How to Build a DUAL-WAVE Superhet

A description in non-technical language of the construction of a modern 6-valve Dual-Wave Receiver, featuring the new wave changing by special switch with silver-plated contacts, new type tone control, tuned R.F. amplification on both bands, calibrated dual ratio Aerovision dial, independent A.V.C., filtered extended range audio system, isolated from R.F. and detector, padding on each band, special air dielectric Isolantite I.F. transformers, Litz wound, and provision for transposed aerial system. Fully illustrated.

RADIOKES LIMITED

GEORGE & CLEVELAND STS., REDFERN, SYDNEY
AUSTRALIA

A HELP TO THE BEGINNER

THESE remarks are addressed to those interested in radio and keen to know more. It is not our intention to delve into technicalities but to show the beginner how to start off in the right direction.

Unlike most other hobbies, radio is exacting. That is, if you take up painting as a hobby, or stamp collecting, a few mistakes merely point you out as an amateur, but with radio no mistakes are permissible. You have to do the job correctly. As time goes on, you learn to make a neater job of wiring a set; by becoming proficient at soldering, cleaner and better solder joints are made; wiring of the set is made neater by keeping all wires as short as possible; and mounting components securely so that they won't work loose.

In "How to Build a Dual Wave Superhet" we show exactly how to solder, but have to rely a great deal on the reader's application to the job. Remember—if you want to take up radio as a real hobby, learn to solder correctly and the way to do that is by getting plenty of practice. With a good solder joint, the solder appears to be spread on to the joint but where the solder sits on top like a round lump on the wire often it is not properly soldered and by applying a knife to the edge, can be levered off the joint.

When working on a radio set, often small drops of solder are dropped off the soldering iron. These should all be removed immediately. Don't have straggling wires or lumps of solder lying over your set—they are apt to cause no end of trouble. After soldering a wire there is often still some flux left about the joint. If wiped immediately with a rag, all of this can be removed.

Another word of advice to the beginners: Do not buy inferior components—they will have a detrimental effect on your radio. If you build a good radio set, give it a chance to show its worth by using good valves and a good speaker. It is a waste of good material if the valves and speaker are not capable of giving maximum results.

In reading over the description which follows, you will see various signs and wonder at their meaning. For instance, the first wiring you do is to connect all the leads H1 and H2 to the power transformer, which is your source of energy. The power comes from your A.C. electric light supply as one definite voltage. This Kit-Set requires A.C. (alternating current) voltages for the filament of the valves and various D.C. (direct current) voltages for the remainder of the circuit. The power transformer is the means of breaking up the A.C.

First of all, the filaments of all the valves, except the rectifier (type 80) require 6.3 volts to heat up the tube, or really the cathode of the tube. By wiring up all of the H1 and H2 leads of sockets 1 to 5 to the 6.3 volt winding on the power transformer this is accomplished and one circuit is completed.

The rest of the set requires D.C. and for this purpose the rectifier is fitted in the radio. The heater of this valve requires 5 volts A.C. and is connected to the 5 volt winding of the power transformer.

The voltage to be rectified from A.C. is 385 volts and the rectifying plates of the 80 valve are connected to the 385 volt winding of the transformer. To go into the process of altering the A.C. to D.C. would be a little too advanced at this stage; suffice it to say that the 80 changes the current from A.C. to D.C.

Then various D.C. voltages are required. Unlike A.C., D.C. cannot be broken up or down by a power transformer and a voltage divider is used; tappings off this give the required potentials (voltages).

In the dual wave set following, the actual signal from the aerial, first comes to the 6D6 valve which is an R.F. (radio frequency) amplifier; that is, it boosts up the signal from the aerial and passes it on to the 6A7 valve which is the oscillator section of the set. This valve alters the frequency (wave length) of the signal to suit the fixed frequency of the I.F. transformer 1 and I.F. transformer 2 which, with the aid of the 6B7, boost, or amplify, the signal.

This 6B7 valve is responsible also for controlling automatically the volume of the set, smoothing out a large percentage of fading and generally keeping the volume at the correct level. It also is the detector valve and changes the signals from radio frequency to audio. Radio frequency cannot be heard by the human ear.

The signal is then passed on to the 75 valve which again amplifies the signal and acts as a filter to definitely separate any radio frequency that may have leaked through. The clear audio signal is then passed on to the 42 valve, the final amplifier and output valve. This valve boosts the signal up to the output necessary to satisfactorily operate the loud speaker. On the loud speaker is a transformer which matches the 42 valve to the speaker windings.

This description of the path of the radio signal is the way the beginner can understand; once he becomes more proficient, the finer details can be followed. If, after reading this booklet, you are anxious to secure more information, we advise that from your nearest bookseller you procure a manual of radio that starts off by telling you what a volt is, what an ohm is, what an amp is, as follows:—

Volt is the unit of EMF (Electro motive force).

Ohm is the unit of resistance.

Ampere is the unit of current.

You have to start at the beginning and, in radio, you first of all have to learn what atoms and molecules are. They all make it possible to thoroughly understand the subject.

THE ART OF SOLDERING

How to Use a Soldering Iron

IT is our boast and guarantee that soldering is not difficult. It is necessary for the beginner to learn all the rules first before trying to do soldering; with this knowledge and very little practice soldering is simple.

It is essential in building a Radiokes Kit-set to be able to solder, and soldering can be done one way only—that is, correctly. We are not trying to frighten you but merely impress that you must read the instructions carefully and they are not difficult.

The essential parts for soldering are—

Soldering Iron.

Flux (a non-corrosive resin flux must be used in radio).

A cloth (a piece of old sheet is very good).

A file 10in. x 1in.

A block of wood about 6in. x 6in x 4in.

A rest for the Iron.

The last item can be easily made by bending a piece of tin 1in. wide by 8in. long into a letter "M." Rest the tip of the iron in the "V."

These instructions are for an ordinary copper iron. This is supplied with the Simplified Radiokes Dualwaver, and is already tinned. You can tell when an iron is tinned by the appearance of the tip, which will be completely covered with a smooth coat of solder. You will readily see how tinning should be done and when you have to do it yourself, be sure and make just as good a job. It is 50 per cent. of soldering to have a well-tinned iron.

To solder correctly, the iron must first preferably be heated over a gas flame, or a good coal or wood fire, real red embers if possible. The iron doesn't get dirty that way. You only heat the copper "bit" part of the iron; it is essential that all of this gets hot as you depend on the copper to retain the heat. Care should be taken to see that the iron doesn't get red hot. The correct temperature is indicated by the condition of the tinning. An experienced solderer knows by the appearance of the iron and by the "zipp" it makes when brought into contact with the soldering flux, just when the right temperature is reached.

Only a little practice is required to acquire this knowledge. If the tip is overheating there will be a tendency for the tin to burn off; that is,

instead of the tinning on the copper tip remaining bright, it will oxidise, forming a heat insulating crust. Thus the heat is prevented from melting the solder and raising the parts to the soldering temperature.

With the iron hot, pull it from the flame, rub off any ash or dirt lightly with a rag. Dip the point of the iron in the flux sharply then hold the solder to the tip; just touch it on and the solder will melt instantly. Melt off about an eighth of an inch of solder with the iron. If you don't put too much on it won't drop off.

In the packet marked "Tinned Wire" you will find some short scraps. Notice how clear they are. Twist two of them together and with a wooden match-stick spread a very light smear of flux on to where you are going to solder. It is necessary to have all of this ready before heating the iron, otherwise the iron will soon lose its heat.

Press the point of the iron on to the flux-covered joint of the two scraps of tinned wire and the solder will quickly run from the iron to the joint. If there isn't sufficient solder on the iron, hold a little more on to the tip and apply again. Don't take too long to make a joint. As soon as the points you are joining reach the same temperature as the solder, the transfer of solder from the iron takes place. Try soldering various scraps until you feel sure that you are quite a competent solderer.

For general knowledge it must be understood that to successfully solder the surfaces to be soldered must be clean. Fortunately, we are only interested in the Radiokes Kit-set and here all the parts to be soldered will be cleaned and tinned, making soldering very easy.

Should any joint be difficult to solder, and the solder forms lumps or just runs off, or sits on the surface, the reason is that the surface is dirty and should be scraped until bright with a pocket knife blade, then apply another thin coat of flux. See that the iron is as hot as possible. Don't try to use a lot of solder. On applying the iron, first of all the flux will "fizz" and smoke up and then the solder will run from the iron to the joint.

If a wire tends to spring up and away from the position it is being joined to, have a wooden rod and as you take the iron off hold the springing part down with the rod until the solder cools. We advocate that you make a good mechanical joint first which then eliminates all the springing up.

The chief fault of the beginner is to use too much solder; next, not to have the iron correctly tinned, or the correct heat, or hold it on the joint to be soldered too long. It is wise to wipe off after soldering any flux that is still to be found around the outside edge of the joint. This improves the general appearance of your work.

Follow the instructions carefully and you will soon find it a very fascinating art.

TINNING THE IRON

WHEN through overheating or use the iron looses its tinned surface, it is necessary to re-tin, otherwise the solder will not hold on to its surface.

To tin the iron, heat the bit until it is red hot. Take it out of the flame and place it on the wooden block. With the file smooth the four edges and file until they are quite smooth and all traces of scales are gone. Rub any rough corners off and dip the point well into the flux. Apply liberal quantities of solder to the four sides and dip in the flux again. The solder should then spread smoothly and form an even coat all over the tip, leaving the iron ready to do any necessary soldering.

SPECIAL NOTE

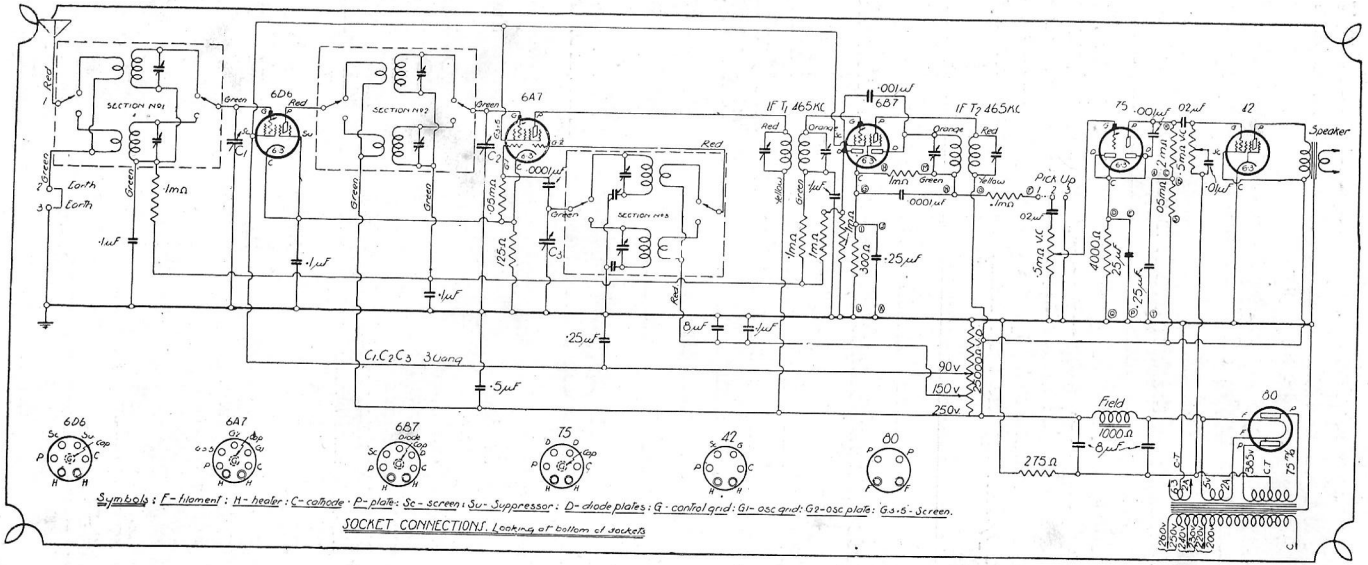
Please note this important change to the instructions on page 25.

Chanex and Ducon Fixed Condensers, instead of being branded "outside foil", are now marked "shielded end", which means the same. Where the instructions refer to "outside foil" look for the wording "shielded end".

N.Z. BROADCASTING STATIONS

Wave Length (Metres)	Station	Wave Length (Metres)	Station
526	2YA Wellington	285.5	4ZO Dunedin
483.6	4ZP Invercargill	263.2	4YO „
461.3	1YA Auckland	260.9	2ZM Gisborne
416.4	3YA Christchurch	256.3	2ZD Masterton
399.8	2YB New Plymouth	252	1ZB Auckland
389.4	1ZH Hamilton	250	3YL Christchurch
379.5	4YA Dunedin	245.9	4ZL Dunedin
365.6	2ZH Napier	241.8	2ZL Hastings
356.9	2YC Wellington	238	1ZM Manurewa
340.7	1YX Auckland	234.2	4ZC Cromwell
333.3	2ZP Wairoa	228.9	1ZJ Auckland
319	3ZR Greymouth	224	4ZR Balclutha
312.3	2ZF Palmerston North	220.5	2ZR Nelson
303.9	2ZJ Gisborne	214.2	2ZO Palmerston North
285.5	4ZB Dunedin	206.8	4ZW Dunedin
285.5	4ZM „	204.1	3ZM Christchurch

RADIOKES SIMPLIFIED DUAL WAVE SUPERHET.



CIRCUIT DIAGRAM

(For the technically-minded reader)

RADIOKES SIMPLIFIED DUAL WAVE KIT-SET

TYPE 12-35S.

PARTS LIST.

1 12-35 chassis specially stamped.
1 5-35A coil assembly complete with grid leads and clips and A.V.C. attachment, comprising two .1 mfd. condensers and 1 .1 meg. resistor.
1 pair 5-35 I.F. transformers complete with grid clips and stamped I.F.T. No. 1 and I.F.T. No. 2.
1 U80-6 power transformer with mounting bolts and stamped.
3 Ducon 8 mfd. electrolytic condensers with 8in. leads.
1 7-14D dial, bronze escutcheon, lamps in sockets and wired with lead long enough to reach H1 and H2 on socket No. 1.
2 4 pin sockets—1 marked 80 on top and 7 underneath.
1 marked speaker on top and 6 underneath.
2 7 pin sockets (small) 1 marked 6A7 on top and 2 underneath.
1 „ 6B7 „ „ „ 3 „
3 6 pin sockets 1 „ 6D6 „ „ „ 1 „
1 „ 75 „ „ „ 4 „
1 „ 42 „ „ „ 5 „
2 .5 megohm variable potentiometers.
1 .05 meg. 1 watt resistor.
1 .1 „ „ „ „
2 1 „ „ „ „
1 275 ohm wirewound maxome.
1 125 „ „ „
1 25,000 ohm voltage divider, vertical mounting with 2 clips in correct position.
1 .5 mfd. fixed condenser.
1 .25 „ „ „
3 .1 „ „ „
2 .02 „ „ „
1 .01 „ „ „
2 .001 „ „ „
1 .0001 „ „ „ Mica.
6 terminals, 2 red, 4 black. Two of the black terminals to have ½in. metal washers instead of bakelite.
3 knobs.
4 No. 9 valve shields.
1 grid clip.
1 T.33 panel completely wired and mounting pillars mounted and making electrical contact. The following components are mounted on the panel:—
1 25 mfd. condenser.
2 .25 „ „
1 .0001 „ „
1 .05 megohm 1 watt resistor.
1 .1 „ „ „ „
1 .2 „ „ „ „
1 1 „ „ „ „
1 300 ohm wirewound maxome.
1 4,000 „ „ „
40 ⅜in. x ¼in. round head brass screws.
50 ¼in. hexagon nuts.
40 Shakeproof washers.
12 solder lugs.
6 yds. hook-up wire, free push-back type.
1 yd. tinned copper wire, also 4 scraps ditto about 3in. long.
1 yd. shielded braid.
1 Dalton power plug, disconnected, with 6 feet of power flex connected to the power supply end.
6 small identification tags.
1 soldering iron.
1 tin fluxite.
1 roll solder.
1 instruction booklet.

All of the above parts are supplied with the kit. The following valves and speaker will be required to complete the set:—

Valves: 1 Radiotron 6D6
1 „ 6A7
1 „ 6B7
1 „ 75
1 „ 42
1 „ 80

Speaker: 1 Amplion speaker, type Q10, 8in., 1,000 ohm field input transformer to suit single 42.

