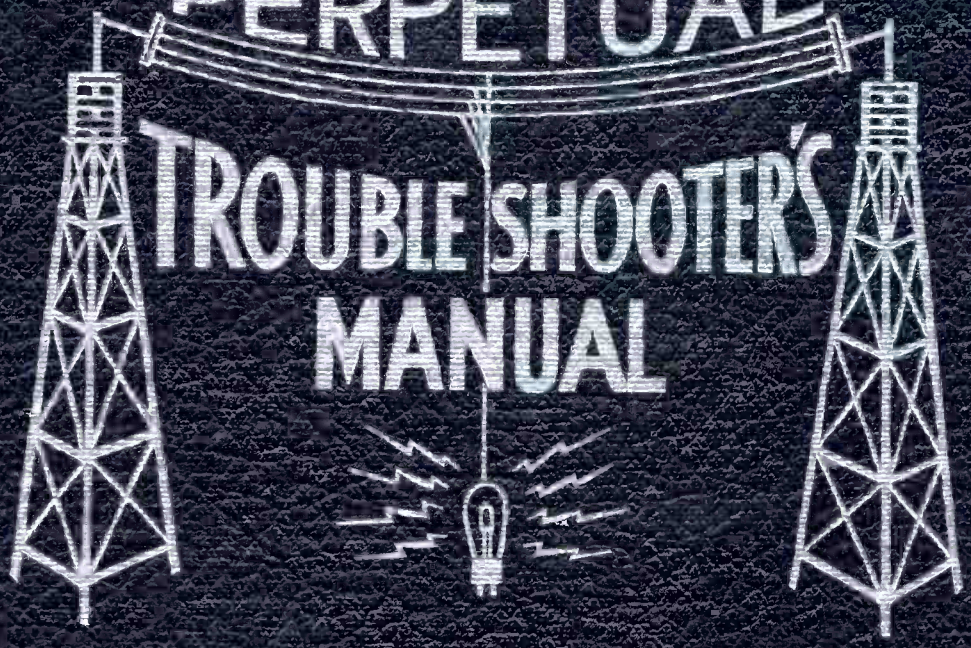
VOLUME IV

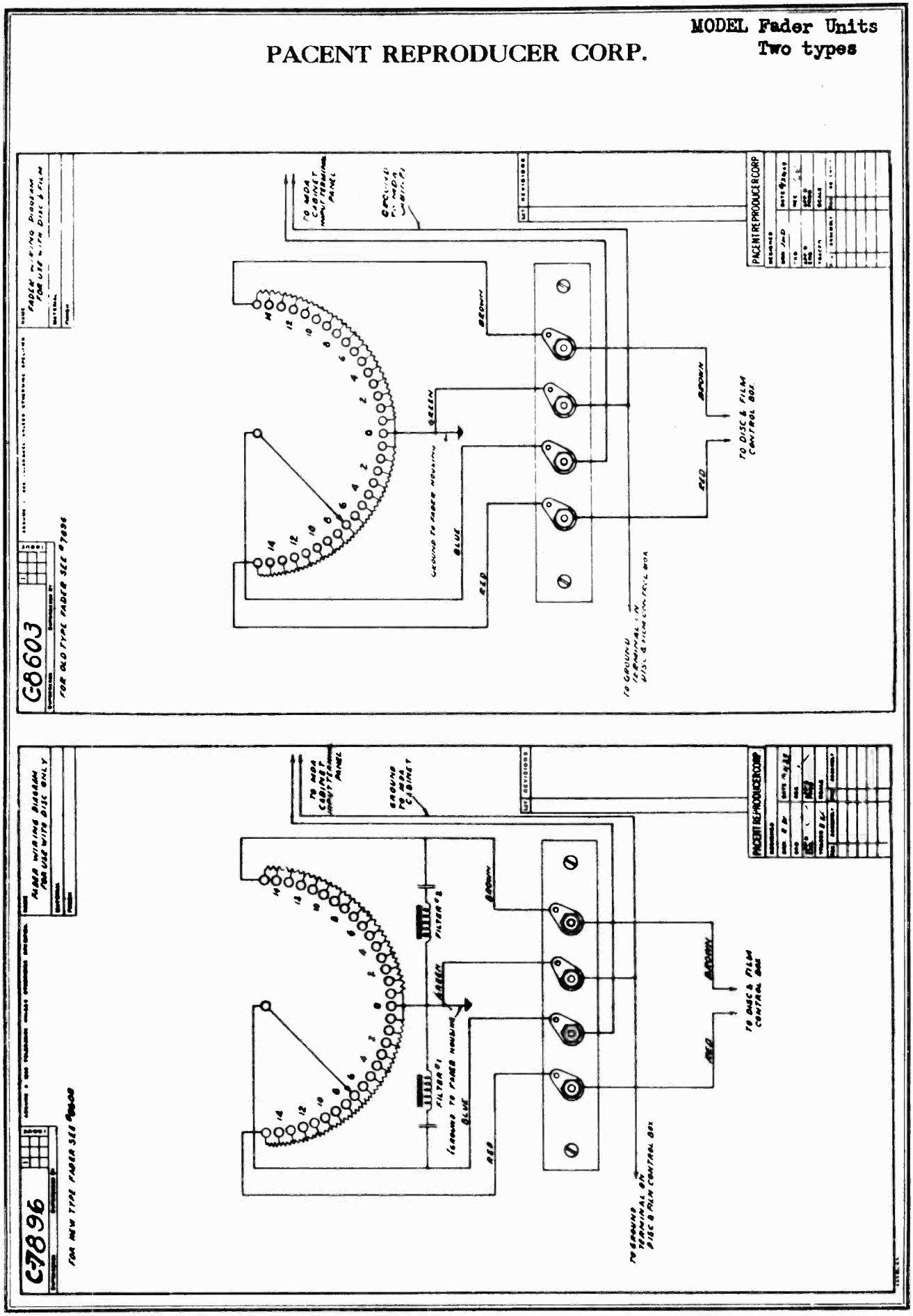
PERPETUAL TROUBLE SHOOTER'S MANUAL



JOHN F. RIDER

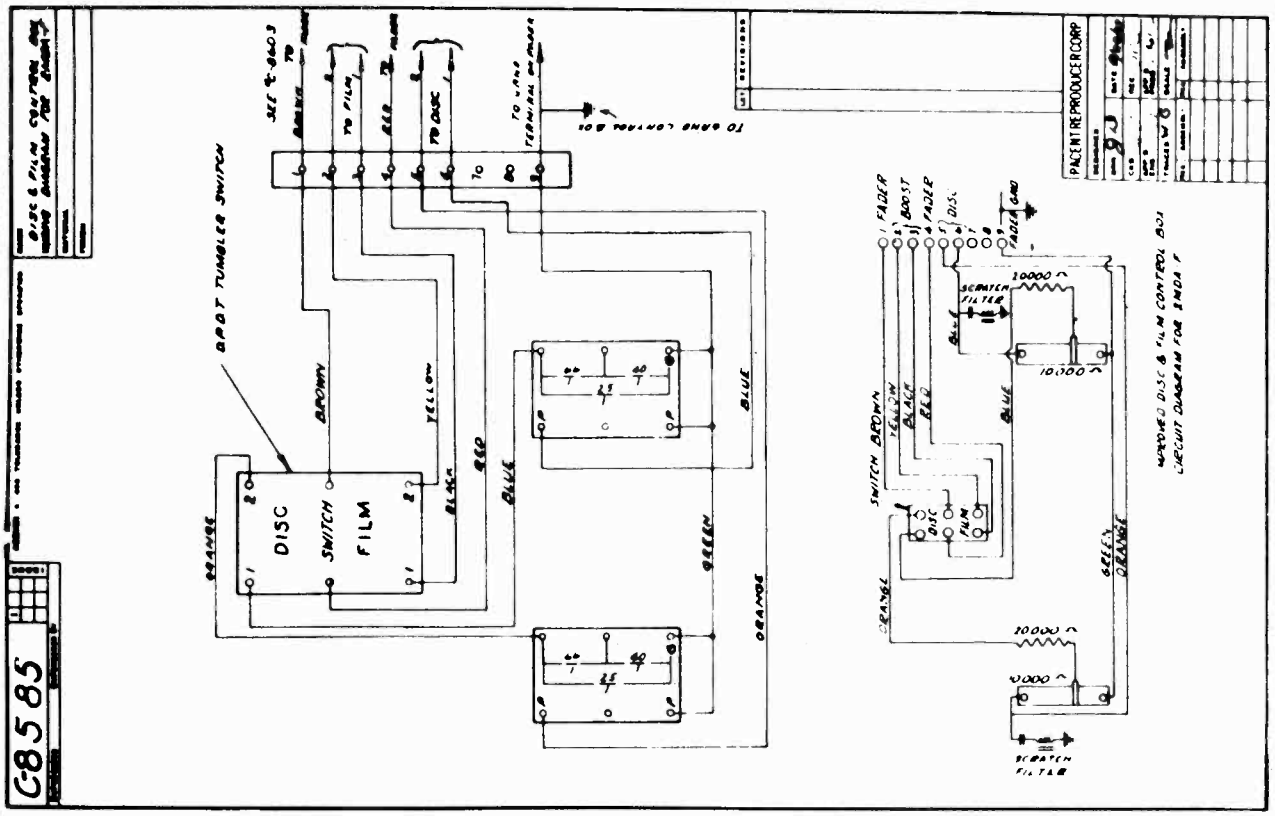
PACENT REPRODUCER CORP.

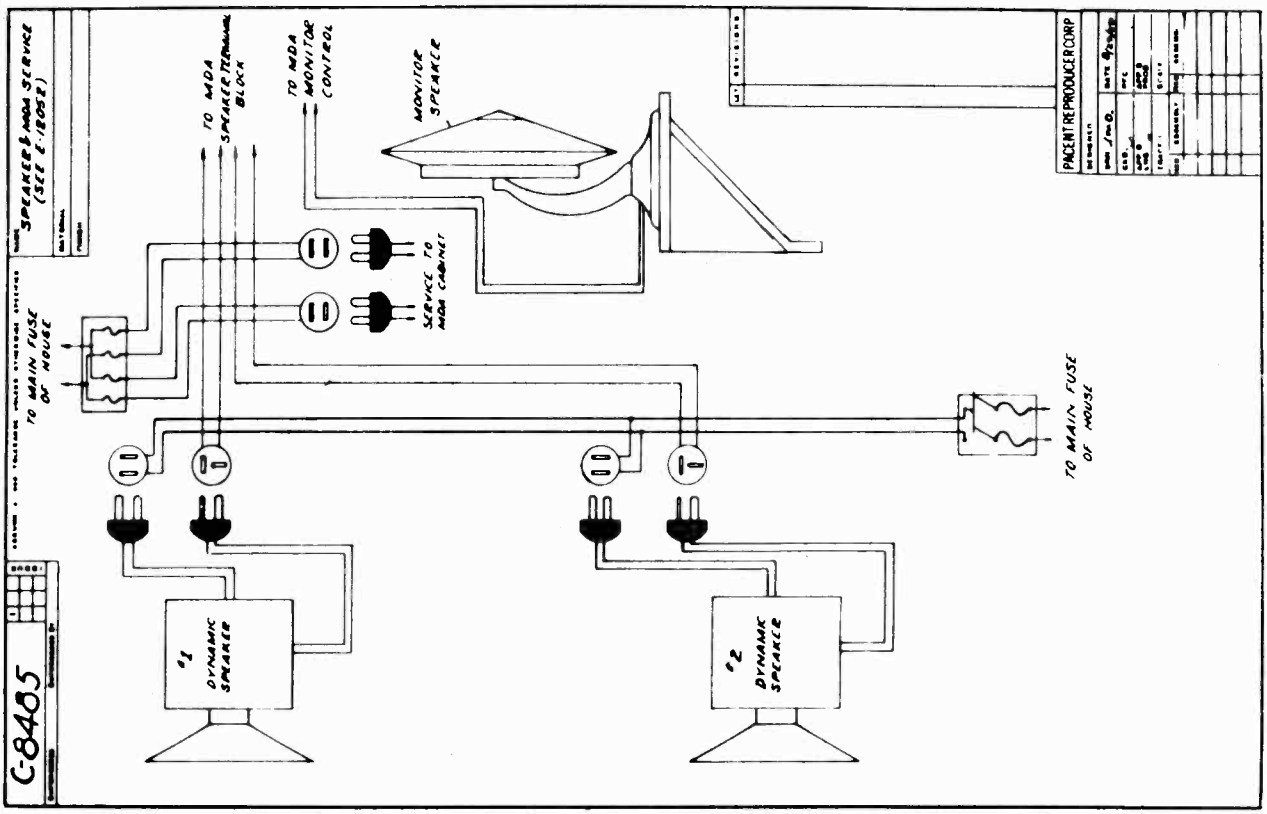
MODEL Fader Units
Two types



MODEL MDA Service Schematic
MODEL 2-MDA-F Control Box Schematic

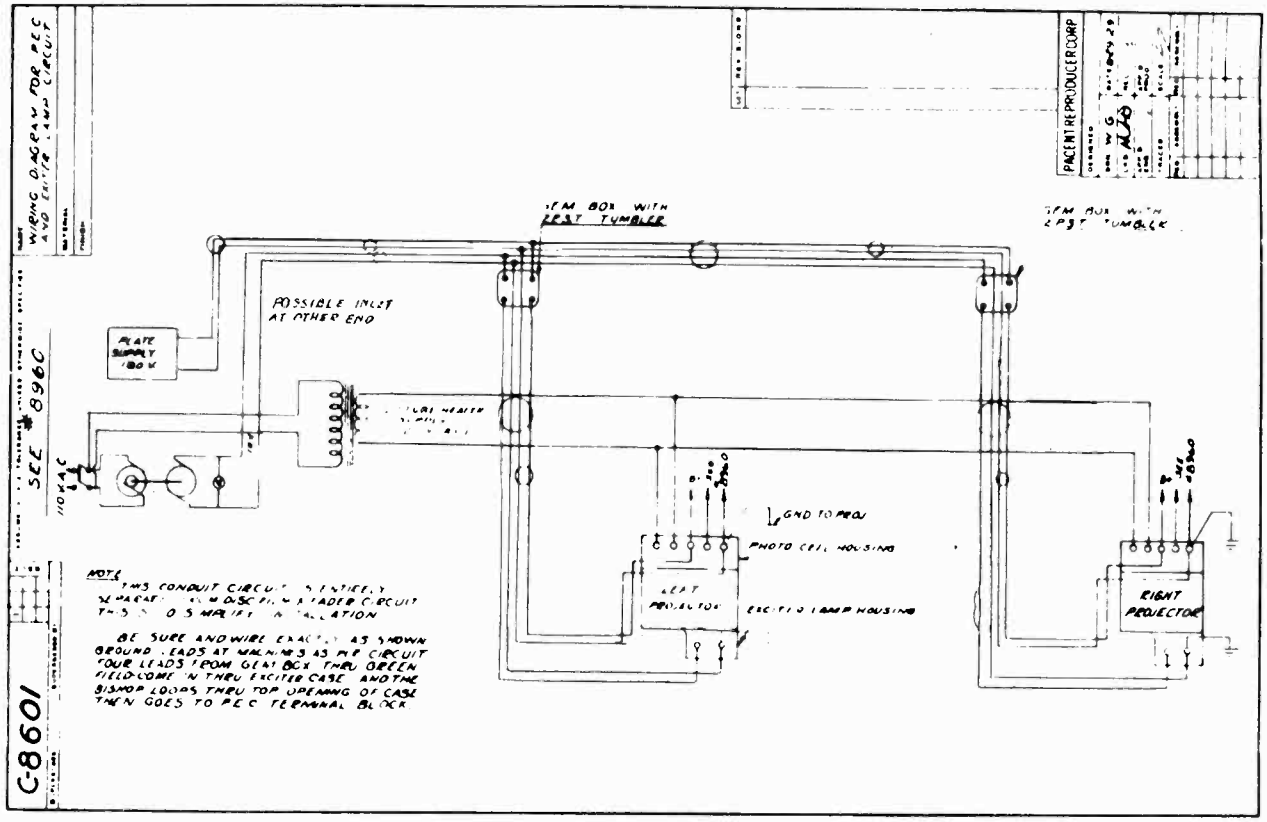
PACENT REPRODUCER CORP.

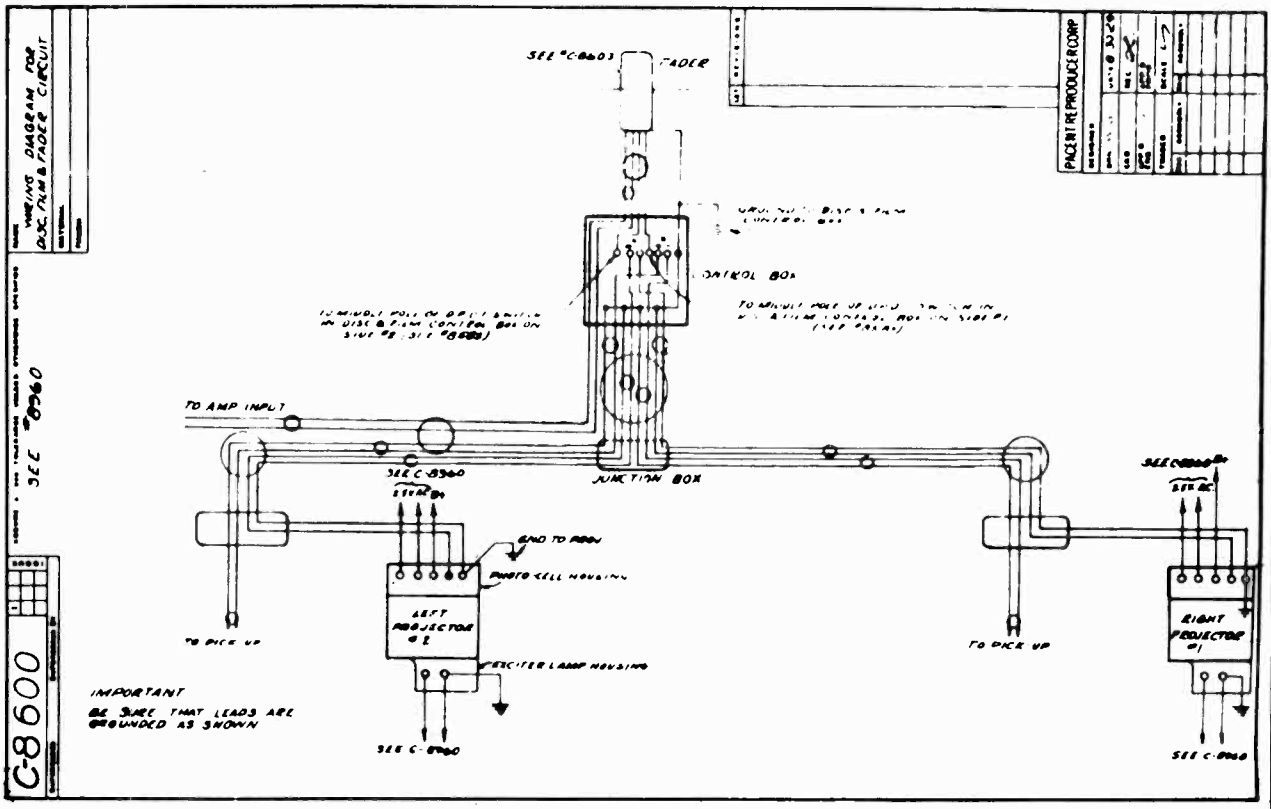




PACENT REPRODUCER CORP.

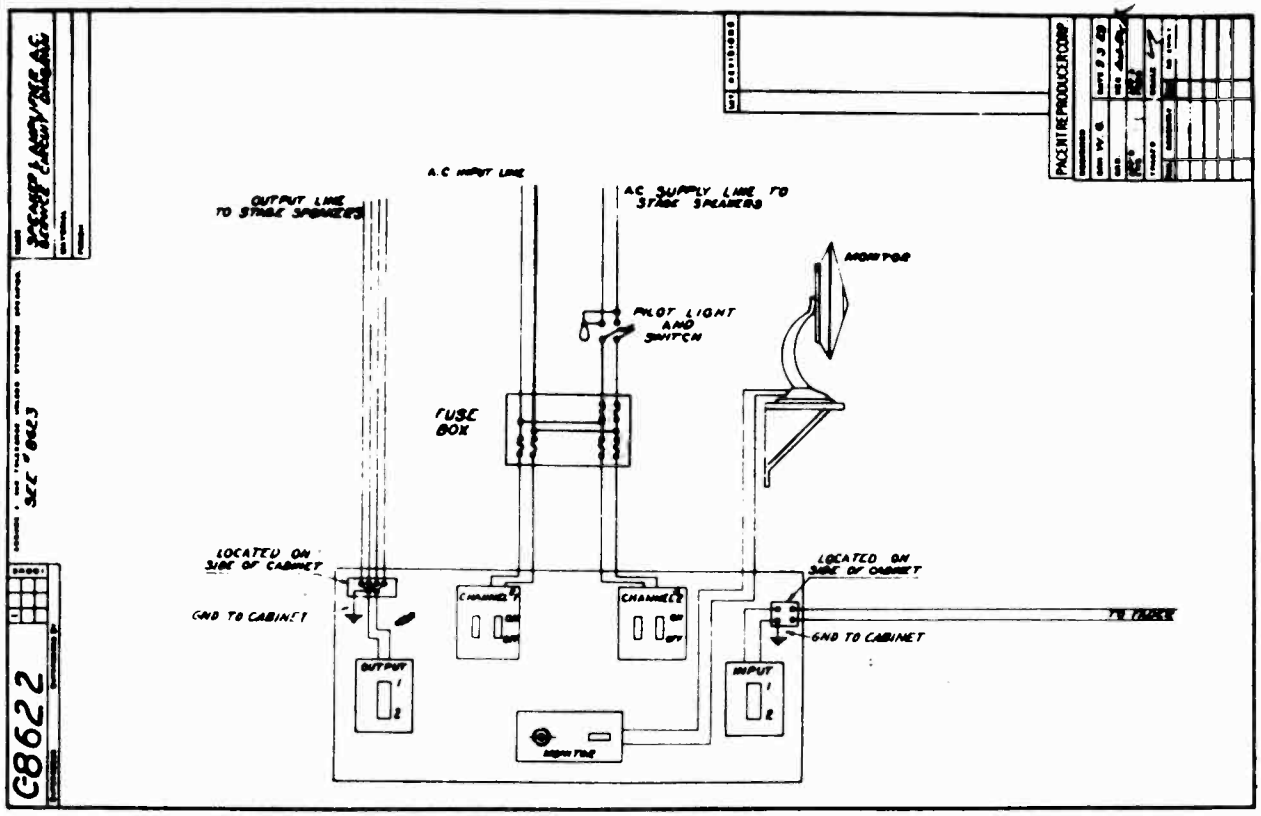
MODEL Disc, Film and Fader Service Schematic
MODEL PEC-Xiter Service Schematic

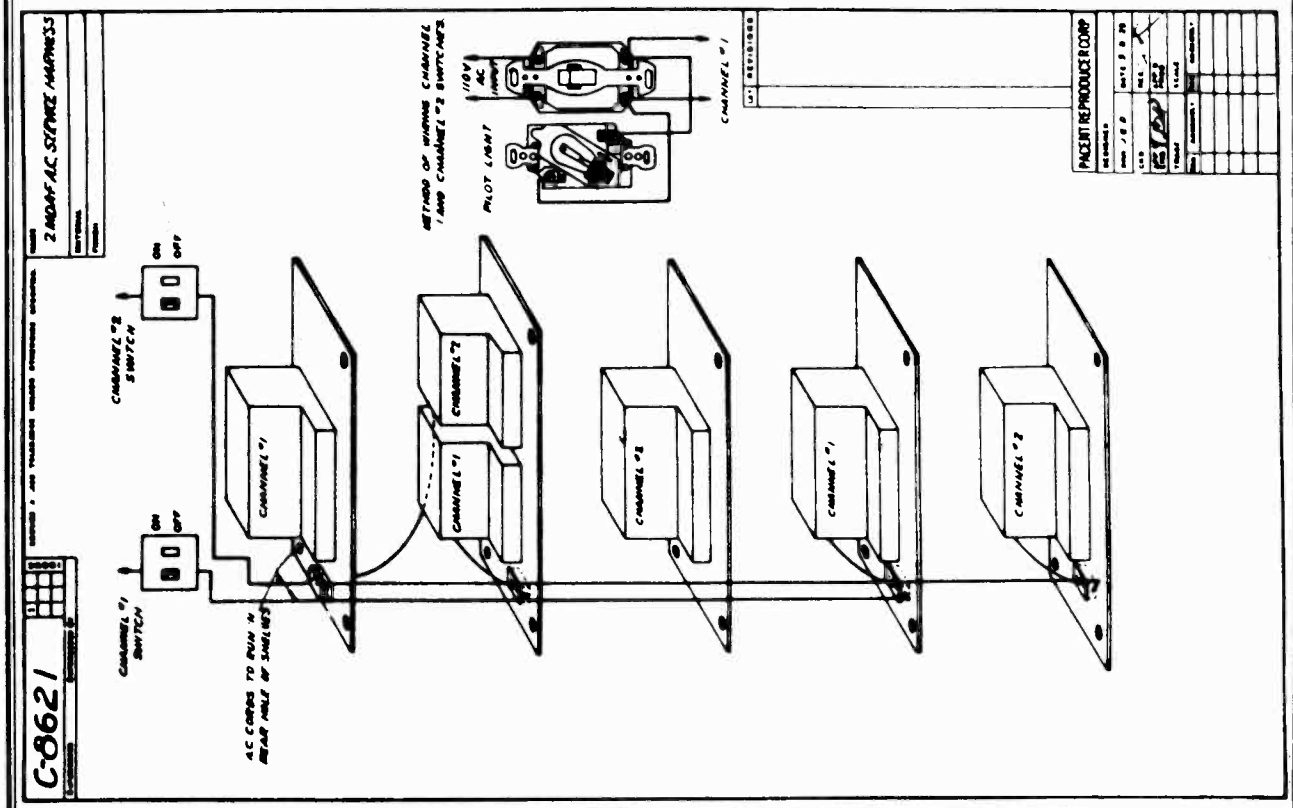




MODEL 2MDA-F
Harness
MODEL Spkr.-Amp. AC
Service
Schematic

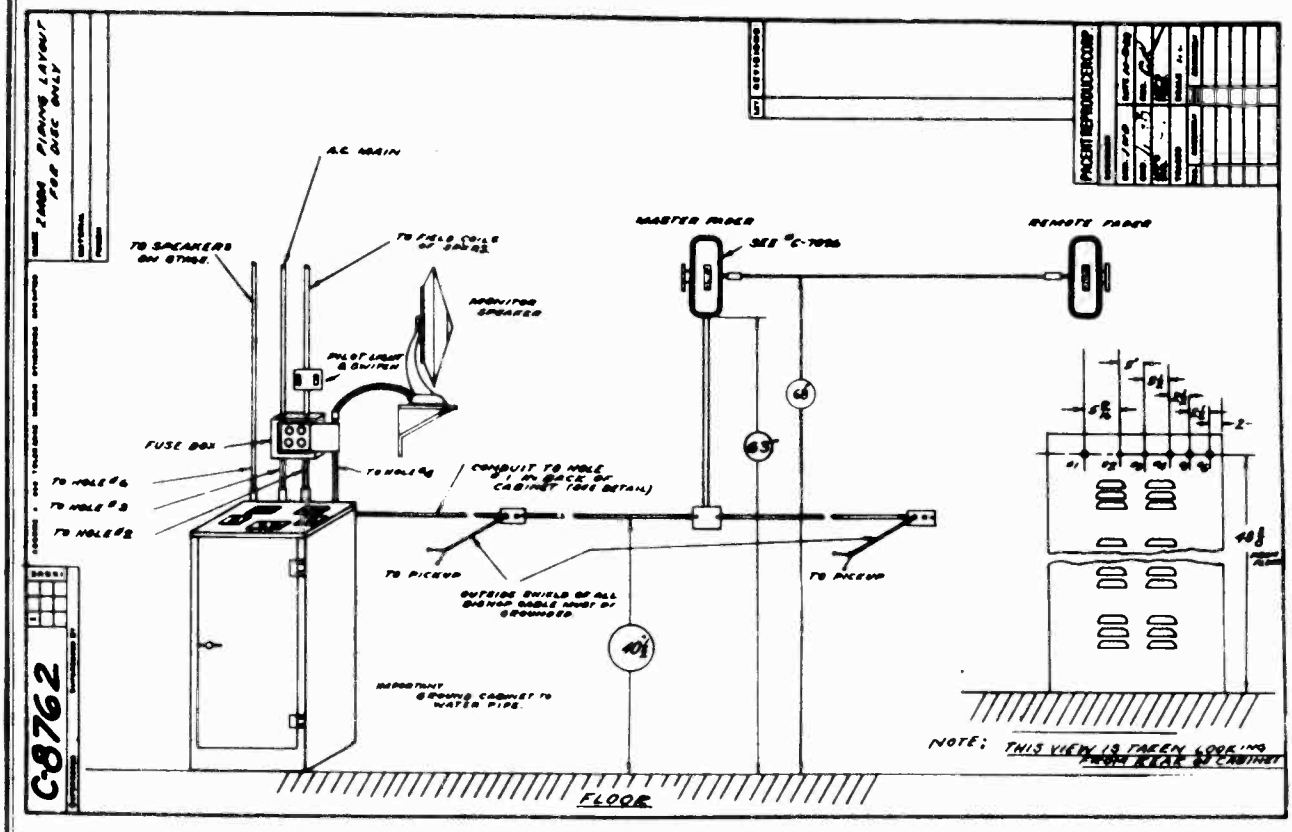
PACENT REPRODUCER CORP.

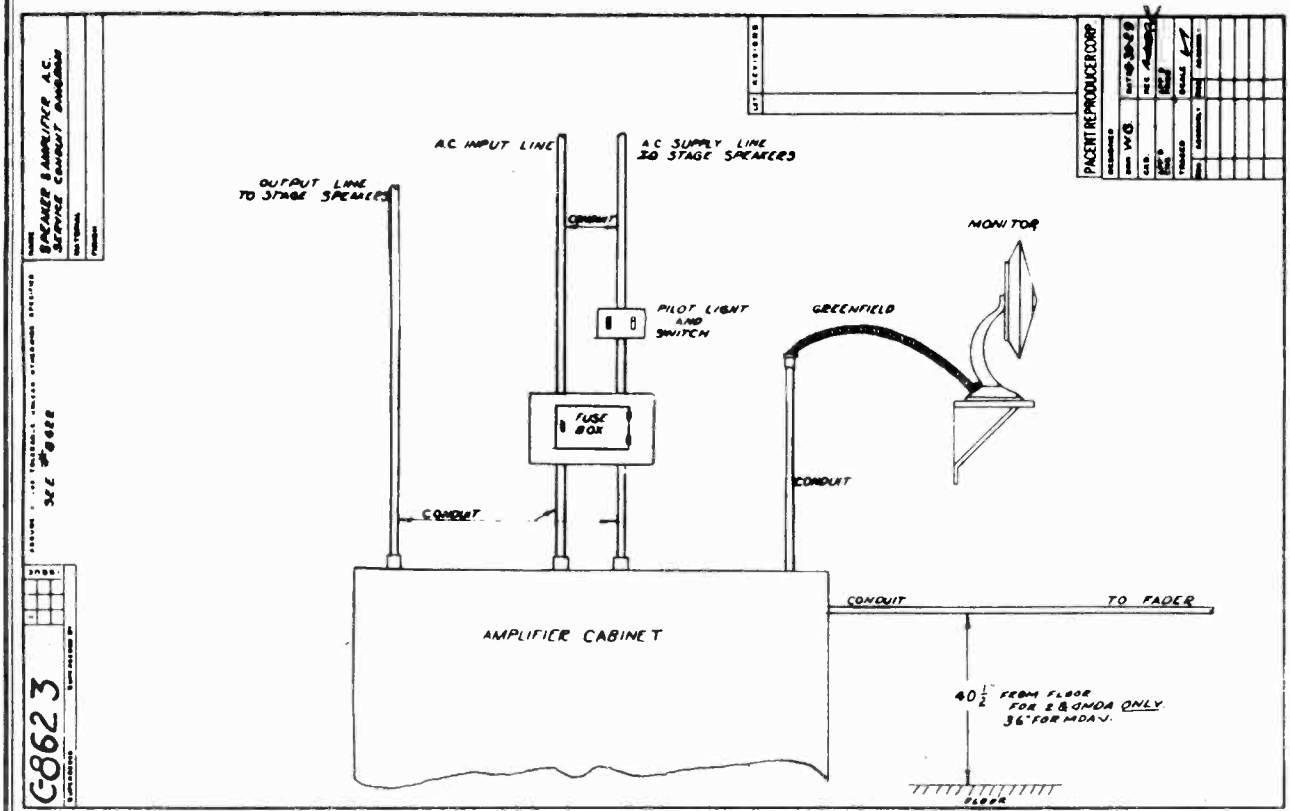




PACENT REPRODUCER CORP.

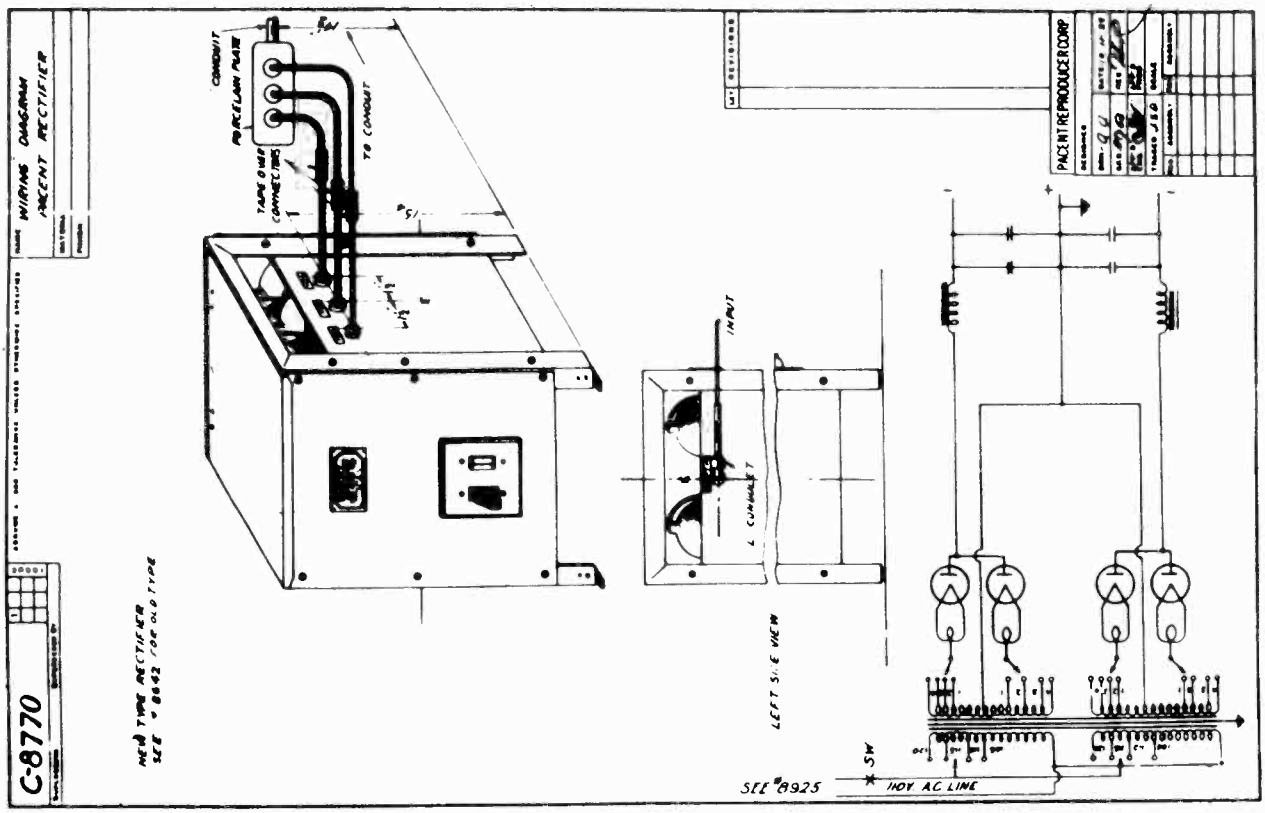
MODEL Spkr.-Amp. AC Service Schem.
MODEL 2 MDA-F Piping Schematic

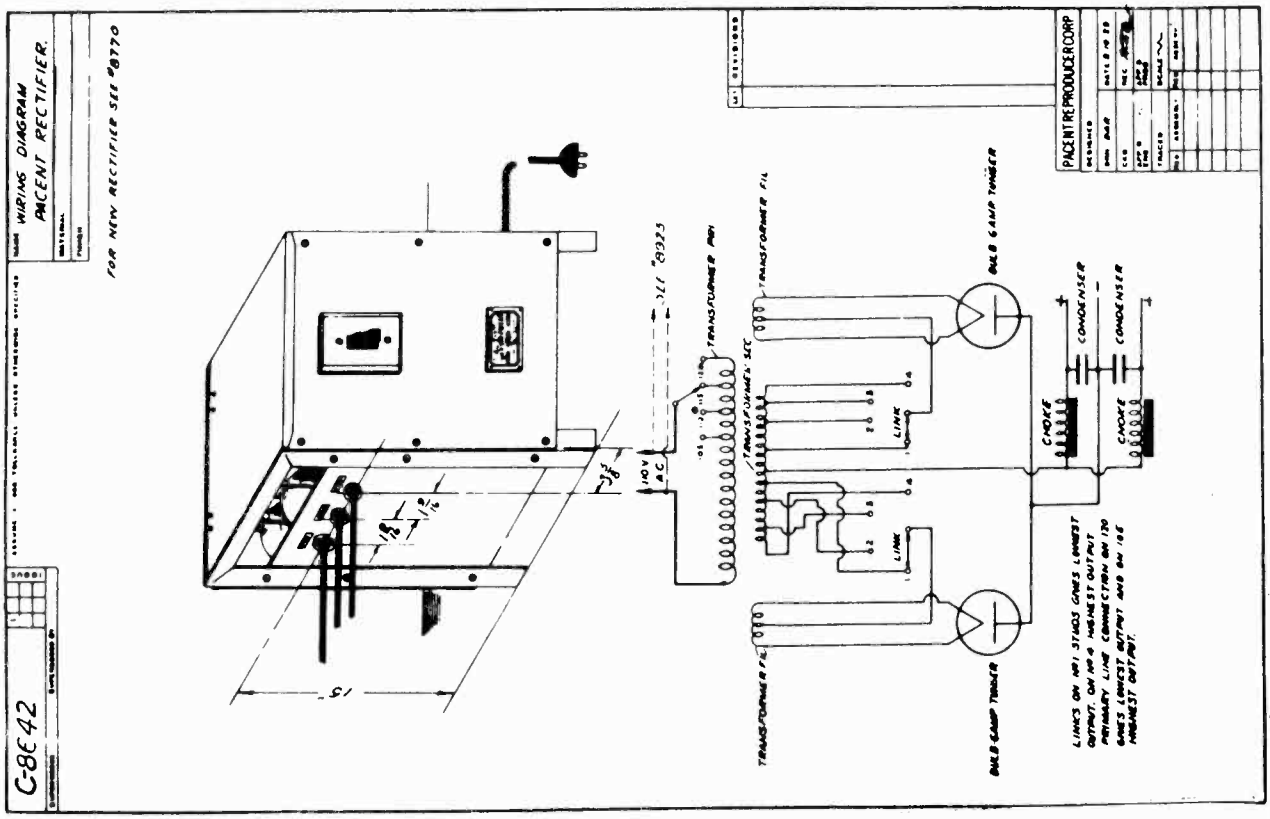




MODEL Pacent Rectifiers
Two types

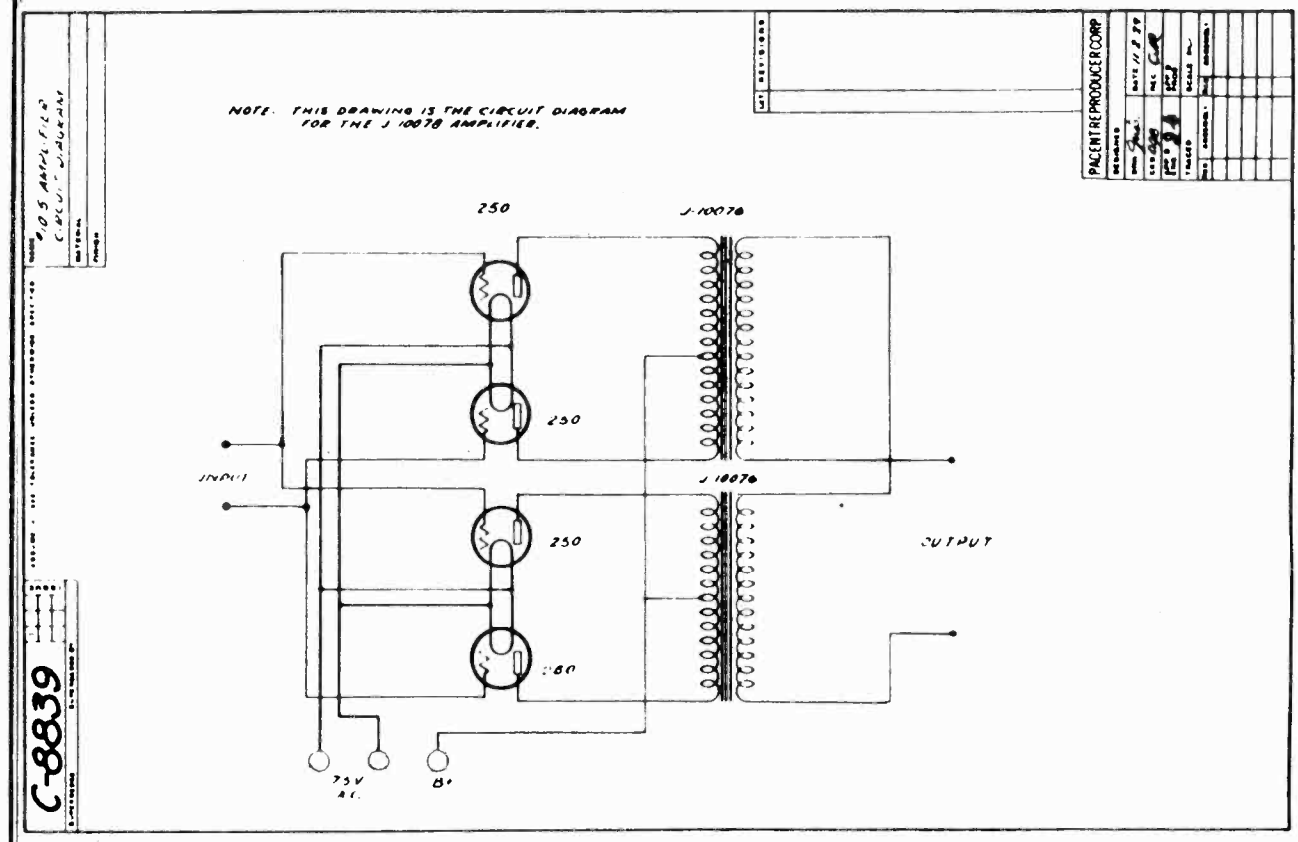
PACENT REPRODUCER CORP.

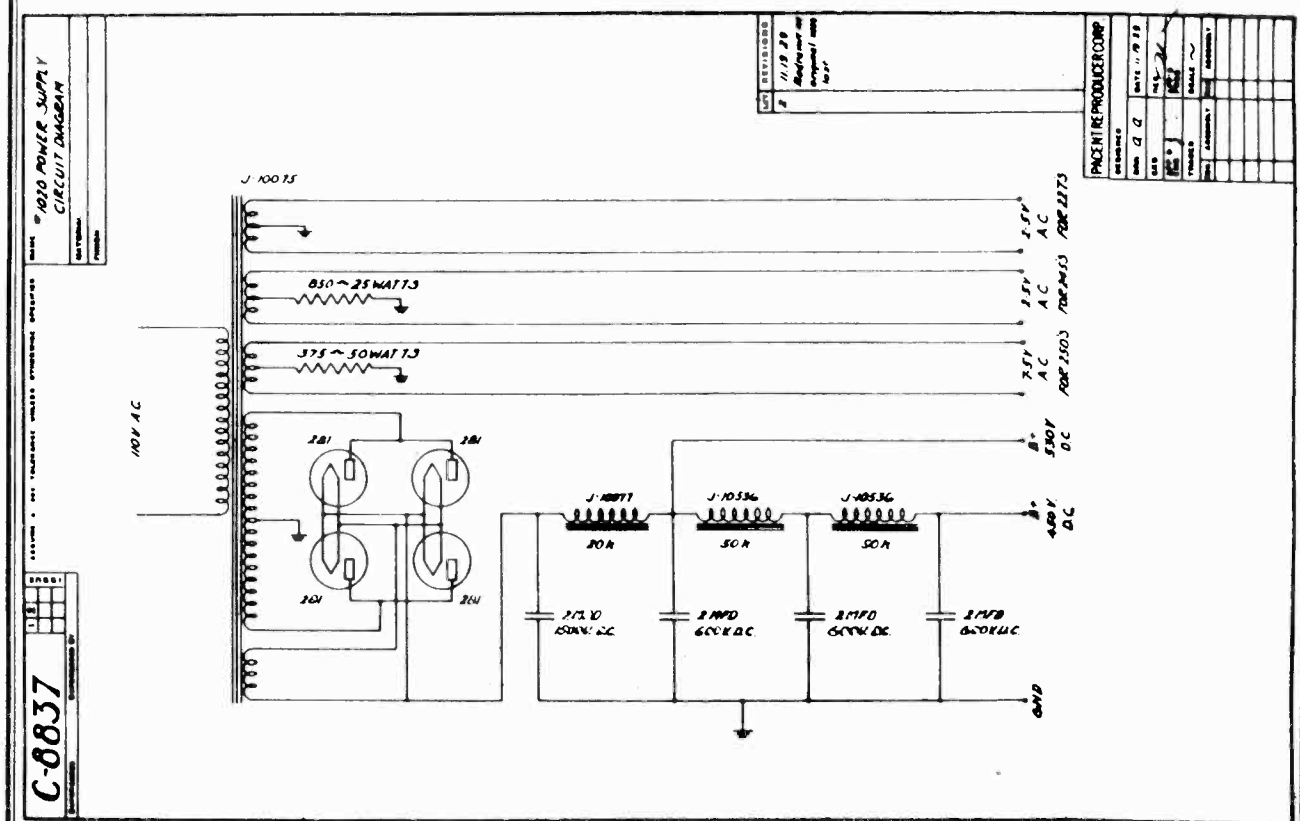




PACENT REPRODUCER CORP.

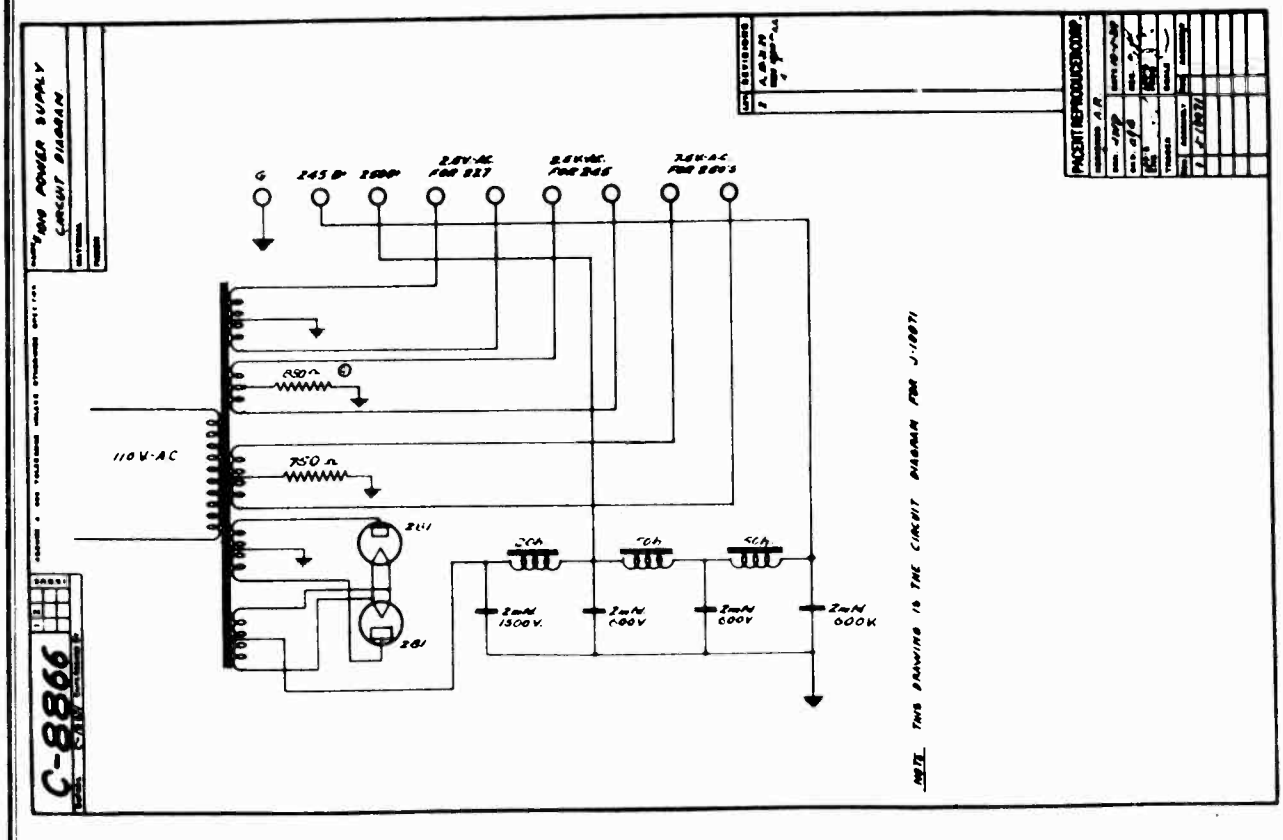
MODEL 1015 Amplifier
Schematic
MODEL 1020 SPU
Schematic

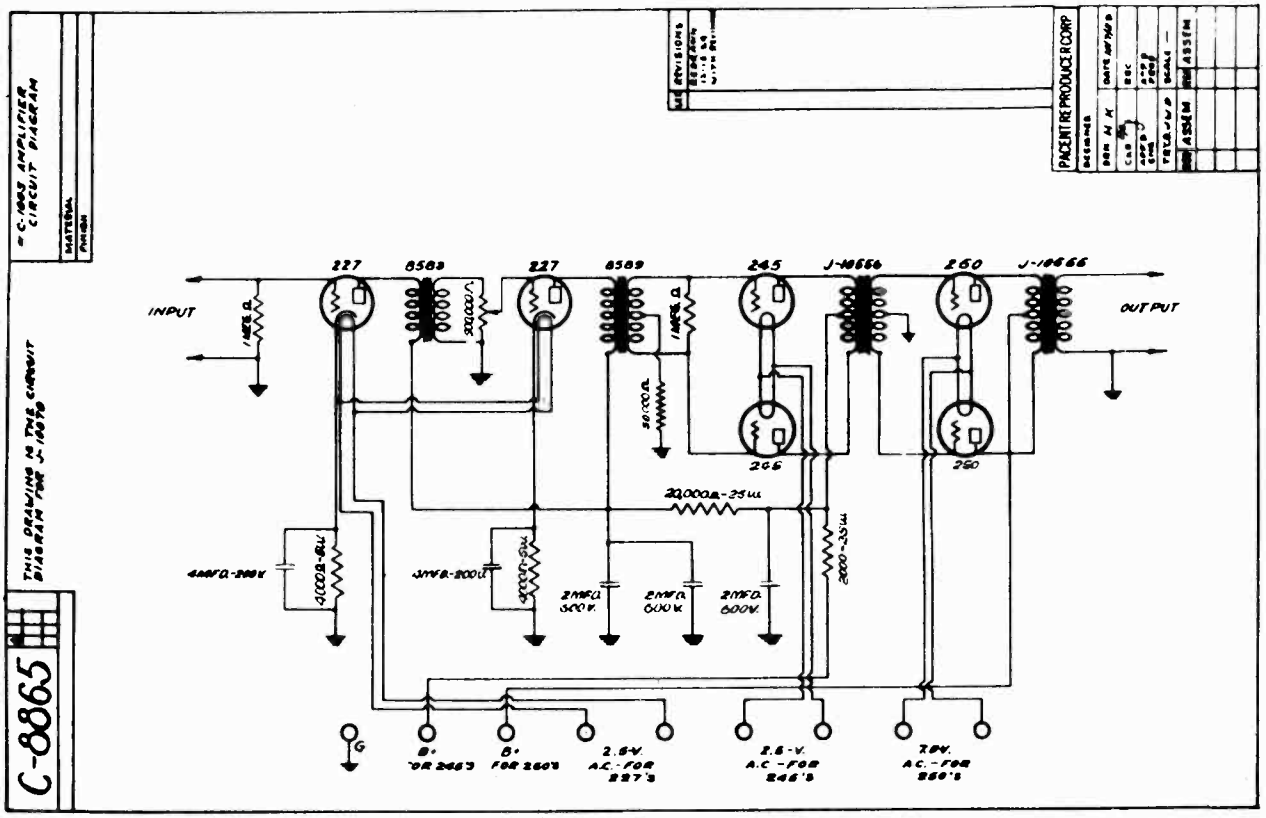




MODEL 1005 Amplifier
Schematic
MODEL 1010 SPU
Schematic

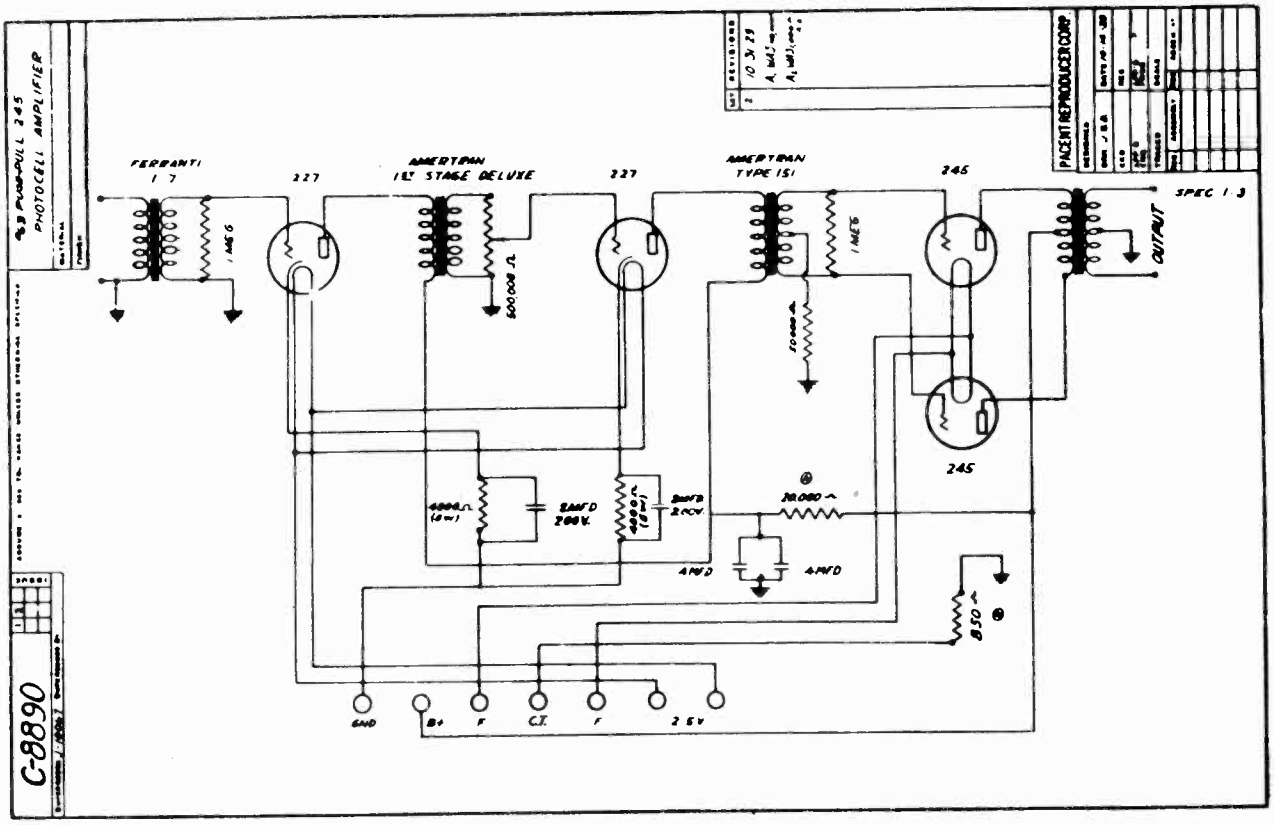
PACENT REPRODUCER CORP.

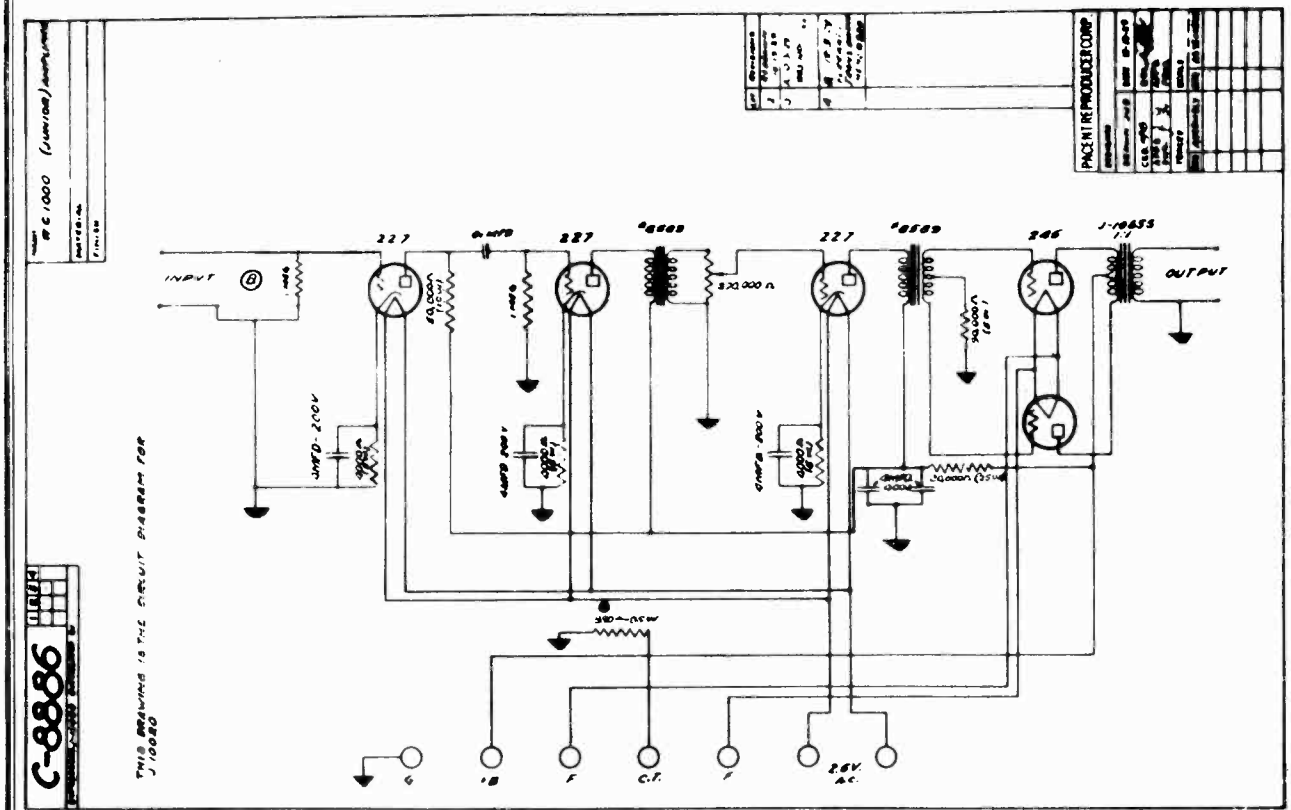




PACENT REPRODUCER CORP.

