

The
SHORT WAVE
Magazine

3/6

VOL. XXII

FEBRUARY, 1965

NUMBER 12

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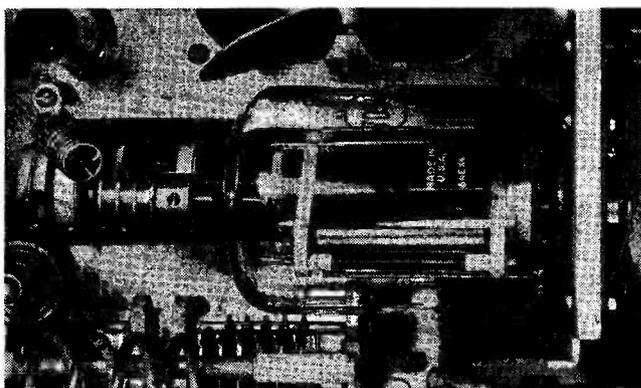
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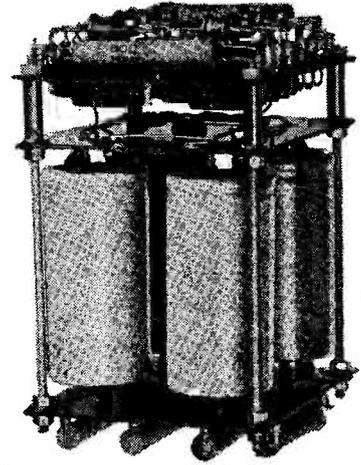
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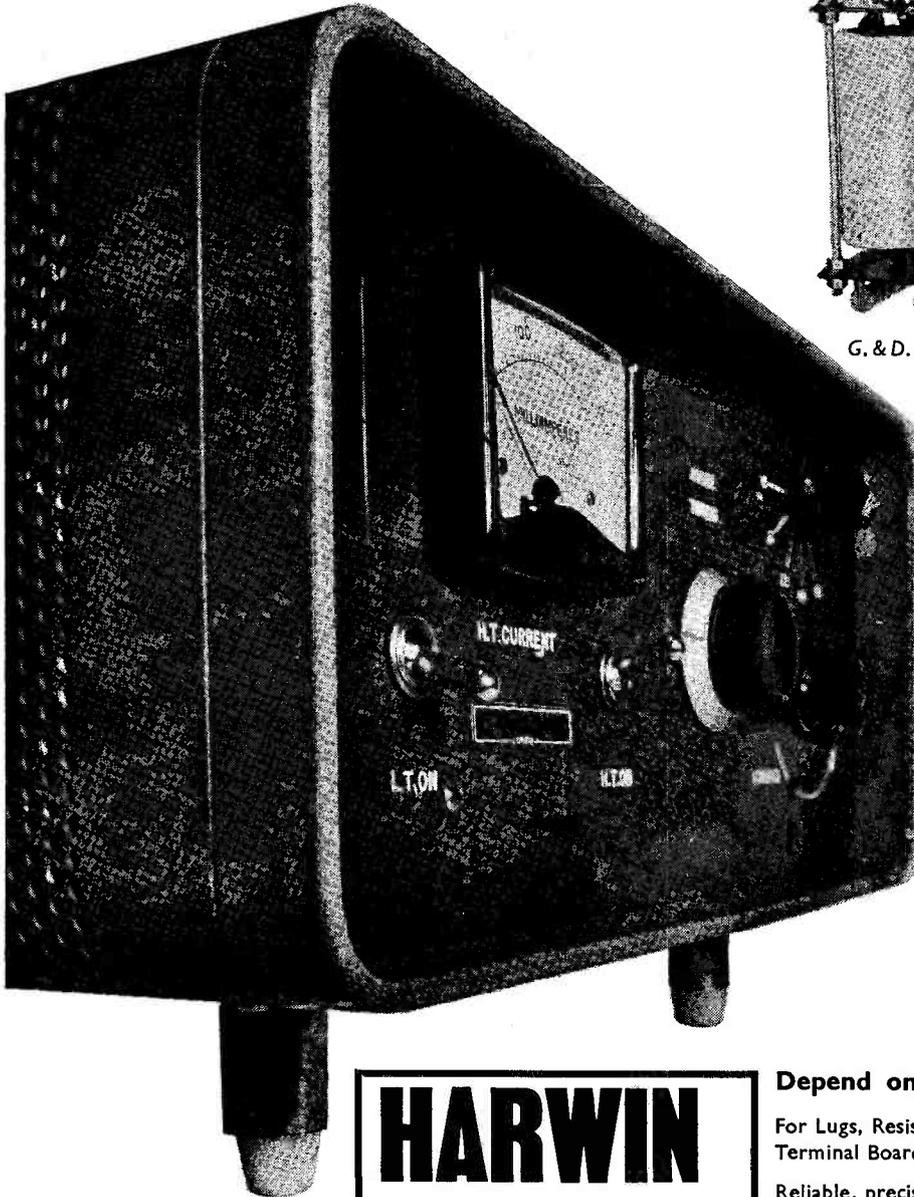
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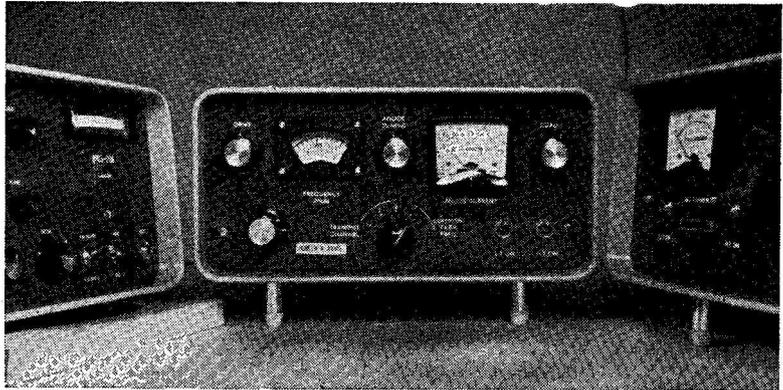


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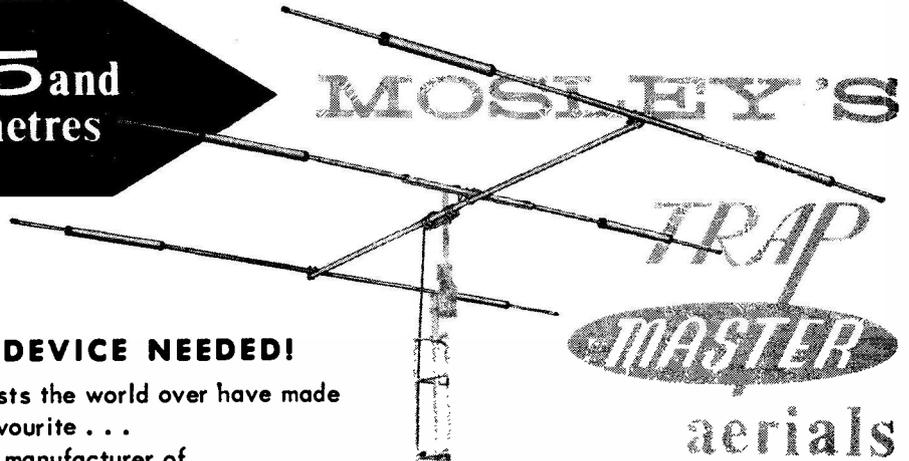
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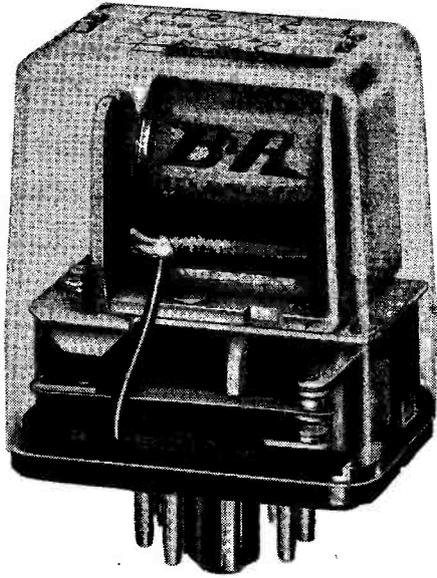
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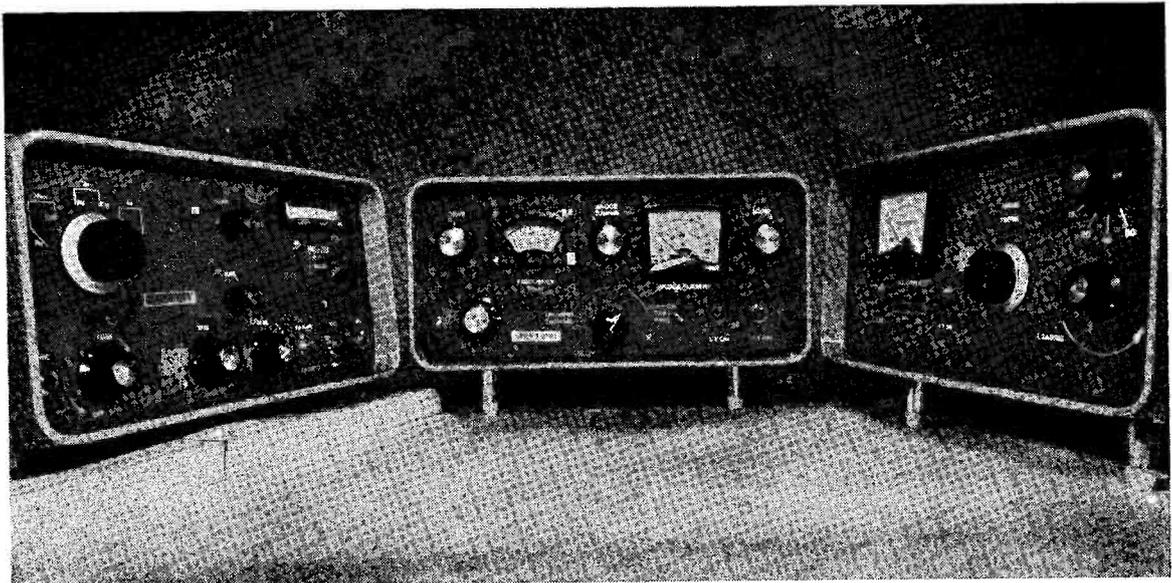
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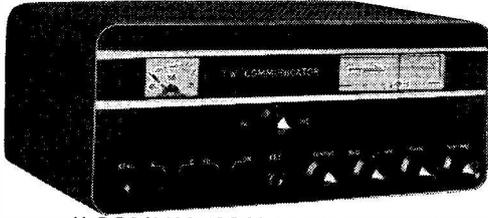
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IU4 ... 5/6	6CL6 ... 9/1	19A05 5/6	5763 10/6	EF36 4/6	GZ34 ... 4/6	PEN220A 12/6	UBF89 7/6
IUS ... 6/-	6CV4 12/6	20P2 15/6	6080 25/6	EF37A 8/6	GZ37 ... 9/6	PEN348 12/6	UBL21 11/6
IX2A ... 7/6	6DS4 ... 15/6	20L1 14/6	6146 27/6	EF39 5/6	H12 ... 3/6	PEN453DD 10/6	UCC84 9/6
IX2B ... 7/6	6EP1 ... 14/6	20P1 14/6	6F40 9/6	EF40 9/6	H2K ... 3/6	PEN453DD 10/6	UCC85 7/6
2CW4 12/6	6F13 6/6	20P3 12/6	CY31 6/6	EF41 7/6	H23 6/6	PL36 10/6	UCH87 8/6
2D21 ... 5/6	6F17 ... 6/6	20P4 14/6	DAF91 4/6	EF42 6/6	HL23DD 6/6	PL38 10/6	UCH21 8/6
3A4 ... 4/6	6F23 9/6	20P5 12/6	DAF92 6/6	EF54 5/6	HR2 ... 15/6	PL81 7/6	UCH42 8/6
3A5 ... 7/6	6F24 11/6	25A6G 5/6	DAF96 6/6	EF80 5/6	HR7 ... 15/6	PL82 6/6	UCH81 7/6
3D6 ... 8/6	6F28 10/6	25L6GT 8/6	DF96 6/6	EF83 10/6	KT41 7/6	PL83 6/6	UCL82 8/6
3Q4 ... 4/6	6F33 6/6	25Z4G 7/6	DK96 7/6	EF85 6/6	KT44 5/6	PL84 6/6	UCL83 10/6
3Q5GT 6/6	6K8GT 8/-	25Z5 7/6	DL96 6/6	EF86 7/6	KT61 12/6	PL500 15/6	UF41 7/6
354 ... 5/6	6L6GA 7/6	25Z6GT 8/6	DM70 5/6	EF94 6/6	KT63 6/6	PX25 10/6	UF42 8/6
3V4 ... 5/6	6L18 8/-	28D7 7/6	DY80 7/6	EF95 5/6	KT66 15/6	PY31 7/6	UF80 6/6
SR4GY 6/6	6J4GT 10/6	30C15 10/6	DY86 8/6	EF98 10/6	KT88 20/6	PY33 9/6	UF85 7/6
SU4GB 6/6	6J8 7/6	30C17 7/6	EB8C 14/6	EF183 8/6	N78 15/6	PY81 6/6	UF86 10/6
5V4G 6/6	6V6 9/6	30C18 10/6	E190F 15/6	EF184 8/6	N88 12/6	PY82 6/6	UF89 6/6
5Y3GT 5/6	6X4 4/6	30P5 9/6	EABC80 7/6	EL33 12/6	OCF71 12/6	PY83 6/6	UL41 8/6
5Z4GT 8/6	6X5GT 5/6	30FL1 11/6	EA42 8/6	EL34 10/6	ORP60 10/6	PY88 8/6	UL84 6/6
6I30L2 10/6	6Y6G 6/6	30L17 13/6	EB41 5/6	EL37 17/6	PC86 12/6	PY80 8/6	UM80 7/6
6AB4 ... 6/6	6YD3 8/6	30P12 10/6	EB42 5/6	EL38 17/6	PC88 12/6	QQV03-10 35/6	UY21 8/6
6AF4 ... 11/6	6YD5 8/6	30P19 14/6	EB34 7/6	EL41 8/6	PC89 12/6	TH41 ... 10/6	UY41 6/6
6AG7 ... 6/6	6Y8W 7/6	30PL1 11/6	EB38 6/6	EL42 9/6	PC85 6/6	TH233 6/6	UY85 5/6
6AH6 ... 10/6	6YD7 7/6	30PL13 11/6	EBF80 6/6	EL81 8/6	PC85 6/6	TH232 7/6	V81M 6/6
6AK5 ... 5/6	6Y10C1 10/6	35A5 11/6	EBF83 7/6	EL84 5/6	PC88 12/6	TP221 7/6	X65 5/6
6AM6 ... 4/6	6Y10C2 12/6	35L6GT 7/6	EBF89 6/6	EL85 8/6	PC89 11/6	TP25 5/6	X66 8/6
6AOS ... 6/6	6Y10D1 7/6	35W4 5/6	EL86 7/6	EL86 7/6	PCC189 11/6	TP2620 7/6	X79 20/6

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The SHORT WAVE Magazine

EDITORIAL

Distribution Frequently, we get serious complaints about slow delivery of the Magazine at newsagents, or the impossibility of obtaining a copy locally with any regularity. There can be many reasons for this, most of them beyond our control. We despatch to wholesalers in what should be ample time for distribution to newsagents, and any delay can only be between a newsagent and his wholesaler, or by deliveries being held up in transit.

But there is another side to this. It often happens that a customer — having ordered a copy “to be called for” — either gives his newsagent insufficient notice, or never turns up to claim it. This sort of thing makes some small newsagents very chary about accepting orders for single copies of specialist periodicals like SHORT WAVE MAGAZINE. If the customer is regarded as “unreliable,” it is far easier for the newsagent to throw the blame back on us by making some general statement like “Oh, that magazine is always late, and we can never get copies in time.”

In fact, we are practically never late, even by one day, and all wholesale orders are despatched punctually. But, in the first place, we cannot supply copies for which we have no orders; secondly, it is always for a newsagent to ensure that his wholesaler has your firm order, and in time; and thirdly, newsagents cannot be expected to carry copies ordered but unclaimed by customers. All this simply means that, in the ordinary course of retail newsagent business, one-off orders for any specialist magazine are just not popular.

At the present time, we are regularly supplying about 150 periodical wholesalers in the U.K. alone. They in turn distribute to order through numerous local newsagents, very few of whom can be known to us. It is, therefore, not possible for us to “take up your case,” because we cannot know the facts as they affect you.

If you find your local supplier in any way erratic or unreliable, there is really very little we can do about it. The only suggestion we can make is that either you take out a direct subscription with us, for delivery by mail, or you order your copy each month for postal despatch.

But now, having said all that, let it also be said that, up and down the country, there are 1000's of readers who get the Magazine regularly through a local newsagent, right on time and without any difficulty at all — which also proves that it is not our system of distribution that is at fault.

Austin Forster,
G6FO.

AN ALL-BAND SSB EXCITER

CHASSIS AND PANEL LAYOUTS —FINAL ADJUSTMENT AND SETTING UP

Part II

C. BOWDEN (G3OCB)

The first part of this article appeared in the January issue of SHORT WAVE MAGAZINE, to which cross-references are made in the text following. For the complete equipment, a full Table of Values was given on p.659, January. The block diagram on p.655 of that issue, together with the main layout plan given here, shows how the Exciter can be built up in five separate units, made up as sub-assemblies. This Exciter will drive a 600-watt linear amplifier (Sideband/CW) and a suitable L/A to go with it was described in our issue for July, 1964.—Editor.

PICKING up the threads from Part I in the January issue, we now look at the Vox circuit (Fig. 5, p.717), which is quite straightforward.

A sample of the audio input to the SSB exciter, taken from V2A (C5 in Fig. 2 on p.656, January), is first amplified in V12A and then rectified by V13A, causing C58 to be charged negatively. C58 discharges through R62 but during the time that it is negatively charged it holds V14A cut off. The anode potential of V14A rises, neon V4 conducts making the grid of V14B more positive. The latter conducts and RL1 is energised. Anti-trip precautions are incorporated to prevent sounds from the receiver loudspeaker operating the Vox when they are picked up by the microphone. A portion of the receiver output is taken from across the loudspeaker terminals, R50, stepped up in T1 and then amplified by V12B after which it is rectified by V13B. The resulting negative voltage which is developed across C57 is applied to the grid of V12A as a blocking bias, preventing the latter from responding to any inputs which may come *via* the microphone and V2A. The Vox is therefore prevented from operating. The Vox is fairly simple to adjust although there is some interaction between the settings of the various controls and they may have to be gone over several times to obtain best performance. R63 is set so that V14B is just cut off, *i.e.*, RL1 de-energised, with no input to the microphone or loudspeaker. Then R51 is set so that RL1 holds in for the desired interval with normal speech in to the microphone. Finally R50 is adjusted until loud signals from the receiver do not trip the Vox.

Vox is rather a luxury and it can be quite adequately replaced by the press-to-talk switch (PT)

which can be incorporated in the microphone. The full Vox and anti-trip circuits have been included, however, as some operators prefer this mode. If it is desired to omit the Vox feature simply join the junction of R65 and PT to the anode end of RL1 and then remove V12, 13, 14 and their associated circuitry.

Relay RL1 in Fig. 5 here has several important functions. In the receive (de-energised) position one contact which is on the "made" side short circuits the receiver mute lines. The receiver muting circuit operates in a manner exactly similar to the muting circuit of the exciter, *i.e.*, short circuiting a resistor connected to a negative bias supply. In the case of the receiver the bias power supply and associated resistors are located inside the cabinet so that it can be operated independently of any transmitter bias pack. In fact the receiver bias pack could be used to supply the exciter as well if required.

At the same time another contact on RL1 "makes," removing a similar muting bias from V7 and V18 in the exciter, placing it in the "transmit" position. Another contact on RL1 completes the 12v. supply to the aerial change-over relay. (When the

Table of Typical Readings

(1). Carrier insertion advanced

Position	Voltage	
	Typical	Maximum
Probe either side of R33 to earth, R33 set to mid travel	1-2v.	
V5 anode (Retune to allow for probe capacity.)	1-2v.	
Across R76	2v.	

(2). Carrier removed

Position	Readings	
	Typical	Maximum
VFO Amplifier output across L2 (on probe)	2-5v.	5v.
Crystal osc. input to V5 by current through R21	25 μ A	50 μ A
Crystal osc. input to V16 by current through R74	50 μ A	100 μ A
Normal audio level tone into mic., SSB across R76 (on probe)	$\frac{1}{2}$ v. peak	1-v. peak
Normal audio level tone into mic., SSB to V17 grid (on probe)	$\frac{1}{2}$ v. peak	1v. peak

Notes: The SSB level is too weak to measure accurately at any stage prior to V16 grid (across R76). The probe used is as shown in Fig. 8, p.719.

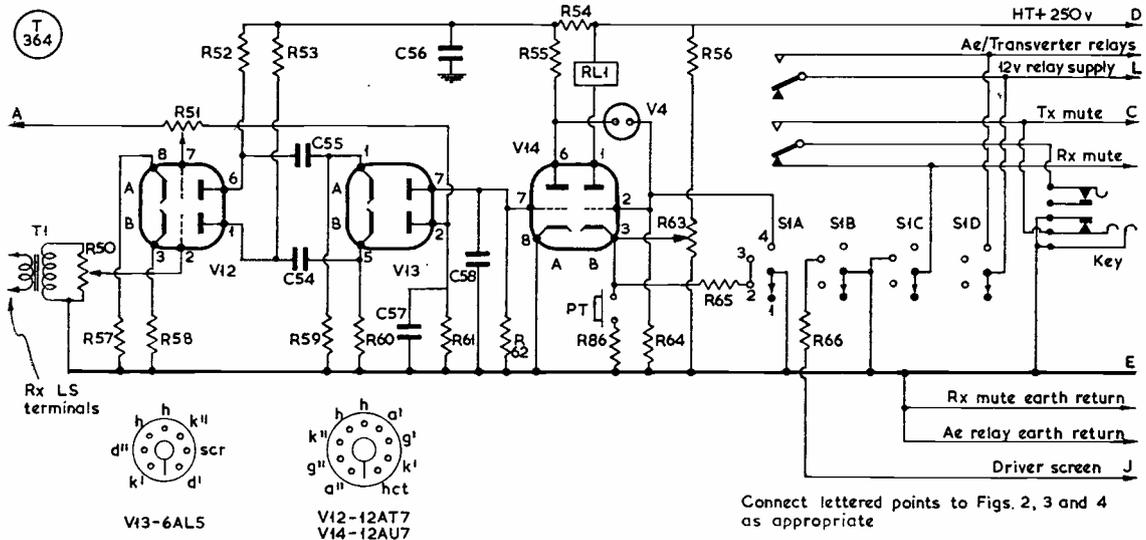


Fig. 5. The Vox and control circuitry for the Sideband Exciter described in the article. It should be noted that values for the circuit shown were included in the full Table of Values on p.659 of the January issue — which also carried Part I of the article. Points affecting the Vox side are discussed in the text, which is fully cross-referenced.

VHF transceiver is in use this 12v. supply also controls the latter.)

Operation of Control Switch S1 (a-d), Fig. 5

Position 1 (Vox). The switch wafers make no connections in this position. Pressing PT or speaking into the microphone will operate the transmitter.

Position 2 (Manual). A contact on S1A earths the cathode of V14B via R65, causing the valve to cut on and RL1 is energised. The press-to-talk function is by-passed with S1 in this position.

Position 3 (Net). S1A functions as above. In addition SIC removes the muting bias from the receiver. In order to prevent overloading of the receiver during netting, the screen of driver valve V17 is earthed via R66 and S1B. When carrier is introduced in order to net the low driver screen voltage prevents the PA from operating at any appreciable input.

Position 4 (CW). Carrier is inserted for the transmission of CW. Keying is effected by controlling the muting bias to V7 and V18. To prevent key noise from operating the Vox, the grid of V14B is shorted to earth when the control switch S1A is in this position. Since RL1 is then inoperative, S1d provides a 12v. supply to the aerial relay (and also to the VHF transverter when it is used).

A 3-position jack plug is used. The rear contact is connected so as to mute the receiver when the key is depressed. The front contact energises the transmitter by short circuiting the bias to V7 and V18.

The transmission can be monitored by placing a variable resistor of about 50K across the receiver muting lines and adjusting for a comfortable audio output level.

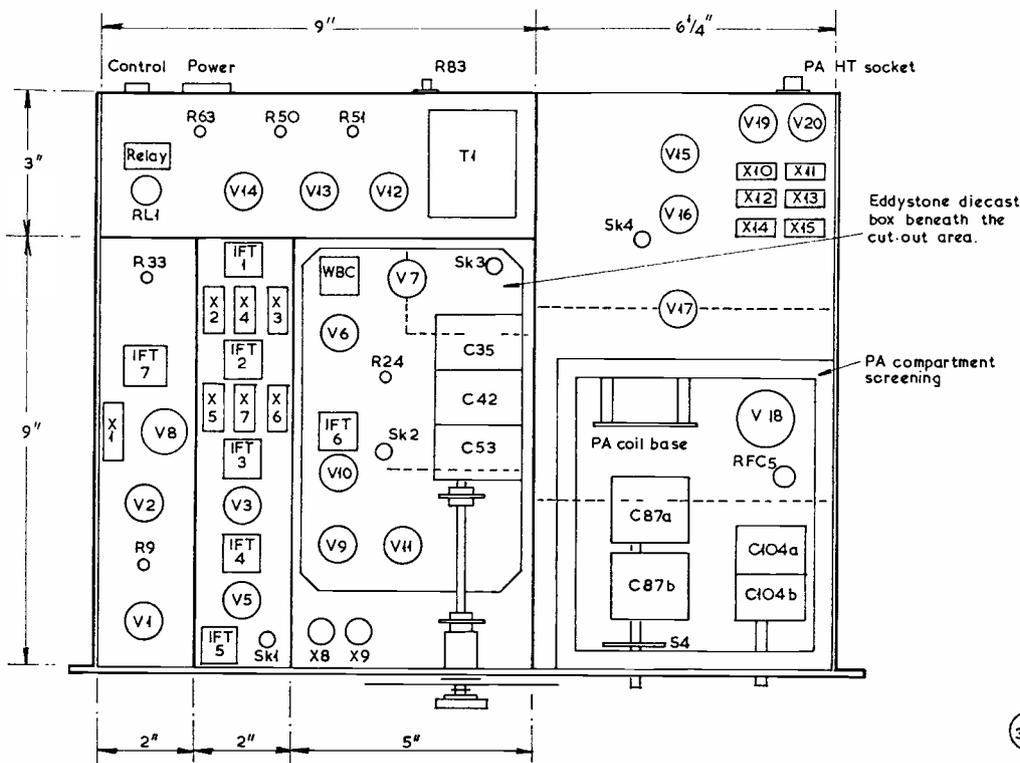
ADJUSTMENT AND TUNING

G3OCB All-Band SSB Exciter

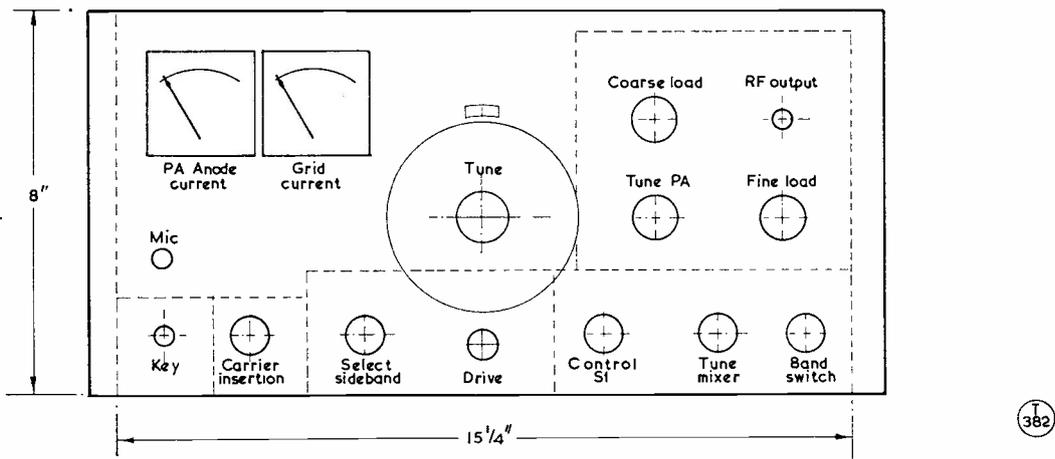
First the wiring should be checked and a suitable power supply arranged. Then all valves and crystals should be inserted with the exception of the oscillator valves, stabilisers and the PA stage. Each oscillator except V11 may then be inserted in turn and checked to see that it goes off and that the injection to its associated mixer is within the range stated in the table of voltages given on p.716 opposite.

When all the oscillators are functioning satisfactorily the VFO valve V11 may be inserted and the tuned circuit core adjusted until the range covered is about 3.0-3.5 mc. (In the author's case the initial coverage of the VFO was from 2.75 to 3.5 mc. and it was decided to retain this range as the coverage on 2m. and 10m. would be greater and there would be a wider choice of crystal frequencies to be used with the final oscillator V15—p.660, January.) The VFO amplifier can then be padded and tracked to gang over this range. A check across the link winding on L2 with the diode probe should give a reading of about 2-3 volts into the mixer V6. The anode circuit of V7 cannot be tracked until after the wideband coupler (Fig. 3, p.658, January) has been set up.

Due to the relatively small percentage change in frequency (about 16 to 25 per cent) the tracking of the circuits V7, V10 and V11 is quite uncritical and if the general component values suggested are used there should be no difficulty. Trimming capacitors were not needed (purely by luck) but as stray capacities will vary in individual cases it may be necessary to include 3-30 μF trimmers across coils L1, L2 and L3.



