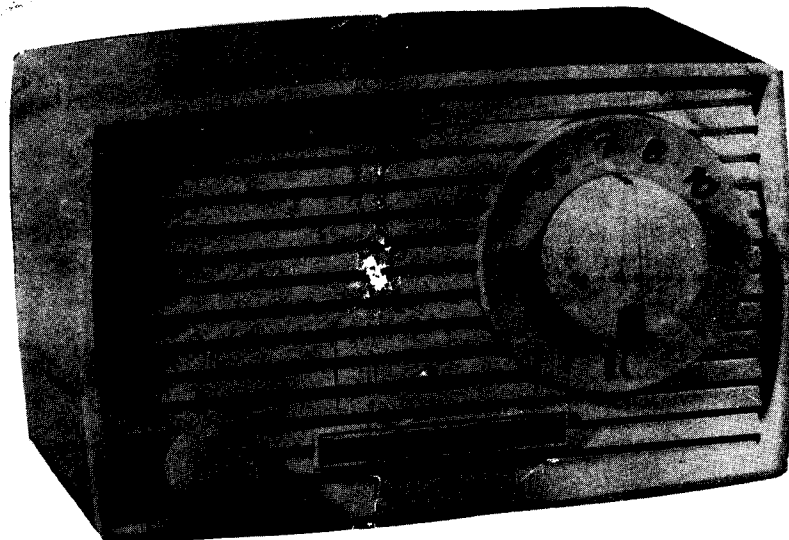


INSTRUCTION MANUAL

Philmore

5 TUBE SUPERHET RECEIVER KIT MODEL 205



Like any other piece of electronic equipment, the ultimate performance of the Superhet Receiver Model 205 depends upon three factors: the excellence of its initial engineering design, the quality of its components, and the care with which it is assembled. PHILMORE MANUFACTURING CO. is justly proud of the manner in which it has handled the first two; the remaining factor -- care in assembly -- is entirely in your hands. To insure the performance designed into this receiver, PHILMORE provides you with one of the most comprehensive instruction manuals ever prepared for the kit builder. Each step has been tested thoroughly. For maximum ease of assembly and the final pleasurable thrill of building an instrument that works properly the first time it is powered, PHILMORE urges you to follow all instructions in the order given, without omissions or modifications.

CIRCUIT DESCRIPTION: This sensitive superheterodyne receiver operates from 540 to 1600 kilocycles and is capable of receiving all AM broadcast stations in the area. The transmitted symmetrical RF signal is received and heterodyned with the local oscillator and changed to an intermediate frequency (IF) of 455 kc in the converter tube V-1. This signal is coupled across transformer I, amplified by IF amplifier V-2 and coupled to the multipurpose diode detector-AVC-audio amplifier tube V-3. The diode detector section of V-3 rectifies the signal so that only half of the symmetrical IF envelope, which contains all the transmitted audio information, remains. Current pulses flow in the circuit comprised of the 100K ohm resistor and 250 mmf. capacitor, the resistance and capacitance being so proportioned that the capacitor charges to the peak value of the rectified voltage on each pulse and retains enough charge between pulses so that the voltage across the 100K ohm resistor is smoothed out. The DC component of the audio signal is removed by the .002 mfd. capacitor so that only the variations in signal voltage remain to be amplified by the audio section of V-3. The amplified audio signal is coupled to the power amplifier V-4 for sufficient amplification to drive the loudspeaker. Automatic volume control AVC is derived from a portion of the average DC component of the audio signal developed across the 100K ohm resistor and is used to vary the bias on V-1 and V-2. Since the voltage is proportional to the average amplitude of the signal, the gain of the receiver is reduced as the signal strength becomes greater, thereby keeping the gain at a constant level. Rectifier tube V-5 changes the alternating line voltage to pulsating direct current. These pulses are smoothed out by the electrolytic filter capacitor K and the 2K ohm resistor and supplied to the plate elements of the tubes.

PARTS LIST: Veteran kit-builders work with the firm conviction that every step is as important as every other step. The first step is to unpack the kit carefully and check the components against the list of parts.

