RADIOKES "SIMPLIFIED" SUPER-HET. SIX

GENERAL

The Radiokes simplified, Super-heterodyne, employing 6 Valves and Rectifier, will give splendid sensitivity, knife edge selectivity and splendid tone, the latter being under the control of the operator. The tubes employed, and the positions they occupy are:

- R.F. Amplifier and Int. Amplifier, Kenrad, 235
- 1st and 2nd Detectors, 224
- Oscillator, 227
- Power Output, 247
- Rectifier, 290

The Radiokes new and improved Kit comprises:

1. Aerial Coil
2. Aerial Transformer
3. Intermediate Frequency Transformers
4. Kenrad, 6 Yds. Hook-up Wire
5. Oscillator Coil

Both the aerial coil and the R.F. Transformer embody impedance capacity coupling, which gives uniform high amplification over the whole wave-band.

The Intermediate Frequency Transformers are so designed that they give the maximum of selectivity obtainable, without sacrificing the finely balanced tonal qualities.

The Super-heterodyne principle makes it imperative that the utmost care should be taken in the construction, and for this reason the instructions given herein should be carefully followed. If this care is taken, even those who know very little about radio will be able to build this set, and thus enjoy, at greatly reduced price, all the advantages given by the most expensive modern factory-built Super-het.

In addition to the parts given on the lists herein, the constructor will require approximately:

- 5 doz. Tin, Nuts and Screws
- 1 lb. Solder, with a resin flux, and a good Soldering Iron

It is important that all soldered joints should be good, as one "dry joint" will be very likely to cause serious trouble.

Sufficient Flat Wire for the Kit is included with the Coil Kit.

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Assemble yourself

The RADIOKES SIMPLIFIED SUPERHETERODYNE 6

METROPOLITAN ELECTRIC COY. LTD.
TRACY HOUSE, CLEVELAND STREET, REDFERN

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The Radiokes has been designed by a well-known Radio Engineer, and the construction is such as to ensure that the set is simple and easy of handling and repair. The tubes used are of the highest quality, and the design is such as to give the maximum of selectivity and sensitivity.

The set is complete with all necessary components, and is supplied with full instructions for assembly. The constructor will require a few additional parts, which can be obtained at any Radio Shop.

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The Radiokes is supplied with a 6 month guarantee, and the constructor is advised to keep a record of all necessary receipts and payments.

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The Radiokes is a complete set, and is designed for home installation. It is supplied with a full guarantee, and the constructor is advised to keep a record of all necessary receipts and payments.
RADIOKES "SIMPLIFIED" SUPER-HET. SIX

GENERAL

The Radiokes simplified Super-heterodyne, employing 6 Valves and Rectifier, will give splendid sensitivity, knife edge selectivity and splendid tone, the latter being under the control of the operator. The tubes employed, and the positions they occupy are:

- R.F. Amplifier and Int. Amplifier, Kenrad 225
- 1st and 2nd Detectors ........ 224
- Oscillator .................. 227
- Power Output ................ 247
- Rectifier .................. 280

The Radiokes new and improved Kit, comprises:

1. Aerial Coil. 
2. Power Condenser. 
4. Stromberg-Carlson Triple Ganged Cond. 
5. Intermediate Frequency Transformers. 
6. Kyplo, 6 Yds. Hook-up Wire 
7. Oscillator Coil.

Both the aerial coil and the R.F. Trans. embody impedance capacity coupling, which gives uniform high amplification over the whole wave-band.

The Intermediate Frequency Transformers are so designed that they give the maximum of selectivity obtainable, without sacrificing the finely balanced tube qualities.

The Super-heterodyne principle makes it imperative that the utmost care should be taken in the construction, and for this reason the instructions given herein should be carefully followed. If this care is taken, even those who know very little about radio will be able to build this set, and thus enjoy, at greatly reduced price, all the advantages given by the most expensive modern factory-built Super-het.

In addition to the parts given on the lists herein, the constructor will require approximately:

- 1 lb. Solder, with a rosin flux, and a good Soldering Iron.

It is important that all soldered joints should be good, as one "dry joint" will be very likely to cause serious trouble.

Sufficient F.R. Wire for the job is included with the Coil Kit.
ASSEMBLY AND WIRING INSTRUCTIONS—Continued.