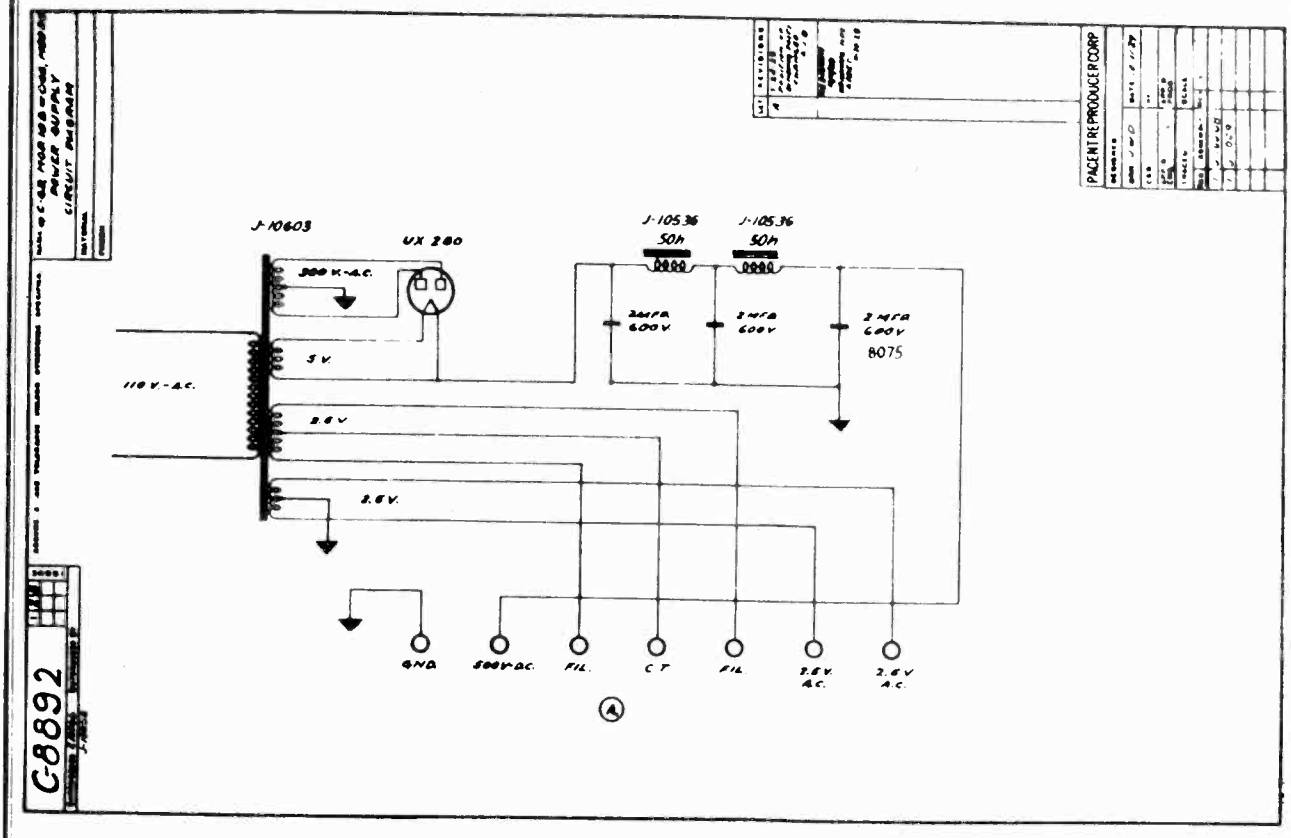
MODEL 63 PEC Amp.
Schematic
MODEL C-1000 Jr.
Schematic

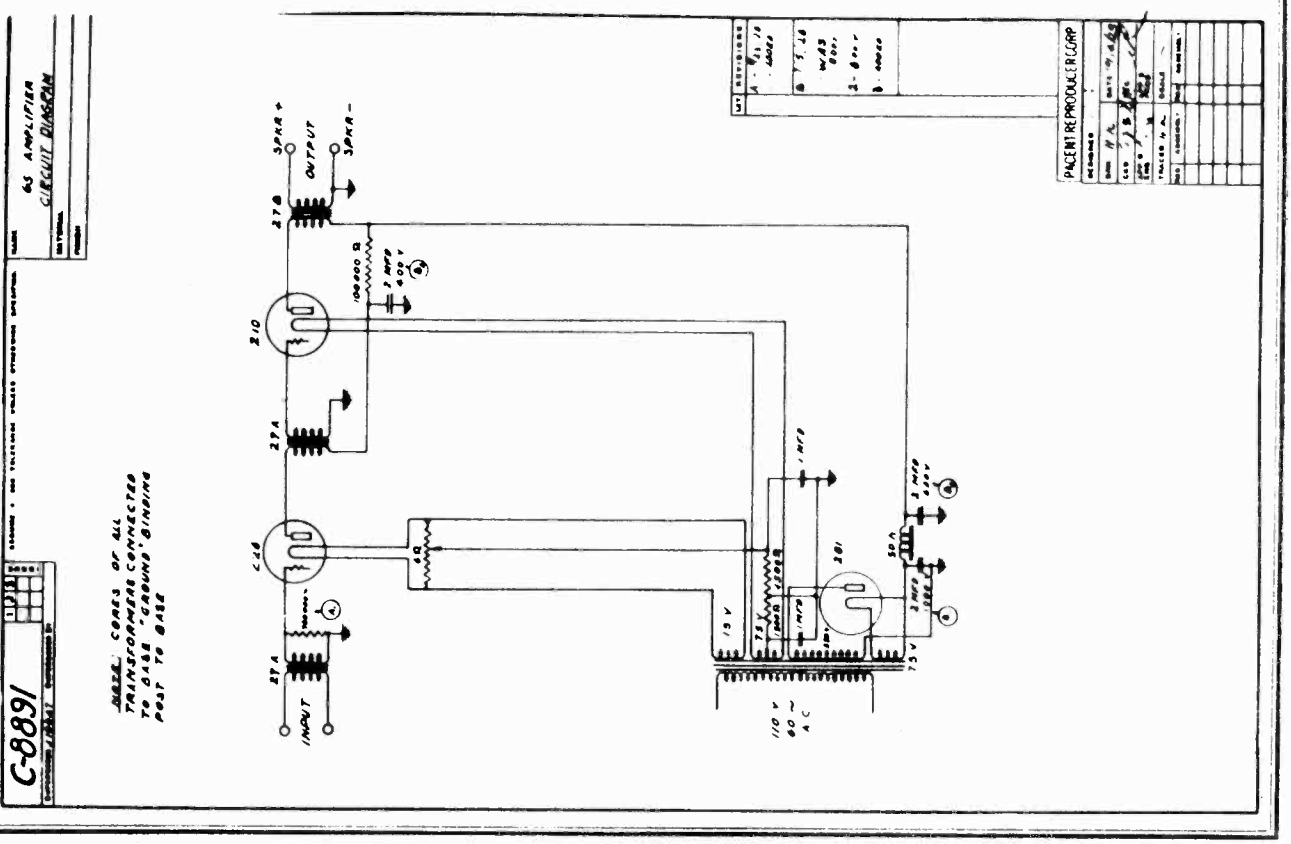




MODEL 65 Amplifier
Schematic
MODEL C-62(102),
C-66(20)
Schematic

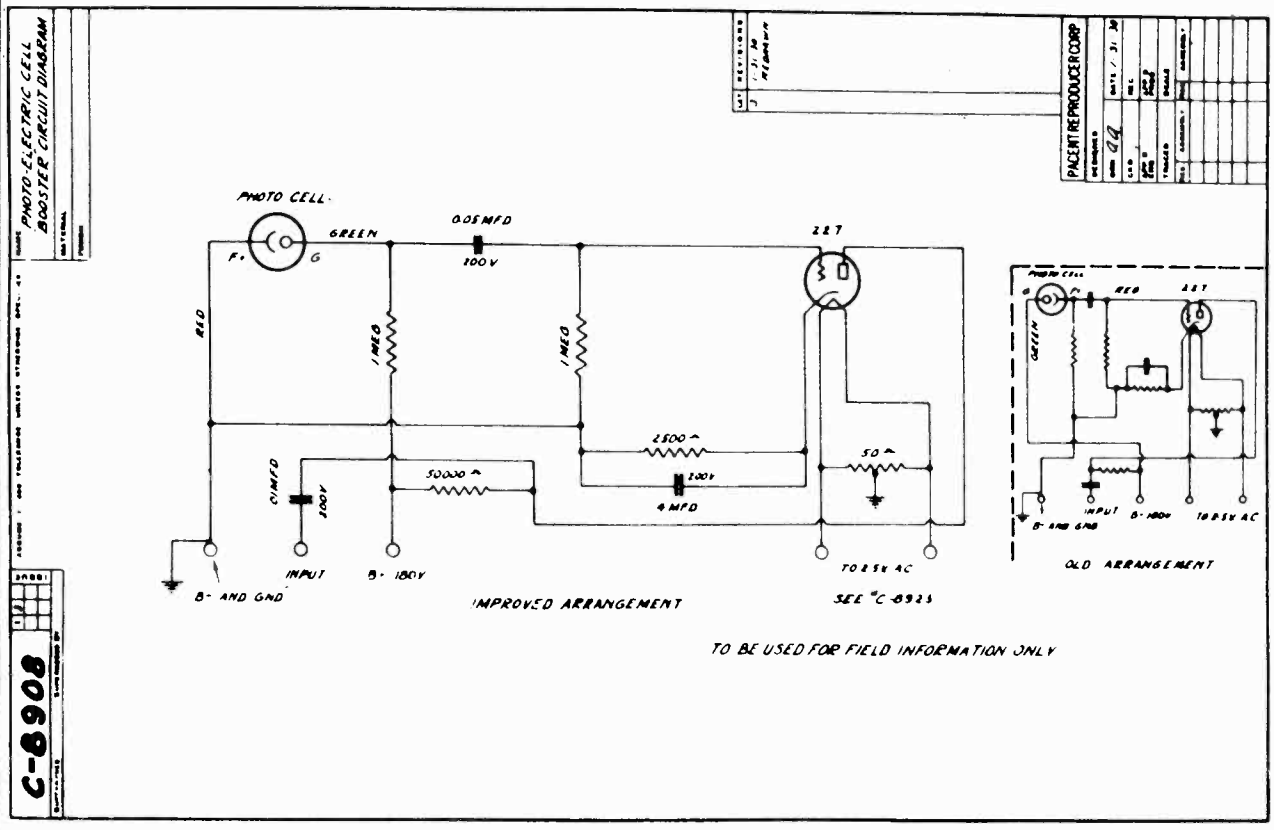
PACENT REPRODUCER CORP.

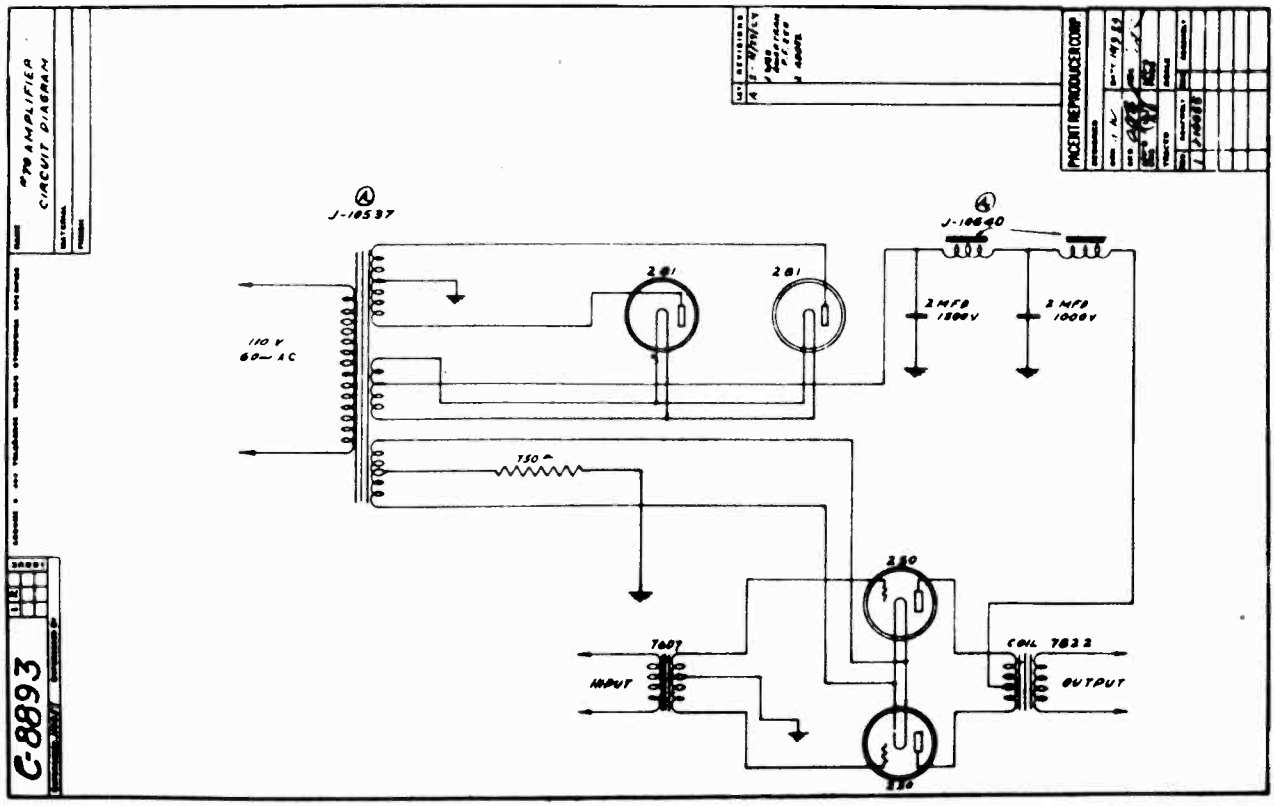




PACENT REPRODUCER CORP.

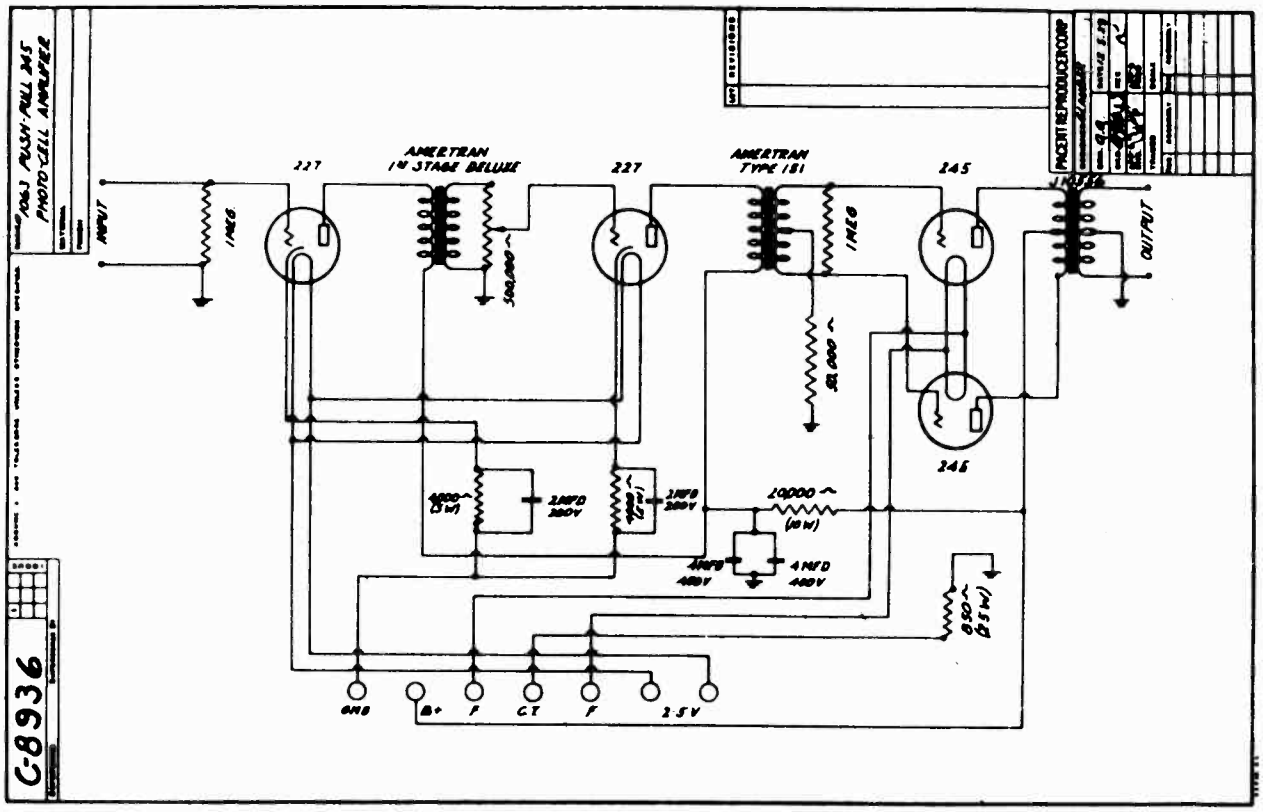
MODEL 70 Amplifier Schematic
MODEL PEC Booster Schematic

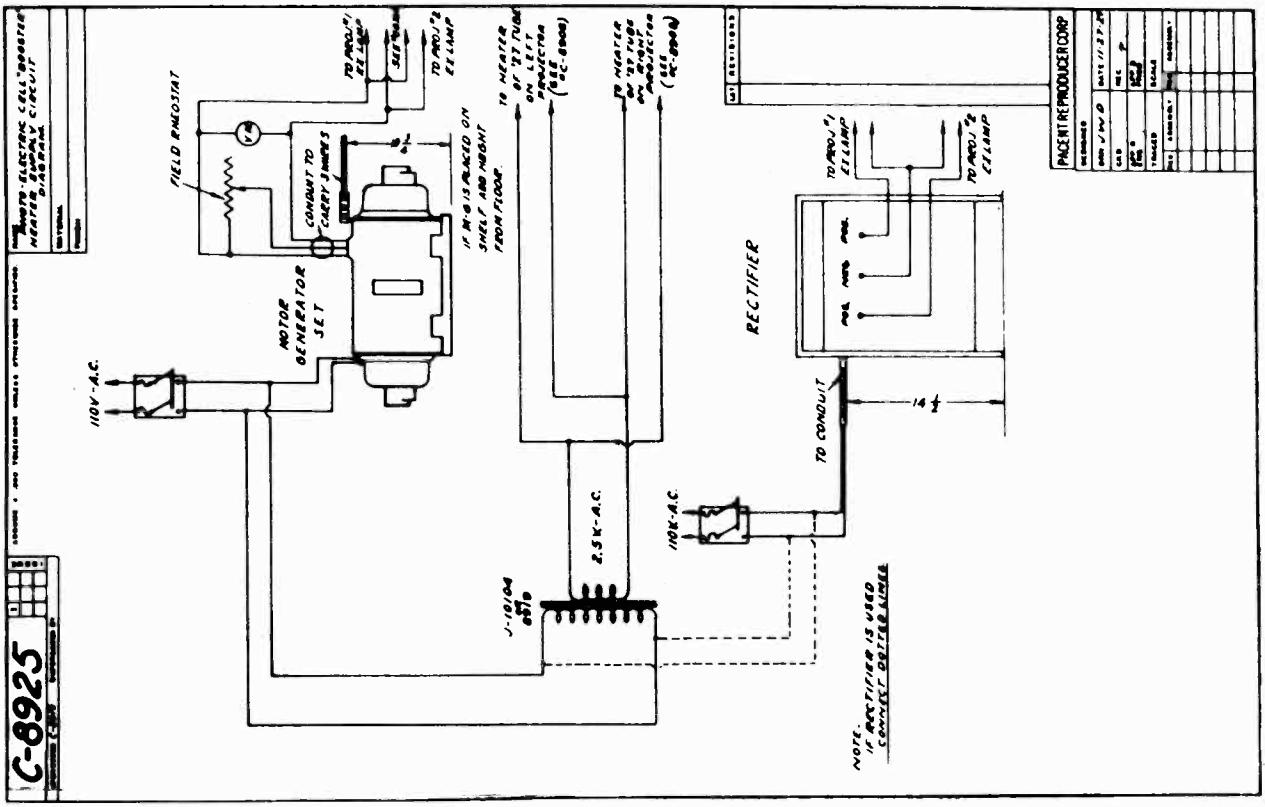




MODEL PEC Booster
Heater Supply
Schematic
MODEL 1063 PEC Amp
Schematic

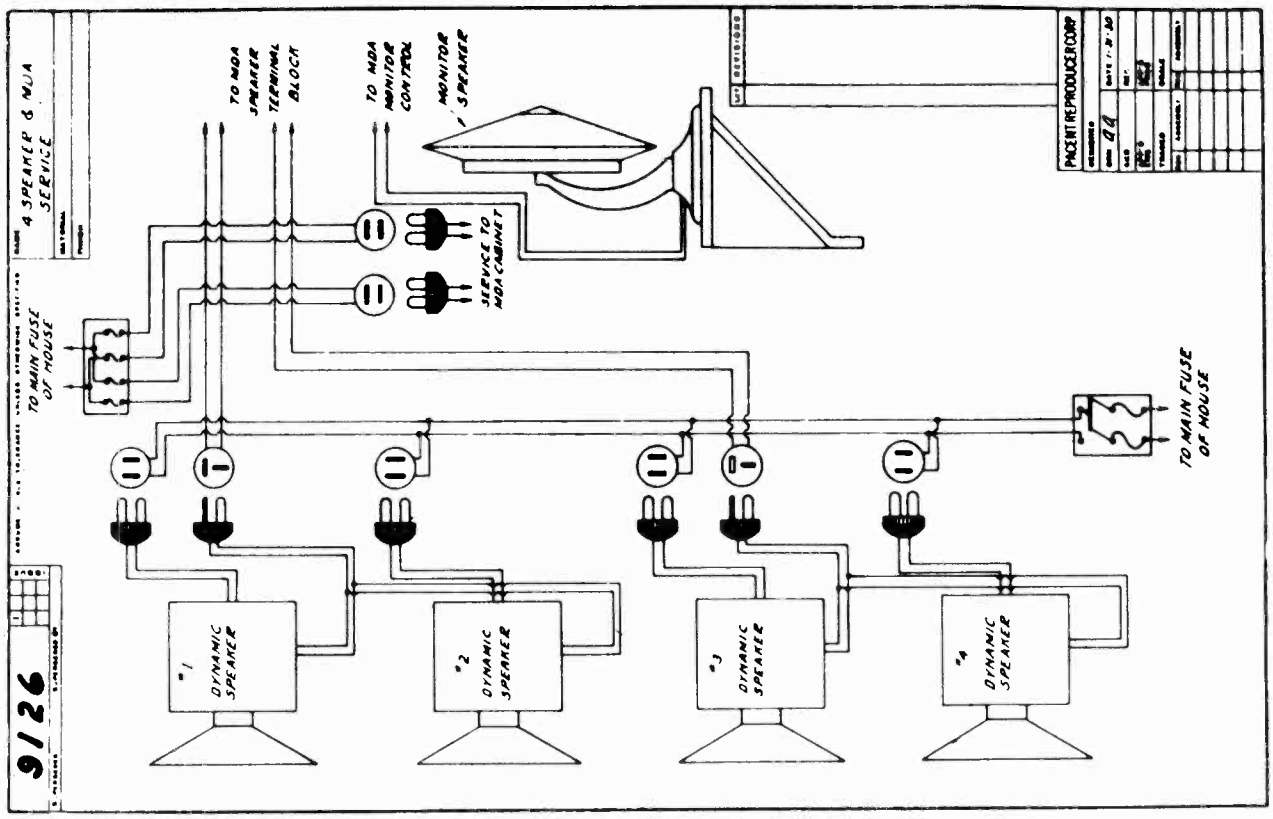
PACENT REPRODUCER CORP.

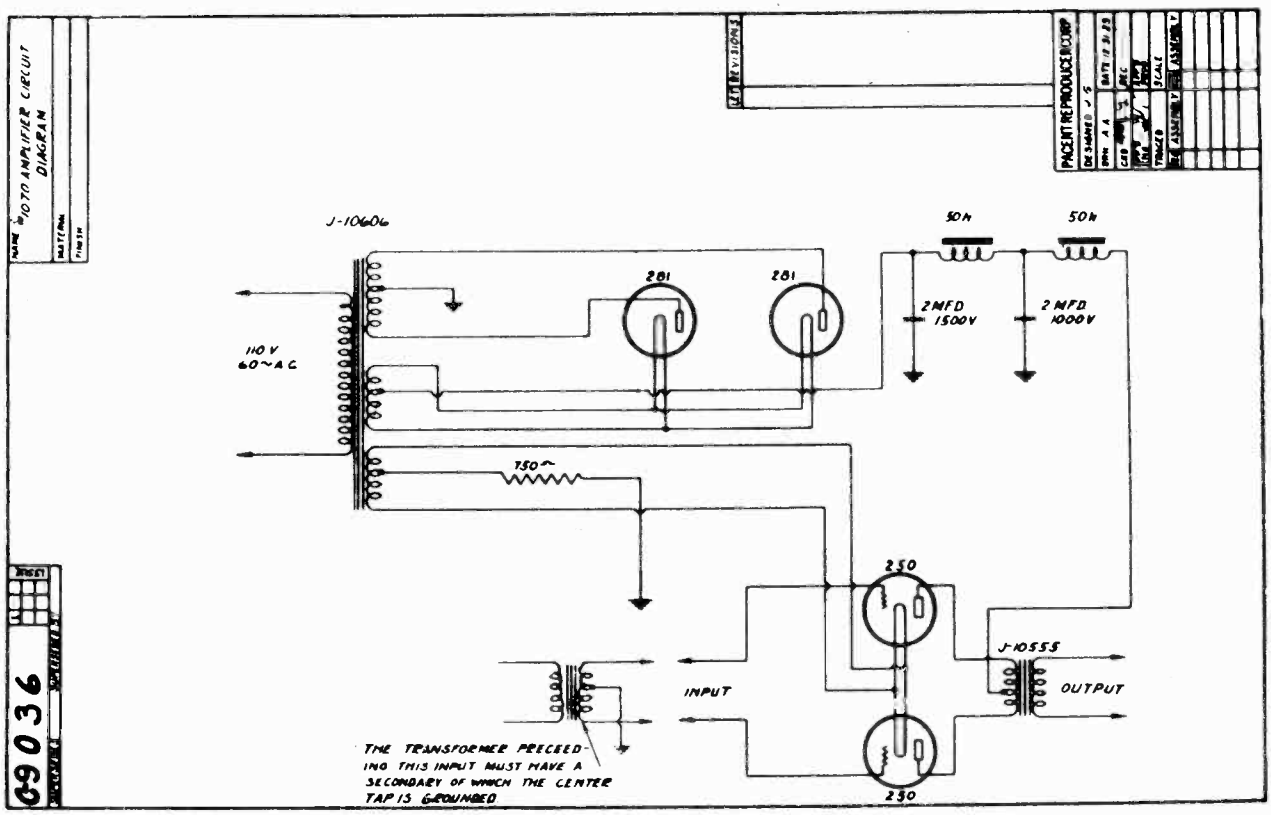




PACENT REPRODUCER CORP.

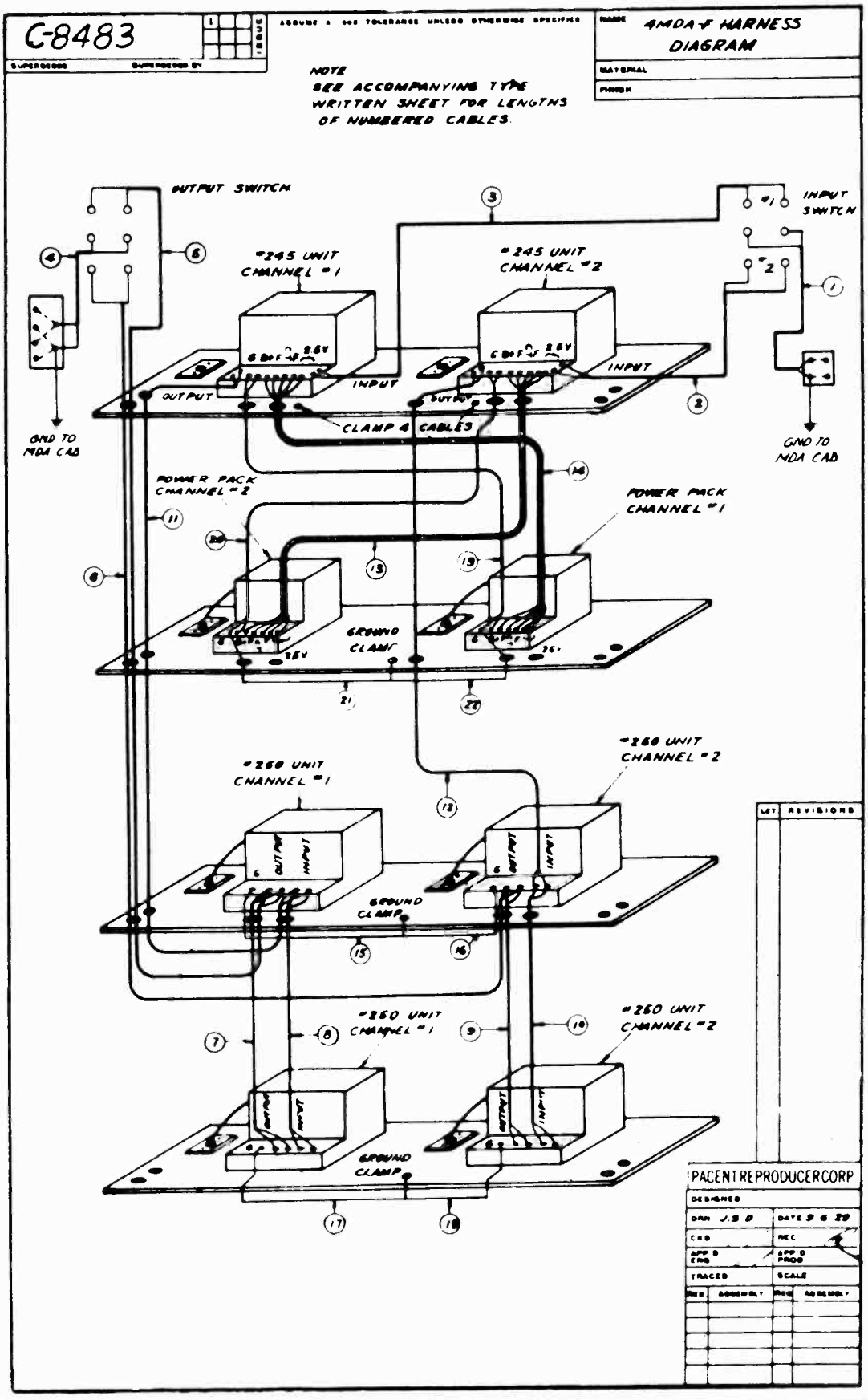
MODEL 1070 Amp.
Schematic
MODEL 4 Spkr-MDA
Service
Schematic





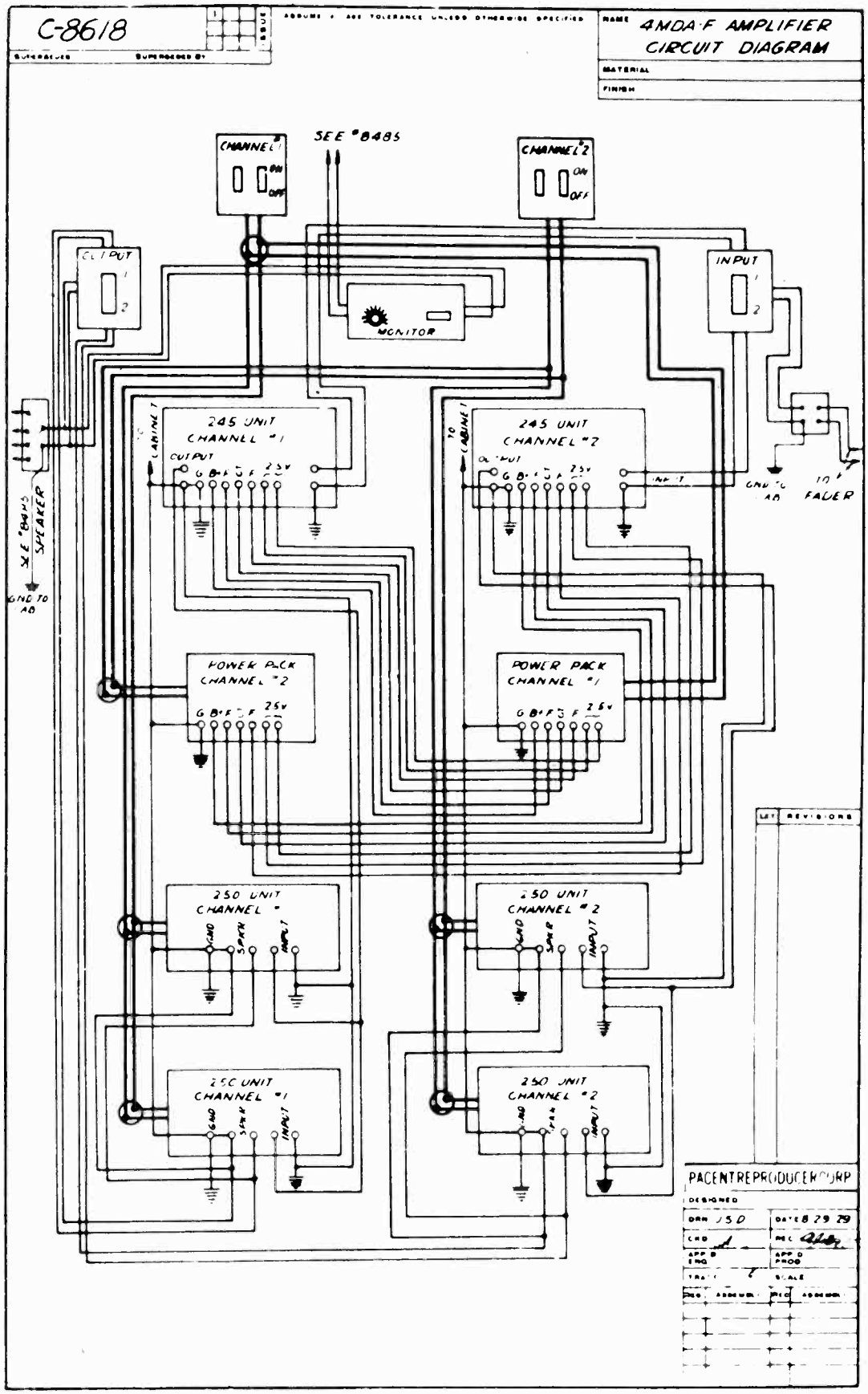
MODEL 4-MDA-F
Harness

PACENT REPRODUCER CORP.



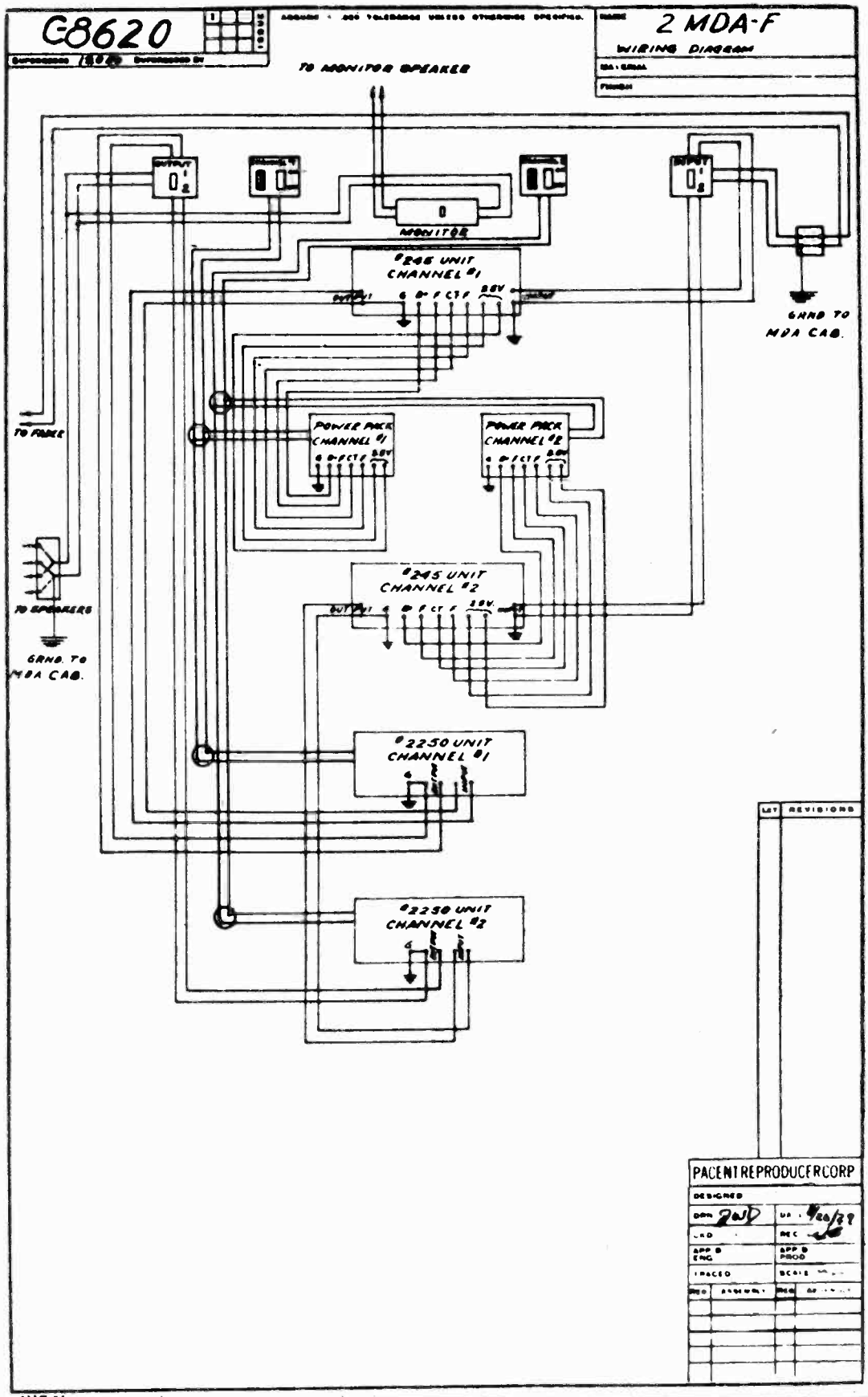
PACENT REPRODUCER CORP.

MODEL 4-MDA-F Amp.
Assembly wiring



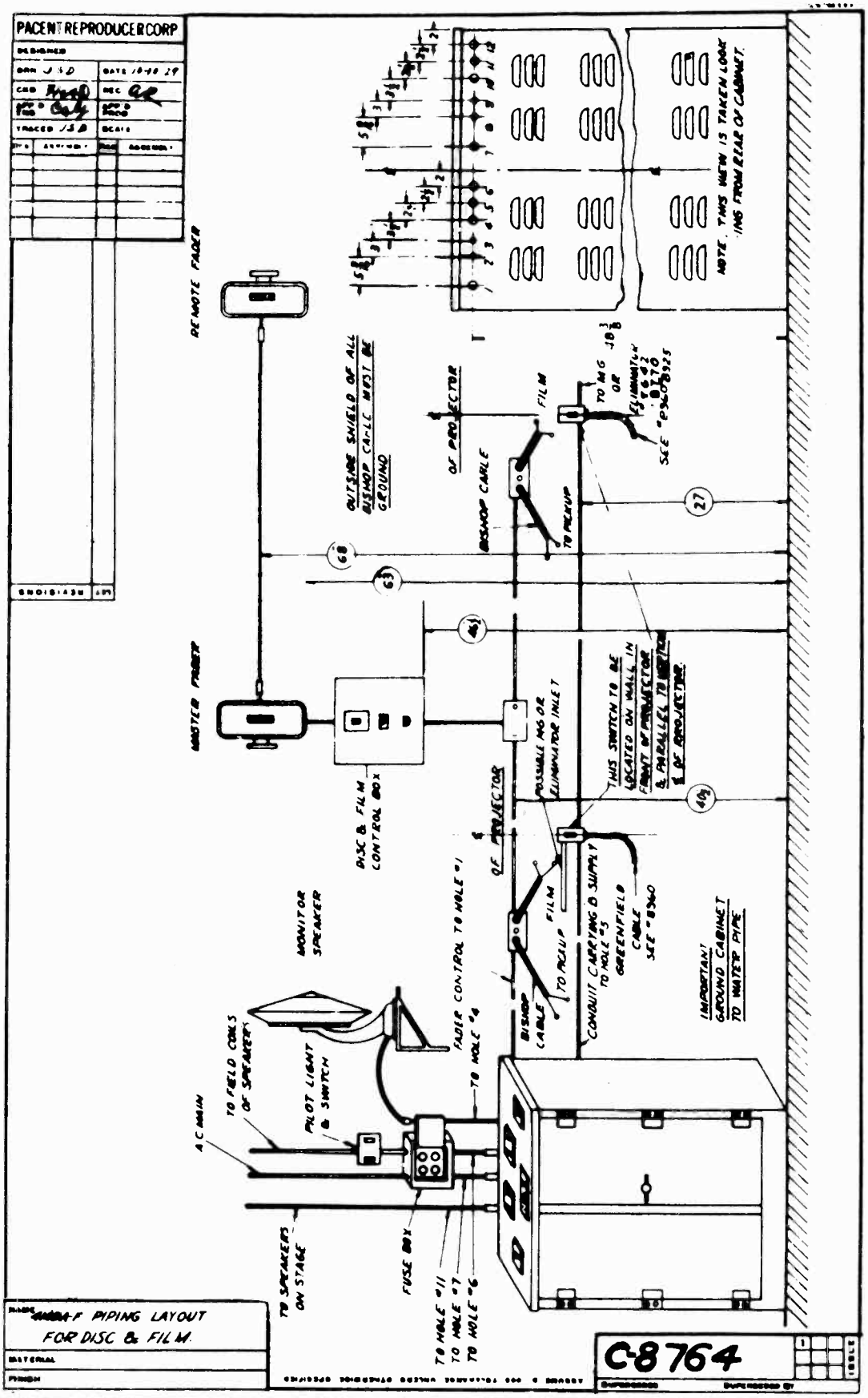
MODEL 2-MDA-F
Assembly wiring

PACENT REPRODUCER CORP.



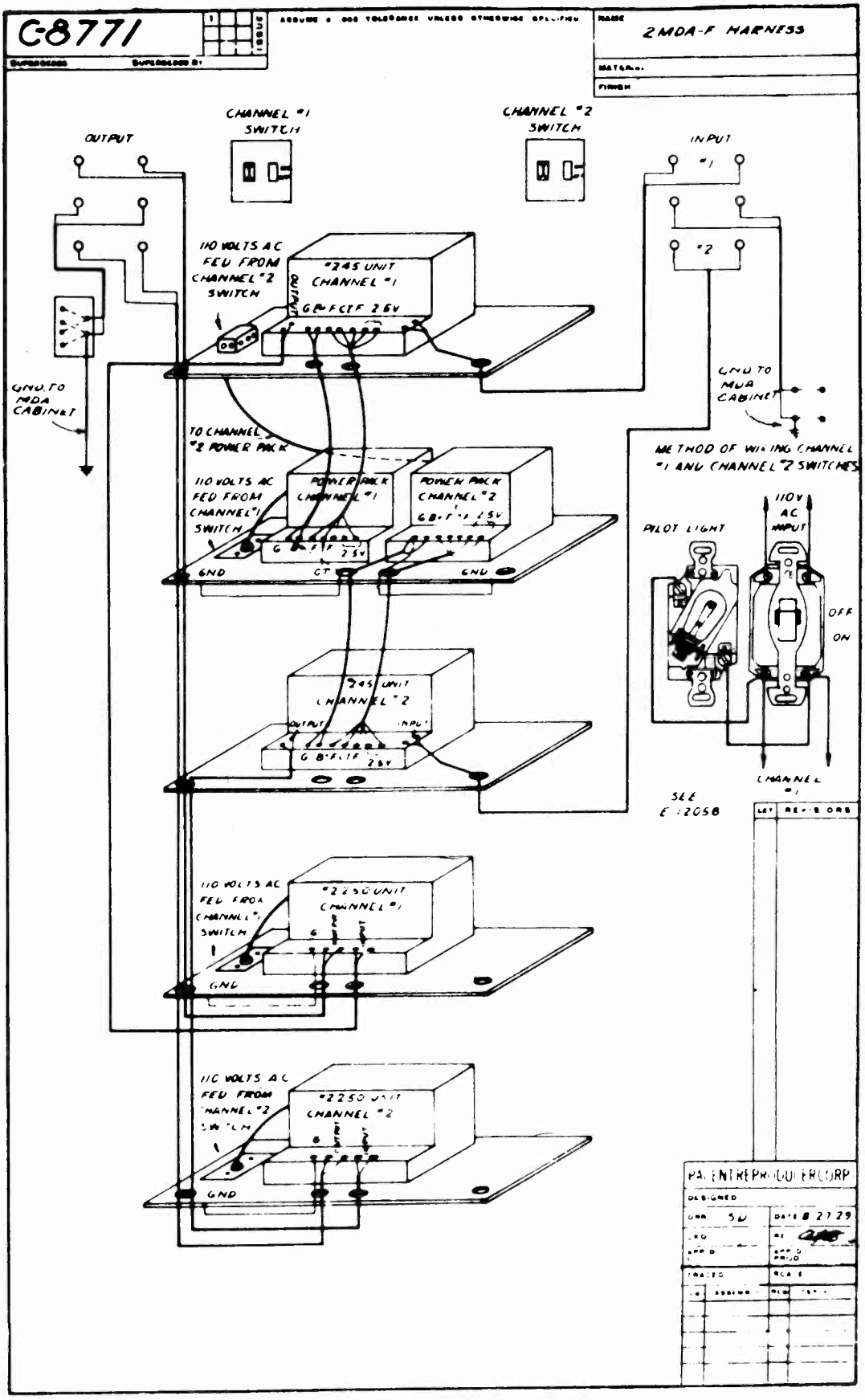
MODEL 4-MDA-F
Piping Layout

PACENT REPRODUCER CORP.



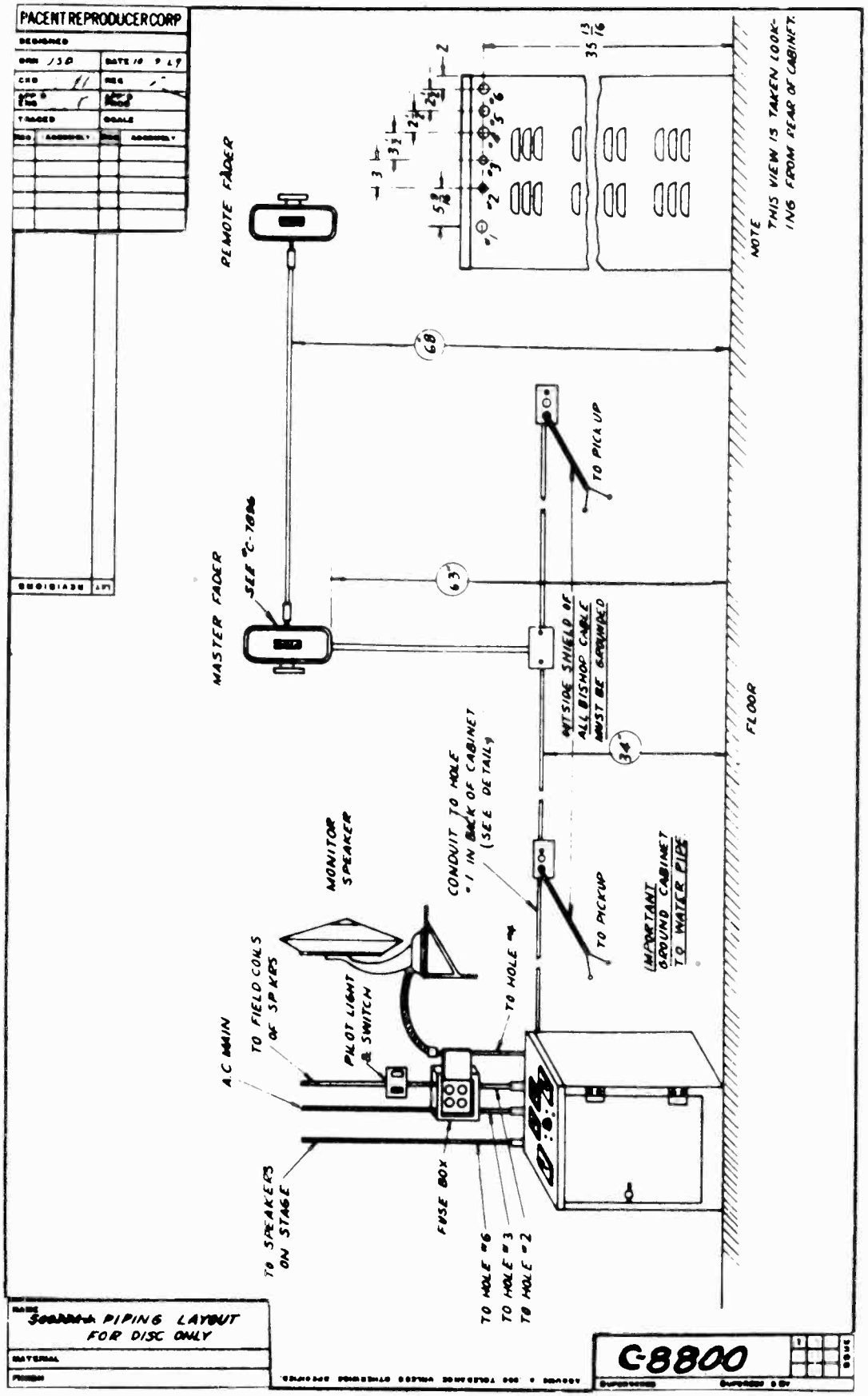
MODEL 2-MDA-F
Harness

PACENT REPRODUCER CORP.



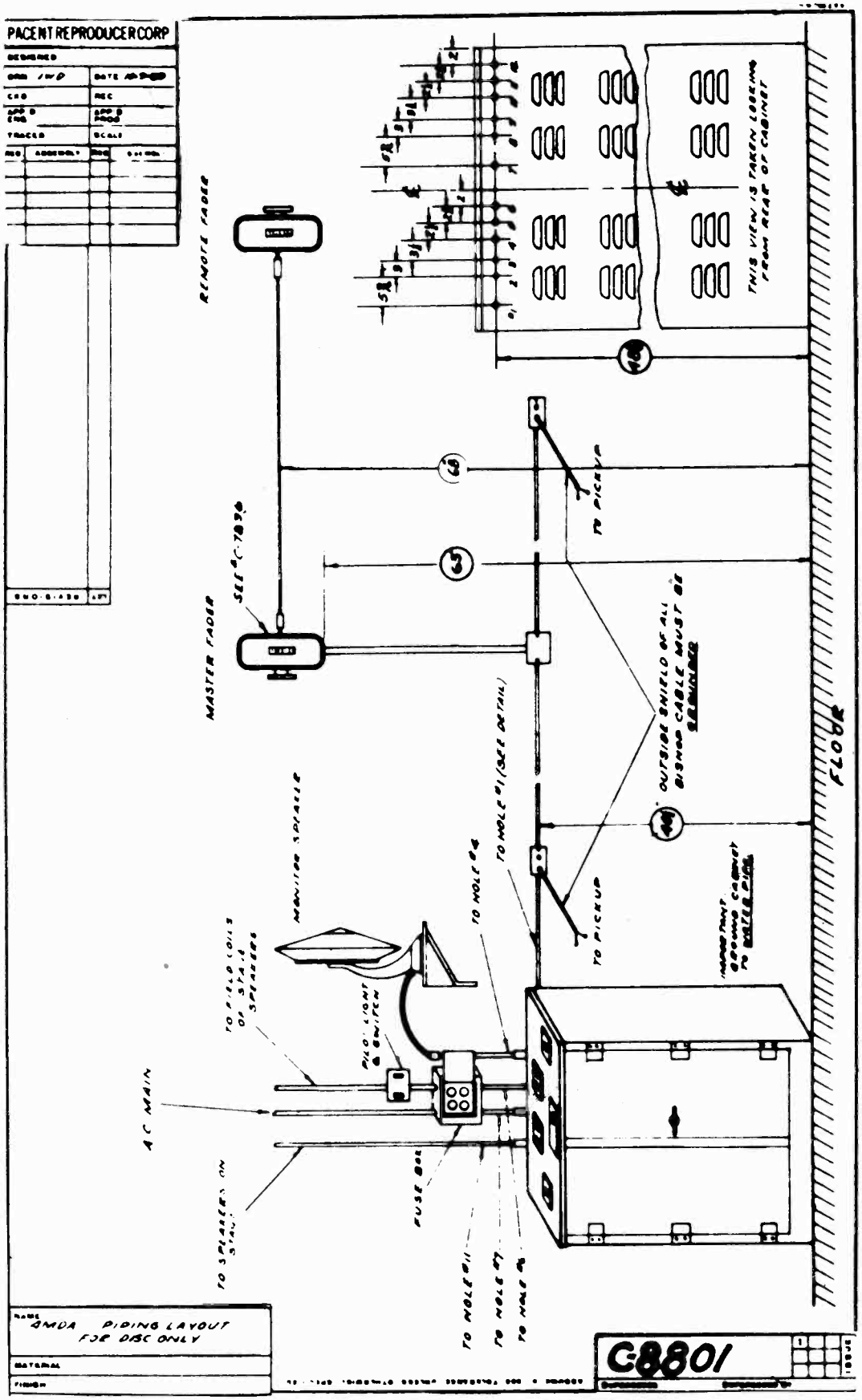
PACENT REPRODUCER CORP.

MODEL 500 DDA-Jr
Piping Layout
for Disc.



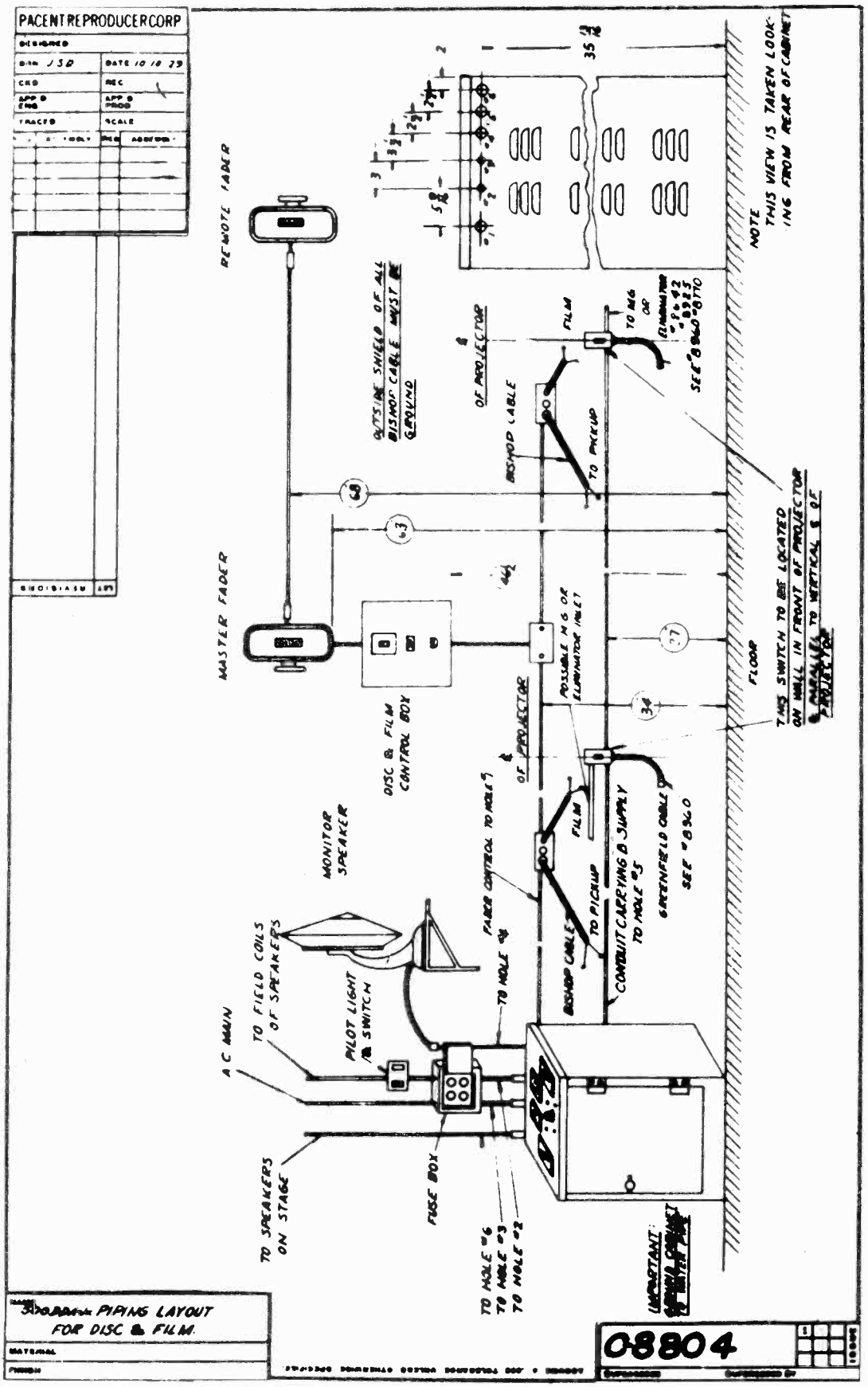
MODEL 4-MDA
Piping Layout
for Disc.

PACENT REPRODUCER CORP.



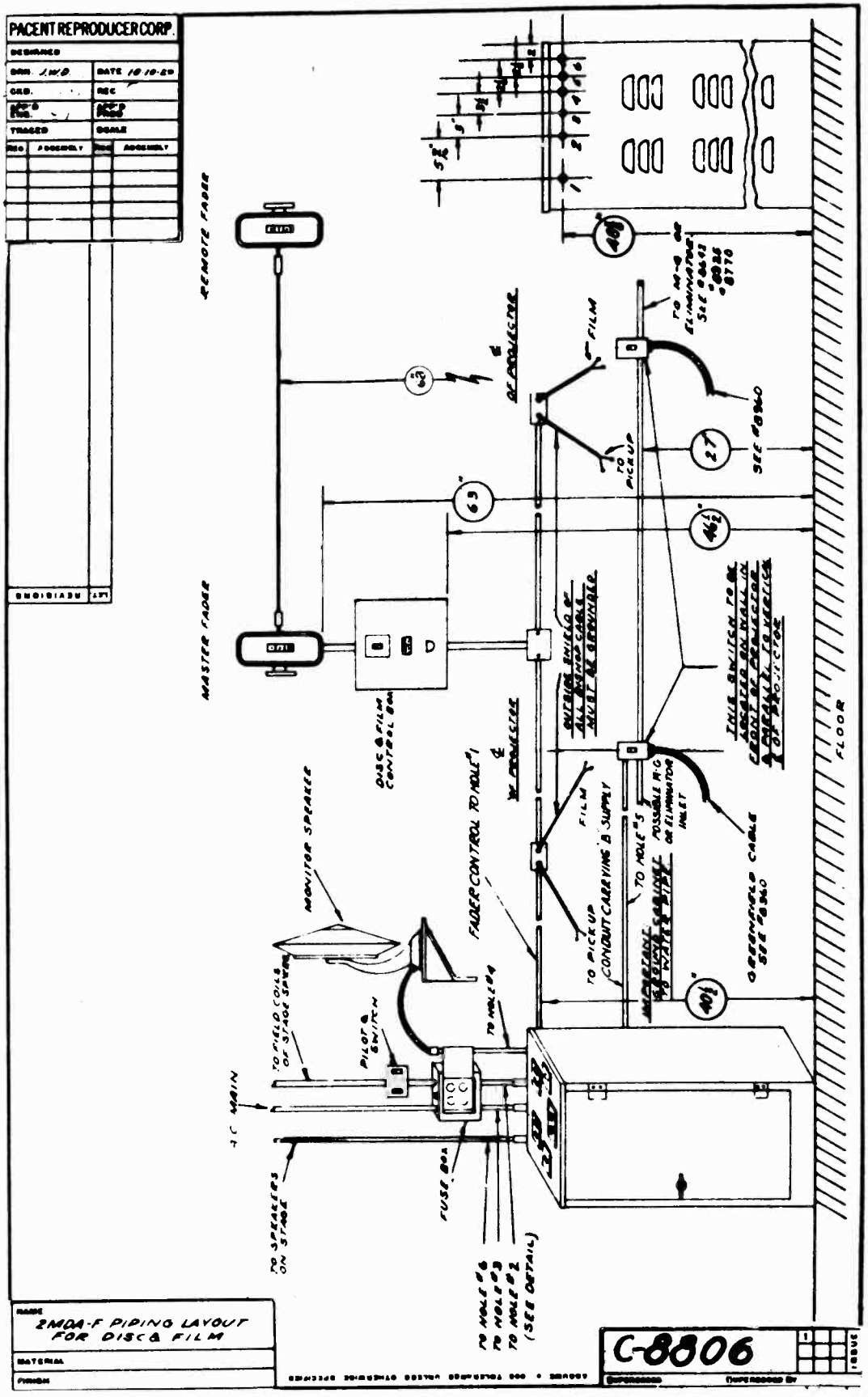
PACENT REPRODUCER CORP.

MODEL 500 DDA-Jr.
Piping Layout
for Disc-Film



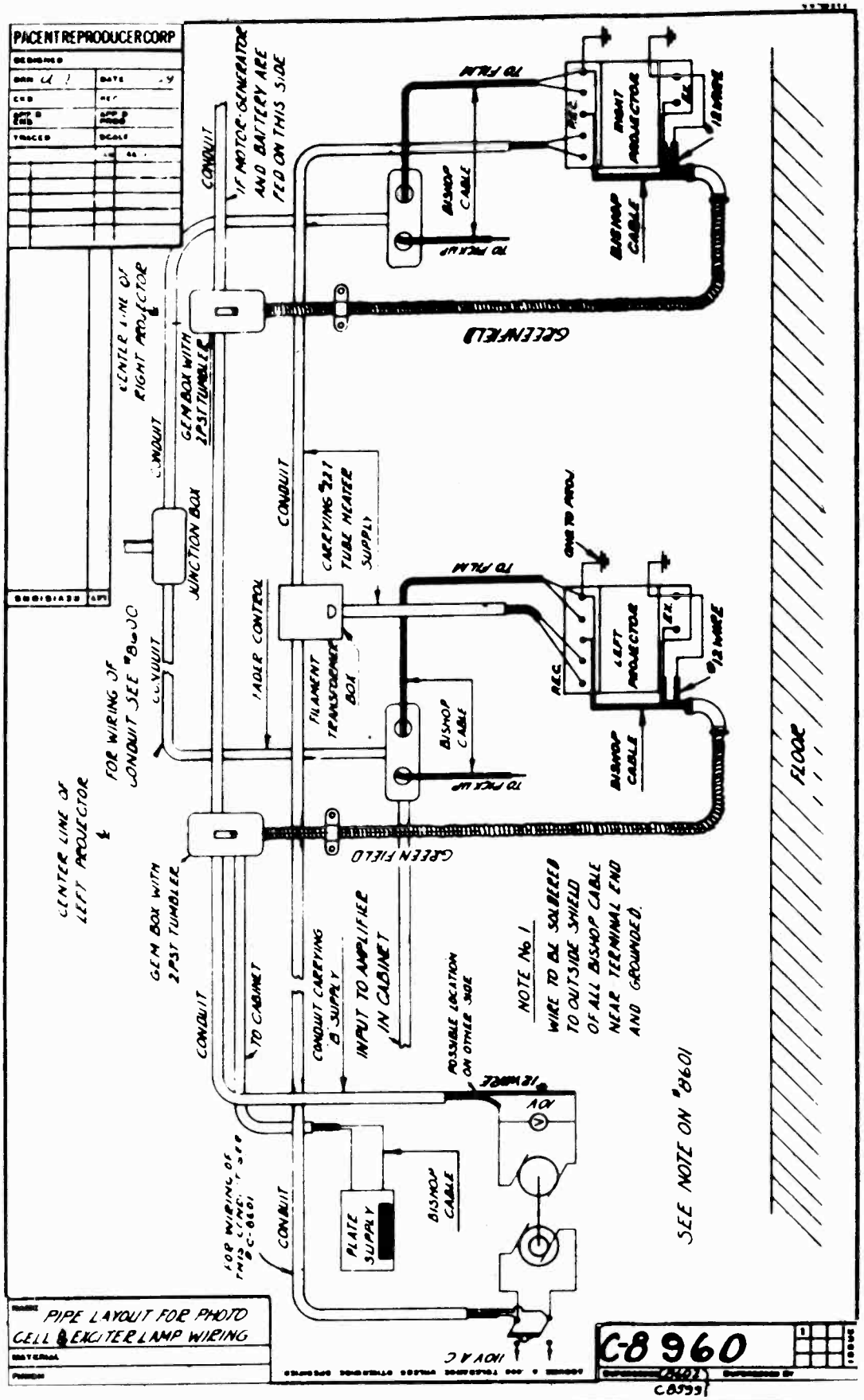
MODEL 2-MDA-F
Piping Layout
for Disc-Film

PACENT REPRODUCER CORP.