NON-TECHNICAL CONSTRUCTIONAL DETAILS

In the preceding paragraphs we emphasised the necessity of knowing how the soldering should be done, and again advise that, before attempting the actual construction of the Radiokes Simplified Dual Wave Kit-Set, satisfy yourself that you can solder. Definitely, the soldering is the hardest part and it shouldn't be hard if the instructions have been adhered to carefully.

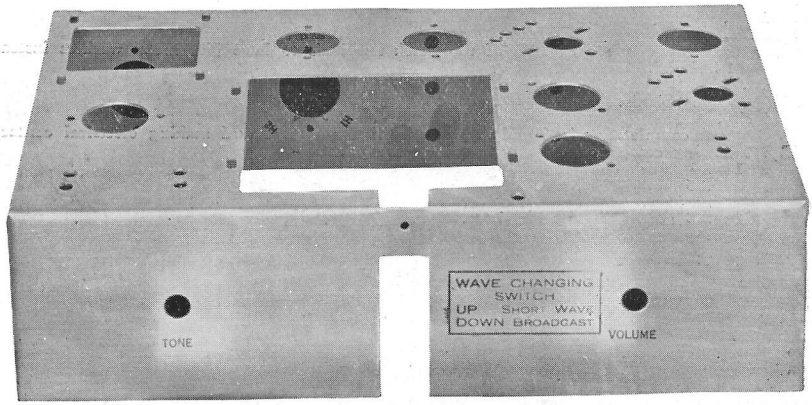
It is advisable to carefully read these instructions before attempting any assembling and then adhere strictly to procedure. Complete one section before proceeding with the next and don't, under any circumstances, depart from the instructions. They are correct and will ultimately show you that you can build a radio set without being a radio technician.

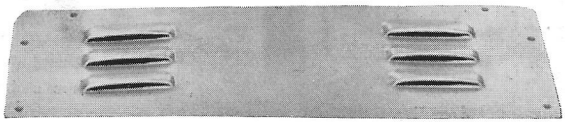
When you have completed this set, a radio receiver second to none is the result and we are sure you will agree that it is "as easy as falling off a log." You will be interested in radio and rapidly find that, with only a layout and a schematic diagram, you can build any reasonably good circuit and call yourself a radio man.

The tools you require:—

1 pair of side-cutting pliers.
1 pair round-nose pliers.
1 screwdriver.
1 Spintite spanner.

The first part of the set you require is the chassis.

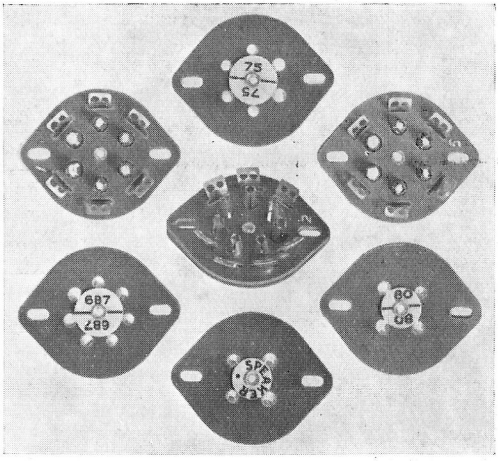




The end plate showing in front of the chassis is not required until the set is going 100 per cent. perfect; it is then fitted into the left end with nuts and bolts. It is left off while constructing the set and testing, for convenience and is fitted just before you fit the set into a cabinet. Forget about it in the meantime, but don't lose it.

Assemble the Kit-Set on a table in good light and handy to your heating arrangement for the soldering iron. If you have two or three small tins handy, put all the small parts in these and make sure none are lost, as each has a place.

Take the seven valve sockets



and then four valve shield bases.

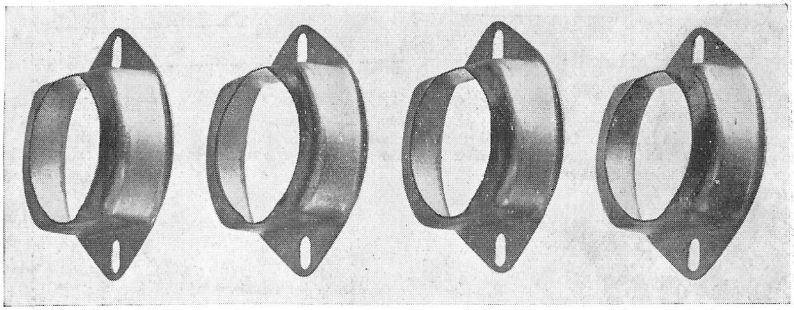


Fig. B.

Place the chassis on the table upside down as shown overleaf in Fig. 2, with the front nearest you and the open end on your right. Proceed to mount the sockets and valve shield bases as shown. Start with socket No. 1, being sure that you hold it over the hole in the chassis with the No. 1 nearest you as shown, and nearest the corresponding number printed on the chassis.

With the nuts and bolts are small washers with cut edges as shown here. These should be used underneath the nuts when bolting down any part. They are not absolutely essential but eliminate the chance of screws coming loose. They are called Shakeproof washers.

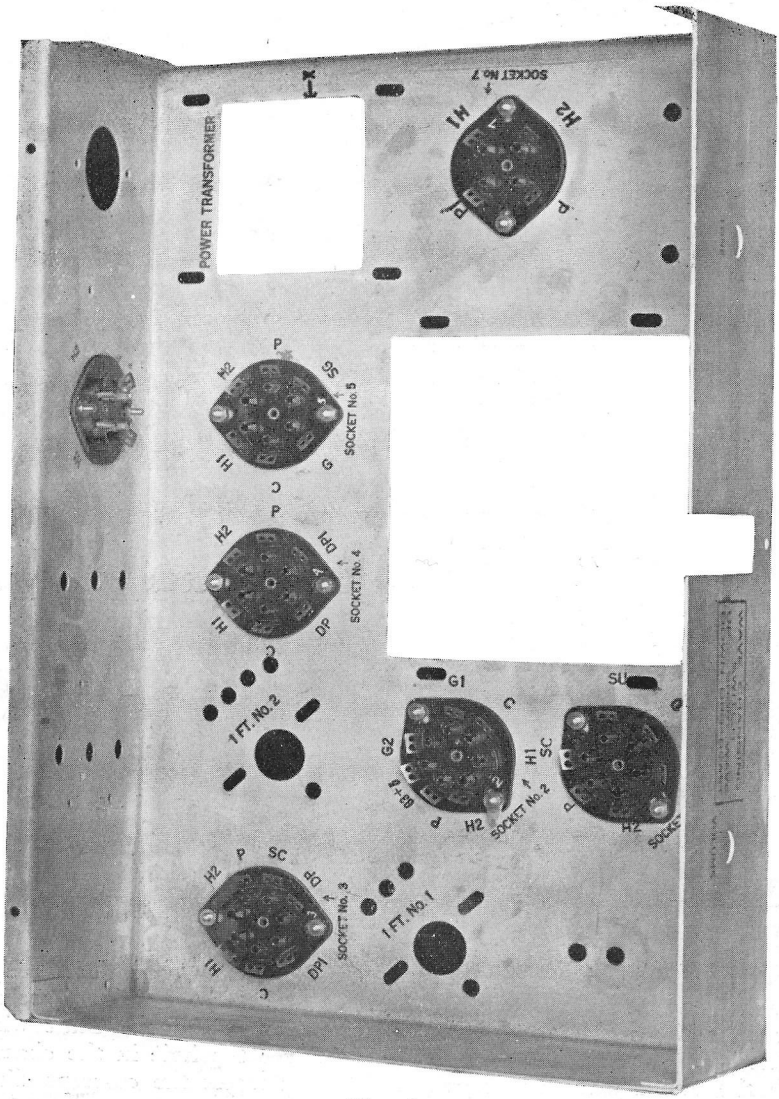
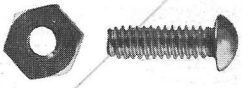

POWER TRANSFORMER
SOCKET No. 7
H1
H2
P
SOCKET No. 5
SG
G
SOCKET No. 4
DP1
DP
SOCKET No. 3
SC
DP1
SOCKET No. 2
G1
G2
SC
H1
H2
P
1 FT. No. 2
1 FT. No. 1

Fig. 2.

On the other side of the chassis (underneath) hold one of the valve shield bases with slotted flanges towards the metal chassis. The metal bases are fitted in the valve shield cans and have to be pulled out. Fig. B, page 15, shows these clearly. From underneath pass a small bolt through one of the slots in the valve shield base the slot in the chassis and then through the socket.



Fit a nut on the bolt and screw up loosely. Secure the other end of the socket in the same manner, then mount sockets number 2, 3 and 4 exactly as illustrated. Before screwing these sockets up tightly, you must see that they are correctly centered wih the valve shield base and the chassis. This is only necessary because later on valves have to be fitted in these sockets and will only go in if everything is centrally lined.

Under the nut mounting socket No. 2, nearest the "2," fit a solder lug and screw down securely with the lug pointing out from the chassis directly to the left. This will be later used as an earth joint and thoroughly explained in the text.

Socket No. 5 is then bolted down as illustrated, as is the case with sockets 6 and 7; none of these have valve shields on the top. The chassis will then appear as Fig. 2.

Turn the chassis over and it should look like Fig. 3. Carefully look to see that it is exactly correct. Turn the chassis upside down again

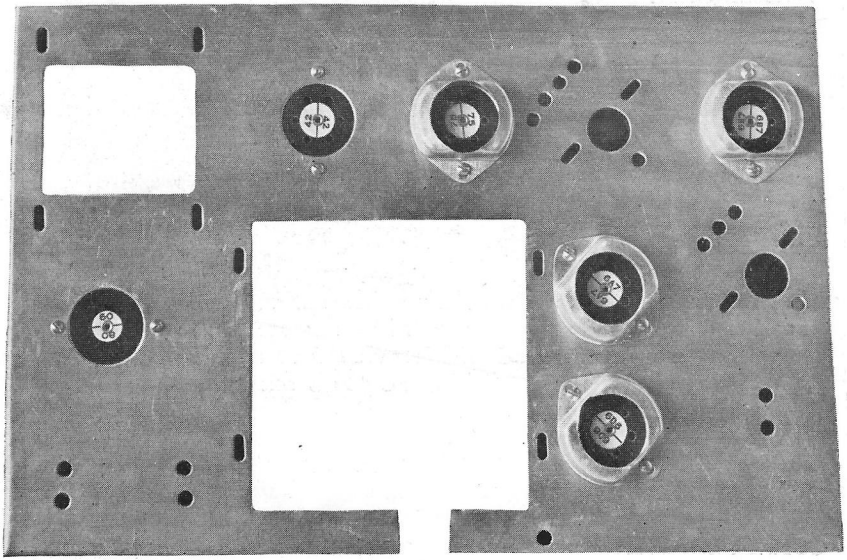
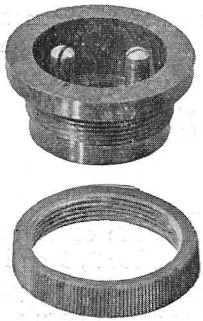


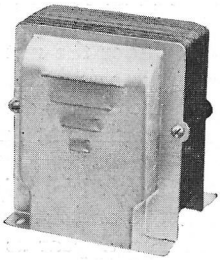
Fig. 3.



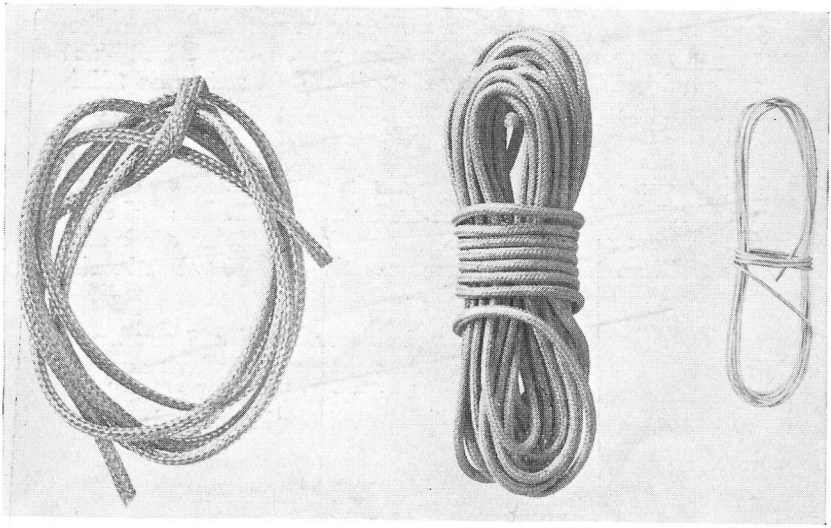
THE POWER PLUG

exactly as before, and proceed to mount the power plug in the hole in the back right hand corner by unscrewing the small ring, fitting the plug from the outside and screwing on the ring from the inside. Tighten securely, with fingers only.

Now proceed to mount the power transformer. It fits in the square hole in the rear right hand corner and from underneath. The mark "X" on the transformer is nearest the corresponding mark on the chassis. Secure the transformer to the chassis by means of nuts and bolts at the four corners. Using the nuts and bolts attached to the transformer. To balance the chassis while doing this, place the empty transformer carton under the other end of the chassis. Having mounted all of these parts as specified the chassis should appear as in Fig. 4.



POWER TRANSFORMER



COPPER BRAIDING

COVERED PUSH BACK WIRE

TINNED COPPER WIRE

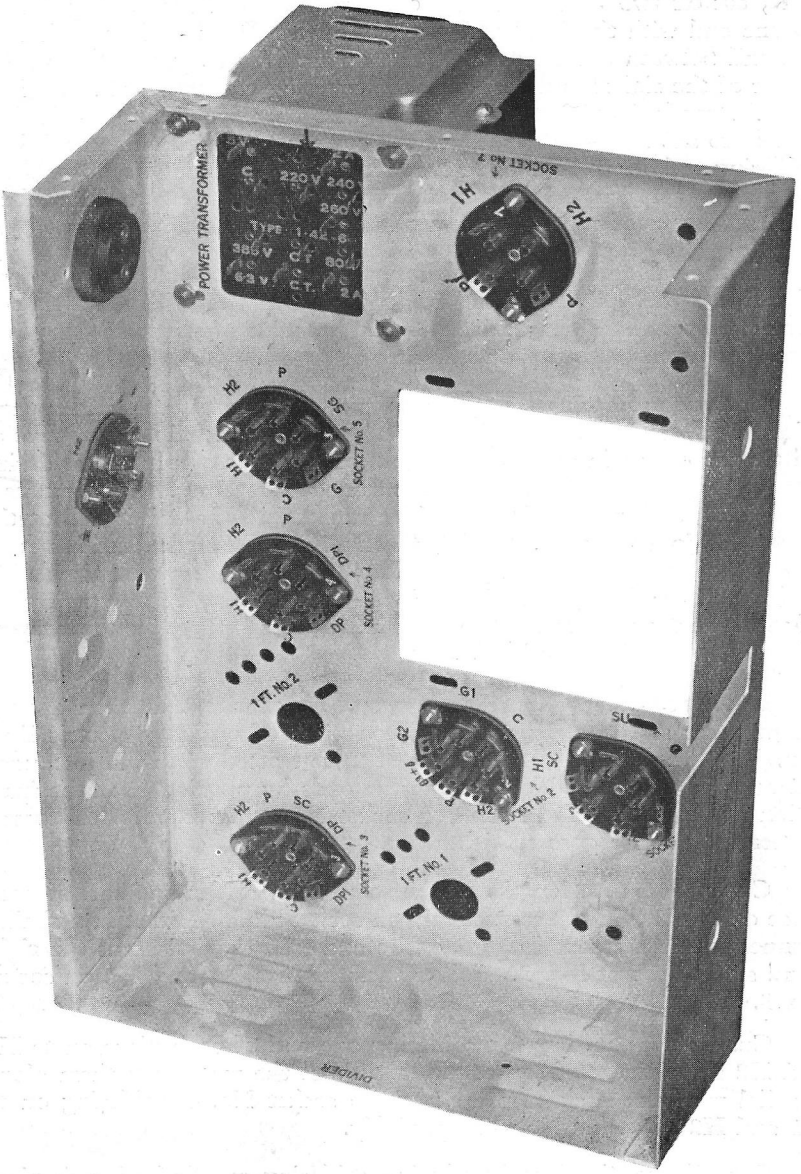

POWER TRANSFORMER
220 V 240
260
TYPE 1.42 S
385 V CT 80
63 V C.T. 2A
SOCKET No 7
H1
H2
P
SOCKET No 5
SOCKET No 4
SOCKET No 3
SOCKET No 2
1 FT. No 2
1 FT. No 1
G1
G2
SC
DP
DIVIDER

Fig. 4.

