chassis by clips formed out of 24 swg aluminium strips $7\frac{3}{4}$ in. long × $\frac{9}{16}$ in wide. Dimensions of each chassis and dust cover, and details of the clips are shown in Fig. 20 and 21 respectively.

Frequency translator and sideband filter

The covers for sub-assemblies 2 and 4 (carrier oscillator/balanced modulator and 0·498–2·15 MHz translator) have cut-outs in two sides to permit entry of power supply leads, and input and output connections to the filter; these are shown at X and Y respectively in Fig. 20. To ensure adequate shielding the upper and lower covers of the filter are secured to the chassis by $\frac{1}{2}$ in. aluminium angle $7\frac{3}{4}$ in. long into each of which are spun three 6BA hank nuts; these may be seen in Fig. 10 and 11.

* 114 Tattenham Grove, Epsom Downs, Surrey.

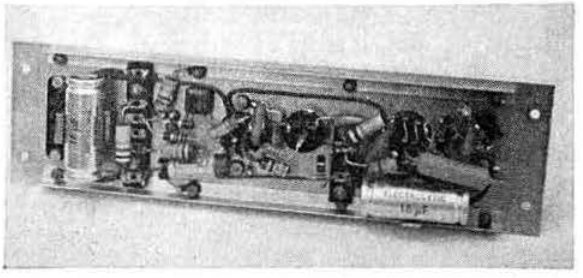


Fig 7. Underchassis view of the af amplifier.

Similar cut-outs in each side of the filter lower cover are made, 1 in. long by $\frac{3}{8}$ in. wide, centred 1 in. from each end to allow input and output connections to be made to the filter. Holes should also be provided in both covers of the filter to permit tuning the primary and secondary windings of T1, T2 and T3.

Sub-assemblies 2, 3 and 4 are mounted together on two $\frac{1}{2}$ in. aluminium channels $8\frac{3}{8}$ in. long to form a sideband generator assembly; this arrangement is shown in Fig. 8 and 9. Power supplies to both active sub-assemblies in this unit are fed to a 4-pin Unitor PL6 mounted on the frequency translator chassis, and routed to the carrier oscillator/balanced modulator via two 3-way tag strips, which can be seen at the upper and lower right hand side of Fig. 9, and a 3-core cable.

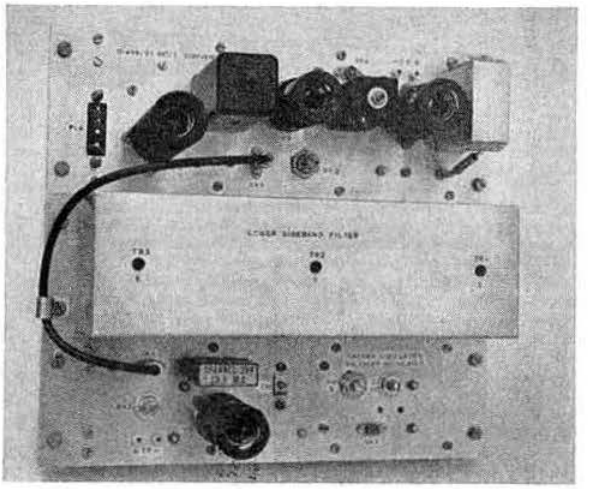


Fig 8. The sideband generator assembly.

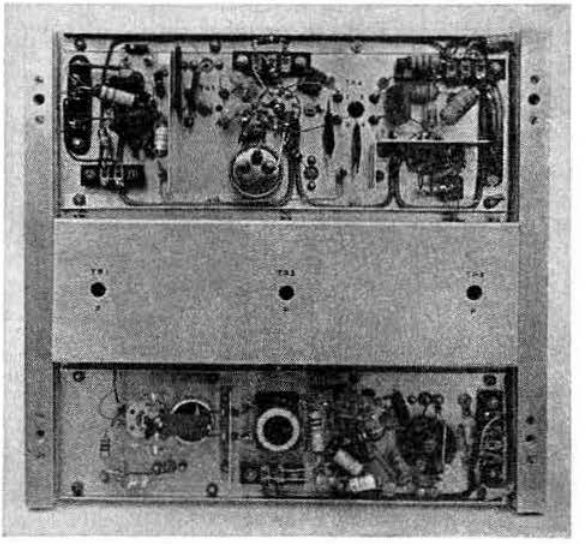


Fig 9. Underchassis view of the sideband generator assembly.

The transformer TC which couples the carrier oscillator to the balanced modulator consists of one winding of a 465 kHz i.f. transformer, which forms the primary, and a secondary consisting of 75 turns of No. 28 swg enamelled copper wire pile-wound at one end of the primary. The oscillator circuitry in this sub-assembly is shielded from the balanced modulator by a small vertical screen through which the connections to RV3 are taken; these leads pass through bushes made of $\frac{1}{4}$ in. lengths of polythene sleeving to minimize capacitance between the wires and the earthed screen. Layout and wiring of the circuitry associated with the modulator diodes D1 and D2 should be mechanically symmetrical to assist in obtaining a good balance and the best possible carrier suppression. The balancing capacitor C18 used in the transmitter described is a *Johnson* miniature type 160–130.

Views of the lower sideband filter are shown in Fig. 10 and 11. The coupling transformers T1, T2 and T3 are standard 465 kHz dust-core tuned i.f. transformers which are modified for the filter application. High-Q transformers should not be used as it is impossible to achieve a good filter response with this type of component. Each transformer is modified by removing the internal fixed tuning capacitors and substituting externally-mounted components; these can be seen in Fig. 11, and reference should be made to the circuit diagram, Fig. 3. C23, C24 and C26, C27 are connected in series across the secondary windings of T1 and T2 respectively; the centre-point of these capacitors is earthed to give a balanced input to the series crystals X1, X2 and X4, X5. A fixed tuning capacitance of 100 pF is required with the particular i.f. transformers used, but the value of C25 and C28 is reduced to 75 pF to take into account the capacitance of the shunt crystals X3 and X6 connected across the primary windings of T2 and T3. All capacitors used in the filter should be of the silvered-mica type and C23, C24, C26 and C27 should be of $\pm$ 1 per cent tolerance.

The two capacitors designated C in Fig. 3 are formed by soldering twisted lengths of pvc insulated wire across the holders of X2 and X5. A twist of one inch should be left initially; the exact capacitance required is then adjusted by cutting off very short lengths during alignment of the filter.

Input and output connections between the filter and the preceding and following sub-assemblies are made directly through wire links. The links run through grommets carried by small L-shaped brackets secured to the aluminium angle at each side of the chassis. Feedthrough connectors should not be used as the added capacitance of these will upset the frequency response of the filter. The two sections of the filter are shielded from each other by a small vertical screen located at the centre of the chassis between the primary and secondary pins of T2.

In the 0·498–2·15 MHz frequency translator T4 is a 465 kHz i.f. transformer of the same type as those used in the filter; this transformer is also modified by removing the internal fixed tuning capacitors and substituting externally-mounted components. The secondary tuning capacitance consists of C34 and C35 in series with the centre-point earthed to give a balanced input to the mixer valve V5. T5 is a standard miniature 2·1 MHz i.f. transformer which is again modified by removing the existing tuning capacitors and substituting C38, C39 and C40, C41 mounted externally. C34, C35 and C38, C39 should have a tolerance of $\pm$ 1 per cent. RV4, the mixer balance control, is of the wire-wound type (*Colvern* CLR.1503/115) as this component carries dc. The coaxial carrier re-supply lead from the carrier oscillator to the first mixer, terminated in PL4 and PL5, is routed round the left-hand side of the filter.

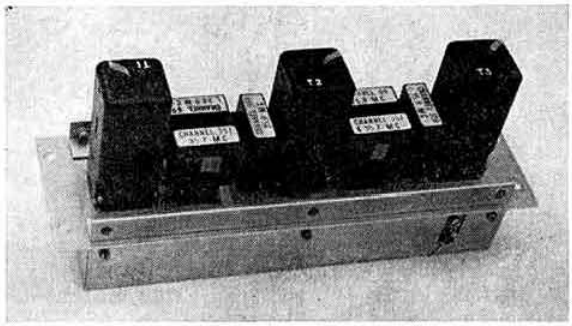


Fig 10. Lower sideband filter.

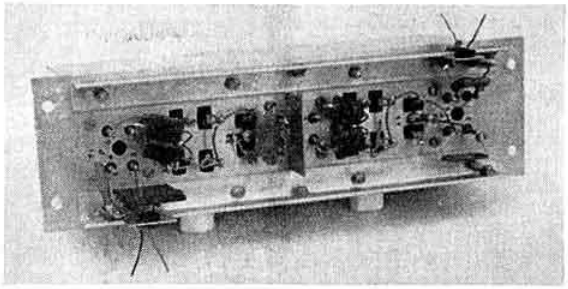


Fig 11. Underchassis view of the lower sideband filter.

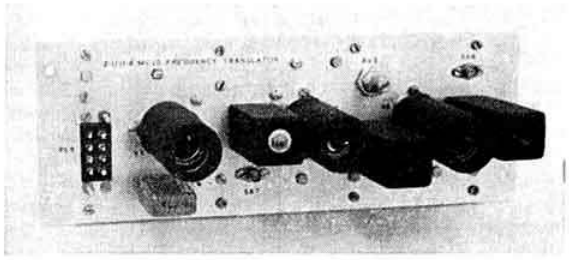


Fig 12. The 2·15–11·6 MHz frequency translator.

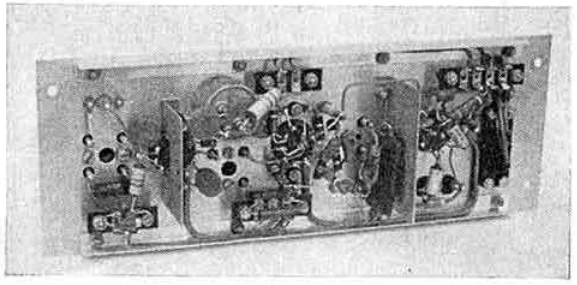


Fig 13. Underchassis view of the 2·15–11·6 MHz frequency translator.

The input and output circuits of V4 are shielded by an L-shaped screen mounted across the valveholder in line with pins 5 and 9. Stray capacitance coupling between oscillator and mixer circuitry is minimized by a screen 2⅛ in. long fixed across the chassis; both these screens are 1¼ in. high.

Figs. 12 and 13 are views of sub-assembly 5, the 2·15–11·6 MHz translator. The oscillator, which appears on the right-hand side of the chassis in Fig. 13, is shielded from the remainder of the circuitry by a screen of similar size to that in sub-assembly 4. Input and output circuitry of V8 is shielded by a screen 1¾ in. long × 1¼ in. high mounted across the valveholder in line with pins 5 and 9. Pins 6, 7 and 8 are prevented from short-circuiting to the screen by a small piece of SRBP sheet cemented to the screen adjacent to the valveholder pins; this precaution is also adopted for the screen associated with V4 in the preceding sub-assembly.

The two 11·6 MHz transformers T7 and T8 are wound on Aladdin ¼ in. dia. coil formers 2⅜ in. long. Tuning capacitors C54, C55 and C59 are mounted inside the coil cans. Winding details of these transformers, and all other fabricated transformers and coils used in the transmitter are shown in Table 3. RV5, the amplifier V8 gain control, is a wire-wound component of similar type to RV4.

Figs. 14 and 15 show top and underchassis views, respectively, of the 11·6–70 MHz translator (sub-assembly 6). A small screen measuring 2 in. long by 1¼ in. high is located adjacent to the three crystals X9, X10 and X11. Isolation of

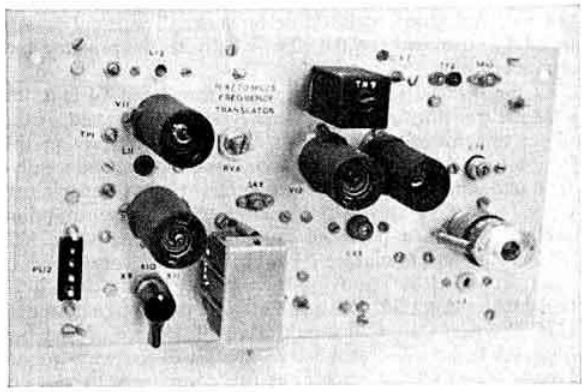


Fig 14. The 11·6–70 MHz frequency translator.

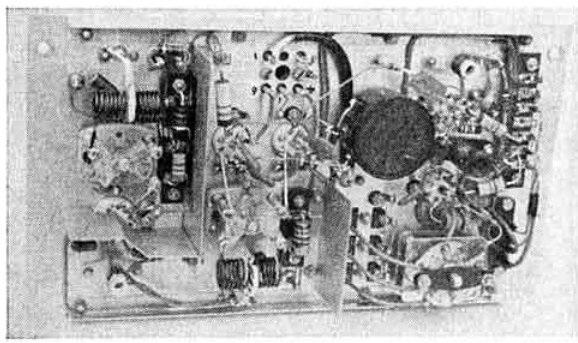


Fig 15. Underchassis view of the 11·6–70 MHz frequency translator.

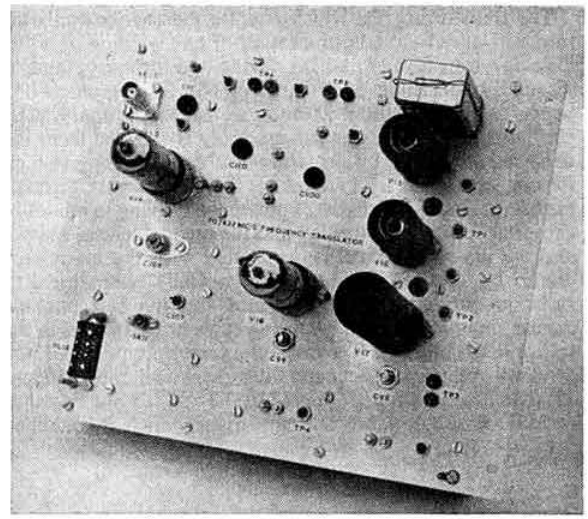


Fig 16. 70–432 MHz frequency translator.

the 70 MHz amplifier V14 is achieved by two screens. One of these, 3½ in. long by 1¼ in. high, is mounted across the chassis between the mixer and amplifier stages; the other screen which isolates grid and anode circuits of V14 is 2 in. long by 1¼ in. high and is formed so as to be in line with pins 6 and 9 and the central spigot of the valveholder. Both these screens are screwed together and can be seen at the left-hand side of the chassis in Fig. 15. Details of all screens fitted in the transmitter are shown in Fig. 22. T9 is wound on an Aladdin ¼ in. diameter former 1¼ in. long; winding details for this transformer and all inductors used in this sub-assembly are given in Table 3. The mixer stage balance control RV6 is a wire-wound potentiometer (*Colvern* CLR 3001/9s).

The 70-432 MHz translator (sub-assembly 7) is shown in Fig. 16 and 17. The crystal oscillator and multiplier chain, V15 to V18 inclusive, and the mixer V19, are on the right and left-hand, respectively, in Fig. 16. X12, the 40 MHz overtone crystal, is mounted in a temperature-controlled oven (*Cathodeon* Type MCO-2m).

In this unit, to achieve adequate shielding, the dust cover is secured to the chassis by four pillars made of ¼ in. diameter aluminium rod, 1⅝ in. long, tapped 6BA at each end, and located at each corner of the chassis. The last three stages of the oscillator-multiplier chain are shielded by a vertical screen measuring 6 in. long by 1⅝ in. high. To ensure that removal of the dust cover does not affect the tuning of the 362 and 432 MHz circuits a shield is located over these circuits, this shield being secured to that previously described and another vertical shield adjacent to the mixer valve; this latter shield measures 3 in long by 1⅝ in. high. Fig. 17 shows the shields in position; the horizontal shield measures 5⅛ in. long by 3 1/16 in. wide, with a 1 in. lip folded down along the length for strengthening purposes.

Power supplies are routed from the 8-way Unitor (PL 15) to an 8-way tag strip for distribution to the final multiplier and mixer stages, and to a 13-way tag strip for distribution to the first three stages of the oscillator-multiplier; these tag strips can be seen at the bottom right- and left-hand

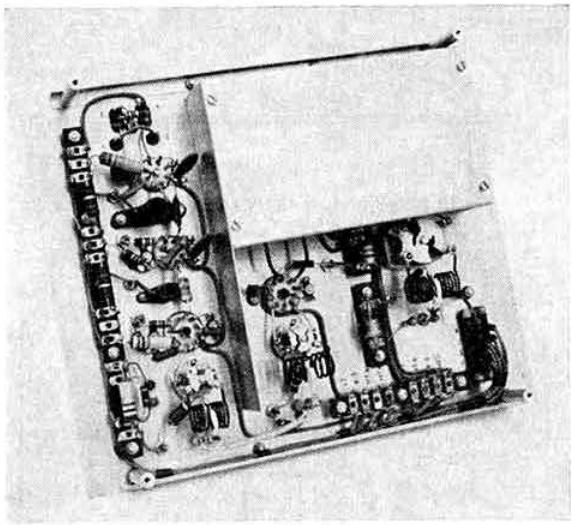


Fig 17. Underchassis view of the 70–432 MHz frequency translator.

sides, respectively, in Fig. 17. Decoupling resistors R76, R80 and R84, and V17 anode current monitoring resistor are mounted on the left-hand tag strip. The zener diode D3 is mounted on a two-way tag strip and is visible above the 8-way strip in Fig. 17.

C95 and C98 are miniature split-stator capacitors (*Johnson* type 160–208). C100, C110, C111 and C113 are miniature pre-set variable capacitors (*Plessey* or *Wingrove and Rogers*). C100, C110 and C111 are soldered across the respective inductors and are accessible for adjustment through holes fitted with insulating bushes in the chassis. C113 is also adjustable from the topside of the chassis but this component is mounted directly on the underside of the chassis.

Layout of the tuned circuits associated with the final multiplier and mixer stages is shown in Fig. 23. The coupling loops L20 and L25 are mounted above and below L19 and L26 respectively, being spaced from these inductors by approximately $\frac{3}{16}$ in. Each loop is terminated at two ceramic stand-off insulators and the two loops are connected by a short length of 75 ohm coaxial cable. L28, the output coupling loop, is mounted above L27 and spaced $\frac{3}{16}$ in. from this inductor. Actual spacing of these loops is adjusted during alignment of the transmitter. Table 3 and Fig. 24 give details of the 362 and 432 MHz tuned circuits.

Power amplifier

Fig. 18 is an external view of the 432 MHz amplifier, which consists of two sub-units, namely:

(1) a chassis frame, the front panel of which carries anode and screen current meters, grid current jack J1 and anode tuning control;

(2) a removable sub-unit which houses the amplifier stage proper (Fig. 19).

The tuning knob is attached to the shaft of C118 by a length of $\frac{1}{4}$ in. diameter Tufnol rod and an insulated flexible coupler. Connections between the meters and grid current jack are made through miniature plugs and sockets, the sockets being mounted on the front of the amplifier sub-unit.

The amplifier unit slides into the frame from the top, being located in slides formed by $\frac{1}{2}$ in. aluminium alloy angle and resting on a bracket at each side of the frame. Figs. 25(*a*) and 25(*b*), respectively, show constructional details of the frame and the amplifier sub-unit.

Details of V20 grid and anode lines are shown in Fig. 24. C115, which tunes the grid line is a concentric-type *Mullard* capacitor. The anode tuning capacitor is a modified *Jackson* double-spaced split-stator with insulated rotor, the number of plates being reduced to two fixed and two moving plates per section. This capacitor is mounted on an *SRBP* insulating bracket with the spindle centre-line located $\frac{3}{4}$ in. above the bottom chassis plate. The fixed plates of the capacitor are connected to the anode line via strips of 0·004 in. copper foil and octal type valve connectors, which form a sliding fit on the anode lines to permit the point of connection of the tuning capacitor on the lines to be adjusted. C120, which tunes the output coupling loop, is a 9 pF miniature capacitor (*Johnson* type 160–104).

SK13 and all power supply wiring are located on the underside of the chassis. Ventilation holes must be provided in the bottom chassis plate and the top cover; the latter is secured by two screws engaging in hank nuts spun into a strip of aluminium angle fixed to the top of the valve screen (Fig. 19 and Fig. 25(*b*)).

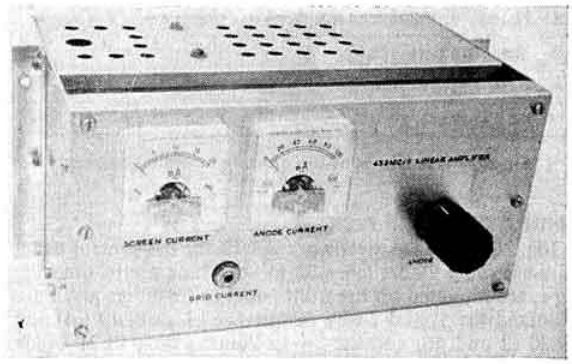


Fig 18. The power amplifier.

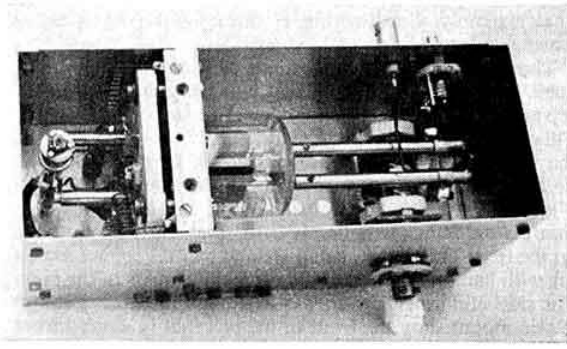
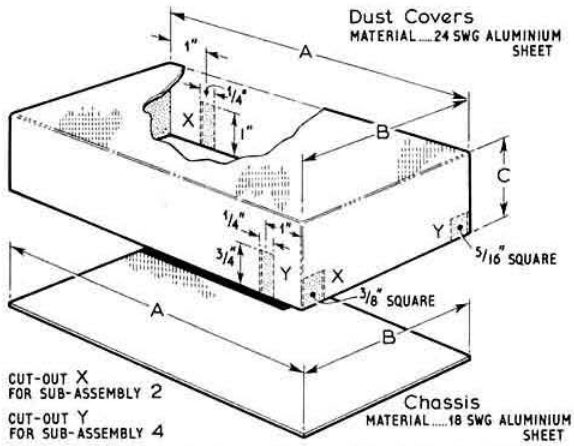


Fig 19. Interior view of the power amplifier sub-unit.



SUB-ASSEMBLY	CHASSIS DIMENSIONS		DUST COVER DIMENSIONS		
	A	B	A	B	C
1 AF AMPLIFIER	9"	2 1/2"	7 3/4"	2 3/8"	1"
2 CARRIER OSC / BAL MOD	9"	2 1/2"	7 3/4"	2 3/8"	1 1/4"
3 FILTER (UPPER)	9"	2 5/8"	7 3/4"	2 3/8"	2 3/4"
FILTER (LOWER)			7 3/4"	2 3/8"	1 1/4"
4 0·498 / 2·15 MHz TRANS	9"	3 1/4"	7 3/4"	3 1/8"	1 1/4"
5 2·15 / 11·6 MHz TRANS	9"	3 1/4"	7 3/4"	3 1/8"	1 5/8"
6 11·6 / 70 MHz TRANS	9"	5"	7 3/4"	4 7/8"	1 5/8"
7 70 / 432 MHz TRANS	9"	7 1/2"	7 3/4"	7 3/8"	1 5/8"

Fig 20. Dimensions of the chassis and dust covers.

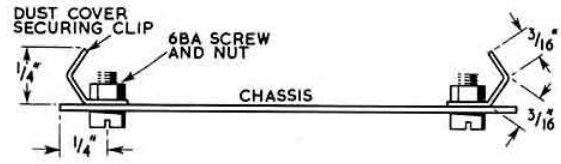


Fig 21. Detail of dust cover securing clips.

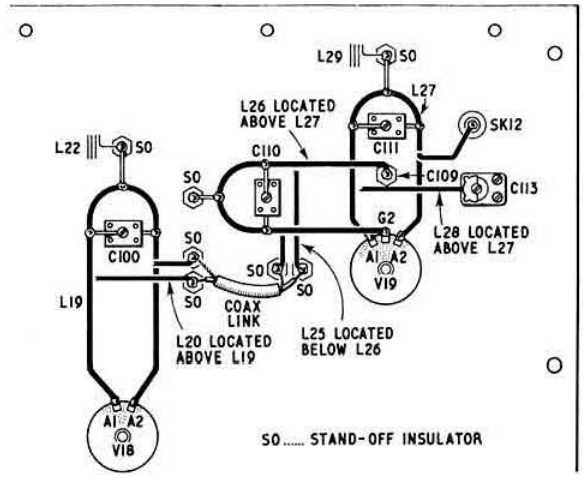


Fig 23. Layout of the 362 and 432 MHz tuned circuits in sub-assembly 7.

Control panel and rack

Fig. 26 shows the metalwork details for the control panel (sub-assembly 9). Switches S2 to S6, which are of the slide type, are mounted on the front panel; on the rear panel are mounted the 5- and 7-way *Belling-Lee* plugs PL19 (ht) and PL20 (lt and gb) and the 8-way Painton plug PL21 which carries all supplies to the amplifier stages. The alc socket SK15 is also mounted on the rear panel.

It is necessary to wire the control panel before the front and rear panels are fixed in position, and for this reason flexible wire is used to avoid breaking any connections during final assembly. Earth-wiring is carried out with a heavy gauge conductor.

The rack consists of two sections of 1 in. aluminium alloy angle 20¼ in. long mounted side by side and spaced at the top and bottom by two each similar angle sections 20 in. long. This results in each section having a spacing of 8 in. between the inner edge of the vertical members. Fixing feet at the bottom of the rack are formed by similar size angle section 7 in. long, projecting at front and rear, and two supporting side plates. Sub-assemblies 1, 5, 6, 7 and 8 are mounted on the front of the rack, being secured by 4BA screws engaging with hank nuts fitted to the vertical members of the rack. The sideband generator assembly (sub-assemblies 2, 3 and 4) is also mounted on the front of the rack but is secured from the rear by 4BA screws engaging with hank nuts fixed to the channel on which these sub-assemblies are mounted.

The control panel is permanently fixed to the rack by 4BA screws and nuts. Permanent power supply wiring to each of the sub-assemblies is located at the rear of the rack and runs from the 23-way tag strip on the control panel to individual tag strips located adjacent to each sub-assembly. From these tag strips short flexible connections are taken through holes fitted with grommets in the face of the rack and terminated by Unitor sockets for mating with the corresponding plug on the sub-assembly. Power supply connections to the 432 MHz amplifier are, however, made to this unit from the rear of the rack. Lt and earth wiring is carried out with a heavy gauge conductor to minimise voltage drop in the wiring.

General

Test points anotated TP in the circuit diagrams are provided to permit current and voltage monitoring in certain circuits. Where a test point is shown connected across a 0·002 μF capacitor, a feed-through type of capacitor is employed with the centre conductor of the capacitor forming one pole of the test point; the other pole is formed by a soldering tag fitted under one of the chassis screws at a convenient location. Miniature sockets (*Radiospares*) are used for all other test points.

Coaxial terminations at frequencies up to 70 MHz are made by *Belling-Lee* miniature coaxial plugs and sockets. At 432 MHz BNC connectors are used; SK12, SK13 and SK14 are *Amphenol* Type UG 290 A/U; PL16 and PL17 are

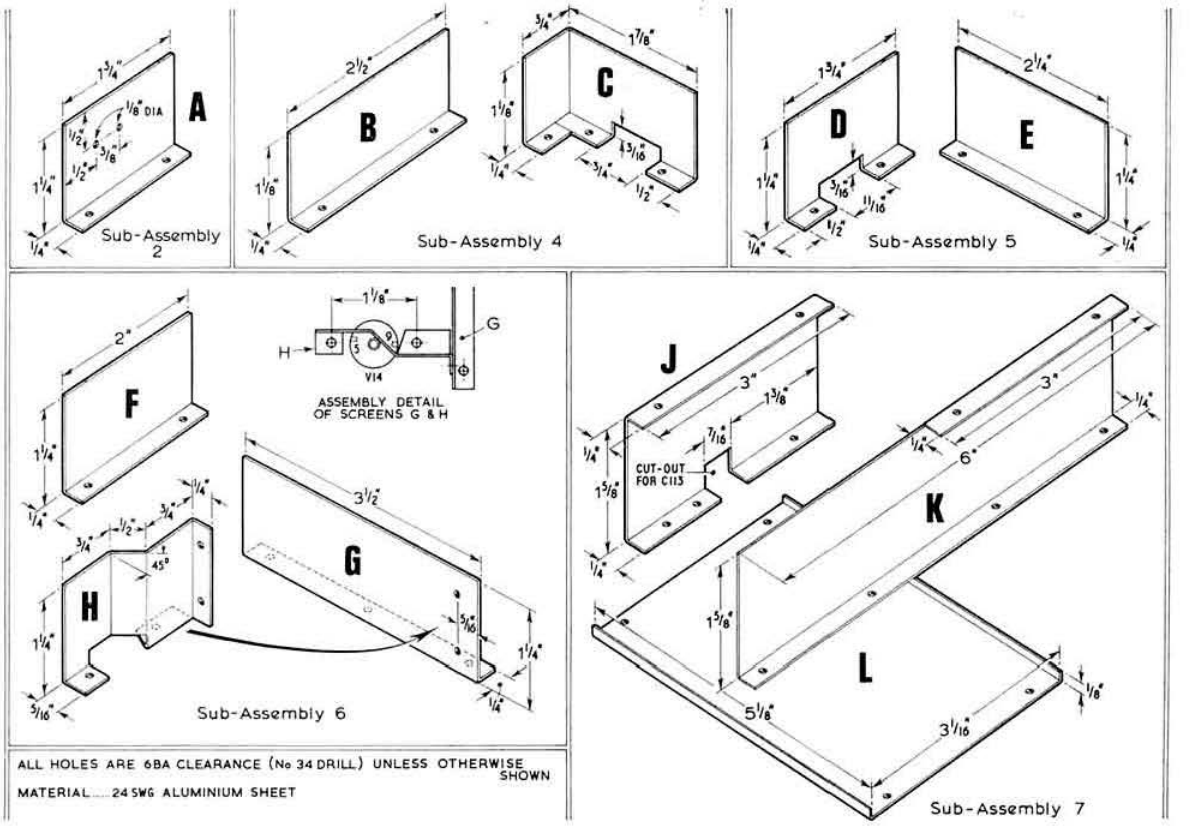
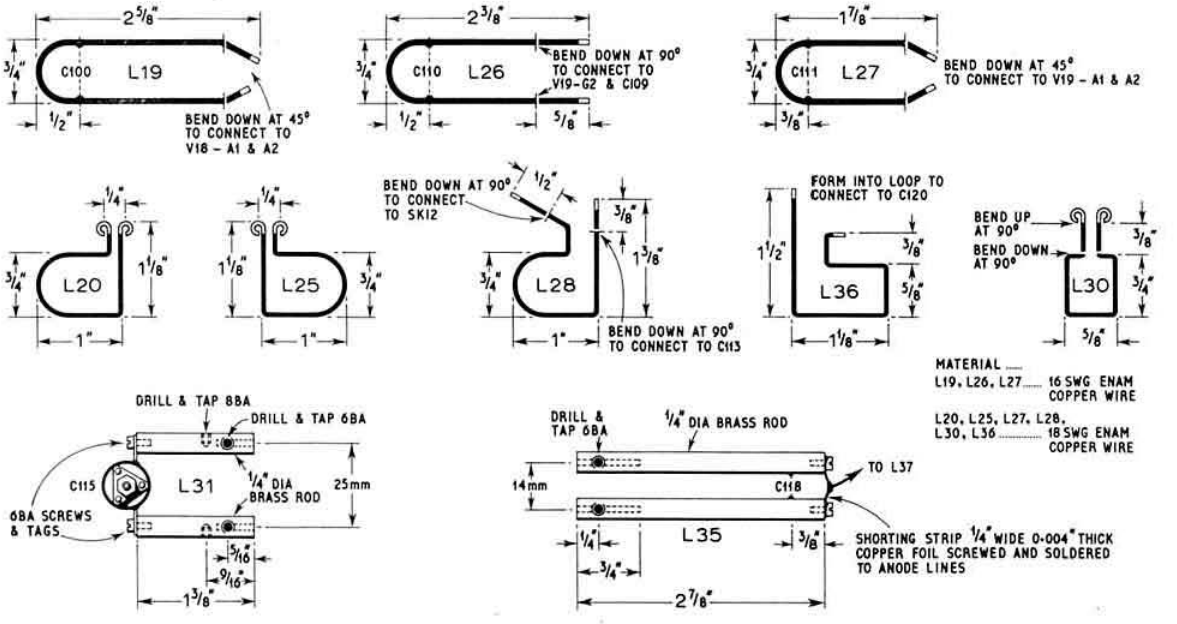


Fig 22 (above). Screen details.

Fig 24 (below). Details of the 362 and 432 MHz tuned circuits.



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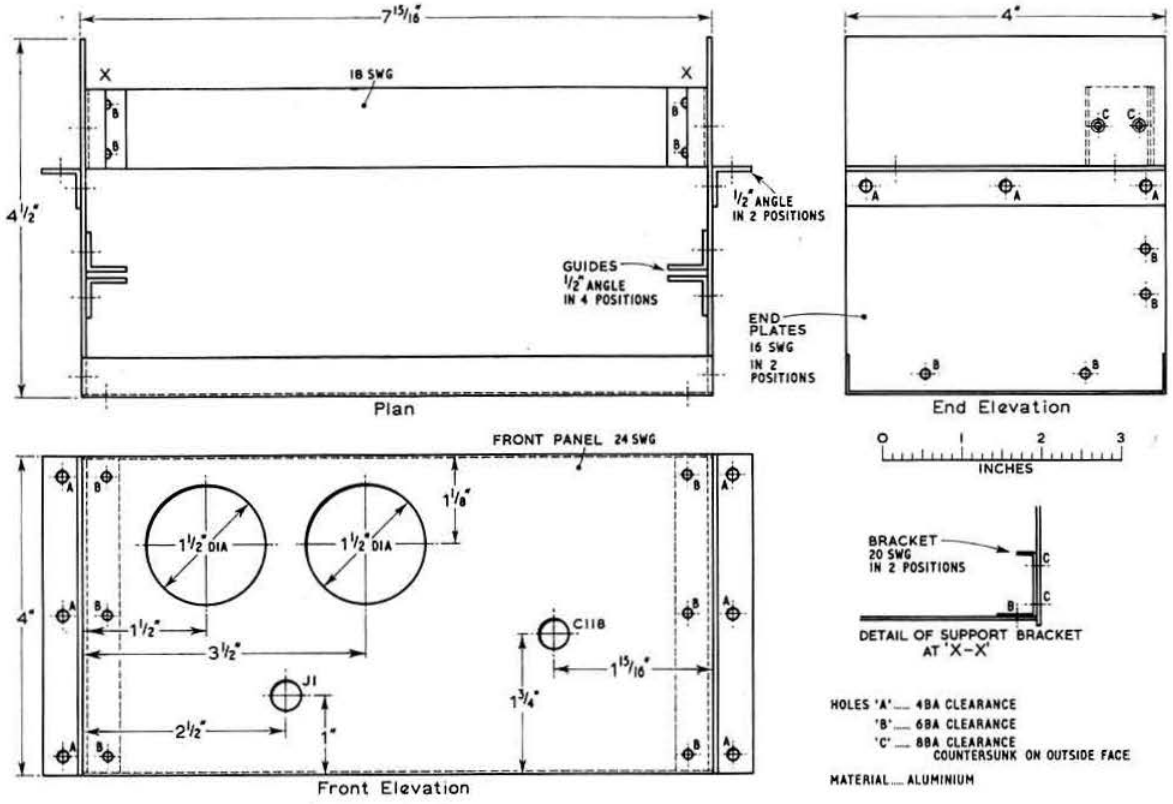
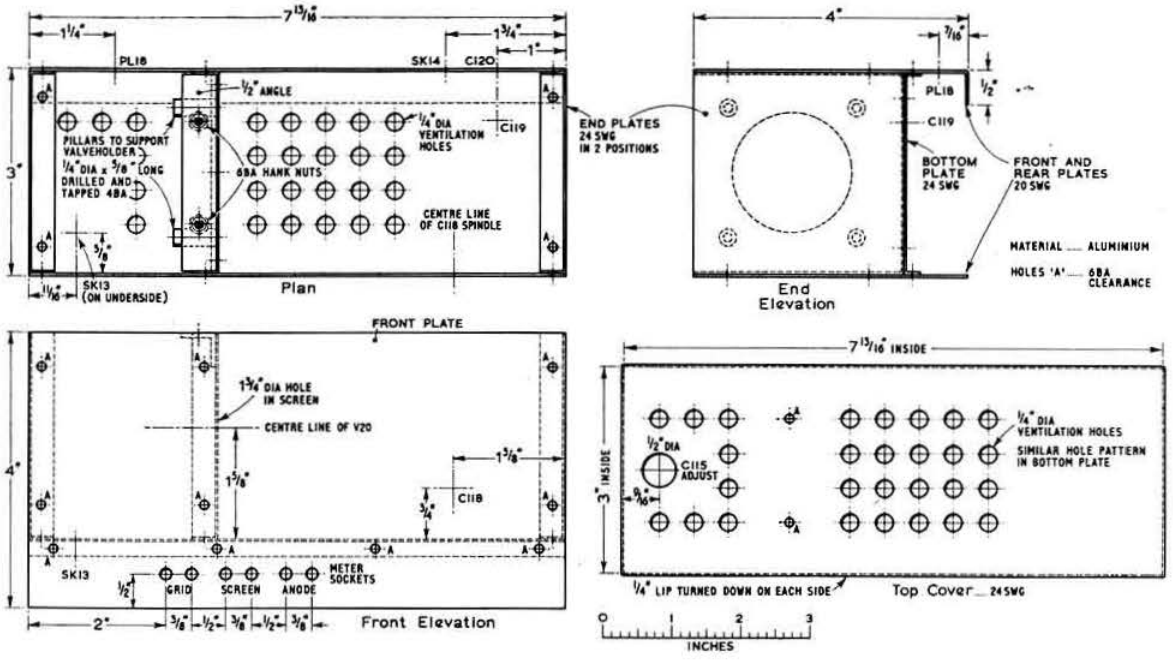


Fig 25a (above). Metalwork details of the amplifier chassis frame. **Fig 25b (below). Metalwork details of the amplifier sub-unit.**



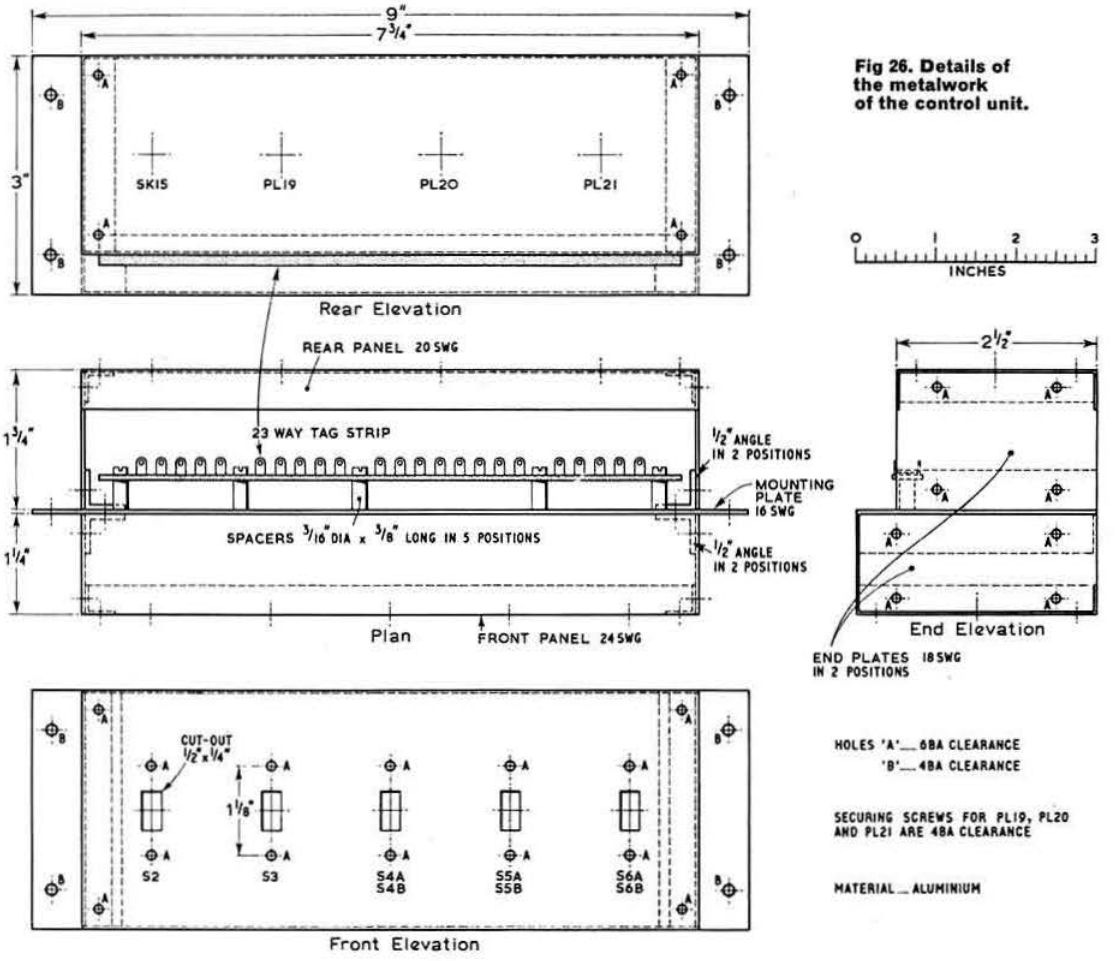


Fig 26. Details of the metalwork of the control unit.