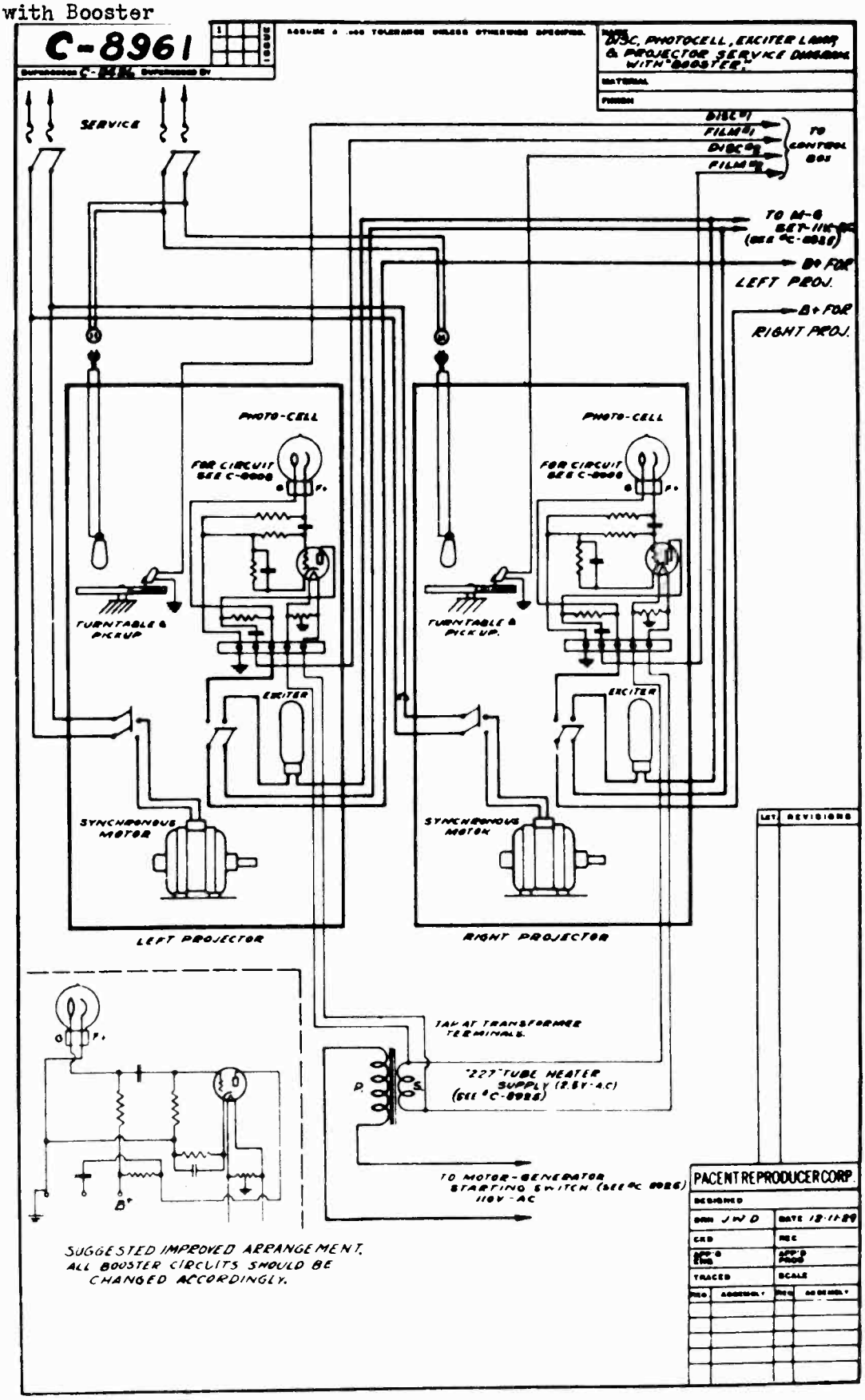
MODEL PEC-XITER
Piping Layout

PACENT REPRODUCER CORP.



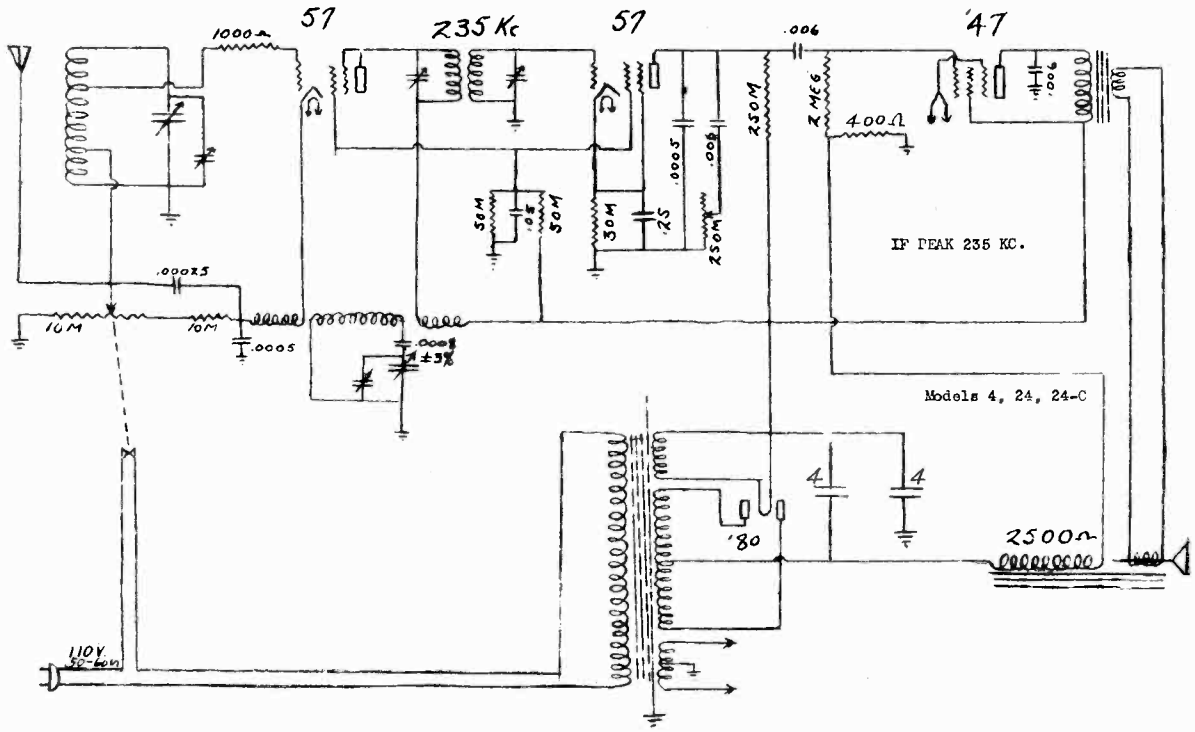
MODEL PEC,XITER and Projector Service Diagrams with Booster

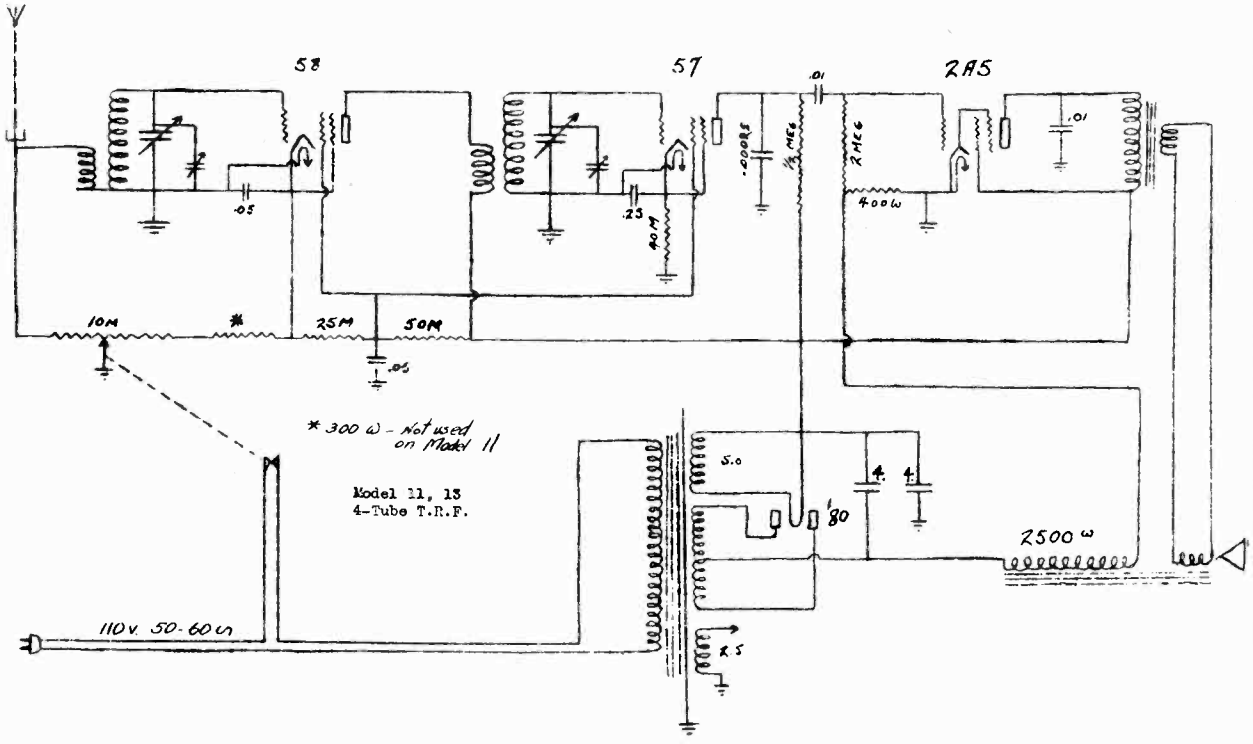
PACENT REPRODUCER CORP.



PACKARD RADIO CO.

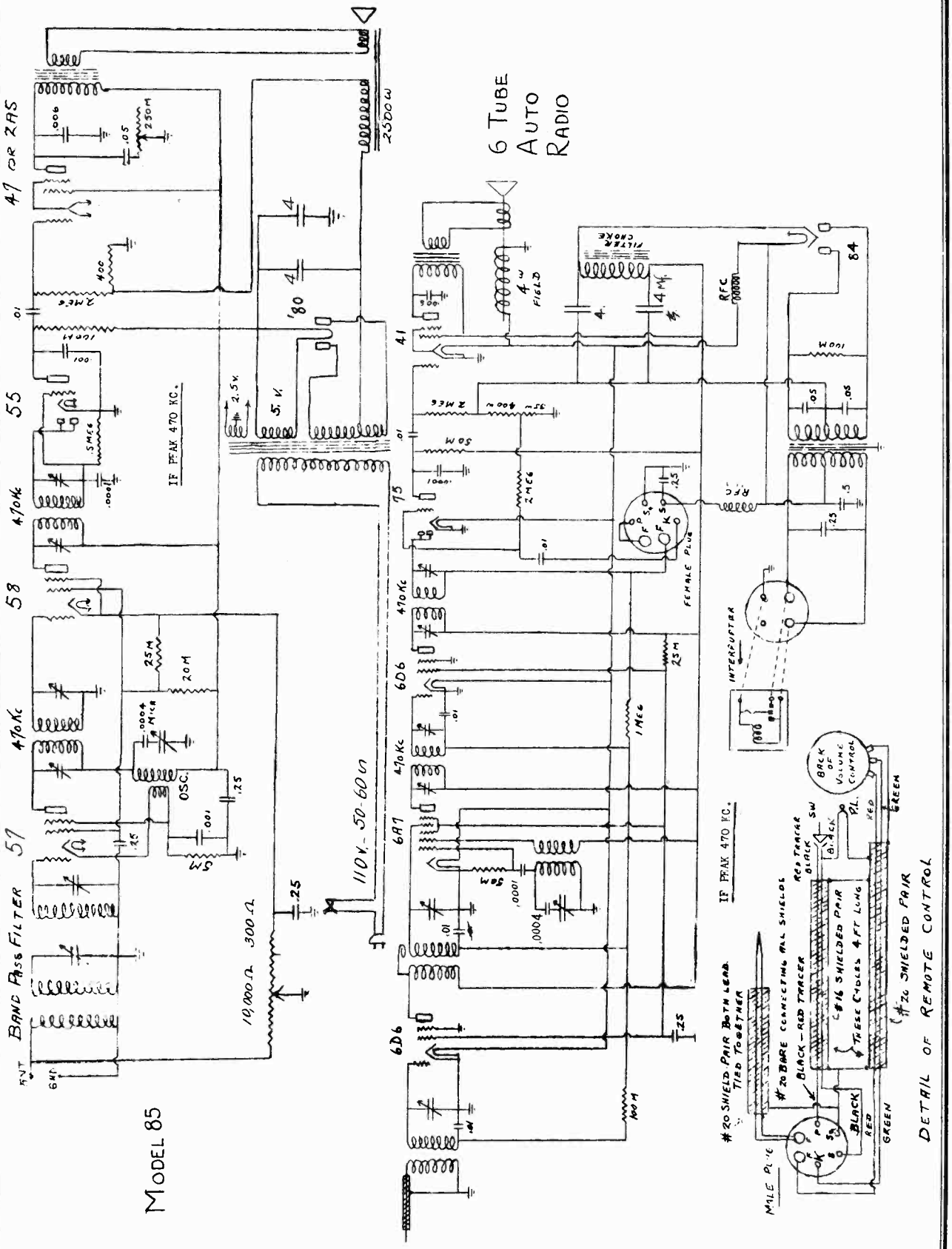
MODEL 4,24,24-C
MODEL 11,13





MODEL 85
MODEL 6 Tube Auto
Schematic

PACKARD RADIO CO.



PATTERSON RADIO CO.

MODEL 70-AW, 74-AW, 507-AW
Schematic, Alignment,
Test data

INTERMEDIATES

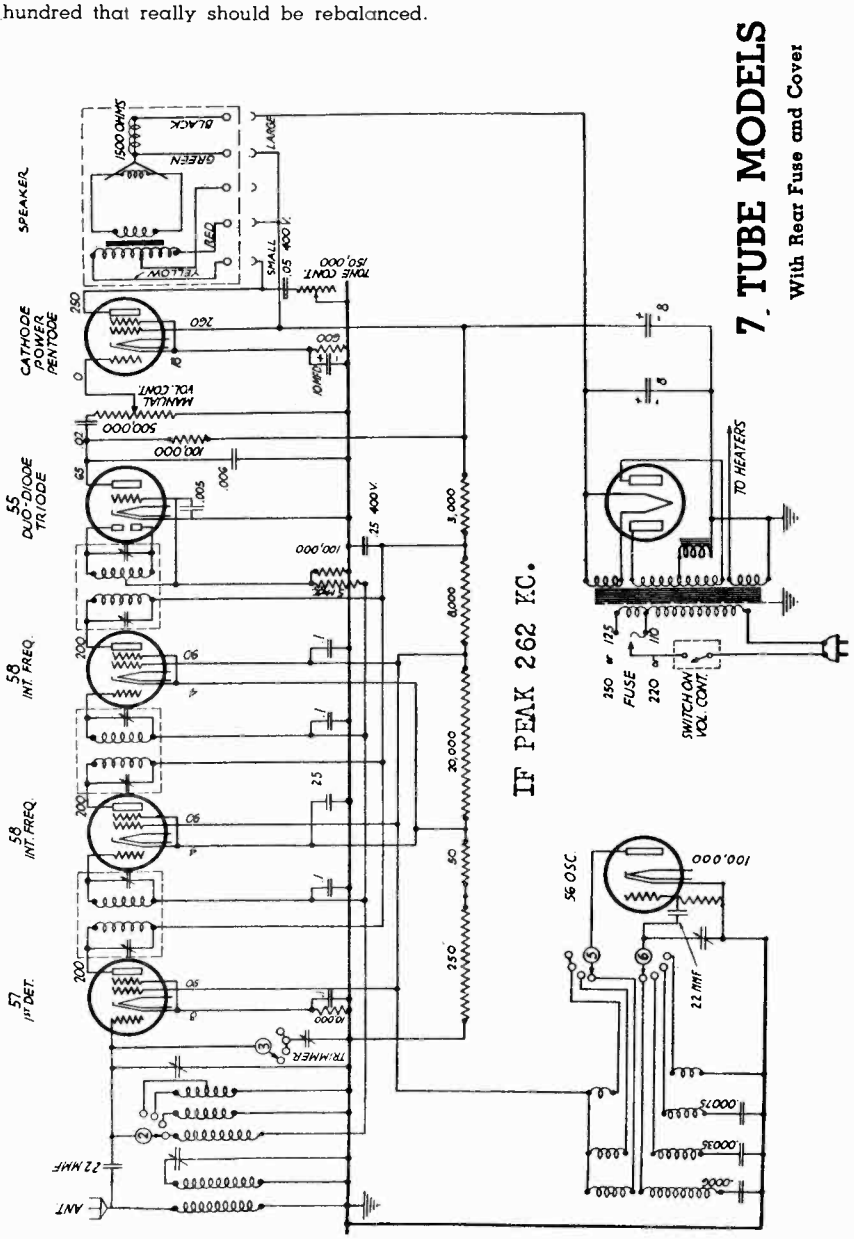
Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.



CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 80-AW, 84-AW, 508-AW
Schematic, Alignment
Test data

PATTERSON RADIO CO.

SERVICE DATA 8-TUBE MODEL

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this 8-tube model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

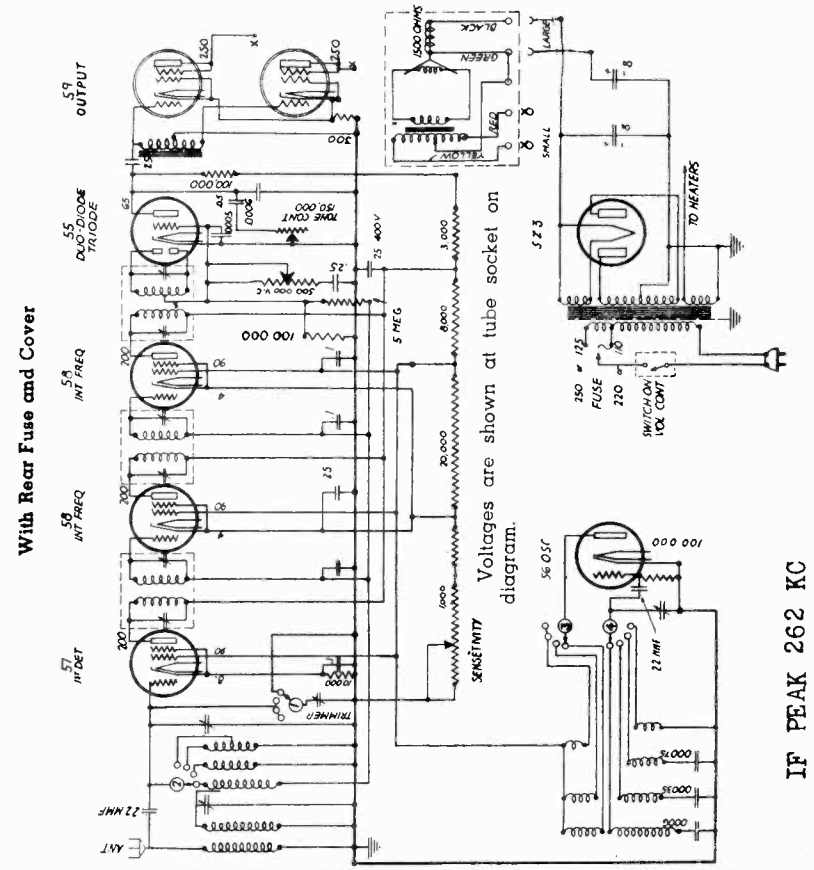
Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

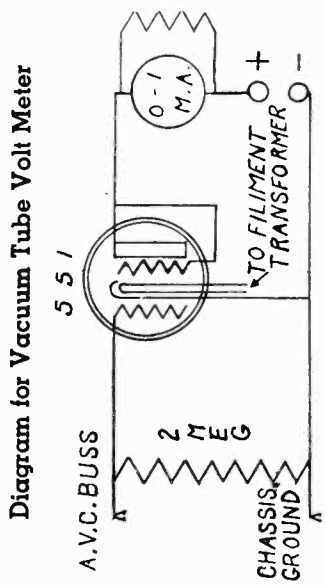
If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

EIGHT TUBE MODELS (Compact and Consoles)

With Rear Fuse and Cover





PATTERSON RADIO CO.

MODEL 104-AW, 510-AW
with #46 power tubes

10 TUBE MODEL
Without Rear Fuse and Cover
No. 46 Power Tubes

Patterson ALL-WAVE SUPER-HETERODYNE

LOS ANGELES U. S. A.

REBALANCING

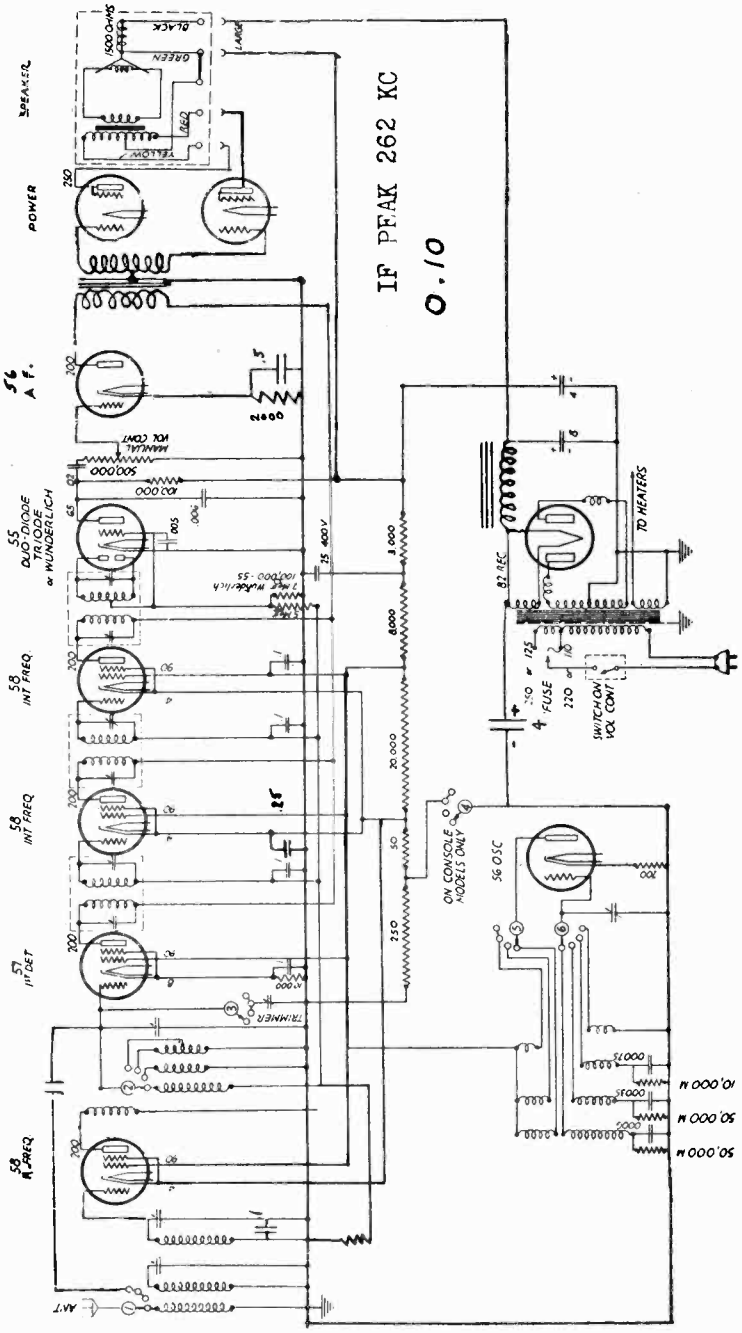
Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.



TUBE TROUBLE

The tubes in this set have been carefully checked and re-heated four times before shipment. Occasionally a tube has a small air leak that will allow gas to enter and cause it to become inoperative within the first thirty days. After this time they should give from 1500 to 2000 hours of satisfactory service.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

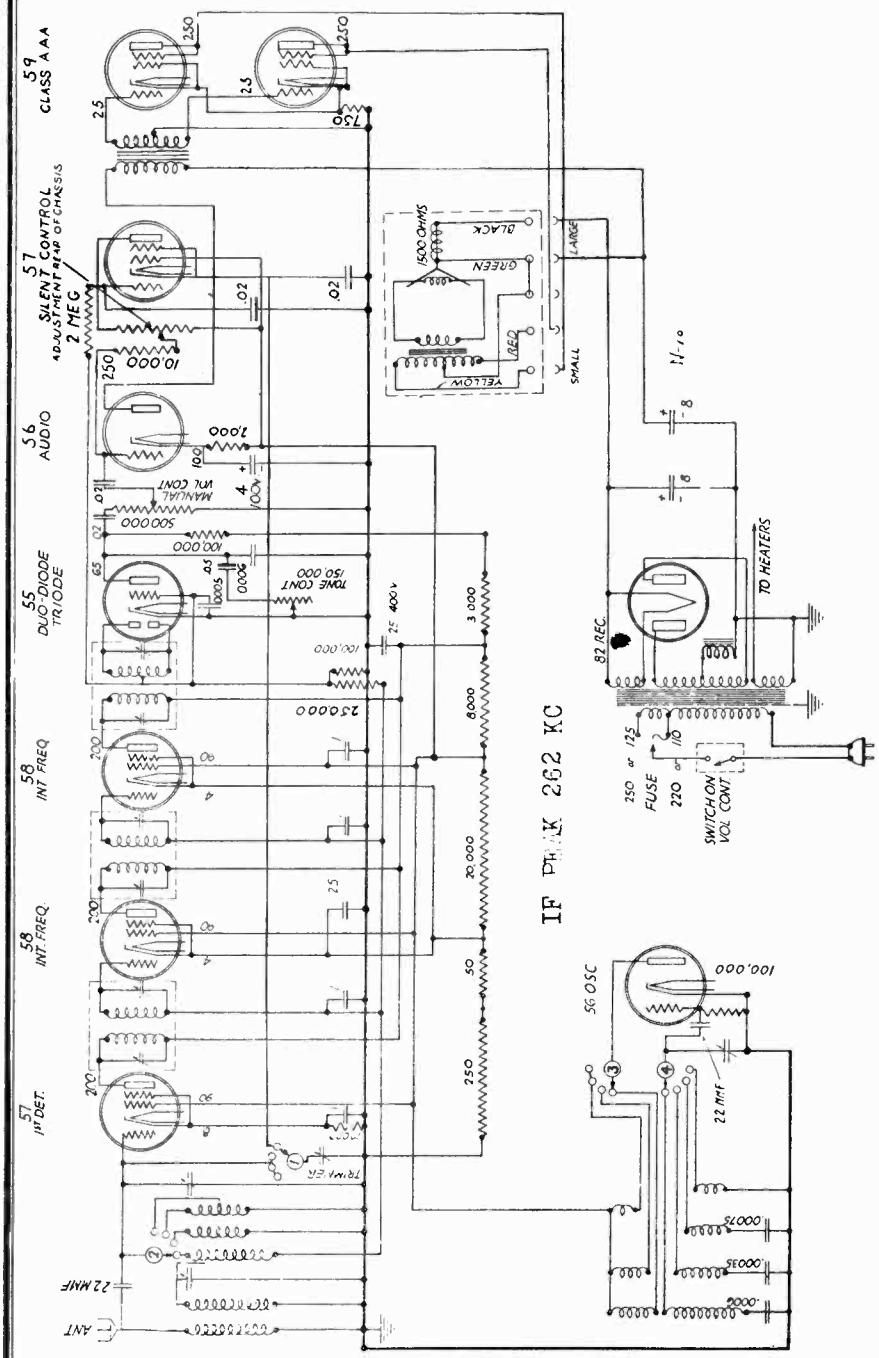
GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 104-AW, 510 AW
with #59 Power tubes PATTERSON RADIO CO.
Schematic, Data



10 TUBE MODEL

With Rear Fuse and Cover
No. 59 Power Tubes

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this model connect the hot lead to the ¼ meg. resistor and the ground lead to the chassis.

SENSITIVITY CONTROL

Models that have this control in rear of chassis. Adjust to required sensitivity by disconnecting antennae and turning control toward maximum until a strong local broadcasting station is heard with a slight fringe howl on each side of the carrier.

SILENT AUTOMATIC VOLUME CONTROL (10 tube models only)

Adjust tuning dial to greatest noise level between stations with right hand trimmer switch turned to extreme left. Then close switch by turning trimmer to extreme right; adjust screw driver control just below point that eliminates all noise.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

MODEL 14
Voltage,
Chassis view
Socket, Data

PHILCO RADIO & TELEVISION CORP.

PHILCO RADIO MODEL 14 is a nine-tube superheterodyne receiver, designed for operation upon alternating current. The intermediate frequency of the superheterodyne circuit is 175 kilocycles. The frequency range of the receiver is 520-4000 kilocycles, which includes standard broadcast, police, aircraft, and amateur radiophone reception. The tube sequence is: Type 78 tube for radio frequency amplifier, Type 6A7 tube as combination first detector and oscillator, Type 78 for intermediate frequency, Type 37 for automatic volume control—second detector, Type 77 as first audio frequency, Type 42 as Driver—2nd A. F.; two Type 42's as triodes form the class "A" amplifier, and a Type 80 is the rectifier. The power consumption of the Model 14 is 110 watts. The Receiver incorporates automatic volume control, four-point bass-compensating tone control, shadow-tuning, and a waveband switch which permits reception over a wide frequency band with the same superheterodyne circuit.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts.

CIRCUIT	R. F.	Det. Osc.	I. F.	A.V.C.-2nd, Det.	1st, A. F.	Driver (2nd A. F.)	Output (Class "A")		Rectifier
TYPE TUBE	78	6A7	78	37	77	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	220		80	205	275	275	340
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	90	90	90		40	205	280	280	
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.4	.1	3.2	.4	.5	.4	28	28	
Cathode Volts—K to F	2.7	2.7	3.2						
Type 6A7—G1 to K		30							
Type 6A7—G2 to K		170							

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other readings. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS RECOMMENDED FOR THIS. Volume Control at maximum; station selector at 520 K. C. Readings which are obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4		Center Tap of 3-5	Black—Yellow Tracer
9		Center Tap of 8-10	Yellow—Green Tracer

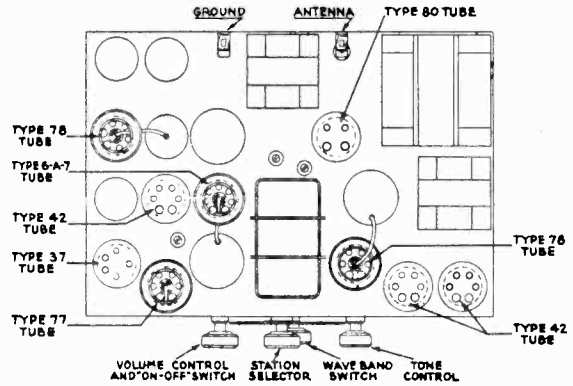


Fig. 1—Top View of Chassis

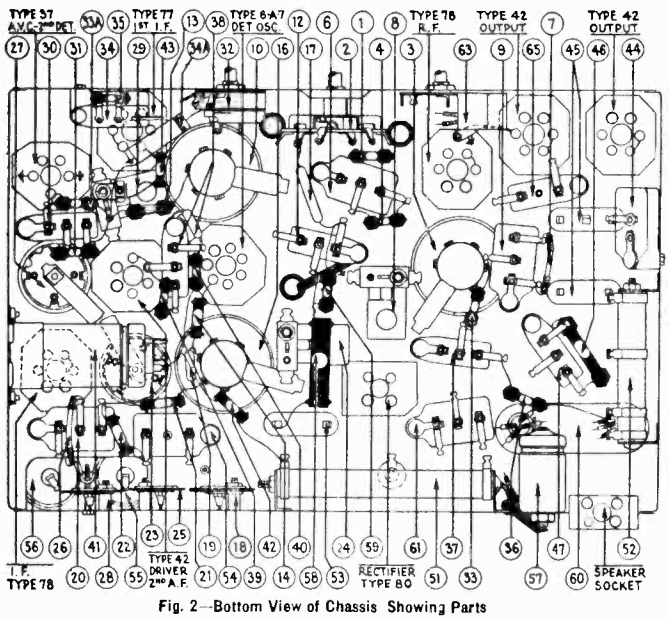


Fig. 2—Bottom View of Chassis Showing Parts

Adjustment of Model 14

The accurate adjustment of receivers is completed before shipment from the factory. Subsequent adjustments should not be undertaken unless complete instruction has been obtained in the adjustment of the compensating condensers. An accurately calibrated signal generator is necessary, and the PHILCO MODEL 048 ALL-PURPOSE SET TESTER, which contains a precision signal generator, is thoroughly recommended. Philco Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes", outlines the general procedure. The following specifically supplements for Model 14:

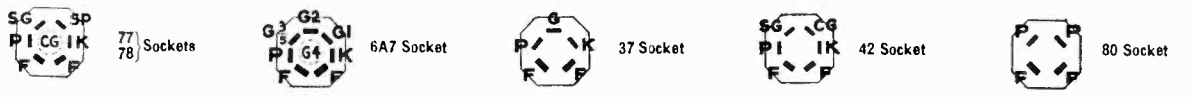
Figure 3 of the present Bulletin shows the electrical position of the several compensating condensers; Figure 2, the physical location of those compensating condensers which are mounted upon the underside of the chassis, and at the rear of the chassis sub-base.

The intermediate frequency compensating condensers should be adjusted first. The intermediate frequency is 175 kilocycles. The location of these compensating condensers is: (a) 1st, I. F. PRIMARY—㉔,—underneath the chassis. May be reached through hole in chassis sub-base to rear, *left*, of Tuning Condenser Assembly ⑥. See Figure 1. (b) 1st, I. F. SECONDARY—㉕,—at rear of chassis, and accessible therefrom. Mounted near ㊺ and ㊻ electrolytic condensers. (c) 2nd, I. F. PRIMARY—㉘,—at rear of chassis. Accessible from rear. Mounted next to ㉕. (d) 2nd, I. F. SECONDARY—㉙,—underneath the chassis. Accessible through hole in sub-base, located between Type 42 (Driver) and Type 77 (1st, A. F.). See Figure 1.

Next, the "OSC.; H. F." ⑮, "DETECTOR" ⑪, and "ANT.; H. F." ⑧ compensating condensers should be adjusted in the order given. ⑮ and ⑪ are mounted upon the Tuning Condenser Assembly ⑥. ⑧ is located *underneath* the chassis, accessible through hole in sub-base at rear of Tuning Condenser Assembly ⑥,—between Tuning Condenser and Type 80 (Rectifier). See Figure 1. The signal generator is adjusted to a frequency of 1500 K. C. for ⑮, to 1400 K. C. for ⑪ and ⑧.

The "OSC.; L. F." ⑱ compensating condenser is next adjusted. It is located at rear of chassis, beside ㉕, and toward "GND" terminal of Receiver. The signal generator is set at 600 K. C. for this adjustment. The Tuning Condenser should be "rocked" during this adjustment.

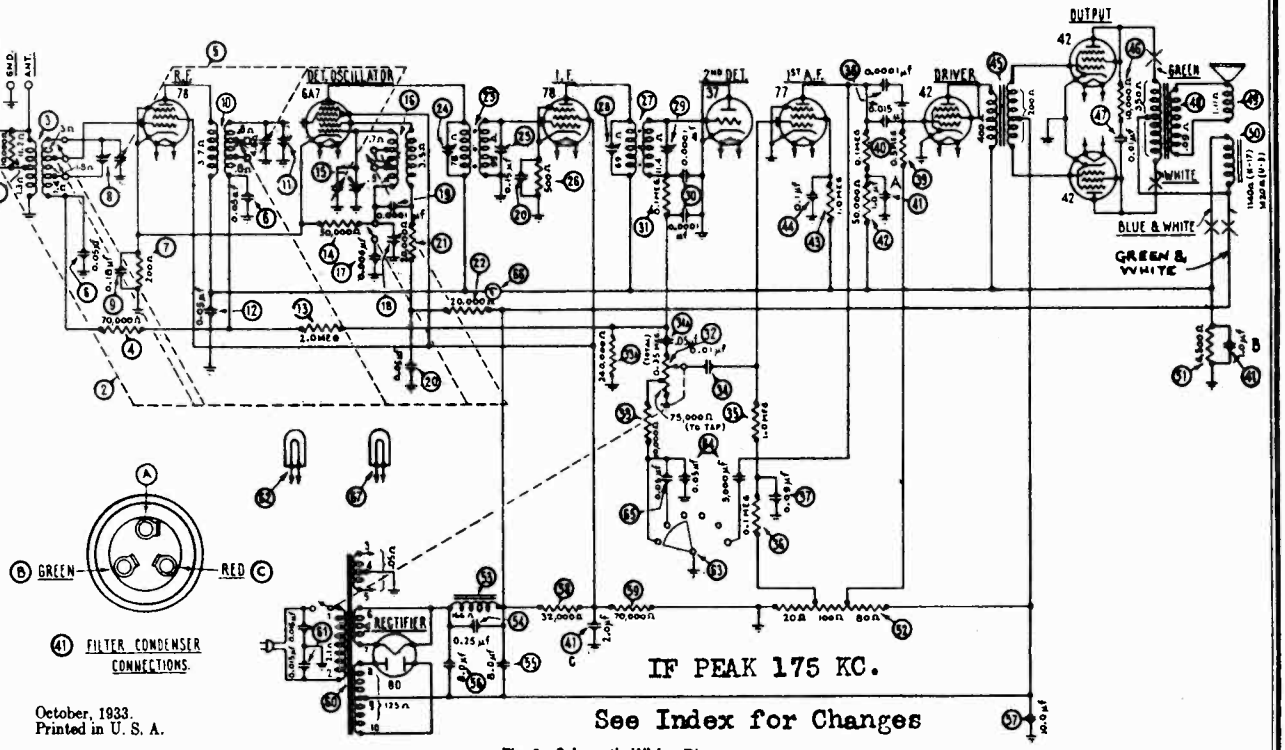
The "Push-on Button" shields covering the holes through which these adjustments are made, must be replaced upon completion of the adjustments.



Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis.

MODEL 14
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.



October, 1933.
Printed in U. S. A.

Fig 3—Schematic Wiring Diagram

No. on Figs.	Description	Part No.	List Price
(1)	Resistor (10,000) (Brown-Black-Orange)	4412	$0.24
(2)	Wave Band Switch	42-1035	.78
(3)	Antenna Transformer	32-1261	.60
(4)	Resistor (70,000) (Violet-Black-Orange)	5385	.24
(5)	Tuning Condenser Assembly	(Code 122) 31-1099 (Code 123) 31-1100	4.35 4.35
(6)	Condenser (Double) (.05-.05)	3615-AM	.24
(7)	Resistor (Flexible Wire Wound); (200) (Red-Black-Brown)	7217	.18
(8)	Compensating Condenser (Ant.; H. F.)	04000-A	.14
(9)	Condenser (.18)	4989-AC	.24
(10)	Detector Transformer	32-1256	.45
(11)	Compensating Condenser (Det.; Part of (5))	....	....
(12)	Condenser (.05)	3615-AA	.24
(13)	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
(14)	Resistor (50,000) (Green-Brown-Orange)	4518	.24
(15)	Compensating Condenser (Osc.; H. F.; Part of (5))	....	....
(16)	Oscillator Transformer	32-1262	.55
(17)	Condenser (.006)	6359	.48
(18)	Compensating Condenser (Osc.; L. F.)	04000-R	.42
(19)	Condenser (.0001)	4519	.22
(20)	Condenser (Double); (.05-.15)	6287-M	.25
(21)	Resistor (20,000) (Red-Black-Orange)	6650	.30
(22)	Resistor (20,000) (Red-Black-Orange)	6650	.30
(23)	1st, I. F. Transformer	32-1263	.55
(24)	Compensating Condenser (1st, I. F. Pri.)	04000-J	.24
(25)	Compensating Condenser (1st, I. F. Sec.)	04000-H	.22
(26)	Resistor (Flexible Wire Wound) (500) (Green-Black-Brown)	6977	.24
(27)	2nd, I. F. Transformer	32-1264	.55
(28)	Compensating Condenser (2nd, I. F. Pri.)	04000-J	.24
(29)	Compensating Condenser (2nd, I. F. Sec.)	04000-T	.19
(30)	Condenser (Double); (.0001-.0001)	8035-K	.25
(31)	Resistor (.1 meg.) (White-White-Orange)	4411	.24
(32)	Volume Control & "On-Off" Switch	33-5024	1.00
(33)	Resistor (10,000) (Brown-Black-Orange)	4412	.24
(33)a	Resistor (240,000) (Red-Yellow-Yellow)	4410	.24
(34)	Condenser (.01)	3903-Z	.17
(34)a	Condenser (.05)	30-4020	.14
(35)	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
(36)	Resistor (.1 meg.) (White-White-Orange)	4411	.24
(37)	Condenser (.09)	4989-N	.24
(38)	Condenser	(.00011) 4519 (.015) 3793-AB	.22 .20
(39)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
(40)	Resistor (.1 meg.) (White-White-Orange)	4411	.24
(41)	Electrolytic Condenser ("A"=1.0 mfd.; "B"=1.0 mfd.; "C"=2.0 mfd.)	30-2029	1.00
(42)	Resistor (50,000) (Green-Brown-Orange)	4518	.24
(43)	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
(44)	Condenser (.1)	3615-BM	.25
(45)	Input Transformer	32-7057	2.70
(46)	Resistor (10,000 ohms) (Brown-Black-Orange)	3524	.24
(47)	Condenser (.01)	3903-P	.24
(48)	Output Transformer	32-7078	1.25
(49)	Voice Coil and Cone Assembly	36-3061	.90
(50)	Speaker Field Coil and Pot Assembly (U-3)	36-3162	6.75
(51)	Resistor (Wire Wound); (6,500)	33-3033	.25
(52)	Voltage Divider Resistor (Wire Wound)	33-3032	.20
(53)	Filter Choke	32-7115	1.50
(54)	Condenser (.25 mfd.)	6287-N	.20
(55)	Condenser (Electrolytic), (8.0 mfd.)	(Code122) 30-2022 (Code123) 7464	1.00 1.50
(56)	Condenser (Electrolytic), (8.0 mfd.)	(Code122) 30-2025 (Code123) 7464	1.15 1.50
(57)	Condenser (Electrolytic), (10.0 mfd.)	30-2003	.84
(58)	Resistor (32,000) (Orange-Red-Orange)	33-1026	.30
(59)	Resistor (70,000) (Violet-Black-Orange)	5385	.24
(60)	Power Transformer (50-60 cycles)	32-7111	5.75
(61)	Condenser (Double); (.015-.015)	3793-R	.30
(62)	Pilot Lamp (Station Selector)	6608	.14
(63)	Tone Control	30-4073	.55
(64)	Condensers, (Internal to (63))	....	....
(65)	Condenser, (External to (63))	3615-G	.19
(66)	Shadow Tuning Meter	6497	2.70
(67)	Pilot Lamp; (Part of (66) Shadow Tuning Meter)	....	....
	Shield ("Push-on" Button)	W-775 per C	1.50
	Tube Shield	28-1107	.12
	Four-Prong Tube Socket	7544	.07
	Five-Prong Tube Socket	7546	.12
	Six-Prong Tube Socket	7547	.12
	Seven-Prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5013	.20
	Mounting Bolt (Chassis)	W-567 per C	2.88
	Mounting Washer (Chassis)	5189	.04
	Mounting Washer (Chassis)	5058 per C	.82
	Knob (large)	03063	.10
	Knob (small)	03064	.07
	Knob Spring	5262 per C	.42
	Bezel	6418	.24
	Bezel Mounting Screw	W-452 per M	4.20
	Bezel Felt	6732 per C	.25
	Speaker (K-17) (Baby Grand Only) — Output Transformer	32-7078	1.25
	Speaker (K-17) (Baby Grand Only) — Voice Coil & Cone Assembly	36-3020	.48
	Speaker (K-17) (Baby Grand Only) — Speaker Field & Pot Assembly	36-3104	2.25
	Speaker Socket *Hole Cover*	7084 per C	.90
	Speaker Cable	L-1632	.24

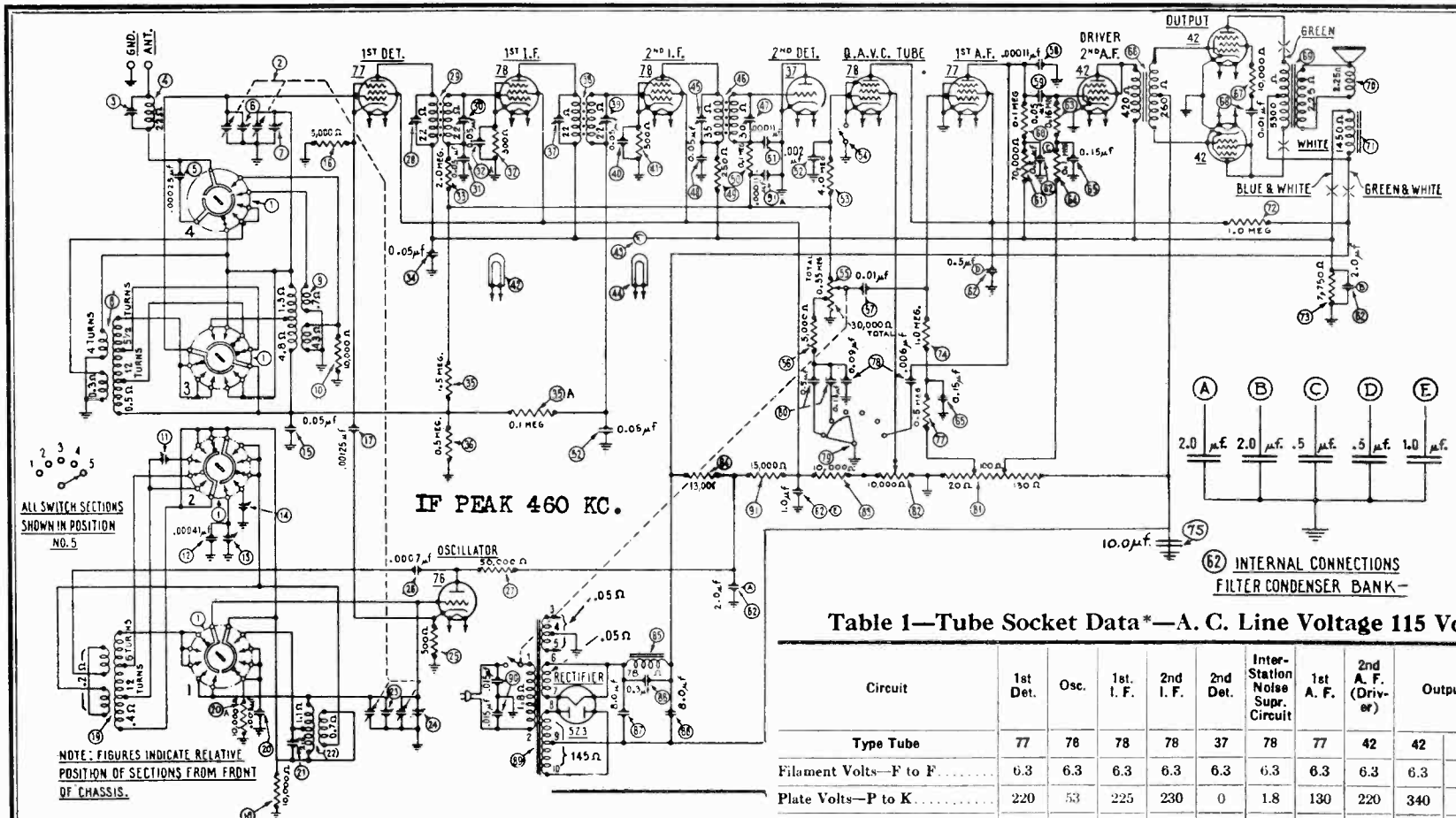


Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	1st Det.	Osc.	1st I. F.	2nd I. F.	2nd Det.	Inter-Station Noise Supr. Circuit	1st A. F.	2nd A. F. (Driver)	Output		Rectifier
Type Tube	77	76	78	78	37	78	77	42	42	42	5-Z-3
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	53	225	230	0	1.8	130	220	340	340	400
Screen Grid Volts—SG to K	80	—	80	80	—	1.8	1.8	220	340	340	—
Control Grid Volts—CG to K	1.6	6.4	0	0	.2	1.6	.4	.6	34	34	—
Cathode Volts—K to F	4.2	1.9	2.2	2.5	0	0	0	0	0	0	—

*All of the above readings were taken from the underside of the chassis, using test prods and leads, with a suitable A. C. voltmeter for filament voltages, and a high-resistance multi-range D. C. voltmeter for other readings. The *Philco Model 048 All-Purpose Set Tester* is highly recommended for this use. Volume control set at maximum and station selector turned to low frequency end; interstation noise suppression circuit potentiometer turned all the way to the right; and toggle switch (interstation noise suppression circuit) in "ON" ("S") position. Readings taken with a plug-in adapter will NOT be satisfactory.

Terminal Arrangement of Tube Sockets Viewed from Underside of Chassis

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1—2	105—125	Primary	White
3—5	6.3	Filament	Black
6—7	5.0	Filament of 5-Z-3	Blue
8—10	800	Plates of 5-Z-3	Yellow
4	—	Center Tap of 3—5	Black—Yellow Tracer
9	—	Center Tap of 8—10	Yellow—Green Tracer

NOTE—These values are for Model 16-122. Model 16-121 uses a Type 80 Rectifier Tube. See Note at end of Replacement Parts List.

MODEL 16
Chassis view
Sockey layout

PHILCO RADIO & TELEVISION CORP.

THE PHILCO RADIO MODEL 16 is an eleven-tube superheterodyne broadcast and short-wave receiver, operating upon alternating current and employing the high-efficiency 6.3 volt tubes, automatic interstation noise suppression, and a frequency (wave-band) coverage that permits reception of the short-wave (high-frequency) broadcast programs. The same superheterodyne circuit is used for all reception. The Receiver is equipped with a five-point wave-band switch. The ranges are—

(1) 520 K. C. to 1500 K. C.
(2) 1.5 M. C. to 4.0 M. C.
(3) 3.2 M. C. to 6.0 M. C.
(4) 5.8 M. C. to 12.0 M. C.
(5) 11.0 M. C. to 23.0 M. C.

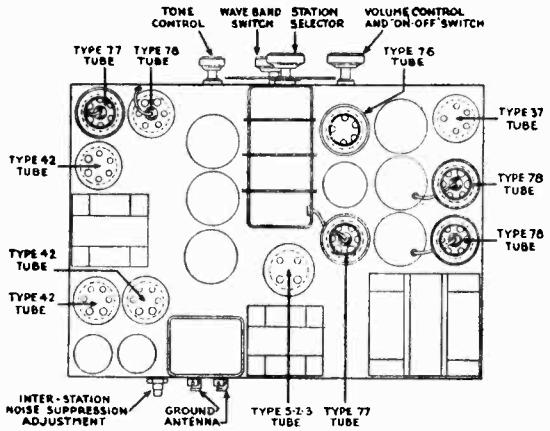


Fig. 1—Top View of Chassis, Showing Tube Locations and Major Parts

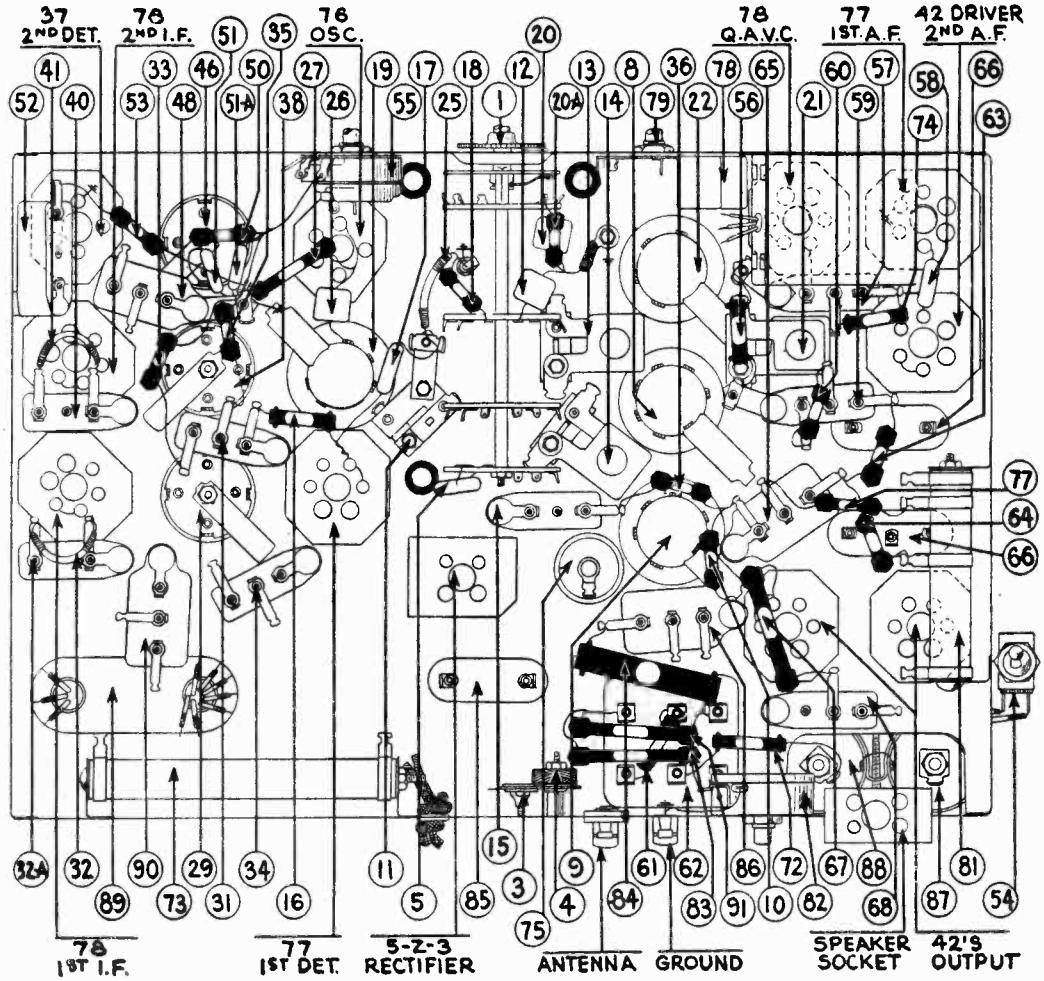


Fig. 3—Bottom View of Chassis, Showing Parts

The Receiver employs a Philco Type 77 tube for first detector, a Type 76 for oscillator, a Type 78 for first I. F., a Type 78 for second I. F., and a Type 37 for second detector. The automatic interstation noise suppression circuit uses a Type 78, the first A. F., a Type 77. The driver (second A. F.) is a Type 42; the class "A" amplification is accomplished with two Type 42 tubes as triodes; the rectifier is a Type 5-Z-3. The intermediate frequency is 460 kilocycles. The power consumption of Model 16-122 is 130 watts; of Model 16-121, 120 watts.

PHILCO RADIO & TELEVISION CORP.

MODEL 16
Parts List

No. on Figs.	Description	Part No.	List Price
①	Wave Band Switch	42-1037	....
②	Tuning Condenser Assembly	31-1039	....
③	Compensating Condenser (Wave-trap)	38-5199	....
④	Inductance (Wave-trap)	38-5199	....
⑤	Condenser	5858	.16
⑥	Compensating Condenser (Ant.; H. F.; Part of ②)	.....	....
⑦	Compensating Condenser (Ant.; Broadcast and Police; Part of ②)	.....	....
⑧	Antenna Transformer (H. F. Bands)	32-1183	....
⑨	Antenna Transformer (B'dc't & Police B'ds)	32-1182	....
⑩	Resistor (Brown-Black-Orange)	4412	.20
⑪	Compensating Condenser (Range 3)	04000-V	.16
⑫	Condenser	30-1000	.20
⑬	Compensating Condenser (Range 2; series)	04000-R	.35
⑭	Compensating Condenser (Range 1; series)	04000-R	.35
⑮	Condenser	3615-L	.16
⑯	Resistor (Green-Black-Red)	5310	.20
⑰	Condenser	5886	.25
⑱	Resistor (Brown-Black-Orange)	4412	.20
⑲	Oscillator Coil (H. F.)	32-1185	....
⑳	Condenser	7301	.35
⑳a	Resistor (Brown-Black-Orange)	4412	.20
㉑	Compensating Condenser (Range 1; Shunt)	0-4000-A	.12
㉒	Oscillator Coil (Broadcast and Police)	32-1184	....
㉓	Compensating Condenser (Osc.; H. F.; Part of ②)	.....	....
㉔	Compensating Condenser (Osc.; Police; Part of ②)	.....	....
㉕	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977	.20
㉖	Condenser	5863	.18
㉗	Resistor (Green-Brown-Orange)	4237	.25
㉘	Compensating Cond'ser (1st, I. F. Primary)	31-6002	....
㉙	1st, I. F. Transformer	32-1186	....
㉚	Compensating Cond'r (1st, I. F. Secondary)	Common with ㉘	....
㉛	Condenser	3615-AB	.20
㉜	Resistor (Flexible Wire-wound; Orange-Black-Brown)	33-3010	.15
㉜a	Condenser	3615-AT	.20
㉝	Resistor (Red-Black-Green)	5872	.20
㉞	Condenser	3615-D	.18
㉟	Resistor (Brown-Green-Green)	7009	.20
㉟a	Resistor (White-White-Orange)	4411	.20
㊱	Resistor (Yellow-White-Yellow)	4517	.20
㊲	Compensating Cond'ser (2d, I. F. Primary)	31-6002	....
㊳	2d, I. F. Transformer	32-1186	....
㊴	Compensating Cond'r (2d, I. F. Secondary)	Common with ㊲	....
㊵	Condenser	3615-AT	.20
㊶	Resistor (Flexible Wire-wound; Green-Black-Brown)	6977	.20
㊷	Pilot Lamp (Station Selector)	6608	.12
㊸	Shadow Tuning Meter	6497	2.25
㊹	Pilot Lamp (Shadow Tuning Meter; Part of ㊸)	.....	....
㊺	Compensating Cond'ser (3d, I. F. Primary)	31-6003	....
㊻	3d, I. F. Transformer	32-1188	....
㊼	Compensating Cond'r (3d, I. F. Secondary)	Common with ㊺	....
㊽	Condenser	3615-AS	.25
㊾	Resistor (Part of ㊽)	.....	....
㊿	Resistor (White-White-Orange)	4411	.20
(51)	Condenser	4519	.18
(51)a	Condenser	4519	.18
(52)	Condenser (Double)	7296-G	....
(53)	Resistor (Yellow-Black-Green)	6010	.20
(54)	Switch (Toggle); Interstation Noise Suppression Circuit	42-1036	.40
(55)	Volume Control and "On-Off" Switch	33-5013	1.00
(56)	Resistor (Green-Black-Red)	5310	.20
(57)	Condenser	3903-J	.20
(58)	Condenser	4519	.18
(59)	Condenser	3615-AD	.20
(60)	Resistor (White-White-Orange)	4411	.20
(61)	Resistor (Violet-Black-Orange)	5385	.20
(62)	Filter Condenser Bank	30-4026	3.00
(63)	Resistor (Brown-Blue-Yellow)	5331	.20
(64)	Resistor (White-White-Orange)	4411	.20
(65)	Condenser (Double)	6287-J	....
(66)	Input Transformer	32-7057	2.25
(67)	Resistor (Brown-Black-Orange)	3524	.20
(68)	Condenser	3903-F	.15
(69)	Output Transformer	32-7052	....
(70)	Voice Coil and Cone Assembly	36-3061	.75
(71)	Speaker Field, Assembled with Pot (U-2)	36-3088	....
(72)	Resistor (Brown-Black-Green)	4409	.20
(73)	Resistor (Wire-wound)	33-3020	.30
(74)	Resistor (Brown-Black-Green)	4409	.20
(75)	Condenser (Electrolytic)	30-2003	.70
(77)	Resistor (Yellow-White-Yellow)	4517	.20
(78)	Condenser (Internal to (79))	.....	....
(79)	Tone Control	30-4033	....
(80)	Condensers (External to (79))	06713	.45
(81)	Voltage Divider Resistor (Wire-wound)	33-3021	.16
(82)	Potentiometer (Interstation Noise Suppression Circuit)	33-5015	.80
(83)	Resistor (Brown-Black-Orange)	3524	.20
(84)	Resistor (Brown-Orange-Orange)	6450	.35
(85)	Filter Choke	32-7056	1.85
(86)	Condenser	6287-F	.12
(87)	Condenser (Electrolytic)	30-2011	1.25
(88)	Condenser (Electrolytic)	30-2011	1.25
(89)	Power Transformer (50-60 ~)	32-7058	5.00
(90)	Condenser (Double)	3793-E	.20
(91)	Resistor (Brown-Green-Orange)	5718	.40
	Tube Shield	28-1107	.10
	Four-prong Socket	7545	.08
	Five-prong Socket	7546	.10
	Six-prong Socket	7547	.10
	Knob (Large)	03063	.08
	Knob (Small)	03064	.06

NOTE.—Model 16-121 uses a Type 80 tube in lieu of 5-Z-3. Parts used in the 16-121 chassis that differ from the 16-122 parts above listed are:

July, 1933

(89)	Power Transformer (50-60 ~)	32-7080	....
(87)	Condenser (Electrolytic) (8.0 Mfd.)	6706	1.50
(88)	Condenser (Electrolytic) (8.0 Mfd.)	7464	1.25
	Speaker	K-17	....
	Speaker Socket	7084	....
	Speaker Cable	L1632	....

Effective December 20th, the shadowmeter used on Model 16 will be part No. 45-2028 instead of the No. 6497 previously used. The new shadowmeter gives a somewhat better deflection when tuning.

A change which eliminates a long lead, separates two capacities, and gives improved results, is effective with Run Number 8, in which By-pass Condenser (62) (.05-.002), Part No. 7296-G is superseded by By-pass Condenser, (.002), Part No. 7296-F; connection between Condenser (62) and 2nd, I. F. Transformer (38) is removed, and Condenser (Tubular) (.05) Part No. 30-4020 inserted between the secondary of (38) and ground at Condenser (31). A 1-inch length of Part No. L-1228 Spaghetti is used to protect one end of Condenser Part No. 30-4020 from grounding.

Better results,—mechanically,—are gotten when, in the Run, Condenser (12) (.00041) (Yellow-Orange), Part No. 30-1000, is superseded by Condenser (.00041) (Yellow-Orange-Green), Part No. 30-1027.

November 15, 1933

MODEL 16
Adjustment

PHILCO RADIO & TELEVISION CORP.

ADJUSTING MODEL 16

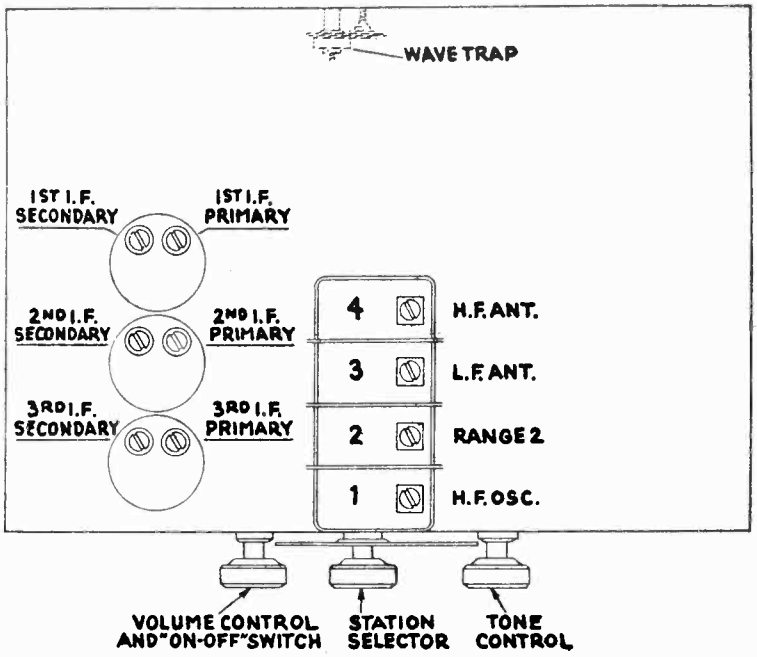


Fig. 1—Position of Compensating Condensers

NOTE: DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections 3 and 4 of the tuning condenser of Model 16. These compensating condensers are carefully adjusted, and sealed at the factory.