<u>PART NO.</u>	<u>SYMBOL</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
<u>Cabinet-Cover</u>			
FT-300		1	Cabinet
FT-301	S	1	Rear cover with attached heat sink
<u>Capacitors</u>			
FT-302		2	100 mmf. (100 pF) disc
FT-303		2	250 mmf. (250 pF) disc
FT-304		2	.002 mfd. (.002 uF) disc
FT-305		1	.03 mfd. (.03 uF) disc
FT-306		3	.05 mfd. (.05 uF) tubular
<u>Resistors</u>			
FT-307		1	20K ohm, 1/4 watt (red-black-orange)
FT-308		1	100K ohm, 1/4 watt (brown-black-yellow)
FT-309		1	500K ohm, 1/4 watt (green-black-yellow)
FT-310		1	1 megohm, 1/4 watt (brown-black-green)
FT-311		1	5 megohm, 1/4 watt (green-black-green)
FT-312		1	150 ohm, 1/2 watt (brown-green-brown)
FT-313		1	250K ohm, 1/2 watt (red-green-yellow)
FT-314		1	2K ohm, 2 watt (red-black-red)
<u>Chassis Assembly</u>			
FT-315	R	1	Chassis
FT-316		5	7-pin tube socket mounted on chassis
FT-317	M	1	Output transformer mounted on chassis
FT-318		1	Condenser bracket mounted on chassis
FT-319	Q	1	Chassis bracket

<u>PART NO.</u>	<u>SYMBOL</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
<u>Coils</u>			
FT-320	P	1	Antenna coil with rubber grommet
FT-321	J	1	3-lug local oscillator coil
FT-322	H	1	2-lug 455 kc coil
FT-323	I	1	455 kc IF transformer can
<u>Filter</u>			
FT-324	K	1	40-20 mfd. electrolytic filter capacitor with mounting bracket, screw, split lockwasher and nut
<u>Hardware</u>			
FT-325		3	3-56 X 5/32" screw
FT-326		1	3-56 X 7/32" screw
FT-327		2	3-56 X 3/8" screw
FT-328		2	3-56 X 9/16" screw
FT-329		1	6-32 X 1/4" screw
FT-330		9	3-56 nut
FT-331		3	Split lockwasher
FT-332		4	Flat washer
FT-333		2	Polyethylene washer
FT-334	G	1	2-lug terminal strip
<u>Knobs</u>			
FT-335		1	1-1/2" tuning knob
FT-336		1	3/4" control knob
<u>Loudspeaker</u>			
FT-337	N	1	3-1/2" PM loudspeaker
<u>Potentiometer</u>			
FT-338	F	1	Volume control-switch with two control washers and nut
<u>Tubes</u>			
FT-339	V-1	1	12BE6
FT-340	V-2	1	12BA6
FT-341	V-3	1	12AV6
FT-342	V-4	1	50C5
FT-343	V-5	1	35W4
<u>Tuner</u>			
FT-344	O	1	Variable tuning condenser
<u>Miscellaneous</u>			
FT-345		1	Length insulated hook-up wire
FT-346		1	Length spaghetti tubing
FT-347		1	Length solder
FT-348		1	Line cord
<u>Printed Matter</u>			
FT-349		1	Instruction manual
FT-350		1	Fold-out print

Miscellaneous poly bags, small packing boxes, and large packing carton.

The Philmore Manufacturing Co., Inc., guarantees each new radio or electronic product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect provided the item is returned to us intact, for our examination, with all transportation charges prepaid to our factory, within ninety days from the date of shipment and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our radio or electronic products which have been subjected to misuse, neglect, accident, improper wiring in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory.

ASSEMBLY DIAGRAMS: Attach the large fold-out print to the wall above your work bench. Refer to this print and the prints in the manual for the remainder of the construction. Lay out all parts so they are readily available. Refer to the general information inside the back cover to help you identify components.