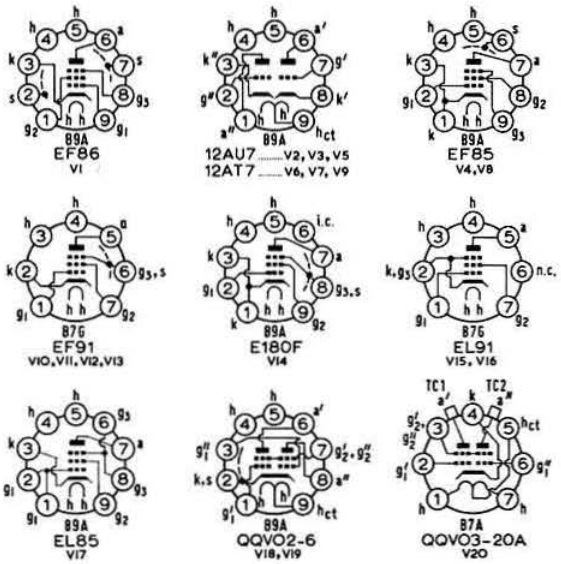


Fig 27. Valve base connections.

Amphenol Type UG 88/U and Type UG 913/U straight and angle plugs, respectively. The soldered terminations to the pins of the cable-mounted Unitor sockets which carry power to the sub-assemblies are each insulated with a $\frac{3}{8}$ in. length of pvc sleeving. Crystals X7 and X9, X10, X11 are held in place by spring-loaded retaining clips.

Cheese-head 6BA screws and nuts are used to assemble the chassis and components, except for miniature components which require 8BA screws. All screws and nuts are cadmium-plated and passivated to prevent corrosion of the aluminium chassis and screens. Lock washers are inserted under the nuts of all screw connections which carry ac, dc and rf currents. 4BA cheese head screws and nuts are used in assembly of the rack.

Coil and transformer winding details are shown in Table 3. Fig. 27 gives details of valve base connections. Full-size templates of the chassis layout for sub-assemblies 1 and 2, 4 to 7 inclusive, which show the location of the major components are available on request from RSGB Headquarters. A template has not been drawn for the filter as the location

TABLE 3

Coil and transformer winding details

TC	Primary—465 kHz i.f. transformer. Secondary 75 turns No 28 swg enamelled. (see text).
T1–T4	465 kHz i.f. transformers modified (see text).
T5, T6	2·1 MHz i.f. transformer modified (see text).
T7	Primary 24 turns No 34 swg enam. Secondary 24 turns No 34 swg enam. wound on Alladdin 0·3 in dia former. Secondary spaced $\frac{1}{2}$ in from primary.
T8	Primary 24 turns No 34 swg enam. Secondary 6 turns No 28 swg enam. wound on 0·3 in dia Aladdin former. Secondary spaced $\frac{1}{8}$ in from primary.
T9	Primary 6 turns No 28 swg enam. Secondary 33 turns No 34 swg enam. centre-tapped, spaced $\frac{1}{8}$ in from primary. Aladdin 0·3 in diameter former.
L1	rf choke—2·5 mH miniature type Ferrite core (*Electroniques*).
L2	12 turns No 18 swg enam. $\frac{3}{8}$ in internal dia, 1 in long, centre-tapped.
L3	2 turns No 26 swg pvc insulated. $\frac{3}{8}$ in internal dia, inserted at centre of L2.
L4	rf choke—40 turns No 34 swg enam. close-wound on 39 K ohm 1 watt resistor.
L5	2 turns No 28 swg enam. $\frac{1}{4}$ in dia spaced 0 in from earth end of L6.
L6	7 turns No 24 swg enam. close wound on Aladdin 0·3 in dia former.
L7	13 turns No 18 swg enam. $\frac{3}{8}$ in inside dia 1 in long, centre-tapped. $\frac{1}{8}$ in gap at centre for L8.
L8	2 turns No 24 swg tinned, $\frac{3}{8}$ in inside dia, insulated
L9	rf choke—as L4.
L10	As L1.
L11	22 turns No 28 swg enam. $\frac{3}{8}$ in dia close-wound on Aladdin F.804 former.
L12	10 turns No 22 swg enam. close-wound on Aladdin 0·3 in dia former.
L13	40 turns No 28 swg enam. $\frac{3}{8}$ in dia close-wound on Aladdin F 804 former.
L14	14$\frac{1}{2}$ turns No 22 swg enam. close-wound on Aladdin 0·3 in dia former.
L15	8 turns No 18 swg enam. $\frac{3}{8}$ in inside dia. $\frac{5}{8}$ in long.
L16	2 turns No 22 tinned $\frac{3}{8}$ in inside dia, insulated.
L17	As L16.
L18	8 turns No 18 swg enam. $\frac{3}{8}$ in inside dia $\frac{7}{8}$ in long.
L19	Hairpin loop No 16 swg enam. 2$\frac{5}{8}$ in long, $\frac{3}{4}$ in wide, spaced $\frac{3}{4}$ in from chassis; C100 connected $\frac{1}{2}$ in from short-circuited end (see Fig. 24).
L20	Hairpin loop No 18 swg enam. 1 in long, $\frac{3}{4}$ in wide (see Fig 24 and text).
L21	24 turns No 34 swg enam. wound on 39 K ohm 1 watt resistor.
L22	10 turns No 22 swg enam. $\frac{3}{16}$ in inside dia $\frac{1}{2}$ in long.
L23	2 turns No 22 swg tinned, $\frac{5}{8}$ in inside dia insulated, inserted at centre of L24.
L24	12 turns No 18 swg enam. $\frac{3}{8}$ in inside dia 1 in long, $\frac{1}{8}$ in gap at centre for L23.
L25	Hairpin loop No 18 swg enam. 1 in long, $\frac{3}{4}$ in wide (see Fig 24 and text).
L26	Hairpin loop No 16 swg enam. 2$\frac{3}{8}$ in long, $\frac{3}{4}$ in wide (see Fig 24).
L27	Hairpin loop No 16 swg enam. 1$\frac{7}{8}$ in long, $\frac{3}{4}$ in wide (see Fig 24).
L28	Hairpin loop No 16 swg enam. 1 in long, $\frac{3}{4}$ in wide (see Fig 24).
L29	9$\frac{1}{2}$ turns No 22 swg enam. 0 in inside dia $\frac{5}{8}$ in long.
L30	See Fig 24.
L31	$\frac{1}{4}$ in dia brass rod, 1$\frac{3}{8}$ in long (2). (see Fig 24).
L32, L33	rf chokes—13 turns No 24 swg enam. $\frac{1}{8}$ in inside dia 1 in long.
L34	rf choke—9 turns No 28 swg Eureka $\frac{1}{4}$ in inside dia $\frac{5}{8}$ in long.
L35	$\frac{1}{4}$ in dia brass rod, 2$\frac{7}{8}$ in long (2) C118 connected $\frac{3}{8}$ in from short-circuited end (see Fig 24).
L36	Hairpin loop No 18 swg enam. 1$\frac{1}{8}$ in long, $\frac{5}{8}$ in wide (see Fig 24).
L37	rf choke—9 turns No 22 swg enam. $\frac{3}{16}$ in inside dia 1 in long.
L38	rf choke—9 turns No 20 swg enam. $\frac{3}{16}$ in inside dia $\frac{5}{8}$ in long.
L39, L40	rf chokes—9$\frac{1}{2}$ turns No 22 swg enam. $\frac{3}{16}$ in inside dia $\frac{3}{4}$ in long.

of components in this sub-assembly is to a great extent dependent on the type of i.f. transformer used.

Alignment

Alignment of the transmitter is best carried out by applying power and adjusting each sub-assembly progressively. Ht voltages and currents should be checked before proceeding with alignment. Typical readings are shown in Table 4; where a line appears in the Table no measurement is applicable or no actual measurement was made.

The following test equipment is required for aligning the transmitter:

(1) Variable-frequency rf oscillator covering a frequency range of 493 to 501 kHz.
(2) Rf valve-voltmeter with range of 0–1 and 0–10 volts.
(3) 1000 Hz af oscillator.
(4) Grid-dip oscillators with ranges of 6 to 450 MHz.
(5) Hf receiver with range from 450 kHz to 12 MHz.
(6) 70 MHz converter (if 4 metre operation is required).
(7) 432 MHz converter.

The undermentioned additional test equipment was used in aligning the transmitter described, and is desirable but not essential:

(1) Two-tone af oscillator (in lieu of the single-frequency 1000 kHz oscillator).
(2) 70 MHz rf oscilloscope.
(3) 432 MHz rf oscilloscope.

Carrier Oscillator and Balanced Modulator (V3, D1, D2).

(1) Check, by tuning the receiver to the carrier oscillator frequency, that the oscillator is operating. Adjust the core of TC for minimum anode current.

(2) Connect the valve voltmeter, on the one volt range, across R22 and R23 in series, and earth.

(3) Adjust RV3 and C18 for minimum reading on the valve-voltmeter. Repeat these adjustments until the correct null point is obtained.

Filter and Amplifier (V4)

(1) Disconnect ht from the oscillator V6. Connect the rf oscillator to the input of the filter (C22). Connect the valve-voltmeter to one side of T4 secondary and earth.

(2) Align transformers T1 to T4 to the mid-frequency point of X1, X4 and X2, X5.

TABLE 4

Typical voltage and current readings

Valve	Vgl	Igl	Vg2	Ig2	Va	Ia
V1	1	0	—	0·2	—	0·8
V2a	2·2	0	—	—	40	1·6
V2b	6	0	—	—	200	4·0
V3a	—	—	—	—	80	2·8
V3b	2·3	—	—	—	70	1·5
V4	3·6	—	150	2·0	230	8·0
V5a	6·0	—	—	—	—	2·0
V5b	6·0	—	—	—	—	2·0
V6a	—	—	—	—	—	1·5
V6b	10·0	—	—	—	100	2·2
V7a	—	—	—	—	200	17·5
V7b	1·5	—	—	—	200	
V8	2 to 12	—	—	2·3	—	2·3 to 10
V9a	—	—	—	—	—	1·3
V9b	16	—	—	—	230	3·4
V10	—	—	120	0·6	140	2·5
V11	19	0·4	120	0·6	145	1·95
V12	2·0	—	190	2·5	240	11·00
V13						
V14	1·6	0	120	3·2	210	12·5
V15	—	—	120	1·6	130	7·0
V16	70	1·5	110	1·75	220	10
V17	80	1·2	220	3·0	230	16
V18	45	1·25	172	6·0	180	22
V19 (quiescent)	18	0	180	0·3	180	2·0
V19 (driven)	18	3·0	172	6·0	180	36
V20 (quiescent)	25	0	250	2·5	300	25
V20 (driven and loaded)	25	1·5	250	8·0	300	80

(3) Tune the rf oscillator through the passband and adjust the secondaries of T1 and T2 a small amount at a time until as near as possible equal output at the anti-resonant frequencies of the crystals is obtained. Adjust the secondaries of T1, T2 and T3 to give maximum dip at the centre of the passband. Adjust the capacitors designated C to give minimum side-lobe response. All these adjustments interact to a certain extent and it will be necessary to repeat the procedure several times until the best response is obtained. After filter alignment is complete the response curve may be plotted. (Fig. 4).

1st Mixer (V5)

(1) Reconnect ht to V6. Check that V6a is oscillating. Connect the valve-voltmeter to SK6.

(2) Apply 1000 Hz to SK3. Tune the secondary of T4, and primary and secondary of T5, to give maximum output.

(3) Disconnect the af oscillator and adjust RV4 for minimum output.

(4) Tune the receiver to 2·15 MHz and check that usb output is obtained when 1000 Hz audio input is applied.

2nd Mixer and Amplifier (V7, V8)

(1) Check that V9a is oscillating.

(2) Connect the valve-voltmeter to SK8, and apply 2·15 MHz ssb to SK7.

(3) Tune T6, T7 and T8 for maximum output. Check against the receiver that the output is 11·6 MHz usb.

3rd Mixer and Amplifier (V12, V13 and V14)

(1) Check with the grid-dip oscillator that L11, L12, L6, and L2, C68, L7, C73 resonate at the correct frequencies.

(2) Align the crystal-oscillator multiplier stages, following normal transmitter practice.

(3) Connect 11·6 MHz ssb to SK9, and a low-consumption bulb to SK10.

(4) Adjust T9, C68 and C73 for maximum rf output. Check against the 70 MHz converter that the output is 70 MHz usb.

(5) Disconnect the ssb input and adjust RV6 for minimum output. (This is best carried out by a valve-voltmeter connected through an attentuator to SK10).

4th Mixer (V19)

(1) Using the grid-dip oscillator, check the resonant frequency of all tuned circuits.

(2) Align the oscillator-multiplier stages, following normal transmitter practice.

(3) Connect 70 MHz ssb to PL14, and connect a low-consumption bulb to SK12. (As an alternative to the bulb, a 50 ohm terminated reflectometer could be used with advantage).

(4) Adjust C100, C110, C111, and C113 to obtain maximum output. (An insulated trimming tool with the minimum amount of metal should be used for these operations).

(5) Check against the 432 MHz converter that the output is 432 MHz usb. Readjust V18 and V19 tuned circuits, and the spacing between L19, L20, L25, L26 and L27, L28 for maximum output.

Class B Amplifier (V20)

(1) Using the grid-dip oscillator, check that L31, C115 and L35, C118 resonate at 432 MHz. If the anode circuit does not resonate at this frequency, adjust the position of C118 on the anode lines.

(2) Connect a 0–5 milliammeter to the grid current jack J1. Connect a 10W bulb (or terminated reflectometer) to SK 14.

(3) With applied anode and screen voltages of 300V and 250V, respectively, adjust the negative grid bias voltage to give a quiescent anode current of 25mA. (In this condition the grid voltage will be of the order of −25 V).

(4) Apply 70 MHz ssb and tune C115 and C118 to resonance. Adjust C120 and the spacing between L35 and L36 for maximum output. In this condition the anode current should not be allowed to exceed 80mA. (It is not possible to resonate V20 anode circuit by tuning for a dip in anode current). If a two-tone oscillator and rf oscilloscope are available it is now possible to adjust the transmitter for maximum linearity. Use of an oscilloscope also permits signal spectrum measurements to be made, i.e., degree of suppression of the carrier and unwanted sidebands. In the transmitter described these were of the order of 60dB and 30dB respectively. More detailed information on theory of operation and adjustment of single-sideband transmitter circuits is given in the RSGB *Radio Communication Handbook*, 4th Edition, Chapter 10.

TECHNICAL TOPICS

A monthly feature by PAT HAWKER, G3VA

WHEN some new system or device comes along, it is only to be expected that it tends often to be seen in absolute black or white terms. Most amateurs do not have the facilities or the time to investigate all the pros and cons, and depend upon the manufacturers and/or magazine contributors for their basic information. At first the old guard may tend to resist *any* changes, but after a time keep quiet about their views if only to avoid being labelled as technically out-of-date. On the other hand, the converted often go overboard in their advocacy of the new technique, and may make sweeping claims that this particular innovation has made every other approach as dead as the dodo.

The controversy between ssb and "ancient modulation" was a case in point—personally I still suspect that the harassment of am on the hf bands may prove in the long term to have been against the best interests of amateur radio, largely for reasons other than technical. In radio communication it is rare for a clear black and white decision to be possible; perhaps the last such occasion was the famous spark versus cw war of almost 50 years ago.

Valves and FETs

A recent example of this attempt to over-simplify the pros and cons of a new technique can be found in the rush to the field effect transistor for vhf converters, often accompanied by the implied or expressed suggestion that these devices are always likely to prove superior to old-fashioned valves. Now in *TT* a good deal of information has been given during the past four years on the applications of FETs and single- and dual-gate MOSFETs, and on the advantages these often confer for specific applications—although even here we have always tried to point out the good dynamic range of some valves and bipolar rf power transistors. I hope that I have never been guilty of suggesting that it is now time that the valve should be relegated to the museums, or to suggest, as did one correspondent recently in the pages of *Radio Communication*, "For serious vhf DX, TV valve gear is rubbish dump material . . . transistors are the thing. . . ." Uumph, well it must be nice to be so sure!

If, in turn, I were asked to stick my neck out, I would have to admit that for hf front-ends I have never been finally convinced that *any* semiconductor unit can yet better a really well designed unit based on beam-deflection valves and/or balanced rf amplifier and mixer stages. There may be very good reasons for using semiconductors, notably in order to improve on what is currently being achieved, but it is very far from being the case that such devices, whether bipolar or field effect, are always likely to be superior to, or even approach, valve performance.

On vhf and uhf, it is probably true to claim that in noise performance there are now many semiconductors as good as, and in a few cases better than, the best valves commonly available; but again and again we have tried to suggest that for most operational purposes a good dynamic range is even more important than extreme low noise. It was interesting to find that when the ITA put the first of their new uhf transmitters on the air at the beginning of September it was followed by a considerable number of reports that the ITA test card was showing up on top of BBC2 transmissions. This was usually due to cross-modulation in transistorized pre-amplifiers, mast-head amplifiers and distribution amplifiers, although in some cases it occurred even where an aerial was fed directly to the receiver. It was a significant indication of the poor dynamic range of many amplifiers designed primarily to achieve good low-noise performance.

Wally Blanchard, G3JKV, draws attention to a tabulation in the August 1969 issue of *Ham Radio* in which Bruce Clark, K6JYO, provides a comparison between the 144MHz performance of various popular FET devices against that of such valves as the 417A and 6CW4. These results can be interpreted in two ways. K6JYO suggests that his results indicate that in noise performance it is only the first generation FETs which are noisier than the best valve designs. On the other hand, G3JKV points out that K6JYO's table also suggests that only the most modern FETs, such as 2N5397, 2N4416 and TIS88, are actually any less noisy than good valves, and then only by a small margin, while the older 2N3823, TIS34, etc, are *noisier* than the comparison valves by some 1 to 4dB.

In fact, G3JKV considers that the *Ham Radio* table confirms what he (and some others) have suspected for some time—that various eulogistic articles have been over-selling FET front-ends using the older type FETs for vhf operation. To quote his letter:

"About a year ago I started building 144MHz FET converters, more or less expecting a minor revolution in low-noise and cross-modulation performance. Six months later, I gave up after, at best, achieving a performance some 2dB worse than my 7895 Nuvistor converter. Even this was done only be experimenting with several different circuits, and many different layouts, using only the very best components, and hand-selecting FETs from batches of 50! I used both 2N3819s and 2N3823s and found little difference (except cost).

"The most important requirement was carefully adjusting bias for best noise figures with each individual FET. I have also built a number of converters using bipolar transistors, which give as good results at the FETs, but none has ever been as good as the Nuvistor unit—and I am still using my eight-year-old converters. Although mainly concerned with low-noise performance in a quiet country location, I have made some elementary cross-modulation checks, but do not

find the FETs any better here, either. Perhaps I'm doing it all wrong somewhere, but I can't spot it at the moment!"

Now I only hope nobody will interprete these remarks as an attack on semiconductors. Rather it is a salutary lesson on the need to be a little wary of product manufacturers' claims or to equate too readily what is new with what is better. Usually what we should be saying is: "Yes, I can see that this device or system may have, for this particular application, *these* advantages and *those* disadvantages." The new approach is ideal for experimentation; the older approach may still be justifiable for operation. In the outcome it may well prove that first generation field effect devices offer most advantages as *oscillators*, a point seldom mentioned by their makers!

Perhaps one unfortunate aspect of the current swing to semiconductors is that it came just when designers were at last really getting to grips with the problems of valves: including the beam deflection tube; the nuvistor, and the compactron (multiple valves that never really reached the UK). Semiconductors have brought with them a whole new set of problems—which in turn are gradually being overcome. So, once in a while, it may be better to retrace our steps back to the thermionic valve, even if only temporarily.

Silicon diode attenuators

Phil Horwood, G3FRB, has been stirred by the notes from BRS16468 on PIN-diode attenuators (*TT*, October 1969) to pass on some very practical information on a form of simple and cheap agc-controlled diode attenuator which can be based on almost any type of small-signal junction diode. He has been using this technique for about six months in his latest transistorized ssb exciter, but clearly it has many possible applications, including receiver front-ends, etc. The basic idea stems from the successful Redifon R408 marine receiver which has been referred to on several occasions in *TT*. Incidentally, a rather more complex three-diode attenuator was described originally in *CQ*, and later in *TT* (November 1967) and *Amateur Radio Techniques*, page 58.

The principle of the technique is that, instead of biasing PIN-diodes *off* to increase attenuation, in this system the normal silicon diodes are biased *on*. The diodes (Fig 1) are used as dc-controlled variable resistors, exploiting the curvature at the start of the forward characteristics; in other words, a change of resistance occurs with a change of current.

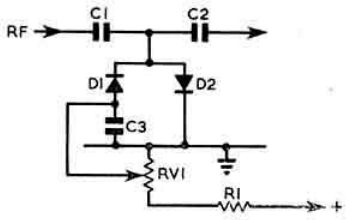


Fig 1. Basic diode attenuator used by G3FRB

This type of attenuator must be employed at a fairly low impedance point—G3FRB places his in the input of the last signal-frequency transistor amplifier, where the signal is at an impedance of about 100 ohms—otherwise it could cause detuning of preceding or following rf transformers. The choice of a low impedance signal point also minimises the limitations on maximum signal amplitude—it will be appreciated that the diodes form a shunt clipper, shunting the signal line symmetrically and limiting on signals exceeding the typical silicon junction potential of about 400 to 600mV. In these circumstances a strong signal would have the peaks clipped; this is a reason for using silicon rather than germanium diodes which would begin to clip at much lower potentials. With silicon diodes, 200mV rms may be considered a typical maximum signal level.

With diodes "off", the attenuator has zero effect; as the current is increased the two diodes become a single symmetrical resistor shunting the signal line. A range of 30dB attenuation is possible in a single stage, VR1 and R1 being chosen to limit the current to the maximum forward current for the particular diodes used (about 10mA in G3FRB's case). The attenuation control with RV1 is far from linear, but G3FRB finds the technique ideal as a drive attenuator. C1 and C2 are typical coupling capacitances, and C3 a suitable decoupling capacitance, typically 1000pF or 10,000-pF.

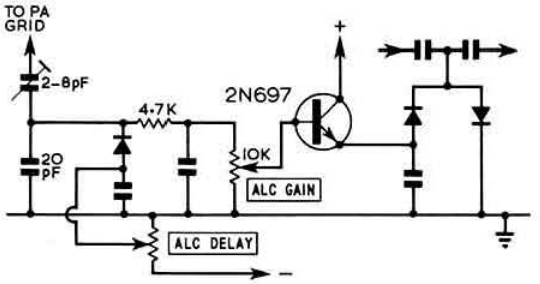


Fig 2. G3FRB's method of incorporating diode attenuator into automatic level control arrangement

In practice G3FRB employs two of these attenuators in cascade, one as a front-panel drive control and another (Fig 2) as an alc-controlled attenuator. In this application a 2N697 is used as a simple current amplifier. In G3FRB's exciter there is some 60dB of voltage gain available from the base of the final transistor amplifier to the pa grid, so it is possible to achieve effective control due to the high gain in the loop—because the gain is high it is most important to prevent reverse signal frequency coupling, otherwise the drivers and pa stage will burst into oscillation. G3FRB points out that this isolation should be achieved by lay-out and good screening of leads, etc, rather than relying too much on decoupling capacitors, otherwise the total capacitance may be so great that the automatic-level-control attack time will be far too long.

Reducing "reverse gain" of transistors

In this connection, it is not always appreciated that transistor amplifiers pass signals in the reverse as well as the forward direction. This can often result in a signal turning up in a part of the circuit where it is emphatically not wanted—for example local oscillator voltages appearing at the input

of a signal input amplifier, and similarly on high gain phase lock loop amplifiers.

A detailed design article on this subject (brought to my attention by Jim Fisk, W1DTY, editor of *Ham Radio*) appears in the 16 August 1969 issue of *Electronic Design*. Among the points highlighted by this article are:

Common-emitter amplifier. This has fair current isolation and excellent voltage isolation.

Common-base amplifier. This provides good voltage isolation and poor current isolation.

Common-collector amplifier. Good current isolation and poor voltage isolation.

The author, Roy Leventhal, concludes that where a transistor amplifier is required to have very good "reverse gain" characteristics, a two-stage amplifier comprising a common-collector stage followed immediately by a common-emitter stage, will often provide the necessary current and voltage isolation.

Fig 3 indicates a typical arrangement of this type. This example is shown in the article to fulfil the need for a signal frequency amplifier at 20MHz, to be followed by a mixer and 18MHz local oscillator, having high attenuation of the 18MHz signal at the input to the amplifier.

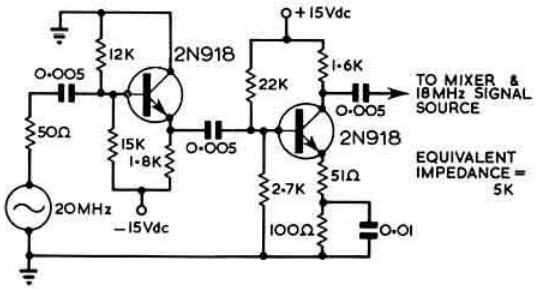


Fig 3. Two stage amplifier arrangement having good "reverse gain" characteristics

More on long delay echoes

Since the notes on cosmic or long-delay echoes (*TT*, August 1969), further information has been received from Professor O. G. Villard, W6QYT, of Stanford Electronics Laboratory, on the early results of his appeal for amateur co-operation in this attempt to crack the 40-year-old mystery of these strange echoes. He summarises the position as "the plot thickens".

Some 45 excellent reports have come from amateurs (plus a few others from persons endowed with over-active imaginations). He considers that the number and internal consistency of the amateur reports "makes me more convinced than ever that we are dealing with a real phenomenon, the origin of which is crying out to be understood." The reported delays have ranged from half-second to *five minutes* (Two of the reports have been on these later super-long delays.)

Two of the most baffling reports are of echoes at frequencies not normally associated with ionospheric propagation—50 and 144MHz. Indeed the reports now range from broadcast band (810kHz) right up to 144MHz, over a period from 1932 up to August this year, and from many different latitudes.

Professor Villard stresses that "our apparent inability to postulate an acceptable theoretical explanation makes the matter of gathering amateur reports even more important." Admittedly there is still a possibility that the echoes could be of subjective origin—that is to say that some of the echoes may in reality be generated within the listener. Several psychologists consider this a definite possibility, but this does not mean that such listeners are going round the bend, rather perhaps that this is some sort of reverse *déjà vu* experience—most of us have known that odd impression of apparently having lived through a particular experience before it happens. Professor Villard considers that such subjective "echoes" may possibly account for some of the shorter delay reports.

He says that "preliminary statistical analysis of the reports suggests that there are two main categories of echoes, one of which may be explainable in terms of retardation at the ionospheric critical frequency. The other (the more common) tends to occur at the time of opening or closing of transmission at a given frequency, when conditions are good for long distance propagation. The latter echoes seem in general to occur at times of low magnetic activity."

W6QYT also has a hunch that the echo effect may be present for much more of the time than is usually suspected—it could be that only when the effect becomes very strong that it is noticed. There is some evidence that the effect may go in cycles, occurring for two or three days and then disappearing for two or three weeks. There could be two entirely different mechanisms involved.

W6QYT will welcome reports from British Commonwealth amateurs (address given in *TT* August 1969), adding "if we can get enough people reporting, it will certainly improve our chances of tying the effect down."

Direct-conversion ssb receiver

The practical development of synchrodyne/direct conversion receivers continues. It has been suggested in *TT* on several occasions that the problem of image reception could be overcome, though at an increase in complexity, by using a phasing type arrangement similar to that used in phasing-type ssb exciters. A practical, if still experimental, realisation of such a receiver is outlined by Richard Taylor, W1DAX, in *QST* (September 1969), built around a 14MHz quadrature hybrid network, hot carrier diode balanced mixer, low-noise MPS6521 pre-amplifiers (af), Barker & Williamson audio phasing network feeding push-pull 2N3823 FETs: Fig 4. The audio selectivity is shaped by a 500ohm pi-network with upper cut-off of 2·7kHz and ultimate roll-off of 16dB/octave.

While technically such an approach is appreciably more complex than the basic direct-conversion receivers so far described, nevertheless W1DAX claims that this experimental model is still, by comparable superhet standards, a relatively simple receiver. It will resolve a signal 0·2μV rms at 14·2MHz, has adequate selectivity for reading adjacent weak and strong ssb signals, and an unwanted sideband suppression of better than 34dB. It is also possible to use the receiver as a 10mW ssb generator for transceive mode, in conjunction with linear amplification. W1DAX concludes by stressing "direct conversion is definitely a promising technique."

The same issue of *QST* carries an advertisement from

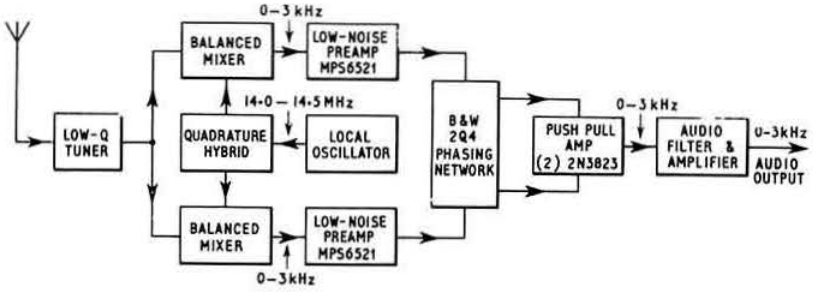


Fig 4. Block diagram of W1DAX's direct-conversion 14 MHz ssb receiver, with audio image phased out

Ten-Tec Incorporated offering a series of modules which when put together form a simple synchrodyne 3·5–7MHz receiver/transceiver. This would seem to be the first attempt to market the direct conversion principle for an amateur receiver. It certainly looks as though this form of semiconductor receiver, first advocated in *Electron* and in *TT* in 1967, is now establishing its place in amateur radio. One may perhaps regret that this approach to receiver design never really took off until the Americans became interested. One must wonder whether our local designers were too busy pressing the idea that all that is important is happening up on the vhf bands.

It was encouraging to see at the recent RSGB Show the compact direct-conversion 14MHz receiver by BRS16468 (award of merit in the home constructors section) using a heterodyne type vfo (crystal 10MHz, vfo 4–4·4MHz with four diode mixer). Four hot carrier diodes are used in the linear detector; and there is a high-gain af amplifier, including sic amplifier for loudspeaker operation. It is clear that there are still many variations of this technique waiting to be exploited.

VXOs for vhf

Another technique that has taken a long time establishing itself is the vxo. One of the first practical articles on this subject (excepting the Goyder lock) was by Stanesby and Fryer of the British Post Office. Harold Stanesby, incidentally, has since led the British delegation at many of the important international conferences, including the CCIR conference at Oslo in 1966 which wrestled with the colour television systems controversy. I recall preparing a short note on their work for the *RSGB Bulletin* some 20 years ago. However, almost all the present development can be traced to articles in *QST* (January 1958) and *Electronic Design* (15 1957) which in turn were based on ideas disclosed in British Patent No 537167 of 1940.

In recent years a number of vhf vxo designs have appeared, several of them reprinted in *TT* (and to be found in *Amateur Radio Techniques*). A more sophisticated design, featuring electronic tuning and thus facilitating remote control, appears in the English language *VHF Communications* (Vol 1, No 2, May 1969) for which Don Hayter, G3JHM, acts as British representative. This vxo, by K. P. Timman, DJ9ZR, comprises a 2N3707 oscillator followed by two BF224 stages (tripler/amplifier). This unit has a sweep of ± 20kHz at 136MHz and is intended for use with transceivers having an if of 9MHz. With a 45·478-MHz crystal (HC-18/U subminiature), performance is given as short term drift of 10Hz in 15 minutes for ± 20kHz; 20–30Hz for ± 20/40kHz, and 100–200Hz for ± 50/100kHz. It is pointed out that where several crystals are used it is not advisable to switch crystals, even with diodes; it would be better to build up complete units for each centre frequency. If electronic tuning is not required the two BA110 diodes could be replaced by a variable capacitor. Fig 5 shows only the vxo stage, though the tripler/amplifier section is fairly conventional.

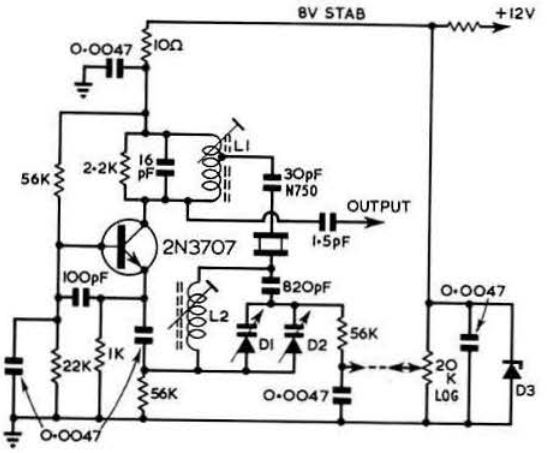


Fig 5. The vxo heart of the DJ9ZR variable oscillator for use with 145MHz transceivers. Output from this stage is fed to BF224 tripler and BF224 buffer to provide output on 136MHz from 45MHz crystal. Full constructional details in *VHF Communications* Vol 1, No 2. D1, D2 BA110 electronic tuning diodes; D3 8V 250mW zener diode. L1 11 turns, 0·3mm (28awg) enam. copper along whole length of 9mm coil former. Tap 2 turns from "earthy" end. Coil former 4·3mm diameter with vhf core and core padding. L2 6·5 turns as for L1 but coil length 6mm. Crystal typically 45·478MHz to give 145·416MHz centre frequency. Special care should be taken with mechanical rigidity of L2; entire oscillator unit is moulded into epoxy resin block and shielded against air currents; further thermo-isolation possible with thin layer of styrene foam

A simpler Danish vxo, using a 9MHz crystal and providing a tuning range of some 30kHz in the 144MHz band, is described in *Electron* (May 1969) in a survey article by PA0SE: Fig 6. This uses a BC108B oscillator, BC108B buffer, 6AK5 and ECF82 (pentode section). This article also discusses the

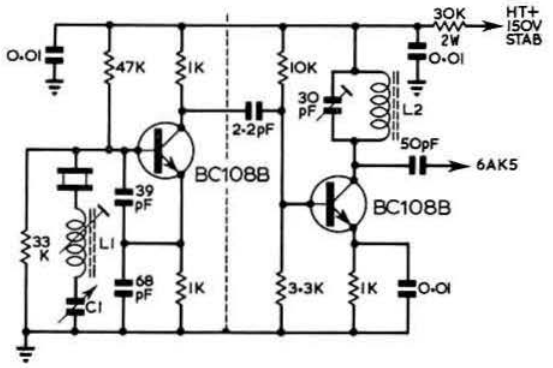


Fig 6. Semiconductor stages of a vxo unit intended for use with 144MHz ssb rig, reprinted in *Electron* from *OZ* (February 1969) using 9MHz crystal and intended to provide about 30kHz sweep on 135MHz. C1 50 to 100pF. L1 has about 60 turns, L2 about 30 turns, 0·3mm wire and former diameter of about 11mm

amateur frequency synthesiser (more correctly partial synthesis), originally described in *Break-in* by ZL4IO, using only about a dozen transistors, and providing a 500kHz tuning range in steps from 4 to 34MHz.

Screen regulated linear amplifier

A report has come in from Maurice Hately, GM3HAT/GM3TDI, which is likely to be of particular interest to those with am transmitters built in the 1950s who may wish to modify these for ssb operation. A number of designs, such as the G5RV Elizabethan or Minimitter Mercury, have a pa comprising one or two tetrodes with a screen regulator (clamp) valve. GM3HAT has been investigating the question of modifying the clamp valve to convert the stage to a modulation linear one so that it is similar to the well-known G2MA linear amplifier (see page 10.61 of *Radio Communication Handbook*).

It was reasoned that since the grid of the clamp valve obtains a negative potential proportional to the voltage of the drive signal applied to the pa grid, this provides an amplified positive-going signal applied to the pa screen, and should thus enable the pa stage to follow the fluctuations of the drive signal; in other words it should be able to follow an ssb drive. It could also be predicted that the time constants of the screen decoupling system must follow af fluctuations yet remain effective by-pass circuits at rf.

To test these ideas in practice, an ssb drive from a KW Vespa Mk I was used in conjunction with a Minimitter Mercury. The grid of the Mercury pa was connected to earth via a 250ohm 10W resistor and a small amount of drive applied from the Vespa, with the Mercury switched to the cw position (no modulation transformer in circuit). The varying rf drive duly swung the pa grid and anode current up and down in step.

With a two-tone af input to the Vespa (set to 3·8MHz) and a high-speed oscilloscope across the output applied to a dummy load, it was found that the pa was linear up to about 5mA of grid drive. This is indicated in Fig 8 which shows the output waveforms across a lamp load. The upper trace represents the output with 5mA grid current and the stage loaded to 200mA. The lower trace is with 2·5mA grid current and 144mA anode current (quiescent anode current about 80mA). In the first setting, the mean power is 70W continuous (140W pep) and dc input (with 750V ht) 150W. Taking into account the efficiency of the rf tank and coupling circuits (say 85 per cent), this represents a pa efficiency of about 55 per cent, which GM3HAT considers quite a fair figure.

It will be appreciated that such a system does not require anything like the full output from a Vespa, and with a damping resistor of 1000ohms and a grid drive of 5mA into 7·5K, some two or three watts of drive should be ample. There are advantages in reducing the damping resistor to 470 or 220ohms to reduce the possibility of self-oscillation in the pa, and this suggests about 5W, or a little more, of ssb drive.

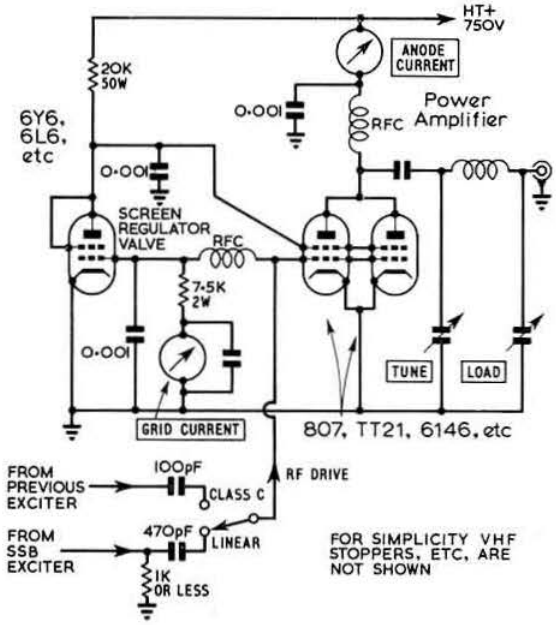


Fig 7. Modification of typical screen regulated Class C pa to provide additional ssb linear amplifier facility, as used at GM3TDI. For simplicity, vhf "stoppers", etc, are not shown

Over a period of about a year, the club station GM3TDI has been using this type of linear on various bands from 3·5 to 28MHz, receiving good quality speech reports. The Mercury has been provided with a change-over switch (see Fig 7) so that it can be used either as linear Class B, or in the original Class C mode.

GM3HAT believes that this idea should prove useful for other amateurs with a low-power ssb exciter who need a linear, who still have a serviceable screen-regulated pa, and who want a medium power linear (within about 4·5dB of the legal limit).

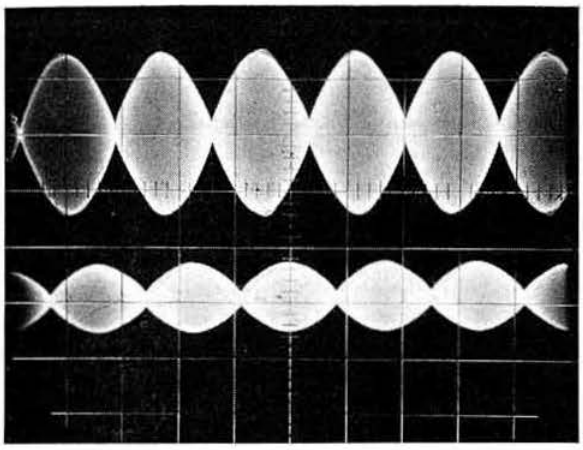


Fig 8. Oscilloscope photograph indicating performance of the screen regulated pa used as linear amplifier

Thermostat interference

In connection with the suggestions on how to cope with thermostat interference to vhf reception, stemming from the Derby Newsletter (*Radio Communication*, September 1969, page 600), W. E. Thompson, G3MQT, rightly points out the danger of anyone without extensive experience delving into such control systems, particularly any not in his own home.

He writes: "The amateur might well upset the operation or cause unexpected damage which could let him in for a heavy repair bill—far better to have the maintenance engineers present and let them undo things. Even then, the wrong kind of interference suppression device can be the cause of later trouble, so beware!"

G3MQT stresses that in most cases thermostat interference will also affect local radio and TV (see Post Office Statistics, October issue, page 708). If this is so, it is possible to solicit help from Post Office interference investigation officers, with no charges raised for investigating the interference. It should be noted that if the amateur asks for such help on the basis of interference to amateur reception, which is not "protected", he can be asked to pay Post Office charges.

Even the experienced Post Office officers make it a rule to have an owner's system maintenance engineer present whenever work is to be done on a heating system.

It has been pointed out several times in *TT* that it is a risky business to fit any devices or filters in other people's homes or equipments. In fact any modification to domestic apparatus imposes legal and moral responsibilities. Unless fully experienced and possessing the type of qualifications which would stand up in a court of law, it may prove far safer not to tackle the job yourself, even if you feel confident of being able to do it.