Main chassis layout diagram for the G3OCB Sideband Exciter. The side panels are 12in. by 8in., and the two smaller chassis are 2in. deep; the other chassis are 2 1/2in. in depth. The front panel (as shown in another drawing) is 16 1/2in. by 8in. deep. The construction is in (five) unit form, and there is some additional screening beneath the main chassis.



Front panel layout as used by G3OCB for his Sideband Exciter. If the main chassis arrangement as shown in the other mechanical diagram is followed, then the front panel will necessarily have to be laid out somewhat as indicated here. However, other constructional arrangements are possible. An Eddystone die-cast box is used for the VFO, and this can be mounted to ensure that the main dial is central.

V11 should now be removed. Set the balanced modulator balancing control R33 (Fig. 2, p.656, January) to mid-travel and with V8 inserted it should be possible to measure about 1 to 2 volts from either side of R33 to the chassis using a diode probe. R33 may then be set to one end of its travel and IFT's 1-4 should be peaked for maximum output using a loosely coupled receiver as indicator.

If a BC221 is not available then it will be necessary to build a small oscillator which can be tuned across the frequency band in the region of the filter crystal frequencies at a slow rate and having a dial which can be reset fairly accurately.

Filter Adjustment

The carrier oscillator V8 should be removed and the test oscillator or BC221 connected across C10. With a receiver loosely coupled to the anode side of V3 the test oscillator should be tuned slowly across the crystal filter passband. As this is done there should be two definite peaks in output corresponding to the frequencies of the filter crystals. The test oscillator must be tuned exactly half way between these two frequencies and IFT's 1-4 should then be peaked again. (Without test instruments this is the best that can be done but filter performance should be quite acceptable by this method of setting up.)

Before final tailoring of the filter for best carrier rejection the first mixer stage V5 should be put into operation in order to prevent direct pick-up of the carrier oscillator by the receiver, which could occur if the latter were tuned to the carrier frequency. V9 should be inserted and with V8 also in position, R14 should be advanced until the carrier is heard on the receiver, tuned to 2.06 mc and loosely coupled to IFT5. The transformers IFT5 and IFT6 should then be peaked at 2.06 mc, after which R14 may be turned back. The carrier should now be much weaker.

The filter can now be adjusted for best carrier rejection, viz: Crystals XC1, XC4 and XC7 can be interchanged and any other crystals of this frequency can also be tried. After each crystal change V8 should be removed and the IF transformers 1 to 4 re-peaked at mid-band. R33 and C100 should be adjusted for best carrier rejection, different values of C100 being tried from either side of R33 to chassis. The receiver S-meter may be used as an output level meter but the gain controls and the coupling between the receiver and exciter should not be touched while adjustments are being made. The settings of R33 and C100 which provide the best carrier rejection should be adopted.

IFT's 1 to 4 must be re-tuned to the centre of the filter passband after each change of crystal as the variation of crystal positions can often cause quite a change in the shape of the passband if this is not done. In addition it is important to try each crystal of the nominal carrier frequency in the position XC1, the others being tried in positions XC4 and XC7, as certain layouts of the crystals provide much better carrier rejection. (This is probably due to the parallel resonant frequency of the crystal used in the position XC1 coinciding with the series resonant frequency of the crystals in positions XC4 and XC7.)

Headphones can now be connected across R12 and

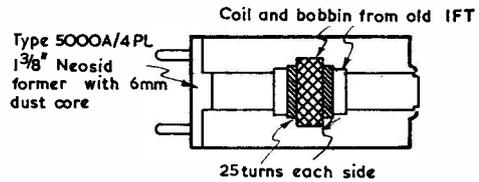


Fig. 6: Construction of IFT 7 (not to scale).

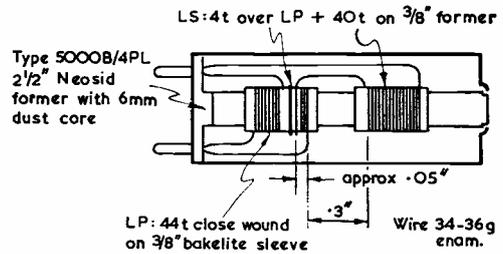


Fig. 7: Construction of WBC (not to scale).

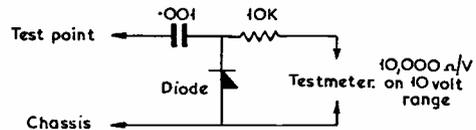


Fig. 8: Suitable diode probe

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365

Sketches referred to in the text, and self-explanatory.

with the AF gain (R9, p.656, January) turned up speech into a crystal microphone should sound quite clear with no distortion or hum. If all is well here disconnect the phones and instead connect an AC voltmeter across R12. With a tone of normal speech level into the microphone R9 should be set so that the meter indicates about 1/4 volt.

The receiver (still tuned to 2.06 mc) should then be set to receive SSB and with V8 inserted speech into the microphone should result in the signal being quite clear and easily resolved. If the receiver coupling and gain are adjusted so that the speech level is about S9, then the carrier should be much weaker—about S2 or less—and the unwanted sideband should be not more than about S3 even with a single half-lattice filter. If R14 (carrier insertion control) is advanced the carrier level should be greater than S9.

V11 may now be replaced and with R14 and R29 advanced the cores of the wideband coupler and the tracking of L1 (Fig. 3, p.658, January) should be adjusted for even output over the range of the VFO, using a receiver as indicator during the earlier stages. The wideband coupler as shown in Fig. 7 above is quite flat from 4.9 to 5.5 mc and to offset the drop in output from 4.75 to 4.9 mc, the core of L1 is slightly detuned to the LF side. When this adjustment

has been completed it should be possible to obtain about 2 volts output across the link winding on L1 as measured on the diode probe (Fig. 8), this voltage being reasonably constant across the whole band.

Valves V15, 18, 19 and 20 may now be inserted, the control switch set to net and the coils L5-10, L11-16, L17-22 tuned up and checked for band coverage. Power should be temporarily removed from the PA and the control switch set to "manual." With the exciter tuned to one of the higher frequency bands

and with carrier and drive controls (R14, R29), turned up it should be possible to obtain some PA grid current. The PA can now be neutralised. A dummy load may then be connected and the PA tuned up, power having of course been restored. If an RF ammeter of lamp load is available the RF power output can be checked and the efficiency can be expected to be in the region of 60 per cent. The rig is now ready for air testing—and it will be for your contacts in QSO to tell you how the signal sounds.

ONE-TRANSISTOR TOP BAND CONVERTER

TO WORK WITH ANY
MEDIUM-WAVE RECEIVER

B. J. P. HOWLETT (G3JAM)

OF the three main points at which one can have the local oscillator to convert the 160m. Band to Medium Wave, namely:

- (1) Oscillator above signal frequency;
- (2) Oscillator above IF but below signal; or
- (3) Oscillator below IF and below signal,

the writer believes that the most difficult is the first case. Besides giving reverse tuning, the 2nd channel lies near the 49m. broadcast band, full of high power transmissions, and short-wave breakthrough could become a severe problem.

The choice seems to lie between Case No. 2 and Case No. 3. Taking some typical values:

	No. 2		No. 3	
	A kc	B kc	A kc	B kc
Osc.	1100	950	800	600
IF	700-900	850-1050	1000-1200	1200-1400
2nd Ch.	200-400	100-100	200-400	600-800

Number 2B is definitely out, and one can look at it two ways. The IF range includes the oscillator frequency. Alternatively, the 2nd harmonic of the oscillator falls in the 160m. band. In fact any oscillator frequency between 900 and 1000 kc is automatically ruled out. However, frequencies HF of this are quite in order up to about 1250 kc when the main receiver will reach the LF end of the band coverage.

No. 3B itself is workable, just. The third harmonic of the oscillator falls at 1.8 mc and the 2nd harmonic at its IF equivalent. Oscillator frequencies between 600 and 667 kc are out for the same reason—harmonic falls in the band. And that leaves a broad section 667 to 900 kc in which to play around, so case No. 3A is near-enough in the middle of the

optimum section.

It is fortunate for Londoners that the corresponding IF range does not include any powerful local stations; other parts of the country may not be so lucky.

The writer has actually tested using all the investigated possibilities, and has confirmed all the possible reasons for rejection. As a result, 820 kc was chosen for the local oscillator, giving a tuning range of 980-1180 kc (2nd channel 360-160 kc, which admittedly includes Droitwich, but this station is no problem in S.E. England).

Circuit

The great care in choosing the IF range was well worth the trouble, as only a single OC44 frequency changer was required in the end, connected in a Clapp circuit with high-Q coils knocked up with 34g. wire on cast off fragments of rod aerial ferrite! It was found important to avoid diffused-junction transistors of all kinds, for two reasons:

In the first place, it is desirable not to have any gain on short waves proper; and if there is no appreciable gain at higher frequencies there is less tendency for the oscillator waveform to become distorted. The local oscillator was adjusted so that it starts readily but gives near enough a sine wave on an oscilloscope.

Stage gain is slight, but the frequency change action introduces very little noise, and when used with a good centre-loaded whip a Pye hybrid type car radio sounded just like a proper Top Band receiver. Matching out is done with C1 and matching in with C6. The series-tuned input greatly improved reception when used with the regular car aerial but performance is not very impressive under those conditions.

Used in the home station with the same centre-loaded whip. but working into a CR-100. it was extremely difficult to tell when the converter was in use, so the comparison had to be by listening carefully for MW breakthrough. There is a little such down in the South-East, the strongest being Hilversum III. (Since writing this, one of the D.I.Y.S. stations has appeared in that section of the MW band!)

The writer would like to add that the input tuning does not have to be removed when using a centre-loaded whip; two series tuned circuits in

Table of Values

Transistor Top Band Converter

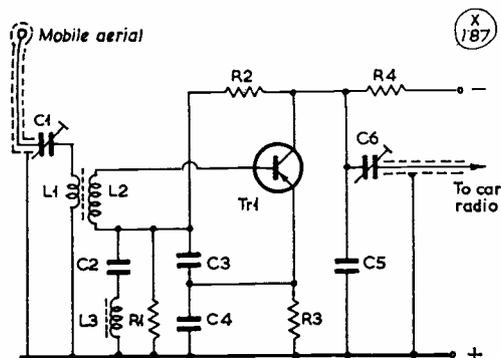
C1 = 30 $\mu\mu\text{F}$ Philips trimmer	R1, R3, R4 = 2,700 ohms
C2, C5 = .001 μF	R2 = 15,000 ohms
C3, C4 = .005 μF	Tr1 = OC44, or similar
C6 = 100 $\mu\mu\text{F}$ comp. trimmer	

Notes: For L1 and L3, use single-layer winding on off-cuts of ferrite-rod aerial material, adjusting turns experimentally. For L2, 8 turns of insulated wire over-wound on L1.

series with one another still tune to the same frequency—the better one virtually takes charge. In fact, it all helps in keeping out unwanted QRM.

Conclusion

Writing in the past tense does not imply that the unit no longer exists. It was built for and is used by a friend—the writer has no vehicle. Sturdy construction and secure bonding of earths will help to make the unit long-lived and reliable whether used on a 9-volt dry battery (consumption 0.8 mA), or on the



Circuit of the transistor converter described by G3JAM. The choice of local oscillator frequency and the IF is discussed in the text. This simple arrangement will enable almost any medium-wave receiver—car radio, transistor portable or domestic BC set—to give coverage over the 160-metre amateur band.

12-volt car battery (consumption just over a milli-amp).

On the car battery, consumption is so small that it is hardly worth the effort of fitting a switch!

Do You Know That —

— The round YL hair-curlers, in the plastic types, obtainable from Woolworth's for a few pence and in various diameters, make ideal small coil formers where spaced turns are needed; they are "spiked" with spacing of about $\frac{1}{4}$ in. (A. Papworth, Over, Cambs.)

— If the appropriate junction socket is not available, coax cables can be connected together temporarily by making a tight coil of 20g. tinned copper round a No. 43 drill, to catch the centre conductors; for the sheathing, bend and press a piece of aluminium sheet round a $\frac{3}{8}$ in. drill, to make a slotted tube forming a tight fit over the coax sheathing. This is the sort of "temporary" connection that can become permanent! (W. Puffet, Upstreet, Kent.)

— Useful scales, ready etched, for test equipment such as GDO's and even frequency meters, can be contrived from the protractors obtainable so cheaply for school geometry sets—and if you want something better and more accurately divided, a draughtsman's protractor will take you further in terms of accuracy. These degree-marked scales are available for a shilling or so from good stationers, and can be easily adapted for their radio purpose merely by drilling out a hole for the condenser shaft, with three or four 8 BA counter-sunk holes for fixing the protractor-scale to the panel, against a thin off-white background strip to improve reading. (P. Nickalls, Barnehurst, Kent.)

— A very effective heat-sink when soldering in

transistor wiring can be made by soaking a piece of cotton-wool in water, wrapping it round the appropriate lead, and holding it in place with a croc. clip. The efficiency of this device as a heat-sink when soldering transistors is far greater than the dissipation obtained by using, say, the much-advocated "pair of pliers." (B. McGrath, Glasgow, W.3.)

— Large holes can be cut in sheet aluminium by using a 12in. fret-saw frame fitted with the fine blades known as "piercing saw," obtainable very cheaply at ironmongers. The work should be laid out horizontally and the cut made with the saw held in a vertical direction. (GW3TLW.)

— Copper wire of 14g., suitable for transmitting aerial systems and coil winding, can be bought economically by the lb. weight over the sales counter of the local Electricity Authority office. This particular gauge of bare copper wire is extensively used for binding cable joints and similar purposes. (N. W. Roberts, Cambridge.)

— A smallish modulation transformer can be used to give quite satisfactory performance in a QRO rig if its primary winding is parallel-fed, i.e., choke-condenser coupled, on the analogy of RF PA tank circuit design. This obviates saturation of the mod. transformer core, as the DC is carried by the choke. Any heavy smoothing choke will usually do, with a 2 μF coupling condenser rated at least three times the modulator DC plate voltage. (G3KPO.)

— To make sure a crystal will still oscillate after returning it to its holder, it can be checked by clip-

ping it in series with the aerial lead to the Rx. On tuning the receiver to the xtal frequency, it will produce a "crinkly" tone to the background noise, similar to that of a crystal filter at full selectivity. If no ringing can be detected, the crystal is dead. (ZL1PL.)

— Cheap feed-through insulators can be made by extracting the insulant from odd pieces of coax, cutting it into $\frac{1}{2}$ in. lengths, and pushing about 1 in. of 16g. or 18g. tinned copper wire through the bore of the insulator. This is then force-fitted into a suitable hole in chassis or screen. (G3AEK.)

— A few inches of cored solder can be used to hold nuts and bolts for guiding them into inaccessible places. For a bolt, wrap a turn or two round the thread near the head; for a nut, squeeze the solder in so that it is held by one or two threads. The length

of solder will bend to any position, remain rigid, and can easily be pulled away once the nut or bolt has been started. (G8QM.)

— Very good VHF/UHF RF chokes and coils can be made from thin enamelled wire by winding the required number of turns on 4 BA or 6 BA studding (to give even spacing), screwing out the studding, and then dipping the winding in cellulose lacquer; this will skin over between turns, to give a neat and rigid coil when the lacquer is dry. (G3JAM.)

Half-a-guinea is being paid for each of these items. If you have what you think is a good idea, which can be explained briefly, send it in on a separate slip headed "Do You Know That," with your full QTH. Payment is made immediately on publication.—*Editor.*

THE PRACTICAL APPLICATIONS OF SEMICONDUCTORS

IN THE AMATEUR STATION

Part VII

OSCILLATORS (I)

M. I. DAVIS, B.Sc.

*Having at last got our contributor to work again, here he discusses in some detail transistors in receiver and transmitter oscillator circuits, including VHF applications, with design data. Previous articles in this series appeared in the April, May, June, July, September and October issues of SHORT WAVE MAGAZINE for 1964.—
Editor.*

IN the course of discussing test equipment in a previous article, several audio and radio frequency oscillator circuits were mentioned. In this month's instalment we shall not consider audio-frequency oscillators at all, and shall discuss RF oscillators—not as a source of test signals, but as functional units of transmitter and receiver design.

We examine first the use of semiconductors in oscillator stages of superheterodyne receivers. By far the most commonly-used of the several types available is the Reinartz inductive feedback system, typified in Fig. 1. This circuit is to be found, almost without exception, in every transistor portable radio. It must be admitted that it is not a particularly easy circuit to design so that it will operate satisfactorily over a

wide range of frequencies, but with an understanding of the principles involved, the circuits given here may be suitably adapted, using a little trial-and-error. The difficulty lies mainly in the fact that Tr1 is required not only to oscillate over a wide frequency range (this would not be too difficult), but is also required to amplify and mix the incoming RF and the locally-generated signal, and by means of the tuned collector load, to filter out the intermediate frequency.

If we look first at the function of the stage purely as an oscillator, we see that feedback to sustain oscillation is provided by the transformer T1 (the oscillator coil) and is from collector to emitter, the frequency-determining network being the overwind n3, tuned by C4. In theory, either the winding in the collector (n1) or that in the emitter (n2) could be tuned by a capacitor, thus eliminating the overwind altogether. However, for various reasons, including the isolation of the frequency-determining components from the effects of the rest of the circuit, the system as shown is preferred. Note at this point that the biasing method, DC-wise, is a standard potential divider/emitter-resistor system, with the emitter resistor R3 decoupled by C3. Since the oscillator and signal frequencies are spaced by the IF, they may be considered sufficiently different for the combination L1, C1 to be of low impedance to the oscillator frequency, and hence the base of Tr1 is held to earth via C2 for AC, so the oscillator is really in common-base mode. For the incoming signal, however, L1 and C1 form a high-impedance at resonance, the transistor operating in the common-emitter configuration, and the fact that the oscillator output and the signal-frequency input are connected in series between base and emitter enables the transistor to act as an additive mixer. If properly operated, this arrangement will give a conversion gain not much short of that obtainable from a system using a separate oscillator transistor, which will be described later.

The two-transistor circuit is best used to advantage at frequencies considerably higher than those for which this circuit is recommended, *i.e.* up to about 1 megacycle.

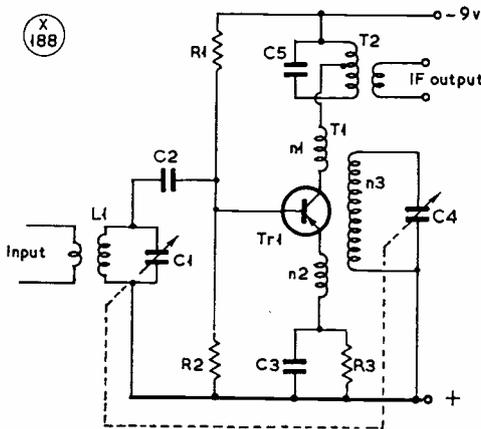


Fig. 1. Transistor frequency changer circuit, using the Reinartz feed-back arrangement, as commonly found in transistor receivers — see text.

The reason for the collector tap on the primary of T2 is that, in this way, the capacitance required to tune it to any particular frequency is much larger; hence the effect of collector capacitance on the tuned circuit is reduced, and transistor parameters have less effect on the performance of the unit.

It is becoming an increasingly popular practice to do away with IF transformers altogether, and to use instead ceramic transfilters. These are available at all the usual IF frequencies, and once installed in the circuit, require no initial alignment, or subsequent checks in this respect. In Fig. 1, T2 would be replaced by a resistor, and a transfilter used to couple to the next stage from the collector of Tr1. (More information on these useful components will be given in the next article in the discussion on IF amplifiers.)

HF Frequency Changers

For frequency-changer stages operating at higher frequencies, a separate oscillator and mixer are desirable, so that each transistor can be optimised for one operation only. A circuit of this type is shown in Fig. 2, where Tr1 is the oscillator (crystal-controlled in this case) and Tr2 is an additive mixer. Both these devices are of the new inexpensive range of high-speed silicon epitaxial transistors, which are ideally suited to this type of application. The oscillator runs at about 28-470 mc, thus covering the 28 mc amateur band with 470 kc IF.

A high-performance converter for the 28 mc band could be made using this circuit as a basis—a suitable fixed-tuned RF amplifier will be described in a later article. An IF resonant circuit in the collector of Tr2 could be tuned to a suitable frequency covered by the main receiver, and tuning carried out by varying the effective intermediate frequency with the main tuning dial. It will be seen that the circuit is fairly straightforward; Tr1 is a crystal oscillator, with the crystal in the base circuit, and a tuned collector load. From the coupling link of T1, C5 injects the oscillator signal into the base of Tr2, while the

incoming RF is transformer-coupled into its emitter, again producing additive mixing, with T2 tuned to the intermediate frequency. By suitable modification of component values, the system could be arranged to take off at any frequency up to about 30 mc, which is about the highest one is likely to have at crystal fundamental. Further, by replacing the crystal by a tuned circuit, a variable-frequency mixer-oscillator results.

For higher frequencies still (and 70 cm band transistors are available now) multiplier chains are necessary, and a typical multiplier is shown in Fig. 3. It should be pointed out at this stage that most of these circuits require the same attention to layout that one would have to give to their valve counterparts, especially with respect to adequate screening and shortness of leads. Any kilomegacycle transistor is usually only too keen to oscillate, and the leads make a nice tuned line which causes the thing to go off at a few hundred megacycles.

Design Factors

The reader will already have realised that Tr1 is in common-base mode for AC, under the influence of C1; to get an output around 110 mc for two-metre operation, L1 might be 3 turns of silver-plated 16g. wire, about ½ in. diameter, squeezed or stretched as necessary, and the ubiquitous 3-30 μμF trimmer pressed into service for C4. The output capacitor C3 controls the amount of oscillator injection, and should be adjusted as necessary.

In Fig. 4, the oscillator-mixer layout of Fig. 2 has been modified to a variable frequency unit covering 144 mc. The author uses this circuit in conjunction with an RF amplifier, IF strip, and audio amplifier as a compact portable 2m. receiver. The circuit could also be preceded by an aperiodic RF amplifier and would then make a passable converter to feed into an untunable low-frequency receiver or IF strip, obtained, perhaps, from the surplus market.

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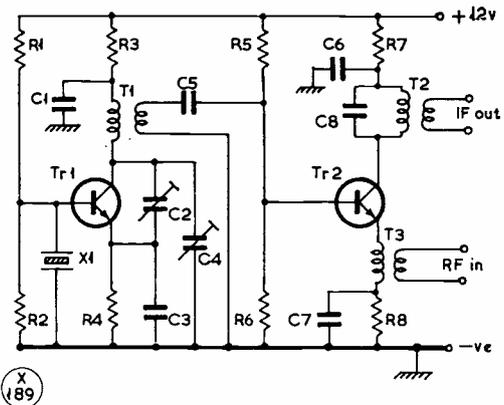


Fig. 2. An oscillator-mixer for HF use in receiver circuits. Both transistors can work to best advantage. Values are: C1, C6, .01 μF; C2, C4, 3-30 μμF; C3, 22 μμF; C5, .05 μF; C7, .001 μF; C8, as required; R1, 33K; R2, 10K; R3, 1K; R4, 2.2K; R5, 47K; R6, 4.7K; R7, 430 ohms; R8, 910 ohms; and Tr1, Tr2, 2N706.

The actual circuitry is not particularly sophisticated; Tr1 is a conventional common-base oscillator, with its output coupled to the base of the mixer by the small capacitor C3. At this point, the oscillator signal and the RF input are summed in the mixer Tr2, and T1 couples the signal out at the desired IF.

One feature of the circuit may, however, prove of some interest to readers who are stuck with the problem of maintaining stability and image rejection in a circuit of this type, and this is the trap L2/C8. Certainly the idea of a series "wavetrap" (as they used to be called) is not a new one; the advantages such a combination has to offer in this instance may, however, be new to readers. The series combination is made resonant to the IF and so prevents spurious responses at this frequency by shorting them to earth at the base of the mixer. It must be admitted that a frequency-changer of the type shown in Fig. 1 will perform at this frequency with a suitable choice of components, but the separate mixer and oscillator combination will beat this every time on performance and sheer designability.

Oscillators for Use in Transmitters

When considering the design of transistor oscillators for use in transmitting equipment, we can channel our thoughts along one of two lines: Either we can design for a reasonable stability and as much output power as possible, or we can hold frequency stability to be of paramount importance, and, provided that there is sufficient RF output to drive the following stage, we neglect the QRP disadvantage—which must always accompany a high frequency stability. The former course of action is often adopted in the design of miniature transmitter-receivers, while the latter system is always adopted for use in multi-stage transmitters. Transistors for this purpose are fairly easy to come by, but only a few devices for the former type of circuit are available at a reasonable price to the amateur for power operation at high frequencies.

A few suitable transistors will be mentioned here; there are many American types to which one may be lucky enough to have access, but only those which are readily available in this country will be listed.

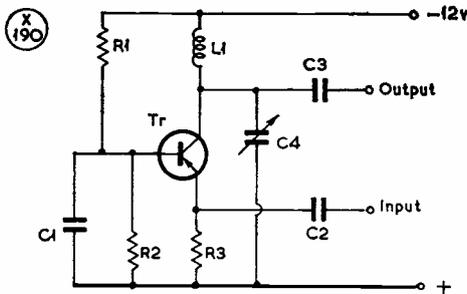


Fig. 3. A transistor multiplier circuit for VHF. Transistors suitable for operation at up to 500 mc are now generally available. In this circuit C1 is .001 μ F; C2, C3, 10 μ F; R1, 33K; R2, 10K; R3, 1.2K; L1 and C4 are made resonant at the required output frequency. Suitable transistors are the Ferranti ZT2475; SGS-Fairchild 2N709, 2N706; and Mullard OC171, AF102.

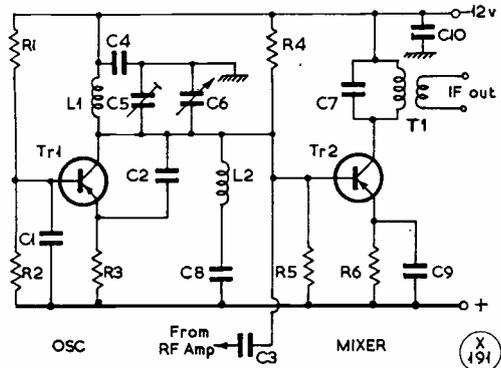


Fig. 4. Variable frequency unit for 144 mc, the two-metre band. C1, C9, C10, .05 μ F; C2, 2.4 μ F; C3, 1.5 μ F, by trial; C4, .0015 μ F; C5, 15 μ F; C6, 1-8 μ F; C7, as fitted; C8, see text; R1, R4, 47K; R2, R5, 8.2K; R3, 1K; R6, 820 ohms; T1, IF xformer to suit; Tr1, Tr2, any VHF Rx type. L1 can be 3 turns 14g. silver-plated, 1/4-in. dia. spaced over 3/4-in.

Beginning with S.T.C. there are the TK203A and the TK253A. Both of these devices are fabricated by the now well-known silicon planar epitaxial process, giving lower leakage currents and stray capacitances, consistent with lower noise figures and carrier storage times than are usually obtainable with other forms of construction.

The maximum power dissipation of these transistors is 2.5 watts and 600 mW, respectively at 25°C in free air, coupled with an f_t of 100 mc, and a maximum mean collector current of half an amp.; 1 1/2 amps. may be passed for a period not exceeding 100 μ S. This implies that an intermediate figure can be used as a working-point, if the transistor is to be run as a Class-B or a Class-C RF amplifier, since the periods for which it is biased into conduction will be of short duration, never more than one half-cycle.

Mullard Ltd. contribute several transistors from their Southampton factory to the high-frequency high-power range. Notable particularly are the OC24 and the AU710. The latter, designed as a high-speed driver for computer ferrite core stores, has characteristics which make it a highly successful all-band power transistor, with its f_t of more than 100 mc and a collector current of 0.7 amp. It is, of course, a little too expensive to play around with (as in fact are most devices in this class), but is certainly worthy of consideration if one intends at last to build that no-expense-spared, chrome-handled, pilot-lamp bestrewn beauty of a Tx.

The OC24 is by comparison, as a wine-taster might say, "a rather shy little thing." These devices are, however, really first-class for Top-Band, and are just coming on to the surplus market, where they appear on plug-in printed circuit cards extracted from the store driving section of obsolete digital computers. Their maximum ratings include 40 volts collector-to-emitter, two amps. peak in the collector, a common-base cut-off frequency of 2.5 mc, and the ability of delivering, as a Class-B pair, a comfortable three watts into a 90-ohm load.

(To be continued)

RTTY TOPICS

RTTY CONTEST FOR MARCH 1965 —NOTES AND NEWS ON T/P OPERATING—T.U. FILTER CIRCUIT AND CURVES

W. M. BRENNAN (G3CQE)

In this first offering of the New Year it is good to be able to report some news of major importance to RTTY operators, particularly so since it is news made by U.K. RTTY.

For some time now it has been obvious that a second international RTTY DX contest is very much in demand by RTTY operators throughout the world. There are in fact already two RTTY Contests during the year. One of these is the well-known and very popular World-Wide RTTY Sweepstakes Competition, and the other is known as the Anniversary Sweepstakes Contest. (This latter event is organised to commemorate the granting of FSK facilities to U.S.A. amateurs by the F.C.C.) It takes place each year around the third weekend in February. It was intended as an internal U.S. event and the rules were made with this in mind. There is little incentive in these for DX stations to compete—or for U.S. stations to try to work DX, although there is nothing in the rules which forbids this. Little wonder there is not a great deal of support outside the U.S.A. for it.

What was required was a full-scale DX contest and at a date in March when DX conditions could be expected to be good. The initiative for organising such a Contest has come from the British Amateur Radio Teleprinter Group, which is the U.K. RTTY organisation. G2HIO has shouldered the responsibility for organisation and log-checking—no mean task, and in particular the formulation of rules for such an event is in itself a work of art.

