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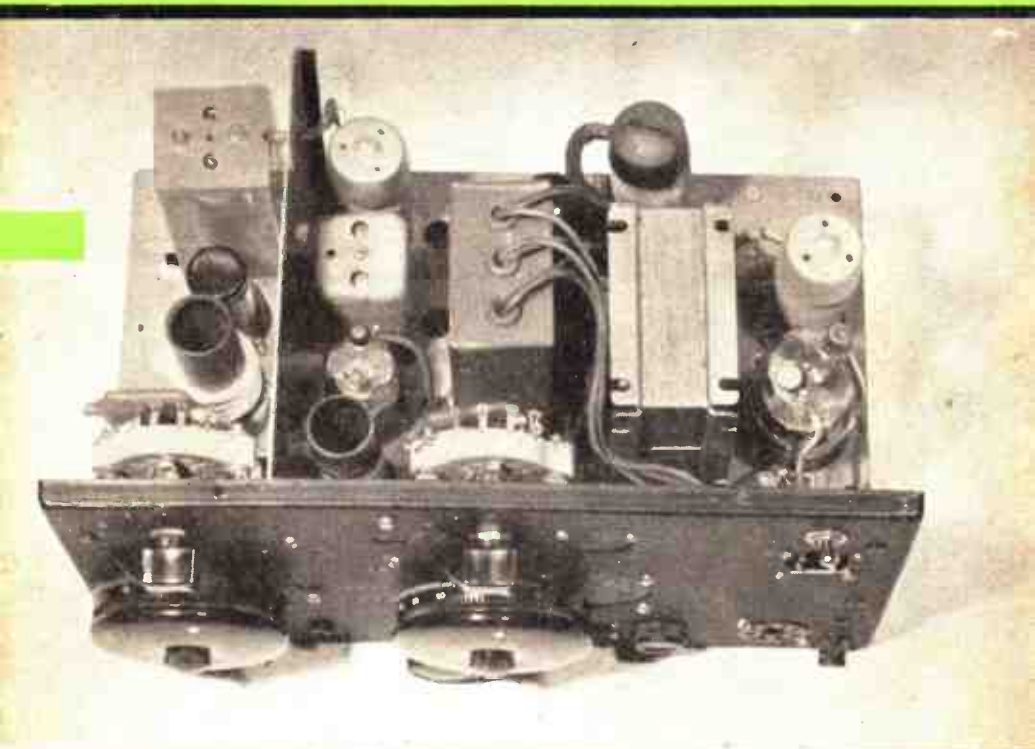
Number 11
NOVEMBER
1953

The RADIO AMATEUR

SPECIAL CONSTRUCTIONAL FEATURES

"The Inconvenient Six"
"The Top Band Special"



ALSO IN THIS ISSUE . . .

Further notes on the ZU-LS Minibeam. An improved R.F. Stage for the HRO. Strictly for the Beginner. World on the Air—Indo-China. Modifications to the B36 Receiver, together with Amateur Bands, SW BC and VHF News, Club News, SW BC Station frequency List, etc. etc.

1/6

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CONTENTS

OUR FRONT COVER

Shows the general view of the "Inconvenient Six," a receiver for coverage from 2000 to 10 metres, described in this issue.

The
RADIO Amateur

Vol. 8. No. 11. Annual Subscription 18/- November 1953

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EDITORIAL

This month, we have to announce a number of forthcoming changes in this journal. Our decision to concentrate on constructional features appears to have met with more approval than disapproval, and generally speaking the change has been heralded with enthusiasm.

As our regular readers will know, we have always been pro-RSGB in our policy in that we feel strongly that a united National Society is essential for the well-being of Amateur Radio in this country. We have not always seen eye to eye with the Society on some details of their policy, but we do not favour any efforts to split the Society or start a competitive organisation.

Your Editor has been repeatedly asked during recent months by numerous groups of amateurs to stand for election to the RSGB Council. As the editor of a commercially-sponsored amateur radio publication, he has felt that such a step would be misrepresented in some quarters and was therefore inadvisable.

However, it seems that with the present changing character of the journal, the moment would be opportune to vacate the editorial chair. Moreover, in its new form *The Radio Amateur* could well be incorporated in its companion journal *The Radio Constructor* to the mutual advantage of both.

We have decided therefore to proceed as follows:

This month's number will be the last to include any topical features; SW BC review, Amateur Bands Commentary and VHF News. The final number of this volume will contain constructional features only.

From January next, *The Radio Amateur* will be incorporated in *The Radio Constructor* under the editorship of my colleague, Bill Overland, G2ATV. This will leave your present editor free to stand for nomination at the current RSGB elections.

We are very pleased to be able to report that our Amateur Bands feature contributor, Stan Herbert, G3ATU, has agreed to take over the *RSGB Bulletin* feature *Month on the Air*. Its present contributor, Arthur Milne, G2MI, has, as most people will know, much on his hands at present as Secretary of Bureau I, IARU, and he has expressed his appreciation at 3ATU's agreement to take over this feature. 3ATU's first contribution in the *Bulletin* will appear in the December number. We do hope all our reporters will continue to support him and so enable him to continue to produce a feature as meritorious as that he has contributed in our pages.

To our Transmitting, VHF, and SW BC readers, we would say that constructional features to interest them will continue to appear in *The Radio Constructor*, so we feel there is no need for us to say goodbye to them. We hope that those who are not already readers of *The Radio Constructor* will transfer their *Radio Amateur* affections to that journal, and continue to be " our readers." A.C.G.

Component Review. Manufacturers, publishers, etc., are invited to submit samples or information of new products for review in the section.

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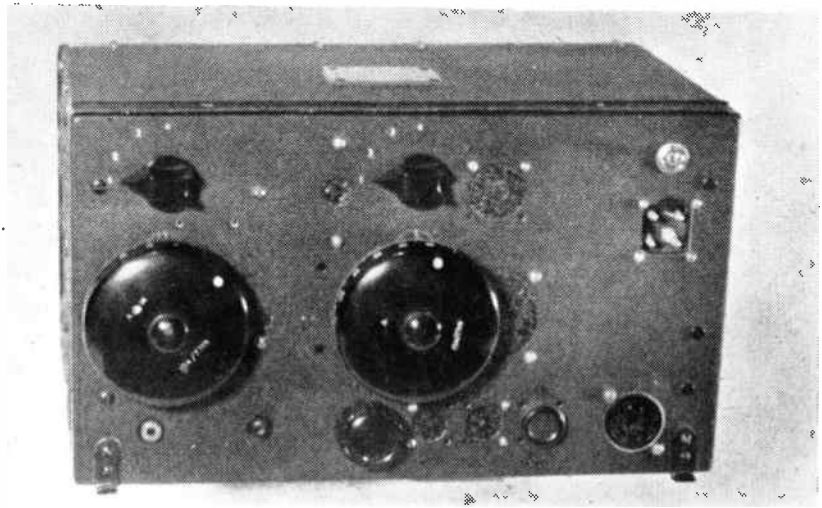
The "Inconvenient Six"

—: by :—
R. W. HILL

A Receiver for 2000 to 10 metres



No, this is not, as the title might suggest, a new football pool to bring fresh hope to the eager punter, but a design for an all-wave superhet giving continuous coverage from 2000 to 10 meters. Now these days everything has to be bigger and better than it used to be, and the all-wave set is no exception to the rule, it always comes in a communication receiver specification with a BFO, double frequency changer and all the frills, together with a highly complicated switched tuning arrangement which usually defies the amateur's efforts to reproduce, even if he buys ready made coils and possesses the necessary equipment to line it up; and as for making the coils . . . well, this is where he gives up and goes out to buy an 1155. Now for the non-ham, who's chief desire is entertainment and not the extrication of a difficult station from the mush then a less ambitious and cheaper specification would satisfy his requirements.

Disadvantages

The present design came about because a simple all-wave tuner was needed to calibrate and try out a new signal generator. But, I thought, while I am making a set of coils I may as well make a receiver with them, and while I am making a set it might as well be that superhet that I was going to make sometime anyway . . . and so the thing grew and grew, until it turned into this unwieldy monster. I say unwieldy because it was designed for low cost and inconvenience is the price that has to be paid for same. It should be perfectly possible (although I wouldn't like to attempt it) to design a communication receiver that could be reproduced by the amateur, but the coil unit would have to be mainly factory made to specification, there would be similar tight tolerances on related components and a signal generater would most certainly be needed to line it up. Now the present arrangement is simple and has no pretensions to communications standards, there is no RF stage and plug-in coils are used, which have to be changed for each band, there is no large dial with all the frequencies marked, but instead there is separate aerial and oscillator tuning, so that you have to twiddle two knobs at once to find any station—inconvenience indeed. This should discourage most of the prospective customers; diehards and the penurious please read on for the good points.

Advantages

With a high gain IF stage the sensitivity is very good, the choice of components is reasonably free, so that the cheapest can be found, and the layout fairly flexible. The coils are cheaply made, and being plug-in can be easily adjusted, a great advantage over a coil pack as any adjustment there usually requires an autopsy on a carefully wired set. Not the least advantage is that a signal generator is not required,

the IFs can be peaked on any convenient signal and the separate aerial and oscillator tuning ensures that any frequency can be lined up with the utmost accuracy. An attempt is made to adjust the coils and pad where necessary so that the two-dial readings are the same; no high degree of accuracy is needed, only enough to be able to spin the two dials together when tuning; the final adjustment of the aerial tuning is made when the signal is found. It is sometimes an advantage to be able to detune the aerial circuit to avoid interference.

Design

A glance at the circuit diagram, Fig. 1 will immediately invoke the remark that there are too many valves doing too little work, but a study of the advertisements will show that the more conventional superhet valve types are in popular demand and the supply apparently being short, the prices have risen in proportion. The valves shown here are deliberately chosen for low cost and the fact that some may have accumulated from stripped gear. If available, the more usual triode-hexode, DD-triode and output pentode would serve the same purpose.

The SP61 used as an output valve gives about 1 watt, which is ample for most purposes, in fact the volume will surprise many a confirmed 6V6 user; the load required is about 20000 ohms. Another SP61 for an AF amplifier gives far too much gain, but a large amount of negative feedback—some 30 db or so—cuts this down to more manageable proportions, and incidentally gives very good quality. A CV6 would be more suitable but the SP61 was easier to screen—a very important point in this case, for owing to restricted space it had landed up right next to the mains transformer. An EF50 would be even better as regards screening. The gain available will lift any worth-while signal up to full output if the background noise permits. The 6H6 or EB34 provides rectification and non-delayed AVC.

The liveliness of the set is mostly due to the high gain intermediate frequency stage and adequate screening should be provided, as otherwise the full gain will not be achieved; if this stage proves a little unruly—don't forget that it is working full out all the time—the gain can be reduced by dropping the voltage on G2. This can most easily be done by shunting G2 to earth with a 100 k ohm resistor, or less, thus making a potential divider across the HT.

The CV6, otherwise known as the 7193 or E1148, has equivalent characteristics to the 6J5 and can be obtained at a ridiculously low price, the only snag being that the anode and grid come out to top caps. This valve naturally gave rise to the idea of a separate oscillator to the frequency changer, particularly as this arrangement has the reputation of giving better stability and high frequency working. The original idea was to use an SP61 as a mixer, but this was rejected on the grounds that the arrangement would be too precise to set up simply, so the expense of a 6SA7 in this place was justified on the score that it is very suitable for working with a separate oscillator, has a fairly high conversion conductance, and provides a very useful measure of AVC with the minimum frequency shift.

Power Supply

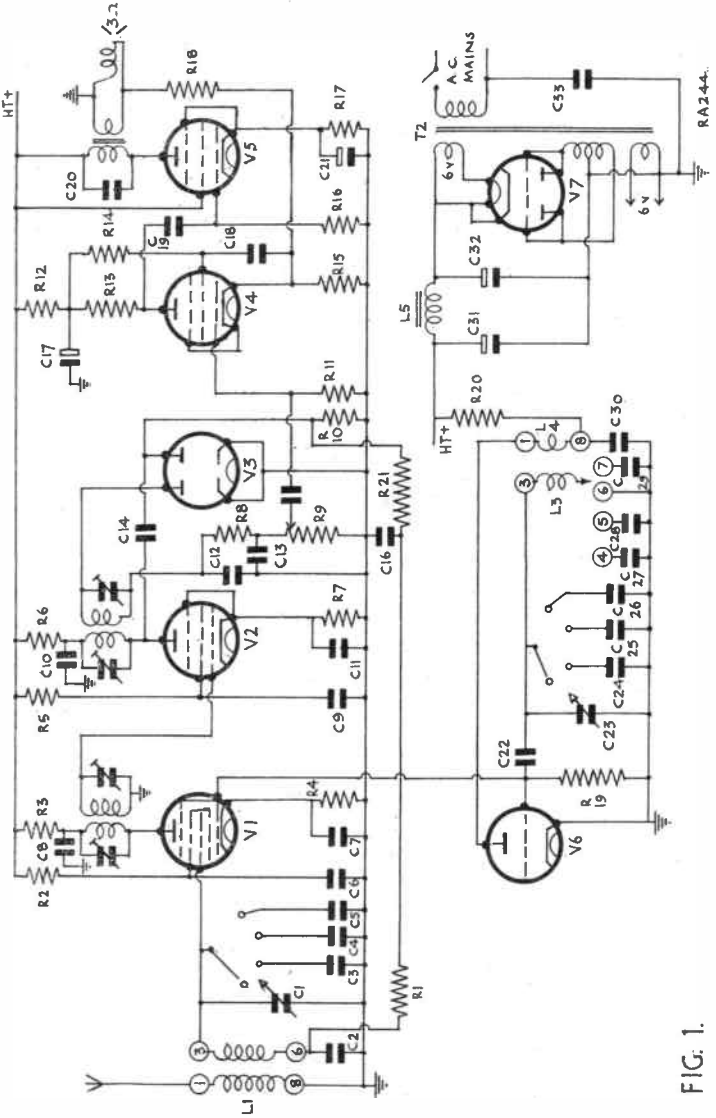
The power pack uses an RK34 as described in *The Radio Constructor* for December. A transformer coupled HT supply should be regarded as an essential safety precaution when one considers delving inside the set to change coils.

Tuning System

The size of variable capacitor is the first consideration.

A standard 500 pf would give the most coverage with the least number of coils, but would prove much too critical to use at the higher frequencies unless a very good slow motion drive were used, so some form of bandspread must be arranged. There are many methods, of course, and one of the most popular is the small variable in parallel with the main tuning capacitor, the latter being used as a band set for the short-wave bands; the band setting naturally has to be very accurate if the bandspread readings are to remain constant. The tapped coil with the bandspread capacitor across the tapping is another method, but this leads to more complication with the coil construction. The eventual choice was a 100 pf variable. This, in conjunction with a Muirhead slow motion dial gives ease of tuning on the three high frequency bands. On the three lower frequency bands this capacitor is supplemented by switched steps of 100, 200 and 300 pf in the form of high stability fixed silver mica capacitors, giving a maximum of 400 pf in all. Thus, these bands are covered in four sweeps of the dials, which all sounds very complicated, but the ease of tuning makes it worth while, for once having made a note of a station's position you can drop back on it with certainty. The number of bands is not unduly large, but at the same time the LC ratio is good, thus keeping the circuit impedance high and minimising noise.

The switches should be of ceramic for low loss and the variable capacitors should have similar insulation for the best results. Some latitude in the choice of these is permissible and even the capacitance need not be exactly 100 pf, the only stipulation is that it should be at least the value of the first fixed step of the switched capacitors, so that the coverage is continuous. The ones I used were about 120 pf and cost 1s. 6d. each, the actual value


HT+
A.C. MAINS
T2
RA244
V1
V2
V3
V4
V5
V6
V7
L1
L2
L3
L4
L5
C1
C2
C3
C4
C5
C6
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R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
6 V
6 V

FIG. 1.

Components for Fig. 1

C1, C23 100 pf variable.	R1 100 k ohm
C2 .005 μF	R2 15 k ohm
C3, C24 100 pf) Silver Mica,	R3 2.2 k ohm
C4, C25 200 pf } 5 per cent tolerance	R4 180 ohm
C5, C26 300 pf) or less	R5 56 k ohm
C6, C7, C8, C9, C10, C11 .1 μF	R6 2.2 k ohm
C12, C13, C14 100 pF	R7 470 ohm
C15 .01μF	R8 100 k ohm
C16 .1 μF	R9 500 k ohm Pot
C17 4 μF	R10 2 M ohm
C18 .1μF	R11 1 M ohm
C19 .002 μF	R12 47 k ohm
C20 .002 μF	R13 100 k ohm
C21 25 μF, 12 volt	R14 330 k ohm
C22 50 pf	R15 1 k ohm
C27 175 pf, Range 1 Padder Silver Mica	R16 1 M ohm
C28 340 pf, " 2 " " "	R17 180 ohm
C29 .001, " 3 " " "	R18 10 k ohm
C30 .1μF	R19 22 k ohm
C31 24 μF	R20 25 k ohm, 2 watt
C32 8 μF	R21 1 M ohm
C33 .01 μF	All resistors ½ watt,
L5 1 OH, 50 mA	except where specified
T1 Midget OPT 80:1	
T2 Mains Transformer giving 6.V, 6.V, 250-0-250, 50 mA	
V1 6SA7	
V2 SP61 or EF50	
V3 6H6 or EB34	
V4, V5 SP61 or EF50	
V6 CV6	
V7 RK34	

was not known, as is the case with many of these surplus items; the extra capacitance merely provides an overlap on to the next band. Incidentally, this overlap, or that provided by the first switched step can be very useful if one of the high frequency coils does not quite reach over the band and some extra capacitance is needed.

The other Muirhead dial is not really necessary as the aerial tuning is broad, but it matches up and is nice to handle.

Band Coverage

Before designing the coils some estimation must be made of the stray capacities in order to ascertain the frequency coverage of the tuning arrangements. These strays vary, of course, but to take an average approximation let us call the stray due to the self-capacitance of the coil 5 pf, the switch 3 pf, the input capacitance of the valve 9 pf, the wiring 2 pf and the transferred capacitance from the aerial 4 pf, making 23 pf in all. If the variable has a range of 8 to 100 pf, then the total swing will be 31 to 123 pf. This gives a frequency range of

$$\frac{123}{31}$$

which is 2:1. On the lower frequency ranges 10 pf can be added to allow for the larger coils, making the total strays 33 pf. The variable is now 8 to 400 pf, making the total swing 41 to 433 pf, which gives a frequency range of about 3.2:1.

We can now allot the coverages to the various bands and calculation or reference to charts will give the inductance of the aerial coils necessary. These figures are given in Table 1.

Oscillator Coils

Information given on coil construction is not very helpful on the subject of oscillator coils and says that such things are difficult to calculate and individual adjustment is always necessary. Now this is quite true, but I thought that I would have a shot at trying to calculate these coils if only for the fact that it would give some starting point for the adjustment which was to come. The necessary formulae are given in Langford-Smith's *Radio Designers Handbook*, and they are certainly a bit of a bore to work out, but considering that the aim was not exact tracking, but convenience in tuning only—even omitting trimmers for simplicity—then the results were surprisingly useful, in fact the inductance and padder values for Range 2 came out just right. The calculated results are not given here,

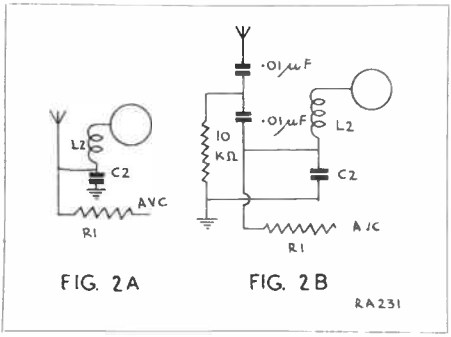


FIG. 2A FIG. 2B

RA231

because the coil winding data serves a more useful purpose.

Coil Design

These estimations and calculations are all very high falutin', but how to convert these into practical coils is the question. The Wireless World Radio Data Charts solved this difficulty and gave practical inductors of surprising accuracy, even with the variety of wire diameter and spacing employed. By way of encouragement may be mentioned the fact that the aerial coils came right and gave continuous coverage at the first go, the only error being on Range 6, where an adjustment of one turn to be made.