You are now ready to try your skill at soldering, as shown in the opening paragraphs of the instructions. Take the covered pushback wire, cut off two four inch lengths; take the wire in your fingers near to one end with the left hand—hold the wire about half an inch from the end between the thumb and first finger. With the thumb and first finger of the right hand hold the wire covering and push it back off the actual strands, leaving the tin copper wire bare for about $\frac{1}{4}$in. This is merely to show how to push back the covering neatly from the wire for soldering and has to be done in every case when soldering has to be done. To make a neat job, twist the strands of wire to the *right* with the thumb and first finger of the right hand to stop them from unravelling.

In the wiring instructions it states "take a certain length of wire." If you find that length a little too long, and by shortening it a little, a neater job would be the result, by all means make the lead shorter; long leads are not an advantage in a radio set.

Get your soldering iron hot as already instructed and solder these wires to H1 and H2 of socket No. 1. It is a great help if you first of all tin the ends of the wire to be soldered; that is, apply the soldering iron to them and solder all the strands neatly together. This insures a good joint, as immediately the solder runs on to the lug it will at the same time join the wire. ALSO, throughout these instructions is mentioned "join these wires to H1 and H2." It means join one wire to H1 and the other wire to H2. "Lug" is the term we use for the small piece of metal on the socket with two holes in it. This is there for the purpose of making a good solder joint.

Having securely soldered these two pieces of wire, twist them around one another so that they appear like a piece of ordinary electric light flex. You'll find that the other ends of these twisted wires will just reach H1 and H2 on socket No. 2. Bare the ends by pushing back the insulation and solder to H1 and H2 on socket No. 2 respectively. It doesn't matter which wire goes to either lug.

Cut off two 7in. lengths of the same wire, solder one end of each piece on to H1 and H2 respectively on socket No. 2. Twist in a similar manner to the previous length of wire and lead them towards the right hand side of socket No. 3. Solder them to lugs H1 and H2 on socket No. 3.

Cut off two 7in. lengths, soldering one end of each piece on to H1 and H2 respectively of socket No. 3. Twist the wires, run them along parallel with the back of the chassis to socket No. 4, soldering on to H1 and H2 of socket No. 4 respectively.

Cut off two 4in. lengths of wire, soldering one end of each piece on to H1 and H2 respectively of socket No. 4. Twist the wire, run them along parallel with the back of the chassis and solder to lugs H1 and H2 on socket No. 5.

Cut off two 4in. lengths of wire, soldering one end of each on to

lugs H1 and H2 of socket No. 5 respectively. Twist the wire and run direct to the power transformer. Connect one wire to lug marked "6.3V." The other wire to lug marked "2A" (NOTE: The lug marked "2A" in the rear left hand corner of the power transformer) making sure that in soldering you do not leave the solder, or the wires bare, in such a way that they could come in contact with any other lugs or the metal chassis.

Next, cut off two six inch lengths, soldering the end of one length to the lug on the power transformer marked "5V." Solder the other wire to the lug marked "2A" in the corner of the transformer nearest the open side of the chassis. Twist the wires together, run them along the edge of the chassis and solder on to lugs H1 and H2 of socket No. 7 respectively.

Cut off two pieces of wire 4in. long, soldering them to the two metal parts of the power plug; twist the wires loosely together and run them direct to the power transformer and solder one wire to the lug marked "C" on the power transformer and the other wire to the lug marked "240V" on the power transformer. You will notice that there are three tappings on the transformer 220/240/260 and for Victoria we supply 200/230/250. This is so you can connect this lead to your correct voltage. If your local power supply is 240 volts A.C. then connect to 240 volts. If however, your local voltage is 260 connect to the lug marked 260 or if you are in Victoria, connect to the lug marked 230. If, for instance, your transformer is marked 220/240/260 and your local voltage is 250 connect to the 260 tapping. A matter of 10 volts one way or the other does not matter.

Cut off an 8in. length of covered wire. Solder one end on to lug "5V" on the power transformer, run the wire along the back of the chassis and then at right angles up to and solder on to lug H1 on socket No. 6. Lug marked C.T. (in between lugs marked 6.3V and 2A on the power transformer) is the next to have a wire soldered to it. Use a piece of bared tin wire 2in. long. You will find a small roll of this wire in with the kit. We call this earth wire and it is used for earthing purposes.

Take a solder lug; fit this soldering lug over the rear left hand corner mounting bolt of the power transformer; secure the lug by screwing a nut down tightly on top of it. Solder the free end of tinned wire (the other end of which is connected to lug C.T.) to this lug, making sure it is well clear of the 6.3V lug on the power transformer. Fig. 5 shows the position now.

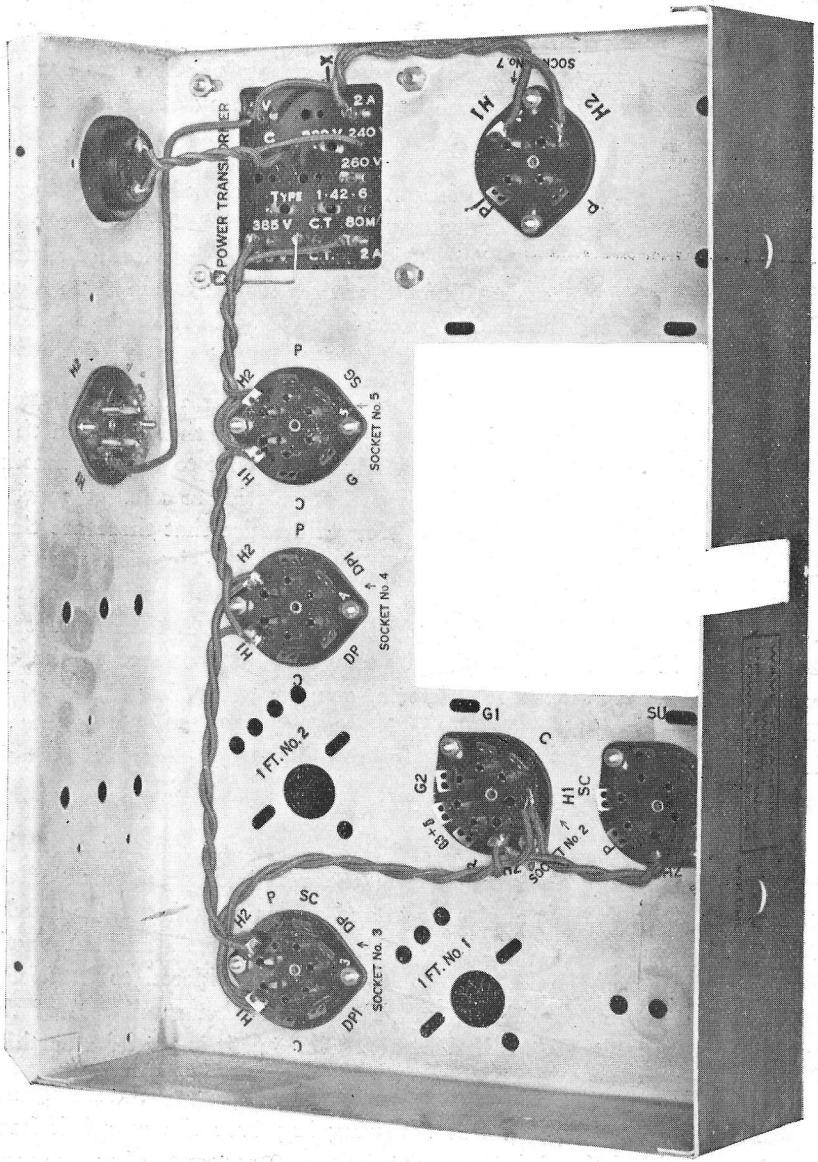
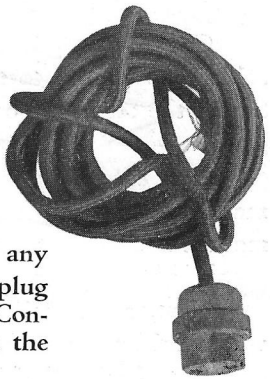

POWER TRANSFORMER
TYPE 1·42·6
385 V C.T. 80M/A
260 V
C.T. 2A
H1
H2
P
SOCKET No. 5
SOCKET No. 4
SOCKET No. 3
SOCKET No. 2
I FT. No. 2
I FT. No. 1
G1
G2
SC
DP
DP1

Fig. 5.

Check off all wiring to date and see that it is correct. Having reached this stage, the first test can be carried out. You know what the valves look like and the packets are marked "VALVES" so no further description is necessary. Unpack the valves and turn the chassis over. From the top of the chassis, plug the valves into their correct sockets. On the side of each valve its type number is shown and a corresponding number is on the valve socket. The valves will only fit in the socket one way.

If you look at the base of the valve, the end with the legs on, you will see two of these legs thicker than the rest. These have to be fitted in the two large holes of the valve sockets. Push the valves in until the legs are right through the socket, as far as they can go, and the black bakelite part of the valve is flush with the chassis.



Having fitted all the valves, take the part of the power plug which has the power flex attached to it and plug it in to the power plug at the back of the set near the right hand corner. On to the other end of the cord, a proper power plug should be connected, exactly as used on any electric iron. It is wise to have the correct plug fitted by a serviceman or recognised electrician. Connect the plug to your power point and turn on the power. Fig. 6 shows appearance at this stage.

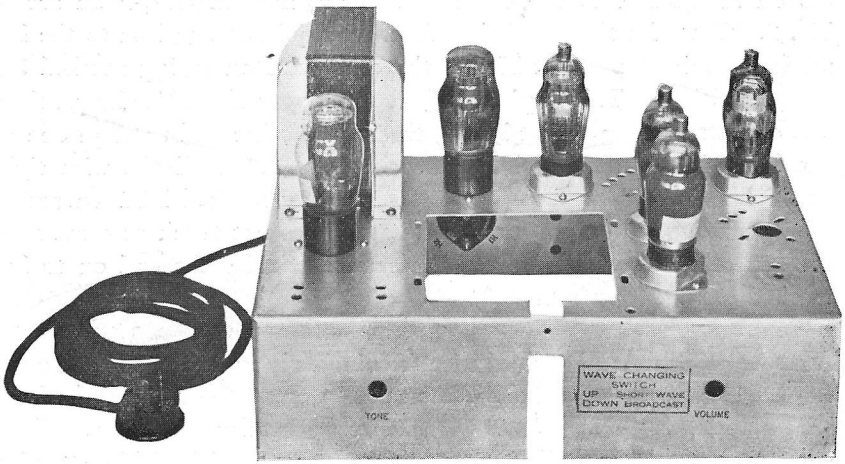


Fig. 6.

If anything such as a flash or crackling occurs in the power transformer, turn off the switch immediately. If everything appears O.K. watch the top of the valves. First of all the 80 valve will light up to a dull red, then the other valves will dimly show a glow inside. Leave the set for about five minutes with the power switched on; switch off and disconnect the power plug. Feel the power transformer—if it is still cold or just slightly warm everything is O.K.

This is just a preliminary test to see if the wiring you have done (the filament wiring) is correct. Everything working as above, remove the valves, put them back in their packets and continue with the wiring as follows.

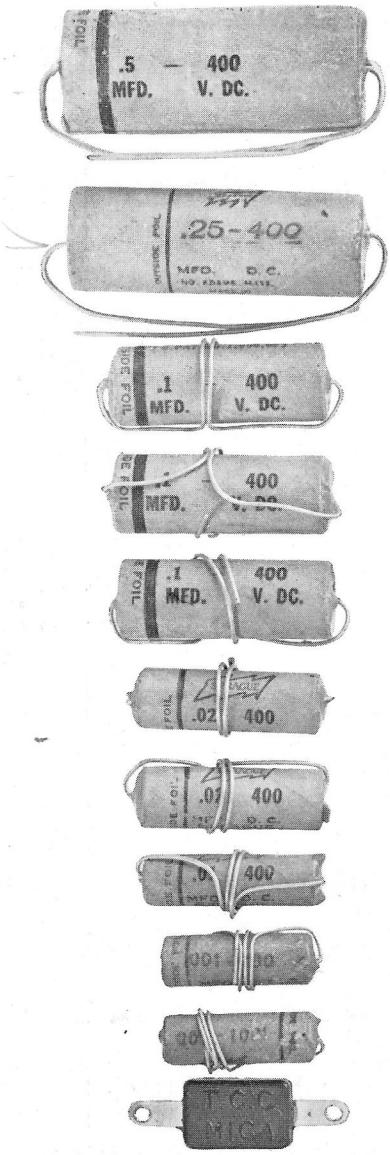
Cut off a length of wire 4in. long, push back in the usual manner, solder one end on to the lug marked 385V on the power transformer. Solder the other end on to lug marked P1 on socket No. 7.

Next cut off a piece of wire 4in. long. Solder one end on to the lug marked 80 m.a. on the power transformer, the other end on to the lug marked P on socket No. 7.

Next, commencing at socket No. 6, cut off a three inch piece of wire. Solder one end on to lug marked G on socket No. 6, the other end on to lug marked P on socket No. 5.

Cut off a three inch piece of wire, solder one end to lug marked SC on socket No. 1, the other end to lug marked G3+5 on socket No. 2. Cut off a three inch length of wire, join one end on to the lug marked G3+5 on socket No. 2, the other end on to lug marked SC on socket No. 3. Take a piece of bare tin copper wire $1\frac{3}{4}$in. long, solder one end on to C on socket No. 4, thread the other end through one of the holes in lug marked DP on socket No. 4. Pull the wire tight and solder it. Carry the free end on to lug marked DP1 on socket No. 4, pulling it straight across so that it does not touch or come near the nut and bolt which mounts the socket. Solder the end on to lug marked DP1.

Cut off a piece of covered wire four inches long, solder one end on to lug DP1 on socket No. 4. Tie a small tag on to the other end of the wire marking it "to E." This wire has to be left for some time. There will be various other similarly marked wires, all of which will be attended to at a later stage of construction.



Continuing on socket No. 4, solder the end of one of the wires on the end of the .001 mfd. condenser (not the end marked "outside foil") to lug marked P on socket No. 4. This wire will be found too long; cut off to handy length. The other end of this condenser connects to lug marked C on socket No. 5. The capacity of a condenser can easily be identified. They are usually marked:

.1 400
MFD VDC

The .1 mfd. is the capacity and is what we refer to when we say "a .1 mfd. condenser." If we say ".001 condenser" you have to sort out a condenser marked

.001 400
MFD VDC

The "400 VDC" or sometimes only "400 DC" means that they are tested to stand 400 volts direct current and are the standard necessity to suit our Kit-Sets.

Take a piece of bare tinned wire one inch long, solder one end to lug marked C on socket No. 5. Solder the other end direct to the chassis. In soldering direct to the chassis, it will be found best to first scrape a patch of the chassis shiny and rub a little flux on the chassis at the point where you are going to solder and to rub a little solder on to the chassis with the soldering iron, making sure that it takes securely. Then solder the other end of the tinned wire to this spot. This particular joint to the chassis is almost hidden in Fig. 7, but can just be seen under the fixed condenser near lug G of socket No. 5.

Now solder one end of a .02 mfd. condenser to lug marked P on socket No. 4. The other end marked "outer foil" of this condenser, solder on to lug marked G on socket No. 5.

Cut off a piece of covered wire 3in. long, connect one end to lug P on socket No. 4 and tie a tag on the other end marking the tag "to R." From lug marked S.G. on socket No. 5, solder one end of a four inch length of covered wire, the other end of this wire solder on to lug marked H2 on socket No. 6.