Incidentally, I gather from Kay Priestley, G3XIW, that the TVI Clinic could cope with more technical enquiries on tackling specific problems of tvi.

Here and there

Space considerations make it necessary to hold over several ideas for another month, but here are a few final shots.

Harry R. Habig, K8ANV, the author of the article on the HRH-delta loop beam (*QST* January 1969 and *TT*, May 1969) writes to point out that the formulae for the dimensions of the G3ENI double-delta vhf aerials (*TT*, June 1969) appeared originally in the useful article by A. C. Doty, K8CEU, "Circular antennas for 10 metres" (*QST*, November 1958). K8ANV has been doing a lot of work on various delta loop systems (including double-delta configurations which he foresaw in his patent application), and on their mechanical aspects. He has been using a novel 2 delta loop for 28MHz (using a special 28MHz gamma matching system with 14MHz loop) to provide what he believes to be a very fine 28MHz beam. It is hoped that further details can be given later.

H. O. Bradshaw, G3VTJ, draws attention to the simple method of providing fine tuning for ssb in the Eddystone EA12, where a 40pF capacitor is connected between the ssb fixed capacitor and the bfo tuning capacitor; this divides the tuning range by about six to one, giving almost something for nothing.

Harvey Gernsbeck, editor of *Radio-Electronics*, makes gracious acknowledgement that this *TT* is the inspiration for his journal's *TT* (see *TT Mk II*, July issue). So this time we send unqualified best wishes to the newcomer!

President in Canada

In the last issue of *Radio Communication* mention was made of the President on the Move and he is seen here with Mrs Swinnerton, during their visit to Canada.

(Photo by VE3CJK)

The President and Mrs Swinnerton visit the station at the 1969 Toronto Exhibition manned by members and helpers of the Metro Amateur Club. At the controls of the HW 12 is blind member, Roy Manning, VE3FPR, assisted by his wife, Myrtle, VE3FXM. Roy is using the Swail Reader to indicate over-modulation—an invention of a local research group by which the speaker becomes "live" on excessive peaks.

THE MONTH ON THE AIR

A monthly feature by JOHN ALLAWAY, G3FKM*

BEFORE proceeding with the usual contents of MOTA, your scribe would like to mention the great pleasure he obtained from meeting some of the regular contributors to this column at the RSGB Exhibition, and also his sorrow that he was not able to make personal QSOs with more. One thought that crossed his mind was that it would be a good idea to have a special area for sitting and rag chewing on future occasions if this could be arranged.

Those who are aware of the importance of making the fullest possible use of our frequency allocations will be pleased to know that some of the further restrictions which were to have been imposed on some American licence holders as from 22 November have been dropped. Proposals to double the size of the cw bands reserved for Extra class licence holders will not now be brought into effect. However, the original changes in telephony allocations will be made, and 3,800 to 3,825 and 21,250 to 21,275kHz will be for the exclusive use of Extra class licensees. They will share the exclusive use of 3,825 to 3,900, 7,200 to 7,250, 14,200 to 14,275, and 21,275 to 21,350kHz with Advanced Class holders. The 3,500 to 3,525, 7,000 to 7,025, 14,000 to 14,025, and 21,000 to 21,025kHz segments will remain as exclusive cw bands for Extra licensees. It does seem to the writer that in view of the fact that these parts of the bands will have a much lower occupancy than the others, it might perhaps be wiser to have them within the bands rather than at their lower limits (eg 14,050 to 14,075kHz etc).

G3OGC writes to say that all contacts with a station of that call-sign between 5 April 1964 and 5 August 1969 were not genuine and were the result of pirate activity. Colin was in Saudi Arabia during part of this time but is now back on the air on the hf bands, mainly on 20m cw. Another who complains of unwelcome attention from a pirate is G2HP, who says that he is receiving QSLs for contacts on 14 and 21MHz which he has not made.

The Society of Wireless Pioneers

The WP QSO Party. During the weekends of 29-30 November and 6-7 December the call "CQ WP" will be heard around the bands, for this is when the Society of Wireless Pioneers will be holding their QSO party. Who are they?

The Society was founded last year in America, is international in outlook, and membership is open to those who have at one time or another earned their living " pounding brass ", particularly the old " pros " who remember the days of rotary spark gap (or before) and the pungent smell of ozone. This will be the Society's first get-together on the air and it is fitting that the QSO Party will be strictly cw. For more information about the Society write to Frank Geisel, Vice-President, Society of Wireless Pioneers, P.O. Box 530, Santa Rosa, Calif, USA 95402. (Frank served 40 years at KPH, San Francisco, finishing up as station manager when he retired in 1967).

Top Band News

The 1969-70 season began " with a bang " according to a 160m " Flash " *Bulletin* from W1BB. Stew reports that QSOs between W3 and W8 and VK3s ACA, APN, and GU, and VK5KO have already taken place with signal strengths up to RST 559 both ways. SWL George Allen in Western Australia has reported hearing W3DPJ. VP9GJ reported to your scribe that he had already worked several British stations before the end of September. The coming winter promises to be most interesting, and reports of dx heard and worked on this band would be greatly appreciated by G3FKM, who normally learns all about these matters second hand via W1BB.

K1PBW reports that some of the US stations are now making a practice of giving their listening frequency after each "CQ", eg "CQ DX 27" or "CQ DX 1827", and he most strongly recommends that these instructions are followed. Ernie has a 142ft vertical with a ground system of 100 radials, 70 of which are half a wavelength long! His receiving antenna is a 2,500ft long wire " Beverage " directed on Europe. He says that G3s OLI, MYI, RPB, and CFV seem to have the best G signals but that G3KRA peaks highest. Look for him exclusively on Saturday nights—Sunday mornings

The 1969-70 series of Transatlantic Tests will take place on 30 November, 14 and 28 December, 11 January, and 1 and 15 February, between 0500 and 0730. No special " first timers " nights will be held, and all are asked to assist newcomers. Call " CQ DX Test " during alternate five-minute periods, the W/VEs leading off, and keep accurately to these periods unless actually in QSO. Eastern W/VE stations will be found between 1,800 and 1,820kHz, western ones between, 1,975 and 2,000kHz. European stations should use 1,823 to 1,830kHz or the clear spot between 1,851 and 1,861kHz—or as directed by the calling station (see earlier). Please send reports to W1BB and G3FKM.

News from Overseas

John, YJ8JM, has at last managed to have a few contacts with the UK. He says that the interference on his own

* 10 Knightlow Road, Birmingham 17. Closing date for the December issue is 12 November and for the January issue—10 December.

YS1AG uses this attractive array of equipment to hand out the first Salvador contacts to many dxers. Andy may visit Europe in 1970.

frequency has to be heard to be believed, with many stations continually calling. He asks all Europeans never to make long calls when trying to raise him, as short calls with emphasis on the caller's call-sign are more effective. The QSO total at YJ8JM in six months of operating is now over 1,700, and John once again apologises for the long delay in answering QSLs. At the end of August his cards had still not arrived from New Zealand, and he anticipated that it would take his XYL and himself some time to deal with them when they are received. Mains power is only available in the New Hebrides between 0600 and 1130, and between 1900 and 2200 daily, and John's home-built transmitter is crystal controlled on 14,040kHz. He would like to operate on other bands and also on ssb, and wonders whether any manufacturer (or anyone else) would loan him some suitable equipment to use during the remainder of his stay which ends in August 1971.

Another exiled G station is VR1O, David, who sends the latest news on activity in the Gilbert and Ellice Is. He says that VR1L is currently busy on 14, 21, and 28MHz with an FT DX 400 and a two-element quad. VR1Q is located on Betio—the same island as VR1O—and has a Swan 350 which he is presently using on 14MHz only with a dipole antenna, but is at present building a quad for 14 and 21MHz. VR1I is licenced but not active at present. VR1R and VR1T are W7TNA and K7BGS, respectively, who are captain and wife on the trimaran *Chamaru*, which was anchored in Betio harbour at the time David's letter was written. They were expecting to become /MM using their US calls en route to 5W1, VR2, and ZL, and their equipment consisted of two FT DX 100s with FL1000 linear and an inverted L antenna. They also have a helical whip at 40ft and operate on 14 and 21MHz. Dave is looking for British stations in particular and thinks that 1000 to 1100 is the most likely time, particularly on Saturdays, and 21MHz cw the most likely method.

G3RTU is now back in Israel and using his G3RTU/4X4/ Mobile call-sign. At present Keith has no permanent accommodation so is confined to using a mobile set up. His licence permits him to use 1kW and he hopes to be on the air with this soon and on the look out for G contacts. On the outward journey to Israel, UK QSOs were managed from ON 8KG/M, F0JS/M, G3RTU/DL/M, G3RTU/LX/M and HB9XFH/M. QSLs for all calls may be sent via RSGB or to the addresss in *QTH Corner*.

A recent letter from MP4TDB, Michel, says that he is now QRT and has returned to 82 Avenue des Anciens Combattants, Evere, Brussels. He promises to QSL all his Trucial Oman contacts either via ON5MG or via UBA, and thanks all those with whom he has spent many enjoyable hours on the air. Michel will be in London in mid-November.

Spider, MP4TCS, is also QRT and is now back in England, and he hopes to be on the air again soon from HQ RAFARS and to renew old acquaintance. He also wishes to express his thanks to all those who contacted him, and likewise promises 100 per cent QSLing (via BRS 26222).

A third member, Cy, who had only just obtained his MP4TDE call, is also now back in the UK. The club station MP4TCE, will continue with some new operators under their new secretary, Bob, MP4TCZ.

Apologies to those who sent cards for stations for whom ON5TO acts as QSL manager to the addresss given in September *QTH Corner*. Although this address is given in the latest issue of the *Callbook* it is not correct and correspondence should be sent to ON5TO, Edward de Jansstraat 30, Sint-Andries, Belgium. ON5TO acts as manager for 3A0II, 9U5CR, and 9U5RH. Another QSL manager who has moved is K9CSM, whose charges include MP4BGR, MP4BGW, MP4BGX, SV0WM, YB0AAD, 9K2CA, 9K2CB, 9K2CC and 9V1OX. His new address is in *QTH Corner*.

G3KDB writes to say that the VS9MB on 80m is a pirate, as the genuine station with that call-sign is only operative on 10 to 40m. He also says that VS9MP/MM, who is G3SXE, should be on the air by December.

Joe Oxenbury, G3LXZ, formerly SU1XZ and VS9XZ, is now licensed as VS9MZ and is a meterological officer at Gan. He has an LG50 transmitter and a 1935 vintage HRO, with a G5RV antenna strung between two palm trees some 20ft above ground. He is to be found on cw, and asks for all QSLs to be routed via RSGB or G3KDB. The terms of Joe's licence do not permit him to contact stations in the Eastern European bloc.

Tommy, CN8AW, is now GW5AHU, and is living near Swansea. It is believed that he may remain there permanently with his family.

Alec, 6Y5AH, Kingston, Jamaica, is often to be found around 14,100kHZ on ssb using a Swan 500 and a beam.

John, 6Y5JR, will be back in the UK when this is published and using his G3XHX call. All QSL requests will be dealt with by John at the address in *QTH Corner*.

Awards

The International DX Organization, mentioned a few months ago in *MOTA*, has now produced details of its **International Call Areas Award** (ICAA). Before giving details of this award it should be mentioned that IDXO consists of a board of directors drawn from the ranks of prominent dxers from all six continents, its current President being Roy Stevens, G2BVN. It is hoped that the award will prove to be of a non-controversial nature, as with the exception of UN or IARC stations it is proposed that normally uninhabited islands and places and neutral or demilitarized zones will not be recognized, nor will QSOs with stations not using official ITU call-signs count. The award is issued in four classes—Class IV needing 100 call areas and 500 points, Class III 200 call areas and 950 points, Class II 300 call areas and 1,300 points, and Class I 400 call areas and 1,500 points. The points value of a QSO varies according to the frequency used—1·8MHz QSOs counting five points (ten if international), 3·5MHz counts three points, 7MHz two points, and 14, 21 and 28MHz one point each. The call areas include each of the US states. Special application books are needed, and leaflets giving a complete call area list and full details of the Award are available from IDXO, Box 543, 1211 Geneva 3, Switzerland. Contacts to be valid for this certificate must have taken place since 1 January, 1969.

The ZM Cook Bi-Centenary Award

NZART. Awards manager: ZL2GX, 152 Lytton Road, Gisborne, New Zealand.

This award is being issued to commemorate Captain James Cook's first landfall in the Pacific Ocean at Gisborne, New Zealand, on 9 October, 1769. Applicants need to contact 50 different ZM stations between 1 October 1969 and 31 December 1970, including at least one station from each district ZM1—ZM4. A check list giving full log data which has been verified by two other amateurs should be sent to ZL2GX together with 3 IRCs for mailing costs (if airmail postage is desired extra should be enclosed). No QSL cards are required, and all one band or all one mode endorsements are available. The ZM1 to ZM5 series of prefix will be used by New Zealand stations between the dates mentioned above.

The 100, 200 and 300 SSB Awards, issued by *CQ Magazine*, will not be discontinued on 1 October as originally planned. Many requests for their continuance were received. British applicants may therefore continue to submit claims for these awards to G3FKM for checking.

The Robinson Crusoe Award

Issued by Hull ARC (G3AMW).

This is issued in three parts, Part 1 must be gained first. Parts 1 and 2 require the following points: DX 50, Europe 75, and British Isles 115. These may be gained as follows: contacts with stations in any town called Hull count 16 points, with G3AMW 24 points, and with members of HARC 19 points. QSOs made with Tobago (where Robinson Crusoe was supposed to have lived) are worth 24 points. All QSOs made on Fridays count double. For part 2 (the " Man Friday " endorsement) the required number of points must have been achieved by making all QSOs on Fridays and not counting the double points normally allowed. The Part 3 endorsement is an interesting departure from normal procedure and is fully explained in a leaflet available from the custodian: BRS27806, 132 Danube Road, Wold Road, Hull, Yorks. All QSOs must have been since 1 January 1960, and log data (certified by two licence holders) plus 5s, 8 IRCs, or $1 are required for Part 1. Part 2 costs 2/6d, or equivalent. There is no charge to blind or handicapped applicants, and the award is available to listeners. Members of G3AMW include G2s CPS, FS, G3s JRX, AGX, LDB, LZQ, LIQ, JHD, SSA, TTW, VME, WWD, FCY, RDM, OHT, LNH, GWT, MVO, WAK, and G8AZO.

The Chapter 8 CHC Awards manager is now Mrs Ruth Unwins, G3TNN, 18 Clarendon Road, North St Annes, Lancs. G3MTL, who previously held the position, has now left for Sierra Leone.

Several nets are now in operation to assist those working for the **WAB Award.** The main net is held on Sundays on 7,060kHz at 1400. If conditions are poor the net moves to 3,760kHz at 1415. Other nets take place on Saturdays

QTH Corner

A2CAF	R. Short, PO Box 20, Gaberones, Botswana.
C31BY	via G3OKQ, "Greenfingers", Oyster Lane, Byfleet, Weybridge, Surrey.
CR9AK	(30 and 31 August, 1969 only) Akira Kurokawa, 3-11 Kyo, Kawasaki, Kanagawa, Japan.
JD1AAH	via JA1BIR.
JT1AK	PO Box 92, Ulan Bator, Mongolia.
K9CSM	Ben Piller, RFD 1 Box 86, Monee, Ill., 60449, USA.
KH6NR/KH6	(see text).
KX6BS	APO San Francisco, California, 96333, USA.
MP4BHF	now G3XMQ, 13 Beacon Heath, Whipton, Exeter, EX4 8NP, Devon.
TF2WLN	via WA3BZO, 800 Upper Market Street, Milton, Pa., 17847, USA.
TF2WLW	via K3EST, 2101 Ingraham St., Hyattsville, Md., USA.
TR8MC	B.P. 3135, Libreville, Gabon.
VQ8CFB	via VQ8 Bureau, Box 467, Port Louis, Mauritius.
VR1L	via W6NJU, Gary Stilwell, 7164 Rock Ridge Terr, Canoga Park, Calif, USA.
VR1Q	(After 1 September, 1969) via WA3ATP, 7649 Malvern Av., Philadelphia, Pa., USA.
VS6BC	via GM3JDR, D. Robertson, 5 Lindsay St., Golspie, Sutherland.
VS9MZ	via G3KDB, 28 Scotch Orchard, Lichfield, Staffs.
WF6NNW	via WA6AHF, 17494 Via Alamitos, San Lorenzo, Cal., 94580, USA.
XE1J	Jose Levy, Box 200, Colima, Col., Mexico.
XT2AA	via WA5REU, 601 W. Barton St, W. Memphis, Ark., USA.
ZB2BV	R. H. Williams, 2 Maltings Garth, Thurston, Bury St Edmunds, Suffolk.
ZF1AA	via K2OLS, 45 Cedar Lane, Bronxville 8, NY, USA.
ZL3PO/C	via ZL2AFZ, George Studd, 48 Nuffield Av., Napier, New Zealand.
3V8AL	F. Powell, AID Mission, US Embassy, Tunis, Tunisia.
G3RTU/4X4	IRAC, Box 4099, Tel Aviv, Israel.
5VZDB	via W4SPX, 1722 Dorris Dr., Orlando, Fla., USA.
601KM	via VE3AAZ, 146 Deloraine Av., Toronto 12, Ont., Canada.
6Y5JR	John Rudkin, Treveria, St Teath, Nr Bodmin, Cornwall.
9V1PA	(After 26 August, 1969) via G3LQP, 56 Combe Rd, Tilehurst, Reading, Berks.

RSGB QSL Bureau, G2MI, Bromley, Kent.

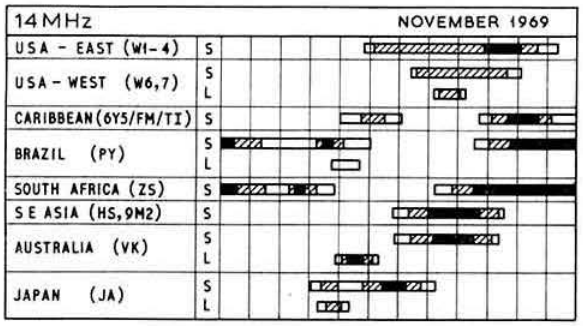
Propagation Predictions

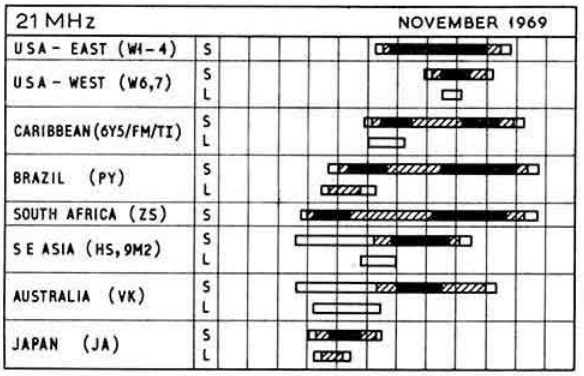
At the beginning of November the F2 mufs reach their maximum value in the northern hemisphere. This implies good conditions on the hf bands, (**21** and **28MHz**). The present level of sunspot activity is expected to be sufficient to make traffic possible with the east coast of North America on **28MHz.** Contact with the west coast will only be possible on favourable days. Traffic with Central and South America, South Africa as well as India and South-East Asia will certainly be possible. Because of the winter season **28MHz** will close between about 1800 and 1930GMT, to open again in the morning between 0700 and 0800GMT.

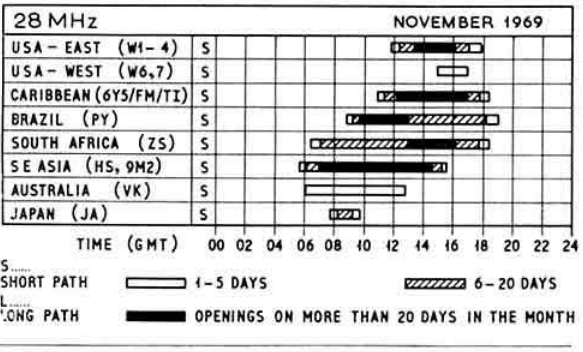
On **21MHz** all continents will be workable with certainty, including the west coast of the USA and Australia. On this band the mid-winter months will give the opportunity to work dx by the long path in stable conditions, in contrast to the months of March and September. Towards the end of the month 21MHz should close around 2100GMT.

On **14MHz** dx traffic will be heaviest from afternoon till about midnight. In the latter half of the night practically only South America and Africa will be workable. On **7** and **3·5MHz** conditions will change little from those of the previous month. On **3·5MHz** local traffic may be interrupted by the dead zone in the early morning.

The provisional sunspot number from the Swiss Federal Observatory for September 1969 was 81, with activity fairly evenly distributed throughout the month. The predicted smoothed sunspot numbers for January, February and March 1970 are 85, 84 and 82, respectively.







between 0900 and 1100 on 7,060kHz (G3GHE/G3GJQ in control), and on cw at 1400 on 7,030kHz (net control stations: G3s SVK, GJQ, ABG or PUW). Other special calling frequencies are 1,834–1,838, 3,560, 3,760, 14,030, 14,300, 21,060, 21,300, 28,060 and 28,560kHz (±3kHz).

Contests

Results of the **1968 CQ WW DX Contest** (cw section) have now been received. This apparently produced fewer entries from Europe than in the past. Outstanding British scores were made by **G3VWK** who was world fourth on 3·5MHz, and by **G3HCT** who was world fifth and also top European on 21MHz. Congratulations to these two and also to the other certificate winners (listed in bold type).

Single-operator

		points			points
G3HDA	(All bands)	**969,612**	G3RZI	(28MHz)	36,366
G3FXB	,,	**695,372**	G3IGW	,,	31,570
G6PD	,,	253,791	G3JKY	,,	26,076
GM3CFS	,,	**215,757**	G2NH	,,	14,500
G3TXF	,,	197,175	G3WP	,,	276
G2DC	,,	179,967	**G3HCT**	**(21MHz)**	**240,468**
GM5AHS	,,	168,151	G3RUX	,,	39,648
G2AJB	,,	105,878	G3ESF	,,	34,821
G3JFF	,,	55,074	**GM3JDR**	,,	**30,039**
G3TIF	,,	48,287	G3NSY	,,	23,925
G6VC	,,	25,550	GM3SKX	,,	14,147
G3NVK	,,	22,698	**G3FKM**	**(14MHz)**	**172,376**
GI6YM	,,	**12,000**	G3JVJ	,,	20,727
G2BOZ	**(28MHz)**	**97,644**	**G3VMK**	**(3·5MHz)**	**35,316**
G3UQR	,,	45,954	G3IAR	,,	18,894
			G3PFZ	,,	8,262

Multi-operator single transmitter

G3SSO (G2HDU, G3s FXA, LCJ, PEO, G8KG) 1,003,563 points.

GB2SM (G3s CRP, HZL, JEA, JUL, NYY, OHP, SZG, TLG, TUM, UFM, VJG) 667, 392 points.

G8FC (G3s GNS, JFH, JUT, KLK, TTH, SVG, SVK, G8AX) 461,833 points.

G5BK (G3s CEG, LDA, OLN, TVW, WKH) 167,265 points.

GW3NJW (GW3NJW, GW3OAY) 156, 624 points.

The OK DX CW Contests

0000 9 November to 2400 9 November.

All bands 1·8 to 28MHz, cw only.

Single-operator stations may enter single or multi-band section, multi-operators must be multi-band. Exchanges consist of RST plus two figures indicating how long the operator has been licensed. Each QSO is one point, with

Czech stations three points. A multiplier of the number of prefixes worked on each band is used to arrive at the final score. Use a separate log for each band and show: Time (GMT), station worked, number sent/received, QSO points, and prefix (first time worked only). Include summary sheet with name and address in block letters and a signed declaration that all rules have been observed. Contest QSOs may be used as credits when claiming the " 100 OK Award " and the " S6S Award," and in this case written application must accompany the log. Logs go to: The Central Radio Club, PO Box 69, Prague, Czechoslovakia, and must be postmarked no later than 31 December.

The CHC International Contest

0001 6 December to 2400 7 December (cw).

0001 13 December to 2400 14 December (phone).

All bands. Exchanges consist of RS/T plus serial number of QSO (starting at 001), followed by entrant's category (ie CHC or HTH—all non-CHC members are HTH—and 73 or 88 if member of either of these Chapters). One point per QSO between HTHers. Two points between CHC and HTH stations, three points for QSOs with Chapter 73 and 88 members. Bonus of 50 points for each 100 QSO points gained on 80 and 160m. Double points for QSOs with stations outside own continent. Multiplier is ARRL countries worked on each band totalled together. Entries may be single or multi-band. Logs must show date, time, station worked, sent, received, band, points. A summary sheet showing scoring on each band and totals, with name and address in block letters, should be sent with logs before 31 January to WA2BNF, 105 Carpenter Street, Belleville, NJ 07109, USA.

Results of the **1968 VK/ZL/Oceania Contest** have now been received and show that in the phone section **G3SSO** came third in Europe and first in the British Isles with 6,016 points. Other entries were **GW3NNF** (1,224 points) and G5ALW (eight points). In the cw section **G3SSO** again won top UK place with 2,392 points, followed by G5RP (1,218), G2DC (720) and G3VMK (60 points). Top European listener was **BRS26431** with 4,806 points—this was world third. Other listeners were A.5662 (2,730), G-1516 (672) and GW-7796 (2,988).

DXpeditions

KH6GKV, KH6SP and others, the exact composition of the party seems to be in some doubt, will be visiting **Kure Is** between 10 and 14 November. The call-sign is not known, but may be KH6NR/KH6, and they expect to be found on 14,230kHz (listening on 14,240kHz) and 21,295kHz (listening on 21,305kHz). Possible cw operation has been mentioned. Funds are not solicited and anything received will be put towards QSL expenses. QSLs should be sent with sae and two IRCs to 530 Peltier Avenue, Honolulu, Hawaii, 96818, and according to the *DXers Magazine* no QSLs will be sent out via the bureau. There will be no "lists" or MCs.

W2PCJ, W2GGE and WB2CKS intend to be on the air from **Grand Cayman Is** (ZF1) between 0000 29 November and 0000 1 December. Frequencies are given as 3,515, 7,015, 7,045, 14,045, 21,045 and 28,045kHz, listening 5kHz up or down. Their call-sign is not yet known. QSLs should be sent to W2SUC, 3239 Corsa Avenue, New York 69, NY, USA, with sae and IRC for prompt reply.

The trip to **Revilla Gigedo Is** by XE1J and XE3EB is expected to take place for a two-day spell commencing at 1800 16 November. They will use all bands 10 to 80m and their schedule is given as follows: 0000 to 0100 28,585kHz, 0400 to 0500 3,785kHz, 0500 to 0700 7,085kHz, 1100 to 1200 7,085kHz, 1600 to 1800 28,585kHz, and 1800 to 2200 21,285 or 21,305kHz. At other times, or if conditions on the chosen bands are no good, they will be on 14,185kHz. No cw operation is mentioned. Call-signs will probably be XE1PJL/XF4 and XE3PEB/XF4, and QSLs should be sent via XE1J (see *QTH Corner*).

There will be six band activity from the **Isle of Man** during the CQ WW DX contest cw weekend. GD5APJ, which is the call-sign held by F5QQ (who is at present resident on the island), will be operated by G3SXW and G3TXF as well as F5QQ himself. Direct cards may be sent to G3TXF, Holt Cottage, Kingston Hill, Surrey.

DX News

As already mentioned in the awards section, stations in New Zealand will be using call-signs in the ZM1—ZM5 series in place of their normal ZL1—ZL5 calls between 1 October 1969 and 31 December 1970. Other new prefixes include VU0 which was used by Indian stations during October to celebrate the Gandhi Centenary Year, and the series 3BA to 3BZ which has been allocated to Mauritius. (Canada has now relinquished the 3B to 3F block.)

According to VK6HD, formerly G3HDA, all new call-signs issued after 1 July 1969 to stations in the VK9 call area will adhere to the following sequence: Papua and Territory of New Guinea—VK9AA to VK9MZ, Norfolk Is—VK9NA to VK9NZ, Christmas Is—VK9XA to VK9XZ, and Cocos Keeling Is—VK9YA to VK9YZ.

The team scheduled to relieve the weather station on **Macquarie Is** will include ZL3HV, who has a three-element beam with him and hopes to be very active on 3,539, 3,695, 3,830, 7,020, 7,095, 14,040, 14,255, 21,040, 21,355, 28,040 and 28,555kHz. Another ZL, this time ZL3PO, expects to be on Chatham Is as ZL3PO/C for a six-month stay in the very near future. Lester has a transceiver with external vfo and gives 3,520, 3,790, 7,065, 14,020, 14,150, 14,185, 28,050 and 28,600kHz as possible operating frequencies. QSLs for both these stations will be dealt with by ZL2AFZ.

The location of the Indonesian stations is now indicated by their prefix. YB1 is West Java, YB2 Central Java, YB3 East Java, YB4 South Sumatra, YB5 Central Sumatra, YB6 North Sumatra, YB7 Kalimantan (Borneo), YB8 Celebes, YB9 all other islands east of Java (including Indonesian New Guinea), YB0 Djakarta. VE7IR/YB is now YB6IAB. It is understood that it is now necessary to reside in the country for three months before a licence is granted.

CR3KD is expected to have returned from leave and be back on the air by the time this is being read, and he will be joined by CTIFL in January. The latter's call-sign will be CR3FL. CR8AI reports that a number of his " second ops " have been fired by his enthusiasm and will shortly have CR8 calls and equipment of their own.

The Pacific dx net now commences its Friday session at 0600 on 14,265kHz. The Tuesday net time is 0700, as before.

Those who missed FR7ZL/T during his previous visit to **Tromelin Is** will be pleased to know that he should be returning there for a further spell around the end of October. Previous QSL requests have not all been dealt with yet but

will be settled as soon as possible. Another Indian Ocean station to look for is VQ8CFB, who is at the meteorological station on St Brandon for six months. He has a DX4OU and a GR410 and is expected to use cw on 14MHz and ssb on 14,320kHz.

W1YRC is reported to have all 601GBs logs up to 1 December 1968 and will confirm QSOs if supplied with sae and IRCs. 601KM is now on the air from Somalia and will be there for a year. He has been heard on 14MHz ssb daily from 1400, and his QSL manager is VE3AAZ (see *QTH Corner*).

G3NMH reports that disaster has struck VP8KO's transmitter and that it is unlikely that Les will be on the air in the immediate future.

According to *QST* the Radio Sports Federation of the USSR reports that amateurs visiting the Soviet Union may apply for permission to operate there. Anyone wishing to do this is advised to apply to his own IARU society (eg RSGB) who will certify the application to RSF. Applicants should give the dates and locations of intended operation and should use their home calls with a portable suffix (eg G3FKM/UA0).

In future all applications for QSL cards confirming contacts with W4BPD's expeditions should be directed to W2MZV *not* W4ECI. His address is H. A. Bohning, 1 Caryle Avenue, Yonkers, NY, USA, 10705. This covers all operations since 1960.

G6UF reports that VP2VI, who is one of his "locals", is to be found around 14,190—14,200kHz on ssb from the British Virgin Is.

Band Reports

Conditions throughout the past month have fluctuated from the very good to very bad, the first day of the Society's 28MHz contest being typical of one of the bad patches. No doubt some of the difficulties have been caused by the solar activity noted around 29—30 September. Many thanks to all who have written, and especially to the following: G2BOZ, G2BW, G2HKU, GW3AX, G3CFV, G3HB, G3HCT, G3KDB, G3TXF, G3TZU, GM3UCI, G3UML, G3URX, G3UYM, G3VIE, G3VPS, G3VRZ, G3WBN, G3WNT, G3XBY, G3XYP, G3YOB, GM4QK, G5JL, BRS2098, BRS25429, BRS26870, BRS30694, A6023, A6098, A6143, A6148, A6254 and A6444. Stations listed below in italics were cw, all others ssb.

80m. 0200 *8P6BU*. **0500** CP1GN, HK3WO, *K6KA*, *W6UED*, XE1KB, *ZP9AC*, 9Y4MM. **0600** HC4BS, K3JH (S9+, using full size rotatable quad), KV4FZ, OA4OS, *VP9GJ*, many ZLs. **1900** *TA1CN*. **2100** 5H3KJ, 5Z4KL. **2200** JW7UH, TJ1QQ, XV5PM (DL4PM in Saigon), *XW8BP*, 4U1ITU, 9G1DY, 9J2s BC, DT, 9X5SP. **2300** PY7AWD, *TA2E*, 9M2DQ.

40m. 0000 EL2AK. **0100** *HC8AI* (QSL via WA5LES, ? genuine), PY7AWD, VU2DK. **0300** ET3USA, *ZS6CR*. **0500** PYs, *TG9CD*, *XE1B*. **0600** *CE9AF*, *9Y4AA*. **0700** OA4NLM, many VKs, VP1CP. **1900** KR6JT. **2000** DU1FH, VS6DR. **2100** CR6GO, *CR7IZ*, *JA3DUD*, etc, *XW8BP*, 5H3KJ.

20m. 0100 VP2s VI, VV. **0500** CE0AE. **0600** FO8BY, *KH6GND*, VKs (LP until 0900 then SP) 5VZDB. **0700** WA2IKP/KS6 (Box 788, Pago Pago). **0800** Pacific stations via SP (until 1300), G3RJS/MM (on Oronsay in S. Pacific), KS6CQ, KW6GJ (Box 533, Wake Is), VR2FT, YK1AA. **0900** 5W1AS. **1100** VR1L. **1200** KC4USP (QSL Op Drew del Monaco, Wyassup Road, N Stonnington, Conn, USA). **1500** WA4MMO/KC6, 4L0CR, 9N1MM. **1600** *JW1CI* (Bear Is), 5R8AB, *VK9DH*. **1700** FR7ZU, *VQ8CFB*, 5H3s LV, KJ. **1900** CT2AQ, *JW7UH*, ZD7SD. **2000** TR8MC, WF2LIB (Station commemorating discovery of America by Columbus), YS3FH. **2100** FL8DG, VK2WX/VK9 (Papua). **2200** VP8s FL, KD, KL.

15m. 0800 TR8DG. **1000** *VR2EK*, *VS9MB*, 9N1MM. **1100** *KA1C*. **1200** *HP1IE* (most days). **1300** JX4YM, *WG6ASE*. **1400** *G3JFF/MM* (off Timor). **1500** *TG4SR* (most days). **1600** YB0AAF. **1700** *MP4MBJ*. **1800** *FP8CY*, VP2ME, W6/W7 (until 2200 some days). **1900** CE8DK, *ZB2BO*, 9Y4NN. **2000** *K5MWZ/KH6*, *KL7EQG*. **2100** *KL7GCV*, *8R1J*. **2200** VP1DW.

1969 Countries Table

	1.8 MHz	3.5 MHz	7 MHz	14 MHz	21 MHz	28 MHz	Total
G3TZU	5	34	58	131	141	161	530
G3LNS	—	102	122	174	161	131	690
G3XYP	—	16	51	175	121	86	449
G3KDB	—	5	100	158	109	69	441
G3HCT	—	85	73	47	61	111	377
G3KS	1	25	25	87	72	73	283
G2MI	1	33	35	125	98	52	345
G3XBY	3	44	58	68	71	76	312
G3TFX	8	52	51	103	53	76	343
G3VUM	4	4	8	70	51	57	194
G8VG	2	25	26	30	52	44	179
G3PEJ	4	5	21	43	58	38	169
G3VLM	1	16	25	71	39	48	200
G4RS	4	25	10	63	66	21	189
G3VPS	3	15	19	84	30	33	184
G3VJG	—	2	19	9	6	54	90
G3IAR	2	23	21	25	23	26	120
G3UML	—	63	22	101	23	18	227
G3WPO	17	10	37	31	1	23	109
G3JVJ	12	70	24	81	18	2	207
G3PQF	6	13	12	30	8	5	74
A5390	9	87	69	174	164	106	609
A6254	6	47	26	128	159	96	462
BRS25429	4	75	98	167	126	95	565
A6148	8	81	69	126	104	105	493
A5662	18	31	31	127	114	86	407
BRS31164	4	52	47	127	107	81	418
BRS30694	9	29	38	93	123	59	351
BRS26870	5	50	58	132	102	79	426
BRS24529	4	55	80	153	94	75	380
A6590	3	45	—	32	72	89	241
A6337	5	52	43	104	108	51	363
A6143	4	24	46	63	107	51	295
A6003	5	25	24	46	93	61	254
A6553	2	13	8	41	92	60	216
A5154	2	35	18	111	83	62	314
A6431	9	34	31	92	83	46	295
A5489	—	48	21	80	78	42	269
A6248	3	23	32	110	88	27	283
A6023	7	40	16	72	70	42	247
A6242	1	8	7	80	58	35	189
A6248	1	16	27	118	67	16	217
A6593	1	10	9	59	68	8	155
BRS27806	6	35	20	67	64	4	236
A6923	4	29	14	54	40	27	168
A5466	8	24	27	41	30	37	167
BRS31172	1	9	18	57	54	13	139
A6179	3	17	14	66	34	4	138
A4253	1	14	8	28	27	11	89
A6220	1	16	24	95	15	18	169
A6444	2	22	14	81	14	9	142
BRS28198	2	27	32	1	—	20	82
A6498	4	14	2	17	8	11	56
A6201	—	42	24	47	—	—	113
A6144	—	4	15	62	—	—	81
A6098	5	11	29	31	—	—	76

(This month's table is in order of 21 plus 28MHz totals).

SOCIETY AFFAIRS AND NEWS SUPPLEMENT

A brief report of the Council Meeting held at Society HQ on 8 September 1969

Present: *J. W. Swinnerton, President (in the Chair), Messrs B. Armstrong, N. Caws, J. Etherington, J. C. Graham, R. J. Hughes, A. F. Hunter, E. G. Ingram, G. R. Jessop, H. E. McNally, L. E. Newnham J. Petty, R. F. Stevens, G. M. C. Stone, F. C. Ward, E. W. Yeomanson (Members of Council); A. E. Dowdeswell, general manager, and Dr J. A. Saxton, President-Elect.*

Apologies for absence were received from Messrs D. M. Thomas and G. Twist.

Membership and affiliation

It was resolved: (i) to elect 113 corporate members and 33 associate members;
(ii) to grant corporate membership to eight associate members;
(iii) to grant life membership to Mr P. Helm, G8AEN;
(iv) to waive the subscription of six members due to blindness or other disability according to the articles of association. Reduced subscription was granted to one member according to the articles of association.

The President made a brief report on his private visit to the USA. He had received a most cordial welcome at ARRL Headquarters.

Society accounts

Mr Caws explained various items in the accounts and these were adopted by Council, subject to final audit. The treasurer's report was also approved.

Award of Society Trophies

After discussion of nominations, the following awards were made:

Founder's Trophy F. E. A. Green, G3GMY.
ROTAB Trophy E. J. Allaway, G3FKM.
Calcutta Key R. A. Vanmuysen, ON4VY.

Region 15 ORM

The President agreed to represent the Society at the Region 15 ORM in Northern Ireland on 11 October.

Profiles of committees

Mr McNally, chairman of the Membership and Representation Committee, reported that the *Profile* of that Committee had been submitted for publication.

Presidential installation

The date for the installation of Dr J. A. Saxton as President of the Society for 1970 was fixed for the evening of Friday, 16 January, at the Bonnington Hotel, London WC2.

Editor

Mr Stevens reported that Mr A. W. Hutchinson would join the Society's staff on 15 September, 1969.

Council Report 1968/9

The final draft of Council's Report, which had been prepared by Mr Stevens, was approved for publication.

Recommendations of Committees

The following recommendations of Committees were accepted by Council:

RAEN Committee (*A*) That Mr J. A. Rollason, G3WCO, be co-opted to fill the vacancy caused by the resignation of Mr J. Kingston, G3VK.
(*B*) That the *Raynet Trophy* be awarded to the County of Sussex for its progress during the past year. A certificate is to be awarded to each of the Groups, namely, North, East and West Sussex RAEN Groups.

HF Contests Committee That the Low Power Section of the BERU Contest be dropped and that the BERU Rose Bowl be awarded to the overall runner-up.

VHF Committee That the 4 Metres and Down Award should be extended to include the 13cm band and that the qualification should be three countries and 15 counties.

70cm Band

The VHF manager reported that certain official stations had now vacated the 70cm band following an approach by the Society.

Council was in session for 4½ hours.

Month on the Air—continued

10m. Was very good in early September. **0700** AP2MR. **0900** WA4MMO/KC6, YB0AAF. **1000** KG6AQY, VK9RY. **1100** VK2WX/VK9, VQ8CX. **1200** KX6FJ, PJ7JC, VK9s BB, BG, VS6AA, 4S7PB. **1400** CR9AK (QSL CT-IBH), TR8DG, VU0BEO, WC4GSC. **1500** EA9ER, FP8CY, VQ8CW. **1600** *VS9MB*. **1700** 9G1GG. **1800** VP8JT (Antarctica), VQ9EP, ZD3K, *9L1HC*. **1900** FY7YQ, VP5AA. **2100** VP2GLE, ZL3s LE, VY (via LP).

Gratitude is expressed to the following for permission to quote from their publications: **CQ DX** (*ARI*), **NARS Newsletter** (*5N2AAF*), **Long Skip** (*VE3DLC*), **QUAX** (*SM4DXL*), **On the Air** (*ON4AD*), the **West Coast DX Bulletin** (*WA6AUD*), **DX-press** (*PA0TO*), **DX News Sheet** (*Geoff Watts*), the **Ex-G Radio Club Bulletin** (*W3HQO*), the **DX'ers Magazine** (*W4BPD*), and **Florida DX Report** (*W4BRB*).