The actual rules follow the pattern of the World-Wide S.S. Contest with some slight modifications that give no incentive for the contestants to go on a "Worked All States" hunt. This modification has been made because it is now felt that there are enough active DX RTTY stations to support a full-scale event while yet giving plenty of QSO's for the U.S. stations without the need for State

multipliers. It will be interesting to see just what differences there will be in the tactics, and the scores, of some of the top DX RTTY operators in this event.

RULES—B.A.R.T.G. Spring RTTY Contest, March, 1965

The event will run from 0200 GMT, March 20 until 0200 GMT March 22, 1965.

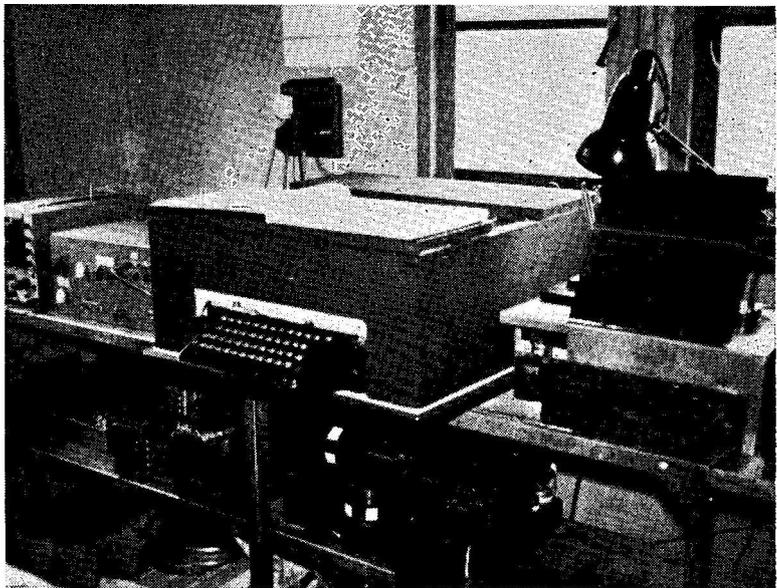
The Contest will take place in the 3·5, 7·0, 14·0, 21·0 and 28·0 mc bands.

Country status will be as laid down in the Official Lists, with the exception that VO, KL7 and KH6 will count as separate countries for this event.

Contact may be made only once on each band with any particular station.

A message consisting of the following items must be exchanged on RTTY:— (1) Message Number, (2) Report (RST), (3) Time in GMT, (4) Country (in which station is located).

Scoring: All two way RTTY contacts between stations in the same country will earn 2 points. All two way RTTY contacts between stations in different countries will earn 10 points. All stations will earn 200 bonus points for each country worked *including their own*. **Total Score:** This will be computed by multiplying the total exchange points earned by the number of countries worked and adding this total to the total obtained by multiplying the country bonus points by the number of continents



G3SZN, 27 Mount View, Rickmansworth, Herts. runs a Creed 7B teleprinter (centre), with its T.U. on the immediate left and a 'scope at far left. Under the bench is a Type 1B Auto Tx and a 7TR reperferator. The machine to the right of the printer is a reperferator.

worked. For example :

- | | |
|--|--------------|
| (1) Exchange points 302 x
Countries worked 10 | = 3,020 |
| (2) Country Bonus Points 2,000
x Continents 3 | = 6,000 |
| (3) Add (1) and (2) to give | <u>9,020</u> |

Total Test Score = 9,020 points

In order to qualify, Contest logs must be received by the B.A.R.T.G. Contest Manager not later than May 1, 1965, addressed: A. Walmsley, G2HIO, The Woodlands, Bath Lane, Moira, Nr. Burton-on-Trent, Staffs, England.

All your conductor can now hope for is that this Contest—the first such organised from Europe—will be given good support and that the dates coincide with favourable band conditions!

RTTY Award

Another innovation announced by B.A.R.T.G. is an Operating Award which may be claimed by anyone who can submit proof of having worked 25 Countries on RTTY. There will be stickers for each further 25 countries up to 100 and it is probable that a special award will be offered for the 100 Countries. The awards are in the process of being printed and full details of how to claim will be given at a later date. In the meantime, any queries can be sent to G3CQE (QTHR), who will be acting as Awards Manager.

Other News

From time to time we hear rumblings which

indicate that there is an interest in RTTY at the other side of the Iron Curtain. Although the interest is there it is certain that the availability of machines for amateur use is virtually nil. RTTY operators in the West do receive SWL reports from the U.S.S.R. or Satellite Countries from time to time, but almost always they are from listeners who have copied the CW identification given by the RTTY station at the end of an over. Now, however, there is news of at least one SWL in Hungary who is printing RTTY on his own machine in his own home. This information comes from G2HIO who received and replied to a report from this listener and subsequently had a letter giving quite a lot of factual information. This SWL has in fact printed a number of CSO's and has sent reports to FG7XT, LU1AA, F9RY/FC, G3HKR, 5A5TR, ON4HW, OZ5EL, DL3JR, IILCF, K1CPX, W3DKF, W4MGT in addition to G2HIO. His letter explains that the machine used is a scrap Siemens send-receive printer but that only the receiving side is serviceable and this is not working any too well! The receiver is a 14-valve superhet feeding a simple T.U. The letter goes on to say that although there is interest in RTTY in Hungary, there are just no machines available at prices that are within the reach of amateurs.

From SWL Colin Jones of Plymouth comes news of a new country available on RTTY. He sends along copy taken of the first amateur RTTY working from Guantanamo Bay (Cuba), in the shape of a QSO between KG4CG and KG4CM (a man-and-wife station) on the one hand, and K8YJQ on the other. The gear in use at KG4CG is a home-brewed W2PAT T.U. with the filter coils wound on plastic sewing machine bobbins! His T/P equipment comprises a Teletype Model 15 with the Type 14 Transmitter Distributor and Typing Reperf. The Rx is a Collins 75A-4 and aerials available are a 60ft. vertical for 3.5 and 7.0 mc and a Mosley TA33 Tri-bander for 10, 15 and 20m. The initial QSO took place on 20m., but KG4CG has also been heard since on 15m.

Additionally to this interesting "First," SWL Jones can show an impressive list of RTTY DX printed. It includes over 70 prefixes in 25 countries—and it is pretty certain that no other SWL able to receive on T/P can better his score at present.

Another addition to the list of European countries now available on RTTY is Luxembourg. DL6EQ has been lending a helping hand to LX1DE in order to get him going on T/P. LX1DE is now active on 80 metres and G2HIO reports having printed a Christmas card from him during a recent QSO.



K1CPX, 161 Concord Avenue, Lexington 73, Mass., has a very neat RTTY layout (left of picture) and is a keen DX operator on teleprinter.

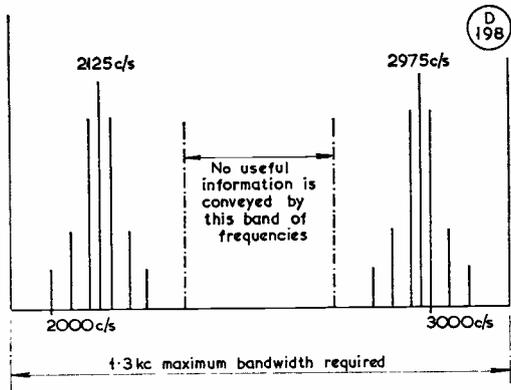


Fig. 1. This sketch illustrates the standard frequency shift in amateur T/P working, taken as 850 c/s to accommodate a maximum keying speed of 50 bauds.

Simple Notch Filter for AF TU's

The standard freq. shift used in RTTY is 850 c/s. At a maximum keying speed of 25 c/s (50 bauds) this requires a minimum bandwidth of 850 c/s plus the bandwidth necessary to accommodate the sidebands produced by the third and fifth harmonics of the keying freq. Fig. 1 illustrates this. The third and fifth harmonics are necessary in order to preserve a reasonable representation of the original square-wave keying waveform. Thus, the total bandwidth required is 850 c/s plus 125 c/s on the HF side of the mark freq. and 125 c/s on the lower freq. side of the space frequency, giving a total of 1,100 c/s.

This bandwidth requirement does not allow for any tuning errors that may be encountered due to drift or incorrect receiver setting. It is usual to assume an extra 100 or 200 c/s in order to give some tuning tolerance, making therefore a total bandwidth of 1.3 kc which the receiver IF must pass and (in the case of an AF type of T.U.) convert into the usual 2 to 3 kc for the T.U. input. Fig. 1 then shows the frequencies produced at the input of a T.U. by the RTTY signal. A glance at the sketch indicates that between the mark and space frequencies and their attendant sidebands there is a sizable frequency band which conveys no signal information at all. Even allowing 100 c/s either side for tuning errors there still remains some 400 c/s of bandwidth which merely represents an open door for unwanted noise and QRM. Most T.U.'s do have filters at their inputs which eliminate a large number of unwanted frequencies and the response of one such filter is shown in the solid line curve of Fig. 2. This is in fact the Bandpass Filter response of the Commercial T.U. very much favoured by U.K. amateurs, the FSY.1.1. A similar response is exhibited by the BPF of an earlier version of this equipment, the FSR1.1X. As can be seen, these filters do an excellent job of discriminating against signals outside the band 1.5 to 3.5 kc. However, nothing is aimed at reducing the unwanted signals in the centre of this passband. In all fairness to the manufacturers, they designed

the T.U. to accept a number of different amounts of frequency shift and in some of these, the centre frequencies would be required.

Fig. 3A and B shows the circuit of a simple notch filter which can be inserted in the AF input lead to the T.U. and which will provide a very useful amount of attenuation in the centre of the unwanted frequency band. The dotted curve in Fig. 2 shows the actual measured insertion loss of this filter. At first sight it may seem that the nose of this filter is much too sharp and that a much wider rejection band is required. This is in fact only partly true since with the normal input level (around 1 volt RMS) to the T.U. there is no discriminator response to signals 100 c/s either side of the centre frequency and only a limited response another 75 c/s either side of these freqs. This is therefore a reasonable compromise between filter complexity and insertion loss (at the wanted frequencies) on the one hand, and the ideal filter on the other. This filter has been in use at the writer's QTH for two years or so and is rarely taken out of circuit. There is some insertion loss (about 10 dB at the mark and space freqs.) and though in most cases this loss can easily be made up by increasing the Rx AF output to the T.U., there is at the input to both types of T.U. three resistors which form a 5 dB attenuator that can be removed to compensate for some of this. These resistors form part of a matching device to the 600-ohm input of the filter. Provided that the T.U. is being fed from a 600-ohm source they can be removed.

The notch filter coil consists of one of the well known 88 mH telephone loading coil so often used as part of T.U. discriminator tuning in home-brewed converters. These consist of two windings that can be connected to give the 88 mH inductance required. The junction of the two coils is of course used as the centre tap in the filter of Fig. 3A. The capacitor is selected so that the circuit resonates at 2550 c/s. The resistor is adjusted until the filter shows maximum

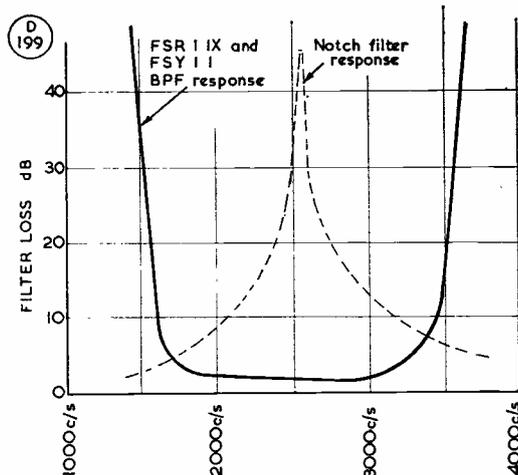
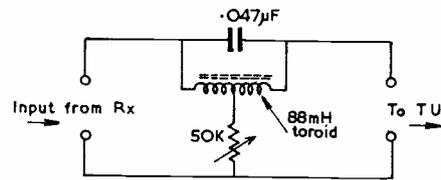


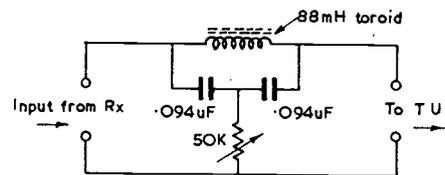
Fig. 2. Curves to show the response of a T.U. filter — actually the FSY.1.1, well known to U.K. RTTY operators — to eliminate unwanted signals. See text for discussion.

rejection at this freq. It can then be measured and replaced by a fixed resistor if required. The usual value is around 30K. If a coil with a centre tap is not available then the circuit of Fig. 3B can be used with no difference in performance over the band of frequencies involved. This is a little more difficult since two condensers of identical capacity are required. The values of capacity shown are the labelled value of the condensers used. The two 0.094 μF capacitors could probably be replaced by two 0.1 μF types if a few of the turns were pruned from the coil. Listening through both the BPF and this notch filter at the T.U. it is surprising just how little unwanted signal gets through and for the time and materials required for this filter the results are well worth it.

Finally, please keep March 20-22 free for the B.A.R.T.G. Contest and even if you can't put in the whole weekend behind the keyboard, at least jump into the m el e for a couple of hours or so in order to give the stalwarts something to bite on! And don't forget to dust off the 40m. band before and after midnight—it might provide some real surprises. See you during the games—73 de G3CQE.



A 2550c/s Notch filter.



B

(D 200)

Fig. 3. Notch filter for the AF input to a T.U. in an RTTY set-up. The (measured) insertion loss using this particular type of filter is shown dotted in Fig. 2 on p.277.

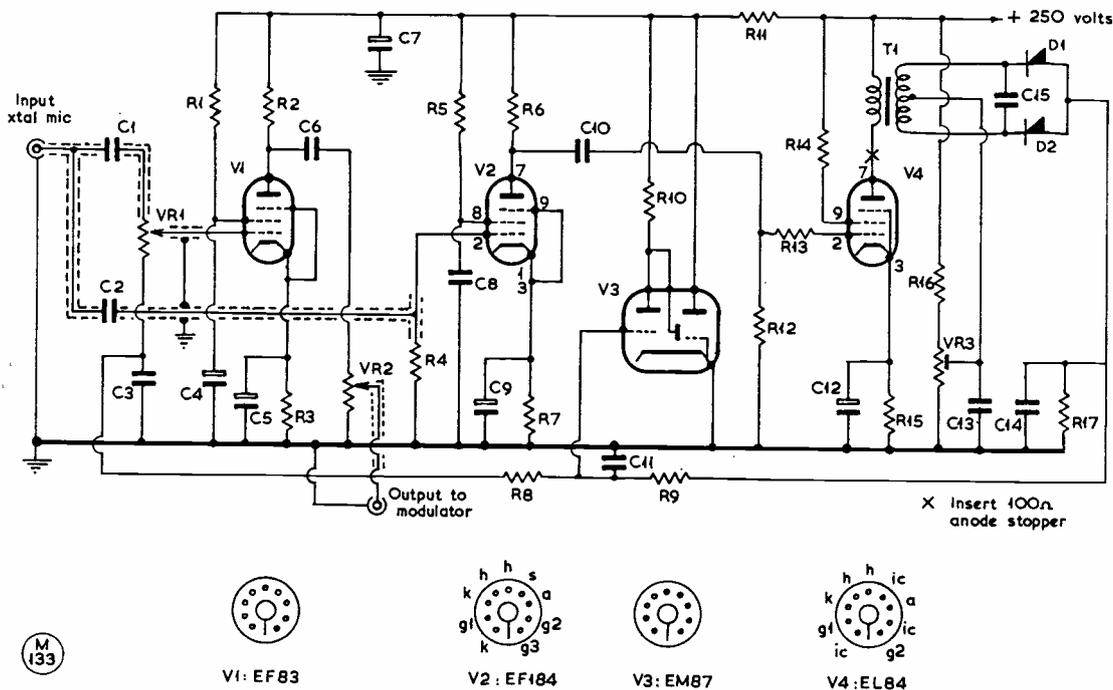


W6AEE, 372 West Warren Way, Arcadia, Calif., has an HT-32A/33A transmitter and SX-117 receiver, with his own design of terminal unit. The printer is described as "ASR-28, home assembled from parts." The signal is radiated off an all-band vertical aerial system.

NOTE FOR SUBSCRIBERS IN YORKSHIRE

Direct subscribers in the Yorkshire and Co. Durham area receive their postal copy of the *Magazine* through the York head post office. For many of them, the January issue was 12 days late in delivery. As soon as we became aware of this, the matter was taken up with the North-Eastern Region, G.P.O., and on January 20, we had a letter of explanation and apology from the Postal Controller for the area, to the effect that delivery of a large volume of mail had been held up at York due to

circumstances beyond their control. All subscribers who complained direct to us will have had the official Post Office explanation. Needless to say, so far as we were concerned, the January issue was posted to all direct subscribers before noon on December 31, for delivery on January 1, and — though we came in for a good deal of criticism about the whole affair — those concerned will now know that the fault lay with the Post Office, and that they have accepted the responsibility.



Circuit of the speech compressor, which will enable heavier modulation to be obtained without causing the sideband splatter that usually results when a "straight" modulator is pushed too far. The principles of speech compression are explained in the handbooks and — since only a circuit, values and notes on adjustment are given here — it would be as well to read up the subject before trying out this arrangement.

SPEECH COMPRESSOR CIRCUIT

FOR MODULATION CONTROL

From Notes by G3SZC

THE speech compressor shown here will enable deeper control to be obtained without causing over-modulation — for the principles involved in speech compression, filtering and clipping, see the amateur handbooks, in which the subject is treated in detail.

This circuit is simple to set up and once the delay level control VR3 has been fixed, the degree of compression can be increased by reducing the input gain control VR1 and advancing the output level on VR2. In practice, it is best to set VR1 to about half-travel and then to adjust compression by VR2, as dictated by QSO conditions.

It will be found possible considerably to increase the apparent depth of modulation without causing sideband splatter the limiting factor here being speech quality. The process cannot be taken too far, but much more modulation can be obtained than is possible with a straight speech-amplifier/modulator before, in the ordinary way, splattering would

Table of Values

Speech Compressor Circuit

C1, C2,	R10 = 100,000 ohms
C10, C15 = .01 μF	R11 = 4,700 ohms, 5w.
C3, C8,	R13 = 4,700 ohms
C13 = 0.1 μF	R14 = 100 ohms
C4 = 2 μF	R15 = 135 ohms, 2w.
C5, C9,	R16 = 50,000 ohms, 5w.
C12 = 25 μF, elect.	VR1,
C6 = .005 μF	VR2 = 500,000-ohm
C7 = 16 μF, elect.	potentiometer
C11 = 0.2 μF	VR3 = 50,000-ohm wire-
C14 = 0.5 μF	wound potentiometer
R1 = 1 megohm	D1, D2 = BY100
R2, R4,	T1 = X-former to suit
R8, R9,	diodes D1, D2
R12, R17 = 220,000 ohms	V1 = EF83
R3 = 220 ohms	V2 = EF184
R5 = 270,000 ohms	V3 = EM87
R6 = 82,000 ohms	V4 = EL84
R7 = 1,000 ohms	

become evident when its audio gain control is turned up.

Constructionally, normal practice should be followed where "touchy" audio circuitry is concerned — that is to say, the input side should be carefully screened.

Before building the unit or attempting to put it into operation, read up the appropriate chapter in whatever Amateur Radio handbook is your reference on the general subject of amateur transmission.

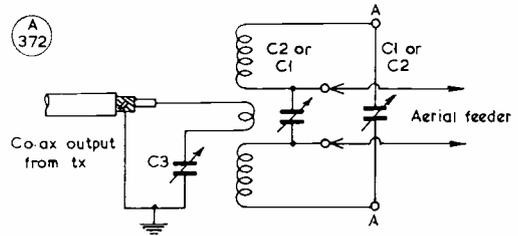
ALL-BAND AERIAL COUPLER

SOUND DESIGN REVIVED

S. E. JANES (G2FWA)

SEVERAL years ago, in the R.C.A. *Ham Tips* for November, 1952, to be precise, there appeared an ATU which deserves to become better known to users of aerials with Zepp-type feeders.

Driven on by what at that time appeared to be insurmountable TVI trouble, the conventional PA parallel-tuned tank coil was giving way to the *pi*-output configuration, with its much reduced harmonic content—when operated in the correct manner. This change resulted in many fine push-pull tank coils, with a centre swinging link, to be relegated to the junk box. However, this particular coupler enables such coils to be given a new lease of life. An interesting point to remember is that the coil for the next lower frequency band may be found to give optimum performance; for example, if the transmitter is operating on 20 metres, the 40-metre coil should be used in the coupler. This fact also enables an otherwise spare coil to be used if the transmitter is still a conventional push-pull PA output.



Circuit of the arrangement discussed by G2FWA. Values are: C1, 50 $\mu\mu\text{F}$; C2, 100 $\mu\mu\text{F}$; and C3, 500 + 500 $\mu\mu\text{F}$, BC-type twin-gang. The aerial feeder may be connected across A-A, or as shown. This is a very versatile ATU.

The two variable condensers may be of the split-stator type, with the rotor grounded, if the capacitance per section is double the given values. Depending on feeder length, optimum loading may be obtained by connecting the feeders across either C1 or C2.

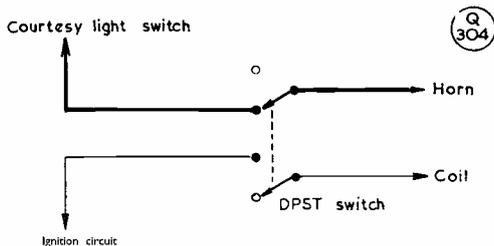
The series tuning of the link coupling coil is always used at G2FWA. With care regarding size of the link a series capacitor will be found invaluable for achieving maximum loading. This will be readily appreciated by users of an SWR indicator. Unless by good fortune the choice of link coupling coil size happens to be initially correct it will not be possible to get a satisfactory SWR indication without this series tuning.

ANOTHER ANTI-THEFT DEVICE

On p.400 of the September, 1964, issue of SHORT WAVE MAGAZINE we showed a horn-blowing alarm devised by G3BA (Sutton Coldfield) for the protection of his car against theft or pilfering. G3HBZ (Feltham, Middx.) puts forward another similar circuit, which he has been using for some years now.

The difference is that by means of a DPST switch, he cuts the ignition lead as well when the horn is at "alarm on"—see circuit. This guards against that situation (and type of car) where the door can open a foot or more before the courtesy-light switch is actuated—thus, even if the thief did squeeze in quickly, he would be unable to start the car.

A good point made by G3HBZ is that horns, especially the two-tone type, take a lot of current—anything up to 30 amps. or more. Hence, both switch and wiring should be heavy enough to carry current of this order without burning out or getting hot enough to start a fire!



The circuit suggested by G3HBZ, set to "alarm on."

He also points out that, legally, it is an offence "to sound the horn of a stationary vehicle." He has himself been warned about this when forgetting to switch off the alarm!

A suitable DPST switch, rated about 30 amps. at 24v., can be picked up around the surplus stores for something in the region of 4s. 6d.



The new Hammarlund HQ-145AX offers the precision of crystal controlled reception in a moderately priced communications receiver. The general specification includes: Frequency coverage 540 kc to 30 mc; calibrated electrical band-spread on the 10-80m. amateur bands; dual conversion above 10 mc; 6-position xtal filter, with adjustable slot, giving up to 60 dB attenuation; variable high stability BFO for SSB/CW reception; and a sensitivity of 1 μV to give 10:1 signal-to-noise ratio. Hammarlund equipment is handled in the U.K. by K.W. Electronics, Ltd., Dartford, Kent.

Miscellany

NOTES AND NEWS FROM ALL PARTS — SENSE, AND SOME NONSENSE

The daily press, alone amongst the mass media, has failed to keep pace with the growth of world population; while the latter has increased by 26 per cent, the press circulation has advanced by no more than 20 per cent. (Compare this with the recent note on the growth of world broadcasting—six times as many TV's and twice as many radios as in 1954.)

(UNESCO Report)

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A new *Mullard* film on Thin-Film Microcircuits shows the launching of a satellite, and part of the telemetry equipment in the third stage of the Eldo rocket is displayed. A unit the size of a cigar-box contains 2,000 resistors and capacitors, 500 transistors and diodes. Other applications of thin-film microcircuits are shown, and this film will be of interest to electronic engineers wishing to familiarise themselves with the new manufacturing techniques involved.

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"There's an old sentimental notion that somehow Amateur Radio is exempt from the normal laws of human behaviour and attracts a mystically superior breed of men. Of course it unfortunately does not . . ."

(Letter from Martin Harrison, University of Manchester)

— • • • —

"It is always amazing to me that a group of people whose hobby is communication can be so poor at communicating among themselves. Like our transmitters and receivers, we must be tuned to the same channel if we are to convey a thought."

(W5UYQ in "Collector and Emitter," Oklahoma)

— • • • —

Way back in the dim past, the CW operator (and doubtless the spark man before him) used "dit-dit-dit-dit dit-dit" as a substitute for a laugh. It probably had no connection with "Hi" at all, but the phone men cottoned on, first to "Hi" and then the ghastly "Aitch-Eye" . . . and if they give tongue thuswise, one knows that what they have said is supposed to be funny. An interesting departure is that the vast majority of CW men now send "Hee" rather than "Hi"; and maybe this has some connection with the fact that an increasing number of W's have been noted sending "Haw"!

— • • • —

The First YL? W5RZJ, writing in *CQ*, quotes from *Modern Electrics* for August, 1913: "A little Honolulu girl has the honour of being the first girl to pass the Federal Wireless Examinations . . . Mary Ann Nobriga is only 14 years old. Her complete outfit for sending and receiving is as follows—One

loose coupler, double-slide tuner used as a loading coil, one variable condenser, 2,000-ohm receiver, galena detector, one fixed condenser, 1½ in. spark coil, one brass spark gap, six dry batteries. Her aerial consists of four No. 14 copper wires, spaced two feet apart, 60ft. long and 55ft. high." (That aerial might still be useful, but the rest of it would look a bit odd.)

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A word from the Deputy Chairman of the Fire Protection Association: "Everyone thinks he understands electricity; everyone is confident he is an electrician; but his ignorance of *fire* is abysmal." The number of electrical fires is on the increase, and about one quarter of them are caused by wiring and cable faults. Would *your* shack stand up to an inspection by an official of the Fire Protection Association? Or even by a representative of your insurance company?

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Some of the achievements of the late C. S. Franklin, C.B.E., M.I.E.E.—whose death was reported on p.668 of the January issue of *SHORT WAVE MAGAZINE*—are not nearly as well known as they deserve to be. He was associated with Marconi from 1902 onwards, having previously worked to introduce "wireless" into the field, for the Marconi Co., in the Boer War, starting in 1899. Among the 65 patents standing to his credit are those concerned with the variable condenser, the ganged condenser, the reaction circuit and the concentric feeder. Many of his designs are still in use, in various fields of HF communication.

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G3ESP writes to us about a description (in *Das DL-QTC*) of a new electronic key designed and used by DJ3CCA. This device, guaranteed to send *perfect* Morse, uses a little collection of 31 transistors and 16 diodes, and is said to work perfectly at temperatures between -22°C and 60°C.

— • • • —

A great improvement in astronomical telescopes was made possible by the scientist Cassegrain (in 1672), who introduced the principle of double-focussing by placing a small convex mirror near the focus of a large concave mirror. The received image was viewed through a hole in the large mirror. S.T.C. have now applied this principle to microwaves, and have found it possible to replace the 29ft. "fog-horn" aerials on many radio towers with Cassegrain aerials of only 12ft. 6in. diameter. The new *Standard Telephones* system consists of a convex reflector of 6in. diameter, near the horn-shaped end of the circular

waveguide which feeds the energy down the tower to the receiver (and the transmitting process, naturally, works in reverse). Half the size, a quarter of the cost and much lighter . . . thanks to the work of a University professor of 1672.

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"Experience is a wonderful thing—it enables you to recognise a mistake when you make it again. But some mistakes can only be made once—they are fatal." (W8MGQ, in "Auto-Call")

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Selection of Famous Last Words, from the A.E.R.E. (Harwell) *Newsletter*:—

"Put the red plug in the black socket."

"No!! Don't switch on yet!"

"Don't let the meter drop below 20—that's zero. 35 is about 8 amps."

"Tune up the PA for the lowest-pitch note from the DC converter."

— • • • —

This reminds us of a recent statement in an engineering paper about servo-mechanisms. Those of great complexity, it said, were uneconomic; the most useful and sophisticated servo, the writer said, was still human muscle. Human beings were relatively cheap, very numerous, and the product of entirely unskilled labour! (So don't ignore the chap with the old pump-handle when you hear DJ3CCA's perfect Morse.)

— • • • —

If the local planning authority refuses permission for the erection of a mast or tower, don't give up, but *appeal*—and make sure your case is well prepared and documented. This advice comes from G6HL (Andover), who has appealed successfully against a refusal to allow him to erect a second 55ft. tower on his land. Protests, by neighbours, were partly on the grounds of spoiled amenities and partly because of fears of interference. (One lady stated that her property "now overlooked a wireless station.") The Ministry inspector, recommending that the appeal be allowed, suggested that the proposed wooden lattice tower, against a background of tall trees, would not detract from the amenities; and (more interesting to many of us) stated that the applicant, considering his background as a professional engineer and an experienced radio amateur, "might be presumed to possess the knowledge and ability to conduct his experiments and to maintain his equipment in such a way that interference . . . would be reduced to a minimum."