PARTS ASSEMBLY: Read each step through before starting on it. Check each step off (✓) when completed. Refer to the assembly drawings as instructed.

✓ Slip a control washer over volume control shaft F. Mount the control from inside the chassis R so that the tab fits into the slot on the bottom edge of the chassis. Secure the control with the remaining washer and nut. See Figures 1 and 5.

✓ Press the 3-lug local oscillator coil J through the chassis from the bottom until the two small tabs snap out and hold the coil in place in the position shown in Figure 5.

✓ Press the 2-lug 455 kc coil H through the chassis from the bottom until the two small tabs snap out and hold the coil in the position shown in Figure 5.

✓ Loosen the screw in the 40-20 mfd. electrolytic filter capacitor K mounting bracket. Mount the bracket and capacitor in hole L from the top of the chassis using a 3-56 X 7/32" screw, lockwasher and nut as shown in Figure 6. Refer to the Actual Size drawing for the proper size screw. Bend the bracket mounting tabs over to lock the bracket as shown in Figure 5. Turn the capacitor to orient the lugs so that the lug with the symbol (□) is toward the rear of the chassis. Tighten the bracket screws.

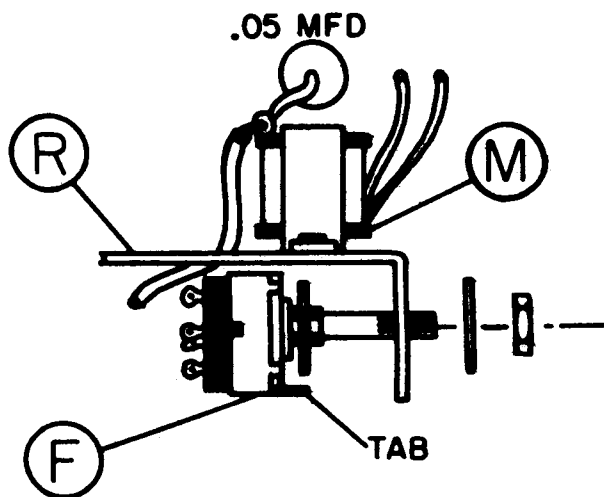


Figure 1

✓ Mount the 455 kc IF transformer can. Direction not critical. Install the 2-lug terminal strip on the screw shown in Figure 5 and secure the can with lockwashers and nuts.

✓ Secure the variable tuning condenser O to the condenser bracket using three 3-56 X 5/32" screws as shown in Figures 6 and 7. Bend the four lugs on the tuning condenser up so they do not touch the chassis.

✓ Insert antenna coil P with the rubber grommet in the slot in the condenser bracket as shown in Figures 6 and 7.

✓ Insert a polyethylene washer in each slot at the rear of chassis R as shown in Figure 2. Secure chassis R and chassis bracket Q with two 3-56 X 9/16" screws, flat washers and nuts. Then mount the rear cover S on the same screws with two flat washers and nuts so that the heat shield attached to the rear cover is directly over the tube sockets.

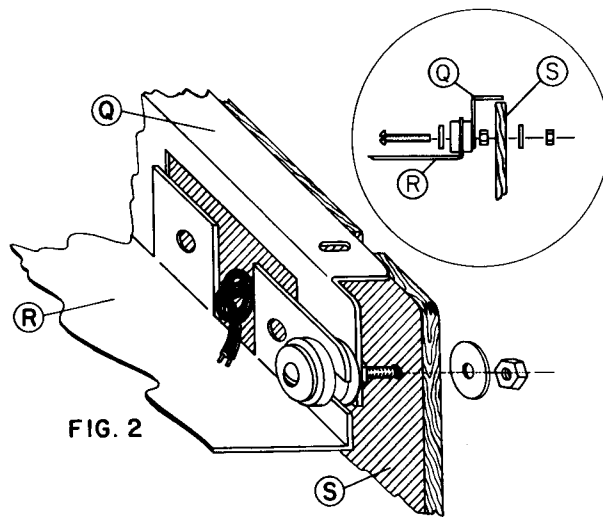


FIG. 2

Figure 2

WIRING: Strip 1/4" of insulation from each end of the wires listed below and connect as indicated. Specific wire locations are designated by symbol and lug; for example, tuner 0-1 means variable tuning condenser 0, lug 1. (S-1) means solder one wire to this connection. (NS) means do not solder this connection yet.