Please send all items for **December** issue **to reach G3FKM** no later than **12 November,** for **January** by **10 December,** and for **February** by **10 January.**

FOUR METRES AND DOWN

A monthly account of vhf activity and news compiled by JACK HUM, G5UM*

A UK "Oscar"

A proposal to form a project group

Orbital satellites carrying amateur radio (in short, OSCARs) have developed from the original simple device that emitted on 145·8MHz the Morse symbol HI plus telemetry information as it circumnavigated the globe, through to the sophistication of Oscar 4, whose capability of receiving signals at one end of the band and retransmitting them at the other offered opportunities for intercontinental contacts on "Two".

These American-made devices went into orbit by courtesy of space agencies as and when accommodation could be found for them in rocket vehicles. From this work done five years ago have sprung such things as the AMSAT project (see this page, July 1969) and the very promising and highly developed package which our VK friends have designed and built—Australis 1.

Noting the advanced level of the electronic art in Britain, and in particular the vhf amateur radio side of it, many people have voiced the thought that some Oscar-type activity ought to be going on here. Second thoughts obtrude when the cost is counted.

Well, what would it cost? The answer is: £300, plus.

And who would undertake the work? The answer here is that even if any one member had £300 to spare, the task of designing, building and testing a radio satellite is such an enormous technical and time-consuming one that only a team of some size would have the ability to bring it to fruition.

There *is* such a team. It is the South Coast VHF Group, whose membership is made up very largely of transmitting amateurs professionally engaged in R and D work. This group has already brought to an advanced stage a design study for an orbital satellite that would receive transmissions beamed to it in the 144MHz band, re-radiating them in the 432MHz band—in other words, a device with distinct promise as an initiator of global amateur communication on 70cm.

Designing the package to full professional standards and applying full environmental tests is one part of the story; another part is getting it into orbit. And here the South Coast VHF Group through their professional contacts have facilities for arranging for such a satellite to be carried aloft.

The third part of the story is of course finding the money. However valuable such a project may seem to be scientifically to most readers of "Four Metres and Down," this opinion is unlikely to be shared by the marginally larger proportion of Society membership to whom vhf is not everything. In consequence there can be no charge on the Society.

It is therefore proposed to form a national project group to enable this work to be financed, and to invite members' comments upon it.

And what is the venture to be called? Why, PROJECT TRIDENT, to identify it slightly with the island race without appearing to be too chauvinistic, and to underline the tripartite contribution of South Coast Group, of the launching agency, and of RSGB membership to its success. More about Project Trident over the next several months. Meanwhile, your comments, gentlemen, please.

The simplified zoning for "Two"

With the introduction of the revised vhf/uhf band plan less than two months away, readers may like to be reminded of the simplified zoning arrangements which will apply to the area of maximum population, the 144 to 146MHz allocation. These are:

144·0 to 144·15MHz Telegraphy.
144·15 to 144·5MHz Zone A, the South West.
144·5 to 145·1MHz Zone B, the South East.
145·1 to 145·5MHz Zone C, the Midlands.
145·5 to 145·95MHz Zone D, the North, Scotland, and Northern Ireland.
145·95 to 146·0MHz Beacons.

Because the new zones are wider than the old, the general effect will be to enable operators to have more room for manoeuvre frequency wise; that is, if they want to. Where they do, and where in a minority of cases crystals have been made redundant by the new plan, tell "Four Metres and Down" the frequencies of crystals required (or for disposal) so that they may be listed in "Xtal Xchange" on this page.

For full details of the new UK bandplans see "VHF and UHF band planning for the Seventies", page 725 last month.

The microwave front

Across the Channel on 3cm with G3RPE/P working F2FO/P (this page last month). Now comes news of success on a lower frequency band—the term "lower" is very relative. Alan Wakeman, G3EEZ, and Les Sharrock, G3BNL, have just established what may well be a UK record for the 9cm (3,400MHz) band by working one another from portable sites at Painswick and Enville across a 50-mile path.

This was on 28 September, and the G3BNL/P signals were

* Houghton-on-the-Hill, Leicester, LE7 9JJ. Send reports for the December issue by 10 November, and for the January issue by 6 December.

RS55 at the Enville end. At Painswick the G3EEZ/P pulse signals registered RS59, special permission having been obtained from the GPO to use pulse on a band from which normally it is barred.

Aerials in use were a 3ft dish with waveguide feed at G3EEZ/P and 4ft and 2½ft dishes at G3BNL/P.

More interest in 9cm: Martin Collar, G8AGM, reports having obtained a reflex klystron which covers this band, and produces about 200mW out at 3,450MHz. He hopes to develop a "Polarplexer" type transceiver before long.

G8AGM was one of several stations visited by F1RJ, "the French half of our cross-Channel QSO," as Martin puts it. By the time he departed from the UK a vivid impression of British activity on the 13cm band had been left in the mind, of F1RJ, helped in no small measure by a QSO which was set up for his benefit between G3MCS out on the Chilterns with G3FP at Thornton Heath near Croydon, described as a demonstration of what has come to be a routine operation on 2,304MHz.

During discussions about uhf techniques in general, F1RJ described how he has managed to circumvent the shortage of microwave varactor diodes which exists in France: as the final doubler in his 13cm transmitter he uses nothing more than a homely 1N914 computer diode, which can be obtained very cheaply. This delivers an estimated 300mW output on 2,304MHz for an input of 2W on 1,152MHz. "I can vouch for the strength of signal which this produces," remarks G8AGM.

Although with G3BNL/P and G3EEZ/P the big excitement has been the 9cm contact, this is not to say that 13cm has been neglected. There have been several expeditions during the summer months in attempts to extend the distances covered on this band.

On 13 July rain and low cloud, big inhibitors of microwave success, did their worst over the 135-mile path between Winter Hill and Painswick, although one burst from G3BNL/P at RS57 was briefly heard.

On 3 August (more torrential rain) signals at RS59 were exchanged over a 100-mile path, Clee Hill to the Chilterns; but when G3EEZ/P moved 15 miles farther west to the Long Mynd, higher than Clee but with Clee on the path, the signals disappeared altogether.

A test on 17 August over a 70-mile path produced what G3EEZ describes as "the usual RS59 plus signals." When nothing more than the "oil can feed" device described in "Tech Corner", August, was used, the G3BNL/P signals were still RS55 at the 'EEZ end.

On 14/15 September, that foul weekend when most of us were feeling thankful that VHF/NFD had been held the weekend before and not then, G3BNL/P and G3EEZ/P were out. A proposed link between Glaisdale Moor in Yorkshire and Dunstable over 183 miles was thwarted by the weather. "We had to resort to the A1 mode on 2m!" says Alan Wakeman.

Across the Channel on 3cm

From Dr Dain Evans, G3RPE, has come the full story of the contact he made on 3cm with F2FO, briefly reported here last time. Each station was operating portable from the cliffs on their respective sides of the English Channel, a distance of about 25 miles, G3RPE/P being on 10,030MHz and F2FO/P on 10,060MHz. Good strong loudspeaker signals were exchanged both ways.

Video on "Seventy"

Many 70cm operators are equipped with wideband converters capable of putting amateur television signals into domestic receivers. What they frequently lack is knowledge of when Stroke T stations within range of them are active. If required, "Four Metres and Down" will print G6-plus-3 operating times and frequencies, and—if the information is forthcoming—details of who is equipped to receive them, apart from other Stroke T licensees.

As from 1 January, the video segment of 70cm will start at 434MHz, with accompanying sound in 433·5 to 434 where this is convenient.

There were plans to attempt to bridge the 100km path from the Isle of Wight to Cherbourg during VHF National Field Day the following day. That would have been quite a booster to the VHF/NFD score of the Harrow Club, with which G3RPE is associated, but on this occasion was not to be: F2FO was unable to make the journey to Cherbourg at that particular time.

"Essentially the equipment used is a simple transceiver, built upon ideas generated by the G5FK Group," says Dain Evans. It consists of an 11in length of waveguide at one end of which is mounted the aerial feed set in a 9in dish, with a CV2154 diode at the other end. At intermediate positions are a home-built cavity wavemeter and a 732A/B klystron pulled into the amateur band. Portable power supplies consisted of a conventional inverter fitted with 300V gas stabilizers feeding the resonator, and a couple of 120V ht batteries for the reflector.

On transmit the diode acts as a power indicator necessary for adjusting the klystron reflector voltage, and for frequency setting, using "suck out" by the wavemeter. The transmitter was frequency modulated using either a magnetic microphone or a tone generator feeding the reflector directly. Although the output was only an estimated 15mW the 30dB gain afforded by the dish turned this into a useful 15W of effective radiated power.

On receive, the klystron was used as the local oscillator and the diode as a mixer. This fed a four-stage if amplifier at 30MHz, having a 5MHz bandwidth, a Foster-Seeley detector and an audio amplifier.

Although only bare details are to hand of the 3cm equipment used at F2FO/P it is known that for the historic contact of 5 September he had an fm transmitter employing a TV85 klystron that delivered 350mW to a 20dB horn aerial. In the receiver was a 2K25 klystron as local oscillator, with afc.

The A1 Mode—Again

The Class B licensee wishing to work up his Morse code speed should seek the aid of local Class A men prepared to help him by paying regular visits to pump it into him.

The suggestion was made here a couple of months ago in the light of the fact that many areas have enough cw men

around the place to make this blitz method of Morse tuition possible.

But many areas do not—or if they do the local cw men are either too heavily committed in other directions to be able to spare a night or so a week each to give code practice, or just do not have the inclination. What does the poor Class B man, out on a limb, do then?

One thing is certain: the RSGB Slow Morse practices ought to claim his priority attention. Year after year these have been pounded out by "Mac's boys" to a receptive audience whose size can only be guessed but whose steady transition to Class A status is undoubted. The aspirant to a G3-plus-three licence is well advised to use this service, if it is within range, to supplement whatever at-home practice he may be given by local members.

It might be thought from the size of the list of slow-Morse senders which appears in *Radio Communication* that there is adequate coverage of the country. This is not so. Many more helpers are wanted, especially in the 2m band, G3KGU tells us. Mac himself has been sending slow Morse every Wednesday for 11 years, and many of his helpers can claim to have served the cause of inculcating the code for almost as long. Others who would like to assist should drop a line to G3KGU at 25 Purlieu Way, Theydon Bois, Essex.

It ought to be emphasized that sending slow Morse on the air while not in QSO amounts to broadcasting and does not accord with the terms of the licence. By a special dispensation from the licensing authority to the RSGB such broadcasting is made legal in the case of "Mac's boys" so long as the slow-Morse sender is a member of the Society and is shown in the list published in this journal.

* * *

One of the slow-Morse team, G3KAN, Alan Shrewsbury of Northampton, who gives a service on 160m every Monday at 8pm, transfers his attention to "Two" afterwards and may be heard in the cw sector from 9pm onwards.

In south-west London G3NWG comes up on 144·08MHz every Friday at 10pm; he has vxo facilities to provide netting anywhere in the bottom 150kHz of "Two."

Another Friday nighter of long sitting is EI6AS, to be heard a few kHz inside "Two." Remote from most populated vhf districts, and dx to nearly everyone, Albert is a compulsive and compulsory user of the key on 4m, 2m and 70cm.

Another member who is dx to many is Fred Crisp, G3GZJ, of Redruth, whose marvellous site and well run station help him put a signal up country when even GB3CTC is inaudible. He is vfo-controlled in the cw segments of 4m and 2m.

Also vfo-controlled at the bottom end of "Two" is Bill Lord, G5NU, of Reading. Look for him on 70·06 and 432·1 as well. He says, "I listen for 4m cw almost every evening beaming north at 7pm and 9-10pm, clock time. I listen on 70cm most evenings and 2m sometimes."

Long-term member of RSGB (he was once BRS536) is G2QY of Cheltenham, who frequently goes out on to the hills above the town to work the "Stroke P" mode in the cw end of 2m. Here is Gloucestershire for those wishing to collect the county.

Farther north, G3XAC of Burnley is active every Tuesday night on 144·06 between 9.30 and 11.30, clock time. And on Monday nights after the customary sideband session he checks the cw segment for signs of cw activity.

BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG	Craigowl Hill, Dundee	145.950 MHz	A1	S
GB3CTC	Redruth, Cornwall	144.13 MHz	A1	NE
GB3GW	Swansea	144.250 MHz	A1	ENE
GB3GM	Thurso	70.305 MHz	A1	N/S
GB3GEC	W. London	434.000 MHz	F1	N/W
GB3SC	Sutton Coldfield*	433.50 MHz	A1	N/S
GB3SU	Sheffield (temporary location)	70·695 MHz	A1	Omni
GB3SX	Crowborough,Sussex*	28.195 MHz	A1	E/Omni
GB3SX	Crowborough *	70.699 MHz	A1	Omni
GB3VHF	Wrotham, Kent	144.500 MHz	F1	North-West

* Not operational

ZB2VHF is now operational on 50·0092, 70·311 and 145·1298 MHz. Reports to G3JHM.

Field work

Conditions normal for much of the time, but 260 stations worked on 4m, 2m and 70cm. This sums up the results of the expedition to the Isle of Man which used the call-sign GD3XAC/P and was operated by Lancashire's G3XAC and G3VRW from an 1180ft windswept hilltop. "A thank you to all the people who stood by to work us," says Chris Whitehead, G3XAC. It was a rigorous but rewarding two-man effort.

To Herefordshire went a three-man team of G3VPS, G3SJV and BRS Allin from Sussex, to cause a flutter on 4m at the appearance of this rare county. All prearranged schedules were met, but fading caused many drop-outs of random QSOs.

"One thing that did surprise us was the number of stations to be found on cw," reports G3VPS, adding that all northern stations were worked on the key—there was screening on the northerly path from the 1300ft site near Hay on Wye. An additional bit of news he imparts is that G3WRA of Hereford is now on "Four," who, as he puts it, "should take Hereford from the 'Wanted' list!"

A potential expeditionary during term times is G8BVP, now at Loughborough University for the next three years. He plans portable operation from Leicestershire and possibly from Rutland on the 2m band. For schedule-fixing he may be reached at 63 Middleton Place, Loughborough.

Six more parchments

Although only six claims for "Four Metres and Down" operating awards were processed at the October meeting of the Society's VHF Committee, they happened to be an even more than usually interesting batch.

In particular, congratulations go to G3JEQ of Surrey on securing the 22nd 144MHz Senior Award. Where the "Senior" is concerned perspicacity needs to be succeeded by patience while the last few cards from the needful 15 countries trickle through. The 60 counties are usually quicker in coming if SAEs are sent. On 4m G3JEQ secures also Certificate No 68, and to G3OHC of Sutton Coldfield, a regular user of "Four" most Sunday mornings, goes No 66.

In the 2m clip Brian Cockell of St Albans, G8BJK, brings to two the number of claimants in the G8B——callsign block (G8BQX, see last month, was the first). He gets Certificate

No 130. And No 131 goes to a real old timer of vhf, Ted Laker, G6LK, of Cranleigh in Surrey: he was operating on metre wavelengths years before many of today's Class B men were born. It has been good to hear his famous call-sign activating 2m again.

A further "Stroke P" claim was dealt with by the VHF Committee last month: Bill Scarr of Weston earns the 4m certificate No 67 for G2WS/P. Which prompts us to a comment or two about claims for portable operation.

When a member takes a vhf rig on holiday with him with the idea of making a few friendly contacts and savouring the feel of his favourite band in another part of the country, it is generally possible for him to pick up some extra counties which would be unworkable from home. This might well happen, for instance, to a GM visiting the south or to a G on a tour of Scotland.

Now although the prefix changes if you move into a different UK country you are still the same portable station whether you sign G8LM/P, GM8LM/P, GW8LM/P, or whatever. So you claim for *one* "Stroke P" certificate irrespective of location travelled to or prefix used. The same of course goes for "Stroke M" claims.

The man in an impossible home location with little chance of working 5 plus 30 need not abandon hope of ever acquiring a "Four Metres and Down" certificate to adorn the radio room wall; the "Stroke P" mode may be the way to get it.

Encore for "Four"

The Pennine VHF Group's 70MHz contest drew such big support and so many requests for "let's have another" that the group will almost certainly oblige with a repeat in 1970. Organized along RSGB contest lines, the event showed up the potentialities of the 4m band by producing dx up to 615km range (Scotland to the South Coast), with plenty of more modest QRBs turned in under quite average conditions.

Secretary D. Carden of Rochdale tells us that prizes of bottles of whisky go to Willie McClintock of Chelmsford,

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VHF PERSONALITIES—No. 12

G3AOS and G8CJQ Geoff and Robert Barnes of Cheshire

Browsing through the columns of the RSGB Callbook can be a fascinating exercise by the remarkable number of coincidences of name that it throws up. For example, are G3GUD and G8BAV related? Yes, they are. And G3FZL and G3SGN? They are husband and wife. What about G2FNW and G8AKE? They are father and son. And G3BKQ and G8AWW? Same again. All of the above, incidentally, are vhf/uhf orientated.

Now that the 1970 RSGB Callbook has come out there is another father and son pair listed. They are G3AOS of Hale Barns in Cheshire and his son Robert, the latter having acquired the callsign G8CJQ last February, after passing the RAE with flying colours at the age of 16. By the time the 1971 Callbook is published Robert may well hold a Class A licence: he is coming on apace with the cw. (Have they reserved G4AOS for him we wonder?)

By 1971, also, G3AOS himself will have reached his "quarter century licensed" stage.

For most of those years G3AOS has been a metre-waveband man. After a spell on 5m "Two" claimed him from the time it was granted in 1948. In the ensuing 21 years most people who have heard him operate regard him as almost an archetype of the unaggressive and ever-helpful sort of person so often to be met with on vhf. He devotes an infinite amount of patience to keeping long haul schedules when by all the rules contact should be virtually impossible.

More than once he has helped out 2m holiday makers who had taken the rig along "just to get a contact or two in the evening," only to find that the band was empty—or would have been except for the appearance on it of G3AOS with beacon-like regularity to give them comfort and conversation.

This he will do on any mode required, cw, phone, or single sideband, from his hilltop station 220 feet up in the outer commuter belt of the Manchester conurbation.

The G3AOS 2m transmitter uses a pair of 4/65A valves with TZ40 modulators while ssb comes from a pair of 4X150s, transverted by 14 MHz injection from a KW2000A. The 2m aerial is a 10-element Yagi at 40 feet, remotely controlled.

Now aged 57 and Northern Sales Manager for one of the largest of UK telecommunications consortia, Geoff Barnes's radio interests date back to the Twenties and the amateur callsigns to be heard on 440m. Interests in outdoor sports compelled amateur radio to take a back seat until 1946.

Robert Barnes, G8CJQ, is still at College, eagerly awaiting the day when he may be able to join one of the radio communication or Government establishments. He has just completed a small QQVO3/10 transmitter "in order to show the OM that power is not everything," as Geoff puts it. There are also Gillian, who is in Miami, and Peter, who is with the RAC.

who was the winner in the portable section with GM3VPK/P; and to Roger Hargreaves, of Mow Cop, G3OHH, winner in the fixed station section.

"Four" should be getting another good airing in just about a month's time: the RSGB telegraphy contest on this band is slated for Sunday, 7 December. Brasses polished up?

Another VHF group

News comes from John Mulye, G8ALM, that a new vhf/uhf group has now been formed in his part of London. It is called The North-East London VHF/UHF Group, and it meets at "The Shack," Wanstead Community Centre, The Green, Wanstead, London E11.

Already among the founder members, all RSGB, there is activity on 2m, 70cm and amateur television. They cordially invite all metre-wave activists within travelling distance of Wanstead to join them any Friday, though G8ALM adds that someone is on duty in "The Shack" almost every evening.

Given a regular series of tech-lectures relevant to the metre-wave world, the new group should be all set for a bright future in an area where activity on 4m and down is notably high. All success to them.

* * *

For its November meeting the Leicestershire VHF/UHF Group has the subject of "Aerial masts and towers, and planning permission problems" down for a discussion that will be led by G3EGK, who has built up a valuable dossier of information about it. This is a topic which is becoming increasingly "hot" in many areas and, to sustain the simile, requiring ventilation.

Date: Thursday 20 November. *Place:* Leicester Polytechnic, room 45. *Time:* 7.30pm. All welcome. No membership formalities; just a shilling a head from those who go.

Varactors—multiplied

When Jeff Harris, G3LWM, asked "Four Metres and Down" to publish a small piece saying he had a few Sylvania varactor booklets to give away, he expected perhaps a couple of dozen applications for them. Three weeks after the note appeared here in September he had had over 300.

"I had no idea of the publicity value of *Radio Communication* . . . perhaps something that should be drawn to the attention of the advertisers!" remarks 'LWM.

The situation now is that Jeff's stock of the booklet is exhausted, and a reprint is unlikely to appear for about 18 months. In order not to disappoint those who took the trouble to write to him he is sending what data he has available on varactors and other microwave devices.

Xtal exchange for RAEN?

There was a very practical and sensible suggestion by G3PAZ in "RAEN News" for September about a diplomatic swop of crystals among RAEN groups who suffer from interference on "Four." If "Four Metres and Down" can help in respect of RAEN crystal-exchanges then we will willingly provide space to publish details.

Naturally, RAEN groups which have already laid out cash to buy crystals for a local spot frequency are reluctant to have to find another lot of cash for *another* spot frequency. Some diplomatic swopping may be the answer, especially if directed towards the less populous top end of the 70MHz band.

Send us details of quantities of RAEN crystals available and frequencies, together with information on frequencies wanted, and we will print them here.

Tech Corner

From G3MNQ (Eric Goodwin, Dunton Bassett, Rugby)

A number of inquiries have been received about the 70MHz meteor-scatter converter which appeared as an incidental part of the writer's article on meteor scatter in the August issue of *Radio Communication*. It seems that a number of people are planning to build this converter for communication purposes.

In particular there has been some interest in the inductor-capacitor arrangement at the input to the AFZ12 mixer.

The main purpose of this circuit is to provide a low impedance at the base of the mixer at the intermediate frequency chosen: this is essential for optimum conversion efficiency. The circuit also functions as an if rejector to help to dispose of any if signals which may come down through the converter from the aerial. Its tuning will be found to be quite broad.

At the front end of the converter it may be noted that no neutralization is necessary between the two AFZ12 cascode stages. Tests showed that the arrangement was perfectly stable without the complication of a neutralizing coil, and in fact delivered over 20dB of gain at 70MHz.

* * *

On the subject of cascode front ends, an arrangement using two FETs may be of interest. It is shown in the diagram at Fig 1. Its similarity to a valve cascode will be evident.

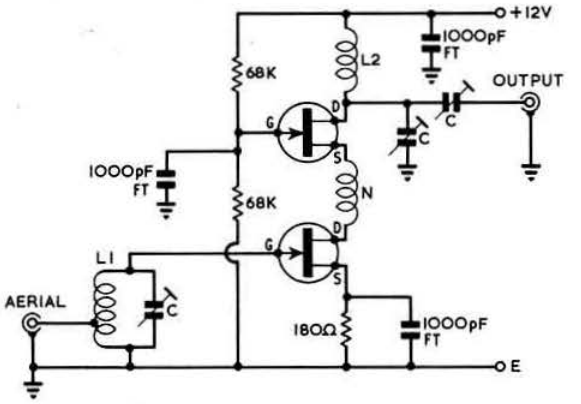


Fig 1

For 2m the inductors L1 and L2 should have about three turns 0·3in diameter self-supporting, L1 being tapped one turn up. For 70MHz these values should be doubled.

The neutralizing coil N between source and drain of the two FETs is an optional extra that may slightly improve the noise factor (if you can measure it!) but as in the bi-polar front end referred to earlier is probably not worth the additional complexity.

The capacitors marked C may be 1–6pf variable: those following L2 serve to match the output of the amplifier into the following mixer or converter.

Biassing arrangements are set up to give a flow of 3mA from a 12V battery.

From G3XIW (Mrs Kay Priestley, Slough, Bucks)
The Pye Group filter type AGO 6994, which is a vhf notch filter, is available to protect transistorized television sets from breakthrough by vhf transmitters. It can be obtained free through dealers for Pye Group sets, but may also be bought from Combined Electronic Services Ltd, 604 Purley Way, Croydon, Surrey.

The sketch shows how the attentuation varies with frequency.

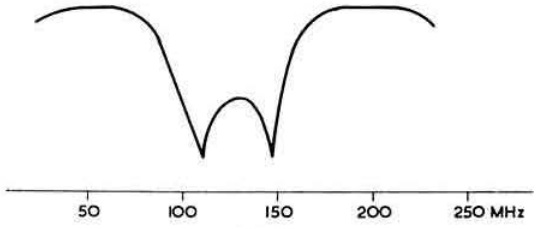


Fig 2

As supplied, the core which controls the notch is locked in place, but this can be loosened with a drop of methylated spirit at each end and adjusted for the best notch at 145MHz. A specimen filter was capable of 30dB of attenuation at 145MHz with negligible loss on Bands I and III, and so has a comparable performance to a coaxial stub, but is much neater. See Fig 2.

It is rather cheering that manufacturers are at last taking some interest in problems of breakthrough.

Incidentally, we thoroughly agree with the note by G3PMJ that 72 × 2 is an admirable way of getting to 144 without masses of harmonics all over the place.

From G3AHB (Les Coote, Slough, Bucks)
I have been experimenting for some time with an overtone circuit to take the more commonly available 43MHz third overtone crystal to make it go on the fifth overtone at 72MHz, to provide a simplified and cheaper arrangement than using 72MHz fifth overtone HC6U crystals. The output from the CO drives a three stage transistor transmitter using a 2N708 doubler to 144MHz and a 2N2218 driver into a 2N2219 pa, all in grounded base on a 15V supply. The output stage delivers a quarter of a watt of rf.

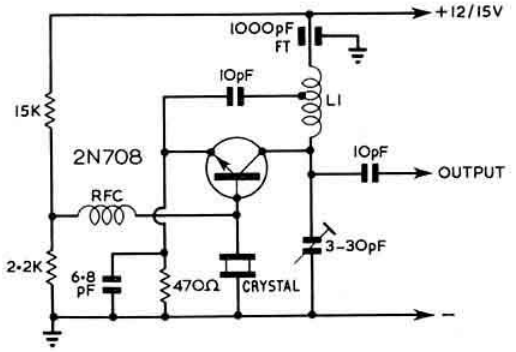


Fig 3 The overtone crystal oscillator circuit recommended by G3AHB, to provide 72MHz output from a 43MHz crystal. The inductor L1 requires 5 turns of 22 swg tinned copper wire, self-supporting at ⅛in outside diameter and ½in long. The tap is 1½ turns from the cold end. The choke RFC has 15ft of 34swg enamelled copper wire on a small 47K resistor

From G8AGM (M. D. Collar, High Wycombe)
Here are further details of the crystal controlled equipment used for 13cm portable operation by G8AGM. A block diagram of the transmitter is shown in the sketch. The input to the final driven pa stage is 10 watts, amplitude modulated, and the rf output is 2·5 watts at 2304·1 MHz. Overall consumption when the equipment is used in the portable mode from a 12 volt car battery is 10A.

Amplitude modulation is applied directly to the pa stage alone, because any attempt to modulate earlier stages, as is sometimes advocated, results in " scrambled " speech from the varactor multipliers.

The receiver converter uses a self-excited transistor oscillator directly on 2280 MHz, as described last month. This necessitates some form of crystal marker for calibration purposes, the tuning range of the converter being 2150 to 2500 MHz! A harmonic generator is a permanent part of the G8AGM/P set-up. It gives an output on precisely 2304 MHz at a level of about minus 40dB. This signal can be detected up to sixty feet away, using only a quarter wavelength of wire in both the marker and the converter aerial sockets. The AAZ12 final diode sits in a cavity fashioned from a circular tobacco tin.

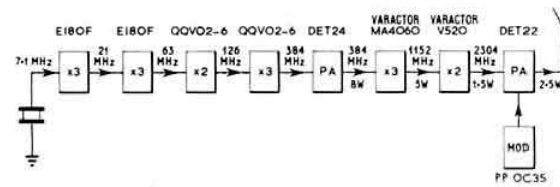


Fig 4 The 13cm transmitter at G8AGM uses a straight through DET22 power amplifier

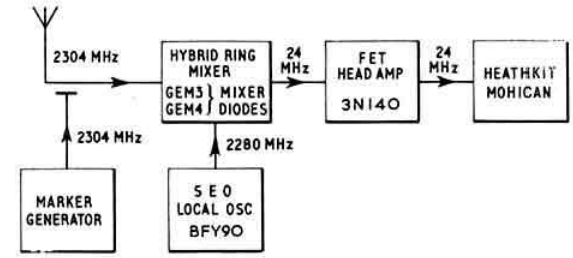


Fig 5 The 13cm receiver line up at G8AGM

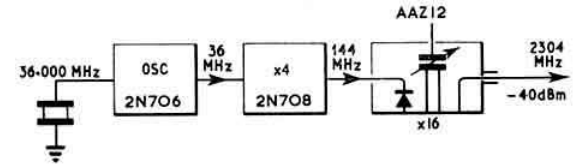


Fig 6 A simple two-transistor and one diode circuit gives G8AGM a calibration point on the receiver tuning scale at 2304MHz

I feel that some mention should be made of the virtues of the hybrid ring mixer shown in the block diagram, as its use with a self-excited local oscillator is almost mandatory by reason of the very good isolation of signal and local oscillator which it affords, and the very modest LO power requirement.

From G3PBV (Dave Sellars, Newton Abbot, Devon)
Having been very active restoring an old cottage, I have not had time to get round to commenting on the interesting NBFM circuit described in Tech Corner for June by GM3UWX. This is similar to the arrangement I used at the former Northampton QTH for a number of years, although in my case I had an E180F as an oscillator with an 85A2 screen stabilizer. The anode was tuned to 24MHz by strays alone. A reasonable amount of phase modulation of this circuit occurs, to enhance the fm produced in the grid circuit. The modulation is corrected in the normal way by introducing top cut.

I found that the anode tuning affected quality, best results being obtained by arranging for it to be detuned 3dB on the lf side (no worries about loss of output: the E180F can produce 2mA through 100,000 ohms into the half-12AT7 following multiplier!).

I hope a study of the circuit will persuade more people to try NBFM, and enjoy some of its undoubted advantages.

What they say

"Would you remind readers to look out for dx by meteor ping during the Leonids, 15 to 18 November? The peak is expected at about 1am on the morning of 17 November"—Ron Ham, BRS15744.

* * *

"Have exchanged my call-sign from G8AZO to G3YQA. The schedule on 70cm from here in Hull across the Pennines to GW8AHI is continuing under the new call"—G3YQA.

* * *

"Would welcome weekend skeds with any southern counties, especially Devon and Cornwall . . . am going out for that Four Metres and Down certificate. Have 130W and a 10-element Skybeam"—G8BZN, of Burbage, Leicestershire, but address for sked-fixing is D. V. Goadby, Newton 26, Rugby College of Engineering Technology, Eastlands, Rugby, Warwickshire.

* * *

"UG6AD in Asia? Not on my map it isn't! Georgia, Armenia *et al* are in Europe"—G3COJ (Apologies from the "Is my face red" department: this page last month).

* * *

"Here's something to match Ron Ham's quick QSL turn-round. After a recent lift in conditions I posted a report to a GW in Cardiff at 8am with a 5d stamp and a 5d sae. Within 48 hours the GW QSL was at my home address . . . a word of praise to the GW and to the GPO"—A4626 (J. Clay of Margate).

Here and there

Wondered why GB3VHF gives a bigger signal these days? It is because the power output has been peaked to 50W of rf. This comes from an 829B final powered by a psu using EY82 rectifiers. Spares are hard to get for these valves. If *you* have any surplus to requirements and feel inclined to donate them to GB3VHF, beacon keeper G3BPT will be glad to put them in the spares box at Wrotham.

* * *

A popular number at the RSGB Show was the large-scale QRA Locator map. Over 250 were sold. Send 9s to RSGB HQ and one will be sent to you safely packed in a postal tube.

* * *

Hermetically sealed buildings with windows that do not open are all very nice and modern but present difficulties if co-ax is to be run out of them. This problem faced GB3MAN during Manchester University's science open day. No aerial could be put outside. Operation had to be from a halo inside. Contacts were fewer in number than had been hoped. "Apologies to those who couldn't work us," says Pete Best, G8CQH, the University's radio society chairman.

Now aerial problems *have* been solved, and the University club is active as G8CQH/A or under its own G3CXX. Look for it on "Two" now, 70cm later.

* * *

Every night an' all, two Derbyshire stations, G8BGW and G8CKX, keep a schedule on 433·6MHz. Afterwards, from 9.30pm on, they look for other contacts. "We would welcome 70cm QSOs from any stations in any directions," says G8BGW.

* * *

The request for a copy of *Artificial Earth Satellites* for the Manchester schoolboys (this page September), brought one promptly from John Allen, BRS27331, to the expressed gratitude of G3RHI, the boys' teacher.

* * *

Mistaken identity again? Nottingham's G8BSH had a 2m contact with what sounded like G8BEI of Bridgwater. But G8BEI has not been on the air this year. Possible pirate? Unlikely: pirates prefer easier bands to pollute than the vhf ones, and in any event are too easily pinpointed by directional aerials. Two Midland G8 men hearing nasty noises on 2m located the actual house they were coming from. As it happened, it was not a pirate but someone's unstable converter taking off. But it showed the order of accuracy possible in tracking down the misguided.

* * *

Call PA0CML of Kootwijk the "Two John Fox" of Holland and the comparison would be apt; his signal holds up on "Two" when all else has disappeared beneath the noise. On 11 October he worked his 1,000th British station on 2m—it was G8CQP/A. Two days before this he had worked his 1,000th German station, DJ8PLA, on "Two" at a range of 400km.

* * *

Thirty-six counties on 2m with a watt of frequency modulated transistor power from a site 60ft above Thames level. Who? Why, old timer Fred Lambeth, G2AIW. And his QRPP dx-getting is consistent, too. At the cw end of "Two" he worked an F at Reims at 250 miles with only half a watt in.

* * *

"Dustmen's strike affects 4m". Headline in *The Times* last month. Thanks, Peter Blair, G3LTF, for this one!

VHF NATIONAL FIELD DAY 1969

By VHF Contests Committee

Overall winners
Mid-Essex VHF/UHF Contest Group

Overall runners-up
Pennine VHF Group

Band winners
70MHz-Blackpool and Fylde Amateur Radio Society
144MHz-GB2GD Expedition Group
432MHz-G8AWS
1296MHz-Mid-Essex VHF/UHF Contest Group
2300MHz-G3EEZ and Loughborough Radio Club

Country winners
England-Mid-Essex VHF/UHF Contest Group
Wales-Midland Amateur Radio Society
Scotland-Albright & Wilson Amateur Radio Society
N. Ireland-GI8AYZ
Isle of Man-GB2GD Expedition Group

A total of 102 groups and 16 individual operators took part in the eighth VHF NFD, held on 6 and 7 September. Many of the groups were formed for the event and one, Northwest Durham ARC, was noted as "In process of being formed." No doubt G3KRG would like to hear from prospective members. Some original titles were assumed, notably the "Three Dee Bees" who sound as if they may have escaped from the Top Twenty. As for the "Ysbyty Ystwyth" Contest Group, the adjudicators are working on a rule compelling them to use this unpronouncable combination as a contest exchange next year!

In addition to all the entries, check logs from G2FLG, GD2HDZ, G3ABM, G3LTN, G3MWF, GC3OBM, G3REP, G3RRK, G3VSA, G6HD, G8AEL, G8ART, G8BKR, G8CBZ, G8CCP, G8CEZ, and G8PX (Oxford & District ARS) are gratefully acknowledged.

Listeners BRS15822, BRS28005, A5032 and A6054 also sent in the results of their efforts, and these will be credited to the Listeners' Championship.

Mid-Essex VHF-UHF Contest Group maintained their position at the head of the overall results table, thanks largely to their excellent scores on the uhf bands. Strange to relate, the only band on which they were in first place was 1,296MHz, where they lead AERE Harwell by over 800 points. On 432MHz they were 220 points behind single operator station G8AWS/P, who made no less than 110 contacts from a site near Leek in Staffordshire.

144MHz saw the GB2GD (onetime GB2GC) Group coming out of hiding to win first place from the G3TXR/G8BHY Group. It should be noted that the GB2GC Group rose from 19th overall position in 1964 to hold the top spot for three consecutive years 1965-67. Perhaps their re-appearance heralds a shot at another hat-trick!

Blackpool and Fylde ARS were the leaders on 70MHz with GD3NJN narrowly beating GM3PXZ of Albright and Wilson ARS. The latter dropped over a thousand points from their claimed score, due to errors in measurement and received information. As this well-known club also omitted to send a summary sheet, it appears that their excellent operating is not backed up by suitable clerical effort!

The rules

As was to be expected, most comments on rules concerned the siting requirements and the band multipliers. GD3VXK felt that having all the stations on one site would help in clearing up some spurious transmissions, while Sheffield state that "The 1km radius in Rule 6 is detestable." Southampton ARG viewed Rule 6 with disgust and suggest that contestants should have been consulted and more warning given before its introduction. Many groups submitted revised band multipliers and these will be carefully considered when the time comes to draft the rules for the 1970 event. It appears that 432MHz is somewhat "overweight" and 70MHz slightly so. An anomaly also exists with 1296MHz contacts under 20km.

Several groups comment that it is hardly worth taking gear out for the bands above 1,296MHz. Some of these difficulties may be resolved by separating the uhf bands into their own contest, as proposed by other societies in IARU Region 1.

The entrants who suggested closer radials in the scoring system will be pleased to know that the 150km radial will be re-introduced in the General Rules for VHF Contests in 1970. This reduces a rather big "jump" in scoring distance. The next zone, from 200 to 300km, represents a 50% increase in distance which is felt to be reasonable.

Only two groups used four call-signs, and in neither case does it appear that 432MHz operation continued while higher frequency tests were being carried out.

One group felt that exchanging both QTH and QRA Locator was a waste of time, but this was the only comment on the subject and perhaps at long last we can assume that "this correspondence is now closed."

The entries

The VHF Contests Committee is indebted to G5UM of "Four Metres and Down" for his excellent write-up in the July issue. It resulted in a flood of requests for logsheets, summary sheets and Forms 427. Some were received after the contest, indicating that the groups concerned meant to get the paperwork right at all costs. The overall result is that no group has had to be disqualified for forwarding insufficient details, although a few are missing from the main table of results where the summary sheet was omitted. Several cover sheets of the type used for hf contests were received and accepted as it was assumed that these had been issued by HQ, acting on insufficient information. The VHF Cover Sheet was christened Form 427 to overcome this difficulty!

Two groups have lost points for failing to log locations of stations worked as required by Rule 14. It must be admitted that the rule could be misconstrued, but in each of the groups concerned other stations had entered both QRA and QTH as was intended.

Several entries were received late or were sent to the wrong address. There is little time to spare between the closing date for entries and deadline for *Radio Communication* so unfortunately these logs cannot be checked.

70MHz

Almost everyone on this band agreed that conditions were above average and scoring seems to be limited more by the number of stations available than by the state of the band. Pennine VHF Group, who had the greatest number of contacts, reached No 100 in the first seven hours and took a further 15 hours to make their remaining 65 contacts.

An unusual entry came from G2WS, who adopted a GW prefix for the occasion and operated from a site to the west of Snowdon. This was by way of an experiment to investigate the effect of the mountain range on propagation. The cut-off was so effective that no G stations were contacted and only one was heard. Nevertheless 'WS was able to work 4 GMs, 2 GDs, 2 GWs, 6 GIs and 6 EIs.

G3PGM for Reading ARC suffered interference from a neighbouring group whose transistor tx covered the top end of the band with spurious emissions. Mid-Essex also complained of local QRM.

There was no equivalent to the well-known General Rule II in the rules for VHF NFD but this will be remedied next year!

144MHz

As on 70MHz, most contestants agreed that conditions were above average. There were periods when conditions were very much above average and some good dx was worked between 0400 and 0800 GMT. The best of this period was 980km with G3FZL/P working SK6AB/7 on cw at 0750 from a site near Croydon. Several other contacts approached this distance. To use a culinary term, the Cordon Bleu goes to G3GJY of North Riding, who worked OK1KSO/P at 1217 GMT on the Sunday, a distance of 1,025km. The key was again employed.

GW stations were again much in evidence at the top of the table but were denied first place by the GB2GD group. Last year's winner, GW3NUE/P, had to be content with third place.

The cw band was troubled by occasional intruders on phone, but there was insufficient evidence to disqualify certain stations.

G8BQX for Southdown ARS found Continental stations not over keen on working G stations and requests a bonus for half an hour spent calling SM7BZX who was coming in at 5 and 7. 'BQX was not the only South Coast operator who commented on the apparent lack of Continental activity. GW3ONP of the Wulfrun Group from Wolverhampton mentions that the "F2XN Beacon" was always audible at good strength.

432MHz

With a total of 56 entries, all records on this band have been shattered by a handsome margin. The good weather and conditions are reflected in the slightly greater distances and numbers of stations worked.

Only one station complained of trouble with the third harmonic from their 144MHz station, but several reported trying to work two 144MHz stations whose harmonics were audible at quite good distances! G8ATK of Shefford suggests that 434/435MHz should be used for lining up 1,296MHz contacts, to avoid causing unnecessary QRM.

The top places in the table seem to be reasonably distributed geographically, and it is significant that the maximum distances covered by the stations in the north were not appreciably different from those of the southern stations working into PA0 and DL.

G3BJD of Windscale felt a bit put out when he heard a Midland station say he believed his leg was being pulled when someone told him that there was a station active in Cumberland!

