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SEPTEMBER, 1962

VOL. 38, No. 3

BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

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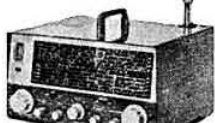


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Volume 38 No. 3

September 1962

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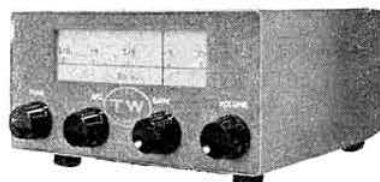
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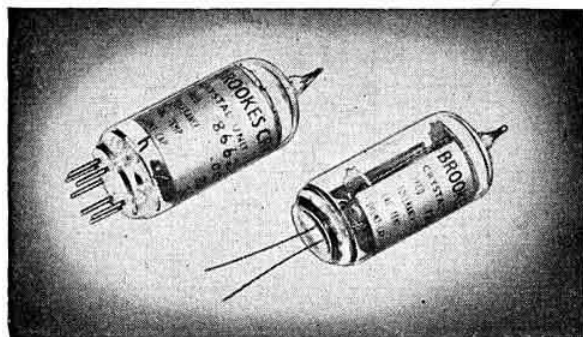
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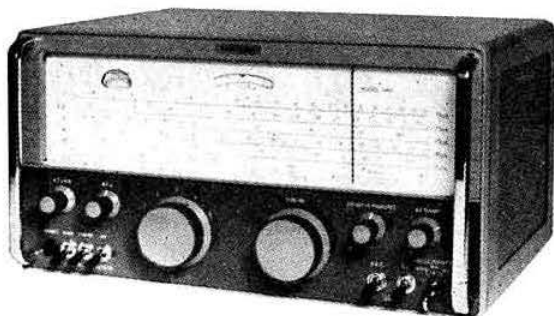
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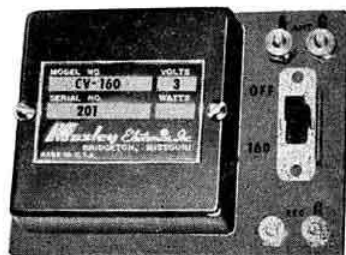
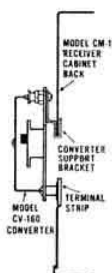
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R.S.G.B. BULLETIN SEPTEMBER, 1962

Current Comment

discusses topics of the day



Technical Data

THREE essential books to be found at every amateur station should be a copy of the R.S.G.B. *Amateur Radio Handbook*, an up-to-date copy of the R.S.G.B. *Amateur Call Book* and a data reference book. Nine shacks out of 10 probably possess copies of the *Handbook* and the *Call Book* but in far too few will there be found a really good reference data book. More often than not the amateur relies on the limited amount of data published in the *Handbook* or in specialised diaries. That state of affairs will soon be rectified when a brand new R.S.G.B. publication—*Radio Data Reference Book*—makes its bow to the public. The author—George Jessop, G6JP—has contrived to squeeze within its covers a mass of data which should satisfy not only the radio amateur but also the professional radio and electronic engineer as well. A feature of the book is that it will be packed with tables, curves and graphs, with text kept to a minimum.

Radio Data Reference Book will be bound in a cloth cover and is being printed to a size that will enable it to be slipped easily into the coat pocket. Some idea of its scope can be gleaned by glancing through the synopsis. Among the items that will have a special appeal to the radio amateur are the design of pi tank circuits, wideband couplers and filters, the operation of class C amplifiers, aerials and aerial feeder details, great circle calculations, rectifiers and smoothing data, standard frequency transmissions, U.K. television and broadcast channels, a summary of amateur licence conditions, general formulae for radio and electronics, colour codes, crystals for s.s.b. filters, standard wire and mathematical tables, transmission line resonators, characteristics of slab lines and co-axial resonators, waveguide sizes, attenuators and winding coils, to mention just a few of the contents.

Accurate technical information, whether it be in the concise form offered by this new R.S.G.B. publication or in the more detailed form of the R.S.G.B. *Amateur Radio Handbook* will always be a top requirement in every ham shack. It will continue to be the policy of the R.S.G.B. to see that that requirement is met.

J. C.

Safety Recommendations

IN this issue the Society offers for the guidance of members a series of safety recommendations. These are not a collection of hit-and-miss ideas dreamed-up by an individual but are the result of deliberations extending back over more than a year. The recommendations were drafted originally by the Technical Development Sub-Committee who submitted them after much discussion to the Technical Committee. The Technical Committee amended them and sent them forward to the Council. The Council offered various suggestions for improvement in presentation. Finally they were approved for publication.

The difficulty of preparing recommendations which are clear and concise yet free from ambiguities will be well appreciated by any member who has served on a safety recommendations' panel or committee set up by one of the professional institutions. The recommendations now issued by the R.S.G.B. have been no exception.

The wise reader will mount the recommendations on a piece of stout cardboard and then see that they are placed in a prominent position in the shack. Of special importance is the recommendation that members of the household should know the position of the master switch. Attention to that one detail may save a life. Fortunately the number of fatal accidents to radio amateurs in the United Kingdom has been relatively small, for which this Society can take some credit for publishing persistent warnings of the danger of using high voltages, but with an ever-increasing number of young people becoming licensed to operate transmitting equipment the need for a re-appraisal of the position is not out of place at the present time.

It is the earnest hope of all who have helped to draw up the new safety recommendations that members will adopt them without delay.

J. C.

London Lecture Meeting
Friday, October 26, 1962

"Satellite Communication"

By R. W. White

(Senior Controller of Experiments at
Goonhilly Telstar Station)

Buffet Tea 6 p.m.

(Free.)

Lecture 6.30 p.m.

A V.H.F. Transmitter Monitor using the Type 11 Oscilloscope

By R. C. HILLS, B.Sc.(Eng.), A.M.Brit.I.R.E. (G3HRH)*

THE ultimate means of checking the operating condition of any radio frequency transmitter is by the visual monitoring of the r.f. output envelope waveform on some suitable display device. Faults on a normal a.m. telephony transmitter may readily be observed by this means, and such a device is an essential under the present terms of licensing conditions to the correct setting up of a single sideband transmitter. The Type 11 oscilloscope is a unit which is still available on the surplus market and which readily lends itself to simple modification as a transmitter monitor.

Original Equipment

The Oscilloscope No. 11 A.A. Predictor Mark I is essentially a conventional oscilloscope using a 2½ in. display tube. The unit incorporates built-in h.t. and e.h.t. power supplies with facilities for 110 or 230 volts a.c. mains input, a three valve "hard" time base, which provides a number of limited frequency ranges, and a three valve a.c. coupled amplifier, the output of which drives the Y deflection plates of the display tube. The basic schematic is shown in Fig. 1.

Display Tube and Power Supplies

The display tube is a 2½ in. green faced medium persistence tube, type ACRI10, which is closely equivalent to the VCRI39A. The e.h.t. supply is derived from a separate winding on the mains transformer through a VU120 rectifier and the FOCUS and BRIGHTNESS controls, both of which appear on the front panel of the unit, are part of a conventional resistance chain across this e.h.t. supply. The brightness control is through a diode coupled to the display tube grid. H.T. for the time base and amplifier sections is derived from a further winding on the mains transformer and a full wave rectifier type 6X5G with a capacitor input smoothing filter. Heater supplies and an a.c. reference voltage for the time base are derived from a separate transformer.

Time Base The time base proper consists of three valves, V6 (6J5GT), V7 (6F33) and V8 (EBC33). The oscilloscope was intended for use with a pulse system and consequently the time base ranges are calibrated in pulse width rather than frequency. The time base selector switch on the front panel provides the choice of three scanning periods, 40 ms, 5 ms, and 1 ms. A fourth position on this selector switch provides a 50 c/s a.c. sweep on the X plates for elliptical displays. The selected time base periods are adjusted by two preset potentiometers located inside the unit at the lefthand edge.

Amplifier The first stage of the amplifier is V3 (EF91). Two alternative input connections are provided to this stage. The

first is a conventional a.c. coupling to the grid: the second is through an isolating transformer called the Nulling Transformer. Selection of the alternative inputs is by means of a switch INPUT SELECTOR located on the front panel of the unit. A small indicator lamp lights when this switch is in the NULLING TRANS position. V3 is a.c. coupled to a long tailed pair V4 and V5 (EF91), the anodes of which are a.c. coupled to the Y plates of the display tube. Two gain controls are also available on the front panel of the unit. GAIN (COARSE) is provided by means of a switched attenuator at the grid of V3 and GAIN (FINE) is provided by ganged potentiometers in the cathodes of V4 and V5. A preset potentiometer located inside the unit on the righthand side provides for an adjustment of the bias on the grid of V5: this should be set for best linearity. A second preset control on the same internal sub bracket is the Y SHIFT. The X SHIFT control is a further

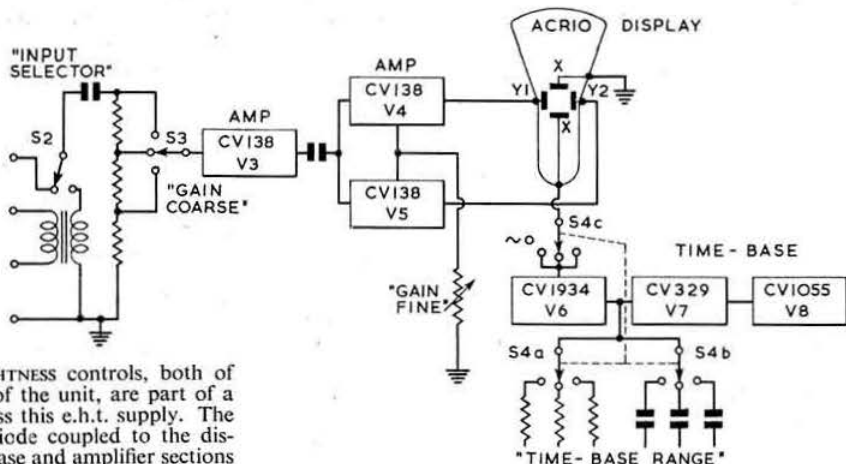


Fig. 1. Basic block diagram of the Type 11 Oscilloscope.

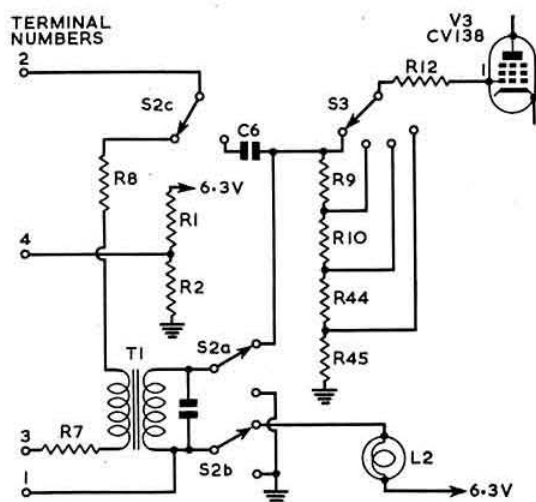
preset potentiometer located inside the unit at the lefthand edge adjacent to the preset time base controls.

Basic Modifications

The oscilloscope in its original form is immediately suitable for displaying a.c. waveforms up to a frequency of about 10 kc/s. This limit is set by the fastest time base speed and represents a display of ten complete cycles of the waveform, which is, in the writer's opinion, the worth-while limit in terms of X definition. However, some simple modifications can be carried out to the instrument to improve its convenience in operation. These changes are facilitated by the fact that every component in the oscilloscope has its circuit reference number marked on it: these numbers are used in the figures referred to in the text.

Input Circuit The original input circuit is shown in Fig. 2, and all the components may be located at the front righthand

* 73 Warren Way, Digswell, Welwyn, Herts.



end of the instrument. C6 and R12 are located underneath the chassis; the other components can be found on the tag board above the chassis. The revised input circuit is shown in Fig. 3 and by comparison with Fig. 2 the wiring changes can be followed. The use of terminal 3 for a 6.3V a.c. reference supply is purely arbitrary, and this terminal could be left blank for the possible addition of a synchronising input at a later date. The completion of this revision creates a

blank space on the front panel previously occupied by the INPUT SELECTOR and this can be put to good advantage in the next modification.

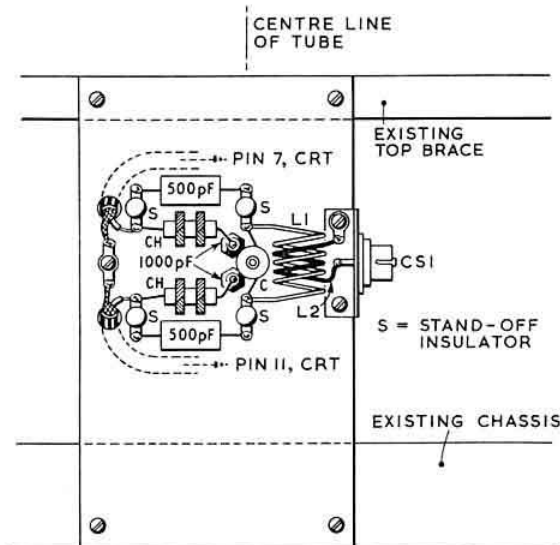
Time Base Circuit Part of the original time base circuit is shown in Fig. 4 (a). The two potentiometers VR5 and VR9 are located on a sub-bracket at the lefthand end of the chassis. In order to improve the operating convenience it is necessary to move the time-base FINE SPEED control to the front panel, and the modified circuit is shown in Fig. 4(b). The two series resistors R22 and R27 are located on the tag board immediately in front of the two potentiometers: one of these is not required in the modified arrangement. The connections to the time base switch COARSE SPEED on the front panel are most easily modified by permanent wiring joining the relevant switch tags. The single 2 Megohm potentiometer VR5 is located on the front panel in the space previously

occupied by the input selector switch, and is labelled TIME BASE FINE SPEED. The shafts of the original potentiometers are cut very short, and it is advisable to use a new 2 Megohm unit with a long spindle in order to make use of the matching knob from the selector switch. However an acceptable arrangement can be made by tinning with a coat of soft solder the spindle of the old potentiometer. This acts as a shim to retain the knob as a "drive fit" on the end of the spindle although it is not possible to make use of the grub screws.

Conversion for R.F. Envelope Display

The modifications detailed above cover only the use of the instrument as a normal a.f. oscilloscope with a practical upper frequency limit of about 10 kc/s. In order to utilize the oscilloscope for the display of an r.f. envelope waveform at 145 Mc/s, it is necessary to make some fundamental changes

insulators. The outers are earthed at the base of the stand-offs: the actual length of lead employed is approximately 6 in. and by using the method explained here, the tuned circuit is effectively connected across the Y plates by a 6 in. length of binocular feeder of $Z_0 = 150$ ohm balanced. This merely acts as an additional screened fixed capacitor of approximately 12 pF across the tuned circuit and is compensated in the setting of the tuned circuit trimming capacitor, a 3-30 pF Philips trimmer. The use of screened connections avoids radiation and coupling effects from other leads and



components, i.e. it puts a definite known and stable capacity across the tuned circuit instead of an unstable and unknown stray capacity due to other objects nearby. The tuned circuit itself is supported on a second pair of stand-off insulators, spaced from the first by the length of the 500 pF coupling capacitors which act as d.c. blocking capacitors. The coupling between L1 and L2 should be as great as possible, i.e. they are tightly interwound. The d.c. connections previously wired to the tube base are attached to feed-through type 1000 pF capacitors on the sub-chassis, and

Terminal No.	Original Use	New Use
1	Earth	Earth
2	No. 1 } Amp. input	Amp. a.c. input
3	No. 2 } Nulling trans	Cal. 6.3V. rms.
4	Cal. 50 mV. rms.	Cal. 50 mV. rms.

When a line trace on a c.r.t. is expanded to display an r.f. waveform, the average brightness level falls by a significant amount. This means that during periods of non-transmission a very bright linear trace is displayed, which would in time leave a permanent burn on the display face of the tube. To avoid this it is necessary to arrange some brightness suppression during such periods of non-transmission.

R.S.G.B. BULLETIN SEPTEMBER, 1962

TABLE 2
Valve Types

Valve	Function	CV. No.	Commercial Type
1	Rectifier (F.W.)	572	6X5G
2	Rectifier (E.H.T.)	1120	SU2150A
3	Amplifier	138	EF91
4	Amplifier	138	EF91
5	Amplifier	138	EF91
6	Time-base	1934	6J5GT
7		329	6F33
8		1055	EBC33
9	Brightness diode	—	EA50
C.R.T.		ACR10	VCR139A

The contacts of the relay RLA operate at approximately 600 volts d.c. positive with respect to the chassis of the oscilloscope, and although a normal P.O. type relay provides adequate insulation from contacts to frame, a further safeguard would be to mount the relay on an insulated bracket. The coil of RLA may be operated either from an external supply switched by auxiliary contacts on the "send-receive" transmitter relay, or can derive its own supply from the unit in which case only the auxiliary normally open contacts are required. In the writer's case RLA and its associated rectifier were taken from the modulator deck of a BC640 transmitter (originally used as the m.c.w. tone source keying relay). Together with the associated 100 μ F 25 V capacitor they were mounted on a small aluminium bracket in the space previously occupied by the nulling transformer, immediately behind the new TIMEBASE FINE SPEED control. The necessary relay energising connections were brought out to a terminal block on the rear edge of the main chassis, together with a 230 V mains input pair wired in parallel across the rear of the front panel 230 V a.c. socket.

R.F. Line Coupler

As described the envelope display circuit requires approximately 3 volts D.A.P. for an unmodulated envelope width of $\frac{1}{2}$ in. on the tube face. This represents approximately 50 mW in 100 ohms or alternatively—30db on 50 watts of carrier power. Since the overall efficiency of an amateur 145 Mc/s transmitter rarely exceeds 50 per cent, this in turn dictates an input power of 100 watts. The trace amplitude will of course decrease as the square root of the power, e.g. 50 watts d.c. input will provide $\frac{1}{2}$ in. of trace width.

A suitable directional coupler for use with the envelope monitor is shown in Fig. 8. It consists of a short section of 72 ohm transmission line, the outer of which is an Eddy-stone box cat. no. 896, and the inner a piece of $\frac{1}{8}$ in. o.d. brass tube $3\frac{1}{2}$ in. long which is soldered to the spigots of Amphenol SO239 coaxial bulkhead connectors. The mounting of the tube is achieved as follows:

- File a 4 B.A. hexagonal brass nut roughly circular, until it is a drive fit into the end of the tube.
- Sweat in such a bush at each end using a 125 watt iron and resin cored solder.
- The spigot of a standard Amphenol connector can now be pushed into the 4 B.A. tapped hole in the nut using a screwing motion, and finally soft-soldered in the correct position.

The sampling line consists of a strip of 18 s.w.g. brass $\frac{1}{8}$ in. wide and $3\frac{1}{2}$ in. long, one end of which is soldered to the cut-down spigot of a Belling-Lee coaxial socket type L714S mounted on the side wall of the outer box. The other end of the strip is earthed through a 100 ohm $\frac{1}{2}$ -watt carbon resistor using absolute minimal lead lengths. The strip line is arranged to be spaced $\frac{1}{8}$ in. from the inside face of the box, as shown in Fig. 8.

The prototype of this coupler had an output at -30db relative to the power in the main line, and its reflection

coefficient in a 72 coaxial line is less than 5 per cent. The directivity [2] of the strip coupler is only about 12db but this is adequate for the present purposes. The length of $\frac{1}{4}$ in. diameter coaxial cable from the coupling output to the monitor input link is not critical but should be kept as conveniently short as possible: the length used by the writer is approximately 3 ft.

Specification

The final monitor will produce an unmodulated trace of $\frac{1}{2}$ in. width from an input of approximately 3 volts D.A.P. carrier. As explained earlier this represents a transmitter d.c. input of 100 watts, and the trace width will reduce as the square root of the power. The minimum worthwhile trace width is, in the writer's opinion, $\frac{1}{4}$ in., which dictates a transmitter input power of at least 25 watts.

Although the Y plates are permanently joined by an effective capacity of 250 pF, and each is earthed via 1000 pF, at audio frequencies (when the chokes have little effect), the a.f. performance of the instrument is only about 3db down at 5 kc/s when used through the normal amplifier chain, and this is regarded as quite acceptable. This is particularly so

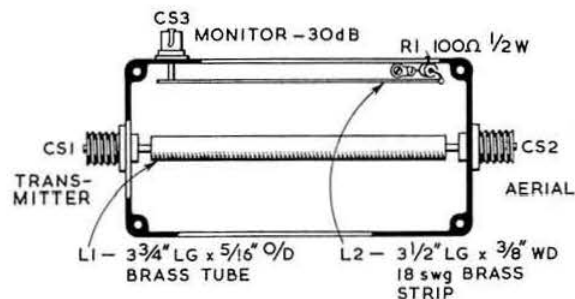


Fig. 8. Directional coupler for monitor pick-up.

because the only alternative is to switch the Y plate connections, which re-introduces immediately the problem of shunt stray capacities in the envelope monitor condition. As an absolute check, an input of 100 mV at 200 kc/s into the amplifier, with maximum gain control settings, gave a trace width of approximately $\frac{1}{2}$ in. From this it would appear likely that a modulated i.f. waveform could also be displayed on the modified instrument, although this has not been tested.

References

- "Scope Intensifier," A.R.R.L. S.S.B. Handbook.
- "A Reflectometer for 145 Mc/s," R. C. Hills, R.S.G.B. BULLETIN, August, 1961.

Special Events Stations

DURING the Freshers' Conference Week, commencing October 1, Manchester University Amateur Radio Society will be operating on Top Band every day under the call-sign G3CXX from the Union building. The operator will be Richard Kay (G3OQF) who will particularly welcome the co-operation of stations in the Manchester area in the arrangement of contacts.

The University of Birmingham Radio Society will be operating G3IUB at the 1962 Freshmen's Conference to be held at the University from September 28 to October 1. All bands from 10-80 metres will be used, with possibly some activity on 2m. R.S.G.B. members going up to Birmingham University for the Conference will be cordially welcomed in the Radio Society's room on the top floor of the Students' Union.

Third Method Single Sideband

PART 2—Operation

By G. F. GEARING (G3JJG) *

IN the first part of this article†, the third method of generating a single sideband suppressed carrier signal was compared with the other two well-known systems, the filter and phasing methods.

The third method is put forward as a system capable of excellent results, with the added incentive that, as far as the amateur is concerned, scope is allowed for experimentation. For instance, though this article suggests an exciter at a frequency in the 450 kc/s range, in theory the basic s.s.b. signal could be generated at 9 Mc/s, with little more difficulty than a phasing rig at that frequency.

Operation of the Third Method Exciter

As may be seen from Fig. 1, two separate modulation channels are used, for convenience notated Channel A and

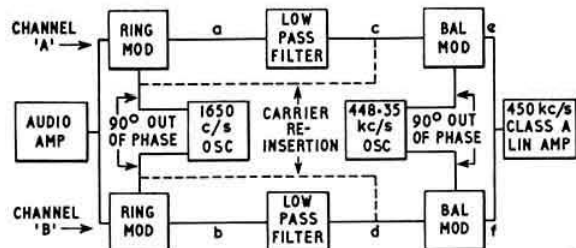


Fig. 1. Block diagram showing operation of a third method exciter.

Channel B. The original speech signal, after amplification, is presented in parallel to the ring modulators. The switching frequency of these modulators is 1650 c/s, which is centred in the speech range 300-3000 c/s as indicated in Fig. 2.

After modulation, the signal will appear at point a as shown in Fig. 3. At point b at the same instant, the signal will be identical in frequency but 90 degrees out of phase, due to the switching signals to the two ring modulators being advanced and retarded by 45 degrees respectively. The signal now consists of sidebands on a nominal carrier frequency of 1650 c/s produced, as has been shown, by modulating speech frequencies

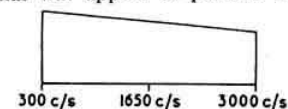


Fig. 2. Centring of the switching frequency (1650 c/s) in the speech range.

* 21 Rastell Avenue, London, S.W.2
† R.S.G.B. BULLETIN, July 1962.

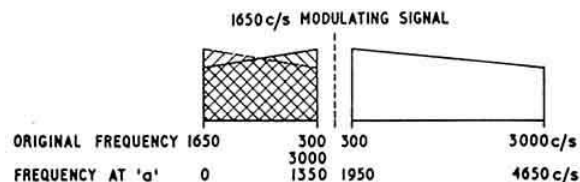


Fig. 3. Output signal at point "a" in Fig. 1 after modulation.

between 300 and 3000 c/s with the 1650 c/s carrier oscillator. The signal in each channel is then passed through a low pass filter which has a roll-off commencing just above 1350 c/s. At points c and d the signal now appears as shown in Fig. 4. The resultant signal comprises the original 300-3000 c/s with 300-1650 c/s occupying the same part of the spectrum as 3000-1650 c/s.

Reference to Fig. 1 shows that signals in both chains are next mixed in the balanced modulators with a radio frequency of 448.35 kc/s. The r.f. injection to the Channel A balanced modulator is 90 degrees out of phase with the injection to Channel B. Since Channels A and B are 90 degrees out of phase the spectrum picture after the balanced modulators (see Appendix I) appears as in Fig. 5.

This is at points e and f. The wanted sideband extends from 449.7-447.0 kc/s and the unwanted product, known as the inversion, from 447.0-449.7 kc/s. However, the wanted signal in Channel A is in phase with the wanted signal in Channel B and so the two combine. The inversion in Channel A on the other hand is exactly 180 degrees out of phase with Channel B and thus they cancel out.

A lower sideband signal has thus been produced on a nominal carrier frequency of 450 kc/s. The unwanted sideband has been removed at audio frequency by the two low pass filters and whatever fault may occur no signal will fall in the unwanted sideband.

Carrier suppression is achieved at audio frequency in the first two ring modulators and a further 30db is available due to the low pass filters. Suppression of the unwanted side-

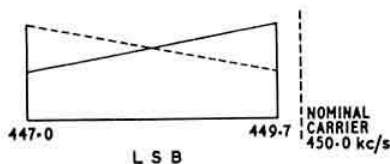


Fig. 5. Speech spectrum after the balanced modulators.

band is due to the audio low pass filters and figures of 50db sideband suppression are easily realized. The nominal carrier frequency for a lower sideband generator is, in this case, 448.35 kc/s + 1650 c/s = 450.0 kc/s.

Carrier re-insertion with the "third method" takes place after the two low pass filters in each chain, resistive dividers being used to produce the required level.