⊗ ✓ Attach a 2" wire from tuner 0-1 (S-1) to socket A-7 (S-1). Run the wire through the small hole beneath tuner 0-1. See Figure 6. Make sure tuner 0-1 does not touch the chassis.

⊗ ✓ Secure loudspeaker N with a 6-32 X 1/4" screw inserted through hole T from the bottom of the chassis. See Figures 5 and 6. Be careful not to tear the loudspeaker.

⊗ ✓ Wind a 2-1/2" wire around a piece of solder to form a coil. Remove the solder from the coil. Attach one end of this coil to oscillator coil J-1 (NS) as shown in Figure 3. Feed the other end through the small hole in the chassis near the oscillator coil and connect it to tuner 0-2 (S-1). Make sure tuner 0-2 does not touch the chassis.

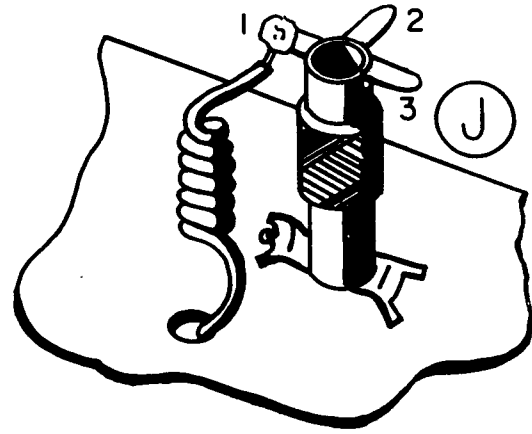


Figure 3

⊗ ✓ Connect a 2-3/4" wire from antenna coil P-2 (S-1) to tuner 0-3 (S-1). See Figure 6. Make sure tuner 0-3 does not touch the chassis.

⊗ ✓ Connect a 1-3/4" wire from IF transformer can I-2 (S-1) to socket B-1 (S-1). Use just enough solder to make a good electrical connection. Avoid using too much solder.

⊗ ✓ Attach a 1-1/4" wire from socket A-4 (S-1) to socket B-3 (S-1).

⊗ ✓ Connect a 2-3/4" wire from socket A-3 (S-1) to socket C-4 (S-1).

⊗ ✓ Attach a 2-1/2" wire from socket B-4 (S-1) to socket D-3 (S-1).

⊗ ✓ Connect a 2" wire from IF transformer can I-4 (S-1) to socket A-5 (S-1).

⊗ ✓ Connect a jumper between Variable Frame Lug and Chassis (S-1).