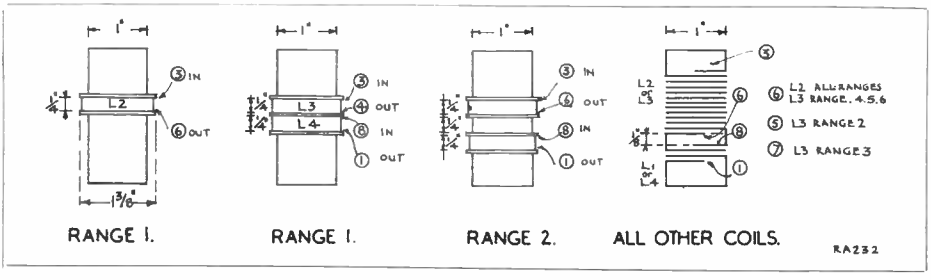
The oscillator coils are more difficult to get right first time, as explained above, and some adjustment will invariably be necessary. This will be complicated by the fact that there are two oscillator frequencies, one above and one below every incoming signal. This can be very useful when you are showing off the set to a friend, you just spin the oscillator dial round more quickly than the aerial and there seem to be twice as many signals on the band—most impressive! In practice the higher frequency is used, as is the normal custom and adjustment is best carried out by starting off with a full value of inductance (it is easier to strip turns off than put them on) and the recommended padder, this will give oscillator readings which are lower (less capacitance) than the aerial readings. Stripping off turns gradually will increase the readings; do this until the high frequency end lines up with the aerial reading. If the low frequency reading is then too high, it can be brought down by increasing the value of the padder, with but little effect on the high frequency end. A little of this matching will soon give rise to a healthy respect for the manufacturers of matched coils and make you wonder how a superhet ever does line up anyway.

In the absence of a signal generator the coverage of each band can only be checked by known signals. As signals take some time to identify in this way, it is sometimes easier to ensure continuous coverage first and check the actual frequencies later. This can be done by finding a signal at the end of one band and then changing the aerial coil only to the next range, leaving the oscillator fixed, and trying to find the same signal at the other end of the aerial tuning dial, at the same time watching that the image is not being received. It is fairly easy to ensure coverage on the aerial coils in this way, and the oscillator coils can then be tailored to fit.

The highest frequency is only 30 Mcs as compared with the estimate 32, this is due to the stray capacitance being higher than estimated, owing to bad arrangement and long leads in the oscillator section. The aerial tuning is similarly restricted, as the use of a tightly-coupled primary winding on this band to increase signal strength introduces a certain amount of damping. On the other ranges the primary is kept as small as possible in order to increase selectivitv. L4 is designed to supply, as near as possible, the optimum oscillator voltage to the mixer; this is best measured by inserting a 0-1 mA meter in the earthy end of R19 and reading the current, a value of 22 k ohms requires a current of 0.5 mA for a 6SA7.

Winding Data

This is given in Table 2. In the interests of



RANGE 1. RANGE 1. RANGE 2. ALL OTHER COILS.

RA232

economy the coils are made from ordinary 1-in. paxolin tubing on octal bases salvaged from old valves. In view of the number of bases required the local dealer will probably have to be approached for some of this throwouts, and if he raises objections to this non-profit-making line, then it would be appreciated if the writer's name were not mentioned, because he has worried the life out of his local dealer already, and it might be the same one !

All windings are made as near the base as possible and long ends led out inside; these are then threaded through the relative pins and soldered at the tips, a 6BA bolt right through base and coil form will then hold the two together quite firmly. A length of 3½ in. for each former will give ample room for all windings and leave enough space at the top for handling. The numbers on the circuit diagram and the coils refer to the base pin connections used; the numbering as given on the Denco plug-in coils is adopted, the padders are then kept under the chassis and not on the coils.

No primary winding is given to go with L2 on Range 1, as the results were far better using shunt capacitance aerial coupling as shown in Fig. 2a. There is a likelihood of hum modulation of the signal with this method, but in most cases the use of an earth will prevent this. The correct cure is to shunt C2 with a low-value resistor—about 500 ohms—but this would short out the AVC. If trouble should be experienced the circuit of Fig. 2b will effect a cure while maintaining AVC, the extra components can be accommodated in the coil former. In the case of Fig. 2a all that is needed is a connection from pin 1 to pin 6 on the coil, thus effecting the change of aerial coupling without in any way disturbing the set wiring.

Layout

The layout will possibly depend on what chassis and case is available. The photographs show the receiver fitted in an AN/APA-1 case, the aerial tuning dial is to the left with the switch above it, and the aerial and earth sockets underneath, the oscillator tuning has the switch over and the gain control below; the power and speaker sockets are on the right. For ease of construction full use was made of all the available valve socket positions, which never gives quite the best layout, and this could well be improved. The screen across the chassis is mainly to prevent coupling between oscillator and mixer, but the most important thing to watch is the screening of the IF stage, the rest should follow normal receiver practice. It can be argued that if this arrangement works, with long leads running up to the top caps of the oscillator and across the chassis, and with the tuning system spread all over the front panel, unscreened coils and other defects, then success should be practically assured with any better layout.

For safety's sake the rectifier must be kept well away from any coil changing operations as the top caps are "hot," the high voltage warning label which was on top of the case is quite appropriate here.

The valve holders in the signal frequency circuits are of ceramic for low loss, but the limiting factor here is probably the coil form material, as the performance definitely falls off at the highest frequency. Even so, a comparison of the Range 6 aerial with a commercial all polystyrene coil showed that it compared reasonably well.

As mentioned before, any connection between this and a communication receiver, brought about by the similarity in the frequency range, is purely accidental; the second channel interference caused by the lack of preselection would by itself be enough to condemn it out of hand. However, the design is dedicated mainly to the penurious, and if they have penetrated this far it is felt that the performance, and the interest given by the all-wave coverage is well worth the slight expense, and it is hoped that the design details given will encourage those who have not previously ventured on this line of construction.

TABLE 1

	Coverage	*Capacitance*	*Inductance*
Range 1	150 — 450 kcs	41 — 433 pf	2600 μH
Range 2	450 — 1350 kcs	,,	290 μH
Range 3	1.3 — 4.0 Mcs	,,	40 μH
Range 4	4.0 — 8.0 Mcs	31 — 123 pf	12.5 μH
Range 5	8.0 — 16 Mcs	,,	3.1 μH
Range 6	16 — 32 Mcs	,,	18 μH

TABLE 2

	L1	L2	L3	L4
Range 1 ..	—	270 turns 36 SWG, DSC	115 turns 36 DSC	20 turns 36 DSC
Range 2 ..	20 turns 36 DSC	85 turns 36 DSC	100 turns 36 DSC	30 turns 36 DSC
Range 3 ..	12 turns 24 SWG enamel	52 turns 24 SWG enamel	43 turns 22 SWG enamel	21 turns 24 SWG enamel
Range 4 ..	5 turns 24 SWG enamel	24 turns 22 SWG enamel	17 turns 22 SWG enamel	8 turns 24 SWG enamel
Range 5 ..	5 turns 22 SWG enamel	12½ turns 18 SWG enamel	9 turns 18 SWG enamel	5 turns 22 SWG enamel
Range 6 ..	4 turns 36 DSC	6 turns 18 SWG enamel	4 turns 18 SWG enamel	3 turns 22 SWG enamel

The larger inductors on Ranges 1 and 2 are scramble wound between cardboard or paxolin cheeks as shown, the rest are close wound, with the exception of L2 and L3 of Ranges 5 and 6, which are spaced to 1 in. length. L1 Range 6, is interwound at the lower end of L2.

FURTHER NOTES on the ZU-LS MINIBEAM

During the last two years the writer has used several types of aerial on 14 Mcs ranging from 132 ft. long wires to Windoms, and tilted folded dipoles. Whilst these aerials have all brought in their share of DX, complete coverage has not been obtained and it was felt that the only answer lay in a beam. Unfortunately, the conventional beam array for 14 Mcs is mechanically unwieldy, but, when the article by G4LS, describing the Minibeam appeared in the August issue, construction was immediately put in hand.

The 2 in. × ¾ in. battening obtained for the frame was found to be considerably distorted—a not uncommon fault with timber nowadays—the frame was therefore clamped to shape and fixed by a generous supply of 1½ in. *brass* woodscrews. Small crosspieces at the corners help to keep the frame rigid and the whole of the woodwork was given a liberal application of creosote. The tubular feeder and the 14-gauge wire were then fixed to the frame in the manner described by G4LS, except that the tubular feeder was held in position by string passed through holes drilled in the wooden frame.

It was desired to make the aerial rotatable in conjunction with a tubular wood mast already in the writer's possession, and therefore a hardwood centre plate was fixed to the underside of the frame and to this was screwed a galvanised flange for ¾ in. conduit. Thus, a suitable length of ¾ in. conduit can be used as a means of rotating the array.

The feeder in hand was of the balanced screened type of 72 ohms impedance, and this was attached to the aerial as described by 4LS, led to the centre of the mast, along a channel in the centre plate and out through the flange preparatory to insertion in the drive rod. Two spacers were fitted on to the stubs and the end of the tubular feeder closed with Bostik Sealing compound.

In order to allow the trimming of the stub, the Minibeam could not be put up above about 20 ft. therefore two sections only of the tubular mast were used. A plate and ball bearing were placed on the top section, the centre rod and aerial frame slid into the mast and the whole affair hoisted up.

After repairing the damage to the lawn, we were in a position to commence the trimming

of the stub as set out in the original article. In the writer's case about 14 in. was taken off each leg of the 14-gauge wire before the field strength meter, placed on the sill of an upper-floor window about 25 ft. away, began to show appreciably increased readings. The cutting proceeded according to plan and eventually an optimum point was reached when about 22 in. had been taken off each leg. During the trimming operation the transmitter was rediating on 14100 kcs and a careful check with the FS meter showed the optimum frequency to be in the region of 14130 kcs. The falling off in signal strength on either side of this optimum point was gradual and was thought to be sufficient to provide a reasonable compromise for Phone and CW working. Part of the cutting was carried out in conjunction with G5WG, about five miles away, who provided S meter confirmation of the FS meter readings.

When rotating the array it was found that the signal fell off quite rapidly as the front of the beam, i.e. the stub side, was turned away, giving a very low signal from the sides with a somewhat stronger signal from the back.

A practical check was furnished by OE1BU who reported S9 with the beam towards his station and S6 when rotated through 180 degrees. This took place on a Sunday morning with conditions only fair and amidst considerable QRM. The signal from a tilted folded dipole was reported at S7 with much more QSB than was experienced when the Minibeam was used.

It should be mentioned that the RF ammeter readings became lower and lower as the FS meter readings increased, and when the optimum point was reached the meters in each leg of the feeder registered 400 Ma for an input of 60 watts. At this station the RF ammeters are placed in the screened aerial couplet which is connected by coax via a low pass filter to the output of push-pull 807s. This phenomenon of decreasing RF readings was also reported by G3H1X when adjusting his Minibeam, and is almost certainly linked up with the actual position of the meter in the feeders.

When used for reception the directional properties of the aerial were evident, and when the line of bearing was transferred from the front to one side, the signal generally dropped by three or four S points. Thus the SWL, in addition to the transmitting ham, would gain considerable advantage from using a properly adjusted aerial of this type.

It was noted that during wet weather the RF ammeters showed increased current to a maximum of approximately 600 mA, and the FS meter readings slightly decreased. This effect is presumably due to rain lying on the wooden frame, and it is proposed to turn the aerial upside down so that the tubular feeder is below the frame and the water may thus run off. Alternatively, stand off insulators could be used to hold the wire away from the wood.

It is hoped that the experiences here related will prompt others to try their hand with a Minibeam, and out thanks go to G4LS for bringing the original details to print. The writer would like to acknowledge the helpful co-operation received from G2WG, OE1BU, G3HIX and G3HIW.

An Improved R.F. Stage for the HRO

by :—E. H. TROWELL, G2HKU

In a recent article the author described various improvements which he had made to his HRO receiver. Among these were a new audio stage and increased headphone output. At the opposite end however, the RF stages were not considered to be all that one could desire. The signal to noise ration was poor and on 14 Mcs the RF gain control was fully open to receive weak signals.

The transconductance of the 6D6 first RF valve is 2000 μmhos and to obtain a higher signal to noise ratio, it is of course necessary to use a valve having higher transconductance. However, the higher the transconductance, the greater is the risk of instability, due to the grid-plate capacitance of the standard HF pentodes available, being rather high.

The 6BA6, which is a remote cutoff pentode, is an exception to the general type just referred to and although it has a low value of grid plate capacitance it also has a high transconductance and furthermore, it is available

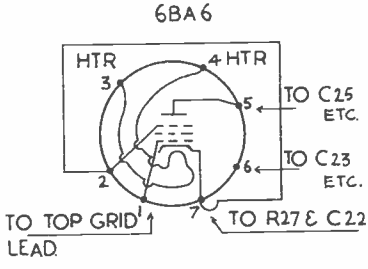


FIG.1. RA230

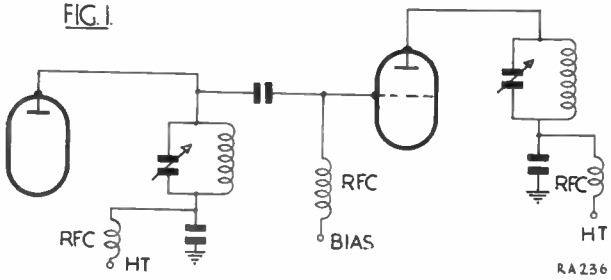
(*Continued on page 428*)

STRICTLY FOR THE BEGINNER

PART 10. by O. J. RUSSELL, B.Sc., A.Inst.P., G3BHJ

THE P.A. STAGE—II

FIG. 1.



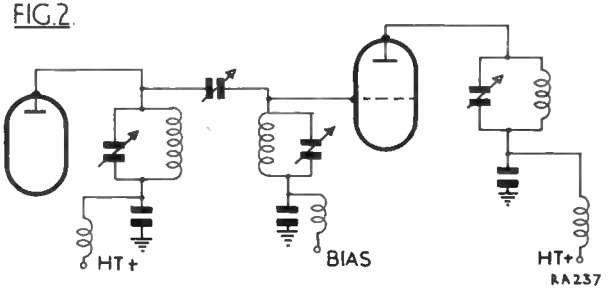
Simple capacity coupling of driver to a PA stage.

Grid driving power may be coupled to the PA grid in an almost endless number of ways. However, a selection of some of the more orthodox methods may be considered. For example Fig. 1 shows the simple capacity coupling system quite often employed. This is capable of good results, and has the merit of being simple. However, as only one tuned circuit is in use, harmonic discrimination is not so high as might be desirable. Accordingly, it is possible to use capacity coupling between TWO tuned circuits, as indicated in Fig. 2. Here however, it will be found that quite a low value of coupling capacity is desirable, say some 20 to 50 pfs according to operating frequency, so the coupling condenser may very well be a small variable of say 100 pf maximum. A variable coupling capacitor has the advantage of serving as a drive control, so that the optimum PA drive conditions may be easily found. It is to be noted that the simpler circuit of Fig. 1 has some popularity, as in a band switched exciter it only requires a single wafer and a single pole switch to allow for band switching.

It should be noted that the use of separate tuned circuits for the driver tank and the PA grid enables both of these to be separately designed for optimum performance. Thus, the driver anode tank circuit can be made with its LC ratio chosen to suit the driver anode conditions, and the PA grid circuit can be designed to match the PA grid impedance under Class C conditions. A further development in this direction is the use of Pi coupling networks between the driver anode and the PA grid, as illustrated in Fig. 3. This conveniently allows of matching the driver anode to the load presented by the PA grid, although it is not so helpful in supressing TVI harmonics as is the more popular PA anode Pi network arrangement, which will be considered later.

The previous circuits have all been for single-ended stages, but can be adapted for driving push-pull PA stages from a single ended drive stage. This is shown in Fig. 4, where the circuit of Fig. 1 is adapted to drive push-pull grids. Similarly Fig. 5 is the push-pull adaption of Fig. 2. In both the push-pull circuits, a balancing or padding capacity must be added to the

FIG. 2.



Capacity coupling with a tuned grid circuit.

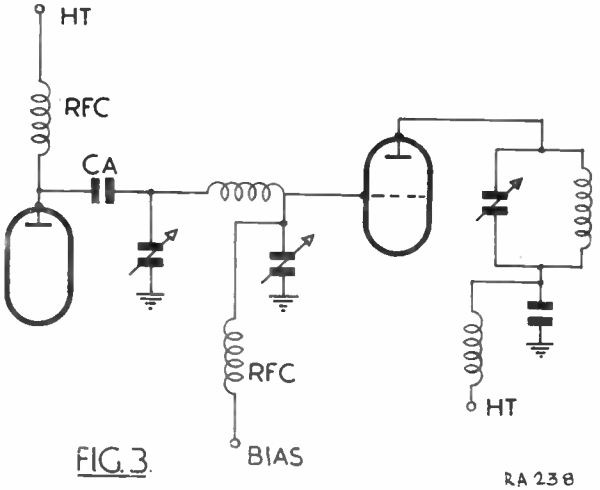


FIG. 3.

A Pi-network used as a coupling between driver and PA.

CA is a blocking condenser to keep HT voltage off the Pi-network. A value of .01 (mica) is suitable.

unattached grid side. This is beacuse the grid attached to the coupling capacitor side of the circuit is loaded by the anode capacitance of the driver valve. Contrary to intuition, it is the unattached side which will actually receive the greatest RF drive in this condition. The addition of a small trimming capacitor to the unattached grid side and to earth, will enable the capacities on each side of the push-pull grid circuit to be accurately matched, so that each grid is driven symmetrically. This may be checked by using separate grid leaks for the PA grids, and measuring the individual grid currents of each valve. Similarly, balance can be checked also by measuring the individual screen currents of both valves. Needless to say, a push-pull stage should consist of two valves of the same type and preferably of the same manufacturer if good balance is to be achieved. Under the usual conditions, it will be found

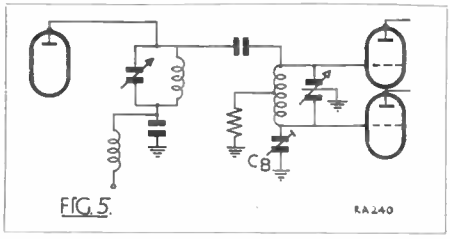


FIG. 5.

that the balancing capacity is around 25 pf, and the concentric Phillips trimmers of 30 pf maximum capacity are very useful in this application. Once set, it will be found that the balance is maintained over several bands, and should not require resetting. If balance does not hold over several bands, it is as well to examine the RF layout, as this is an indication of large stray capacities present.

A further form of the two tuned circuits idea is the inductively coupled tuned circuit arrange-

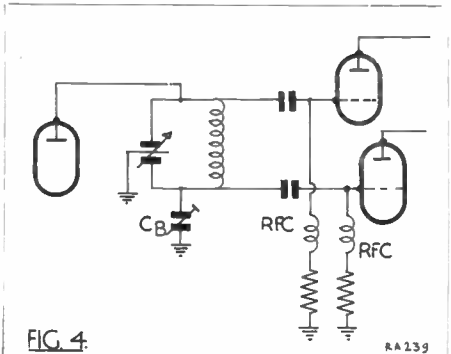


FIG. 4.

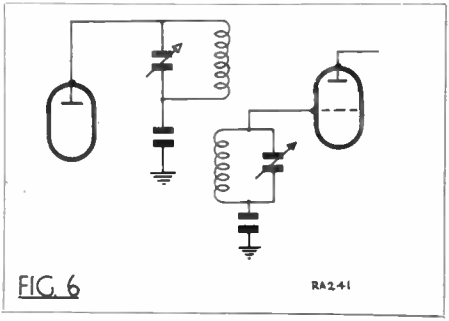


FIG. 6

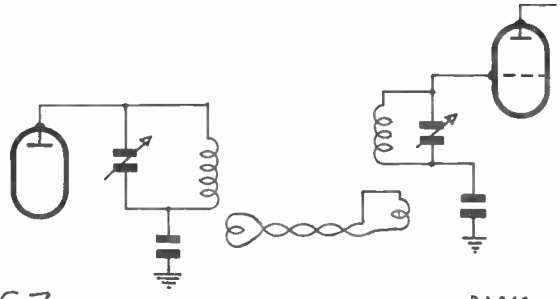


FIG. 7.