1,296MHz and up

There were four more entries on 1,296MHz than in 1968 but the number of scoring logs was one down. This year only six groups made 10 or more contacts, against 12 last time. Of last year's entrants, Reigate, Ealing, RAF Sealand, G3MCS and G3OAD have dropped out, to be replaced by Pennine VHF Group, Yeovil, Verulam, Hadleigh, Clifton, Mid-Norfolk, Lothians, GB2GD and Plymouth The last three named, together with Albright and Wilson ARS, returned "zero scores." All were "cut off from civilization" by at least 75km of unfavourable country, and none mention even an attempted contact. The operators of GM3OXD/P comment that they do not like the band multiplier but do not say which way it should be adjusted!

The scoring was designed to give a reasonable return for the effort put in, without having an undue influence on the overall scores. It was realized that groups in remote areas stood little chance of making contacts, no matter how good their equipment might be.

The band leader, G3LTF/P, worked 14 counties and three countries. Their first three contacts were with F1RJ/P, F9XG/P and F1BQ/P and were worth 519 points. These valuable QSOs took only about 15 minutes and were the only contacts with France on this band. Several groups suggest that more points should be given for 1,296MHz, but it should be pointed out that if as much as three points per kilometre had been awarded, Mid-Essex would have exceeded their 70 and 144MHz scores.

More than half of the transmitters used 2C39As but three groups employed DET24s while four had varactor multipliers. G3LTF/P obtained 5W from a 1N4386, and G3BNL/P 3W from a BAY66. G3JIE/P also used a BAY66, with 15W of rf input, while G3GHN/P started from 144MHz and reached 1,296MHz via a IN4387 and an MA4060C. (Described by G8APV as a varactor "nonotipler!")

On 2,300MHz, the leading entries came from two well-known uhf operators, G3EEZ and G3BNL, the latter representing Loughborough Radio Club. Apart from his contact with 'EEZ, 'BNL was also received by G8AUE at 47km. 'AUE, who contacted seven of the 1,296MHz entrants, was unable to transmit on 2,300MHz. In this connection, G3NNG suggests that half points should be allowed for crossband contacts, as in 1,296MHz open contests.

The only other contact made on 2,300MHz was between the Bournemouth and Poole VHF Group and The Radio Society of Harrow operating from the Isle of Wight. Their stations also carried out tests on the 10GHz band, without success.

General comments

No two metre station entry because it is just not possible to find a site 1km in radius, and you need this if operating harmonically related bands, in spite of filters and high Q breaks, etc—Southampton RSGB Group.

A G8 who shall remain nameless switched off his 70cm station. The generator pushed out 270V ac, and G3YMK had to purchase 10 new valves for his 70MHz receiver—Fareham.

Spent four hours digging out Gertie the Landrover—Mid-Severn.

Conditions best ever encountered on 144. Proved to my satisfaction that a single operator can last for the complete contest without any harmful results—G3OTK.

6 over 6 wrongly assembled. Reflector and fourth director at wrong ends on one half. Beam heading about 45° out, but still nabbed OZ9FR—Skegness.

Re-word Rule 17 to ban operation from the site during seven days before the contest—Westmorland VHF Group.

Modulator died on us early on—Sutton Coldfield.

WX organization much appreciated, keep up the good work—Harrow.

VHF NFD proved to be an outstanding college exercise... we used the club call-sign on some hf projects with an HW 100 . . . 20 licensed operators available and boredom can set in!—Mexborough Tech.

IARU

As usual, the entry for the Region 1 Contest was very small, though the VHF Contests Committee must accept responsibility for failing to publish the rules.

Logs are acknowledged from the following:

144MHz	G2JF, G3FZL/P, G8BWF, GD3VXK/P, GM3TGL/P, GW3BA/P
432MHz	GD3WMS/P, GW3HAZ/P
1296MHz	GW3HAZ/P

Factors thought to contribute to the small entry are the points-per-kilometre scoring and the necessity of preparing extra logs.

It has been suggested that the British entry in this international event might be boosted by requesting interested groups to add their claimed scores in kilometres to VHF NFD logs, which would then be passed on to the adjudicating society.

Comparison of entries

Band (MHz)	1967	1968	1969
70	55	63	74
144	60	83	103
432	51	44	56
1296	17	20	24
2300	2	3	4
10000	0	1	1
Overall entries	69	91	118

OVERALL RESULTS

Posn.	Group	Band (MHz) 70	144	432	1296	Total score
1	Mid-Essex VHF-UHF Contest Group	G3VPK	G3ORL	G3LTF	G3LTF	22696
2	Pennine VHF Group	G3RIK	G3PUO	G3XAD	G3XAD	20715
3	Midland ARS	GW3MAR	GW3BA	GW3HAZ	GW3HAZ	20086
4	Westmorland VHF Group	G3FDW	G3PXF	G3NPO		20051
5	GB2GD Expedition Group	GD3PSH	GD3VXK	GD3WMS	GD3WMS	18592
6	Surrey Radio Contact Club	G8TB	G3ODY	G2RD	G2RD	17989
7	RAF Sealand ARC	GW3ITZ	GW3NTI	GW8BZZ		15849
8	Crawley ARC	G3PHG	G3WSC	G3FRV	G3FRV	14512
9	Grimsby ARS	G3VIP	G3RSD	G3XDY		13770
10	AERE (Harwell) ARC	G3PIA	G2HIF	G3NNG	G3NNG	13557
11	Radio Society of Harrow*	G3TUX	G3EFX	G3HBW	G3HBW	12734
12	Windscale Amateur Radio & Electronics Society	G3WIN	G3RHE	G3BJD		11996
13	Mid-Norfolk VHF Group	G3JQI	G3JQI	G3JIE	G3JIE	11986
14	Mid-Severn Valley Raynet Group	GW3JFH	GW3NUE			11653
15	Bournemouth-Poole VHF Group	G3VOB	G3AAK	G3OBD	G3OBD†	11439
16	Wirral ARS	GW2AMV	GW3NWR			11135
17	Dunstable Downs RC	G3USE	G8AYB	G3VZV	G3VZV	11095
18	G8AWS			G8AWS		11180
19	Hadleigh Contest Group & Southgate RC	G3TDM	G3SFG	G3FD	G3TTV	9870
20	Mid-Herts ARS	G3HRH	G3PKV	G3WGC	G3WGC	9639
21	Verulam ARC	G3NOH	G3VER	G3OFH	G3OFH	9440
22	Northern Heights ARS VHF Group	G2SU	G3UBI	G8BCL		9405
23	Mexborough Technical College ARS	G3VJR	G8BIW	G8BHZ		9283
24	South Dorset RS	G3VPF	G3SDS	G8BCH	G8BCH	8839
25	Ealing & District ARS	G3KLK	G3UUP	G3THQ		8690
26	Clifton ARS	G3JKY	G8APV	G3GHN	G3GHN	8451
27	Guildford & District RS	G3PGT	G3HTP	G3TLM		8276
28	Wessex ARG	G3WJJ	G3FVU	G3NIL		8247
29	Reigate ATS	G3NKS	G3REI	G8AMU		8073
30	Echelford ARS	G3TDR	G3UES	G2HDJ		8023
31	Derby & District ARS	G2BZF	G3ERD	G2DJ	G2DJ	7962
32	Reading ARC	G3PGM	G5HZ	G3PWU		7865
33	Blackpool & Fylde ARS	GD3NJN				7848
34	North Riding ARG	G3PEJ	G3GJY	G2KK		7775
35	Leicester RS & Leicestershire VHF Group	G5UM	G3LRS	G5UM		7482
36	Southampton RSGB Group	G3MRA		G3MRA		7320
37	Shefford & District RS	G3FJE	G3TVG	G8AKT		7189
38	Cornish VHF Group	G3TTG	G3XC	G2BHW		7025
39	G3EMU/G8AJC		G3EMU	G8AJC		7019
40	Southdown ARS	G3VPS	G8BQX			7002
41	Cray Valley RS	G3TAA	G3YGR	G3RCV		6728
42	G3TXR/G8BHY Team		GW3TXR			5928
43	Cardiff RSGB Group	GW3XIS	GW3GHC			5907
44	North Kent RS	G3XFZ	G8AXA	G8ARM	G8ARM	5749
45	Ysbyty Ystwyth Contest Group	GW3VFD				5214
46	Crystal Palace & District RC	G3IIR	G3FZL			5146
47	Saltash RC	G3WKF	G3IGV			5040
48	City & County of Bristol RSGB Group	G3XFS	G6YB	G3TWT		5031
49	Sheffield ARC	G4JW	G3JRL	G8NN		4946
50	Norfolk ARC	G3PXT	G3TNY			4626
51	Wulfrun Group		GW3ONP	GW3SOE		4618
52	Salop ARS		G3SRT			4569
53	Cambridge & District ARC	G3PKF	G2XV			4353
54	Pontypool ARC	GW3VXC	GW3WVG	GW3UUS		4328
55	Purley & District RC	G3XMW	G3VKI	G3WRR		4060
56	Ainsdale RC	G3XIM				4972
57	Lothians RS	GM3KSU	GM3OWU	GM8BJF	GM8BJF	3633
58	University College of North Wales ARS		GW3UCB			3417
59	Moray Firth ARS	GM3TKV	GM8AZS	GM8AGU		3331
60	Glenluce Group	GM3LTW				2952
61	Caesoromagus VHF/UHF Contest Group		G3SLJ			2826
62	South Cheshire RSGB Members	G3JLL	G8CLR	G8ARQ		2744
63	Yeovil ARC		G8AFA	G8AFA	G8AFA	2668
64	G3WWF/G3XVU	G3WWF				2598
65	Three Dee-Bees	G3UHN				2538
66	Coventry ARS	G2ASF				2496
67	Fareham & District ARC	G3VXM	G3VEF	G8CBT		2362
68	Stourbridge & District VHF/UHF Group		G8AKX			2337
69	Maidenhead & District ARC	G3WKX	G3WKX	G3RQI		2299
70	Woodmansterne Group	G3KTA	G3JKU			2289
71	GI8AYZ		GI8AYZ			2121
72	Plymouth RC		G3PRC	G8ADP	G8ADP	2111
73	G8APO		G8APO			2070
74	Ebor Group	G3TPW	G8BNE	G8BVL		2021
75	Sutton Coldfield RS		G3RSC	G3RSC		1994
76	G3WOP/G3ERB	GW3WOP				1980
77	G8BEN		G8BEN			1917
78	G8BGR/G8AMG/G8BIS/G8BJG		G8BGR			1762
79	Skegness & District ARG		G3THX			1614
80	G8CKC		G8CKC			1524
81	Torbay ARS	G3NJA	G3TLK			1452
82	Barry College of Further Education RS		GW3VKL			1449
83	Burnham Beeches RC	G3WIR	G3AHB			1377
84	G3OTK		G3OTK			1332
85	Hull & District ARS		G3AMW			1290
86	G8BGW			G8BGW		1280
87	G8AFN		G8AFN			1248
88	Hemel Hempstead & District ARS		G3WIH			1173
89	Westmorland RS		G8BUY			1041
90	Northwest Durham ARC		G3KRG			1020
91	West of Scotland VHF Group		GM6ZV			993
92	G2WS	GW2WS				972
93	West Kent ARS	G3WKS	G3TXZ	G3WKL		900
94	GI3RXV		GI3RXV			870
95	Barking Radio & Electronics Club		G3XBF			861
96	West Herts Group	G3BZG				810
97	Dundee Group	GM3NHQ	GM3KYI			798
98	G8CEA		G8CEA			648
99	G3ERN		G3ERN			576
100	South Shields & District ARC		G3DDI			573
101	South Birmingham RS		G8BHE			549
102	SE Scotland VHF Group		GM3DXJ			396
103	G8CLW		G8CLW			321
104	Minehead & District VHF Group		G8BCI			288
105	G3EEZ (2300MHz only)					110

* Also G3RPE on 230MHz and 10GHz.
† Also on 2300MHz.

Overall Results (continued)

Late and mis-directed entries (see Rules 19a and 19b)

Group	70	144	432	1296	Claimed score
South Coast VHF Group & Worthing & District ARC	G3WOR	G3WLE	G3URC	G3URC	15923
Barnsley & District ARC	G3LRP	G8CMB			7447
Loughborough Group		G3PXP			3057
Mid-Cheshire ARS	G3JWK	G3SIQ			
Southampton ARG		G3SOU			2154
Ashford ARC	G3TYB	G3TYB			1782
Hartlepools ARC		G3IDV			756

Band Results

70MHz

Call-sign	Posn.	Score	QSOs	County	Best QSO station	km	Aerial
GD3NJN	1	7848	135	IM	G3VPS/P	470	10
GM3PXZ	2	7842	124	KB	G3VPS/P	522	4
G3RIK	3	7644	162	SE	GM3TLA/P	493	4/4
G3FDW	4	7386	123	WD	G3TTG/P	516	4
GD3PSH	5	6420	117	IM	G3VPS/P	495	4/4/4/4
GW3ITZ	6	6108	137	DB	GM3TKV/P	426	4
GW3JFH	7	5904	128	BR	GM3EGW	400+	4
GW2AMV	8	5670	125	FL	G3VPS/P	339	4
GW3VFD	9	5214	113	RN	GM3TKV/P	530	4
G3WIN	10	5046	93	CD	G3VPS/P	454	4/4
G3TUX	11	4998	114	HE	GM3PXZ/P	520	4/4
G3VPK	12	4746	122	SX	GM3PXZ/P	495	6/6
GW3MAR	13	4656	104	MG	G3GZJ	315	4
GW3XIS	14	4398	83	GN	GM3KSU/P	435	8
G3KLK	15	4380	123	OX	GM3KSU	520	4/4
G3VIP	16	4206	85	LN	G3TTG/P	485	4/4
G3PGT	17	4200	121	SY	GM3PXZ/P	494	4/4
G3PHG	18	4122	109	SX	EI7AF/P	485	4/4
G3MRA	19=	4080	96	HE	GM3PXZ/P	480	4
G3NKS	19=	4080	127	SY	GM3PXZ/P	490	4
G3TTG	21=	4074	66	CL	G3FDW/P	510	4/4
G3VOB	21=	4074	88	WE	GM3PXZ/P	457	6/6
G8TB	23	4056	110	SX	GM3PXZ/P	525	4/4
G3XIM	24	3972	75	WD	G3TTG/P	480	4
G3WJJ	25	3696	79	DT	GM3PXZ/P	480	4
G3TAA	26=	3642	119	KT	GM3PXZ/P	511	4/4
G3VPS	26=	3642	95	SX	GM3PXZ/P	522	4/4
G3JKY	28	3594	99	SX	GM3PXZ/P	520	4
G3JVR	29	3534	86	YS	G3TTG/P	450	4
G3VPF	30	3462	73	DT	GM3PXZ/P	475	4/4
G3TDM	31	3426	108	BS	GM3PXZ/P	495	4/4
G3WKF	32	3366	55	CL	GM3PXZ/P	495	4/4
G2BZF	33	3288	77	DY	G3TTG/P	388	4
G3NOH	34	3084	88	HF	EI7AF/P	428	4
G3TDR	35	3024	97	HF	GM3PXZ/P	450	4
G3IIR	36	2998	100	SY	GM3PXZ/P	400+	4/4
GM3LTW	37	2952	53	WG	G3TUX/P	498	3
G3PGM	38	2940	73	HE	GM3PXZ/P	465	4
G3PXT	39	2886	59	NK	GD3NJN/P	425	6/6
G3USE	40	2820	95	BS	GM3PXZ/P	425	4
G3PIA	41	2610	61	BE	GM3EGW	515	4/4
G5UM	42	2604	78	LR	GM3LTW/P	338	4
G3WWF	43	2598	48	YS	G3VPF/P	406	3
G3UHN	44	2538	44	YS	G3TUX/P	418	4/4
G2ASF	45	2496	58	WK	GM3KSU/P	402	4/4
G3HRH	46=	2460	68	HF	GM3PXZ/P	—	4
G3JQI	46=	2460	54	NK	GD3PSH/P	401	4
GM3KSU	48	2448	50	LK	G3KLK/P	448	3
G3PEJ	49	2430	48	YS	G8TB/P	375	4
G3FJE	50=	2334	66	BD	GM3PXZ/P	504	3
G2SU	50=	2334	56	YS	G3TUX/P	350	5
G3XMW	52	2274	77	SY	GM3PXZ/P	499	3
G4JW	53	2190	59	YS	G3TUX/P	305	4
GW3WOP	54	1980	50	FL	G8TB/P	345	3
G3KTA	55	1830	72	SY	GD3NJN/P	450	4
G3XFS	56	1554	44	ST	—	—	7
G3WKS	*	1464	50	SX	—	—	4
G3PKF	57	1368	41	CE	GD3NJN/P	410	5
GM3TKV	58	1236	18	KE	GW3VFD/P	510	8
G3TPW	59	1041	24	YS	G3PHG/P	371	4
GW2WS	60	972	20	CV	GM3EGW	330	3
G3MGS	61	966	25	DT	GM3PXZ/P	445	4
G3XFZ	62	954	51	KT	GW2AMV/P	337	4
G3BZG	63	870	32	HF	G3WIN/P	320	4
G3WIR	64	750	45	BS	GW2AMV/P	220	4
G3JLL	*	600	22	CH	G3VPS/P	310	Dipole
G3VXM	65	480	22	SX	G3VIP/P	420	4
G3WKX	66	378	24	BS	G2BZF/P	165	3
GW3VXC	67	296	11	MH	G3WIN/P	296	5
G3NJA	68	288	11	DN	G3VOR/P	142	Quad
GM3NHQ	69	78	3	AS	GM3KSU/P	135	2

* Disqualified. No QTHs logged

432MHz

Call-sign	Posn.	Score	QSOs	County	Best QSO station	km.	Aerial
G8AWS	1	11040	110	SD	F1RJ/P	445	18 pb
G3LTF	2	10820	83	SX	PD3JNH/P	423	48 stk
GW3HAZ	3	9200	72	MG	G3LQR	315	14/14
G2RD	4	9180	79	SX	PA0HVA	330	2 × pb
G3NPO	5	8780	50	WD	G3URC/P	435	2 × pb
G3XAD	6	8400	76	SE	G3LQR	298	18 × 18
G3JIE	7	7900	51	NK	G3NPO/P	315	pb
GD3WMS	8	7860	38	IM	G3LTF/P	438	4 × 14
G3NNG	9	7720	74	BE	PD3PCR/P	373	8/8/8/8
G3XDY	10	6960	48	LN	G8BCH/P	—	48 stk
G3FRV	11	6620	73	SX	G3NPO/P	460	18 pb
GW8BZZ	12	5700	56	DB	G3URC/P	284	8/8
G3BNL	13	5620	61	LR	F1RJ/P	—	8/8
G8BCL	14	5220	42	YS	G8AJC/P	355	4 × 8/8
G3WGC	15	4920	53	HF	GD3WMS/P	—	14el
G3VZV	16	4560	53	BS	GD3WMS/P	372	10/10
G3HBW	17	4420	44	HE	G8AWS/P	291	8/8/8/8
G3FD	18	4180	54	BS	GD3WMS/P	365	18/18
G8AJC	19	4100	24	KT	DJ9DL	430	18 pb
G3OBD	20	3960	41	WE	ON4ZK	—	48 stk
G8BCH	21	3720	34	DT	G3XDY/P	325	8/8/8/8
G8BHZ	22	3640	32	YS	G8AJC/P	316	8/8
G3OFH	23	3480	52	HF	GD3WMS/P	368	24 stk
G3NIL	24	3300	29	DT	G3JIE	320	14 el
G3MRA	25	3240	37	HE	G3XDY/P	277	16 el
G8ARM	26	3220	36	KT	F1RJ/P	375	18/18
G3THQ	27	3200	45	OX	G3NPO/P	425	18 pb
G8AKT	28	3160	32	BD	GD3WMS/P	370	18/18
G3BJD	29	2780	22	CD	G3LTF/P	412	14 el
G3PWU	30	2720	30	HE	PA0NAP	405	18+8/8
G2HDJ	31	2560	41	HF	G8BCL/P	240	14 el
GW3UUS	32	2540	25	MH	G3JIE/P	290	8/8
G3TLM	33	2420	41	SY	G3UQK	278	8/8
G5UM	34	2400	32	LR	GD3WMS/P	275	14/14
G3TWT	35=	2040	27	HE	G3JIE/P	—	8/8
G8AMU	35=	2040	34	SX	G8BHZ/P	270	18 pb
G3GHN	37	1980	23	SX	PA0HVA	360	8/8+ph
GW3SOE	38	1960	16	MR	G3LTF/P	286	18 pb
G2DJ	39	1820	20	DY	G2RD/P	250	8/8
G2KK	40	1640	11	YS	G8ARM/P	340	2 × pb
G8AFA	41	1540	23	WE	G8AWS/P	190	24 el
G3RCV	42	1460	27	KT	F1RJ/P	230	18 pb+10el
G3RQI	43	1360	27	BS	G3XDY/P	203	18 el
G8BGW	44	1280	18	DY	G2RD/P	280	8 el
G3WRR	45	1240	24	SY	GW3HAZ/P	254	18 pb
G2BHW	46	1040	4	CL	GD3WMS/P	410	8/8/8/8
G8NN	47	980	15	YS	G8ATS	213	18 pb
G8CBT	48	940	19	SX	G3XDY/P	—	48stk+8/8
G3WKL	49	900	15	SX	—	—	18 pb+8/8
G8ADP	50	620	5	DN	GC2FZC	250	8/8
GM3OXD	51	320	2	KB	GW8BZZ/P	350	8/8
GM8AGU	52	280	1	KE	G2KK/P	305	18 pb
G8BVL	53	200	3	YS	G8BHZ/P	102	10 el
GM8BJF	54	180	2	LK	G3NPO/P	112	5/6
G8ARQ	55	80	2	DY	G8BCL/P	65	8/8
G3RSC	56	20	1	WK	G8AVX	8	18 pb

144MHz

Call-sign	Posn.	Score	QSOs	County code	Best QSO station	km.	Aerial
GD3VXK	1	6312	200	IM	F2XN/P	552	10/10/10/10
GW3TXR	2	5928	257	DB	PA0HVA	525	10/10
GW3NUE	3	5749	268	BR	PD3VVH/P	600+	10
GW3BA	4	5615	233	MG	PD3VVH/P	613	10
GW3NWR	5	5465	221	FL	F1RJ/P	452	6/6
G3ORL	6	4770	186	SX	OZ9SW/P	860	14ele pb
G3SRT	7	4569	214	SE	—	—	8/8
GM3TGL	8	4344	124	KB	G3WLE/P	516	9
G3RHE	9	4176	149	CD	G8BQX/P	454	6/6
G3WSC	10	4095	175	SX	DL0WU/P	571	10/10
GW3NTI	11	4041	177	DB	F9NJ	497	8/8
G3PUO	12	3918	184	SE	ON4RY	575	10
G3PXF	13	3885	143	WD	G3GZJ	525	10
G3GJY	14	3705	126	YS	OK1KSO/P	1025	2 × 14ele pb
G3ODY	15	3616	145	SX	DJ6GPA	643	14ele pb
GW3UCB	16	3417	151	CV	GM3TLA/P	422	9/10
G8BOX	17	3360	138	SX	OZ9AC/P	815	8
G8AYB	18	3336	157	BS	DK3AL/P	613	8/8
G2XV	19	2985	143	CE	OZ9SW/P	749	8/8
G3EMU	20	2919	115	KT	OZ9SW/P	630	6/6
G3SLJ	21	2826	169	SE	PA0VD	460	8/8/8/8
G3ERD	22	2814	141	DY	F2XN/P	537	10
G8APV	23	2766	123	SX	OZ9AC/P	925	8/8
G3VER	24	2715	156	HF	OZ9SW/P	842	10
G3AAK	25	2673	128	WE	OZ9AC/P	938	10
G8CLR	26	2664	132	DY	GM8AZS/P	410	10
GW3ONP	27	2658	99	MR	F2XN/P	426	10
G3RSD	28	2604	109	LN	GC8AAZ/P	465	6/6
G3EFX	29	2523	117	HE	PA0EZ	459	8/8
G3LRS	30	2478	150	LR	ON4RY	425	8/8
G3UES	31	2439	159	HF	EI7AF/P	435	10
G8AKX	32	2337	131	SE	F3NG	397	8
GH5Z	33	2205	129	HE	PA0EZ	450	6/6
G3FZL	34	2148	121	SY	SK6AB/P	980	10/10
G3FSG	35	2133	126	BS	GM3TGL/P	415	8
GI8AYZ	36	2121	74	AM	G3IXH/P	394	6
G8BIW	37	2109	103	YS	F2XN/P	366	6/6
G3IXH	38	2085	108	LN	GI3AYZ/P	410	6/6
G8APO	39	2070	128	LR	PA0HVA	400	8
G3RSC	40	1974	114	WK	G3XC/P	385	10
G3REI	41	1953	139	SX	G3RHE/P	390	6/6
G8BEN	42	1917	107	HN	G3XC/P	410	10
G3XC	43	1911	59	CL	G3GJY/P	533	6/6
G3UBI	44	1851	82	YS	PA0VD	440	10/10
GM8AZS	45	1815	69	KE	G3PUO/P	490	14 ele pb
G3TXZ	*	1794	103	SX	OZ9SW/P	—	4/4
G8BGR	46	1762	123	KT	DJ9DL	477	8
G3JRL	47	1776	87	YS	PA0VD	422	8
G3TNY	48	1740	80	NK	G8CKC/P	325	10
G2HIF	49	1698	87	BE	GM3TGL/P	420	10/10
G3TVG	50	1695	98	BD	GM3TGL/P	405	8/8
G3IGV	51	1674	63	CL	G3DAH	420	6/6
G3HTP	52	1656	98	SY	GM3TGL/P	494	8/8
G3SDS	53	1638	84	DT	ON4RY	420	8/8
G3YGR	54	1626	119	KT	G3PXF/P	420	8/8
G3THX	55	1614	66	LN	OZ9FR	730	6/6
G3JQI	56	1554	70	NK	PD3VVH/P	343	10
G8CKC	57	1524	89	ST	G3AMN/P	380	8
G6OI	58	1512	115	WR	G3XC/P	340	6/6
GW3GHC	59	1509	89	GN	F1ABU/P	384	4/4
G3PRC	60	1491	68	DN	F2XN/P	450	6
GW3WVG	61	1452	78	MH	F2XN/P	350	6/6
GW3VKL	62	1449	80	BR	F2XN/P	320	4/4
G6YB	63	1437	76	ST	—	—	8/8
G3PKV	64	1422	97	HF	GD3VXK/P	—	10
G3OTK	65	1332	70	ST	EI5BH/P	371	6
G3AMW	66	1290	67	YK	G3XC/P	525	14 ele pb
G3FVU	67	1251	66	DT	G3RHE	395	8
G8AFN	68	1248	62	EX	GD3VXK/P	449	4/2/2/2
G8AXA	69	1227	82	KT	OZ9SW/P	760	10
G3WIH	70	1173	81	HF	GD3VXK/P	394	8
G3TLK	71	1164	50	DN	G3GJY/P	440	6
G3UUP	72	1110	71	OX	GM3TGL/P	485	10
G8BUY	73	1041	40	WD	G3WSC/P	425	7/7
G3KRG	74	1020	58	DH	G3PKV/P	335	6/6
GM3OWU	75	1005	45	LK	GW3NUE/P	392	8
GM6ZV	76	993	48	RW	G3GZJ	607	4/4
G3VEF	77	942	66	SX	G3RHE/P	450	14
GI3RXV	77	870	30	TE	GW3NUE/P	390	6
G3XBF	79	851	60	BE	GD3VXK/P	380	4
G8AFA	80	786	51	WE	G3GJY/P	328	5
G8BNE	81	780	29	YS	F2XN/P	677	6
GM3KYI	82	720	38	AS	GW3TXR/P	420	4/4
G8CEA	83	648	65	SY	F1ABU/P	280	6/6
G3AHB	84	627	86	BS	F9NJ	230	6/6
G3ERN	85	576	44	EX	GW3NTI/P	301	6/6
G3DDI	86	573	36	DH	GW3NUE	350	4/4
G3WKX	87	561	50	BS	ON4RY	363	8/8
G8BHE	88	549	43	WR	F2XN/P	328	10
G3VKI	89	546	52	SY	GW3NWR/P	280	4
G3XRT	90	543	56	EX	GW3NWR/P	285	5
G3JKU	91	459	58	SY	GW3NWR/P	290	8
G8CLW	92	321	27	SX	G3RSD/P	270	6/6
GM3DXJ	93	396	46	KS	G3PUO/P	401	7
G8BCI	94	288	31	ST	G8APV/P	245	8/8
G3MYE	95	255	52	SY	PA0FAS	465	10

* Disqualified—No QTH's recorded.

1296MHz

Call-sign	Posn.	Score	QSOs	County code	Best QSO station	km.	Aerial
G3LTF	1	2360	22	SX	GW3HAZ/P	251	4ft dish
G3NNG	2	1529	17	BE	G8AUE	161	3ft pbla
G2RD	3	1137	13	SX	G8AUE	263	3ft Pbla
G3BNL	4	853	12	LR	GW3HAZ/P	132	3ft dish
G3WGC	5	837	9	HF	G8AUE	152	4ft dish
G3HBW	6	716	10	HE	G3NNG/P	110	4ft dish
G3XAD	7	713	6	SE	G3LTF/P	228	3ft dish
G3OBD	8	655	10	WE	G2RD/P	140	4ft pbla
GW3HAZ	9	615	5	MG	G3LTF/P	251	Trough ref
G3FRV	10	497	9	SX	G3OBD/P	87	8/8
G3VZV	11	379	7	BS	G3LTF/P	102	4ft pbla
G8ARM	12	348	5	KT	G3MCS	86	8/8
G8AFA	13	342	5	WE	G3HBW/P	95	6ft dish
G3OFH	14	161	5	HF	G3NNG/P	75	4ft dish
G3TTV	15	131	2	BS	G3LTF/P	90	Reflex
G3GHN	16	111	3	SX	G3HBW/P	84	Corner re
G3JIE	17	72	1	NK	G3WGC	88	Corner ref & 3ft dish
G2DJ	18	40	2	DY	G3BNL/P	30	Corner ref
G8BCH	19	19	1	DT	G3OBD/P	24	3ft dish
GM3OXD	—	0	0	KB	—	—	—
GM8BJF	—	0	0	LK	—	—	—
GD3WMS	—	0	0	IM	—	—	—
G8ADP	—	0	0	DN	—	—	—

2300MHz

Call-sign	Posn.	Score	QSOs	County code	Best QSO station	km.	Aerial
G3EEZ	1	110	1	SE	G3BNL/P	110	6ft dish
G3BNL		110	1	LR	G3EEZ/P	110	4ft pbla
G3OBD	3	77	1	WE	G3RPE/P	77	4ft pbla
G3RPE		77	1	HE	G3OBD/P	77	4ft dish

Beru 1970

RADIO amateurs throughout the British Commonwealth are invited to take part in the 33rd BERU contest to be held on 7-8th March 1970.

The attention of entrants is drawn to Rule 1, and in particular to the requirement for *separate log sheets for each band*. This new rule has been introduced to simplify the adjudication of this very popular contest.

Reprints of these rules, the General Rules for HF Contests, and supplies of log sheets and cover sheets may be obtained from BERU HF Contests Committee, Radio Society of Great Britain, 35 Doughty Street, London WCI, England. (Members resident in the British Isles should enclose a large SAE with their request).

The Low Power Section has been dropped because of minimal support in recent years.

Rules

1. The General Rules for RSGB HF Contests, as published in the January 1969 edition of *Radio Communication* will apply.

2. When: from 0001 gmt on Saturday, 7 March 1970 to 2359 gmt on Sunday, 8 March 1970.

3. Eligible entrants: Members of the RSGB resident in the British Isles, and radio amateurs licensed to operate within the British Commonwealth and British Mandated Territories.

4. Contacts: CW (A1) only, in the 3·5, 7, 14, 21, and 28MHz bands. Contacts may be made with any station using a British Commonwealth call sign, except those within the entrant's own call area. British Isles stations may not work each other for points.

5. Scoring: Each completed contact will score 5 points. In addition a bonus of 20 points may be claimed for the first, second and third contacts with each new Commonwealth call area (as defined in accompanying table) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.

6. Logs: These must be addressed to: BERU, RSGB HF Contests Committee, c/o J. C. Graham, G3TR, "The Willows," Church Road, Lowfield Heath, Crawley, Sussex, England.

A check list showing call area worked on each band must be included.

7. Trophies: To the winner—The BERU Senior Rose Bowl. To the runner-up—The BERU Junior Rose Bowl. To the leading British Isles station—The Col. Thomas Rose Bowl.

Rules for the BERU Receiving Contest 1970

The rules for the Receiving Section of the BERU Contest 1970 are as follows:

1. Eligible Entrants. The contest is open to all fully-paid-up members of the RSGB resident within the United Kingdom and to all short wave listeners resident within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by these rules. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.

2. Time and dates as for transmitting contest.

3. Entries. (*a*) To count for points, a station outside the entrant's own call area must be heard in a contest contact and the following details logged in columns headed as follows: (i) Date/Time (GMT); (ii) Call-sign of Station heard; (iii) Report and Serial Number sent by Station heard; (iv) Call-sign of the Station being worked; (v) Band in MHz; (vi) Bonus Points claimed; (vii) Points claimed. CQ or Test Calls will **not** count for points.

(*b*) Entries must be set out on ONE SIDE ONLY of foolscap or International A4 log sheets. Entries must be postmarked not later than **8 April, 1970** and must be addressed to BERU, Contests Committee, Radio Society of Great Britain, 35 Doughty Street, London, WC1. Log sheets are available from RSGB Headquarters on request. A check list showing call areas heard on each band is also to be included.

(*c*) All entries must contain the following declaration:

I declare that this receiving station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I do not hold an amateur transmitting licence.

Date ..... Signed .....

4. Scoring. Each complete log entry will score 5 points, In addition a bonus of 20 points may be claimed for the first, second and third stations heard in each new Commonwealth call area on each band. The British Isles (G, GB, GC, GD, GI, GM and GW) count as one call area only as indicated in the Appendix to the rules of the Transmitting Section. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately; points may be claimed for both entries.

5. Awards. The BERU Receiving Rose Bowl to the winner. Certificates of Merit to the leading entrant from each IARU continent.

Commonwealth Call Areas

The following call areas are recognized for the purposes of scoring in the 1970 BERU Contest.

A2/8O/ZS9*
AC3
AP2
AP5
C2/VK9 (Nauru)*
G/GB/GC/GD/GI/GM/GW*
MP4B
MP4M
MP4Q
MP4T
VE1
VE2
VE3
VE4
VE5
VE6
VE7
VE8
VK0 (Aust. Antarctica)
VK0 (Heard)
VK0 (Macquarie)
VK1
VK2
VK2 (Lord Howe)
VK3
VK4
VK4 (Willis)
VK5
VK6
VK7
VK8
VK9 (Admiralty)
VK9 (Christmas)
VK9 (Cocas)
VK9 (Norfolk)
VK9 (New Guinea & Bismark)
VK9 (Papua)
VO
VP1
VP2A (Antigua & Barbuda)
VP2D (Dominica)
VP2G (Granada)
VP2K (St. Kitts, Nevis, Anguilla)
VP2L (St. Lucia)
VP2M (Montserrat)
VP2V (British Virgin Is.)
VP3/8R*
VP4/9Y4*
VP5 (Turks and Caicos)
VP5/ZF1* (Cayman)
VP6/8P*
VP7
VP8 Falklands
VP8 Antarctica
VP8 (Grahamland)
VP8 (South Georgia)
VP8 (South Orkneys)
VP8 (South Shetlands)
VP8 (South Sandwich)
VP9
VQ1
VQ8 (Agalega & St. Brandon)
VQ8 (Chagos)
VQ8 (Cargados)
VQ8 (Mauritius)
VQ8 (Rodrigues)
VQ9 (Aldabra)
VQ9 (Seychelles)
VQ9 D
VQ9 F
VR1 (British Phoenix Is.)
VR1 (Gilbert & Ellis and Ocean Is.)
VR2
VR3
VR4
VR5
VR6
VS5
VS6
VS9/8Q*
VS9O
VU
VU (Laccadive)
VU (Andaman & Nicobar)
ZB2
ZC4/5B4*
ZD3
ZD5
ZD7
ZD8
ZD9
ZE
ZF1* (See VP5)
ZK1 (Cook)
ZK1 (Manihiki)
ZK2
ZL
ZL (Auckland & Campbell Is.)
ZL (Chatham Is.)
ZL (Kermadec Is.)
ZL5 (NZ Antarctica)
ZM6/5W*
ZM7
ZS3
ZS8/7P8* (Lesotho)
ZS9* (See A2)
457
5B4* (See ZC4)
5H3
5N2
5W* (See ZM6)
5X5
5Z4
6Y5
7P8* (See ZS8)
7Q
8O* (See A2)
8P* (See VP6)
8Q* (See VS9)
8R* (See VP3)
9G1
9H1
9J2
9K2
9L1
9M2 (W. Malaysia)
9M6/9M8* (E. Malaysia)
9VL
9Y4* (See VP4)

* British Isles count as one call area, as do others that are cross referenced.

RADIO AMATEUR EMERGENCY NETWORK

By S. W. LAW, G3PAZ*

We return refreshed from a cruising holiday in the relaxing company of our trusty old Type 68 set with a tale to rend the heartstrings of the 4m groups. A certain G3+3 (who shall be nameless) told us that he and his friends had acquired some half-dozen of those delectable little " Bantam " walkiephones, all complete—and had broken them up for the parts! As we have a strict regard for life and limb, wild horses shall not force us to divulge the QTH!

Cumbria

Owing to the resignation of Mr D. H. Facer, G3WBZ, due to pressure of business, the post of controller for Cumbria has been taken over by G3XEN (QTHR).

A meeting will be held on 8 November at 1500 BST to decide the policy for the Cumbria (South) area. The venue is RMS WRAY CASTLE, near Ambleside, Westmorland. The landline for G3XEN is CATON 300. The area is roughly south of a line from Whitehaven to Penrith and extends down to Lancaster to include part of North Lancashire.

RAEN Committee

The Committee welcomed Mr J. A. Rollason, G3WCO, who will fill the vacancy left by the resignation of Mr J. D. Kingston, G3VK.

A report from the registrations secretary shows that over 250 cards have been sent out in the first half of the year, more than a third of which were to new members. After some discussion it was decided that the Raynet Rally Contest should not be run this year, but that a new set of rules be drawn up for the future. The award of the Raynet Trophy was also discussed, together with the certificate awards, and the decision will be published in this column in due course.

Glasgow and Aberdeen are to operate temporarily under Mr Dickie and Mr P. Park, GM3PIP, respectively. The appointment of Mr T. Sorbie, GM3MXN, as group controller, Mid-Lanark, was approved. Prospective members please contact GM3MXN (QTHR).

Leicestershire

An interesting exercise was run by the Leicestershire Group under their controller, G3GXZ, in conjunction with the three user services on the morning of 21 September. A " practice " 999 call started the ball rolling at HQ Leicester and Rutland Constabulary, the police, fire and ambulance services went into action and the RAEN controller was asked to provide additional communications. In less than 30 minutes all the available members had arrived at Police HQ and a control station had been set up. Links on 4m and top band were soon in operation between the scene of the simulated air crash, the Leicester Royal Infirmary and Casualty Enquiry at Police HQ. All messages were successfully passed and the Chief Constable expressed his complete satisfaction when terminating the exercise at midday. Prospective members contact G3GXZ (QTHR).

Feeling Neglected

We still receive letters from members who feel left out of things, especially when they see the user services hurrying off to an exercise without them. Now we have discussed this before, but we will say again that nothing is done without effort. There must exist liaison between groups and their local user services. Since we claim to communicate, it is absurd to sit back complacently and expect user services to compete for your favours. Unless you tell them that you are a properly organised group they will not automatically be aware of your existence—they have enough to do. And unless you can demonstrate that you can do a good job when called upon you are wasting both their time and your own. So first make sure that you know what to do and then tell them—but it had better be good!

If you are not happy with things, have a go at your controller. If most of the group are not happy, perhaps you need a new one! But make sure you know the score—it could be you who has the wrong idea. And if you are a SWL are you prepared to write out message forms quickly and accurately, climb around with aerials, run errands, hump gear around, make tea, coffee and sandwiches at all hours, use a 12V soldering iron in pouring rain, and so on? Or are you going to sit around until you get your medal? Chum, there is no medal! So get on with it.

* 130 Alexandra Road, Croydon, Surrey, CRO 6EW.

Looking Ahead

9 November—Members of the GB3WRA group are to give a demonstration of amateur radio to the residents of the local (Gerrards Cross) Cheshire Home, commencing at approximately 2pm local time. While one of the main objectives will be to contact other Cheshire Homes, they will appreciate all contacts they can make. They will be using the callsign G3NGK/A, mainly on 80m but possibly on 20, 15 or 10, depending on conditions.

5 December—RSGB AGM, Royal Society of Arts, London.

30 January 1970—RSGB Dinner Club, Kingsley Hotel, WC1.

5 July 1970—1970 South Shields Mobile Rally.

25–26 July 1970—British Amateur Television Club Convention, Cambridge.

Contests

8–9 November—7 MHz Contest (Phone). (421 June).

15–16 November—Second 1.8 MHz Contest. (736 October).

29–30 November—November CW WW DX Contest—CW.

6–7 December—Tops CW Club 80m Contest.

6–7 December—CHC International DX-CW.

7 December—Fifth 70 MHz (CW) Contest.

13–14 December—CHC International DX-ssb.