- ⊗ (✓) Attach a 1-1/2" wire from socket A-6 (NS) to socket B-6 (NS).
- ⊗ (✓) Connect a 2" wire from socket A-6 (S-2) to filter capacitor K-3 (NS).
- ⊗ (✓) Attach a 5-1/2" wire from filter capacitor K-3 (S-2) to socket D-6 (NS).
- ⊗ (✓) Connect a 7" wire from filter capacitor K-2 (NS) to socket E-7 (NS).
- ⊗ (✓) Attach a 2-1/4" wire from output transformer M-2 (NS) to socket D-7 (S-1). Run this wire through the small hole beneath M-2.
- ⊗ (✓) Connect a 2-1/2" wire from output transformer M-1 (NS) to socket E-7 (NS). Run this wire through the small hole beneath M-1.
- ⊗ (✓) Attach a 5-1/4" wire from antenna coil P-1 (S-1) to IF transformer can I-3 (NS). Run this wire through the small hole beneath tuner O-2.
- ⊗ (✓) Connect a 1-1/2" wire from filter capacitor K-1 (NS) to oscillator coil J-3 (NS).
- ⊗ (✓) Attach a 2-1/4" wire from filter capacitor K-1 (S-2) to socket B-7 (NS).
- ⊗ (✓) Connect a 2-3/4" wire from socket B-7 (NS) to terminal strip G-1 (NS).
- ⊗ (✓) Attach a 1-3/4" wire from socket C-2 (NS) to socket B-7 (NS).
- ⊗ (✓) Connect a 3" wire from socket A-2 (S-1) to oscillator coil J-2 (S-1).
- ⊗ (✓) Connect a 1/2" wire from socket B-2 (S-1) to the center shield of socket B (NS).
- ⊗ () Attach a 1/2" wire from socket B-7 (S-4) to the center shield of socket B (S-2).
- ⊗ (✓) Connect a 1/2" wire from socket C-2 (S-2) to socket C-3 (NS).
- ⊗ (✓) Attach a 1/2" wire from socket C-3 (S-2) to the center shield of socket C (NS).
- ⊗ (✓) Connect a 1/2" wire from socket C-6 (S-1) to the center shield of socket C (S-2).
- ⊗ (✓) Attach a 3/4" wire from socket D-2 (NS) to socket D-5 (NS).
- ⊗ (✓) Attach a 1/2" wire from socket E-4 (NS) to socket E-5 (NS).
- ⊗ (✓) Connect a 3/4" wire from IF transformer can I-1 (NS) to socket B-6 (NS). Make sure the wire does not touch the screw on the IF transformer can.
- ⊗ (✓) Attach a 1" wire from socket B-6 (S-3) to 455 kc coil H-1 (S-1).
- ⊗ (✓) Connect a 3/4" wire from socket B-5 (S-1) to 455 kc coil H-2 (NS).
- ⊗ (✓) Attach a 1-1/4" wire from socket D-4 (S-1) to socket E-3 (S-1).
- ⊗ (✓) Connect a 1" wire from volume control F-1 (NS) to volume control F-5 (NS).
- ⊗ (✓) Attach a 2-1/2" wire from volume control F-5 (S-2) to terminal strip G-1 (NS).
- ⊗ (✓) Connect output transformer lead M-3 to loudspeaker N-1 (S-1). Use spaghetti tubing.
- ⊗ (✓) Connect output transformer lead M-4 to loudspeaker N-2 (S-1).

MOUNTING COMPONENTS: Cut component leads so that the resistor or capacitor is evenly centered between lugs with just enough excess lead length to wrap leads once around lugs.

(1) Slip a 1" length of spaghetti tubing on one lead of a 100K ohm resistor, 1/4 watt (brown-black-yellow) and connect this lead to socket C-5 (NS). Attach the other end to volume control F-3 (NS).

(1) Connect a 1 megohm resistor, 1/4 watt (brown-black-green) from IF transformer can I-3 (NS) to volume control F-3 (NS).

(1) Attach a 500K ohm resistor, 1/4 watt (green-black-yellow) from socket D-2 (S-2) to terminal strip G-1 (NS).

(1) Connect a 150 ohm resistor, 1/2 watt (brown-green-brown) from socket D-1 (S-1) to terminal strip G-1 (NS).

(1) Attach a 5 megohm resistor, 1/4 watt (green-black-green) from socket C-1 (NS) to terminal strip G-1 (NS).

(1) Connect a 250 ohm resistor, 1/2 watt (red-green-yellow) from socket C-7 (NS) to socket D-6 (S-2).

(1) Slip a 3/4" length of spaghetti tubing on one lead of a 20K ohm resistor, 1/4 watt (red-black-orange) and connect this lead to oscillator coil J-3 (S-2). Attach the other end of this resistor to socket A-1 (NS).

(1) Attach a 2K ohm resistor, 2 watt (red-black-red) from IF transformer can I-1 (S-2) to filter capacitor K-2 (S-2).

(1) Connect a 250 mmf. (or 250 pF) capacitor from socket C-7 (NS) to terminal strip G-1 (NS).