RA242

Link coupling between single ended driver and single ended PA stage. Link coils are always placed at the cold RF part of the tuned circuits.

The link coils may be joined by twisted flex or preferably by coaxial cable.

ment of Fig. 6. Generally, however, this arrangement is now confined to VHF, and to broad-band coupling arrangements. While broad-band couplers are a coupled circuit arrangement of the same basic form as Fig. 6, the broad-band coupler uses much tighter coupling than normal. However, the design of broadband couplers is not suitable for discussion at the moment, and in any case complete broad-band coupled units are commercially available.

The classic form of interstage coupling, is the link coupling system of Figs. 7 and 8, which illustrate the method of coupling to single ended and push-pull grids respectively. As a properly constructed link coupling system has good discrimination against harmonics, and also as it is possible to " pipe " the RF some distance, it is a flexible system of considerable value. The only snag is that in band switched systems it is necessary to switch the link coils as well. Preferably the link coils should be connected by coaxial cable with the outer shield earthed, although twisted flex leads are quite satisfactory as far as efficiency of transfer goes, at any rate for short runs of cable. However, the use of coax is well worth while, particularly as by its use, a TVI-proofed VFO-exciter unit in an enclosed box can be link coupled to a separate high power enclosed final stage. With a coaxial link, no radiation should be detected from the cable. The facility with which RF may be piped around in non-radiating coaxial cable is very convenient, as a high power final can be kept as an independent unit, and modifications made thereon. Similarly, of course, a final operating as a unit can be used to test various exciter driver designs. In either case, extensive modifications need not cause interruption of transmitting—it is of course noteworthy that rare DX is abundant when the rig is being rebuilt—and individual units are ideal for servicing. While it is true that TVI and other considerations have made the modern all-in-one table-topper justly popular, it is also true that with such designs, modification is much more difficult—short of a complete rebuild. It is perhaps true to say that individual unit construction is more straightforward, and the beginner would be very well advised to cut his teeth on each item of the Tx individually. Armed with the bitter experience thus obtained, the not inconsiderable task of designing a complete " table-topper " can be undertaken.

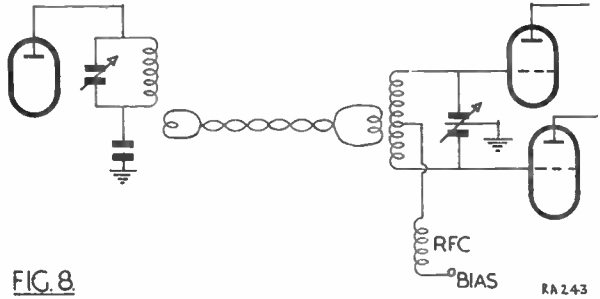


FIG. 8.

RA243

Link coupling a single ended driver to push-pull grids. The cold RF part of the push-pull coil is in the centre, so the link coil is coupled to the centre of the coil.

Amateur Bands Commentary

STAN. HERBERT G3ATU

Rather sadly, we embark on what is the last monthly "Commentary" for *The Radio Amateur*.

The task of compiling the "A.B.C." has been an enjoyable one, and we would like to record our sincere thanks to all of you who have helped keep it rolling along by sending in your reports so regularly.

However, with the ending of this "Commentary" we have been asked by A. O. Milne, G2MI, to take over the *RSGB Bulletin* in feature "The Month On The Air." Arthur has written "M.O.T.A." since June, 1939, and feels that he would now like to pass it on. We have accepted the invitation gladly and will make a start in the December issue of the *Bulletin*. We hope that the many friends we have made through these pages will continue to send their notes and comments along and we shall be happy to welcome them all to the pages of "M.O.T.A."

Twenty Metres

Without further ado, on with the month's happenings.

VK and ZL at breakfast, VR4 and FK8 for lunch, KH6 and W7 at tea-time—things have been looking up in a big way during the past month. (Did we hear someone saying "And about time, too?") At any rate, 20 has been more like its old self and must have staggered people who didn't hear it in 1946-48.

K. B. Ranger (Strood) dashed off a report last month, prior to his National Service call-up. He missed the deadline, unfortunately, but writes from R.A.F. Hednesford, where he has the bad luck to be in sick bay for the time being.

Just before call-up, Keith snagged HH2LR for a new one and managed also CR4AP, ST2NW on Phone and AP2K, KR6GU, LU3ZS (Deception Island), VP3VN, VQ3AU, ZD2JOB on CW.

Keith hopes to be out of "dock" soon and we hope this happy state of affairs has now come about.

I. G. Winter (R.A.F. Kinloss) was also just too late to catch the date last month, but makes up for it with a prompt report this time.

Ian uses an 1155A and is sticking to Phone for the moment. Despite "Exercise Mariner" he logged 24 new countries and five new zones, giving him a total of 29Z—85C since July, 1953.

His best were TG9RV, ZS3P, HP3JK, KL7, I5RM, KA8SC, KG6AEX, HI6EC, 4S7ER, ZC4MH, MD5, MP4ABW and CR7AZ, with EA9FC (Ifni) and PK5DJ (2043) as two beauts, if genuine.

Of particular interest to county-chasers is the news that Kinloss has a Radio Club. A transmitter is being built and until a club call-sign is allotted, they will use GM3HLU—'3HLU being one of the club members.

C. R. Johns (ex-Bournemouth), writes from R.A.F. Sandwich, so C.R.J. is yet another of "The Boys"!

A recent experience with the BC receiver in the canteen (A 5 valve job used all day by all and sundry) produced amazing results. Between 2200/2330, this ancient job, with 9 ft. of wire round the picture-rail, pulled in CM9AA, CO2GI, HK, HI, HR1AA, KP4's, KZ5, PJ2AA and VP5AR, VO6 and WØ. As a result, C.R.J. is having his 0-V-0 sent along, so we expect some juicy DX reports soon!

A. P. Allchin (Clacton-on-Sea) heard more new ones last month than enough. CR5SP, CR7CF, HK4DT, MP4ABW, OA4BC, VP1ZZ, KS4 and ZS8RV make the 20 Phone score 32Z—121C this year.

YI9AA (2050) is queried. DI9AA (of whom, more later, could fill the bill).

R. Nixon (Stockport) reports a very good month, on both 15 and 20, which latter band produced DU1RS, I5RM, KG6s, KF3AA (still afloat on Fletcher's Ice Island), KR6KS, 6RQ, M1B, MP4K, VE8SD, VK2, 4, 6, VP4TO, 9BF, ZL's 2BE and 2GL, 4S7 and ZS2MI.

MP4ABW was heard, this time giving his QTH as Quatar, although on a previous occasion he gave it as "Sur, in Oman"; we *did* think he was Quatar, but apparently he moves around a bit!

G. H. Elleson (Malvern Link) says his brightest spots were VK4MJ, W8BZP/AM (over Ohio) and the S9 ZS6XL calling VQ2LS.

Other Phone DX from Gerry is FM7WN, FQ8AR, HH2LR, HK, HR1AB, KP4UK/P, KG6ABD, OA4BC, VE8SD, VP6, W1 to Ø and ZS8E, with lots more usual stuff besides.

P. M. Crawford (Darlington), despite continued domestic decorating upheaval, presses on. Martin considers his only good catch to be ZK2AA, weak and fluttery on 14010 CW at 0615. VS1YR was logged also, while Phone got him AP2K, EP2ZZ (could be ET2ZZ), EL9R, FQ8BN, JA1AD, LZ2KSK (Yes, quite OK), OQØDZ, OY3Z, ZE2KO, ZS4CB and some ZS6s.

Martin is compiling reception data for publication in the N.Z. magazine *Break-In* and would welcome details of ZLs heard on any band. Date, time, frequency, RST and stations worked. Send to him at 9 Hewiston

Road, Darlington, Co. Durham. All reports will be sent to ZL2QI for tabulation.

N. C. Smith (Petts Wood) who is very far from being a one-hobby man, still finds time to pick up such exotic calls as—on CW—VR2AS, VR2CG, VU5AB (Nicobar Island), ZS3BC, ZS7, LU3ZS (South Shetland), VP8AJ, CE, VK, VU, etc. Phone yielded TG9RB, HH2LR, DI9AA, CR5SP, DU1RS, ZL and other eastern DX.

P. Hunt (Ellistown) was one of the lucky chaps to hear VQ8RO (Mauritius on Phone. In addition, Peter snagged ST2NW, KV4AQ, KH6HJ, CR5SP, VK5, SVØWG and four KL7s.

P. N. Morgan (Stourbridge) got CS3BC, KP4MS, KV4AQ, VP6GN, ZC4MH (all new ones), MP4K and MI1CTH (?) on Phone.

S. J. Melvin (Nuneaton) missed VK9WL on the key, but connected with CR6AQ, LUØAAW, PJ2AK, VE7GI, VK4 and VS1.

Steve, with G. Curtis and Dick Poppi, runs a weekly " S.L.P." Interesting, as they use different receivers (and probably different aerials, too).

J. Eden (Ely), who is just 14 years old, sends a list of phone. YO3, YI2AM, 4X4AH, VP6GN, TI2ACQ, CN8FT/MM, HP and KL7 were heard on a BC1147A. (Which is the receiver used at '3ATU, also.)

R. Balister (Chorley Wood), who can now listen at week-ends only, had Phone from KP4, OA4BC, WØ and VP3GL, KZ5DC, ZS3BC, CT2BO, OH2UA and VP8AJ were good ones on CW.

Roger's brother—G3IQB—now at Bristol University, has a 4-watt rig with him and hopes to use it on 80 from time to time.

F. B. Allen (Gravesend), listening between 1700 and 2130 hrs., picked up CO2OM, CR4AD, 6A1, 7AD, 7LU, DI9AA (Azores), ET1AB, 2TS, EAØAB, FB8BE, I5LV, JY1US, VP8's AJ, AK and AN, VP9GX, VQ2, ZD1RW, 2S, 4AK and ZE, making his total 87 countries. (Darby doesn't say so, but you can regard the above—or most of 'em—as being on CW.)

H. D. Woodward (Manchester) heard LUØAAW (a Maritime mobile station), LU5ZO, VK5MS and hordes of W/VE.

J. Whitington (Worthing) missed VR2AS on CW, but logged HS1WR (1300), KX6BC (0930), DU1CE, KG6GX, LU3ZS, 4ZO, 5ZO (2200). On Phone, John had CR7CF, FM7WN, TI4JG (2315) and ZS3P.

R. P. Wayne (Worthing) was encouraged by friend John Whitington to send us his calls logged. The receiver is a 5-valve Super and Phone was heard from CR4AJ, 5SP, 7CF, MP4, 4S7, VK2, 3, 5, 7, FF8, KR6KS, KX6BC *and* KC6AA. CW came from UA9KCF, 9KYB, UG6, ST2, KG6, KR6, and VU.

R.P.W. reports XW8 as a new call-sign for Laos.

D. L. McLean (Yeovil), pursuing his Phone researches, found 1600/1900 the best time for VK. Don heard DI9AA (Yacht *Sarifa*), ET2s, I5RM (14120-1800), KH6IJ, SVØWK/AM (Over Turkey), VE8SD (Baffin Island), VS1s, lots of VK, VP9F, ZC6UNJ and ZS8D (14130-1706).

G3CMH (Yeovil) worked EA8BM, KV4AA, VE8YC, VS9WI, PI1LS and Ws on the key, and ET2ZZ, SVØWK/AM, VK5RN and VS1ES on Phone.

J. L. Hall (Beckenham) took time off from LF DXing and dug out KB6AY, FK8AB, VP8AN, KX6BC (at both 0745 and 1410 GMT), VR2AS (0720, RST 579) and last but not least, FD4BD. All these were CW, but John mentions CR5NC (St. Tome) on Phone.

D. J. Wright (Forest Hill) pulled in DI9AA, CM9AA, KV4, OA4BC and SU1MR.

P. A. Conway (Birmingham) had *his* big moment when he heard VK2FA for his first-ever VK. This, on Phone, was followed by MP4K, ZD4BF, LX1DC, VQ4AC (who, incidentally, is a missionary), KV4 and YV5BQ.

Peter heard that KS4AU would be on until mid-October, so he may have gone as you read this.

H. Lee (Oslo) is still battling against terrible conditions and the best he could manage this time was EA8AX, HZ1AB, PY, VK2FA, YI2FA, YI2AM, 3A2AN and a ZS1.

R. Goodman (Edgware) is still pulling in the good stuff with his trusty 0-V-0 which, says Ron, he wouldn't change for anything. He is interested in meeting other " one-valve " users in North-West London.

Latest Phone include HH2LR, MP4ABW, MP4K, TG9RV and XE2CQ (all new ones), CR4AD, HP1AP, KA2MC, PJ2AK, TI4EJ, VP6, 9GE, VQ2, 5 and ZD2S (2230). This makes the band score 33Z in 136C.

C. J. Goddard (Warwick) heard no fewer than 11 " Portable VOs " and suggests they may be on holiday up there. (Rather a chilly spot to choose !)

John mentions the " pipe-line " effect which will often produce a band full of Texan W5s one day and all W4 or W9 the next. We notice that often on 10, when the band was open.

His Phone findings include CT3AN, HH2LR, KA2LK, KG4AO, KZ5NM, TG7AR, 9RB, VE8OP, VP5BE (Caymans), VK, VQ2KD, W7, ZS3P. CW brought in CT2BO, FP8AP, K7SX, VE5DR, 7GI, VK4FJ, WØOCA/KG6, OH2UA/M, LB9IC (who is on Andoy Island north of Norway—counts as LA) and EE4H (??).

The 1953 score stands at 37Z—145C.

R. Winters (Melton Mowbray) writes in high delight, having realised a seven-year ambition by hearing his first VKs ! What pleased him even more was to get a QSL from VK4FJ by return air mail. Spot on ! The

other VKs heard were 2FA, 2QR and 4RT. FF8CN, KP4WAB, VP9BF, W7RTS/VO6, YI3WH and ZD2RRW complete the picture.

With 1OOC in 27Z for the year, Richard is all set to break eggs with sticks and hopes conditions will at least remain as good as they have shown they can be. (Hear, hear !)

R. W. Pinnell (East Ham), another staunch Phone man, thinks conditions were " Tops " despite the various electrical noises produced by this modern age. CX2CO, HP3GJ, HR1GM, 1JM, KA3AA, KG4AT (QSL rcd.), KZ5, TG9RV, TI4JG, VK5MS, 6MK, VP1CO, 2DL, 3BTG, 4TO, 5AR, 6GN, 7NB 9BG, VQ2DT, VS1, VU5AB and YS1MA all go to prove his point.

R. E. Oxley (Maidstone) sends his first report. He uses a domestic 5-valve super with a 60-ft. Windom, 14 ft. high, which gave him OA4BC, VO2L, VP6, PJ, OQØDZ, KV4BB, HH2LR, CX2CL and VP9BH. Highly satisfactory, by the look of things.

D. J. Newton (Catford), now at 86C—28Z, had new ones on both Phone and CW. His Phone diggings gave him CN2AD, CX2CO, I5RM, KA3RR, KG4AN, KG6, MP4K, VK6FL, VS2CP, ZC6UNJ and ZS6Z. CW new ones were UG6KAA, VP7NS, with DI9A A/EA8, LU5ZO, OQØDZ for good measure.

The AJ5 D.J.N. hears is a MARS set-up in French Morocco. CS3AC (Azores), a specially-allocated call, is quite genuine.

G3JFD (Derby) sends his first report, but far from being a stranger, he is none other than our old friend B. J. C. Brown, now ticketed and on 1900Kc only, for the time being, though plans are afoot for wider operation. Naturally, Bernard spends most of his time on top band, but he *did* check 20 and heard VKs, HH2LR, HK, VS1, 2 and 4S7FG.

DI9AA

We mentioned this station last month, when we referred to the terrific drift on his transmission.

From the *RSGB Bulletin*, we learned that DI9AA is the call issued to the motor yacht *Sarifa*, which is carrying the members of an expedition led by Dr. Hass, the famous undersea photographer.

The yacht carries no standard radio equipment, so that the amateur station is its only link with the shore. All amateurs are asked to be ready to assist should the need arise.

D. J. Newton tells us that the ship, now in the Azores, was waiting the arrival of a new VFO. This has apparently been installed, as we heard DI9AA recently and although he has a distinct chirp, his frequency is now free from drift and QSO's with him should present no difficulty.

Other Bands

A glance through the following should show that 20 is far from being our only DX band.

N. C. Smith, for instance, got PZ1WZ on 80 CW for a good one. Twenty-one Phone gave Norman YN1AA, CP5EK, CR6BX, HK, W5SFW, TI and ZD9. CW catches were VQ3KIF, WØs and YN1AA again. The score for the band is now 105C, which is very nice going.

On top band, N.C.S. heard W3HL (0415) and 40 CW produced KL7PI, UJ8, EL2ABS (!) ZS5YF (1950), VK and ZL.

J. L. Hall has some interesting " gen " from G3EIZ, who has been logging Medium-wave BC stations from W/VE, CO after 2300. Recently, 'EIZ heard Los Angeles, Seattle (Wash.) and Chicago at excellent strength, so it looks as if W6 and 7 may be workable on top band this Winter.

John himself heard W3HL and W2GGL up there. He, too, got PZ1WX and six ZLs on 80, with ZL2JA, LU, HK and an unexpected CP5AB on 40 *Phone*. CW gave him ten ZSs, VK, LU3ZS, 4ZO, 5ZO (all Antarctic), VQ3KIF, CR7AD (1850), HR1AT, ZE1JZ, PZ1WX, ZC4 and VE8PK. In 20 minutes one morning, John collected a 40 metre HAC, which shows what can be done !

D. L. McLean speaks highly of 21, which stayed open for a time until 2200 for South America and the West Indies. CE3, CX, CP5EK (on most days up to 1830), FB8SR (1700), HC1MB, KZ5, VP5SC, YK1AA, VP9BF, VQ2, 3, 5, W5, ZE, ZS3 and VK9GW (S9 at 0800), give an idea of how the band is shaping.

G3CMH has a Phone WAC on the band, with 57C and recently worked KV4AA, TI2TG—CW and KP4, PY, VK9GW, VP6, ZE and ZS—Phone.

.M1B has QSL'd, so *that* one was OK.

R. Winters logged ELØA on 10. Fifteen Phone was good for HK4FV, TI, VP6, VQ5, ZS and ZP5DC.

P. N. Morgan heard a YL operator on 80 Phone at 2300, working a " G " and signing PJ1OY. (This may be all right, but we confess to a sneaking feeling it may have been DJ1YO.)

S. J. Melvin checked 40 CW seriously for the first time and was rewarded by SU1XZ, VP5RS (0630), VP6AF, ZS5VG and three ZLs.

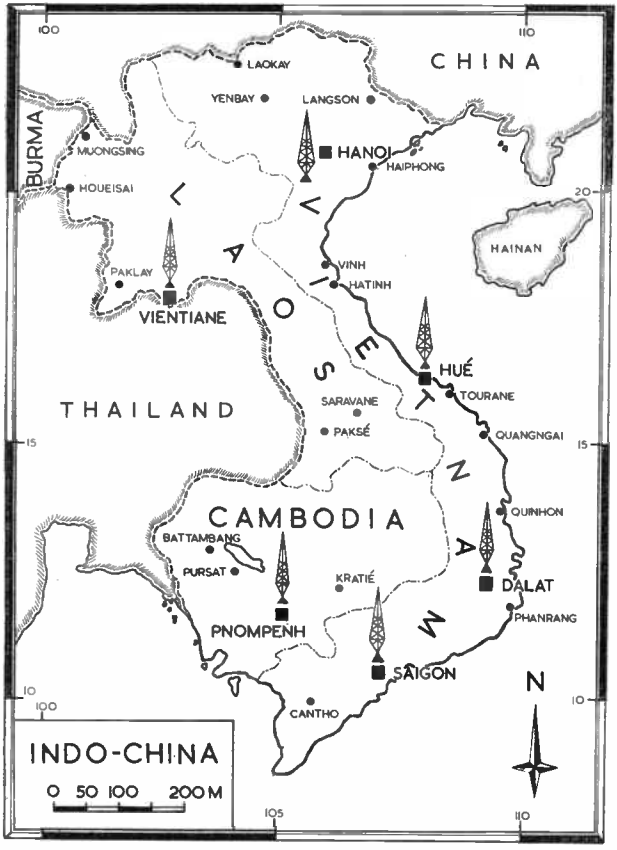
R. Goodman grabbed a good new one on 80 Phone. HR1AT was the chap. ZL1WW, 2RT and XE1*FC* got away, but Ron is on their track !