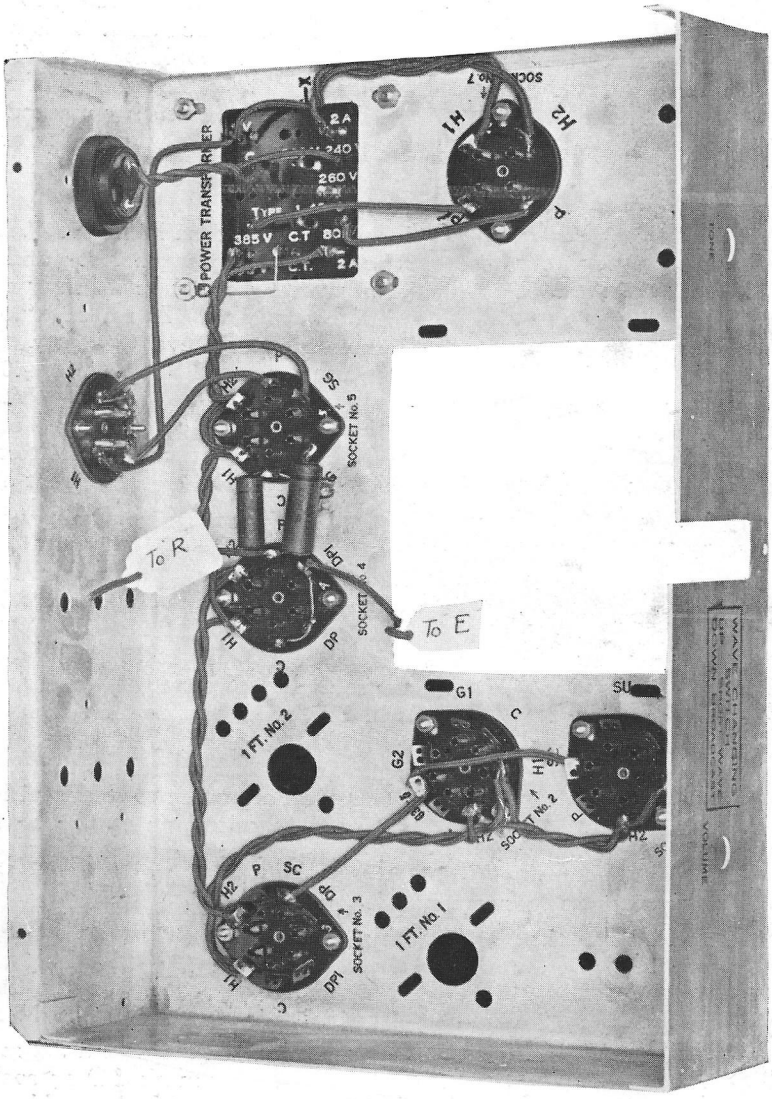
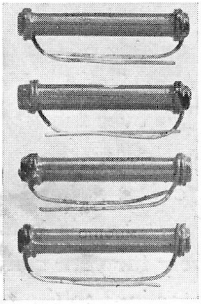

POWER TRANSFORMER
2A
240
260 V
385 V C.T 80
SOCKET No. 7
H1
H2
P
SOCKET No. 5
SOCKET No. 4
To R
To E
G1
G2
SU
H1
P
H2
SOCKET No. 2
SOCKET No. 3
I FT. No. 2
I FT. No. 1
WAVE CHANGING SWITCH
VOLUME

Fig. 7.

Take a length of bare tinned wire one inch long, solder one end on to lug marked H2 on socket No. 6. The other end on to lug marked P on socket No. 6. The wiring now appears as in Fig. 7.

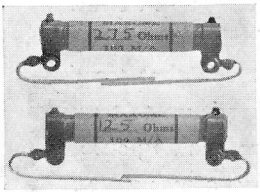


RESISTORS

Now go to socket No. 3. Solder one end of a 1 meg. resistor to lug marked DP1. You will identify the resistor and its value as follows: The resistor is a small article as illustrated and is painted brown, one end black and a green dot about the middle. Solder the other end of this resistor to earth—that is, to the chassis. Also on socket No. 3 take a .001 condenser, solder one end on to lug marked DP1—the other end to lug DP.

Next solder one end of a six inch length of covered wire to lug C on socket No. 3. Tie a tag to the other end of this wire, marking it "to J."

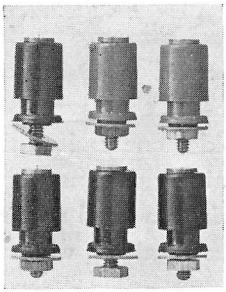
Next go to socket No. 2. Cut off a 3in. length of covered wire, connect one end to lug marked C. Connect the other to lug marked C on socket No. 1. To lug G1 on socket No. 2, solder one end of a 50,000 ohm resistor (this resistor will be identified as follows: painted green, one end black and an orange spot.) Solder the other end of this resistor to lug marked SU on socket No. 1, and also to lug marked "C" on socket No. 1. The easiest way to do this will be to thread the wire through one of the holes in SU and carry it on to C, soldering the wire on both of these lugs.



MAXOMES

On socket No. 1, lug C, solder one end of a 125 ohm Radiokes Maxome. Solder the other end of this maxome to earth (that is, the chassis) also on to lug C on socket No. 1, solder one end of a .1 condenser (not the end marked "outside foil.") Solder the other end of this condenser to earth (the end marked "outside foil.") Solder one end of a .25 mfd. condenser (not the end marked "outside foil") on to lug marked SC on socket No. 1. Solder the other end of this condenser to earth.

From lug marked G1 on socket No. 2, solder one end of a .0001 mica TCC condenser; to the other end of this condenser tie a tag marked "to green." There is no outside or inside foil mark on this condenser.



It will be now necessary to mount the terminals in the back of the chassis. There are six of these altogether and it will be a simple matter to connect them to the chassis. Take the two red terminals for a start. Undo the nut on the bottom of the terminal and from

the outside of the chassis fit the screw part of the terminal through the hole marked 1. You will find it quite a neat fit. Pass the insulating washer over the screw from the inside, fit a solder lug over the screw and then tighten the nut up, making it secure. You will understand that the object is to fit the terminal in such a way that the metal part of the terminal is definitely not touching the chassis. The solder lug is merely for your convenience because later on it will be necessary to make connections to the terminals. Fit lugs on each of the six terminals.

Mount the four black terminals in the holes marked 2 and 3. With terminals 3 the insulating washers are omitted, and metal washers are substituted. These two terminals have not to be insulated. Fig. No. 8 shows wiring to this stage. Take a piece of tinned wire just long enough to reach from one terminal (marked 3) to the other, No. 3 terminal. Solder securely. From one of these terminals, preferably from the one nearest the left hand corner of the chassis, solder a short length of tinned wire to earth. From the terminal No. 1 nearer to socket No. 6, connect one end of a six inch length of covered wire.

Now cut off a three inch length of copper braiding and thread the six inch length of wire through it to within half an inch of terminal No. 1, making sure that the copper braiding does not touch that terminal. Hold the wire close to the back of the chassis, running it up to terminal No. 3 on the left hand side, and under the earth wire, making sure that it does not touch terminal No. 2. Where the braiding comes nearest to terminal No. 3, make a solder connection between terminal No. 3 and the braiding. There will be about three inches of covered wire protruding from the end of this braiding, or shielding as it is generally called. To the end of this covered wire, connect a tag marked "to F." To stop the ends of the braiding from fraying it can be coated with solder by applying a little flux round the edge and running the hot soldering iron round the edge.

Now cut off a length of covered wire 12 inches long and a piece of braiding 10 inches long. Thread it through so that you have one inch of the covered wire protruding from either end of the shielding. Solder one end of this wire to terminal No. 2, making sure that the braiding does not touch the terminal. Press the braiding to the chassis making a good solder joint to earth at some convenient position; to the other braiding wire will do.

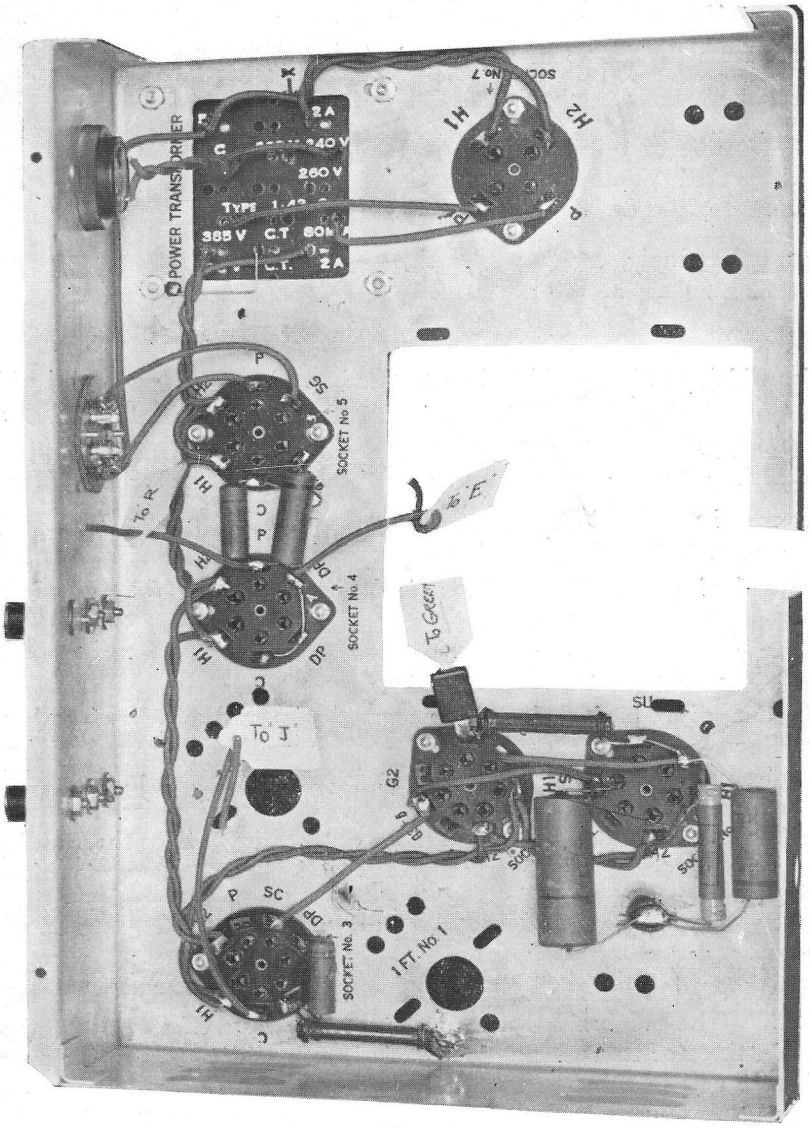
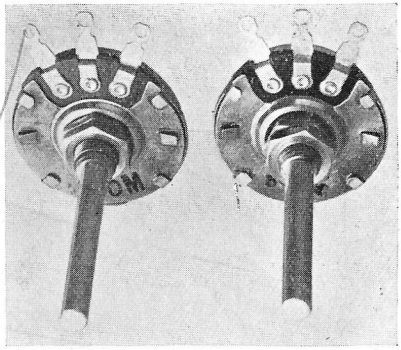

POWER TRANSFORMER
260 V
385 V C.T 80
C.T. 2A
H1
H2
SOCKET No 5
SOCKET No. 4
SOCKET No. 3
1 FT. No. 1
To R
To E
To G
To J
G2
SC
DP

Fig. 8.

Now take one of the 500,000 ohm volume controls. Unscrew the nut off this volume control and push the shaft from the inside of the chassis through the hole in the front of the chassis directly above socket No. 1 and marked "Volume." From the outside of the chassis tighten up the nut quite firmly, making sure that the solder lugs on the volume control are facing up. Now take the other end of the long length of wire which you have soldered on to terminal No. 2. Push the end of it underneath the wires which run from H1 and H2 on socket No. 3 to H1 and H2 on socket No. 4, that is, the wire and braiding will be between the chassis and these wires. Run the wire closely along the bottom of the chassis past P on socket No. 2 and along close to H2 on socket No. 1. Bend the wire here upwards and solder the end of it on to one end of a .02 mfd. condenser (it does not matter which end of the condenser) and the other end of the condenser solder on to the left hand lug of the volume control.



THE VARIABLE CONTROLS

Cut off an 18 inch length of covered wire and a 13½in. length of braiding. Thread the covered wire through the braiding until half an inch appears through one end. Join this end of wire on to the middle lug of the volume control, making sure that the braiding does not touch the bare wire. With a short wire (bare tinned wire) solder the braiding on to the remaining lug of the volume control. Run the long wire along the chassis close alongside the other shielded lead until you come to a hole in the chassis near the lug marked "C" on socket No. 4. Push the wire and shielding through this hole until you take up all the slack and connect a tag to the end of it on top of the chassis marking it "to grid of 75." The two braided wires should now run parallel to each other and in three or four places along their length solder the two braidings together and in three or four other places solder the braiding to the chassis.

The solder lug on the left hand mounting bolt of socket No. 2 is there as a convenient earthing joint and the braid should be well soldered to it.

Figs. 9 and *10* clearly show this stage of the wiring.

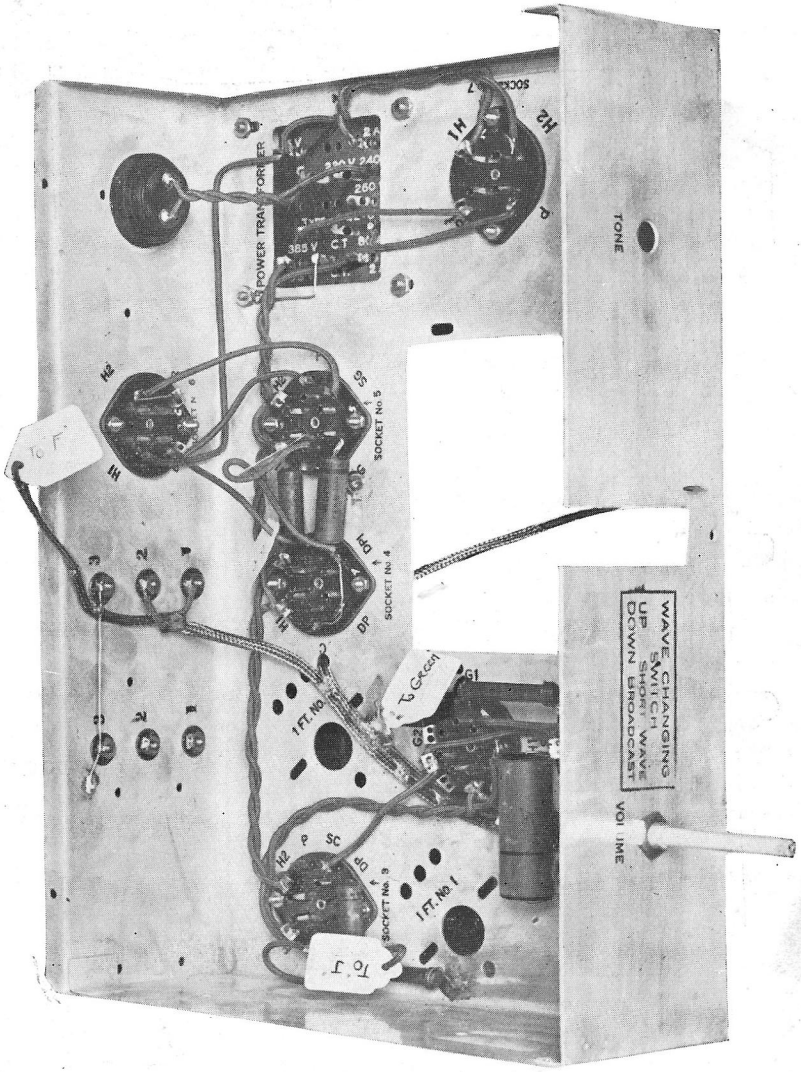

POWER TRANSFORMER
TONE
VOLUME
WAVE CHANGING SWITCH
UP SHORT WAVE
DOWN BROADCAST
SOCKET No. 5
SOCKET No. 4
SOCKET No. 3
I F T. No. 2
I F T. No. 1
To F
To J
To Green

Fig. 9.