A further advantage of the method is the fact that the generator is bi-directional and may be used as the receiver demodulator. Should this be the intention, the nominal carrier frequency should be chosen as the receiver i.f. The received sideband will be the same as the transmitted sideband. However, sideband switching does present some problems, necessitating a second crystal on 451.65 kc/s (upper sideband) which must be switched; the outputs of the two 1650 c/s oscillators must also be switched. This may be accomplished with a single relay.

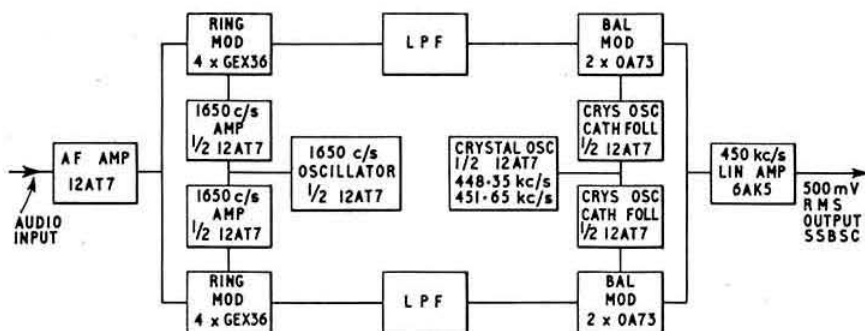


Fig. 6. Block diagram of a complete third method s.s.b. exciter.

The total requirements for a s.s.b. generator/demodulator with selectable sideband facilities and delivering 500 mV s.s.b.s.c. at 450 kc/s are two crystals and five valves (one 6AK5 and four 12AT7). A block diagram of such a third method s.s.b. exciter is shown in Fig. 6.

Microphone Amplifier

The audio amplifier uses the two halves of a 12AT7 in cascade, with the gain control between the two halves, providing adequate gain for the average crystal microphone. Low values of coupling capacitors are used to restrict the lower speech frequencies.

The amplifier output is transformer coupled to the ring modulators, the two transformers used being fed in series and matching the input impedance of the ring modulators. Some 6db of negative feedback is applied to the second half of the 12AT7 by virtue of the unbypassed cathode resistor.

Action of the Ring Modulators

Each ring modulator comprises four point-contact germanium diodes arranged so that only the sum and difference of the two input frequencies appear at the output, both original frequencies being balanced out. This configuration is necessary because, in a balanced modulator using two diodes, only one of the input frequencies is balanced out. In this application, this would not be acceptable.

The ring modulators are fed with switching signals of 1650 c/s at a level of about one volt r.m.s. This frequency has been chosen to be mid-way in the speech range of

300-3000 c/s, i.e. $\frac{3000-300}{2} + 300 = 1650$ c/s.

The modulators produce sum and difference frequencies of the original speech and the 1650 c/s oscillator.

Consider the case of a 1000 c/s modulating signal. This signal beats with 1650 c/s in each ring modulator to produce signals at 650 c/s (1650-1000) and 2650 c/s (1650+1000). For 300 c/s modulation the difference frequency will be 1350 c/s and the sum 1950 c/s. With a 3000 c/s signal the difference will be 1350 c/s and the sum is 4650 c/s. Any input frequency in the range 300-3000 c/s, will produce difference frequencies between 0 c/s and 1350 c/s and sum frequencies from 1950 c/s to 4650 c/s. The difference signals are those required.

Phase Relationships

It will be seen that a difficulty arises here. Both 300 c/s and 3000 c/s will produce the same difference frequency after the modulators and, in fact, for a given difference, there are two possible speech frequencies, one above 1650 c/s and one below. At this point the phasing aspect of the system must be considered.

The output of the 1650 c/s oscillator is fed separately to two amplifiers, each having a simple phase shift network in

its input circuit. These networks each comprise one resistor and one capacitor and retard or advance the phase by 45 degrees, the outputs therefore differing by 90 degrees. The phase shift networks have to deal with a signal of constant amplitude and frequency, hence their functional appearance.

The 1650 c/s switching signals now being 90 degrees out of phase, it follows that the modulator outputs will also be 90 degrees apart. Furthermore, it can be shown mathematically that, if the frequency of the modulation signal, being below 1650 c/s (300-1650), is then altered to be above (1650-3000), then, in one chain the phase of the modulator output will change by 180 degrees with respect to the second chain. So, although there is always a 90 degree difference between

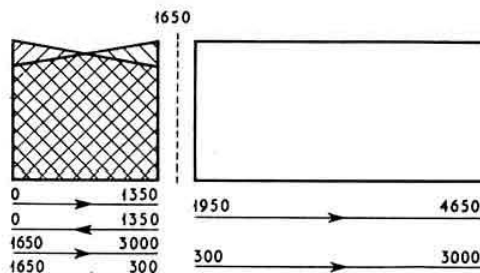


Fig. 7. Signal spectrum before the filters.

them, one chain will lead or lag the other, depending on whether the incoming signal is above or below 1650 c/s.

At this point the picture of the spectrum can be illustrated in the form shown in Fig. 7.

Filters

The output of each ring modulator is fed into a low pass filter, each of which consists of five capacitors and four inductors, constituting a major percentage of the cost of building the generator. It will be found, however, to be little more expensive than a crystal filter or phasing exciter using new components.

The filters have a substantially flat frequency response up to 1350 c/s, then commencing to roll off until the output is at least -35db at 1650 c/s and -50db at and above 1800 c/s. As explained earlier, with 300 c/s modulation, the unwanted sum product is at 1950 c/s where the attenuation is about

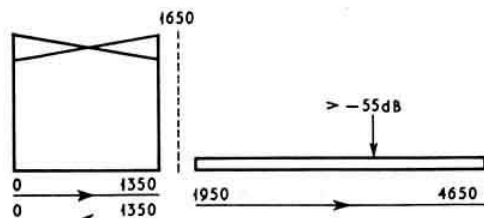


Fig. 8. Spectrum at the output of the ring modulators.

55db. The suppression of the unwanted sideband as generated is never less than this figure.

Allowing for comparatively large errors in the filter inductors, the sideband suppression will not be materially affected. Due to the insertion of the filters, a phase change occurs and it is desirable that this change should be equal in each filter between 0 c/s (d.c.) and 1350 c/s. The effect of differing phase change will cause a spurious signal, contained within the wanted sideband only, leaving the suppression of the unwanted sideband unimpaired.

Owing to the action of the filters, the sum frequencies appearing at the output of the ring modulators will be greatly attenuated, leaving, at the output of the filters, signals in the range 0 c/s to 1350 c/s. These correspond to speech signals in the range 300-3000 c/s and, as earlier explained, a 90 degree phase difference exists between the two chains.

R.F. Balanced Modulators

The filter outputs are fed to two series balanced modulators while a crystal oscillator (in the present example at 451.65 kc/s) provides the heterodyning signal. As in the circuitry of the 1650 c/s oscillator, the signal from the crystal is fed through phase shift networks to the grids of two cathode followers which in turn provide two signals 90 degrees out of phase for the modulators. One resistor and one capacitor is used in each phase shift network.

In each balanced modulator, the signals from the filter produce a double sideband signal around a frequency equal to the crystal frequency. This sub-carrier, 451.65 kc/s, is suppressed by the action of the balanced modulators, leaving a d.s.b. suppressed carrier signal wholly contained in the wanted sideband spectrum.

At this stage, it must be explained that the nominal carrier frequency of the final transmission is, in the case of an upper sideband exciter, 451.65 kc/s - 1.65 kc/s, i.e. 450 kc/s or for the lower sideband, 451.65 kc/s + 1.65 kc/s, 453.3 kc/s. The relative phasing determines which sideband shall be radiated. This is explained in greater detail later.

Considering the d.s.b.s.c. signals, if a 1000 c/s modulating signal is presented to the a.f. amplifier, signals at 650 c/s and 2650 c/s are obtained before the filters, the higher frequency being rejected and the 650 c/s signal reaching the second balanced modulators. This heterodynes with 451.65 kc/s, resulting in a difference frequency of 451 kc/s (451.65 - 0.65) and a sum of 452.3 kc/s.

With a modulating signal at 300 c/s, there are 1350 c/s and 1950 c/s signals before the filters, 1350 c/s post-filter giving difference and sum frequencies of 450.3 kc/s and 453 kc/s respectively. Taking as the third example an incoming signal

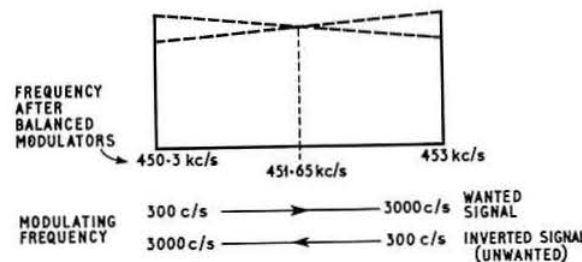


Fig. 9. Derivation of signals in the 450 kc/s range corresponding to the speech range 300-3000 c/s.

at 3000 c/s, we have 1350 c/s and 4650 c/s, 1350 c/s post-filter and 453 kc/s and 450.3 kc/s, sum and difference after the second modulators.

From the above, it can be seen that a band of frequencies, referred to the 450 kc/s nominal carrier, is produced extend-

ing from 450.3 kc/s to 453 kc/s, corresponding to modulating signals between 300 c/s and 3000 c/s. This is a single sideband suppressed carrier signal, the upper sideband being radiated.

Inversion

A second band of frequencies is produced simultaneously with the wanted sideband. This covers from 453 kc/s to 450.3 kc/s, the same part of the spectrum but with the signal inverted. This is a lower sideband signal, with a nominal carrier frequency of 453.3 kc/s (451.65 kc/s + 1.65 kc/s), and is referred to as the "inversion."

The wanted signal and the inversion signal are found in each channel, equal in frequency but having phase differences. The relative phasing arrangements of the 1650 c/s and crystal oscillator injection voltages are arranged such that the wanted signal in the first chain is exactly in phase with the same signal in the second chain, the inversion signal being exactly 180 degrees out of phase.

If the two chains are combined at this stage, it follows that the inversion signals, being equal in frequency but opposite in phase, will cancel and the wanted signals combine.

To take an example, with an u.s.b. generator: a 1000 c/s modulating signal produces 451.0 kc/s and 452.3 kc/s, the latter being phased out. The expression for the 451 kc/s signal is (crystal oscillator frequency) - (frequency of signal post-filter), i.e. 451.65 kc/s - 0.65 kc/s = 451 kc/s. This expression holds for any modulating signal below 1650 c/s. When the signal is above this frequency, the expression becomes (crystal oscillator frequency) + (frequency of signal post-filter). This change is due to the relative phase reversal in one chain previously described under the heading "Phase Relationships."

In this way inputs of 300 c/s and 3000 c/s both produce 1350 c/s after the filters and are sorted out by the change in the above expression. So 300 c/s gives 450.3 kc/s (451.65 kc/s - 1350 c/s), and 3000 c/s gives 453.0 kc/s (450.65 kc/s + 1350 c/s). The whole of the sideband is in the correct spatial relationship.

Amplitude and Phase Balance

No mention has so far been made of the necessity to achieve the same conversion loss in each signal path. For the inversion signal to cancel completely, the signals in the two chains must be equal in amplitude and frequency and in anti-phase.

Amplitude balance may be accomplished very easily at the primaries of the audio transformers. Due to the symmetry of the circuitry, this is completely effective, and, if the phasing is correct, complete cancellation of the inversion signal takes place.

Phase correction is accomplished in the r.f. section of the generator by tuning the second modulator input transformers above or below resonance, as is necessary. Inaccuracies in the 1650 c/s phase shift networks may also be taken into account but to facilitate sideband switching, it is normal to try to make these networks accurate.

Carrier Re-insertion

In common with the crystal filter system, carrier re-insertion is achieved by feeding the original signal at nominal carrier frequency into the signal path after the sideband filters. In this case, the 1650 c/s signal must be fed into both chains at once, of equal amplitude and in the correct phase relationship.

The signals, from the anodes of the 1650 c/s amplifiers, are passed through blocking capacitors to potential dividers having an integral amplitude balancing control. They enter the signal path immediately before the final balanced modulators.

The potential dividers should be so arranged that the carrier level is sufficient to produce one quarter of the output power

that the final linear amplifier is capable of delivering, i.e. 6db below the onset of limiting. Limiting may be defined as the point at which an increase in input voltage does not cause a corresponding rise in output power.

Sideband Switching

The ease of switching from one sideband to the other is one great advantage of the phasing method in which it is necessary only to reverse the phasing of one audio channel. With the crystal filter system it is not as simple as it is very desirable to retain the same nominal carrier frequency when changing sidebands. A filter rig must therefore either use two separate filters, each with up to four crystals, or use one filter, altering the frequency of the carrier to be above or below the filter passband. As this will alter the carrier frequency, the transmitter v.f.o. must be changed by the same amount in the opposite direction.

Sideband switching with the third method falls somewhere between the ease of the phasing rig and the difficulty of the filter system. At some point in the signal path, a phase change of 180 degrees must be introduced. This selects the other sideband but the carrier frequency will alter by an amount equal to twice the frequency of the 1650 c/s oscillator. A d.p.d.t. switch or relay set will reverse the phase and a s.p.d.t. set of contacts select either the 451.65 kc/s or 448.35 kc/s crystal.

Any deviation of the carrier frequency between the two sidebands may be removed by either etching one crystal or altering the 1650 c/s oscillator frequency until it is exactly half the difference between the crystals.

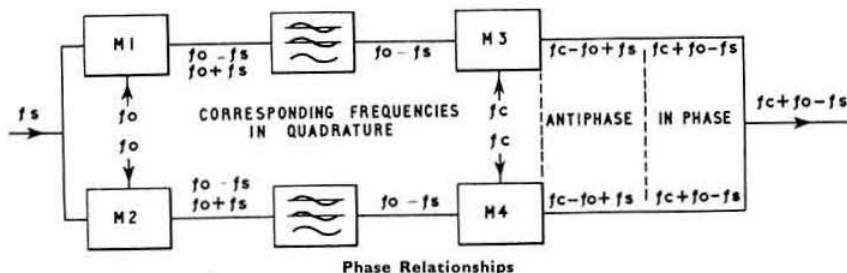
Relative Cost

It is difficult to assess the cost of building a third method generator, but it is estimated to be cheaper than a crystal filter rig of comparable performance using new components. At present, surplus crystals are available which reduce the cost considerably. For the third method the expensive items are the four audio transformers and the two filters. However, by the very nature of the system, it is well worth the cost. It is a fascinating way of generating a s.s.b. signal and the reports gained over the air, during two years of operation, suggest that the quality is excellent. Unwanted sideband and carrier suppression have been measured by means of a spectrum analyser as greater than 50db. It is offered as something comparatively new to try, in the knowledge that, as yet, few amateurs are using the system.

In the final article in this series, a practical transmitter will be described, generating either sideband on a nominal carrier frequency of 450 kc/s, heterodyning with a v.f.o. tuning 3.05 - 3.35 Mc/s to give operating frequencies from 3.5 - 3.8 Mc/s. The power amplifier employs a pair of 6146 tetrodes, running up to about 100 watts peak input with 600 volts h.t.

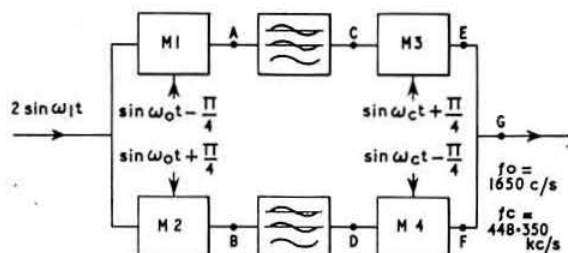
(To be concluded)

Appendix I



Appendix 2

Mathematical Analysis—Lower Sideband



$$\text{At A, } \sin \omega_0 t - \frac{\pi}{4} \cdot 2 \sin \omega_1 t.$$

$$= \left(\cos \omega_0 - \omega_1 t - \frac{\pi}{4} \right) - \left(\cos \omega_0 + \omega_1 t - \frac{\pi}{4} \right)$$

At C there remains post-filter

$$\cos \omega_0 - \omega_1 t - \frac{\pi}{4}.$$

$$\text{At B } \sin \omega_0 t + \frac{\pi}{4} \cdot 2 \sin \omega_1 t.$$

$$= \left(\cos \omega_0 - \omega_1 t + \frac{\pi}{4} \right) - \left(\cos \omega_0 + \omega_1 t + \frac{\pi}{4} \right)$$

At D, there remains post-filter

$$\cos \omega_0 - \omega_1 t + \frac{\pi}{4}.$$

$$\text{At E, } \sin \omega_c t + \frac{\pi}{4} \cdot \cos \omega_0 - \omega_1 t - \frac{\pi}{4}.$$

$$= \left(\sin \omega_c + \omega_0 - \omega_1 t \right) + \left(\sin \omega_c - \omega_0 + \omega_1 t + \frac{\pi}{2} \right)$$

$$\text{At F, } \sin \omega_c t - \frac{\pi}{4} \cdot \cos \omega_0 - \omega_1 t + \frac{\pi}{4}.$$

$$= \left(\sin \omega_c + \omega_0 - \omega_1 t \right) + \left(\sin \omega_c - \omega_0 + \omega_1 t - \frac{\pi}{2} \right)$$

\therefore after combining signals at E and F, there remains at G.

$2 \sin \frac{\omega_c + \omega_0 - \omega_1 t}{2}$, i.e. lower sideband, output frequency decreases with increase in modulating frequency.

New French Call Book

R. E.F. has just published the 14th Edition of its *Call Book*. Printed on high quality art paper, and indexed by call-sign as well as by name, this must surely be the most ambitious of all call books yet published. Copies can be obtained from the R.E.F. Secretariat, 60 Boulevard de Bercy, Paris 12. Price (in France) 6.25 N.F.

Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

Bad Manners

MODERN techniques, resulting in improved equipment available to the amateur, have aided world wide communication but, unfortunately, operating manners appear to have moved in the opposite direction and the deterioration has prompted harsh, but justified, comments from several correspondents. It is undoubtedly true that the increasing use of s.s.b. has provoked some particularly unpleasant habits but some of the recent DX activity on c.w. has caused behaviour which was outrageous by standards of a few years back. G13CDF deplores the poor operating of European stations (U.K. included) and mentions the long calls on the frequency of the DX station, often without first having heard the latter, and then, if contact is established a 5 and 9 report is given together with a request for a repeat of the report from the overseas station. A recent example of selfish operating occurred this month when VR5AR announced that he was standing by for G3AEE. The response this statement evoked was amazing bearing in mind the fact that the G.P.O. do not issue duplicate calls.

G16TK adds his voice in complaining of the present day bad manners and despairs of the stations who call DX that they cannot hear and then endeavour to obtain from a third station a relay of their signal report, to say nothing of the characters who, unable to raise the DX, then proceed to call CQ on the frequency. "Tail ending," if properly carried out, can often be tolerated, both on c.w. and s.s.b., but as WOMLY points out it now frequently leads to front ending, middle ending, and shortly, complete chaos. Incidentally, is there any enactment which decrees that stations conducting phone patch traffic shall always have a clear frequency? The answer to the present state of affairs lies with each and every operator who should behave himself on the air in the same way as he would wish others to behave and to remember that Amateur Radio is a hobby and not a way of life. To quote OY7ML, "What we need is more ham spirit and considerate operating."

The present sunspot cycle continues its decline to the minimum which it is anticipated will occur between November 1964 and April 1965. The mean sunspot number of 19.7 for July 1962 compares with 41 for the preceding two months and a predicted figure of 27 for October.

News from Overseas

ZD8RN, now on board a ship of the R.N. in Far Eastern waters, was active from Georgetown, Ascension Island from May 31 to July 11. The rig was a converted BC458 and a CR100 receiver with a long wire aerial, which produced a total of 283 QSOs with an input of only 25 watts. ZD8RN comments that U.K. contacts were hard to come by although G8TC was worked several times. The home QTH of ZD8RN is 27 Peak Road, Clanfield, Hants.

G3LMH is now signing 9G1EE whilst on a 14 month tour with the Ghana Broadcasting System and will be looking for U.K. friends. The equipment at present in use is a K.W.

* Please send all reports to R.S.G.B. Headquarters to arrive not later than September 20.

Vanguard with a CR100 receiver and a multiband trap aerial. The address for QSLs will be found in *QTH Corner*.

5B4TC is the latest call of 5A4TC who is now active from Nicosia, Cyprus. The new QTH affords space for aerials for the l.f. bands and TC hopes to be on both 7 and 3.5 Mc/s in the near future. If any operator has not yet claimed his 5A4TC QSL the new address will be found in *QTH Corner*.

On his way to the U.K. from Aden VS9ADM toured Africa for a month and now signs G3HZW again. If anybody requires a QSL for his Aden operation G3HZW will be pleased to oblige and may be reached through the R.S.G.B. Bureau or direct.

Using a DX40 and a R.1155 VS4RM made over 1000 QSOs during a 30 week period of operation. After a period of service under the Voluntary Service Overseas (similar to the U.S. Peace Corps) Robin Maule will shortly be active as GM3OEF from St. Andrew's University. VS4RB, Roy Beckerleg, is now on the air from Sarawak using a B2 but hopes to have a DX60 shortly.

MP4TAO is now QRT from Abu Dhabi but this spot will be represented by ex-9G1AA who will be on duty in that area with International Aeradio.

Further to the note in the July issue it is emphasised that, contrary to statements often heard over the air, minimum signal reports are not necessary to obtain DXCC credit.

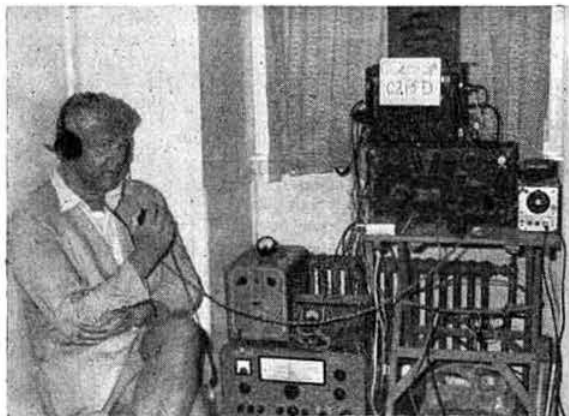
In connection with the Jamboree-on-the-Air to be held between 00.00 on October 20 and 24.00 October 21 on a world wide basis, G2CAJ has received the call GB3BPH for use during the Jamboree at Baden Powell House. It is hoped that this station will be operating on all bands from 1.8 Mc/s to 144 Mc/s.

DXpeditions

The operation from the British Phoenix Islands under the call VR3L/VR1 was somewhat unsatisfactory for U.K. operators. The station opened on August 21 and was soon



VS4RS, operated by G3IHP, has been very active from Sibul, Sarawak, using an Eddystone receiver and a Heathkit transmitter feeding a three element 21 Mc/s beam.



The first s.s.b. station to operate from Sark was G2HFD/A. The equipment comprised G2HFD's home station which he normally operates from Blackheath, London.

worked by G3AWZ, G6XL and others; however, after a short time the signals decreased in strength and few European contacts were made. The following day conditions were variable although at one time the s.s.b. signals were 5 and 6 in the U.K., but on the third day no signals were heard at the times when they could reasonably be expected. On August 25 the station was active on 14,010 kc/s c.w. but giving the QTH as Canton Island. A feature of the s.s.b. operation was the reports of 5 and 1 given to at least two stations, whilst on c.w. the name of the operator, the QTH and the QSL address were given on every transmission, thus slowing down tremendously the QSO rate. In so far as DXCC country status is concerned it will be interesting to hear the arguments advanced so that two countries may be created from one piece of land. Canton Island is under the joint administration of the U.S. and U.K. governments and is not a partitioned area. There has been considerable activity from the Island by KB6 stations.

Other Pacific activity may be expected in the shape of ZL1ABZ (ex-ZL4JF) who will be operating from the Kermadec Is. in the autumn for a period of about 10 months using a Collins S-line, whilst ZK1BY plans a stint from Samoa after the conclusion of the operation from the Cook Islands. K1AZA will be returning to Palmyra Is. on September 10 for about one month, but it is not known whether he will again sign /KP6 or if a KP6 call will be available. CR8AB will, it is said, again operate from Timor during the coming December.

After his stay on Chagos (VQ9A/8C) W4BPD returned to the Seychelles and received the information that he would not be given permission to operate from any of the VQ8 areas. This has presumably prevented a trip to St. Brandon, and Gus now states that he will visit the French possessions off the coast of E. Africa. However, circumstances rapidly change and it would be wise to keep an ear on the usual s.s.b. and c.w. frequencies used by W4BPD.

W0MLY amassed a total of 16,000 QSOs during his African trip and offers to QSL direct if any difficulty is experienced in obtaining cards.

G2HFD/A became the first s.s.b. station to operate from Sark and was active during the period July 22 to August 10. Frequencies used were 1.8 Mc/s c.w., 3.5 Mc/s s.s.b. and c.w. and s.s.b. on 14 Mc/s, with the main effort on 14 Mc/s sideband. The gear consisted of a K.W. Viceroy with a B2 for 1.8 Mc/s, the receiver being a modified BC342N with a Q5'er. Aerials available were a ground plane for 14 Mc/s and also a V beam for this band plus a 200 ft. wire for 1.8 Mc/s. In the course of 400 QSOs 58 countries were worked in all continents, and generally the DX operation was

considered to be satisfactory. Unfortunately poor summer conditions combined with paralysing "fish fone" made operations on Top Band very disappointing. Only seven G stations and GC2FMV on Jersey were raised on 1.8 Mc/s and G2HFD regrets disappointing those who were looking for a contact with Sark on this band. There is a potential amateur on the Island and the 1.8 Mc/s transmitter was left for his future use. Despite the limited hours during which operation could take place it is intended to repeat the trip, and all contacts will be acknowledged on receipt of a card. The correct QTH of G2HFD appears in *QTH Corner*.

The Cheltenham A.R.S. represented by G3CGD and G3HCV staged another GW5BK/P trip from July 28 to August 7. In spite of unpleasant weather 200 QSOs were made on 1.8 Mc/s from the counties of Carmarthen, Cardigan, Montgomery and Flint, and an additional 30 QSOs on 14 Mc/s. Using a vertical dipole and an input of 10 watts to the 5763 p.a. valve good reports were received from most stations worked including the N. Americans. A home-made mast made of 4 ft. lengths of paxolin tube was erected to a height of 45 ft. but unfortunately gale force winds blew it down twice in the same day and the party was washed out of Mynydd Bach in Cardiganshire.

Bad weather was also experienced by G3OYU who was forced to abandon his trip to several Welsh counties. During the nine hours operating that were possible 77 contacts were made with 25 counties on Top Band. However, the operators are not discouraged and hope to make a longer and dryer trip next year.