(1) Attach a .002 mfd. (or .002 uF) capacitor from socket C-7 (S-3) to socket D-5 (S-2). Make sure the capacitor leads do not touch pins 2 and 3 of socket D.

(1) Connect a .03 mfd. (or .03 uF) capacitor from IF transformer can I-3 (S-3) to terminal strip G-1 (NS).

(1) Attach a 100 mmf. (or 100 pF) capacitor from socket C-5 (S-2) to 455 kc coil H-2 (S-2).

(1) Slip a 1" length of spaghetti tubing on one lead of a .002 mfd. (or .002 uF) capacitor and connect this lead to socket C-1 (S-2). Slip a 1/2" length of spaghetti tubing on the other lead of this capacitor and connect it to volume control F-2 (S-1).

(1) Connect a 250 mmf. (or 250 pF) capacitor from volume control F-1 (S-2) to volume control F-3 (S-3).

(1) Slip a 1" length of spaghetti tubing on one lead of a 100 mmf. (or 100 pF) capacitor and attach this lead to socket A-1 (S-2). Connect the other lead to oscillator coil J-1 (S-2).

(1) Slip a 1/2" length of spaghetti tubing on one lead of a .05 mfd. (or .05 uF) capacitor and attach this lead to socket E-5 (S-2). Connect the other lead to socket E-7 (S-3).

() Attach a .05 mfd. (or .05 μ F) capacitor from terminal strip G-1 (S-8) to chassis (S-1).

() Connect a .05 mfd. (or .05 μ F) capacitor from output transformer M-1 (S-2) to output transformer M-2 (S-2). Bend the capacitor leads so that the capacitor rests on top of the transformer as shown in Figure 6.

() Insert the stripped ends of the line cord into the small bottom hole in the rear cover. Tie a knot for strain relief in the line cord $2\frac{1}{2}$ " from the stripped ends. See Figure 2.

() Solder one of the stripped ends of the line cord to volume control F-4 (S-1).

() Solder the other stripped end of the line cord to socket E-4 (S-2).

() Insert a 12BE6 tube in socket A, a 12BA6 tube in socket B, a 12AV6 tube in socket C, a 50C5 tube in socket D and a 35W4 tube in socket E.

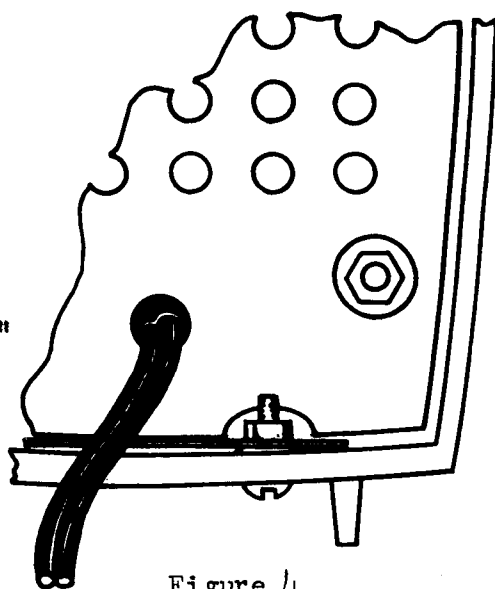


Figure 4

This completes the wiring and mounting of components. Carefully inspect all the wiring. Shake out loose bits of wire trimmings and solder splashes. Double check all solder connections.

OPERATION: Plug the line cord into a 105-125 volt, AC or DC wall outlet. Allow one minute for warm-up. Adjust tuning and volume.

- IN CASE OF DIFFICULTY:
1. Read the circuit description to understand the principles of operation.
 2. Check the operating voltages against the Table of Typical Socket Voltages. Any large discrepancies may give a clue to the source of difficulty and further investigation in that particular part of the circuit, both visually and with a voltmeter, may reveal improper construction or faulty components.
 3. Check the tubes.
 4. Frequently much time may be saved by having another person check the wiring with you. Often a simple mistake becomes invisible to the constructor but is clearly evident to another, even unskilled, person.