31 January–1 February—1970 French Contest, CW.

28 February–1 March—1970 French Contest, Phone.

HF Contests Calendar, 1970

Contest	Date(s)
AFS	10–11 January
1st 1·8MHz	14–15 February
BERU	7–8 March
Low power 80m	5 April
NFD	6–7 June
Summer 1·8MHz	4–5 July
High Power Field Day	11–12 July
80m Field Day	13 September
28MHz	10–11 October
7MHz CW	24–25 October
7MHz Phone	7–8 November
Second 1·8MHz	14–15 November

Mobile Rallies

19 April 1970—North Midlands Mobile Rally.

CONTEST NEWS

July 1969 432MHz Portable Contest

The July 432MHz Portable Contest can only be described as having been a quiet, peaceful event with a singular lack of commen t from most competitors. The weather was unusually kind, and propagation conditions ranged from average to very slightly above normal.

G3EEZ criticized the scoring system, and would prefer to see 50km radials to at least 200km. G8AUE wants more open events with /P and fixed stations to increase the level of activity. G3OBD favours the one day portable contests, but would like an extra hour. G8ADP made what is now the inevitable plea for more stations to beam to the south-west. He logged 25 call-signs but worked only five. G2WS complained of heavy QRM from a nearby station and G8ARM suffered breakthrough from Wrotham and a herd of bullocks.

The winning station was operated by Graham Roper, G8AKM/P and G8ARL, from the highest point on the Berkshire Downs, 11km south-west of Newbury. Graham used the popular QQVO3-20a in his transmitter and a 32 el stack, and he is to be congratulated upon pressing home the advantage of a good site with equally good operating.

The runner-up, Arthur Russell, G8AWS/P, made a strong challenge from his regular site 7km north-east of Leek, Staffs, but just failed to make good the contacts lost through a late start.

Check logs from G8BKR and G8AYN are gratefully acknowledged.

Posn	Call-sign	Score	QSOs	County	Best QSO	Aerial	Power	Ft asl
1	G8AKM	291	59	BE	480km	32 stk	24	974
2	G8AWS	227	54	SD	287km	18 para	22	1630
3	G3BNL	201	48	GR	240km	8/8	10	1000
4	G3EEZ	144	35	SE	220km	11 yagi	20	1531
5	G3KKP	141	20	YS	355km	2x para	20	980
6	GW8ACG	139	27	FT	296km	6/6	25	1000
7	G8AUE	129	37	DY	280km	14 el	4	1034
8	G3FD	106	33	BS	239km	2x para	8	800
9	G3SBL	104	31	SD	296km	2x18 el	15	1260
10	G8ADC	94	28	HF	252km	14 el	12	600
11	G3OBD	91	22	WE	288km	48 stk	24	911
12	G2DJ	81	28	DY	158km	14 el	5	1250
13	G3NAQ	77	23	OX	148km	8/8	4	730
14	GW8BZZ	73	19	FT	260km	18 para	9	1400
15	G3SLJ	72	32	BD	72km	8/8/8/8	30	798
16	G8AJC	71	14	KT	380km	18 el	30	600
17	G8APV	69	25	SY	260km	4x para	8	—
18	G8AFA	68	19	WE	230km	24 yagi	35	964
19	G8ARM	65	24	KT	265km	18 el	14	760
20	G5UM	60	14	LR	102km	6/6	15	700
21	G8APJ	26	17	EX	116km	18 para	6	354
22	G2WS	25	10	ST	158km	11 yagi	12	900
23	G8ADP	21	5	DN	120km	8/8	25	1200
	G8CLW	21	9	HE	90km	2x para	18	700

August 1969 70MHz CW Contest

As an experiment, the VHF Contests Committee decided to run a 70MHz contest after tv hours to give those who suffer from tvi a chance. The result was a good entry, receiving generally favourable comments from contestants. It would appear, however, that the majority would prefer a shorter contest, this being supported by the fact that most stations had either gone to bed or fallen asleep by 0400GMT!

The winner in Section A was Bryan Turner, G3RLE, with 276 points from 34 contacts. Second was Mike Walters, G3JVL, with 244 points from 33 contacts. Section B had only two entries, the winner being G3OXO/A, operated by Michael Deacon, G3XHU. There were three entries in the portable section; the winner being that well-known Irishman Willie McLintock, operating GM3VPK/P from the Mull of Galloway, Wigtown.

The best dx worked was between G3DAH and GM3VPK/P at 540km.

Congratulations to all these stations.

Comments received included: "A very enjoyable contest"—G3GVM. "I fell asleep at the key at about 0530GMT"—G3RLE. "Activity in the South-West was virtually nil"—G2WS. "We did not hear many stations from tvi-difficult areas—" GM3VPK/P.

R.J.B.

Posn	Call-sign	Score	QSOs	County	Best QSO—km		Power (watts)
Section A							
1	G3RLE	276	34	YS	G3VPS	— 356	50
2	G3JVL	247	33	HE	GM3VPK/P	— 495	50
3	G2AMV	245	33	CH	G3DAH	— 360	45
4	G3OHH	215	34	SD	G3VPS	— 310	50
5	G3TDH	200	33	BD	GI3TLT	— 447	50
6	G3DAH	194	23	KT	GM3VPK/P	— 540	25
7	G3GVM	191	27	SX	GM3VPK/P	— 485	50
8	G6HD	190	32	KT	GM3VPK/P	— 494	32
9	G5NU	169	24	BE	GM3VPK/P	— 440	43
10	G3WSC	164	29	SX	GM3VPK/P	— 475	35
11	G5UM	160	29	LR	GM3VPK/P	— 315	25
12	G3VSA	155	24	LE	G3JVL	— 300	50
13	G3RDQ	107	16	BS	GM3VPK/P	— 430	50
14	G3PMJ	102	14	LE	G3JVL	— 310	45
15	G3JKY	97	21	KT	G3JYP/P	— 442	12
16	G3NKS	95	20	SX	GM3VPK/P	— 315	25
17	G3VPS	88	16	SX	G3RLE	— 350	48
18	G8LY	74	14	HE	G3RLE	— 320	45
19	G3OHC	48	8	WK	GM3VPK/P	— 310	10
20	G2WS	47	6	ST	GM3VPK/P	— 382	12
Section B							
1	G3OXO/A	238	32	WR	GM3VPK/P	— 312	30
2	G3SAK/A	169	30	BD	GM3VPK/P	— 429	50
Section C							
1	GM3VPK/P	453	36	WG	G3DAH	— 540	50
2	G3JYP/P	333	29	ND	G3JVL	— 490	25
3	GW3TXR/P	291	42	DB	G3DAH	— 335	35

432 MHz Open Contest, 1969

The 432 MHz contest, held on 10 August, was a disappointment because it attracted only 26 entries, in spite of the exceptionally good weather conditions. This was no doubt largely due to the competition from the Woburn Mobile Rally, and as was pointed out by many entrants, an effort should be made to avoid such clashes in future.

Propagation conditions were variously described as "fair," "poor" and "dead," but nevertheless several contacts were made at over 300 km, the best distance being 386 km between G8ARL/P and PA0NAP.

The top fixed station was once again G8AKE of Melton Mowbray, by a large margin. G3SLJ/A was the only entrant in Section B, but the Caesaromagus Group made the overall highest score, including ten Continental QSOs, helped, no doubt, by their 32 element array no less than 125ft above ground. In the portable section, a close contest was won by GW8ACG/P from G8ARL/P.

Special mention should be made of the entries from G3UBX/P who put up a very creditable performance running only 3·5 watts into a varactor tripler.

The last word must go to G8AWO/P who proves conclusively that you can't please everyone, by his comment. "I'd rather spend 24 hours soaking wet! It was 110° in the car and I packed up when the cheese melted in my sandwiches."

Posn	Call-sign	Points	Con-tacts	Height (ASL)	Best Distance (km)	Power Input	County
Section A	**Single Operator, Fixed Stations**						
1	G8AKE	139	34	320	360	150	LR
2	G8BGQ	67	27	400	118	30	HF
3	G3DAH	62	15	100	220	40	KT
4	G8ATK	58	22	600	137	10	SY
5	G8AVX	57	20	—	—	60	WK
6	G8AJC	43	8	150	240	70	KT
7	G8AVC	37	15	550	154	19	DY
8	G8BAV	32	16	250	108	30	DY
9	G8AVG	30	9	370	80	15	WE
10	GC2FZC	28	4	175	225	24 (trip)	GY
11	G8APJ	15	9	95	106	8 (trip)	LD
12	G8BKR	12	7	190	102	25	GR
13	G3PWU	6	4	—	—	35	BE
Section B	**/A and Multi-Operator Stations**						
1	G3SLJ/A	176	36	330	310	60	EX
Section C	**Portable Stations**						
1	GW8ACG	154	35	1509	232	25	DB
2	G8ARL	145	36	974	386	10	BE
3	G8AWO	129	31	547	276	35	HF
4	G3EEZ	100	28	1530	230	25	SE
5	G3GKF	88	19	630	204	25	RD
6	G3UBX	74	23	1050	166	3·5 (Var)	SD
7	G5UM	68	24	700	141	16	LR
8	G3NAQ	66	21	730	162	4	OX
9	G8ADP	56	10	1400	230	25 (Var)	DN
10	G8ARM	51	18	760	—	14	KT
11	G3NEO	41	14	490	170	6 (Var)	YS
12	G2WS	39	13	950	141	12	ST

D/F National Final 21 September 1969

This year the D/F National Final was organized by the Rugby club with welcome assistance from Chepstow and Stratford-upon-Avon.

The contest took place in the Forest of Dean, and at 1320 bst the qualifiers assembled along a tree-lined track near the Speech House for their first bearings.

Signals from Station A were stronger than those from B and most competitors decided to visit this transmitter first. Marion's Inclosure, a thick wood four and a half miles from the start was soon the centre of activity, and after some trouble with the thick undergrowth and ong aerial, competitors finally unearthed G3ATM/P.

It was after successfully locating this station that Mike Hawkins, G3WMM, last year's winner, came to grief, his navigator and car stuck firmly on a steep muddy track from which, despite frantic efforts, it took him three hours to escape.

Meanwhile the other teams had switched their attention to G3BXF/P, which was located at the very top of Waterloo Tip, a relic of the forest's industrial past. This enormous triple mound is about 200ft high, and is covered with trees and bushes. It is surrounded on one side by a lake, on another by a deep ditch, and the remaining sides are protected by a jungle of bushes and high, dense undergrowth.

Eric Mollart, now well on the way to regaining the RSGB D/F Trophy, was first to the top, forcing his way up the steep sides of the tip without making any attempt at finding an easier route. Almost as soon as Eric had signed in, Bert Newman, G2FIX, arrived, only two minutes away from exploding the "Oxford can't be beaten" myth. One by one all the remaining competitors, except Mike Hawkins, found their way to the top, arriving in various stages of exhaustion.

A party of 55 sat down to an excellent tea at Longhope where later Mrs G. T. Peck presented the RSGB D/F Trophy to a very happy Eric Mollart. Mr G. T. Peck, representing the HF Contests Committee, welcomed Mr J. J. Grant and Mr D. A. Findlay, G3BZG, who had come along as observers, and thanked Graham Taylor, G3MDC, and his helpers for organizing the contest. Thanks were also expressed to the transmitter operators, Doug Nasey, 3W3ATM, Ian Jackson, G3TYP, and Mike Webb, G3OOQ.

Those intending to take part next year may like to know that at the tea Eric Mollart finally revealed his secret method of winning National Finals. Leaving aside his usual claim that his valved set is far superior to transistor models, Eric assured us that his success this year was almost certainly due to a four-leaved clover acquired at the start. As a search party was about to set out to the rescue of Mike Hawkins, to everybody's relief he arrived safely to a very late tea, having spent most of the afternoon trying to locate a tractor instead of a transmitter.

Posn	Name	Call	Club	Time of arrival Stn A	Stn B
1	E. L. Mollart		Oxford	1457	1525
2	A. Newman	G2FIX	Salisbury	1458	1527
3	I. Butson		Oxford	1457½	1532
4	A. Simmons		Oxford	1458½	1532½
5	J. R. Vickers	G3ORI	Stratford	1501	1538
6	B. J. Mahony	G3NDM	Rugby	1455	1541
7	W. North	G3TRY	Chiltern	1503	1547
8	P. Tyler		Oxford	1500	1555
9	M. J. Gee		Oxford	1556	1528
10	T. C. Gage		Oxford	1504	1601
11	R. J. Pearce-Boby	G3JLE	Oxford	1534	1609
12	D. E. Newman	G8BGD	Rugby	1612	1526½
13	B. M. Bristow		Chiltern	1533	1621
14	M. P. Hawkins	G3WMM	Oxford	1503½	—

1st World RTTY Championship

The committees of several RTTY groups and societies have decided to make an award to the "World Champion of RTTY".

The objects of this award are as follows:

(1) To promote greater interest for the RTTYer taking part in the various RTTY contests.
(2) To increase the competitive spirit during the course of the contests during the year.
(3) To make available an award to the radio amateur who has demonstrated his ability to operate RTTY during a period of one year.

At the present time the contests which will count towards this new award are as follows:

1969 BARTG Spring RTTY Contest
1969 DARC RTTY WAE Contest
9th World-wide RTTY dx Sweepstakes
1969 Alex Volta RTTY Contest
1970 Giant RTTY Flash Contest

The committees of BARTG, the A. Volta and the Giant RTTY Flash Contest wish to thank the committees of the DARC and CARTG Societies for giving permission to make use of their own contest scores in arriving at the final scoring for "World Champion of RTTY".

It is hoped that other societies who organize international contests will join in this new idea to increase interest in the RTTY mode for radio amateurs.

In order to arrive at the final score and to decide the winner, the following points system will be used for each contest: 30 points to the winner, 25 points for 2nd place, 22 points for 3rd place, 20 points for 4th place, 18 points for 5th place, 17 points for 6th place, 16 points for 7th place, etc, to 1 point for 22nd place, and all other entrants will be credited with one point.

For the final score for each year, only the best four scores (out of a possible five) of each operator will be used.

In order to take part in this award contest it is not necessary for entrants to send in a claim, as the entries of all competitors will be automatically included.

The 1969 championship will start with the 1969 BARTG Contest and finish with the 1970 Giant Flash Contest.

The 1969 World Champion of RTTY will receive a plaque, and prizes will be awarded for the leading position in the final score.

The *cq elettronica* magazine will make available the award for each year. The various societies in turn would nominate the winner for the year for which that society is responsible and would notify *cq elettronica*.

The magazine would then present the award with due acknowledgement to the society concerned.

December 1969 70MHz CW Contest

Date and time. December 7 from 0900 to 1500 gmt.

All **entries** must be sent to the adjudicator at VHF Contests Committee, c/o G3LAS, 7 Barclay Close, Hertford Heath, Hertford.

The following **General Rules,** published in the January issue of *Radio Communication,* will also apply: 3a, 4a, 5a, 6a, 7a, 8b, 9b, 10a, 11-25, 27 and 28.

CLUB NEWS

Region 1 RR B. O'Brien, G2AMV

Merseyside Luncheon Club—First Monday in each month on HMS *Landfall*, 12.30 for 12.45 meal. If you wish to attend please advise *G3VQT* or *G2AMV* beforehand.
Ainsdale (ARC)—12 and 26 November, 10 December, 8 pm, " Morris Dancers " Scarisbrick.
Allerton (Liverpool)—Scout Amateur Radio Society, North West Region—First and third Thursdays each month, 8 pm, Liverpool County Scout Headquarters, Richmond Street, Liverpool.
Blackburn (ELARC)—6 November (Film Show by Esso), 4 December (AGM and Discussion Group), 7.30 pm, Edinburgh House, Shearbank Road, Blackburn. Further details from *G4JS*.
Blackpool (B & FARS)—Mondays, 8 pm, Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 pm.
Bury (B & RRS)—The next meeting takes place on 11 November at the George Hotel, Market Street, Bury, 8 pm, and is to be the popular Junk Sale. Members are requested to arrive after 8 pm as this will give the committee members time to sort out the best gear for themselves *Hi*! As an experiment we are holding informal meetings at the above QTH two weeks after the main meetings, (a good excuse for a noggin and natter for those with XYL problems) Club secretary: *G3VVQ*, 411 Holcombe Road, Greenmount, Bury.
Cheshire (Mid Cheshire ARC)—Club nights every Wednesday, 7 pm to 9.30 pm. 5 November, no meeting due to Bonfire Night. 12 November, the society has been fortunate to obtain the services of Mr R. G. Lascelles, BA, FRAS, G3AKX. He will be talking on radio astronomy, which he is well equipped to do being a member of the Jodrell Bank staff. Seating for 200 is available in the school lecture theatre and there is ample car parking space. Refreshments will be served. Further details from *G3JWK*, Technical Activities Centre, Winsford Verdin Grammar School, Winsford, Cheshire.
Chester (C & DARS)—Tuesdays, 8 pm, YMCA.
Crewe and District—Local interest is being kept alive by R. Owen, BRS 26847, the local representative. He welcomes calls at his home from local enthusiasts and is searching diligently for a new meeting place. His address is 10 Circle Avenue, Willaston, Nantwich, Cheshire.
Douglas (D & DARS)—Second and fourth Wednesday each month, 7 pm, 19 Rosemount, Douglas. Further information from W. T. McEvoy at same address. Telephone Douglas 6146.
Eccles (E & DRC)—Tuesdays, 8 pm, Bridgewater School, Worsley, Lancs. Every Thursday Club Top Band net 2030 hours.
Leyland Hundred Amateur Radio Group—The Thursday night net at 2000 GMT on 1.915 MHz.
Liverpool (L & DARS)—Tuesdays, 8 pm, Conservative Association Rooms, Church Road, Wavertree. Secretary: H. James, *G3MCN*, 448 East Prescot Road, Knotty Ash, Liverpool 14.
Liverpool (NLRC)—7 and 21 November, 5 December, 9 pm,. Labour Party Headquarters, 13 Crosby Road South, Liverpool 22 Secretary: Peter Jeffs, 38 College Road North, Liverpool 23. Telephone 051-924 3020.
Macclesfield (M & DARS)—Wednesdays, 7.30 pm, 203 Droylesden Road, Newton Heath, Manchester 10. Hon secretary: G. Tillson, *G3TJK*, 95 Kelverlow Street, Oldham, Lancs.
Manchester (SMRC)—Fridays, 8 pm, Conservative Association Divisional Office, 449 Palatine Road, Northenden, Manchester 22.
North West VHF Group—Meetings take place every Monday at 8 pm, (Private Room) "Windsor Castle", St Paul's Square.
Salford (Dial House Radio Society)—This is a society formed by GPO engineers who are at the moment endeavouring to increase the vhf activities of the club. They meet every Wednesday evening at 6 pm on the 8th floor, river end, of Dial House. Anybody interested who is a GPO engineer should write to the secretary at Dial House, Chapel Street, Salford 3.
Southport (SRS)—Wednesdays, 8 pm, and Sundays, 2.30 pm, the Esplanade. Secretary: S. Miller, 72 Station Road, Banks, Southport.
Southport (73 SSB Society)—Thursdays, 8 pm, (All commencing with a talk on part of the RAE syllabus), 73 Avondale Road North, Southport.
Stockport (SRS)—12, 26 November, 10 December, 8 pm, The Brookfield Hotel, Wellington Road, South, Stockport. New members are always welcome. Further details from the secretary, D. I. Lunn, *G3LSL*, 4 Farnham Avenue, Macclesfield. Telephone 7903.
Warrington Culcheth (CARC)—Fridays, 7.30 pm, Chat Moss Hotel, Glazebury. All visitors will be welcome. Secretary: K. Bulgess, 32 Hendon Street, Leigh.
Westmorland—Fridays, 7.30 pm, 24 Park Road, Milnthorpe. Additionally there is an RAE class on Mondays and Thursdays at the same time. Secretary: *G3UEC*, 9 Castle View, Sedgwick, Kendal.
Wirral (WARS)—First and third Wednesdays each month, 8 pm, at the former Civil Defence HQ, Upton Road, Bidston, Birkenhead. The meeting scheduled for 5 November will be moved to 12 November because of Bonfire Night. The meeting on 19 November and subsequent meetings are unaffected. No details are available regarding these meetings which will be arranged by the new committee (AGM 15 October). We welcome to the Society four new members: Philip Brobyn, John Firmstone, G. Kyffin and R. N. Sillars. We trust they will make much of their association. Public relations officer: *G3WSD*.
Wirral (Wirral DX Association)—Meet on the last Wednesday in every month at members' homes. On 31 October there will be a show of slides taken by G3UFO/MM at the home of G3AKW. On 28 November there will be an RSGB tape and slide lecture on aerials at the home of G3UFO. Details will be announced for the December Christmas gathering, while 30 January is scheduled for the AGM at G3OKA. Members recently visited the Decca Navigator station at Neston and take the opportunity of expressing their thanks to G3YFZ for making such a pleasant evening possible. Because gatherings are held in members' homes we regret members only at all events. Details available from the secretary, *G3OKA*.

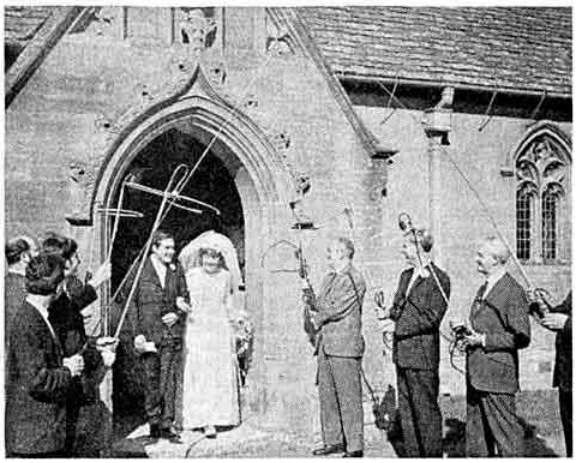
Region 2 RR K. Skethaway, BRS 20185

Barnsley (B & DARC)—14 November (Club construction project), 28 November (" Practical alignment of a G2DAF SSB Tx," by R. Smith, G3DHU), 7.30 pm, King George Hotel, Peel Street, Barnsley. *G3LRP*.
Bradford (BRS)—4 November (Grand auction or junk sale), 18 November (to be arranged), 7.30 pm, 10 Southbrook Terrace, Great Horton Road, Bradford 7. 11 November (Mullard Lecture and Film Show), Bradford Technical College. The talk by Jack Bateman, G6BX, was a fascinating look back over the early days of amateur radio and was punctuated with many humorous stories. It got the first meeting in the new HQ off to a great start. A visit to the computer installation at Bradford Technical College was well attended, ending with the computer playing and singing *Daisy*. September also included a demonstration of members' gear, and for the first time in the new HQ, G3NN went on the air. October brought a talk by L. W. Burkitt on " Simple semi-conductor theory " and Bill Scarlett, G3RXS, asked " Who wants a 623.1Ω resistor? " *G3HJP*.
Durham (DCARS)—6 November (A team quiz), 20 November (The G3PDM receiver), 7 pm, Durham University's Elvet Riverside Arts Block, New Elvet, Durham.
Hull (H & DARS)—7 November (A night with Dick Watson—Photography), 14 November (Open night and junk sale), 21 November (" A simple Impedance Bridge," by G3PQY), 28 November (Film, tape, slide show), 7.45 pm, Unity Hall, 592 Hessle Road, Hull. Secretary: Mrs M. Logson, 4 Chester Road, Wold Road, Hull. *G3LNH*.
Halifax (NHARS)—19 November (" SSB," by Bert Walmsley, G3ADQ), 3 December (Members' slides), 10 December (Annual Dinner), 17 December (Ragchew), 7.45 pm, Sportsman Inn, Ogden, Near Halifax. In September the Club visited the Jodrell Bank giant radio telescope which proved of much interest to those on the visit. Also a gigantic sale of surplus gear was auctioned off once more by G8CB when a large sum was raised for the vehicle fund. *G3MDW*.

Scarborough (SARS)—Thursdays, 7.30 pm, c/o RAF Association Fulbeck House, 3 Westover Road, Scarborough. *G8KU.*
Sheffield (SARC)—25 November (" Top Band DX," by W1BB, taped lecture by kind permission of G3MDW, NHARS), 7.30 pm, " Cross Scythes " Hotel, Totley. It would be appreciated if Sheffield amateurs would contact Guy Easton, G3JMY (Secretary), 46 High Storrs Crescent, Sheffield 11, to enable him to bring the list up to date. *G8NN.*
South Shields (SS & DARC)—7 November (Business meeting), 14 November (" Television DX," by David Clarke), 8 pm, Trinity House Social Centre, Laygate, South Shields. *G3SFL.*
Spen Valley (SVARS)—6 November (" More about Aerials," by I. Lamb, G6LD), 13 November (" VHF Antennas," by A. E. Ashby, G3HCW), 27 November (" Laboratory Instruments," by A. Lamming of Farnell Inst. Ltd), 7.30 pm, The Grammar School, High Street, Heckmondwike. 20 November (Video Tape Recording) at Huddersfield Tech. *G8BSC.*
Sunderland (SARS)—18 November (Film), 7 pm, Sunderland Technical College. *G3XID.*
Teeside—Second Saturday every month. Social Evening, 8 pm, The Crown Hotel, Yarm. *G3JMO.*

Region 3 RR R. W. Fisher, G3PWJ

Birmingham (MARS)—11 November (Lecture by Mr B. Bond, G3XGP), 21 November (Annual social evening, Savoy), 7.45 pm, Midland Institute, Margaret Street, Birmingham 3.
(South)—5 November (Lecture by Mr T. Douglas, " VHF? Why not? How? "), 3 December (Christmas party and surplus sale), 8 pm, The Scout Hut, Pershore Road, Stirchley, Birmingham 29. *G8BHE.*
Bromsgrove (B & DARC)—14 November (G3FIK demonstration of trio equipment), 8 pm, Co-op Room, High Street, Bromsgrove.
Coventry (CARS)—7 November (Quiz), 14 November (Night on the Air and RAE Class), 21 November (Junk sale), 28 November (Night on the Air and RAE Class), Scout HQ, 121 St Nicholas Road, Radford, Coventry.
Dudley (DARC)—4 November (VHF Receiver by G3PWJ), 18 November (Raynet by Mid-Severn Valley Group, G3NUE), 8 pm, Central Library, St James Road, Dudley. *G3PWJ.*
Hereford (HARS)—First and third Fridays of each month, Civil Defence HQ, Goal Street, Hereford. *G3RJB.*
Leamington Spa (MWARS)—3 November (Open meeting), 10 November (Films), 17 November (Sale of surplus equipment), 24 November (Simple test gear), 8 pm, 28 Hamilton Terrace, Leamington Spa. A 2m station is now on the air every Monday evening, and a test bench is now operational with scope, signal generator, BC221, valve test, etc, for members use.
Redditch (EWARG)—13 November (Tape talk and slides "ARRL HQ "), 8 pm, Old People's Centre, Park Road, Redditch. *G3EVT.*
Shrewsbury (SARS)—6 November (Preparation for MCC) 13 November (Talk on Weller soldering equipment), 20 November (Club station), 27 November (" Selectivity—Unusual types of transmission," Mr. G. Bagley, G3FHL), 7.30 pm, Shrewsbury School Signals Hut, *G3WNI.*
Solihull (SARS)—18 November. The first meeting of our second year, so please bring your friends and money, 8 pm, The Old Manor House, 126 High Street, Solihull. *G3VXV.*
Stourbridge (STARS)—4 November (" GPO Radio Tower Birmingham," by Mr J. Tipple), 14 November (Visit to GPO Tower, Birmingham), 2 December (Annual junk sale), 7.45 pm, Longlands School, Stourbridge.
Stratford (SUARC)—14 November (Mini D/F Hunt by G3ORI), 28 November (Top Band/2 metre receiver construction by G3RPJ/G3III), 7.30 pm, Halls Croft, Stratford upon Avon. *G3XFV.*
Wolverhampton (WARS)—3 November (Raynet by G3NUE), 10 November (Natternite), 17 November (" Model aircraft control equipment," by Mr C. Pittaway), 24 November (Committee meeting) 8 pm, Neachells Cottage, Stockwell Road, Tettenhall. *G3UBX.*



Roger Avery, G3TQD, married Miss Georginia Dallimore at the Parish Church of St John, at Badsey, near Evesham, Worcs, on 27 September 1969. On leaving the church they passed under an archway of halos and mobile whips supported by Brendan Magill, G3RMF; Keith Ballinger, G8BBP; Geoff Tibbetts, G3NUE; Roger Allan, G3TQZ; Jack Byrne, G2AFD; Don Price, G3RLF; Les Sharrock, G3BNL; and Russell Luckock, G3VDX. Best man was Roger Hirst, G3SIC. Roger Avery was secretary of the Worcester and District Amateur Radio Club for two and a half years until the Annual General Meeting early in September when he resigned

Region 4 RR T. Darn, G3FGY

Derby (DARS)—5 November (Surplus sale followed by a talk, " Direction Finding "), 12 November (Theory and practice), 19 November (Open evening in the sub-basement clubroom when there will be a check on the Club inventory. All members holding Club equipment are requested to have it returned to the clubroom for this check), 26 November (Visit to the British Railways Technical Research Centre). Full details of all these events can be found in the future programme which has been forwarded to all paid up Club members.
Mansfield (M & DARS)—First Friday in each month, 7.45 pm, The " New Inn," Westgate, Mansfield, Notts. Further information from the secretary. *G8HX.*
Melton Mowbray (MMARS)—21 November (" Construction Techniques," by H. Miles). St Johns Ambulance Hall, Holwell Works, Asfordby Hill, Melton Mowbray. Secretary: R. Winters, *G3NVK.*
South East Derbyshire Radio Society—4 November (Aerial systems), 11 November (Aerial tuning units), 18 November (Sale of members, surplus items), 25 November (Handy gadgets), 7.30 pm. All meetings at the College of Further Education, Heanor.
Nunsfield House Amateur Radio Group—7 November (AGM), 14 November (" Radiography " by G8BFC), 21 November (Open evening), 28 November (Film show by G3ALA), 7.30 pm, Room 7, Nunsfield House, Boulton Lane, Alvaston, Derby. *G3LCV.*
Chesterfield (CDRS)—Second and fourth Wednesdays in each month, 7.30 pm, The Barnett Observatory, Newbold, Chesterfield. *G3VDI.*
Leicester Radio Society—Further information from J. D. Garner, *G8BNP.* Information on Club programmes and activities would also be welcome from the following societies and clubs. Grimsby, Loughborough, Burton on Trent, Lincoln, Newark, Alfreton and Nottingham.

Region 5 RR S. J. Granfield, G5BQ

Bedford (B & DARC)—Thursdays, 8 pm, (Morse classes at 7.30 pm For further information apply to Ken Whitbread, *G3XDU,* 78 Pipit Rise, Bedford.
Bishop's Stortford (BS & DARC)—Meetings held monthly at the British Legion Club, Windhill, Bishop's Stortford, Herts. Further details from P. J. Toynton, *G3RGA,* at " Wildhern," Old Mead Lane, Henham, Herts.
Cambridge (C & DARC)—1 November (Informal), 14 November (Expert review of equipment—G3GGK and G3EED), 21 November (Informal), Fridays at 7.30 pm, Club Headquarters, Victoria Road, Cambridge.
Cambridge University (CUWS)—Freshmen should contact S. C. Cripps *G3TPF,* c/o Jesus College, or N. Kingsley, c/o Trinity College, for full particulars of activities.
Dunstable Downs (DDRC)—Fridays, Chew's House, Dunstable Beds. Full particulars from A. C. Don, *G8BWZ,* 51 Manor Park, Houghton Regis (Dunstable 67349).

Luton (L & DARC)—First Tuesday in the month at 8 pm, Club HQ Putteridge Estate, Luton, Bedfordshire.
March (M & DARS)—Tuesday evenings, Club HQ, Old Police Headquarters, High Street, March, Isle of Ely.
Peterborough (P & DARS)—Meetings on the first Friday in each month, 7.30 pm, in the Lecture Hall of the Electronics Section at Peterborough Technical College, Eastfield Road. Other Friday evenings meet at the Club HQ in the Ancient Windmill behind the Peacock Inn, London Road, at 8 pm. Further particulars from hon/sec, Douglas Byrne, *G3KPO*, Jersey House, Eye, Peterborough. (Tel Eye 351).
Shefford (S & DARC)—6 November (Film Show G3TDW & G3EUS), 13 November ("What is a Watt?"—Dr Williams), 20 November ("I would like to know..."—Club queries), 27 November ("Exploring VHF"—G8AKT), 29 November (Annual dinner). This will be its 21st year, make it the best yet. The secretary is C. W. Stedman, *G3XWS*, 10 Wychwood Avenue, Luton, Bedfordshire.

Region 6 RR L. W. Lewis, G8ML

Cheltenham (RSGB Group)—First Thursday, 8 pm, Great Western Hotel, Clarence Street, Cheltenham.
Chiltern (CARC)—Last Thursday in every month, 8 pm, The British Legion, St Mary's Street, High Wycombe.
Gloucester (GRS)—Second and fourth Thursdays, 7.30 pm, RAFA Club, 6 Spa Road, Gloucester.
Oxford University Radio Society—Meets every Wednesday during term, 8.15 pm, Department of Metallurgy. Contact Simon Watts, St John's College, for information about membership or use of the radio station.

Region 7 RR P. A. Thorogood, G4KD

Can you always let me have two months events in advance, or ring me during the day by the 1st of the month for the next month's event. Telephone 636 1403.
Acton, Brentford & Chiswick (ARCRC)—18 November (Members holiday slides), 7.30 pm, Chiswick Trades & Social Club, 66 High Road Chiswick.
Addiscombe (AARC)—Second and fourth Tuesdays, 7.30 pm, Toc H Hall, 158 Lower Addiscombe Road.
Ashford, Echelford (ARS)—Last Thursday of month, 7.30 pm, St Martin's Court, Kingston Crescent, Ashford, Middx. Last meeting 25 RSGB members and 17 non RSGB and nine visitors heard talks on colour tv by G8ASI and G2FNK.
Barking (B & DREC)—Tuesdays and Thursday, 7.30 pm, Gascoigne Recreation Centre, Gascoigne School, Morley Rd, Barking.
Bexleyheath (NKRS)—Second and fourth Thursdays, 13 November (latest vhf/uhf developments by G8/G3s), 27 November (Club station and natter evening), 7.30 pm, Congregational Church Hall, Chapel Road, Bexleyheath. Last meeting 32 RSGB members and 11 non RSGB members! Mr D Ralphs of the Diplomatic Wireless Service gave an interesting lecture on the Piccolo system of teleprinter transmission.
Cheshunt (CDRC)—Fisrt Friday of month, 7 November (Tape lecture entitled "Radio Aurora"), 7.30 pm, Methodist Church Hall, opp Theobalds Station, Cheshunt.
Chingford (RSGB Group)—Fridays, Telephone 01-524 0308.
Chingford (SRC)—Fridays, 8 pm, Friday Hill House, Simmons Lane, Chingford, E4.
Civil Service (CSRS)—First and third Tuesdays, 6.30 pm, Civil Service Recreation Centre, Monck St, Westminster. 4, 18 November see last month *Radio Communication*. Welcome to new member Dave Harris, who is at DGW(N) Bath. Under new management—CSRS Newsletter by G3TJQ—news items welcome.
Croydon (SRCC)—Third Tuesdays, 7.30 pm, Swan & Sugarloaf, South Croydon. Latest new calls, G3YQL, G3YQW, G3YRB. 20 RSGB members at last meeting, others were on holiday, and 20 YLs, XYLs and guests.
Crystal Palace (CP & DRC)—8 pm, Emmanuel Church Hall, Barry Rd, SE22.
Dorking (DR & DRS)—Second and fourth Tuesdays. 11 November (Informal), 25 November (Film show by Ralph Cathles, G3NDF), 8 pm. 15 RSGB members and two non members attended last meeting, a low supply but good attendance. 2nd Tuesday, "Wheatshaft," 4th Tuesday, "Surrey Yeomen," Dorking.
Ealing (E & DARS)—Tuesdays, 7.30 pm, Northfields Community Centre, Northcroft Rd, W13. Planning of first stage to hold rally at Hanwell in May date to depend on keeping clear of contests. Talk-in station on high QTH. Think *First London Rally—Big Show Intended*—suggestions invited.
East London—16 November (Lecture, discussion, meeting and demonstration), 2.30 for 3 pm. 28 RSGB members attended last meeting.
Edgware & Hendon (E & DRS)—Second and fourth Mondays, 8 pm, St George's Hall, Flower Lane, Mill Hill, NW7.
Farnham, Bucks (Burnham Beeches RC)—Fortnightly, Mondays Farnham Common, Village Hall, Victoria Road.
Gravesend (GRS)—Wednesdays, 8 pm, Community Centre Cedar Avenue, Kings Farm Estate, Gravesend.
Guildford (G & DRS)—Second and fourth Fridays, Guildford Engineering Society, Stoke Park.
Hampton Court (TVARTS)—First Wednesday, 7.30 pm, The Three Pigeons, Portsmouth Rd, Surbiton.
Harlow (DRS)—Tuesdays (General), Thursdays (CW Practice) Fridays (Junior), 7.30 pm, Mark Hall Barn, First Avenue.
Harrow (RSH)—Every Friday. 7 November (Practical night), 14 November (El bugs—G3SCO), 21 November (Practical night), 28 November ("Ancient radio by an old timer" by G6NZ), 8 pm, Roxeth Manor School, Eastcote Lane, Harrow.
Havering (H & DARC)—Fortnightly, 8 pm, British Legion House, Western Road, Romford.
Hemel Hempstead (HH & DARS)—First and third Fridays, 7.30 pm, "Addmult" Sports Club, Hemel Hempstead.
Holloway (GRS)—Mondays (RAE) 7 pm, Wednesdays (Morse) 7.30 pm, Fridays (Club) 7.30 pm. 24th AGM held on 26 September. Club officers re-elected: A. W. Wennell (G2CJN), President; A. E. Bristow (BRS 25779), Chairman; W. Coleman (BRS 27678), Hon. Secretary; S. Dimmock (G8COH), Hon. Treasurer; C. E. Heywood (G3KEB), Contest Secretary. Added to list of Vice-Presidents: R. M. H. Barnes. Elected Committee voted in from 9 proposals: B. Greenway (G3THQ), P. Beresford (G3AFC), B. Bond (G8CUR), D. Greene (G8BCQ), Auditors R. Findley (G3MFU) and J. Band (G8BLN).
Ilford—Every Thurdsay, 8 pm, 50 Mortlake Road, (off Ilford Lane). Ilford.
Kingston (K & DARS)—Second Wednesday, 8 pm, Penguin Lounge, 37 Brighton Road, Surbiton.
Leyton & Walthamstow—Tuesdays, 7.30 pm, Leyton Senior Institute, Essex Road, E10.
London (UHF Group)—First Thursday (Discussion on 3cm band) 7.30 pm, Whitehall Hotel, Bloomsbury Square, WC1.
Loughton—Fortnightly, Fridays, Loughton Hall, Rectory Lane. (Near Debden Station).
New Cross—Wednesdays and Fridays, 8 pm, 225 New Cross Road, SE14.
Paddington (P & DARS)—Thursdays, 7.30 pm. Beauchamp Lodge, 2 Warwick Crescent, W2.
Purley (P & DRS)—First and third Fridays, 8 pm. Railwayman's Hall, side entrance, 58 Whytecliffe Road, Purley.
Reigate (RATS)—First Wednesday. 1 November (Visit to Gatwick control tower), 5 November (Construction contest and G3TDT NFD film), 19 November (Informal meeting at the home of Mike and Sylvia Hubbard), 7.45 pm, "George and Dragon," Cromwell Road, Redhill.
Romford (R & DARS)—Tuesdays, 8.15 pm, RAFTA House Carlton Road.
Scouts (ARS)—Third Thursdays of month, 20 November (Junk sale), 15 December (Xmas party), 7.30 pm, Baden Powell House, Queensgate, South Kensington, SW7.
Sidcup (CVRS)—6 November ("Integrated Circuits," by C. A. Jones of Mullard), 20 November (Natter night), 8 pm, Congregational Church Hall, Court Road, Eltham.
Slough (SDR Group)—First Wednesday, 7.30 pm, United Services Club, Wellington Street.
Southgate (SRC)—Second Thursday of month, 7.30 pm, Civil Defence Hut, Bowes Road, N11.
St Albans (Verulam ARC)—19 November ("The development of the uhf tv network" by Mr R. Hills, G3HRH), 7.30 pm for 8 pm sharp, Town Hall, St Peter's Street, St Albans.
Sutton & Cheam (SCRS)—Third Tuesday, 8 pm, The Harrow Inn, High Street, Cheam.
Welwyn (Mid-Herts ARS)—Second Thursday of month. 13 November ("Amateur tv" by G6OPB/T), 8 pm, Welwyn Civic Centre, Welwyn.
Wimbledon (W & DRS)—Second and last Fridays, 8 pm, St John Hall, 124 Kingston Road, South Wimbledon, SW19.
Wembley (GECARS)—Thursdays, 7 pm, Sports Club, St Augustin Avenue, North Wembley. (This club is open to non-GEC employees by invitation. Telephone ARN 1262 for details).

Region 8 RR D. N. T. Williams, G3MDO

Worthing (W & DARC)—11 November (Grand junk sale). Meetings held every Tuesday, 8 pm, at Rose Wilmot Youth Centre, Littlehampton Road, Worthing.
Eastbourne (SARS)—3 November (Talk and demonstration by KW Electronics), 8 pm, Victoria Hotel, Latimer Road, Eastbourne.
Dover (SEK YMCA RC)—Thursdays, 7.30 pm, YMCA, Leybourne Road, Dover.
Mid-Sussex (MSARS)—All meetings and Club station at Marle Place, Leylands Road, Burgess Hill.
Maidstone (MYMCA ARS)—Tuesdays and Fridays, 8 pm, 'Y' Sports Centre, Melrose Close, Loose, Maidstone.
Canterbury (EKRS)—Information of future meetings from hon sec., D. N. T. Williams, *G3MDO*.
Thanet (TRS)—Fridays, 8 pm, Hilderstone House, St Peters, Broadstairs.