Contests

The 1962 VK/ZL Oceania DX Contest will be held from 10.00 October 6 to 10.00 October 7 (phone), and from 10.00 October 13 to 10.00 October 14 (c.w.). Two points will be scored for each QSO on a specific band with VK/ZL stations; one point for each QSO on a specific band with Oceania



I1SVZ with the Miniphase SB7M s.s.b. transmitter he recently operated under the call-sign M1/I1SVZ.

stations other than VK/ZL. The final score is obtained by multiplying total QSO points by the sum of the VK/ZL call areas worked on all bands. (The same call area worked on different bands counts as a separate multiplier.) The serial numbers to be exchanged will consist of the signal report plus three figures which should commence with 001 and increase by one for each successive QSO. The logs must show the following details in this order: Date; Time (G.M.T.); Call of station worked; Band; Serial No. sent; Serial No. received; Points. Underline each new VK/ZL call area contacted and use a different log for each band. The summary sheet should show the call, name and address, with details of the equipment, make up of total score and a declaration that all rules and regulations were observed. There is also a Listeners' Section, and to count for points a VK or ZL

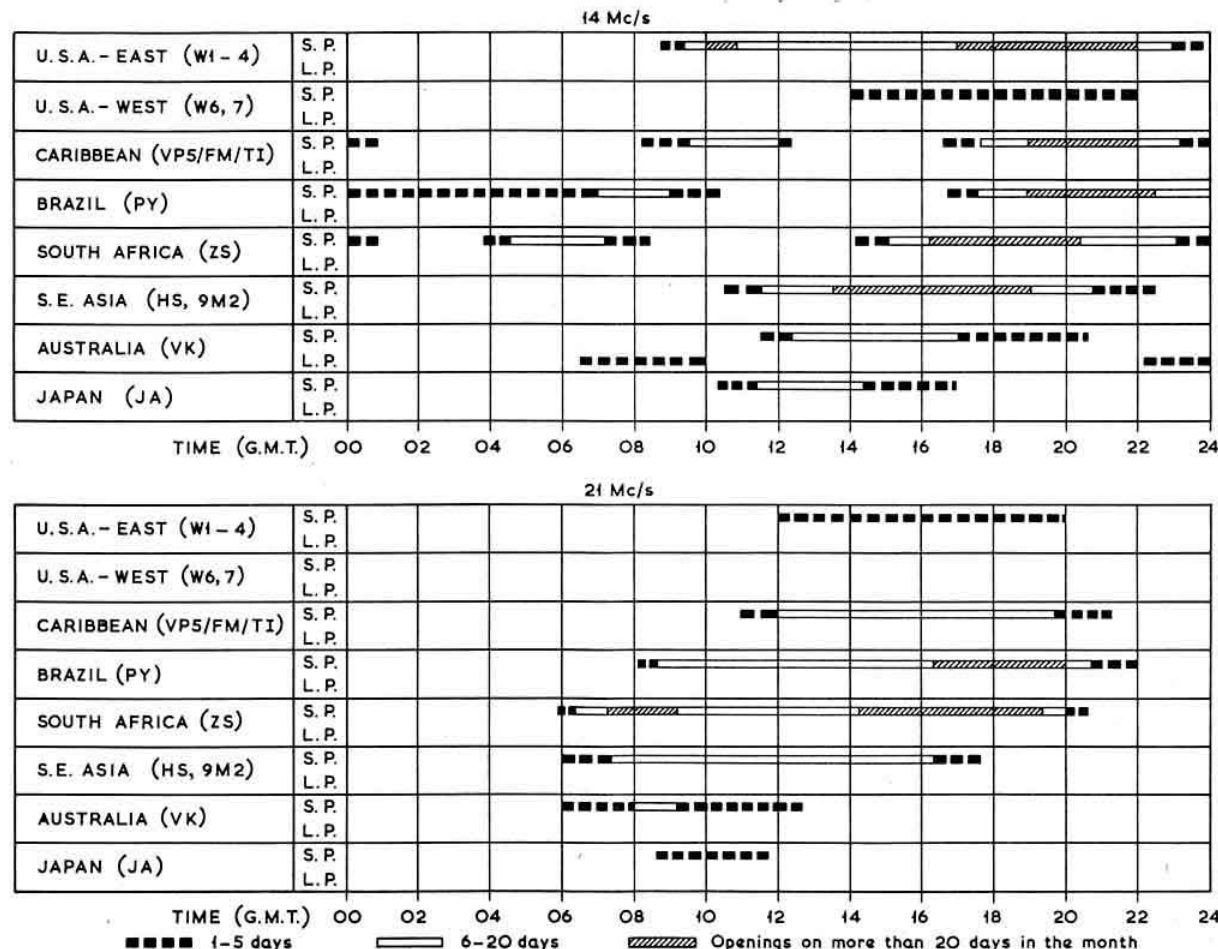
station only must be heard in QSO and the following details logged: Date; Time; Call of the VK or ZL station heard; Call of the station being worked; RS(T) of the VK/ZL station; Serial No. sent by the VK/ZL station. Scoring is on the same basis as for the transmitting section and the summary sheet should be similarly set out. All logs should be posted to reach N.Z.A.R.T., Box 489, Wellington, N.Z. on or before January 19, 1963.

The Goose Bay A.R.C. Annual QSO Party will be held from 00.00 October 12 until 24.00 October 22. All bands and all modes may be used and the Worked All Goose certificate will be awarded to those stations (outside the U.S.A. and Canada) submitting a list showing that they have worked three members during the 10 day period. Members are VO2s AA, AH, AI, AV, DP, HA, NA, PC, RC, RN and

Propagation Predictions for 14 and 21 Mc/s

Frequency predictions covering 14 and 21 Mc/s for the next 30 days are presented following a number of requests for this information, and it would be appreciated if comments on the usefulness of the charts could be sent to G2BVN. The predictions have been prepared by Dr. G. Lange-Hesse (DJ2BC) of the Max Planck Institute, to whom the Society is indebted for permission to reproduce the information. The probability of openings along the various paths is shown in one of three ways in accordance with the key given below the charts.

Present conditions do not justify the publication of a separate chart for 28 Mc/s but the forecast predicts openings to S. Africa on between five and 20 days during the month between 10.00 and 18.00, with occasional openings to Brazil between 14.00 and 20.00.



UA. Reports should go to J. Willis, Awards Manager, Aeradio, Dept. of Transport, Goose Bay, Labrador.

The 1962 CQ World Wide DX Contest will take place during the following periods: *phone section*: 00.00 October 27 to 24.00 October 28; *c.w. section*: 00.00 November 24 to 24.00 November 25. Rule changes from previous years are: (i) Starting and ending time has been advanced by two hours. (ii) Points value of contacts between N. American stations has been increased to 2 points. (This has been done to try and stimulate activity in C. America and the Caribbean area.) (iii) Operating requirements on 28 and 21 Mc/s are reduced to eight hours. (iv) Trophies will be available to previous winners after a period of three years. The deadline for entries is December 1, 1962 for the phone section and January 15, 1963 for the c.w. section. All logs must bear postmarks no later than these dates. The address for entries is CQ Magazine, 300 West 43rd Street, New York, 36, N.Y., U.S.A. Att: Contest Committee (indicate phone or c.w. section).

In sending details of the forthcoming contest WIWY mentions that the number of logs received from U.K. stations is far below the number of those heard to the active, and urges that ALL those who participate should send in a log. A résumé of the rules will appear in the October issue of the BULLETIN and log sheets will shortly be available from G2BVN on receipt of a s.a.e.

The results of the 1961 CQ Contests show the following as the top ten in each section:

C.w.	Phone
All band-single operator	All band-single operator
7G1A 1,177,893 pts.	CX2CO 876,304 pts.
CX2CO 856,416	KW6DG 349,492
KW6DG 841,334	VQ2WZ 337,176
KH6IJ 791,840	5N2JKO 302,222
5N2LKZ 777,155	HCIAGI 290,928
W4KFC 645,663	KH6IJ 259,341
W3GRF 622,506	XT2Z 257,153
W4HYD 544,504	PJ2AF 250,746
UB5WF 514,022	4X4OC 244,016
W4HDZ 464,002	ZE7JV 220,239

In so far as individual U.K. stations are concerned, G5RP was first in Europe on 28 Mc/s, whilst G4CP was top European station on 14 Mc/s, both on c.w. The only U.K. station in the position of a continental leader was G3JUL for the 7 Mc/s band. In the c.w. section G2DC was way ahead of his nearest rival in the all band classification. On phone G3NFV was the all band winner although G3NNT scored nearly three times as many points on 14 Mc/s only. At the time of writing the certificates had not been mailed but these will be available in the near future.

Awards

The Society of Newfoundland Radio Amateurs offers the WAVO Award and recently new rules have been drawn up superseding those framed three years ago. The Worked All VO Award is now available to any amateur who can show proof of two-way contact with 30 or more stations operating fixed, portable or mobile in the province of Newfoundland, which includes Labrador. All bands and all modes may be used and there are specific endorsements for contacts made wholly on two way phone, c.w. or s.s.b. A minimum report of readability 3 is required, and all contacts after June 1, 1946 count. Cards should be sent, together with a self-addressed envelope and sufficient I.R.C. to prepay return postage, to Awards Committee, Society of Newfoundland Radio Amateurs, P.O. Box 1226, St. John's, Newfoundland.

The Tigers Amateur Radio Club has been formed by the amateurs now active from E. Pakistan and has created the Worked All Tigers (WAT) award for working four of its members after August 14, 1962. All bands and all modes may be used, and the minimum signal report allowed is RS33. QSLs, accompanied by 12 I.R.C., should be sent to

AP5CP, Tigers Amateur Radio Club, Dhaka Signals, Dacca 6, E. Pakistan. Stations now active from Pakistan include AP5CP, AP5AR, AP5JA and AP5JL. The same club also announce the Worked All Pakistan Award for contacting five stations in W. Pakistan and four stations in E. Pakistan.

The Certificate Hunters' Club, which is rapidly climbing towards the first thousand members, now has a Chapter in London formed by G2BUL, G5GH and G3ITQ as officers with another eight members. Meetings are held at the QTH of G5GH on Saturdays at 10.30 a.m. when visitors will be welcome. G5GH suggests that ex-G stations might like to have their names added to the list of members, and to reinforce this with a personal call when they are next in the U.K.

The U.S.A. Counties Award was recently received by G3DO and it is believed that this is the first one issued to a U.K. station. This certificate receives high praise from G3DO and others for its fine appearance.

Around the Bands

The 1.8 and 3.5 Mc/s bands have apparently provided little in the way of DX and B.R.S. 20317 (Bromley) launches

QTH Corner

CR6JA	Box 71, Ganda, Angola.
CP5EQ	Box 940, Cochabamba, Bolivia.
DL1ZG	via DL9FF.
FG7XC	via WA2FIT.
FG7XK	G. Goyadin, 2 Cite Deboisvieux, Pointe-a-Pitre, Guadeloupe.
FB8CA	via K20JD.
FB8CB	via WA2WBH.
FB8CC	via W2HLL.
FB8CD	via K2UTN.
G2HFD	Dr. H. Reeve, 20 Lock Chase, London, S.E.3.
HL9KB	c/o Signals Section HQ, EUSA, A.P.O. 301, San Francisco, Calif., U.S.A.
HL9KR	via K7KID.
HL9KT	via K6RPC.
JZ0ML	via W2CTN or 5 Whitehall Road, London, W.7.
WA9CXO/KJ6	R. L. Dellacca, Det. 1 1957 Comm. Group, A.P.O. 105, San Francisco, Calif., U.S.A.
WA6LFK/KJ6	A.P.O. 105, Box 100, San Francisco, Calif., U.S.A.
KG6IC	U.S.C.G., A.P.O. 815, San Francisco, Calif., U.S.A.
KL7FBI	Mars Station, A.P.O. 730, Seattle, Washington, U.S.A.
K56AM	via W1BYH.
KX6CG	U.S.C.G. Loran Stn., Navy 572, F.P.O., San Francisco, Calif., U.S.A.
PJ5MB	K9KDI, 2948 Maple Avenue, Berwyn, Ill., U.S.A.
PY0NG	Box 58, Rio de Janeiro, Brazil.
SP9FR	Box 654, Cracow, Poland.
SU1IM	Ibrahim Ibr Mohd, 7 Roda Str., Cairo, Egypt.
TF2WGT	via K0UXU.
V54RM	via R.S.G.B.
VP5WB	W. E. Bell, P.O. Box 10, Darlington P.O., Jamaica.
VP6AM	via K1IMP.
V59AE (ex-EP2BD)	Iain Dunbar, Telecomms., B.P. (Aden) Ltd., Steamer Point, Aden.
VR3L/VR1	via WA6MAZ.
VR5AR	via W9EXE.
ZK1BY	via W8EWS.
ZL4JF	via ZL2GX.
ZP9AY	via W2CTN.
5A2TD	E. J. Dempster, P.O. Box 106, Benghazi, Cyrenaica, Libya.
5B4TC	S. Crabtree, HQ Forces Broadcasting Station, B.F.P.O. 53.
9G1DT	via W4HVE.
9G1EE	P.O. Box 233, Tema, Ghana.
9NTSO	Box 27, Kathmandu, Nepal.
9U5BH	Box 81, Astrida, Rwanda.
9U5CB	Box 1122, Usumbura, Burundi.
9U5DS	Box 14, Usumbura, Burundi.
9U5DM	Box 1, Usumbura, Burundi.
9U5JH	Box 76, Kitega, Burundi.
9U5JL	Box 5, Ruhengeri, Rwanda.
9U5PE	Box 142, Shungu, Rwanda.
9U5XX	Box 490, Usumbura, Burundi.

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent.

straight away into 7 Mc/s where a number of unusual stations have been heard on c.w. in the remaining usable 20 kc/s of the band. The E. Coast Ws come in well around 22.00/23.00 with K3CYA, K3GKF and W3JXS being outstanding at S8, with VE1ZZ and VE1EK also providing good signals. The S. Americans predominate from 22.00 to midnight with KV4CI and HI3PC the most consistent, with CE3ZK, CX4IK, KZ5MQ, LUs, PY9BW, VP5MJ, VP9AK and VP8GQ close behind. CP5EZ attracted a good deal of attention at 23.25 when his signals were S7. Zone 40 was represented by OX3AI and OX3BZ around 23.00, whilst SM5CBC/9Q5 was a lone signal from Africa at 23.30. AP5HQ participated in the W.A.E. contest, and was heard around 23.30 with VU2BK audible some 30 minutes earlier. Gus was heard working G3AAE when /MM on his way to Chagos at 17.40 but no reports have been received of VQ9A/8C being worked on this band.

The band on which almost all the exotic DX has appeared has again been 14 Mc/s. This is unfortunate in many ways for obviously these circumstances have attracted large numbers of stations from all over the world with a heavy increase in the QRM. It is to be hoped that in present conditions operators working local stations will, when the band is open for DX, shift their contacts to other bands—28 Mc/s can accommodate many such QSOs.

Using s.s.b. OE1ME (Vienna) has worked practically everything that has showed itself, and from his comprehensive list the following are selected: CO8HR (22.07H), CR7CI (16.10H), CT3AV (21.56L), EP2BI (06.30H), HH2PW (19.47L), HH9DS (22.27L), HK4EB (21.37L), IS1RIF (18.53H), KC6BK (15.05H), KG4AO (21.50L), KG6IJ (16.30H), KG6AGZ (15.37H), W5AKM/KG6 (12.58H), WA6LFK/KJ6 (07.45H), KL7DBG/KS6 (07.34H), KX6CG (14.00H), UA0EK (20.15H Zone 19), VR5AA (08.25L), VR5AR (07.54L), VR3O (06.45L), ZK1BY (06.57H and L), ZP5OG (21.20L), 5H3GX (20.42H), 9G1GN (22.04H), and 9M2DW (16.35H). Continuing on this mode G6XL (Leeds) exchanged reports with HK3RQ (06.20L), LX3MA (21.35H), KJ6BZ (08.30H), VP6KL (21.40L), VE8BC (08.25L), VR5AA (08.18L), VR5AR (07.00L), ZD8JP (22.12H), ZK1BS (07.46H) with, in addition, the W4BPD and W0MLY DXpedition stations. G6XL was one of the few who managed a QSO with VR3L/VR1 whilst at British Phoenix receiving a report of 5 and 2! This is somewhat better than the station who received a magnificent 3 and 0. A.2404 concentrated on the carrierless mode and offers CN8FU (17.25H), FG7XT (21.20L),

K6CQV/KS6 (07.00H), KG1CC (17.20H), OA4CV (22.00H), UI8AG (17.50H), VP9CP (21.45L), VR5AR (07.15L), 4U1ITU (22.05H), 5B4PC (17.20H), 9G1YL (21.25L) and 9Q5AF (22.25L). B.R.S. 24643 (Potters Bar) mentions most of the DX already listed heard on an AR88, and A.2453 (Addington) used an R.208 to enter a very similar log including a number of Pacific stations. G6LX (Croydon) worked ZC5KL on s.s.b. when the latter was using a crystal controlled frequency of 14,068 kc/s, the only one available at the time. This would presumably not count under the recent A.R.R.L. decision. VK9LA on Cocos-Keeling was also contacted at 16.12 on 14,300 kc/s. A new station heard on s.s.b. from Macau is CR9AK who has been active on the high end.

In the sideband listings the letter H following the time indicates a frequency in the region of 14,300 kc/s, whilst L refers to operation around 14,120 kc/s.

That DX on this band has not been confined to s.s.b. is evident from the log of G3HDA (Stratford-on-Avon) which includes AP5AH (18.28), AP5CP (19.00), CO7AI (21.47), FG7XC (22.01), FM7WP (21.40), FP8CA (17.22), FY7YF (22.15), HI8XAG (23.02), HP1SB (20.50), PZ1AH (21.33), TI2CMF (21.45), VP4LO (22.17), VP5BF (22.32), VP8GQ (17.07), VQ1GDW (20.04), VQ8AI (16.13), VS1FJ (15.11), VS4RS (15.10), XE1H (22.16), 4S7EC (18.16), together with VP2AR on a.m. at 20.35. G3AAE (Loughton) mentions AP5JA (17.45), CP5EQ (22.40), FP8CA (18.20), FP8CB (20.03), JT1AG (18.20), LX3QX (16.20), VP2MV (21.33), VP3ER (22.17), ZK1BY (07.35), ZS4PB/ZS9 (18.10), 3A2BZ (16.50) and 5T5AD (20.52). G2FFO (Burnley) lists what he classes "routine" contacts and which include JZ0ML (18.15), and just in time as the latter is now back in the U.K.; G2FFO also reports a swift QSL from W2CTN; MP4QBB (18.46), VP8GQ (19.30), VQ9A/8C (19.00), 6O1ND (20.11) and 9K2AD (20.00). G3PSY (Thorpe Bay) with little time to spare following a move of QTH collected 3A2BZ (23.37, and QSL via W2CTN), SV0WT (23.15 Crete), TF2WGT (11.22), UA2AK (08.14), W7VCB/MM off the Ivory Coast at 08.30, and 4S7EC (15.27). G8PL (Hampstead) renders his usual comprehensive of stations heard and worked, but generally finds that the early morning conditions are declining, and that the Asian stations were unusual for the time of day. 04.00/05.00 AP5HQ, KP4BBN, UA9s, UL7KBA, UM8AJ, VQ4IV, VU2BK, Ws and 5B4CT. 05.00/06.00 CR7GH, EP2BE, IS1ZUI, JA8AH, KH6DKD, OX3BZ, SU1IM, UA9s, UH8BO, UI8KAA, UL7s, Ws, ZS6DF, 4X7s and 5N2PJL. 06.00/07.00 MP4BBL, UA9s, UA0BN, UI8KTA, UH8KAA, U3KAB, UL7s, UM8AP, W6s, VE6RR, VK2AMB, ZB2I, 4X4BS, 5B4RF. 07.00/09.00 M1C, UQ2AE/MM, VP8GQ, XE1CV, 4X4KK, 6W8DD. G6XL lists AP5SS (18.08), AP5JS (14.42), JA8AH (05.52), VR2DK (08.00), VR3S (06.54), and 9K2AD (18.35). FO8AA was heard at 07.32 working above 14,100 kc/s!

The 21 Mc/s band has been very patchy and a lot of the stations, whilst obviously DX in so far as the distance is concerned, are not very unusual. The recent split of Burundi and Rwanda, now counting as two separate countries for DXCC, has occasioned considerable activity in a southerly direction. G3AAE QSOd 9U5CB (17.55) and 9U5DS (18.50), both on a.m., whilst G3HDA worked two stations on Fernando de Noronha, PY7AKW and PY7VHK, both around 18.30. On c.w. G3HDA also QSOd VP5GI (21.15 Grand Turks), VQ5IG (18.42), VQ9A (19.42) and ZD6RM (21.15). The lack of reports on this band has caused A.2019 (Stafford) to provide some information on the band on which he spends most of his time. The HRO-MX received CE1EN (22.15), CE4FI (22.05), HC4CD (21.55), KP4s (21.00), KZ5LW (22.20), LUs (22.00), PY8MZ (19.50), PZ1BW (21.50), TN8AD (17.45), VP3MC (21.45), VP9DL (after



ZBIA is the first regularly active s.s.b. station in Malta, G.C.

(Continued on page 125)

National Field Day 1962

N.F.D. Shield	...	Stourbridge and District Amateur Radio Society (G3BMY/P and G8GF/P)	...	1908 points
Gravesend Trophy	...	Stamford and District Group (G3ARS/P and G3FUR/P)	...	1811 points
Scottish N.F.D. Trophy	...	Aberdeen Town Group (GM3BSQ/P and GM3EOL/P)	...	1393 points
Bristol Trophy	...	Wolverton District Radio Club (G3LCS/P)	...	924 points
Leading 1.8 Mc/s Station	...	Cardiff Group (GW5BI/P)	...	383 points
Leading 3.5 Mc/s Station	...	Gravesend Amateur Radio Society (G6VC/P)	...	487 points
Leading 7 Mc/s Station	...	Oxford and District Amateur Radio Society (G2DU/P)	...	561 points
Leading 14 Mc/s Station	...	Aberdeen Town Group (GM3BSQ/P)	...	692 points
Leading 21 Mc/s Station	...	Belfast Group (GI3GAL/P)	...	255 points
Leading 28 Mc/s Station	...	Weston-super-Mare Group (G8FC/P)	...	46 points
Overseas station contributing most points to competitors			ZC4PB/P	
Most useful check log from non-transmitting British Isles member...			M. Harrison (B.R.S.24733)	

THE 1962 National Field Day results produced very much the same mixture as before. The winning scores showed little change from last year even though the four lower-frequency band winners had an average reduction of over 10 per cent in their scores.

Stourbridge and District Amateur Radio Society are to be congratulated on winning the N.F.D. Shield for the second year in succession. Their two stations, G8GF and G3BMY, ran up a total of 1,908 points to give them a lead of 97 points over Stamford and District Group (G3ARS and G3FUR) who were third last year. Cannock Chase Amateur Radio Society (G4CP and G3ABG), winners of the Bristol Trophy in 1961, came third with 1,793 points. Gravesend Amateur Radio Society, last year's runners-up, finished fourth with 1,782 points, just one point ahead of Cardiff Group (GW5BI and GW4FW). Port Talbot, fourth last year and fifth in 1960, had the misfortune to run into serious generator trouble resulting in one station closing down in the early hours of Sunday morning and the other some hours later. The group sent in their log for check purposes from which it seems they would have been near the top if they had kept going, as their unchecked total was 1,199.

The Scottish N.F.D. Trophy was won by Aberdeen Town Group (GM3BSQ and GM3EOL) who scored 1,393 points, a lead of 21 over Dunbartonshire Group (GM3KBZ and GM3ITN). Last year Aberdeen had a total of 997 points and they owe their success this year to their score on 14 Mc/s, in fact they are the band winners.

The leading single station was Wolverton District Radio Club (G3LCS) who, with 924 points, had a comfortable margin over Southgate and District Group.

Dealing with the individual bands it seems that the bonus on 1.8 Mc/s and 3.5 Mc/s helped Cardiff to be first and second respectively on those bands. South Birmingham Radio Society were runners-up on 1.8 Mc/s with Stamford and District third. The 3.5 Mc/s leadership was taken by Gravesend Amateur Radio Society by 7 points while Norwich and District Radio Club were third.

Oxford and District Amateur Radio Society found 7 Mc/s very much to their liking and obtained a score of 562 points. This gave them a lead of 69 points over Southampton with Chelmsford third, 20 points lower. There was a very close fight on 14 Mc/s with Aberdeen Town emerging the winners with a margin of 6 points over Stourbridge and District Amateur Radio Society. Exeter came third with a score of 647 points.

The winning scores on 21 Mc/s and 28 Mc/s were higher than last year though 28 Mc/s did not provide many contacts. Belfast led the 21 Mc/s band with 255 points with

Croydon Town second and Cannock Chase Amateur Radio Society in third place. Weston-super-Mare managed to amass 46 points on 28 Mc/s which was enough to give them an 8 point win over Croydon who had a similar margin over the Radio Society of Harrow.

Equipment

The general run of equipment used has changed very little, but the word transistor is appearing more frequently. So far, its main use has been in connection with power supplies but at least one transistorized receiver was in use.

Transmitters were generally v.f.o.-b.a.-p.a. with a doubler stage for the higher frequency bands with a few Valiants and Panda Cubs. As usual, the receivers were HRO, BC342, BC312, AR88 and Eddystones, etc., with just a sprinkling of home-built sets. Groups seemed to be using more aerials per station with the cubical quad a firm favourite for the h.f. bands.