The compensating condensers of the Model 16 All-Wave Receiver are adjusted in essentially the same manner as detailed in Service Bulletin No. 120-C. The ability of the Model 16 to cover the higher frequencies up to 23 megacycles requires the use of a signal generator which will supply a suitable frequency, with its harmonics, to cover the adjustment throughout the short wave bands.

The Philco Model 091 signal generator is recommended for the higher frequencies. It supplies an accurate and constant 3600 kilocycle (3.6 megacycle) signal, whose harmonics include the necessary high frequencies.

The Philco Model 048 All-Purpose Set Tester is recommended for the adjustment of the I. F. compensating condensers, and for *any* adjustments requiring the use of a signal generator supplying frequencies between the limits of 105 kilocycles and 2000 kilocycles.

The Model 16 is adjusted as follows:

ADJUSTMENT OF THE I. F.

Connect the signal generator and receiver in the manner described in Philco Service Bulletin No. 120-C. (NOTE: The output terminals of the signal generator are connected to the grid cap of the first detector tube,—after removing the grid clip,—and to the "GND." terminal of the receiver. The output meter is connected to the primary terminals of the output transformer). The intermediate frequency of Model 16 is 460 K. C. Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Fig. 1. They are reached from the top of the receiver chassis.

WAVE TRAP ADJUSTMENT

Replace the grid clip on the first detector tube. Connect the output of the signal generator to the antenna and ground terminals of the receiver. Adjust the wave-band switch of the receiver to the broadcast band (520-1500 K. C.) (Range 1) and the station selector to the low frequency (520 K. C.) end. Adjust the wave-trap condenser to give *minimum* response to a 460 K. C. signal from the signal generator. This adjustment is made from rear of chassis.

MODEL 16
Adjustment

PHILCO RADIO & TELEVISION CORP.

ADJUSTMENT OF DIAL FREQUENCIES

In the procedure given herewith, the frequency ranges are referred to as follows:

Range 1	520 K. C.—1500 K. C.
Range 2	1.5 M. C.— 4.0 M. C.
Range 3	3.2 M. C.— 6.0 M. C.
Range 4	5.8 M. C.—12.0 M. C.
Range 5	11.0 M. C.—23.0 M. C.

The tuning condenser (four-gang) sections and their individual compensating condensers are shown in Figure 1. They are additionally referred to as numbered sections 1 to 4 inclusive, with 1 as the front section.

Do not attempt to adjust compensating condensers on sections 3 and 4.

The compensating condensers of "H. F. Osc." circuit and of "Range 2 (Police & Aircraft)", are located upon sections 1 and 2, respectively.

Connect the output terminals of the signal generator (Model 091) to the antenna and ground terminals of the receiver. Adjust the wave-band switch of the receiver to Range 4 and adjust the station selector to 10.8 megacycles. At this point the third harmonic of the 3.6 M. C. generator can be picked up. Adjust the "H. F. Osc." compensating condenser (located on section 1 of tuning condenser) to give maximum response in the output meter.

Next, the wave band switch is set upon Range 5, and the station selector placed at 21.6 megacycles.

If the signal from the signal generator is not picked up within a reasonable distance (approximately 100 K. C. either side) of the 21.6 M. C. position on the receiver station selector dial, it will be necessary to re-adjust the 10.8 M. C. compensating condenser to care for the 21.6 M. C. signal. Such adjustment causes a slight error in the 10.8 M. C. setting. The error at the two points (10.8 and 21.6 M. C.) must be split in proportion to the frequencies. Care should be taken not to mistake the image of 21.6 M. C., which also can be heard at approximately 20.7 M. C.

Next, the adjustment should be made at 5.2 M. C. on Range 3. At this point the second harmonic of the oscillator circuit in the receiver beats with the third harmonic of the 3.6 megacycle crystal in the 091 signal generator. This adjustment is accomplished by means of the "Range 3" compensating condenser (⑪ in Service Bulletin No. 165), mounted under the chassis, and reached from beneath.

Following this, adjustment at 3.6 M. C. on Range 2 should be made. The "Antenna" connection between the signal generator and the receiver must be removed for this adjustment, as the output of the signal generator is too great otherwise.

This adjustment is made with the compensating condenser ("Range 2: Police & Aircraft") mounted on section 2 of the tuning condenser.

Next in sequence, the station selector is set at 1.57 megacycles (Range 2), by approximating the correct position on the dial. The second harmonic of the receiver oscillator beats with the fundamental frequency of the 3.6 megacycle crystal in the signal generator. Normally, it is necessary to replace the "antenna" connection between the signal generator and the receiver, for this test. Adjustment is accomplished by means of "Range 2, series", compensating condenser (⑬ in Service Bulletin No. 165), reached from the underside of the chassis.

Next, adjustment of the "Range 1, Shunt," compensating condenser (㉑ in Service Bulletin No. 165) is made at 1400 kilocycles (Range 1), by means of the signal generator in the Model 048 All-Purpose Set Tester, or by using the eighth harmonic of a signal generator producing a 175 kilocycle frequency. This compensating condenser is reached from underside of chassis.

The next step is the adjustment of the "Range 1, Series," compensating condenser (⑭ in Service Bulletin No. 165), by placing the wave band switch on Range 1, and the station selector at 520 kilocycles. Use the signal generator in Model 048 Set Tester, with setting of 520 K. C., or the second harmonic of a signal generator giving a frequency of 260 kilocycles.

For proper adjustment of the Model 16 receiver, the procedure must be followed in the sequence given.

The adjustment should *not* be undertaken without full information and proper equipment. Your distributor can supply both.

August, 1933
Printed in U. S. A.

MODEL 16,16A-122, 16A-123
Changes

PHILCO RADIO & TELEVISION CORP.

Model 16

Effective with current production, Toggle Switch (Interstation Noise Suppression Circuit) ⑭, Part No. 42-1036, is superseded by Toggle Switch Part No. 3253, and two Part No. 9618 leads, in Model 16-123; by Toggle Switch Part No. 3253, one Part No. 9616 lead and one Part No. 9617 lead, in Model 16-121 and 16-122. The joint at the switch is protected by two pieces of sleeving. The *list* price of Switch, Part No. 3253, is 40 cents.

Effective with current production, Knob Part No. 03063 will be used upon Wave-Band Switch ①, in lieu of knob Part No. 03064, upon Models 16-121, 16-122 and 16-123. Tuning Condenser Assembly ② will use Knob Part No. 42-4025, Volume Control and "On-Off" Switch ⑮ will use Knob Part No. 03064, and Tone Control ⑲ will use Knob Part No. 03064.

Model 16

Refer to Service Bulletin No. 165

Effective with Run Number 3, the following substitutions were made in the by-pass condensers:

⑫-A Part No. 3615-AT superseded by Part No. 3615-BK, *list* price, $0.16
⑭ Part No. 3615-D superseded by Part No. 3615-BL, *list* price, 0.16
㊵ Part No. 3615-AT superseded by Part No. 3615-BK, *list* price, 0.16

NOTE: The electrical values of these condensers remain the same.

Effective with Run Number 2, Resistor ㊶ Part No. 6977 (500 ohms) (Green-Black-Brown) is superseded by Resistor Part No. 33-3010 (300 ohms) (Orange-Black-Brown). Both are flexible wire-wound. The *list* price of Part No. 33-3010 is $0.15.

The large knob now used upon Tuning Condenser Assembly ② bears Part No. 27-4025, instead o 42-4025. Make this correction to Service Bulletin No. 170; Page 2, line 5.

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figures	Description	Part No.	List Price
③ ④	Wave Trap Assembly	38-5199	$0.30
⑨	Antenna Transformer (B'dc'st & Police Bands)	32-1182	.60
㊹	Condenser (Double)	6287-J	.30
㉑	Speaker Field, Assembled with Pot, (U-2)	36-3088	6.75

(NOTE: The above four list prices are effective September 15, 1933).

This additional *list* price should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
㊸	Condenser (Double)	7296-G	$0.19

Note: The above list price is effective September 15, 1933.

Models 16A-122 *and* 16A-123

(25 cycle sets)

Effective December 14, 1933, all production on these models will have the first electrolytic condenser ㊷, part No. 30-2014 superseded by part No. 30-2067, no change in connections. (No. 30-2014 is 8 mfd. 500 volt, and 30-2067 is 10 mfd. 15 volt.)

The following additional *list* prices should be included in the Replacement Parts list:

No. ON FIGURES	DESCRIPTION	PART No.	LIST PRICE
①	Wave Band Switch	42-1037	$2.75
③	Tuning Condenser Assembly	31-1039	.40
㊲	Compensating Condenser (2nd. I. F. Pri.)	31-6002	.35
㊺	Compensating Condenser (3rd. I. F. Pri.)	31-6003	.35
㊽	Output Transformer	32-7052	1.50

PHILCO RADIO & TELEVISION CORP.

MODEL 16
MODEL 17
Changes

Models 16 and 17

Change in Volume Control Circuit

The change in the volume control circuits of Models 16 and 17, outlined in this bulletin, is recommended in EVERY case where rotation of the volume control is accompanied by noise—traceable to the control.

PRODUCTION BEGINNING WITH RUN No. 4 FOR MODEL 16 SERIES, AND RUN No. 4 FOR MODEL 17 SERIES, **INCLUDE** THESE CHANGES.

Model 16

1. The Volume Control and "On-Off" Switch ⑯ is replaced by Volume Control and "On-Off" Switch, Part No. 33-5022, having an overall value of 2 megohms. The movable element of the Volume Control goes to ⑰ as heretofore; the tap to the resistor ⑱ mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3).

2. Resistor ⑯ (Green-Black-Red) is replaced by Resistor (Orange-Red-Orange), (32,000 ohms), Part No. 5279.

3. A resistor (Orange-Orange-Yellow) (330,000 ohms), Part No. 6046, is *added,* with one side grounded to frame; the other joining the original circuit at ⑩ and ⑬; this same point (high side of 330,000 ohm resistor) connected through a .01 mfd. condenser, Part No. 3903-J, (*added*), to the high side of the Volume Control.

4. Tone Control ⑲ is replaced by Tone Control, Part No. 30-4069, inclosing a .09 mfd. and a .003 mfd. condenser, with two .025 mfd. condensers in a single external housing, Part No. 7653-C, which replaces the two external condensers ⑳ in metal container. The .09 mfd. condenser is on the first tap of the tone control; one of the .025's is on the second tap, while the third tap is permanently connected to ground through the other .025 mfd. The "fourth" tap of the tone control (previously connected through the .006 mfd. condenser) is connected to the .003 mfd. condenser, connecting to the original circuit at the plate of the first A. F. tube (type 77) and to ⑬.

5. It is essential that A. C. shielded cable (Part No. L-1655) be used to connect the "On-Off" switch. The cable is a special two-conductor shielded and braided conductor. The shield of this cable is brought out at one end and tied to ground. This cable should be kept as close as possible to the chassis frame. At the power transformer ㉑ one lead of the shielded cable is connected to the external A. C. cable. In order that the other lead may be connected to the primary lead of the power transformer, it is necessary to use a stand-off insulator (Part No. 03103). This insulator may be mounted at any convenient place.

Model 17

1. The Volume Control and "On-Off" Switch ⑭ is replaced by Volume Control and "On-Off" Switch (Part No. 33-5023), having an overall value of 2 megohms. The movable element goes to ⑮ as heretofore; the tap to the resistor ⑯ mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3)

2. Resistor ⑯ (Green-Black-Red) is replaced by resistor (Red-Green-Orange) (25,000 ohms), Part No. 4516.

Continued on next page

MODEL 16
Changes
MODEL 17
Changes

PHILCO RADIO & TELEVISION CORP.

3. A resistor (Violet-Black-Orange) (70,000 ohms), Part No. 5385 is *added,* with one side grounded to frame; the other joining the original circuit at ⑳ and ㊽; this same point (high side of 70,000-ohm resistor) connected through a .01 mfd. condenser (Part No. 3903-J) (*added*) to the high side of the volume control.

4. Tone Control ㊺ is replaced by Tone Control, Part No. 30-4070, inclosing a .09 mfd. and a .003 mfd. condenser, with two .025 mfd. condensers in a single external housing, Part No. 7653-C, which replaces the two external condensers ㊹ in metal container. The .09 mfd. condenser is on the first tap of the tone control; one of the .025 mfd. condensers is on the second tap, while the third tap is permanently grounded through the other .025 mfd. condenser. The "fourth" tap of the tone control (previously connected through the .006 mfd. condenser) is connected to the .003 condenser, connecting to the original circuit at the plate of the first A. F. tube (type 77), and to ㊵.

5. It is essential that A. C. shielded cable (Part No. L-1655) be used to connect the "On-Off" switch. This cable is a special two-conductor shielded and braided conductor. The shield of this cable is brought out at one end and tied to ground. This cable should be kept as close as possible to the chassis frame. At the power transformer ㊽ one lead is connected to the external A. C. cable. In order that the other lead may be connected to the primary lead of the power transformer, it is necessary to use a stand-off insulator (Part No. 03103). This insulator may be mounted at any convenient place.

Production to *include* the change will be Run No. 5 for both models, instead of Run No. 4.

Model 16 **Model 17**

An error occurs in the designation of Part No. 7084, as Speaker Socket of Code 121 (Models 16 and 17). Part No. 7084 is Speaker Socket *Hole Cover* and has a *list* price of 75 cents per hundred, as shown in Bulletin 170, under Model 16-121-122. The Code 121 of Models 16 and 17 does not have a Speaker Socket. Part No. 7084 covers (in Code 121) the opening which accommodates Speaker Socket Part No. 4957 in Code 122.

This correction should be made to Bulletin No. 161, bottom of second page, under NOTE; to Bulletin No. 165, bottom of fourth page, under NOTE; and to Bulletin No. 170, as noted above.

PHILCO RADIO & TELEVISION CORP.

MODEL 17
Voltage, Data
Chassis view
Socket layout

MODEL 17

The Philco Radio Model 17 is an eleven tube superheterodyne, designed for operation on alternating current. The same superheterodyne circuit is used for standard broadcast, police broadcast and airport and aircraft reception. The frequency coverage upon the two bands is,—

520–1500 K. C.
1500–4000 K. C. (4.0 megacycles).

The receiver employs a Philco Type 78 tube in the pre-selection circuit, a Type 6A7 as a combination first detector and oscillator, a Type 78 for the intermediate frequency, a Type 37 for second detector, a Type 37 for automatic volume control, and a Type 78 for automatic interstation noise suppression. The first audio frequency stage is a Type 77 tube, the driver (2nd A.F.) is a Type 42; the class "A" amplification is accomplished with two Type 42's as triodes, and the rectifier is a Type 5Z3. The intermediate frequency used in adjusting the superheterodyne circuit is 175 kilocycles. The power consumption is 130 watts.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	R.F.	Det. Osc.	I.F.	2nd Det.	A. V. C.	Inter-Station Noise Supr. Crt.	1st A.F.	Driver	Output		Rectifier
Type Tube	78	6A7	78	37	37	78	77	42	42	42	5Z3
Filament Volts—F to F..	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K.. .	220	220	225	0	0	45	45	230	340	340	400
Screen Grid Volts—Sg to K... (6A7-G3-5 to K)	75	58	75	—	—	50	50	230	340	340	. .
Control Grid Volts—CG to K.. (6A7-G4 to K)	Negligible	Negligible	3.7	.25	.25	.24	.24	.24	34.	34.	. .
Cathode Volts—K to F..	0	0	3.7	0	11.	0	0	0	0	0	. . .

NOTE: These values are for Model 17-122. Model 17-121 uses a Type 80 Rectifier. See note at end of Parts List.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1- 2	105–125	Primary	White
3- 5	6.3	Filament	Black
6- 7	5.0	Filament of 5Z3	Blue
8-10	800	Plates of 5Z3	Yellow
4	. . .	Center Tap of 3-5	Black—Yellow Tracer
9	. . .	Center Tap of 8-10	Yellow—Green Tracer

6A7-G1 to K = 22.0 Volts
6A7-G2 to K = 140.0 Volts

*All of the above readings were taken from the underside of the chassis, using test prods and leads, with a suitable A. C. voltmeter for filament voltages, and a high-resistance multi-range D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end; interstation noise suppression circuit potentiometer turned all the way to right; and toggle switch (interstation noise suppression circuit) in "ON" position. Readings taken with a radio set tester and plug-in adapter will NOT be satisfactory.

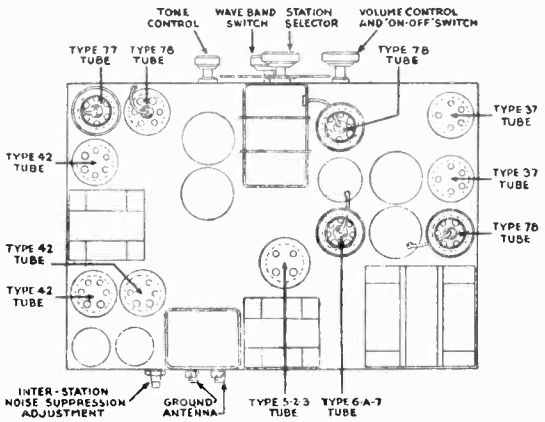


Fig. 1—Top View of Chassis, showing Tube Locations, and Major Parts

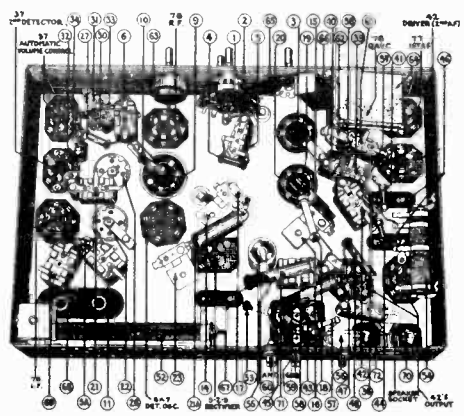


Fig. 2—Bottom View of Chassis, showing Parts

Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis.

June, 1933

Effective December 20th, the shadowmeter used on Model 17 will be No. 45-2028 instead of the No. 6497 previously used. The new shadowmeter gives a somewhat better deflection when tuning.

MODEL 17
Schematic
Trimmer data

PHILCO RADIO & TELEVISION CORP.

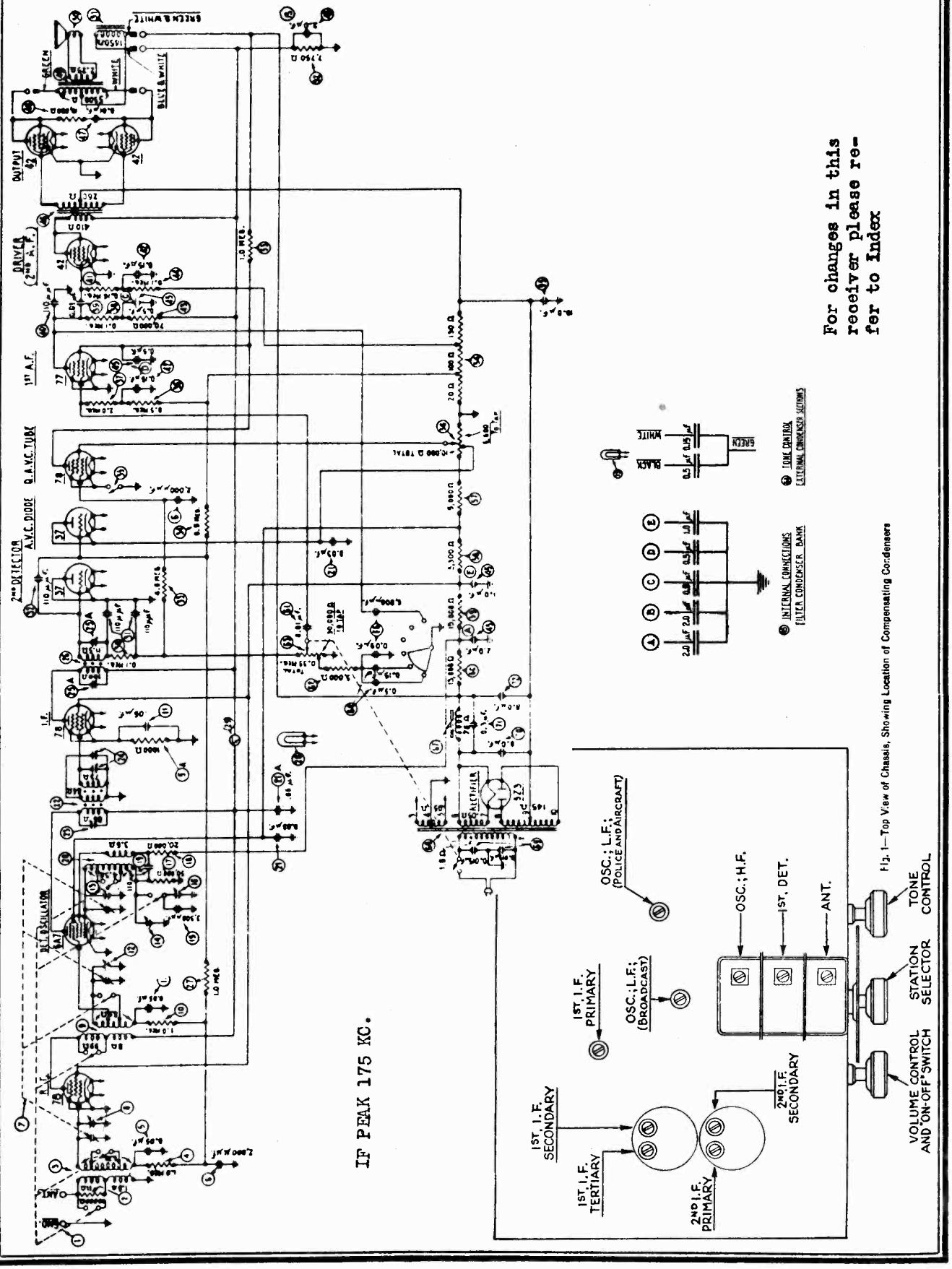


Fig. 1—Top View of Chassis, Showing Location of Compensating Condensers

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MODEL 17
Alignment
Parts List

The adjustment of the I. F. compensating condensers is first completed. The intermediate frequency is 175 K. C. An accurately calibrated signal generator is necessary for these adjustments. The *Philco All-Purpose Set Tester Model 048* is recommended.

Next, the high frequency, detector, and antenna compensating condensers (located upon the tuning condenser) are adjusted, followed by the adjustment of the low frequency compensating condensers.

Care should be exercised in *each* individual adjustment.

It is advisable to give a final re-trimming to the intermediate frequency compensating condensers.

All adjustments of the Model 17 Series compensating condensers can be accomplished from the top of the chassis.

REPLACEMENT PARTS FOR MODEL 17

No. on Figs.	Description	Part Number	List Price
(1)	Wave Band Switch	42-1035	....
(2)	Resistor (Brown-Black-Orange)	4412	.25
(3)	Antenna Transformer	32-1170	....
(4)	Resistor (Brown-Black-Green)	4409	.20
(5)	Condenser	3615-BC	....
(5)a	Resistor (Brown-Black-Red)	5837	.20
(6)	Condenser (Double)	7296-E	....
(7)	Tuning Condenser Assembly	31-1041	....
(8)	Compensating Condenser (Ant.; Part of (7))	....	....
(9)	1st Detector Transformer	32-1171	....
(10)	Resistor (Brown-Black-Green)	4409	.20
(11)	Condenser (Double)	3615-AP	....
(12)	Compensating Condenser (Det.; Part of (7))	....	....
(13)	Compensating Cond. (Osc.; Part of (7))	....	....
(14)	Compensating Condenser (Oscillator)	04000-R	....
(15)	Condenser	7301	.35
(16)	Compensating Cond. (High Freq.)	04000-R	....
(17)	Resistor (Green-Brown-Orange)	4518	.20
(18)	Resistor (Red-Black-Orange)	6649	.20
(19)	Condenser	4519	.18
(20)	Oscillator Transformer	32-1172	....
(21)	Condenser (Double)	8318-C	....
(21)a	Condenser	30-4012	.15
(22)	1st I. F. Transformer	32-1173	....
(23)	Compensating Cond. (1st. I. F. Pri.)	04000-M	.16
(24)	Compensating Cond. (1st. I. F. Sec.) / Compensating Cond. (1st. I. F. Tert.)	31-6001	....
(25)	Compensating Cond. (2nd, I. F. Pri.) / Compensating Cond. (2nd, I. F. Sec.)	31-6000	....
(25)a	2nd. I. F. Transformer	32-1174	....
(27)	Resistor (Brown-Black-Green)	4409	.20
(28)	Pilot Lamp (Shadow Tuning Meter); (Part of (29))	....	....
(29)	Shadow Tuning Meter	6497	2.25
(30)	Resistor (White-White-Orange)	4411	.20
(31)	Condenser (Double)	8035-C	....
(32)	Condenser	4519	.18
(33)	Resistor (Yellow-Black-Green)	6010	.20
(34)	Resistor (Yellow-White-Yellow)	3769	.20
(35)	Switch (Toggle); (Interstation Noise Supp. Ckt.)	42-1036	....
(36)	Resistor (Yellow-White-Yellow)	4517	.20
(37)	Resistor (Red-Black-Green)	5872	.20
(38)	Resistor (White-White-Orange)	4411	.20
(39)	Condenser	3903-L	.16
(40)	Condenser	4519	.18
(41)	Resistor (Brown-Blue-Yellow)	5331	.20
(42)	Condenser	6287-H	.20
(43)	Resistor (Violet-Black-Orange)	5385	.20
(44)	Resistor (White-White-Orange)	4411	.20
(45)	Filter Condenser Bank	30-4026	....
(46)	Input Transformer	32-7057	....
(47)	Condenser	3903-F	.15
(48)	Resistor (Brown-Black-Orange)	3524	.20
(49)	Output Transformer	32-7052	....
(50)	Voice Coil & Cone Assembly	36-3061	....
(51)	Speaker Field, Assembled with Pot, (U-2)	36-3088	....
(52)	Resistor (Wire-Wound)	33-3020	....
(53)	Resistor (Brown-Black-Green)	4409	.20
(54)	Voltage Divider Resistor (Wire-Wound)	33-3021	....
(55)	Condenser (Electrolytic)	30-2003	....
(56)	Potentiometer (Interstation Noise Supp. Ckt.)	33-5015	....
(57)	Resistor (Green-Black-Red)	5310	.20
(58)	Resistor (Orange-Orange-Red)	7238	.20
(59)	Resistor (Brown-Green-Orange)	5718	.40
(60)	Resistor (Brown-Orange-Orange)	6450	.35
(61)	Condenser	3903-L	.16
(62)	Resistor (Green-Black-Red)	5310	.20
(63)	Volume Control & "On-Off" Switch	33-5013	....
(64)	Condenser (External to (65))	06713	.45
(65)	Tone Control	30-4028	....
(66)	Condensers (Internal to (65))	....	....
(67)	Filter Choke	32-7056	....
(68)	Power Transformer (50-60 ~)	32-7058	....
(69)	Condenser (Double)	3793-R	.25
(70)	Condenser (Electrolytic)	30-2011	....
(71)	Condenser	6287-F	.12
(72)	Condenser (Electrolytic)	30-2011	....
(73)	Pilot Lamp (Station Selector)	6608	.12
	Tube Shield	28-1107	.10
	Four Prong Socket	7545	.08
	Five Prong Socket	7546	.10
	Six Prong Socket	7547	.10
	Seven Prong Socket	27-6005	.10
	Knob (large)	03063	.08
	Knob (small)	03064	.06

NOTE: Model 17-121 uses a Type 80 tube in lieu of 5Z3; Power Transformer (50-60 ~) (68) No. 32-7080; Resistors (Brown-Black-Orange) No. 33-1024 in both (59) and (60); Electrolytic Condensers (70) No. 6707 and (72) No. 7464; Speaker "K-17"; Speaker Socket No. 7084; Speaker Cable L-1632

MODEL 17
MODEL 17A-122, 17A-123
Changes
Parts List

PHILCO RADIO & TELEVISION CORP.

Model 17

1. The Volume Control and "On-Off" Switch ⑬ is replaced by Volume Control and "On-Off" Switch (Part No. 33-5023), having an overall value of 2 megohms. The movable element goes to ⑪ as heretofore; the tap to the resistor ⑫ mentioned under (2) below; the end nearest tap, to ground; and the opposite end to the .01 mfd. condenser mentioned in (3).

The 2nd I. F. Transformer ㉖ has been superseded by a transformer which is identified by an orange dot on the metal bracket. This new coil possesses less turns on the primary, and the spacing is decreased between the secondary lugs.

The part number of the transformer remains the same.

Effective with current production, Toggle Switch (Interstation Noise Suppression Circuit) ㉟, Part No. 42-1036, is superseded by Toggle Switch Part No. 3253, and two Part No. 9618 leads, in Model 17-123; by Toggle Switch Part No. 3253, one Part No. 9616 lead and one Part No. 9617 lead, in Model 17-121 and 17-122. The joint at the switch is protected by two pieces of sleeving. The *list* price of Switch, Part No. 3253, is 40 cents.

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
①	Wave Band Switch	42–1035	$0.65
③	Antenna Transformer	32–1170	.70
⑤	Condenser	3615-BC	.16
⑥	Condenser (Double)	7296-E	.16
⑦	Tuning Condenser Assembly	31–1041	3.75
⑨	1st Detector Transformer	32–1171	.70
⑪	Condenser (Double)	3615-AP	.18
⑭	Compensating Condenser (Oscillator)	04000-R	.35
⑯	Compensating Condenser (High Freq.)	04000–R	.35
⑳	Oscillator Transformer	32–1172	.75
㉑	Condenser (Double)	8318-C	.18
㉒	1st I. F. Transformer	32–1173	.75
㉘	2nd I. F. Transformer	32–1174	.60
㉛	Condenser (Double)	8035-C	.16
㉟	Switch (Toggle); (Inter-station Noise Suppressor Circuit)	42–1036	.40
㊺	Filter Condenser Bank	30–4026	3.00
㊻	Input Transformer	32–7057	2.25
㊿	Voice Coil and Cone Assembly	36–3061	.75
㊷	Resistor (Wire-Wound)	33–3020	.30
㊹	Voltage Divider Resistor (Wire-Wound)	33–3021	.16
㊺	Condenser (Electrolytic)	30–2003	.70
㊻	Potentiometer (Inter-station Noise Suppressor Circuit)	33–5015	.80
㊸	Volume Control and "On-Off" Switch	33–5013	1.00
㊺	Tone Control	30–4028	.45
㊼	Filter Choke	32–7056	1.85
㊽	Power Transformer (50-60 ∿)	32–7058	5.00
㊿	Condenser (Electrolytic)	30–2011	1.25
㉒	Condenser (Electrolytic)	30–2011	1.25

No. on Figures	Description	Part No.	List Price
㊶	**Speaker Field, Assembled with Pot, (U-2)**	**36-3088**	**$6.75**

The following additional *list* prices should be included in the Replacement Parts list:

No. ON FIGURES	DESCRIPTION	PART No.	LIST PRICE
㉔	Compensating Condenser	31-6001	$0.35
㉕	Compensating Condenser	31-6000	.40
㊵	Output Transformer	32-7052	1.50

On page 2 of the Bulletin, at end of the Replacement Parts list, make Electrolytic Condenser ㊿ read "No. 6706" instead of No. 6707.

Models 17A-122 *and* 17A-123

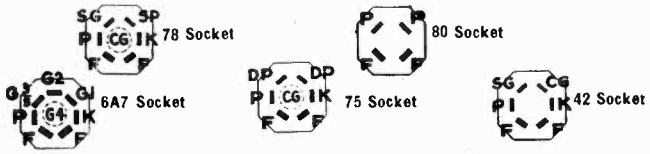
(25 cycle sets)

Effective December 14, 1933, all production on these models will have the first electrolytic condenser ㊿, part No. 30-2014 superseded by part No. 30-2067, no change in connections. (No. 30-2014 is 8 mfd. 500 volt, and No. 30-2067 is 10 mfd. 15 volt.)

PHILCO RADIO & TELEVISION CORP.

MODEL 18
Schematic, Data
Voltage, Socket

PHILCO RADIO MODEL 18 is an eight-tube superheterodyne receiver. It is designed for operation upon alternating current. The frequency range is 520-4000 kilocycles, and the same superheterodyne circuit is used for the reception of standard broadcast, police broadcast, airport and aircraft, and amateur radiophone signals. A Type 78 tube is employed in the R. F. amplifier circuit, a Type 6A7 tube as a combination first detector and oscillator, a Type 78 tube for the intermediate frequency, and a Type 75 as second detector and first audio stage. A Type 42 acts as a driver (2nd A. F.), two Type 42's as triodes form the class "A" output, and a Type 80 acts as rectifier. The intermediate frequency is 260 kilocycles. The power consumption is 110 watts.



Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

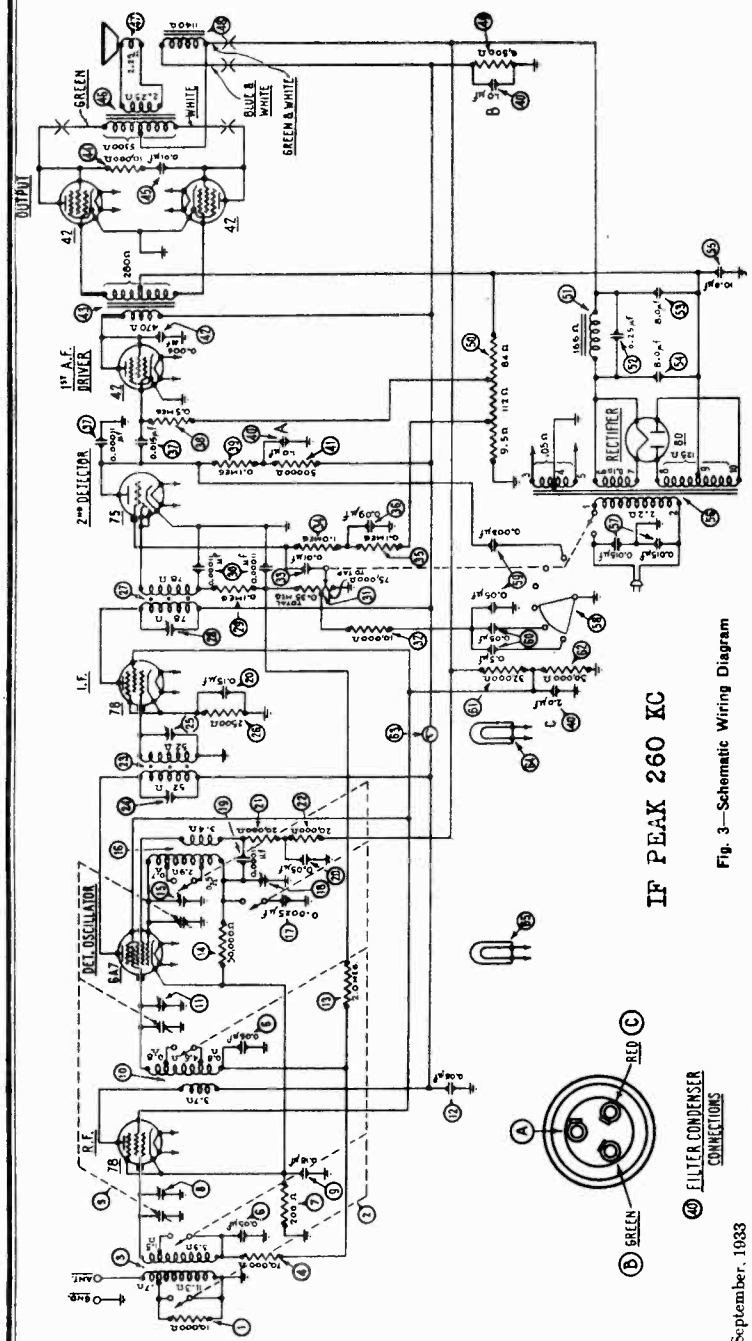


Fig. 3—Schematic Wiring Diagram

See Index for Changes

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	R. F.	Det. Osc.	I. F.	2nd Det. & 1st A. F.	Driver (2nd A. F.)	Output (Class "A")		Rectifier
Type Tube	78	6A7	78	75	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	210	120	205	280	280	350
Screen Grid Volts—G to K (Type 6A7—G3-5 to K)	80	80	80		200	300	300	
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.3	15	5.3	.3	35	28	28	
Cathode Volts—K to F	2.8	2.8	5.3	0	0	0	0	
Type 6A7—G1 to K		35						
Type 6A7—G2 to K		130						

NOTE: In current production—(32)-a Resistor (240,000) (Red-Yellow-Yellow), Part No. 4410—(*not* shown in Schematic), is connected *between* line running from (13) to junction of (29), (30), and ground. (33)-a Condenser (.05), Part No. 30-4020—(*not* shown in Schematic), is connected *between* high side of Volume Control (31) and junction of (28), (30). (60) External Condenser in Tone Control circuit has but one section (in current production),—the .05 mfd. on point two. Point one goes directly to (32).

NOTE: Values of primary and secondary of (46) Output Transformer, and value of (47) Voice Coil are given in impedance at 200 cycles, 30 volts. The D. C. resistance of the primary is 350 ohms; of the secondary, .09 ohm. D. C. resistance of (47) is 1.11 ohm.

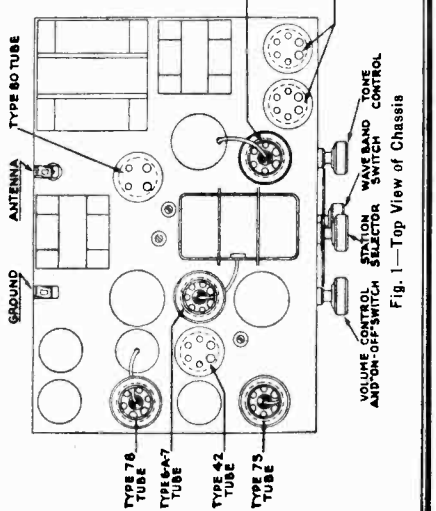


Fig. 1—Top View of Chassis

September, 1933

MODEL 18
Chassis view
Alignment
Parts List

PHILCO RADIO & TELEVISION CORP.

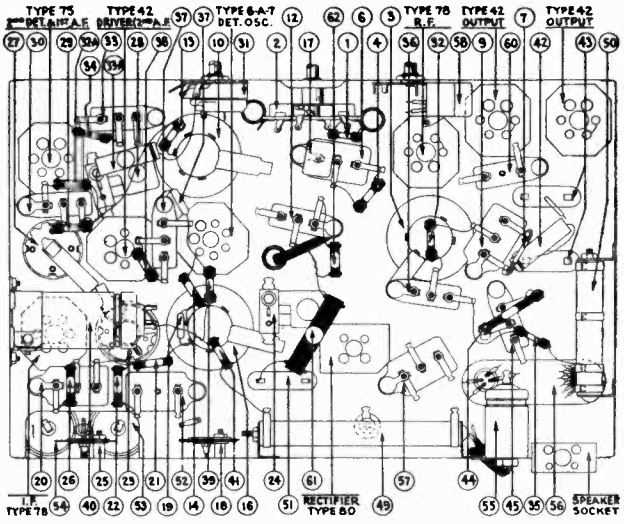


Fig.—2 Bottom View of Chassis, Showing Parts

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
8-10	760	Plates of 80	Yellow
4	....	Center Tap of 3-5	Black-Yellow Tracer
9	....	Center Tap of 8-10	Yellow-Green Tracer

ADJUSTMENT OF MODEL 18

Receivers are adjusted accurately before shipment from the factory. Complete instructions and suitable equipment should be available when *any* adjustments are undertaken. Your distributor is in a position to supply both. The **Philco Model 048 All-Purpose Set Tester** is thoroughly recommended for these adjustments. It includes an accurately calibrated signal generator. Adjustment of the compensating condensers essentially is the same as that outlined in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes."

Reference to Figure 3 of the present Bulletin will give the electrical location of the several compensating condensers in the Model 18 Receiver. Figure 2 will show the physical location of the compensating condensers underneath and at the rear of the chassis.

The intermediate frequency compensating condensers should be adjusted first. The intermediate frequency is 260 kilocycles. These compensating condensers are situated:

(a) 1st I. F. PRIMARY—㉔, underneath chassis. Access from above through hole in sub-base, back of the Tuning Condenser Assembly ⑤. Shield covers the hole and may be removed by prying with a screw driver.

(b) 1st I. F. SECONDARY—㉕, at rear of chassis, beneath the two vertically mounted electrolytic condensers ㊸ and ㊹. Accessible from rear of chassis.

(c) 2nd I. F. PRIMARY—㉘, underneath chassis. Accessible from above through hole in chassis sub-base, in *front* of Type 42 (Driver; 2nd A. F.), and to right of Type 75 tube. The shield can be removed as under (a). The "OSC.; H. F." ⑮, the "DETECTOR" ⑪, and the "ANT.; H. F." ⑧ compensating condensers are then adjusted, in this sequence. The signal generator is set at 1500 K. C. for ⑮; at 1400 K. C. for ⑪ and ⑧. These are mounted upon the Tuning Condenser Assembly ⑤. ⑧ is mounted upon the condenser section nearest front.

The "OSC.; L. F." ⑱ compensating condenser, located at rear of chassis is adjusted next; with the signal generator set at 600 K. C. It is accessible from rear of chassis. The Tuning Condenser ⑤ should be "rocked" while the "OSC.; L. F." adjustment is made.

The "Push-on Button" shields should be replaced over ㉔ and ㉘ after the adjustments are finished.

No. on Fig.	Description	Part No.	List Price
①	Resistor (10,000) (Brown-Black-Orange)	4412	$0.24
②	Wave Band Switch	42-1046	.70
③	Antenna Transformer	32-1255	.65
④	Resistor (70,000) (Violet-Black-Orange)	5385	.24
⑤	Tuning Condenser Assembly	31-1110	3.75
⑥	Condenser (Double) (.05-.05)	3615-AM	.24
⑦	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217	.18
⑧	Compensating Condenser (Ant.; H. F.; Part of ⑤)	....	....
⑨	Condenser (.18)	4989-AC	.24
⑩	Detector Transformer	32-1256	.45
⑪	Compensating Condenser (Det.; Part of ⑤)	....	....
⑫	Condenser (.05)	3615-AA	.24
⑬	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
⑭	Resistor (50,000) (Green-Brown-Orange)	4518	.24
⑮	Compensating Condenser (Osc.; H. F.; Part of ⑤)	....	....
⑯	Oscillator Transformer	32-1257	.50
⑰	Condenser (.0025)	7006	.36
⑱	Compensating Condenser (Osc.; L. F.)	04000-R	.42
⑲	Condenser (.00011)	4519	.22
⑳	Condenser (Double) (.5-.15)	6287-M	.25
㉑	Resistor (20,000) (Red-Black-Orange)	6650	.30
㉒	Resistor (20,000) (Red-Black-Orange)	6650	.30
㉓	1st I. F. Transformer	32-1288	.45
㉔	Compensating Condenser (1st I. F. Primary)	04000-M	.19
㉕	Compensating Condenser (1st I. F. Secondary)	04000-X	.19
㉖	Resistor (2,500) (Red-Green-Red)	7775	.24
㉗	2nd I. F. Transformer	32-1258	.45
㉘	Compensating Condenser (2nd. I. F. Primary)	04000-A	.14
㉙	Resistor (.1 meg.) (White-White-Orange)	4411	.24
㉚	Condenser (Double) (.00011-.00011)	8035-K	.25
㉛	Volume Control and "On-Off" Switch	33-5024	1.00
㉜	Resistor (10,000) (Brown-Black-Orange)	4412	.24
㉜-a	Resistor (240,000) (Red-Yellow-Yellow)	4410	.24
㉝	Condenser (.01)	3903-Z	.17
㉝-a	Condenser (.05)	30-4020	.14
㉞	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
㉟	Resistor (.1 meg.) (White-White-Orange)	4411	.24
㊱	Condenser (.09)	4989-N	.24
㊲	Condenser (.00011)	4519	.22
	Condenser (.015)	3793-AB	.20
㊳	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
㊴	Resistor (.1 meg.) (White-White-Orange)	4411	.24
㊵	Filter Condenser (Electrolytic) (A = 1.0 mfd.; B = 1.0 mfd.; C = 2.0 mfd.	30-2029	1.00
㊶	Resistor (50,000) (Green-Brown-Orange)	4518	.24
㊷	Condenser (.006)	30-4024	.36
㊸	Input Transformer	32-7114	1.75
㊹	Resistor (10,000) (Brown-Black-Orange)	3524	.24
㊺	Condenser (.01)	3903-P	.24
㊻	Output Transformer	32-7078	1.25
㊼	Voice Coil and Cone Assembly	02625	.66
㊽	Speaker Field Coil and Pot Assembly (H-13)	36-3104	
㊾	Resistor (Wire-Wound) (6,500)	33-3033	.25
㊿	Voltage Divider Resistor (Wire-Wound)	33-3034	.20
(51)	Filter Choke	32-7115	1.50
(52)	Condenser (.25)	6287-N	.20
(53)	Condenser (Electrolytic) (8.0)	6706	1.80
(54)	Condenser (Electrolytic) (8.0)	30-2025	1.15
(55)	Condenser (Electrolytic) (10.0)	30-2003	.84
(56)	Power Transformer (50-60 ~)	32-7111	5.75
(57)	Condenser (Double) (.015-.015)	3793-R	.30
(58)	Tone Control	30-4073	.55
(59)	Condensers (Internal to (58))	....	....
(60)	Condenser (External to (58))	3615-G	.19
(61)	Resistor (32,000) (Orange-Red-Orange)	33-1026	.30
(62)	Resistor (50,000) (Green-Brown-Orange)	4518	.24
(63)	Shadow Tuning Meter	6497	2.70
(64)	Pilot Lamp (Part of (63) Shadow Tuning Meter)	....	....
(65)	Pilot Lamp (Station Selector)	6608	.14
	Shield ("Push-on Button") for sub-base holes; over ㉔ and ㉘ Compensating Condensers	W-775 per C	1.50
	Tube Shield	28-1107	.12
	Four-prong Tube Socket	7544	.07
	Six-prong Tube Socket	7547	.12
	Seven-prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5013	.20
	Mounting Bolt (Chassis)	W-567 per C	2.88
	Mounting Washer (Chassis)	5189	.04
	Mounting Washer (Chassis)	5058 per C	.82
	Knob (large)	03063	.10
	Knob (small)	03064	.07
	Bezel	6418	.24
	Model 18— Code 121 only		
	Speaker (K-17) Output transformer	32-7078	1.25
	Speaker (K-17) Voice Coil and Cone Assembly	36-3020	.48
	Speaker (K-17) Speaker Field and Pot Assembly	36-3104	
	Speaker Socket Hole Cover	7084 per C	.90
	Speaker Cable	L-1632	.24

PHILCO RADIO & TELEVISION CORP.

MODEL 14, 14-121
Changes
MODEL 18
Changes

Model 14

Part Numbers of knobs and bezel used on 14-MX cabinet are as follows:

Knob (large-black)	27–4051
Knob (small-black)	27–4052
Bezel	27–4092

Effective with Run Number 2, Condenser (34), Part No. 3903-Z, (.01 Mfd.) is superseded by Condenser, Part No. 4989-AJ, (.09 Mfd.); also, Resistor (30), Part No. 4411 (.1 Meg.; White-White-Orange) is superseded by Resistor, Part No. 4517 (.5 Meg.; Yellow-White-Yellow).

In Run No. 2, Model 14-121, Tone Control (44) Part No. 06698 is superseded by Part No. 30-4041; Resistor Part No. 4411 by Part No. 4517 in both (32) and (51)a positions; Resistor Part No. 6984 (28) by Part No. 5310; By-pass Condenser Part No. 4989-T (56) by 4989-K; and By-pass Condenser Part No. 3903-P (42) by Part No. 3615-BJ. The leads from the Volume Control are NOT twisted.

Model 14-121

Twin speakers (H-7 and K-12) in this model were superseded by speaker "U". This speaker ("U" type), Part No. 36-1017, has a field coil D.C. resistance of 6500 ohms and a D.C. resistance of 2 ohms in the voice coil. The Speaker Field assembled with Pot ("U") is Part No. 36-3074. The Voice Coil and Cone Assembly is Part No. 36-3061. The Output Transformer is Part No. 32-7051, and has a D.C. resistance in primary of 680 ohms; in secondary, .2 ohm.

With Run number 1-X, Tuning Condenser Assembly (4) will be changed to Part No. 31-1048, superseding Part No. 31-1011. In this substitution, three of Part No. 29-6060 spacers and three of Part No. W-729 mounting bolts are used.

Model 18

Effective with Run Number 4, Condenser (17), Part No. 7006, (.0025 Mfd.) is superseded by Condenser, Part No. 30-1026,—same capacity.

This additional *list* price should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
(46)	Speaker Field Coil and Pot Assembly (H-13)	36-3104	$2.25
	[Code 121] Speaker Field and Pot Assembly (K-17)	36-3104	2.25

NOTE: The above list price is effective September 15, 1933.

ALL PRICES CONTAINED IN SERVICE BULLETIN NO. 172 (MODEL 18) WERE THOSE EFFECTIVE SEPTEMBER 15, 1933.

Compensating Condenser Identifications

Cellulose paint spots on the bottom of compensating condensers will identify them as follows:

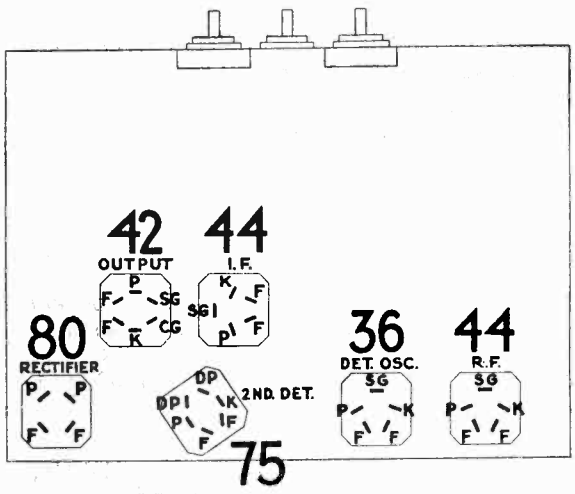
Part No. 31-6000	Capacity 350-600 Mmf.	No Spot
Part No. 31-6001	Capacity 100-145 Mmf.	Red Spot
Part No. 31-6002	Capacity 145-190 Mmf.	Green Spot
Part No. 31-6003	Capacity 50-125 Mmf.	Yellow Spot

MODEL 19 - 128
Socket layout
Voltage, Data

PHILCO RADIO & TELEVISION CORP.

Model 19 (code 128)

PHILCO RADIO MODEL 19 is a superheterodyne designed for operation upon alternating current. It uses the high-efficiency, multiple-function 6.3 volt tubes which give the performance of a set using several more than the six tubes the Model 19 actually employs. Model 19 has Automatic Volume Control, Shadow Tuning, Four-point Bass-Compensating Tone Control, and Pentode Output. The Receiver covers a frequency range from 550 to 3260 kilocycles,—which includes all standard broadcast stations, police stations, airport and aircraft, and amateur stations. The tubes, and their uses in the several circuits, are: R. F. Stage, Philco Type 44; First Detector and Oscillator, Type 36; Intermediate Frequency Stage, Type 44; Second Detector, Type 75; Output Stage, Type 42; and Rectifier, Type 80. The intermediate frequency used in adjusting the superheterodyne circuit is 260 kilocycles. The power consumption of Model 19 (Code 128) is 70 watts. The receiver has an undistorted output of 5 watts.



F FILAMENT SG SCREEN GRID K CATHODE
P PLATE CG CONTROL GRID DP DIODE PLATE

Fig. 1—Tube Socket Locations, from Underside of Chassis.

Table 1—Tube Socket Data*
A. C. Line Voltage, 115

Circuit	RF	Det. Osc.	IF	2nd Det.	Output	Rectifier
Type Tube	44	36	44	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	215	215	215	175	235	350/Plate
Screen Grid Volts—SG to K	95	90	95	.....	245	.....
Control Grid Volts—CG to K	.3	9.0	.3	.3	2.2	.....
Cathode Volts—K to F	4.4	9.5	4.4	.....	.....	.....
Diode Plate Volts—K to DP	.....	.....	.....	.2	.....	.....

*The filament voltage values in Table 1 were obtained with an A.C. voltmeter; all the other values were obtained with a high-resistance, multi-range D.C. voltmeter. The readings were taken from the underside of the chassis,—with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is especially useful in taking these readings, and is highly recommended for this and many other tests of Model 19. When the above values were obtained, the Station Selector was set at the low frequency (550 K.C.) end of the scale; the Volume Control was at maximum (all the way to the right).
Readings will NOT be reliable if taken with a plug-in adaptor.

CAUTION: DO NOT CONNECT THE CHASSIS TO THE POWER SUPPLY UNLESS THE SPEAKER IS CONNECTED TO THE CHASSIS AND ALL THE TUBES ARE IN PLACE.

Table 2—Power Transformer Data

Terminal	A.C. Volts	Circuit	Color
1-2	120	Primary	White
3-4	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
9-10	746	Plates of 80	Yellow
5	...	Center Tap of 3-4	Black-Yellow Tracer
8	...	Center Tap of 9-10	Yellow-Green Tracer

PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS HIGHLY RECOMMENDED FOR ALL TESTS OF MODEL 19.

Table 3—Resistor Data

Numbers on Figures 2 and 3	Resistance (Ohms)	Power Rating (Watts)	COLOR		
			Body	Tip	Dot
1	10,000	⅛	Brown	Black	Orange
7*	300	⅛	Violet	Black	Brown
10	15,000	½	Brown	Green	Orange
19	2 meg.	½	Red	Black	Green
23	50,000	½	Green	Brown	Orange
27	70,000	½	Violet	Black	Orange
28	70,000	½	Violet	Black	Orange
30	250,000	½	Red	Yellow	Yellow
36	2,900	⅛	Red	White	Red
39	10,000	½	Brown	Black	Orange
43	1 meg.	½	Brown	Black	Green
45	100,000	½	White	White	Orange
46	2,000	1	Red	Black	Red
49	1,000	1	Brown	Black	Red
50	15,000	2	Brown	Green	Orange
51	13,000	1	Brown	Orange	Orange
52‡	263, 21 (tapped)	1.7,.14	—	—	—

*Wire wound flexible ‡Wire wound porc. tube

44 and 36 Sockets

75 Socket

42 Socket

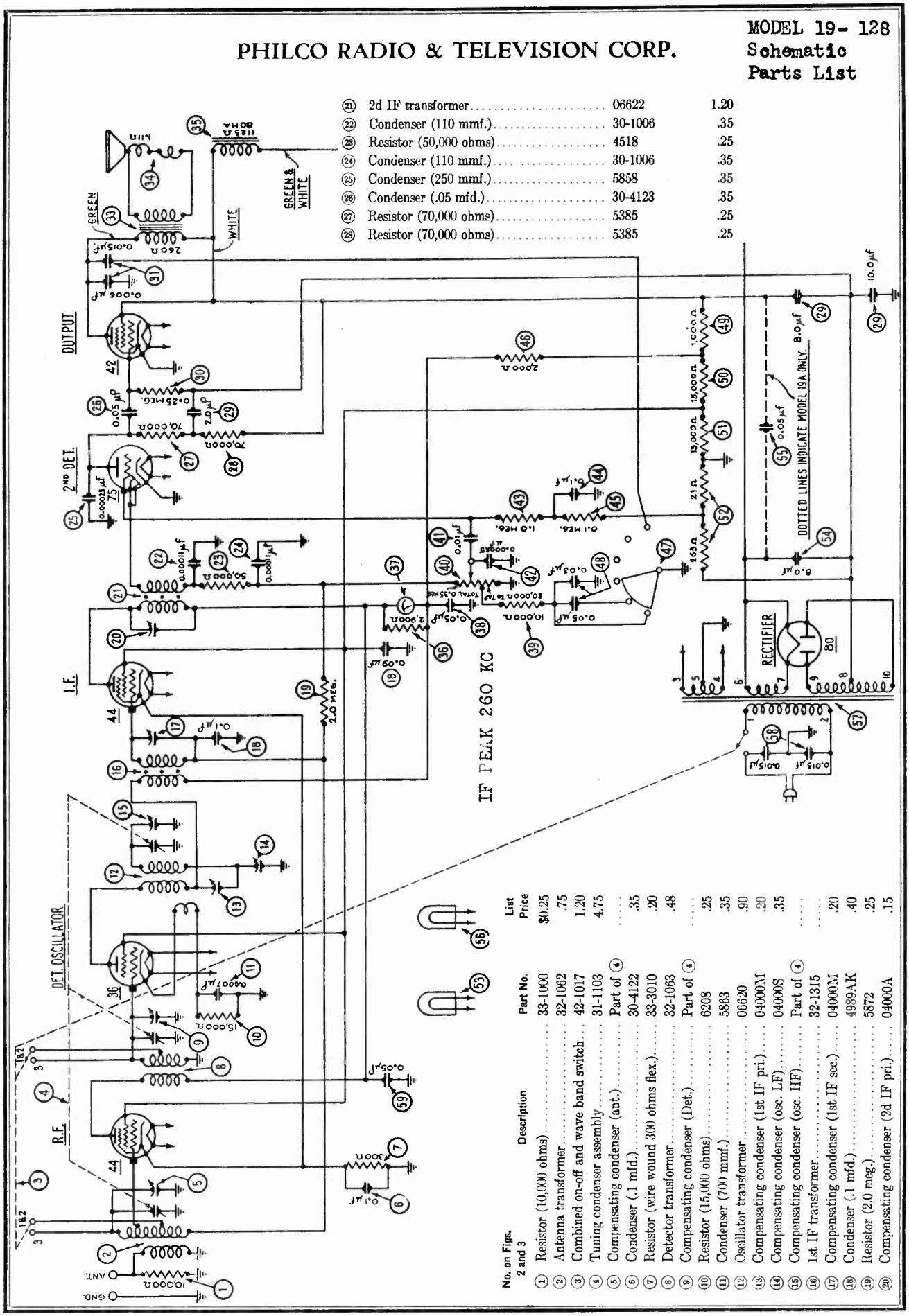
80 Socket

Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

December, 1933

PHILCO RADIO & TELEVISION CORP.

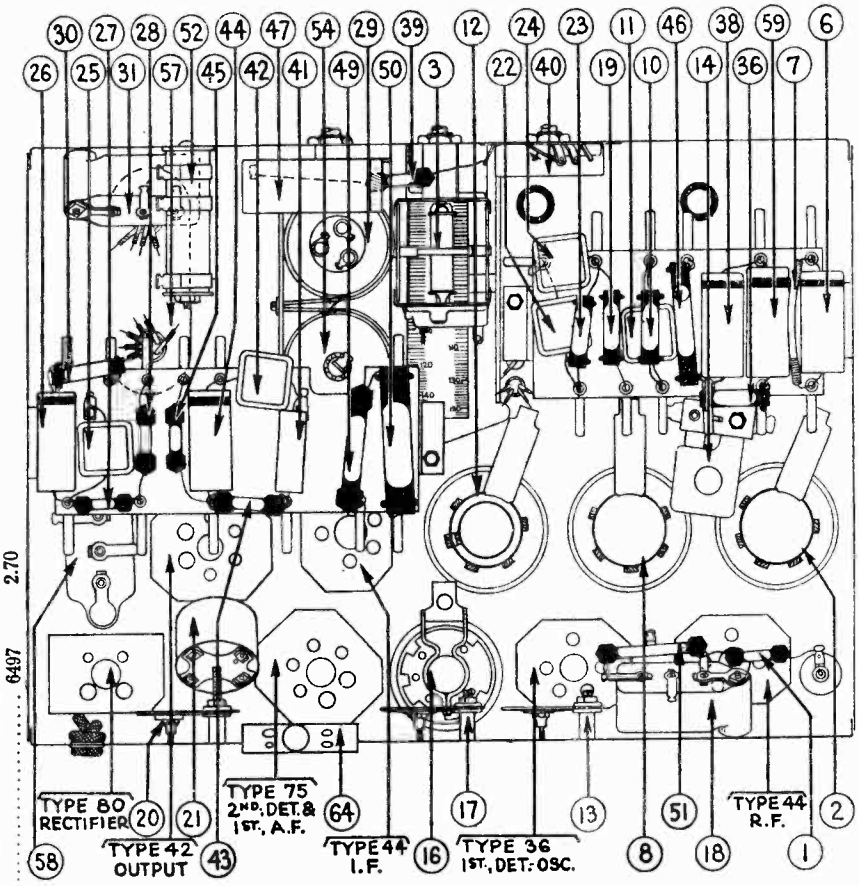
MODEL 19- 128
Schematic
Parts List



No. on Figs. 2 and 3	Description	Part No.	List Price
①	Resistor (10,000 ohms)	33-1000	$0.25
②	Antenna transformer	32-1062	.75
③	Combined on-off and wave band switch	42-1017	1.20
④	Tuning condenser assembly	31-1103	4.75
⑤	Compensating condenser (ant.)	Part of ④	.....
⑥	Condenser (.1 mfd.)	30-4122	.35
⑦	Resistor (wire wound 300 ohms flex.)	33-3010	.20
⑧	Detector transformer	32-1063	.48
⑨	Compensating condenser (Det.)	Part of ④	.....
⑩	Resistor (15,000 ohms)	6208	.25
⑪	Condenser (700 mmf.)	5863	.35
⑫	Oscillator transformer	06620	.90
⑬	Compensating condenser (1st IF pri.)	04000M	.20
⑭	Compensating condenser (osc. LF)	04000S	.35
⑮	Compensating condenser (osc. HF)	Part of ④	.....
⑯	1st IF transformer	32-1315	.....
⑰	Compensating condenser (1st IF sec.)	04000M	.20
⑱	Condenser (.1 mfd.)	4989AK	.40
⑲	Resistor (2.0 meg.)	5872	.25
⑳	Compensating condenser (2d IF pri.)	04000A	.15
㉑	2d IF transformer	06622	1.20
㉒	Condenser (110 mmf.)	30-1006	.35
㉓	Resistor (50,000 ohms)	4518	.25
㉔	Condenser (110 mmf.)	30-1006	.35
㉕	Condenser (250 mmf.)	5858	.35
㉖	Condenser (.05 mfd.)	30-4123	.35
㉗	Resistor (70,000 ohms)	5385	.25
㉘	Resistor (70,000 ohms)	5385	.25

MODEL 19- 128
Chassis view
Trimmer notes
Adjustment

PHILCO RADIO & TELEVISION CORP.