Region 9 RR J. Thorn, G3PQE

Bristol (BARC)—Every Monday and Thursday, 7.30 pm, Club HQ (G3TAD), University Settlement, Ducie Road, Barton Hill, Bristol 5. *G3WLZ*.
(City & County of Bristol RSGB Group)—24 November ("Receiver and Transmitter measurement techniques," by G. M. Stone, G3FZL), 7.30 pm, Becket Hall, St Thomas Street, Bristol 1. 16 November (Annual Bristol—MARS Contest). *G3ULJ*.
(University Bristol Amateur Radio Society)—Meets Saturdays 2.30 pm, Department of physics, Royal Fort. *G8ADP*.
Burnham-on-Sea (BOSARS)—Contact *G3GIW*.
Cornwall (GARC)—6 November. SWEB Clubroom, Pool, Camborne. *G3UCQ*.
(VHF Group)—Third Thursday in each month, 7.30 pm, The Peoples Palace, Fydor Street, Truro. *G3XC*.
(Falmouth Group)—11, 25 November, Laburnham Drive Mission Hall. *G3OJN*.
(Newquay Group)—12, 26 November, Treviglas School. *G3THT*.
Exeter (EARS)—Contact *G3HMY*.
Plymouth (PRC)—4 November (Brains trust), 15 November (Annual dinner), 2 December ("SBS," by Ron Daw, G3OIQ), Club HQ, (G3PRC), Virginia House, Bretonside, Plymouth. *G3YDU*.
Saltash (S & DARC)—14 November (Annual General Meeting) 7.30 pm, Wheatsheaf Inn. 28 November ("Life and Times of G9BO," introduced by G2DFH), 7.30 pm, Burraton Toc H Hall, Warraton Road, Saltash. *G3XWA*.
South Dorset (SDARS)—7 November, 7.30 pm, Labour Rooms, West Walk, Dorchester. *G3RZG*.
Taunton (T & DARC)—Every Friday, SEVO HQ, The Barracks, The Mount, Taunton. *G3DTB*.
Torbay (TARS)—29 November (Arrangements for Xmas Social and the Draw). Every Tuesday and Friday, Club HQ, (G3NJA), Bath Lane, Rear of 94 Belgrave Road, Torquay. Recently two lectures were given on Transistors and Met. Weather Observation by Mr Gray, a visitor from Norfolk. Additional attraction at the November meeting will be a mystery talk by G3ABU. *G3GDW*.
Wells (WARS)—Contact *G3MQQ*.
Weston-super-Mare (WSMARS)—Back to school this month. 7 November ("Licences, prefixes and callsigns of early days of radio," by Ken Harvey, G5KT), 5 December (Lecture), 7.30 pm, Westhaven School, Ellesmere Road, Uphill, WSM. A programme of lectures has been organized for the winter months, visitors are warmly welcomed, especially the lads from RAF Locking and the Technical College. *G3GNS*.
Yeovil (YARS)—5 November (Junk Sale). Tape lectures are being arranged for future meetings, preparations are in hand for future contests. *G3NOF*.
Royal Signals (RSARS)—The Amateur Radio Society for anyone who has been connected with the British Army in any way. HQ and Station, Blandford Camp, Blandford Forum, Dorset. Secretary: W.O.1.J. Cooper, *G3DPS*.

Region 10 RR C. H. Parsons, GW8NP

Blackwood (ARC)—Fridays, 7 pm, Blanche Cottage, off High Street, Blackwood, Mon. The Club members on the final stages of fitting out the new Club premises. This has been a long job, made no easier by vandalism which has involved loss and time set-backs. *G6BK*.

Barry College of Further Education (ARS)—Thursdays, 7 pm, at the College, Colcot Road, Barry, Glam. *GW3VBP*.
Cardiff (RSGB Group)—10 November (Film Show), 7.30 pm, TA Centre, Park St, Cardiff. This Group has suffered a sad loss in the death of Vic Bartlett, GW5BI, who was the group treasurer, and had been a member since 1934. *GW3GHC*.
East Glamorgan Raynet Group—First Tuesday in each month, 7.30 pm, Cardiff Emergency Services HQ, Womanby St, Cardiff. *GW3VNO*.
Hoover (ARC)—Mondays, 7.30 pm, Hoover Social Club, Hoover Factory, Merthyr. The Club held a very enjoyable and successful social evening on 16 September. The regional representative attended this function and was very impressed by the standard of accommodation and facilities available. The Club station, GW3RDB is well equipped and very active. Secretary: Mr F. E. Tribe.
Port Talbot (ARC)—Meetings at Trefelin Club & Institute, Port Talbot. Details of meetings are available from *GW5VX*.
Pontypool (ARC)—Tuesdays, 7 pm, Educational Settlement, Rockhill Rd, Pontypool, Mon. *GW3JBH*.
Pembroke (ARC)—Last Friday of each month, 7.30 pm, Defensible Barracks, Pembroke Dock.
Rhondda (ARS)—Meetings at Pengelli Hotel, Treorchy, Rhondda, Glam. Details from *GW3PHH*.
Sully & District Short Wave Club—Tuesdays, 7 pm, Annexe Sully Bowls and Social Club, 59 South Rd, Sully, Glam. *GW3SLA*.
Swansea Telephone Area (ARS)—Tuesdays, 7.30 pm, Telephone Engineering Centre, Gors Rd, Townhill, Swansea, Glam. The venue may be subject to change. For full details please contact Mr M. D. E. Connor, 54 Talley Rd, Penlan, Swansea.
University College, Cardiff (ARS)—Interested fresher students please contact the Secretary, Students Union, Dumfries Place, Cardiff.
University College, Swansea (ARS)—Meetings held in Students Union Building. New students should contact the Secretary, c/o UCS Radio Society, Engineering Society, Applied Sciences Building, University College Campus, Swansea.

Region 11 RR M. Williams, GW3LCQ

Bangor (UCNWARS)—6 November ("RAEN," by Mr Scarborough, G3MBD), 20 November ("The use of ics by amateurs," by Mr A. R. Owens of UCNW). The Club is active all bands 160m–2m on all other evenings.
Conway Valley (CVARS)—Next meeting on 20 November at the Parade Hotel, Church Walk, Llandudno. The main speaker of the evening will be G. Barnes, G3AOS, Tech. Rep. for GEC — Marconi Electronics Ltd, who will talk and demonstrate some of the latest vhf and uhf equipment. Meeting commences at 2000 hours, prompt, and all friends and strangers interested will be welcome. At the October meeting Dr J. D. Last, B.Sc. PhD, GW3MZY, lectured on FETs and filters, and once again he proved himself a lecturer of outstanding ability.
Rhyl (R & DARC)—The venue for the next meeting of this Club has been changed to The Mona Hotel, Market Street, (Nr GPO), Rhyl. This meeting will be held as usual on the second Tuesday of the month, namely 13 November at 2000 hours. The subject will be a film show by Mullard's. Visitors will be made very welcome. The September junk sale turned out to be a great success, and Dr J. D. Last, B.Sc. PhD, GW3MZY, gave once again a most excellent lecture on frequency measurements at the October meeting.

Region 12 RR A. W. Smith, GM3AEL

Aberdeen (AARS)—Fridays, 7.45 pm, 6 Blenheim Lane, Aberdeen. *GM3HGA*. Telephone Aberdeen 33838.
Lhanbryde (MFARS)—Mondays, 7.30 pm, St. Andrews School, Lhanbryde, by Elgin, Morayshire. *GM3UKG*. Telephone Clochan 225.
Dundee (RSGB Group)—Thursday, 8 pm, 3 Magdalen Place (off Roseangle), Dundee. *GM3KYI*.
Lerwick Radio Club (Shetland)—Tuesdays and Thursdays Annabrae House, Lerwick. *GM3XPQ*. Telephone Bixter 249.

Region 13 RR V. W. Stewart, GM3OWU

Lothians Radio Society—13 November (Junk Sale), 27 November (Visitors night—Films "Day of precision" and "For better-For worse"), 7.30 pm, YMCA, South St Andrew Street, Edinburgh.

Region 14 RR N. G. Cox, GM3MUY.

Ayrshire (Ardeer Recreation Club ARC)—6, 11, 13, 18, 20, 25, 27, November, 7.30 pm, Ardeer Recreation Club, Amateur Radio Section, Stevenston, Ayrshire. Details from J. F. McCreight, *GM3DJS*, 10 Auchenharvie Road, Saltcoats, Ayrshire.
Ayrshire (AARG)—2, 16, 30, November, 7.30 pm, ATC HQ, Kilmarnock.
Glasgow University (GURC)—14 November, (AGM and junk sale), 23 November (RAEN Glasgow Group), 7.30 pm, George Service House, 11 University Gardens, Glasgow, W.2. Enquiries to Colin Weston, *GM3VAP*, 46 Marchester Drive, Glasgow, W2. Telephone 041-339 2074.
Greenock (G & DARC)—7, 14, 21, 28, November, 7.30 pm, Watt Library, Union Street, Greenock.
Mid-Lanark (RSGB Group)—21 November, 7.30 pm, YMCA, Brandon Street, Motherwell.

Region 15 RR J. Thompson, GI3ILV

Mid-Ulster Group—7 November ("Medium wave DXing" by GI3WSS), 8 pm, Temperance Hall, Portadown.

Region 16 RR W. J. Green, G3FBA

Chelmsford (CARS)—First Tuesday in each month, 7.30 pm, Marconi College, Arbour Lane, Chelmsford. *G3OZF*.
Colchester (CARS)—Each Wednesday, 7 pm, Room 41, NE Essex Technical College, Colchester. 8 October (AGM), R. C. Greenleaf 27 Ernest Road, Wivenhoe, Essex.
Gt Yarmouth (GYRC)—Last Friday in each month, 7.30 pm, 98 South Market Road, Gt Yarmouth. *G3HPR*.
Ipswich (IRC)—26 November ("Electronic Control," by Mr Harris of Norton Devices), 7.30 pm, Red Cross HQ, Gippeswyk Hall, Gippeswyk Avenue, Ipswich. *G3UJR*.
Maldon Essex (MYCRG)—Thursdays, 7.30 pm, The Friary, Chequers Lane, Maldon, Essex. Michael Humphries, G3LRQ, has relinquished his post as instructor of this Group, due to an impending move away from the district. He has been with the group since its inception four years ago, when a few enthusiasts persuaded the warden of the youth centre to include radio in the centre's activities. Weekly attendance has more than doubled since those early days, and in July of this year the Group became affiliated to the RSGB. Members include Jeff Wagner, G3VOJ, and Paul Duvoisin, G8CBM, who help to keep the group's call G3WDP "aired." The meetings are under the auspices of Essex County Council, and all are welcome.
Norwich (NARC)—3 November ("Please explain this"—Arthur Porter, G2CDX), 10 November (Informal Meeting), 17 November (Business Meeting), 24 November (The Racal RA17L Receiver, J. Hanks Esq), 7.30 pm, The Brickmaker's Arms, Sprowston Road.

Region 17 RR C. Sharpe, G2HIF

Basingstoke (B & DARC)—1 November (Basic Radio for the Beginner), 15 November (Receivers and Frequency Measurement), 7 pm, Chineham House, Popley Way, Basingstoke.
At the Annual General Meeting held on 20 September the following were elected to office: Chairman: Roy Powers, G8CKN; Secretary: Peter Sterry, G3CBU; Treasurer: Dick Hogan.
Bournemouth (Wessex ARC)—Meetings on the first Friday and on the Monday following the third Friday in each month, 7.30 pm, Cricketers Arms Hotel, Windham Road, Bournemouth, Hants. *G8AVE*.
Chippenham (C & DARC)—25 November ("Pitfalls to avoid when loading SSB transmitters," by Vic Newport, G3CHW), 7.30 pm Chippenham School for Boys, Hardenhuish Lane, Chippenham. The current Club project is a mosfet converter for 2m. *G3UTO*.
Maidenhead (M & DARC)—3 November (Demonstration of a home-built transistorized receiver by G3VCT), 18 November (Informal), 7.30 pm, Victory Hall, Cox Green Lane, Maidenhead. *G3VMR*.
NW Berks (AERE, Harwell, ARC)—Meetings on the third Tuesday in each month, 7.30 pm, Social Club, AERE, Harwell, Berks. *G2HIF*.
Reading (R & DARC)—4 November ("Military Radio,") by a guest speaker), 18 November ("Metal, solder and screws." Construction techniques), 7.30 pm, Victory PH, off the Meadway, Tilehurst, Reading. *G3TEB*.
Southampton (RSGB Group)—Meetings on the second Saturday of each month, 7 pm, Lanchester Buildings, University. *G3GOY*.

MEMBERS' ADS

These advertisements are free to members. The number of words is limited to 32, not including your name (or call-sign) and address. All ads must be clearly written or typed on the Order Form or on a postcard. Each ad must be accompanied by a recent *Radio Communication* wrapper, the address of which must agree with the address on the ad. No trade or business ads can be accepted. The RSGB cannot accept responsibility for errors, for the quality of equipment offered, or guarantee inclusion. Ads must reach RSGB HQ during the period printed on the top of the current order form. Ads which are not printed will *not* be held over, they must be re-submitted. We advise members to enclose a stamped addressed envelope, when replying to ads. For further details of these ads see the current Order Form.

Entry period for Dec. ... 7 Nov. to 12 Nov. Entry period for Jan. ... 1 Dec. to 7 Dec.

AR10 rotator, AR88D not wking, offers, pref buyer coll. G8BUT QTHR.

Sell or exch AGFA sonector phon 8 mm sound proj, zoom, reverse, 16/24 fps, mike output amp, carry case, one sound film, imac cond. cost over £200 offers or accept gd ssb transcvr. G3NIM, QTHR. Tel Hamble (Southampton) 2025.

RFs 24, 25, 26, 27, £1 ea, Woden UM2 £3, SCR522 (no valves) £1, 500-0-500V 200 mA £1, Parmeko 550-0-550 200 mA, £1 10s, paper capacitors 5 of 4 μF 600V, 2 of 12μF 900V, 5s ea. Various valves sae please. G3SAX, QTHR. Tel Gerrards Cross 82440.

Balanced modulator diodes, matched quad, 4XCV2279 packed and sealed by GEC, 2 packs at 7s 6d ea. 2 RCA new boxed 6F4 valves 10s ea. 2 GE new boxed 7462 valves £1 ea. E. Clarke, G3UYD, 65 Oakmount Rd, Chandlers Ford, Eastleigh, Hants. Tel Chandlers Ford 2309.

Mech filt Lafayette HA350 type. 2.2kHz at 6dB with new QCC carrier xtal for usb. £9 ono. Also 1·25kV psu ex-1154 any offers cons, buyer coll. Wanted 9MHz am xtal filt 80dB stopband. C. Horrobin, G3TZW 50 Fletcher Rd, Stoke on Trent, ST4 4AJ.

Pye high power/M PT114 mod 4m £10. Base stn lo band un-mod £5. Lo band boot set £1 10s, hi-band boot set 15s, Hartley CRO as bought £15, will haggle. G3OCQ, QTHR. Tel Stratford 5973.

Sommerkamp FR100B rx £90, FL200B tx £95, both mint. Pref buyer coll but could arrange local del. G3SOE, 37 Springhill Lane, Penn, Wolverhampton.

No 36 set (tx) 20-15-10m am/cw, 50W plus, £6 ono, buyer coll or will break for fb hf compnts. G3XRW, QTHR. Tel 01-393 8894.

30W Pye ranger, hi band, 12V dc, partly mod, circ diag supplied, exc cond comp £16. I. Richmond, G8CLJ Parkview, 33 Abbey Road, Gt Malvern, Worcs.

Heathkit RA-1 rx, 160-10m, exc cond, £30 ono. G. Winter, G3XCW, 48 Ann Rd, Nr Birmingham. Tel Wythall 6036.

Two AR88D cabinets, 1·7-420 modulators, psu, 18 meters, 2m 3×3×3 beam, prop motor converter, 3in scope, Qmax gdo 1, 120 valves, emdo motor geared 1 rpm, relays, rf cables, 10M tubing, chassis, books, transformers, many other spares, £100 lot. G6CB, QTHR. Tel 01-542 0432.

Hy-gain 18JR-197 hy-tower, 10-80m vertical 39ft £20, leaflet avail. New hammer grey cabinet panel and chassis £5. G3NUG, 27 London Rd, Shenley, St Albans, Herts. Tel Radlett 4435.

Heathkit RA1, gd cond no mod, with homebrew Qmult £25. B. Attenborough, G3WKD, 364 Jessop Rd, Stevenage, Herts.

Hallicrafters SR150 transcvr, full coverage 80-10m with auto transformer, ac psu, dc psu, mobile mount, spare valves, manual, KW Eezee match, orig cost over £400, bargain £200. J. Joslin, G3NPY, 13 Talbot Rd, Skegness, Lincs. Tel Skegness 4185.

5AH tx 1·5-13MHz, 2x807 pa, v clean but needs attention £5. Heavy duty psu for same, dirty but working £2. Various HRO coilpacks buyer coll. Wanted psu 250V 150ma, 6·3V 6A or close. D. Turney 9 Hengist Way, Bromley, Kent. BR2 ONS. Tel 01-460 6326.

Minimitter tx, 150W 80-10m incl psu, exc cond £25. Buyer coll. G3VOP, QTHR. Tel Vange 2218.

Heathkit RA1 rx, with Qmult, xtal calibrator, speaker, exc cond, £32. H. Stannard, G2YC, 15 Hendale Ave, Hendon, NW4. Tel 01-203 4257.

Rxs R107 £8 10s, R209 £9, both vgc. Servograph pen recorder circular charts 50mA sensitivity, as new £8 ono. 30ft sectional ant with guys £2, carr extra. H. Brash, GM3RVL, 5 Hillview Drive, Edinburgh, EH12 8QW. Tel 031-334 7152.

70cm tx DET 24 pa, less mod + psu, £10. 70cm 2C39 flat plate line pa less valve £3. K6AXN 23cm conv trough line assmbly, comp 35s. All ono + pp. G3NOH, QTHR.

Mosley V3JR tri-band vert little used, buyer coll, offers. G3BRT, QTHR.

Paper caps 8mF 1500V 5s, 8mF 750V 4s, also valves, transformers, chokes, sae list or send your requmnts to G3SWH, QTHR. Tel 0272 673703.

Codar CR-70A with bfo, avc and s-meter, mint cond. Also PR30 preselector in same cond. £15 for both. A. Burges, 59 Laburnum Grove, Torbrey, Stirling, Scotland. Tel Stirling 4591.

7B printer with 45·5 and 50 band govnrs, Creed 5120 ps tu with 299an relay, £20. 2m 100W tx 2xT240 mod £22. Offer. xtals in B7G, 28000KHz, 28155·56KHz, 28011·11 KHz and 28114·44kHz, offers. R. Gabbitas, G3KHU, 12 Thornyville Drive, Oreston, Plymouth.

840C £35, 358 £10, SX24 £10, CR66 £10, AR88LF £35, BRT402E £50, CR100 £10, Siemens all wave £5, G2HKU, QTHR. Tel Minster (Sheppey) 3100.

R1475 (revalved) ac psu £6. Pye PTC704 tx wkg 2m £3. H/b lin, two QV08-100, metered, 80/15m, needs 800V, transformer sup £16. Buyer coll or arrangement. G2BVN, QTHR.

1154 rectifier type 45, ref 10D/889, input 250V output 1200V 200mA. 3 at £15 ea. 1154/1155 rectifier type 46 ref 10D/890, input 200/250V output 6·3V 13A, 220V 110mA. 3 at £15 ea. All first class. Buyer coll. GI3RNY. Avonmore, Antrim Rd, Ballymena, Co Antrim, NI. Tel 41468

T & R Bulls, May + Aug 1929, Jan 1930, July 1932, Aug 1937, G3IDG, QTHR.

Valves 6SA7, EF36, 6SQ7, 6J5, 6B8, 6AG7, EL32, OM6, EF39, 6L7, 6J7, EF50, 6V6G, EF80, ECC82, EF91, PCC84, ECL80, 3s ea. OD3, QV04/7, 6L6G, 10F1, 5s ea. 832, A1714, 10s ea. G. Jeapes, G2XV, 165 Cambridge Rd, Gt Shelford, Cambridge.

R220 mk 2 £5, B44 mk 2 variable tuning transistor psu £6, post extra. Creed 3X teleprinter free, come and coll. B. Robertson, G3TTV, 12 Hazel Close, Mildenhall, Suffolk.

Sommerkamp FLDX500 £115, HA350 with 160m £50 ono, 6 months old. Would px for gd transvr with cash adj. R. Mitchell, G3YBM, 91 Cants Lane, Burgess Hill, Sussex. Tel Burgess Hill 3851.

Abandoning taped music collection. Gd quality boxed 7 in 1800ft LP tapes 10s ea. Post ea 1-2 1s 3d, 3-6, 1s, 7-12, 9d, over 12, 6d. Will wipe if requested. G3ERB, 56 Kings Lane, Bebington, Cheshire.

A number of 4CX250Bs comp with EIMAC bases and chimneys + anode caps—offers to G3YGM, 73 Cherrytree Ave, Cowplain, Hants.

Valves, 3 7360, 1 TT21 15s ea, 2 DET 22, 20s ea, QQV03-10 7s 6d ea, 2 EF183, 2 6BZ6, 2 6BR7 4s ea. FT241A xtals for filt, 2 447·78, 2 479·63, 1 476·6 kHz, 50s the set, post 1s. G8ATF, QTHR.

Elizabethan home-brew tx, 150W am/cw, Geloso vfo, 2×807 pa, 2×807 mod, £15 ono. Lab-type oscillator 150—300MHz £5. Buyer coll. K. Starnes, G3JWK, 14 Springbank Cres, Winsford, Cheshire. Tel Winsford 2466.

Xtals 3595, 7001, 700·8, 7190, 8054, 8072·73, (pair) 8s ea. Valves EF91, 6J6, 6AK5, 3s ea, 832 10s. Paper capacitors 8μF 400V, 2μF 1KV, 5s. Selenium rectifiers believed 450V 150mA, 5s. G2QY, QTHR. Tel Cheltenham 7905.

KW valiant psu £25 ono, EC10 fitted S meter £40 ono, Erskine 13A scope £20 ono, wanted HW 32A, G3RUG, QTHR. Tel 061-483 2188 (day).

BCC 69D, 4m, fully converted, tuneable rx, comp with 2 xtals, mic, 12V psu, battery and all connecting leads £7 ono. M. Brown, G3XMW, QTHR. Tel 660 0959.

Trio JR500SE rx mint, orig pack £52, Pye reporter 4m £5, HRO psu 30s, Panda Tuneable LP filt 50s, 4m and 10m txs £4 ea, wanted HW32A and 20m whip. E. Haycock, G3VKC, Two Four The Comyns Bushey Heath, Herts. Tel. 01-950 3387

DX100U with man £45, CT53 signal gen 8·9-300 MHz 4μV-100mV with man and graphs, £19 10s both items, as new. Psu 300V, 100mA 150V stab, 6·3V 3A, uses AR88 transfmer £3, 813 valve 21s. G8BGQ, QTHR.

Kits for G3PDM wattmeters still in stock. See July p.499. 6s 6d ea, post paid from P. Martin, G3PDM, Oak Cottage, Witton Gilbert, Durham.

KW vespa mk 2 with psu as new £110. RA1 with calibrator and mosley RV4 £10. De luxe joystick new £4, offers cons, carr extra. G3YBK, QTHR, Tel Exeter 78710.

Eddystone EA12 vgc £120, DX100 £40, SB10 £22 10s, Codar T28 £11 10s, TW twomobile, requires attention £9, RV4 £11. Wanted, 70 cm rx and converter, heavy duty rotator, 1·5kV linear psu. H. Storey, G3UPB, Smallburn East, Ponteland, Newcastle on Tyne. Tel Ponteland 3706.

Lafayette HA63 gc rx mint £14. Tiny tim gen 300W 13V £15. Philips mics new 22s 6d. Many ht transfmers at low prices, example 500-0-500 secondary 250m £1. Post extra, all items. R. Bastin, G3LHA, 40 Stamford Ave, Coventry. Tel Coventry 67133.

DX4OU, VFIU, spare valves inc 6146, exc cond, £28 ono. Buyer coll or carr ex. J. Baker, G3YHB, 86 Max Rd, Liverpool, Lancs, Tel 051-228 1321.

DX100, SB10, what offers. G2HMG, QTHR. Tel Thetford 3106.

15W QQV03-10 2m tx 8W rf o/p, ptt, ae c/o. Well-built rig. full mod sig, fully metered, £16. Buyer coll or would arrange weekend sked. G3YFK, 10 Woodfield Rd, Shrewsbury. Tel Shrewsbury 55673.

2 command rxs 1·5-6·0 MHz £4 10s ea, CR100 £15, Woden Williamson output transfmer £3 10s, R109A £4, 100 copies bulletin swap for 8-8·1 xtals or offers. 0-30V precision mc meter £2 10s, all ono. G8AWA, QTHR. Tel Wantage 3660.

Mech filt + xtals for G2DAF tx £14, pair TT21 25s ea, dipole traps 10-80m encapsulated new 30s, Ficord batt charger £3 10s, Philips transistor car radio £3 10s, Woden UM3 £2 10s, post paid. G3NJC, QTHR. Tel Doncaster 030-49237.

Minimitter mercury table topper tx 3·5-30MHz, 150W cw, 120W am, £30. Hallicrafter HT11 tx/rx 1·5-3MHz, home brew psu £5. G3BNF, QTHR.

23cm mixer bridges comp with 723AB klystrons, diodes and magnetrons. Also two 10in dia dishes comp with feed and coupling, both ex airborne equipt. Offers. G3JJT, QTHR. Tel Reading 24078.

Ferrograph tape recorder type 4AN, exc cond, £48 or offer. Will deliver up to 40 miles. G30SK, 46 Beaumont Rise, Fareham, Hants.

Trio JR500SE plus match spkr. As new £55 carr pd. G8BLM, QTHR.

Various microammeters and other meters, calib and uncalib, at bargain prices. State requ with sae. G2WS, 2 Fairway Close, Weston-super-Mare.

R208 rx covers 10-60MHz 100-250V, built-in spkr, hdbk, no case, wking, offers. R. Lodge, 24 Oakfield Rd, Malvern Link, Worcs. Tel Malvern 4665.

Headphones with boom mic by Eagle, type HMA209, listed at £9 9s accept £5 10s, unused. Bantex 2m/M⅛ wave base loaded whip, unused, £3 10s. S. Sims, obo G3OUF, Tel 01-837 8688.

Eddystone 940, mint, matching plinth l/s, £90. Radiostructor electronics course+comp meter, sig/gen, scope, s'het, £25. Buyer coll. P. Dockerty, 7 The Ave, Felling, Gateshead 10

BC348 p/p £10, BC221 charts £12, CT53 £10, AR88D £30, RF40 30s, TU7B 30s, carr extra. G3GZJ, QTHR.

Sig gen W1191 mod mains with xtal and charts, £8. B44 mk 3 with mic, new cond unmod £6, buyer coll. Pair 6JS6/A £3, post inc. G3BSW, QTHR. Tel Ascot 20992.

Creed model 75 teleprinter 45/50 bauds. Silenced fluorescent lit cover, fitted perforator, perf order, £60. Creed 655 auto tx, £20. G8BMQ, QTHR. Tel 01-653 8489.

Comp stn, NCX 5 mk 2, mains psu, Z match, swr bridge, dummy load, key, mike, 80-10m hygain 14AVQ with 100ft coax all exc cond, del 100 miles £225 ono. J. Tayler, G3RDT, Queens Court, Kings Parade, Bognor Regis, Tel Bognor Regis 5254.

Hallicrafters SR150 cw/ssb transcver matching ac psu/spkr, hdbk, spare valves. No faults or mods, £120. D. Lockyer, G3HCL, 11 Merrifield Rd, Ford, Salisbury, Wilts. Tel Salisbury 27938.

2m fet convtr cascode 2N5245, 4-6 MHz if, £8. Mains Q5er £2. 19 set valves, sae. J. McDonald, G8BLH, 16 Halton Cres, Greasby, Wirral, Cheshire.

WS12 tx gd wkg order mod to pi tank o/p orig tank cct available. Hdbk 2 spare pa valves, buyer coll, £15. Some other spare valves. WS12 remote control unit, gd cond, £1. G8ATK, QTHR. Tel Farnham 5765.

KW Vanguard 80-10m £35 ono. Pref buyer coll. A. Dempsey, GW2FBG, 125 Dunvant Rd, Killay, Swansea, SA2 7NN. Tel Swansea 25352.

Star SR600 Triple conv rx, H-bands, £40. J. Matthews, G3WZT, 3 Daniels Cotts, New Pound, Billingshurst. Tel bus hrs Cranleigh 2121 Ext 126.

Labgear 160m tx £10, Heath reg psu HV £20, also Heath str-1 recorder, Shure M3D-M cartridge. Buyer coll. G3UCM, QTHR. Tel 71-55342.

MR fs measuring set 40-250 MHz. 8 bands perfect wking order £35. Heathkit scanalizer SB620, tuned 455 kHz, kt for other ifs, perf cond £55, buyer coll. G8BI. Tel Welwyn Garden City 23676.

G2DAF rx, all bands with pp, offers to E. Lawrence, G3BIC, 121 Walsall Rd, Four Oaks, Sutton Coldfield. Tel 021-353 4119.

Swan 350c with very superior ac sup+100kHz cal, 50 qsos only. Around £230. G3LLJ QTHR. Tel 0782 561509.

G3HSC Morse course 2 lps and books £2. Valves QQV06/40A £1, 7360, QQV03/10, 6146, TT21, 10s ea. 12AX7, 6W8, 6CB6, 6AK5, 6BH6, 6BA6, 12AT7, 2s each. Many others available, post extra. G3URX, 10 Mill Close, Tiptree, Essex. Tel Tiptree 6533.

Heathkit RA1 rx 160-10m, mint cond, £35. G3TVX, QTHR. Tel Cleveleys 4758.

52 set rx with spare valves £8, carr ex. G. Lugton, 26 Oxgangs Farm Ave, Edinburgh EH13 9PV.

Marconi AD108D Aircraft rx, 4 bands 260 to 510kHz and cont cov 2·0 to 10·5MHz, built in mains psu, £8, buyer coll or will del 25-miles radius. G8AVX, 19 Burcote Rd, Birmingham 24.

Vickers Biolux microscope. X3 X10 X40 prof objectives, self illuminated, blue filt, 240V mains. X10 huygens eyepiece, fb cond in cabinet, ideal for gce biology, £20. G3TDZ, QTHR.

G2DAF type lin amp, all new parts no Q/3/125s, KW G cabinet £20. Scope Mullard E800, man, £10. 4 813s new, £1 ea, 4 813 bases, 5s ea, trans 1000-0-1000V, tapped 300V 750mA, £3. G3BDS, QTHR. Tel Droitwich 3644.

Channel Master alignment bearings, 2 off, £2 15s ea (new). Coax, low loss, 50Ω 16yds, £1. 75Ω 16yds, £1. GM3POK, 123 Moubray Grove, S. Queensferry, W. Lothian.

Marconi type 31 fsk unit, gd basis for scope/panadaptor, new cond, £9 ono. 2800V transfmer, suitable 4X150s, 4X250s 4-65s, etc, £3. 12V 100W pe gen £3. Jap bug, £2 10s. G3LHZ, QTHR.

Eddystone 680x rx, gen voc 500kHz-30 MHz, fb cond, offers over £60. Armstrong 227m am/fm tuner/amp mono, £15. Fane 12in spkr in cab, £7 10s or £20 the pair buyer coll. I. Gower, 10 Homethorpe, Orchard Park Est, Hull, Yorks.

Cossor 1039 double beam scope, £12, also rx type 62B, £15, both in gd cond. Plse note owing to the weight of these—buyer colls. R. Russell, G3MGC, Winsoredge, Nailsworth, Glos.

Swan 350 (1968) mint cond, little used, £185. B. Shaal, G5AIY, 43 Hamilton Rd, London NW11. Tel 01-455 2677.

Heathkit HW12A 80M transcver with psu £55. Lafayette KT340 rx £17. Both mint cond and prof made. Garex 2m convter if 23·7—25·7 MHz (new) £7. P. Andreae, G3YOP, 2 Bushwood Drive, Dorridge, Solihull, Warwickshire.

Ea at 95s, Quickstarter 2m convter transistored, mobile psu by G & D, small mains psu, BC455, QQV06/40A, many valves and components. sae for list. G5UM, Leicester. LE7 9JJ.

Class D wavemeter, A. Talmage, 33 Atherton Crescent, Hungerford Berks. Tel Thatcham 3193.

Layfayette HA63 £15 or offer. Zeiss Nettar camera with ER case £6, Collect or pay carr. Revd. J. Marshall, G3RKH, 9 Colston Parade, Bristol, BS1 6RA. Tel 0272 20587.

T1131 tx 250W 80/10m £20. Pye 4m /M rig comp £5. KT320 rx £10. 3 speed RGD tape recorder £12. 2C1 mk 2 tx/rx £2. G2DTQ, QTHR. Tel Cheslyn Hay 409.

15m 3 ele beam with coax, £5. PCR2 mod £5. Gen cov rx consisting of Electroniques coilpack and Eddystone 898 dial, £15. P. Smith, G3WPB, 76 Southfield Rd, Hinckley Leics.,

KW2000B with ac psu as new in unmarked cond £200. P. Cooper, G3VMB, 42 The Osiers, Braunstone, Leics. Tel 0533 896213.

Wavemeter G56 15 to 24000kHz. Brand new + charts, £10. TS110AP 2400 to 2700MHz, £10, TS92AP 500 to 7000kHz brand new, £6. 3cm scanner comp, £7. Sae. Waveguide microwave testgear etc. G3IUD, QTHR.

19 set mk 3 transceiver comp with mains psu giving all voltages for transmit and receive functions. 12V dc psu, variometer, mic, headphones, all cables and some spare valves. All in gd cond, £9. G3XER, QTHR.

KW lpf, 75Ω, channel 1, 60s. Eagle rf 45 fs meter, 30s. Both nearly new, post included. P. Wallis, G3YJI, 17 Meadowside, Walton on Thames, Surrey. Tel Walton on Thames 23228.

SB300 perf, £100. G3JMR, QTHR.

Cornishman, £10, 13A double beam oscilloscope £5, low band pye reporter, £2, comp morse course £2, uniselector £1, multimeter 10s, Eddystone switches, new valves, etc. P. Williams, G3XXE, 55 Dolphin Court Rd, Paignton, S. Devon. Tel Paignton 58600.

B44 mk 2 12V dc, £6. B44 mk 2 mod to 240V ac, £6 10s. Both exc cond and wkg, pref buyer coll. G8CSR, 4 Warren Cotts, Lordship Rd, Writtle, Chelmsford, Essex.

QRT, mostly new gear. SB301, cw filt, £125. SB610 monitor, £38. V7AU vtvm rf probe, £14. G2DAF tx with psu, £60. TA32JR unused, £14. 10-12V scope, £28. 75 ohm dummy load, £4. G2DTS, QTHR.

RC oscillator 0-100kHz, bulky, £10. Oscillator 65-500MHz 115V ac, £5. 75Ω attenuators hf, £1, m/c meter 0-1mA 7 in dia, £1. Del as arranged. G3MBK, 10 Poplars Close, St Albans Road West, Hatfield

KW2000 G line with ac psu. Shure mic, immac, £130 ono. C. Crisp, G3ELJ, Claypole, Newark, Notts.

Rxs, RA1 with calibrator and spkr, £27, T28 £13, R1475 × psu £10. Tx DX40 + VF1U £20, scope 13A comp £20, all gd cond buyer coll or by arrangement. G3TXG, QTHR. Tel Exeter 67963.

84 copies CQ mag, May 1955 to May 1962, £5 delivered free. G3JMO, QTHR.

KW2000A + dc psu, £150, Hammarlund HQ180 rx £120, Hallicrafters SX28 re-aligned £25, Hamobile 2m transcvr + psu/skr, rotary generator £45, Heathkit Cheyenne tx + Mohican rx £30, BC221 frequency meter £10. R. Edwards, G3KSR, 14 Leaside Way, Southampton.

Vibroplex blue racer de luxe bug, chrome plated, exc cond, £5 10s carr paid. K. Brooks, G3XSJ, 72 Nicholls Lane, Winterbourne, Bristol.

Transistorised speech compressor pre-amp comp shielded with self-contained batt. Increases talk power by plugging into mic lead, Best offer. G2PU, 39 London Rd, Harston, Cambs. Tel Harston 454.

Cossor double beam scope 339 with hdbk and trolley on shepherd castors, first £10 secures. 2 heavy duty 500mA chokes 10s ea, Unused 4X150 A 30s. G3MDM, QTHR. Tel Weybridge 46672.

Exch DX40U + RME69 for gd Heathkit Mohican GC -IU or HW30. G2BZQ, QTHR. Tel Maidenhead 31902.

Hallicrafters SX28 exc cond prof realigned, with man and some spares, £20 or reasonable offer. R. Weatherburn, 26 Quaves Rd, Slough. Tel Slough 22921.

HC6U 3rd overtone xtals, 39518·5 approx 37·1kHz spacing to 41037·0, inc 40222·2, 40259·3, 40296·3, 7s 6d ea post pd. Nearest alternative sent or refund, state which. Wanted, G2DAF conversion Rx xtals. G3IAF, QTHR. Tel Byfleet 42824.

Transistor psu, modulator and control box in cabinet made from Garex units, £10. G3WQP, 33 Chestnut St, Southport, Lancs. Tel 051-236 0450.

R206 + psu and loudskr perf cond, contains 14 valves, 0-55-30 MHz in 6 bands, variable selectivity, variable agc, bfo, anl, af filter, ae trim, sep rf/af controls, £20 ono. S. Wilders, 45 Tabors Ave, Gt Baddow, Chelmsford, Essex. Tel Chelmsford 71754.

BC342N 1·5/18MHz £14, speech-amp/mod UM1 less 6L6's and psu £3, 19in rack units for 150W tx, psu 650V + 470V dc less valves + relay switching unit, speech/amp unit, exciter unit, offers. H. Randall, G3GJR, 3 Boston Grove, Ruislip, Middx. Tel Ruislip 35594.

Two robust operating desks, 29in H, 26in D, 41in W. Polished lino top, cupboards, drawers under one with knee hole, £10 ea or £14 the pair, deliver by arrangement. G3UXA, QTHR.

Lafayette stereo tape deck on plinth 3¾ × 7½ ips, as new £25. Scope type CT52 unused, in case, £15. G8CKH, QTHR. Tel 01-300 4825.

EA12 mint £130, sommerkamp FL100B and FR100B mint £160, BC221 powered £15, many components also. Wanted Nikon Canon Rollei or sim. G3HKC, 1 Bumbles Green, Nazeing, Essex. Tel Nazeing 3126.

New 813 25s, TZ40 15s, 5R4GY 2s. DM16HL dynamic mic h/l impedance, new and boxed £4. Acos xtal mic 20s post extra. Wanted Drake rx. G2UZ, QTHR.

Geloso 209 amateur bands rx, 80-10m, double conversion, switched sidebands, in gd wking order and exc appearance, £25. Carriage by arrangement, G3WNT, QTHR. Tel 021-445 1405.

G2DAF rx comps, Philpots cabinet, chassis, Eddystone dial, coils, ifts, variable caps, switching. Cost £40, sell £25. TR2002 tx/rx partly converted 2m, incl converter xtal, two fets, £4. DC-DC converter 12 V to 300V 200mA £4. G3XCF, QTHR. Tel Runcorn 2419.

Heathkit Mohican, mint cond, £30 ono, can del. Pye 42 in stainless steel vhf whip 25s, new. Can be cut 4m or 2m. S. Parry, G8BVP 63 Middleton Place, Loughborough.

Races for 1in mast with plate for guys (new), 20s pair. Dow key relay DK60, 20s. 6 10 mfd oil filled capacitors 1500V (USA), 7s 6d ea. G3AIZ, QTHR.

KW swr indicator 52Ω, SO239 sockets, £7 5s. KW E-Z match £10. 12177·5kHz xtal for KW2000 35s. Xtals for Heath HW-17, 8033·3, 8043·3, and 8063·3kHz, £3 10s. All items new, unused. G3UFU, QTHR

Sphinx tx, 160, 80, 20m. Spare valves, gd cond, £45. Wanted, 3 gang variable capacitor from 38 set. Lindsay-Smith, G3WNI, 22 Kingswood Cres, Shrewsbury, Tel Oswestry 2895.

Pye five band car radio with 3 sw, mw + lw bands, separate spkr in cabinet, exch for transistor car radio. Matched pair 6BG6G, boxed and unused, OK for lin, 15/6 pair. G3KPO, QTHR. Tel Eye 351.

Morse tuition records (G3HSC) beginners course, 2 records and bk, £2. Colour tv xtal 4·433619MHz and delay line 50s. All post extra. G3XGK, QTHR. Tel Lowestoft 64160.

160-40m 3 band tx comp, wkg, £17 10s. Want NCX3 transcvr and cct hdbk for KT34O. G2ANB, QTHR. Tel Hockley 3278.

Two tone oscillator parts: 2 wound adjustable pot cores, 3 transistors, 2 pots, switch, data. 25s post free. G8ABR, 45 School Lane Milton, Cambs. Tel 0223 58294 ext 82.

Teleprinter distortion & margin tester type T6958-9 with hdbk £6 10s carr £1. Wilcox gay master oscillator type M1-19467 2-10 MHz new with hdbk £3 10s. 19 set pa 12V input £1 10s. A. Stagles, G3RBY, 2 Blackthorn Close, St. Albans, Herts. Tel 56 54009.

KW160 mk 2 exc cond best reasonable offer. Heathkit sig gen RF1U, as new cond, best offer. E. Taylor, G3FK, 4 Brownsea Ave, Corfe Mullen, Nr Wimborne, Dorset. Tel Broadstone 2631.