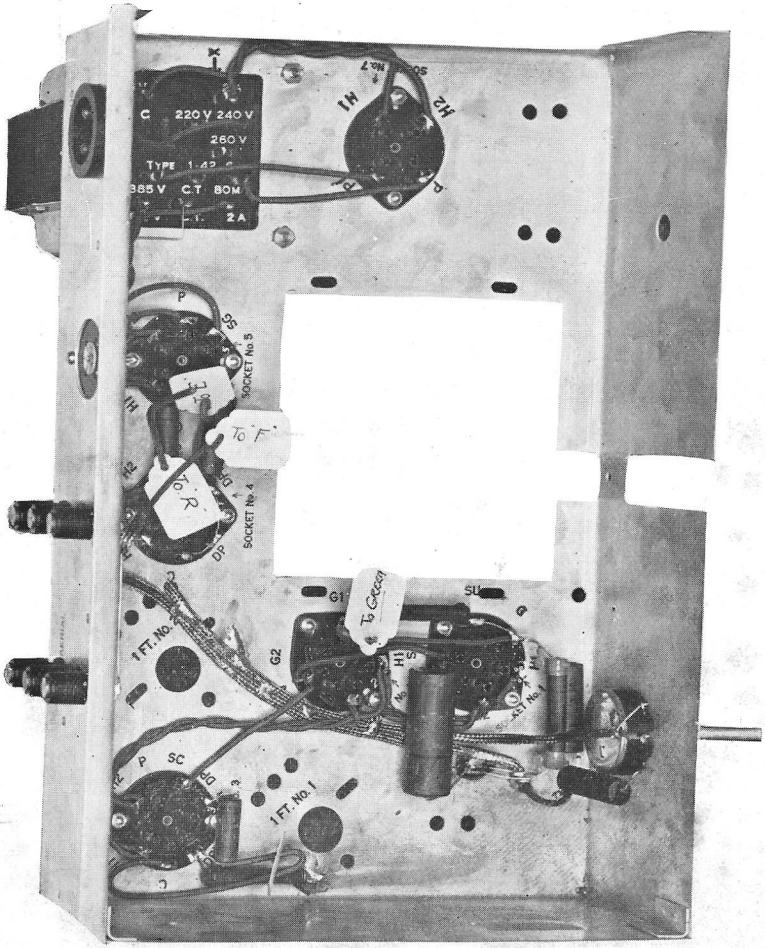
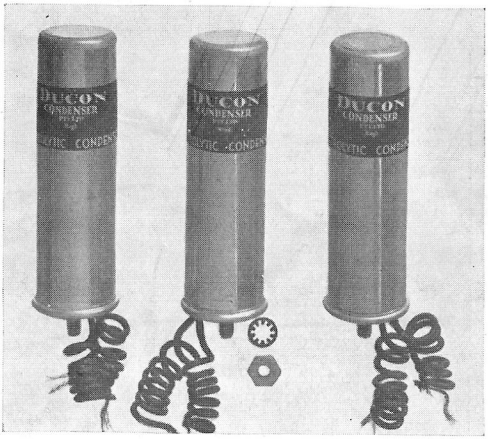

220 V 240 V
260 V
385 V C.T 80M
2A
H1
H2
P
SOCKET No. 5
SOCKET No. 4
To F
To R
To Grid
G1
G2
H1
1 FT. No. 2
1 FT. No. 1
SC

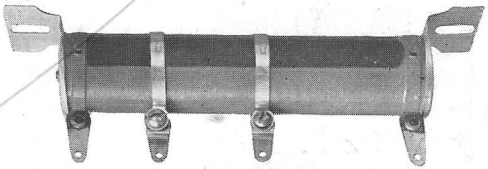
Fig. 10.

Now take one of the 8 mfd. electrolytic condensers. It has to be mounted in the two holes marked "8 mfd.1." Unscrew the nut off the bottom and take off the spring washer. From underneath, that is, the side of the chassis nearest the table, push the two wires through the hole furthest away from the front and the bolt through the other hole. Fit the spring washer over the bolt and screw on the nut tightly.



8 MFD. ELECTROLYTICS

Now take the Radiokes voltage divider, 25,000 ohms, and with the end with the two clips nearest the front of the chassis and the lugs facing out, bolt the divider to the left hand end of the chassis, where it is stamped "Divider" as shown in Fig. 11. From the lug on the voltage divider nearest the front of the chassis, solder one end of a .5 mfd. condenser (the end *not* marked O.F.). Solder the end marked "outside foil" of this condenser to earth.



VOLTAGE DIVIDER

To the next lug on the voltage divider, solder the red lead which comes from the electrolytic condenser 8 mfd.1 that you have already mounted in the corner of the chassis. This red wire can be cut off to the right length before soldering. To the same lug on the divider, solder one end of a .1 mfd. condenser, the other end of this condenser solder to earth. Next solder the black lead which comes from 8 mfd.1 to earth. This black lead can also be first cut off to a reasonable length.

Next solder a 3in. length of wire from G3+5 on socket No. 2 to the next lug on the voltage divider.

To the only remaining unsoldered lug on the voltage divider solder a short piece of bare tinned wire 4in. long and the other end of the wire solder to earth, the best and handiest earthing point being the nearest terminal, No. 3. *Fig. 11* shows the wiring to this stage.

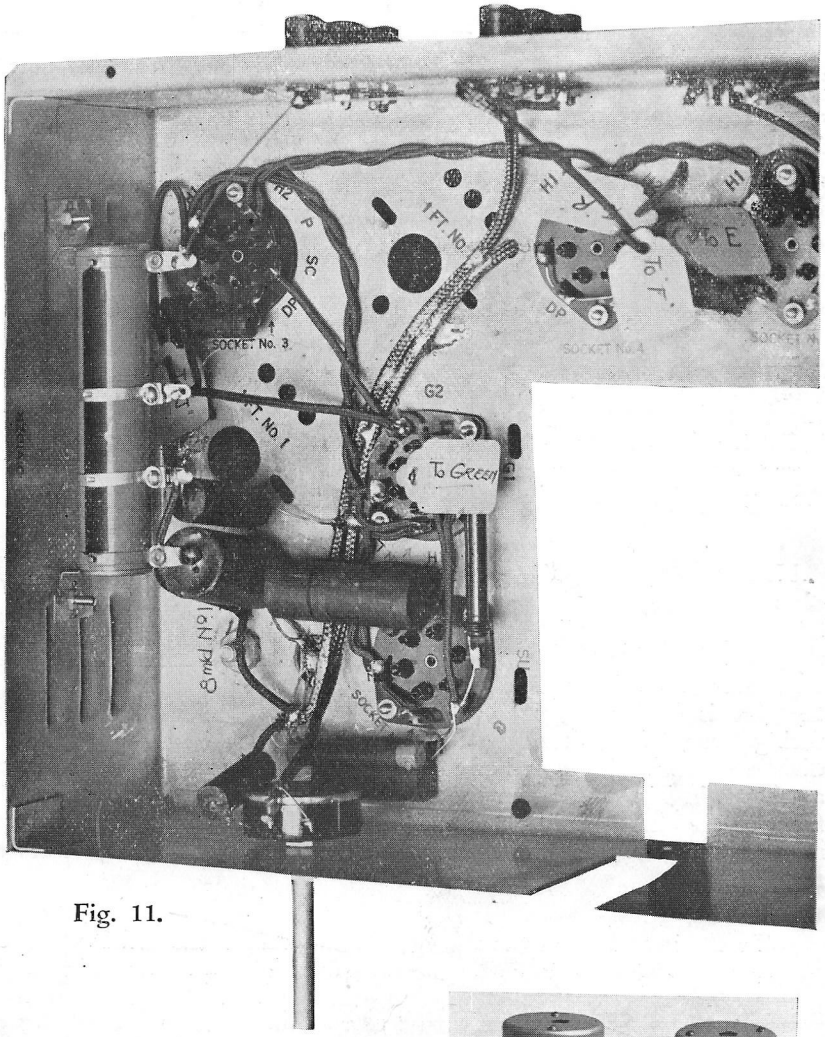
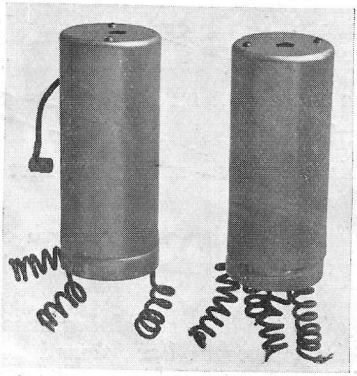


Fig. 11.

Now take I.F. transformer No. 1 and mount it from the top of the chassis by means of the two bolts. In mounting it first of all feed the green lead through the hole in the chassis nearest socket No. 3. There are three holes in a row. Through the next hole feed the red wire. Opposite these and directly underneath the voltage divider is one hole on its own.



I.F. TRANSFORMERS

Through this feed the yellow wire. Now, with the aid of the bolts which are screwed into the I.F., mount the I.F. transformer to the chassis through the slotted holes, taking care to see that the adjustable screw is as near to the centre as possible. Run the yellow wire to the lug at the end of the voltage divider nearest the front of the chassis. Cut off at the correct length, and solder. The red wire can be cut off at the correct length and soldered on to the lug marked P on socket No. 2. The green wire can be cut off to an inch and a half long, push the covering back a fairly long way so as to leave plenty of room to solder, and to this lead solder one end of a .1 mfd. condenser, and also one end of a .1 resistor. The .1 resistor you will recognise as follows: Brown body, black end, yellow dot. The other end of the .1 condenser solder to earth. The other end of .1 resistor solder to one end of a 1 megohm resistor. Where these two resistors join, tie a tag marked "x." The other end of this second resistor (1 megohm) connect on to DPI on socket No. 3. *Fig. 12* shows this stage of the wiring.

Now take I.F. transformer No. 2 and mount in a somewhat similar manner to I.F. transformer No. 1 at the place marked I.F.T. No. 2. Start by pushing the red and yellow wires through the hole nearest socket No. 3, then the green wire through the hole nearest terminal No. 1 on the right. The orange wire through the next hole. Now tighten the I.F. transformer to the chassis by passing the bolts through the slotted holes, centering the I.F. up and screwing up the bolts. Place a solder lug under the right hand screw. Take the yellow lead of this I.F. and solder it to the same lug on the divider as the yellow lead of I.F. transformer No. 1. The red wire cut off to the correct length and solder to P on socket No. 3. The orange lead cut off to the correct length and solder to DP on socket No. 3. Tie a tag "to M" on the green lead. From S.G. on socket No. 5, solder one end of a lead 10½ inches long. Run this wire along the chassis to the yellow wire on I.F. transformer 2. Pull it tight, take a twist round this yellow lead, then twist it the full length of the lead and solder it on to the same lug as the yellow lead. This twisting is only to make the lead neat. Now take the 275 ohm Maxome resistor, solder one end on to the lug marked C.T. on the power transformer between the terminals 385V and 80 m.a. The other end of this resistor join to earth.

Now mount the other two electrolytic condensers in the holes in the right hand corner of the chassis, marked 8 mfd. 2 and 8 mfd. 3. Mount these in exactly the same manner as you mounted the first electrolytic condenser in the left hand corner. Take the two black leads on these electrolytic condensers and join both of them on to the same lug on the power transformer as the 275 ohm. resistor, where it joins on to the terminal marked "C.T." If you have left the wire on this resistor about ½ in. long you have plenty of room to make a nice solder connection. It is important that no stray bare leads are left in such a manner that they may touch any of the other lugs.

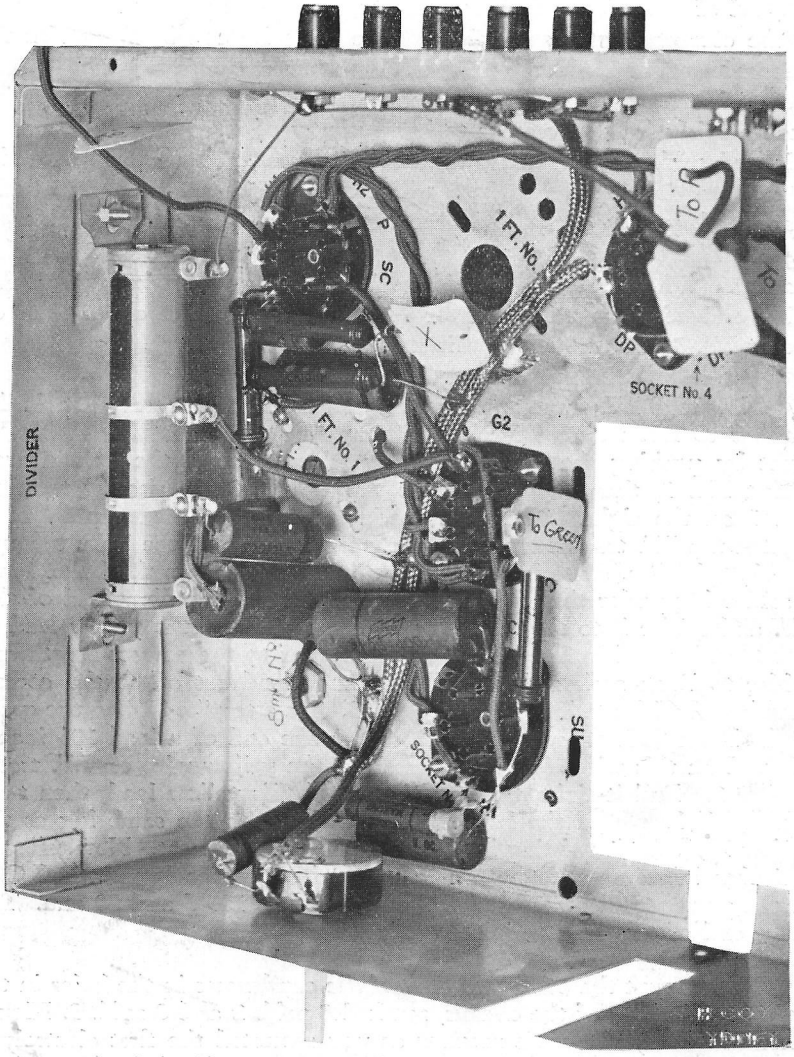
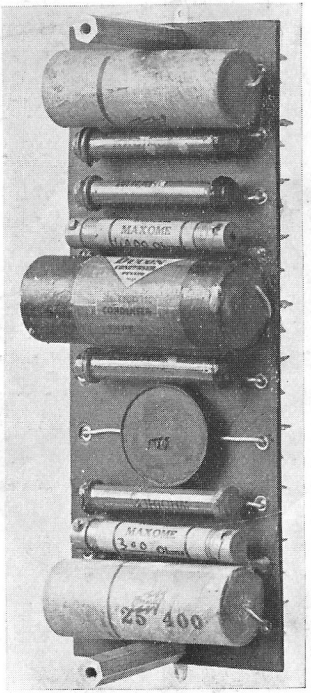


Fig. 12.

Next take the red lead on the electrolytic 8mfd. 3 in the right hand corner and solder it on to the lug marked 5V on the power transformer. Take the red lead on the other electrolytic condenser 8mfd. 2, solder it on to S.G. on socket No. 5. Do not cut this wire too short as it is absolutely essential that none of these leads run across the large square hole.

Now mount the other .5 meg potentiometer in the hole in the chassis marked "tone," directly above the two electrolytic condensers in the right hand corner of the chassis. Make sure you mount it with the lugs facing up. From the lug nearest the right hand corner of the chassis join a wire eleven inches long, thread a piece of copper shielding 10 inches long over this wire. To keep the braiding in position where it comes near to the tone control, it can be soldered to the metal case of the control, keeping it secure and making a good earth. This braiding is to act as a shield for the wire and stop the signals from radiating, therefore good earthing of it improves the stability of the set. Join the other end of this lead on to lug marked G on socket No. 5, soldering the shielding to earth in two or three places along the chassis. *Fig. 13* shows the wiring to this stage. From the middle lug on the volume control, join one end of a .01 condenser. The other end of this condenser join on to the remaining untouched lug on the potentiometer. From this same last lug solder one end of an 8 inch length of covered wire, the other end of this wire solder on to the lug C.T. between 385V and 80 m.a. on the power transformer.

Now take the resistance panel and mount it on the back of the chassis with the pillars nearest the back of the chassis and the letter "A" between socket No. 6 and the power plug; with the two small bolts passed through the back of the chassis, mount the resistance panel in place. There are two holes in the chassis in the right places and by means of two small bolts it can very quickly be tightened to the brass pillars. Now take the lead marked "to F" and after cutting it off to the right length, solder it on to the lug marked F on the panel. Now take the lead "to R," cut off to right length and solder on to "R" on the panel. Next treat lead "to E" in same manner and solder on to "E" on panel. Next solder the lead marked "to J" to "J" on the panel and the lead marked "to M" to "M" on the panel. Solder "T" on the panel to C.T. between 6.3V and 2 amp. on the power transformer with a 2 inch length of bare tinned wire. Solder a 2 inch length of covered wire from S on the panel to S.G. on socket No. 5. *Fig. 14* shows wiring to this stage.