Stourbridge used a K.W. Valiant and an HRO at one station with a four stage rig with an 807 p.a. and a CR100-plus-converter at the other. Each site had four aerials. Stamford had a v.f.o.-b.a.-p.a. line-up at both stations with



Bury and Rossendale Group's G2GA/P with G2GA himself on the key, ex-G3FYT logging and G3JZ looking on.
(Photo by courtesy of Tillotsons Newspapers Ltd., Bolton)

NATIONAL FIELD DAY 1962—COMPLETE RESULTS

Posn.	Group, Club or Society, etc.	Call-sign(s) A Stn. * B Stn.	1-8 Mc/s	3-5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s	Total Points	Posn.	Group, Club or Society, etc.	Call-sign(s) A Stn. * B Stn.	1-8 Mc/s	3-5 Mc/s	7 Mc/s	14 Mc/s	21 Mc/s	28 Mc/s	Total Points
1	Stourbridge and District Amateur Radio Society	G8GF G3BMY	261 *	373	392	686 *	176	20 *	1908	56	Purley and District Radio Club	G3KTA G3DPW	295 *	209	190 *	48	26 *	6	774
2	Stamford and District Group	G3ARS G3FUR	303 *	331 *	439	599	139 *	—	1811	57	Stean Group	G8NF	234	368	138	—	—	—	740
3	Cannock Chase Amateur Radio Society	G4CP G3ABG	230 *	447	434	470 *	212 *	—	1793	58	Ainsdale Radio Club	G2CUZ G2DQX	127 *	150	188 *	206	68	—	739
4	Gravesend Amateur Radio Society	G6BQ G6VC	283 *	487	437 *	354	206 *	15	1782	59	Dorking and Leatherhead Group	G5BT G3PIQ	243 *	171	127 *	48	146 *	—	735
5	Cardiff Group	GW5BI GW4FW	383 *	480	427	345 *	146 *	—	1781	60	Nottingham Amateur Radio Club	G6CW G3MP	69 *	357	127 *	71	99 *	—	723
6	Croydon Town Group	G3BFP G6LX	210 *	378	389 *	542	216 *	38	1773	61	Chester Group	G3EWZ G3ATZ	139 *	282	90 *	89	117 *	—	717
7	Oxford and District Amateur Radio Society	G2DU G8PX	299 *	400	561 *	237	132 *	2	1631	62	Newbury and District Amateur Radio Society	G3LLK G3MWB	218	344 *	104 *	39	8 *	—	713
8	Belfast Group	G13GAL G6YM	232 *	329	295 *	415	255 *	—	1526	63	Sutton and Cheam Radio Society	G8DF	161	295	254	—	—	—	710
9	Wirral Group	G3NWR G2AMV	250 *	285	223 *	514	190 *	—	1462	64	R.A.F. Kinross Amateur Radio Club	GM3HRZ GM3OEV	—	51	158 *	474	4 *	—	687
10	Edgware Group	G5FG G2IM	219 *	362	419 *	328	108 *	16	1452	65	Scarborough Amateur Radio Society	G3KS G4BP	79 *	151	322 *	68	66	—	686
11	Medway Towns Group	G2BP G2ZP	254 *	274	389 *	465	43	—	1425	66	Southport Radio Society	G2ART G3HWS	179 *	228	231 *	41	—	—	679
12	Reigate and Redhill Group	G3NKS G2AJS	256 *	297 *	417	308	143 *	3	1424	67	Gloucester Group	G3MA	230	272	169	—	—	—	671
13	Aberdeen Town Group	GM3BSQ GM3EOJ	—	291	240	692 *	170	—	1393	68	Chilren Amateur Radio Club and High Wycombe Group	G5WW G6IF	235 *	277 *	140 *	—	—	—	652
14	Southampton Group	G5LR G5OB	272 *	313	493 *	175	130	—	1383	69	North Kent Radio Society	G3FBA G6HD	187 *	289	18 *	84	72 *	—	650
15	South Birmingham Radio Society	G3LNS G3OHM	338 *	353	245 *	319	127	—	1382	70	Blackwood (Mon.) Group	GW6GW	221	341	79	—	—	—	641
16	Dunbartonshire Group	GM3KBZ GM3ITN	183 *	429	294	316 *	150 *	—	1372	71	Verulam (St. Albans) Group	G8TK	197	214	223	—	—	—	634
17	Weston-super-Mare Group	G6NA G3XJ	229 *	272 *	317	333	191 *	24	1366	72	Caithness Group	GM3COV	203	—	177	250	—	—	630
19	Mitcham Group	G5UG G8FC	278 *	398	239 *	264	141 *	46	1366	73	Dunfermline Radio Society	GM3CCT	—	338	238	54	—	—	630
20	Norwich and District Radio Club	G3NFA G3LCH	253 *	287 *	461	230	92 *	—	1323	74	Stroud Group	G3MGF	153	267	195	—	—	—	615
21	City and County of Bristol Group	G2YU G3LDI	255 *	459	305 *	296 *	—	—	1315	75	Dundee Group	GM3EUV GM4HR	77 *	128	65 *	172	168 *	—	610
22	Crawley Amateur Radio Club	G3RQ G6GN	271 *	292	295 *	283	173	—	1314	76	Conway Valley Amateur Radio Club	GW3CW	134	349	125	—	—	—	608
23	Exeter Group	G8FR G3TR	193 *	252	181 *	468	195 *	—	1289	77	A.E.R.E. (Harwell) Amateur Radio Club	G3PIA	153	195	—	247	—	—	595
24	Barnsley and District Amateur Radio Club	G3ID G3JW	106	115 *	333	647 *	48	—	1249	78	Ariel Radio Group	G2BCI	229	263	—	99	—	—	591
25	Guildford and District Radio Society	G3ABS G5IV	263 *	368	417 *	199	—	—	1247	79	Hull and District Amateur Radio Society	G3FCY	265	—	322	2	—	—	589
26	South Shields and District Amateur Radio Club	G3FZC G3IAF	272	281 *	426	165 *	72 *	6	1222	80	Deal Radio Club	G3LCW	—	198	323	55	—	—	576
27	Cambridge and District Amateur Radio Club	G3NCE G3DDI	230 *	427	254 *	193	114 *	—	1218	81	Stockport Group	G6UQ	18	320	237	—	—	—	575
28	Lincoln Short Wave Club	G8PB G5DQ	278 *	371	117 *	361	61 *	18	1206	82	Enfield Group	G3FD	226	260	86	—	—	—	572
29	Bury and Rossendale Group	G4BU G5XL	205	386 *	349	220 *	38 *	—	1198	83	Mid-Lanarkshire Group	GM3PXX GM3EHI	145 *	288	107 *	31	—	—	571
30	East Molesey Group	G2GA G3BRS	276 *	344 *	262	263	28	—	1173	84	Skegness and District Group	G6GH	142	282	129	—	—	—	553
31	Grimsby Amateur Radio Society	G5LC G8SM	274 *	382 *	357	63	74	11 *	1161	85	Brentwood (Essex) Group	G3LST	237	213	—	96	—	—	546
32	Torbay Amateur Radio Society	G3LOP G4XC	165	354 *	312	201 *	102	3 *	1137	86	Basingstoke Amateur Radio Club	G3CBU G3ORF	183 *	227 *	51 *	60	15	—	536
33	Retford Group	G3GDW G3NJA	204 *	180	392 *	265	84	—	1125	87	Newmarket and District Group	G8QM	143	294	93	—	—	—	530
34	Radio Society of Harrow	G3KPU G3BTU	218 *	366	193 *	190	138 *	—	1105	88	Sheffield and District Group	G3EUS G3IDR	160 *	209 *	—	119	17	—	505
35	Blackpool Group	G3EFX G3GNM	189	320 *	234 *	213	95 *	30	1081	89	Wolverhampton Amateur Radio Society	G8TA	—	281	64	157	—	—	502
36	Ballymena Radio Club	G8GG G5ND	287 *	289	246 *	149	108 *	—	1079	90	East Ham Group	G2ZZ	288	213	—	—	—	—	501
37	Coulsdon Group	G13FFF G13FJA	290	171 *	313	182 *	113	—	1069	91	Southend and District Radio Society	G5QK	135	159	201	—	—	—	495
38	Sheffield Group	G2DN G3DVQ	216 *	259	402 *	86	96	—	1059	92	Albright and Wilson Amateur Radio Society	G3OXD G3NZS	99 *	179 *	186	12	—	—	476
39	Hartlepool Group	G8NN G6LF	294 *	345	180 *	79	159	—	1057	93	South Dorset Radio Society	G2TZ	173	180	—	114	—	—	467
40	Chelmsford Group	G3CHJ G3AWL	108 *	236	345 *	336 *	22 *	—	1047	94	Chingford Group	G3YF	112	210	140	—	—	—	462
41	Dursley and District Amateur Radio Society	G5IX G4VF	126 *	277 *	473	146 *	21	—	1043	95	Aquila Radio Club	G3BRK	122	212	117	—	—	—	451
42	Ilford Group	G3NXI G3ONX	196 *	341 *	376	93	10	—	1016	96	Grantham and District Amateur Radio Society	G3HOC	—	240	192	—	—	—	432
43	Macclesfield and District Radio Society	G3HIW G6AH	234 *	422	282 *	62	15	—	1015	97	Bath Group	G2ZR	—	248	162	4	—	—	414
44	Acton, Brentford and Chiswick Group	G3LDT G3ATK	260 *	336	196	200 *	—	—	992	98	Ilminster Grammar School Amateur Radio Society	G3IGS	170	228	—	—	—	—	398
45	Clifton Amateur Radio Society	G5LQ G3IU	195 *	260	331	115 *	67 *	—	968	99	East Kent Radio Society	G4WK	138	169	75	—	—	—	382
46	Derby and District Amateur Radio Society and Derby Short Wave Experimental Society	G3OGF G3GHN	210 *	268 *	263	199	13	—	953	100	Royston and District Radio Club	G3NAH	109	—	241	31	—	—	381
47	Isle of Thanet Group	G3ERD G3EEO	209 *	350	231 *	106	51 *	—	947	101	Stratford upon Avon and District Amateur Radio Club	G3PGU	95	270	—	—	—	—	365
48	Glasgow Group	G2JF G2IC	213 *	350 *	317	55	—	—	935	102	Welwyn Garden City Group	G5UM	—	—	360	—	—	—	360
49	Cheltenham Group	GM3AXX GM3LKY	156 *	410	252 *	116	—	—	934	103	Great Yarmouth and District Group	G6ZG G3OEP	164 *	78	93 *	—	—	—	335
50	Wolverton District Radio Club	G3CGD G8FF	259 *	271	226 *	146	24	—	926	104	Lichfield Amateur Radio Society	G3NEU	—	213	115	—	—	—	328
51	Liverpool and District Amateur Radio Society	G3LCS	183	359	382	—	—	—	924	105	Radio Section EMI (Wells) Sports and Social Club	G3ORA	—	245	59	—	—	—	304
52	Lothians Radio Society	G3LNG G8DI	209	326 *	126	207 *	38	—	906	106	Bradford Radio Society	G3KSS	133	152	—	—	—	—	285
53	Ayrshire Group	GM3UM GM6SR	251 *	207	273 *	60	78	—	869	107	Sole Bay Radio Group	G3WN	95	172	—	—	—	—	267
54	Southgate and District Group	GM3KJF GM3GSC	101 *	370	158 *	64	158 *	—	851	108	Eccles and District Radio Club	G8VF	—	115	9	122	—	—	246
55	Pontypool Group	G5FA	177	319	337	—	—	—	833	109	Manchester and District Amateur Radio Society	G3HOX	178	11	2	—	—	—	191
†	Rotherham and District Radio Club	GW2HIN GW3GIA	267 *	402	72 *	75	—	—	816	110	Ravensbourne Amateur Radio Club	G3HEV	34	—	—	—	—	—	34
†	Portsmouth and District Radio Society	G2LG G4BD	180	317 *	166 *	111	—	24 *	798										
†		G6NZ G2IJ	158 *	207 *	298	86	44	—	793										

† Late entry.

‡ Invalid—Rule 18.

§ Invalid—Rule 3.



G6CW operating one of the Amateur Radio Club of Nottingham stations during N.F.D. 1962. (Photo by G3RDJ)

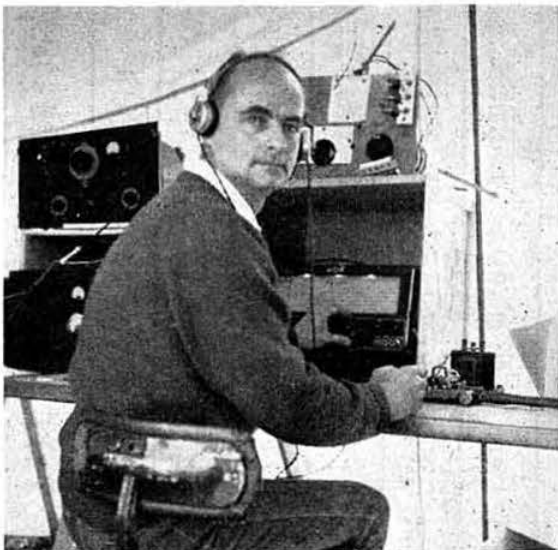
a BC342 and a double superhet as receivers. A total of five aerials were employed, mostly dipoles. Cannock Chase had the most common line-up ending with an 807 and 6146 respectively as their transmitters. While one site used an AR88D the other had a SX24 plus *Q* multiplier plus Monitone plus five-valve converter (home built). This was used on 3.5 and 7 Mc/s with half-wave dipoles and "G8KW" multiband aerials. The other site had quads, half-wave dipoles and a long wire.

Wolverton used a transceiver with a common oscillator and a 2E26 p.a. with dipoles and an end-fed long wire.

Aberdeen used 6146s as p.a.'s with Eddystone 888A and SX100 receivers. On 3.5, 7 and 21 Mc/s they had a "W8JK" and a two element wire beam for 14 Mc/s.

Comments

On the subject of rules: *Reigate*—no complaints about either rules or scoring. *Cardiff*—start 16.00 hours Saturday for 24 hours. *R.A.F. Kinross*—no criticism regards contest.

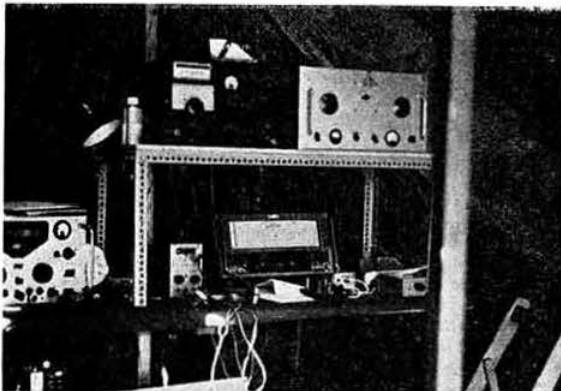


G3JLB at Gravesend Amateur Radio Society's A station, for whom he was the fastest scoring operator.

Ariel Radio Group—raise power to 25 watts (14 Mc/s) and scrap Rule 9(a). *Exeter*—extra points for Devon and Cornwall stations. *Dunbartonshire*—surely GM-HB1 contact worth more than 4 when GM-G gets 5 points. *Edgware*—raise points value to 12 on 21 Mc/s and 28 Mc/s. *Sheffield*—bonus on 3.5 Mc/s an insult to very FB operating groups in G. European /P should be 5 points. *Gravesend*—strongest objection to GW stations getting 5 points on 1.8 Mc/s and 3.5 Mc/s. *Medway Towns*—what about bonus points on 28 Mc/s next year? *Cheltenham*—"A" stations should have identical bands. *Ainsdale*—would like valve type limit such as 5763 and keep out 807/6146.

On the subject of conditions: *South Birmingham*—FB weather. *Maidstone*—operations hampered by extreme cold on exposed site. *Cardiff*—weather perfect for field day. *North Kent*—we know it was cold but no truth in rumour that operators made toast on 6V6 (driver). *Croydon*—weather good but cold at night—a 2 kW blower heater running off p.e. generator very welcome.

On the subject of food: *Dunfermline*—"Banger Barbecue" by GM3FYB, minestrone by GM3CIG's XYL and quart of bourbon by K4NMZ. *Slough*—full marks to XYL



The operating position at ZC4PB/P, Kantara.

of G3ORZ/T who cooked and brewed up for the full 24 hours plus. *Iminster*—enjoyable time had by all, due largely to food cooked by two YL cooks from Girls' Grammar School. *Port Talbot*—one bright note—new recruit (ex-R.A.F. cook) provided 20 operators with roast pork, peas and potatoes followed by oranges and a special Welsh cake for their Sunday dinner.

Comments—General

R.A.F. Kinross—several lessons learnt the hard way. *Derby*—hard work all the way this year. *Dunbartonshire*—too many QRO signals from down South, ban the gennies! *Gravesend*—heavy duty p.a. h.t. supply left at home. *North Kent*—lost a lot of points when transmitter gave up. *Bury and Rossendale*—transmitter 12 years old and used every year. *Wirral*—gave drummer 599+ at barn dance near by. *Bath*—QRM from cock pheasant outside the tent. *Cheltenham*—how G QSOs are managed on this band (7 Mc/s) we cannot fathom (even with dipoles at all angles). *Mitcham*—four operators, two stations and 24 hour contest—phew! *Grantham*—in this, our first entry, the contest was thoroughly enjoyed by all. *Slough*—on the score of sheer enjoyment N.F.D. has not let us down yet. *Medway*—contest thoroughly enjoyed apart from usual generator troubles. *Wolverton*—nothing went wrong—most unusual! *Grantham*—we think standard of operating was very good. *Dunbartonshire*—European N.F.D. activity was FB. *Sheffield*—some good lads in ZC4 these days. *Mitcham*—new site this year but 21 Mc/s score about usual—ah well! *Sheffield*—21 Mc/s

turned up trumps. *North Kent*—instead of diesel generator ordered, a petrol machine turned up so the Chancellor did well—21 gallons at 4/6d. per gallon! *Cambridge*—faulty petrol pump caused late start. *Lincoln*—SWL's Sprott and Otter performed extraordinary feats of tree climbing. *Dunbartonshire*—you get a report from everybody except the Contests Committee! *Albright and Wilson*—thank you for your efforts in organizing the contest.

What We Have to Say

The Contests Committee were pleased to note an improvement in the logs submitted this year. There were more typed and clearly written entries and the death roll among the spiders trained to use 9H pencils was very satisfactory. May the remaining few perish before next year! Many thanks to the people who have the task of preparing the logs for their efforts to make the job of checking easier.

There are two main points, however, that must be mentioned. Firstly, to those that write out the entries, please be more careful to differentiate between "U" and "V" and also between "H" and "M." Secondly, to all of you, it would be a help if the numerals in the call-signs (not the one starting a call-sign as in 5A3ZZ) were kept in a vertical line. A few stations made out their logs in this way and were found to be less strain on one's eyes.

In response to many requests please note that HBIs are portables and count as four points.

In the rules, contestants are asked to log all duplicate contacts but not to count points for them. The Contests Committee would like to emphasise this rule mainly for the following reasons. Station G3ZZZ logs a contact with G3YYY and claims points but the latter has logged G3XXX who enters G3YYY in his log. Later G3ZZZ logs a duplicate contact with G3YYY who duly logs G3ZZZ. Now the first contact with G3YYY logged by G3ZZZ gets deleted by the checker but the second entry (i.e. the one marked duplicate) gets credited with points. If G3ZZZ did not log the duplicate contact both G3ZZZ and G3YYY will have contacts deleted. As a matter of interest one entrant logged over a dozen duplicate contacts, 10 of which were credited with points as explained above.

Also, one station commented on the fact that having G3LCS and G3LCH on the same band did not make things any easier. If the station had logged some of the duplicate contacts we know he must have had he would have come out with a higher score.

Once again please read the rules carefully. The bonus on 1.8 and 3.5 Mc/s was two points, and not only one as claimed by nine stations, and British Commonwealth and Empire portables rate 12 points and not anything between four and 16 as several contestants claimed.

Check Logs

The Contests Committee would like to express their appreciation to all senders of check logs, both large and small. The average check log runs to a dozen or so contacts but very often much larger ones are received, and it is very clear that a lot of work has been put into them. Check logs from listeners are also very helpful if they give the report (and serial number) sent by the station heard and the call-sign of the station being worked.

Several of the check logs received for this contest deserve special mention. Pride of place, we feel, must go to the log sent by Mr. M. Harrison (B.R.S.24733). It contained 597 entries spread over the 24 hours of the contest. Mr. Harrison is a listener of 20 years' standing and a study of the log seems to show he had his lunch from 13.24-13.51 or perhaps 14.18-14.42. There are two or three periods of 10 minutes or so between logged times late on Saturday evening otherwise all the gaps are less than 10 minutes.

The Cyprus Amateur Radio Society also provided above



G3JBR operating G4BP/P for the Scarborough Amateur Radio Society.

the average check logs. Two portable stations were set up, ZC4PB/P (Famagusta Group) and ZC4FD/P (Limassol and Nicosia Groups). The first mentioned station had a team of eight operators who made 113 contacts with Gs and the latter had six operators with 92 contacts. We imagine setting up a N.F.D. station in Cyprus must involve a lot more work than setting up one at home.

G3DMZ/P must also get a special mention. They staged an "exercise" and made 178 contacts on all bands.

Check logs from the following are also gratefully acknowledged: G2MI, G2MI/M, G2CNX, G2DHV, G3ABM, G3COY, G3GMK, G3PAI/A, G4KS, G5AO, G5LF, G5LY, GM3LCP/P, EI6U/P, EI9S/P, K3MNJ, SM3CUS, SM5BDS, SP5BR, ZE3JO/P, ZL1AH, North Wiltshire Group (G3OWH/P and G2BBR/P), Port Talbot Group (GW5VX/P and GW4CG/P), and Maidstone Group (G8LZ/P).

CONTESTS DIARY

- September Scandinavian Activity Contest
15-16 (C.W.).
- September 16 Low Power Field Day (see page 40, July 1962).
- September Scandinavian Activity Contest
22-23 (Phone).
- October 6-7 - VK/ZL Oceania DX Contest (Phone).
- October 7 - R.A.E.N. Rally (see page 40, July 1962).
- October 12-24 Goose Bay A.R.C. QSO Parties.
- October 13-14 VK/ZL Oceania DX Contest (C.W.).
- October 20-21 Second 420 Mc/s Contest (see page 85, August 1962).
- October 27-28 CQ WW DX Contest (Phone).
- October 27-28 R.S.G.B. 7 Mc/s DX Contest (Phone).
(For rules, see page 504, April 1962).
- November 3-4 - R.S.G.B. 7 Mc/s DX Contest (c.w.)
(For rules, see page 504, April 1962).
- November 10-11 Second 1.8 Mc/s Contest.
- November 24-25 CQ WW DX Contest (c.w.).
- December 1-2 - R.S.G.B. 21/28 Mc/s Telephony Contests.
- December 9 - OK DX Contest.
- March 9-10 - A.R.R.L. DX Contest (phone).
- March 23-24 - A.R.R.L. DX Contest (c.w.).
- March 23 - Pakistan Day DX Contest.

The T5-er

A Different Approach to C.W. Reception

By PAT HAWKER (G3VA)

FOR many years the audio output circuits of amateur receivers have been designed to provide reasonable fidelity over the required audio bandwidth. In the case of c.w. reception, a conventional audio stage used in conjunction with stable high frequency and beat frequency oscillators provides, from a good ripple-free A1 transmission, an audio waveform of basically sine wave characteristics (chopped up sometimes by intermodulation or ionospheric effects). In fact the ability of a receiver to produce a clean and relatively pure c.w. beat tone is generally regarded as a highly desirable quality.

Recently, however, we started to think about this convention; it was not long before we began to believe it may represent a fundamentally wrong approach, leading to unnecessary fatigue and discomfort in c.w. operating. Consider how seldom the sine wave occurs in nature. Most of us soon tire of a sustained whistle (try tuning in one of the B.B.C. test transmissions during the radiation of a sine wave tone and see how quickly it begins to grate on the nerves). Again, operators using sharply tuned audio filters such as the FL8A on a single fixed audio frequency often find this particularly fatiguing.

On the other hand, the notes of musical instruments consist of fundamental notes together with their related harmonic series, which musicians term overtones or upper partials. In some instruments very high orders of harmonics are present, their amplitude often, but not always, occurring in decreasing order of magnitude. Fig. 1, reproduced from *High Fidelity Sound Reproduction* (Newnes), shows the audio spectrum of a single violin note, with appreciable harmonic amplitudes extending up to beyond the 30th harmonic of the fundamental.

In Morse practice or for monitoring, the neon relaxation oscillator is often favoured, providing a roughly saw-tooth waveform rich in harmonics. Similarly, many operators find that commercial A2 transmissions, such as those widely used on the 600-metre shipping band, received with b.f.o. turned on, provide a complex but pleasant listening tone. It is also sad but true that signals with a high 100 or 120 c/s (plus harmonics) ripple content are often the easiest to read over a long period (we can recall from the 'thirties one chap who whenever the going got tough was reputed to switch out his ripple filter capacitors).

It would be a retrograde step if we all went back to r.a.c. (rectified a.c.) or A2 transmissions—apart from other considerations, this would greatly increase the bandwidth occupied. But would it not be possible to convert A1 signals

into something akin to r.a.c. or A2 after the detector stage of the receiver?

One method which has occasionally been adopted—though usually for other reasons—is to use the incoming signals to trigger off a local tone oscillator which can be arranged to have any desired characteristics. A fairly complicated system of this type was described in *Electronics World* (March, 1962) using a 12AT7 Wien bridge oscillator and a 12AT7 Schmitt trigger.

We believe that for various reasons these triggering systems are not always altogether satisfactory; the audio note is fixed by the oscillator and so the same audio note is likely to be produced—at the same signal strength—by QRM from stations within the i.f. passband of the receiver, and the note does not usually vary for small changes in tuning.

But why not simply change the normal audio output from a sine wave to a more acceptable waveform? After all, this is how square-wave, saw-tooth and other types of pulses are produced in many branches of electronics. The basic process

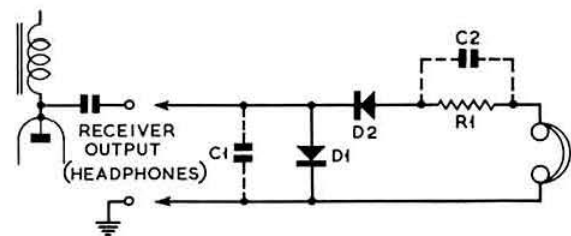


Fig. 2. Basic form of T5-er. Output characteristics can be varied by changing C1, C2 and R1. D1 and D2 can be crystal diodes or metal rectifiers.

of turning a sine wave into a more complex waveform is to distort or shape it by passing it through a non-linear network. In our case, why not deliberately introduce severe distortion in the hope that something less fatiguing than a pure tone will emerge?

The T5-er

So was born a simple device which we originally termed the "Snafu" (Signal Note All Fouled Up) but which later—to avoid possible misinterpretation—was renamed the "T5-er" on the grounds that the intention is to produce a "musically modulated note"—the old definition of a T5 signal.

A well-known technique for harmonic generation which has been widely used in frequency meters and similar instruments is to pass the signal through a crystal diode or metal rectifier. This produces a form of pulsating d.c. rich in harmonics.