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"If you are truly apathetic, there is not much to be said or done about it. You are suffering from a disease not uncommon in all clubs and societies; and, quite honestly, until you yourself begin to feel the desire to take a real interest in the world around you, there is not much point in others attempting to shake you out of your coma. You just wouldn't care

less . . . let's face it; the average individual can't be bothered to get himself involved in wider and bigger issues which seem to be remote from his own activities." (G2HIF, in A.E.R.E., Harwell, "Newsletter")

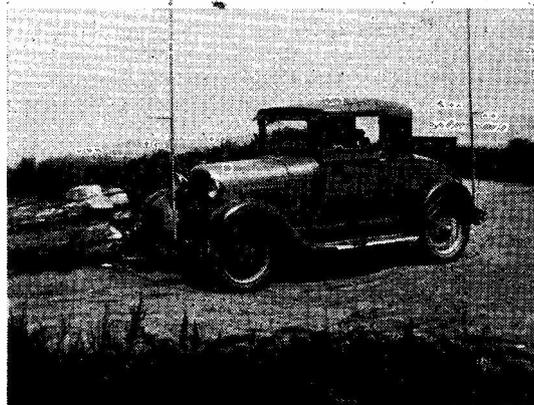
MOBILE RALLY FIXTURES

Dates now fixed for this Season's Mobile Rallies, as so far notified, are as follows:

Midland, Trentham Gardens, *April 11*; Thanet, Pegwell Bay, *May 9*; R.N.A.R.S., Petersfield, Hants., *May 30*; Hunstanton Rally, *June 20*; Oxford Tenth Anniversary Rally, *July 11*; South Shields, *July 11*; Cornish A.R.C., Newquay, *July 25*; Derby & District A.R.S., at Derby, *August 15*; Peterborough, *August 30* (Bank Holiday); and Harlow, *September 26*.

That makes ten fixtures so far — and only one clash! However, Oxford and South Shields are probably far enough apart for it not to matter unduly.

First Mobile Rally ever held in the U.K. was at the Perch Inn, Binsey, near Oxford, on October 9, 1955, reported in *SHORT WAVE MAGAZINE* for November 1955—hence the 10th anniversary event being laid on by the Oxford boys. And since the last issue appeared, Derby's date has been changed to *August 15*, as noted above. Any further bookings should reach us as soon as possible, for a consolidated list in the next issue.



Recent discovery in the archives — G6FO/M (Newport, Mon.) in 1932! The car is the Ford coupe of that time, the gear 5-metre with SEO Tx and super-regen. Rx (mounted on a board behind the front seat) with the 5-metre dipole hung between the short fore-and-aft masts fitted to the bumper bars. In those days, the happy hunting ground was in the hills of the lovely county of Monmouthshire (this photograph was taken at Skenfrith). Easy 5-metre contacts were possible with stations in Bristol, round the West Country and in South Wales. And this was more than 30 years ago! "Mobile" in the modern radio amateur context was, of course, quite unknown then. For these operations, a portable licence was granted and the /P suffix actually used when G6FO was on the move with this outfit!

WHEN REMITTING TO US

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A TRANSPORTABLE STATION

FITTING OUT A CARAVAN—
FOR OPERATION ON THE AIR
AND AS A WORKSHOP

C. E. DEAMER, Grad.I.E.R.E. (G3NDC)

A "SHACK" can take many forms, both for the transmitting amateur and the SWL. Its location is greatly dependent on available space and frequently also on the diktat of the XYL.

Because of these well-known facts, it is felt that the solution found by G3NDC may be of interest. The problem with which the writer was faced was not so much lack of available space, but the need frequently to change QTH, anywhere in the British Isles, in order to follow his course of employment. These frequent moves will probably continue, with not more than three years elapsing between moves and maybe only a short period of six months or so.

Several attempts were made to produce a collapsible station, which could easily be dismantled and reassembled without too much effort and loss of operating time. However, anyone who has tried to move, say, a garden shed will no doubt appreciate the problems attached to a shack of this type. A satisfactory solution was not found until a good friend suggested a caravan might be the answer. Before the possibilities could be explored yet another move had to be made and once again G3NDC was dismantled, this time from the spare room. However, the seed had been sown, and the caravan idea was given serious consideration.

First and foremost it had to be capable of housing the rig and the essential ancillaries, with the possibility of including a small compact workshop. These ideas prompted the search for a caravan of a size limited to that which could be man-handled and manoeuvred in an average-size garden.

A new caravan was out of the question financially; any caravan fully equipped would involve considerable work removing unwanted fittings; and the price asked even for quite decrepit caravans with full equipment was prohibitive. Consideration had also to be given to "equipment, radio type, layout of" when viewing a caravan to ensure that it could be economically converted. It was decided, therefore, that an elderly caravan with no interior fittings was the answer, provided that it was at least 6ft. wide inside and not more than 12ft. long outside (plus a couple of feet for the tow bar) to enable it to be accommodated in reasonable space.

After much searching the required item was located. The interior *decor* left much to be desired, but it was acquired for the princely sum of £15. Towing gear and braking system were non-existent and delivery over a distance of about 5 miles involved

a further expenditure of £2.

Having established that the outer skin was aluminium and the inner hardboard, with about lin. between fitted with glass wool, it was decided to remove the inner skin to facilitate cleaning, and during this operation to do the necessary wiring, to be clipped to the wooden framework in such a way that the hardboard panels could be replaced completely to hide the rather unsightly cable runs.

Wiring Out

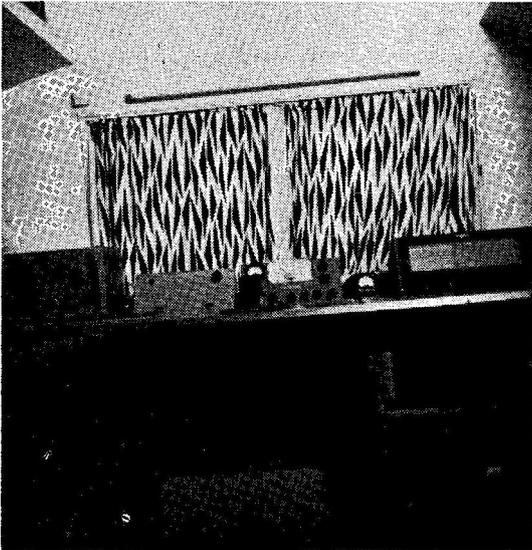
For power circuits 7/029 twin and earth, p.v.c. insulated, cable was used to give 6.13 amp outlets on a ring, whilst 3/029 was used for lighting, with two 5ft. 50-watt fluorescent units and one 30-watt architectural fitting, the latter positioned immediately above the operating position.

Beam rotation is achieved by cowl-gill motor controlled from the operating position with direction indication; the wiring for this was also fitted at this stage, using multi-core cable. Also the aerial feed cable of low-loss coax was included in order that it could be connected externally, whatever aerial was in use. Burglar alarm wiring was also incorporated to give some protection to the rig and to reduce the insurance premium. All this took several weeks due to frequent interruptions—such as going to work and stopping for food and sleep.

The hardboard inner skin was then replaced and painting started, applying the usual multiple coats. Obviously, it was necessary to make the interior as light as possible on the eye, and for this reason light green paint was chosen; this would probably not meet with everyone's approval, but it has the advan-



In this picture, G3NDC himself is on the left, with K0JGF (visiting, at centre) and SWL Slack. By buying a discarded 'van very cheaply, and doing it up and fitting it out himself, from first to last the whole project did not cost G3NDC more than about £50—and he now has a complete station to take round with him wherever he goes.



Operating position in the caravan station of G3NDC, as described in his article.

tage of giving maximum light reflection with minimum eye strain, an important factor if serious late-night operation is to be undertaken. When painting was completed, the operating bench was installed at the rear end of the caravan, under a large window to ensure adequate light, using $\frac{3}{4}$ in. tongue-and-grooved boarding, the back of which was inclined downwards to position the equipment at the optimum angle from the operating point of view. Additional support was given at one side of this bench by a set of drawers (salvaged from an old desk) whilst at the other side a bookcase was suspended from the underside of the bench using a sliding door fitting (probably the most expensive item purchased). Space was left behind this bookcase to form a cupboard, access to which is gained by sliding the bookcase sideways into what is normally the leg space area under the bench. Finally, the bench top was covered with heavy linoleum stuck down with linoleum adhesive, and a strip of $\frac{3}{4}$ in. aluminium angle screwed on to the front edge, just to finish off.

General Equipment

For storage space the desk drawers under this bench were obviously inadequate, and a chest of 28 drawers was next constructed, 20 of the drawers being divided into multiple compartments using hardboard strips, and fitted on the nearside of the interior. The opposite side was used for work bench and tool storage, as shown in the photograph. All tools are readily accessible and neatly stored, either on Terry clips or on cuphooks of various sizes. (This is a definite asset when carrying out constructional work and avoids searching in drawers full of tools for some small implement which is probably not in there anyway.)

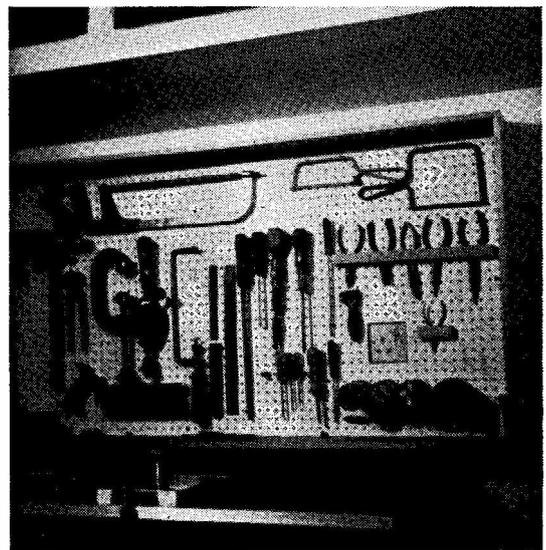
The front cover clips into place when the tools are not in use, and to this cover is fixed a SHORT WAVE MAGAZINE Great Circle DX Zone Map giving quick reference to bearings and prefixes.

At the front end of the van there is a low window below which a cupboard was installed at one side for storing cables and to provide a seat for visitors, well out of the way. On the other side is fitted the "air-conditioning unit;" this provides heating, ventilation, cooling or fug removal by a large fan and two heater elements, 1 kW and $1\frac{1}{2}$ kW, which may be used separately or together. Air is drawn in from outside through a filter, heated if necessary, and blown into the caravan through an expanded metal grille. The outside air intake may be closed if the temperature is too low and the air is then re-circulated within the caravan, the whole system being controlled (to some extent) by thermostat, which can be set to any temperature between 30° F. and 90° F.

The finishing touches were put to the interior by covering cupboard tops with Formica, the work bench with hardboard, and the floor with linoleum tiles. This latter operation was one in which the XYL gave considerable assistance by scrubbing and disinfecting the original rough wooden floors, and washing and polishing the finished tiled floor. (Perhaps she just wanted to get G3NDC out of the house.)

Leakage Snags

With the interior completed, or as near as it ever will be, some trouble was experienced with water leaking in through the outer skin at the seams, so the exterior had to be given the full treatment. Sealing strips were removed, cleaned, re-packed with putty and re-fitted. Paint was then applied to prevent further ingress of moisture, this operation being



The work-bench and tool-rack layout in the G3NDC caravan. Equipment includes a drilling machine, out of view to the left.

carried out over a period of a few weeks, whenever the weather was favourable.

Fitting Out

With this job completed and the interior dry and warm, the real purpose for which the shack was intended could be tackled. So now, even when the rain pours down and the wind blows a gusty Force 6, it is without doubt the most pleasant shack G3NDC has yet occupied.

This has by no means been a minor undertaking; it has involved about 20 weeks of pretty hard work although the total expenditure, first to last, is estimated at not more than £50. Anyone with the ability to work in wood could no doubt make a conversion

of this type equally as good and probably for less money. The /P enthusiast might well consider such a shack to be preferable to a tent, since mains power input is connected to a waterproof plug and socket under one side of the caravan. It only requires a portable 250-volt 50 c/s motor alternator set and a length of cable and operation can be carried out both in comfort and with efficiency.

It is hoped that the experience of the writer may be of help to others, although it is felt that the theme could be varied in many ways.

It is the kind of project which will have the enthusiastic support of the XYL, as G3NDC gratefully acknowledges. So now it's heigh-ho for any new QTH, with the station trundling behind!

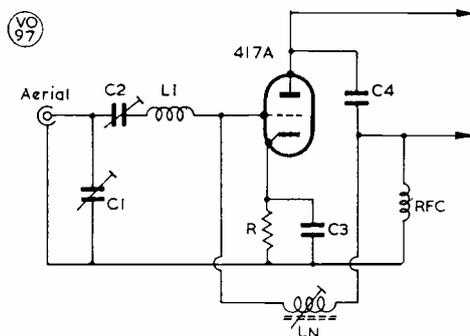
IMPROVED INPUT CIRCUIT

FOR VHF CONVERTERS

From Notes by G3LTF

THE diagram herewith shows a desirable modification for the RF stage of a two-metre converter. Though it is drawn round a 417A (5842)—a triode with a trans-conductance of 25,000 mhos—other types could be used, such as the A.1714 or A.2521.

Impedance transformation is adjusted by C1 and tuning is on C2, the procedure being to start with C1 fully open (minimum capacity) and, with the aerial on, look for any weak signal about mid-band and peak it up on C2. Then increase C1 gradually and re-set to resonance by C2 until the best NF is obtained—this can be done by ear if no noise generator is available. If the C1, C2, adjustment is carried too far, the valve may go into oscillation—in other words, the stage is operated in a slightly regenerative condition, having regard to a reasonable noise factor. Neutralising of the stage is carried out in the normal way and what it amounts to is that the circuit is adjusted to be as gainy as possible



The two-metre Rx input circuit as described by G3LTF. Values are given in the text, and completion "to the right" depends upon the circuitry of the following stage.

without reaching the verge of oscillation while showing an acceptable NF. The purpose of the RF choke is to provide a DC return to ground if the next stage requires it.

Actual circuit configuration "to the right" depends upon how the second stage is arranged—whether in cascode; as a straight RF amplifier; or as a mixer. In some such circuits, C4 might not be required.

Values for the circuit shown are: C1, C2, 33 μF trimmer type; C3, 100 μF ; C4, if required, 200 μF ; R, cathode resistor, 68 ohms. For the two-metre band, using a 417A, L1 can be six turns of 18g. to $\frac{1}{4}$ in. diameter by $\frac{1}{4}$ in. long, and L2 either the existing neutralising coil or nine turns of 22g. to $\frac{1}{4}$ in. diameter by $\frac{1}{4}$ in. long. The choke RFC, if required, is made up from 20in. of 18g., drawn out and wound tight on to a pencil, sprung off and mounted to be self-supporting.

WE ALWAYS WANT TO SEE

Articles of Amateur Radio interest for possible publication in SHORT WAVE MAGAZINE. Good rates are paid for acceptable work, and a general note for the guidance of authors appears at the foot of the Contents page in every issue of the *Magazine*.

We also use a great many pictures by way of general illustration, and therefore photographs are always of interest. These can be any size (within reason) but must be good, sharp prints, *not* negatives. Pencil call-sign and QTH lightly on the back, for identification only, and write the details about the picture on a separate piece of paper. All photographs used are paid for immediately on publication — as are articles and similar contributed material.

R.E.C.M.F. EXHIBITION, 1965

The twentieth exhibition of the Radio and Electronic Component Manufacturers' Federation will be held at Olympia, London, over May 18-21. It will be one-fifth larger than the last R.E.C.M.F. Show in 1963—these exhibitions, which tend to be highly specialist, are laid on every other year, and attract buyers from all over the world.

COMMUNICATION and DX NEWS

L. H. Thomas, M.B.E. (G6QB)

ANYONE with experience of previous sunspot minima must find the present conditions little short of miraculous. We are right at the bottom of the current trough, and have nothing but improvement to look forward to for several years; yet there is not, and never has been, any real absence of DX.

Even in the 1953-54 minimum we had quite long spells when it was an event to work even a W on the HF bands; nowadays such days are so rare as to be almost non-existent. True, we have virtually lost 28 mc as a DX band; and 21 mc has had long periods of disuse. But 14 mc, always the DX-er's mainstay, has never ceased to be interesting.

What have the next few years in store for us? Well, 21 mc should be showing a great improvement this year—certainly by the autumn. 28 mc probably won't be in full cry for a couple of years, but—who knows?—it might even be a worthwhile DX band by next winter.

All this will have the effect of relieving the pressure on the heavily over-crowded 14 mc band; and those who will first feel the benefit are the "communicators," rather than the rare DX chasers. The SSB types who spend most of their time just chatting with medium DX (not having hit-and-run contacts with rare ones) will find it so much easier on 28 mc that a lot of them are bound to transfer their attention to that band.

Those who *are* competitively minded will find their thrills by working new countries on the 21 and 28 mc bands—and, we hope, signifying same by their entries in the Five-Band Table, which starts again here and now.

One effect of a wide-open 28 mc band will be to raise a crop of beams among those who feel that a full-size 14 mc beam is too unwieldy, too unsightly or just not practicable in their circumstances. However, a thing precisely half the size is a different proposition, and we can visualise some

pretty big 28 mc signals coming along.

Meanwhile, in the words of a TV personality, "it pays to shop around," and that 21 mc band shouldn't be neglected. It carries some mighty nice DX at unexpected times, and the way the SSB types neglect it has always been a puzzle. There are always acres of wide-open spaces there—and *not* necessarily because conditions are bad. Someone pops up occasionally with a wonderful signal, and there is simply no one there to reply to him.

All this is very mysterious; why are so many amateurs complaining about the shortage of frequencies, while neglecting a nice band of 450 kc? It's akin to the other great puzzle, which can be observed on Sunday mornings . . . why do hundreds of people try to cram themselves into the 200 kc of Top Band, while the 1700 kc of 28 mc goes virtually unused? It is an ideal band for local natter, at the present state of the sunspot cycle; but in a few years your local chat will (we hope) be rudely broken up by QRM from another continent.

Top Band is as two-faced as ever—local natter by day and frantic DX-chasing after dark. The season appears to be quite as good as the previous one, and might well turn out to be better. A notable change, for instance, is the way G's are working VO's, VE's and W's by staying up late at night rather than by getting up early in the morning. VO1FB has been worked as early as 2215 GMT, and VE1's and W1's by 2300.

But this is to be expected in the period of an IQSY, and this particular Top-Band peak will be remembered for a long time. What still makes us blink is the excellent state of 14 mc during a period when it might well be flat on its back. Technical progress, no doubt; better beams; the use of SSB rather than AM; but don't forget that there are plenty of CW-only men, some of them

without beams, who are marvelling at the contrast between this period and the previous one 11 years back. (There are even some types who, we might say without being unkind, have made no technical progress at all in the past eleven years . . . and *even they* are enjoying things.) Let us all make the best of *all* bands, and be thankful that things are as good as they are.

Two-Faced

Are you a schizophrenic? Do you suffer from a split personality? Does Dr. Jekyll alternate with Mr. Hyde? Then you have, perhaps, the makings of a successful DX-er.

We know of quite a few keen operators who—although normally they are polite, rag-chewing types, exemplary family men, fond of children and all that—transform themselves, at the smell of rare DX, into ravening wolves. Doors are slammed, windows shut, sound-proof headphones put on, and everything goes by the board until that DX-pedition has been successfully landed.

In a recent conversation with W6EBG, on the eve of a "rare appearance" (this one was from 8Z4), we were told that the rag-chewing sked must take second place to the DX. Gene said "Out comes my black cloak, and my fangs begin to show," but he was back to normal two days later, having worked the new one, needless to say.

This state of affairs is not something to be deplored, for it certainly shows enthusiasm. What *would* be sad would be the permanent ascendancy of the cloak-and-fangs personality; but it must be the product of some atavistic urge, and probably serves some valuable purpose. If its victim hadn't got this outlet, who knows what frightful practices he might not become addicted to?

Next thing we know, there will be a "Q" signal meaning "My normal personality has temporarily left me. Keep away—I'm dangerous until this DX attack has subsided."

Final note on all this: The attacks are, if anything, more severe among those in the "300-plus" category, but they don't occur so often. The patient has usually worked every country that is currently on the air, so it takes a DX-pedition to a new one to bring on the symptoms. When the first signs appear, though—a glazed expression during conversation, heavy breathing and itching fingers—the only thing to do is to shut the patient in the shack and wait for the trouble to subside.

Top Band DX

Once more it is the Top-Band news that preponderates, and if those who are not interested in this band think the space devoted to it is excessive, we can only say that we are right now at the absolute peak—both seasonal and periodic—and that the band may never again reach the heights that it is now touching. History is being made, and we must record it.

First, W1BB's bulletins. Stew notes (as many of us have done) that the cyclical variations of the band have not favoured the weekends of the organised tests. The intervening weekends have seen the best conditions. And we have now reached the state where the G's getting across to the W's have become too numerous to list—*everybody* seems to be doing it.

The weekend of January 9-10 was probably the best of the season, so far, and we can only hope that the CQ Contest Weekend (January 30-31) was as good as it was last year. (We shall know by the time this appears in print!)

Another *first*: ZP9AY worked W1BB on January 11, having previously worked PY1NFC. So far, this season, W1BB has worked 114 stations in 21 countries . . . last season the score overall was only 82S in 19C.

DX stations, other than W's, who have worked Europeans include VP3CZ, VP7NY, HR3HH, CO2QR, 9L1TL, 9L1HX, JA6AK (who worked DL1FF), 6Y5XG, 6Y5CZ, 9M4LP.

VK3ATN worked W1BU; VK3BM and 5KO also have skeds for the spring. KR6BQ worked KØPIV and W6GTI for another *first*; and the first between G and 9L1 seems to go to the credit of

G3RFS and 9L1TL (December 12).

Other "strays": W1BB is sending out a nice souvenir "IQSY" QSL to those he works, or who send reports . . . an unwelcome intruder who doesn't make things any easier is DHJ58/1/2 on 1819.5 kc, a station near Kiel running 10 kW output, right in the American sector of the band—but he's not always on in the early mornings.

Top-Band News from Readers

G3NOF, who doesn't work the 160m. band himself, reports that G3CFV, on SSB, raised VO1FB on AM; also that other locals have worked W1BB. G3GGS actually heard the QSO between JA6AK and DL1FF. The JA, on 1880 kc, was RST 239 at 2020 on December 16.

G3SVW asks in a despairing note "How can we get the phone boys off 1880 kc?" Most of them are probably not interested in DX, don't know that the JA's are on that spot frequency, and probably couldn't care less, anyway. (In fact we have met some who flatly refuse to believe that anyone can work out of Europe on the band.)

G3IGW says that he and G3JML will once more be operating from Scotland during the CQ Contest . . . GM3IGW/A will be on from Lochnaw Castle with an inverted-Vee at a good height. From the home QTH, 3IGW finds things better than last year, and he, too, has worked VO1FB on phone. He wonders whether it so happens that propagation conditions at present happen to favour a horizontal wire rather than all the fancy verticals?

GW3PMR worked VO1FB as

early as 2105 GMT, although the opening lasted only a few minutes; and on January 7/8 he was amazed to hear several W QSO's on SSB. The W's who were on CW seemed to be working locals rather than looking for DX (around midnight, January 7).

G3LIQ sends in a terrific list of W/VE's worked on 160m.—20 of them in a row on the morning of December 13, and again on January 10. Not content with this, he reports others on the band at 2230 GMT on the latter date. And on the same day he heard VP2AV at 559, but busy with W's. And he received his QSL for the first G/OX contact (November 1).

GM3KLA had bad luck with the gales in early January, which broke the top 40ft. off his 100ft. vertical, but he says the remaining 60-footer loads quite well—but neither of them can compare with the original 128ft. that he once had up.

Piracy Runs Riot

It is our sad duty to announce that *all* the following calls, heard or worked on Top Band, must be considered phoney unless some sort of positive confirmation is received: LA2VF, OY7FP, all OZ's, SVØWZ, VE8HL/SU, 4U1ITU, HA5AA, ZB2A, TF5TP, all 3A2's, F2GL, numerous UA-UB-UQ stations, SP5DY, 4X4WT, FA8LP, ON4QU and even a pirate "W1BB" heard working at the same time as the real one! Sorry, but they're all the product of someone's misguided sense of "humour" (?).

The Other Extreme

From the DX-ers with their full

FIVE-BAND DX TABLE

Station	3.5 mc	7 mc	14 mc	21 mc	28 mc	Countries Worked
G2DC	107	165	305	279	165	319
G3DO	83	86	312	223	183	318
G6QB	56	116	276	183	143	301
G3NOF	38	32	244	190	132	272
G3IGW	64	112	150	128	123	188
G3IDG	17	27	53	66	55	94
G3TJD	18	47	44	36	0	94

ten watts to an amusing QRP episode. G3TKN (Wallasey), in the throes of construction, found himself with nothing to get on the air with during Christmas holidays. But he discovered that the local oscillator of the ancient family BC receiver just covered Top Band, so he connected a bent "piece of wire" to it, keyed it, and at the time of writing had worked five stations on it, the furthest at 20 miles. He was surprised to find that there was no chirp or clicks!

Tabular Stuff

There is a great demand among the G3S-- and G3T-- boys for a Top-Band table of their own, on a Counties and Countries Worked basis, similar to the two which we have previously run for the latest

sequence of calls. So they win! Starting next month, a Top-Band Counties and Countries Table will appear for G3S-- and G3T-- stations *only*; starting date, January 1, 1965. Just three columns, please: Callsign; Counties Worked; Countries Worked. (Now they will have to look for some of the good ones worked during 1964 and winkle them out again—which will be an incentive and possibly an irritant as well!) The other Counties Ladder will remain as at present for a while, but we are thinking of changing the rules to obviate that block at the 98/98 mark.

The HF Bands

The many readers who try to use all the bands have probably organised themselves into some sort of regular time-table, which is a good thing in some ways, but can sometimes be quite the reverse.

For instance, how many users of *Twenty* pack it in by 1900 or thereabouts, having heard the band go dead on many occasions? Well, it could be that they have been missing things. Several times recently *Twenty* has been open at amazingly late hours (possibly after having had an early closure).

SWL L. Margolis (Ilford) has been on at the right time to catch some of these unusual openings, and found KC4USX at 5-and-7 around midnight; then, a few nights later, PY's at good strength at 0215; and, on a third occasion, W6's and KP6AZ all good signals at 2300. In fact, between 2215 and 0230, during December and January, he logged such prefixes as LU 1-9, CE 1-7, HK 1-5, HC, CEØAG, ZP 3, 5, 7, 9G1, EL, VP8HI/MM, ZS's and many others. *Fifteen* he found disappointing, but nevertheless heard VK 2-6, ZL, 4S7, TJ8, XW8 on phone; and 5H3, VK, VS9, 7Q7, 5N2 and YA3TNC on CW. The SWL will often take a chance and cover a band when the man sitting behind his Tx is too impatient to bother—one might learn something there.

G3GGS, on *Twenty*, worked K2JGG/JY and the elusive FB8WW (Crozet), the latter S9 at 1730 . . . G3TJD raised LX1CF on *Twenty*; VK3, 5, 7, ZC4's, ZS8G, 4W1H, 5H3JJ and ET3USA

on *Fifteen*—all CW. He dislikes *Twenty* during the day, because *everyone* in Eastern Europe replies to his "CQ DX" calls, so retires to the comparative peace of *Fifteen*.

G3DO reports "plenty of DX on *Twenty* SSB around 0800-0900 GMT" and quotes ZL4JF, VK9TL, AP5KC, KG6IG (Bonin) and KG6IF (Marcus), FK8AC and ZD8BB.

Ken Randall of VP8HF has now been relieved by VP8IH, who has no U.K. call at present, but hopes to get one between May and November, when his next trip begins. Meanwhile he is aboard H.M.S. *Protector* with a Vanguard, a Hammarlund receiver and a long wire, working mostly on *Fifteen* with occasional sorties to *Twenty*. He operates mostly on phone and has so far worked two G's, who seem to get down to him between 1300 and 1400 GMT. More wanted, please—call VP8IH if you hear him.

G2DC found conditions wonderful until about mid-December, since when he thinks they have fallen off. *Twenty* in the early mornings seems to have been his main hunting-ground; on December 17, 0745-0915, he raised VK4TE (Willis Is.), KG6IF (Marcus Is.), ZD8BB and FU8AG, all in a row—and the lowest report either way was S7! Since then some good ones such as the JY, CEØAG and HZ3TYQ/8Z4 have been worked. On *Fifteen*, Jack thinks conditions have been good, but inactivity is the trouble. One morning a quick change from the noise on *Twenty* to the peace and quiet of *Fifteen* brought 599 contacts with VK3AZY and PJ2MI. Similarly, the seemingly blank state of *Ten*, most days, is easily explained by the fact that no one is trying to use it!

G3NOF confirms the lack of activity on *Ten* and the general slackness of *Fifteen*, though on the latter he has often heard W's at 1300-1600, and Africans around 1000. *Twenty* has been open for VK/ZL (long path) at 0800, and others at that time have included VK9NT (New Guinea), KG6, KR6 and KA. He worked SSB with CEØAG, VP2LS, VQ1GDW, XT2HV, VKØDS and many Africans.

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
GM2HIK	98	98
GM3KLA	98	98
G3REA	98	98
G3NPB	98	98
G3GGS	98	98
G2NJ	98	98
G2CUZ	96	98
G3PLQ	92	95
GM3IKD	90	93
OH3NY	81	83
G3SED	77	90
G3NOW	74	82
G3OJE	58	68
G3IDG	51	56
G3SWH	47	69
G3SJJ	38	76
G3SVL	38	51
G3SVW	33	61
G3SXW	32	45
G3TJD	29	37
GW3TLW	24	41
GW3PMR	17	61
<i>Phone only</i>		
G3NPB	88	88
G3REA	56	67
G3PLQ	55	58
G2NJ	54	54

(Failure to report for three months entails removal from this Table. New claims can be made at any time.)

The LF Bands

Not many reports to hand concerning Forty this month. However, it is *always* open for DX, it seems, the variable quantity being the amount of QRM through which you have to filter it. G2DC says that W6ULS can be worked any afternoon at 1430-1530, and on a recent QSO Merle asked for comparative reports on his two aeriels, which turned out to be a 3-el. beam at 50ft., and a 2-el. beam at 75ft. (Yes, Forty!)

G3TJD raised WIIZY for his first W on Eighty; and on Forty he worked K2JGG/JY, KV4CI, HZ3TYQ/8Z4, W's and lots of

medium DX. G3GGS got the 8Z4 rarity on Forty after much fruitless calling on Twenty.