(28)	Condenser (elec.—2.0, 8.0, 10.0 mfd.)	30-2062X	
(29)	Resistor (.25 meg.)	4410	.25
(31)	Condenser (.006-.015 mfd.)	7625D	.30
(32)	Output transformer (H-16)	32-7178	
(34)	Speaker voice coil and cone (H-16)	02625	.65
(35)	Speaker field coil and pot assembly (H-16)	36-3218	
(36)	Resistor (2900 ohms)	5309	$0.25
(37)	Shadow meter	6497	2.70
(38)	Condenser (.05 mfd.)	30-4123	.35
(39)	Resistor (10,000 ohms)	4412	.25
(40)	Volume control	33-5000	1.45
(41)	Condenser (.01 mfd.)	30-4124	.25
(42)	Condenser (250 mmf.)	5858	.35
(43)	Resistor (1.0 meg.)	4409	
(44)	Condenser (.1 mfd.)	30-4122	
(45)	Resistor (.1 meg.)	4411	
(46)	Resistor (2000 ohms)	4515	
(47)	Tone control	38-5519	
(48)	Condensers (inside (47))		
(49)	Resistor (1000 ohms)	4590	
(50)	Resistor (15,000 ohms)	5718	
(51)	Resistor (13,000 ohms)	3766	
(52)	Resistor (wire wound tapped, 263,21 ohms)	33-3069	
(53)	Pilot lamp (station selector)	6608	
(54)	Condenser (elec. filter 8 mfd.)	30-2026	
(55)	Condenser .05 mfd. (used on 19A only)	30-4020	
(56)	Pilot lamp	Part of (57)	
(57)	Power transformer	32-7170	
(58)	Condenser (double .015-.015 mfd.)	3793E	
(59)	Condenser (.05 mfd.)	30-4123	
(60)	Tube shield	8005	

Fig. 3—Bottom View of Chassis, Showing Parts.

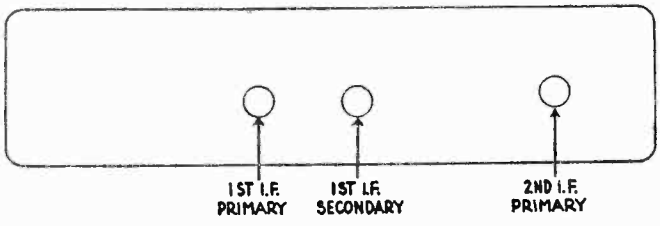


Fig. 4—Rear of Model 19 Chassis, showing location of Compensating Condensers

NOTE:—I. F. Frequency of Model 19 is 260 K.C.

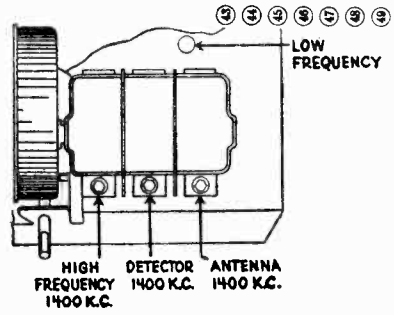


Fig. 5—Top View of Chassis showing Comp. Cond. mtd. on Tuning Condenser, Model 19, also Low Freq. Compensating Condenser.

ADJUSTMENT OF MODEL 19

COMPENSATING CONDENSERS

The compensating condensers of Philco Model 19 are adjusted in essentially the same manner described in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes." The method should be understood thoroughly before any adjustments are attempted.

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is necessary usually only to re-align the intermediate frequency compensating condensers. Figures 3 and 4 show the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER includes a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles. It is recommended. Your Distributor can supply the Model 048 Set Tester, and can give you complete instruction in the adjustment of Model 19.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 5 shows the location of these compensating condensers.

The OSC; High Frequency compensating condenser is adjusted at 1400 kilocycles,—with the signal generator of the Model 048 Set Tester set at that frequency. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should now be adjusted, with the signal generator still operating at 1400.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K.C signal.

A final re-setting may be made of the H.F. condenser (signal generator at 1400) the maximum peak of compensation is desired.

PHILCO RADIO & TELEVISION CORP.

MODEL 38, 38-A
Chassis view, Data
Socket layout
Alignment

Models 38 and 38-A

The Philco Models 38 and 38-A are battery-operated five-tube superheterodyne receivers. Model 38 is designed for use with a two-volt storage battery for filament ("A") supply; Model 38-A for use with dry "A" battery,—in conjunction with a Type 6 ballast tube. The frequency range is 520 to 2470 kilocycles, and a wave-band switch permits the selection of either the standard broadcast or police and amateur radiophone signals. Models 38 and 38-A possess receiver chasses that are identical. When shipped, Model 38 has a shorting jumper across the filament contacts of the Type 6 Ballast Tube socket. This should **not** be disturbed as long as the receiver is operated upon the storage battery. Removal of it will open the filament circuit. The Model 38-A, —in addition to its complement of five tubes,—is equipped with a Type 6 ballast tube which **must** be used with the receiver operating on dry "A" battery. A 30-ohm resistor is used across the filament of the Type 6 ballast tube.

The Models 38 and 38-A employ a Philco Type 15 tube as detector-oscillator, a Type 32 tube for the intermediate frequency amplifier, a Type 32 as second detector, a Type 30 tube for the first audio frequency stage, and a Type 19 tube as output (class "B" amplifier). These are the Philco low-current drain two-volt tubes.

The Model 38 is designed to be used with the Philco Type 172-R two-volt storage battery and Philco Type "P-962" "B"/"C" battery; the Model 38-A with the Philco Type "P-166" dry "A" battery and Philco Type "P-962" "B"/"C" battery.

The filament ("A") supply should **never** exceed two volts at the tube socket terminals of either Model. The Type 6 tube acts as a voltage-regulator, and maintains a constant "A" potential to the filaments of the Model 38-A. The filament current drain upon the "A" battery is 720 milliamperes. The "B" battery current drain varies between 8 and 12 milliamperes,—at 135 volts. The intermediate frequency of the superheterodyne circuit is 460 kilocycles.

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	I. F.	2nd. Det.	1st. A. F.	Output
TYPE TUBES	**15**	**32**	**32**	**30**	**19**
Filament Volts—F to F	1.9	1.9	1.9	1.9	1.9
Plate Volts—P to F	135 (P to K)	135	40	135	135
Screen Grid Volts—SG to F.	67 (SG to K)	67	25	..	..
Control Grid Volts—CG to F	4. (CG to K)	.15	.15	.15	3 (To Gnd.)
Cathode Volts—K to F	5	..	..	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

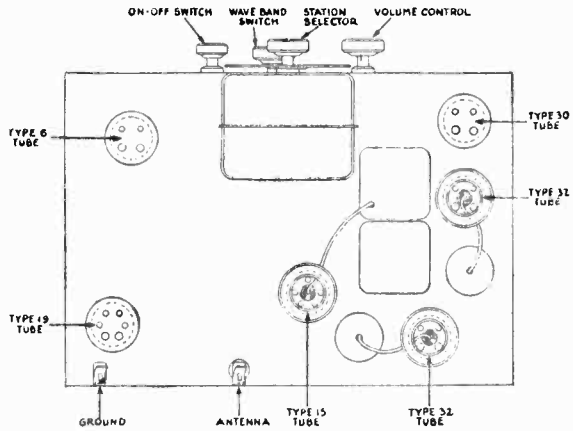


Fig. 1—Top View of Chassis, Showing Tube Locations. NOTE: Model 38 does not use Type 6 tube.

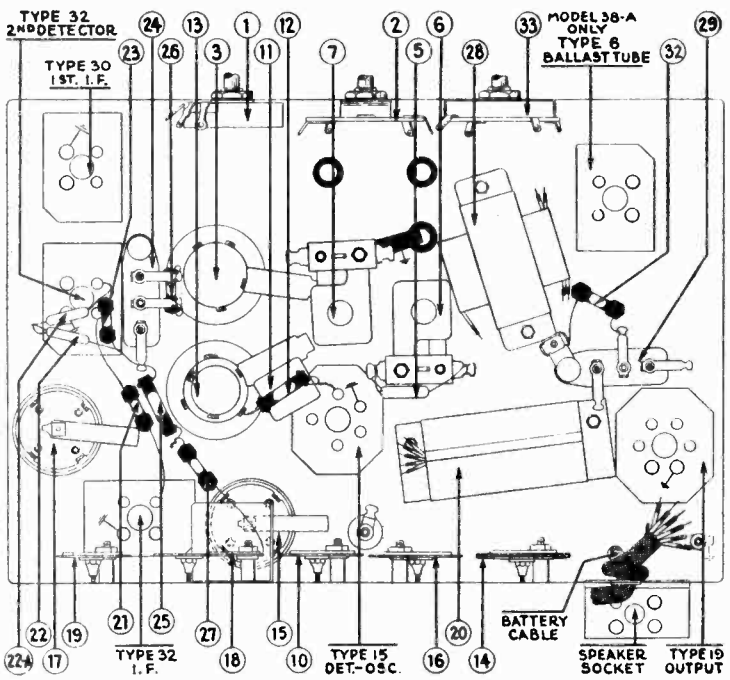


Fig. 2—Bottom View of Chassis, Showing Parts.

Adjustment of Models 38, 38-A

These receivers are adjusted accurately before shipment from the factory. Adjustments of the compensating condensers with which the receivers are equipped should be undertaken **only** when proper equipment is available, and full instructions are at hand. Your distributor can supply both. The **Philco Model 048 All-Purpose Set Tester** is recommended. It contains an accurately calibrated signal generator.

The adjustment of the compensating condensers is similar to the method described in Service Bulletin No. 120-C.

The location of the compensating condensers may be learned by referring to Fig. 3 of the present bulletin for their electrical location in the circuit; to Fig. 2 of this bulletin for the physical location of the compensating condensers underneath and at the rear of the chassis.

The intermediate frequency compensating condensers first should be adjusted. These condensers are identified as ⑩, ⑯, ⑱, and ⑲; they are situated at the rear of the chassis, and are shown in Fig. 2. They are accessible from the rear of the chassis. The intermediate frequency is 460 K.C.

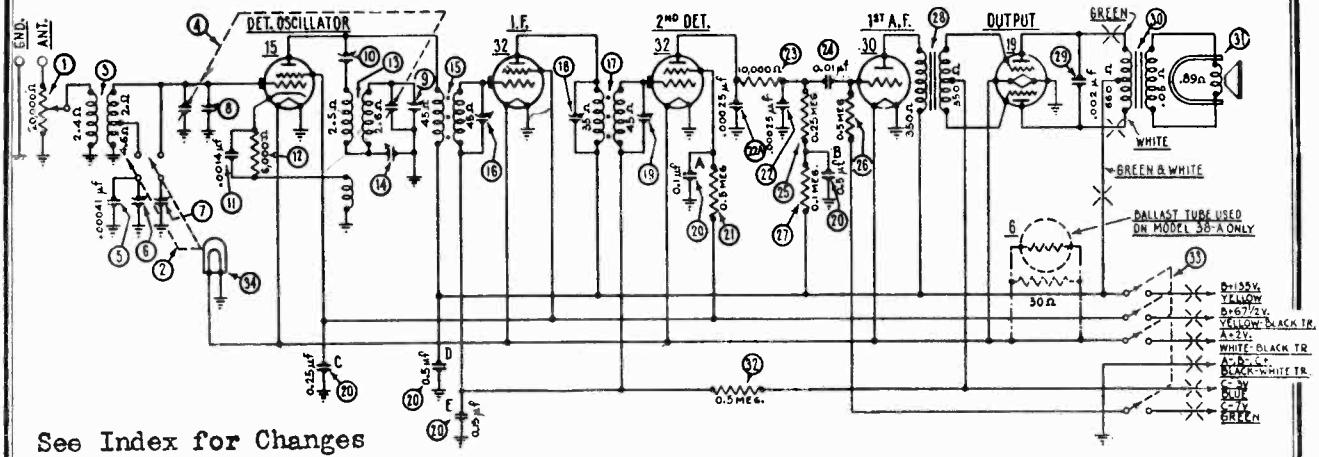
The H.F.; Ant. (Broadcast) ⑧ and H.F.; Osc. ⑨ compensating condensers are situated upon the tuning condenser assembly, and these should next be adjusted. ⑧ is mounted upon the section nearest the front. Both are accessible from top of chassis, as is the H.F.; Ant.; (Police) ⑦, which also should be adjusted at this time. ⑦ is reached through an opening in the chassis sub-base, to the rear and left of the tuning condenser, facing front of chassis.

Next, the L.F.; Ant.; (Police) ⑥ and L.F.; Osc. ⑭ are adjusted. ⑥ is accessible through an opening in the chassis sub-base, to the right of ⑦ and behind the tuning condenser. ⑭ is situated along the rear underside of the chassis, and is accessible from chassis' rear.

Following the adjustments outlined above, the I.F. compensating condensers should finally be re-trimmed.

MODEL 38, 38-A
Schematic, Changes
Parts List

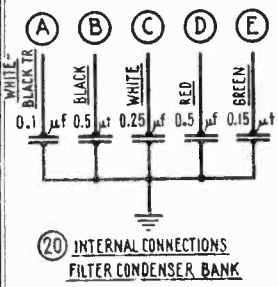
PHILCO RADIO & TELEVISION CORP.

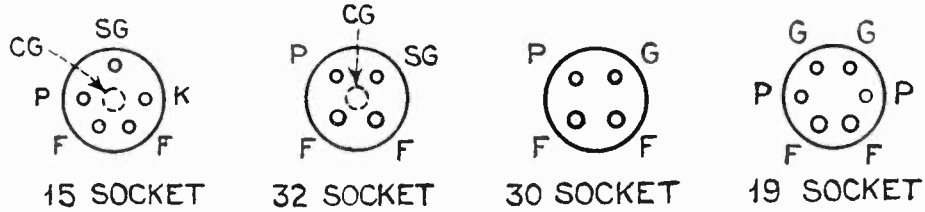


See Index for Changes

Fig. 3—Schematic Wiring Diagram

IF PEAK 460 KC.





August, 1933.

REPLACEMENT PARTS FOR MODELS 38 AND 38-A

No. on Figs.	Description	Part No.	List Price
①	Volume Control	33-5017	....
②	Wave-Band Switch	42-1039	....
③	Antenna Transformer	32-1208	....
④	Tuning Condenser Assembly	31-1076	....
⑤	Condenser (.00041)	30-1000	$0.20
⑥	Compensating Condenser (Ant.; L.F.; Police)	04000-S	.25
⑦	Compensating Condenser (Ant.; H.F.; Police)	04000-X	.16
⑧	Compensating Condenser (Ant.; H.F.; Part of ④)	....	....
⑨	Compensating Condenser (Osc.; H.F.; Part of ④)	....	....
⑩	Compensating Condenser (1st. I.F. Primary)	04000-A	.12
⑪	Condenser (.0014)	7007	.25
⑫	Resistor (6,000) (Blue-Black-Red)	7352	.20
⑬	Oscillator Transformer	32-1209	....
⑭	Compensating Condenser (Osc.; L.F.)	04000-S	.25
⑮	1st. I.F. Transformer	32-1251	....
⑯	Compensating Condenser (1st. I.F. Secondary)	04000-A	.12
⑰	2nd. I.F. Transformer	32-1252	....
⑱	Compensating Condenser (2nd. I.F. Primary)	04000-A	.12
⑲	Compensating Condenser (2nd. I.F. Secondary)	04000-A	.12
⑳	Filter Condenser Bank	03915	1.10
㉑	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
㉒	Condenser (.00025)	3082	.20
㉒A	Condenser (.00025)	3082	.20
㉓	Resistor (10,000) (Brown-Black-Orange)	4412	.20
㉔	Condenser (.01)	3903-Z	$0.14
㉕	Resistor (.25 meg.) (Red-Yellow-Yellow)	4410	.20
㉖	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
㉗	Resistor (.1 meg.) (White-White-Orange)	4411	.20
㉘	Input Transformer	7233	1.50
㉙	Condenser (.002)	7296-C	.12
㉚	Output Transformer	2565	1.40
㉛	Voice Coil and Cone Assembly (KR-2)	36-3014	....
㉜	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
㉝	Switch ("On-Off"; Battery)	42-1040	....
㉞	Pilot Lamp (Station Selector)	5316	.30
	Resistor (30 ohm) [(Used across Type 6 ballast tube filament; Model 38-A, only)]	7155	.20
	Shorting Jumper (Model 38; across filament terminals; Type 6 tube socket)	28-8061	....
	Tube Shield	28-1107	.10
	Four-prong Tube Socket	7545	.08
	Five-prong Tube Socket	7546	.10
	Six-prong Tube Socket	7547	.10
	Speaker Socket	4957	.08
	Battery Cable Assembly (including multi-plug)	38-5265	....
	Station Selector Dial-scale	27-5019	....
	Knob (large)	03063	.08
	Knob (small)	03064	.06

Effective with Run Number 3, 1st I. F. Transformer ⑮, Part No. 32-1251, is superseded by Part No. 32-1290; 2nd I. F. Transformer ⑰, Part No. 32-1252, is superseded by Part No. 32-1291; Resistor ㉓, Part No. 4412 (10,000 ohms; Brown-Black-Orange) is superseded by Resistor, Part No. 4516 (25,000 ohms; Red-Green-Orange); Compensating Condenser (2nd I. F. Primary) ⑱, Part No. 04000-A, is superseded by Compensating Condenser, Part No. 04000-J.

Compensating Condensers ⑩ and ⑱ are reversed, with respect to wiring into the circuit. They are of the same capacity and the change is therefore physical only. (Run Number 3). Wave-Band Switch ② is rotated 180 degrees away from former position. The new position brings lug end nearest to sub-base. (Run Number 3).

In Run Number 4, Volume Control ① is rotated 90 degrees in a clockwise direction, looking from front of chassis.

PHILCO RADIO & TELEVISION CORP.

MODEL 44
Voltage, Trimmers
Socket layout

Model 44

PHILCO MODEL 44 is a six-tube superheterodyne broadcast and short wave receiver. It operates on alternating current. The intermediate frequency is 460 kilocycles. The receiver has automatic volume control. A four-point wave-band switch covers the following ranges:

(1) 520 K.C. to 1500 K.C.
(2) 1.5 M.C. to 4.0 M.C.
(3) 4.0 M.C. to 11.0 M.C.
(4) 11.0 M.C. to 23.0 M.C.

The radio receiver uses the high-efficiency 6.3 volt tubes. A Philco Type 6A7 dual-purpose tube is used as Detector-Oscillator; a Type 78 is used for the 1st I.F. stage, a Type 78 for 2nd I.F., a Type 75 as 2nd Detector and 1st A.F., and a Type 42 as output. The Rectifier is a Type 80 tube. The power consumption of Model 44 is 65 watts.

Table 1—Tube Socket Data*—A. C. Line Volts, 115.

CIRCUIT	Det.-Osc.	1st I.F.	2nd I.F.	2nd Det. and 1st A.F.	Output	Rectifier
TUBE TYPE	6A7	78	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	260	260	255	165	250	350
Screen Grid Volts—SG to K (Type 6A7—G-3-5 to K)	50	85	85	...	260	...
Control Grid Volts—CG to K (Type 6A7—G-4 to K)	.4	.4	.35	.2	.5	...
Cathode Volts—K to F	2.2	2.1	1.9	0	0	..
Type 6A7—G-1 to K	20	...	...	...	..	...
Type 6A7—G-2 to K	168	...	...	...	...	..

*The values in Table 1 were gotten with an A.C. voltmeter for filament voltages and a high-resistance D.C. voltmeter for all others. The values were gotten from the underside of the chassis with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS RECOMMENDED FOR THIS USE. The Volume Control was at maximum (all the way to right) and the Station Selector was adjusted to 520 K.C.,—(with Wave Band Switch all the way to left),—when these readings were taken. NOTE: Values obtained with a plug-in adaptor will NOT be reliable.

DO NOT ATTEMPT TO ADJUST COMPENSATING CONDENSERS MOUNTED ON SECTIONS 3 AND 4 OF TUNING CONDENSER. (FIG. 2).

Table 2—Power Transformer Data

Terminal	A.C. Volts	Circuit	Color
1-2	105-125	Primary	White
3-5	6.3	Filaments	Black
6-7	5.0	Filament of 80	Blue
8-10	680	Plates of 80	Yellow
4	.....	Center Tap of 3-5	Black—Yellow Tracer
9	.....	Center Tap of 8-10	Yellow—Green Tracer

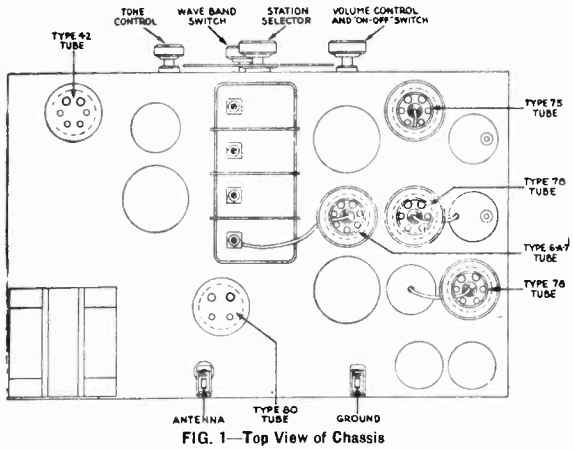


FIG. 1—Top View of Chassis

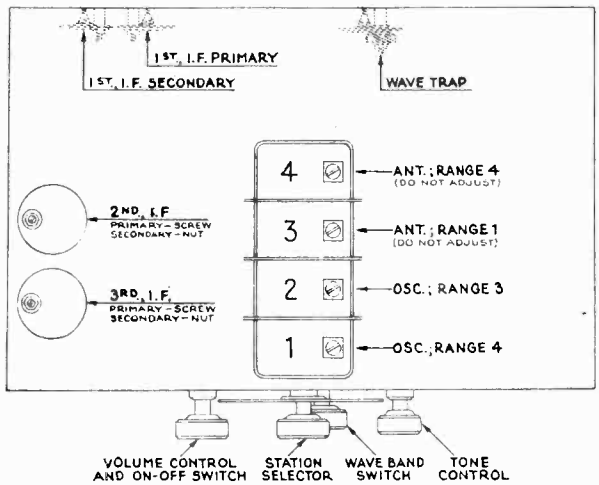


FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis

Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis

MODEL 44
Schematic
Condensers

PHILCO RADIO & TELEVISION CORP.

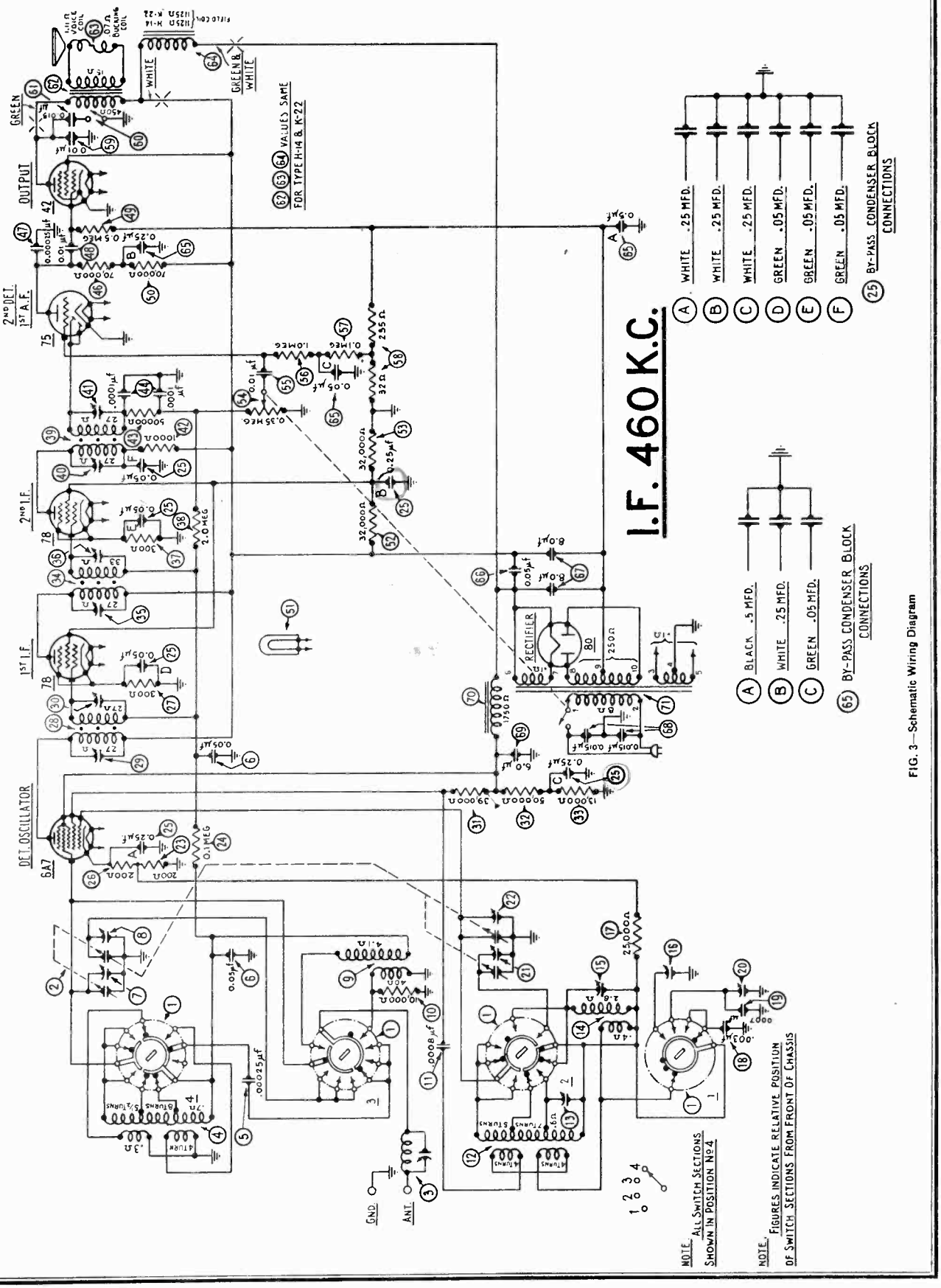


FIG. 3—Schematic Wiring Diagram

PHILCO RADIO & TELEVISION CORP.

MODEL 44
Chassis view
Adjustment data

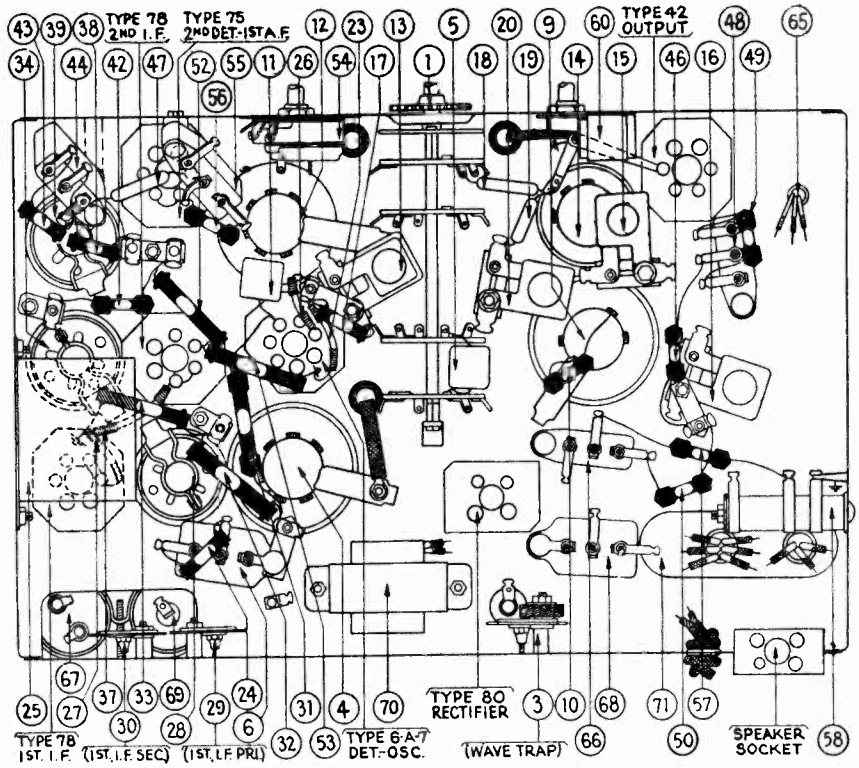


FIG. 4—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Located,—and Reached,—from Below Chassis.

ADJUSTING MODEL 44

DO NOT ATTEMPT TO ADJUST the compensating condensers of Model 44 unless full instruction has been received in the actual adjustment.

Each of the compensating condensers of Model 44 has been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should not be undertaken unless the receiver is seriously out of alignment.

The adjustment of Model 44 is the same generally as that described in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes".

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly (2). These have been adjusted, and sealed, at the Factory.

Philco Model 048 All-Purpose Set Tester is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers, and for any adjustments requiring the use of an accurately calibrated signal generator supplying a signal between the frequency limits of 105 kilocycles and 2000 kilocycles. The Model 048 Set Tester is extremely useful in many other tests.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies.

PHILCO MODEL 44 is adjusted:

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—

The "ANT" output terminal of the signal generator (Model 048 Set Tester) is connected to the grid cap of the Detector-Oscillator tube (Type 6A7),—after removing the grid clip. The "GND" output terminal (of the Model 048) is connected to the "GND" terminal of the receiver chassis.

The output meter is connected to the primary terminals of the Output Transformer. Set the signal generator of the Model 048 at 460 K.C.,—the intermediate frequency of Model 44,—and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2 and Figure 4. Figure 2 shows the position of the compensating condensers of the 2nd, I.F. Transformer (34) and of the 3rd, I.F. Transformer (39). Each of these transformers has its dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by the SCREW; the Secondary circuit is adjusted by the hex-head nut. The adjustment of the primary and secondary circuits of the 1st, I.F. Transformer (28) is made by means of two single compensating condensers (29) and (30) mounted underneath, and at the rear of the chassis and accessible from the rear. They are shown in Figures 2 and 4.

ADJUSTMENT OF THE WAVE TRAP—

Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output of the signal generator (Model 048) to the antenna and ground terminals of the receiver. Set the Wave-Band Switch (1) of the Model 44 to the standard broadcast band (520-1500 K.C.) (Range 1), and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap (3) condenser to give minimum response to a 460 K.C. signal from the Model 048's signal generator. The Wave Trap (8) is located at rear and underneath the chassis, and is shown in Figures 2 and 4. It is reached from the rear of the chassis.

ADJUSTMENT OF THE DIAL FREQUENCIES—

In the following procedure, the frequency ranges are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

The Tuning Condenser (2) has four sections. The individual compensating condensers are shown in Figure 2. They also are identified as numbered sections 1 to 4 inclusive, with 1 as the front section.

Do not attempt to adjust Compensating Condensers on Sections 3 and 4.

Connect the output terminals of the Model 091 Signal Generator to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. The meter of Model 048 may be used as Output Meter. Set the Wave-Band Switch (1) to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser (21) on Section 1 of Tuning Condenser to give maximum response in the output of the receiver, measured with the output meter.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be gotten. Adjust the compensating condenser (22) on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment. The output of the Signal Generator will be too great, otherwise. Adjust the compensating condenser (13) to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4.

The Model 048 Set Tester is used again. Turn the Wave-Band Switch to Range 2, Station Selector to 1.5 M.C. Set the Signal Generator (Model 048) at 1500 K.C. (1.5 M.C.). The "Antenna" connection between the Signal Generator and the chassis should be restored. Adjust compensating condenser (20), located underneath the chassis, (Figure 4). Adjustment is possible from the underside of the chassis.

Place the Wave-Band Switch at Range 1, and the Station Selector to 1400 K.C. Set the Signal Generator (Model 048) at 1400 K.C. Adjust the compensating condenser (15), which is located underneath the chassis. See Figure 4. This adjustment is possible from the underside of chassis.

With Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator of the Model 048 at 520 K.C., and adjust the compensating condenser (16), (Figure 4). This compensating condenser is mounted underneath the chassis, and is reached from below.

For proper and accurate adjustment of Model 44, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without full information and proper equipment. Your Distributor can supply both.

MODEL 44
Parts List

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS FOR MODEL 44

(THESE PRICES ARE EFFECTIVE SEPTEMBER 15, 1933)

No. on Figs.	Description	Part No.	List Price
(1)	Wave-Band Switch	42-1045	....
(2)	Tuning Condenser Assembly	31-1106	....
(3)	Wave Trap	38-5199	$ .30
(4)	Antenna Transformer (H. F. Bands)	32-1271	....
(5)	Condenser (.00025)	5858	.19
(6)	Condenser (Double) (.05-.05)	3615-AM	.24
(7)	Compensating Condenser (Ant.; H. F.) (Part of (2))	....	....
(8)	Compensating Condenser (Ant.; B'dc'st.) (Part of (2))	....	....
(9)	Antenna Transformer (B'dc'st. Bands)	32-1270	....
(10)	Resistor (10,000) (Brown-Black-Orange)	4412	.24
(11)	Condenser (.0008)	5878	.24
(12)	Oscillator Transformer (H. F. Bands)	32-1273	....
(13)	Compensating Condenser (Range 2)	04000-C	.10
(14)	Oscillator Transformer (B'dc'st. Bands)	32-1272	....
(15)	Compensating Condenser (Osc.; Range 1)	04000-A	.14
(16)	Compensating Condenser (B'dc'st.; Series)	04000-S	.30
(17)	Resistor (25,000) (Red-Green-Orange)	4516	.24
(18)	Condenser (.003)	6009	.36
(19)	Condenser (.0007)	5863	.22
(20)	Compensating Condenser (Range 2; Series)	04000-R	.42
(21)	Compensating Condenser (Osc.; Range 4) (Part of (2))	....	....
(22)	Compensating Condenser (Osc.; Range 3) (Part of (2))	....	....
(23)	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217	.18
(24)	Resistor (.1 meg.) (White-White-Orange)	4411	.24
(25)	By-pass Condenser Block (6-section)	30-4077	....
(26)	Resistor (200) (Flexible Wire-Wound) (Red-Black-Brown)	7217	.18
(27)	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010	.18
(28)	1st, I. F. Transformer	32-1274	....
(29)	Compensating Condenser (1st, I. F. Pri.)	04000-J	.24
(30)	Compensating Condenser (1st, I. F. Sec.)	04000-J	.24
(31)	Resistor (39,000) (Orange-White-Orange)	33-1027	.24
(32)	Resistor (50,000) (Green-Brown-Orange)	5868	.42
(33)	Resistor (13,000) (Brown-Orange-Orange)	3766	.24
(34)	2nd, I. F. Transformer	32-1306	....
(35)	Compensating Condenser (2nd, I. F. Pri.)	31-6007, (included as part of (34))	....
(36)	Compensating Condenser (2nd, I. F. Sec.)		....
(37)	Resistor (300) (Flexible Wire-Wound) (Orange-Black-Brown)	33-3010	.18
(38)	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24
(39)	3rd, I. F. Transformer	32-1307	....
(40)	mpensating Condenser (3rd, I. F. Pri.)	31-6007, (included as part of (39))	....
(41)	ompensating Condenser (3rd, I. F. Sec.)		....
(42)	esistor (1,000) (Brown-Black-Red)	5837	.24
(43)	Resistor (50,000) (Green-Brown-Orange)	4518	.24
(44)	Condenser (Double) (.0001-.0001)	8035-K	.25
(45)	Resistor (70,000) (Violet-Black-Orange)	5385	$.24
(46)	Condenser (.00025)	5858	.19
(47)	Condenser (.01)	3903-AN	.24
(48)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.24
(49)	Resistor (70,000) (Violet-Black-Orange)	5385	.24
(50)	Pilot Lamp (Station Selector)	6608	.14
(51)	Resistor (32,000) (Orange-Red-Orange)	3525	.24
(52)	Resistor (32,000) (Orange-Red-Orange)	3525	.24
(53)	Volume Control and "On-Off" Switch	33-5025	....
(54)	Condenser (.01)	3903-J	.24
(55)	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24
(56)	Resistor (.1 meg.) (White-White-Orange)	4411	.24
(57)	Voltage Divider Resistor	33-3037	....
(58)	Condenser (.01) (Part of (60))	....	....
(59)	Tone Control	30-4080	....
(60)	Condenser (.015) (Part of (60))	....	....
(61)	Output Transformer (H-14)	2580	1.50
(62)	Voice Coil and Cone Assembly (H-14)	02625	.66
(63)	Speaker Field Coil and Pot Assembly (H-14)	02767	2.70
(64)	By-pass Condenser Block (3-section)	30-4087	....
(65)	Condenser (.05)	3615-H	.24
(66)	Condenser (Electrolytic) (Double) (8.0-8.0)	30-2028	....
(67)	Condenser (Double) (.015-.015)	3793-H	.24
(68)	Condenser (Electrolytic) (6.0)	30-2020	1.00
(69)	Filter Choke	5930	1.68
(70)	Power Transformer (50-60 cycle)	32-7137	....
(71)	Tube Shield	28-1107	.12
	Four-Prong Tube Socket	7544	.07
	Six-Prong Tube Socket	7547	.12
	Seven-Prong Tube Socket	27-6005	.12
	Speaker Socket	4957	.10
	Dial Scale (Station Selector)	27-5028	....
	Drum Assembly (Tuning Condenser)	31-1055	....
	Idler Shaft Assembly (Tuning Condenser)	31-1056	....
	Tuning Shaft Assembly (Tuning Condenser)	31-1057	....
	Gear (Wave-Band Switch)	28-7012	....
	Knob (large)	27-4025	....
	Knob (medium)	03063	.10
	Knob (small)	03064	.07
	Knob Spring	5262	.42 per C
	Knob Screw (Brass) (Secures large knob to shaft)	W-267	.53 per C
	Bezel	27-4039	....
	Bezel Mounting Screw	W-841	....
	Bezel Felt	6732	.25 per C.
	Mounting Bolt (Chassis)	W-567	2.88 per C.
	Mounting Washer (Chassis) (Rubber)	5189	.04
	Mounting Washer (Chassis) (Steel)	5058	.82 per C.
	Speaker (K-22) **(Baby Grand Only)**:		
	Output Transformer	2580	1.50
	Voice Coil and Cone Assembly	36-3174	....
	Speaker Field Coil and Pot Assembly	02767	2.70

The lead from the screen-grid of the type 6A7 detector-oscillator tube should connect to the junction point between resistors (32) and (33) instead of as shown on the diagram, which is incorrect.

PHILCO RADIO & TELEVISION CORP.

MODEL 57
Voltage
Parts view

THE PHILCO RADIO MODEL 57 is a four-tube superheterodyne receiver, combining standard broadcast and police reception and employs the new Philco high efficiency tubes with pentode output and electro dynamic speaker. The same superheterodyne circuit is used for standard broadcast and police reception. The intermediate frequency for tuning the I. F. transformer is 460 kilocycles. The power consumption of the Model 57 is 46 watts.

Table 1—Tube Socket Data*—Power Line Voltage 115 Volts

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	25	25	....
Cathode Volts—K to F	25	15	15	....

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1- 2	105-125	Primary	White
3- 5	6.3	Filament	Black
6- 7	5.0	Filament of 80	Blue
8-10	580	Plates of 80	Yellow
4	...	Center Tap of 3-5	Black-Yellow Tracer
9	...	Center Tap of 8-10	Yellow-Green Tracer

* All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a radio set tester and plug-in adapter will NOT be satisfactory.

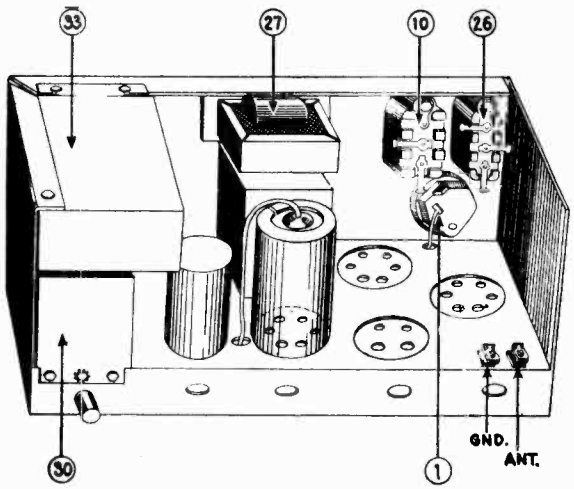


Fig. 1—Top View of Chassis, Showing Parts

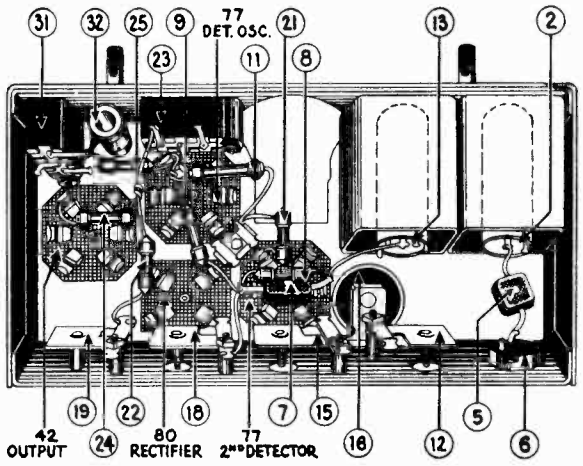


Fig. 2—Bottom View of Chassis, Showing Parts

77 Sockets

42 Socket

80 Socket

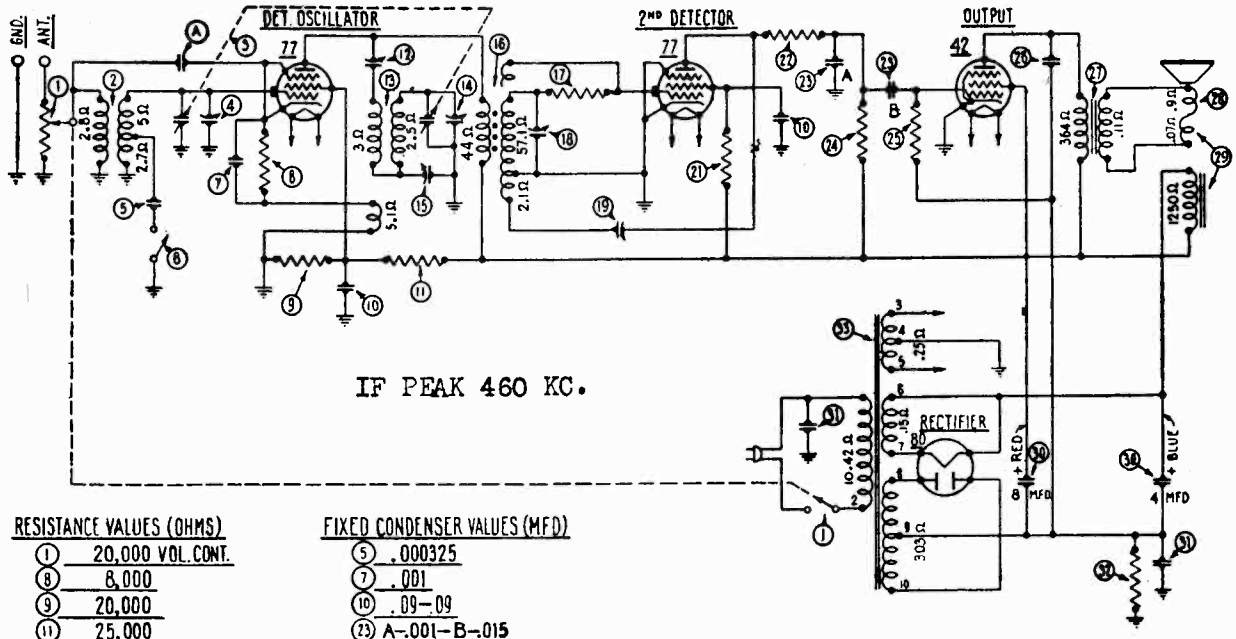
Terminal Arrangement of Tube Sockets Viewed From Under Side of Chassis.

Instruction sheet (Part No. 39-3185) packed with previous shipments of this Model contains an error in the designation of the "Antenna" and "Ground" connections in Figure 1. The "Antenna" connection of the Model 57 is at the extreme right, facing rear of chassis; therefore the words "Ground" and "Antenna" should be transposed on the Instructions.

This change also should be made on the "Tube Location" label pasted on bottom of Model 57 cabinet.

MODEL 57
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.



RESISTANCE VALUES (OHMS)

(1)	20,000 VOL. CONT.
(8)	8,000
(9)	20,000
(11)	25,000
(17)	4,000,000
(21)	1,000,000
(22)	10,000
(24)	240,000
(25)	490,000
(32)	325 (WIRE WOUND)

FIXED CONDENSER VALUES (MFD)

(5)	.000325
(7)	.001
(10)	.09—09
(23)	A—.001—B—.015
(26)	.006
(31)	.015—.015

June, 1933

Fig. 3—Schematic Wiring Diagram

Note (A)—This capacity obtained by pair twisted wires

REPLACEMENT PARTS MODEL 57

No. on Figs.	Description	Part No.	List Price
(1)	Volume Control and "On-Off" Switch	33-5011	.80
(2)	Antenna Transformer	32-1153	.50
(3)	Tuning Condenser Assembly	31-1035	1.75
(4)	Compensating Condenser (Antenna; Part of (3))	....	....
(5)	Condenser	30-1004	.18
(6)	Wave Band Switch	42-1027	.50
(7)	Condenser	5215	.20
(8)	Resistor (Gray-Black-Red)	5838	.20
(9)	Resistor (Red-Black-Orange)	6650	.20
(10)	Condenser (Double)	4989-C	.25
(11)	Resistor (Red-Green-Orange)	3656	.20
(12)	Compensating Condenser (I. F. Primary)	04000-A	.12
(13)	Oscillator Coil	32-1023	.85
(14)	Compensating Cond. (High Frequency—1400 kilocycles) (Part of (3))	....	....
(15)	Compensating Cond. (Low Frequency)	04000-S	.25
(16)	I. F. Transformer	32-1155	1.00
(17)	Resistor (Yellow-Black-Green)	6010	.20
(18)	Compensating Cond. (I. F. Secondary)	04000-D	.10
(19)	Compensating Condenser	04000	.16
(21)	Resistor (Brown-Black-Green)	4409	.20
(22)	Resistor (Brown-Black-Orange)	4412	.20
(23)	Condenser (Double)	7762-B	.20
(24)	Resistor (Red-Yellow-Yellow)	4410	.20
(25)	Resistor (Yellow-White-Yellow)	3769	.20
(26)	Condenser	7625-E	.12
(27)	Output Transformer	32-7041	.80
(28)	Voice Coil and Cone Assembly	36-3029	.60
(29)	Field Coil and Pot Assembly	36-3081	1.50
(30)	Electrolytic Condenser (Double)	30-2004	1.60
(31)	Condenser (Double)	3793-R	.25
(32)	Resistor (Wire Wound)	7465	.12
(33)	Power Transformer	32-7046	3.25
	Tube Shield	28-1107	.10
	Four Prong Socket	7544	.06
	Six Prong Socket	7547	.10

With Run number 4, Power Transformer (50-60 ∿) (33) is changed to Part No. 32-7064. This transformer possesses electrical characteristics identical with Part No. 32-7046, but its physical mounting differs. In instances where the chassis is of a run prior to Run number 4, Part No. 32-7046 should be used.

A change which gives greater accessibility to Electrolytic Condenser (30), (4.0 Mfd.-8.0 Mfd.), was obtained when Part No. 30-2004, originally used, was superseded by Electrolytic Condenser (4.0 Mfd.-8.0 Mfd.), Part No. 30-2013. 4.0 Mfd. section has GREEN terminal; 8.0 Mfd. section has RED terminal; the "Negative" point is BLACK.

Effective with Run No. 6, Wave-Band Switch (6), Part No. 42-1027, is superseded by Wave-Band Switch, Part No. 42-1043, employing a Part No. W-467 washer on the switch side of shaft.

PHILCO RADIO & TELEVISION CORP.

MODEL 57
Trimmers
Data

Model 58 is a four tube superheterodyne receiver, very similar to Model 57 (see Bulletin No. 159A). It uses the same tubes, circuit and most of the same electrical parts as the Model 57, however, the cabinet is somewhat different, and a pilot light (part No. 6608) has been added. The illuminated dial and volume indicator are similar to those used in Model 54C. A friction drive tuning condenser is used, and a few other parts carry different part numbers.

Note that the center tap of filament winding goes to —B instead of to ground (as shown on diagram of 57 in Bulletin 159A). This connection (to —B) is also used on all Model 57 except the earliest production.

Note also that the connections on the oscillator pick-up coil have been changed from Model 57. In the Model 58 one end of this coil goes directly to the cathode of the detector-oscillator tube, and the other end to the 8000 ohm resistor and .001 condenser, the other ends of these two units being grounded.

The following parts used in Model 58 are different, otherwise replacement parts are the same as Model 57.

Item	*Part No. (Model 58)*	*List Price*
Tuning Condenser	31-1089	
Electrolytic filter condenser	30-2013	$1.95
Wave-band switch	42-1043	.30
Volume Control	33-5057	1.45
Dial scale	27-5023	.15
Pilot light shield	29-1126	

Also part No. 3569 (1-watt resistor—490,000 ohms) used in Model 57, is replaced by part No. 4517 (½ watt, 490,000 ohms) in Model 58.

January, 1934

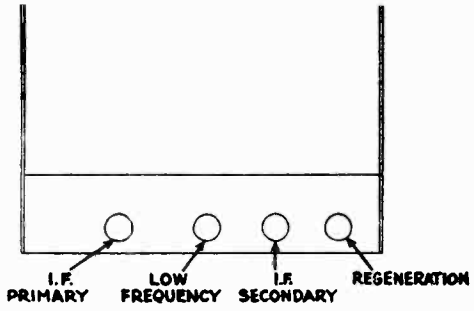


Fig. 3—Back of Model 57 Chassis, showing location of Compensating Condensers and Regeneration Control.

Model 57

Refer to Figures 3 and 4

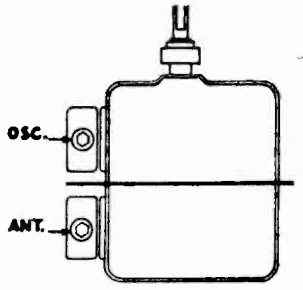


Fig. 4—Tuning Condenser, Model 57 Chassis, showing location of additional Compensating Condensers ("H.F. Oscillator" and "Antenna").

The I. F. (460 K.C.) compensating condensers are adjusted first, after which the Antenna and High Frequency compensating condensers are adjusted at 1400 K.C.; then the Low Frequency at 600 K.C. (Note: The Antenna and High Frequency compensators can be reached with a screw driver through side of cabinet).

The Regeneration Control is adjusted with the Philco All Purpose Set Tester Model 048, or by tuning to a station operating on approximately 1300 kilocycles, and turning the fibre screw at back of chassis (right end when facing back of set) in a clockwise direction, with a screw driver, until the receiver goes into oscillation, giving a squeal when various carriers are passed with the station selector. Then turn the screw counter-clockwise until the "swishing" sound just ceases. Continue to turn in the same direction about one quarter of a revolution beyond this point. Tune to different stations over the dial, noting that the squeal is not present on any stations received. If such a noise is present at any section of the dial, the adjusting screw should be turned farther in a counter-clockwise direction until the noise stops. For best average operation, the screw should be turned back from one-half to one turn except where extreme selectivity is required. Should the type 77 tube (2nd Det.) under the metal shield ever be replaced, this adjustment should be repeated.

Following the adjustment of the Regeneration Control, the I. F. compensating condensers should be finally re-trimmed, inasmuch as the two circuits are closely interrelated.

MODEL 60
Changes

PHILCO RADIO & TELEVISION CORP.

Model 60

Run No. 2 will include an individual filter condenser section in the form of Part No. 6287-B (.2 mfd.) in addition to Part No. 30-4013 ⑳ already used. This additional unit will be connected between the *end* terminal of ⑧ and grounded terminal of ⑧.

Run No. 3 will use a five-section filter condenser bank ⑳, Part No. 30-4063, in place of Part No. 30-4013. The additional section included will be of .2 mfd. capacity (red and yellow lead) and will be connected to the *end* terminal of ⑧.

Effective with Run Number 4, Compensating Condenser ⑪, Part No. 04000-S, and Condenser (.0008 Mfd.) (Green-Orange), Part No. 5878, which was connected across it, have been removed, and a Condenser (.0014 Mfd.) (Red-Red), Part No. 7007, added—between the third terminal (counting clockwise from underside of chassis—Resistor ① is across first and second) of Wave-Band Switch ② and *grounded* terminal of Condenser ⑦.

The following substitutions of electrolytic condensers are effective with current production:

Position	
㊻	30–2025, or 7558
㊺	30–2024, or 7464, or 7557

(These are all of 8.0 Mfd. capacity)

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
②	Wave Band Switch	42-1001	$0.60
③	Tuning Condenser Assembly	31-1006	2.70
④	Antenna Transformer	32-1047	.78
⑧	Condenser (.18)	4989-*Z*	.24
⑮	Oscillator Transformer	32-1048	.78
⑯	1st I. F. Transformer	32-1049	.60
㉕	2nd I. F. Transformer	32-1050	.60
㉙	Volume Control and "On-Off" Switch	33-5006	1.20
㉝	Condenser (Double) (.00011-.015)	8035-D	.24
㊲	Tone Control	30-4008	.54
㊵	Output Transformer	32-7019	1.50
㊶	Voice Coil and Cone Assembly	36-3014	.60
㊷	Speaker Field, assembled with Pot (S-7)	36-3037	1.80

The following additional *list* price should be included in the Replacement Parts list:

No. on Figures	Description	Part No.	List Price
㉚	Condenser (.01)	3903-AP	$0.24

(NOTE: The above list price is effective September 15, 1933).

To give greater selectivity to Model 60, the following changes have been made, effective with Run Number 6:

No. on Figs.	DESCRIPTION	REMOVED (Part Number)	ADDED (Part Number)
⑯	1st, I. F. TRANSFORMER	32-1049	32-1304 (Orange Paint)
㉕	2nd, I. F. TRANSFORMER	32-1050	32-1305 (Orange Paint)
	COMPENSATING CONDENSER (2nd, I. F. Secondary)	.....	04000-S*
⑫	COMPENSATING CONDENSER (Osc., L. F.; Broadcast Band)	04000-S	04000-M
⑰	COMPENSATING CONDENSER (1st, I. F. Primary)	04000-M	04000-A
⑱	COMPENSATING CONDENSER (1st, I. F. Secondary)	04000-A	04000-M
㉖	COMPENSATING CONDENSER (2nd, I. F. Primary)	04000-M	04000-A

*1 each of Part No. 3098 Sleeve, W-614 Screw, W-291 Washer, and W-95 Nut, are required for this additional Compensating Condenser.

The Padder Shield, Part No. 29-1131, at ㉖ Compensating Condenser is superseded by Padder Shield, Part No. 29-1416, *which is now placed at* ⑱ Compensating Condenser.

PHILCO RADIO & TELEVISION CORP.

MODEL 60
Voltage
Parts view
Adjustment

Model 60

THE PHILCO RADIO MODEL 60 is a five-tube superheterodyne receiver, operating upon alternating current and designed for the reception of standard broadcast, and police, airport and aircraft, and amateur radiophone signals. The frequency range is 530–4000 kilocycles. The intermediate frequency is 460 kilocycles. The power consumption is 60 watts. A Type 6A7 tube is used as a combination first detector and oscillator, a Type 78 for intermediate frequency; a Type 75 as second detector and first A. F.; a Type 42 as second A. F. (output), and a Type 80 as rectifier.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	Det. Osc.	I. F.	2nd Det. and 1st A. F.	2nd A.F. (Output)	Rectifier
Type Tube	6A7	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	4.8
Plate Volts—P to K	250	250	170	240	350
Screen Grid Volts—SG to K (6A7-G3-5 to K)	85	120	.....	245	.....
Control Grid Volts—CG to K (6A7-G4 to K)	.18	.18	.15	.18	.....
Cathode Volts—K to F	3.	3.	0	0	.....

6A7-G1 to K = 1.4 volts.
6A7-G2 to K = 180 volts.
*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 530 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1–2	105–125	Primary	White
3–5	6.3	Filament	Black
6–7	5.0	Filament of 80	Blue
8–10	680	Plates of 80	Yellow
4	.....	Center Tap of 3–5	Black-Yellow Tracer
9	.....	Center Tap of 8-10	Yellow-Green Tracer

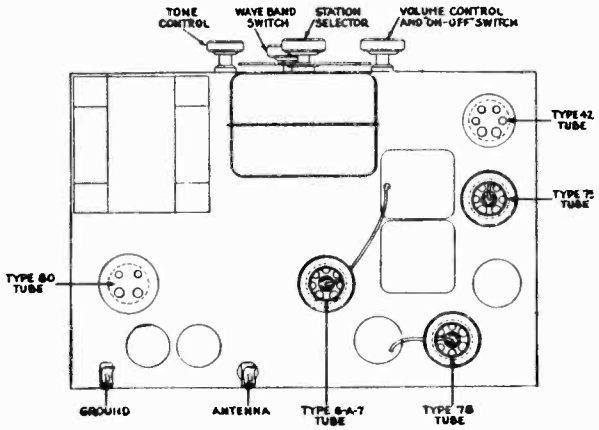


Fig. 1—Top View of Chassis

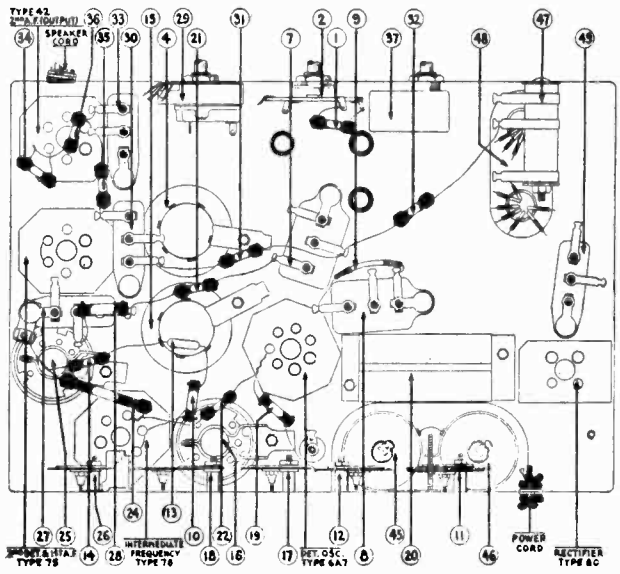


Fig. 2—Bottom View of Chassis Showing Parts

ADJUSTMENT OF MODEL 60

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. Your distributor can supply both. The *Philco Model 048 All-Purpose Set Tester* is highly recommended. It contains an accurately calibrated signal generator.

The adjustment of the compensating condensers is similar to that outlined in Service Bulletin No. 120-C.

Location of the several compensating condensers can be learned through reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear of the chassis.

The intermediate frequency compensating condensers first should be adjusted. The intermediate frequency is 460 K. C. These condensers are ⑰, ⑱ and ㉘, accessible from rear of chassis.

Next, the high frequency ⑧ and antenna ⑤ compensating condensers are adjusted. These are mounted upon the tuning condenser assembly ③; ⑤ is nearest front of chassis.

The low frequency compensating condensers are adjusted last. These are ⑪ for Police Band, ⑫ for Broadcast Band, and are at rear of chassis.

The I. F. compensating condensers should be given a final retrimming after these adjustments are completed.

Terminal Arrangement of Tube Sockets, Viewed From Under Side of Chassis

MODEL 60
Schematic
Parts List

PHILCO RADIO & TELEVISION CORP.

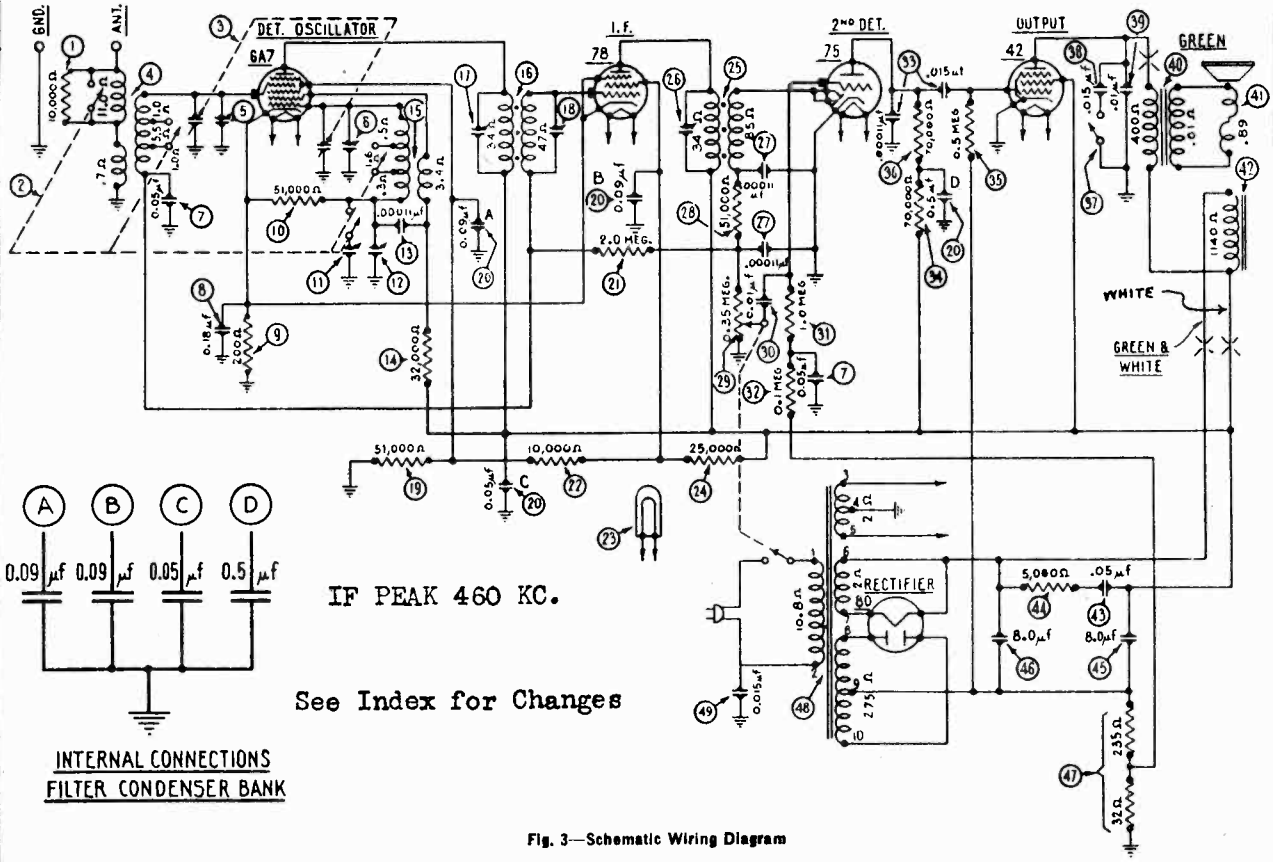


Fig. 3—Schematic Wiring Diagram

NOTE—(20) External connections, Filter Condenser Bank, are:
(A) 0.09 mfd. section—White-Black Tracer.
(B) 0.09 mfd. section—White-Black Tracer.
(C) 0.05 mfd. section—Green.
(D) 0.5 mfd. section—Black.

NOTE—(48) Condenser, and (44) Resistor, are NOT included in current production.

NOTE—A Fixed Condenser (Green-Orange); Part No. 5878; (.0008 mfd.) is connected across (11) in current production.