The simple test of connecting a crystal diode in series with high impedance headphones produced a pronounced "buzz" on all reasonably strong signals when the receiver was set to receive a fairly low frequency beat note; the resulting note however was harsh rather than musical and left a good deal to be desired. Improved results were obtained by using two diodes in a type of voltage doubler

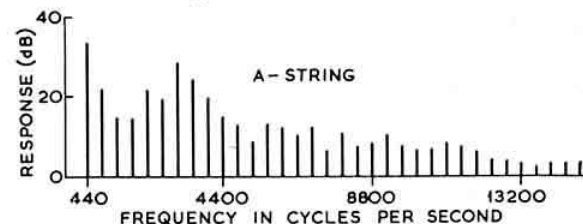


Fig. 1. Audio spectrum of open A violin string showing the loudness of the fundamental and harmonic frequencies composing the note. (From *High Fidelity Sound Reproduction*)

circuit; considerable variation of the note was found to be possible by connecting different value resistors in series with the headphones, and also by varying the various time-constants by adding capacitors in the positions indicated in Fig. 2. Values are not at all critical, and are best selected by trial and error, to suit the particular set-up.

This elementary form of T5-er is sufficiently practical to show whether or not this technique appeals to the individual concerned. It is suitable for use with most receivers, though the voltage output should be kept reasonably low to avoid possible damage to the diodes. In what are essentially subjective judgments, the final verdict must always depend upon the individual preferences of the listener, and no claim is made that this technique will appeal to all operators. The T5-er does not, of course, improve the performance of the receiver, though we have the impression that it makes it a little easier to distinguish between signals of slightly different audio frequency and sometimes reduces crystal filter "ringing" effects. Just as for normal c.w. reception, the receiver should preferably be stable, sufficiently selective to provide single signal reception, and have a very slow tuning rate.

Since the installation of the original T5-er, slightly more complex networks using metal rectifiers and transistors have been tried in order to increase the "musicality" of the note. Use has also been made of the "knee" in the characteristics of miniature copper oxide rectifiers ("Westectors"); this knee means that forward current does not begin to flow until the potential across the rectifier reaches about 0.2 volts per element (type W2 indicates two series connected elements, type W6 six series connected elements, etc.). One of the objectives has been to make it possible to receive signals at very low levels as A1, gradually giving way to A2 as the gain control is advanced; another is to make the device function also as an unpolarized clipper or crash limiter. It has been found possible to obtain a type of "capture" effect with the receiver output partially desensitized in the short gaps between Morse symbols, although frankly we are as yet not altogether sure exactly how this choking effect comes about. Signals already subjected to a degree of amplitude limiting before reaching the main T5-er network have been found to provide a slightly more pleasant listening tone. The A2 effect is most pronounced when the T5-er is fed with a stable, low a.f. note. It is useful to be able to switch the device "in" or "out" of circuit, though in practice the "out" position is seldom used.

Clearly, once the basic principle of the T5-er is accepted, there is a wide variety of ways in which the desired effects can be produced, and we feel there is considerable scope for further work in this field.

Army Wireless Reserve Amateur Radio Society

THE Army Wireless Reserve Amateur Radio Society was formed by members of No. 1 Army Wireless Reserve Squadron, Royal Signals (now 404 Signal Squadron) in the hope that eventually there would come into existence an Amateur Radio society representative of the Corps.

As the Royal Signals Amateur Radio Society is now flourishing, members of the A.W.A.R.S. at their A.G.M. held at Blandford on July 27 agreed that (i) the A.W.A.R.S. should be wound up, (ii) publication of the society's newsletter *Broadcast* should cease, and (iii) all members who have not already done so should be invited to join the Royal Signals Amateur Radio Society, details of which may be obtained from Capt. J. E. P. Philp (G3NJM), 11 Signal Regiment, Catterick Camp, Yorkshire.

Members of 404 Signal Squadron will continue to use the call-sign GB3AWR during their annual camp.

The Month on the Air (Continued from page 118)

22.00), YVs (after 19.30), 6W8DK (19.00) and 9U5BH (19.00) in Rwanda. Information from A.2019 and others regarding 9U5 has been integrated in *QTH Corner*.

At the moment 28 Mc/s seems to be a blank spot and a most suitable place for cross-town QSOs. However, the predictions for October, if realised, should provoke considerable activity on the band.

DX Briefs

UM8FZ, who is a blind operator, needs a contact with GW on s.s.b., and would welcome any calls from that country. Boris is usually on most days between 13.00 and 16.00 around 14,300 kc/s. (From OE1ME.)

A note from VP4NC expresses surprise at some of the VP4 calls which appear in DX columns and points out that the latest *Call Book* contains a complete list of all licensed VP4 stations with the exception of VP4s LO and LD. The government of Trinidad and Tobago has authorized the issue of a commemorative QSL card marking Independence Day, August 31, 1962.

W1BB is looking forward to a very active and interesting DX season on 1.8 Mc/s and has prepared for this with a new and special Top Band QSL.

K0RDP is now the QSL manager for the following stations: GW2DUR, HH2P, HH2P/3, PJ3AR, SV0WT, VE8MZ, and YN1TAT. This is the first occasion that the writer has seen a N. American QSL manager for a U.K. station!

JZ0ML was recently evicted by the Indonesians from his QTH in Netherlands New Guinea and is now back in the U.K. Outstanding QSL matters will be dealt with by W2CTN.

If this should catch the eye of ZD9AD (operator Terry) would he please get in touch with G3LPS. 9M2CR has been active on s.s.b. from an exhibition in Kuala Lumpur and has been heard at 18.30Z. Apparently exhibitions in 9M2 are still open at 01.30 (local time)!

Grateful acknowledgement is made to the *DX'press* (PA0FX), the *W. Gulf DX Club Bulletin*, the *DX'er* (K6CQM), *Florida DX Report* (W4CKB) and to our many correspondents. Please send all items for the October issue to arrive at R.S.G.B. Headquarters not later than September 20.

R.S.G.B. INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

SEYMOUR HALL, LONDON, W.1

OCTOBER 31-NOVEMBER 3, 1962

A Silver Plaque will be presented in connection with the Constructors' Competition. For exhibits by members residing outside Region 7 there will be additional prizes of vouchers to the value £10 and £5. Offers to help on the R.S.G.B. Stand at the Exhibition should be sent direct to G. W. Norris (G3ICI), 134 Meads Lane, Ilford, Essex.

Single Sideband

By G. R. B. THORNLEY (G2DAF) *

IN this feature last month the action of a diode modulator was described in detail and it was shown that the diodes are used as electronic switches, operating at the carrier frequency. The carrier frequency can be suppressed or nearly eliminated by the use of a balanced modulator. The basic principle in any balanced modulator is to introduce the carrier in such a way that current at the carrier frequency in the output circuit cancels out.

Valve Balanced Modulators

These requirements are satisfied by introducing the r.f. and audio inputs in push-pull and the output in parallel as shown in Fig. 1(a). The modulator can also be connected with the audio in push-pull and the r.f. drive in parallel, and connecting the output of the valves in push-pull as shown in Fig. 1(b).

The choice of circuitry used in the balanced modulator is usually determined by constructional considerations and the method of modulation preferred by the builder. In the examples shown, the r.f. excitation is taken to the grids and the modulation to the screen grids, but control grid or anode modulation could be used equally well. Furthermore, the valves could be triodes with the r.f. excitation taken to the cathodes and the modulation to the control grids, or alternatively the excitation to the grids and the audio to the cathodes. There are many possible circuit arrangements but the basic principle remains the same. In the absence of an audio signal there is no output because the circuits are balanced. The signal from one valve is balanced or cancelled in the output circuit by the signal from the other valve. The circuits are therefore balanced for any value of parallel audio signal. When audio in push-pull is applied, the modulating voltages are of opposite polarity and one valve will conduct more than the other. Since any modulation process is the same as mixing, sum and difference frequencies (sidebands) will be generated. The modulator is not balanced for the sidebands, and they appear in the output. Carrier suppression is dependent on the matching of the two valves and their associated circuits and usually two valves (or one double valve) can be adjusted to give at least 30db of carrier suppression without further filtering. The balance is difficult to maintain since valve characteristics change with age and with supply voltage variation. Since in suppressed carrier single sideband transmission it is desirable to suppress the carrier at least 45db the selective filter following the balanced modulator is used for further carrier suppression. Two basic triode modulator circuits are shown in Fig. 2.

Sideband Selection

The modulation process produces a pair of sidebands symmetrically disposed on either side of the carrier frequency, and since the objective is to transmit only a single sideband, it is necessary to select the desired sideband and suppress the undesired sideband. This is possible because the modulating wave is restricted to a band of audio frequencies separated from the carrier by an appreciable amount. It is necessary to have a rapid increase of attenuation in the sideband filter in order that it may adequately suppress the unwanted sideband and this is the decisive factor in filter design. Components having a high rate of change of impedance with frequency, or high Q , must be used. The requirement is a certain amount of attenuation in a given number of cycles, and for any given frequency of filter operation and degree of sideband suppression, the quality or Q factor of the

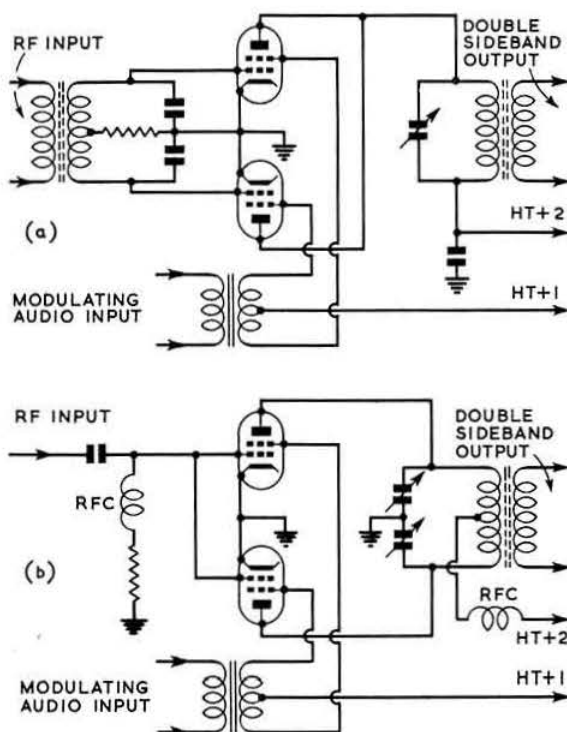


Fig. 1. Tetrode balanced modulators.

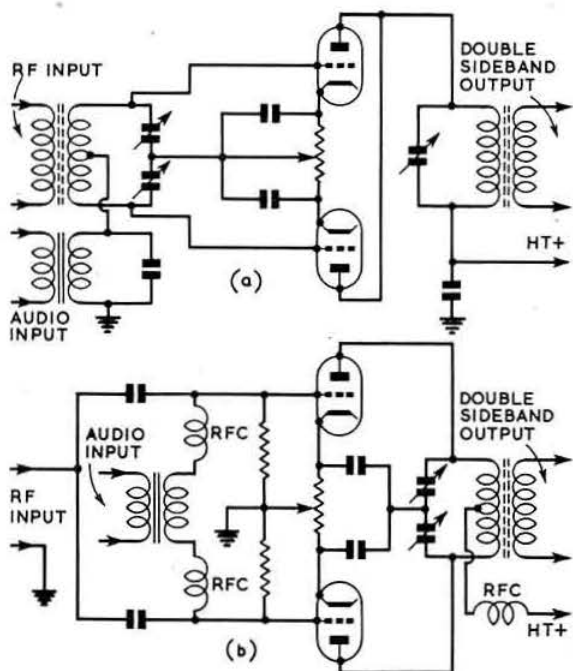


Fig. 2. Triode balanced modulators.

* 5 Janice Drive, Fulwood, Preston, Lancashire

components making up the filter is determined. This means that for low frequency sideband selection a lower Q element may be used, conversely for high frequency sideband selection high Q elements are required. Inductors and capacitors have low Q factors and can be successfully used for sideband filters only at relatively low frequencies up to about 50 kc/s. On the other hand, small metal plates and quartz crystal plates have extremely high Q factors and can be used to build sideband filters capable of operating at higher frequencies. Mechanical filters or metal plate filters have been built to operate up to 600 kc/s and crystal filters have been made to work at frequencies as high as 10 Mc/s.

Removing the unwanted sideband through the use of a selective filter has the advantage of simplicity and good stability. The unwanted sideband suppression is determined by the attenuation of the sideband selecting filter. The stability of sideband suppression is determined by the stability of the elements used in constructing the sideband filter and this stability can be quite high because it is possible to use materials that have very low temperature coefficient of expansion.

Experience has shown that an audio frequency range of

300 to 3000 c/s is entirely satisfactory for voice communication and in fact gives good speech quality. For instance all the regular members of the "80 metre net" can be readily identified from the voice characteristics alone. The pass-band of the filter is therefore required to be 2700 c/s and if the filter were perfect the "slope" of the filter response curve would be vertical so that the bandwidth 60db down would also be 2700 c/s. In practice an infinite cut-off is not practicable and the sides of the filter response slope outwards so that the bandwidth 60db down is greater than the bandwidth at the 6db point. This ratio, 6db bandwidth/60db bandwidth, is the shape factor of the filter. Modern mechanical filters generally have a shape factor of 2.1, although it is possible to manufacture them with a shape factor of approximately 1.5 although this would entail a more complex assembly and therefore greater cost.

The crystal sideband filter is attractive to the amateur because it can be home constructed and the response characteristics and shape factor are under the constructor's control. It is the intention next month to consider in detail the various types of response curves, filter construction, crystal manipulation and alignment.

Audible Atmospheric Phenomena

Listening to "Whistlers"

By B. M. FLACK (B.R.S.23215)*

FOR some time, the writer has been carrying out casual observation of atmospheric noises which occur within the audio spectrum. The emphasis here is on the word "casual," because there is very little in the way of reliable information available on this subject, and also because no very elaborate equipment is available.

The aerial used is an untuned long-wire and a more convenient aerial of this type than the (wire) garden fence could surely not have been provided. This fence is continuous throughout an estate block approximately 300 yards by 100 yards, and the effective length probably exceeds a mile. The impedance of the fence to ground is approximately 6 ohms, this figure being mainly resistive, as the fence no doubt comes into contact with the soil in quite a few places. The aerial is connected, via a transistor low impedance pre-amplifier, to a Mullard 5-10 amplifier, the output of which feeds a high fidelity loudspeaker system.

The tone controls of the main amplifier are set to maximum treble boost and maximum bass cut. Reference to the response curves for this amplifier shows that these settings provide 5db bass cut at 25 c/s and 10db top boost at 10 kc/s. The cross-over point (0db) occurs at 800 c/s. The main reasons for using these settings is that it has been found that a considerable amount of 50 c/s hum is picked up by the fence aerial from underground supply cables or adjacent house wiring. Furthermore, most of the atmospheric noise occurs in the audio range above 800 c/s.

The most distinctive and interesting phenomenon observed is that known as "whistlers." These sounds descend through the audio spectrum from the highest audible note (probably much higher) to a very low note, finally disappearing again. Some "whistlers" are preceded by a "click" and this is an indication of their point of origin. The length of each "whistler" is 3-4 seconds during its

passage through the audio spectrum, although the whistle probably commences well above the highest audible note, and therefore the total duration of each "whistler" is unknown to the writer.

An interesting article entitled "A Technique for the Rapid Analysis of Whistlers" by J. K. Grierson was published in the June, 1957 issue of *Proc. I.R.E.* in which the explanation given for "whistlers" is that the source of these phenomena is electrical storms. Those commencing with a "click" emanate from storms occurring in the vicinity of the receiver, others may well be produced by storms in the other hemisphere. The signal reaches the receiving station by propagation along the "lines of force" of the Earth's magnetic field. The time taken for the discharge signal to propagate along the line of force, which intersects the Earth's surface at the point of reception, varies with the frequency of the different components of the discharge signal, the lower frequencies taking longer to make the journey than the higher frequencies. This produces the descending note effect.

The writer has been observing "whistlers" without difficulty for more than a year, together with many other interesting noises, one of which sounds like pebbles being dropped on the base of an upturned bucket. No explanation has been found, so far, for these other noises.

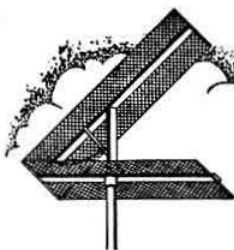
One quite clearly defined signal which has been observed from the commencement of these experiments is that of the v.l.f. telegraphy station GBR on 16 kc/s. This is, of course, about the only case where one can receive a carrier without a tuned receiver, and at the same time read a Morse signal at its true carrier frequency.

R.S.G.B. INTERNATIONAL RADIO COMMUNICATIONS EXHIBITION

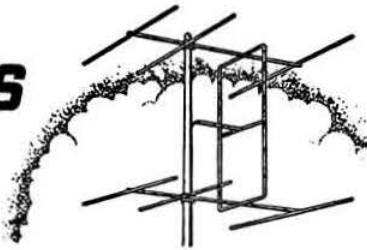
October 31-November 3, 1962

For a successful display in the Home Constructors' section, the Exhibition Committee requires the loan of home-built equipment. Offers, together with full details, should be sent to the Committee at Society Headquarters.

* 16 Grotto Road, Weybridge, Surrey.



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

Hawaii to Massachusetts on 1296 Mc/s by Moonbounce

ANOTHER chapter in the long history of amateur u.h.f. achievement was written at 01.48 G.M.T. on August 9, 1962, when Ralph Thomas, KH6UK, in Oahu, Hawaii, established two-way amateur communication with W1BU (W1FZJ) in Massachusetts, on 1296 Mc/s. Sam Harris (W1FZJ) writes "The World Above 50 Mc/s" in *QST*. Propagation was of course by means of moonbounce.

The successful contact came after weeks of what *QST* for September describes as a never ending series of "almosts." For weeks, KH6UK and W1BU (W1FZJ) had copied fragments of each other's signals. *QST* reports, "Both were blessed with work schedules which permitted them to follow the moon as its orbit caused its optimum target time to be advanced day by day. Both were blessed with plenty of technical know-how. But most of all, both were blessed with that wonderful persistence which caused them to stick with this project through days and days of near-misses. FB, OM's." Fine business, indeed.

Both KH6UK and W1BU employed Eimac 1 kW klystrons in their transmitters feeding 28 ft. and 18 ft. parabolic reflectors.

KH6UK first received W1BU on July 24, and again on the 25th and 26th when the signal was 8db over the noise in Hawaii. KH6UK's signals at W1BU ran on the average about 15 to 18db above the noise in a 30 c/s filter.

Other stations reported by *QST* to be ready for 1296 Mc/s moonbounce experiments are WA6JZN, W2CXY, HB9RG, DL3FM, KX6CN and W8LIO. Who will be the first G?

Meanwhile the 1296 Mc/s tests which have been going on under the auspices of G3FEX and G2DDD have led to a number of contacts which give some idea of the potentialities of the band from the point of view of more normal amateur operation.

At 18.45 G.M.T. on August 12, 1962, G3FEX/P at Chantry Hill (600 ft. a.s.l.), Storrington, Sussex, made a QSO with G3FP (Thornton Heath) over a distance of 40 miles, this being a British Isles record for crystal controlled gear. This record was broken at 19.44 G.M.T. the same day by a QSO between G3FEX/P and G8AL (Chingford), a distance of 58 miles. The gear used at G3FEX/P comprised a CV90 running 6 watts input in the transmitter while the receiver set-up included a crystal controlled converter using a cavity mixer and hi-Q break, with a Hallicrafters 5-10 tuning 31-35 Mc/s. The aerials were a 16 in. dish and a dipole 5 ft. high. The transmitter at G3FP used a 2C39A running 80 watts input.

Contact was first made with G3FP on 430 Mc/s at 18.00 G.M.T., G3FEX/P using a 66 element aerial at 12 ft. Tape recordings were made by G3FP. Tests were also carried out on 1296 Mc/s with G2RD. G3FEX/P was assisted by Ron Ham of Storrington (B.R.S.15744) and his XYL.

A few days earlier, at 19.15 G.M.T. on July 29, G3FEX/P on 2m and receiving on 23cm at Chantry Hill, tested with G3FP (Thornton Heath) whose 23cm signals were heard at S3/4 on c.w. over about 40/45 miles over the North Downs.

All this is a result of about 12 months' work between G3FP and G3FEX, which had the object of 1296 Mc/s contacts between fixed stations. This is now within reasonable sight of success. G2DDD has also been involved.

Two Metre Opening

The first real 2m opening of the year coincided with the period of the Region I I.A.R.U. Contest and the National 144 Mc/s Open Contest on September 1-2, 1962. West Country and Welsh stations in particular appeared to benefit and conditions for them to the Continent seemed to be better than for those in the Home Counties. G6GN was working PAs, G3EHY was heard calling DLs and GW3MST/P, near Brecon, had made nearly 200 contacts by midday on the Sunday. G2JF worked SM and OZ.

Stations in Belgium, France, Germany and Holland were all putting in good signals but little was heard in the London area from the North. Nevertheless, there was plenty of activity and many contacts were made. EI2W reports excellent signals from all these countries.

Scottish V.H.F. Expeditions

The Birmingham University Radio Society V.H.F. expedition to Southern Scotland will now take place from September 17 to the evening of September 26. The call will be GM3IUB/P and the frequency 145.78 Mc/s approximately, using an e.r.p. of 1 kW on A1 and 100 watts on A3. Operation will be from 17.30 G.M.T. onwards, and skeds will be welcomed but *must* be made on time. Operators



Aerials being set up at G3FEX/P for the 1296 Mc/s tests on August 12, 1962.

* R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the October issue to arrive by September 19.



G3HBR operating GC3PBR/A on Sark while G3PBR examines the log sheets. Note the German poster on the wall—a relic of the Occupation during the Second World War.

requiring skeds should contact G3NAQ (address in the *Call Book*) giving dates, approximate times (in G.M.T.) required and enclosing a stamped postcard or s.a.e. for reply. Skeds will not be made after 20.30 G.M.T. and the station will close down at 21.00 G.M.T. most evenings. A special QSL will be issued for each QSO and cards will be despatched via the R.S.G.B. QSL Bureau. The expedition will be in Cumberland on September 17, Lanarkshire on the 18th, Dumfriesshire on the 19th, Kirkcudbright on the 20th, Wigtown on the 21st, Ayrshire on the 22nd, Midlothian on the 23rd, Berwick on the 24th, Selkirk on the 25th and Roxburgh on the 26th. Operation will be from 17.30 G.M.T. daily.

By the time these notes appear G5UM should be operating his "pipsqueak" rig on the southern tip of Kintyre (Argyll) using the call-sign **GM5UM** on the zone frequency of 145.8 Mc/s. Operation is planned to be every night from 8-10 p.m. clocktime (weather permitting!) from September 16 until September 20 inclusive. In view of the remoteness from centres of v.h.f. activity much of the operation will be on the key.

GC3PBR/A in Sark

GC3PBR/A worked 30 stations during the visit to Sark by G3HBR, G3MLS and G3PBR on July 21-22. This is believed to be the first time a 2m station has operated from the island and hence a new county for the lucky ones.

The QTH on Sark was a disused windmill (full of relics of the German occupation) on the highest point of the island at approximately 400 ft. above sea level. The complete station (except the aerial) was loaned by G3HBW—transmitter running 20 watts to QQV06/20, transistorized modulator and transistorized communications receiver. The power was obtained via a transistorized inverter from one of the island's very few 12 volt batteries. The gear was installed on the first floor of the mill with a 5 element Yagi some 20 ft. higher in the roof.

Most contacts were made with stations in the London area, including G3JR. Outstanding signals were G6NB, G3FZL, G3MPS and G2JF, the latter being one of the very few stations heard consistently in Guernsey.

The first QSO was with G3HBW who appeared within seconds of GC3PBR/A putting out a test transmission. Three "locals," GC2FZC, GC3OBM on Guernsey and GC2TR on Jersey, were also worked from the island.

Conditions were not particularly good and heavy QSB

on almost all signals made the going difficult at times, particularly when stations persisted in using phone.

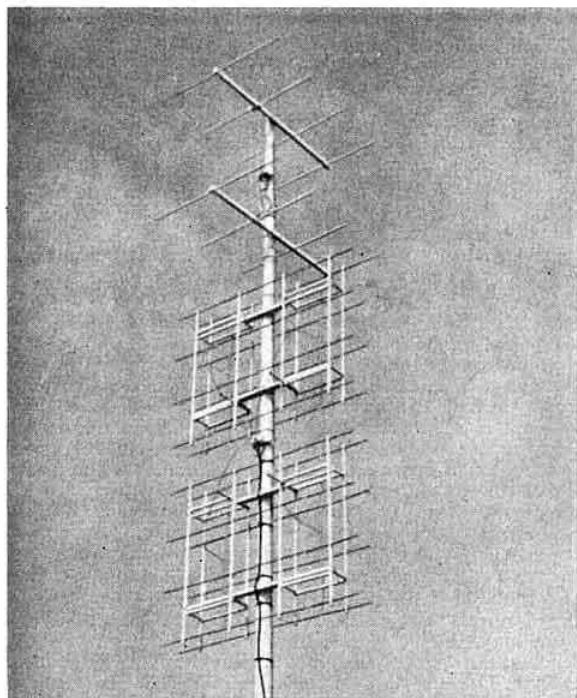
Transport for the operators and the gear, accommodation, and the loan of the 12 volt accumulator was provided by a friend, Mr. P. Perks and his wife of Beauvoir Guest House, Sark, who would be only too pleased to help any other v.h.f. DX-pedition in a similar manner.

London U.H.F. Group

G4KD reports that the London U.H.F. Group has arranged a series of lectures by the M-O Valve Co. on converters and transmitters for 70cm and 23cm. On October 4 a miniature 70cm transmitter with a separate higher power final will be described. Previous lectures were on a new 70cm converter using two A.2521 valves and details and circuits were given to the 28 who attended (a record number for this year). On September 6 a 23cm converter was due to be shown and discussed. The group meets at the White Hall Hotel, Bloomsbury Square, London, W.C.1 on the first Thursday in each month. All v.h.f. and u.h.f. enthusiasts are cordially invited to attend.