* * *

And so we come to the end of the last " Commentary " and in so doing, wish all our readers good luck and even better DX.

As we said earlier, we shall be very pleased to have your reports and comments for inclusion in " M.O.T.A." The address is the same—Roker House, South Cliff, Roker, Sunderland, and the deadline is November 20th, for the December issue.

So, 73 and BCNU.



THE WORLD on the AIR—

INDO-CHINA

Compiled by JACK FAIRS

During the past few years many people seem to have fallen into the habit of loosely speaking of "Vietnam," when they really mean "Indo-China." Let us have a closer look at this troubled, but no less important, corner of South-East Asia, so much in the news at the present time, and get down to plain, straightforward facts.

Indo-China consists of three Associated States of the French Union: Vietnam, Cambodia and Laos, with the seat of the Central Government at Saigon. Vietnam is the most thickly-populated of the three, and is goverened under the Emperor; the capital is Hanoi, and not, as so often assumed, Saigon.

Vietnam is itself further divided into three territories, North (formerly Tonkin), Central (formerly Annam) and South Vietnam (previously known as Cochin-China).

North Vietnam was at one time a province of the old Kingdom of Annam, becoming a French protectorate in 1884. Hanoi is the capital, lying on the right bank of the Song-ka or Red river, about 100 miles from its mouth in the China Sea. A fine railway bridge spans the river, the cathedral is a prominent landmark and there are remains of an ancient palace. A school of medicine for natives was opened in 1902, and, together with a European college, was formed into the university of Indo-China in 1917. Rice, sugar, tobacco, tin, coal and silk are among the products of this most northern district.

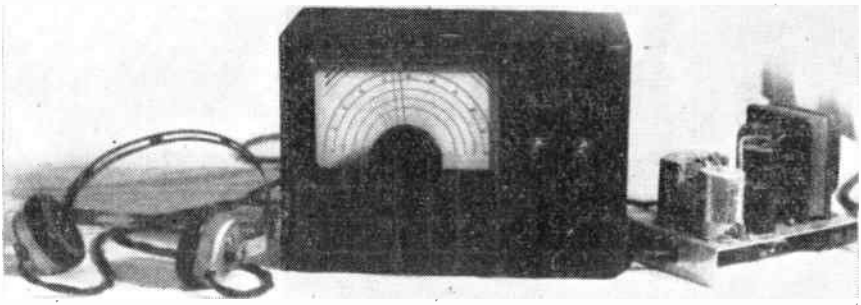
Central Vietnam extends for about 750 miles along the China Sea. For some centuries it was under Chinese rule but a native monarchy, set up in the year 968, gradually gained power and in 1428 the country of Annam, as it was then known, became independent. In 1787 the French appeared, and in 1884 a French protectorate was established. To-day, Hue (or, in Chinese, Thua-Thien) is the capital and Tourane the chief sea port. Irrigation is increasingly practised, many thousands of acres having been made available for agriculture by the Phanrang river alone, allowing much greater production of rice, cotton, sugar, maize and coffee; copper, iron, zinc and salt are mined.

South Vietnam has very fertile plains, though a great portion of the territory consists of the hot marshy jungle of the delta of the

(*Contd. on p.* 425)

The "TOP BAND SPECIAL" Receiver

by PETER LUMB, G3IRM.



The Top Band (160 metre) has always held a certain amount of fascination for the writer. Among other things it is an ideal band for morse practice, can always produce some good rag-chews and has the advantage of being a purely local band. Although the noise level is usually high there are no high-power broadcasters to cause interference. For these reasons the top band is an ideal beginner's band for he can learn morse by means of the excellent slow morse transmissions organised by the Radio Society of Great Britain, and he can learn more about amateur radio by simply listening to Phone stations than can be learned from most text-books.

In order to help such beginners the Top-Band Special was designed. Straight receivers are all very well in their way but most constructors would like to own superhet receivers. This receiver covers 1.6 to 2.0 Mcs with a little to spare at each end. It thus provides a useful IF channel so that should the constructor tire of local listening on the top band he can try his hand at DX on one of the other amateur bands. The receiver then becomes a double-conversion superhet. A switched converter covering all amateur bands would make the Top-Band Special an excellent receiver for the newly-licensed transmitter.

The following points were borne in mind when the design was commenced:

(1) simplicity of construction
(2) cheapness
(3) no high voltages (140 volts high tension)
(4) low consumption
(5) adequate output for headphones only
(6) adequate performance without too much noise which is another reason for keeping the high tension down
(7) no special equipment needed for alignment.

An attempt was first made to modify a type 1196 receiver chassis but the difficulties encountered would be too much for the beginner to superhet construction. The finished receiver was not as good as it might have been and had a pronounced hum caused by bad layout. Its appearance was far from neat for it looked like a real " conversion from surplus " effort. However, the 1196 receiver still forms the basis of the design and provides the majority of the components needed. The table of components shows the parts used in the original circuit as well as the use to which they are put in the top band receiver. Additional components are listed at the end.

The original receiver was built on a Denco chassis and housed in an Eddystone cabinet. The latter was on hand but can be classed as a luxury. It is by no means essential. Fig. 1 shows the chassis and screen measurements. Note that the diagram is divided into sections for the purposes of description only. The positions of some of the principle components can also be seen, further drawings will show where each particular component is soldered.

It may be wondered why an Eddystone chassis was not used as supplied for the cabinet. This chassis is first-rate but unfortunately does not lend itself to such a good layout as does the Denco which is longer and not quite so wide. Should the constructor wish to use the Eddy-

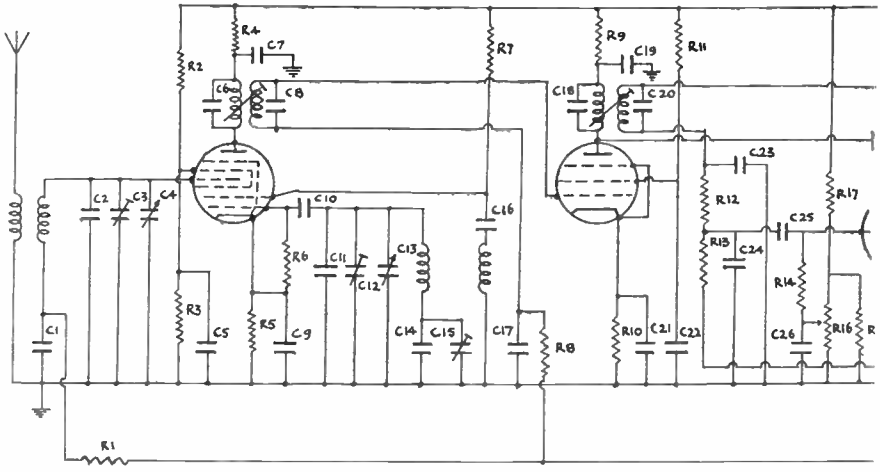


FIG. 2. CIRCUIT DIAGRAM

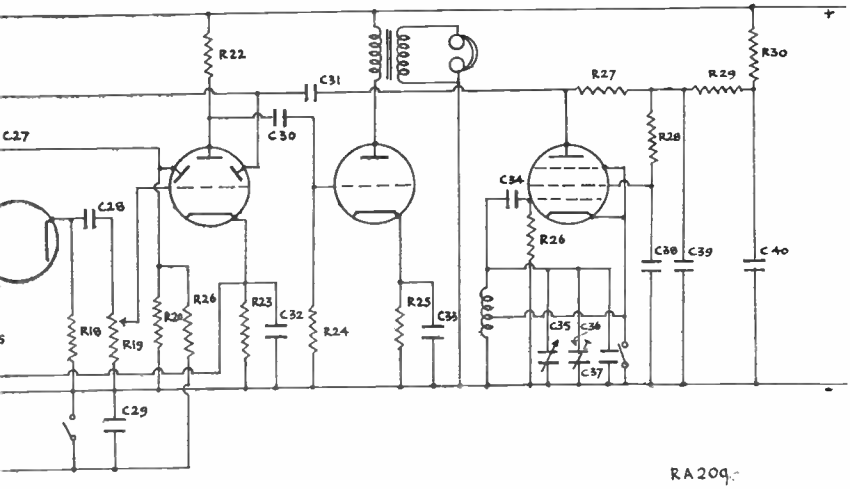
LIST OF CO

Note: The component numbers for the 1196 diagram ar

Resistor	1196	*Value*	*Used in Top-Band Special*
1	1	1 M Ω	FC AVC decoupling
2	8	100 K Ω	,, screen potentiometer
3	9	100 K Ω	,, ,, ,,
4	13	2 K Ω	,, anode decoupling
5	10	400 Ω	,, bias
6	12	50 K Ω	,, oscillator grid
7	11	50 K Ω	,, ,, anode
8	14	1 M Ω	IF AVC decoupling
9	16	2 K Ω	,, anode decoupling
10	17	200 Ω	,, bias
11	15	100 K Ω	,, screen dropper
13	24	500 K Ω	Detector load
14	3	200 K Ω	NL anode decoupling
20	25	1 M Ω	AVC load
21	28	1 M Ω	,, decoupling
22	20	200 K Ω	1st LF anode load
23	21	5 K Ω	,, ,, bias
24	29	1 M Ω	Output grid
25	34/35	1200 Ω	,, bias
28	23	100 K Ω	BFO screen dropper
29	27	60 K Ω	,, decoupling
30	26	250 K Ω	,, ,,
12	—	50 K Ω	IF filter
15	—	22 K Ω	NL anode potentiometer
16	—	1 M Ω	,, ,, ,,
17	—	40K Ω1W	,, ,, ,,
18	—	50 K Ω	,, cathode
19	—	500 K Ω	Volume control
26	—	47 K Ω	BFO grid
27	—	10 K Ω	BFO anode load

stone cabinet and it is well worth using if it can be afforded, no panel will be needed. The two switches, panel light and dial are bolted to the cabinet. The BFO pitch control and audio gain control are of course mounted on the chassis and protrude through holes in the cabinet front.

A suitable chassis having been obtained, punching and drilling are the next operations. For this work a Maxi-Q or similar punch is ideal, and is much better than the older method of drilling holes and filing to shape. Investment in such a punch is well worth while if any amount of constructional work is contemplated. Drilling operations completed, the principal components may be fitted. The positions of the valveholders and IF transformers can be seen from the chassis drawing, Fig. 1. The positions of other components can be seen from the photographs. The tuning gang is fitted in slotted holes behind the dial and joined to the latter by a flexible coupler so that it can be accurately positioned to ensure smooth operation. The aerial coil is between the gang and the frequency changer valve. There is only one other component above the chassis and this is the output transformer which is mounted on the only available space next to the output valve. A soldering tag must be fitted near pin 8 of each valve. Twisted flex is used for heater wiring, all valve pins which are earthed being taken to the appropriate soldering tag. Every earth connection for eacy stage should be earthed to the tag on its own



MPONENTS

those shown in *The Radio Constructor* for March, 1949.

Capacitor	1196	*Value*	*Used in Top-Band Special*
1	2	.01 mf	FC AVC decoupling
5	+	.1mf	,, screen decoupling
6	13	150 pf	IF tuning
7	+	.1 mf	FC anode decoupling
8	15	150 pf	IF tuning
9	+	.1 mf	FC cathode decoupling
10	21	100 pf	,, oscillator Grid
17	3	.01 mf	IF AVC decoupling
18	18	150 pf	,, tuning
19	+	.1 mf	,, anode decoupling
20	22	150 pf	,, tuning
21	+	.1 mf	,, cathode decoupling
22	+	.1 mf	IF screen decoupling
25	5	.01 mf	NL anode coupling
27	29	100 pf	AVC coupling
28	9	.01 mf	1st LF coupling
29	11	.01 mf	AVC decoupling
30	28	.01 mf	2nd LF coupling
34	1	50 pf	BFO grid
38	+	.1 mf	,, screen decoupling
39	+	.1 mf	,, anode decoupling
40	+	.1 mf	,, ,, ,,
2	—	100 pf	FC grid fixed tuning
3	—	30 pf	,, ,, trimmer (preset)
4	—	75 pf	,, ,, tuner (ganged to C13)
11	—	122 pf	,, oscillator fixed tuning
12	—	30 pf	,, ,, trimmer (preset)
13	—	75 pf	,, ,, tuner (ganged to C4)
14	—	500 pf	,, ,, padder
15	—	500 pf	,, ,, ,, (preset)
16	—	.001 mf	,, ,, anode blocking
23	—	100 pf	IF filter
24	—	100 pf	,, ,,
26	—	8 mf	NL potentiometer decoupling
31	—	2 pf	BFO coupling (twisted wires)
32	—	25 mf	1st LF cathode decoupling
33	—	25 mf	2nd ,, ,, ,,
35	—	15 pf	BFO tuner
36	—	30 pf	,, trimmer
37	—	75 pf	,, fixed tuning

Note: C5, C7, C9 form one block. C19, C21 C22 form one block. C38, C39, C40 form one block.

valveholder. A length of flex is soldered to the live heater pin of the output valve and taken through a grommet for connection to the pilot lamp. Keep all heater wires as close to the chassis as possible. The negative side of the panel lamp is earthed on its holder. By using twisted flex and earthing at intervals the hum level of the receiver is kept to a minimum. There is, in fact, no noticable hum using the simple power supply to be described later.

In order that construction may be made as simple as possible and to ensure that even the rawest newcomer will be able to make a success of the receiver, separate diagrams are given showing the positions of all components under the valveholders.

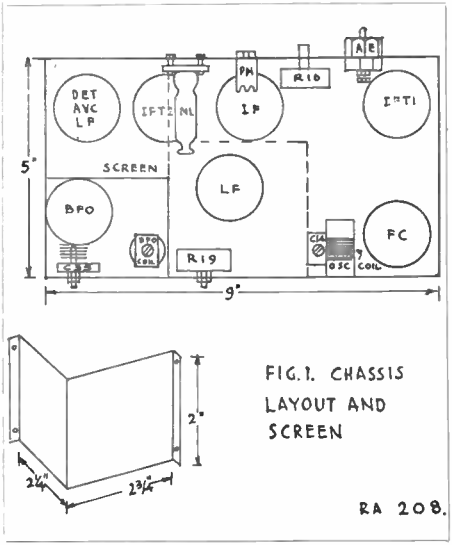


FIG. 1. CHASSIS LAYOUT AND SCREEN

RA 208.

The Frequency Changer, VI

The sub-chassis components for this stage are shown in Fig. 3. Components are grouped as near as is reasonably possible to the valveholder which tends to assist in keeping down stray fields and helps considerably towards stability. It is not necessary to use heavy wire for connections but keep each wire as short as possible and *avoid fancy right-angle bends.* Be neat by all means but not so neat as to have long wires all over the place.

The frequency changer valve itself is an EK32 taken from the 1196 receiver and is operated in a normal circuit for this type of valve. Wiring up should not cause much difficulty if a small type of soldering iron is used.

In order to ensure that the receiver tunes the band correctly the coils must be home-made. This is of course all to the good in a beginner's receiver. Coils are such simple things to make that a useful amount of money can be saved in this direction. Fig. 4 shows the two coils required. All four windings are in the same direction, the feedback coil for the oscillator circuit being wound on top of the bottom end of the grid winding. The formers are $\frac{5}{8}$ in. paxolin and were taken from old Wearite " P " type coils, the wire of which was removed.

Use has been made of the triple capacitors in the 1196 receiver and a better idea the writer has not seen for a long time. Instead of the underside of the chassis being full of by-pass capacitors there are only a few small resistors to be seen. It will also be noted that another triple capacitor is used for the IF amplifier and yet another for the BFO.

The Intermediate Frequency Amplifier, V2

Fig. 5 shows the positions of components associated with the IF valve. This valve is another taken from the 1196, and is in fact, used for the same purpose as in the original receiver. The circuit is also almost identical. Automatic volume control voltages are fed into both this valve and the frequency changer. In such a simple receiver, control of two valves is essential to get a reasonably good AVC characteristic. No S-meter is included but should the constructor so desire, this can easily be arranged in either the cathode or screen circuit of the valve. AVC voltages are not large on the top band due to the low input power allowed so an S-meter was not considered essential when the design was first planned.

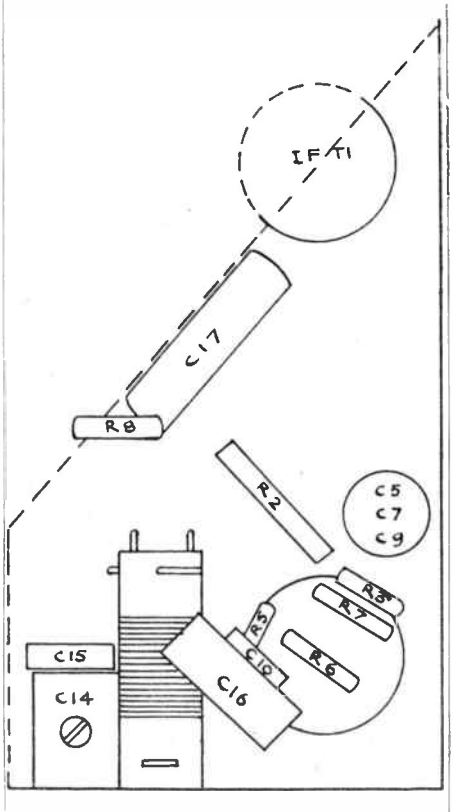
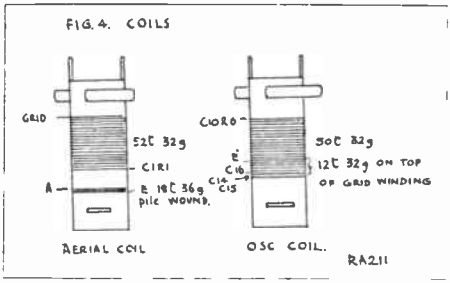


FIG. 3. FREQUENCY CHANGER

R1, C1 ARE ABOVE CHASSIS; R4, C6 C8 ARE IN IFT1 CAN.

RA210



Should it be the constructor's intention to build a converter as suggested earlier in this article, then an S-meter would be a practical proposition. No other comments are necessary on the IF stage, it is quite straight forward.

The Noise Limiter, V3

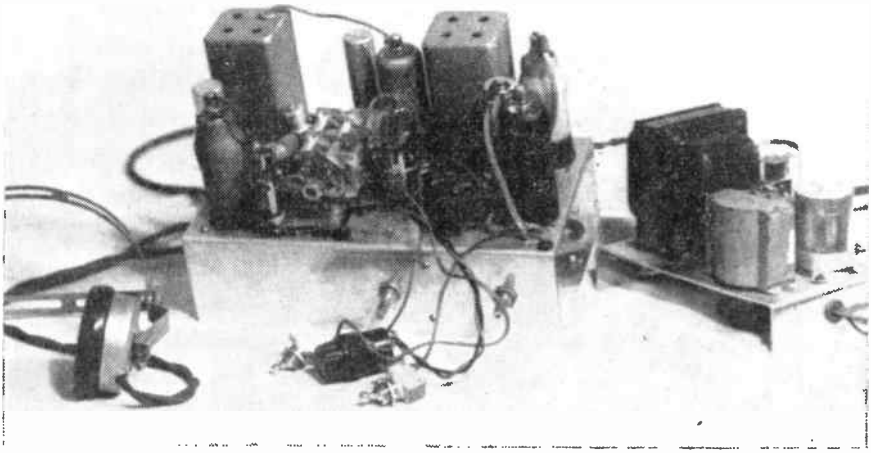
Due to the high noise level on the top band a noise limiter was considered essential. Ten metres can be noisy too, so that the inclusion of the limiter stage will be found useful when a converter is used. The arrangement of the components in the limiter can be seen from Figs. 5 and 6. Wiring is quite simple and should not cause any difficulty. Potentiometer R16 is used to set the level at which the limiter operates and is adjusted when interference is being received. A setting can usually be found which covers most occasions and no further adjustment is normally necessary. Though simple in design the limiter is effective especially when dealing with peculiar clicks (like a grandfather clock ticking) on the top band. The writer has been troubled by this confounded "clock-ticking" for some time and would be interested in any suggestions as to its cause. Any offers please? (*Possibly the electric self-wind clock on the dashboard of the car in next-door's garage—Ed.*)

The Detector, AVC Rectifier and First LF Stage, V4

The signal passes to V4 via the capacitor C28 and volume control R19. This valve is another 1196 part. Note that the detector diode load is returned to the cathode of V4 and the AVC diode load goes straight to earth. No anode de-coupling is necessary. This is the only part of the circuit which may cause difficulty in wiring. Things are a little cramped and it is best to assemble as much as possible before wiring into the valveholder. With patience and a little forethought it is easily possible.