SWL Margolis found Eighty excellent, hearing all W districts except 6 and 7 on SSB in the mornings, to say nothing of VU2, YV5, OX3's in the evenings. The best two, however (mornings again) were KH6FIZ and HI8XAL. Forty yielded lots of 5Z4's, ZS's, W's and VK on SSB, with PY's, JA's and such on CW.

Reporting the HF Bands

G3NOF found VE1's and VO1's, on SSB, peaking at 9-plus and coming in as early as 2030 GMT. G3HZL raised VE1ZZ, on Eighty CW, at 1926 GMT—the earliest we have yet heard of, and also had a good 40-minute QSO with a W1.

General Chat

This month's mail yields a nice cross-section of opinions, some controversial and some conventional. Herewith a few quotes: "I think the rudest people on the band (Eighty) are some of the German SSB-ers. If they want the frequency you are on, they send Morse, or whistle, or put a carrier on until you move; if you move on to *their* frequency, the stream of abuse they throw at you can be amazing" (SWL L. Margolis) . . . "So many G's with their ten watts do try to hog it on 1.8 mc and see how many times they can work W1BB. They could well give way to others who haven't worked him" (GM3IAA) . . . "Think you were right in changing back to the Five-Band Table; the Zone table was too slow and rarely changed" (G2DC).

"Some well-known DX-ers with longish callsigns *will* repeat their time and time again at dead slow speed on SSB, with long-winded phonetics; and why do some people want to work every DX-pedition four or five times? Does it prove anything?" (G4MJ) . . . "A certain well-known chaser sits on rare DX and calls slowly for about five minutes, with the result that no one on the frequency can hear the DX station. And a G3 - - near London spoils everyone's QSO's by continually calling the DX station while a contact is in progress, and then gets annoyed when he is ignored. But we have to contend with selfish people in all hobbies and sports as well as in business, and I don't think our hobby is abused more than any other—but let us all reprimand the Clots whenever possible" (G3DO).

Harking back to the recent note



Station of DL3BK, Hans Scholz, Ackermannstrasse 31, Stuttgart, consisting of a 200w. Tx, a double-conversion superhet receiver and, outside, a 3-band Quad — and all this lot is entirely home-constructed.

TEN-METRE ACTIVITY TABLE

(Starting Date: June 1st 1964)

Station	U.K. Countries Worked	Countries Worked
G3OAD	17	27
G3HCU	13	19
G3IDG	4	12
G2DC	2	14

on faked contacts, forged QSL's and the like, one of the strangest stories comes from VE3BWY. Last year he was listening for Gus on Tromelin Island, and worked a DL3. This chap said "I will arrange for you to work Gus tomorrow." Tomorrow dawned, Gus was not audible, but there was the DL3 putting out a previously-recorded call from VE3BWY to Gus, who replied to it (unheard in Canada but acknowledged by the DL). In due course a QSL arrived! But what is so puzzling is the DL's motive in doing this . . .

G2CUZ suggests that a certain well-known DX-er on Top Band doesn't *really* need to try to work the same DX stations every night at about 3 w.p.m.; now he's proved that he can do it, he might give others a chance. (Note how often this complaint is coming up.) G2CUZ adds "Brother, have we got 'em on 160 at the moment! I counted six the other night, all calling VO1FB while he was actually transmitting, and all at the same speed (3 w.p.m.). If they are so tired, why don't they go to bed?" And, we might add, if they can't hear him, what's the point of calling anyway?

DX Gossip

VKØDS told G3NOF that there would be no activity from Heard Is. for at least a year, as the present op. is not interested. VKØTO is on, though, from Macquarie Is., AM phone on 14120 and 14160 kc (crystals) . . . VU2NRA should be active from the Andamans by about February 1st.

W6FAY/MM has been a familiar call on Twenty for some time; he is now seeking help in visiting such places as PX, EA8, EA6, Ifni and so on; some are already

planned, and operation will be CW and SSB on 7, 14 and 21 mc.

The VQ8/Rodriguez DX-pedition is held up for the time being. VE8CO, who was to be one of the operators, unfortunately had a motor accident in England, and legal complications caused him to miss the boat. This will be a Hammarlund sortie, and W2GHK promises news as soon as possible.

HZ3TYQ/8Z4 duly came on in January, and was worked by many stations on many bands. Some cloak-and-dagger work now seems to be going on in connection with the other Neutral Zone (8Z5).

VK9DR and 9XI are still on Christmas Island, and it is hoped that in the near future 9DR may operate CW, and 9XI SSB, simultaneously.

KH6CMM/KB6, recently very active on CW and SSB, says he may move to the British Phoenix Is. shortly; meanwhile, look for him on 7006, 14006 and 21006 kc CW, also 14300-14340 kc SSB.

CEØAG will probably still be there after publication date—mostly 14110 kc SSB . . . Jan Mayen is now very strongly represented, with LA2AJ and 2QJ, LA3IJ, LA4EJ, LA5AJ and LA8FI all on 14 kc CW.

FB8WW (Crozet) now seems to have shed his T7 rock-crusher note and puts out a T9 signal with an SR-150. FB8XX (Kerguelen) has another operator and expects a new SSB rig, and FB8ZZ (New Amsterdam) will continue, mostly on SSB.

ZS7, reported last month as doing a quick-change act to VQ6 and then back again to ZS7, now seems to have settled for ZD5. Why the change was necessary at all is not known. Will ZS8 and ZS9 follow suit?

Those who haven't yet worked Sint Maarten might like PJ2MI, quite active on 21030 kc CW, midday . . . VS9SJF (Socotra) is now around, mostly 14015 kc CW, T8c . . . ZL4JF (Campbell Is.) has a new operator, using 40 watts to a vertical and pretty weak in the U.K. (mostly 14 mc SSB).

ZS8E, 8G and 8H were all around recently; probably no longer active, but you never know . . . 4W1G is still on spasmodically; 4W1H has returned to Switzerland.

FK8 is still well represented; FK8AC and 8AU are on 14 mc SSB, the latter at weekends only; FK8AH is on 14070 kc CW . . . Trinidad Is. is kept activated by PY1BCR/Ø (14090 kc, T7, drift), but PY4ND and PY4OD promise operation thence in February for about a month, after which they make for Fernando do Noronha.

ZM7AE (Tokelau) made several appearances during December and January—mostly 14010 kc CW (T7) . . . VR6TC is on 21060 kc every Monday at 2000 GMT, for a sked with W5IGJ, after which he will be QRV for others.

All the Nigerian callsigns have been changed; instead of using the operator's initials, they are now in sequence from 5N2AAA onwards (for instance, 5N2JKO is now known as 5N2AAF). Incidentally, after his U.K. leave starting on March 22 there is some doubt whether he will be returning to Nigeria—Thailand is mentioned as an alternative possibility.

WPX enthusiasts might like to search for the following, all said to be active: HM2BD, YA3TNC, ZD5R, JT4KAA, TJ1AC, XE2AAG and 2HW.

FU8AG is at present in FK8, but will return to FU8 soon, and hopes to join with FU8AA in SSB operation . . . The FO8 gang promise a DX-pedition to that rare FW8 spot before long . . . VP2KJ opened up as VP2LS on January 17, and was due from VP2DAA a week later.

VS9OC (Sultanate of Oman) has been active on 14120 kc SSB and many CW frequencies lower down the band . . . VS9SJF (Socotra) reported on 7022 kc CW (1820) . . . CR4AJ has been heard on 14118 kc SSB.

DX-ers Award

The Virginia Century Club awarded their 1964 DX Certificate to W2GHK (Stuart Meyer), who has been responsible for organising so many of the Hammarlund "DX of the Month" expeditions. Quote: "Without Stu, the man behind the scenes, the various DX-peditions and the expeditious handling of the QSL cards would have bogged down, and many new countries would not have been heard."

Their 1962 award went to Gus Browning, W4BPD—for obvious reasons—and the 1963 one to W4ECI, Gus's QSL manager and mentor. A few people with no interest in DX may wonder what on earth this is all about, but they have only to ask their nearest DX-chaser to find out!

Late Flashes

GM3IAA continues to be surprised at the variation in conditions between Inverness and London. He recently had an early morning on Top Band when conditions were "really foul," but he could hear the Southerners working W2IU, K8RRH, W9PNE and others. But Jim says he gets his own back in a mild way, because he is "DX" to some of the new G3T--'s, and he always QSL's to *them*. He regrets the bad manners in evidence on Top Band, with yells of "Clot," "Lid" and "BF" flying around; and he is yet another who remarks on the way some people try to hog it with W1BB, to see how many times they can work him.

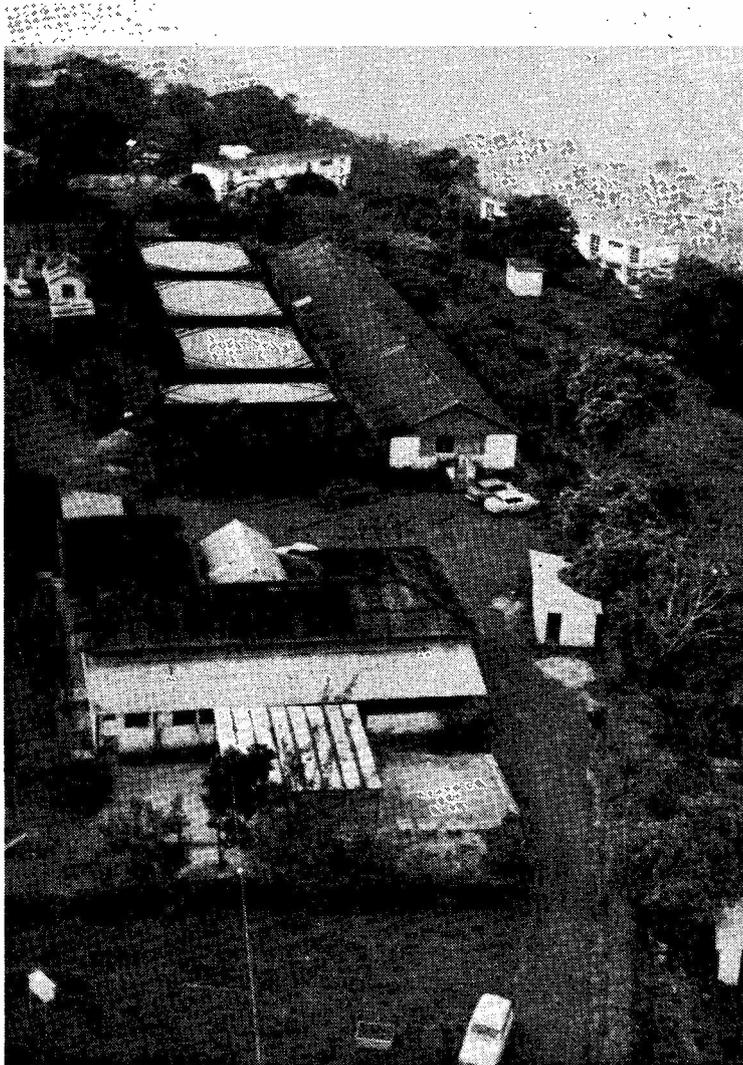
G3SED, G3SVW, G3SWH and others comment on the various suggestions concerning the Top Band Counties Ladder. In general, the idea of a combined listing for CW and Phone, with a total of 196 counties, is not popular. (Some of our correspondents say they have no key, others have no mike—which we think is a rather sad state of affairs.)

The scheme most favoured is to introduce the "country" element into it, as in the new G3S-- and G3T-- table. That, at least, would separate out the "98/98" boys, because it's highly unlikely that they will *all* have worked the same number of countries!

The second of our "Instant Band-Surveys" (the first appeared last month) will have to wait, on account of lack of space this time. Having had a go at Eighty one night, we decided that it would be far easier to log the frequencies on which amateur signals were heard than to list the various commercials and strange noises. But we will press on with the idea—not on Eighty Metres, though.

Reminder

More entries are wanted for the Tables next month, please. The



View from the high end of the 9L1HX 160m. aerial, Freetown, Sierra Leone, West Africa. A 350ft. wire, from a 140ft. mast itself at 1,100ft. a.s.l., is resonated against ground, the Tx taking an 807 in the PA; the receiver is an AR88, and 9L1TL is also in on this Top Band exercise.

Five-Band Table is now resumed (note that the five bands are Ten to Eighty, *not* Fifteen to One-Sixty, as in the last series), but it has started slowly. More and more for this one, please, and never mind your low score.

The G3S-- and G3T-- affair for Top Band will start from next month, and, we hope, with a bang. Enough people have been asking for it! Now it's up to them to support it.

And, regarding the Ten-Metre Activity Table, we can't really believe that only four readers use

that band . . .

Sign-Off

So that's it for another month. Next deadline is **first post on Monday, February 15**, so be sure to catch that one with all your news and comments, which should be addressed to "Communication and DX News," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Conditions will be improving steadily from now on, and we look forward to larger and larger post-bags. So, for now, Good Hunting, 73 and—BCNU.

RADAR PROTECTION FOR GLIDERS

With the growing popularity of gliding as a sport; the improved performance of the latest types of glider and their ability to reach considerable altitudes; and the density of air traffic over the U.K., the danger of collision between civil or military aircraft and high-flying gliders not under radar control has been causing considerable concern. Hitherto, only the ability of pilots to obtain a visual on gliders in sufficient time for avoiding action to be taken has prevented accidents—but in the case of an aircraft travelling at 600 knots or more, visual contact has to be made at well over one mile for evasive action to be effective. In fact, it could well be that a pilot might never see a glider till it was "through his windscreen."

This alarming prospect has inspired some experimental work—by the Marconi Co. in collaboration with the Ministry of Aviation and the London Gliding Club—involving metallised strips, resonant at the radar frequencies used for airways surveillance, on the glider. It has been found that a good "ping" can be obtained on the 50 cm. and 23 cm. radar equipments off thin strips of metal foil mounted on the fuselage and under wings and tailplane of the glider; for the 10 cm. and 3.2 cm. radar systems, a reflector inside the fuselage will give a good response.

Air-traffic controllers are thus able to see gliders and—on the analogy that "steam gives way to sail"—the pilots of powered aircraft can be warned to take evasive action. No radio equipment—beyond a light QRP, talk-back-to-base VHF transceiver—is normally carried in a glider. The radar reflector device is, of course, entirely passive, and is applied in such a way as not to impair the flying performance of the glider. In this context, it is of interest to mention that yachts and other small craft using busy sea-ways, e.g., the Solent and the English Channel, have for long carried radar reflectors to make themselves visible to big ships fitted with radar as a navigational aid. But even with all the aids, you still have to keep a sharp visual look-out—whether navigating a yacht by night across the Channel, flying an aircraft, or juggling with the thermals in a glider.

OBITUARY—G2JI, G3SDP, GD3IYS

We very much regret to have to record the deaths of:

George Keyworth, G2JI, of Brampton, Chesterfield, on December 21, at the age of 67; he had held a licence for over 30 years.

Of Martin Shaw, G3SDP, of Northwood, Middlesex, on December 16, at the early age of 18; the brother of G3OXF, and a member of the GB2GC expedition group, his death was a result of the tragic accident to the "Radio Invicta" ferry-boat.

And of James Sheard, GD3IYS, Union Mills, I.o.M., on January 4, suddenly, at the age of 41, leaving a widow and two young children.

Relatives and friends of these three amateurs will have the sympathy of all who knew them.

HEATHKIT DEMONSTRATION SCHEDULE

The firm of Daystrom, Ltd., who supply a wide range of high-grade, modernised equipment in the home-constructor category—covering radio, hi-fi, laboratory and test gear, as well as amateur transmitters and receivers—never lose an opportunity of demonstrating their product to the public. Fully-staffed stands, representative of all Heathkit apparatus in the current range, are being arranged at the Y.W.C.A., 45 Division Street, Sheffield, 1, for February 19-20, and also at the Grand Hotel, Southampton Row, London, W.C.1, during April 22-25. If you are interested in any of the kits marketed by Daystrom, Ltd., under the Heathkit brand-name, you can find out all you want to know about them by visiting these demonstrations.

NOT A FEASIBLE PROPOSITION

Many honorary secretaries of Clubs—and others who might be interested in the educational context of Amateur Radio—will have had a circular putting forward a suggestion to the effect that, in order to encourage the study of electronics, Club members not licensed should be permitted to "talk over the air under supervision." While the originator of this idea was obviously inspired by the most laudable motives, his suggestion is totally impracticable because (a) It could lead to all sorts of abuses, (b) If such a concession were allowed for one category of aspiring radio amateur, it would encourage the development of all sorts of private networks on the amateur bands, and (c) Even if there is a demand for on-the-air experience of this sort, it could be better met by an intelligently-contrived closed-circuit demonstration using artificial aerial (which is how Service personnel are trained in radio operating procedure).

Apart from these objections—and the majority of Clubs who have expressed an opinion to us make it quite clear that they are entirely against the idea, anyway—the G.P.O. could not grant such a concession even if they wanted to, because it would be contrary to the terms of the Geneva Convention governing the issue of amateur licences and the control of amateur stations. So far as SHORT WAVE MAGAZINE is concerned, we would entirely support the Post Office in this particular matter.

CORRECTIONS AND AMENDMENTS

In the Transistor Tx article, December issue, R20 in the table of values on p.596 should have been shown as 5.2K. Also in that issue, in the Rx article by G3HTA and looking at the main circuit diagram on pp.590-591, C13 should be connected to the anode (pin 5) on V5; C35 should go to the junction of R42/R44; R34 in the table of values on p.593 is 220 ohms; and T3 in the table should have been given as the *Electroniques* type DIF.1/D.

A few slight corrections are also called for in the January issue: In the circuit on p.670, the junction of C1/R9 goes to pin 6 of V7. And G4AC now says that the last two figures in col. 2 of the appendix on

p.652 have since been found to be $1\frac{1}{2}$ in. and 2in. respectively, instead of "3" and " $1\frac{1}{2}$ " as shown.

In the mathematical setting on p.685, the expression for $j/W.Cag$ should be :

$$Z_o \frac{Z_r + j Z_o \tan \phi}{Z_o + j Z_r \tan \phi}$$

Also, in the final equation for the value of C_t , a division line should, of course, have been shown between the upper and lower quantities.

We trust no reader will have been misled by these errors—there are few things more exasperating to us than to have them pointed out *after* the article has appeared in final print! And readers may be assured that we always do publish corrections for valid errors that may occur in technical articles.

BBC ON SIDEBAND

We are informed that the BBC have started experimental SSB transmissions on certain channels for the Overseas Service. Times GMT and frequencies are: 0300-0500, on 9317 kc; 0600-0800 and 0915-0945, on 15913 kc; and 1330-1745, also 1800-2215, on 12182 kc. Some of these transmissions can be strongly received on ground-wave in various parts of the country.

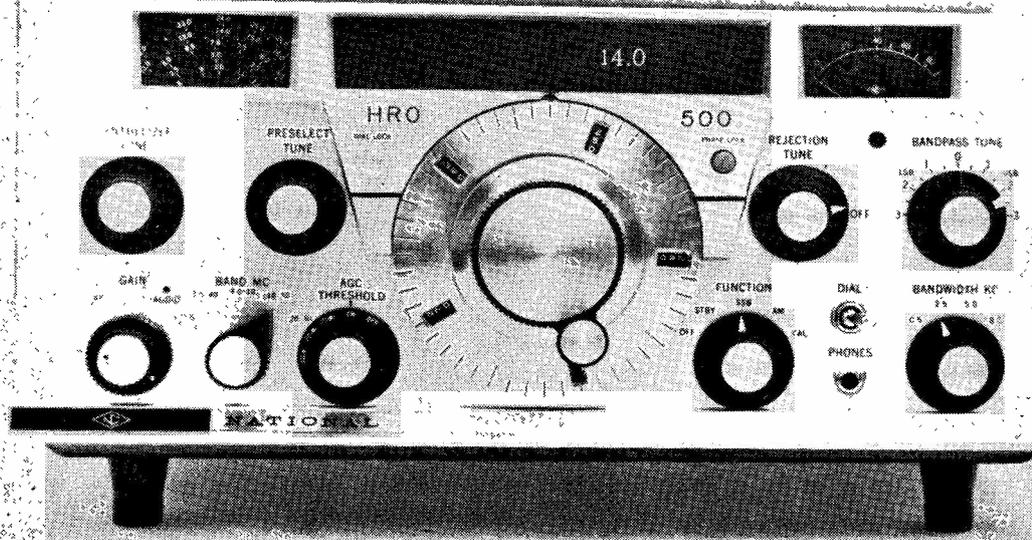
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A large number of our direct subscribers pay their subscription to SHORT WAVE MAGAZINE by Banker's Order — which is a convenience to them as it is to us. But a check through our records shows that in some cases the order has not been amended to reflect the new annual subscription rate of 42s. It would save a great deal of paper work if standing orders could be amended accordingly.

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NEW MULLARD UHF DOUBLE-TETRODE

An interesting new valve in the *Mullard* series is the YL-1190, a double-tetrode designed for use in mobile equipment, and capable of efficient operation at frequencies up to 500 mc. It will give 33w. RF out at 200 mc, and 20.5w. at the higher frequency. It is of single-ended construction, to simplify in-line circuit design, and is of the quick-heating type, to eliminate current consumption on stand-by. It has a 1.1v. 3.8 amp. filament, and gives 70 per cent of its output within half-a-second of switching on from cold. The quick-heater characteristic makes it specially useful in hybrid circuits involving transistors in low-power and modulating stages.



The new National HRO-500, the latest of a famous line, is designed on the solid-state principle and incorporates every latest refinement and requirement for superlative amateur-band reception. It took the National Co. four years to develop and finalise the HRO-500. By the use of the solid-state technique, all the advantages of transistorisation are obtained — reliability, oscillator accuracy, minimum heating and power drain, and lasting stability and calibration accuracy. The frequency coverage is enormous, 5 kc to 30 mc, with the main tuning dial calibrated to one kc over the entire tuning range. Four IF bandwidths are available, to 8 kc wide-open, and frequency control is by a phase-locked crystal frequency synthesiser, with electronic band-switching; this eliminates the need for multiple crystal oscillators and ensures the same degree of calibration accuracy over the whole tuning range. The U.K. distributors for the HRO-500, and all National products, are Ad. Auriema, Ltd., 125 Gunnersbury Lane, London, W.3, from whom further details can be obtained.

VHF BANDS

A. J. DEVON

THE crazy weather pattern of the last few weeks—with lows, highs and fronts chasing one another across the U.K. to Scandinavia and back again—has had the inevitable effect on VHF conditions. Since the turn of the year, they could hardly have been worse, and though things had begun to look hopeful in the early part of January, with a brief opening around the 5th, and glimpses of an improvement as we got towards the present deadline, the Wx state was essentially unstable and no GDX conditions had time to develop.

All this is well illustrated by the shape of the barograph trace—an extraordinary succession of “hills and valleys,” with an abnormally low reading towards the end of the third week in the period.

Of course, none of this has deterred the meteor-scatter operators, of whom there is an increasing number, keeping their patient schedules and making new EDX contacts of great interest—indeed, MS has been the only propagation mode to pay off during the last couple of months or so.

Before going on to that, however, let us look first at the *Oscar III* possibilities, as the buzz has gone forth that the launch

“could be during February.” No firm advance warning can be given, because it will be a passenger on a military space vehicle, incidental to a launching which is itself classified as secret. When *Oscar III* does achieve an orbit, it will not only be a transponder operating in the two-metre band, but it will also radiate continuous beacon and tracking signals.

Main details are as follows: It will receive only signals in the range 144-075-144-125 mc, for re-transmission on a frequency between 145-875 and 145-925 mc, with an RF output power of about one watt. It will transmit its continuous CW beacon signal on 145-950 mc (25 mW RF out) and on 145-850 mc will appear the “hi-hi” characteristic signal, which will also carry telemetric pulses, enabling various calculations to be made. In other words, these two transmissions should be audible whenever the satellite is within operating range.

At this stage, it is hardly possible to predict the usefulness of *Oscar III*. A great deal depends, obviously, upon the orbit achieved and its height relative to that part of the earth “visible” to it at any given time. However, according to some very useful and interesting data circulated by G2AOX (Hendon), who is the U.K. co-ordinator for the project, its height can be calculated from the orbit period, which gives a maximum communication distance. For instance: For a circular orbit period of 94.2 mins., the height would be 300 miles, giving a communication range, point-to-point, of 2,400 miles.

To make full and proper use of the transponder facility involves knowing, among other things, its position in the sky so that the beam can be aimed correctly, its land coverage at that particular period of time, and the availability of DX stations to work at that time. It seems to your A.J.D. that if and when *Oscar III* does get going successfully, there will be a lot of “blind calling and listening” until the best way to use it has been worked out by experience—only the dab-hands will be calculating orbit time, position and coverage, and arranging schedules accordingly. To start with, the

best operating procedure would appear to be to call CQ in the 144-07-144-12 mc area whenever the beacon or tracking signal can be heard on 145-85 or 145-95 mc, keeping the Rx searching over 145-87-145-92 mc—and, of course, to answer any CQ calls heard in that area by replying on some frequency in the calling zone at the LF end.

Recent MS Results

As already mentioned, the MS boys have been having a good time during the last couple of months. G5YV worked UP2ON via the *Geminids* shower on December 13; UA1DZ had a good QSO with YO7VS on January 3 using the *Quadrantids*; and EA4AO worked

TWO METRES

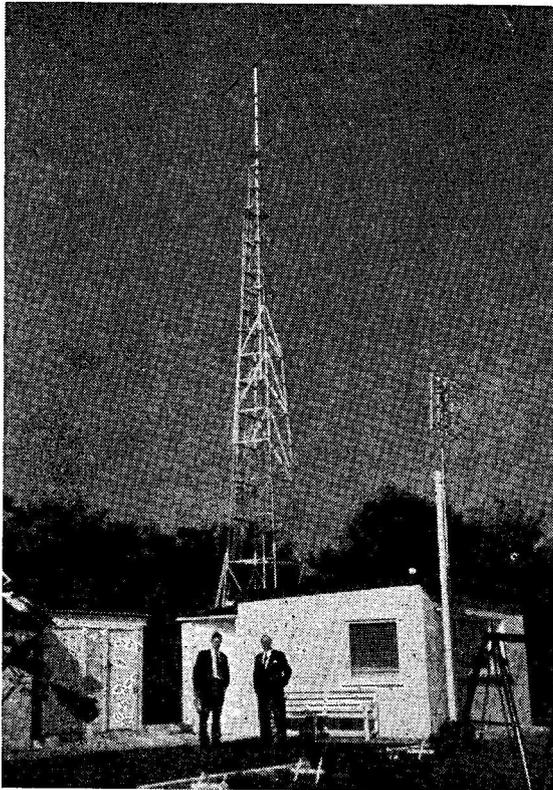
COUNTIES WORKED SINCE
SEPTEMBER 1, 1964

Starting Figure, 14

From Home QTH only

Worked	Station
52	G3EDD
51	G3SAR
42	G3HRH
38	G3CO
36	G3AHB, G3FNM
34	G3GWL, G3TNO
32	G2AXI, G3LAS, G3PSL
29	G2BJY, G2CDX, G3PTM, G4LÜ
28	G3JHM/A
27	G3KWH
26	G3FIJ
21	G3TKQ
19	G3IOE, G3THC
18	G5UM, G8VN
17	G3CKQ
14	G3KQF, G13SLI, GW3CBY

This annual Counties Worked Table will run till August 31, 1965. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving call sign and date for the county worked. To keep the Table up-to-date, claims should be made at frequent intervals. Operators new to VHF are particularly invited to join Annual Counties.



Harry Wilson, EI2W, one of our best-known and consistently successful VHF operators, active on three bands, in his station at Sandyford, 6m. south of Dublin City and just over 1,000ft. a.s.l. The VHF antennae comprise a 4-ele beam for 70 mc and above it the 10-ele array for two metres. On the pole is a 32-ele stack for the 430 mc band. EI2W built this station specially to make the most of his opportunities, and to get the best out of an exceptionally favourable VHF site. He holds a long list of "Firsts" for Eire on all three bands.

Pictures by G3HRH

CT1CO and DL3YBA via the same Shower.

Apart from these actual contacts, there has been a good deal of one-way reception reported during schedule periods. EA4AO/F8DO have heard one another; likewise EA4AO/SM6CSO, and F8DO logged SM6CSO calling EA4AO. Other stations on the EA4AO schedules include OK2WCG and SM6PU—indeed, Martin-Cordova of EA4AO remarks that, with the number of requests he is now getting for MS skeds, he has about as much as he can cope with single-handed. This makes his results all the more creditable and shows what can be done with the right gear and operating procedure. For the next showers likely to be useful, he will be at his summer QTH, running a new Tx with a pair of 4X150A's in the PA—and he says that from the Madrid location, CT1CO can now be heard at almost any time.

Harold of G5YV has MS schedules running with no less

than eight EDX stations, in six different countries, from UA round to LZ and OK. Harold says that UA1DZ probably takes the palm for the number of countries worked exclusively by MS—his total is 15. G5YV himself has 9 worked by MS, and UP2ON (who we take into Countries Worked this time) has 8/MS.

Four-Metre Chat

Getting down to earth again, there is an interesting selection of 4-metre reports on this month's clip. G3MOT (Hillingdon, Middx.) started on the 70 mc band in January of last year, and since then has worked 261 different stations in 35 counties—which puts him well up the 4m. All-Time ladder. He says "the increase in activity on the band is nothing but amazing"—good thing! G3FIJ (Colchester) reports for the table, and G2DHV (Sidcup) says he is now on 70:20 mc, with a QQV03-20A in the PA, an R.216 Rx, and a loft dipole.

G3SKR (Wembley, Middx.) can claim some new counties worked on 4m., his total of different stations now being 221—again proving the high level of activity.