RESISTANCE PANEL

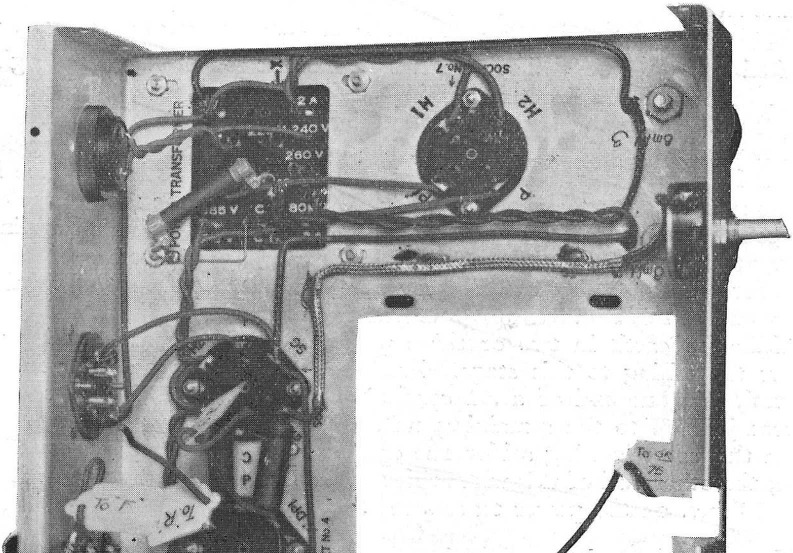


Fig. 13.

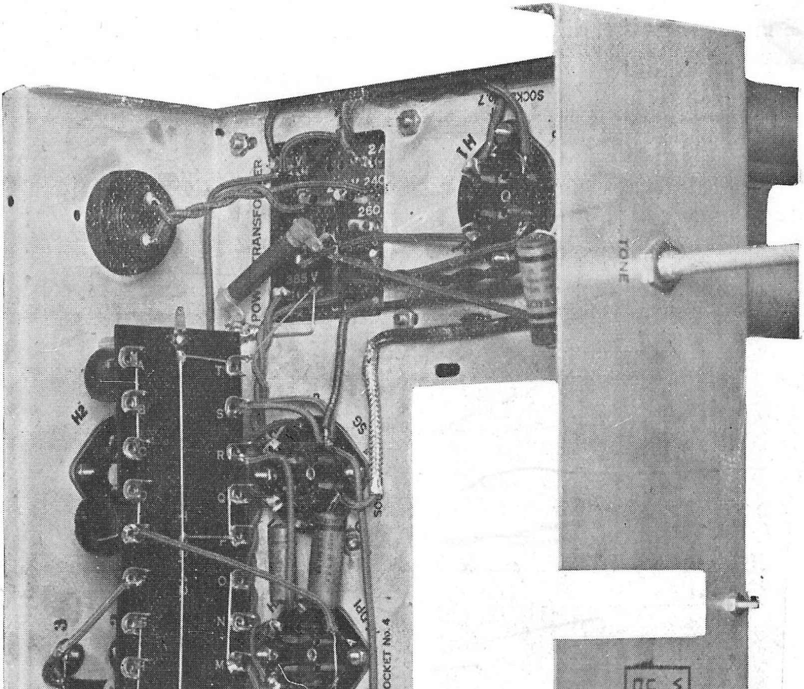
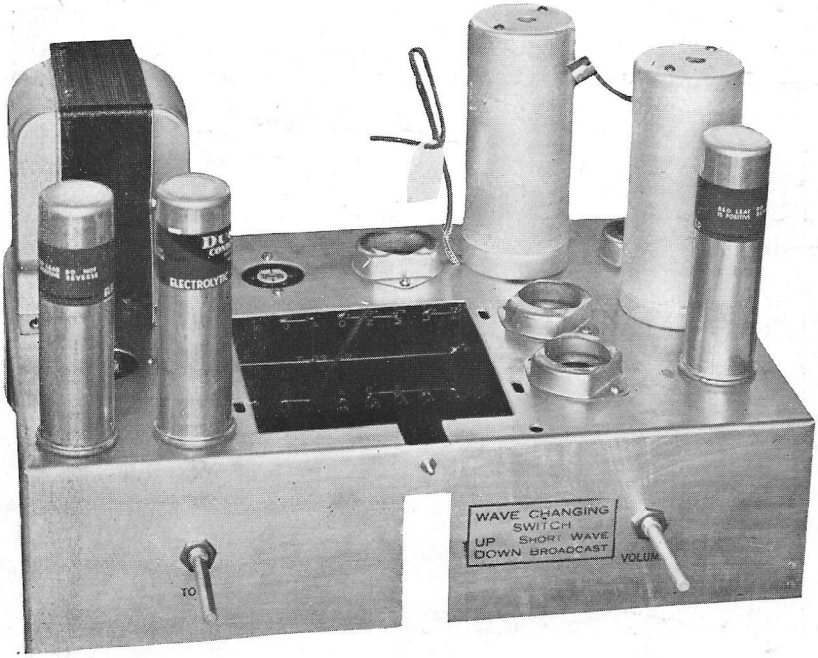

TONE
WAVE CHANGING
SWITCH
UP SHORT WAVE
DOWN BROADCAST
VOLUME
SOCKET No. 4

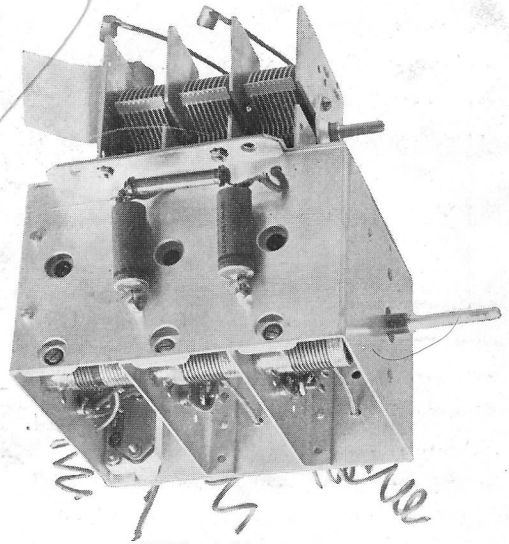
Fig. 14.

On the front of the chassis at the bottom of the oblong slot is a small hole (Fig. 14). From the inside, fit a small bolt, half an inch long; screw a nut on tightly from the outside. This bolt is for later on holding down the dial and has to be fitted now as later it will be inaccessible.



ABOVE SHOWS THE SET RIGHT SIDE UP AT THIS STAGE

Now take the all-wave coil assembly and pass it through the chassis to appear as in figures 15 and 16. With four bolts and nuts mount it to the chassis through the holes provided, placing a washer on the bolts first. To green (Fig. 16 on page 43 shows clearly this connection) where the 2.1 condensers and resistor are already soldered on the right hand side of the box (middle section) join one end of a 9 inch piece of wire; run the wire round the back of the box and along to and solder to the joint of the .1 and 1 megohm resistors marked "x". Now start on the left

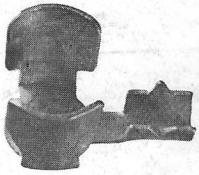


COIL ASSEMBLY

hand side of the box nearest the front of the chassis; you'll find a red and a green wire coming out of the first compartment. Twist these two wires together, join the green wire to terminal No. 2 at the left hand end of the resistance panel and the red wire to terminal No. 1, after cutting to correct length.

From the middle section of the box, join the red wire on to the lug marked P on socket No. 1 and the green wire on the lug on the end of the voltage divider, nearest the front of the chassis. On the far away section of the box, solder the green wire on to the end of the .0001 condenser marked "to green." The red wire solder on to lug marked G2 on socket No. 2. At the back of this box is a long red wire. Join this on to the lug on the voltage divider which has the red lead from the electrolytic 8MFDI connected to it.

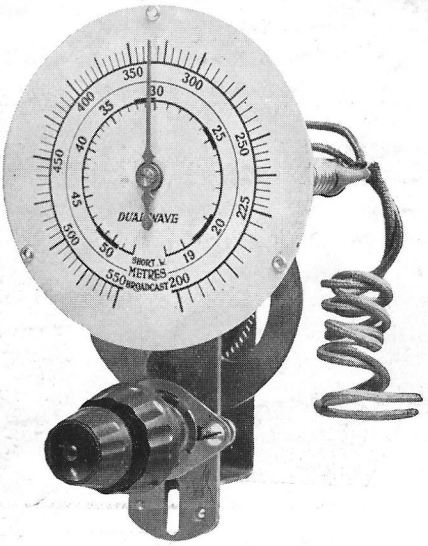
Turn the chassis right side up: The shielded lead which comes through the top of the chassis near socket marked 75 is marked "to grid of 75." To this lead solder a grid clip. If you study the clip on the orange lead of I.F. transformer No. 1, you will see exactly how to solder this to the wire. Turn the set upside down again. Carefully check all wiring, making sure that all soldering joints are good joints—that every wire is in its correct place.



GRID CLIP

MOUNTING THE DIAL

With the set right side up, hold the dial with the wired lamp sockets nearest the gang condenser and fit the bush of the dial on to the spindle of the condenser. There are two set screws on this bush; these have to be loosened enough to allow the shaft to push in freely.



Make sure that the knob of the dial is pointing down and you will easily see how it has to be attached to the small bolt you mounted some time ago. The bolt fits through the hole in the chassis of the dial. Fit a nut and screw up tightly.

Turn the big knob of the dial until the needle points to 300. To do this, the dial will have to be held with the left hand and the knob turned with the right. Now turn the knob until the needle moves from 300 to 400 and then to 550. With the needle exactly on 550, with the left hand turn the moving plates of the variable condenser until they are right in mesh with the fixed plates, that is as far round to the right as they will go.

See that the dial is perpendicular and appears to be fitting squarely on to the set. Tighten up the two set screws on the connecting bush and turn the dial by the big knob to the left. The plates of the condensers should move in unison in the same direction.

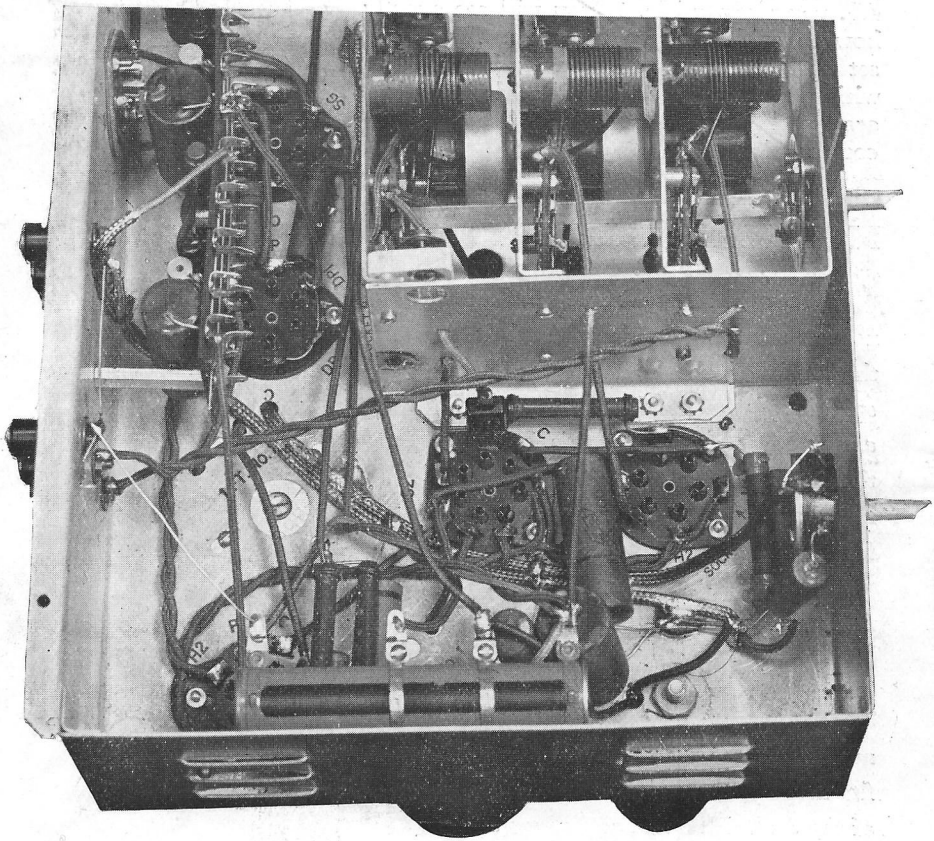


Fig. 15.

On the top of the chassis to the right of the dial, near the 6D6 valve, is a small hole. Push the two leads from the dial lamp through this hole and solder to H1 and H2 on socket No. 1 respectively. This supplies 6.3 volts to the dial lamps and provides illumination.

Connect pick-up terminals 1 and 2 together with a piece of bare tinned wire. These are spring terminals. To connect, you push back the bakelite part and insert the wire in the hole provided. Connect terminals 2 and 3 together of the aerial and earth terminals. Join the aerial to terminal 1 and the earth to the other two. If you decide later to install a transposed aerial, 2 and 3 are disconnected, but forget about this in the meantime.

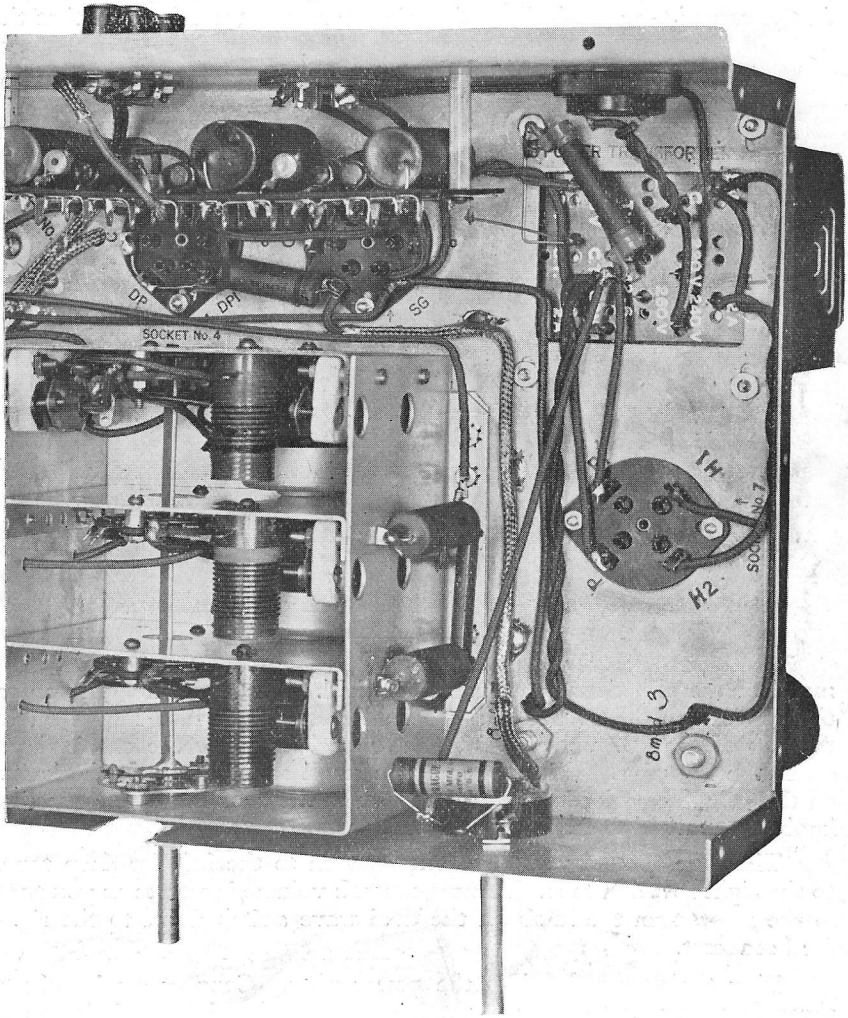
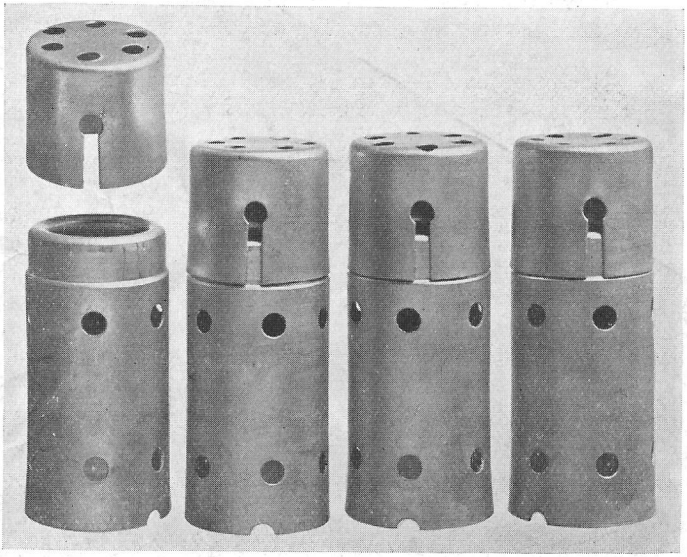


Fig. 16.