TABLE OF TYPICAL SOCKET VOLTAGES

All readings are taken with a high input impedance vacuum tube voltmeter. All readings are DC unless otherwise specified. Variations up to 20% are normal and do not indicate trouble in most cases. All readings are taken between the pin and terminal strip G-1 except as indicated below.

TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7
12BE6 SOCKET A	-12	0	V	V	95	92	- 2
12BA6 SOCKET B	- 8	0	W	W	91	91	0
12AV6 SOCKET C	- 8	0	X	X	13	0	58
50C5 SOCKET D	54	0	Y	Y	0	92	140
35W4 SOCKET E	0	0	Z	Z	115 VAC*	0	140

* 115 VDC if line voltage is DC.

Heater voltages across pins V, W, and X is 12 volts AC or DC (depending upon line).
 Heater voltage across pins Y is 50 volts AC or DC (depending upon line voltage).
 Heater voltage across pins Z is 35 volts AC or DC (depending upon line voltage).

ALIGNMENT: Certain adjustments are necessary for proper operation and to assure that the stations appear at the correct place on the dial. The procedure outlined below uses no additional test equipment, however if a signal generator and VTVM are available they should be used. Very little adjustment is required since the components have been factory pre-aligned.

- () Rotate the variable tuning condenser F shaft fully clockwise. Temporarily install the 1-1/2" tuning knob on the shaft with the knob set screw pointing upwards. Tighten the set screw.
- () Tune in a station. Adjust the volume until the station is barely audible.
- () Using an alignment tool (Philmore No.'s 921, 922 or 923) or a small insulated screwdriver, adjust the slotted screws on the top and bottom of IF transformer can I for maximum volume. As the volume increases, reduce the volume control setting to keep the station barely audible.
- () Adjust the slotted screw of 455 kc coil H for maximum volume.
- () Consult a newspaper for the frequency of a local station at the highest end of the broadcast band between 1300 and 1600 kc. Set the tuning pointer at the frequency of that station while referring to the calibrations on the cabinet face.
- () Adjust the local oscillator coil J until that station is heard at maximum volume.

- () Adjust the screw above tuner 0-2 for maximum volume.
- () Set the tuning pointer for another station in the frequency range of 530 to 700 kc according to the calibrations on the cabinet face. Adjust the screw above tuner 0-3 for that station.
- () Remove the tuner knob.

This completes the alignment of the receiver. Tune through the broadcast band while observing the location of the stations received and compare them with the calibrations on the face of the cabinet. If the stations appear at the wrong place on the dial, repeat the alignment procedure.

- () Insert the chassis into the cabinet so that the two shafts protrude from the front of the cabinet.
- () Secure the chassis in the cabinet with two 3-56 X 3/8" screws and nuts inserted through the bottom of the cabinet and chassis bracket Q. See Figure 4.
- () Rotate the right tuning shaft fully clockwise. Install the 1-1/2" tuning knob on the shaft with the knob set screw pointing upwards. Tighten the set screw.
- () Rotate the left shaft fully counter-clockwise until a click is heard. Install the 3/4" knob on the shaft with the knob set screw pointing toward the right. Tighten the set screw.

This completes your Philmore 5-tube superhet receiver.

SERVICE: If a defective component is discovered which has not been caused by improper handling by the purchaser, the PHILMORE MANUFACTURING CO. will gladly replace the component if the following conditions are fulfilled: identify the part by part number as listed in this instruction manual and state the name and model of the equipment for which the component is required. In your letter, refer to the date of purchase and the dealer from whom the kit was bought. Include complete details relative to the defective component.

In all cases, return the defective part postage prepaid and carefully packaged to avoid breakage in transit.

In extreme cases, where the equipment cannot be made operative by the kit builder, the PHILMORE MANUFACTURING CO. will provide the necessary service under the conditions outlined below.

Equipment will be serviced only if it has been completely wired and assembled in accordance with the instructions contained in this manual. Equipment that has been constructed in any other manner, that has been modified in any way, that has been wired with acid core solder or soldering paste of any type, or is incompletely assembled will be shipped back to the sender collect.