Two Metre News and Views

EI2W (Dublin) reports that conditions in Ireland during July/early August were poor, although July 27/28 produced some reasonably good DX, when G2JF (nr. Ashford, Kent) was worked at fair strength and G5MA (Gt. Bookham, Surrey), G6JK and G3MCS were good signals. F8MX was heard and called for over 2 hours without success. On July 28 G6NB (Brill) and G3OBD/P (Dorset) were both S9 signals. The GW3BA/G4LU expedition was worked from various Welsh counties, as was GW3FRV/P. G3IGM produced Caernarvonshire and Merioneth for the second time during the week. GD3IWP in the Isle of Man (using a simple



The aerial system at F8MX/A (St. Valery-en-Caux). Below the 4-over-4 beam for 145 Mc/s is a 64 element curtain for 432 Mc/s. The pole is approximately 20 ft. high, and is rotated by the Armstrong method. (Photo by G3HRH)



The well-known blockhouse near Dieppe—operating QTH of F8MX/A. From left to right are F8MX, F9CQ and G3HRH.
(Photo by G3HRH)

dipole) was worked at S9. G3FZL was coming in well on some evenings at the end of July. EI6AI was again worked from Donegal and EI9AC was heard for the first time. EI3S (Dublin) on 145.5 Mc/s has returned to 2m and is on nightly. EI2W himself is sometimes on 145.8 Mc/s as well as 144.008 Mc/s.

During a recent holiday in France, G3HRH (Digswell) was able to visit F9CQ in Paris, and took part in one of the weekly Paris-St. Valery 420 Mc/s tests to F8MX/A. Signals received at F9CQ were very good for the 100 mile path, but Jacques clearly benefits from an excellent aerial, sited on top of an eight storey block of flats, approximately 120 ft. above street level. The second week of G3HRH's holiday was spent with both F9CQ and F8MX at their JA QTH at St. Valery-en-Caux, 20 miles south-west of Dieppe. During this period a number of G stations were worked from the "blockhouse" on the cliffs, at varying strengths, the better QSOs being with GW4LU/P (Radnor), G3KMT (Wolverhampton), G6US, G3ASC (Oswestry), G3BNL (Nottingham) and G3FUR (Stamford). F9MX/A uses 80 watts to an 829B, and a 4-over-4 aerial at about 20 ft. (200 ft. a.s.l.). Converters in use are a cascode job and another with a straight Nuvistor r.f. stage. Also available is a QQV06/40A on 70cm into a 64 element curtain array. F8MX/A is usually to be found round about 144.96 Mc/s in the late evenings, and operation will continue into the middle of September, when he returns to Paris. During his stay on the coast, G3HRH was also able to visit F3LP (near Le Havre) and F3NG (near Le Treport) both of whom were generous in their hospitality. F3LP demonstrated his portable equipment, which is completely transistorized apart from the r.f. stages of the transmitter

(three valves). The converter was built to a design by B.R.S.20533, published in the R.S.G.B. BULLETIN for April, 1961.

Recent A3 contacts from the home station of G3HRH include GW3BA/P (Merioneth), G3AZU (Bradford), G8SB (Sale), G3HBW/P (Dorset), G3JMA/P (near Hull), EI2W (Dublin), F8MX/A (St. Valery), F9EA/M (Veulettes) and F3RL (Caen). The old aerial system (two 5-over-5 Yagis side by side) has been replaced by a new version comprising two 8-over-8 slot beams stacked vertically. First results indicate that the expected marginal improvement of 2db has been achieved, but with a wider horizontal beam-width than that of the old system, which was embarrassingly sharp with a fine collection of sidelobes.

G3OCB (nr. Truro) is a welcome Cornish newcomer on 2m. Recently an l.f. s.s.b. rig was completed and it was an obvious step to build a 14-to-144 Mc/s mixer to get on 2m. The transmitter uses a pair of 5763 in a balanced mixer driving an 832 in AB1 on 144 Mc/s. GB3CTC was finally identified for band location and G5ZT was heard at S5/6. The best contacts since then have been with GW3MOP, G3EGV and G3OBD. G3OCB has been reported heard at Salisbury. Stations heard but not raised include GW8UH, GW3ATM and G2JF (who was S8/9). GC2FZC was heard at S9+ at a time when the transmitter was not operational. G3OCB thinks that many stations after calling CQ do not search carefully enough, and that many more would get contacts with Cornwall if they would only turn their beams to the s.w. There are almost always at least two and sometimes as many as seven or eight stations active in any one evening from Cornwall alone, and although conditions have been poorish the band is usually open to South Wales, Somerset and Dorset. G3OCB's location at Truro is about 400 ft. a.s.l., the take-off reasonable with low hills 50/150 ft. at between half to five miles away, with a 20-mile view in the London direction. The aerial is a 5 element long Yagi at about 25 ft. The converter is a Walman cascode with a Nuvistor preamp.

G3LMG (Tavistock) is a new member of the Society and is active on 2m. In a first report he makes the old "moan" about putting beams in the South-West direction. It can be very rewarding these days with the increasing number of stations operating in the Devon/Cornwall area. Most of G3LMG's operation this year has been /P or /M and he has been out with G5ZT in all the contests this year—they have had a lot of fun. Another "moan"—more c.w. should be used; many apparently DX carriers are unresolvable phone but the carriers are often strong enough to make a good c.w. QSO possible. During the week of July 15 G3LMG was in the Hastings area and had some very good contacts using only a 19 in. whip. F2XO and F9EA/M were worked with 58 signals. G2JF and G3KMP always seemed to be on the band. When GW3BA was in Pembrokeshire G3LMG was fortunate enough to work him from Kit Hill, Cornwall, about seven miles from Tavistock. On August 12, from a site in Devon near Okehampton (1,800 ft. a.s.l.) G3GYQ/M at Boscastle was worked. This is the best accessible site in Devon as it can be reached by car, except when it is in use as a gunnery range.

G3OJY (Rosudgeon, Penzance) says there have been one or two good evenings in spite of generally poor conditions. The best days lately were July 26/29. There have been several 2m operators visiting Cornwall on holiday, notably G3FJ/A, G3DKF/M, G3GHI/P, G3GRA/M, G3GYQ/M and /P, G5ML/M and G6OX/M. G6GN was with G3GYQ/M on a personal QSO and G6OX also called. Visiting amateurs are always welcome at G3OJY.

GW3BA/P and GW4LU/P produced four new Welsh counties for G3OJY. Other noteworthy contacts during the month were F2NX, G2JF, G3EGK (s.s.b.) G3NOH, G3OBD, G5ML (all phone), G3NLV, G5NF, G3JZF (c.w.),

GW3ACF, GW3CBY, GW3MFY and GW3MOP. August 18 was a good night but activity appeared low. With reference to G3CO's remarks in August *Short Wave Magazine* about G3OJY not hearing London stations, this is partly explained by the fact that the only higher ground near the QTH (250 ft. higher, in fact) is directly in line with the London area. However, five countries and 36 counties have been worked since May 1962 and 93 stations worked and 63 confirmed. G2BHW has not been operating very much lately owing to much constructional work.

G3JR (Barnes) worked GW3JEQ/P in Montgomery, Radnor and Breconshire on June 14, 15 and 16. GB2IC (Scillies) was heard on June 20. GC3PBR/A (Sark) was a very welcome contact on July 21 and 22. A sked was fixed with GW4LU/P and GW3BA/P and a QSO was made with them on c.w. in Radnor, Brecon, Carmarthen, Cardigan and Merioneth. The last named brought the county score to 53.

G3CCH (Scunthorpe) had a fine contact with OK2WCG via meteor scatter on August 12 (03.00/03.30 G.M.T.). This was just about one of the fastest meteor scatter QSOs on record, using five-minute periods. OK2WCG heard G3CCH in the first period and vice versa in the second; the whole thing went smoothly, the final RRR in their respective last periods—all over in half an hour! An attempted QSO with SP5ADZ on the following day was unsuccessful, but SP5SM (only 1 kc/s off SP5ADZ) was heard during August 10/14. Another interesting feature was the reception of G3LTF whilst he was calling UR2BU. This was by meteor back scatter. Although this is not new (it is the normal radar type return but then transmitter and receiver are spaced 150 miles), it does show that stations who are too close for the familiar forward meteor scatter, but are too far for tropo or badly obstructed, can make QSOs via this method. Of course both stations must aim at a common point perhaps 600 miles away, choose the correct time, date and so on, and also be keen MS operators, because it is not as easy as forward meteor scatter, but it certainly is possible! G3LTF and G3CCH tried a QSO by this means, but failed because of the tropo signal getting through even with both aeriels facing east. A few pings were sorted out, however.

Alex Smith (G3MTI) has been awarded the first *Four Metres and Down* certificate for 2m mobile operation, while Walter Butt (G2CFZC) is the first Channel Islands operator to gain the 2m certificate.

CTICO (Lisbon) is still trying hard to work EAs, Fs and Gs. The CTs are looking forward to the coming Spanish tests from a mountain top near Madrid. CTICO himself has sked arrangements with G3OJY and G3LTF, so far without result, but they live in hopes! The new p.a. at CTICO is two 4X150As in push pull with about 300 watts input on c.w. only.

G2DHV states that G3MCS was the first contact of the Cray Valley Radio Society under its new call-sign G3RCV/A operated by G2DHV at the First Swanley Scout Fete.

Amateur TV Across the North Sea

G3NOX/T successfully transmitted television pictures of good quality to PAOCOB at The Hague on September 2, 1962, at 22.30 G.M.T. The path distance was more than 170 miles. This is the first occasion on which amateur TV

signals have been transmitted from England to the Continent.

SM6PU's Auroral Report

SM6PU reports via G4LX that on May 6 aurora was noticed first at 13.10 G.M.T., the first 2m signal coming through at 15.40 when SM3AKW was heard, and a QSO satisfactorily concluded. This contact was immediately followed by a QSO with LA4YG, but nothing else was heard. On May 31, the aurora was evident at 11.15 G.M.T. At 13.06 a QSO was made with LA4RD, followed by contacts with SM3AH and SM3KW. Stations heard were SM5BSZ and SM7ZN. A final QSO was made at 15.06 with LA5EH before the conditions deteriorated.

No other successful openings have occurred recently, but slight aurora was observed on May 7, 11, 15 and 30, on June 28 and 30, and July 4, 24, 26, 27 and 31.

Four Metres

G3PJK (Middleton Junction) says that after reading the 4m news in the July BULLETIN he was prompted to write regarding the remark passed by G3EDD about poor equipment. G3PJK thinks that if this is so it is mainly in the south where it happens. G3EHY is usually on on Wednesday nights and Sunday mornings and stations in the Manchester area work him regularly. G3PJK himself has not failed to work him even during the worst conditions and 58 and 56 reports are usually exchanged on phone and 599/579 on c.w. Also worked during the 70 Mc/s Contest were EI2W (58) and G3PSA/P (559). G3OHH and G3PJK were heard. G3CLW was about S1/2 but where are all the other "southern stations we read and hear about?" G3OHH and G3AYT worked GM3EGW during the contest.

G3AYT is also active on s.s.b. Activity time in the Manchester area is most nights of the week from about 22.00 G.M.T. onwards, particularly on Wednesday for G3EHY, and on Sunday mornings. Beams are turned in all directions for possible QSOs. The North-West is standing by!

Seventy Centimetres

G3LHA (Coventry) says that activity is increasing in the Midlands and that G2FNW (Melton Mowbray) is active using a new 48 element stack and that his signals at 33 miles are usually S9+—"a really fantastic signal." G3MXW/T (Smethwick) also has a potent signal. Using new co-ax to the aerial, his report at 22 miles is S9+. G2CIW, G3MYD/T and G2CIK/T are all on regularly from the Birmingham area. Sunday nights at 18.00 G.M.T. is now activity night in the Midlands, with G3LHA, G2CIK/T, G2CIW, G2FNW, G3MXW/T, G3BNL and others regularly operating. G3LHA operates /P on Sundays from rarish counties on 70cm. Northants was No. 1 on the list (July 29), when G2CIW (S. Birmingham, 38 miles) and G3EEZ (Wolverhampton, 53 miles) were worked in quick succession. It is hoped to visit Oxfordshire, Gloucestershire, Rutland, Buckinghamshire and Huntingdonshire and maybe Norfolk. Sundays, between 16.30 and 19.30 G.M.T. will be the operating times, on a frequency of 433.38 Mc/s.

Twelve Centimetres

G3IUD (Wilmslow) has just reported that on June 11, 1960, he worked G3NLZ on 2400 Mc/s over a distance of 80 miles. Phone signals were S8 at both ends. The power output was approximately 1/2 watt. The contact was duplex, a system of two 17 in. paraboloids being used at each end. The i.f. was 45 Mc/s. On June 2 this year the same stations had QSOs on 8cm (3415/3460 Mc/s) over 38 miles. The power output was approximately 1/10 watt. Again the QSO was duplex. A single 17 in. paraboloid system was used at each end. Other equipment included a 726A and a polaplexer.

R.S.G.B. V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham Hill, Kent, when measured by the B.B.C. Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s).

Date	Time	Error
August 7, 1962	12.12 G.M.T.	1030 c/s high
August 14, 1962	19.29 G.M.T.	610 c/s high
August 21, 1962	12.20 G.M.T.	558 c/s high
August 28, 1962	11.28 G.M.T.	420 c/s high

The station is in operation from 06.30-23.59 G.M.T. daily, but may be on for the full 24 hours for test purposes from time to time.

Mobile Column

By C. R. PLANT (G5CP)*

THE successful operation of a mobile station, excluding perhaps one being used on the v.h.f. bands, necessitates the use of a v.f.o. in order to be able to keep clear of high powered stations. If the transmitter is installed at the front of the car no problem exists but if it is remotely located the question of oscillator tuning can be a tricky one. A Bowden cable device (with its back lash), a remote v.f.o. (which may be difficult to design) or in the last resort, stopping the car, opening the boot and retuning, are possible methods of changing frequency.

The newly developed voltage variable silicon capacitors now available may be the answer; the one under consideration is the Hughes H.C.7001 manufactured in the United States. A recent article in *CQ Magazine* by W1ZPT gives a comprehensive survey of this component.

The qualities of a voltage variable silicon capacitor are such that it will vary its capacity according to an applied variable voltage; the current flow is negligible, being leakage current only. The principle of operation is as follows: two pieces of silicon are treated with impurities and joined together; one of these pieces has an excess of electrons (*N*) and the other a deficiency of electrons (*P*). If a positive voltage is applied to the *P* plate and a negative to the *N* plate a current will pass through the junction. If the potential is reversed, i.e. positive to the *N* plate and negative to the *P* plate a neutral charge will build up as a dielectric between the plates—hence a capacitor will form—and within the capability

* "Lynton," 12 Nottingham Drive, Wingerworth, Chesterfield, Derbyshire.



Part of the car park at the Derby Mobile Rally. Note the preponderance of Top Band whips. (Photo by G3FY)

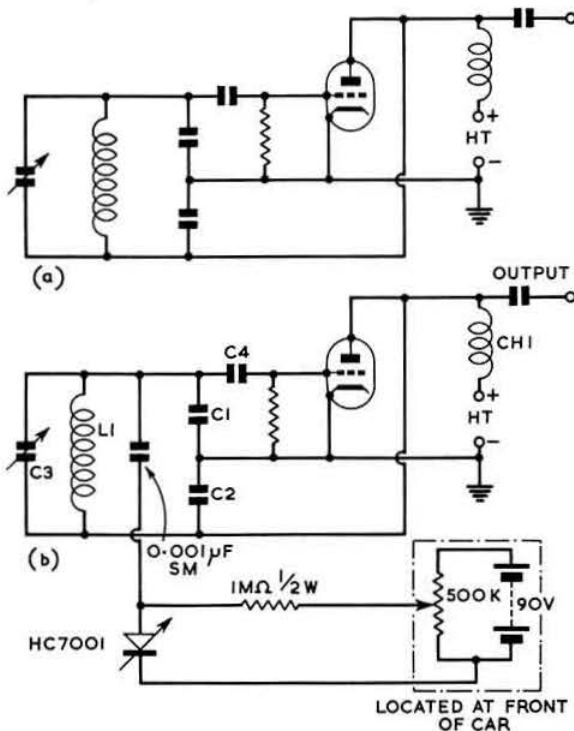


Fig. 1 (a) Colpitts oscillator circuit. (b) Suggested modification for remote control of frequency.

of the unit, the value will be infinitely variable as the voltage increases from zero upwards. The H.C.7001 has a minimum capacity of 6 pF at 130 volts and 88 pF at 0.1 volt; the *Q* is 360 at 5 Mc/s and maximum voltage.

Initial experiments were carried out with a Clapp oscillator but these were discontinued due to frequency modulation which when cleared reduced the effective frequency change to a low figure. Good results were obtained with the Colpitts circuit—here the frequency is varied by capacitor C3 across coil L1 in Fig. 1. The additional capacity is introduced via a 0.001 μF silver mica capacitor and associated circuitry. It is recommended that a dry battery be used for energizing the silicon capacitor because of the inherent stability of dry batteries under low discharge conditions—in the circuit shown the total drain appears to be of the order of one-fifth of a milliamp, hence the omission of a switch in the battery circuit; no doubt some people will decide to include one in case of a component failure when the car is unattended. Once again a request is made for information from anyone who tries out this method.

One of the most useful pieces of equipment for multi-band mobile operation is a sensitive absorption wavemeter. It is easy to radiate a signal on an adjacent band in error particularly when a pi-section tuner is used. The writer recalls an incident some time ago when repeated calls failed to raise a local station on 3.5 Mc/s—the transmitter was in fact radiating on 7 Mc/s with the aerial acting as a half-wave radiator. Since the installation of a Raymart unit this problem has been completely overcome—the absorption meter will only accept fundamental frequencies thus giving an accurate indication of the band in use. A duplicate aerial socket on the transmitter is used to connect a single cored wire which terminates in a loop wound round the remote end of the wavemeter pick-up coil. This gives ample signal strength on all bands from 3.5 to 28 Mc/s. The meter is used primarily to check the band and then with the needle set at half scale, modulation peaks may be observed. Provision is made for headphones to be plugged in so that the signal may also be monitored.

Forthcoming Rallies

A Mobile Rally is to be held at Weston-super-Mare, Somerset, on Saturday, September 22, and a special en-

closure has been reserved on the Beach Lawns from 1.30 p.m. The talk-in stations will be G2FQA/P on 144.36 and 144.108 Mc/s, G5UG on 1920 kc/s and G5UG/M on 1900 kc/s from 10 a.m. to 2 p.m.

One of the main events will be a mobile competition to test driving ability, navigating and equipment efficiency on Top Band over a pretty route of approximately 10 miles. The organizers say that the radio tasks will be tough but no physical effort will be needed and they believe that all competitors will have a lot of fun pitting their wits against the high power signal. It certainly sounds interesting and the award of a small cup to the winner should attract a large entry. There will be other matters of interest for those not taking part in the contest, including a Treasure Hunt around the shopping centre, a Balloon Race, a Draw and the usual raffles.

The Mobile Rally precedes the O.R.M. which will be held the following day at the Grand Atlantic Hotel at 2 p.m.—good parking facilities at the hotel. The General Secretary (G6CL) and Council Members have promised to attend.

Visitors have been invited to visit the R.A.F. Amateur Radio Station at Locking on the Sunday morning (G8FC has recently been re-equipped with Collins "S" Line gear). There is a bus from Weston to the Camp Gates then 10 minutes walk to the radio station. If travelling by car follow the Bristol road, turn right two miles from Weston into A371, carry on over two bridges past the airport and in one mile turn left into the camp entrance. The amateur station is located five blocks deep into the camp roughly on a level with the main gates. Alternatively a trip to Burnham Radio G.P.O. Station can be arranged with local amateurs as guides. This is the last rally we know of for 1962—it should, given good weather, be a fitting termination to a very successful season.

Rally Reports

The Chiltern Amateur Radio Club Mobile Rally was held on July 15 at West Wycombe Park, Bucks. The weather was very dull all day and rain started in the late afternoon but a total of 77 cars attended, of which 40 were equipped with mobile transmitters. A closed circuit demonstration of both 405 and 625 line television proved to be of considerable interest. The visitor who travelled the longest distance was G3OS (Gainsborough) who covered 318 miles—such enthusiasm certainly deserved a prize! The longest Top Band contact was made with G3OKI and a prize for the most ingenious Top Band whip was awarded to G3IED. Only two

stations were equipped for v.h.f. operation, G3GRA (144 Mc/s) and G3LVP (70 Mc/s). The Lucky Number programme winner was G. Hussey, the club's Hon. Treasurer. Distinguished visitors included ON4YV and HI8DCC. The talk-in stations were G6IF/A on 1.9 Mc/s and G3INZ/A on 144 Mc/s.

The Harlow and District Mobile Rally at Magdalen Laver was also held on July 15. Despite the weather about 30 radio equipped cars arrived at the site. The raffle winning numbers were picked by a blind S.W.L., the first prize, a set of transistors for a 10 watt amplifier, being won by A. S. Hall; the second prize, an electric fire, went to G3OPA (Loughton)—other prizes went to G3NKX (Loughton) and G3PED (Ilford). Frequency measurement brought prizes to G3OJV (Hornchurch) and G3MAY (London, N.15). The auction was presided over by G3HJL (Harlow) who sold a large number of items in record time! In all, a pleasant and successful rally.

Operating News

G2DHV (Sidcup, Kent) must surely be the record holder for the number of mobile rallies visited. Since 1959 he has attended 24 and this number would have been greater had not some been held on the same date as others with too great a mileage between them to permit attendance at both. G2DHV hopes to be at the Western-super-Mare Rally on September 22. Recent contacts by G2DHV/M/P on 144 Mc/s include GW3ATM/M, G3FRV/M, G3HGE/M, G3JMA/M, G3KEF/M, G3MCG/M, G3MTI/M, G3NPF/M and G3OSS/M. Stations heard included G3LBA/M, G8SM/M and GW3LWY/M.

A welcome letter was received from G2YS (Rickmansworth, Herts), who runs a Minimitter mobile transmitter in his Series V Oxford, from a Minimitter transistor power unit. G2YS normally uses the set as a mobile unit in summer and then installs it in the shack for the winter months.

ZC4CS sends an amusingly illustrated letter showing the method of mounting an Acos crystal microphone on a G.P.O. horn breast type set—he also uses it with the fixed station and likes it because "it leaves my hands free to operate the rig." If the microphone is heavy it may be necessary to fix two wires to act as strainers back to the breast plate.

G2DTQ (Wolverhampton, Staffs) says that he operates mainly on Top Band—he is at present inactive but hopes this will be changed by the time this is in print.

A letter from G5UF (Dorchester, Dorset), the C.R. for the county, tells of mobile activity down there. The most active are G3AS/M (Dorchester), G3ABH/M (Wimborne), G3OBD/M (Poole), all on 144 Mc/s, and G3LSC (Poole) and G2XQ (Portland) on Top Band. G5UF hopes to be operating before too long; equipment is at present on the stocks.

G3MTI (Gt. Malvern, Worcs) has fitted a slot aerial to his /M outfit and will operate regularly from Herefordshire on Thursday evenings on 144.9 Mc/s. This is not a highly populated county and so G3MTI should attract a lot of attention.



Reception at the Derby Mobile Rally on August 19, 1962. From left to right (back row), a s.w.l., G2CW; (front) G3PDD, G3PEL, G3PRM, s.w.l. Lake and YL Susan. (Photo by G3FGY)

MOBILE RALLIES 1962

- Sept. 16 Lincoln Radio Society Mobile Rally, North Kesteven Grammar School, North Hykeham, Lincoln.
- Sept. 22 Region 9 Mobile Rally at Weston-super-Mare.

Society News

Election of Council 1963

IN accordance with Article 55 of the Society's Articles of Association the Council have nominated the following Corporate members to fill the vacancies in the Council which will occur on December 31 next.

Officers:

President: Mr. N. Caws (G3BVG).
Executive Vice-President: Mr. G. M. C. Stone (G3FZL).

Ordinary Members:

Mr. D. A. Findlay (G3BZG).
Mr. F. E. A. Green (G3GMY).
Mr. R. C. Hills (G3HRH).
Mr. J. Douglas Kay (G3AAE).

The other retiring Ordinary Members of Council are Mr. C. H. L. Edwards (G8TL) and Mr. A. O. Milne (G2MI), both of whom are eligible for nomination.

* * *

Not later than October 24 next any 10 Corporate Members may nominate any other Corporate Member to serve on the Council by delivering their nomination in writing in a single document to the Secretary, together with the written consent of such nominee to accept office if elected but each nominator shall be debarred from nominating any other person for this election.

Zonal Representation on Council

Not later than October 24 next any 10 Corporate Members resident in Zone B (Regions 3 and 4), Zone D (Regions 6, 9 and 17), and Zone F (Regions 12, 13, 14 and 15) may nominate any other duly qualified Corporate Member to serve as a Zonal Representative on the Council by delivering their nomination in writing in a single document to the Secretary together with the written consent of such nominee to accept office if elected, but each such nominator shall be debarred from nominating any other person for this election.

Candidates for Zonal Representative must be resident within the Zone for which they are nominated and the nominators must be resident in that Zone.

The present Zonal Representatives are Mr. F. C. Parker, G3FUR (Zone B), Mr. H. A. Bartlett, G5QA (Zone D) and Mr. A. D. Patterson, G13KYP (Zone F), all of whom are eligible for nomination by members resident in their respective zones.

I.A.R.U. Calendar

CALENDAR No. 64 of the International Amateur Radio Union records that at the meeting of the Board of Directors of the American Radio Relay League held on May 11, 1962, Herbert Hoover, Jr. (W6ZH) was unanimously elected to succeed Goodwin Dosland (W0TSN) as president. Under the provisions of the I.A.R.U. Constitution, Mr. Hoover thus becomes the new president of the Union.

In addition to a wealth of Amateur Radio background which dates back to 1915, Mr. Hoover is well-known in diplomatic circles and during 1954-1957 served as U.S. Under Secretary of State. He is a son of President Herbert Hoover.

The Calendar also refers, *inter alia*, to the launching of *Oscar II*, the inauguration of 4U1ITU in the I.T.U. Building in Geneva, the projected Conference on Space Communications to be held in Geneva in 1963, the granting of permission to Belgian amateurs to use s.s.b., the abolition of a special fee for mobile operation in France, the proposal of the Swedish Society to operate beacon stations on 145 Mc/s and on 432.5 Mc/s from 15.00 to 24.00 G.M.T. daily with power inputs up to 500 watts, and the admission of the Association Radio-Amateurs Libanais (R.A.L.) to membership of the Union. The Calendar reports that the Radio Sports Federation of the U.S.S.R. (R.S.F.) has applied for membership.

Amateur Radio Handbook

MEMBERS will be pleased to learn that a copy of *The Amateur Radio Handbook*, bound in blue morocco with the spine and front blocked in gold lettering, was recently accepted by the Society's Patron, H.R.H. The Duke of Edinburgh, K.G.

The book was produced to the instructions of the Council by the Society's printers, Loxley Bros. Ltd.

Posting Certificate

ALL copies of the August issue of the R.S.G.B. BULLETIN were posted on Thursday, August 16, 1962, and the Society holds a certificate to that effect from the Letchworth, Herts, Post Office.