REPLACEMENT PARTS FOR MODEL 60

No. on Figs.	Description	Part No.	List Price
(1)	Resistor (10,000) (Brown-Black-Orange)	4412	.20
(2)	Wave-Band Switch	42-1001	....
(3)	Tuning Condenser Assembly	31-1006	....
(4)	Antenna Transformer	32-1047	....
(5)	Compensating Condenser (Ant.; H. F.; Part of (3))		....
(6)	Compensating Condenser (Osc.; H. F.; Part of (3))		....
(7)	Condenser (Double) (.05-.05)	3615-AJ	.25
(8)	Condenser (.18)	4989-Z	....
(9)	Resistor (Flexible Wire-Wound) (200) (Red-Black-Brown)	7217	.15
(10)	Resistor (51,000) (Green-Brown-Orange)	4518	.20
(11)	Compensating Condenser (Osc.; L. F.; Police Band)	04000-S	.25
(12)	Compensating Condenser (Osc.; L. F.; Broadcast Band)	04000-S	.25
(13)	Condenser (.00011)	4519	.18
(14)	Resistor (32,000) (Orange-Red-Orange)	5279	.20
(15)	Oscillator Transformer	32-1048	....
(16)	First I. F. Transformer	32-1049	....
(17)	Compensating Cond. (1st I. F. Primary)	04000-M	.16
(18)	Compensating Cond. (1st I. F. Secondary)	04000-A	.12
(19)	Resistor (51,000) (Green-Brown-Orange)	4518	.20
(20)	Filter Condenser Bank	30-4013	.65
(21)	Resistor (2. meg.) (Red-Black-Green)	5872	.20
(22)	Resistor (10,000) (Brown-Black-Orange)	4412	.20
(23)	Pilot Lamp (Station Selector)	6608	.12
(24)	Resistor (25,000) (Red-Green-Orange)	3656	.20
(25)	Second I. F. Transformer	32-1050	....
(26)	Compensating Cond. (2nd, I. F. Primary)	04000-M	.16
(27)	Condenser (Double) (.00011-.00011)	8035-B	.16
(28)	Resistor (51,000) (Green-Brown-Orange)	4518	.20
(29)	Volume Control and "On-Off" Switch	33-5006	....
(30)	Condenser (.01)	3903-AP	....
(31)	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.20
(32)	Resistor (.1 meg.) (White-White-Orange)	4411	.20
(33)	Condenser (Double) (.00011-.015)	8035-D	....
(34)	Resistor (70,000) (Violet-Black-Orange)	5385	.20
(35)	Resistor (.5 meg.) (Yellow-White-Yellow)	4517	.20
(36)	Resistor (70,000) (Violet-Black-Orange)	5385	.20
(37)	Tone Control	30-4008	....
(38)	Condenser (Part of (37))—(.015)		....
(39)	Condenser (Part of (37))—(.01)		....
(40)	Output Transformer	32-7019	....
(41)	Voice Coil and Cone Assembly	36-3014	....
(42)	Speaker Field, assembled with Pot (S-7)	36-3037	....
(43)	Condenser (Electrolytic) (8.0)	7558	1.25
(46)	Condenser (Electrolytic) (8.0)	7558	1.25
(47)	Resistor (Wire-Wound)	7998	.15
(48)	Power Transformer (50-60 ~)	8046	3.00
(49)	Condenser (.015)	3793-W	.16
	Tube Shield	28-1107	.10
	Four-Prong Tube Socket	7544	.06
	Six-Prong Tube Socket	7547	.10
	Seven-Prong Tube Socket	27-6005	.10

PHILCO RADIO & TELEVISION CORP.

MODEL 84
Adjustment
Voltage
Parts view

Model 84

THE PHILCO RADIO MODEL 84 is a four-tube superheterodyne receiver, operating upon alternating current and designed for the reception of standard broadcast, and police stations in the two lower police bands. The frequency range is 540-1740 kilocycles. The intermediate frequency is 460 kilocycles. The power consumption is 43 watts. A Type 77 tube is used as a combination first detector and oscillator, a Type 77 as I.F. and second detector, a Type 42 as second A.F. (output), and a Type 80 as rectifier.

Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	Det. Osc.	2nd Det.	2nd A.F. (Output)	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	5.0
Plate Volts—P to K	240	70	225	340
Screen Grid Volts—SG to K	95	23	225	...

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 540 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

Table 2—Power Transformer Data

Terminal	A. C. Volts	Circuit	Color
1-2	120	Primary	White
3-4	6.3	Filament	Black
6-7	5.0	Filament of 80	Blue
9-10	630	Plates of 80	Yellow
5	.....	Center Tap of 3-4	Black-Yellow Tracer
8	.....	Center Tap of 9-10	Yellow-Green Tracer

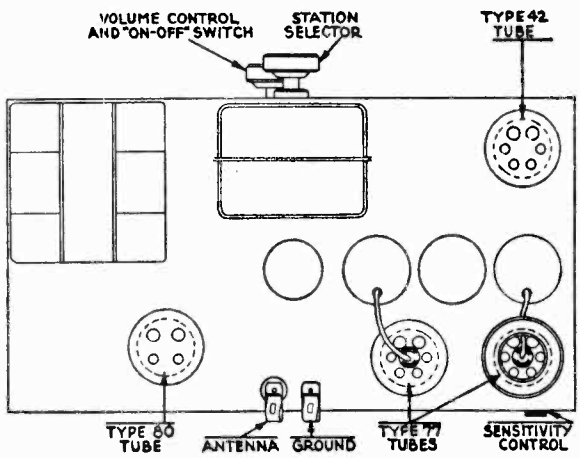


Fig. 1—Top View of Chassis

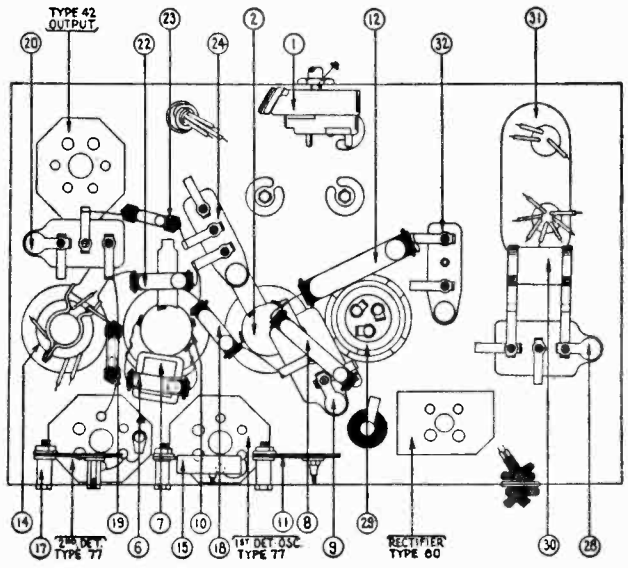


Fig. 2—Bottom View of Chassis Showing Parts

ADJUSTMENT OF MODEL 84

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. Your distributor can supply both. The *Philco Model 048 All-Purpose Set Tester* is highly recommended. It contains an accurately calibrated signal generator.

The adjustment of the compensating condensers is similar to that outlined in Service Bulletin No. 120-C.

Location of the several compensating condensers can be learned through reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear of the chassis.

The I.F. primary and I.F. secondary condensers should be adjusted first. Set the signal generator at 460 KC (the I.F. of Model 84) and the dial pointer at 600. Adjust I.F. condensers ⑪ and ⑮ so that maximum signal is obtained. These condensers are at rear of chassis, accessible from rear.

Next, adjust the "regeneration" condenser. This is ⑰ located at the right hand rear of chassis (facing rear). Adjustment is made by turning the fibre hex nut with either a screw driver or the special fibre wrench. The procedure is: tune in a signal at the high frequency (1500) end of the dial and turn the fibre nut clockwise until oscillation or squealing is heard. Then turn the nut half a turn back (to left). Now tune in a low frequency station, and if squealing is still heard, turn the adjusting nut half a turn back from the squealing point.

The OSC HF ⑬ and ANT compensating condensers ⑤ are adjusted last in the order mentioned. These are located on the tuning condenser gang, the ANT ⑤ being nearest the front of set. In early production sets use the fibre handle screw driver for adjustment, later production, the fibre hex wrench. In making these adjustments, set the signal generator at 1400 and the station selector at 140.

77 Sockets

80 Socket

42 Socket

Terminal Arrangement of Tube Sockets, Viewed From Under Side of Chassis

MODEL 84
Schematic
Parts list

PHILCO RADIO & TELEVISION CORP.

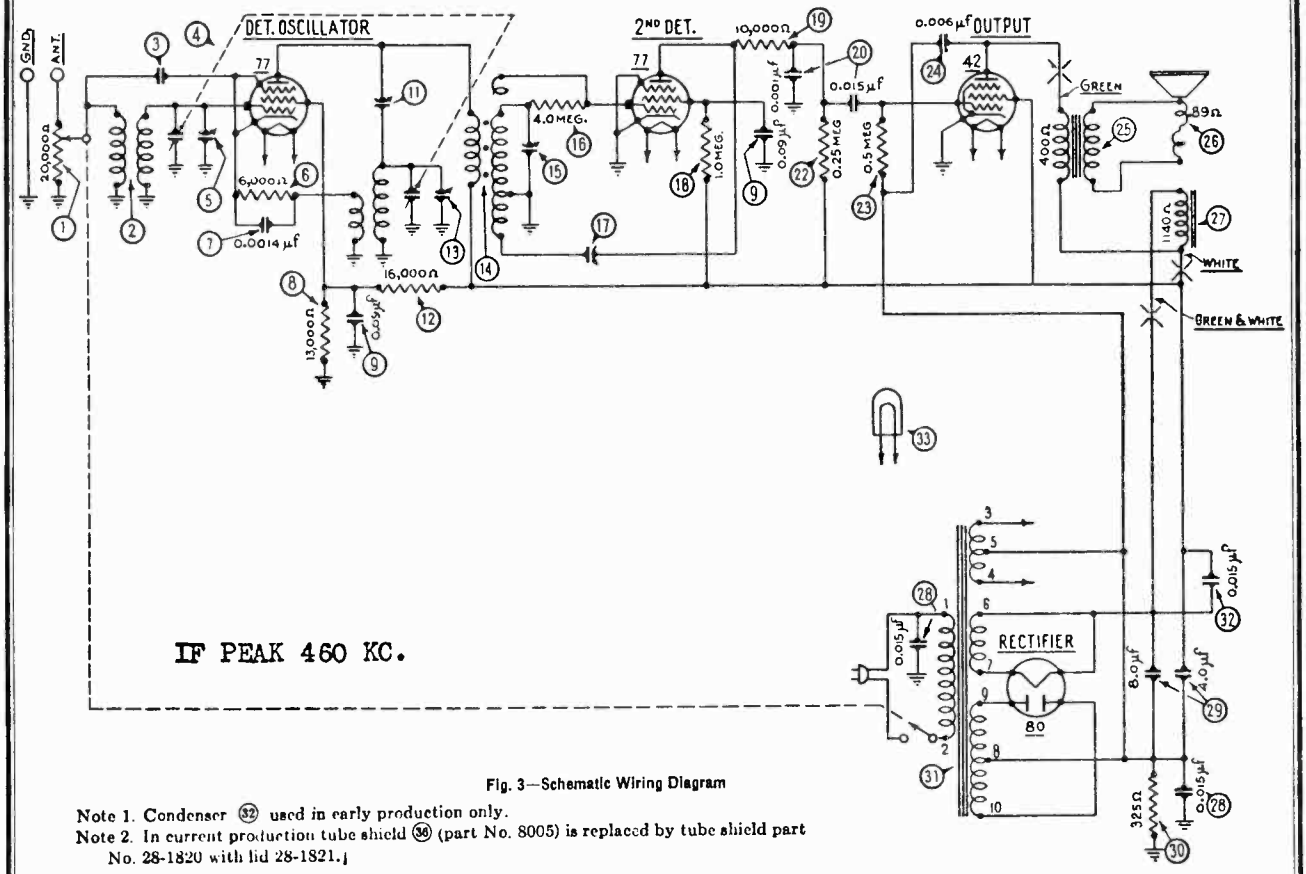


Fig. 3—Schematic Wiring Diagram

Note 1. Condenser (32) used in early production only.
Note 2. In current production tube shield (36) (part No. 8005) is replaced by tube shield part No. 28-1820 with lid 28-1821.

REPLACEMENT PARTS FOR MODEL 84

No. on Figs.	Description	Part No.	List Price
(1)	Volume control and on-off switch	33-5055	1.45
(2)	Antenna transformer	32-1310	.40
(3)	Condenser—capacity obtained by twisting ends of two leads together		
(4)	Tuning condenser assembly	31-1122	
(5)	Compensator (antenna)	Part of (4)	
(6)	Resistor (6000 ohms: Blue, Black, Red)	7352	.25
(7)	Condenser (.0014 mfd.)	7007	.35
(8)	Resistor (13000 ohms: Brown, orange, orange)	3766	.25
(9)	Condenser (double .09 .09 mfd.)	4989 AK	.40
(10)	Oscillator transformer	32-1311	.40
(11)	Compensator (I.F. primary)	04000A	.15
(12)	Resistor (16000 ohms: Brown, blue, orange)	7500	.25
(13)	Compensator (OSC HF)	Part of (4)	
(14)	I.F. transformer	32-1313	1.05
(15)	Compensator (I.F. sec.)	0-4000Y	15
(16)	Resistor (4 meg.: Yellow, black, green) inside (14)	6010	.25
(17)	Compensator (regeneration)	0-4000	.20
(18)	Resistor (1 meg: Brown, black, green)	4409	.25
(19)	Resistor (10000 ohms: Brown, black, orange)	4412	.25
(20)	Condenser (.015 .001)	7762-B	.30
(22)	Resistor (240000 ohms: Red, yellow, yellow)	4410	.25
(23)	Resistor (490000 ohms: Yellow, white, yellow)	4517	.25
(24)	Condenser .006 mfd.	7625H	.25
(25)	Output transformer	32-7019	1.25
(26)	Voice coil and cone assembly	36-3014	.60
(27)	Field coil and pot assembly	36-3243	1.60
(28)	Condenser (.015—.015)	3793AD	.40
(29)	Condenser (electrolytic—4.0—8.0 mfd.)	30-2013	1.95
(30)	Resistor (wire wound 325 ohms)	7465	.15
(31)	Power transformer	32-7180	3.60
(32)	Condenser (.015)	3793 C	.35
(33)	Pilot lamp	6608	.11
(34)	Four prong socket	7544	.10
(35)	Six prong socket	7547	.11
(36)	Tube shield	8005	.06
(37)	Knob	27 4038	.10
(38)	Pointer	27 5007	.30 Per C
(39)	AC cord and plug	L-943A	.60
(40)	Speaker cord	L 1474	.15
(41)	Base shield plate	29 1724	.13
(42)	Chassis mounting screw	W-490	3.60 per C
(43)	Chassis mounting washer	W 315	.50 per C
(44)	Output transformer shield	36 3025	.08
(45)	Dial scale	27-5031	.15

PHILCO RADIO & TELEVISION CORP.

MODEL 71
Shadow tuning data

INSTRUCTIONS FOR INSTALLING SHADOW TUNING METER IN PHILCO MODEL 71

The mechanical part of the installation of the shadow tuning meter is accomplished by means of the two brackets supplied with the kit which are to be fastened to the tuning dial bracket with the two small screws provided for this purpose. The dial bezel on the set is to be replaced with the new bezel which will require the enlarging of the hole in the control panel to accommodate the opening for the shadow screen.

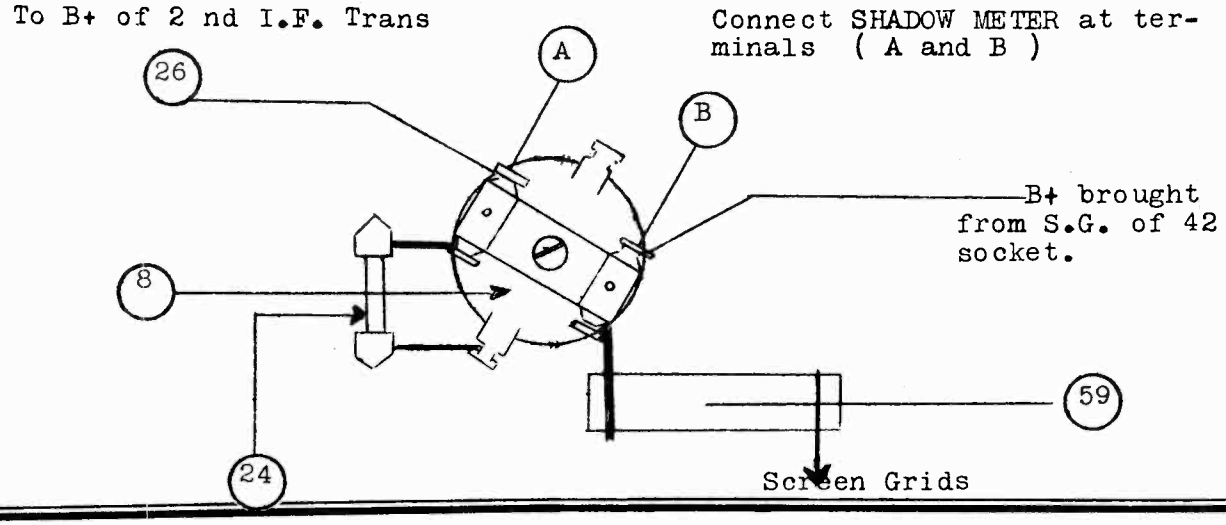
In some of the later 71 chasses the wiring at the terminal board of choke #8, Service Bulletin #128, will be arranged as shown in the accompanying figure and with a short piece of wire connecting terminals A and B. In these sets it is only necessary to remove the link and to connect the tuning meter leads to these terminals.

The earlier chasses which are not already wired for the tuning meter in the above manner will require the following changes.

If the terminal strip at the top of choke #8 has only a single terminal, remove the strip and replace with the double terminal strip furnished with the kit. In other chasses equipped with the double terminal strip, a common lead from resistors #27, 28 and 17 and condensers #31 and 32 will be found connected to terminal A. In this case the common lead should be removed and connected to this corresponding terminal of by-pass oondenser #32. After making either of these changes, the wiring at the terminal strip should be re-arranged as illustrated.

The B+ lead coming from the screen grid contact of the 42 socket must be broken at this point and connected at terminal B as shown. When the changes have been properly made, the B+ lead will be connected to the screen grids of the R.F., I.F., and detector oscillator tubes through resistor #59 and to the plates of these three tubes through the shadow tuning meter.

To complete the changes remove resistor #23 and wire the terminal on the first I.F. transformer from which the resistor was removed to the terminal on by-pass condenser #5 to which resistor #17 is connected. This change will connect the grid returns of the R.F. and I.F. tubes to a common point and through resistor #17 to the automatic volume control circuit.



MODEL 37
MODEL 43-121
MODEL 54
Changes

PHILCO RADIO & TELEVISION CORP.

Model 37

In Run No. 4, the cathode resistor ⑪ is changed from Part No. 7352 (6,000 ohm) to Part No. 5838 (8,000 ohm).

Model 43-121

The following substitutions of electrolytic condensers are effective with current production:

Position	Code 121
⑰	7556 (6 Mfd.) (remains)
⑱	7556 (6 Mfd.)
⑲	6453 (6 Mfd.)

Model 54

Effective with Run No. 9, fixed condenser ㉞, 3793-Y is replaced by 3793-S, same capacity, .015 mfd. 3793-S is mounted in a new hole and is parallel to chassis.

Present production of this Model carries condenser ㉘ Part number 3903AR instead of 3903AM. There is no difference in the electrical characteristics of these condensers.

In run number 4, two of Part number 31-6004 double compensating condensers supersede Parts number 04000A in locations ⑱, ⑳, and ㉒ one of Part number 31-6004 covers ⑱ and ⑳, the other ㉒, and the additional compensating condenser is used to tune the secondary of the 2nd I. F. transformer ㉘

The correct resistance value of the Speaker Field Coil ㉙ is 2600 ohms.

The extruded washers at top and bottom of voltage divider resistors ㊸ and ㊹ are Part No. 27-7168. These washers are used in some of the later production of this Model.

Second I. F. Transformer ㉘ Part No. 32-1116 is superseded by Part No. 32-1195.

Refer to Figures 1 and 2

The adjustment of the I. F. compensating condensers is first completed. This is followed by the adjustment of the High Frequency and Antenna compensating condensers, and then the Low Frequency compensating condenser. The intermediate frequency is 460 kilocycles, and it is necessary to have an accurately calibrated signal generator for the adjustment. The Philco All Purpose Set Tester Model 048 is ideal.

The adjustment of the High Frequency and Antenna compensating condensers can be accomplished by means of a screw driver through the top grille of the cabinet. The Low Frequency condenser is accessible from rear of cabinet.

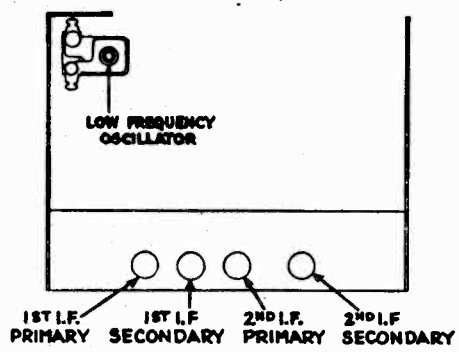


Fig. 1—Back of Model 54 Chassis, showing location of Compensating Condensers.

Model 54

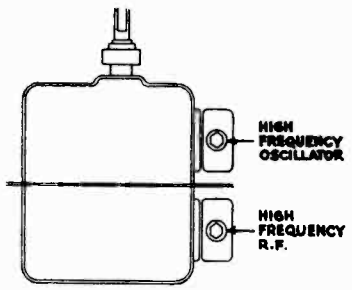


Fig. 2—Tuning Condenser, Model 54 Chassis, showing location of additional Compensating Condensers.

FOR FURTHER INFORMATION ON THESE RECEIVERS, SEE INDEX

PHILCO RADIO & TELEVISION CORP.

MODEL 503
Schematic
Data

Radio-Phonograph Model 503

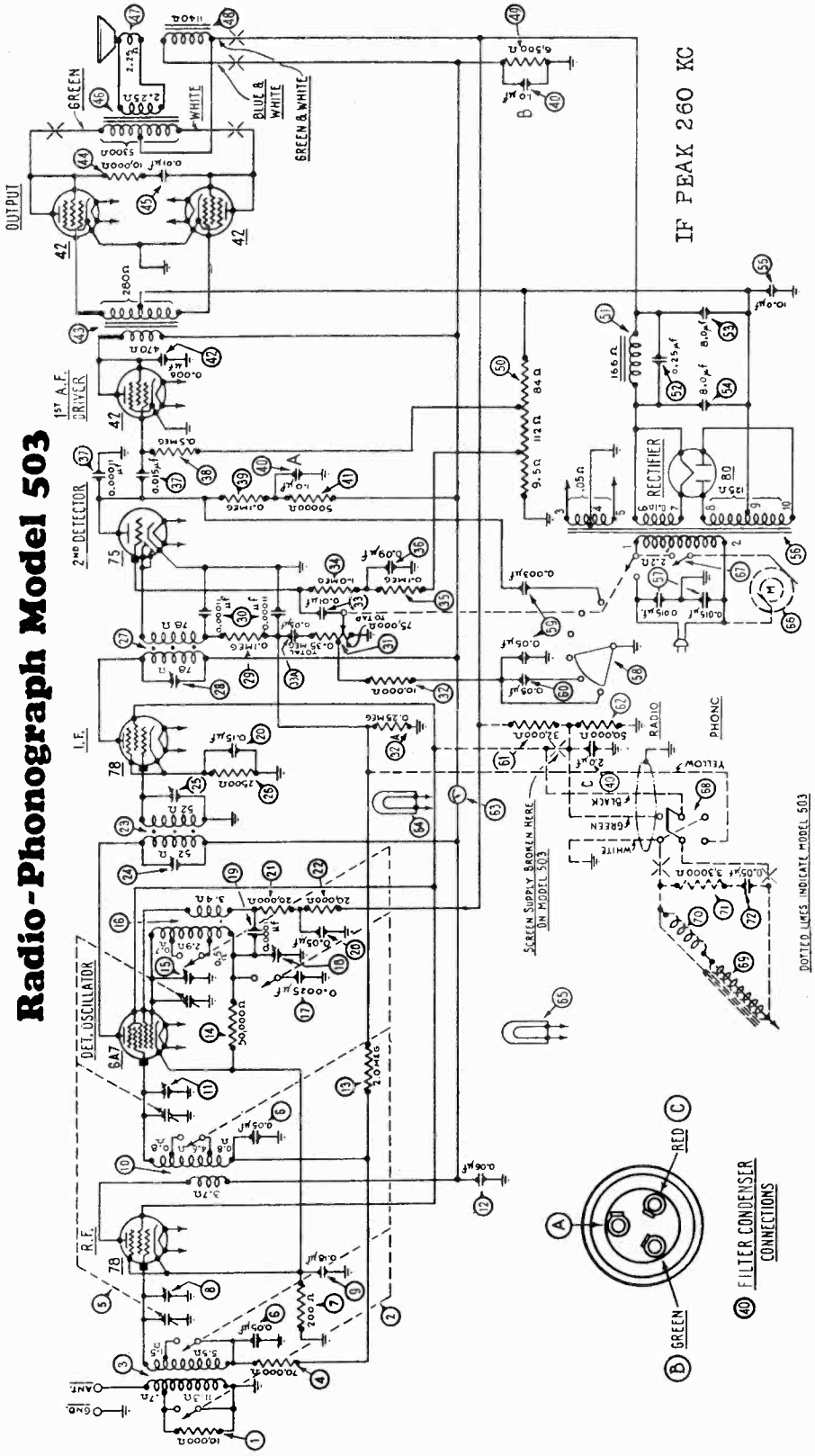


Fig. 1—Schematic Wiring Diagram. Numbers on this figure from ① to ⑥⑤, inclusive, are the same as in Fig. 3, Service Bulletin No. 172.

NOTE: Primary and secondary winding values of ⑯ Output Transformer, and value of ⑰ Voice Coil are given in impedance at 200 cycles, 80 volts. The D. C. resistance of the primary winding is 350 ohms; of the secondary, .09 ohm. The D. C. resistance of ⑰ is 1.11 ohms.

NOTE: ⑦① and ⑦② form the Scratch Filter, Part No. 35-5001.

The electric motor of Model 503 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D.C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D.C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly. The direction of current flow is very important.

The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

The speaker unit is Type H-13.

MODEL 503
Parts List

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 503

PHILCO MODEL 503 is a radio-phonograph using the same radio receiver chassis as the Model 18 superheterodyne.

Except for the additional wiring of the phonograph, the circuits are the same as those of Model 18. The audio system of the radio chassis takes care of the amplification of the pick-up currents.

The power consumption of Model 503, with motor running, is 140 watts.

Complete schematic wiring diagram of Model 503 is given in Fig. 1 of this Bulletin.

Refer to Service Bulletin No. 172 (Model 18) for data on the radio chassis, including the adjustment of the compensating condensers. Replacement parts for the radio receiver and for the speaker unit are included in Bulletin No. 172. The additional *phonograph* parts are:

These Prices are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
(66)	Phonograph Motor (115-volt, 60-cycle)	6336	$27.00
	Phonograph Motor (115-volt, 50-cycle)	6338	27.00
	Phonograph Motor (115-volt, 40-cycle)	6339	31.80
(67)	Automatic-Stop Switch (Motor)	6345	3.30
(68)	Phonograph-Radio Switch	42-1053	
(69)	Pick-up Unit (only)	35-2004	
(70)	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2003	
(71)	Resistor (3,300 ohms) (Orange-Orange-Red)	7238	.24
(72)	By-pass Condenser (.05 Mfd.)	3615-AX	.24
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting Washer	W-464	1.44 per C.
	Motor Board Mounting Washer	W-410	.48 per C.
	Motor Board Mounting Nut	W-149	.48 per C.
	Motor Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Turntable	6344	3.00
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4108	.17
	Speed Change Plate	6347	.10
	Speed Change Plate Pin	W-976	.06 per C.
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

PHILCO RADIO & TELEVISION CORP.

MODEL 504
Schematic

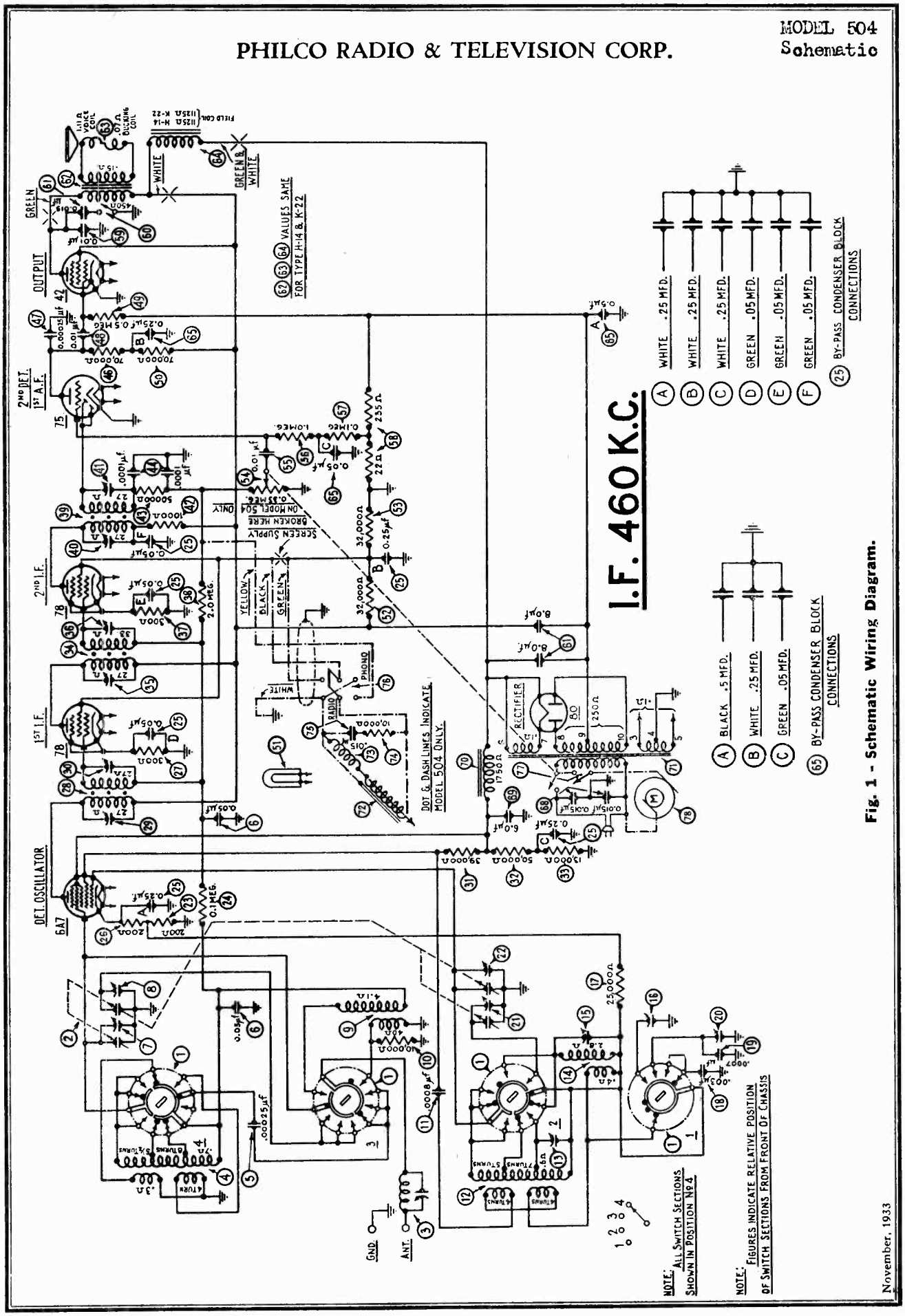


Fig. 1 - Schematic Wiring Diagram.

November, 1933

MODEL 504
Parts List

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 504

PHILCO MODEL 504 has the same superheterodyne broadcast and short-wave receiver chassis as Model 44, and must be operated upon the exact frequency (cycles) of alternating current given upon the name-label of the radio receiver chassis,—for correct speed of the phonograph motor.

Service Bulletin No. 176 upon Model 44 gives the data necessary to test and adjust the radio receiver of Model 504, and includes a full description of the adjustment of its compensating condensers.

The radio circuits are the same as those of Model 44,—with the additional phonograph reproducing circuits. Complete schematic wiring diagram of Model 504 is given in Figure 1 of this Bulletin. The audio frequency system of the radio chassis amplifies the impulses generated in the pick-up.

Replacement Parts for the radio chassis and speaker are given in Service Bulletin No. 176 (Model 44); the additional *phonograph* parts are:

These Prices Are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
(72)	Pick-up Unit (only)	6823	$11.40
(73)	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2006	
(74)	Resistor (10,000 ohm) (Brown-Black-Orange)	4412	.24
(75)	Condenser (.015 Mfd.)	3793-N	.18
(76)	Phonograph-Radio Switch	42-1053	
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
(77)	Automatic-Stop Switch (Motor)	6345	3.30
	Turntable	35-3001	
	Speed-Change Lever (Turntable)	28-1648	
	Speed-Change Lever Spacer (Turntable)	28-6103	
	Speed-Change Lever Spring (Turntable)	28-1649	
(78)	Phonograph Motor (115 volt, 60 cycle)	35-1002	
	Phonograph Motor (115 volt, 50 cycle)	35-1007	
	Phonograph Motor (115 volt, 40 cycle)	35-1003	

No. on Fig. 1	Description	Part No.	List Price
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting Washer (Finishing)	W-464	1.44 per C
	Motor Board Mounting Washer	W-410	.48 per C
	Motor Board Mounting Nut	W-139	.48 per C
	Mounting Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4108	.17
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

The electric pick-up is of the high-impedance type. Its impedance, at 1000 cycles, is 10,000 ohms. Its D. C. resistance is 700 ohms. A description of the adjustment of the pick-up is given in Service Bulletin No. 89, "Adjusting the Electric Pick-up". The D. C. resistance of the pick-up bucking coil is 230 ohms. The direction of current-flow in the bucking coil is very important for proper reproduction; if the bucking coil is temporarily disconnected, be sure it is re-connected correctly.

The electric motor depends upon the frequency (cycles) of the power supply for its correct speed. The power line frequency must be the same as that given in the name-label upon the radio chassis and upon the motor frame. Only a motor of the correct frequency will give the proper turntable speed.

The motor is of the self-starting, synchronous type. The motor should be lubricated at least once every six months. To do this, lift off the turntable and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it; get in touch with your Distributor regarding the faulty motor.

The tone arm must be free to rotate upon its axis at all times. Damage to records will result if it is not.

The speaker unit of Model 504 is Type H-14.

The power consumption of Model 504,—with motor running,—is 95 watts.

MODEL 505
Schematic

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 505

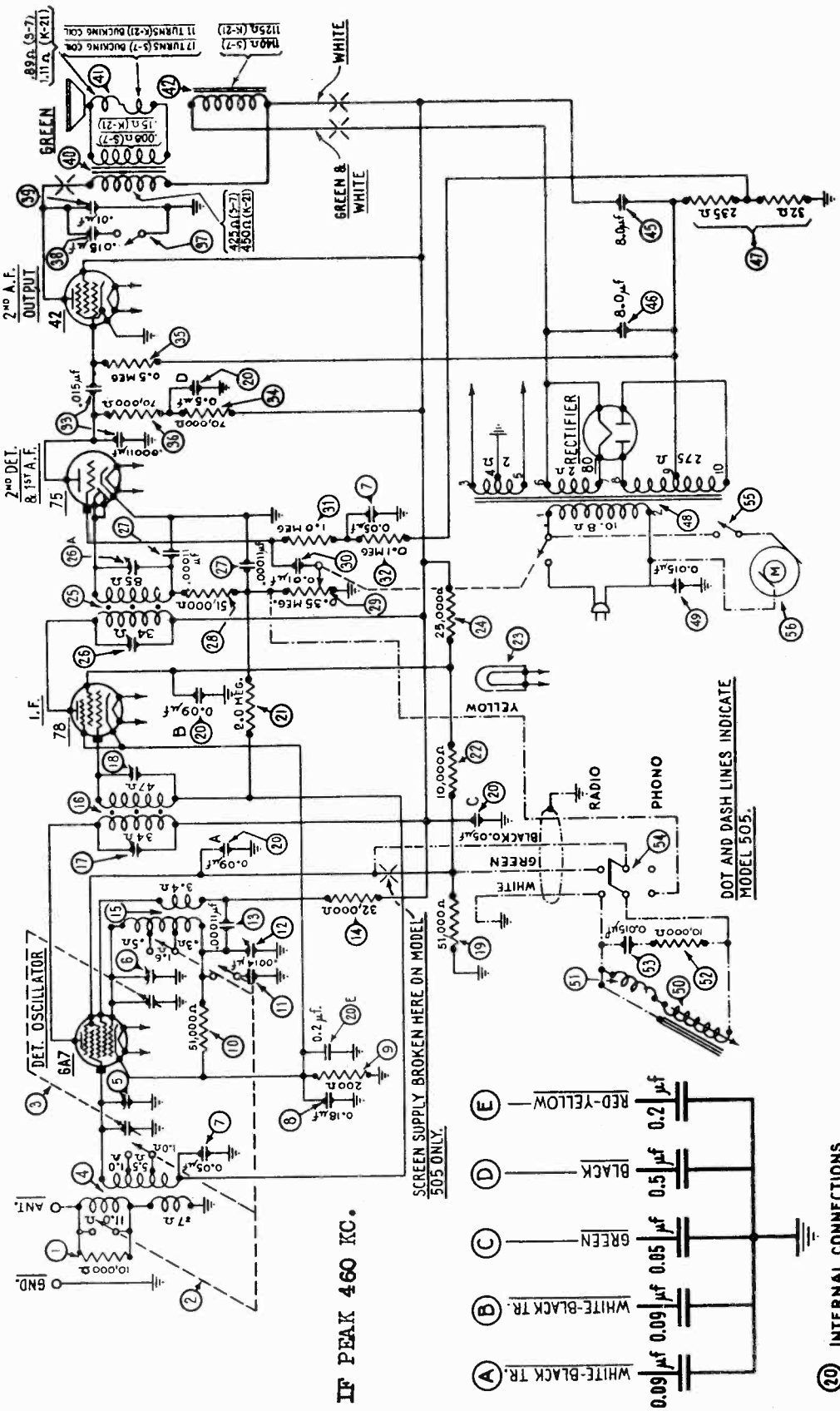


Fig. 1 - Schematic Wiring Diagram

November, 1933

MODEL 505
Parts List
Data

PHILCO RADIO & TELEVISION CORP.

Radio-Phonograph Model 505

PHILCO RADIO-PHONOGRAPH MODEL 505 uses the same radio receiver chassis as the Model 60 Superheterodyne.

Model 505 is designed to operate upon alternating current; the frequency (cycles) of the power line must be that given upon the name-label of the radio chassis.

The radio circuits are the same as those of Model 60,—with the additional wiring of the phonograph. The audio system of the radio chassis amplifies the voltages generated by the pick-up.

Complete schematic wiring diagram of Model 505 is given in Figure 1 of this Bulletin.

Service Bulletin No. 164-A (Model 60) gives the information necessary for tests, and adjustments of the radio receiver, including the adjustment of the compensating condensers.

Replacement Parts for the radio chassis and speaker are included in Service Bulletin No. 164-A. The additional *phonograph* parts are:

These Prices Are Effective September 15, 1933

No. on Fig. 1	Description	Part No.	List Price
⑩	Pick-up Unit (only)	6823	$11.40
⑪	Pick-up Bucking Coil	32-1293	
	Tone Arm and Bucking Coil Assembly	35-2006	
⑫	Resistor (10,000 ohms) (Brown-Black-Orange)	4412	.24
⑬	Condenser (.015 Mfd.)	3793-N	.18
⑭	Phonograph-Radio Switch	42-1053	
⑮	Automatic-stop Switch (Motor)	6345	3.30
⑯	Phonograph Motor (115 volt, 60 cycle)	35-1002	
	Phonograph Motor (115 volt, 50 cycle)	35-1007	
	Phonograph Motor (115 volt, 40 cycle)	35-1003	
	Motor Board	32516	
	Motor Board Mounting Screw	W-461	.01
	Motor Board Mounting (Finishing) Washer	W-464	1.44 per C.
	Motor Board Mounting Washer	W-410	.48 per C.
	Motor Board Mounting Nut	W-149	.48 per C.
	Motor Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-694	1.20 per C.
	Motor Mounting Washer	W-410	.48 per C.
	Motor Mounting Nut	W-139	.48 per C.
	Turntable	35-3001	
	Pick-up Mounting Screw	W-695	.24 per C.
	Pick-up Mounting Washer	W-410	.48 per C.
	Pick-up Mounting Nut	W-696	.30 per C.
	Pick-up Needle Screw	4103	.17
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Cover	27-7285	
	Phonograph-Radio Switch Plate	6444	.10
	Speed-Change Lever (Turntable)	28-1648	
	Speed-Change Lever Spacer (Turntable)	28-6103	
	Speed-Change Lever Spring (Turntable)	28-1649	
	Cord-Connector Plug	4091	.30
	Needle Cup	4101	.19
	Needle Box	4102	.36

The electric motor of Model 505 is of the self-starting, synchronous type, depending upon the frequency (cycles) of the power line for its correct speed. The power line frequency must be the same as that given on name-label of Model 505. The motor should be lubricated at least once every six months. Lift off the turntable, and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor. Only a motor of the correct frequency will give the proper turntable speed.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it. Communicate with your Distributor regarding the faulty motor.

The electric pick-up is of the high-impedance type. Its impedance is 10,000 ohms, measured at 1000 cycles. The D. C. resistance is 700 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D. C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly, as the direction of current-flow is very important.

The tone arm must be free at all times to rotate upon its axis. Damage to records will result if it is not.

The speaker unit of Model 505 is Type K-21.

The power consumption of Model 505,—with the motor running,—is 90 watts.

PHILCO RADIO & TELEVISION CORP.

MODEL 38,38-A
MODEL 71
MODEL 89-126-126-B
MODEL 19-122-126-126B
MODEL 91,14,91-122
MODEL 91-A,121
Changes

SEE INDEX

FOR FURTHER INFORMATION ON THESE RECEIVERS,

Models 38 and 38-A

The following additional *list* prices should be included in the Replacement Parts list:

No. on Figs.	Description	Part No.	List Price
①	Volume Control	33-5017	$0.72
②	Wave Band Switch	42-1039	.48
③	Antenna Transformer	32-1208	.48
④	Tuning Condenser Assembly	31-1076	2.70
⑭	Oscillator Transformer	32-1209	.78
⑯	1st I. F. Transformer	32-1251	.60
⑰	2nd I. F. Transformer	32-1252	.60
㉛	Voice Coil and Cone Assembly	36-3014	.60
㉝	Switch ("On-Off"; Battery)	42-1040	.54
	Battery Cable Assembly (including Multi-Plug)	38-5265	.96
	Station Selector Dial Scale	27-5019	.14

Note: The above list prices are effective September 15, 1933.

Model 71 Series

To correct typographical error;—

Change Part No. 02761 ㊾, Speaker Field and Bucking Coil assembled with Pot (K-7)—(single speaker Models), to Part No. 02741.

Change Part No. 02762 ㊼ Speaker Field and Bucking Coil assembled with Pot—(K-9)—(twin speaker Models)—to Part No. 02761.

Model 89-126-126B

Model 19-122-126-126B

The following substitutions of electrolytic condensers are effective with current production:

Position	Code 122 (Model 19 only)	Code 126 and 126B (Models 89 and 19)
㊻	8095 (6 Mfd.), or 7464 (8 Mfd.)	30–2020, or 8166, or 4916, or 8095
㊹	8095 (6 Mfd.), or 7464 (8 Mfd.)	30–2021, or 8165, or 8095 (These are all of 6.0 Mfd. capacity)

Effective with Run Number 5, Tuning Condenser ④ is superseded by Tuning Condenser, Part No. 31-1053. The *complete* Tuning Condenser Assembly ④ Part No. 06577, is superseded by Assembly, Part No. 31-1059.

The sub-base has been modified to accommodate the new condenser by change in location of mounting holes.

Effective with Run Number 6 for Model 89, and with Run Number 5 for Model 19, the red and black wires connecting Oscillator Transformer ⑭ and Compensating Condenser—(1st. I. F. Primary) ⑱ are reversed at the Compensating Condenser.

Part No. 3615BF Condenser is substituted for Part No. 3615E in ㊺.

Change Part No. 02761 ㊾, Speaker Field and Bucking Coil assembled with Pot (K-7), to Part No. 02741.

Effective with Run Number 6 for Model 89, and with Run Number 5 for Model 19, the red and black wires connecting Oscillator Transformer ⑭ and Compensating Condenser—(1st. I. F. Primary) ⑱ are reversed at the Compensating Condenser.

Models 91 and 14 Series

Make ⑲ Oscillator Coil read Part No. 05983. This part has a list price of 65 cents.

Model 91-122

With Run number 2, Tuning Condenser Assembly ④ will be changed to Part No. 31-1051, immediately superseding Part No. 31-1015. In the substitution, it is necessary to remove three of Part No. W-453 mounting bolts and add three of Part No. W-729 mounting bolts; to add three Part No. 29-6060 spacers, six Part No. 3914 rubber washers, and three Part No. W-410 washers.

Model 91-A; Code 121

Effective with current production, this Model will have two Part No. 8022 (10 microfarad) Electrolytic Condensers.

PHILCO SPEAKERS

PHILCO RADIO & TELEVISION CORP.

DATA ON ALL PHILCO SPEAKERS

All speakers are equipped with output transformer, except as mentioned in notes

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Speaker Field Coil and Pot Assembly (Part No.)	Speaker Field Coil (Part No.)	Speaker Voice Coil and Cone Assembly (Part No.)	Speaker Field Coil Resistance D.C. (Ohms)	Speaker Voice Coil Resistance (Ohms)	Speaker Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
A‡		3 (Transitone)	1-71A	Not furnished	2707	2769-B	4.05	.62	.....	2706	1.50 A.	375	A-17
A-2‡	02971	3 (Transitone)	1-71A	Not furnished	2707	02996	4.05	.62	.....	2706	1.50 A.	375	A-17
A-3‡	02832	7 (Transitone)	1-38 as Pentode	Not furnished	2707	02996	4.05	.62	.....	2589	1.50 A.	700	A-18
A-4	02822	6 (Transitone); 7 (Transitone)	1-41 as Pentode	02795	2593	36-3020	4.2	1.11	.....	2598	1.25 A.	680	.....
A-5	02756	8 (Transitone)	Push-Pull 41's as Pentodes	02795	2593	36-3020	4.2	1.11	.....	2565	1.25 A.	680	.....
A-6	02712	12 (Transitone) (Code 121)	Push-Pull 41's as Pentodes	02688	2535	36-3020	16.0	1.11	.....	2565	.75 A.	680	.....
A-7	02674	9 (Transitone) (6 Volt)	1-79 as Class "B"	02795	2593	36-3020	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-8	02665	B-6 (Transitone)	1-41	02795	2593	36-3020	4.2	1.11	.....	2598	1.25 A.	680	.....
A-9	36-1001	12 (Transitone) (Code 122)	1-79 as Class "B"	02688	2535	36-3020	16.0	1.11	.....	32-7039	.75 A.	725	.....
A-10	36-1003	B-9-F (Transitone)	1-79 as Class "B"	02795	2593	36-3020	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-11	36-1032	PB (Transitone)	1-41	02795	2593	36-3020	4.2	1.11	.....	2598	1.25 A.	680	.....
A-12	36-1040	PA (Transitone)	1-79 as Class "B"	02795	2593	36-3020	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-13	36-1045	9 (Transitone)	1-79 as Class "B"	02795	2593	36-3020	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-17	36-1062	Replacement for A and A-2	1-71A	02795	2593	36-3020	4.2	1.11	.....	32-7014	1.25 A.	170	.....
A-18	36-1063	Replacement for A-3	1-38 Pentode	02795	2593	36-3020	4.2	1.11	.....	32-7005	1.25 A.	680	.....
B	36-1007	54	1-43 as Pentode	36-3040	32-9007	36-3029	2600	.89	36-3021	32-7020	40 M.A.	200	.....
B-2	36-1016	57; 58	1-42 as Pentode	36-3081	32-9019	36-3029	1140	.89	36-3057	32-7041	50 M.A.	400	.....
E‡		86	Push-Pull 71A's	Not furnished	2850	02996	3100	.62	.....	2897	40 M.A.	550	K-24
F-10‡		65, 76	Push-Pull 45's	Not furnished	2850	.....	3200	.62	.....	2848	.....	550	K-24
G‡		65; 76; 87; 95	Push-Pull 45's	Not furnished	Not furnished	36-3170	3200	.62	.....	2848	40 M.A.	550	H-17
H‡		77; 96	Push-Pull 45's	Not furnished	Not furnished	36-3170	3200	.62	.....	2848	40 M.A.	550	H-17
H-2‡	02999	90-H; 90-L; 112-L; 111-L	Push-Pull 45's	Not furnished	2850	36-3170	3200	.62	.....	2848	40 M.A.	550	H-17
H-3‡	02951	90-H. (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	2850	36-3170	3200	.62	.....	2673	40 M.A.	450	H-18
H-4‡	02901	112, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2850	36-3170	3200	.62	.....	2635	40 M.A.	800	H-12
H-5‡	02876	90-H. (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	2850	36-3170	3200	.62	.....	2673	40 M.A.	450	H-18
H-6‡	02873	90-X. (Series "B"); 112-X, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2850	36-3170	3200	.62	.....	2635	40 M.A.	800	H-12
H-7	02813	14-LZX; 15-X; 23-X; 91-X (See Note 1)	Push-Pull 42's as Pentodes	02803	2588	02625	3275	1.11	.....	2565	40 M.A.	680	.....
H-9	02648	19-H; 19-LZX; 71-X; 25-L; 27-L; 43-L; 71-H; 44	1-42 as Pentode	02807	2562	02625	1125	1.11	02775	2580	65 M.A.	450	.....
H-10	02641	47-H (Code 125); 47-X (Code 125)	Push-Pull 43's as Pentodes	02745	2546	02625	70	1.11	.....	2550	300 M.A.	170	.....
H-11	36-1005	Central Control System	(4,000 Ohm Impedance on line)	02803	2588	02625	3275	1.11	.....	32-7014	40 M.A.	170	.....
H-12	36-1006	91-D; 91-L; 91-X; 23-L	Push-Pull 42's as Pentodes	02803	2588	02625	3275	1.11	.....	2585	40 M.A.	680	.....
H-13	36-1036	18-D; 18-H; 18-L; 18-X; 503-L	Push-Pull 42's as Triodes	36-3104	2562	02625	1125	1.11	.....	32-7078	65 M.A.	310	.....
H-14	36-1037	44-H; 504-L; 260-L; 261-L	1-42 as Pentode	02767	2562	02625	1125	1.11	02775	2580	65 M.A.	450	.....
H-15	36-1057	19-H (Code 126)	1-42 as Pentode	36-3201	2562	02625	1125	1.11	02780	2580	65 M.A.	450	.....
H-16	36-1059	19-X (Code 128)	1-42 as Pentode	36-3218	32-9087	02625	660	1.11	36-3204	32-7178	80 M.A.	260	.....

H-17	36-1064	Replacement for H, H-2, G	Push-Pull 45's	02803	2588	02625	3275	1.11	.....	32-7078	40 M.A.	310	.....
H-18	36-1065	Replacement for H-3 and H-5	1-47 as Pentode	02803	2588	02625	3275	1.11	.....	2580	40 M.A.	450	.....
H-19	36-1066	Replacement for J	Push-Pull 71A's	02795	2593	02625	4.2	1.11	.....	32-7078	1.25 A.	310	.....
H-20	36-1080	Central Control System	(1000 Ohm Impedance on line)	02803	2588	02625	3275	1.11	.....	32-7198	40 M.A.	32	.....
HR	02652	Central Control System	(12000 Ohm Impedance on line)	.....	.....	02625	Permanent Magnet	1.11	.....	2598	.....	680	.....
J‡		40; 41	Push-Pull 71A's	Not furnished	2799	36-3170	3	.62	.....	2848	1.75 A.	550	H-19
K‡		20; 21	Push-Pull 71A's	Not furnished	2768	02996	3100	.62	.....	2766	40 M.A.	500	K-24
K-2‡	02998	90-B	Push-Pull 45's	Not furnished	2768	02996	3100	.62	.....	2766	40 M.A.	500	K-24
K-3‡	02981	70-B; 70-H; 90-H, (Series "B")	1-47 as Pentode	Not furnished	2768	02996	3100	.62	.....	2673	40 M.A.	450	K-25
K-4‡	02865	470; 490	1-47 as Pentode	Not furnished	2768	02996	3100	.62	.....	2673	40 M.A.	450	K-25
K-5‡	02834	90, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	2768	02996	3100	.62	.....	2590	40 M.A.	700	K-6
K-6	02821	91-B (Also replacement for K-5)	Push-Pull 42's as Pentodes	02803	2588	36-3174	3275	1.11	.....	2585	40 M.A.	680	.....
K-7	02819	19-B; 19-LZ; 89-B; 89-H; 71-B; 71-L; 43-B	1-42 as Pentode	02741	2562	36-3174	1125	1.11	02780	2580	65 M.A.	450	.....
K-8	02806	470, 490	.....	Not furnished	2768	02996	3100	.62	.....	2590	40 M.A.	700	.....
K-9	02874	22-L; 43-H; 71-D; 71-H (See Note 2)	1-42 as Pentode	02761	2588	36-3174	3275	1.11	02775	2564	40 M.A.	530	.....
K-10	02872	22-L; 43-H; 71-D; 71-H (See Note 3)	.....	02767	2562	36-3174	1125	1.11	02780	.....	65 M.A.	.....	.....
K-12	02765	14-LZX; 15-X; 23-X; 91-X (See Note 4)	.....	02803	2588	36-3020	3275	1.11	.....	.....	40 M.A.	.....	.....
K-13	02763	47-B and Replacement for N and N-2	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	.....	2550	300 M.A.	170	.....
K-14	02758	47-H (See Note 5)	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	.....	2544	300 M.A.	170	.....
K-15	02757	47-H (See Note 6)	.....	02744	2545	36-3020	2200	1.11	.....	.....	50 M.A.	.....	.....
K-16	02706	247-E	Push-Pull 43's as Pentodes	02745	2546	36-3020	70	1.11	.....	2585	300 M.A.	680	.....
K-17	36-1025	16-B; 17-B; 14-B (Code 122); 18-B	Push-Pull 42's as Triodes	36-3104	2562	36-3020	1125	1.11	.....	32-7078	65 M.A.	310	.....
K-18	36-1031	10 (Transitone) (6 Volt) (See Note 7)	.....	02795	2593	36-3020	4.2	1.11	.....	.....	1.25 A.	.....	.....
K-19	36-1035	261-B	1-42 as Pentode	02741	2562	36-3174	1125	1.11	02780	2580	65 M.A.	450	.....
K-20	36-1043	10 (Transitone) (12 Volt) (See Note 7)	.....	36-3172	2535	36-3020	16	1.11	.....	.....	.75 A.	.....	.....
K-21	36-1055	505-L; 19-B; 89-L; 89-B; 19-LZ	1-42 as Pentode	36-3245	2562	36-3174	1125	1.11	36-3177	2580	65 M.A.	450	.....
K-22	36-1058	44-B	1-42 as Pentode	02767	2562	36-3174	1125	1.11	02775	2580	65 M.A.	450	.....
K-23	36-1060	19 (Code 128)	1-42 as Pentode	32-3239	32-9087	36-3174	660	1.11	36-3177	32-7178	80 M.A.	260	.....
K-24	36-1067	Replacement for E, F-10, M, K, K-2	Push-Pull 71A's or 45's	02803	2588	36-3174	3275	1.11	.....	32-7078	40 M.A.	310	.....
K-25	36-1068	Replacement for K-3 and K-4	1-47 as Pentode	02803	2588	36-3174	3275	1.11	.....	2580	40 M.A.	450	.....
KR	36-1002	Central Control System	(10000 Ohm Impedance on line)	.....	.....	36-3014	Permanent Magnet	.89	.....	32-7005	.....	680	.....
KR-2	36-1004	38-B; 38-L	1-19 as Class "B"	.....	.....	36-3014	Permanent Magnet	.89	.....	2565	.....	680	.....
KR-3	36-1022	Model 12, (Coast Guard)	Push-Pull 41's	.....	.....	36-3014	Permanent Magnet	.89	.....	2585	.....	680	.....
KR-4	36-1085	Central Control System	(4000 Ohm Impedance on line)	.....	.....	36-3014	Permanent Magnet	.89	.....	32-7014	.....	170	.....
L		30	Push-Pull 31's	.....	.....	36-3223	MAGNETIC	.....	.....	.....	.....	.....	.....
M‡		Separate Speaker	Push-Pull 71A's	.....	2768	02996	3100	.62	.....	2766	40 M.A.	500	K-24
N‡		46-B; 46-H	Push-Pull 71A's	Not furnished	2694	02996	80	.62	.....	2766	330 M.A.	500	K-13
N-2‡	02977	46-B; 46-H	Push-Pull 71A's	Not furnished	2694	02996	80	.62	.....	2766	330 M.A.	500	K-13

PHILCO RADIO & TELEVISION CORP.

PHILCO SPEAKERS

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Speaker Field Coil and Pot Assembly (Part No.)	Speaker Field Coil (Part No.)	Speaker Voice Coil and Cone Assembly (Part No.)	Speaker Field Coil Resistance D.C. (Ohms)	Speaker Voice Coil Resistance (Ohms)	Speaker Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
P‡	02947	50; 51	1-47 as Pentode	Not furnished	2674	02970	1140	.89	.....	2660	65 M.A.	360	P-16
P-2‡	02860	52-B; 52-C; 52-L	1-47 as Pentode	Not furnished	2674	02861	1140	.89	.....	2660	65 M.A.	360	P-16
P-3‡	02705	48-E	1-18 as Pentode	Not furnished	2527	02861	50	.89	.....	2651	330 M.A.	360	P-13
P-4‡	02680	48-B; 48-C	1-43 as Pentode	Not furnished	2527	02861	50	.89	.....	2520	330 M.A.	175	P-17
P-5‡	02679	80-C; 80-P	1-42 as Pentode	Not furnished	2674	02861	1140	.89	02678	2660	65 M.A.	360	P-8
P-6‡	02666	80-C; 80-P	1-42 as Pentode	Not furnished	2674	02861	1140	.89	02664	2660	65 M.A.	360	P-8
P-8	36-1012	81 (Also Replacement for P-5 and P-6)	1-42 as Pentode	36-3058	32-9008	36-3027	1140	.89	36-3101	32-7019	65 M.A.	400	
P-10	36-1014	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3046	32-9013	36-3027	6	.89	.....	32-7042	1.0 A.	450	
P-11	36-1018	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3097	32-9013	36-3027	6	.89	.....	32-7065	1.0 A.	450	
P-12	36-1023	5 (Transitone) (12 Volt)	1-41 as Pentode	36-3098	32-9035	36-3027	24	.89	.....	32-7065	.5 A.	450	
P-13	36-1024	48-E (Also Replacement for P-3)	1-18 as Pentode	36-3120	32-9038	36-3027	50	.89	.....	32-7076	330 M.A.	400	
P-16	36-1069	Replacement for P and P-2	1-47 as Pentode	36-3242	32-9008	36-3027	1140	.89	.....	32-7076	65 M.A.	400	
P-17	36-1070	Replacement for P-4	1-43 as Pentode	36-3120	32-9038	36-3027	50	.89	.....	32-7191	330 M.A.	175	
PR	36-1000	53	1-43 as Pentode	.....	.....	36-3000	Permanent Magnet	1.22	.....	32-7000	.....	200	.....
R‡	02941	35-B; 35-H	1-33 as Pentode	.....	.....	02949	Permanent Magnet	.89	.....	2646	.....	450	KR-5
R-2‡	02888	35-B; 35-H	1-33 as Pentode	.....	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-5
R-3‡	02753	Separate Speaker	(15000 Ohm Impedance on line)	.....	.....	02887	Permanent Magnet	.89	.....	2551	.....	680	KR-2
R-4‡	02748	36-B; 36-H; 36-L	1-33 as Pentode	.....	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-5
R-5‡	02709	36-B; 36-H; 36-L	1-33 as Pentode	.....	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-5
R-6‡	02708	37-C; 37-L	1-19 as Class "B"	.....	.....	02887	Permanent Magnet	.89	.....	2528	.....	680	KR-2
R-7‡	02619	Central Control System	(10000 Ohm Impedance on line)	.....	.....	02887	Permanent Magnet	.89	.....	2585	.....	680	KR
S‡	02912	52-L; 50; 51	1-47 as Pentode	Not furnished	2674	02887	1140	.89	.....	2660	65 M.A.	360	S-9
S-2‡	02858	24-L; 52-L; 50; 51	1-47 as Pentode	Not furnished	2674	02887	1140	.89	.....	2660	65 M.A.	360	S-9
S-4‡	02672	48-L	1-43 as Pentode	Not furnished	2527	02887	50	.89	.....	2520	330 M.A.	175	S-10
S-7	36-1009	60-B; 60-L; 260-B	1-42 as Pentode	36-3037	32-9008	36-3014	1140	.89	36-3129	32-7019	65 M.A.	400	
S-9	36-1071	Replacement for S and S-2	1-47 as Pentode	36-3264	32-9008	36-3014	1140	.89	.....	32-7076	65 M.A.	400	
S-10	36-1072	Replacement for S-4	1-43 as Pentode	36-3120	32-9038	36-3014	50	.89	.....	32-7191	330 M.A.	175	
SB	36-1073	84	1-42 as Pentode	36-3243	32-9019	36-3014	1140	.89	36-3240	32-7019	50 M.A.	400	
U	36-1017	14 (Code 121)	Push-Pull 42's as Pentodes	36-3074	32-9026	36-3061	6500	2.0	.....	32-7051	40 M.A.	680	
U-2	36-1019	16-L; 16-X; 16-RX; 16-PX; 17-L; 17-D; 17-X; 17-RX	Push-Pull 42's as Triodes	36-3088	32-9024	36-3061	1450	2.0	.....	32-7052	80 M.A.	350	
U-3	36-1039	14-L (Code 122); 14-X (Code 122); 14-R(Code 122)	Push-Pull 42's as Triodes	36-3162	32-9055	36-3061	1140	2.0	.....	32-7052	70 M.A.	350	
KR-5	36-1097	Replacement for R, R-2, R-4, R-5	1-33 asPentode	.....	.....	36-3014	Permanent Magnet	.89	.....	2580	.....	450	

NOTE 1: Output Transformer designed to carry two speaker voice coils in parallel; with K-12.
NOTE 2: Output Transformer designed to carry two speaker voice coils in series; with K-10.
NOTE 3: NO output transformer on speaker; this speaker paired with K-9.
NOTE 4: NO output transformer on speaker; this speaker paired with H-7.
NOTE 5: Output Transformer designed to carry two speaker voice coils in parallel; with K-15.
NOTE 6: NO output transformer on speaker; this speaker paired with K-14.
NOTE 7: NO output transformer on speaker; Output Transformer is on chassis.
‡NOT available; use replacement.

January, 1934

PHILCO RADIO & TELEVISION CORP.

MODEL Transitone
Vibrator data
Steering Column

HOW OLD IS A VIBRATOR?

THIS question often comes up. Nobody can afford to give Vibrators away free indefinitely. There must come a time when the customer is no longer entitled to a free Vibrator replacement.