A minimum service charge of \$3.00 will be made to the sender, plus the cost of replacement parts if they are required. This offer is valid only for equipment purchased one year or less before shipment for service is made. No money should be sent with the equipment. After repairs have been effected, PHILMORE MANUFACTURING CO. will bill the sender in full. Upon receipt of payment, the equipment will be shipped back by the company.

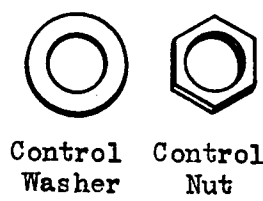
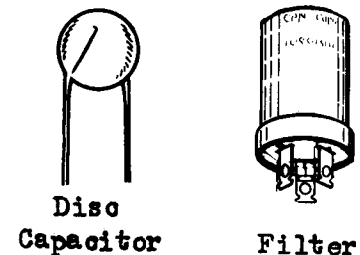
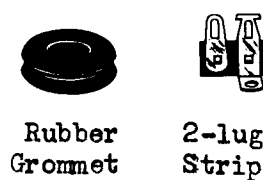
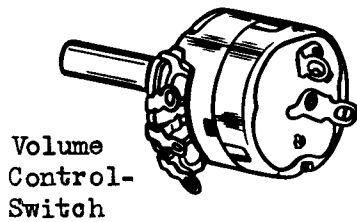
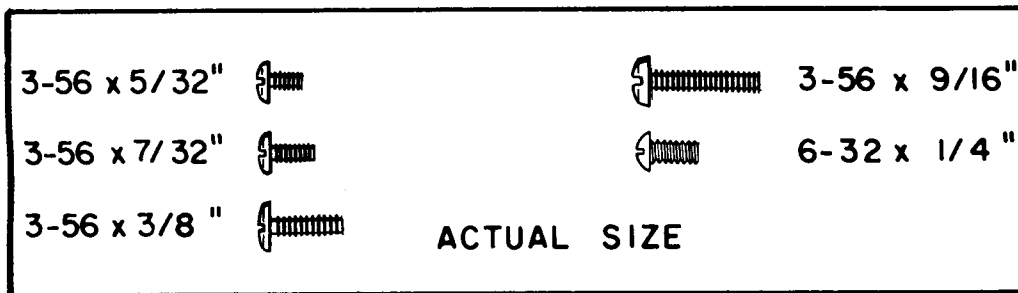
SHIPPING INSTRUCTIONS: 1. Attach a tag with the following information to the body of the equipment itself, not to the carton or package:

- a. Name
- b. Address
- c. Trouble symptom

2. Make sure all equipment components are securely mounted on the chassis in the positions given in the manual.
3. The carton in which the kit is sold is NOT suitable for shipment back to the factory. The container must be rugged and oversized to permit the use of generous layers of padding material such as shredded newspaper, excelsior or styrofoam. Allow room for at least 3-1/2" of padding on all sides and bottom of the carton.
4. Ship to: PHILMORE MANUFACTURING CO., INC.
130-01 Jamaica Avenue
Richmond Hill 18, N.Y.
5. Shipment must be made express prepaid.

We are not responsible for damage that occurs in transit. The consignee must file claims for recovery with the carrier. We reserve the right to change instrument specifications at any time without being obliged to modify existing instruments or those already sold in like manner.

GENERAL INFORMATION



IF Transformer Can

Resistor

STANDARD RESISTOR COLOR CODE

AXIAL LEAD RESISTOR		Color	First Figure	Second Figure	Multiplier
Brown - Insulated		BLACK	0	0	None
Black - Non-Insulated		BROWN	1	1	0
		RED	2	2	00
		ORANGE	3	3	0,000
		YELLOW	4	4	0,000
		GREEN	5	5	00,000
		BLUE	6	6	000,000
		VIOLET	7	7	0,000,000
		GRAY	8	8	00,000,000
		WHITE	9	9	000,000,000