A report from G2BRR (Wootton Bassett, Wilts.)—who mentions that it must be six or seven years since last he wrote in!—is to the effect that, having abandoned two metres, he is now back on VHF to try four metres, using the B.44 Mk. III equipment, which is very suitable for /P working—this being the main consideration for G2BRR, as he is badly located. Various stations have been heard and worked, and he remarks "I hope to get a foot on the bottom rung of the 4m. ladder before long."

From Seascale up in Cumberland. G3FDW reports that, operating /P only for his county, he has worked 37 counties in six countries, with G3OCB (Cornwall), GC3OUF/P and GM3GDU/P heard but called in vain! The difficulty at G3FDW from the home QTH is TVI in

a very weak TV signal area—but he has nevertheless done quite well after TV hours and early on Sunday mornings; he offers skeds at these periods for anyone wanting Cumbs. (*QTHR*). The 4m. gear at G3FDW consists of a VXO 15w. Tx, all-nuvisor converter, and a 4-ele. w.s. Yagi—and he says he finds the VXO facility extremely useful for breaking in on the tail-end of a QSO.

Two-Metre Reports

GW3KYT (Colwyn Bay) writes that, now being installed in a new QTH about 500ft. a.s.l. with a good take-off in the southerly directions, he is returning to two metres after some years' absence—he found the 144 mc band too difficult from his previous location, below sea level!

An operator very well known right at the other end of the amateur-band spectrum—G3IGW (Halifax), who works it all on 160m.—has now started up on two metres. Mike says "With an 8/8 J-Beam and armed with a TW-2, I have been peering through the gloom of the poor conditions since coming on at the end of November." However, contacts have been made and he was much heartened, in striking the sudden and very temporary improvement in conditions on January 5, to work F8VN (Chartres) on CW with a report of 559.

Another station fairly new on the two-metre air is GI3SLI (Downpatrick, Co. Down), who has a Heathkit HW-20 running 8w., with a 6-ele J-Beam at 300ft. a.s.l. The HW-20 is a VFO job, which is handy for breaking-in; though his usual freq. is 145.62 mc, on which he is running a sked with G2JF, the VFO, says GI3SLI, "is used quite a lot, and is beginning to get known round the band." (Yes, and we can see many more VHF operators appreciating the advantages of VFO before long!) GI3SLI is doing well from where he is, and gets into the Annual at 14C, one of his best contacts to date being with G3SAR, for Kent.

Active for Cumberland and Westmorland are G3BJD, G3FDW and G3RHE, who get out and about together under the /P suffix, when some good DX has been worked, including EU's. G3LAS

(Berkhamsted) goes up in the two-metre tables, as does G3AHB (Slough), who now has 473 different stations worked.

G3EDD (Cambridge) slips into the lead (just) in the Annual. He has recently been plagued by terrific interference off a particular EHT pylon just over a mile away. It was traced by mobile D/F, and exhibits the most extraordinary characteristics—it peaks around the two-metre band and is horizontally polarised, and apparently does not affect 70 mc, nor can the noise be traced on 430 mc (though that is not so surprising). We have no doubt that Brian is chasing the "appropriate authority" with vigour and eloquence, to get the nuisance suppressed.

A note from G3TKQ (Colchester) brings him up-to-date in the tables—with the remark that he agrees with G3PQR about the poor return for QSL'ing; in G3TKQ's case, only about half the stations he has worked so far have responded.

In the "Is-this-a-record?" category: The A.E.R.E. (Harwell) Club *Newsletter* for January reports a QSO between G2HIF and G3NNG, on two-metre Sideband over a distance of six miles, using silicon planar epitaxial transistors only. The interesting thing is that, with "an absolute peak power of 4 microwatts at G3NNG," signals were R4 (and could have been R5 had a xtal filter been aligned on the nose). According to calculations by G2HIF (with which we do not quibble) this gives a rating of 670 milli-microwatts/mile—which is pretty well ultra-QRPP in anybody's language! G2HIF has a silicon transistor transverter using the (relatively) enormous power of 400 milliwatts p.e.p. on SSB. We are told that "further tests are proceeding." All we can say is—congratulations, both!

On the SWL front, which is still far from usual on VHF, David Douglas writes from Dundee in Scotland—his report is of particular interest because he has 14 countries confirmed on 2m./70 cm. and a goodly batch of GDY counties on two metres. SWL Douglas searches during the MS periods, and lists EDX like UR2BU and DM2AKD. He has

TWO METRES

COUNTRIES WORKED

Starting Figure, 8

26	ON4FG (DL, EA, EI, F, G, GC, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR, YU)
26	G3LTF (DL, EA, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR)
25	UA1DZ (DL, DM, G, HB, HG, LA, LZ, OE, OH, OH0, OK, ON, OZ, PA, SM, SP, UA, UB, UC, UO, UP, UQ, UR, YO, YU)
24	G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, YU)
21	G3HBW, UP2ON
20	G3CCH
19	OK2WCG
18	G2JF, G6NB, ON4BZ
16	G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB
15	G2CIW, G2XV, G3AYC, G3DKF, G3EDD, G3FZL, G3HRH, G3RMB, G4MW, GM3EGW
14	G2FJR, G2HDZ, G3AOX, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KPT, G3LAS, G3NUE, G3PBV, G3SAR, G3WS, G4LU, G5BD, G5DS, G6LI, G8OU
13	G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EHY, G3GPT, G3GWL, G3HIT, G3LHA, G3NNG, G3OHD, G3PSL, G6XX, G8VZ
12	E12A, E12W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3JAM, G3JLA, G3JXN, G3OBD, G3PTM, G3WW, G5CP, G5JU, G5ML, G8DR, GW2HIY
11	G2AJ, G2AXI, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JHM/A, G3JYP, G3JZN, G3KUH, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PA0VDZ
10	G2AHP, G2FQP, G3BK, G3DLU, G3FIJ, G3GSE, G3KQE, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3XD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW3MFY, GW5MQ
9	G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BYI, G3FUR, G3OJY, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIQ, GM3LDU
8	G2BDX, G2DDD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKX, G3FNM, G3GBO, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG

also heard HG2RD three times in the last two years (for his information the QSL address is via P.O. Box 214, Budapest 5, Hungary, and the station is located in the town of Veszprem).

Seventycems in Doldrums

Not unnaturally, the propagation conditions prevailing have resulted in a *nil* return as regards new results on the 70-centimetre band.

This is not to mean that those

interested in the band have given it up. Far from it. G2CIW (Birmingham) has been using the time to improve his 70 cm. converter, which now has a transistorised pre-amp. with an AF139, and working very well. G3AHB (Slough) is getting going with a QOV06-40A, giving about 10w. RF out into a beam at 35ft.

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
50	EI2W, G3IUD
49	G3OHH (205)
43	G3EHY
38	G3SKR (221)
37	G2OI, G3PIK
35	G3JHM/A (210), G3MOT (261)
33	G3OWA (213), G5JU
32	G3NUE, G5FK
30	GM3EGW
29	G2BJY, G3PMJ
26	G3LQR
25	G3AYT
24	G3LZN
23	G3BOC
21	G13HXV
20	G2AXI
19	G3BNL
17	G5CP
16	G3BJR, G3FDW, G3HWR, G3OJE
14	G3OKJ
13	G3FIJ, G5UM
12	G5DS
11	G3LHA, G3SNA
10	G2BDX, G3ICO, GC3OBM
9	G3EKP
8	G3NNO, G3PRQ

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required. Totals in excess of 100 different stations worked can be claimed and will be shown in brackets after the call.

Now able to receive on the 430 mc band are GW3RBM (Wrexham) and G3RME (Oswestry), both of whom would be glad of the opportunity of cross-band QSO's, 70 cm./2m.

There is no news this time of any 23 cm. activity or results—except from G2CIW, consistently active on this band, who has built a new aerial and is working on another tunable IF strip.

Those able to listen or transmit on 1290 mc should look out for generally foggy conditions when the glass is high—this always produces good propagation to GDX distances on 23 cm.

Proposed New Table

As mentioned in recent issues, it has been suggested by several VHF operators able to work two or more bands that we start a consolidated table to show the progress of those who can use more than one band, and use them consistently. Obviously, the bands are 4m., 2m. and 70 cm., and there are now a good many stations in the British Isles equipped for operation on these bands.

Having thought it out carefully, in the light of operating experience, current results and future possibilities, your A.J.D. has come to the conclusion that the right way to tackle this—while involving all interested in the minimum of log-scrutiny and paper work—is as follows: *Bands, 4/2/70. Starting Date, September 1, 1964. Counties worked on each band. Countries worked each band. Total of Counties, all bands together. Total of Countries, all bands together.*

Suppose you work 4m./2m. only, and since September 1 you find you have worked 28C on 4m. and 37C on 2m., with four countries on 4m. and 9 countries on 2m. You show this as *Bands 4/2, Counties 28/37, Countries 4/9, Totals 65/13*. And, of course, if you operate all three VHF bands, you bring in the additional counties/countries accordingly. Same applies to any other two you work.

Order in the Table will be shown by the sum of the totals, in this case $65 + 13 = 78$, followed by call sign and the break-down by bands, in terms of counties and

countries.

This means that anyone who works only one band, but has a good total of counties and countries, can still show a high standing. On the other hand, it gives full scope to those who achieve their totals by working on two or more bands—and the object of this exercise is, of course, to get more activity on the 4m., 2m. and 70 cm. bands, taken together.

Obviously, it will take a little time to get this new table going. We will call it the Three-Band Annual VHF Table, and all claims should be made on separate slips, under this heading, with call sign and QTH, set to show clearly the bands and totals under the various heads.

So as not to confuse the issue—and to make sure that this new Table does, in fact, represent a tangible expression of the consolidated three-band approach—all existing tables will, for the time being, continue as before. It will be a matter of experience, by claims received, to find whether the new Three-Band Annual will supersede the others.

It is also evident that by the end of the current VHF year—August 31, 1965—a leader could emerge who has gained his lead by consistent three-band working. It is not improbable that the Editor (under the urgent influence of A.J.D.) may be induced to signify such a success by some small gift or token, not gaudy but perhaps acceptable. (*This is printed without prejudice—Editor.*)

Anyway, there it is. As soon as we have about ten claims for three bands, suitable for showing under the heads enumerated, we can start this new table.

And So To Conclude—

This should be with you by February 5, which means that A.J.D. needs all your VHF news, views, claims, ideas, criticisms and suggestions by **Wednesday, February 17 latest**, addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Till March 5, then, *Cheers*, and may Allah keep you on a favourable path.—73 de A.J.D.

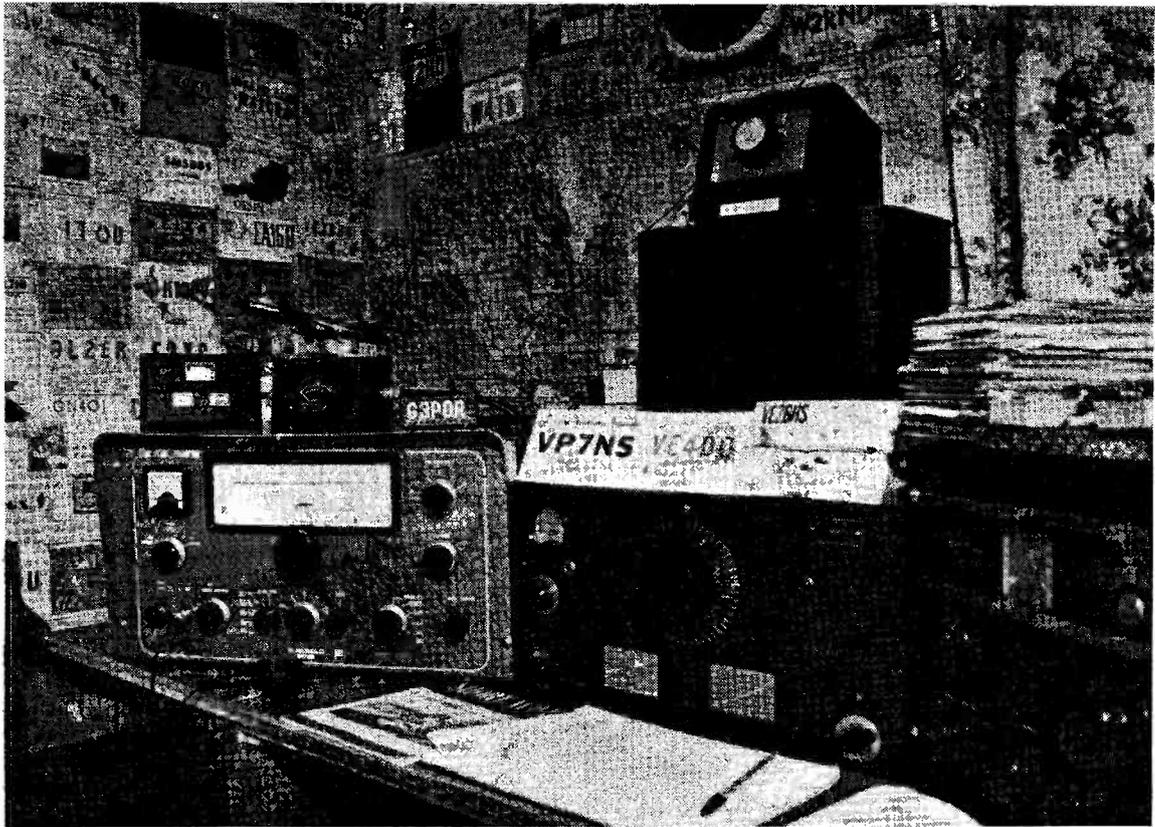
NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- DL2CT**, C. J. Thomas (*GW3PSM*), Box 125-A, R.A.F. Station, Butzweilerhof, B.F.P.O.19.
- DL2DW**, D. H. White (*G3TRW*), R.A.F. Comcen, Hq. Unit, R.A.F. Germany, B.F.P.O.40.
- EI3AV**, P. B. Maher, Knockearl, Cloughjordan, Co. Tipperary, Eire.
- G3DBP**, Nottingham University Radio Society, The Union, University Park, Nottingham. (*Re-issue.*)
- G3LQX**, M. A. Nicolaidis (*ex-VS9AMN*) c/o R.A.F. Station, Digby, Lincoln.
- G3TBQ**, T. Quail, 51 Meadowbrook Road, Moreton, Wirral, Cheshire.
- G3THH**, E. P. Beatson, Springmount, Rainow, Macclesfield, Cheshire.
- GW3TLP**, I. Jones, 5 Plashyfyrd Crescent, Holyhead, Anglesey.
- G3TMC**, R. J. Cross, 6 Bennett Road, Scunthorpe, Lincs.
- G3TOU**, J. W. Graves, 79 Stamfordbridge Road, Rochford, Essex.
- G3TQE**, A. J. Booth, 81 Brockhurst Road, Ward End, Birmingham, 34.
- G3TQK**, A. Meadows, 208A Stephenson Avenue, Beechdale Estate, Walsall, Staffs.
- G3TQT**, R. H. Gwinnett, 20 Plaistow Avenue, Ward End, Birmingham, 34.
- G3TRB**, T. A. Barber, 15 Brushfield Road, Great Barr, Birmingham, 22A. (*Tel. GRE 3574.*)
- G3TRQ**, J. R. Foster, Windy Ridge, Metton Road, Felbrigg, Norwich, Norfolk.
- G3TRU**, H. Bates, 16 Northfield Road, Ruskington, Sleaford, Lincs.
- G3TRW**, D. H. White (*DL2DW*), 3 Firlands Road, St. Marychurch, Torquay, Devon.
- GW3TSM**, V. J. Mallows, 8 Channel View, Sketty Park, Swansea, Glam. (*Tel. Swansea 24100.*)
- G3TTK**, A. W. King, 79 Rosslyn Road, Whitwick, Coalville, Leics.
- G3TTP**, B. B. Horsey, 7 Wares Lane, Wembdon, Bridgwater, Somerset.
- G3TTR**, R. S. Landers, 34 West Park, Selby, Yorkshire.
- G3TTU**, R. Holt, 37 Markham Avenue, Carcroft, Doncaster, Yorkshire.
- G3TTV**, B. Robertson, 9 Holbeck Lane, Cheshunt, Herts.
- G3TUA**, Dr. S. Lazarus, 114 Beechwood Gardens, Ilford, Essex. (*Tel. CREscent 0012.*)
- G3TUF**, F. A. Long, 37 St. Catherines Road, Bitterne Park, Southampton, Hants. (*Tel. Southampton 57539.*)
- G3TUN**, J. B. Greenwood, 4 The Bungalows, Pitch Place, Guildford, Surrey. (*Tel. Worpleston 2286.*)
- G3TUO**, G. R. Lambert, 24 Newnham Close, Loughton, Essex.
- G3TUW**, P. J. Moore, 1 Bons Farm Cottages, Stapleford Tawney, Romford, Essex.
- G3TUX**, C. J. Rees, 17 Colburn Avenue, Hatch End, Pinner, Middlesex.
- G3TVA**, D. A. Gosling, 24 Braemar Road, Bulwell, Nottingham.
- G3TVI**, R. A. W. Stevens, 64 Ferndale, Waterlooville, Portsmouth, Hants. (*Tel. Waterlooville 2753.*)
- G3TVM**, D. Fletcher, 43 Park Lane, Whitefield, Manchester, Lancs. (*Tel. Whitefield 5165.*)
- G3TVS**, Thames Valley Amateur Radio Transmitters Society, c/o L. Cooper, 3 Summer Avenue, East Molesey, Surrey.
- G3TVW**, H. M. Davison, 15 Forest Way, Ashted, Surrey.
- G8ADC**, J. O. Hoile, Hillside, Chalton, Luton, Beds.
- GW8AFB**, R. Murray-Shelley, 30 Beaufort Avenue, Higher Lane, Langland, Mumbles, Swansea, Glam.
- G8AFY**, K. R. Smith, 117 Wykin Road, Hinckley, Leics.
- G2YX**, A. Kendrick, 1 Longwood Road, Barr Common, Aldridge, Staffs.
- G3COR**, P. F. D. Cornish, 33 Townsend Avenue, Southgate, London, N.14.
- G3HCM**, D. Dumbleton, 11 Woodburn Close, Allesley Park, Coventry, Warks.
- G3JAP**, E. J. Andrews, 31 Anglesey Avenue, Loose Court, Maidstone, Kent.
- GM3JDR**, D. Robertson, 5 Lindsay Street, Golspie, Sutherland.
- G3KOG**, W. J. Blanchard, Tremezzo, Church Avenue, N. Ferriby, E. Yorkshire. (*Tel. Ferriby 86606.*)
- GW3KYT**, K. Schofield, Burn Naze, Trawscoed Road, Llysfaen, Colwyn Bay, Denbighshire.
- G3MZF**, P. B. Furminger, 227 Keldregate, Deighton, Huddersfield, Yorkshire.
- G3NPU**, P. Hill, Alpha, Coldharbour Lane, Penshurst, Kent.
- G3NRW**, A. I. H. Wade, 20 Upper Pines, Woodmansterne, Bantstead, Surrey.
- G3NSU**, B. G. Ellis, 12 Oldfield View, Wortley, Leeds 12, Yorkshire.
- G3PYN**, J. A. Birley (*ex-DL2DJ*), 75 Farm Road, Maidenhead, Berkshire.
- G3RJK**, R. L. J. Kissick, 1 May Cottage, Copse Lane, Freshwater, Isle-of-Wight.
- G3RZH**, K. J. Roberts, c/o Civil Aviation Flying Unit, Tels. Section, Stansted Airport, Essex.
- G3STG**, G. A. Griffiths, 62 Albany Mansions, Albert Bridge Road, Battersea, London, S.W.11.
- G3STL**, M. L. Barrett, 145 Benfleet Road, Hadleigh, Essex.
- G3SUO**, A. A. Spencer (*VE7BMF*), 1 Manor Farm Cottages, Godmanstone, Dorchester, Dorset.
- G3SUP**, A. T. Spencer (*VE7BMG*), 1 Manor Farm Cottages, Godmanstone, Dorchester, Dorset.
- G3SWC**, B. Tinton, The Stores, Pidney, Hazilbury Bryan, Sturminster Newton, Dorset.

CHANGE OF ADDRESS

- G2XY**, H. Littlewood, 32 Mavis Lane, Cookridge, Leeds 16, Yorkshire.



THE OTHER MAN'S STATION

G3POR

THOUGH Wisborough Green is but a small village in West Sussex, it has no less than five licensed amateurs on the air, and an aspirant bobbing on his R.A.E. This must constitute an Amateur Radio situation unique in the U.K.

Be that as it may, one of the active ones is shown here—G3POR, owned and operated by Ted Lewis, whose full QTH is Glanrhyd, Weavers Hill, Wisborough Green, Billingshurst, Sussex. Having started as SWL's, he and two friends were encouraged and led on first by G3JEP (Wisborough) and then coached at night school in Bognor Regis under G2JU—their tickets being finally granted in October 1961.

Starting on 80/20m. with a K.W. "Victor" running 120w. and an AR88D as receiver, with an 8KW trap-dipole, G3POR then converted to Sideband and now has a K.W. "Viceroy." To radiate, he has a Mosley TA-33 Jr. up at 40ft. With the advice and assistance of G8OS (Pulborough, Sussex), an HRO was modified and fitted with a mechanical filter for SSB working.

Activity is still mainly on 80/20m.—which band being used depending on conditions and the season of the year, with DX as a primary interest—and so

far 129 countries have been worked.

G3POR says "I read with interest in the July '64 SHORT WAVE MAGAZINE (p.291) about ZE3JO working the DX on his tin leg. I should be very happy to take mine off and try a QSO with him some time". . .

R.A.E. REMINDER NOTES

Those wishing to take the Radio Amateur's Examination in May—"Subject No. 55, City & Guilds"—should have their applications in well before the end of this month. It can be arranged either through their school of instruction, or the nearest Technical College, or the local office of the Education Authority. It should be noted that the final date for accepting entries varies from district to district.

We are informed that a Morse Test session is being arranged by the G.P.O., during the second week in March, at various head post offices. For this, application forms are available from the Radio Services Department, Radio Branch, Hq. Building, G.P.O., London, E.C.1. Apply *immediately*, as the form must be returned to the G.P.O., with the 10s. test fee, by February 12 latest.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for Next Issue: February 12)

(Address all reports for this feature to "Club Secretary")

WITH a record number of Clubs reporting this month (70 in all!), including half a dozen newcomers to these columns, it is obvious that the club movement is in a pretty healthy state.

As far as our own records are concerned, clubs come and go pretty frequently, but this is not to say that they fold up. They just, for some reason or other, decide that they don't want publicity. Sometimes this is because no one can be bothered to write a report to catch the deadline; sometimes it is due to the fact that no one cares, anyway—or that no one realises that free publicity is a commodity not to be lightly thrown away.

Too often, though, we feel that it is due to an unhealthily unstable state within the club. The card-index system which we use for keeping track of club secretaries and their changes of QTH tells its own little story in this respect.

The particular set of cards in use dates back for some sixteen years. Among the 150 or more cards on file, there are now only two or three which have just *one* name on them (meaning, of course, that the same long-suffering type has been acting as secretary for all those years). There are several with only two or three names; but there are others who have filled up one complete card, with eight, nine, or ten changes of secretary within as many years! (And in quite a few of these cases, they have eventually reverted to either the *first*, or one of the very early ones.)

We feel that such frequent changes of officials cannot reflect a very satisfactory state of affairs within the club—besides, it makes the card index so untidy! As we have remarked before: If you have a willing horse who takes on the secretary's job, does it well and doesn't complain overmuch, then for goodness sake stick to him through thick and thin; and if he seems discontented, do everything you can to keep him happy and make his job easy. If you've got a good man, thank your lucky stars—you may never find another one!

And so to this month's reports, very numerous and very condensed.

ACTIVITY REPORTS

Cray Valley have their monthly meetings booked until July; on February 5 G3JJG will be talking about his Princess Tx, and on March 5 G3GJW will give his talk on "My Shack" (Part II).

Fareham is a brand-new club seeking help in the way of a little publicity. At present the members meet on Sunday evenings (7.30) at the QTH of

G3SHD—39 Nicholas Crescent—and the secretary is G3LGX, who will give full details to anyone interested. Write or phone him (after 6 p.m.) at Titchfield 2482.

Grafton continue their usual mixed programme of talks, demonstrations and practical evenings, and now hold a special evening once a month for R.A.E. students, under the guidance of G3KRH. The normal meetings take place every Friday in Room 35, Montem School, Hornsey Road, London, N.7; visitors always welcome, and details can be provided by the secretary.

Peterborough had a talk on RAEN, from G3EEL, and Top-Band contacts were made from Peterborough Technical College with out-stations manned by G3RLV, 3TSN and 3TSO. **Silverthorn** held their AGM and elected G3SBX secretary and G2HR chairman; they meet at the Friday Hill Community Centre, 8 p.m. every Friday except the first in the month, and new members will be very welcome.

Acton, Brentford and Chiswick will be having a mixed Film Show on February 16. Visitors for this event will be welcomed at their Hq., 66 High Road, Chiswick, 7.30 p.m.

Ainsdale report good progress, with an attendance of nearly 80 per cent at meetings. Subjects coming up include Aerial Tuning and Indicators, Aerials, Station Control and Safety; and a Club Social is planned, also, possibly, a Spring "Mystery Mobile Tour" with the Wirral Club and others. Four new SSB rigs are under construction, and three more members are active on VHF. There will be a Hot-Pot Supper on February 26 and a joint meeting with the Preston Club, probably on the 17th.

Blackpool and Fylde meet on February 8 for a Tape Lecture; on the 15th for Questions and Answers; and on the 23rd for their AGM and election of officers. The clubroom at Squires Gate is open every Monday at 7.30 p.m., when Morse tuition will be available, the meetings following at 8 p.m.

Cambridge continue their full weekly programme with a New Year's Junk Sale on February 5, an informal evening on the 12th, professional demonstrations of Communication Receivers on the 19th and another informal evening on the 26th. G2MI will be visiting them on March 5.

Plymouth report several interesting meetings in recent weeks, including a talk on DX/TV Reception, by Reg Roper, on December 8. February 6 is booked for their Annual Dinner, and the tickets have been going very satisfactorily. The New Year's calendar of events will be available soon.

Another newcomer to our ranks is **Aldridge** (Walsall), where a club has just been formed. They were due to elect officers and hold a Film Show on January 15, and an R.A.E. Class will be starting almost at once. For details contact G3NXP, the secretary (see panel for QTH).

Huddersfield are now meeting on alternate Thursday evenings; although the reorganised club has only been going for a few months, membership already numbers 45. Future events will include talks, shows of slides and Top-Band tape recordings by W1BB. All with any amateur radio interest are welcomed.

Lichfield, who recently held their AGM, have formed a Contest Sub-Committee; their Club chairman (G3DZT) is at present conducting an evening course for R.A.E. at the Lichfield City Evening Institute. Club meetings are on the first Monday and the third Tuesday, at the Swan Hotel.

South Birmingham report a very successful Christmas Junk Sale; also that they have "taken under their wing" another disabled SWL and a YL member of the White Stick Club who has an 840A and "got as many mentions on the Christmas net as any member." At the February meeting they will hear a talk on SSB by two out of several members who are building their own SSB rigs.

Loughborough now hold Morse classes every Monday (7.30-9 p.m.) under a professional Morse instructor, and welcome anyone in the district who would like to take advantage of this facility. Full details from the secretary (see panel for QTH). On February 5 they have a Junk Sale; on the 12th a Film Show; on the 19th an NFD Discussion; and the 26th is their Night on the Air.

Bristol have moved into their new home and are now decorating the rooms; they are also building the Club's new Tx. Their Christmas Draw brought in about £80, and they hope to acquire an AR88. Membership is still increasing, but they feel that a good Club station will pull still more in.

Coventry continue their weekly meetings; on February 8 they have a Mullard film show, and on the 15th will be continuing their Top Band Tx construction.

Crystal Palace, having heard from G3FZL about modern commercial gear at their January meeting, will be holding their AGM on February 20. **East Kent** have already had their AGM, and are now in new premises at the Toc H Hall, Vernon Place, Canterbury. Club night will in future be every Wednesday, and they are having a drive to recruit some younger members. (We note that the new secretary, G3TMI, is aged 16 and still at school!)

Surrey (Croydon), at their January meeting, had a talk from G3BCM on Starting on the LF Bands—primarily for beginners but aimed at broadening other members' "response curves" also.

Tees-Side are aiming at providing better service for the local amateurs, and all absentees are urged to get in touch with the Club and make their wants and needs known. They meet on alternate Fridays, 8 p.m. at The Settlement, 132 Newport Road, Middlesbrough; February dates are the 5th and 19th.

Bury held their AGM in December and elected G3RSM chairman and G3RHR secretary. Their meetings will continue on the second Tuesday, 8 p.m. at the Old Boar's Head (corner of Crompton Street and The Rock, Bury). On February 9, G3JAG will be talking about Receivers, and on March 9 there will be a Junk Sale.

Cornish, continuing their monthly meetings, will show a film on Electro-Magnetic Devices and discuss the agenda for their AGM, at the February meeting. In March they will debate "CW versus AM or SSB," and in April the actual AGM will be held. The VHF Group meet on the third Thursday at the Coach and Horses, Truro.

Lothians report a fascinating lecture by Mr. Wall of Solartron, who demonstrated some of the more sophisticated oscilloscopes manufactured today. On February 11 they will be discussing Mobile Operation, and on the 25th GM3PQU will talk about SSB. They took part in the Rotary Club's Hobbies Exhibition, in the Waverley Market, Edinburgh, and the exhibit was a big draw, attracting a few new members.

Greenford will have a demonstration of Amateur TV, by G6NDT/T, on February 12; on the 26th the subject will be Two-Metre Reception, by G3BJR.



The first-ever get-together of radio amateurs in the city and county of Hereford was held on 29 Dec. The total attendance of "members and friends" was 30, some of whom are seen here. About 14 licensed amateurs were present, with SWL's, YL's and XYL's, and the whole affair was a great success.

Picture courtesy "Hereford Times."

Meetings are at the Community Centre, Oldfield Lane, Greenfield, where new members and visitors are always welcome. It is hoped to install the Top Band Tx and Rx on a permanent basis before long.