The Second LF valve, V5

The 1196 does not contain a suitable output valve and advantage has been taken of using another cheap ex-Govt. valve in the shape of a 6C5 or a 6J5. The writer cannot remember using an output triode or pentrode, he has always used small LF triodes of the 6C5 type even in the most complicated communication superhets. The 6C5 will give ample output for headphones or a small loudspeaker when correctly matched. Why commercial receivers must have things like push-pull 6V6s is a mystery apart from a riduculous waste of electricity, necessitating a bigger power supply or causing too much heat in the receiver. However, in the present design, an output transformer and speaker can be used but to save expense, the transformer in the 1196 is pressed into service feeding a 600-ohm pair of



General view of layout of the components.

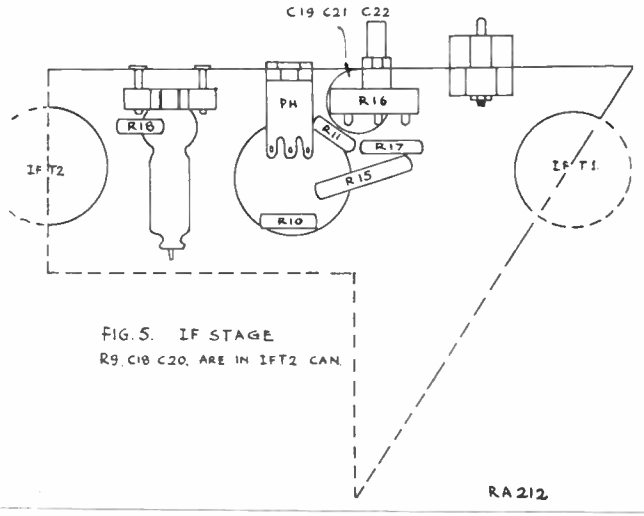


FIG. 5. IF STAGE
R9, C18 C20, ARE IN IFT2 CAN.

headphones. High-resistance phones can be connected between a large capacitor (.5 mf or more) and earth, the other side of the capacitor being taken to the anode of V5. Using this arrangement, it has never been found necessary to advance the gain control more than half-way.

The Beat Oscillator, V6

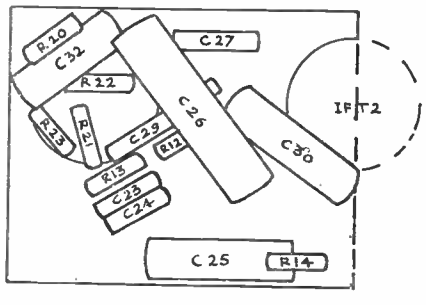
A fourth 1196 valve is used as a beat oscillator. It is an EF36 and so there are two valves (one EF36 and one EF39) left over as spares. It will be seen that plenty of decoupling is used in this stage. It is not claimed to be absolutely necessary, but it does ensure that the beat oscillator output can only get into the detector through C31. The valve itself is screened, its grid lead is screened and all sub-chassis components are screened by a metal screen and the cabinet baseplate. A very low voltage is used for the valve to ensure maximum stability with adequate output. Both BFO and AVC switches operate in reverse—when they are open the oscillator, or AVC, are " on." They are therefore mounted upside down on the front of the cabinet.

The Power Pack, V7

A very simple power pack was constructed, the circuit of which is shown in Fig. 9. Full-wave rectification was used and to avoid two sets of LT windings a 6X5 rectifier was needed.

The transformer was home made, or a 5Z4 or

FIG. 6. DET. A.V.C. AND L.F.



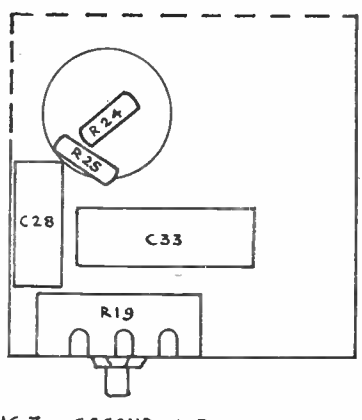
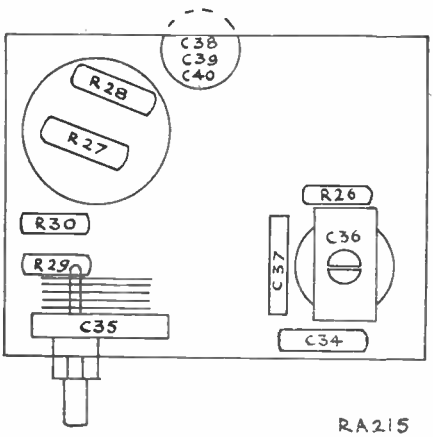


FIG. 7. SECOND L.F.

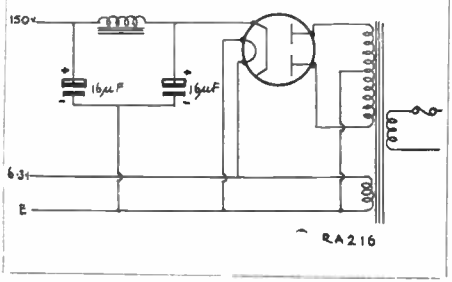
FIG.8. THE BEAT OSCILLATOR



similar rectifier would have been used. When winding was nearing completion it was found that a five-volt winding could not be accommodated without risk of damage when inserting the laminations. For those interested, the transformer is 150-0-150 volts at 60 ma and 6.3 volts at 2 a, and is wound on a core, measuring 1 in. square at 6.2 turns per volt. Even after runs of three or four hours there is no noticeable rise in temperature.

Primary: 1,430 turns tapped at 1,300 of 28 SWG wire.
HT Secondary: 1,860 turns centre tapped of 38 SWG wire.
LT Secondary: 39 turns of 20 SWG wire.
A layer of empire tape was wound between the primary and HT Secondary and between the two secondaries and a further layer over the whole bobbin on completion.

FIG 9. POWER PACK CIRCUIT



World on the Air. (*Contd. from p. 418*)

2,800 miles long Mekong river. Saigon is the capital and chief centre of commerce, as well as being the principal French military and naval base in the Far East. It stands on the estuary of the Saigon river, 40 miles from the coast, and is connected by railway and electric trams with the neighbouring town of Cholon.

The State of Cambodia is ruled by King Norodom Sihanouk, and has been under French protection since 1863. It now covers nearly 70,000 square miles with a coastline of some 200 miles on the Gulf of Siam. The capital is Pnompenh, on the Mekong river, and the forests contain valuable timber, though the greater part of the country is malarial swamp. Cambodia has mineral wealth, and limestone, phosphates, iron ore and sapphires are mined. Splendid ruined cities recall the greatness of the former empire, and there are prehistoric remains of an earlier Khmer civilization. The ruined city of Angkor, standing near the Toule Sap, or Great Lake, covers an area of some four square miles and is enclosed by walls 30 ft. high. To the south is the famous temple of Angkor Vat, a wonderful building where Brahma, and later Buddha, were worshipped; one of the finest remaining examples of Khmer architecture, it dates probably from the opening half of the 12th Century, and is now a Buddhist place of pilgrimage.

Laos is, like Cambodia, a Kingdom; it is an independent sovereign state by a treaty signed between the President of the Republic and the King of Laos, Sisavang Vong. There are extensive teak forests and mineral deposits of gold, tin, copper and precious stones. Vientiane is the capital. Laos was once known as the protectorate of " Lane Xang " or " Land of the millions of elephants." It was given to France by Auguste Pavie, who explored the territory in 1879-95, and has been under Franch administration since 1893.

About five-sixths of the population of Indo-China are Annamese, short, ungainly, tawny people, who live in the lowlands and subsist mainly on rice, fish and poultry. Both men and women wear silk or cotton trousers and tunics, with the hair coiled into top-knots surmounted by turbans or palm-leaf hats. They follow the strange custom of blackening their teeth by betel-chewing and varnish, are industrious, independent, vain, fond of entertainment, and are inveterate gamblers. Their dialects and script are of early Chinese derivation.

The Trans-Indo-China Railway was opened in 1938, and runs from Laokay and Langson in the north to Hanoi, following the east coast down to Vinh, Hue, Tourane, Dalat and Saigon, thence on to Pnompenh and Battambang, and eventually links up with Bangkok, capital of Thailand.

Broadcast Bands Review

All Times G.M.T. **"Nf" New Frequency.** **by J. FAIRS**

Australia. D. A. Read of Melksham, starts us off this month (for the last time !) with VLM4 Brisbane, heard Q2 S4 at 2000-2030 on 4918 kcs. This station should now be on 4920 kcs, OM—see the August " Review." (The station on a slightly lower frequency will surely be CR7BU ?) Dr. T. B. Williamson, London, also lists VLM4 (but no frequency given !) with a S9 signal on September 20th, at 1955, testing until opening the regular morning transmission at 2000; announced for SW stations VLQ9 and VLM4, station 4QR, and Regional stations 4GM, 4QS, 4QL, etc. News is read at 2001.

VLA9 of " Radio Australia " on 9580 kcs was Q5 S6-7 for Ted Classe of Vienna, Austria, at 1230-1310. On September 13th, VLA9, although announcing as on 9580 kcs, was heard from 1645 on 9615 kcs until wiped out by VOA Relay Station Tangier-2 which signed on at 1729. (Sidney Pearce, Berkhamsted. Rx: Hallicrafters " Sky Champion.")

Bechuanaland Protectorate. ZNB Mafeking, 8242 kcs, was located amid the CW QRM by Carl Shapiro of Belfast, and Patrick Cody of Roscrea, Co. Tipperary, Ireland, with weak signals and QSB around 1830-1900.

Balearic Islands (Spain). " Radio Menorca," Mahon, on 7410 kcs (varying) is reported heard by Stanley Coppel, Belfast, around 2000-2030, and by *Radio and Television News*, USA, at 2200 to sign-off at 2225.

Bolivia. " Radio Illimani, La Voz de Bolivia," La Paz, is now reported on 4745 kcs (Nf) at 2200-0400. (*Sweden Calling DXers.*) Carl Shapiro lists this station on 4747 kcs, Q3 S4-5 at 2300; identification is given every quarter-hour. This may be either CP5 or CP6, moved from either 5970 or 9500 kcs respectively; as far as we can recall, it is a very, very, long time since a Bolivian station operated on 4 Mcs.

Brazil. A station announcing as " Radio Record, Sao Paulo " is reported heard around 2330 on approximately 11965 kcs (Nf). (" R.T.N.") Pat Cody asks if this could be our " lost " PRB20 ? ZYY3 Campinas, 4755 kcs: Q3 S4-5 with CW QRM at 2315, identifying as " Aqui Radio Brasil." (Shapiro.)

Canada. Station CFCX Montreal, although regularly listed for a number of years on 6005 kcs, is permanently off the air and actually ceased broadcasting 'way back in 1948 ! This rather surprising item can be taken as authentic, as it comes direct from the Canadian Marconi Company via *Universalite*, bulletin of the Universal Radio DX Club of California. CJCX Sydney, Nova Scotia, 6010 kcs: heard with English news at 0945 (Ian Hardwick, Thames Line, New Zealand), and on a clear channel with light recorded music around 2400 (Robert Mercier, Juvisy-sur-Orge, France.)

Canary Islands. EA8AB " Radio Club Tenerife," Santa Cruz de Tenerife, is mentioned on approximately 7633 kcs around 2200 (" R.T.N.") and on 7295 kcs with 250 watts power at 2100-2300 (" W.R.H."). EA8AB relays EAJ43 on 1412 kcs MW (400 watts).

Colombia. HJFV " Emisora Radio Neiva," Neiva, on 4855 kcs, have sent a letter verification plus a silk pennant by air mail to Sidney Pearce; this station relays HJFP on 1240 kcs MW, and is in the " Ca-Ra-Col " network. HJCX " La Voz de Colombia," Bogota, also obliges Sidney for his report on 6018 kcs; HJCX relays HJCZ on 710 kcs and can be heard after 2400. HJKH Sutatenza, 5070 kcs: S9 at 2335 with a religious service; identifies as " Radio Sutatenza." (Williamson.)

Costa Rica. " Radio Excelsior " San Jose, is broadcasting on 6075 kcs (Nf) in parallel with 6500 kcs and 1060 kcs MW. (*Sweden Calling DXers.*)

Dominican Republic. H12A " La Voz de la Reeleccion," Santiago de los Cabelleros, has been heard by Robert Mercier on 6044 kcs, which confirms Carl Shapiro's report in our September issue. The extremely lengthy identification begins with " Por la Paz y por Trujillo " and includes the slogan and city.

Dutch New Guinea. R.O.N.G. Hollandia is now using 4860 kcs (Nf) instead of 5045 kcs. (" W.R.H.")

Egypt. The 31-metre station of the Egyptian State Broadcasting Service, Cairo, has moved from near 9615 to about 9680 kcs (Nf), possibly to avoid Tangier. (Pearce.) Ron Young of Chelmsford lists them on 9465 kcs at 1830, and the latest one is 9475 kcs (Nf). (Pearce and Scribe.)

Germany (Federal Republic). The 6175 and 7130 kcs outlets of " Radio Liberation " mentioned last month, are used by a 10-kW transmitter which previously belonged to " Radio Free Europe "; these are located at Lampertheim, north of Munich. The schedule is 1000-2200, all in various Russian languages and dialects, and the address: Lilienthalstrasse 2, Munchen 19. (*Sweden Calling DXers.*) " Voice of America " Relay Station Munich-2 is using 3980 kcs (Nf) at 1615-2200.

Greece. VOA Relay Station Salonika-2 is now on 5960 kcs (Nf) at 1800-2200. (Pearce.)

Guadeloupe. " Basse Terre, Radiodiffusion Française de la Guadeloupe " has been logged

by Robert Mercier on 6067 kcs (Nf, ex-9425), and heard with fair signals until sign-off at 0100.

Haiti. Station 4VCN Port-au-Prince is back on the air on 6406 kcs with the new slogan " Radio Tropiques," since May 31st. The new owner, M. Raymond Dambreville, purchased the old and silent " Radio Fides " transmitter from Archbishop Father Pouliquen; all programmes are in French, at 1100-1230, 2300-0130 weekdays, and 1300-1500, 2300-0100 Sundays. The announcement is " Ici Radio Tropiques, Poste 4VCN, travaillant sur la longueur d'onde de 49 mètres, fréquence de 6406 kcs, à Port-au-Prince, Capitale de la République d'Haiti." (Robert Mercier.)

4VPL " La P.B.S.," Pétionville, has been heard several times on a varying 5882 kcs with poor signals weakened by a nearby carrier; noted with jazz music around 0130 and French recordings at 0200. The announcer is a YL. (Mercier.) The full identification of " Radio Commerce," Port-au-Prince, is kindly supplied by Robert, and this is what we attempted to quote in our September issue: " Ici Radio Commerce émettant de Port-au-Prince, Capitale de la République d'Haiti. Radio Commerce au Service du Progrès national dans l'Ordre et le Travail. . . . "

India. Frequencies currently used by the External Services of " All India Radio," New Delhi, are listed by URDXC as follows:— 3970, 4760, 4860, 4940, 5980, 6040, 7115, 7120, 7170, 7255, 7275, 9630, 9705, 11780, 11850, 11940, 11950, 15085, 15130, 15160, 15190, 15290, 15350, 15380, 17705, 17740, 17850 and 21700 kcs. The 1530-1545 English news is heard on 7170, 9770 (Nf) and also near 11915 kcs; the broadcast for South-East Asia in English is strong on 9670 and 15380 kcs at 1330-1445. (Sidney Pearce.) *Sweden Calling DXers* reports 15245 kcs (Nf) in parallel with 17760 kcs at 0815.

Indonesia. YDP Medan (Sumatra), 4930 kcs: Q3-4 S4 at 1600 with recorded piano music by Solomon to close at 1630 with Hawaiian musical time signal. (Williamson.)

Iran. " Radio Teheran " was heard on 15015 kcs (instead of the usual 15100)at 1925 with the announcement " This is Teheran calling on 335 metres and short-wave 19 and 49 metre bands." (Williamson.)

Italy. Nfs for Rome are 7290 (used at 1915-2210) and 7300 kcs (at 0315-0345). (Ted Classe and " W.R.H.")

Japan. JOB2 Yamata, 7180 kcs, of the NHK International Service, is listed by Stan Coppel and heard during the European transmission at 1900-2000; signals were not very good and suffered from bad QRM.

Libya. Dr. T. B. Williamson reports the re-appearance of the FBS Benghazi on 4788 kcs—was listed on 4790 a few years ago—Scribe. Signals were Q4 S7 at 1945 with a BBC recording of " Ray's a Laugh," and the call at 2000 was " This is the Forces Broadcasting Service, Benghazi." The station closes at 2100 with a slow march—" God Save the Queen " is not played. They announce as returning to the air the next morning on 341 and 62.7 metres. (Note: This station should presumably not be confused with Tripoli on 4965 kcs ! Scribe.) TBW: " Radio-Dakar " is most certainly using 4950 kcs for their French-language " Dakar-Inter " programme, to close at 2300; see the " Review " for last March, OM.

Malaya. " Radio Malaya," Singapore, is reported on 3330 kcs (Nf). (*Australian DXers Calling.*)

Mexico. XE2AW La Paz, Baja California, appears to be a new station heard closing at 0400 on 7200 kcs. (URDXC.) XEKW " Radio Morelia," Morelia, 6030 kcs: weak around 0130 with North and Latin American rythms intermixed with " commercials." (Mercier.)

Nicaragua. An air mail letter from " Radio Mil, La Voz de Nicaragua," Managua has arrived at Sidney Pearce's QTH, and its contents confirm our suggestions of last month's issue. Sidney's report was on the station announcing as " Radio Mil " on about 6200 kcs, and it lists YNVK 1000 kcs MW, and YNVP 6185 kcs SW. No schedule was included, but they say " afiliada a la National Broadcasting Company y La Cadena de la Paz de Las Naciones Unidas." (Which boils down to the fact that " Radio Mil " is, in fact, the old YNVP. Scribe.)

Carl Shapiro has been hearing YNWA " Radio Mundial," Managua, on 7830 kcs. (Nf—must be a move from 6463—Scribe). Signals were Q3 S6 at 2330 on September 13th, when popular tunes were featured. YNBH Managua has moved again since last month's report, and is now on 6335 kcs (Nf); identifies as " En Managua, Nicaragua, Centro America, transmité Radio Panamericana." (Mercier.)

Nigeria. Lagos is heard regularly on 4800 kcs around 2100-2200. The announcement at 2130 is " This is the National Service of the Nigerian Broadcasting Service," followed by the weather forecast and English news. At 2157 the interval signal of the well-known Yoruba talking drums can be heard until close at 2200 with " God Save the Queen." (T. B. Williamson and Pat Cody.)

Philippines. Sidney Pearce has received a schedule from DYH4 at Dumaguete City, Negros Oriental, on 6055 kcs; this station relays DYSR on 840 kcs MW at 1000-1330. Newscasts are daily excepting Sundays at

1010 and 1200, while news commentaries are featured on Sundays at 1030 and 1115, and on Wednesdays to Fridays at 1115 only.

Pitcairn Island. Possible frequencies to be used by ZBP are 375, 500, 522.5, 7859, 9200 and 12110 kcs; power will be 500 watts. The station was built by a New Zealander, and the transmitter (called the " Transarctic ") will use an Australian wind charger to provide the necessary power. (" W.R.H. " and URDXC.)

Reunion Isle. " Radio St. Denis " is now broadcasting with 1.5 kW on 3380 kcs (Nf) during the hours of local darkness, and on 4820 kcs during the day; also a 200-watt Tx is used on 7170 kcs. The evening transmissions are at 1400-1800 daily. (" W.R.H.")

South Africa. " Springbok Radio," Johannesburg is audible on 3356 kcs most evenings around 1830 when the amateur and CW QRM permits. (Pat Cody.)