Then wire the loudspeaker socket as follows:

To two adjacent pins bring leads from plate pin of 227 socket, and from B- the most convenient point being centre tap of 220 ft. Res. Then join the pin to the next adjacent pin on the speaker socket, and finally take a lead from C.T. to the fourth pin. The last step in this stage is to wire in the bias resistor of the 217. This is simply done by mounting R5 between the chassis and the second terminal of the Power Choke. All leads in this stage may be done in Great Fried Wire.

STAGE (2)—ASSEMBLY OF OTHER COMPONENTS.

First mount the T.C.C. By-Pass Capacitor 2 mfd.—mount on side of chassis, directly under 280 socket. Now mount these in 6 or 4Controllers opposite side of chassis. It will be found that the spacing is such that these can be done while still leaving the coil mounting holes undrilled. Mount Control and Tone Control Switch on front, followed by padding Condenser on back. Mount aerial and earth terminals (isolating aural terminal) Mount R.F.C. near 2nd Detector socket. Mount Trip Gang. The balance of the components are put in during stage (3). Note that soldering iron is not used during stage (2).

STAGE (3)—COMPLETION OF WIRING.

Before starting on stage (3) it is important to note that the Radiohans and Pigtail Resistors and small Condensers must be mounted so that they are unable to move, i.e., to a convenient terminal on a component which is wholly mounted to the chassis. First wire in 247 bass and grid lead. This is done by mounting R6 between pin of R6 and the Power Choke, and one terminal of the 232 T.C.C. Next insert the 0.5 meg. Durham lead between this terminal and the grid pin of the 247 socket. (See diagram of Circuits.) On this grid terminal also mount the common terminal of the Simplex Tone Control Condenser, and the other terminal of a 0.1 mfd. T.C.C. Connect up these two legs of the Simplex Tone Control to three of the four points of the switch, leaving the other vacant. Next take a lead from R.F.C. to plate terminal of second detector socket, and other side of R.F.C. to 0.1 mfd. T.C.C. wired in above. Then connect all the 0.1 mfd. T.C.C’s to Chassis wire in the coil as shown in diagram of Circuits, being careful to rigidly follow the colour of the leads as shown. The two resistors marked R6 may be supported by the 0.1 mfd. T.C.C. to which they are connected. Note that the Green leads from R.F.C. Coil and the two Intermediate Frequency Coils go straight to B+; it will be found that the top R6 (in circuit diagram) will be a convenient spot to bring the B+ lead from the power side of the chassis, with R4 mounted on the plate de-coupling Condenser 10.5 mfd. The Oscillator plate lead goes through R4 to B+. The plate de-coupling Condenser 10.5 mfd. is straightforward in Circuit diagram. This 0.5 mfd. is a convenient mounting point for R6. The Orange lead from Oscillator Coil goes to cathode of 1st Detector Socket, and the Red to R6 and 0.1 mfd. T.C.C., the other ends of both of which are earthed to chassis. The Screen Grids are simply connected as shown in Circuit diagram. Cathodes of R.F. Amplifier and I.F. Amplifier are joined, and go through R4 to B+, the other side of which goes to chassis. Cathodes are de-coupled as shown by 0.5 mfd. 2nd Detector Cathode is connected to R6, and the other side of which goes to chassis.

Finally, 2nd Detector Screen Grid is taken to the other grids through R4 and is by-passed to chassis through the 0.5 mfd. and 2nd Detector plate goes to B+ through the other 0.5 meg. Durham lead. Black lead from Oscillator coil goes to grid pin of 227 socket through 0.0025 T.C.C. Fixed Cond. and Blue lead to pudding.

Condenser, the other side of which goes to chassis. The grid pin of the 227 is earthed through the 2.0 meg. Durham leak. The Blue Fried Wire in this stage. Having thus completed the wiring, go carefully through the Circuit, stage by stage, paying strict attention to the diagram of Circuits in order to thoroughly check out the wiring. Care should be taken to connect the Lead Speaker to the plugs in corresponding order to that in which the socket in the chassis is wired.

The receiver is now ready to be lined up and tested.

TESTING AND ADJUSTING THE COMPLETELY WIRED CHASSIS.