Mid-Warwickshire report good progress and have drawn up a full six months' programme; February 8 is their AGM, and on the 22nd Part 3 of the Radio Theory series (dealing with valves and transistors) will be dealt with. Morse tuition is now available for those taking R.A.E. this year. The meeting-place from now on is the Civil Defence Training School, Harrington House, Newbold Terrace, Leamington Spa.

Peterborough held a sale in their Mill clubroom on January 8, and members bought thousands of surplus components, all brand-new and wrapped in

plastic bags. The very popular price was 6d. per bag!

Crawley, at their AGM, elected G3TR chairman and G3FRV secretary. A full programme is planned for 1965, and the February meeting will be a talk on Mobile and Portable Operation by that well-known exponent, G3JEQ. The Annual Constructional Contest will be judged at the same meeting, by members of the Reigate Club. Crawley's Annual Dinner will be on March 19, with G2UJ and his wife as guests.

Derby, who held their AGM just before publication date, will have a talk by G3JFD on The Short Wave Listener on February 10; the 13th is the date of their Annual Dinner and Dance; the 17th, a discussion on NFD; and the 24th, a Technical Film Show. On March 3 there will be a Junk Sale.

Slade will be preparing for their 1965 "TV

Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
 AERE (Harwell): C. Sharpe, G2HIF, Building 347.3, AERE, Harwell.
 AINSDALE: N. Horrocks, G2CUZ, 34 Sandbrook Road, Ainsdale, Southport.
 ALDRIDGE: D. Flannery, G3NXP, 32 Mob Lane, High Heath, Pelsall, Walsall.
 ARMS: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.
 BATH SPA: G. C. Wynes, G3TLY, 14 Brook Road, East Twerton, Bath.
 BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cheveleys, Blackpool.
 BRISTOL: E. J. Davis, G3SXY, 72 North View, Westbury Park, Bristol 6.
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Spectacular" from now on, and discussion and rehearsal takes place on February 5. On the 19th there will be a Junk Sale, and on the 25th (Thursday) a Mullard Film Evening, in the Great Hall of the College of Advanced Technology, Gosta Green, Birmingham 4, at 7.30 p.m.

Chester held their AGM in January, and elected their officers for the new season. G3EWZ is chairman, and G3DRB continues as secretary. A Contest Sub-Committee has been formed, and it is hoped to get the Club's old callsign back again. Meanwhile, meetings every Tuesday except the first, 8 p.m. at the YMCA, Chester.

Dudley report many interesting meetings in recent weeks, with a satisfactory up-swing in membership, which they hope will continue. On February 12 they will be hearing tape recordings made by members, and, on the 26th, a demonstration of new Hi-Fi equipment by Pye of Cambridge. Both meetings at 8 p.m. in the Art Gallery, Dudley.

Southgate will be meeting at 7.30 on February 11, at Atlasta Lodge, but the subject of the talk is not yet fixed. At the AGM, in December, the Club committee was strengthened, and the editorship of the *Newsletter* was changed. Note, also, change of secretary's QTH (see panel).

The **Ex-G Club** (for amateurs born in the U.K. but domiciled abroad) now has 200 members in 25 different countries. They keep in touch *via* the monthly bulletin and, of course, by joining in the worldwide nets. Full details available by sending an s.a.e. to G4MJ, W3HQO or the secretary, W8YHO.

Northern Heights report a successful Annual Dinner in December. On February 10 they will visit the Bradford G.P.O.; on the 17th there will be a Ragchew; and on March 3 Mrs. Shaw (G3OMM) will repeat her lecture on Radio on Stamps.

Reading held their Dinner-Social on January 9, with 37 members and friends attending; the Club trophies were presented on this occasion. Next meeting is on February 27, when they will discuss the various contests coming up during the year.

Spenn Valley, having devoted recent meetings to Model Control and Radio Astronomy, increase their range still further by a talk on Radioactive Isotopes in Everyday Life, on February 18 (7.30 at Heckmondwike Grammar School).

South London Mobile Club recently held their Constructional Contest, also their annual Dinner and Dance. They run a Club net (1920 kc) every Wednesday at 2100 GMT, and by now they hope also to be on 28 mc at the same time. Meetings are on alternate Saturdays, 8 p.m. at Clapham Manor Baths, London, S.W.4.

NOTE FOR SECRETARIES

These pages are available for reports from any Club caring to make use of the space. It is essential that we have reports by the due date, given each month at the head of the article, with the Club hon. secretary's name, c/s (if any) and full address for inclusion in the Secretaries' QTH Panel. Reports received late cannot be written in. Address all items for this feature to: "Club Secretary," Short Wave Magazine, 55 Victoria Street, London, S.W.1.

South Shields meet every Friday evening in the Trinity House Social Centre, Laygate. Theory instruction and Morse practice are given to the SWL members; business meetings are on the first Friday, usually with a talk, demonstration, Junk Sale or Film Show to finish off the evening. The March meeting, on the 5th, will be a G.P.O. talk on communications. Friday April 2 will be a two-metre night. The Club Hq. is the Trinity House Social Centre, Laygate.

Stevenage, at their AGM, appointed a new secretary (see panel). They have many new callsigns in the Club, and G3TIK has already worked W1BB on Top Band. Meetings are on the first and third Thursdays, in the staff canteen of Hawker Siddeley Dynamics Ltd.; new members will be welcomed, especially newcomers to the town.

Wirral have recently had a talk on "Bits and Pieces," and a Junk Sale. On February 17 there will be a lecture-demonstration on RTTY, and it is hoped to run a mobile treasure-hunt early in the Spring.

Bromsgrove, another newcomer, held an inaugural meeting on January 8 and decided to meet again on February 5, 8 p.m. in the meeting room above the Co-operative Grocery, High Street (corner of Stratford Road). All local amateurs and SWL's are



At a recent meeting of Northern Heights Amateur Radio Society a tape-recorded lecture by W1BB on Top Band DX operating was given to an audience of more than 60. Here are some of them. This recording can be borrowed by other Clubs interested, as explained on p.668 of the January issue of "Short Wave Magazine."



The Bristol Group, now with its own Club Hq. and organisation, put G3TAD/A on the air for the Bristol Senior Scouts when they held their "Kon-Tiki Expedition" competition and demonstration on the beach at Weston-s-Mare. In this picture G3SIZ is operating, and the gear consists of a K.W. Vanguard Tx and AR88 Rx, with a long-wire aerial.

invited to attend this informal discussion of a future programme.

Norfolk report an almost 100 per cent attendance at their AGM, and the arrival of four new members (all licensed). The weekly meeting is justified and will continue every Monday at the Club Centre—140 Oak Street, Norwich. Healthy finances favour the building of a Club station, and possible affiliation with the newly-formed University of East Anglia Club is also under consideration.

Yeovil held their AGM on February 3 (just before publication date); on the 10th they will discuss SSB Transmitters, on the 17th members will hear W1BB's tape on 160-metre DX, and on the 24th there will be a ragchew.

Wessex will have their AGM on March 1, 7.30 at the Cricketers Arms, Windham Road, Bournemouth, and will then arrange their programme for the coming season. A good "mixed bag" is already envisaged, and all members are urged to attend the AGM and help to further progress.

University of Keele are busy with their clubroom so that they can operate efficiently as an out-station in the North Midlands Mobile Rally (April 11). They will be providing 160- and 2-metre coverage for mobiles approaching from the West.

Bath Spa meet at 7 Lambridge Mews, Larkhall, Bath, on Mondays and Thursdays at 8 p.m. R.A.E. classes will soon be starting on Mondays—not so much lectures as discussions. On Thursdays the Club Tx, G3IVL is usually on the air (Top Band CW). Meanwhile the main requirement is *more members*,

and anyone interested will be more than welcome on Mondays or Thursdays.

The **East Ham Group** extends a cordial welcome to SWL's and licensed amateurs in the area. They meet fortnightly at the QTH of G2COG (12 Leigh Road, London, E.6), and newcomers can be sure of seeing a practical demonstration of a station in operation. For meeting dates, and so on, contact G3SIR, the secretary (*see panel*).

Saltash (yet another newcomer) now has its own Club with a membership of 23, and already publishes its own newsletter, the *Tamar Pegasus*. Several SWL members are studying for R.A.E. and a Morse class is in action. Meetings are held fortnightly at the Toc H Hall, Warrington Road, Burraton, and the next dates are February 12 (Two-metre Demonstration at G3SN's QTH) and February 26 (Talk by Mr. R. Roper on DX/TV).

Roding Boys' Club held a Christmas Social for parents, which went off well, although

the transmitter had to go QRT after one contact because it was breaking through on the sound-track of a film projector! The Club's receiver-renovation project continues—at least one elderly R.107 has been rejuvenated.

Leyton started their new session on January 11, having already had a successful AGM and appointed their new officers. Next meetings are February 9 and 23, March 9 and 16—all 7.30 at the Leyton Senior Evening Institute, Essex Road, London, E.10.

Oxford, looking back on a very successful year, are now hoping that 1965 will be even better. They have some lecture-demonstrations booked (Dawe Instruments on February 24, and STC Crystal Division on March 24). The Annual Dinner will be in March, and the 10th Anniversary Mobile Rally on July 11. Visitors are welcomed at all meetings, the next dates being February 10 and 24, 7.30 at the Cherwell Hotel, North Oxford.

Manchester will run a Tape-and-Slide lecture on February 10; G3RTU will talk about the HE-80 receiver on the 17th; there will be a "Junk-and-Gunk" sale on the 24th; and W1BB's Top-Band lecture will be presented on March 3. All 7.30 at the Newton House Community Centre, 203 Droydsden Road, Newton Heath.

Maidstone YMCA have worked out their programme until the end of April. Their February events are a talk on SSB Reception (G3RNL) on the 10th; W1BB's Top-Band lecture on the 17th; G3REM on his Top-Band Mobile Installation on the 24th. On March 3 they will be hearing about CW Procedure in the Royal Navy.

WE ACKNOWLEDGE, WITH THANKS, THE RECEIPT OF THE FOLLOWING CLUB PUBLICATIONS:

AERE, Harwell (*Newsletter*, December); **ARMS**, *Mobile News*, December); **Cambridge** (*Cambeam*, November and December); **Gray Valley** (*QUA*, December and January); **Crystal Palace** (*Newsletters* 108-110); **Halifax** (*Newsletter*, December); **Lothians** (*Lothians Radio Amateur*, November); **Midland** (*Newsletter*, November and December); **Norfolk** (*NARC Challenge*, December); **North Kent** (*Newsletter*, December and January); **RAIBC** (*Radial*, November and December); **Reigate** (*Feedback*, November, December, January); **Radio Club of Scotland** (*GM Magazine*, November and December); **Southgate** (*Newsletters*, December and January); **WAMRAC** (*Circular Letters* Nos. 48-50); **West Kent** (*QLF*, November); **Cornish** (*Cornish Link*, January); **Plymouth** (*QUA*, January); **Coventry** (*CQ CARS*, January); **Surrey** (*SRCC Monthly News*, January); **Ex-G Radio Club** (Vol. 4, Nos. 5 and 6); **Aeronautical Centre ARC**, Oklahoma (*Collector and Emitter*, November and December); **Foundation for Amateur Radio, Inc.** (*Auto-Call*, November and December); **Royal Signals Amateur Radio Society** (*Mercury*, January); and **Radio Society of Ceylon** (*457 Bulletin*, December).

Loughton look back on 1964 as their busiest year, and a most successful one. Two members have just come up with their tickets, as G3TUM and G3TUO. They recently visited ARDE Rediffusion and heard an interesting talk on Sound in Television. Further events planned include a visit to the G.P.O. Radio Tower, to the receiving station at Brentwood, and to

the PLA Radar Installation at Gravesend.

Reigate recently held their annual Constructional Contest, judged by visitors from the Crawley and Dorking Clubs. Winners were G3NKS and G3RIN (the latter for the fourth time in five years). There will be a Members' Evening on February 20, when all present will be asked to talk briefly on their favourite piece of equipment. The Annual Dinner is on February 12, at the Reigate Hill Hotel (tickets from G3NKT or G3RAE).

Midland will have a station on the air from the Birmingham Boat Show (at Bingley Hall, Birmingham) from February 12-27. **North Kent** will hear about the Goonhilly Receiving Station (from Mr. H. P. Shelvey) on February 11, and on the 25th Ron Skelton (VS4RS) will talk about Telecommunications in Borneo. Both meetings 8 p.m., Congregational Hall, Clock Tower, Bexleyheath.

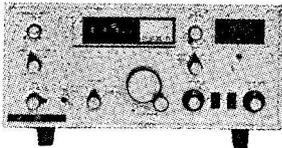
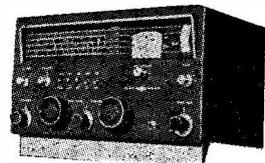
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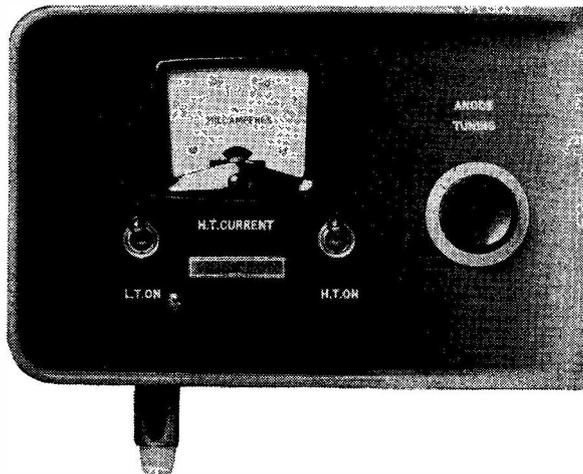
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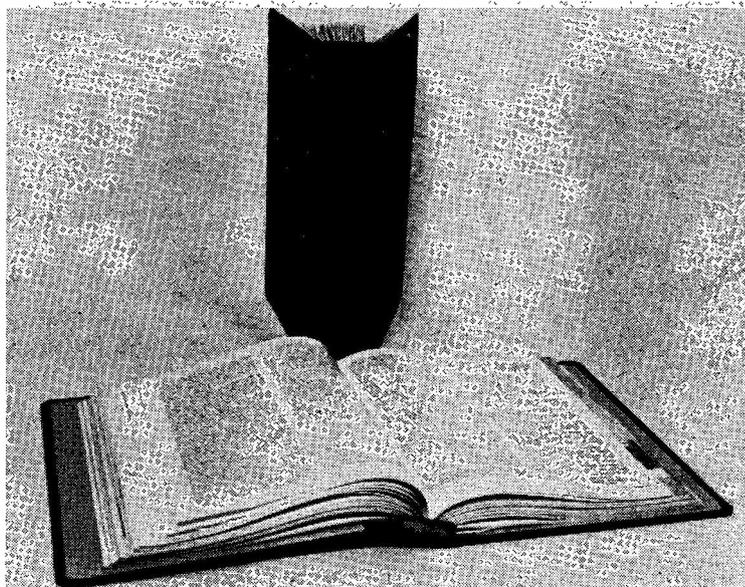
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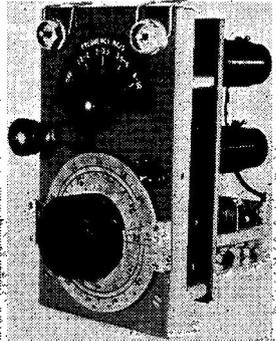
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(A monthly review of news, views and advice)

LABORATORY TEST EQUIPMENT

We were surprised to learn recently that a British manufacturer (upon his own admission) was unable to measure exactly, or even to $\pm 20\%$, the R.F. power output of his transmitters. We were informed that only a Lamp was used. In our opinion Test equipment is a very important facet in Design, Development Test and Service.

Latest acquisitions at KW are the new all transistor Frequency Counter manufactured by Marconi Instruments and a Polyskop by Rhode and Swarz both in a class costing well more than a family saloon car. The Counter will give us frequency measurements at one part in 10^7 , in other words 1 cycle accuracy at 10 Megacycles or 10 cycles at 100 Mc/s. The Polyskop is a sweep instrument which displays on a 6" CRT. Next instrument for delivery to us and even more expensive is a new Spectrum Analyser designed by the G.P.O. and manufactured to the G.P.O. specification. This will allow us to analyse all forms of signals from audio up to 200 Mc/s. and is particularly useful for checking sideband generators, mixers and Linear Amplifiers for SSB applications. It will enable us to keep a close control on Product-distortion and Linearity in all KW and other SSB equipment.

When you buy imported equipment make sure you buy from a reputable firm with adequate test facilities who can guarantee "Service after Sales." KW can offer all imported equipment "tuned to perfection" by experienced engineers with the backing of good quality test equipment—all at no extra charge. Why go elsewhere!

K.W. ELECTRONICS LIMITED

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1 HEATH STREET, DARTFORD, KENT

SMALL ADVERTISEMENTS, TRADE—continued

COLLINS KW-S1 SSB Tx only, realigned, new valves, £135 o.n.o.? 30ft. Lattice Tower, ideal tilt over, self supporting, £35. 75A-4 and KW-S1 PTO's, offers? Approximately 200 new miniature crystals, offers?—Box No. 4060, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NORTH WESTERN Agents for Green & Davis, Codar, Partridge Electronics equipment. Heathkit Apache, matching SB-10U, £100.—James Stephens, 70 Priory Road, Liverpool. (Anfield 3602.)

SALE: Multiband Antenna traps, 80 to 10m., highest efficiency, superbly finished, 45s. pair. Complete aerials available. OC170/171, 4s. each, 888A Receiver, S-meter, mounting blocks, excellent, £60.—Wakeley, 70 Arnold Road, Binstead, I.o.W. (Tel. Ryde 3231.)

GREEN & DAVIS LTD. now have a wide range of secondhand and new Receivers, Transmitters and Transceivers, price between £25 and £500, for sale. HP and part exchange can be arranged.—Green & Davis Ltd., 104 Hornsey Road, London, N.7. (Tel. North 6871.)

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

FOR SALE: Lafayette HE-40, mint condition, four bands, 550 kc-30 mc, with manual, £17 (inc. carriage).—Ridgley, 62 Elmfield, Gillingham, Kent.

EXCHANGE: 1957 Lambretta Scooter for any Receiver, Transmitter or equipment. Birmingham, Midlands area preferred.—Box No. 4058, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HEATHKIT Mohican, little used, £23 o.n.o.?—Bell, 22 Newton Brow, Barrow-in-Furness, Lancs.

SALE: Eddystone 358X, improved front end, manual, ANL, 10 coils, built-in PSU, £12 10s. Valve Voltmeter No. 2, new, £2 10s. Envoy Enlarger, 120 Wray Supar 4.5, £7 10s. Vols. 1-6 Newnes *Radio TV Servicing*, offers?—H. Feakes, 14 Sandringham Walk, Spalding, Lincs.

WANTED: *Short Wave Magazine*, June, 1956 (Top Band Mobile Whip article).—McFarlane, Sharon, Ranfurly Road, Bridge-of-Weir, Renfs., Scotland. (Tel. 2948.)

SALE: 1000-0-1000v. Transformer, 30s. Power Supply components, many valves, meters, relays, etc., s.a.e. list. Delivered 30 mile radius.—G3BFF, 13 Tollers Lane, Coulsdon, Surrey.

STABILISED 300v. 500 mA, 6.3v. AC 12A, PSU, 10 $\frac{1}{2}$ in. x 19in. grey hammer, part wired, suitable TV/Tx, £4. 800v. 70 mA, 12.6v. AC PSU, steel case, spare rectifiers, 30s. Carriage extra. Data sheets for 10w. 160m. all-transistor fixed/mobile AM/CW transmitter, 7s. 6d. Germanium diodes, 75 mA 300v., 4s. per dozen.—G3SBA, 46 St. James Road, Harpenden, Herts. (Tel. OLU27-4815.)

WANTED: Good mains operated Communications Receiver: AR88D, Eddystone, etc.—Ring Doncaster 66461 or write Atkinson, 91 Sandall Park Drive, Doncaster, Yorks.

WANTED: All FT241 crystals for G2DAF Rx filter; also Eddystone 898 dial.—D. Parker, 97 Mountain Crescent, Thornhill, Dewsbury, Yorks.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Cossor 1039M portable Oscilloscope. **SALE:** Pye base station, transmitter, receiver and microphone, with xtals for 70-26 mc, £12, carriage extra.—Joslin, 13 Talbot Road, Skegness, Lincolnshire. (Tel. 1185.)

WANTED: Good Communication Receiver, CR-100, SX-28, AR88D, etc., in EXCHANGE for gent's 10-gear racing cycle; as-new condition, cost £35; cash balance if necessary.—Full details to Groves, 1 Rose Cottage, Summers Lane, Freshwater, I.o.W.

HAMMARLUND HX-50, mint condition, original packing, manuals, £139. Creed 7B 4-Bank Page Printer, recent makers' overhaul; not ex-G.P.O.; 12 rolls paper; AP66863 PU, AP66862 TU, bias supplies, £37 10s. complete.—G3NMR, 95 Collinwood Gardens, Clayhall, Essex.

888A S-meter, speaker, blocks, very little used, brand new condition in box. Offers? **Trix Soundsystem** 130w., 5 units in rack comprised of: 1-30 watt amplifier, 2-50 watt amplifiers, 1-TSL tuner unit 88-108 mc, 1-control and monitor unit; new condition, offers? **AVO** Valve tester, £4. **234A** power pack, metered, £2. **Radiolab** valve tester, £2. **78 Rx** 2.4-13 mc, £2. **IM81UP** Standing Wave Indicator, with handbook, new, 50s. Variable power pack, metered volts/milliamps, 50s. "Reptone" control Tx, £1. **Top Band Tx**, never used, consisting of 12AU7, EF91, TT-11, UM-1, Mod. 12AX7, 6C4, 2/6AQ5, individual power packs, metered, £9. **Geloso** VFO 4102V, brand new in box, escutcheon dial, PA assembly, £5. **Telescope** Greenkat rack and pinion, focus 15X, 30X, 45X, £4. **Microscope** illuminated rack and pinion, focus 100X, 200X, 400X, £4. Radio, electronics, tape, Hi-Fi, magazines, books, etc., valves, transformers, large capacitors, s.a.e. **All above items in perfect and clean condition.** Offers and callers ring **WES 0409 evenings**. Buyers collect.—Willetts, 11 Milton Street, Tantany, West Bromwich, Staffs.

WANTED: QQV02-6, QQV03-10, QQV03-20A, QQV06-40, QY3-125, 4X150, Woden UM-3, or complete QRO modulator, 12v. DC P.E. generator 120w. minimum.—G3NZS, 75 St. Stephens Road, Smethwick 40, Staffs.

SELLING STATION: Sphinx SSB/AM/CW Tx, S 20/80/160 metres, almost new, hardly used, perfect, £70. K.W. Valiant, 10-160 metres, 60 watts AM/CW. with mains PSU, coax relay, £35. AR88D, very good condition, sprayed grey, £40 — or EXCHANGE for Amateur bands Rx.—G3SCJ, Power, Chapel Green, Fillongley, Coventry, Warks.

G.E.C. BRT-400E, 150 kc-32 mc, crystal calibrator, perfect condition, £65. R.216 Receiver, 19 mc-157 mc, new condition, with power supply, leads, manual, £40. Heathkit Sig. Gen., Model RF-1U, new, £9. AVO-8 Mk. II, mint, £15.—Barry, 15 Fairlawn Court, London, W.4.

EDDYSTONE 840C, mint condition, £45.—C. Vanderneut, 20 Lampton Park Road, Hounslow, Middx. (Phone Hounslow 6110 after 7 p.m.)

ACHTUNG: Lorenze E52B sub Rx wanted, state price and condition to—G3MAO, Address as Call Book or Gulliver 4261.

SALE: Hallicrafters 5R10A MW to 31 mc Receiver, £8, Eddystone S.640 Receiver, £20. Command Receiver 3-6 mc, with built-in power supply, £7. Philips portable Tape Recorder (transistor), £20. All in good order.—G3RAD, 1 Approach Road, Broadstairs, Kent.

G. D. COMPONENTS

● 25O26 VHF POWER TRANSISTORS. 40w. 40 Mc/s. Max. Price 79/- each

SSB COMPONENTS

1 KW. PIE-TANK O/P COILS. 80-10m. ... 25/-
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POWER UNIT, TYPE 3, 230 volts A.C. Supplies 250 volts 100 MA. and 6.3 volts 4 amps. to suit above R1132 and P104, £2/5/-, carriage 10/- . A few available with damage externally to handles, switches, etc. But good working order at 35/-, carriage 10/-.

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MECHANICAL TURNS COUNTERS. 0-999.9, 2/6, post 1/- . Carbon Mikes, No. 3 with lead and jack, 4/6, post 1/6. P.A. Condensers 200 plus 200 PF. Made for 813 at 1200 volts, used, 7/6, post 2/6. Used 813 bases, 3/6, post 1/- . Carbon Mike with 4 pin plug for 18 set, 4/6, post 1/6. Low impedance headphones, 6/6, post, 1/6.

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CONTROL UNITS. No. 1 for Canadian 52 set, complete with chassis padded low impedance headphones, microphone, morse key, hand generator and bell, etc. In "as new" condition, 27/6, post, 7/6.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only. Telephone Worthing 9097.

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Transmitter Output R.F. Power Meters, Type 17. Calibrated 0-40 watts. Requires approx. 1/2 pint MS 550 oil. Complete with test leads. Invaluable for tuning up transmitters, especially for 2 or 4. Good Condition, £2/10/-, carriage 5/-.

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TE-12 Multimeters. 20,000 ohms/volt. 28 ranges. Up to 6000v. D.C. and 600 m/a. D.C., 60 megohms and 1200v. A.C. Complete with leads. Brand new and boxed, £5/15/-, post free.

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Mail Order Only. Terms: C.W.O.

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SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: Complete SSB/CW/AM Station. Hallicrafters 32A exciter; Hallicrafters HT-41 linear amplifier; Hammarlund HQ-170 Rx (with Telechron clock timer fitted). Spare valves for all three pieces of equipment also for sale. Heathkit HO-10 Oscilloscope. No reasonable offer refused.—Box No. 4059, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Hallicrafters SX-28, 0-55-43 mc, £30. **FS27-U,** 28-140 mc, £25; both with S-meters and manuals, very good condition. **88 Set (1541),** 2-20 mc, manual, good condition plus power unit, £20. **R.206 Mk. II,** 0-55-30 mc. Adaptor 50-600 kc plus power unit; very good condition, circuit, £30. **Pye Transistor 12v.** Car Radio, MW/LW, very good condition, £10. **Mullard Valve Tester (1,000 Cards) CT-80/1/3,** high speed, very good condition, £25. *Wireless World,* April 1958 to date, £2 10s., *Radio Constructor,* January 1953 to date, £2 10s., *Practical Television,* December 1962 to date, 10s., *Practical Wireless,* January 1963 to date, 10s. Or all magazines, £5 the lot. Buyers collect. No reasonable offers refused.—K. C. Shepherd, Toll Bar Cottage, Eynsford, nr. Dartford, Kent.

AMERICAN Apache Transmitter, works built, A perfect, plus SB-10 SBA, needs attention, £95. Eddystone 882A, perfect, £78. Heath OS-1 'Scope, needs attention, £17.—Dodson, 78 St. Bernard's Road, Olton, Works.

VICEROY Transmitter, working, needs attention, £50. SSB Linear, £25. Z-Match, £3. SWR meter, 30s. Multimeter, £5. New Eddystone 898 dial, 50s. Electroniques SMD2, 12s. 6d. Four de luxe IF's, 460 kc, 25s. Heathkit power pack, 50s.—Westleigh, Fore Street, Beer, Devon.

SALE: Mint items supplied by Philpotts and S Electroniques for G2DAF Mk. II SSB rig (filter version). Prepared separate cabinet/components. List if required. 75 per cent original prices. Reason for Sale: Buying commercial.—Box No. 4061, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MOSLEY V3Jr. vertical, £4. **Taylor Windsor 88A** Multimeter, 20,000 o.p.v., in carrying case, serviced by Taylors, £15. Valves approximately 300, Tx/Rx/TV including 5B254M, 807, 6V6, Rects. PL36, PCF80, ECC82, PCL83, many others, many brand new, £6.—G3IIX, 5 Wattsfield Road, Kendal, Westmorland.

R.1155 Receiver, separate power pack/amplifier unit, good condition, £7. **PART EXCHANGE HRO** or CR-100.—Salomon, 15 Alyndale, Hope, Wrexham, Denbighshire.

SALE: ZC-1 Mk. II Tx/Rx, 160-80-40 metres, may need attention, £4 o.n.o.? Buyer arranges carriage.—Poulter, 279 Aragon Road, Morden, Surrey.

SALE: KW-77 and speaker, as new, bought 1964, £90 o.n.o.?—Pinnell, 67 Outram Road, London, E.6. (Phone Clocktower 1805.)

MINIMITTER MC-8 converter, £9 (all-band). **Minimitter TR-7,** 160-metre transistor mobile Rx, £8. Both including p/p.—G3LOL, 30 Johnson Road, Barrow, Bury St. Edmunds, Suffolk.

SALE: Pair GET-573 power transistors, 30s., **SBY100** equivalents, 2s. each, **RB4** rectifiers, 1s. RF unit Type 79, £7. 5670's, 6094's.—David Woodhouse, 52 Barnby Gate, Newark, Notts.

WANTED: K.W. Vanguard, also KW-77 or similar. State price and condition. Will collect up to 60 miles.—Tinkler, 11 Westhill Drive, Kettering, Northants. (Phone Kettering 3500 evenings.)

SMALL ADVERTISEMENTS, READERS—continued

SALE: Sinclair X10 Amplifier kit (unopened), £5. Power supply for X10 (new), 47s. 6d. Decca "Deram" Stereo Cartridge (new), £4. **WANTED:** Labgear Tri-band Quad.—G3MOE, Westbury Road, Cheltenham, Glos. (24217.)