Southern Rhodesia. ZEAF Salisbury was logged on 3320 kcs at good strength around 1800 (Cody). This outlet has apparently now moved, and is heard near 3400 kcs (Nf) from 1730; BBC News is carried at 1800, African News and South African News at 1815. (Pearce.) Salisbury has QSL'd to a Swedish listener for reception on 15120 kcs (Nf), according to *Sweden Calling DXers*.

Spain. A new Spanish station irregularly testing on approximately 6640 kcs is " Emisora veinte y tres " (Transmitter 23) " Radio Burriana." Burriana is a small town near Castellon de la Plana. (Radio Sweden.)

Tahiti. Ian Hardwick lists " Radio Tahiti," Papeete, on 6833 kcs (Nf) at 0600 in French to close at 0630. (This must be a move from 6980 kcs. Scribe.

Tangier. Pan-American Radio was noted on about 7405 kcs around 2200-2245. (*New Zealand DX Times*.)

Thailand. Sidney Pearce reports reception of the new HSK8 " Radio Thailand," Bangkok, on a frequency near 11680 kcs (though listed on 11700). News in English is from 1000, with the call in English at 1020, followed by Thai music and songs.

United States. WRUL " Radio Boston " now broadcasts to Europe on 11740, 15280 and 17750 kcs, at 1930-2145 on Mondays, Tuesdays and Wednesdays, and at 2015-2115 on Sundays. Regular daily transmissions were due to be resumed in October, and two new antenna systems have been tested. (Roy Patrick, Oldham.)

Venezuela. YVKR " Radio Caracas," Caracas, 4920 kcs: Q3 S4 around 2345 with popular Spanish music. YVMO Barquisimeto, 4990 kcs: Q3-4 S5 at 2330 with the call " Radiodifusora Occidental." (Carl Shapiro.) YVXJ " Radio Barquisimento " on 9510 kcs, has been a good signal from around 2015; has chimes and call every 15 minutes. Is in the clear until 2115, when severe QRM is caused by BBC station GSB, though YVXJ appears to sign off at 2130 on this channel. (Sidney Pearce.)

Conclusion

It is with deep regret that, " owing to circumstances beyond our control," this series of Broadcast Band features has now ended. The Editor, G2UK, and your Scribe can do no more then extend an especially grateful and sincere " Thank you " to the many readers, listeners and DX editors, in this country and overseas, who have during the past two years so very kindly assisted by sending along such friendly letters and interesting reports—and in particular our " regulars " who have maintained a consistent and reliable flow of first-class up-to-the-minute information. Our humble task of compiling these notes has never on any occasion been a matter of searching for something to write about. On the contrary, it has invariably been a case of how much could be squeezed into the least possible amount of available space, without any sacrifice of intelligibility ! In this connection we trust we have, in the main, succeeded, and also hope to have pleased " most of the people for most of the time " !

73, Good Listening, and the best of DX to everyone.

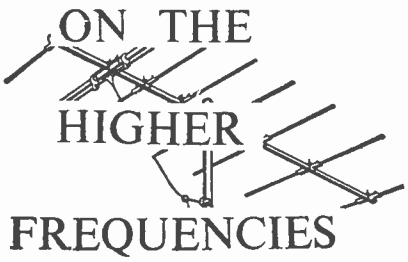
Modifications to HRO. (*Contd. from p.* 411)

on the surplus market at a reasonable price.

Bearing this in mind the author decided to remove the HRO 6D6 first RF valve and accordingly the holder was removed and a B7G ceramic holder with complete shield, was mounted on a small flat aluminium plate and fitted in its place, using the original screw-holes. The top grid cap was then cut off and the grid lead threaded back on itself through the slot near the corner of the coil box adjacent to C24. After cutting the grid lead to the correct length, connect to pin 1 on the 6BA6 holder, as in Fig. 1. The existing cathode resistor R27, which in most models is 300 ohms should be changed to 70 ohms.

The RF gain and signal to noise ratio will show a very marked improvement as the transconductance of the 6BA6 is some 4400 μmhos and the grid-plate capacitance is only .0035 uufd. This valve is recommended for use in series heater circuits and thus is ideal for the circuit as modified by the author, in the previous article referred to.

For identification purposes, all numbering conforms with the *HRO Instruction Manual*.



Monthly Notes and News

by H. E. SMITH, G6UH

This month's edition is being written under extreme QRM conditions. Surrounded by packing cases and uprooted carpets, your Conductor is about to move QTH to the Isle of Wight. We hope to be active again by the time this appears, from a more favourable QTH. The site at West Cowes appears to be quite good for London, Midlands, North and West, but not so good for South and East. However, we look forward to renewing contacts with many of our old friends and hope to work many of those whom we have not had the opportunity to work before. The actual frequency has not yet been finally decided upon, but we shall certainly be operating in the zone for that area. Listener reports are particularly welcomed, and all will be acknowledged. Speaking of Listener reports reminds us to issue a little " finger shaking " to those listeners who send in reports to *locals*. Once again we say—NEVER send a report to any station within 30 miles or so unless he is particularly asking for reports from ANY distance. One case recently occured. A well-known station in QSO with another at 150 miles, received a report from a listener 10 miles away ! ! It's a waste of time and effort, and is liable to annoy the operator rather than help him.. We are in no way attempting to under-rate the usefulness of the listener to the transmitting fraternity. In fact, we should like to see dozens more of them. We know how difficult it is for the beginner to refrain from sending a QSL to the first station he hears on VHF, but remember that a well-situated station *knows* that his signals are *always* well heard at 30 miles or so, even on the simplest type of equipment. So concentrate on the " over 50 mile " stations; that is when listener reports begin to be really useful.

Switzerland on the VHF Map

HB1IV's excursion to the 6,000-ft. peak during September seems to have created the high spot of the month, and stirred up quite a lot of interest. Our latest information is that over 20 G stations managed to work the Swiss station during the week-end of September 12th-13th. All credit to the HB station for his fine work. This is the kind of thing which makes VHF operation well worth while.

Another " Phoney "

Round about the same time as the Swiss episode, many stations reported hearing OH5NR on 145.090 Mcs. This turned out to be another *phoney*. We just cannot imagine how anyone can indulge in a " leg pull " of this kind. If, in fact, it was someone putting out the OH call for the sole purpose of causing some excitement, he certainly needs his brains examined. It's almost as bad as a station calling fictitious DX stations in order to try and impress anyone who may be listening. There is just no sense in it, and operators indulging in such capers should be thrown off the air. Unfortunately, these types are always with us, and it seems that little can be done about it. It's a great pity though, that these half-wits should be let loose on VHF.

Transmitter Reports

We are indebted to " Old Faithful " G3WW, G5LK and Gw3ENY, the only three transmitters who took the trouble to drop us a line this month. Many others have written to say how sorry they are to see the cut in VHF space, but they do not seem to realise that we cannot claim more space if we have not the material to fill it. Anyway, we try to do *our* best each month.

G3WW (Wimblington, Cambs.), still as active as ever, found conditions good enough to work Montgomery, Somerset, Wiltshire and Nottinghamshire on September 5th. On the 6th, F3LQ, ON4HN, G2BMZ, and many others. On this same evening, G2BMZ worked OZ2FR but no sign of the OZ was heard at Wimblington. On the 7th, G6NB worked LAIKB and an LA8, and G5YV worked DL9MZ. G3CGQ was heard calling Gi3BIL and G4MW worked Gi3GBZ. Once again no sign of these stations was heard by G3WW but he worked Ei2W.

During the week-end of the 12th-13th, G3WW completely forgot that the HB station would be on, and so missed the chance of a QSO. On the 20th, G3WW gave G3DOV (Norfolk) his first QSO on 2 metres. Since September 21st, G3WW has been working with a temporary beam as the feeders to the 5-over-5 broke off at the aerial during a gale.

Gw3ENY (Llandudno) corrects an error which appeared in our QRG list. He was listed as *G3ENY* and has in fact, been a Gw for two-and-a-half years. His present QRG is 144.500 *Mcs.* (Apologies OM.) Gw3ENY reports on a recent " Hit and Run " effort in Anglesey. A full moon and a calm night inspired some portable activity in that rare county, and with the aid of a map and the moonlight a site was selected at Llanddona, 500 ft. above sea level (3 miles NW Beaumaris). The portable rig, using a 832 in the final, and a 3-element Yagi produced contacts with G2HGR, G3EPW, G3IOO, G3IWJ, G3IUD, G3FMI and G6NB. G5UD and G5YV were heard.

G5LK (Reigate, Surrey) made his first contact with G2MBZ during September. Les is now operating on his new QRG or 145.180 Mcs which now puts him in the correct zone. A new transmitter is now in operation, employing an 829 in the final, and Les wishes to acknowledge the kindness of G3GBO who built and installed the new transmitter for him.

Listener Section

It's good to see that Listener interest is being maintained even if it's not increasing, and we do most sincerely thank all the following reporters for the interesting news which they have taken the trouble to send. Although we may appear to deal somewhat briefly with the Listener reports, we do assure you that they are carefully checked and studied, and many notes are taken each month and kept in our files for future reference.

M. McBrayne (Westcliff-on-Sea) was away on business for two weeks during September so his survey is somewhat restricted. However, he turns in an interesting report. Eighty-odd stations were heard during his two weeks of listening, about half of them being over 50 miles distant. The best spells appeared to be between the 5th and 8th, 12th, 13th and 14th, and a final burst on the 25th. An excellent log of stations over 50 miles is submitted.

Peter Blair (Mill Hill) is still using the Superregen as the new converter is not quite up to operational standard.

The record " Heard " distance has been put up by 5 miles, G6CW now having been received. Other good DX stations heard are G5TZ/A, G2DSW and G3FAN. The latter two were well heard at loudspeaker strength. A QSL from G5TZ/A brings his total returns to 100 per cent.

A. W. Blandford (Mitcham, Surrey) has had the beams down for overhaul before the winter sets in. They are now re-erected on a new mast some 6 ft. higher than previously. The 2-meter beam is now at 36 ft. and the 70 cms beam 2 ft. lower. The total number of stations now heard on 2 metres is 579. Fifteen stations were heard during the 70 cms test week-end, G2DD, FKZ, AD, QY, G3ECA, FP, GDR, HBW, G4CG, G5DT, TP, RO, G6NF, YP and G8KZ. Two new stations, G2DTO and G5DS, have been heard, bringing the 70 cms total to 44.

R. W. Russell (Southampton) says that the first fortnight in September produced some of the best VHF conditions since last March. One of the best contacts for the South-West during this period was the QSO between G3AGA and PEIPL. French stations were audible almost all the time. During the week-end of September 12th-13th, HBIIV was audible for a long time at 56/79. Stations heard over 200 miles include DL3FM, ON4BZ, 4HN, Ei2W, G2FCL, F3JN, 3LQ, 8GH and 9DI.

Len Whitmill (Harrow Weald) has found poor activity on most nights. The best DX heard was G3AGA who provided Len with a new county and a QSL by return post. Gw8UH has also again been heard at S8. New stations heard since the last report are, G2CUJ, AVO, CNT, G3AGA, WS, CJY, bringing his total all-time score on 2 metres to 526 stations.

Call-sign	*QTH*	*QRG normal*	*QRG when last heard*
G6AG	Bexley, Kent	145040	same
G6BO	Harrow, Middx.	145625	,,
G6BZ	Windlesham, Surrey	145300	145025
G6CB	Wimbledon, Surrey	145190	144805
G6CH	Benfleet, Essex	145080	same
G6CI	Kenilworth, War.	144475	,,
G6CJ	Stoke Poges, Bucks	144765	,,
G6CW	Nottingham	144168	144580
G6DP	Frodsham, Cheshire	145010	same
G6DT	Horndean, Hants.	145060	,,
G6FK	Wolverhampton	144505	,,
G6GR	Rickmansworth	144775	,,
G6HD	Beckenham, Kent	144910	145040
G6HG	Ealing, Middx.	144735	same
G6HK	Mottingham, Kent	145790	,,
G6JI	Walthamstow, London	145350	,,
G6JP	Pinner, Middx.	145050	,,
G6HC	Thornton Heath, Surrey	144550	,,
G6LC	Lowton St. Mary's Lancs.	144410	,,
G6LI	Grimsby, Lincs...	144585	144490
G6LK	Cranleigh, Surrey	145220	same
G6LL	Cuffley, Herts.	144140	,,
G6LO	Sydenham, London	145375	,,
G6LR	Westminster	145465	,,
G6NB	Brill, Bucks.	145120	145070
G6NF	Shirley, Surrey	144720	same
G6OH	Ascot, Berks.	145110	,,
G6OT	Southgate, Middx.	145310	,,
G6NR	Chingford, Essex	145090	,,
G6LX	Croydon, Surrey	144880	,,
G6OU	Basingstoke	145440	,,
G6PA	Petts Wood, Kent	145100	,,
G6PG	Dartford, Kent	145110	,,
G6PS	Sheffield, Yorks	144306	,,
G6QN	Colliers Wood, London	145160	,,
G6SB	Pinner, Middx.	145000	,,
G6SN	Birmingham	145170	144610
G6TG	Scarborough, Yorks.	145130	same
G6TF	Sheffield, Yorks.	144370	,,
G6TL	Stalybridge	145750	,,
G6TS	Bournemouth	145260	,,
G6TA	Balham, London	145150	,,
G6UH	West Cowes, I.O.W.	145400	(approx); not yet operating at new QTH
G6UW	Cambridge	145200	same
G6VA	Warlingham, Surrey	145120	,,
G6VC	Northfleet, Kent	145205	,,
G6VX	Cheltenham ?	145000	,,
G6WU	Southgate, Middx.	144914	,,
G6XM	Farnborough, Hants.	145195	,,
G6YO	Bradford, Yorks.	144150	,,
G6YP	Denmark Hill, London	145000	,,
G6YU	Coventry, War.	144725	,,
G6XY	Kenilworth, War.	144455	,,
G6XX	Goole, Yorks.	144405	144175

CALLS HEARD SECTION

M. McBrayne (Westcliffe-on-Sea)

Over 50 miles:—G2BMZ, CNT, DSW, DVD, FJR, HCG, HOP, PU, UN, XV. G3AGA, AJP, BKQ, CZY/A, CFK, DJX, EVV, FAN, GDR, GHO, IIT, NL, WW. G4MW, RO, SA. G5BD, TP, TZ/A, UD, YV. G6LI, NB, XX. G8OU. Gw2ADZ. ON4BZ, HC, HN. PAØFC. WA, PEIPL, F3LL, 8GH.

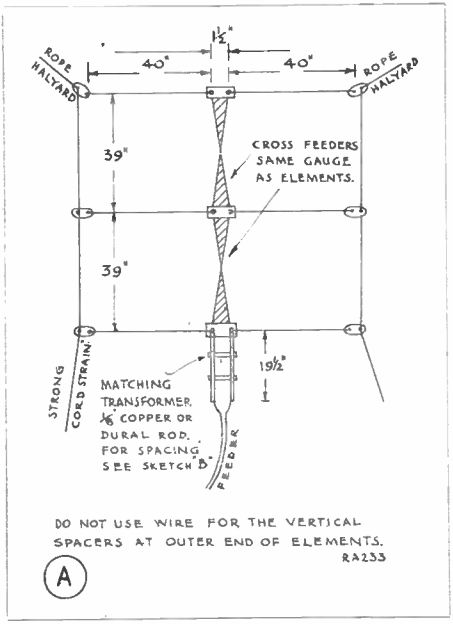
(*Contd. on p. 432*)

TALKS ABOUT VHF

by H. E. SMITH, G6UH

Stacked Arrays

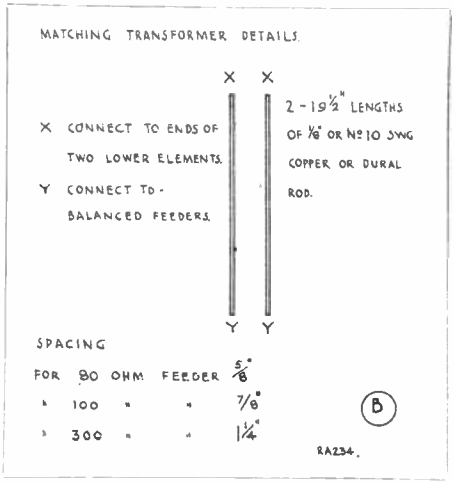
Many beginners on the VHF bands seem to think that the Stacked Array type of aerial is a complicated and difficult one to design and get into operation. Actually, quite the reverse applies. It is the Yagi aerial which presents the greater problem. Even the simple three-element type requires a large amount of calculation, and sometimes quite a bit of "cut and try" before it will operate anything like as efficiently as it should. That is one reason why some people say that a certain type of Yagi aerial is the best they have ever used, while others, using exactly the same type, say that the results are no better than a dipole with reflector. One has succeeded in obtaining correct matching, while the other has not taken enough trouble in his calculations, or is perhaps, unable to calculate the impedance correctly. We are in no way attempting to decry the efforts of those who cannot get the Yagi aerial to work correctly. It is indeed a very difficult job, and much of the knowledge only comes from experience over a long period.

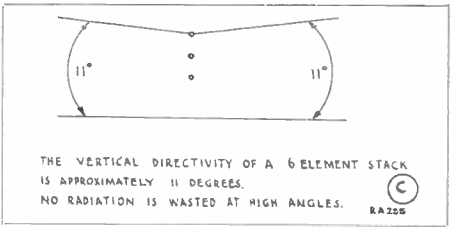


Text-books are a great help in this direction, but it is quite useless just blindly following the instructions given in handbooks, because the majority of these deal only with the ideal theoretical case. It is not perhaps generally realised that local conditions "rule the impedance" of the Yagi far more than with any other type of aerial. For instance, a Yagi aerial constructed from details given in a handbook, and having a stated impedance of, say 15 ohms, before the folded portion is added, may well be as little as 8 ohms when erected, because of the presence of a gutter, or perhaps a water tank in the roof. So when the folded portion is added, with perhaps a multiplier of 4 times, instead of the aerial matching nicely to 60 ohms, the actual impedance is only just over 30 *ohms*. We are not quoting an extreme case. This could happen *very* easily. Now why not start with a simple stacked array? This type of aerial is much easier to construct, and it is extremely simple to arrive at the correct feed impedance. Then again, the stack is not affected by nearby metal objects to anything like the degree that the Yagi is, because of its much higher impedance and its larger physical proportions. There is no need to go to the expense of tubing to start with. Try it out with wire as the elements. Use at least 16 SWG preferably enamelled, and sling the whole thing up between the house and a pole. This will provide at least 40 degrees coverage back and front (approximately 70 degrees for 3 db down). Thus, by using two at right-angles to each other, you will obtain almost 360 degrees coverage without the necessity for any rotating mechanism. The stack described herewith will work first time, provided your measurements are correct, and there should be no need for any further adjustment. The element lengths are for any gauge wire between 12 and 16 SWG, and the matching section is 10 SWG or ⅛ in. copper or aluminium. Balanced feeder *must* be used. (It is possible to use co-axial feeder with a "balun" but this only complicates the job for the beginner.)

The matching section remains the same length for any type of feeder, and it is only the spacing which varies. The three conditions which are given, cover most types of balanced feeder commonly in use, but the higher impedance is recommended because of its lower losses.

The drawing is self-explanatory and no trouble should be experienced in the construction. In the particular details given, we aimed to make the whole thing as simple as possible, but the constructor may like to use his own ingenuity in the methods he adopts in insulating the elements at the centre connection. Small stand-off insulators could be used instead of the perspex strips shown, making the affair somewhat stronger if a little heavier.





Stacked Array Impedance

A very simple method of arriving at a close approximation of the radiation resistance of a stack is to divide 1800 by the number of *pairs* of elements used. For instance, a 6-element stack has three pairs of elements, 1800 ÷ 3 = 600 ohms. A 12-element stack may therefore be fed with 300-ohm feeder without the necessity for a matching section. The matching section shown in the drawing is an Impedance Transformer having an impedance equalling the goemetric mean of the aerial and feeder impedances. It is quite a flexible arrangement and in no way critical in adjustment. If for instance, the impedance of the matching transformer should be 250 ohms according to calculation, it will not matter one scrap if it is 230 or 270 ohms. It will not be possible to detect any change on a SWR meter.