SOUTH WEST OF ENGLAND REGIONAL MEETING AND MOBILE RALLY WESTON-SUPER-MARE, SOMERSET

Saturday, September 22, 1962

Mobile Rally at Beach Lawns

The talk-in stations will be in operation from 10 a.m.

G2FQP/A on 144.108 Mc/s and 144.36 Mc/s

G5UG/A on 1910 kc/s

A programme comprising competitions, a Treasure Hunt, Draw, Children's Events and a Display of Equipment will commence at 2 p.m.

No charge for the rally

Sunday, September 23, 1962

Regional Meeting, Grand Atlantic Hotel, Beach Road

Visits in the morning, by arrangement, to R.A.F. Amateur Radio Society (G8FC) Locking, Burnham Radio Station, and local amateur stations.

Programme

- 2 p.m. Assembly
- 2.30 p.m. Business Meeting
- 4.30 p.m. High Tea
- 5.15 p.m. Group Photograph
- 5.30 p.m. Draws and Raffles
- 6 p.m. Lecture/demonstration on "Power Transistors" by J. I. G. Brown (G3EUR) of Aveley Electric Ltd.

There will also be demonstrations of closed circuit Amateur Television by G3NDT/T and of Electronic Counters by G3CHW.

The Council will be represented at the meeting by Mr. H. A. Bartlett, G5QA (Zonal Representative and Past President), Mr. A. O. Milne, G2MI (QSL Manager and Past President), Mr. L. E. Newnham, B.Sc., G6NZ (Chairman, G.P.O. Liaison Committee and Past President) and Mr. John Clarricoats, O.B.E., G6CL (General Secretary and Editor).

Tickets, covering also high tea, 15s. single, 25s. double.

Applications for tickets should be sent with the appropriate remittance to Mr. J. Etherington, G5UG, 32 Worlebury Park Road, Weston-super-Mare, Somerset, or to Mr. H. Andrews, G5DV, 6 Milton Avenue, Weston-super-Mare, Somerset.

East London Amateurs help Walthamstow Silver Threads Fellowship

A FEW months ago the organizer of the Walthamstow Silver Threads Fellowship (Mrs. Starr) wrote to R.S.G.B. Headquarters to enquire whether the Society could put her in touch with members who would help her in the task of building an amplifier to assist the old people who attend meetings of the Fellowship to hear more clearly what is being said. The enquiry was passed on to the Society's East London District Representative (Mr. M. McBrayne, G3KGU), who invited the help of local amateurs.

Mr. McBrayne has now written to say that under the guidance of Mr. K. Smith (G3JIX), younger members of the Wanstead and Woodford Radio Society recently completed a partially-made amplifier donated to the Fellowship by Mr. J. A. Steele (G3KZI). They also constructed a power pack for the amplifier.

Mrs. Starr visited the Wanstead and Woodford Radio Society a few weeks ago to express her thanks to all who had helped the Fellowship.

Headquarters Fund—List No. 12

THE following is the twelfth list of those who had contributed to the Headquarters Fund up to August 31, 1962:

P. J. A. Gowen (G3OIR), D. Westwood (G8WF), H. Griffiths (G2DFH), M. Morris (ex-G2BZK), W. A. Mills (GW3LJP), J. McDermott (G3NZ), J. N. Buckland (G3JSQ), A. W. Cox (B.R.S.24661), D. Rosen (G3MZO), D. Outram (G3HJM), Dr Karl-Heinz Birr (DLITA).

Total amount contributed to date: £1,519 6s.

Longleat Mobile Rally DX Balloon Race

IN the DX Balloon Race held at Longleat House on June 17, 1962, the winner was E. Davis of 72 North View, Bristol 6, whose balloon was found at Stanmore, Middlesex. Runners-up were Paul Gay of Yeovil whose balloon came down in Watford, Hertfordshire, and D. E. Wilkins of Shepton Mallet whose balloon reached Weedon, Buckinghamshire.

The R.S.G.B. stand at this year's National Radio and Television Exhibition held at Earls Court, London, from August 22 to September 1, 1962, occupied a commanding position in the gallery and was visited by many hundreds of amateurs and shortwave listeners in addition to thousands of interested members of the public. As may be seen from this photo, the stand was one of the most attractive the Society has had for many years. A striking feature was the map of the world surrounded by QSL cards with coloured tapes indicating the countries of origin. For the technically minded there was a display of typical amateur equipment and the full range of R.S.G.B. publications. Once again, the management of the stand was in the hands of Fred Ruth (G2BRH) who had the assistance of an enthusiastic group of members from the London Region. Other exhibits in the gallery were staged by the Metropolitan Police, the three Services, the B.B.C. and the I.T.A. A popular attraction was the Colour Television Avenue where it was possible to see on receivers built by leading manufacturers examples of the type of picture that can be expected when the B.B.C. colour TV service begins. Particularly interesting was a live demonstration of the use of television in education. (Photo by Terence Wilson and Partners Ltd.)

LONDON REGIONAL MEETING SOUTH RESTAURANT

Earls Court, London, S.W.5

Saturday, October 6, 1962

Programme

- 2 p.m. Reception.
- 2.30 p.m. (Members) Lecture on Communications Receivers of Today.
- (Ladies) Beauty Lecture.
- 3.30 p.m. (Members) Business Meeting.
- (Ladies) Holiday Film.
- 5.30 p.m. Tea.
- 7 p.m. Raffle.
- 7.30 p.m. Social gathering with hi-fi music and dancing.
- 9 p.m. (approximately) Finale.

The Council will be represented at the meeting by Messrs. N. Caws, F.C.A., G3BVG (Vice-President and Honorary Treasurer) and E. W. Yeomanson, G3IIR (Zonal Representative and Chairman, TVI/BCI Committee).

Tickets, including high tea, price 12/6 each, may be obtained from P. A. Thorogood (G4KD), 35 Gibbs Green, Edgware, Middlesex or from any D.R., T.R. or A.S.R. No tickets will be available on the day.

Radio Amateurs' Examination

THE City and Guilds of London Institute have advised the Society that the fee for the Radio Amateurs' Examination was increased from 20/- to 30/- with effect from the May 1962 examination. The Society had earlier been advised that the increase would not take effect until the November 1962 examination.



Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Saturday, July 28, 1962, at 2.30 p.m.

Present: The President (Mr. E. G. Ingram in the Chair), Major-General E. S. Cole, Messrs. H. A. Bartlett, N. Caws, C. H. L. Edwards, A. D. Patterson, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, P. H. Wade, E. W. Yeomanson (Members of the Council), and John Clarricoats (General Secretary).

Apologies

Apologies for absence were submitted on behalf of Messrs. R. C. Hills, A. O. Milne, L. E. Newnham, F. K. Parker and A. C. Williams.

"Amateur Radio Handbook"

It was reported that an expenditure of approximately £122 had been incurred in circularizing secondary schools in the United Kingdom with information concerning the *Amateur Radio Handbook*.

Membership

Resolved (i) to elect 62 Corporate members and 33 Associates; (ii) to grant Corporate membership to six Associates who had applied for transfer.

Applications for Affiliation

Resolved to grant affiliation to the Radio Research Station Amateur Radio Society, and R.A.F. Masirah Amateur Radio Club (Persian Gulf.)

Petition to Extend U.S. 14 Mc/s Phone Band

Consideration was given to a letter from the General Manager of the A.R.R.L. (Mr. John Huntton) regarding a petition sent to the Federal Communications Commission by an individual U.S. amateur to extend the U.S. phone band. It was made clear from the letter that the petition did not carry the support of the A.R.R.L.

Resolved to receive the letter and to await developments.

Contest Awards

It was agreed to ask the Contests Committee to express its views on a suggestion that the Society should present special lapel badges to winners of major contests, as is done by the Central Radio Club, Moscow, and other societies.

Royal Naval Amateur Radio Society

It was agreed to set up a small panel to examine various proposals sub-

mitted by the Royal Naval Amateur Radio Society in respect of Cede Proficiency Runs and to empower the panel to deal direct with that Society.

Region 7 Meeting

Resolved to authorize the Region 7 Representative to organize an O.R.M. at Earls Court, London, on Saturday, October 6, 1962.

I.A.R.U. Calendar

Resolved to cast an aye vote in favour of the election to membership of the International Amateur Radio Union of the Radio Sports Federation of the U.S.S.R.

Reports of Committees

The Minutes of the following meetings of Committees were submitted as Reports:

Contests Committee	June 21, July 19, 1962
G.P.O. Liaison Committee	July 6, 1962
Mobile Committee	July 6, 1962
Scientific Studies Committee	July 9, 1962
Exhibition Committee	July 10, 1962
Technical Committee	July 17, 1962

Resolved to receive the Reports and accept certain of the Recommendations contained therein.

The recommendations dealt with various contests matters, a proposed technicians' licence for work on 420 Mc/s and above, mobile rallies, trophies and prizes for 1962, safety recommendations, and the making available of enlarged copies of circuit diagrams to members.

Satisfaction was expressed at the solution which had been reached by the G.P.O. in connection with the matter of the reception by amateurs of signals from artificial earth satellites operating on frequencies outside the amateur bands (See *Current Comment* and *Society News*, August 1962, R.S.G.B. BULLETIN).

Amateur Radio Handbook Book Review

It was reported that an excellent review of the *Amateur Radio Handbook* written by the President of V.E.R.O.N. (Mr. W. J. Dalmijn, PA0DD) had appeared in the July 1962 issue of *Electron*.

The meeting terminated at 6.10 p.m.

Affiliated Societies and Clubs

THE following are corrections to the list published in the August 1962 issue.

- B.B.C. (Evesham) Club. Call-sign should read G3PPG.
- B.B.C. Club, Ariel Radio (Langham) (G3AYC), c/o A. H. B. Bower, Designs Dept., B.B.C., London, W.1
- B.B.C. Club, Ariel Radio (Bush House) (G3GDT), c/o B. A. Toms, Room 208, S.E. Wing, Bush House, Aldwych, London, W.C.2
- B.B.C. Club, Ariel Radio (Lime Grove) (G3NTS), c/o S. W. Lane, SA11, B.B.C. TV Studios, Lime Grove, London, W.12 and not as listed under Ariel Radio Group.
- South Yorkshire Amateur Radio Society. The Hon. Secretary is now D. Critchlow, 63 Gattison Lane, Rossington, nr. Doncaster, Yorks.

THE following is an addition to the list published in the August 1962 issue.

Radio Research Station Amateur Radio Society, c/o R. G. Flavell (G3LTP), Ditton Park, Slough, Bucks.

Affiliated Society Representative

THE address of Mr. G. F. Nottingham (G3DTA), Affiliated Society Representative for York Amateur Radio Society, is now 23 Walney Road, Heworth, York.

Courses of Instruction for the R.A.E.

THE following are additions to the list of centres at which instruction in preparation for the Radio Amateurs' Examination is to be given during the forthcoming session:

- Plymouth: Devonport Technical College. Details may be obtained from the Hon. Secretary of the Plymouth Radio Club, R. Hooper, 2 Chestnut Road, Peverell, Plymouth.
- Port Talbot College of Further Education, Margam. Intending students should contact H. G. Hughes (GW4CG), 20 Austin Avenue, Porthcawl, Glamorgan.
- Wembley Evening Institute, Copland School, High Road, Wembley. Enrolment will take place from 7.15 to 9.15 p.m. on September

17-20. Classes will be held on Mondays (Morse Practice, 7 to 8 p.m., Radio Theory, 8 to 10 p.m.) and will commence the following week.

Radio Amateurs' Examination, November 1962

THE following are additions to the list of centres published in the June issue, at which the Radio Amateur's Examination will be held on November 2, 1962, from 6.30 to 9.30 p.m. Candidates must apply direct to the college concerned not later than October 1, 1962.

- ABERDEENSHIRE
Aberdeen: Education Dept.
- CORNWALL
Redruth: Technical College
- CUMBERLAND
Carlisle: Technical College.
- ESSEX
Harlow: College of Further Education.
- HAMPSHIRE
Farnborough: Technical College.
- SURREY
Carshalton: Technical College.
- WORCESTERSHIRE
Redditch: College of Further Education.
- CHANNEL ISLANDS
St Helier: Technical College.

Can You Help?

- D. Kitson (B.R.S. 24801), Nethway, 7 Moorland Drive, Brierfield, Lancashire, who requires the circuit diagram of the NC156S receiver?
- P. J. Flanagan, Gortin, Omagh, Co. Tyrone, Northern Ireland, who requires the manual for the R.C.A. CRV52233 transmitter?
- R. E. Sedgwick (G2BSN), 8 St Margaret's Road, Chelmsford, Essex, who requires the handbook and/or circuit diagram for the CR200 receiver or the B29?

The Twenty-fifth B.E.R.U. Contest 1962

Tabulation of Results

HIGH POWER SECTION

Posn.	Call-sign	Points	Posn.	Call-sign	Points	Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	*ZBIHC	3422	29	*VEIIM	1705	57	VK7WA	1094	85	G2AJB	620
2	*ZC4IP	3245	30	G3GFG	1690	58	VK4XW	1085	86	G3FTQ	575
3	*G5WV	3035	31	G3HDA	1680	59	G6VC	1050	87	VK2QW	565
4	*VK5NO	3009	32	G2DUJ	1643	61	VEIEK	1050	88	G3LWS	549
5	*VE2YV	2890	33	*VSIKF	1635	62	VE6HG	1045	89	VE2BV	550
6	VE2WVW	2849	34	*ZK1AR	1595	63	G3MPB	990	90	VE1AE	545
7	ZC4PB	2780	35	*VE4MF	1544	64	VE3RIT	905	92	VE1DB	540
8	VE2NV	2760	36	*VK4XJ	1540	65	G3KRC	960	93	VE3CYJ	540
9	*G4CP	2755	37	G5VUJ	1525	66	G2FYT	950	94	G3GUP	525
10	G3FXB	2736	38	G3FPK	1475	67	G3NAN	945	95	G8KU	445
11	*VR2EA	2704	39	VK3AXK	1464	68	VO2NA	940	96	VE5PM	450
12	*ZLIHY	2603	40	VQ4KPB	1450	69	VP9BO	930	97	G3GJF	440
13	G5RP	2595	41	G5HZ	1423	70	G3AGN	868	98	G3GSZ	415
14	*VK2GW	2450	42	VE1PA	1405	71	G3H2L	865	99	VQBBM	410
15	*5N2JKO	2445	43	5N2RSB	1395	72	VK4SS	800	100	G5DF	400
16	G2DC	2415	44	G3KSH	1394	73	G3JY	785	102	VE2EBU	400
17	VE2AYY	2395	45	G3KSY	1380	74	G2BLA	750	103	G2ZR	335
18	*ZLAWJ	2365	46	G6OY	1370	75	G3PQR	744	104	G3MNQ	300
19	*ZL4BO	2305	47	VE3BMB	1360	76	VK3ARX	738	105	G3MWZ	290
20	*VO1FB	2220	48	G6GN	1319	77	VE3HB	735	106	G3WP	285
21	*VE7ZM	2085	49	VE2WA	1300	78	VK5JT	730	107	G2HDR	275
22	G2QT	2070	50	G2GM	1265	79	G5ZT	710	108	VE5JV	210
23	VO1DX	2000	51	G3KHA	1255	80	VK2RA	694	109	G8QZ	190
24	*5H3HD	1985	52	5H3HZ	1250	81	VO2JG	690		GW3IJE	105
25	*VE3HE	1934	53	G3GEV	1185	82	G5JU	679			
26	G3AAE	1874	54	G3LHJ	1185	83	G3KPU	670			
27	*VF3MC	1765	55	VE3LZ	1185	84	GW3CW	640			
28	G8PB	1749	56	VE4OX	1099						

LOW POWER SECTION

Posn.	Call-sign	Points	Posn.	Call-sign	Points	Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	*VK2APK	2052	5	*VK7SM	1474	9	*G3HRY	1160	13	*ZLIMT	800
2	*MP4BBE	1863	6	*ZL3US	1360	10	*ZB1CR	1135	14	*ZL2ARL	780
3	*VK3RJ	1808	7	VK3AYR	1345	11	G3DYY	919	15	VK9AU	705
4	*VQ4IN	1555	8	VK3ZC	1295	12	G3GNS	908	16	G3OOU	415

RECEIVING SECTION

Position	Name	Points	Position	Name	Points
1	*W. E. Wilkinson (B.R.S.20317)	2704	7	F. C. Powell (B.R.S.18461)	1150
2	*E. H. Sherlock (B.R.S.6604)	1997	8	C. Harrington (B.R.S.2292)	1070
3	M. Harrison (B.R.S.24733)	1725	9	W. J. C. Pinnell (B.R.S.21624)	1005
4	D. S. Kendall (B.R.S.24643)	1485	10	N. A. T. Hardy (A.2753)	695
5	*E. W. Trebilcock (B.E.R.S.195)	1485	11	D. M. Grantly (WIA/L2022)	635
6	H. M. Davison (A.2122)	1310	12	L. J. Cleggett (B.R.S.2834)	580

* Denotes certificate winners.

† Denotes late entry.

Check logs from G6CJ, G8PL, G8UQ, VE2YA, VE3BWY, VE3CYL, VE3DDU, VK8UX, VO1BD, VU2MD and ZE3JO are gratefully acknowledged.

CONTEST NEWS



— RESULTS — REPORTS — RULES —

First 420 Mc/s Open Contest 1962

THE general consensus of opinion is that on May 26-27, 1962, the elements provided everything but a dust storm. Reports from entrants in the First 420 Mc/s Open Contest held that weekend mention thunder, lightning, rain, hail, snow and, for good measure, a north-east wind. Radio conditions were almost as adverse.

GW3ATM/P managed to get his car stuck in the mud while inspecting a Forestry Commission tower as a possible site—a call on the mobile gear to G6GN resulted in the arrival of G3OYM/T and two motor cyclists to help dig him out.

The contest was won by P. K. Blair (G3LTF) of Chelmsford with 1496 points, followed by B. A. Maycock (G3JWQ/P) with 1188 points and C. L. Desborough (G3NNG/P) with 1010. The latter reports calling G3EIW/P, G3JHM/A, G2HDJ, G3KDG, G2FNW, G3KPT, G3MPS and G3GDR repeatedly without result!

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3LTF	1496	12	G6GN	498
2	G3JWQ/P	1188	13	G2HDJ	488
3	G3NNG/P	1010	14	G3BYY	429
4	G3JMA	931	15	G3HWR	338
5	G3HAZ/P	751	16	G3EIV/P	262
6	G2XV	744	17	G3LQR	258
7	G5NF	718	18	GW3ATM/P	227
8	G3KMT/P	691	19	G3FIJ	143
9	G3FDT/P	617	20	G3JDM/P	136
10	G2CIW	612	21	G5UM	117
11	G5DF	537			

LONDON U.H.F. GROUP

will meet at the Whitehall Hotel, Bloomsbury Square, London, W.C.1.

at 7.30 p.m. on Thursday, October 4 and November 1, 1962
All v.h.f. and u.h.f. enthusiasts welcome.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the 18th of the month preceding publication. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out the copy, preferably typed double spaced, in the style used below. Standing instructions for more than three months ahead cannot be accepted.

DATES FOR YOUR DIARY

September 22.—Region 9 Mobile Rally at Weston-super-Mare.
September 23.—Region 9 O.R.M. at Weston-super-Mare.
September 23.—Surrey Radio Contact Club 144 Mc/s D/F Hunt.
October 6.—Region 7 O.R.M. at Earls Court, London.
October 20-21.—Jamboree-on-the-Air.
October 26.—London Lecture Meeting at I.E.E.
October 31-November 3.—R.S.G.B. International Radio Communication Exhibition, Seymour Hall, London W.1.
December 15.—Annual General Meeting, Overseas House, London S.W.1.
March 29, 1963.—London Lecture Meeting at I.E.E.

REGION 1

Ainsdale (A.R.S.).—September 26, October 10, 24, 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revridge Road.
Blackpool (B. & F.A.R.S.).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate.
Bury (B.R.S.).—October 9 (proposed date for Dinner), Knowsley Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Eccles (E. & D.R.C.).—Tuesdays, 8 p.m., The Congregational Mission Church, King Street.
September 25.—visit by Regional Representative.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queen's Drive, Stoneycroft.
Macclesfield.—September 18, October 2, 16, 30, 42 Jordongate.
Manchester (M. & D.A.R.S.).—Wednesdays, 7.30 p.m., King George VI Club, North Road, Moston, Manchester 10. (S.M.R.C.).—Fridays, 7.45 p.m., Rackhouse Community Centre, "Rackhouse," Daine Avenue, Northenden.
Morecambe.—October 3, 125 Regent Road.
Preston (P.A.R.S.).—September 25, October 9, 23, St. Paul's School, Pole Street. (Morse practice at 7.30 p.m.)
Southport (S.R.S.).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport (S.R.S.).—September 26, October 10, 24, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—September 19, October 3, 17, 7.45 p.m., Harding House, Park Road West, Cloughton.

REGION 2

Barnsley.—September 28 ("Simple Transistor Circuits"), October 12 ("Power Supplies" by Norman Simpson), 7.30 p.m., King George Hotel, Peel Street.
Bradford.—September 18, 7.30 p.m., 66 Little Horton Lane.
Catterick.—Tuesdays and Thursdays, 7.30 p.m., Club Room, Vimy Road, Catterick Camp.
Halifax (Northern Heights).—September 26 (Ragchew), October 10 (Arrangements for Scout Jamboree), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., Chapman's Yard, North Street.

REGION 3

Birmingham (M.A.R.S.).—September 18, 7.30 p.m., Birmingham and Midland Institute, Paradise Street. (Slade).—September 21 (Display of Members' Apparatus), 7.45 p.m., The Church House, High Street, Erdington. (South).—September 20, 7.45 p.m., Friends' Institute, 220 Moseley Road, Birmingham, 12.
Coventry (C.A.R.S.).—Mondays, 7.30 p.m., R.A.F.A. Club, Holyhead Road, Coventry.

Cannock (A.R.S.).—October 4, 7.30 p.m., White Lion Hotel, Bridgtown.
Stourbridge & District (S.T.A.R.S.).—October 2, 7.45 p.m., Foley College, Stourbridge.
Sutton Coldfield.—September 23 (Club Night), October 11 ("Components—Their Uses and Abuses"), 7.30 p.m., 92 The Parade, Sutton Coldfield.

REGION 4

Chesterfield (C. & D.A.R.S.).—September 26, October 10, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.
Derby (D. & D.A.R.S.).—September 19 (Transistors II), September 26, (D/F League Fixture No. 6), October 3 (Surplus Sale), October 10 (Technical Forum), October 17 ("My experiences at Cape Canaveral Space Exploration Centre" by J. K. E. Tunaley), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D. S. W. Exp. Soc.).—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (G. & D.A.R.S.).—September 27, October 11, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Grantham (G. & D.A.R.S.).—Mondays, 7.30 p.m., Club Rooms, rear of Manners Arms Hotel, London Road, Grantham.
Loughborough (A.R.S.).—Fridays, 7.30 p.m., Corporation Hotel, Wharnciffe Road, Loughborough.
Leicester (L.R.S.).—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.

Lincoln (L.S.W.C.).—September 16, Rally and Hamfest. Meetings fortnightly on Wednesdays, Lincoln Technical College, Cathedral Street, Lincoln.

Melton Mowbray (A.R.S.).—September 20 (A.G.M.), 7.30 p.m., St. John Ambulance Centre, Asfordby Hill, Melton Mowbray.
Nottingham (A.R.C.N.).—Tuesdays (R.A.E.), Thursdays (Lecture), 7.15 p.m., Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Northampton (N.S.W.C.).—Thursdays, 7 p.m., Allens Pram Works, 8 Duke Street, Northampton.

Retford & Worksop (N.N.A.R.C.).—Tuesdays (Beginners), Thursdays (Club), 7.30 p.m., Victoria Institute, Eastgate, Worksop, Notts.

REGION 5

Cambridge (C. & D.A.R.C.).—Fridays 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
March (M. & D.R.A.S.).—Tuesdays, 7.30 p.m., Police Headquarters, High Street.
Sheffield (S. & D.A.R.S.).—Thursdays, Digs Well House, Sheffield.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.

REGION 7

Acton, Brentford and Chiswick (A.B.C.R.C.).—September 18 (Transistorized Radio Control by J. Barfoot) 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick.
Bexleyheath (N.K.R.S.).—September 27 (John Black on "Scrambler"), 8 p.m., Congregational Hall, Clock Tower, Bexleyheath.
Croydon (S.R.C.C.).—October 9 (P. Pennell, G2PL, on "Portable Operation"), 7.30 p.m., Blacksmiths Arms, South End, Croydon.
Dorking (D. & D.R.S.).—September 25, 8.30 p.m., Kings Head, Holmbury St. Mary.
East Ham.—Tuesdays fortnightly, 8 p.m., Leigh Road, East Ham.
East London.—September 23 ("Aerials" by R.S. Roberts, G6NR), October 21 ("Transistor Receivers" by John Gazeley, B.R.S.20533), 3 p.m., Lambourne Room, Town Hall, Ilford.
East Molesey (T.V.A.R.T.S.).—October 3, Carnarvon Castle Hotel, Hampton Court.

Edgware & Hendon (E. & D.R.S.).—Second and fourth Mondays in each month, 8 p.m., John Keeble Hall, Church Close, Deans Lane, Edgware.
Harlow.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.

Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), Fridays (Club), 7.30 p.m., Montem School, Hornsey Road, N.7.
Hounslow (H.A.D.R.C.).—Mondays, 7.30 p.m., Isleworth Town School, Twickenham Road, Hounslow.

Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).

Kingston.—Lectures alternate Thursdays, Y.M.C.A., Eden Street, Kingston (Morse Classes weekly at 2 Sunray Avenue, Tolworth).

Mitcham (M. & D.R.S.).—Lectures alternate Fridays (Morse classes 7 p.m.), "The Canons," Madeira Road, Mitcham.

New Cross (C.A.R.S.).—Fridays, 7.30 p.m., 225 New Cross Road, S.E.14.

Norwood and South London (C.P. & D.R.C.).—September 15 (Film Show), October 20 (Hi-fi and Stereo), 8 p.m., C.D. Training Centre, Bromley Road, Catford.

Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.12.

Purley (P. & D.R.C.).—First and third Friday in each month, Railway Mens Hall (side entrance), Whytecliffe Road, Purley.

Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road.
 at 12.30 p.m. on Friday, September 21, October 19 and November 16, 1962.
 Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

Science Museum (C.S.R.S.).—September 18, 6 p.m., Science Museum, South Kensington.