The Vibrator, like all other radio parts, is covered by our Standard Warranty, which, interpreted liberally, means that the warranty is in force for a period of ninety days from the date of the original sale and installation.

Installation records should furnish this information, but in the absence of these records, the code date of manufacture stamped on the top of the Vibrator can be used. Under average conditions the warranty period expires four months after the date of manufacture. This allows thirty days for distribution and consummation of the retail sale, and then ninety days from the sale date.

The code number is built up by using the last number of the year as the first digit—(3 for 1933, 4 for 1934). The remainder of the code number is the number of the day in the year. For example, January 28, 1933, is 328. The following list shows the code numbers for the first of each month in 1933:

Date	*Code Number*
January 1, 1933	31
February 1, 1933	332
March 1, 1933	360
April 1, 1933	391
May 1, 1933	3121
June 1, 1933	3152
July 1, 1933	3182
August 1, 1933	3213
September 1, 1933	3244
October 1, 1933	3274
November 1, 1933	3305
December 1, 1933	3335

CAR BATTERY CONNECTIONS

THE following list shows the polarity of the ground connection in American automobiles and will prove useful in service work:

(A—) GROUNDED

Buick	Durant	Pontiac
Chevrolet	Essex	Reo
DeVaux	Hudson	Stutz
Dusenburg	Nash	Willys
	Oldsmobile	

(A+) GROUNDED

Auburn	Franklin	Packard
Cadillac	Graham	Peerless
Chrysler	Hupmobile	Pierce Arrow
Cord	LaSalle	Plymouth
DeSoto	Lincoln	Rockne
Dodge	Marmon	Studebaker
Ford	*Nash	

*(Twin Ignition)

STEERING COLUMN CONTROL HOUSINGS

THERE are 50 or more control assemblies for Philco automobile radio, many of which you probably will never be called upon to service. It is important, however, that you have a complete record of the controls—what they are used for and the important parts that enter into the construction of the various controls.

Since there is little wear to the parts that go to make up the control, your replacement parts stock for servicing controls can be limited chiefly to dials, knobs, keys, locks, pilot lamps and the hardware necessary for mounting a control on a steering column. A spare control unit for the current model Receivers should also be stocked for quick replacement.

There are two basic type controls. The type used the most has direct drive and is shown in Fig. 3. The control knobs fasten on to the control ends of the flexible shafts. The control shown in Fig. 4 uses a gear type drive for the volume control shaft. In this type control, the knobs fasten on to short shafts or stubs in the control head and the shafts are coupled to these stubs. The volume control is connected through a gear train, while the tuning control shaft is coupled direct.

The early controls of this type had smaller openings in the rear for coupling the shaft casings, since the casings were straight ended (without the usual swelled or bell end.) These holes were enlarged later on to take the large bell end casing, as shown in Fig. 4., but the same part number was retained for the control housing. When ordering a control housing of the gear type and the one with the small casing holes is required, be sure to note this on the order.

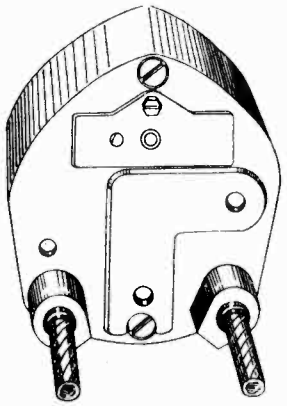


FIG. 3

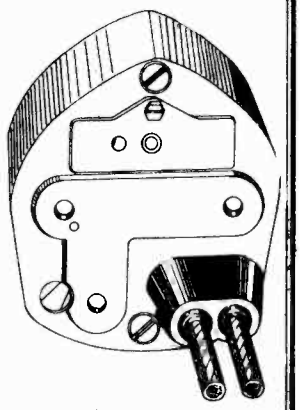


FIG. 4

DIRECT DRIVE CONTROLS—(See Fig. 3)

Control Assembly No. 42-5006		Consists of
Control Housing Only	6029	
Lock Retainer	6031	Lock Retainer Assembly No. 42-5009
Lock Plate	6039	
Lock Spring (coil)	6111	
Washer	W-442	
Screw	W-145	
Screw (shaft end retaining)	6042	
Set Screw (shaft casing)	W-481	
Screw (lock assembly mounting)	W-523	

Continued on next page

MODEL Transitone
Drive controls

PHILCO RADIO & TELEVISION CORP.

This assembly has no shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that can be used for Models 5, 6, 7, 8, 9, 10 and 12 controls and can be used with P, R, W, X and Y type shafts.

GEAR DRIVE CONTROLS—(See Fig. 4)

Control Housing Assembly No. 42-5027 Consists of

Control Housing Only	28-7011	No. 42-5026
Shaft Retaining Screws	6042	
Set Screws	W-481	
Lock Retainer	29-7006	No. 42-5024
Lock Plate	29-1442	
Lock Spring	28-1403	
Stud	28-6048	
Tuning Control Shaft (with set screw)	42-5016	
Volume Control Shaft Driven (with set screws)	42-5017	
Volume Control Shaft Driver	28-7009	
Intermediate Gear	28-7010	
Intermediate Gear Sleeve	28-6075	
Intermediate Gear Spring Washer	28-1456	
Intermediate Gear Mounting Screw	W-849	
Lock Retaining Mounting Screw	W-833	

This assembly has no external shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that is used for Models 5, 6, 9 and 12 gear type controls and can be used with T, U and V type shafts.

The pilot lamp bracket assembly 38-5091 is fastened to the above control assemblies with a W-745 mounting screw.

The standard cover plate, which is used alike on both the direct and gear drive controls, is part No. 6030. The screws for fastening the cover plate to the controls are W-611B.

Special cover plates used with the various car manufacturer special Receivers can only be purchased through the car manufacturer organizations.

The standard knobs are 03334 for the tuning control shaft and 06886 for the volume control shaft.

The dials used in the various steering column controls are:

Model	*Part No.*
7 and 8	6043
6 and 9	8255
B6 and B9	8257
5	27-5006
10	27-5022
12 (121)	6043
12 (122)	8255

The lock used in the direct drive control is 6036. The lock in the gear drive control is 28-8014. These are not interchangeable.

The dial which fits over the dial hub is firmly held in place by means of a spring spider, 6644. The same spider is used in both type controls.

The various types of flexible shafts are shown in the October issue of "Service Broadcast."

The controls for the various models are assembled by using the basic control and adding the following parts:

Pilot Lamp Bracket and Mounting Screw
Dial with Spider
Lock
Cover Plate with Screws
Flexible Shafts
Knobs

A partial list of the direct drive controls in common use is given below:

Receiver Model	Control Part No.	Flex. Shaft Part No.	Shaft Type	Special Note
7-8-12	04343	6128	Z	Also early 6-9.
		6129	Z	
B6-B9	06262	7739	Z	Early B6-B9.
		7740	Z	
B6-9	06918	7739	Z	
		7740	Z	
6-9	06941	6128	Z	
		6129	Z	
B6	42-5003	7739	Z	Without cover or knobs. These furnished by car manufacturer.
		7740	Z	
S6-S9	42-5004	6351	Z	With special 7887 cover plate.
		6352	Z	
5	42-5008	28-8006	R	
		28-8007	R	
P5	42-5010	28-8006	R	
		28-8007	R	
5 Chrysler	42-5011	28-8006	R	Without cover or knobs. These furnished by car manufacturer.
		28-8007	R	
B6	42-5052	28-8064	W	Without cover or knobs. These furnished by car manufacturer.
		28-8065	W	
5 Studebaker	42-5057	28-8113	Y	With special 7887 cover plate.
		28-8114	Y	
Auburn 5	42-5058	28-8113	Y	With special 28-7013 cover plate.
		28-8114	Y	
Nash 5	42-5059	28-8113	Y	With special 28-7015 cover plate.
		28-8114	Y	
Hupp 5	42-5060	28-8113	Y	With special 28-7014 cover plate.
		28-8114	Y	
6-9-12 Chrysler	42-5063	28-8099	X	Without cover or knobs. These furnished by car manufacturer.
		28-8102	X	
6-9-12 Studebaker	42-5064	28-8100	X	With special 7887 cover plate.
		28-8103	X	
6-9-12 Hupp	42-5065	28-8133	Y	With special 28-7014 cover plate.
		28-8134	Y	
6-9-12 Auburn	42-5066	28-8129	Y	With special 28-7013 cover plate.
		28-8130	Y	
6-9-12 Nash	42-5067	28-8129	Y	With special 28-7015 cover plate.
		28-8130	Y	
B6-9	42-5068	28-8098	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8101	Y	
5 Chrysler	42-5069	28-8113	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8114	Y	
5 Packard	42-5070	28-8137	Y	
		28-8138	Y	
9F Studebaker	42-5075	28-8129	Y	With special 7887 cover plate.
		28-8130	Y	
B6-B9	42-5076	28-8135	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8136	Y	
10	42-5077	28-8139	P	
		28-8141	P	
6-9-12	42-5079	28-8099	X	
		28-8102	X	
B6	42-5080	28-8098	X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
		28-8101	X	
6-9	42-5081	28-8099	X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
		28-8102	X	
5 Hupp	42-5083	28-8155	Y	With special 28-7014 cover plate.
		28-8156	Y	
PAS-PBS	42-5084	28-8099	X	With special 7765 cover plate.
		28-8102	X	
5	42-5085	28-8113	Y	
		28-8114	Y	
6-9	42-5086	28-8129	Y	
		28-8130	Y	
SCS-SDS	42-5087	28-8139	P	With special 7887 cover plate.
		28-8141	P	
9 Studebaker	42-5089	28-8099	X	With special 7887 cover plate.
		28-8102	X	
CDS	42-5090	28-8139	P	Without cover or knobs. These furnished by car manufacturer.
		28-8141	P	
9 Hupp	42-5091	28-8109	X	With special 28-7014 cover plate.
		28-8110	X	
HDS	42-5094	28-8157	P	With special 28-7014 cover plate.
		28-5158	P	
NCS-NDS	42-5096	28-8139	P	With special 28-7015 cover plate.
		28-8141	P	
10X	42-5103	28-8186	P	No lock.
		28-8187	P	

Gear Drive Controls (using basic control 42-5027)

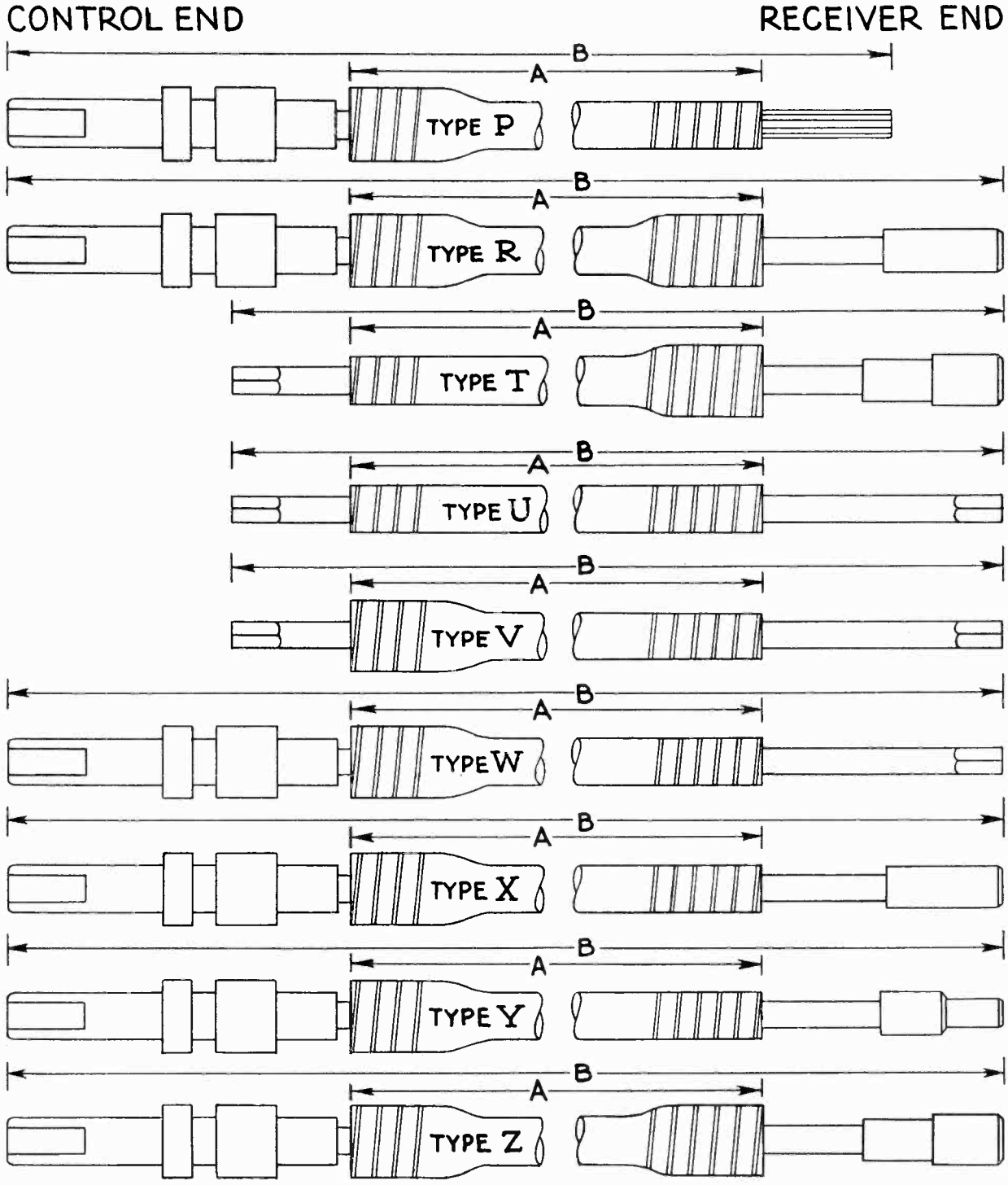
Receiver Model	Control Part No.	
5	42-5012	Without cover or knobs. These furnished by car manufacturer.
B6	42-5014	
6-9-12	42-5015	With special 7765 cover plate.
P5	42-5021	

NOTE—Shafts are shipped separately.

PHILCO RADIO & TELEVISION CORP.

MODEL Transitone
Drive controls

FLEXIBLE CONTROL SHAFTS—MODELS 5, 6, 7, 8, 9, 10, 12



MODEL Transitone
Control shafts

PHILCO RADIO & TELEVISION CORP.

FLEXIBLE CONTROL SHAFT GUIDE LIST

Type	TUNING CONTROL Dimension A	B	Part No.	VOLUME CONTROL Dimension A	B	Part No.	Used With Model
P	12″	14⅜″	28-8161	12″	14⅜″	28-8162	10
	18″	20⅜″	28-6163	18″	20⅜″	28-8164	10
	19″	21⅜″	28-8157	19″	21⅜″	28-8158	10
	28″	30⅜″	28-8139	28″	30⅜″	28-8141	10
R	12″	14⅝″	28-8010	12″	17⅛″	28-8011	5
	18″	20⅝″	28-8012	18″	23⅛″	28-8013	5
	24″	26⅝″	28-8022	24″	29⅛″	28-8023	5
	32″	34⅝″	28-8006	32″	37⅛″	28-8007	5
	84″	86⅝″	28-8020	84″	89⅛″	28-8021	5
T	18″	—	28-8054	18″	—	28-8054	6-9
	—	20⅛″	38-5218	—	20⅛″	38-5218	
	24″	—	28-8052	24″	—	28-8052	5
	—	25⅝″	38-5210	—	27⅛″	38-5211	
	28″	—	28-8036	28″	—	28-8036	5
	—	29⅝″	38-5159	—	31⅞″	38-5160	
	32″	—	28-8038	32″	—	28-8038	6-9
	—	34⅛″	38-5170	—	34⅛″	38-5170	
	120″	—	28-8043	120″	—	28-8043	B6-9
	—	121⅝″	38-5184	—	121⅝″	38-5184	
U	18″	—	28-8055	18″	—	28-8055	6-9
	—	20⅛″	28-8081	—	20⅛″	28-8081	
	24″	—	28-8053	24″	—	28-8053	P5
	—	25⅛″	28-8077	—	27¾″	28-8079	
	28″	—	28-8037	28″	—	28-8037	5
	—	29⅛″	28-8073	—	31¾″	28-8075	
	32″	—	28-8039	32″	—	28-8039	6-9
	—	34⅛″	28-8083	—	34⅛″	28-8083	
	120″	—	28-8045	120″	—	28-8045	B6-9
	—	121⅛″	28-8085	—	121⅛″	28-8085	
V	10″	—	28-8072	10″	—	28-8072	P9
	—	12⅛″	28-8087	—	12⅛″	28-8087	
	18″	—	28-8054	18″	—	28-8054	S6
	—	20⅛″	28-8081	—	20⅛″	28-8081	
	24″	—	28-8052	24″	—	28-8052	P5
	—	25⅛″	28-8077	—	27¾″	28-8079	
	28″	—	28-8036	28″	—	28-8036	5
	—	29⅛″	28-8073	—	31¾″	28-8075	
	32″	—	28-8038	32″	—	28-8038	6-9
	—	39⅛″	28-8083	—	34⅛″	28-8083	
	120″	—	28-8043	120″	—	28-8043	B6-9
	—	121⅛″	28-8085	—	121⅛″	28-8085	

Type	TUNING CONTROL Dimension A	B	Part No.	VOLUME CONTROL Dimension A	B	Part No.	Used With Model
W	10″	14″	28-8091	10″	14″	28-8094	PA
	18″	22″	28-8090	18″	22″	28-8093	S6
	24″	26⅝″	28-8089	24″	28⅛″	28-8092	P5
	28″	30⅝″	28-8062	28″	32⅛″	28-8063	5
	32″	36″	28-8068	32″	36″	28-8069	6-9
	120″	122¾″	28-8064	120″	122¾″	28-8065	B6-9
X	10″	14″	28-8100	10″	14″	28-8103	PA
	28″	30⅝″	28-8106	28″	32⅛″	28-8107	5
	32″	36″	28-8099	32″	36″	28-8102	6-9
	120″	122¾″	28-8098	120″	122¾″	28-8101	B6-9
Y	10″	14″	28-8131	10″	14″	28-8132	PA
	18″	22″	28-8133	18″	22″	28-8134	S6-9
	19″	21⅝″	28-8155	19″	23⅛″	28-8156	H5
	24″	26⅝″	28-8137	24″	28⅛″	28-8138	P5
	28″	30⅝″	28-8113	28″	32⅛″	28-8114	C5
	32″	34⅝″	28-8127	32″	36⅛″	28-8128	5
	32″	36″	28-8129	32″	36″	28-8130	6-9
	120″	122¾″	28-8135	120″	122¾″	28-8136	B6-9
Z	8″	11⅝″	6617	8″	11⅝″	6616	6-7-8-9-12
	11″	14⅝″	28-8003	11″	14⅝″	28-8004	6-7-8-9-12
	18″	21⅝″	6352	18″	21⅝″	6351	6-7-8-9-12
	32″	35⅝″	6128	32″	35⅝″	6129	6-7-8-9-12
	48″	51⅝″	6298	48″	51⅝″	6299	6-7-8-9-12
	—	—	—	48″	50⅝″	8289	3PX
	72″	75⅝″	7289	72″	75⅝″	7290	6-7-8-9-12
	84″	87⅝″	7443	84″	87⅝″	7444	6-7-8-9-12
	120″	123⅝″	6356	120″	123⅝″	6355	6-7-8-9-12
	—	—	—	120″	122⅝″	8293	3PX
	120″	122⅛″	7739	120″	122⅛″	7740	B6-9
	132″	135⅝″	7071	132″	135⅝″	7072	6-7-8-9-12
	144″	147⅝″	8201	144″	147⅝″	8292	6-7-8-9-12
	186″	189⅝″	28-8024	186″	189⅝″	28-8025	6-7-8-9-12

C—Chrysler H—Hupmobile P—Packard S—Studebaker
B6—B9—Special Chrysler PA—Special Packard

FLEXIBLE CONTROL SHAFTS

THE different types of flexible control shafts are pictured on the front page. They all differ in construction from each other, although some are interchangeable. Consulting the front page to identify the type of shaft and then using the guide list will enable anyone to pick the proper part number for the shafts, and *vice versa*.

Types P, R, W, X, Y and Z are used only with the so-termed "old style" control heads where the knobs fasten onto the ends of the shafts which protrude through the control head. Types T, U and V are used with the so-termed "new style" control head, in which both shafts are terminated side by side and the volume control shaft is actuated through a gear train.

Types T, U, V and W have one or more square swedged ends. Type P has an octagon swedging on the Receiver end.

The part numbers given for the T, U and V type shafts are the "A" or casing numbers and the "B" or shaft numbers. All other numbers given are for the completely assembled parts.

The A dimensions are the casing lengths, the B dimensions are the overall lengths. When referring to a particular length shaft as given in our parts lists, the casing dimension is always used. For instance, the standard 28-inch shaft for the Model 10 is actually 30⅜ inches long overall, but the casing which really represents the distance from the control to the Receiver is only 28 inches long.

Tuning control and volume control shafts can easily be identified in all but the T, U and V types by the difference in the stubs at the control end of the shaft. All Model 5 volume control shafts are longer than the tuning control shafts.

There are three different brass tips in use on the shafts. They can be identified by referring to the cuts on the front page.

PHILCO RADIO & TELEVISION CORP.

MODEL 5,6,9
Speaker cones
Adjustments

REPLACING SPEAKER CONES—MODEL 5, 6 AND 9 RECEIVERS

THE Model 5 Receiver uses the P-11 Speaker. Normally, the cone, Part No. 36-3027, is cemented to the frame of the speaker (see Fig. 1). A cardboard spacer, No. 27-7098, not shown in the sketch, is placed between the speaker and the receiver panel to which it is fastened to prevent the frame from being warped by the speaker mounting screws.

To replace the cone of the P-11 speaker, disconnect the voice coil leads, remove the centering screw and remove the cone from the frame.

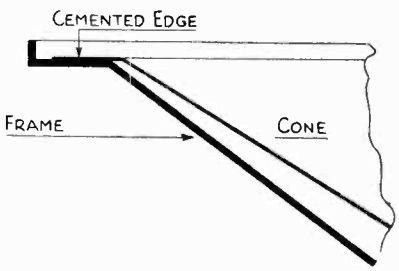


FIG. 1

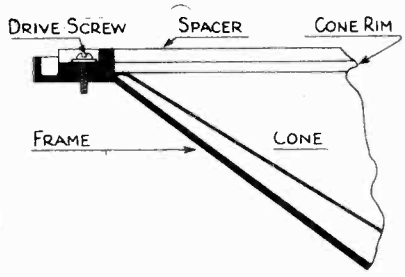


FIG. 2

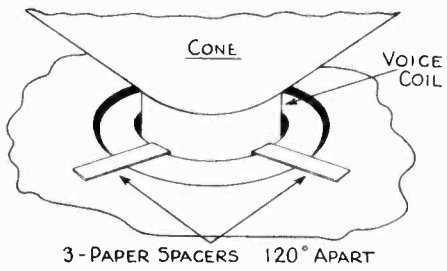


FIG. 3

The proper replacement cone is the No. 02861 cone, which has a cardboard rim. This must be fastened to the speaker frame by means of six W-451 washer head-drive screws. The holes for the drive screws are provided in the speaker frame. After tightening the drive screws and the centering screw, a cardboard spacer, No. 27-7178, must be placed between the speaker and the receiver panel to which it fastens (see Fig. 2). There are cutouts in the 27-7178 spacer for the washer head screws.

The cones in the Models 6 and 9 speakers were formerly held in place by a rim and clamp. This has been discontinued and the cone is now cemented to the speaker frame (Fig. 1). The replacement cone is No. 36-3020. It will be necessary to remove the cone and scrape the cement and cone edge from the speaker frame.

Make three spacers from regular bond letterhead paper. The spacers should be ten inches long and one-eighth inch wide. Fold each one sharply in the middle. This will then make spacers approximately .008 inch thick and 5 inches long. Place the paper spacers in the armature at right angles to prevent falling in (see Fig. 3).

Spread an even coat of Duco household cement over the face of the speaker frame. Set the cone in place with the voice coil in the armature gap. The paper spacers will insure proper clearance for the voice coil on all sides. Tighten the centering screw and firmly press down the edges of the cone, so that they will be cemented securely. Allow the cement to dry thoroughly and remove the paper spacers.

Part No.		*List Price*
02861	Cone (Model 5)	$0.60
27-7178	Cardboard spacer	.03
36-3020	Cone (Models 6 and 9)	.40
W-451	Washer head drive screws	1.20/C

MODEL 5 ADJUSTMENTS

Become thoroughly familiar with the adjustment procedure and the location of the padding condensers before starting to adjust a Model 5 Receiver.

Furthermore, don't attempt to make the adjustments using a make-shift oscillator. The modern radio depends on critically tuned circuits for its exceptional performance. It is nothing short of gross carelessness to try to adjust these delicately tuned circuits using unstable oscillators which are incapable of being calibrated accurately.

Use a Philco 095 oscillator, or if your service department is fortunate enough to have one, the new Philco Signal Generator 048.

NOTE.—United Motors Service Stations, see U. M. S. Service Manual.

The intermediate frequency used is 460 K. C. Set up the oscillator or signal generator for this frequency.

Disconnect the grid lead from the 6A7 tube. Then connect the test lead to the grid of this tube and ground the shield on the Receiver housing. Use the fibre adjusting wrench 3164 for all adjustments.

Padder 10. Turn the adjusting nut in until tight. Then back off one full turn. Leave this condenser in this position until the last step.

Padder 11. This is the first I. F. primary condenser. With the Receiver and oscillator turned on and the oscillator set for 460 K. C., turn the Receiver volume control on full and adjust the oscillator attenuator. Then adjust the padder for maximum signal in the loud speaker.

Padder 13. This is the first I. F. secondary condenser. Adjust the attenuator so that the signal is barely audible. This should be repeated with each adjustment if necessary. Adjust the padder for maximum signal in the loud speaker. Repeat this procedure in the next two adjustments.

Padder 17. This is the second I. F. primary condenser.

Padder 20. This is the second I. F. secondary condenser.

Remove the oscillator connections from the 6A7 tube and reconnect the Receiver grid lead to this tube. The oscillator setting must now be changed to 1500 K. C.

The Receiver volume control must be turned on full, the oscillator lead connected to the antenna lead-in and the shield to the Receiver housing. To obtain the correct setting of the tuning condenser, open the plates as wide as possible. Place a piece of paper on the stator plates and then turn the rotor in until it strikes the paper.

Oscillator padder. This is the padder on the second section of the tuning condenser (section nearest drive mechanism). Adjust for maximum signal.

Antenna Padder. This is the remaining padder on the tuning condenser. Remove the paper from the tuning condenser and set the condenser and oscillator for 1400 K. C. Adjust the padder for maximum signal.

Low Frequency Padder 10. Set the oscillator for 600 K. C. and tune the Receiver to this frequency. Adjust the padder for maximum signal. After completing these operations, repad the antenna padder at 1400 K. C.

MODEL EA, EG
MODEL 9
Data

PHILCO RADIO & TELEVISION CORP.

Be Sure You Know How To Do This

The intermediate frequency of the Model 6 is 260 K.C. This is a departure from the frequency used in the Model 7 and 8 Receivers. All dealers and installation stations must be equipped with a suitable oscillator capable of producing accurately a 175 K.C. signal for the Models 7 and 8 and 260 K.C. for the Model 6.

Philco's oscillator, Model 095, priced at $28.50 net to the dealers and service stations, is the ideal oscillator for such work and can be ordered direct from your distributor.

I. F. Stages

Remove the grid clip from the detector oscillator tube and connect the output of the oscillator to the control grid. The detector oscillator is the second tube from the right.

With the Receiver and oscillator turned "on," set the oscillator for 260 K.C. and adjust the oscillator attenuator so that the signal is barely audible with the Receiver volume control turned on full. If the oscillator is equipped with an output meter, connect the meter and adjust the attenuator so that a half scale reading is obtained.

Using a Philco 3164 fibre wrench, adjust the second I. F. condenser. This is numbered (23).

The correct adjustment is obtained when the strongest signal is heard in the speaker or the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are (20) and (13), respectively.

Disconnect the oscillator and reconnect the clip to the control grid.

High Frequency Compensators

Connect the output of the oscillator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the oscillator set for 175 K.C., tune the Receiver to 1400 K.C., the eighth harmonic of 175 K.C., and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K.C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condensers at 1400 K.C., in order to get a strong enough signal through.

R. F. Compensators

After the detector oscillator has been padded at 1400 K.C., adjust the first and second R. F. Condensers on tuning condenser at 1400 K.C.

Low Frequency Compensator

Now tune the Receiver to 700 K.C. and adjust the condenser (16) During this operation the tuning condenser must be shifted and the compensator must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high frequency condenser at 1400 K.C. again.

IMPORTANT.—MODEL 9 CHANGES.

Description	New Part No. replacing Old Part No.		Schematic and Base View No.
Dial	8255	6043	
Padder	04000-X	04000-D	⑳
Padder	04000-J	04000-A	⑬
Resistor (13,000 ohm)	8267	7352	⑫
Antenna Coil	16914	06574	②
R. F. Transformer	06915	05902	⑨
Oscillator Coil	06916	05975	⑭
I. F. Transformer	06932	05901	⑳
Resistor (8,000 ohm)	8255 (Connected between terminal panel near ⑲ and B+ terminal of ⑨.		

USING THE EA DYNAMOTOR

Many Dealers and Service Stations have built up a profitable business selling and installing the EA Dynamotor for replacing "B" batteries and other power devices. A bit skeptical at first, they soon realized the market for this dynamotor and since then, repeat orders have come in, in nice volume. Intended primarily for use with the Model 3 and Model 7 as a battery replacement, service men have been quick to adapt it to all other makes of battery operated car radio.

The installation instruction label is pasted to the inside bottom of the dynamotor housing, where it can be seen by anyone making the installation. It is vitally important that these instructions be carried out in detail.

Since the EA was first placed on the market, an additional filter condenser has been placed on the "B+" lead. This condenser, 3615-AZ, is mounted on the base at the rear of the dynamotor. When one of the EA dynamotors equipped with this condenser is installed with the Model 3 Philco Transitone or any radio in which "B—" is not grounded, this additional change must be made:

Remove the mounting screw from the 3516-AZ condenser. Bend up the ground terminal which normally is grounded by the mounting screw. Replace the mounting screw and be sure that the old ground terminal does not make contact with the screw. This is important.

The "B—" lead, the black lead coming from the rear of the dynamotor, which is connected to the ground terminal on the base, must be disconnected from the ground terminal and connected to the new terminal on the 3615-AZ.

The "B—" terminal on the condenser must then be connected to the "B—" terminal on the terminal panel. This was formerly the "B+" screen terminal.

This additional change must be made on all Model EA dynamotors having the 3615-AZ condenser connected to "B+" when using the dynamotor with a Model 3 or any other Receiver with a non-grounded "B—", otherwise it will be impossible to clear up the dynamotor hum.

MODEL EG VIBRATOR

The Model EF Vibrator is a part of the Model 6F Receiver. Its counterpart for "B" battery replacement service is the Model EG Vibrator. Instead of being connected with a cable and plug, it is equipped with a terminal panel for easy installation.

When used as a replacement unit for "B" batteries, simply install in the old "B" battery box or in any place that is convenient and where the Vibrator will not be exposed to water and dirt. The installation is easy, but at the same time permanent.

Simplicity in construction insures freedom from trouble and efficient operation. Cut disc tungsten points eliminate any possibility of troubles from contacts. Full wave rectification with the 84 rectifier tube developed especially for this type of service is used to give a smooth flow of power. Complete filtering eliminates all hum.

The terminal panel provides for the following connections:

A ± terminal for control, connecting to the control relay.

+B terminal, 180 volts to 200 volts for the "B" lead to the Receiver.

INT+B terminal, an intermediate voltage for Receivers requiring a tap voltage.

—B terminal, for Receivers requiring this lead. Normally it is not grounded. This, however, can be accomplished by strapping to the GND terminal.

GND terminal for grounding the chassis.

Complete instructions for installing are packed with each Vibrator.

PHILCO RADIO & TELEVISION CORP.

MODEL 5,6,7,8, 9,12 Adjustments

Adjusting the Philco Superheterodyne Auto Radio Receivers

MODEL 5

THE intermediate frequency used is 460 K. C. Set up the signal generator for this frequency.

Disconnect the grid lead from the 6A7 tube. Then connect the test lead to the grid of this tube and ground the shield on the Receiver housing. Use the fibre adjusting wrench for all adjustments.

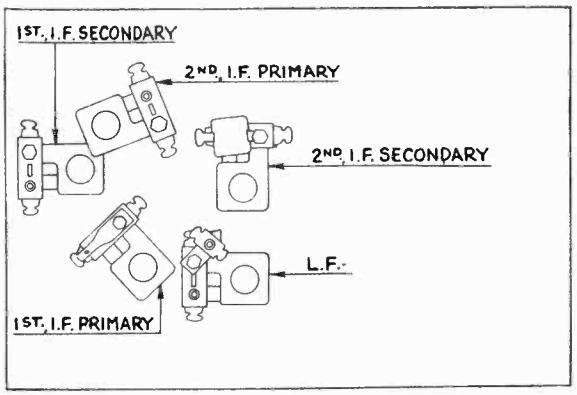


FIG. 1. MODEL 5—I. F. 460 K. C.

Padder "LF." Turn the adjusting nut in until tight. Then back off one full turn. Leave this condenser in this position until the last step.

Now adjust the first I. F. primary condenser. With the Receiver and signal generator turned on and the signal generator set for 460 K. C., turn the Receiver volume control on full and adjust the attenuator. Then adjust the padder for maximum reading on the output meter.

Next adjust the first I. F. secondary condenser. Adjust the attenuator so that a half-scale reading is obtained. This should be repeated with each adjustment if necessary. Adjust the padder for maximum reading. Repeat this procedure in the next two adjustments.

The next adjustment in order is the second I. F. primary condenser. This is then followed by the second I. F. secondary condenser. These are indicated on the illustration. (Fig. 1.)

Remove the signal generator connections from the 6A7 tube and reconnect the Receiver grid lead to this tube. The signal generator setting must now be changed to 1500 K. C.

The Receiver volume control must be turned on full, the oscillator lead connected to the antenna lead-in and the shield to the Receiver housing. To obtain the correct setting of the tuning condenser, open the plates as wide as possible. Place a piece of paper on the stator plates and then turn the rotor out until it strikes the paper.

Oscillator Adjustment. This is the padder on the second section of the tuning condenser (section nearest drive mechanism). Adjust for maximum reading.

Antenna Adjustment. This is the remaining padder on the tuning condenser. Remove the paper from the tuning condenser and set the condenser and signal generator for 1400 K. C. Adjust the padder for maximum reading.

Low Frequency Adjustment. Set the signal generator for 600 K. C. and tune the Receiver to this frequency. Adjust the padder for maximum reading. After completing these operations, readjust the antenna padder at 1400 K. C.

MODELS 6, 9 AND 12 (CODE 122)

I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 260 K. C. and adjust the attenuator so that a half-scale reading is obtained on the output meter, with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the right-hand ones on Fig. 2.

Disconnect the signal generator and reconnect the clip to the control grid.

High Frequency Adjustments. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condenser at 1400 K. C. in order to get a strong enough signal through.

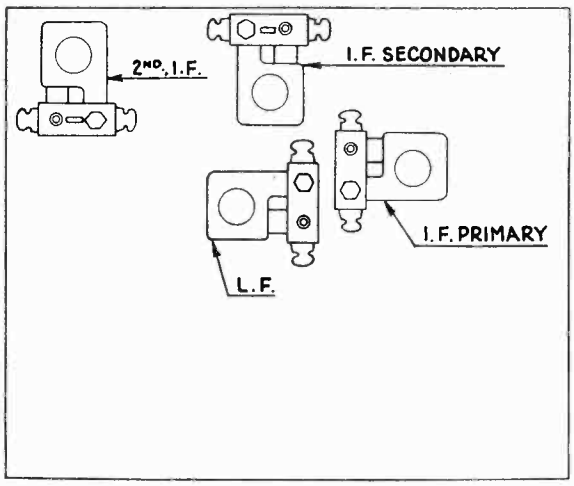


FIG. 2. MODELS 6, 9 AND 12.—(CODE 122) I. F. 260 K. C.

R. F. Adjustments. After the detector-oscillator has been padded at 1400 K. C. adjust the first and second R. F. Condensers on tuning condensers at 1400 K. C.

Low Frequency Adjustment. Now tune the Receiver and signal generator to 700 K. C., and adjust the condenser (LF) on Fig. 2. During this operation the tuning condenser must be shifted and the compensator must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODELS 7, 8 AND 12 (CODE 121)

Intermediate Frequency or I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 175 K. C. Adjust the attenuator so that a half-scale reading on the output meter is obtained with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. This is the one in the upper left-hand corner of Fig. 3.

The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the two shown at right on Figs. 3 and 4.

MODEL 7,10
Adjustments

PHILCO RADIO & TELEVISION CORP.

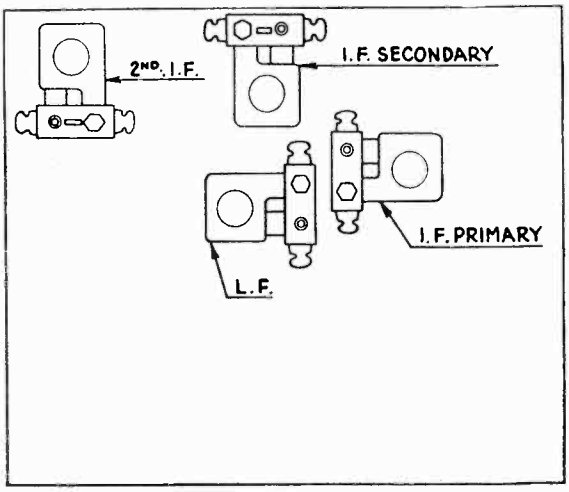


FIG. 3. MODEL 7.—I. F. 175 K. C.

Disconnect the signal generator lead and reconnect the clip to the control grid.

High Frequency Compensator. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condensers at 1400 K. C. in order to get a strong enough signal through.

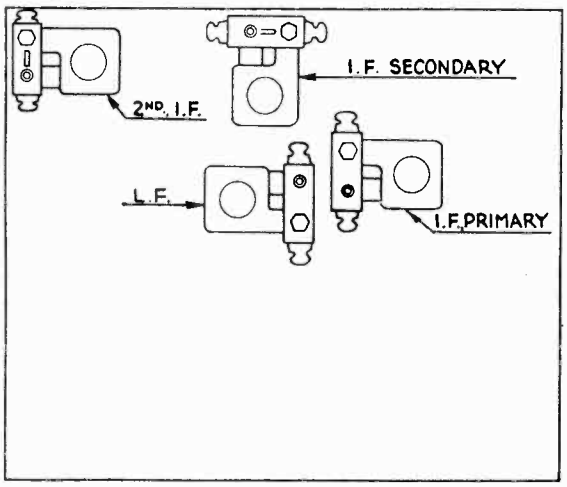


FIG. 4. MODELS 8 AND 12 (Code 121) I. F. 175 K. C.

R. F. Compensators. After the detector-oscillator has been padded at 1400 K. C., adjust the first and second R. F. Condensers on tuning condenser at 1400 K. C.

Low Frequency Condenser. Set the signal generator to 700 K. C. Now tune the Receiver sharply. Adjust the L. F. condenser shown near the center of Figs. 3 and 4. During this operation the tuning condenser must be shifted and the compensators must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODEL 10

I. F. A new style I, F. transformer complete with adjusting condensers is used in the Model 10.

The condensers are placed in the top of the shield can, one above the other.

The primary I. F. condenser is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube. (For location see Fig. 5.)

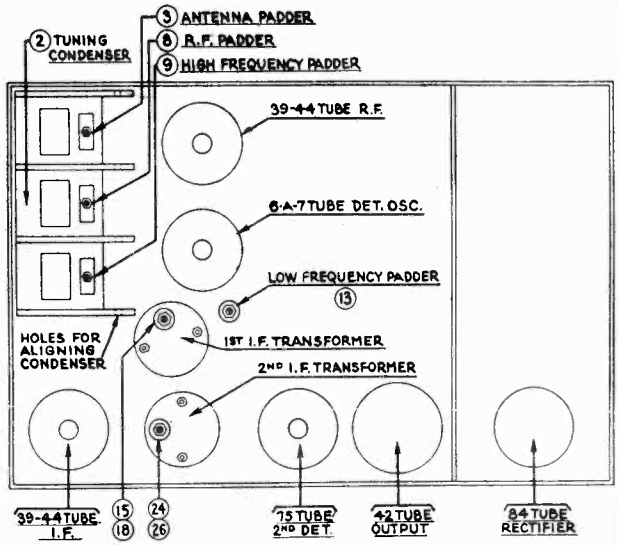


FIG. 5. MODEL 10—I. F. 260 K. C.

Set up the signal generator and adjust it to exactly 260 K. C. Connect signal generator lead to the grid cap of the 6A7 tube. (See Fig. 5.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The condensers 24 and 26 are adjusted first (Fig. 5). Turn the adjusting screw all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 15 and 18.

After adjusting the first I. F. stage, remove signal generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set signal generator to 1500 K. C. and then connect signal generator lead to the antenna lead.

H. F. There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 5.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency condenser until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

R. F. and Ant. Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. Adjust R. F. condenser and the antenna condenser for maximum reading on the output meter.

L. F. Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency condenser for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

PHILCO RADIO & TELEVISION CORP.

MODEL 5 CHANGES

THE schematic—Fig. 4 shows a portion of the Model 5 circuit with the latest changes.

The 78-tube cathode resistor has been changed from 1000 ohms to 500 ohms, a 1,500,000-ohm resistor has been added in the A. V. C. return lead to the control grids of the first and second tubes. The network and volume control circuits in the combined second detector and audio stages have been changed about.

Two other resistors, not shown, have also been changed. Resistor ⑥ in the Model 5 schematic (April "Service Broadcast") has been changed from 13,000 ohms to 25,000 ohms and resistor ⑯ has been changed from 10,000 ohms to 15,000 ohms.

The I. F. transformer ⑱ retains the same part number, but due to certain construction changes, is now marked on the bracket with yellow paint.

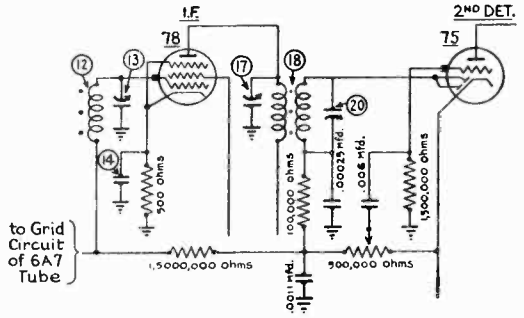


FIG. 4

Fig. 5 shows the changes made in the vibrator section of the Model 5. The 200-ohm resistor ㊶ in the old schematic has been removed from across the vibrator contacts. An .05 mfd. condenser will be added to the driver contact spring to remove vibrator interference which may be picked up due to the increased sensitivity of the receiver. The thirty-turn choke, while not shown in the schematic as a part, is still used in wiring the receiver. Fig. 5 also shows a correction to the schematic in the April "Service Broadcast." The "A" lead to the "A" circuit of the receiver should be connected at the switch ahead of the "A" choke instead of being connected as shown in the earlier schematic.

The speaker in the Model 5 is now enclosed in a fabric bag, which completely covers the rear of the speaker. This prevents iron cuttings and filings from lodging in the armature gap and causing rattles and buzzes.

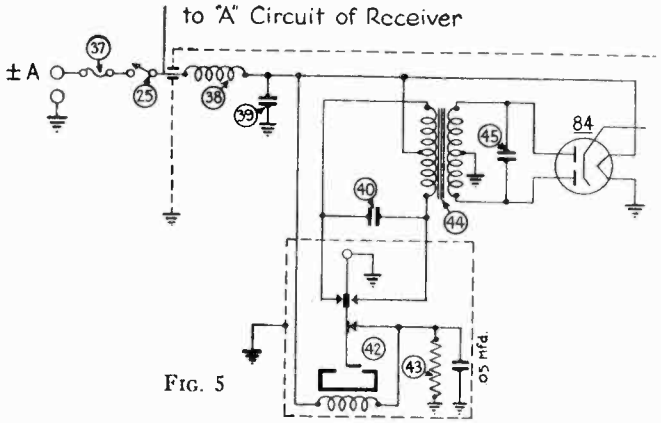


FIG. 5

MODEL 5 IMPROVEMENTS

ON some of the early Model 5 Receivers a frying or crackling noise may have been experienced. In some cases it has been blamed on the vibrators and in others on the 6A7 tube. If there are any Model 5 Receivers held up in the service shop on account of a complaint of this nature, they can easily and quickly be corrected and put back into service.

Remove the grid clip from the grid cap of the 6A7 tube and remove the grid lead from the clip. Using a stranded wire (same size as the grid lead), connect it to the grid clip and wind five turns of wire around the clip. Then splice and solder to the grid lead. Reconnect the clip to the cap on the tube. This makes an R. F. choke of just the proper size, which will eliminate practically all such complaints if they occur.

For the more obstinate cases, wind thirty turns of No. 16 solid, cotton-covered copper wire around a lead pencil. Withdrawing the pencil leaves an air-core choke, which must be installed in the "A" lead between the low-voltage R. F. choke and the heater terminal of the 84 tube. Keep the choke in the vibrator section of the base.

Solder and tape the splices to prevent further trouble.

The factory is installing these chokes in all Model 5 Receivers.

A visual examination of one of the latest Model 5 Receivers will give a better idea of these changes.

INSTALLING THE MODEL 5

1. Use the best antenna that it is possible to install in the car.

2. Use as little shielded antenna lead as possible.

3. After installing the Model 5 in the car and making all connections, the antenna stage should be padded to the car antenna.

Tune in a weak broadcast signal between 120 and 150 on the dial and adjust the padder on the condenser section that is adjacent to the side of the housing. Adjust the padder until the maximum signal is heard in the speaker. If no broadcast signal of the proper frequency is available, set up an oscillator or signal generator inside the car and adjust it to 1400 K. C. A six-foot lead should be connected to the oscillator to radiate the test signal. Then adjust the padder, using the standard Philco padding wrench No. 3164.

The factory is now putting a special hole in the lid of the Model 5, just to make it easier to pad this stage.

Insist on the best top antenna possible in each car. With a good antenna and the antenna stage properly padded, you will notice a big improvement in the Model 5 performance

A SERVICE PRECAUTION

The speaker cable should be dressed toward the vibrator end of the housing. The condenser plates should be fully meshed, so that they cannot be bent out of alignment by the speaker field or cable.

high-frequency padder ⑨ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑧ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑬ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

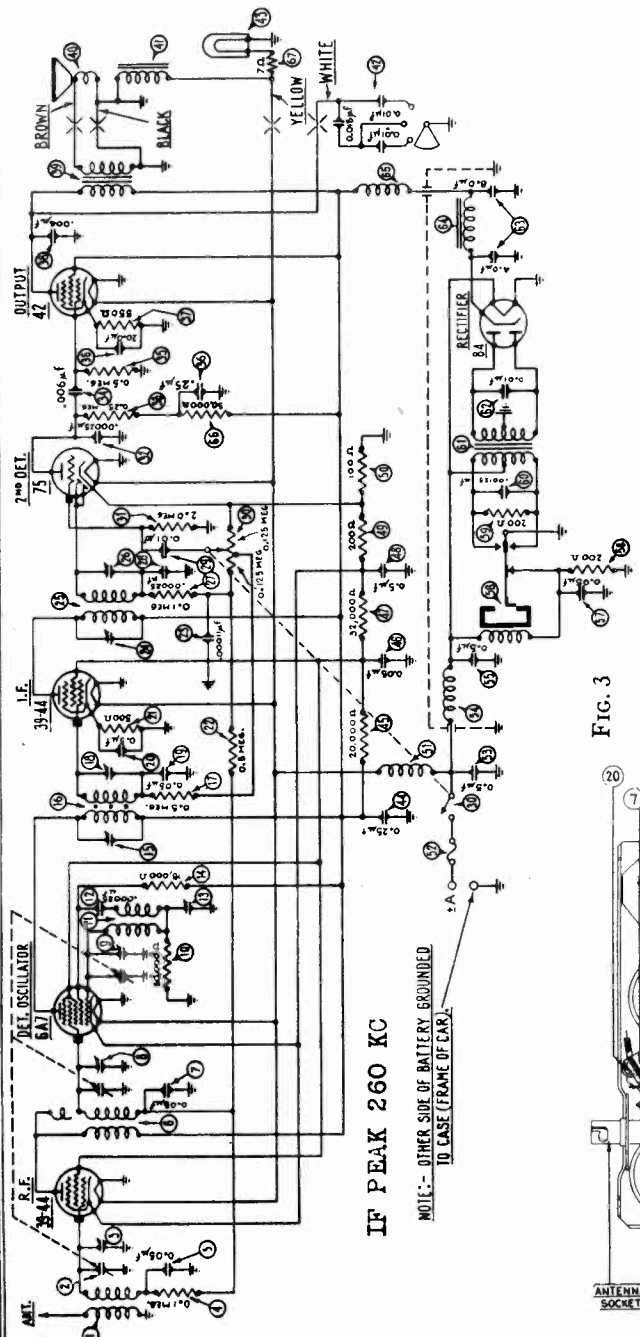


FIG. 3

MODEL 10 PARTS LIST

①	Antenna Transformer	32-1220	
②	Tuning Condenser	30-1083	
③	1st Padder (in tuning cond.)		
④	Resistor (100,000 ohms)	6099	
⑤	Condenser (.05 mfd.)	30-4020	
⑥	R. F. Transformer	32-1221	
⑦	Condenser (.05 mfd.)	30-4020	
⑧	2nd Padder (in tuning cond.)		
⑨	3rd Padder (in tuning cond.)		
⑩	Resistor (50,000 ohms)	6098	
⑪	Oscillator Transformer	32-1222	
⑫	Condenser (.00025 mfd.)	3082	
⑬	Padder	04000S	
⑭	Resistor (15,000 ohms)	6208	
⑮	Padder (prim. 1st I. F.)	31-6007	
⑯	I. F. Transformer (1st)	38-5274	
⑰	Resistor (500,000 ohms)	6097	
⑱	Padder (secondary 1st I. F.)	31-6007	
⑲	Condenser (.05 mfd.)	30-4020	
⑳	Condenser (.5 mfd.)	30-4058	
㉑	Resistor (500 ohms)	6977	
㉒	Resistor (500,000 ohms)	6097	
㉓	Condenser (.00011 mfd.)	4519	
㉔	Padder (prim. 2nd I. F.)	31-6008	
㉕	I. F. Transformer (2nd)	38-5275	
㉖	Padder (secondary 2nd I. F.)	31-6008	
㉗	Resistor (100,000 ohms)	6099	
㉘	Condenser (.00025 mfd.)	3082	
㉙	Condenser (.01 mfd.)	30-4051	
㉚	Vol. Control Assembly	38-5280	
㉛	Resistor (2,000,000 ohms)	33-1025	
㉜	Condenser (.00025 mfd.)	5828	
㉝	Resistor (250,000 ohms)	3768	
㉞	Condenser (.006 mfd.)	30-4024	
㉟	Resistor (500,000 ohms)	6097	
㊱	Condenser (20 mfd.; 25mfd.)	30-2027	
㊲	Resistor (550 ohms)	6977	
㊳	Condenser (.006 mfd.)	30-4024	
㊴	Output Transformer	32-7106	
㊵	Cone and Coil	36-3020	
㊶	Field Coil Assembly	36-3120	
㊷	Tone Control	30-4056	
㊸	Pilot Lamp	6608	
㊹	Condenser (.25 mfd.)	04360	
㊺	Resistor (20,000 ohms)	6649	
㊻	Condenser (.05 mfd.)	30-4020	
㊼	Resistor (32,000 ohms)	3525	
㊽	Condenser (.5 mfd.)	30-4048	
㊾	Resistor (200 ohms)	7217	
㊿	Resistor (100 ohms)	7838	
(51)	A Choke	32-7109	
(52)	15 Amp. Fuse	7227	
(53)	Condenser (.5 mfd.)	30-4061	
(54)	Vibrator Choke	32-1235	
(55)	Condenser (.5 mfd.)	30-4061	
(56)	Vibrator	38-5036	
(57)	Condenser (.05 mfd.)	30-4039	
(58)	Resistor (200 ohms)	7217	
(59)	Resistor (200 ohms)	7217	
(60)	Condenser (.00125 mfd.)	5886	
(61)	Power Transformer	32-7098	
(62)	Condenser (.01 mfd.)	30-4051	
(63)	Filter Condenser	30-2015	
(64)	B Chokes	32-7038	
(65)	R. F. Chokes	32-1078	
(66)	Resistor (50,000 ohms)	4237	
(67)	Resistor (7 ohms)	5110	
	Spark Plug Resistors	4531	
	Distributor Resistor	4546	
	Screw Type Resistor	4851	
	Interference Condenser	30-4007	
	Dial	27-5022	
	Studs	28-6036	
	Nuts (mounting)	W55	
	Knobs	03334	
	Battery Cable	38-5296	
	Antenna Lead	38-5161	
	Control Unit Assembly	42-5056	
	Acorn Nut	W821	
	Key	6091	

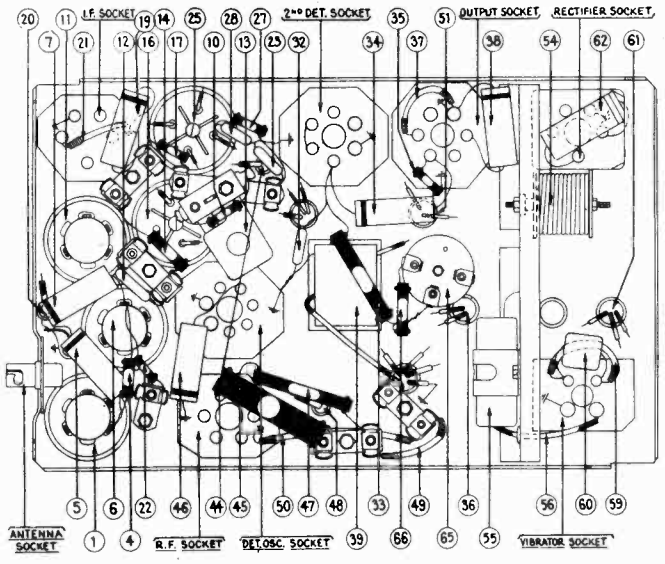


FIG. 4

MODEL 10 RECEIVER

THE MODEL 10 represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro dynamic speaker, the same type as used in high-priced home radio Receivers.

Four-point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 38-5274 for the first I. F. stage and 38-5275 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

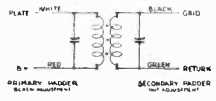


FIG. 1

MODEL 10 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉔ and ㉖ are adjusted first (Figs. 2 and 3.) Turn the adjusting screw ㉔ all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉖ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉔ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

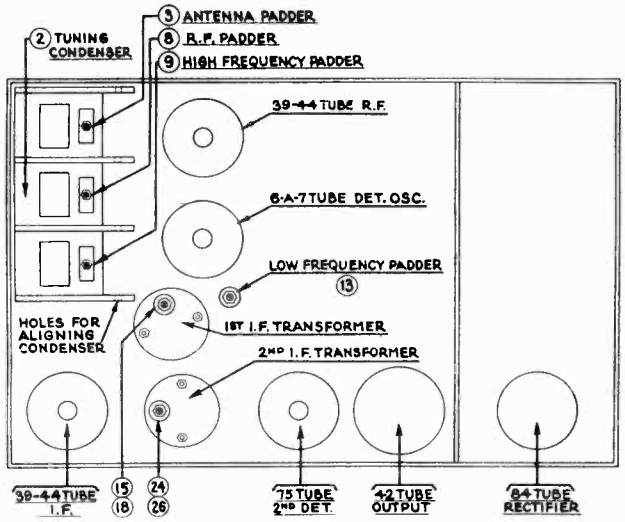


FIG. 2

Repeat the above procedure with the condensers ⑮ and ⑱.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the

MODEL 112-X
Wiring Changes

PHILCO RADIO & TELEVISION CORP.

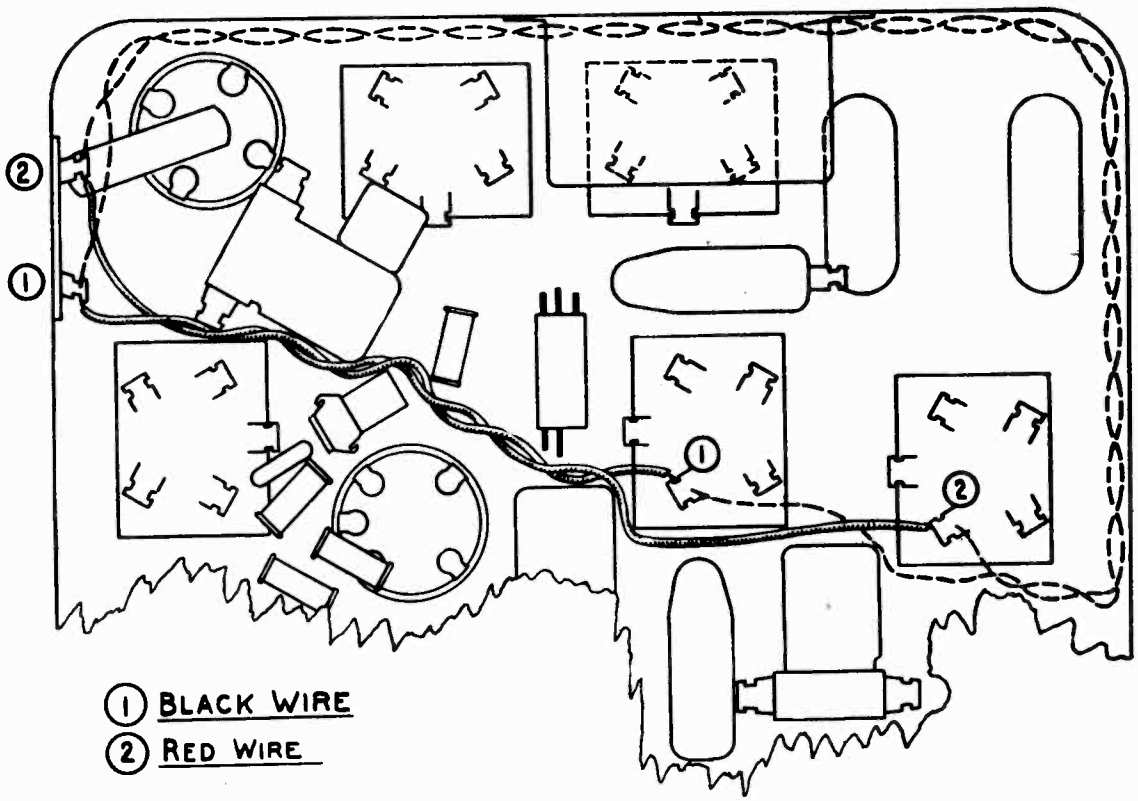
Wiring Changes in Model 112-X

A few of the early production of the model 112-X had an input transformer with a letter "A" after the part number on the terminal board. These transformers should have an .0008 Mfd. condenser, part 5878, connected across the entire secondary.

Later production have the input transformer without the letter "A". They should be equipped with a 490,000 ohm resistor, part 4517 across the secondary.

On some of the first 112-X production the wires from the plates of the pentodes to the two lower terminals of the speaker socket in the chassis were wired as shown by the dotted lines in the illustration. This "dressing" of the wires tends to produce a high pitched whistle if the tubes are slightly unbalanced. The condition is readily eliminated, however, by changing the dressing of the wires as shown by the full lines in the illustration. All production is now wired in this manner. If it is found necessary to make this change, be sure that the polarity of the wires after reconnection is the same as it was before. In production, a red wire and a black wire are now used, but the early production had two red wires.

In some few cases with present production, a slight whistle is present. This can be eliminated by moving the two plate wires away from the compensating condenser (28) in circuit diagram, Service Bulletin No. 101.



Phonograph
Pickup Data

PHILCO RADIO & TELEVISION CORP.

MODEL 211,212,220
270,296
Pickup data

Adjusting the Electric Pickup

Distortion of electric phonograph reproduction is usually caused by a badly worn needle (ordinary steel needles should never be used on automatic record changer instruments), a loose needle, or by improper centering of the electric pickup armature. The adjustment for centering the pick-up is extremely simple, and can be accomplished in the following manner:

Low Impedance Type Part 5251 Used on Model 270

1. Remove the pickup from the tone arm, and remove the cover from the pickup, taking care not to loose the phosphor bronze spring, which serves as a pressure clamp between the top of the magnet and the cover.

2. Slide the magnet out from the pole pieces slightly so that a keeper (heavy flat piece of steel) can be placed across the poles of the magnet before the latter is removed from the assembly. *Great care must be exercised to see that the magnet does not become disconnected from the pole pieces (or the keeper) even for an instant.* A noticeable loss in pickup efficiency and volume will result if this point is not carefully observed.

3. Lift the magnet and keeper from the assembly, taking extreme care that the keeper does not come off the magnet.

4. Loosen the two round head screws in the small brass plate, and move the plate slightly to the right or left as required until the armature is exactly centered between the pole pieces.

5. Tighten the screws while holding the plate in this centered position.

6. After making certain that the armature has not shifted while the screws were being tightened, replace the magnet over the pole pieces, taking care that the magnet is in contact with both pole pieces before removing the keeper.

7. Re-assemble the pickup cover, and replace the pickup on the tone arm.

High Impedance Type Part 4584 Used on Models 296, 220, 211 and 212

1. Remove the pickup from the tone arm, and remove the cover from the pickup as described above. It will be unnecessary to remove the magnet when making this adjustment.

2. Loosen the nuts which clamp the pole pieces to the pickup housing so as to free the adjusting arms.

3. Push the right or the left adjusting arm, as required, until the armature is properly centered.

4. Tighten the nuts while holding the armature in this centered position.

5. Re-assemble the cover, and replace the pickup on the tone arm.

MODEL 77,77-A
Voltage
Values

PHILCO RADIO & TELEVISION CORP.

Table 1—Tube Socket Readings Taken with AC Set Tester AC Line—115 volts

Tube		Filament Volts	Plate Volts	Screen Grid Volts	Control Grid Volts	Cathode Volts	Plate Milli-amperes
Type	Circuit						
24	1st R. F.	2.3	145	90	3	13	3.5
24	2d R. F.	2.3	145	90	3	13	3.5
24	Detector	2.3	36*	30†	1.4	12	0
27	1st A. F.	2.3	140		1	10	3
45	2d A. F.	2.2	230		46		30
45	2d A. F.	2.2	230		46		30
80	Rectifier	4.5					50/Plate

All readings taken with antenna disconnected and ground on. Volume control on full.
*Read with a 250,000-ohm voltmeter. †Read with a 100,000-ohm voltmeter.