Gain of Stacked Arrays

The "gain over a dipole" figure for a 6-element stack, is just under 10 dbs and *all* the gain is at the right-angle, 11 degrees or less. (With the Yagi much of the gain is at high angles—over 40 degrees). For each pair of elements added above 6, another 2 dbs may be added to the front, a back gain figure. It has been shown that a properly constructed 12-element stack without reflectors or directors, has a front *and* rear gain equalling that of a Yagi with 18 directors ! ! Remember also that this gain is *not* secured, as with the Yagi, at the expense of coverage. The front and rear lobes remain exactly the same width, however, many elements are added vertically.

On The Higher Frequencies

(*Contd. from p. 430*)

Peter Blair (Mill Hill)

G2AIW, AHP, CUJ, DSW, DTO, DUV, FVD, DD, YC, WA. G3ANB, BEX/P, BLP, CAT/A, CVO, EGV, ENI, EVV, FAN, FKZ, FQS, FYY, FZL, GBO, GDR, GKJ, GSE, HXK, IEX, SM. G4AU, RO, SA. G5BC, MA, NF, QL, SZ, TZ/A. G6AG, CW, JP, NB, NF, RM, SG, TA, UH, YP. G8CK, SK.

R. W. Russell (Southampton)

150-200 miles:—G2BAT, HGR. G3AGA, CFK, CUZ, FMI, IOO, IUK. G5BD, YV. G6LI, XX. G8MW.

L. A. Whitmill (Harrow Weald)

G2AHP, AIW, AVO, CNT, CUJ, DD, DDD, DUV, DVO, FZU, HDZ. G3AGA, BKQ, BNC, BVG, CJY, ENI, FAN, FOU, FSD, FXG, GBO, GHO, GSE, GVC, WS, RO, SA. G5BC, DT, LK, MA, NF, TZ/A. G6JK, LR. G8DV/A, KZ. Gw8UH, ON4HN, PEIPL.

And now we are afraid, your editor must join with our VHF scribe in thanking all those who have contributed to this feature in the past by submitting their reports.

We know all our VHF readers will join with us in thanking our scribe for the most energetic way in which he has conducted this feature. As we have said elsewhere, we do not propose saying "goodbye" to you all, because we are certain that you will find much to interest you in *The Radio Constructor*. VHF features will appear in it which we know will appeal, so we trust that those who are not already readers of that periodical will transfer their affections to it.—Ed.

MODIFICATIONS to the B36 RECEIVER

by

C. B. RAITHBY, G8GI

A considerable number of these most excellent communication receivers, Marconi type B36 (and certain near equivalents) have been available on the surplus market.

In their original form they are not very suitable for amateur use but they lend themselves to modification, as, unlike most communication receivers, there is plenty of space available.

The writer has successfully modified two of these receivers. The first modification was an elaborate one, but the second, using the knowledge gained from the first effort, was much simpler. It is proposed to describe the latter first, some details of the more elaborate modification being given at the end.

All the receivers have a full circuit diagram on the inside of the front panel protecting lid and it is proposed to refer to the components by number.

In original form the receivers have no internal power pack, no AVC system and the audio output is small, all considerable disadvantages which are removed by the modification.

First remove S1, S2, S6, C10 and the associated DF components that are on the left of the coil turret (viewed from the front). Locate connections a and b on L4 the aerial coupling coil, earth b and take a, via a length of coaxial cable, to an aerial terminal on the front panel where the "search aerial" panel box was located. Disconnect C12 from V1 grid.

This clears a space above and below the left-hand side of the chassis on which can be built an orthodox power unit, chassis mounting mains transformer, 250-0250 volts at 120 mA, 6.3 volts 3 amps, 5 volts 2 amps, rectifier valve holder, smoothing choke and electrolytics. Take the HT positive line through an ON/OFF toggle switched fitted in the place vacated by S6.

Then remove T3 and the decoupling unit W3496 which are not required. Locate the "hot" side of the valve heater wiring, connection 4, join this to one side of the 6.3 volt transformer winding and earth the other. Remove VR2, R15 plug and VR1. These provide mounting places for the new controls. Use one for a mains ON/OFF switch position.

Now comes the more difficult part. All the valve cathodes are directly joined to the earthed heater pin or vice versa and it is necessary to unearth all cathodes i.e. valve pin No. 8. Connect to the cathode of V1 to V6 inclusive a 270 ohm $\frac{1}{2}$ watt insulated type resistor and also a 0.1μF paper condenser which earth to the nearest point on the chassis. If necessary drill and use self-threading screws to provide convenient soldering tag points. Earth V3's cathode resistor only. The arrangement for the cathode bias control of V1, V2, V4, V5, V6 (the RF and IF stages) is a matter of personal choice and the following circuit variations are suggested,

(i) Separate RF and IF gain control, i.e. join the "earthy" ends of V1 and V2 cathode resistors together and take to the moving arm of a 3000 ohm wire wound potentiometer with one end earthed. Do the same with the cathode resistors of V4, V5 and V6, these going to a separate potentiometer. Bye-pass the moving arm of each control with a 0.1μF condenser.

(ii) Single combined IF and RF gain control. Join V1, V2, V4, V5, V6 cathode resistors together and take to a common control potentiometer.

(iii) As (ii) but excluding V6 from the manual control.

Next, identify all the valve grid lines after the decoupling resistors R2, R6, R11, R14, R17 and R20. Earth R11 at point 5, i.e. no AVC on the frequency changer valve V3. Join the ends of all these resistors together and take to an insulated pillar (X for future reference).

Now locate all the HT supply lines to each valve after the decoupling resistors R4, R8, R57, etc., and join all these except R19 of V5 to the HT ON/OFF switch already mentioned. Remove S4 (the meter switch) and its associated leads and resistor network R59-R69 leaving the meter isolated. Join R19 to the HT ON/OFF switch via the meter. This will act as a tuning meter by AVC action, maximum signal giving minimum reading.

Remove the original grid bias network R26-R31 and C63-C68 and the meter rectifier.

Next, consider V7 the double diode triode valve. First disconnect the screened lead from the top of R47. Connect a 1 megohm potentiometer, mounted on the front panel in the hole vacated by the meter switch (reverse the indicator plate for better appearance), across R47 or in place of it. Join the disconnected screened lead to the potentiometer's moving arm. This gives the AF gain control.

Disconnect diode pin 4 of V7 from earth. Connect a 100 pF ceramic or mica condenser from V6 anode to this diode and a 1 megohm resistor to earth. Take the AVC voltage via a 1 megohm resistor and 0.1 μF decoupling condenser to the point X already mentioned. This gives an orthodox AVC circuit. An improved AVC characteristic can be obtained if V6, the last IF valve, is not controlled, i.e. earth R20. Connect an ON/OFF switch located on the front panel so that AVC line (point X) can be earthed when listening to CW. Add a 2000 ohm cathode resistor to V7, suitably bye-passed, ex-C68 will do the job. Insert a 450 ohm V8 cathode resistor, also bye-passed by about a 25 μF electrlytic condenser. Earth both these resistors and also R40. Remove T2 and substitute an orthodox speaker output transformer. Remove C79 and R37A. Remove R41 and R42 at the Phone jacks. One of these jacks can be used for the speaker connections, make this one self-shorting. The other can be used for Phones by connecting a 0.01 μfd condenser from V7 anode but not with self-shorting contacts. Short out, or remove, R48.

Check HT, screen, anode and cathode voltages first setting the RF IF gain control(s) to maximum.

Realign the IF stages, don't forget to undo the locking screws first. The IF frequency is 600 kcs.

Realign the RF and oscillator stages using the trimmers at the HF end and the iron cores at the LF end of each range. Exact alignment according to the hand-calibrated dial is possible.

The result will be a self-contained receiver of great sensitivity, selectivity and reliability.

No system of band spread other than the mechanical arrangement referred to later was evolved that did not upset, to some degree, the high degree of alignment accuracy, so none was included.

The more elaborate modification mentioned at the beginning included,

(1) A stabilised supply voltage for the RF and IF valve screens and V3 oscillator anode obtained via an S130. Disconnect R53, R22, R24, R23, R54 and R25.

(2) A monitor speaker mounted in the original meter hole, and HRO type " S " meter being mounted on the front left of the panel. Drilling this hole requires a certain degree of patience and skill.

(3) The addition of a double-diode valve between V6 and V7 for detection, AVC and noise limiting. This needs a new valve holder on the rear right hand of the chassis just to the left of V8.

(4) The substitution of a pentode 6J7 high gain audio stage RC coupled to the output valve in place of V7 and T1.

(5) Fitting of a large marked dial to the inner existing slow-motion knob for band spread calibration.

(6) Substitution of USA all-metal valves 6K7, 6K8, etc., for those originally specified.

Other suggestions for further improvement but which have not been actually done are the addition of an internal crystal oscillator, say 100 kcs, for calibration, tone control and variable BFO pitch from the front panel.

The writer will be pleased to answer any reasonable queries on the modifications carried our.

CLUB NEWS

Torbay Amateur Radio Society. Hon. Sec.: L. H. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot.

Report of Meeting held on October 17th, 1953, at Y.M.C.A., Torquay

A welcome was extended to a new member, G4RD, who is now living in the district.

A letter of appreciation of the efforts of our members, who assisted in the recent RSGB "Hamfest" was read, from G3EFY, the County representative for Devon.

The Chairman, G2GK, announced the following arrangements for forthcoming meetings:

November: A representative from a Torquay firm of electrical instrument manufacturers will give a talk on methods of production of same, etc.

December: A talk will be given by various members, of their antennas. It is hoped that this will assist members who have been recently licensed to choose the most suitable antennas for their frequencies.

Further programmes have been arranged, and will be announced later; a full programme has been arranged up to, and including, March, 1954.

Meetings are held on the third Saturday each month, at the Y.M.C.A., Torquay—next meeting on November 21st, 1953.

Southend and District Radio Society. Hon. Sec.: J. H. Barrance, 49 Swanage Road, Southend-on-Sea.

Mr. Crispin has expressed his willingness to start a technical class covering the syllabus of the Amateur Examination, "buckshee," if a sufficient number are interested. His previous pupils were 100 per cent successful—opportunity knocks.

Our last meeting took place on Friday, October 16th, at 19.45 hrs. in Room "L," Queen's Road Annexe, Municipal College, when Mr. J. Wallace, this year's winner of the Pocock Cup, gave a non-technical explanatory demonstration with his home-built Williamson amplifier.

Mr. Drury of Romford won the trophy at the final RSGB National DF Contest. Two Northerners were second and third, and our Mr. Seabrook was fourth. The usual "top knotchers" were among the "also ran" on this occasion.

Our congratulations to Mr. H. A. Savage (G2SA) of Burnham-on-Crouch, on obtaining the ARRL Certificate for working 100 different countries since 1945.

Tops CW Club. Hon. Sec.: J. P. Evans, GW8WJ, 2 Fforrdd Ty Newydd, Meliden, Flintshire.

Future copies of "QMF," the Club bi-monthly news-sheet, are now assured due to the excellent response to our call for assistance to purchase a typewriter for use at HQ.

The current copy of "QMF" carries details of an excellent coupling system as used by our member Ted Burgis, GM6FB. This system is ideal for those operating in restricted space . . . a 15-ft. aerial gives FB results when used with 6FB's coupler. Several other members endorse Ted's claims too.

PAØAA was not audible here on the last Code Proficiency run (September 27th) and it is not yet known whether the Run was cancelled or whether it was due to bad conditions. VERON report that over 140 certificates have so far been issued and almost as many applications were rejected.

The following UK Hams are known to have qualified at various speeds. G2ATM, 2AYG*, 2YS, 3ABG*, 3BDS*, 3CED*, 3EZZ*, 3IDG*, 3IMV*, 3INR*, 5JU*, 8JR*, GM3EFS*, GW8WJ* and five SWLs.

(* *Denotes Tops membership.*)

Items of interest:

1. There are over 200 Tops members in 17 countries.
2. About 60 of these are RAF or ex-RAF types.
3. Fifty-odd members have been in either RN or MN services.
4. Fourty are ex-Army types, mostly Signals but there are a few REME types (like your Scribe, hi).

Our membership lists always indicate each members service and several reunions between old pals have been established as a result.

Latest recruits are:—G2AYG, G2ZZ, G3FFL, G3IOW and G3IVH.

Norwood and District Group RSGB. Hon. Sec.: W. G. Mott, 199 Tilson House, Tilson Gardens, S.W.2.

Meetings are held on the third Saturday of each month commencing at 7.30 p.m. at Windermere House, Westow Street, Crystal Palace (not far from bus terminal).

Any interested readers are invited to attend. Further details may be obtained from the Group Secretary, D. Hill, 9 Addington Grove, Sydenham.

Birmingham and District Short Wave Society. Hon. Sec.: F. C. Cook, 67 Regent Road, Handsworth, Birmingham, 21.

The Club's activities continue at a satisfactory level, and for the November General Meeting, which is the second Monday of the month, a talk will be given by a member, entitled " Close Circuit T.V."

This popular subject promises to be very entertaining, and visitors will be very welcome at the Society's Headquarters.

Edinburgh Amateur Radio Club. Hon. Sec.: D. Black, 16 Edina Place, Edinburgh.

The following Programme has been arranged for this year.

November 4th, Junk Sale.

November 18th, RSGB Lecture on Tape.

December 2nd, Audio Amplifiers (T. Telford).

December 16th, TV Construction (C. Patrick).

The Club station (GM3HAM), will operate every alternate week. New members and visitors welcome.

Clubrooms: 16 Bothwell Street (Downstairs), Easter Road.

Secretary: D. Black, 16 Edina Place, Edinburgh. Phone: ABB 1363.

Clifton Amateur Radio Society. Hon. Sec.: C. W. Bullivant, 25 St. Fillans Road, Catford, S.E.6.

At the Society's Annual General Meeting, held on September 11th, the following were elected as officers for the ensuring year: Chairman, J. Lambert (G3FNZ); Hon. Secretary, C. H. Bullivant (G3DIC); Hon. Treas., N. Moore; Committee, Messrs. E. Smith and D. Veasey.

The Society continues to meet every Friday at 7.30 p.m. at the Clubrooms, 225 New Cross Road, S.E.14, and new members and visitors are always welcome.

The DF Field Day held on Sunday, September 6th, was blessed with fine weather and a good time was had by all. The event was won by D. Bennett who with 14 points from three field days wins the Society's DF Shield for 1953. The Society's crystal controlled portable transmitter operating under the call-sign G3GHN/P, made numerous contacts with an input of less then 1 watt in the 3.5 Mcs band.

Preparations are in hand for participating in the MCC during November, and a committee has been formed to arrange operators, log keepers, etc.

Recent events on Friday evening have included a talk on VHF by one of our junior members, G3JRC, an entertaining quiz devised by G3FNZ and a Junk Sale. A full programme has been arranged by the committee covering the next few months, one of the highlights being a film show.

QRG Section

Here is another list of frequencies for your notebook. Once again we make no claim that they are within any specified limits, but they are all very close, and will save you searching in the wrong part of the band.

G3IOO	(Oswestry, Salop) ..	144.16	Mcs
G3IRA	(Swindon, Wilts.) ..	145.32	,,
G3ITI	(Cottingham, Yorks.)	144.36	,,
G3IIT	(Cambridge) ..	144.80	,,
G3IUK	(Derby)	144.52	,,
G3MY/P	(Sheffield, Yorks.) ..	144.37	,,
G3NL	(Great Malvern, Worcs.)	144.75	,,
G3WW	(Wimblington, Cambs.)	144.83	,,
G4AP	(Swindon, Wilts.) ..	145.13	,,
G4GR	(Marshfield, Mon.) ..	145.70	,,
G5RO	(Hastings, Sussex) ..	145.23	,,
G5RW	(Ilkeston, Derbys.) ..	144.60	,,
G5RZ	(Leighton Buzzard, Beds.)	144.71	,,
G5UF	(Dorchester, Dorset)	145.38	,,
G5YV	(Morley, Leeds) ..	144.21	,,
G6CI	(Kenilworth, Warks.)	144.45	,,
G6CW	(Nottingham) ..	144.57 144.13	,, ,,
G8DM	(Shrivenham, Wilts.)	144.77	,,
G8IL	(Salisbury, Wilts.) ..	145.18	,,
G8KL	(Wolverhampton, Staffs.)	144.55	,,
Gc3EBK	(Guernsey, C.I.) ..	145.21	,,

Here are some of the Continentals.

F3CJ	(St. Amand, Nr. Valenciennes) ..	144.77	,,
F8AA	(Boulogne)	144.82	,,
F8GH	(Beauvais)	144.88 144.96	,, ,,
F8JR	(Lille)	144.44	,,
F8NW	(Hardelot-Plage) ..	145.19	,,
ON4BZ	(Brussels)	144.90	,,
ON4HC	(Antwerp)	144.38	,,
ON4HN	(Antwerp)	144.47	,,
ON4LN	(Malines)	144.14	,,
ON4UV	(Nr. Brussels) ..	144.86	,,
PAØFB	(The Hague)	144.42	,,
PAØFC	(Maasluis)	144.69	,,
PAØNL	(Amsterdam) ..	144.98	,,
PAØRK	(Scheveningen) ..	144.73	,,
DL3FM	(Mulheim-Ruhr, Nr. Essen)	144.69	,,
DL3QA	(Alsdorf-Aachen) ..	144.79 145.30	,, ,,
SM7BE	(Lund)	144.72	,,

TELEVISION RECEIVER DESIGN—I.F. STAGES

By A. G. W. Uitjens. 172 pages, 114 illustrations. Price 21s. Distributed in England by Cleaver-Hume Press Ltd., 42a, South Audley Street, London, W.1.

The Philips Technical Library has this latest addition, Book VIIIA, as a companion volume to those already established as standard references on radio theory. Dealing entirely with the I.F. stages in television receiver design, this present book adequately covers all the factors which need careful attention in order to produce maximum gain with required bandwidth. The attainment of satisfactory noise level, and the calculation of noise factor, is of particular interest where the design of "fringe area" receivers is concerned.

In an exposition such as this where one specialised branch of design technique prevails, it is inevitable that the mathematics of the subject should be given some prominence. The author has kept the mathematics as simple as possible in the main body of the book, and gives the derivations of many of the formulae in the several Appendices.

Gain and bandwidth with two-terminal and four-terminal networks occupy only a few pages, but their applications in multi-stage amplifiers employing staggered tuning, and the response curves obtainable, are given fuller treatment. Distortion in double- and vestigial-sideband systems is discussed in another chapter.

The effects, and the use of, feedback in I.F. amplifiers is given over to a large part of the book. It is enlightening to read that the chassis can become a wave-guide for feedback energy, and that a remedy is to be found in the use of a long, narrow chassis.

The practical considerations of circuit design have not been forgotten; a chapter on this aspect deals with some typical examples of sensitivity, gain, selection of valves, staggered tuning and distortion.

There is no doubt that this reasonably-priced book can be of considerable value to the design engineer.

NORMAN CASTLE.

THE BANDHOPPER

Several errors have come to light in the component values, etc., given for this transmitter.

On page 332, ratio L1 to L2 equals 2.4 to 1—NOT 7 as shown. R8 is not shown. It should be 100 k ohms.

On page 342 in the Component List:

RFC should read: 2.5 mH choke.

L9 is not shown. It should read: 7 turns 18 SWG on ½ in. diameter 1 in. length, self-supporting.

C10 should be 25 ufd 25 v. wkg.

In the circuit diagram on pages 340-341, S1B 28 Mcs position should be connected to C8. The capacitors labelled C8 in the final plate circuit—the by-pass capacitors—should read C9.

SHORT WAVE BROADCAST STATION LIST

(T) Denotes Tentative Frequency or Station Under Construction.
(V) Denotes Frequency Liable to Variation.
(E) Denotes Experimental Channel.
(I) Denotes Inactive at the time of publication.