Sidcup (C.V.R.S.).—First Thursday in each month, 8 p.m., Church Hall, Court Road, Eltham. Fourth Tuesday in each month, 8 p.m., Sidcup Hotel, Sidcup.

Southgate & District.—October 11 (Lecture on "Army Radio"), November 8 (G6QM Constructors' Trophy Contest), 8 p.m., Arnos School, Wilmer Way, N.11.

Slough (S.A.R.S.).—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street.

Sutton & Cheam (S.C.R.S.).—September 18 (Tom Withers on "V.H.F. Equipment"), "The Harrow", High Street, Cheam.

Welwyn Garden City.—October 18, 8 p.m. Open meeting for regional groups and clubs (Mullard film show, grand auction of equipment) at the Vineyard Community Centre, Digs Well Road, Welwyn Garden City.

REGION 8

Crawley (C.A.R.C.).—September 26 (Junk Sale), 8 p.m., West Green Centre. October 10—informal, for details contact G3FRV.

REGION 9

Bath.—September 26, 7.30 p.m., Committee Room, Bath Technical College, Lower Borough Walls, Bath.

Bristol.—September 21 ("V.H.F." by R. C. Hills, G3HRH), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol 1.

Burnham-on-Sea.—October 9, 8 p.m., Crown Hotel, Oxford Street.

Exeter.—October 2, 7.30 p.m., Y.M.C.A., St. David's Hill, Exeter.

Falmouth (C.R. & T.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.

Plymouth (P.R.C.).—First Tuesday in each month, 7.30 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St. Andrew's Cross, Plymouth.

South Dorset (S.D.R.S.).—First Friday in each month, 7.30 p.m., alternately at Waverley Hotel, Westham, Weymouth, and Labour Rooms, West Walks, Dorchester. (October meeting at Weymouth.)

Torquay (T.A.R.S.).—October 13 (Film Show), 7.30 p.m., Y.M.C.A., The Castle, Torquay.

Weston-super-Mare.—First Tuesday in each month, 7.15 p.m., Technical College, Lower Church Road.

Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—October 8 (Annual General Meeting and Junk Sale), 7.30 p.m., T.A. Centre, Park Street, Cardiff.

REGION 14

Motherwell.—September 21, 7.30 p.m., Carlin Hall, Motherwell.

REGION 16

Basildon (B. & D.A.R.S.).—For details of meetings in September, contact G3ORT or G3IFN. **Chelmsford (C.A.R.C.).**—First Tuesday in each

month, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

Southend (S. & D.R.S.).—Alternate Fridays, 7.30 p.m., Canteen of E. K. Cole, Ltd., Priory Road, Prittlewell. First meeting of 1962/63 session, October 5 (Reunion). October 19 (Quiz).

REGION 17

Bournemouth (W.A.R.G.).—September 17, October 15 (Morse Class and Ragchew), 8 p.m., 47 New Road, Northbourne. October 1 ("Bring and Buy Sale"), 7.45 p.m., "Cricketers Arms," Windham Road, Bournemouth.

Portsmouth.—Wednesdays, 7.30 p.m., The Community Centre, Twyford Avenue, Portsmouth.

Regional and Club News

Clifton Amateur Radio Society.—The winner of the society's second D/F contest was Malcolm Byars (G3PIF). A junk sale, conducted by G3FVG, will be held on September 21. More than 30 members now hold amateur licences. *Hon. Secretary:* C. E. Godsmark, 211 Manwood Road, London, S.E.4.

Crawley Amateur Radio Club.—Visitors and prospective members are always welcome at meetings, details of which are given in *Forthcoming Events*. *Hon. Secretary:* R. G. B. Vaughan (G3FRV) 9 Hawkins Road, Tilgate, Crawley, Sussex.

Crystal Palace and District Radio Club.—A film show will be held at the C. D. Training Centre, Bromley Road, Catford, on September 15 at 8 p.m. A lecture on hi-fi and stereo is being arranged for the meeting on October 20. *Hon. Secretary:* G. M. C. Stone (G3FZL), 10 Liphook Crescent, Forest Hill, London, S.E.23.

Dudley Amateur Radio Club.—Meetings are held fortnightly at 7.30 p.m. at Priory Hall, Dudley. On September 28 at 8 p.m. G2DTQ will conduct a "S.W.L.'s v. Amateurs Radio Quiz" while the A.G.M. is arranged for October 12. *Hon. Secretary:* D. H. W. Pratt (G3MHS), 23 Kent Street, Upper Gornal, Dudley, Worcs.

Farnborough Technical College Radio Society.—On July 4, a display of microwave and other radio gear and audio high fidelity equipment was given in the College Electronics Lab. and the club station, G3POW, operated from the grounds. A dinner is to be held during the autumn. Meetings are held on Mondays and Wednesdays. Classes in preparation for the R.A.E. and Morse test are held on Wednesdays. Details may be obtained from Dr. D. M. Manley (G3OWF), Farnborough Technical College, Boundary Road, Farnborough, Hants.

Harrow, Radio Society of.—At a special General Meeting on August 10, A. C. W. Biddell (G3GNM), 114 Kingshill Avenue, Kenton, Harrow, was elected *Hon. Secretary* in succession to A. C. Butcher who has had to resign owing to pressure of business. A "Brains Trust" is to be held on September 28. Slow Morse practice sessions are held fortnightly, the next two being on September 21 and October 5. Meetings are held at Roxeth Manor County School, Eastcote Lane, South Harrow, on Fridays commencing at 8 p.m.

Leamington Spa.—It is proposed to form a local society to cater for those interested in amateur transmitting, short wave listening and other aspects of radio and electronics. All interested are invited to attend a meeting to be held at the Oddfellows Hall, Warwick Street, Leamington Spa, on Friday, September 28, at 8 p.m.

Liverpool and District Amateur Radio Society.—The society's annual Amateur Radio Exhibition was held at the Liverpool Show, at which there was an attendance of 103,298. From July 19-21 the exhibition station GB2LS made 376 contacts with 42 different countries. Home-built equipment, radio control of models gear and other aspects of Amateur Radio were displayed. Amateurs from DL, GI, GW, OH, VS1, W, ZS1 and 9G1 visited the stand and 30 new members were enrolled. Details of other activities may be obtained from the *Hon. Secretary:* H. James (G3MCN), 448 East Prescott Road, Knotty Ash, Liverpool 14.

London Members' Luncheon Club.—There was an attendance of 45 at the August meeting presided over by Stan Vanstone (G2AYC). Among the visitors were K7EIP, K9AUR, VK3AHR, VE2CA, ZB1A, 5N2AMS, 5N2DMS and LA9AC. The next meeting at the Bedford Corner Hotel, London, W.C.1, will be

on September 21. Reservations may be made by telephoning G2FUX at RU1slip 2763 or R.S.G.B. Headquarters, HOLBORN 7373.

Mitcham and District Radio Society.—The G5UX Key Award for 1962 has been awarded to K. Frankcom (G3OCA). The contest has now started again for the 1963 award. Meetings are held at "The Cannons," Madeira Road, Mitcham, the next being on September 21 (Club Station Night). *Hon. Secretary:* M. Pharoah (G3LCH), 1 Madeira Road, Mitcham, Surrey.

Northern Heights Amateur Radio Society.—Recent events have included entertaining members of the Manchester Radio Society to a "pea and pie" when G3LGN gave a talk on D/F, and participation in the Warley Fete, at which G3MDW/A was operated. In addition G2DYY/M took part in the fete procession. Details of future plans are given in *Forthcoming Events*. *Hon. Secretary:* Arthur Robinson (G3MDW), Cancy Cabin, Ogden, Halifax.

Plymouth Radio Club.—An R.A.E. course is to be held at the Devonport Technical College and details may be obtained from the *Hon. Secretary*. The club will be taking part in the Jamboree-on-the-Air under the call-sign G3PRC. A dinner and social is being planned for the Christmas period. *Hon. Secretary:* R. Hooper, 2 Chestnut Road, Peverell, Plymouth.

Reigate Amateur Transmitting Society.—Informal meetings at The Tower, Redhill, on the first Saturday in each month at 8 p.m. have been started. The regular club-night is still the third Saturday in the month at the same venue, and on September 15



Members of the Conway Valley Amateur Radio Club at their first annual dinner at Conway, North Wales. From left to right, GW3CW, G. Williams, GW3MDK, GW3YR, GW3HGL, GW3JI and GW3LCQ. Since the club was formed with three members in 1959, membership has risen to 20, of whom 12 are licensed. Meetings are held at the Albert Hotel, Madoc Street, Llandudno, on the second Thursday in each month.

David Deacon (G3BCM) will be giving his illustrated lecture entitled "The Radio Amateur and Interference," commencing at 7.30 p.m. Members of other clubs will be most welcome. The annual sale of surplus equipment is to be held on October 20. At the August meeting G3FM gave a talk on "Crystal Filters." The society has obtained the call-sign G3REI. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill, Surrey.



Captain J. E. P. Philp (G3NJM) operating the Royal Signals Amateur Radio Society station, G3CIC, at Catterick Camp. Equipment includes K.W. Vanguard and Viceroy transmitters, and Eddystone 888 receiver. All h.f. bands and modes of transmissions are used as conditions permit and contacts with past and present members of the Corps are always welcome.

(Photo by John R. Fawcett, Leyburn)

Royal Signals Amateur Radio Society.—The society has been in existence for a little over a year and although membership has grown steadily there must be many past and present members of the Royal Signals who are not aware of its formation. Membership is open to all those who have served in or are serving in the Corps and costs 2/6 p.a. or 2 gns. for life membership. The present officers are: *President*—The Signal Officer-in-Chief, Major-General A. M. W. Whistler, C.B.E.; *Vice-President*—Major-General E. S. Cole (ret.), C.B., C.B.E. (G2EC); *Treasurer*—Major L. Beaumont; *General Secretary*—Captain J. E. P. Philp (G3NJM), 11 Signal Regiment, Catterick Camp, Yorkshire. The society issues a newsletter, *Mercury*.

Scarborough Amateur Radio Society.—A full programme of lectures has been arranged for the weekly meetings until the end of the year. Visitors are always welcome. Martin Tetley, a junior member aged 14 years 9 months, has passed his R.A.E. and Morse test and awaits his call-sign. *Hon. Secretary:* P. B. Briscoe (G8KU), Roseacre, Irton, Scarborough.

South Dorset Radio Society.—At the August meeting a talk on the Jamboree-on-the-Air was given by the British organiser, G3BHK. There was also a sale of members' surplus equipment. *Hon. Secretary:* C. E. Biggs (G2TZ), 54 Prince of Wales Road, Dorchester, Dorset.

South Yorkshire Amateur Radio Society.—Meetings are now held every Thursday and a junk sale is planned for September 27. A series of lectures by G3JLZ on radio theory is to commence shortly. *Hon. Secretary:* D. Critchlow (G3PTV), 63 Gattison Lane, Rossington, near Doncaster.

Yeovil Amateur Radio Club.—Members have recently visited Hinkley Point Nuclear Power Station and attended a Mullard film show at Taunton. There is considerable Top Band portable and mobile activity among members. *Hon. Secretary:* D. L. McLean (G3NOF), 9 Cedar Grove, Yeovil.

York Amateur Radio Society.—An R.S.G.B. recorded lecture on "Transmitter Design and TVI" will be given at the meeting at the clubrooms, Fetter Lane, York, on October 11. Instruction for the R.A.E. and Morse test is given on Tuesday evenings. *Hon. Secretary:* N. Spivey (G3GWI), 80 Melton Avenue, Clifton, York.

Wolverhampton Amateur Radio Society.—A talk by G3KFD on single sideband has been tentatively arranged for September 24 and the A.G.M. for October 8. *Hon. Secretary:* J. R. Rickwood (G3JJR), 738 Stafford Road, Fordhouses, Wolverhampton.

Can You Help?

● J. McCann (GM3LOM), 10 Southfield Crescent, Coatbridge, Scotland, who requires information on the B21 receiver?

● A. R. West (B.R.S.3744), "Hill Side," Penmachno, Betws-y-Coed, North Wales, who seeks information about the BC348 Receiver including the Service Manual and advice on its conversion to amateur band use.

● C. W. Austin (B.R.S.22019), 135 Shaftesbury Avenue, Kenton, Middlesex, who requires the circuit diagram and/or other information and any details of conversions of the Indicator Type 97 for use as an oscilloscope?

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12.00	North East Scotland
145.50 Mc/s	11.00	Beaming north from Leeds
145.3 Mc/s	11.15	Beaming east from Leeds
	11.30 a.m.	Beaming north west from Sutton Coldfield
	11.45 a.m.	Beaming south west from Sutton Coldfield
145.1 Mc/s	12 noon	Beaming north from London area
	12.15 p.m.	Beaming west from London area

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from Affiliated Societies and from non-affiliated societies in process of formation will be welcome.

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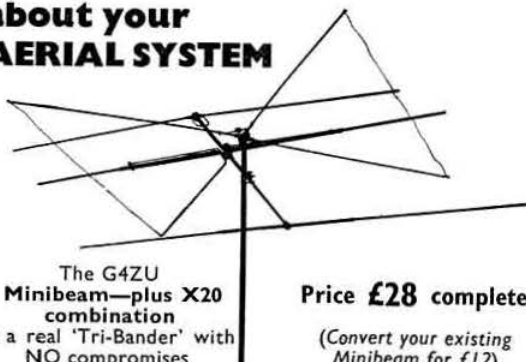
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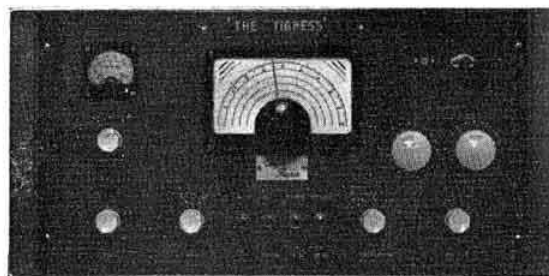
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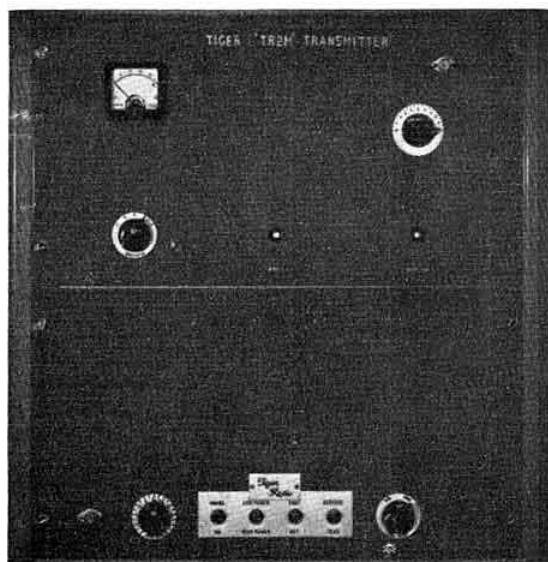
THE TIGRESS 10-80 Metres 6146 PA, KT 77 modulators, compact and simple to operate. 57 Guineas.

NEW RANGE OF ANTENNA COUPLERS 10-80 Metres. 8" x 6½" x 3½". 75 AC—52-80 ohms unbalanced. 300 AC—52-300 ohms balanced. 600 AC—300-1000 ohms balanced. Any type £6 19s. 6d. plus 5/- postage.

WOLFENDALE & HOBDEN trading as

**TIGER RADIO LTD., 36A KIMBERLEY ROAD
SOUTHBORNE, BOURNEMOUTH, HANTS.**

Telephone: Bournemouth 48792



TR 2M—QRO 2 Metre Transmitter QQVO6/40 PA, KT 88 modulators, crystal control. 100 watts input on 5 spot frequencies. 80 Guineas.

RF Section only, in cabinet. 35 Guineas.

THIS MONTH'S BARGAINS

AERIAL EQUIPMENT

TWIN FEEDER: 300 ohm twin ribbon feeder, similar K25, 6d. per yard. K35B Telcon (round), 1/6 per yard. Postage 1/6 any length. 75 ohm Twin Feeder, 6d. per yard.

COPPER WIRE: 14G H/G 140 ft., 17/-; 70 ft., 8/6. Post and packing 2/-. Other lengths pro rata.

RIBBED GLASS, 3" aerial insulators, 1/9 each. P. & P. 1/6 up to 12.

CERAMIC FEEDER SPREADERS, 6" type F.S., 10d. each. P. & P. 2/- up to 12.

CERAMIC "T" PIECES, type A.T. for centre of dipoles, 1/6 each. P. & P. 1/-.

2 METRE BEAM 5 ELEMENT W.S. YAGI. Complete in box with 1" to 2 1/2" mast head bracket. PRICE 49/-, P. & P. 3/6

SUPER AERIAL CABLE, 75 ohm, 300 watts, very low loss, 1/8 per yard. P. & P. 2/-. 50 ohm, 300 watt coax, very low loss, 1/9 yd., P. & P. 2/-.

TOUGH POLYTHENE LINE, type ML1 (100 lbs.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lbs.), 4d. per yd. or 25/- per 100 yds., post free, ideal for Guys, L.V.V. Supports, Hal-yards, etc.

NEW MOSLEY POWER BEAMS
Write for details.

BC221

FREQUENCY METERS

In good condition with Cal. Book,
All checked £12.10.0

Or with A.C. Power Unit £15.10.0

SCREENED MICROPHONE CABLE, 1st grade, 9d. yard. Plus postage.

12 CORE SCREENED CABLE 2/- yard

10 CORE (5 PAIRS) SCREENED CABLE 1/8 yard. All plus 1/6 P. & P.

GELOSO V.F.O. UNITS Type 4/102 with new dial and escutcheon. Output on 80, 40, 20, 15 and 10 metres. For 2-807 or 6146 tubes. Only £8.5.0. Set of valves 24/- post free.

FERRITE BEADS for the S Band Aerial, 50 for 15/- or 100 for 30/- post paid.

ABSORPTION WAVEMETERS: 3.00 to 35.00 Mc/s in 3 Switched Bands, 3.5, 7, 14, 21 and 28 Mc/s Ham Bands, marked on scale. Complete with indicator bulb. A MUST for any Ham shack. Only 22/6, POST FREE.

ROTARY TRANSFORMERS, 12 v Input, 490 v, 65 ma. Out. 17/6 each. P. & P. 3/-.

AMERICAN 807 VALVES. Ex W.D. 7/6 each or 4 for 25/-, P. & P. 2/-.

SHADED POLE MOTORS, 230 v or 110 v operation, ideal for fans, blowers or models. Single Unit 12/6 plus 2/- P. & P. or Pair £1 plus 2/6 P. & P.

RACK MOUNTING PANELS: 19" x 5 1/2", 7", 8", or 10 1/2", black crackle finish, 5/9, 6/6, 7/6, 9/- respectively, postage and packing 2/-.

VARIABLE CONDENSERS. All brass with Ceramic end Plates and Ball Race Bearings, 50 pf, 5/9; 100-6/6; 160-7/6; 240-8/6; and 300 pf, 9/6. Extension for ganging, P. & P. 1/-.

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DEPT. 'B', 110 DALE END, BIRMINGHAM 4

Telephone (all depts.): Central 1635

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Please send all mail orders and correspondence to our Head Office at: 14 SOUTH WHARF ROAD, PADDINGTON, LONDON, W.2. Tel.: AMBASSADOR 0151/2

Please add 2/6 in the £ to all purchases by mail, to cover packing and postage.

TESTED AND GUARANTEED VALVES									
0A2	6/-	3Z4	6/-	6J7G	5/-	12C5	3/-	DH83	6/-
0A3	11/-	3Z4	9/-	6K6GT	7/-	12E1	29/-	06FL15A	20/-
0B2	6/-	3Z4G	7/-	6K7G	2/-	12J5GT	3/6	06FL15	12/-
0B3	6/-	6A3	8/-	6K8	8/-	12K7GT	7/-	06FL15	10/6
0C1	5/6	6A5	5/-	6L5G	6/-	12K8	10/-	06FL13	10/6
0C3	5/-	6A5G	7/-	7H6	6/-	12Q7GT	6/-	35L5GT	6/-
1A3	3/-	6AB4	6/6	6L6G	7/-	12S4T	7/-	35W4	6/-
1A3GT	5/-	6AB7	4/-	6L7	3/-	12S6GT	3/-	35Z4GT	8/-
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166GT	7/-	6AG3	3/-	6N7	6/-	12S8GT	5/-	42	5/-
1H5GT	9/-	6AG7	7/-	6Q7G	6/-	12S9GT	7/6	50L6GT	7/-
1H4	3/-	6AK5	8/-	6S4T	6/-	12S9GT	7/6	50L6GT	7/-
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1LN5	5/-	6AL5	4/-	6SD7GT	5/-	12S9GT	7/6	50L6GT	7/-
1N3GT	9/-	6AM5	3/-	6SH7	3/-	12S9GT	7/6	50L6GT	7/-
1N5	6/-	6AM6	4/6	6S7	7/-	12S9GT	7/6	50L6GT	7/-
1S4	3/-	6AQ3	8/-	6S8GT	5/-	12S9GT	7/6	50L6GT	7/-
1S5	5/6	6AR6	5/-	6SL7GT	6/6	12S9GT	7/6	50L6GT	7/-
1T4	4/-	6AT6	5/-	6SN7GT	4/6	12S9GT	7/6	50L6GT	7/-
1T5GT	6/-	6AUG	7/-	6S9GT	6/-	12S9GT	7/6	50L6GT	7/-
1U4	7/-	6AV6	6/-	6S87	6/-	12S9GT	7/6	50L6GT	7/-
1U5	6/-	6B7	5/-	6V6	4/-	12S9GT	7/6	50L6GT	7/-
1V	5/-	6B8	5/-	6V6GT	7/-	12S9GT	7/6	50L6GT	7/-
2A3	5/-	6B9G	6/-	6X4	5/-	12S9GT	7/6	50L6GT	7/-
2C2A	4/-	6B9G	6/-	6X5G	4/6	12S9GT	7/6	50L6GT	7/-
2C3	12/-	6B16	8/-	6X5GT	6/6	12S9GT	7/6	50L6GT	7/-
2C4	14/-	6B17A	8/-	6Y6G	6/-	12S9GT	7/6	50L6GT	7/-
2D21	6/-	6B7	12/-	6Z4	6/-	12S9GT	7/6	50L6GT	7/-
2E26	20/-	6B8	5/-	7B5	6/-	12S9GT	7/6	50L6GT	7/-
2X2	3/-	6B9G	9/-	7B7	8/-	12S9GT	7/6	50L6GT	7/-
2X2A	7/-	6C4	2/6	7C7	3/-	12S9GT	7/6	50L6GT	7/-
3A4	4/-	6C6	8/-	7E5	3/-	12S9GT	7/6	50L6GT	7/-
3A5	5/-	6C6G	5/-	7H2	6/-	12S9GT	7/6	50L6GT	7/-
3CX100A5	6/6	6C8G	7/-	7N7	5/6	12S9GT	7/6	50L6GT	7/-
3D6	100/-	6D6G	17/-	7Q7	6/-	12S9GT	7/6	50L6GT	7/-
3D6	4/-	6C16	6/-	7Y4	5/-	12S9GT	7/6	50L6GT	7/-
3Q4	7/-	6C16	10/-	7Z4	5/-	12S9GT	7/6	50L6GT	7/-
3Q8GT	7/6	6C4	14/-	11E2	20/-	12S9GT	7/6	50L6GT	7/-
3S4	6/-	6D6	6/-	11E3	20/-	12S9GT	7/6	50L6GT	7/-
3V4	6/6	6E7	6/-	12A6	6/-	12S9GT	7/6	50L6GT	7/-
4-65A	60/-	6F5G	6/6	12A8GT	6/-	12S9GT	7/6	50L6GT	7/-
4X150A	30/-	6F32	5/-	12AH7GT	5/-	12S9GT	7/6	50L6GT	7/-
5B/25AM	30/-	6F33	4/-	12AT6	6/-	12S9GT	7/6	50L6GT	7/-
5R40V	9/-	6G6G	2/6	12AT7	5/-	12S9GT	7/6	50L6GT	7/-
5U4G	5/-	6H6	1/6	12AU7	5/-	12S9GT	7/6	50L6GT	7/-
5V4G	8/-	6J4	9/-	12AX7	6/-	12S9GT	7/6	50L6GT	7/-
5V3G	4/-	6J3G	3/-	12BA6	5/-	12S9GT	7/6	50L6GT	7/-
5Y3GT	6/-	6J6	3/6	12BE6	5/-	12S9GT	7/6	50L6GT	7/-

TRANSISTORS

Mullard Top Quality: OC44, 7/6; OC45, 6/6; OC72, 8/-; OC78, 7/4; OC78D, 7/-; OC81, 7/-; OC81D, 7/-; Set of two matched OC78 plus one OC78D or set of two matched OC81 plus one OC81D, 18/-.

R.C.A. Top Quality: 2N410 (OC45), 5/-; 2N412 (OC44), 5/-.

Slightly substandard but fully guaranteed OC44 or OC45, 3/- each.

Red Spot (I.F.), 2/8; White Spot (H.F.), 2/8; Green Spot (I.F. 3V), 1/6; Yellow Spot (I.F. 6V), 1/10.

UNIVERSAL D.C. RELAYS

300-Ω Coil High Speed Relay with four independently adjustable change-over contacts of 500mA capacity. Contacts can be adjusted on site to operate on any voltage from 3 to 24V D.C., either together or in the required sequence as the voltage is gradually increased. 15/-, p.p. 1/9.

POST OFFICE RELAYS TYPE 3000

C.O. 500 mA, 10kΩ coil, sec. hand, 8/6

4M + 4B, 500 mA, 250Ω coil, sec. hand, 8/6

1M, 1 Amp, 6500Ω coil, brand new, 10/6

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NUVISTORS

0C41 or 0C42 14/-

7886—general purpose medium "mu" triode 22/6

7895—General purpose high "mu" triode 22/6

Bases 2/9 each.

6B8 medium "mu" triode and high slope pentode with separate cathodes, suitable for A.F. applications, 5/-.

VHF TRANSMITTER CHASSIS BC625

This is a section of VHF 4-channel crystal Controlled Aircraft Transmitter-Receiver, having a range of 100-150 Mc/s. Valve line-up: Crystal Oscillator 606G, First Amplifier 12A6, Second Amplifier 832, Power Amplifier 832, Speech Amplifier 6887; Modulator 2N32.

12A6. Complete with microphone transformer and modulation transformer with and without A.F. applications, 5/-.

12A6, Second Amplifier 832, Power Amplifier 832, Speech Amplifier 6887; Modulator 2N32.

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