REMEMBER BEFORE MAKING ANY ADJUSTMENTS TO THE SET, ALWAYS SWITCH OFF AND DISCONNECT THE POWER PLUG FIRST.

Prepare for a preliminary test by plugging the loud speaker in the socket at the back of the chassis marked "speaker." When buying your speaker make sure from the dealer that the plug is correctly wired, otherwise the set won't work. Fit the valves in their sockets as instructed in the first test. This time fit the valve shields over the valves and the caps on to the top of the valves as shown. *Fig. 19* shows how the clip nearest to the 6D6 valve is fitted over the top of this valve; if it is too tight or loose, spread or squeeze the clip to make a good fit. The slot in the cap of the shield allows the wire to pass out neatly. See that the



VALVE SHIELDS

metal of the clip does not touch the shield. The next clip goes on to the cap of the 6A7 valve and the lead from I.F.T. No. 1 goes on to the cap of the 6B7 valve. *Fig. 18* shows clearly how the cap is fitted on to the 75 valve. With the aid of a small screwdriver, fit the knobs on the spindles projecting from the front of the chassis. The respective knobs are marked to show which is which.

The tone control works as follows: turn to the left for deep tone, to the right for high tone. Volume control: volume increases as you turn to the right, turn the knob on the dual wave switch down to the right for broadcast.

Plug the power flex into the power plug. Connect a wire about three feet long on to the red terminal marked "Aerial." This is to act as a temporary aerial.

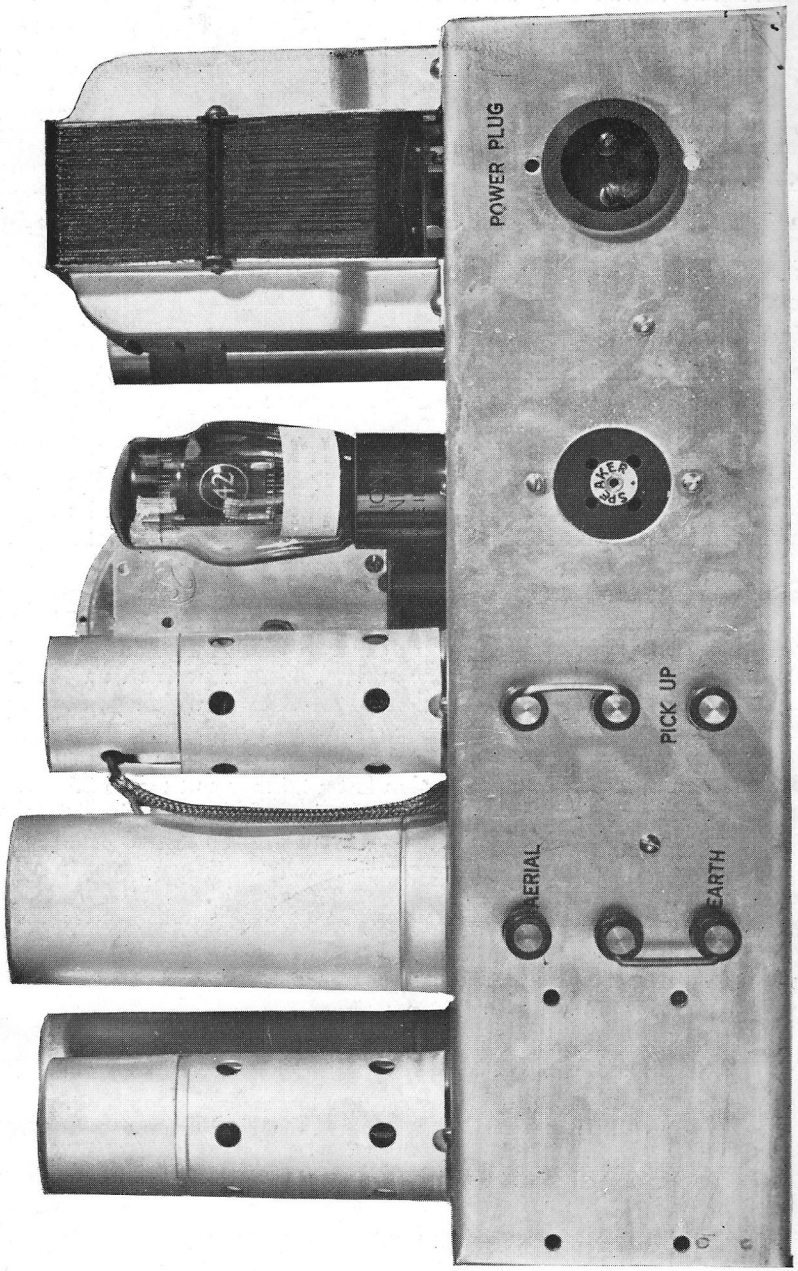
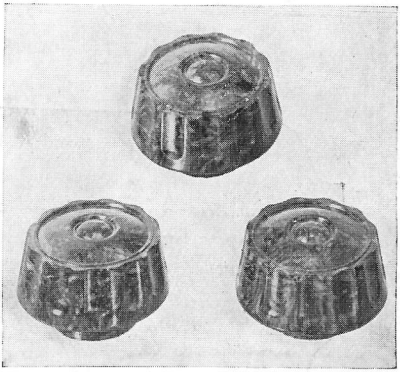


Fig. 18.

As in the preliminary test, watch the 80 valve for sparks and flashes and switch off immediately if anything untoward happens. If everything appears O.K. you will hear a humming noise and probably some crackling in the speaker. You will have the radio set the right side up now and turn the volume control, which is the spindle on the furthermost right hand side on the front of the chassis, as far round to the right as it will go. Turn the knob on the tuning condenser slowly to the left and stations should be tuned in.

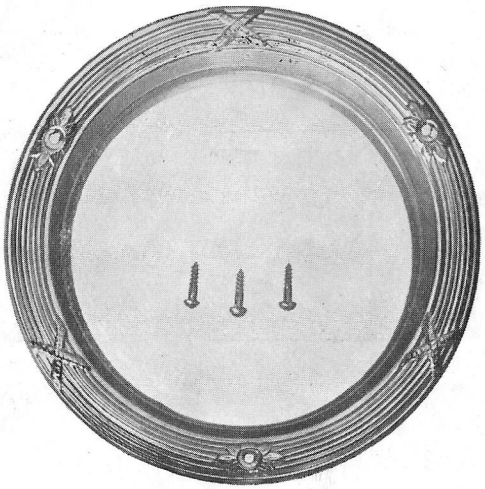


KNOBS

In tuning in, first of all try and get the local stations. The outside scale of the dial is marked in meters and if you look up the list of stations on Page 50 you will see where your nearest station will be heard. Then turn the dial until the needle points to approximately that number, and you'll hear the station alright.

Presuming that the broadcast band is alright, turn the wave-changing switch up to short-wave and try your luck on short-wave. Use the small knob of the dial and tune very carefully. Overseas and Interstate stations on short-wave are irregular and when their position on the dial has been found write it down and also the time at which you hear it. This will prove helpful perhaps later on.

The short-wave scale is the red figures nearest the centre of the dial and, again, if you know a station is on 25 metres turn to 25 on the dial and within one or two degrees each side of that position, the station, if on the air, will be heard.



The Escutcheon Plate for fitting on to the cabinet. The three small screws are for mounting.

ALIGNING THE RECEIVER. This should only be attempted after the set has been operating satisfactorily and perhaps is not bringing in the stations quite as well as you expected.

The set should be operated on an aerial about 30 ft. high and 60 ft. long from the far end of the aerial to the aerial terminal of the set. A good earth should be installed as closely as possible to the set. A good earth can be made by driving about 5 ft. of 1 inch or 1½ inch galvanised piping into ground and soaking the surrounding soil with a saturated blue stone solution. A copper pipe will give even better results. Solder a heavy wire about 7/20 gauge to the pipe and run the other end as direct as possible to the set.

Commencing the aligning by tuning in a station on approximately 250 metres on the broadcast band. With the aid of an insulated screwdriver or proper aligning tool, with the set upside down and working, fit the screwdriver into the screw of the trimmer in the first section of the coil assembly nearest the front and nearest the bottom. Turn this screw slowly until you can notice an increase in the volume of the station. Slightly retune the dial for best results and leave the trimmer where the station came in loudest.

Do exactly the same with the bottom trimmer of the middle section. Don't *under any circumstances* touch the trimmers of the third or far away section.

Now, slightly adjust the adjustable screw on the tops and bottoms of I.F.T. No. 1 and No. 2 in the same manner. Always before adjusting, mark the trimmer position so that you can come back to that if no improvement is noticeable.

Remember, all of these coils were adjusted to maximum in the factory, and should only need a very slight alteration to take up any discrepancies in the wiring of the set.

Now turn the switch on to short-wave. This will be more difficult; owing to the rapid fading sometimes experienced on short-wave, the adjustment must be slower. We advise tuning in to Paris on 25 metres. This station does not swing much and comes in fairly loudly. Also Japan on about 28 metres at 9 p.m. each evening (at present) comes in very loudly.

It is not wise when aligning a set to pick too loud a station as often the degree of sensitivity necessary to hear it is not sufficient to make small adjustments noticeable.

When aligning the short-wave, start by adjusting the trimmer on the front section of the coil assembly; the trimmer nearest the top of the box when the set is upside down. After adjusting for maximum, adjust the top trimmer of the middle section in the same way, and the set will be correctly aligned.

Remember, don't adjust the trimmers on the oscillator section, that is the third far away section.

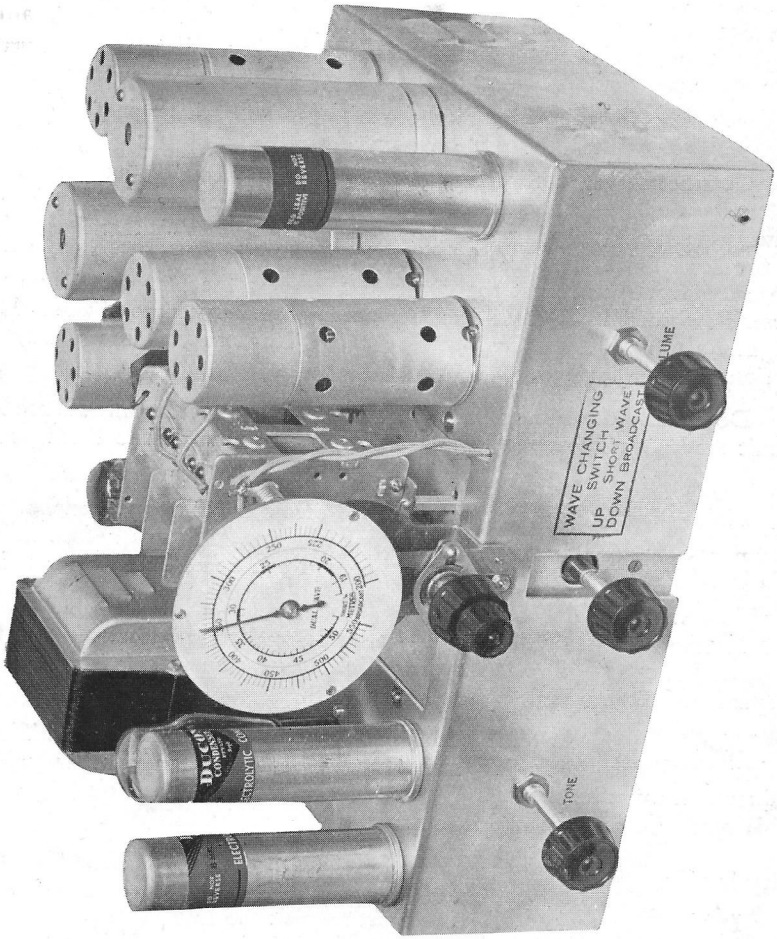


Fig. 19.

THE COMPLETE SET

BUILD YOUR OWN RADIO

THERE is a wonderful thrill in tuning-in overseas stations with all the volume, reliability and clarity of local stations. There is an even greater thrill in knowing that the receiver that pulls in all these stations has been built by you in your spare time!

You can build in your spare time the 6-valve Dual-wave Superheterodyne, the assembling of which is being described in this book. The complete set of parts as listed on page 13 (except valves and speaker) is available in the Radiokes Kit-Set and is known as the *Simplified* Dual-wave Kit-Set, type 12-35S, for A.C. operation. Note the word "simplified!" It means that there is not one single technical snag left which possibly could confuse the non-technical reader. Every bit of wiring that could possibly prove difficult has been done by Radiokes engineers. For instance, the coil assembly unit is tested and aligned "on the air"—under actual working conditions—sealed, and bolted to the gang and switch, before it reaches you. The Intermediate Frequency transformers are already aligned and probably need no further adjustment. As for the wiring—by following the simple instructions and referring to the photographs, you cannot possibly "go astray." In buying the Radiokes Simplified Dual-wave Kit-Set you don't take the slightest risk. Success is GUARANTEED.

Remember, Radiokes engineers are constantly at your service, and will be delighted to give you any technical data or any information you may require regarding the *Simplified* Dual-wave Kit-Set.

The Radiokes *Simplified* Dual-wave Kit-Set is retailed at £12/19/6—an amazingly low price when you think that the Kit-Set includes all the components (except valves and speaker) that comprise a 6-valve Dual-wave Superheterodyne which features independent Automatic Volume Control—filtered extended range audio system which gives exceptional fidelity on both the short waves and broadcast band—wave changing by special switch with silver-plated contacts—new type tone control—dual-ratio Aerovision Dial, calibrated for Short-wave and broadcast band—special air dielectric Isolantite Intermediate Frequency Transformers, Litz-wound, etc. Obtained from leading radio houses throughout Australia and New Zealand. Order your Kit-Set NOW!

BROADCASTING STATION WAVE LENGTHS

Allocations on and after 1st September, 1935

Wave Length (Metres)	Station		Wave Length (Metres)	Station	
545	2CR	N.S.W.	261	2HD	Newcastle
536	6WA	W.A.	259	2KA	Katoomba
517	3WV	Vic.	259	4MK	Mackay
508	7ZL	Hobart	259	6BY	Bunbury
500	4QN	Q'land.	256	4TO	Townsville
492	2FC	Sydney	254	3KZ	Melbourne
476	3AR	Melbourne	252	2CH	Sydney
469	5CK	S.A.	250	5KA	Adelaide
448	2CO	N.S.W.	248	2GF	Grafton
435	6WF	Perth	248	6KG	Kalgoorlie
429	2NR	N.S.W.	246	4AK	Oakey
417	6GF	W.A.	244	2NC	N.S.W.
411	5CL	Adelaide	242	3TR	Sale
405	2BL	Sydney	242	6IX	Perth
400	7NT	Tas.	238	3WR	Shepparton
390	3LO	Melbourne	236	2SM	Sydney
375	4QG	Brisbane	234	3AW	Melbourne
366	7HO	Hobart	233	4BK	Brisbane
361	3GL	Vic.	231	2TM	Tamworth
353	5RM	Renmark	229	5AD	Adelaide
345	2GB	Sydney	227	3BA	Ballarat
341	6PR	Perth	226	2BH	Broken Hill
333	3MA	Mildura	226	4RO	Rockhampton
333	4WK	Warwick	224	2XN	Lismore
330	4RK	Rockhampton	222	3GL	Geelong
323	3UZ	Melbourne	221	2MO	Gunnedah
316	2UE	Sydney	221	4PM	Port Moresby
313	5DN	Adelaide	219	3HS	Horsham
309	3BO	Bendigo	217	4BH	Brisbane
306	4AY	Ayr	216	7BU	Burnie
306	6AM	Northam	216	2GN	Goulburn
303	2GZ	Orange	213	2KO	Newcastle
300	4GR	Toowoomba	211	3XY	Melbourne
297	3HA	Hamilton	210	2WL	Wollongong
294	2KY	Sydney	208	2QN	Deniliquin
291	3DB	Melbourne	208	4IP	Ipswich
288	5PI	Crystal Brook	207	5MU	Murray Bridge
286	2CA	Canberra	205	7UV	Ulverstone
283	3YB	Mobile	204	2BE	Bega
283	4MB	Maryborough	204	4CA	Cairns
278	3SH	Swan Hill	203	2AY	Albury
273	7LA	Launceston	201	2	South N.S.W.
270	2UW	Sydney	200	7	Hobart
268	4BC	Brisbane	200	3AK	Melbourne (night service station)
263	6ML	Perth			
265	2WG	Wagga			

World Time Chart.