FOR SALE: J-Beam Aerials: In perfect condition and with carriage paid: 4m. 4-ele Yagi with balun, £3 5s.; 2m. slot with reflectors, £1 7s. 6d.; pair of 70 cm. 8-over-8 slot-fed Yagis with phasing and matching unit, £6 10s.—Evans, 80 Argyle Road, Ealing, London, W.13.

EXCHANGE: W.S.19, complete with all leads, junction boxes, PSU and variometer, phones, mike, etc., and R.208; both sets in good working order, in EXCHANGE for good R.107.—Symonds, Woodbury, Gt. Witley, Worcester.

KILOWATT linear Amplifier, newly built to ARRL Single Sideband Handbook design "Compact High Power Linear," page 181. Four inexpensive 811's in parallel, 10-80 metres, requires 80-100 watts drive. Commercial appearance, professionally built, table-top Imhof slimline cabinet; chassis size only 17in. x 10in. x 8½in., including built-in silicon diode power supply. L.P. switch for 600 watts p.e.p. Absolute bargain at £38 cash.—Telephone Byfleet (Surrey) 46086.

SALE: K.W. Electronics/Geloso converter, 160-10 metres, excellent condition, £14.—G2APN, QTHR, Phone Bordon 213.

MODEL YACHT—radio controlled 10 Meter—value about £30, offered in (part) EXCHANGE for compact, powerful CW Tx (full break-in, TVI proof), transceiver, small CRO, GDO, miniature tape recorder, 24-hour clock, whips, mobile gear, etc.—G3TJY/M, Jolly, 30 York Road, Broadstone, Dorset. (Tel. 521.)

URGENT: AR88D, Leak TL.12 plus Point One Plus. Decca ffs, Microlift EXCHANGE for Amateur Band only Rx-888A, CM-1, Drake 2B, etc.; cash either way, or would consider private HP if necessary.—Box No. 4062, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MOHICAN with manual, factory built 1964, £27 10s.—Worthington, 43 Mount Road, Wolverhampton, Staffs. (Tel. 36063.)

EDDYSTONE 840C new, 5 spare valves, manual, £45. Few hours' use.—Kemp, 1 Trafalgar Road, Clacton-on-Sea, Essex.

358XF Rx, 90 kc to 30 mc, N/L, xtal filter, power unit, spare valves, £10. Also Geloso G.209 front end coil unit, dial, drive, tuning condenser. 3 min. valves, £7 10s. Both used but electrically FB, carriage paid.—Blackwell, 20 Bloxham Road, Banbury, Oxon.

SALE: Many items half price, e.g. 36v. lead acid accumulators, 3½ in. x 1in. x ¼ in., 6s. for three. P/p 1s. 6d., s.a.e. for lists to: J. N. R. Massara, Milton Abbev, Blandford, Dorset.

38 Set, owner's complete sets of valves in metal cases. 4s., p/p 1s.—J. N. R. Massara, Milton Abbev, Blandford, Dorset.

FOR SALE: Electroniques QP166 coil pack, brand new and unused, 11 gns.—Lonohurst, 44 Redstone Park, Redhill, Surrey. (Phone Redhill 3411.)

R.1116A Double Conversion Receiver, 142 kc-16 mc. ideal SWL or portable use. Complete with power supply, £10 o.n.o.—G300W, 102 Highbury Road, Birmingham, 14. (Phone HIG 3280.)



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Crystal Controlled. For 80-40-20-15-10 Metre Bands. As a Converter—Converts Receiver to Dual Conversion Operation. Improves Selectivity. Widens Band Spread. 3 crystals are included for 20, 15 and 10 metre bands. Operates on 230v. 50/60 cycles A.C., 2 stages of RF assures a high signal to noise ratio. S.A.E. for full details. 19 gns. P.P. 3/6.

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200µA	27/6	2mA	22/6	300mA	22/6	20v	DC 22/6	15v	AC 22/6
500µA	25/-	5mA	22/6	500mA	22/6	50v	DC 22/6	50v	AC 22/6
50-0-50µA	29/6	10mA	22/6	750mA	22/6	100v	DC 22/6	150v	AC 22/6
100-0-100µA	27/6	50mA	22/6	1A	DC 22/6	150v	DC 22/6	300v	AC 22/6
500-0-500µA	27/6	100mA	22/6	5A	DC 22/6	300v	DC 22/6	500v	AC 22/6

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ILLUMINATED "S" METER, 1 21/32" sq. front. Cal. in 5 units, 6v. lamp, 29/6, P.P. 1/-; 2 5/16" square, 39/6, P.P. 1/-.

MODEL TE-18 GRID DIP METER

Complete with all coils for all Frequency ranges from 360 kc/s. to 220 mc/s.

Compact—True one handed operation. Covers 360 kc/s. to 220 mc/s. Functions as a Grid Dip Oscillator. Absorption wave meter and Oscillating Detector. Completely wired—not a kit. The TE-18 can determine the resonant frequencies of tuned circuits, detect stray resonances in transmitters, check neutralization, etc. Frequency range 360 kc/s. to 220 mc/s. in 8 accurately calibrated ranges. Grid current meter has a 500µA movement. Uses a 6AF4A valve powered by a built-in transformer-operated power supply with selenium rectifier. For 220/240v. AC 50-60c/s. Size 7¼" H. x 2½" W. x 2" D. £12/10/-, Carr. 3/6.



Model DA-1 Transistorised Fully Automatic Electronic Keyer



230v. A.C. or Battery operated. Incorporates built-in monitor oscillator, speaker and keying lever. Fully adjustable speeds giving either auto, semi-auto or hold. 7 transistors, 4 diodes. £16 10s., P.P. 4/6.

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LAFAYETTE "HE.30" (P/P 10/-)	£35	0	0
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D.S.T. 100.	50 Kc/s.-30 Mc/s., double conversion, with power unit (P/P 40/-)	£35	0	0

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CR-100, noise limiter, S-meter, manual, excellent condition, £15. Lafayette HE-40, as new, £15.—G3ELJ, Claypole, Newark, Notts.

VHF ENTHUSIASTS now's your chance: QQV06-40A, 45s.; QQV03-20A, 35s.; QQV03-10, 15s. All tested on two metres and guaranteed. Supplies limited.—Box No. 4063, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Eddystone 750, speaker and S-meter, about £40.—Gordon Edwards, Pencastell, Moylgrove, Cardigan. (Tel. Moylgrove 233.)

HEATH MOHAWK, one owner, carefully driven, superb condition, mint; separate RF/IF gain controls, tunable notch filter, 100 kc calibrator, 0.5-5 kc selectivity; brilliant performance SSB/CW/AM. London area. £100, inc. manual, buyer collects.—Box No. 4064, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

£1 6146's, QQV02-6's; 25s. QQV03-20's, 813; 15s. 2E26's; 10s. 5763's; 5s. 6AQ5W's, OB2WA's, OA2's, 12AT7's.—G3NMQ, QTHR, Phone MUN 2795.

DX-40U, Globe VFO, pair, £22. Geloso G.207, £35. R.107, £10. WANTED: 3-band beam.—G3NMQ, QTHR, Phone MUN 2795.

WANTED: Part-time agents for Spastic (Cancer and Polio) pools promotion in all districts. Commission and income.—G3NMQ, QTHR, Phone MUN 2795.

WANTED: Gear for 432 mc converter, Tx, aerials, etc. Anything in good working order considered if cheap.—Box No. 4065, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Viceroy Transmitter, recent model. SALE: BC-453, £4 10s.; FB5, new high power model, unused, £3. Woden components.—G2UZ, 2 Cliff Road Gardens, Leeds, 6.

AR88D, S-meter, manual, professionally overhauled, £35 o.n.o.? UM2 Modulation Transformer, £2 10s. P.C.S. 12 Swinging choke, £1 10s. BC-453B Command Receiver with PSU, 10s. Lab-gear wide-band Couplers (3.5, 7, 14 mc), 15s. the lot. 10-metre Beam (GSV) complete, £3. PSU 500v. DC, 6.3v., 4v., 4v. AC. Buyers collect or carriage extra.—Davidson GM3ATB, 31 Highburgh Drive, Rutherglen, Glasgow. (RUT 6178.)

SALE: Two QQV06-40A, new, boxed, £5 pair. Two QQV03-20A, ditto, £4. Two QQV03-10, new, unboxed, £2 10s. Two QQV02-6, ditto, £2 10s.—Box No. 4066, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

AR88D, latest Model, PVC wiring, S-meter, wonderful condition, new grey hammer case, grey front, handbook, £45. Hallicrafters S.39 Rx, portable AC/DC or batt., handbook, £3 10s. Small 120w. Transmitter, 80-10 metres, 5RV circuit, all miniature valves, £7. Xtal calibrated Wavemeter TE-149. £2. Pair Walkie-Talkies, Type 88, £2 10s. Heathkit SB-10, fitted with tuning oscillator, FB condition, handbook, £27 10s. 12v. Transistor Car Radio, Murphy dipping mirror type, £9. Buyer collects.—(Phone Chobham 483.)

SALE: Viceroy Mark II complete with PSU, excellent condition.—S. McKaig, 52 Beverley Gardens, Bangor, County Down.

WANTED: KW-77, 888A or similar.—G3KAA, 43 Nappsbury Road, Luton, Beds.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Geloso G.209/R, one year old, needs a new mains transformer, Codar PR-30X, self-powered, 4 months' old. Offers?—QTH, 2 Orchard Cottages, Brewer's Street, Lamberhurst, Kent.

EXCHANGE: Factory assembled Heathkit RA-1 with matching speaker, crystal calibrator.

WANTED: Eddystone 840C.—J. C. Bishop, 186 Tixall Road, Stafford.

SALE: 33 Transceiver with mike, £135. Only 2 months' old, see *Short Wave Magazine*, January; *QST*, April, 1964. Real DX'er, worked VK on 20m.—G31DW, Orchard Cottage, Hook, Swindon.

WANTED: SSB mechanical filter with data sheet, in good condition. Also matching carrier crystal if available.—G3KH, 133 Station Road, Cropston, Leicester.

SALE: HRO Rx with 3 coils, newly sprayed, new dial, aligned with wobb' and 'scope; covers 160 metres, 80 metres, 20 metres, 21 metres, 10 metres and medium wave; including small power unit, mains 240v. AC, also 12v. VIB unit; with manual, in superb condition, £20. Pye Mobile Tx/Rx converted for two metres, with mike; blue hammer, ready for use on 12v., £18. Dow-key relay, coaxial, 6.3v. AC, with all plugs and leads, £3. Type 1540 2-metre Tx, complete with built-in power unit, bias pack, relays, etc., etc., as original Tower Transmitter, £9. Top Band mobile Rx/Tx, uses Command Rx, fits in Ford Consul, etc., under dash, £15. Two Vibrator units, 12v. input, 300v.-100 mA o/p, with spare vibrs., leads, etc., unused, 30s. each; s.a.e. please.—G3LTX, 68 Belvedere Road, Burton-on-Trent, Staffs.

GOING MOBILE? Then get your copy of Aids to Mobile Operating, 2s. 9d. post free, or Seven IRC.—G5PP, 22 Sherlock Road, Coventry, Warwickshire.

FOR SALE: Eddystone 888A, good condition, speaker, S-meter, instruction manual, £45.—K. F. Clark, 149 Marlborough Road, Derby.

FOR SALE: Eddystone 750, 0.45 to 32 mc double superhet, speaker and manual, condition as new, performs to maker's specification. Offers?—Piers Cocker, 10 Oaks Avenue, London, S.E.19. (Phone Gypsy Hill 4068.)

MAST, 36ft. 3-section, dural, 2in. diameter, complete with guys, etc., as new, £8. Carriage paid.—Irving, 5 Wattsfield Road, Kendal, Westmorland.

WANTED: DX-40U, good condition, also B/S coils for HRO Mx, and semi-auto Bug key.—Box No. 4067, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MANUALS, circuits of all British ex-W.D. 1939-45 Wireless equipment and instruments, from original R.E.M.E. instructions. S.a.e. for list: over 70 types.—W. H. Bailey, 167a Moffat Road, Thornton Heath, Surrey.

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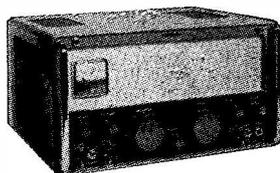
FOR SALE: Eddystone 840C, immaculate, £43 o.n.o.? Or will take HRO-5T (mint) in Part-Exchange. Cash adjustment.—Box No. 4074, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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AMATEUR BANDS RECEIVER



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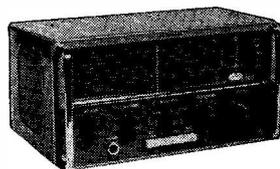
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HALLICRAFTERS mobile supply: 250v, 70 mA, 350v, 150 mA, with H.D. battery, £10; rejector unit, 1.2-10 mc. WANTED: No. 9 Tx for spares.—Box No. 4069, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Heathkit Mohican GC-1U Transistor Receiver, good condition, £20 offered.—Young, The Elms, Westhorpe, Southwell, Notts. (Telephone Southwell 3030.)

BRAND NEW OS-1, £20. PTC.112 Transceiver with mains PSU, three crystals, tunable L.O., just plug in for four metres, £10. New coax cable, 50-ohm, very low loss, 3/4 in. diameter, three pieces of 42ft. complete with fittings, 15s. each. Reflectometer with 500 μ A meter, £3. *Short Wave Magazines* and *Bulletins* to date, 1s. each.—Lawn, 20 Croft Road, Godalming, Surrey.

NATIONAL NC-183D D/Superhet, miniature valves, brand new condition, complete with full technical manual, £95 o.n.o.? AVO Valve Tester Characteristic Meter, Mk. II, complete with all manuals, new condition and in original transit case, £32. Triplett U.S.A. Sig. Generator, type 1632, 100 kc-120 mc, precision instrument complete with manual, new in transit case, £15 10s. QV03-20A, new, 35s. 500 microamp. meter, 3in. scale, latest style, 18s. 6d. Brown's Type "F" phones, 22s. 6d. All plus postage. WANTED: Cossor Wobbulator; G. & D. Mk. IV 2-metre converter.—Box No. 4070, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Brand new or mint condition Collins 516F-2 power supply, full details, price please. FOR SALE: Brand new condition, used less than ten hours, Barker-Williamson SSB/AM transmitter, manual, original carton, 140 watts AM, 180 watts SSB. Best offer over £130. Reason for selling: Owner has S-line.—Box No. 4071, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: HRO, five GC, 4 BS coils, mains and battery power packs, £30 o.n.o.? Drive, gang, BFO, IF's filter, cabinet of HRO, £6 o.n.o.? Magazines, etc. Please send s.a.e. 10g. aluminium, max. size 3ft. x 3ft., 7s. 6d. per sq. ft. Large holes trepaned out at extra charge.—Roy Barker, 82, Main Street, Balderton, Newark, Notts.

MINIMITTER MR-44/11 Receiver, as new, £30. Delivered 100 miles. Class-D Wavemeter. Offers?—G3PYL, 314 Stannington Road, Sheffield.

CLEARANCE: Short Wave Magazine, Volumes 5 to 18; R.S.G.B. Bulletins, Volumes 21 to 28, 10s. each. Radio Handbook, Radio Amateur's Handbook, Rhombic Antenna Design, Handbook of Wireless Telegraphy, 5s. each. Handbooks—BRT 400/402, Cossor 339, SCR-211 (BC-221), 10s. each. Class-D Wavemeter (mains), handbook, £4. Marsland Multi-meter, £5. 12in. loudspeaker, £2. Z-Match, £2. Four Morse Records, £3. Underwood Typewriter, £5. Buyer collects. (Worcestershire.)—Box No. 4072, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

DC Power Supply for KW-2000, new and unused, £19 10s. (List Price £29).—G3AME, Grange House, Reigate Hill, Reigate, Surrey. (Tel. Reigate 46007 after 7 p.m.)

SMALL ADVERTISEMENTS, READERS—continued

MINIMITTER de luxe, 150w. Transmitter, immaculate, £45. Pamphonic speaker enclosure, 15in., bass, etc., £25.—Wood, 22 Habberley Road, Kidderminster, Worcs. (Phone K.5628.)

FOR SALE: 1951 model R.107T, spare valves and vibrator, excellent condition, £10 o.n.o.?—G. Cree, 20 Longwood Lane, Amersham, Bucks.

FREQUENCY METER BC-221, mains PSU, excellent condition, £12 o.n.o.? Crystals 500, 3510, 3580, 4000, 7080 kc, £1 the lot.—Burman, 1 Burnaby Road, Portsmouth, Hants.

GO SIDEBAND: AM or CW with a well tried team, professionally made Heathkit DX-100U Transmitter and SB-10U SSB adaptor, £95 or might separate. Also unmodified DX-100U Tx as new, £55. Heathkit Sig. Generator RF-1U, mint condition, £12.—Terry Edwards, G3STS, 188 Broadhurst Gardens, London, N.W.6. (Tel. Maida Vale 6638.)

NEWNES Radio/TV Servicing, 9 Volumes complete to 1960, and *Newnes Radio/TV Engineers Reference Book*, (cost £23), £11.—Brooks, 5 Police Houses, Westburn, Cambuslang, Lanarkshire.

FOR SALE: Minimitter 2-7 Transmitter, new condition, works well, £17, carriage paid.—Box No. 4073, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: K.W. Vanguard, 160-10 metres, factory built, £35. Buyer collects.—G3NGY, 119 Stamford Road, London, S.W.16.

SALE: Hallicrafters power pack, with auto-transformer, outputs 500 volts, 250 volts, 12 volts (twice), relay controlled, £10, carriage extra.—Box No. 4075, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Minimitter MC.8 converter, £8 o.n.o.? Prefer buyer collects. **WANTED:** Bandspeed coils HRO/Mx for 80m. and 20m., good price paid; also details of front end mods. HRO.—Gorrill, 22 Albany Road, Crawley, Sussex. (Tel. Crawley 20499.)

VICEROY Mk. III SSB Transmitter, extra ½-lattice filter, £95. KW-500 Linear Amplifier, £45. National NC-188 Communication Receiver, £30. All as new.—Box No. 4076, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

HALLICRAFTERS SX-28 all-band receiver, in good working order, may need slight trimming adjustment, £15.—Wickham, 22 Western Avenue, Thorpe, Egham, Surrey.

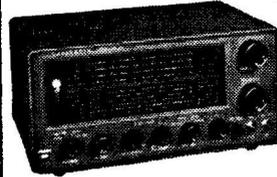
MINIGEN/Petrol Generator, one kilowatt, 240 volt. 50 cycles, 60lbs. weight, nearly new. Ideal for field days or television, £45.—Wickham, 22 Western Avenue, Thorpe, Egham, Surrey.

R.209 with spare RF/mixer/coil unit and spare valves. £10. 160. 80, 40 metre Minimitter whip, as new. £4.—GM3GUJ, 1 Thorfinn Place, Thurso, Caithness.

DRAKE 2B, 2AC, 2-AQ, Top Band, extra xtals, £100. 4X150's with bases, £5.—Box No. 4077, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Eddystone 680/2A, recent maker's overhaul to standard, immaculate with two high grade 8in. speakers, telephones, quantity serviceable valves, aerial equipment, etc. Nearest offer £70.—View: 19 King Street, Canterbury, Kent.

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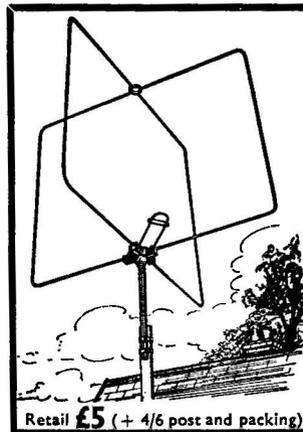
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- 3-BAND "COMBO" Aerial for 10, 15 and 20 m.
- FB.5A. "All" Wave Aerial for 10, 15, 20, 40 and 80 m. (has been used on 160 m.)
- MOBILE WHIP Car Aerials for use at road speeds of 110 m.p.h. and above.

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Size:—14½ x 6" panel. 11½" deep.

SSB-AM-CW — 160-80-(40m.)-20m.

PRICE £75 Carr. paid

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RX80 RECEIVERS. Modified, aligned and set up for S.S.B., A.M., C.W., 160 to 10m. (and Med. Wave), G.C. and B/spectrum. Everyone separately re-developed. Price £53 10s. Carriage paid.

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PYE SOLENT Mk. 11 with D.F.	28	0	0

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FALCON 2 METRE TX. 12 volt type	26	0	0

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HALLICRAFTERS SX111. Amateur bands	120	0	0
EDDYSTONE 870A	34	5	8
EDDYSTONE 840C	62	0	0
EDDYSTONE 940 ...	...	125	0	0
EDDYSTONE EC 10. New transistor receiver Ex stock ...	...	48	0	0
EDDYSTONE EA 12. New Amateur bands receiver, ex stock ...	...	185	0	0
TELREX 4 element w/s beam for 15 metres ...	...	18	0	0

Carriage extra on all the above

£65 allowed on your Eddystone 888A against a new EA 12

Radio Control gear by Grundig, REP, MacGregor, O.S., etc. Models by Keil, Veron, Frog, Graupner, Ripmax, etc.

Wanted—your modern receivers, SSB gear, etc.

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Telephone: 468953

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FOR SALE: Valves, valves, cheap. Send s.a.e. for lists.—P.I.P., 50 High Street, Strichen, Aberdeens.

RARE EKCO 12v. Car Radio, Model CR-61, 8 valve superhet with noise limiter, E-type valves (2/EL42's push-pull output) medium plus 4 separate short wave bands between 15.6 mc and 515 kc, plus 4 pre-set positions, bandsread on 4 short wave bands, all in black crackle with power pack, speaker, full manual/blue prints and trimming tools. Clean and faultless, cost new over £50, bargain, £10. Collect or freight plus 10s.—L. Rigden, 10 Church Square, Leighton Buzzard, Beds.

WANTED: Complete secondhand Morse Course.—Replies to: J. Rolland, 74 Park Grove, Hull, Yorks.

TIGER 200 Tx, £45. Near-new Vibroplex, £5 10s. Potted 250 mA 10 Hy. chokes, 10s. each.—Westleigh, Fore Street, Beer, Devon.

FOR SALE: Olympic T150X CW rig (6 months old), Z-match coupler, £40 o.n.o.? AR88D (rough) £12 10s. Disposing workshop (breaks my heart). Over 200 valves and transistors (current production). Thousands components, meters, transformers, relays, etc. Rx/Tx cases: 20 x 5 x 14in.; 21 x 9 x 15in.; Cases 6 x 6 x 6in., sloping fronts, 3in. Twin Gun 'scope tube. Coax/mains cable, plugs/sockets, AF/RF oscillator. AVO 40. B2 Rx. DC converter 12/250v. The lot £20, or will split, s.a.e. please. Deliver 100 miles.—Box No. 4078, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Space wasted, 210 *Wireless World*, 1943-58, 1963-64, £5. 137 *R.S.G.B. Bulletins*, 1942-53, £3. 164 *Short Wave Magazines*, 1938-39, 1946-59, £4. Plus carriage or offers?—Simkins, G3HYJ, 15 Hillside Road, Thorpe, Norwich, Norfolk. (NOR 48T.)

DX-40U, VFO type VF-1U, Morse key, crystal microphone, and approx. one cwt. of useful radio items, £22. Carriage could be arranged.—G3KYM, 66 South Close, R.A.F. Medmenham, Marlow, Bucks.

FOR SALE: AR88D, mint condition, complete with spare valves, aerial, headphones, service manual, £65 o.n.o.?—Sales, 87 Wickenden Road, Sevenoaks, Kent.

HIGH QUALITY AM tuner unit by Armstrong (model RF-125), five wave-bands, 13 to 2000 metres continuous coverage, RF stage and two IF stages, separate tone control stage, £10 10s. including carriage.—G3MI, The Meades, Germain Street, Chesham, Bucks. (Tel. 3990.)

SALE: RA-1 Receiver with 100 kc calibrator, £35. Professionally built Minimitter all-band converter, £10.—21 Parnell Square, Congleton, Cheshire.

SALE: CR-100, excellent condition, £15 o.n.o.? Buyer collects.—Phone FOO 1608 evenings (Sidcup, Kent).

CR-300 and PSU, £10. GDO 1.6-30 mc, new, £2 10s. Old Batt. Eliminator, 5s. FT-241 crystals, 100 kc, 1 mc, 2 M, 7s. 6d. each. B7G 184 kc, 5s. Trix 10in. 15-ohm speaker in whitewood cabinet, new, £3. Three-section Anglepoise lamp, 15s. SWOP: 45 *Wireless World*, 30 *Practical Wireless*, 40 *Short Wave Magazines* for 15th Edition *Radio Handbook*, or sell. Any offers? 17in. Pye TV, sound OK, picture bad, with circuit, £2 10s. Buyer collects.—66 Manor Avenue, London, S.E.4 (basement).

COLLINS TCS/Rx, £7 10s. and 813, £1.—185 Bisham Road, Blackpool. (G3PTD.)

SMALL ADVERTISEMENTS, READERS—continued

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HALLICRAFTERS SX-28 Rx, 0.55-43 mc, 15 H valves, good condition, handbook; best offer around £30. Prefer buyer collects, or carriage extra. Spare handbook, 15s.—Britton, G2AVW, Stakeford Choppington, Northumbs. (Phone Ashington 2058.)

FOR SALE: Heathkit Mohawk RX-1, amateur bands, switched sidebands, 100 kc calibrator, T-notch filter, product detector, etc. In first-class condition, £90 o.n.o.? Planet U-1 tape deck, with 3 Miniflux heads, £20.—Sloane, 55 Market Street, Omagh, Co. Tyrone, N.I.

WANTED: Case for AR88D Rx.—G3RIM, 20 Rushworth Road, Reigate, Surrey.

TCS-12 Tx/Rx Mains and rotary PSU, £20. Pye 2 or 4 metre mobile, unmodified, £8. Geloso 209, complete front end, 4.7 mc IF out, £8.—D. Dunn, New Street, Louth, Lincs. (Tel. 2327.)

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K.W. Vanguard 160/10m. factory built, as new with LP filter, £40. Buyer collects or carriage extra.—19 Tonge Road, Bournemouth, Hants.

SALE: Brand new HRO, rack mounting, with five amateur band coils and speaker, £20. Monitor 'scope for RTTY, home-made, £5. Marconi Wave-meter with coils, £3. Minimitter converter, amateur and commercial coverage, £14. AP.66863 power pack, £4. Angle rack, £1. Two brand new Command Sets, 3-6 mc and 6-9 mc, converted and ready for use with power pack, £10 or offer? Canadian Marconi No. 9 Receiver with power pack, £5.—B. Davies, 16 Mulhern Road, Holloway, London, N.19.

FOR SALE: One pair of 9-Transistor trans/receivers, complete with leather cases, telescopic aerials, internal batteries, full speaker output, two weeks old, cost £25. Will accept £17.—M. F. Hopkinson, 383 Ainsworth Road, Radcliffe, Manchester.

SALE: TCS-12 Rx, internal power unit, unmodified, good condition, £5. Delivered 40 miles.—G3TKW, 73 Lyndhurst Avenue, Chester-le-Street, Co. Durham.

MILLIAMETER, 2in. flush round m/c, 0.50, 0.100, 0.200 mA, mostly new, 4s. each plus 1s. p/p; two new 813's with bases, £1 each plus 2s. 6d. p/p; four mF 1500v. capacitors, new, 2s. each plus 1s. 6d. p/p. Muirhead S/M drives, logging or plain dial with vernier blocks, new or v.g. condition, 6s. plus 2s. 6d. p/p.—Advertiser, 6 Comberton Road, London, E.5.

840A: requires three valves, trim-up. Best offer before Wednesday. Collect, Essex.—Box No. 4079, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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The Corner House, Manor Road, Tongham,
Farnham, Surrey.

FOR SALE: BC-342N Communications Rx, £15;
and Test Set Type 253, 20-88 mc, £5. Buyer
collects.—Perrin, 91 Swifts Green Road, Stopsley,
Luton, Beds. (Tel. 21870.)

CLASS-D Wavemeter with phones, spares, manual,
box. 6v. AC input, £4 plus postage.—G3TUX, 17
Colburn Avenue, Hatch End, Middx.

FOR QUICK SALE: EA-12, mint condition, £140.
London area.—Box No. 4080, Short Wave Maga-
zine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Manual for AR88LF.—D. Howieson,
188 Trestra Road, Glasgow, N.W.

FOR SALE: Hammarlund HQ-200 Super Pro, 540
kc-20 mc, selectivity variable 16 kc to 100 c.p.s.,
NL, S-meter, PSU. Good condition, £17.—Longhurst,
44 Redstone Park, Redhill, Surrey. (Tel. Redhill
3411.)

SALE: CR-100 Receiver, £14 10s. W.1191A Wave-
meter with mains power pack, £6 10s. Three
Denco IF transformers, 85 kc with BFO coil, 25s.
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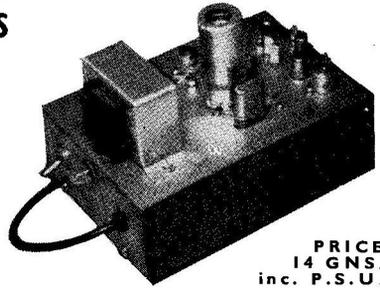
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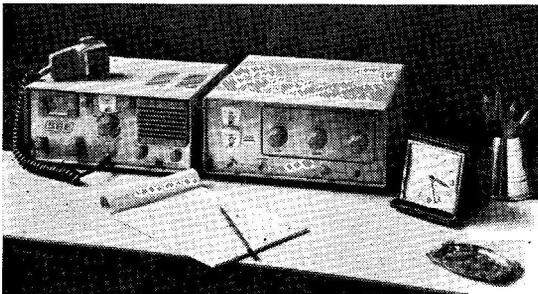
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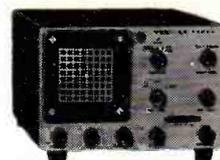
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