28·5MHz walkie/talkie, 12 transistors, batt indic, tone calling £12. RTTY monitor scope CRM-1 £10. Uhf transistors 2N3866 (2), 2N3375, 2N3733 (10W out at 432MHz), £10 the lot. Chapman, G3NGK, QTHR. Tel Beaconsfield 3109.

KW2000A + ac psu vry gd cond £175, or take HW32A or gd qual gen cov rx in part exch. B. Little, G3TLS, 28 Fitzgerald Rd, Bristol 3.

Viceroy mk 4, extra filt, 6146Bs pa, £85 ovno. Buyer coll, del reasonable distance. G3ICH, QTHR. Tel Fairoak 1272.

Codar PR3OX preselector £5, mint cond. G3LKW, QTHR.

Trio JR500S £48, Grundig TK14L £25, Trio 9R-59DE £29, all mint cond. R. Beckley, 32 Hillside, Totteridge Hill, High Wycombe, Bucks. Tel HW 23777.

Magnavox 363 2-track 3-speed tape deck, new unused, £9 ono. Home brew 2m 6 over 6, 30s ono. D. Boniface, 22 Holmefield Rd, Ripon, Yorks.

KW 75Ω swr bridge £6, LED impedance bridge £5, both with SO239 sockets. Advance signal generator 100kHz—100MHz int/ext mod, 6 position switched rf attenuator £10. Eumig standard 8mm projector with tape synchronizer, exc con, £25. G3SVH, QTHR. Tel Cheslyn Hay 708.

KW2000A handpicked with acpu, Shure microphone, lp filt and fitted Q multiplier. About 30 hrs use only. £180. Pref inspect/coll. G4AR, Ashstead, Surrey. Tel 01-298 2515.

20 807s, 2 1625s, 2 VT79s, 2 832s w/valve holders, 3 4X150As, all mostly unused £5 the lot. Buyer coll. W. Scott, G3IFG, Dudley, Anstey Lane, Alton, Hants. Tel Alton 3610.

Uhf sig gen moseley SG45A. 430-480MHz. 1μV-1 volt am mod, intnl stabilised psu. Superb multiplier chain from master xtal (not supplied). Complete 70cm tx, meters missing, £8 + carr ono. D. Wilson, G8APS, 177 Dower Rd, Four Oaks, Sutton Coldfield. Tel 021-308 3044.

Rx BC348Q, gd cond, internal mains psu, £13 ono. Could del 10 mile radius. N. Payne, 4 Chestnut Rd, Wednesbury, Staffs. Tel 021 556 0960.

DX100U and SB10U switchable to am or ssb, manuals, vgc. Demonstration and assist del, £60 pair. Wanted Vespa mk 2 G3VYP, QTHR. Tel 021 747 2358.

National tape recorder model RQ194S, batt/mains, 4-track 2-speed with sound on sound and sound with sound. As new, £45 ono. N. Foley, Senior House, St Patricks College, Maynooth, Co. Kildare, Eire.

Hammerlund SP200SX 1250kHz to 40MHz £35, KW2000 dc psu £20, 80/10m am/cw tx 813 pa £8, Heathkit car radio £10, Armstrong AF208 mw/vhf gram chassis £13. G3TLB, QTHR. Tel Crowborough 5527.

AR88D fb cond £35, 813 25s, QY3125 30s, two big spkr cabs over £60 worth spkrs inside, £20. Wanted, Eddystone 898 dial gd cond. Swop spkrs for aerial rotator. G3MOU, QTHR. Tel 01 570 6181.

KW Vespa mk 2, ac pu, £90. SR550 hamband rx £30 or the pair £115. G3YJD, 347 Croxley View, Watford, Herts. Tel Watford 31369.

Park air electronics air band monitor, 116-136MHz, as new, 16 trans, 6in scale, batt opp, squelch, pulse clipping, £30. Carrying case mains psu ext aerial £5. S. Allen, "Rosswan", Dimmocks Lane, Sparratt, Nr Rickmansworth, Herts. Tel Kings Langley 62438.

KW Viceroy mk 1 and KW77, best offer secures. CDR Ham M meter, cost £8 accept £5. Perkins, G3NMH, 24 Hook St, Hook, Swindon, Wilts.

New valves 5Z4G 5/9, 6K7 4/9, 6V6GT/G 5/6 6J7 6/6, 5Z4GT 5s. MC meters flush mounting 3½in diam 0-200mA, 0-500mA, 11s 6d ea. Sae with enquiries. G8UO, QTHR.

Two 5·2MHz ssb filts + carrier xtals, pair 6HF5 with bases, more than 400 mags QST, CQ, 73, Ham Radio and Bulls, offers for lot. G3HMB, QTHR. Tel Holbrook 362.

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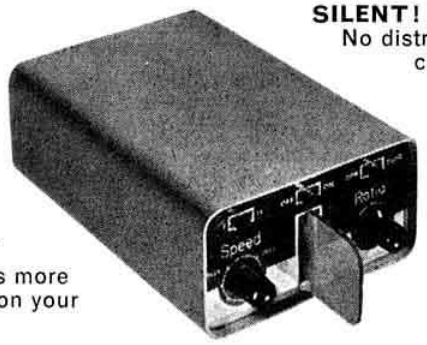

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CRYSTALS FT243. Types from 5675 kHz to 6975. 7050 to 7925. 8100 to 8650 in 25 kHz steps. 4/- each, post and packing 1/-. 40 assorted FT 241A & 243 types. 20/- post & packing 3/6d. Arthur Sallis Ltd., 28 Gardner Street, Brighton.

RECORDING TAPE. 5 in. spool 900 ft. Long-play quality tape. Polythene enclosed, boxed. 10/3 each. Postage, Packing. 1/- per tape. D. Shirley, Willowdene, New Century Road, Laindon, Essex.

HEATHKIT SB200, SB300, SB400. All perfect and as new £250 Gotham 3-Band cubical quad, never been assembled, £30. Prefer buyer inspects and collects. G3FGY, 1 Sandham Lane, Ripley, Derbys, DE5-3HE.

FOR SALE (contd.)

R.S.W. ELECTRONICS
U.H.F.-V.H.F. GEAR

70cm TRIPLER AMP
24W QQVO3/20A TRIPLER AMP. £20 COMPLETE. ALL PARTS SUPPLIED SEPARATELY. S.A.E. LIST.

70cm PRE AMP
SINGLE STAGE BF 180 TWIN TROUGH LINE PRE AMP. TYPICAL GAIN 15 dB. TYPICAL N.F. 4dB. 4" × 1½" × 1". 12v. +VE EARTH. £3.5.

2 METRE LINES
PARALLEL LINE ANODE CIRCUIT FOR QQVO6/40 etc. 8" × ⅜" DIA. LINES WITH DISC TUNING. ANODE CONNECTORS AND CERAMIC INSULATORS. IN BRASS £2.5. SILVER PLATED £3.

2 METRE HIGH Q BREAK
ALL COPPER. CYLINDRICAL TYPE 12" × 1½" DIA. BELLING & LEE T.V. TYPE INPUT AND OUTPUT SOCKETS SUITABLE FOR HIGH POWER. £3.10.

23cm TRIPLER
METALWORK FOR HANDBOOK 23cm TRIPLER (PLATE LINE VERSION) IN DIECAST BOX LESS CATHODE TUNED CIRCUIT. £4.

SPECIALS
ANY VARIATION ON ANY OF THE ABOVE PRODUCED TO ORDER. HIGH POWER CO-AX LINES, CAVITIES, ETC., PRODUCED IN COPPER OR BRASS. SILVER PLATED IF REQUIRED.

S.A.E. enquiries to: *P. & P. 5/- extra*

432 STRATFORD ROAD, SHIRLEY, SOLIHULL

HEATHKIT RA-1 RX E.22. Heathkit OS-2 oscilloscope E14. Carriage extra. Box No. R7413, c/o Radio Communication, 4, Ludgate Circus, London, EC4.

CERAMIC CAPACITORS. Discs: 0·1μF 30V, 6s 6d doz., 10,000 pF 750V 2s 6d doz., 10,000 pF 350V 2s doz., 1,000 pF 750V 1s 6d doz. Feedthroughs 1,000 pF 500V: Solder in 4s 6d doz., Nut fixing, 9d each. Ferrite Beads: Neosid F14, 1s 9d doz. Mullard COO4EA Tubular Ceramic Trimmers: 0·8—6 pF, 1s 8d each, 0·9—12 pF, 1s 10d each. C.W.O. and 1s pp.—C. J. Bryant G3WIE, 42 king Street, Emsworth, Hants.

THREE BEDROOM SEMI-DETACHED HOUSE, Living Room, Kitchen, Bathroom/Toilet, Garage. Garden front and rear. Part central heating. Main services. £4,650. Freehold. G3LRQ. QTHR.

HRO COILS. 3·5—3·8, 7·0—7·1, 60/- each; 14·0—14·35: 21·0—21·45, 50/- each inc. P.P. R1147B free. Darkin, 4 Ash Drive, Catshill, Bromsgrove, Worcs.

LG300 with companion PSU/MOD FB Condx. £30. 20 MT SSB transceiver with 9 Mc/s McCoy filter, £25. Mercer, 63KLL, Hill Top House, Delph, Oldham. Phone Saddleworth 4669.

EDUCATIONAL

RADIO, City & Guilds, R.T.E.B. Certs., etc., on "Satisfaction or Refund of Fee terms." Thousands of passes, For full details of exams and home training Courses (including practical equipment) in all branches of Radio, Electronics, etc., write for 132-page Handbook—*Free.* Please state subject. British Institute of Engineering Technology (Dept. 200K). Aldermaston Court, Aldermaston, Berks.

BECOME "Technically Qualified" in your spare time, guaranteed diploma and exam. home-study courses in radio, TV servicing and maintenance. R.T.E.B., City & Guilds etc.: Highly informative 120-page Guide—FREE! Chambers College, Dept. 864K, 148 Holborn, London, EC1.

WANTED

WANTED.—All types of communications receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment—Details to R. T. & I. Electronics Ltd., Ashville Old Hall, Ashville Road London, E.11 (LEYton 4986).

YOUR UNWANTED EQUIPMENT taken in exchange for new or S/H Cameras-Projectors, York Photo Service, 51 Fossgate, York. Tel: 56176.

HONDA GENERATORS

THE NEW E800E at a cost of £1/10 watts output represents outstanding value for serious portable operation. It has the ability to power the most ambitious /P station or a complete group's stations for NFD or VHF/NFD and all with low noise and no interference.

DETAILS. Engine 67cc OHC, 4 stroke air cooled, Max HP 2·8-rated HP 2·0 at 5000 rpm. Generator 220V 50Hz, 800 watts continuous rating, 1 Kw maximum. 12V DC at 100 watts. Size 25" × 14·2" × 15·2" (L × W × H). Wt 77 lb. **£85 (£99).**

E300K. 220V 50Hz, 300 Watts, 12 VDC. **£66 (£79).**

E1500E. 220V 50Hz, 1·5Kw. 12 VDC. **£117 (£139).**

List prices in brackets—work out your own discount! All models carriage paid in UK. Export enquiries . . . . please! Generators test run before dispatch. Honda six month guarantee.

G3FDW Mike Gibbings

14 Howbeck Lane, Clarborough, Retford, Notts.

Phone: 0777-2634/3448.

MARK EQUIPMENT

V.H.F. U.H.F. ELECTRONICS

0803 55488 *G8ABP*

70 C.M. TRIPLER, AMPLIFIERS

ME70. QQVO2/6 trip. QQVO2/6 P.A. 8 watts input. Copper, aluminium chassis 8 in. × 3½ in. HT 180/200 volts, 6.3 and 12 volt heater. **£14.** Power supply available.

Valves. QQVO6/40A 35/- P.P. 1/-, QQVO3/20A 35/- P.P. 1/-, QQVO3/10 7/- P.P. 6d. } Tested, ex equipment, guaranteed for 3 months.

Transistors: 2N5245 (formerly T1S88), 10/-, 2N3819 9/-, AF239 13/-, AF279 14/-, GMO290A 14/6, MPF105 8/-, 2N3826 5/-, 2N706 2/6, IN914 2/3. Post 5d. Send S.A.E. for Lists and enquiries.

35 Lidford Tor Avenue, Roseland Park, Paignton, Devon.

RADIO AND LINE TRANSMISSION

Volume 1—2nd Edition

By G. L. Danielson, MScTech, BSc, CEng, MIEE and R. S. Walker, CEng, MIERE.

This volume and its sequel will provide a broadly-based introduction to the subject of communications and to the basic theory necessary to its understanding. The material in this second edition has been brought into line with the syllabus of the City and Guilds of London Technicians' Certificate in "Radio and Line Transmission A".

1969, 276 pages, 239 illustrations, 25s.

Further information on request.

THE BUTTERWORTH GROUP

BUTTERWORTHS—ILIFFES—NEWNES

88 KINGSWAY, LONDON W.C.2

Please Mention

RADIO COMMUNICATION

when writing to Advertisers

WANTED (contd.)

WANTED. BC221 in good condition with calibration charts in exchange for mint condition Samson Electronic Keyer. Nuttall (GW3XJD), Avenue Road, Abergavenny.

CAPACITY AVAILABLE

PROTOTYPE or short run turning/milling etc., and sheet metal work capacity available.—C. G. James Electronics (G3VVB), Staines Road, Feltham, Middx. 01-570 3127.

BLANK CHASSIS

FOUR-SIDED 16 S.W.G. ALUMINIUM

Size	Price	Base	Size	Price	Base
6 × 4 × 2"	6/3	2/11	10 × 8 × 2½"	12/-	5/6
7 × 4 × 1½"	6/	3/2	12 × 7 × 2½"	12/-	5/11
7 × 5 × 2"	7/6	3/5	12 × 9 × 2½"	13/9	7/-
8 × 4 × 2"	7/-	3/4	13 × 8 × 2½"	13/9	6/11
8½ × 5½ × 2"	8/-	3/9	14 × 7 × 3"	14/6	6/6
9 × 7 × 2"	9/3	4/10	14 × 10 × 2½"	16/-	8/7
10 × 4 × 2½"	9/-	3/9	15× 10 × 2½"	16/6	9/1
12 × 4 × 2½"	10/-	4/3	17 × 10 × 3"	19/6	10/1
12 × 5 × 3"	12/-	4/9			

Plus post and packing.

PANELS, Any size up to 3 ft. at 6/- sq. ft. 16 s.w.g. (18 s.w.g. 5/3). Plus post and packing.

H. L. SMITH & CO. LTD.

287-289 EDGWARE ROAD, LONDON, W.2 Telephone: 01-723 5891

Dorset Radio Lectronic Supplies G3BKV

We can still supply ferrite ring, matched pair OA79's and silicon Diodes for the **G3PDM Wattmeter - SWR Bridge,** 18/6 post paid. 50 Micro Amp Meters, 39/-, P.P. Enquiries for: KW Electronics, Eddystone, Trio, Lafeyette Codar, Sinclare, Eagle, Electroniques, Joystics, Wightraps, Weyrad, Radiospares, and we are now pleased to include **Garex** products. (prices as per Garex advert.) Please include S.A.E. Log Book—Zone Maps—QRA Locators, Examination Manuals — Handbooks — Call Books — VHF Handbooks. All in stock.

Regret no catalogues or lists available yet. Our range of stock is growing daily and a list would soon be outdated.

73's to the many amateurs who visited Weymouth and us during the summer.

29 WALPOLE STREET, WEYMOUTH 5729

Turn off seafront dead opposite pier bandstand.

SOLID STATE MODULES

2 METRE CONVERTERS. Dual gate MOS FET cascode circuits for both RF amplifier and mixer for excellent overload and cross-modulation performance. Noise factor 2dB. Silicon planar transistor oscillator and multiplier. VHF crystal IFs 4-6MHz, 23-25MHz, 28-30MHz. Supply 12V.

Supplied either:—in an aluminium box finished in stoved silver hammer enamel; size, 2½" × 3½" × 1½" **£12.0.0**

or printed circuit module alone—fully aligned; size 2½" × 2½" **£10.15.0**

2 METRE TRANSMITTER MODULE. Printed circuit construction size 4¼" × 1¾" Uses five silicon planar transistors. Crystal required is 24MHz or 8MHz on third overtone. Supply 12-15V. Output ½ watt. Based on Mullard circuit. **£5.7.6**

9MHz FILTER TYPE SSB GENERATOR. Size 4" × 2" × 4½" deep. Generates 9MHz USB and LSB. S.B. supp. 45dB. Carrier supp. 50dB. Produces 0.2V across 100 Ohms ample to drive a mixer. FET and silicon planar transistor circuit fully aligned An ideal basis for your SSB transmitter **£22.10.0**

SSB GENERATOR AND VOICE CONTROL. Circuitry incorporating FET and silicon planar transistors. Uses a silent reed relay, in same box as above **£28.0.0**

N.B. Although all these modules are becoming very popular we can normally supply from STOCK. All components used in these modules are new branded components and whenever practical our policy is to supply British components.

SOLID STATE MODULES

14 Dalton Green Lane, Huddersfield HD5 9YE. Tel: Huddersfield 25173

CLASSIFIED ADVERTISEMENT ORDER FORM

Advertisements should be prepaid. Rate 6d. per word, minimum 10s. Box no. 1s. 6d. extra, which includes forwarding replies.

Words comprising name and address should be counted for advertisements not requiring a box number.

Trade advertisements should be submitted by letter.

Classification

.....

Box No. Yes / No

Please insert this advertisement in Radio Communication. **(BLOCK CAPITALS PLEASE)**

NAME .....

ADDRESS.....

.....

.....

DATE..... *SIGNED*.....

POST TO SAWELL & SONS LTD., 4 LUDGATE CIRCUS, LONDON, EC4

MEMBERS' ADS

ORDER FORM

Entry Period for January: 1–7 December

Classification

For Sale ☐

Wanted ☐

Please print in block letters

Call-Sign **QTHR**

or Name and Address

Telephone number

DATE..... *SIGNED*.....*CALL-SIGN, BRS or A on.* .....

The number of members ads sent to HQ each month is increasing at such a rate that some form of limiting on an individual ad would be most desirable. Four pages are at present allocated to Members ads each month. We hardly like to cut down the number of words allowed per ad. Thus we ask all **licensed amateurs** to simply give their **call-sign** and state **QTHR**, instead of giving their address in full. (**QTHR** *means—my address is correct in the current call-book*) In this way we should be able to meet the increasing demand for space. By giving QTHR you will be helping other members to have their ads published. Please also make sure that you print your ad clearly, we just cannot read some ads! Also *clearly* describe the equipment that you have for sale or require without using abbreviations (we put in the abbreviations to our own set style). Of course use abbreviations like W for Watts, V for Volts and so on. Please make your ad as brief as possible, in this way you will be helping us and other members. *Thank you.*

POST TO MEMBERS' ADS, RADIO COMMUNICATION, 35 DOUGHTY STREET, LONDON, WC1

INDEX TO ADVERTISERS

Radio Society of Great Britain

FOUNDED 1913
INCORPORATED 1926

PATRON H.R.H. THE PRINCE PHILIP,
DUKE OF EDINBURGH, KG

APPLICATION FOR CORPORATE* OR ASSOCIATE* MEMBERSHIP

RADIO SOCIETY OF GREAT BRITAIN,
35 DOUGHTY STREET,
LONDON, WC1.
01-837 8688

* I hereby apply for election as a Corporate Member of the Society and enclose a remittance for £2/10/- being the amount of my first annual subscription.

* Being under 21 years of age and not holding a current Amateur Radio Transmitting Licence I hereby apply for election as a Non-Corporate (Associate) Member of the Society and enclose herewith a remittance of £1/5/- being the amount of my first annual subscription.

I, the undersigned, agree that in the event of my election to Membership of the Radio Society of Great Britain, I will be governed by the Memorandum and Articles of Association of the Society and the rules and regulations thereof as they now are or as they may hereafter be altered; and that I will advance the objects of the Society as far as may be in my power; providing that whenever I shall signify in writing to the Society addressed to the Secretary that I am desirous of withdrawing from the Society I shall at the end of one year thereafter after the payment of any arrears which may be due by me at that period to be free from my undertaking to contribute to the assets of the Society in accordance with Clause 8 of the Memorandum of Association of the Society.

Date _____

Signed _____

PERSONAL DETAILS TO BE COMPLETED BY APPLICANT

SURNAME (BLOCK LETTERS) _____

CHRISTIAN NAMES (IN FULL, BLOCK LETTERS) _____

ADDRESS FOR ALL CORRESPONDENCE (BLOCK LETTERS) _____

_____

NATIONALITY _____ *AGE (IF UNDER 21)* _____

CURRENT CALL-SIGN (IF ANY) _____

DETAILS OF PREVIOUS MEMBERSHIP (IF ANY) _____

DETAILS TO BE COMPLETED BY THE PROPOSER †

I WISH TO PROPOSE _____ *FOR * CORPORATE/* ASSOCIATE MEMBERSHIP*

PROPOSER'S NAME (BLOCK LETTERS) _____

ADDRESS (BLOCK LETTERS) _____

CALL-SIGN (OR BRS NO.) _____

SIGNED _____

* Please delete where inapplicable.

† If the applicant is not acquainted with a Corporate Member willing to propose him for election he may submit a suitable reference in writing as to his interest in Amateur Radio.

The first subscription of 50/- or 25/- should be enclosed with this application to avoid delay.

FOR OFFICE USE ONLY

APPROVED BY COUNCIL _____ *BRS OR A No. ISSUED* _____ *FIRST SUB. PAID* _____

RADIO SOCIETY OF GREAT BRITAIN

and

LAMBDA INVESTMENT COMPANY LIMITED

Reports and Accounts
for the
Year Ended 30 June 1969

D

Radio Society of Great Britain

35 DOUGHTY STREET, LONDON, WCI

Patron :

H.R.H. THE PRINCE PHILIP,

DUKE OF EDINBURGH, K.G.

COUNCIL 1969

President
J. W. SWINNERTON, TD, B.Sc.(Econ.), G2YS

Immediate Past President
J. C. GRAHAM, G3TR

Executive Vice-President
E. W. YEOMANSON, G3IIR

Honorary Treasurer
N. CAWS, FCA, G3BVG

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General Manager and Secretary
R. G. B. VAUGHAN, G3FRV

Auditors
EDWARD MOORE & SONS
Chartered Accountants

Bankers
BARCLAYS BANK LTD.

REPORT OF THE HONORARY TREASURER

I beg to submit to the Members the Balance Sheet of the Society at 30th June 1969 and the Income and Expenditure Account for the year to the same date.

It had been hoped that this year the Income of the Society would have covered the Expenditure but the continued rise in costs and difficulty experienced in obtaining suitable and competent staff have made it impossible to achieve this. However it will be seen from the Accounts that in spite of the increase in the charge for Salaries and the continued increase in the cost of the paper and printing for *Radio Communication*, the deficit is almost accounted for by the non-recurring expenses of New Ruskin House after the administration had moved into the new Headquarters. It did not prove easy to dispose quickly of the lease of the offices at New Ruskin House and it was not until April of this year that this was done.

The increase in the cost of Salaries is due partly to the need for additional staff to deal with the increased trade in our publications and partly to the unfortunate changes in staff. The publication side of the Society's business has enabled the Society to be registered as a "Refund" Establishment under Section 7 of the Selective Employment Payments Act, 1966. As a result the Society is obtaining a repayment of all the Selective Employment Tax paid from 4th November 1968.

As had been anticipated, the running costs of the new premises at 35 Doughty Street are higher than those at New Ruskin House. However, in addition to the greatly improved conditions under which the staff work the Society now has a Reception Hall and all those Members who have been able to visit the new premises, and in particular those who knew the premises at New Ruskin House, speak very highly of the present accommodation.

The profit from the sales at the 1968 Exhibition was very satisfactory and although this was due mainly to the new edition of the Handbook the result would not have been achieved without the unstinted efforts of the Exhibition Committee and the many willing helpers who were on duty on the Society stand.

The total profit from sales is also very satisfactory but it must be realised that this has not been achieved without an increase in administration costs. The sales for the year were over £60,000. and the handling of this amount of goods has not been easy. The sales of the Handbook to the U.S.A. and other overseas countries and other publications has been very gratifying and the thanks of the Society go to all those who have contributed so much to the production of the publications of the Society at an economic cost.

The reduction in the receipts from advertising in *Radio Communication* is very disappointing. I have for many years stressed the need for Members buying through the medium of the advertisements in *Radio Communication* to make sure that the advertisers are made aware of this fact and this need is more than ever necessary at the present time. Advertisements will only be placed in periodicals where they give good results.

The Accounts and the Report of the Directors of the wholly owned Subsidiary Company of the Society, Lambda Investment Company Limited, are appended to the Society Accounts, and I would state that the Auditors and the Council of the Society still consider that the consolidation of the two sets of Accounts would not be suitable. It had been hoped to transfer during the year sufficient funds from the Society to the Company to pay off the Bank Loan and so avoid the charge for Bank Interest, but this has not been possible.

At the Annual General Meeting I shall try to answer any questions that Members may wish to put and if these questions can be advised in writing to me before the Meeting I would then be certain to have the necessary information available.

In closing this Report I would like to convey the thanks of the Society to the Staff and the many voluntary helpers who have given such valuable assistance in so many ways, on Committees, at functions and at Headquarters, with again special mention to all who help at the Exhibition.

NORMAN CAWS
Honorary Treasurer

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)

35 Doughty Street, London WC1

INCOME AND EXPENDITURE ACCOUNT
for the year ended 30th June, 1969

1968 £	1968 (Note 4) £		1969 £	1969 £
		INCOME		
	34,358	Subscriptions (including proportion of Life Members' Subscriptions) ..		36,132
		Profit on Sales of Publications:		
3,896		General	12,968	
955 (1967)		At Exhibition (1968)	3,263	
515		*Less* Net cost of Exhibition	696	
440			2,567	
	4,336			15,535
	366	Interest on Investments (Gross Amount before deduction of Income Tax)		316
	107	*Deposit Interest*		—
	39,167	**Total Income**		51,983
		EXPENDITURE		
		Rent, General and Water Rates, Cleaning, Lighting and Heating:		
2,326		New Ruskin House	795	
—		35 Doughty Street, W.C.1.	1,927	
1,156		Overlapping periods	1,097	
12,113		Salaries, Staff Pension Premiums, Selective Employment Tax and National Insurances (note 3)	15,713	
210		Payments to Past Employee and widow of past employee..	200	
303		Telephones	346	
1,707		General Postages	1,737	
1,707		Printing and Stationery (including Application Forms, Articles of Association and Leaflets)	1,732	
422		Staff Luncheon Vouchers	580	
232		Insurances	246	
154		Bank Charges	225	
—		Bank Interest	93	
93		Repairs and Maintenance	157	
10		*Legal Expenses*	—	
215		Audit Fee	220	
597		Sundry Expenses	675	
526		Depreciation of Furniture and Equipment	631	
88		Membership Certificates and Badges	123	
96		Awards, Trophies and Contests..	262	
32		Tape Recorded Lectures	24	
5		Film Library	230	
962		Cost of QSL Bureau	1,059	
485		Contribution to IARU Region 1 Division	543	
—		IARU Region 1 Division Conference, Brussels	270	
302		General Meeting (cost of printing and Hire of Hall)	409	
51		Cost of Beacons	55	
		Radio Communication—distributed free to Members:		
21,843		Printing, Postages etc.	25,357	
4,992		*Less* Receipts from advertising	4,392	
16,851			20,965	
—		Cost of Removal from New Ruskin House and of disposal of Lease ..		417
Surplus (*21*)		Cost of Radio Amateurs' Examinations		23
10		Intruder Watch—Printing etc.		37
41		R.A.E.N.—Printing		47
271		Agency Fees and Advertising for staff..		455
—		Deficit on Vending Machine		112
60		*Provision for Bad and Doubtful Debts*		—
		Travelling, Entertaining and Meetings:		
591		Council and Committee Meetings	455	
2,004		Council and Committee Members	1,621	
217		Regional, Club, Overseas and Foreign Meetings 274		
		Less Surplus on various Rallies and Conventions .. 44		
			230	
(63) Surplus				
2,749	*41,004*	*39,167*	Carried forward	2,306 51,405 51,983

INCOME AND EXPENDITURE ACCOUNT
for the year ended 30th June, 1969

£	£	£		£	£	£
2,749	*41,004*	*39,167*	Brought forward	2,306	51,405	51,983
46			London Lectures	49		
216			Sundries	144		
37			Representatives' Expenses	35		
	3,048				2,534	
		44,052	**Total Expenditure**			53,939
		£4,885	**EXCESS OF EXPENDITURE OVER INCOME FOR YEAR** ..			£1,956

BALANCE SHEET 30th June, 1969

£	1968 £	£		£	1969 £	£
			CURRENT ASSETS			
	73		Cash in hand		361	
	2,952		Debtors, *less* Provision for Doubtful Debts		9,832	
	889		Payments in advance		1,107	
	9,546		*Advance expenditure for future Publications*		—	
	9,294		Stock of Publications etc. (as certified by the Honorary Treasurer) ..		11,395	
		22,754				22,695
			FIXED ASSETS			
			INVESTMENTS AT COST			
	9,274		Quoted on Stock Exchange (Note 1)		9,274	
			Middle Market Value *£6,714* (1968 *£6,813*)			
			INVESTMENT IN SUBSIDIARY COMPANY			
100			100 Shares of *£1* each fully paid	100		
19,057			Loan	18,495		
19,157					18,595	
			FURNITURE AND EQUIPMENT			
3,935			At Cost	5,981		
2,418			*Less* Depreciation	3,049		
	1,517				2,932	
		29,948				30,801
		£52,702	**Total Assets**			£53,496
			LIABILITIES			
			BEVAN SWIFT MEMORIAL LECTURE FUND			
60			Balance at 1st July, 1968	55		
5			*Less* Prize awarded	5		
		55				50
		529	LIFE MEMBERS' SUBSCRIPTIONS RESERVE ACCOUNT			486
			CREDITORS			
4,853			Headquarters Trust Fund—*Loan*	—		
9,875			Sundry Creditors and Accrued Expenses	14,898		
18,950			Subscriptions in advance	20,215		
4,885			Bank Overdraft (secured)	550		
		38,563				35,663
		39,147	**Total Liabilities**			36,199
			ACCUMULATED FUND			
18,013			Balance at 1st July, 1968	13,555		
38			*Add* Profit on Sale of Furniture	—		
—			Headquarters Trust Fund (note 2)	5,407		
389			Taxation recovered	291		
18,440				19,253		
4,885			*Less* Excess of Expenditure over Income for the year	1,956		
		13,555				17,297
		£52,702				£53,496

J. W. SWINNERTON, *President*

NORMAN CAWS, *Honorary Treasurer*

REPORT OF THE AUDITORS TO THE MEMBERS OF RADIO SOCIETY OF GREAT BRITAIN

In our opinion, the Accounts set out above give a true and fair view of the state of the Society's affairs at 30th June, 1969 and of its excess of Expenditure over Income for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4/7 Chiswell Street, London, E.C.1.
30th September, 1969

EDWARD MOORE & SONS
Chartered Accountants

NOTES

(1) **Investments**

Middle Market Value at 1st July, 1968		Middle Market Value at 30th June, 1969	Cost Price
£		£	£
3,725	£5,000 3 per cent Savings Bonds 1965/75	3,750	5,219
3.088	£4,145 1s. 6d. British Transport 4 per cent Guaranteed Stock, 1972/77 ..	2,964	4,055
£6,813		£6,714	£9,274

(2) **Headquarters Trust Fund**

The new Headquarters building at 35 Doughty Street, W.C.1. has now been purchased and the Society's administration moved on 2nd November, 1968. The Donations given by the Members over the past years which had been held in the "Headquarters Trust Fund" have now been passed to the Society's Subsidiary Company, Lambda Investment Company Limited, as part of the loan to that Company. As these donations have now been used for the purpose for which they were given the Trust Fund has therefore been closed and the balance transferred to the Accumulated Fund.

(3) **Selective Employment Tax**

As from 4th November, 1968 the Society has been registered as a "Refund" Establishment under Section 7 of the Selective Employment Payments Act, 1966.

(4) **Analysis of Expenditure**

As the analysis of expenditure has been varied in the current year certain figures in last year's accounts have been amended in order to give comparable amounts.

THE PILOT OFFICER NORMAN KEITH ADAMS PRIZE TRUST FUND

BALANCE SHEET 30th JUNE, 1969

	£ s. d.		£ s. d.
TRUST FUND	165 0 0	**INVESTMENT**	
Creditor:		£165 5 per cent National Development Bonds	165 0 0
Prize to be awarded under the terms of the Trust Deed for year ended 30th June, 1969	8 5 0	**CASH AT BANK**	13 10 5
ACCUMULATED FUND			
Balance as at 30th June, 1969	5 5 5		
	£178 10 5		£178 10 5

INCOME AND EXPENDITURE ACCOUNT for the year ended 30th June, 1969

	£ s. d.		£ s. d.
Provision for prize for the year ended 30th June, 1969	8 5 0	Interest on Investment for the year	8 5 0
	£8 5 0		£8 5 0

J. W. SWINNERTON, *President* **NORMAN CAWS,** *Honorary Treasurer*

REPORT OF THE AUDITORS

In our opinion, the Accounts set out above give a true and fair view of the state of the Prize Trust Fund at 30th June, 1969.

4/7 Chiswell Street, London, E.C.1
30th September, 1969

EDWARD MOORE & SONS
Chartered Accountants

LAMBDA INVESTMENT COMPANY LTD.

35 DOUGHTY STREET, LONDON, WC1

Directors : L. E. Newnham *(Chairman)*, N. Caws *(Secretary)*
J. F. Shepherd, R. F. Stevens, E. W. Yeomanson.

REPORT OF THE DIRECTORS

The Directors have pleasure in submitting their Report to the Members for the year ended 30th June 1969.

The Company is a wholly owned subsidiary of the Radio Society of Great Britain and was formed for the purpose of dealing with the purchase of a property which was to be leased to the Radio Society of Great Britain for their use as a Headquarters. As was reported last year the Freehold Property 35 Doughty Street, WC1 was purchased. The Radio Society of Great Britain transferred its Headquarters to this property on 1st November 1968.

The Directors consider that the market value of this property is at least equal to the Book value.

The balance standing on the Accumulated Fund amounts to £12 after payment of the Debenture Interest to 30th June 1969 and the the Directors recommend that this balance be carried forward.

No changes have taken place in the Board of Directors since the last Annual General Meeting. The Share and Debenture Stock holdings of the Directors are given below. The Shares of all the Members of the Company are held as nominees of the Radio Society of Great Britain but the Debenture Stock has been entirely subscribed for in cash by the holders.

	Shares		Holdings of Debenture Stock	
	1968	1969	1968	1969
N. Caws	1	1	£100	£100
L. E. Newnham	1	1	£100	£100
J. F. Shepherd	1	1	—	£100
R. F. Stevens	1	1	—	—
E. W. Yeomanson	1	1	—	—

The Auditors, Messrs. Edward Moore & Sons have intimated that they are willing to continue in office in accordance with Section 159 of the Companies Act, 1948.

By Order of the Board
N. CAWS
Secretary

30th September 1969.

INCOME AND EXPENDITURE ACCOUNT
for the year ended 30th June, 1969

		INCOME		
1,042		Rent—Radio Society of Great Britain		1,250
47		*Bank Deposit Interest*		—
73		*Sundry Receipts*		—
16		*Income Tax Repaid*		—
1,178		**Total Income**		1,250
		EXPENDITURE		
548		Debenture Interest	1,127	
396		Bank Interest	292	
65		Sundry Expenses	50	
21		Audit Fee	21	
25		*Corporation Tax*	—	
1,055		**Total Expenditure**		1,490
(Surplus) £123		Excess of Expenditure over Income for year ended 30th June, 1969		£240

LAMBDA INVESTMENT COMPANY LTD.

BALANCE SHEET, 30th June, 1969

1968 £	£		1969 £	£
		SHARE CAPITAL		
		Authorised and Issued		
100		100 Shares of £1 each fully paid		100
		ACCUMULATED FUND		
129		Balance at 1st July, 1968	252	
(surplus)				
123		Deficit for the year ended 30th June, 1969	240	
—	252		—	12
	352			112
	18,200	6% **DEBENTURE STOCK** redeemable on or before 30th June, 1997		18,975
	19,057	**RADIO SOCIETY OF GREAT BRITAIN**		18,495
		CREDITORS		
1,543		Sundries	21	
226		Tax deducted from Debenture Interest	465	
25		Corporation Tax due 1st January, 1969	25	
—		Loan from Bankers	4,194	
—	*1,794*		—	4,705
	£39,403	**Total Liabilities**		*£42,287*
		FIXED ASSETS		
38,140		Freehold Property		
		35 Doughty Street, W.C.1. (Charged to Bankers) at cost	40,721	
		There are further monies due for works which have been carried out but the amount of these has not yet been agreed by the Surveyors. The total liability is not expected to exceed *£1,000*		
722		Preliminary and Debenture Stock Issue Expenses	722	
417		Sinking Fund Policy—Premiums paid	834	
		(Surrender Value at 30th June, 1969 — *£641*)		
	39,279		—	42,277
		CURRENT ASSETS		
124		*Balance at Bankers*		—
—		Debtor		10
	£39,403	**Total Assets**		*£42,287*

L. E. Newnham, N. Caws } *Directors.*

REPORT OF THE AUDITORS TO THE MEMBERS OF LAMBDA INVESTMENT COMPANY LIMITED

In our opinion, the Accounts set out above give a true and fair view of the state of the Company's affairs at 30th June, 1969 and of its deficit for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4/7 Chiswell Street, London, E.C.1.
30th September, 1969.

EDWARD MOORE & SONS
Chartered Accountants

RSGB PUBLICATIONS

RSGB

Amateur Radio Circuits Book	11/10
Amateur Radio Techniques	14/3
Guide to Amateur Radio	6/6
Morse Code for the Radio Amateur	2/-
RSGB Countries List	1/4
RSGB Amateur Radio Call Book, 1970 edn.	7/3
Radio Amateur's Examination Manual	5/9
Radio Communication Handbook (4th ed.)	63/-
	postage. 6/- extra
Radio Data Reference Book	14/6
SSB Equipment	3/6
Service Valve and Semiconductor Equivalents	5/6
VHF/UHF Manual	23/-
World at their Fingertips (Paperback)	14/6
(De-Luxe)	50/-

MORSE COURSES

RSGB Morse Instruction Tape (900 ft)	21/-
C90 Cassette	26/-
RSGB Morse Practice Tape (450 ft)	13/-
C60 Cassette	17/6

ARRL

Antenna Book	27/-
Course in Radio Fundamentals	11/9
Hints and Kinks	11/9
Mobile Manual	27/-
Radio Amateur's Handbook	51/6
Radio Amateur's Operating Manual	12/-
Single Sideband for the Radio Amateur	27/-
Understanding Amateur Radio	27/-
VHF Manual	27/3

CQ

Amateur Radio DX Handbook	44/6
Antenna Handbook Vol. 1	35/3
Antenna Roundup Vol. 1	28/-
Antenna Roundup Vol. 2	36/-
Mobile Handbook	27/9
Sideband Handbook	26/-
RTTY Handbook	32/6
Shop and Shack Shortcuts	37/-

USA MAGAZINE SUBSCRIPTIONS (pa)

QST (including ARRL membership)	58/6
QST (Societies and organizations)	65/6
CQ	50/-
73	50/-
Ham Radio	50/-
Braille Technical Press	60/-

RADIO PUBLICATIONS INC.

Beam Antenna Handbook	35/3
Better Short Wave Reception	28/6
Cubical Quad Antennas	34/-
S-9 Signals	9/6

MISCELLANEOUS

Basic Electricity	31/6
Basic Theory and Application of Transistors	19/-
Dictionary of Electronics	9/-
Foundations of Wireless	24/6
Guide to Broadcasting Stations	6/6
How to Listen to the World	28/-
Ham's Interpreter	11/3
Improve your Short Wave Reception	23/-
Mullard Data Book	3/10
Radio Amateur Operator's Handbook	6/6
Short Wave Antennas	13/-
Transistors in Practice	36/4
Wireless World Radio Valve Data	13/-
World Radio TV Handbook	48/-

LOG BOOKS

RSGB Standard Log	7/9
RSGB Receiving Station Log	7/3
RSGB VHF Contest Log	7/9
Mobile Mini-Log	4/-
Martin's Log	25/-

73

Simplified Maths for the Hamshack	4/9
VHF Antenna Handbook	25/9

MAPS

Admiralty Great Circle Map (*in tube*)	11/-
Counties	7/-
QRA Locator Map (Western Europe) (*in tube*)	9/-
QRA Locator Maps (Europe, set of four) (*in tube*)	22/6

MEMBERS ONLY

Lapel Badge (RSGB or RAEN emblem, pin or stud fitting)	2/-
Call-sign lapel badge (RSGB or RAEN, pin or stud fitting)*	8/6
Call-sign lapel chrome bar (pin fitting)*	7/-
Car badge (RSGB or RAEN)	10/-
Call-sign car badge (RSGB or RAEN)*	18/-
Call-sign car badge, de-luxe (RSGB or RAEN)*	25/-
Ties (Maroon or Blue)	19/6
Tie bar (RSGB emblem)	5/-
Key fobs (green, black or blue)	7/4
Radio Communication Easi-binders	20/-
Car window sticker (RSGB or RAEN. No adhesive required)	1/4
Member's headed notepaper (100 sheets) quarto	11/-
octavo	5/9

*delivery 4 to 6 weeks.

Prices include postage and packing except where stated.
Stamps and book tokens cannot be accepted.

35 DOUGHTY ST., LONDON, WC1

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1
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