Sweden Germany Switzerland Italy	Petrograd Constantinople. Capetown	Bagdad. Persia.	India.	Borneo. Java. Dutch E.I.	P.I. China Western Australia.	Tokyo	Adelaide South Aust.	Sydney, Melbourne. Eastern Aust.	New Zealand.	Samoa.	Hawaiian Islands.	U.S.A. Pacific S.T.	U.S.A. Mountain S.T.	U.S.A. Central S.T.	U.S.A. New York Washington E.S.T.	Halifax. Buenos Aires.	Rio de Janiero. Brazil.	London. Paris. Madrid	G.M.T or G.C.T.
1.00	2.00	3.00	5.00	6.00	8.00	9.00	9.30	10.00	11.30	Noon	1.30	4.00	5.00	6.00	7.00	8.00	9.00	Midn.	0000
2.00	3.00	4.00	6.00	7.00	9.00	10.00	10.30	11.00	12.30	1.00	2.30	5.00	6.00	7.00	8.00	9.00	10.00	1.00	0100
3.00	4.00	5.00	7.00	8.00	10.00	11.00	11.30	Noon	1.30	2.00	3.30	6.00	7.00	8.00	9.00	10.00	11.00	2.00	0200
4.00	5.00	6.00	8.00	9.00	11.00	Noon	12.30	1.00	2.30	3.00	4.30	7.00	8.00	9.00	10.00	11.00	Midn.	3.00	0300
5.00	6.00	7.00	9.00	10.00	Noon	1.00	1.30	2.00	3.30	4.00	5.30	8.00	9.00	10.00	11.00	Midn.	1.00	4.00	0400
6.00	7.00	8.00	10.00	11.00	1.00	2.00	2.30	3.00	4.30	5.00	6.30	9.00	10.00	11.00	Midn.	1.00	2.00	5.00	0500
7.00	8.00	9.00	11.00	Noon	2.00	3.00	3.30	4.00	5.30	6.00	7.30	10.00	11.00	Midn.	1.00	2.00	3.00	6.00	0600
8.00	9.00	10.00	Noon	1.00	3.00	4.00	4.30	5.00	6.30	7.00	8.30	11.00	Midn.	1.00	2.00	3.00	4.00	7.00	0700
9.00	10.00	11.00	1.00	2.00	4.00	5.00	5.30	6.00	7.30	8.00	9.30	Midn.	1.00	2.00	3.00	4.00	5.00	8.00	0800
10.00	11.00	Noon	2.00	3.00	5.00	6.00	6.30	7.00	8.30	9.00	10.30	1.00	2.00	3.00	4.00	5.00	6.00	9.00	0900
11.00	Noon	1.00	3.00	4.00	6.00	7.00	7.30	8.00	9.30	10.00	11.30	2.00	3.00	4.00	5.00	6.00	7.00	10.00	1000
Noon	1.00	2.00	4.00	5.00	7.00	8.00	8.30	9.00	10.30	11.00	12.30	3.00	4.00	5.00	6.00	7.00	8.00	11.00	1100
1.00	2.00	3.00	5.00	6.00	8.00	9.00	9.30	10.00	11.30	Midn.	1.30	4.00	5.00	6.00	7.00	8.00	9.00	Noon	1200
2.00	3.00	4.00	6.00	7.00	9.00	10.00	10.30	11.00	12.30	1.00	2.30	5.00	6.00	7.00	8.00	9.00	10.00	1.00	1300
3.00	4.00	5.00	7.00	8.00	10.00	11.00	11.30	Midn.	1.30	2.00	3.30	6.00	7.00	8.00	9.00	10.00	11.00	2.00	1400
4.00	5.00	6.00	8.00	9.00	11.00	Midn.	12.30	1.00	2.30	3.00	4.30	7.00	8.00	9.00	10.00	11.00	Noon	3.00	1500
5.00	6.00	7.00	9.00	10.00	Midn.	1.00	1.30	2.00	3.30	4.00	5.30	8.00	9.00	10.00	11.00	Noon	1.00	4.00	1600
6.00	7.00	8.00	10.00	11.00	1.00	2.00	2.30	3.00	4.30	5.00	6.30	9.00	10.00	11.00	Noon.	1.00	2.00	5.00	1700
7.00	8.00	9.00	11.00	Midn.	2.00	3.00	3.30	4.00	5.30	6.00	7.30	10.00	11.00	Noon	1.00	2.00	3.00	6.00	1800
8.00	9.00	10.00	Midn.	1.00	3.00	4.00	4.30	5.00	6.30	7.00	8.30	11.00	Noon	1.00	2.00	3.00	4.00	7.00	1900
9.00	10.00	11.00	1.00	2.00	4.00	5.00	5.30	6.00	7.30	8.00	9.30	Noon	1.00	2.00	3.00	4.00	5.00	8.00	2000
10.00	11.00	Midn.	2.00	3.00	5.00	6.00	6.30	7.00	8.30	9.00	10.30	1.00	2.00	3.00	4.00	5.00	6.00	9.00	2100
11.00	Midn.	1.00	3.00	4.00	6.00	7.00	7.30	8.00	9.30	10.00	11.30	2.00	3.00	4.00	5.00	6.00	7.00	10.00	2200
Midn.	1.00	2.00	4.00	5.00	7.00	8.00	8.30	9.00	10. 0	11.00	12.30	3.00	4.00	5.00	6.00	7.00	8.00	11.00	2300

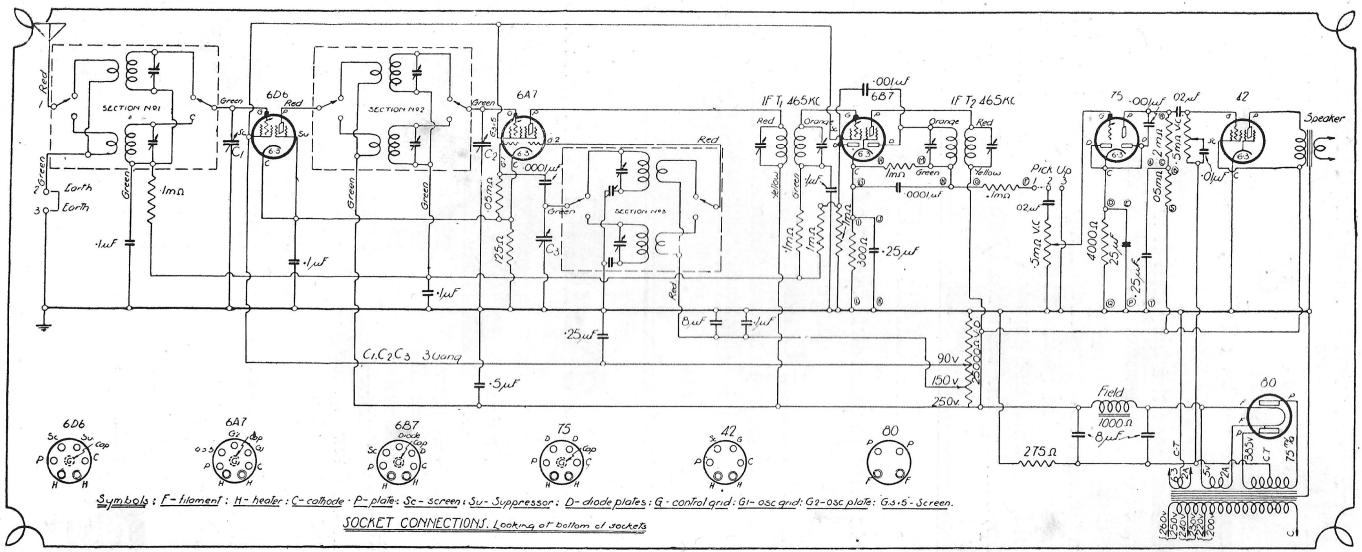
NOTE: Crossing from dark to light area at midnight indicates following day. Crossing from light to dark area at midnight indicates preceding day. Thus 8 p.m. Sydney time corresponds to 5 a.m. New York time on the following day.

A LIST OF SHORT-WAVE STATIONS

Wave-length	Name of Station	Country
19.47	Riobamba PRADO,	Ecuador
19.52	Budapest HAS3,	Hungary
19.56	Schenectady W2XAD (WGY),	U.S.A.
19.61	La Paz CP4,	Bolivia
19.64	New York W XE (WABC),	U.S.A.
19.66	Daventry (Empire) GSI,	G. Britain
19.67	Coytesville N.J. WIXAL (WEEI),	U.S.A.
19.67	Tashkent (RIM),	U.S.S.R.
19.68	Radio Coloniale FYA,	France
19.72	Saxonburg W8XK (KDKA),	U.S.A.
19.74	Zeesen DJB,	Germany
19.82	Daventry (Empire) GSF,	G. Britain
19.84	Rome (Vatican) HVJ,	Italy
19.88	Moscow (RKI),	U.S.S.R.
19.93	W8XK, Saxonburg (KDKA),	U.S.A.
20.27	Rocky Point WQV,	U.S.A.
20.31	Rocky Point N.Y. (WEB),	U.S.A.
21.43	Cairo SUV,	Egypt
21.53	Rocky Point WIK,	U.S.A.
21.58	Rocky Point WQP,	U.S.A.
21.605	Rocky Point WQT,	U.S.A.
21.83	Drummondville CJA8,	Canada
22.26	Rocky Point WAJ,	U.S.A.
22.48	Santa Rita YVQ,	Venezuela
22.684	Zeesen (DHB),	Germany
23.39	Radio Maroc (Rabat), CNR,	Morocco
24.41	Rugby GBU,	Great Britain
24.9	Kootwijk PDV,	Holland
25	Moscow RNE,	U.S.S.R.
25.25	Radio Coloniale, Paris (FYA),	France
25.27	Saxonburg (Pa.) W8XK (KDKA),	U.S.A.
25.28	Daventry (Empire) GSE,	G. Britain
25.34	Wayne W2XE (WABC),	U.S.A.
25.4	Rome 2RO,	Italy
25.45	Boston WIXAL (WEEI),	U.S.A.
25.49	Zeesen DJD,	Germany
25.532	Daventry (Empire) GSD,	G. Britain
25.63	Radio Coloniale FYA,	France
26.83	Funchal CT3AQ,	Madeira
27.65	Nauen DFL,	Germany
27.86	Rugby GBP,	Great Britain
27.88	Marapicu PSG,	Brazil
28.1	Nazaki JVN,	Japan
28.5	Sydney VLK,	N.S. Wales
28.98	Buenos Aires LSX,	Argentine
29.03	Bermuda ZFD,	West Indies
29.04	Ruysselede (ORK),	Belgium
29.35	Marapicu PSH,	Brazil
29.59	Leopoldville OPM,	Belgian Congo
29.64	Marapicu PSI,	Brazil
29.84	Abu Zabel, Cairo SUV,	Egypt
30	Radio Excelsior LR5,	Argentine
30.1	Rome IRS,	Italy
30.4	Lawrenceville WON,	U.S.A.
30.4	Tokio JIAA,	Japan
30.43	Madrid EAQ,	Spain
30.77	Lawrenceville WOF,	U.S.A.
30.9	Rugby GCA,	Great Britain
31.23	Mexico City XETE,	Mexico
31.25	Lisbon CTIAA,	Portugal
31.26	Radio Nations HBL,	Switzerland
31.26	Melbourne VK3LR,	Victoria
31.28	Philadelphia W3XAU (WCAU),	U.S.A.
31.28	Sydney VK2ME,	N.S. Wales
31.32	Daventry (Empire) GSC,	G. Britain
31.34	Jeloy,	Norway
31.35	Millis W1XAZ (WBZ),	U.S.A.
31.38	Zeesen DJA,	Germany
31.45	Zeesen (DJA),	Germany
31.48	Schenectady W2XAF (WGY),	U.S.A.
31.55	Daventry (Empire) GSB,	G. Britain
31.55	Melbourne VK3ME,	Victoria
31.55	Caracas YV3BC,	Venezuela

Wave-length	Name of Station	Country
31.58	Rio de Janeiro PSA,	Brazil
31.6	Skamlebaek,	Denmark
31.7	Havana,	Cuba
31.71	New Brunswick WKJ,	U.S.A.
31.9	Bandoeng PLV,	Java
32.71	Lawrenceville WNA,	U.S.A.
32.79	Maracay YVQ,	Venezuela
32.88	Budapest HAT4,	Hungary
33.26	Rugby GCS,	Great Britain
33.59	Rocky Point (N.J.) WEC,	U.S.A.
34.68	London VE9BY,	Canada
36.65	Rio de Janeiro PSK (PRA3),	Brazil
37.04	Quito HCJB,	Ecuador
37.33	Rabat (CNR),	Morocco
37.41	Suva VPD,	Fiji Isles
38.07	Tokio JIAA,	Japan
38.47	Radio Nations HBP,	Switzerland
38.65	Kootwijk PDM,	Holland
39.34	Tashkent RIM,	U.S.S.R.
39.76	Moscow RKI,	U.S.S.R.
39.82	Riobamba PRADO,	Ecuador
40.3	Radio Nations HBQ,	Switzerland
40.5	Bogota HJ3ABB,	Colombia
40.54	Rocky Point WEN,	U.S.A.
41.55	Bogota HKE,	Colombia
41.6	Las Palmas EA8AB,	Canary Isles
41.67	Singapore VSIAB,	Sts. Settlements
41.84	Grenada YN6RD,	Nicaragua
41.9	Manizales HJ4ABB,	Colombia
43	Madrid EA4AQ,	Spain
43.86	Budapest HAT2,	Hungary
44.61	Rocky Point WQO,	U.S.A.
44.96	Maracay YVQ,	Venezuela
45	Constantine FM8KR,	Tunis
45	Guatemala City,	S. America
45.02	Guayaquil HC2RL,	Ecuador
45.38	Moscow RW72,	U.S.S.R.
46.53	Barranquilla (HJIABB),	Colombia
46.69	Boundbrook W3XL (WJZ),	U.S.A.
46.7	Boston WIXAL,	U.S.A.
47	Caracas,	Venezuela
47.5	S. Domingo HIZ,	Dominican R.
47.8	Domingo HIAA,	Dominican R.
48 75	Winnipeg CJRO,	Canada
48.78	Caracas YV3RC,	Venezuela
48.86	Saxonburg (Pa.) W8XK (KDKA),	U.S.A.
48.86	Moscow (RKK),	U.S.S.R.
48.94	Jeloy,	Norway
49.02	Bandoeng (YDA),	Dutch E. Indies
49.02	Wayne W2XE (WABC),	U.S.A.
49.08	Caracas YV2RC,	Venezuela
49.1	Daventry (Empire) GSL,	G. Britain
49.18	Boundbrook W3XAL (WJZ),	U.S.A.
49.18	Chicago W9XF (WENR),	U.S.A.
49.22	Bowmanville VE9GW (CRCT)	Canada
49.26	St. John VE9BJ (CFBL),	New Brunswick
49.3	La Paz CP5,	Bolivia
49.34	Chicago W9XAA (WCFL),	U.S.A.
49.35	Zeesen (DJM),	Germany
49.39	Maracaibo Y5BMO,	Venezuela
49.4	Vienna OER2,	Austria
49.43	Vancouver VE9CS (CKFC),	British Columbia
49.47	Nairobi VQ7LO,	Kenya Colony
49.5	Pernambuco,	Brazil
49.5	Skamlebaek,	Denmark
49.5	Philadelphia W4XAU (WCAU),	United States
49.5	Cincinnati W8XAL (WLW),	U.S.A.
49.586	Daventry (Empire) GSA,	G. Britain
49.6	Bogota HJ3ABI,	Colombia
49.67	Boston WIXAL (WEED),	U.S.A.
49.69	Priok (YDA),	Dutch E. Indies
49.83	Zeesen DJC,	Germany
49.96	Drummondville VE9DN (CFCF),	Canada
50.	Moscow RNE,	U.S.S.R.
50.8	Barcelona EA3AB,	Spain

RADIOKES SIMPLIFIED DUAL WAVE SUPERHET.



CIRCUIT DIAGRAM

(For the technically-minded reader)