Having carefully checked over the wiring, the final step is to adjust the various trimmers and paddling Condenser. Before outlining a method of doing this, the following will be a great help should a voltmeter be available.—Max. B+ add.—to chassis 250 to 220 Volts. Between F.C. and chassis 50 to 60 mgs. This is the drop through the Panohed Bias Resistor and the Power Choke. Plate Volts. on 255'S and 1st Det.: 240 to 250. Screen Volts. on 255'S and 1st Det. 90 to 100. Max Bias Volt. on 255'S 15 to 20. Min. Bias Volt. on 255'S 3. The bias will be noted that the maximum is not sufficient to entirely suppress plate current in the Variable Mu tubes, but the gain is directly obtainable when the bias is at max. value, and thus complete attenuation of signals is possible. Oscillator plate volt. add. 50 to 90. 2nd Detector or leak-fed, and hence voltages may not be read. It will be found advisable to use a metallic bottom plate for the chassis, since the great sensitivity of the receiver will cause pick up from the lead to the aerial coil, if this is not screened as suggested above. Now set the receiver up, adjusting speaker, and about 10 to 15 feet of aerial and an earth switch on power and allow tubes to warm up. Put Volt. Control to max. and tone control to the vacant position on the 4-point switch. (Should the signal how when it has warmed up, it is a sure sign that one of the T.C.C. de-couplers has been omitted, most likely that one de-coupling the plate.) Tune in a low-wattage station (e.g., 10W). Adjust trimmers on Variable Condenser until maximum signal is obtained. (Note that when the adjustment is complete, the local station will be too strong, so that it is desirable to change to an interferent for the final adjustments.) Having adjusted the circuits at the low wave lengths, we must adjust the tuning Condenser, to ensure that the tuning is in order. (Note that the padding Condenser is untouched until now.) Tune in a fairly high wave-length station (such as 25W). Do not touch simple trimpots trimmers. "Rack" the plate trimmer, i.e., tune from one side of the station to the other, and at the same time screw the padding Condenser. It will be found that (excluding the very improbable case in which the padding is found dead right) on screwing padding out, and rocking, signals decrease in strength, and on screwing in and rocking, signals increase in strength, or vice versa, depending on whether the paddler was too big or too small to start with. The receiver is now lined up, and on returning to low-wattage stations it will be found that they are received at full strength. The Superhet DEMODULATOR is now complete, and the tone control may be tried out and stations sought for. It will be found that the tone control on the first position has the effect of practically eliminating the background noise in the receiver. The other positions result in increased mellowness or tone. The operator will have a choice of about 30 different stations, all of which will give good entertainment consistently, and up to a dozen others will be heard if conditions are favorable. For the most part, the paddlers are unshaded, and the sensitivity is well under 1 micro volt per metre, while 15ms separation is possible under any conditions of station strength, even when the local is giving a strength 1000 times as great as the distant station whose programme is desired.
Assembly and Wiring Instructions—Continued.

Then wire the loud speaker socket as follows:

To two adjacent pins bring leads from plate pin of 247 socket, and from B+.

The most convenient point being centre tap of 200 fil. Res. Then join this pin to the nearest adjacent pin on the speaker socket, and finally take a lead from C.T. to the fourth pin. The last step in this stage is to wire in the bias resistor of the 247. This is simply done by mounting R8 between the chassis and the second terminal of the Power Choke. All leads in this stage may be done in this manner.

STAGE (3)—ASSEMBLY OF OTHER COMPONENTS.

First mount the T.C.C. By-pass Condenser 2 mfd. on side of chassis, directly under 280 socket 6 only 0.5 mfd. Mount these in blocks of 3 on opposite side of chassis. It will be found that the spacing is thereby increased. This may be done while still leaving the coil mounting holes clear. Secondly mount Volt. Control and Tone Control Switch on front, followed by Padding Condenser on back. Mount aerial and earth terminals utilizing aerial terminal. Mount R.F.C. near 2nd Detector socket. Mount Triple Gang. The balance of the components are put in during stage 3. Note that soldering iron is not used during stage 2.

STAGE (4)—ASSEMBLY OF WIRING.