Kcs.	*M.*	*Call*	*Location*
7070	42.43	CR6RG	Dondo, Angola.
7075	42.40	GRS	Daventry, England.
7079 (V)	42.38		Enugu, Nigeria.
7085	42.34		Jannina, Greece.
7088	42.32	EDV1O	Madrid, Spain.
7090	42.31		Makronisos, Greece (FBS).
7092	42.30	YI5KG	Baghdad, Iraq.
7095	42.28		Moscow, USSR.
7097	42.27	APK2	Karachi, Pakistan.
			Katmandu, Nepal.
7100	42.25	YDJ2	Djogjakarta, Java.
			Martorell, Spain.
			San Feliu de Guixois, Spain.
			Plascencia, Spain.
			Molins de Rey, Spain.
			Rivadavia, Spain.
			Villacarillo, Spain.
7104	42.23		Murcia, Spain.
			Bangkok, Thailand.
7105	42.22		"Radio Free Europe."
			Warsaw, Poland.
			Paris, France.
			Cordoba, Spain.
7110	42.19	MCS	Daventry, England.
			Moscow, USSR.
			Rome, Italy.
		EAJ7	Cuenca, Spain.
7115	42.16		Munich-1, Germany (US Zone), (VOA Relay).
			Moscow, USSR.
7120	42.13	GRM	Daventry, England.
		VUD5	New Delhi, India.
			Singapore, Malaya.
7125	42.11		Warsaw, Poland.
		VUD	New Delhi, India.
			Moscow, USSR.
		VQ6MI	Hargeisa, British Somaliland.
7126 (V)	42.10	EA9AA	Tangier, Tangier.
			Villanueva del Arzobispo, Spain.
7132	42.06		Warsaw, Poland.
7133	42.06		Moscow, USSR.
		CR6RC	Luanda, Angola.
7135	42.05	MCM	Daventry, England.
		BED7	Taipeh, Taiwan.
(V)			Hollandia, Dutch New Guinea.
7140	42.02		"Radio Free Europe."
		APD2	Dacca, Pakistan.
		CR6RE	Malange, Angola.
			Merida, Spain.
7142 (V)	42.01	CR6RL	Luanda, Angola.
7145	41.99		Warsaw, Poland.
			Damascus, Syria.
			"Radio Free Europe."
7150	41.96	GRT	Daventry, England.
			Moscow, USSR.
(V)			Berlin, Germany (USSR Zone).
		APD2	Dacca, Pakistan.
			Warsaw, Poland.
		OLR8A	Prague, Czechoslovakia.
		OQ2AB	Elizabethville, Belgian Congo.
7155	41.93		"Radio Free Europe."
			Moscow, USSR.
			Warsaw, Poland.
		VUD7	New Delhi, India.
7160	41.90		Caraquez, Spain.
7161	41.89	CR6RB	Paris, France.
7165	41.87		Benguela, Angola.
			"Radio Free Europe."
			Moscow, USSR.
			Kiev, Ukrainian SSR.
7170	41.84	VUD	New Delhi, India.
			St. Denis, Reunion Isle.
7175	41.81		Warsaw, Poland.
7177	41.79		Moscow, USSR.
7180	41.78		Moscow, USSR.
			"Radio Free Europe."
		JOB2	Yamata, Japan.
		CR4AB	St. Vincent, Cape Verde Is.
7185	41.75	GRK	Daventry, England.
7190	41.72		Moscow, USSR.
			Paris, France.
		VUD	New Delhi, India.
			Colombo, Ceylon.
7192	41.71		"Radio Free Europe."
7193	41.71		Tangier, Tangier ("R. Africa.")
7195 (E)	41.70	VPD2	Suva, Fiji Islands.
7198	41.68	CR7IB	Beira, Mozambique.
			"España Independiente" (Clandestine.)
7200	41.67	GWZ	Daventry, England.
			Belgrade, Yougoslavia.
			Moscow, USSR.
			Courier-2 (VOA Relay).
(V)			Djeddah, Saudi-Arabia.
(I)			Singapore, Malaya.
		OQ2AC	Elizabethville, Belgian Congo.
			Santa Isabel, Spanish Guinea.
7202	41.66		Cadiz, Spain.
7205	41.64		Warsaw, Poland.
			Hué, Indio-China (Vietnam).
7210	41.61	GWL	Daventry, England.
		HEI3	Schwarzenburg, Switzerland.
		LLS	Tromsö, Norway.
			Moscow, USSR.
		VUD1O	New Delhi, India.
		VUC2/3	Calcutta, India.
		FHE7	Dakar, Senegal (FWA).
			Abidjan, Ivory Coast (FWA).
			Melilla, Spanish Morocco.
7215	41.58		Moscow, USSR.
(I)		VLC7	Shepparton, Australia.
			Vientiane, Indo-China (Laos).
(E)		VPD2	Suva, Fiji Islands.
7220	41.55		Tangier-10, Tangier (VOA Relay).
			Budapest, Hungary.
			Moscow, USSR.
			Paris, France.
		VLA7	Shepparton, Australia.
(I)		YDF5	Djakarta, Java.
(I)		ZL12	Wellington, New Zealand.
		ZQP	Lusaka, Northern Rhodesia.
7225	41.52	VUD1O	New Delhi, India.
			Moscow, USSR.
		APD2	Dacca, Pakistan.
7230	41.49	GSW	Daventry, England.
			Saigon, Indo-China (Vietnam).
		FET22	Oviedo, Spain.
		CR6RM	Moçamedes, Angola.
7235	41.46		Tangier-1, Tangier (VOA Relay).
			Moscow, USSR.
7237 (T)	41.45	VS4S	Jesselton, North Borneo.
7240	41.44		Tangier-1, Tangier (VOA Relay).
			Paris, France.
			Belgrade, Yougoslavia.
		LLR	Tromsö, Norway.
(I)		VLC7	Shepparton, Australia.
		VUD1O	New Delhi, India.
		VUB2/3	Bombay, India.

Kcs.	M.	Call	Location
(V)		CR7AA	Lourenço Marques, Mozambique.
(T)		TAM	Ankara, Turkey.
7245	41.41		Moscow, USSR.
			Vienna, Austria (USSR Zone).
			Djeddah, Saudi-Arabia.
			Lhasa, Tibet.
		HC4DC	Manta, Ecuador.
7250	41.38	GWI	Daventry, England.
			Munich-2/4, Germany (US Zone), (VOA Relay).
(T)		HVJ5	Vatican City.
		YDG3	Surakarta, Java.
7255	41.35	VUD	New Delhi, India.
			Moscow, USSR.
			Laos, Nigeria.
			Capetown, South Africa.
7257	41.34	JKH	Yamata, Japan.
7260	41.32	GSU	Daventry, England.
		VUD5	New Delhi, India.
		VUM2/3	Madras, India.
		OZF4	Herstedvester, Denmark.
			Moscow, USSR.
			Rome, Italy.
			Singapore, Malaya (BFEBS).
			Ayora, Spain.
7263	41.30	APK1	Karachi, Pakistan.
			Dalat, Indo-China (Vietnam).
7265	41.30		Moscow, USSR.
			Nairobi, Kenya (FBS).
7270	41.27	SBO	Motala, Sweden.
			Tangier-3, Tangier (VOA Relay).
			Salonika-2, Greece (VOA Relay).
			Moscow, USSR.
		YDB3	Djakarta, Java.
		YSO	San Salvador, El Salvador.
			Srinagar, Kashmir.
(T)		HVJ6	Vatican City.
7275	41.24	VUD8/9	New Delhi, India.
			Almansa, Spain.
7280	41.21	GWN	Daventry, England.
			Paris, France.
			Moscow, USSR.
			Algiers, Algeria.
7280		HVJ7	Vatican City.
		DXH2	Davao City, Philippines.
(I)		VLA7	Shepparton, Australia.
(I)		VLB7	Shepparton, Australia.
(I)		VLC7	Shepparton, Australia.
7281	41.20		Granollers, Spain.
			Barcelona, Spain.
			Igualada, Spain.
7284	41.19	APL2	Lahore, Pakistan.
7285	41.18	TAS	Ankara, Turkey.
		JKJ	Nazaki, Japan.
7288	41.16		Saigon, Indo-China (Vietnam).
7290	41.15		Norden-Osterloog, Germany (British Zone).
			Moscow, USSR.
		VUD2/8	New Delhi, India.
(V)			Tangier, Tangier (Pan-American Radio).
(I)		ZL13	Wellington, New Zealand.
7290	41.15		Rome, Italy.
7295	41.12		Moscow, USSR.
			"Radio Free Europe."
(V)		EA8AB	Santa Cruz de Tenerife, Canary Islands.
			Johannesburg, South Africa.
		ZOY	Accra, Gold Coast.
		YDQ3	Makassar, Celebes.
7300	41.09		"Radio Free Europe."
			Moscow, USSR.
			Athens, Greece (NBI).

Kcs.	M.	Call	Location
(V)			Tangier, Tangier (PAR).
			Rome, Italy.
		BEC36	Shin-Lin (Taipeh), Taiwan.
7310	41.04		Moscow, USSR.
			Djeddah, Saudi-Arabia.
(V)		YNRL	Granada, Nicaragua.
7312	41.03		Shanghai, China.
			Vinh, Indo-China (Vietnam).
7315	41.01	YSO	San Salvador, El Salvador.
7320	40.98		Moscow, USSR.
		VED	Edmonton, Canada.
7325	40.95	GRJ	Daventry, England.
			Moscow, USSR.
			Lanchow, China.
7328	40.94	HC2CX	Babahoya, Ecuador.
7330	40.93		Moscow, USSR.
7340	40.87		Moscow, USSR.
7349	40.81	3AM4	Monte Carlo, Monaco.
7350	40.80	HC2AN	Guayaquil, Ecuador.
7360	40.76		Moscow, USSR.
7370	40.71		Moscow, USSR.
7374	40.68	FIQA	Tananarive, Madagascar.
7375 (V)	40.68		Moscow, USSR.
			Tientsin, China.
7380	40.66		Madrid, Spain.
7383	40.63		Mogadishu, Italian Somaliland.
7385	40.62		Sanaa, Yemen.
7397 (V)	40.56	CR4AA	Praia, Cape Verde Islands.
7400	40.54		Moscow, USSR.
(V)			Tangier, Tangier (PAR).
		YNAM	Managua, Nicaragua.
			Mandalay, Burma.
			Barbastro, Spain.
7408	40.50		Hanoi, Indo-China (North Vietman).
7410 (V)	40.49		Mahón, Balearic Islands.
7415	40.47		Cartagena, Spain.
7420	40.43		Moscow, USSR.
			Athens, Greece (FBS).
7440	40.32		"Free Slovakia" (Clandestine).
7444	40.30		"Free Yugoslavia" (Clandestine).
7460 (V)	40.21		Albacete, Spain.
7470 (V)	40.16	TGDA	Quezaltenango, Guatemala.
7490	40.06		Tbilisi, Georgian SSR.
7496	40.04		Peking, China.
7508 (V)	39.95		"Free Yugoslavia" (Clandestine).
7547 (E)	39.75	ZNX32	Bridgetown, Barbados.
			Conakry, French Guinea.
7570	39.63	OZL	Angmagssalik, Greenland.
7582	39.57	CR6RO	Silva Porto (Bie), Angola.
7610 (V)	39.42		Kavalla, Greece (FBS).
7618	39.38	YNLAT	Granada, Nicaragua.
7630 (V)	39.32		Zaragoza, Spain.
7650	39.21		Moscow, USSR.
7654 (V)	39.18		Omdurman, Sudan.
7660	39.16	CE766	Santiago, Chile.
			Mukden, Manchuria.
7670	39.11		Sofia, Bulgaria.
7700 (E)	38.96	ZMB6	Apia, Samoa.
7750	38.75		Moscow, USSR.
(V)			Istanbul, Turkey.
7806	38.43	CR6RP	Novo Redondo, Angola.
7830	38.31	YNWA	Managua, Nicaragua.
7850	38.22	ZAA	Tirana, Albania.
		YNWW	Granada, Nicaragua.
7859 (T)	38.18	ZBP	Pitcairn, Pitcairn Islands.
7860 (V)	38.17	SUX	Cairo, Egypt.
		YNSO	Managua, Nicaragua.
7920 (V)	37.88		Kozani, Greece, (FBS).
7935 (V)	37.81	HLKA	Pusan, South Korea.
		PSL	Rio de Janerio, Brazil.
7945	37.76		Victoria. Seychelles.
7948	37.75		Chelman, Iran.
7960	37.69		Ahwaz, Iran.
7970	37.64		Istanbul, Turkey.
8000	37.50	JJY	Kemigawa, Japan.

SMALL ADVERTISEMENTS

Readers' small advertisements will be accepted at 2d. per word, minimum charge 2s. Trade advertisements will be accepted at 6d. per word, minimum charge 6s. If a Box number is required, an additional charge of 1/- will be made. Terms: Cash with order. All copy must be in hand by the 12th of the month for insertion in the following month's issue.

PRIVATE

EXCHANGE Pilot "Blue Peter" Receiver, 4 wave-band including Trawlers, 6 months' old, for Communication Receiver to value of approximately £25. Box No: C 141.

R1116A Battery Communication Receiver covering 172 kcs to 20 Mcs, complete with power pack and loud speaker, £8 o.n.o., Moore, 33 Jackson Road, Clacton-on-Sea, Essex.

HAMMARLUND HQ-129-X post-war Rx, separate bandspread on ham bands, built in 100 kcs calibrator, speaker, mint condition, bargain, £45. Box No: C 143.

AMATEUR SELLING UP. 1155 modified with S meter, noise limiter, power pack output stage and speaker. Realigned, fine appearance, £15. R103A with internal AC power pack with S meter and speaker. All new Mullard valves, £10. BC342N chassis complete with valves and xtal but without front panel and power pack. Needs some re-wiring, £5. 100/1000 kcs mains Xtal Oscillator, can be fitted to any radio. Spot on, £2 10s. If desired—£30 the lot or offers. Chapman, 62 Tagwell Road, Droitwich Spa, Worcs.

EDDYSTONE S640, perfect condition, Instruction book. 41 Appleton Street, Northwich, Cheshire.

FOR SALE. Eddystone 680 receiver, mint condition. Reeve, 6 Manor Mount, Forest Hill, London. Tel: FOR 0231.

RX R107, 28 Mcs convertor, speakers, Radiocraft DX2 Rx, Phones. Offers, lot or separate. H. James, 448 East Prescott Road, Liverpool.

FOR SALE. Eddystone 740 with S meter. Tx, CO/PA, 160/80 CW, in TUB case with internal power pack (Woden transformer) and built in volt and mA meters. All in excellent condition, Inspection welcomed. Offers—G3GYR, 6 Council Houses, Rode Heath, Stoke-on-Trent, Staffs.

WIRELESS SET 48. Transmitter/Receiver, good condition, covers 33—50 metres. Complete equipment for Phone/CW plus ten spare valves, hand generator. Ideal for Field Days. Benton, 11 Paines Lane, Pinner, Middx.

WAVEMASTER 34-in. Cabin Cruiser Kit, ideal for radio control—unwanted gift, £2 10s. Mrs. Carter, 25 Inglis Road, Ealing, London, W.5.

EXCHANGE. Surplus Equipment for record player, receiver, anything. S.A.E. Box No: C 142.

WANTED. *Short Wave News* January—June 1950 (inclusive); March 1952. *Monitor* January 1952. *Short Wave Listener* January 1951. Prices to Coppel, 540 Antrim Road, Belfast.

WANTED. 2 RF Coils for R1155A, 16-40 metres Nos: 10D/1643 and 40-100 metres Nos: 10D/955. Rowe, 136 Hillfoot Avenue, Liverpool, 19.

SALE. Service Sheets 2s. each plus S.A.E. List 1s. plus S.A.E. Ratel, 171 Norris Street, Preston, Lancs.

PREMIER 6; TV, with pre-amp, polished Oak console cabinet. Holme Moss working, guaranteed perfect. Free delivery £17 10s. Ekco Eliminator 15s. Altas with trickle charger 20s. Young, 94 Liquorpond Street, Boston, Lincs.

UNUSED. VCR511, 12 in., screened, 70s. VCR97, N.C.O., 25s. VCR138A, 15s. 38 Sandiways Avenue, Netherton, Liverpool.

FOR SALE. Haynes quality tuner, amplifier and power pack, £18. Epoch 12 in. energise speaker £5. Barker 148A £9. Inspection by appointment. Fisher, 51 Bemsted Road, Walthamstow, London, E.17.

FOR SALE. Premier electrostatic Televisor, complete and working, VCR97 tube, requires slight adjustment for excellent picture. Owner built Viewmaster. Seen Croydon. £10 or offer. Box No.: C 139.

FOR SALE. Electronic Keyboard (3-Octave) with Tone generator and circuit diagram, (less amplifier), £24. Cash, exchange or instalments. Box No.: C 140.

FOR SALE. Magnaview timebase, specified components good working order, £15. Robinson, 2 Coteford Close, Loughton, Essex.

FOR SALE. Portable Tape Recorder, Lane deck (3 Collaro motors), fitted with Burgoyne heads, amplifier incorporating Magic Eye and earphone monitoring, complete with Xtal mike and housed in grey rexine covered cabinet. £30 or near offer. Box No.: C 144.

FOR SALE. Oscilloscope, all-metal black crackle finish with unbreakable glass inspection window. Usual X plus Y amplifier shift and expansion—ten controls— made by Henrys of Harrow Road—new last Easter—cost £14 14s., accept £10 or offer. Goodman's 12-in., speaker—15 in. ohm voice coil, £8 or near offer. Laminated 1 in. wood 10 in., reflex cabinet fitted speaker—accept £6. Many Rotary Converters, American and British Hoover—cheap—offers. Fine console model three speed (Bristol Magnetic Recording Company) Tape recorder, (Practical Wireless design). Double amplifier, separate power pack, 11 watts output, Wharfedale spealer, cost £125 would accept £80. Apply by letter or call Monday, Thursday or Fridays, after 6 p.m. to Ernest Wain, 39 Kensington Gardens Square, Bayswater, London, W.2.

TRADE

BLUEPRINTS. High Gain 10 Metre Converter, with a de-luxe circuit comprising EF91 RF stage, ECC91 double triode mixer and oscillator, EF92 IF amplifier, with stabilised voltage supply via a 7475. 1s. 8d. post free with full instructions. A.S.W.P., 57 Maida Vale, London, W.9.

JOIN THE ISWL. Free Services to members include QSL Bureau, Translation, Technical and Identification depts. DX certificates, contests and activities for the SWL. Monthly magazine "MONITOR," containing articles of general interest to the SWL and League member. Membership 10s. 6d. per annum. 86 Barrenger Road, London, N.10.

AMATEUR STATION RECORD CARDS. 6 in. by 4 in., best quality card, for recording that QSO and full details of the contact. An invaluable aid to quick reference of stations worked, etc., 3s. per 100 from Data Publications, 57 Maida Vale, London, W.9.

METALWORK. All types cabinets, chassis, racks, etc., to your own specifications. Philpott's Metalworks, Ltd. (Dept. R.A.), Chapman Street, Loughborough.

"GLOBE KING" (Regd.) Minature Single Valve Receiver gets real DX—Amateur Radio enthusiasts should send for free copy of interesting litreature and catalogue (enclose stamp for postage). Write to makers: Johnson (Radio), 46 Friar Street, Worcester.

BOOKBINDING. Volumes of *The Radio Constructor* and *The Radio Amateur* fully bound, imitation leather, gold lettering. 7s 6d. post free. Prices for other publications on application. Jerome Alcock, CHEADLE, Stoke-on-Trent.

Miller's "PANEL"—the air drying black crackel enamel. From dealers 3s. 6d. jar or direct 4s. 6d. including postage—8 Kenton Park Crescent, Kenton, Middx.

OSMOR—for efficient coils, coilpacks, etc. Send 5d. stamp, for FREE circuits and lists. Dept. RCC, Osmor Radio Products Ltd., Borough Hill, Croydon, Surrey. Tel.: CROydon 5148/9.

OAK SWITCH SERVICE. Multi-way switches made to specification. Approximate cost:—Ceramic Wafer 5s., Paxolin Wafer 2s., Clicker Plate 2s. 6d. Box No.: C 117.

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WIRELESS STATION SUPERINTENDENT required by the NIGERIA GOVERNMENT. Post and Telegraphs Department for one tour of 18 to 24 months in the first instance. Commencing salary according to experience in scale £864 rising to £1,392 a year. Gratuity £100/£150 a year. Outfit allowance £60. Free passages for Officer and wife and assistance towards cost of children's passages or their maintenance in the U.K. Liberal leave on full salary. Candidates must have had wide practical experience of modern radio techniques and equipment, in particular V.H.F. equipment, and preferably also V.H.F. multi-channel equipment. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/28927/RM.