Before starting on stage 3, it is important to note that the Radiohams and Pigtail Resistors and small Condensers must be mounted so that they are unable to move, i.e., to a convenient terminal on a component which is solely mounted to the chassis. First wire in 247 bias and grid leads. This may be done by mounting R8 between join of R4 and the Power Choke, and one terminal of the 2 mfd. T.C.C. Next insert the 0.5 meg. Durham leak between terminal and ground pin of the 247 socket. (See diagram of Circuits.) On this grid terminal also mount the common terminal of the Simplex Tone Condenser, and one side of a 0.1 mfd. T.C.C. Connect up the three legs of the Simplex Tone Condenser to three of the four points of the switch, leaving the other vacant. Next take a lead from R.F.C. to plate terminal of second detector socket, and from other side of R.F.C. to the 0.1 mfd. T.C.C. wired as above. Then connect all the 3 mfd. T.C.C.'s to Chassis, wire in the leads shown in diagram of Circuits, being careful to rigidly follow the colouring of the leads as shown. The two resistors marked R5 may be supported by the 3 mfd. T.C.C., to which they are connected. Note that the green leads from R.F.C. and the two Intermediate Frequency Coils go straight to B+; it will be found that the top R6 (in circuit diagram) will be a convenient spot to bring the B+ lead to from the power side of the chassis, with R4 mounted on the plate de-coupling Capacitor (0.5 mfd.). The Oscillator plate lead green goes through R3 to B+ and is de-coupled by the 0.5 mfd. T.C.C. shown in Circuit diagram. This 0.5 mfd. is a convenient mounting position for R3. The Orange lead from Oscillator coil goes to cathode of 1st Detector socket, and the Red to R4 and 0.1 mfd. T.C.C., the other ends of both of which are earthed to chassis. The Screen Grids are similarly connected as shown in diagram of circuits. Cathodes of R.F. Amplifier and U.F. Amplifier are joined, and go through R3 to B+, the other side of which goes to aerial terminal. Cathodes are de-coupled as shown by 0.5 mfd. 2nd Detector Cathode goes to R5 and 0.5 mfd. 3rd Detector Cathode is connected by 0.5 mfd. Resistor to aerial terminal.

Finally, 2nd Detector Screen Grid is taken to the other grids through R8, and is by-passed to chassis through the remaining 0.5 mfd., and 2nd Detector plate goes to B+ through the other 0.5 meg. Durham leak. Black lead from Oscillator coil goes to grid pin of 227 socket through 0.0025 T.C.C. Fixed Cond. and Blue lead to padding...
CIRCUIT DIAGRAM.

ABBREVIATIONS USED IN WIRING AND ASSEMBLY INSTRUCTIONS.
I.F.C.: INPUT FILTER CONDENSER.
O.F.C.: OUTPUT FILTER CONDENSER.
CHASSIS.
P.T.: POWER TRANSFORMER.
C.T.: CENTRE TAP OF P.T.
R.F.C.: R.F. CHOKE.
V.C.: VOLUME CONTROL.

KEY TO "MARQUIS" VALVE SOCKETS
KEY to "MARQUIS" VALVE SOCKETS

UY 247
UY 235-224
UY 227
UX 280

Looked at from Underneath Socket

LIST OF PARTS REQUIRED FOR RADIOKES SUPERHETERODYNE.

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Model</th>
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<tbody>
<tr>
<td>Only Radyokes Superhet. Coil Kit, comprising...only Standard aerial coil.</td>
<td></td>
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<tr>
<td>1. Standard R.F. Transformer</td>
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<tr>
<td>1. Oscillator Coil</td>
<td></td>
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<tr>
<td>1. Intermediate Trans.</td>
<td></td>
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<tr>
<td>1. Radiokes Paddiing Condenser</td>
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<tr>
<td>1. Stromberg-Carlson Triple Gang</td>
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<tr>
<td>1. 10,000 ohm Volume control (VCWU), R1</td>
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<tr>
<td>1. 10,000 ohm A10A Radiom. R2</td>
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<tr>
<td>1. 10,000 ohm A10A Radiom. R3</td>
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<tr>
<td>2. Only 25,000 ohm 10mA A25A Radiom. R4</td>
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<tr>
<td>2. 5000 ohm 10mA A25A Radiom. R5</td>
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<tr>
<td>2. 10000 ohm 5MA A100D Radiom. R6</td>
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<tr>
<td>3. 350 ohm 100mA Pigtaii Resistor, R7</td>
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<tr>
<td>4. 50 ohm Centre Tapped Fil. Res.</td>
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<tr>
<td>5. 100W Power Transformer</td>
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<tr>
<td>6. E3015S Power Choke</td>
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<tr>
<td>8. Radiokes Full Vision Dial Complete</td>
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OTHER PARTS.

2. Only 4-point switch.
4. Only Loud Speaker Plug.
5. Only Valve Screening Caps, 2in. dia x 4in. high.
6. Only Pressed Metal M.S. Udyline finished Chassis.
7. Only "MARQUIS" VALVE SOCKETS.