Table 2—Power Transformer Voltages

Terminals	A.C. Volts	
1—2		Primary
3		Center Tap for 80 Plate
4		Center Tap for 45 Tubes
5—6	2.67	Heaters of 24 and 27 Tubes
7—8	2.68	Filaments of 45 Tubes
10—11	5.00	Filament of 80 Tube
9—12	750	Plate of 80 Tube
Rubber Covered Lead		Center Tap for 24 and 27 Tubes

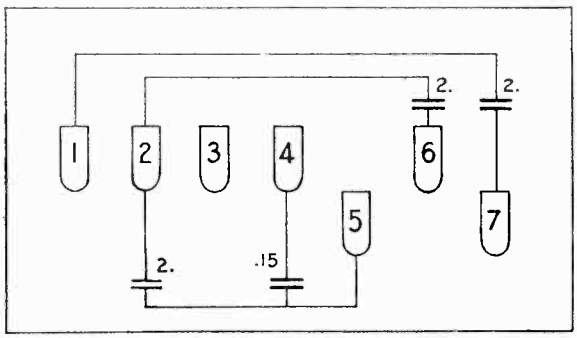
Table 3—RESISTOR DATA

No. on Figs. 3 and 4	Terminal	Resistance	Color
㉚	1–2	1,400	Long Tubular
	2–3	1,500	
	3–4	2,000	
㉖	1–2	250	Short Tubular
	3–4	800	
⑫ ⑱		100,000	Silver Gray
⑮		250,000	White
⑰ ⑳		500,000	Battleship Gray
㉙		85	Flatwire wound

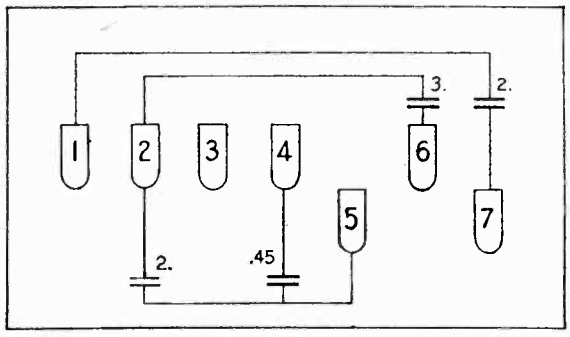
Table 4—CONDENSER DATA
(Other Than Filter Block)

No. on Figs. 3 and 4	Capacity MFD	Volts D.C. With Receiver Turned On
⑦	.25	95 on Screen Grid Cond. 15 on Cathode Cond.
⑪	.05	150
⑬	.5	12
⑭	.25	95 Plate Resistor Cond. 40 Screen Grid Cond.
⑯	.00025	40
⑲	.01	25

Model 77 Condenser Block Part No. 3870



Model 77A Condenser Block Part No. 3871



MODEL 800
Schematic
Parts List
Chassis Layout

PHILCO RADIO & TELEVISION CORP.

MODEL 800 PARTS LIST

(1)	Antenna Transformer	32-1220	
(2)	Tuning Condenser	31-1083	
(3)	1st Padder (in tuning cond.)		
(4)	Resistor (100,000 ohms)	6099	
(5)	Condenser (.03 mfd.)	30-4025	
(6)	Condenser (.05 mfd.)	30-4020	
(7)	R. F. Transformer	32-1221	
(8)	Condenser (.03 mfd.)	30-4025	
(9)	2nd Padder (in tuning cond.)		
(10)	3rd Padder (in tuning cond.)		
(11)	Resistor (50,000 ohms)	6098	
(12)	Oscillator Transformer	32-1222	
(13)	Condenser (.00025 mfd.)	3082	
(14)	Padder	31-6012	
(15)	Resistor (15,000 ohms)	6208	
(16)	Padder (prim. 1st I. F.)		
(17)	First I. F. Transformer	32-1236	
(18)	Resistor (1,000,000 ohms)	33-1096	
(19)	Padder (secondary 1st I. F.)		
(20)	Condenser (.03 mfd.)	30-4025	
(21)	Condenser (.5 mfd.)	30-4058	
(22)	Resistor (500 ohms)	6977	
(23)	Resistor (500,000 ohms)	6097	
(24)	Condenser (.00011-.00025)	30-1020	
(25)	Padder (prim. 2nd I. F.)		
(26)	Second I. F. Transformer	32-1237	
(27)	Padder (secondary 2nd I. F.)		
(28)	Resistor (25,000 ohms)	33-1013	
(29)	Condenser (.006 mfd.)	30-4125	
(30)	Volume Control Assembly	33-5058	
(31)	Resistor (2,000,000 ohms)	33-1025	
(32)	Resistor (250,000 ohms)	33-1097	
(33)	Resistor (250,000 ohms)	33-1097	
(34)	Condenser (.00025 mfd.)	5858	
(35)	Resistor (250,000 ohms)	33-1097	
(36)	Resistor (25,000 ohms)	33-1013	
(37)	Condenser (.01 mfd.)	30-4145	
(38)	Condenser (.25-8-10mfd.)	30-4135	
(39)	Resistor (500,000 ohms)	6097	
(40)	Resistor (2500 ohms)	33-1100	
(41)	Input Transformer	32-7206	
(42)	Pilot Lamp	34-2031	
(43)	Resistor (7 ohms)	33-3130	
(44)	Condenser (.006 mfd.)	30-4024	
(45)	Output Transformer	32-7205	
(46)	Cone and Voice Coil	36-3159	
(47)	Field Coil Assembly	36-3130	
(48)	Tone Control	30-4142	
(49)	Condenser (.25 mfd.)	30-4134	
(50)	Resistor (5,000 ohms)	33-1070	
(51)	Resistor (20,000 ohms)	6649	
(52)	Resistor (37,000 ohms)	33-1098	
(53)	Condenser (.5 mfd.)	30-4018	
(54)	Resistor (200 ohms)	7217	
(55)	Resistor (100 ohms)	33-3023	
(56)	Resistor (100 ohms)	33-3023	
(57)	Condenser (.5 mfd.)	30-4015	
(58)	Vibrator Choke	32-1335	
(59)	Condenser (.5 mfd.)	30-4115	
(60)	Vibrator Unit	38-5036	
(61)	Condenser (.05 mfd.)	30-4039	
(62)	Resistor (200 ohms)	7217	
(63)	Resistor (200 ohms)	7217	
(64)	Condenser (.00125 mfd.)	5886	
(65)	Power Transformer	32-7098	
(66)	Condenser (.01 mfd.)	30-4051	
(67)	Filter Condenser (4-8 mfd.)	30-2015	
(68)	"B" Choke	32-7104	
	Spark Plug Resistors	33-1015	
	Distributor Resistor	4546	
	Interference Condenser	30-4007	
	Dial	27-5022	
	Studs	28-6036	
	Nuts (mounting)	W55	
	Knobs	03334	
	Battery Cable	38-5296	
	Antenna Lead	38-5131	
	Control Unit Assembly	42-5077	
	Acorn Nut	W821	
	Key	6091	
	Flex. Shaft (28") Vol. Con.	28-8141	
	Flex. Shaft (28") Tun. Con.	28-8139	

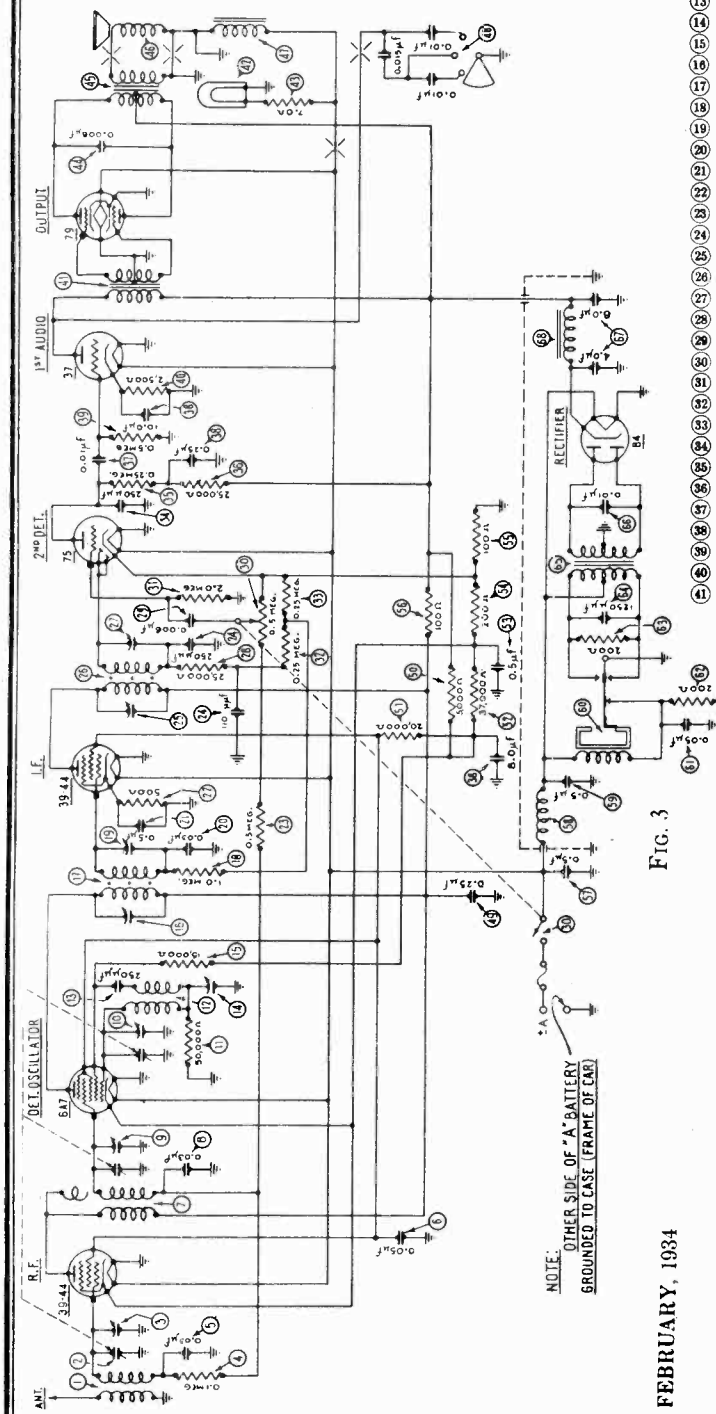


FIG. 3

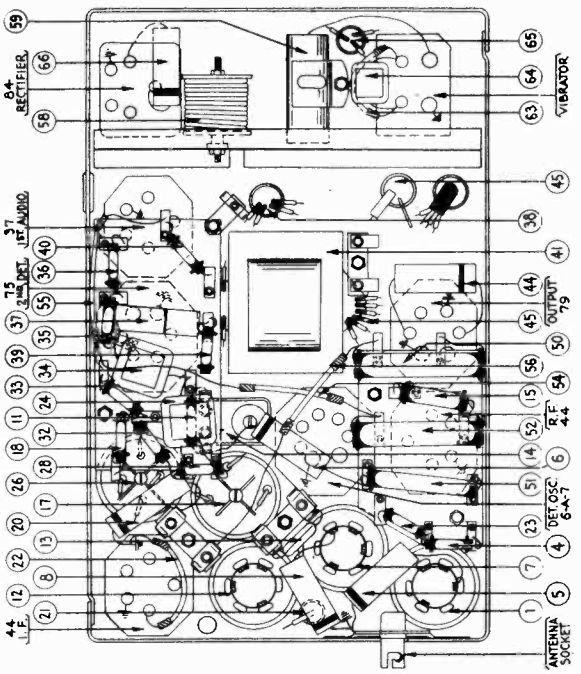


FIG. 4

FEBRUARY, 1934

MODEL 800
Layout
Notes

PHILCO RADIO & TELEVISION CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

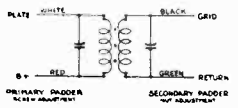


FIG. 1

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉕ and ㉗ are adjusted first (Figs. 2 and 3.) Turn the adjusting screw ㉕ all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉗ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉕ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers ⑯ and ⑲.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑩ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑨ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑭ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

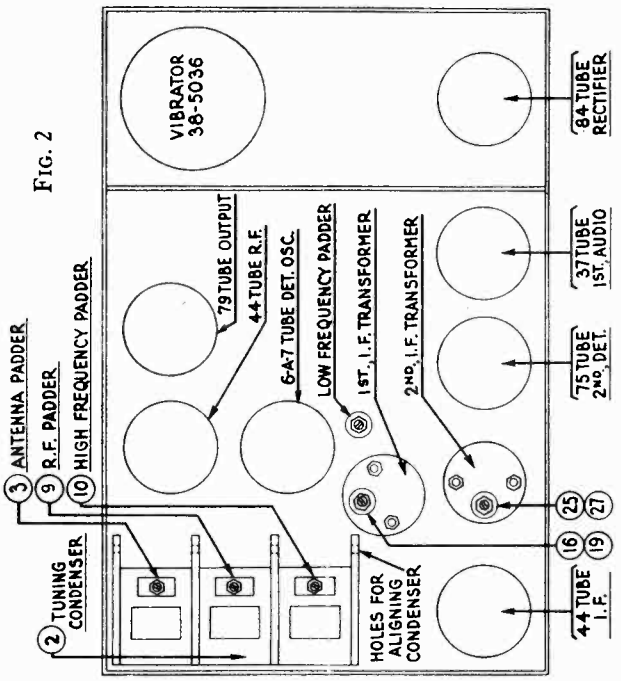
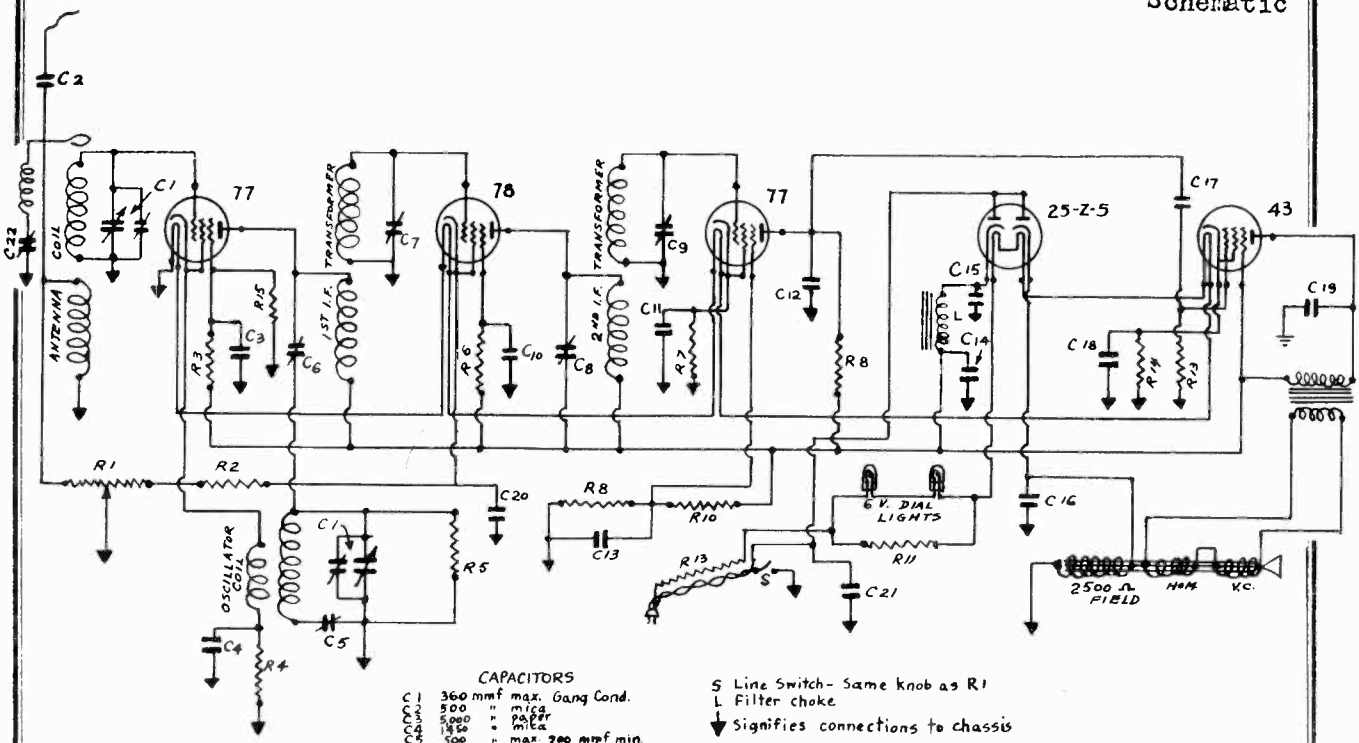


FIG. 2

PILOT RADIO & TUBE CORP.

MODEL 2
Schematic
MODEL D-3
Schematic



CAPACITORS

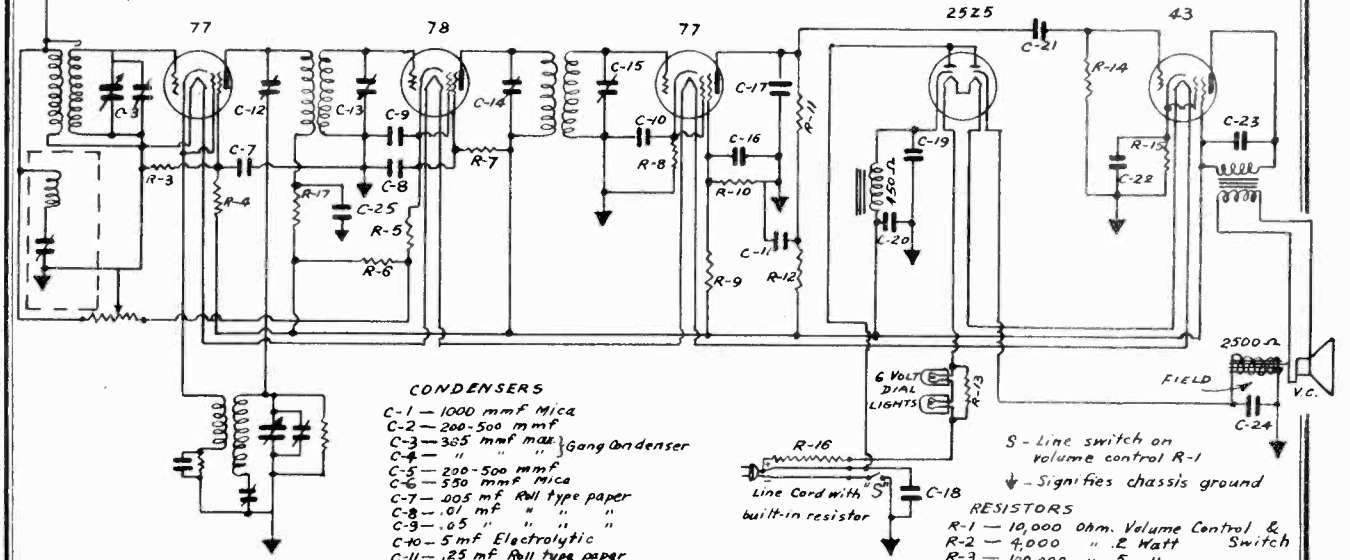
C1	360 mmf max. Gang Cond.
C2	500 " mica
C3	5000 " paper
C4	1450 " mica
C5	500 " max. 200 mmf min.
C6	225 " " 95 " "
C7	" " " " " "
C8	" " " " " "
C9	" " " " " "
C10	0.01 mfd. paper
C11	6 " Electrolytic
C12	500 mmf mica
C13	0.1 mfd. paper
C14	12 " Electrolytic
C15	8 " "
C16	4 " "
C17	0.01 " Paper
C18	5 " Electrolytic
C19	0.01 " Paper
C20	0.05 " "
C21	0.03 " "
C22	500 mmf max 200 mmf min.

S Line Switch - Same knob as R1
L Filter choke
⏚ Signifies connections to chassis
DO NOT CONNECT TO GROUND

RESISTORS

R1	20,000 Ω	Volume Control
R2	250 "	.2 Watt Carbon
R3	50,000 "	" " "
R4	4,000 "	" " "
R5	100,000 "	" " "
R6	50,000 "	" " "
R7	20,000 "	" " "
R8	500,000 "	" " "
R9	40,000 "	" " "
R10	40,000 "	" " "
R11	50 "	Wire wound 1.25 watt
R12	112 "	10 Watt incl. in Extn Cord
R13	500,000 "	.2 " Carbon
R14	500 "	.5 " "
R15	100,000 "	.5 " "

Model 2



CONDENSERS

C-1	1000 mmf Mica
C-2	200-500 mmf
C-3	385 mmf max. (Gang Condenser
C-4	" " "
C-5	200-500 mmf
C-6	550 mmf Mica
C-7	.005 mf Roll type paper
C-8	.01 mf " " "
C-9	.05 " " " "
C-10	5 mf Electrolytic
C-11	.25 mf Roll type paper
C-12	90-225 mmf
C-13	" " "
C-14	" " "
C-15	" " "
C-16	.25 mf Roll Type paper
C-17	250 mmf Mica
C-18	.05 mf Roll Type paper
C-19	8.0 " Electrolytic
C-20	120 " "
C-21	.01 " Roll type paper
C-22	5 " Electrolytic
C-23	.005 " Roll type paper
C-24	4 " Electrolytic
C-25	.25 " Roll type paper

S - Line switch on volume control R-1
⏚ - Signifies chassis ground

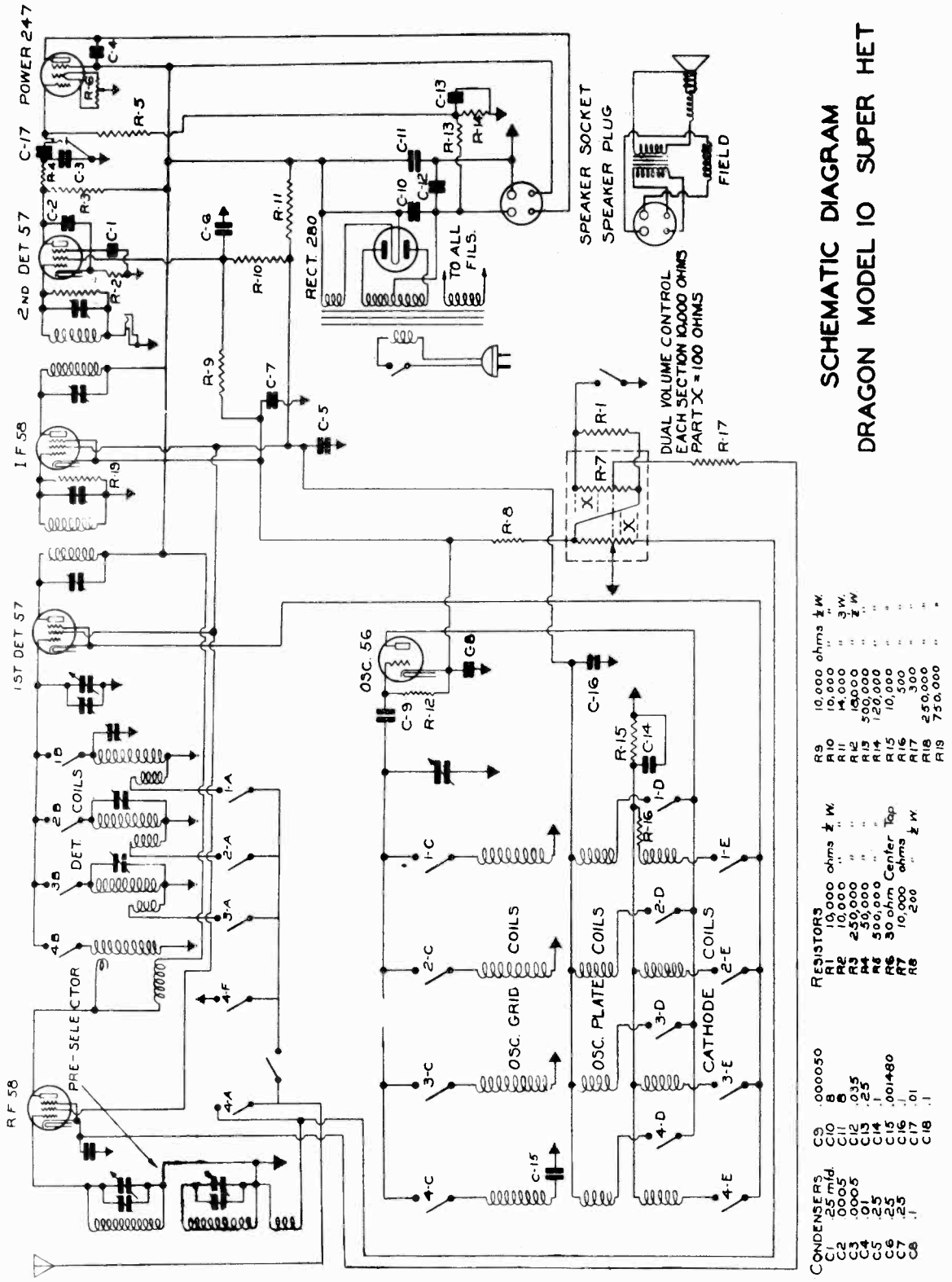
RESISTORS

R-1	10,000	Ohm. Volume Control & Switch
R-2	4,000	" .2 Watt
R-3	100,000	" .5 "
R-4	50,000	" .2 "
R-5	250	" .2 "
R-6	40,000	" .5 "
R-7	50,000	" .2 "
R-8	20,000	" .2 "
R-9	40,000	" .2 "
R-10	40,000	" .5 "
R-11	500,000	" .2 "
R-12	100,000	" .2 "
R-13	50,000	" Moulded resistance
R-14	500,000	" .2 Watt
R-15	500	" .1 "
R-16	112	" Resistance in line cord
R-17	10,000	" .5 watt

Model D-3

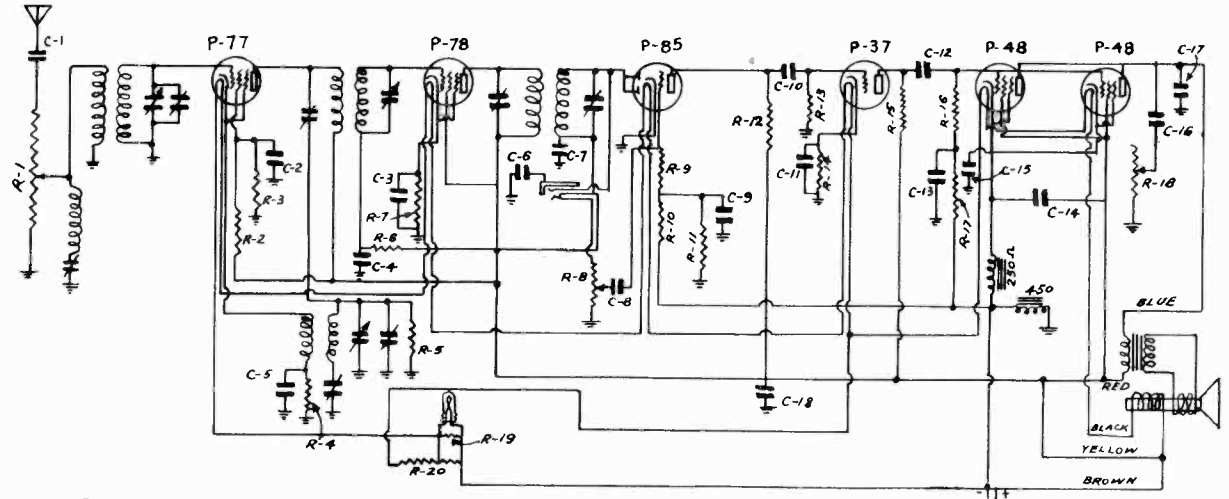
MODEL 10 AC
Dragon Superhet
Schematic

PILOT RADIO & TUBE CORP.



PILOT RADIO & TUBE CORP.

MODEL F-14 DC Superhet
MODEL 4 Tube DC Superhet



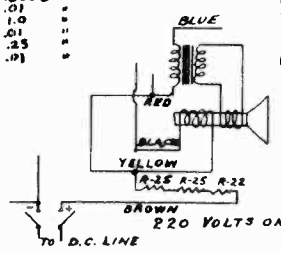
CONDENSERS

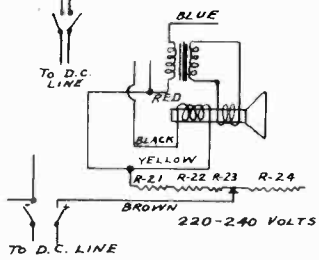
C1	.002	MFD
C2	.05	"
C3	.25	"
C4	.05	"
C5	.0005	"
C6	.01	"
C7	.0005	"
C8	.01	"
C9	1.0	"
C10	.01	"
C11	.25	"
C12	.1	"
C13	.25	MFD
C14	4-4	" Elect.
C15	.1	"
C16	.25	"
C17	.01	"
C18	2.0	"

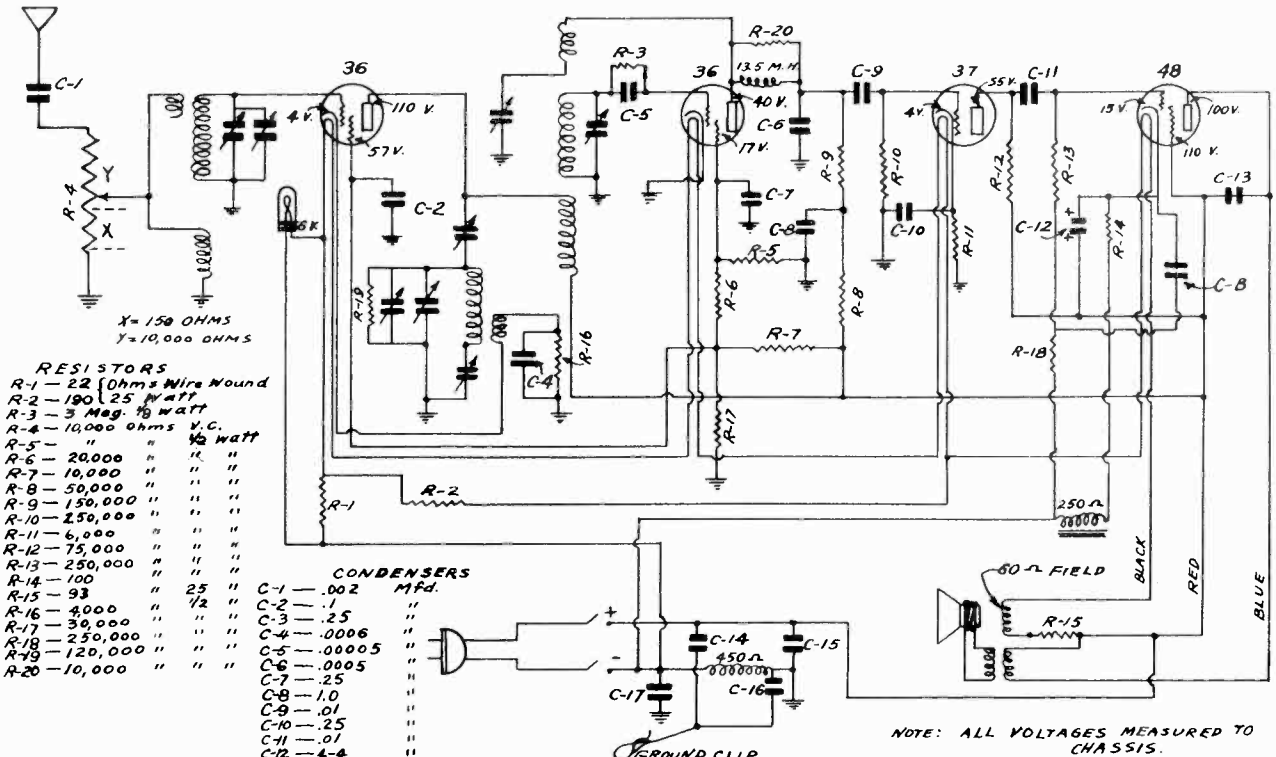
RESISTORS

R1	10,000 Ω	Sensitivity Cont.
R2	"	.5 Watt
R3	"	"
R4	6,000	"
R5	250,000	"
R6	500,000	"
R7	150	"
R8	750,000	Volume Control
R9	500,000	.5 Watt
R10	250,000	"
R11	20,000	"
R12	100,000	"
R13	500,000 Ω	.5 Watt
R14	6,000	"
R15	75,000	"
R16	250,000	"
R17	250,000	"
R18	10,000	Tone Control
R19	50	1 Watt
R20	274 Ω [22-252 Ω]	Wire Wound Watt
R21	65 Ω	Wire Wound 25 Watt
R22	"	"
R23	"	"
R24	" [13.5 Ω - 15.4 Ω - 193 Ω - 16.8 Ω]	Wire Wound Taps
R25	75 Ω	Wire Wound 25 Watt

Model F-14







RESISTORS

R-1 — 22	Ohms Wire Wound		
R-2 — 190	25 Watt		
R-3 — 3 Meg.	½ watt		
R-4 — 10,000	ohms	V.C.	
R-5 —	"	"	½ watt
R-6 — 20,000	"	"	"
R-7 — 10,000	"	"	"
R-8 — 50,000	"	"	"
R-9 — 150,000	"	"	"
R-10 — 250,000	"	"	"
R-11 — 6,000	"	"	"
R-12 — 75,000	"	"	"
R-13 — 250,000	"	"	"
R-14 — 100	"	"	"
R-15 — 93	"	25	"
R-16 — 4,000	"	"	½ "
R-17 — 30,000	"	"	"
R-18 — 250,000	"	"	"
R-19 — 120,000	"	"	"
R-20 — 10,000	"	"	"

CONDENSERS

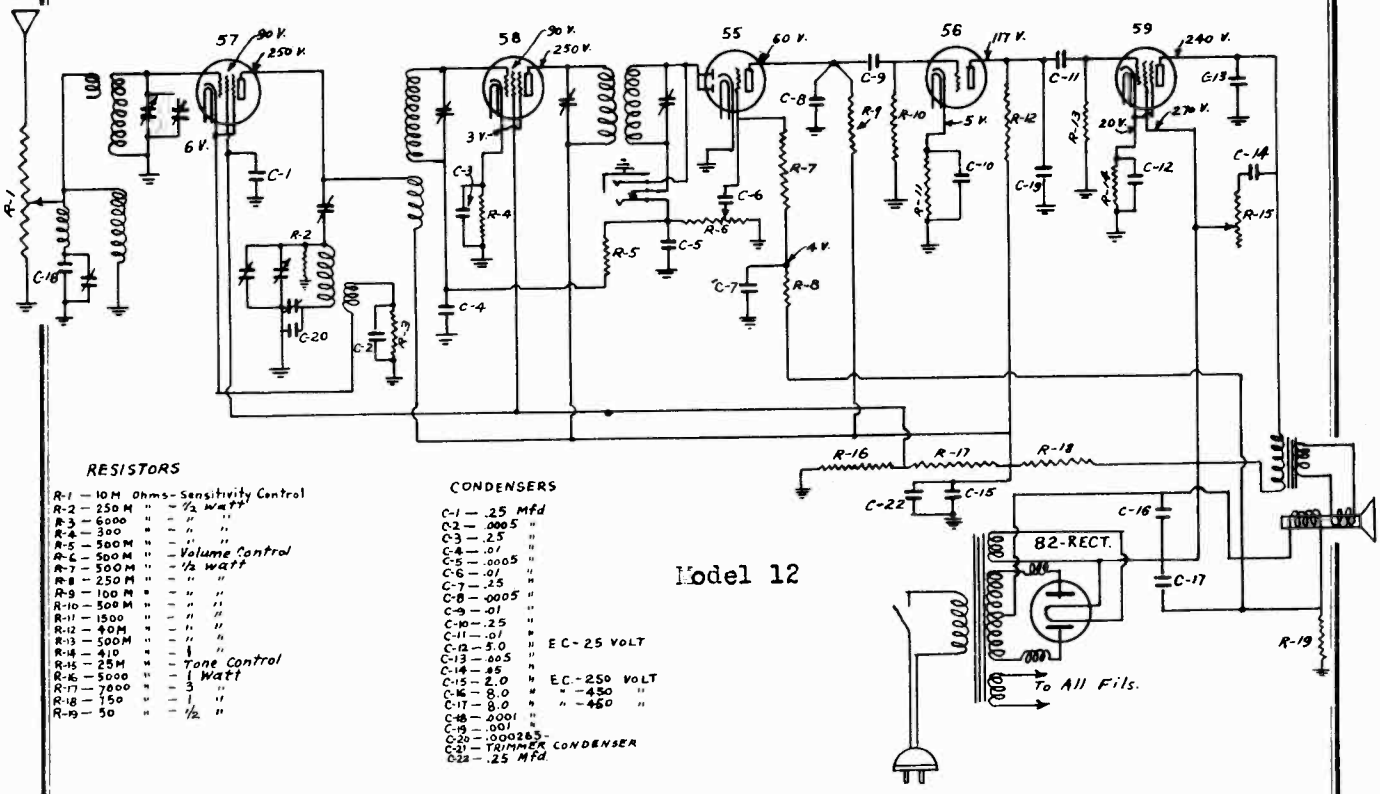
C-1 — .002	Mfd.	
C-2 — .1		"
C-3 — .25		"
C-4 — .0006		"
C-5 — .00005		"
C-6 — .0005		"
C-7 — .25		"
C-8 — 1.0		"
C-9 — .01		"
C-10 — .25		"
C-11 — .01		"
C-12 — 4-4		"
C-13 — .035		"
C-14 — .1		"
C-15 — 2.		"
C-16 — .1		"
C-17 — .01		"

NOTE: ALL VOLTAGES MEASURED TO CHASSIS.
⏚ DENOTES CHASSIS GROUND

4-Tube D-C. Superhet

MODEL 12 AC
Superhet
MODEL 20
Schematic

PILOT RADIO & TUBE CORP.



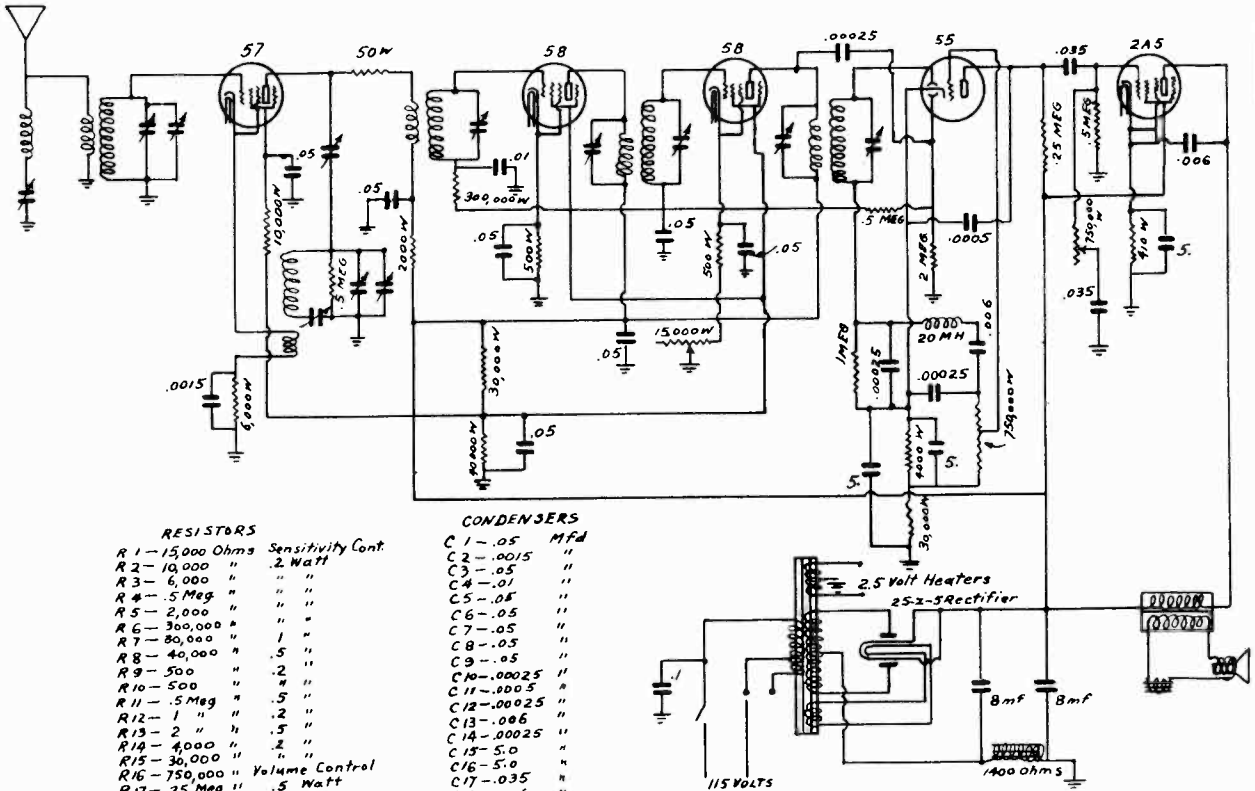
Model 12

RESISTORS

R-1	10 M Ohms	Sensitivity Control
R-2	250 M	½ watt
R-3	6000	
R-4	300	
R-5	500 M	
R-6	500 M	Volume Control
R-7	500 M	½ watt
R-8	250 M	
R-9	100 M	
R-10	500 M	
R-11	1500	
R-12	40 M	
R-13	500 M	
R-14	410	1
R-15	25 M	Tone Control
R-16	5000	1 Watt
R-17	7000	3
R-18	150	1
R-19	50	½

CONDENSERS

C-1	.25 Mfd
C-2	.0005
C-3	.25
C-4	.01
C-5	.0005
C-6	.01
C-7	.25
C-8	.0005
C-9	.01
C-10	.25
C-11	.01
C-12	5.0
C-13	.005
C-14	.25
C-15	2.0 — E.C.-250 Volt
C-16	8.0 — " -450 "
C-17	8.0 — " -450 "
C-18	.0001
C-19	.001
C-20	.000285 - CONDENSER
C-21	TRIMMER
C-22	.25 Mfd



Model 20

RESISTORS

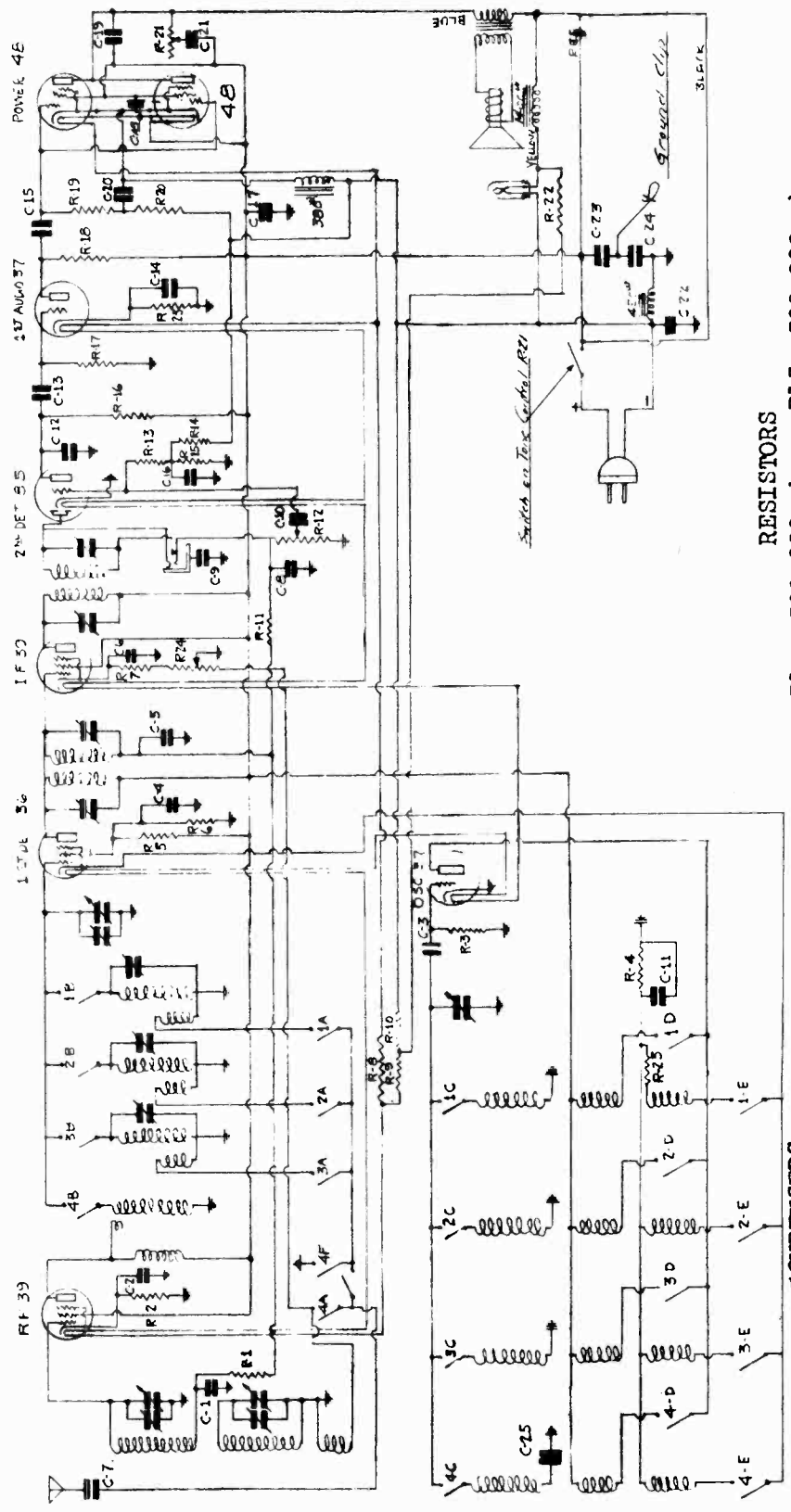
R 1	15,000 Ohms	Sensitivity Cont.
R 2	10,000	.2 Watt
R 3	6,000	
R 4	.5 Meg	
R 5	2,000	
R 6	300,000	
R 7	80,000	1
R 8	40,000	.5
R 9	500	.2
R 10	500	
R 11	.5 Meg	.5
R 12	1	.2
R 13	2	.5
R 14	4,000	.2
R 15	30,000	
R 16	750,000	Volume Control
R 17	.25 Meg	.5 Watt
R 18	.5	
R 19	150,000	Tone Control
R 20	410	1 Watt
R 21	50	.2

CONDENSERS

C 1	.05 Mfd
C 2	.0015
C 3	.05
C 4	.01
C 5	.05
C 6	.05
C 7	.05
C 8	.05
C 9	.05
C 10	.00025
C 11	.0005
C 12	.00025
C 13	.006
C 14	.00025
C 15	5.0
C 16	5.0
C 17	.035
C 18	.006
C 19	5.0
C 20	.035
C 21	.1
C 22	8.0
C 23	8.0

PILOT RADIO & TUBE CORP.

MODEL 28
Schematic



RESISTORS

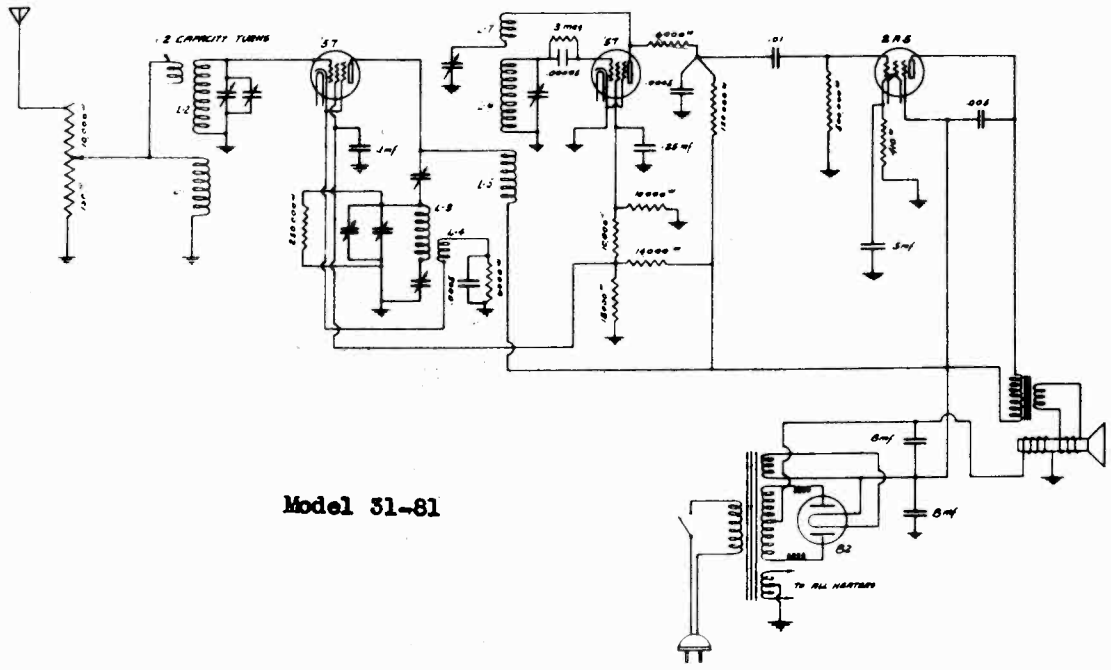
R1	500,000 ohms	R13	500,000 ohms		
R2	500 "	R14	100,000 "		
R3	30,000 "	R15	250,000 "		
R4	10,000 "	R16	100,000 "		
R5	10,000 "	R17	500,000 "		
R6	10,000 "	R18	75,000 "		Tone Cont.
R7	500 "	R19	250,000 "		
R8	378 "	R20	250,000 "		
R9	25 "	R21	10,000 "		Tone Cont.
R10	22 "	R22	100 "		
R11	500,000 "	R23	6,000 "		
R12	750,000 "	R24	15,000 "		
	Vol.Cont.	R25	500 "		

CONDENSERS

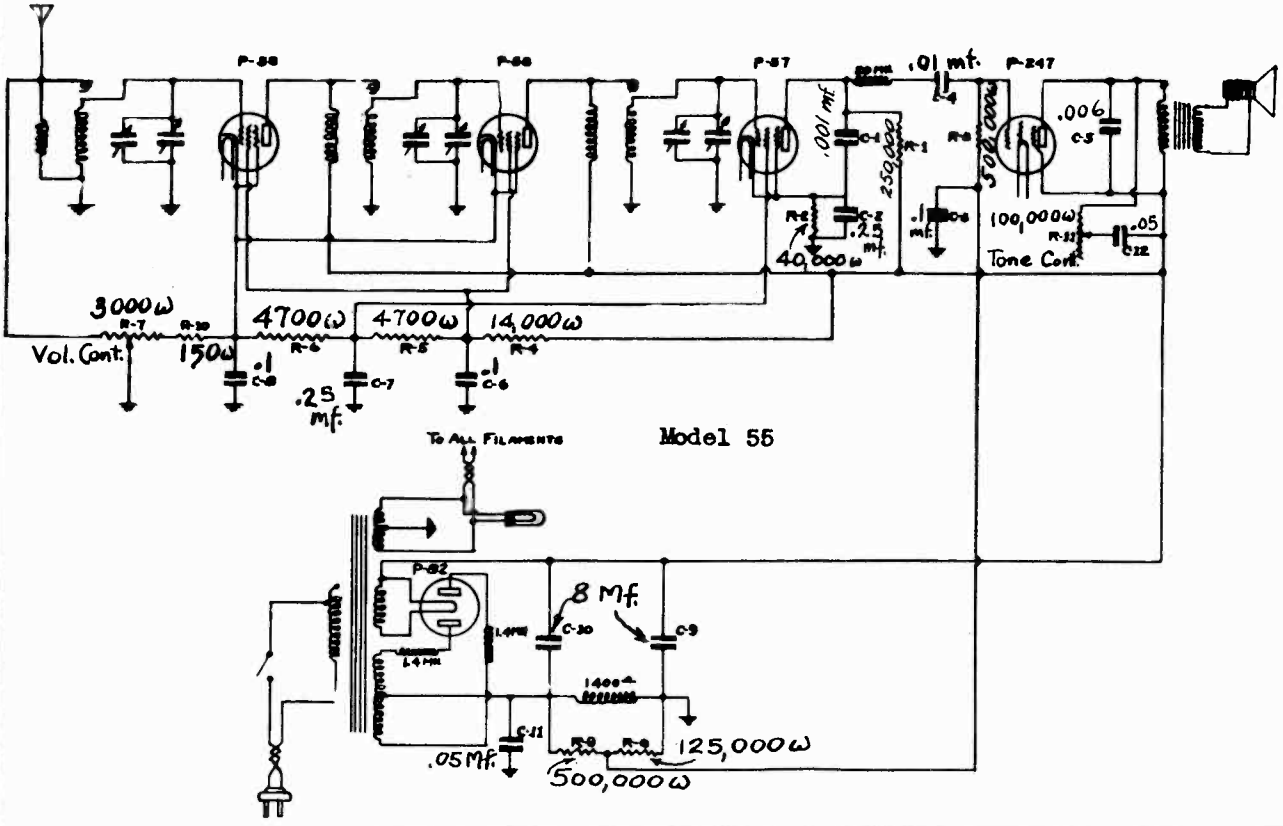
C1	.1 mf.	C13	.01 mf.	C25	.00148 mf.
C2	.1 mf.	C14	.25 mf.		
C3	.0001 mf.	C15	.01 mf.		
C4	.05 mf.	C16	1.0 mf.		
C5	.1 mf.	C17	2.0 mf.		
C6	.25 mf.	C18	2.0 mf.		
C7	.0015 mf.	C19	.005 mf.		
C8	.0001 mf.	C20	.25 mf.		
C9	.1 mf.	C21	.25 mf.		
C10	.01 mf.	C22	.01 mf.		
C11	.1 mf.	C23	.1 mf.		
C12	.0005 mf.	C24	.1 mf.		

MODEL 31-81
Rainbow Super
MODEL 55
Schematic

PILOT RADIO & TUBE CORP.



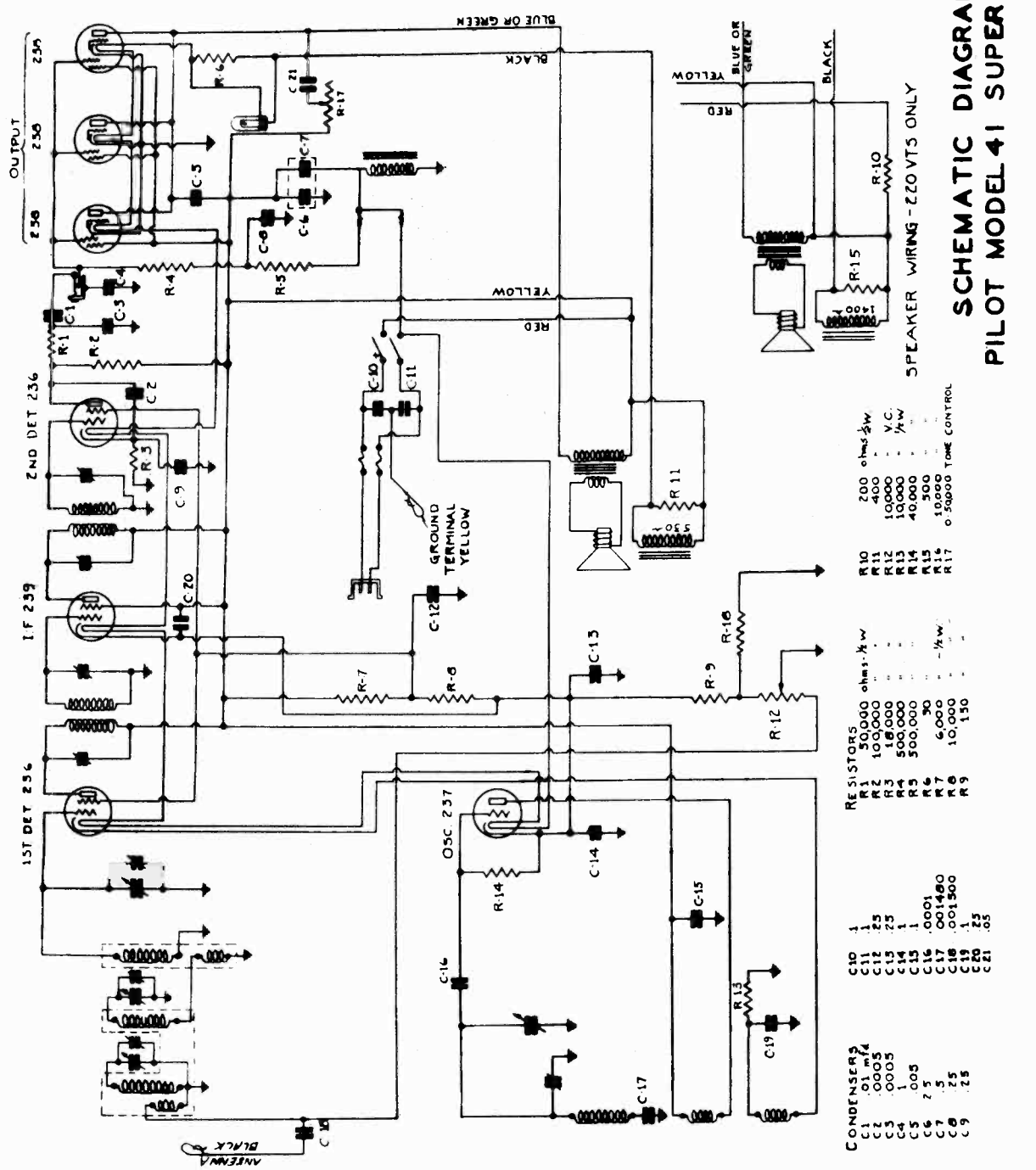
Model 31-81



Model 55

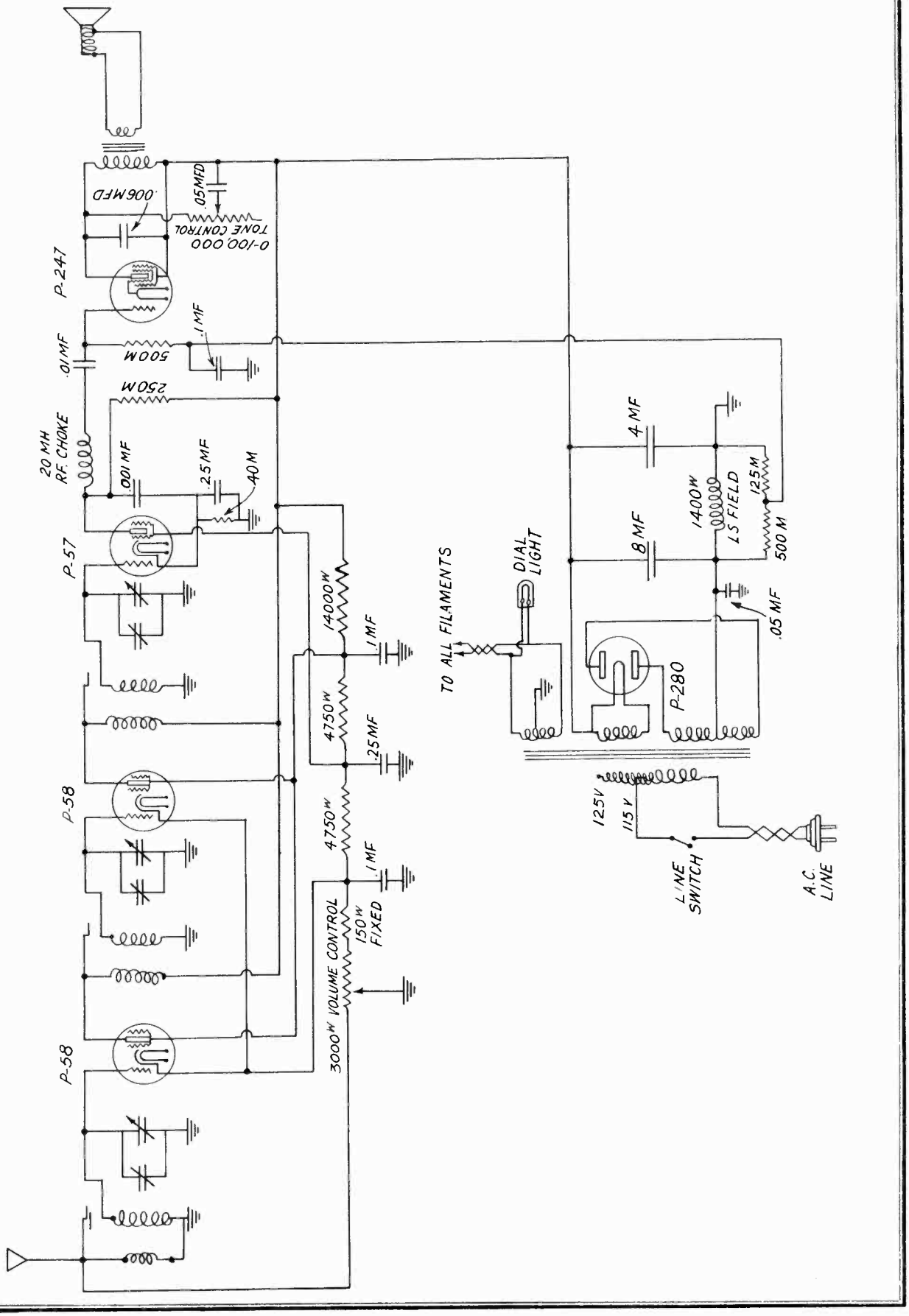
PILOT RADIO & TUBE CORP.

MODEL 41 DC
Superhet
Schematic



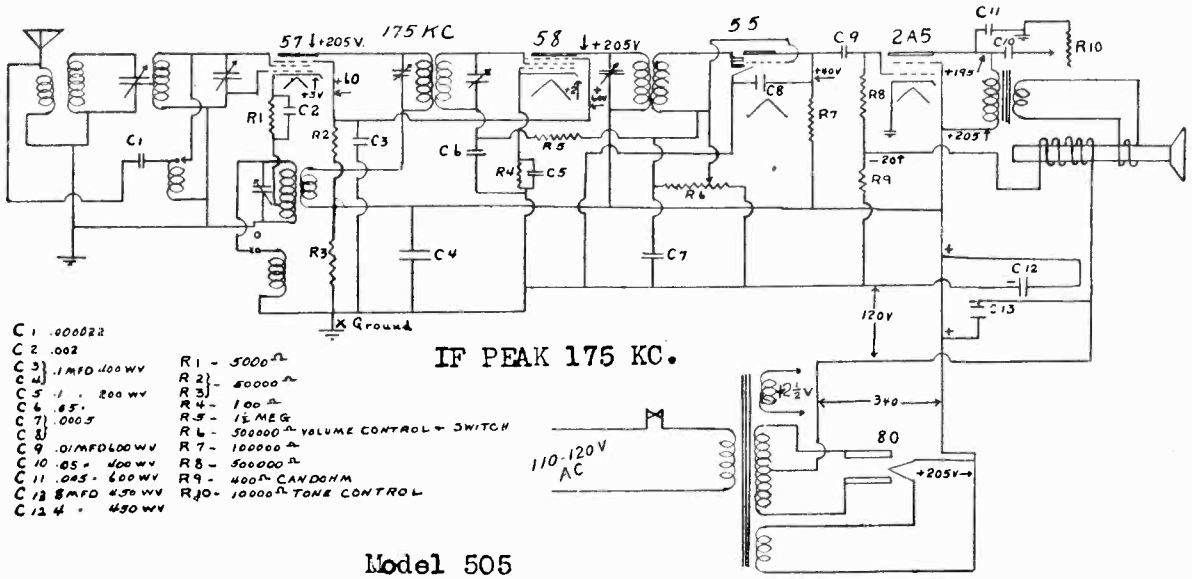
MODEL 43
Schematic

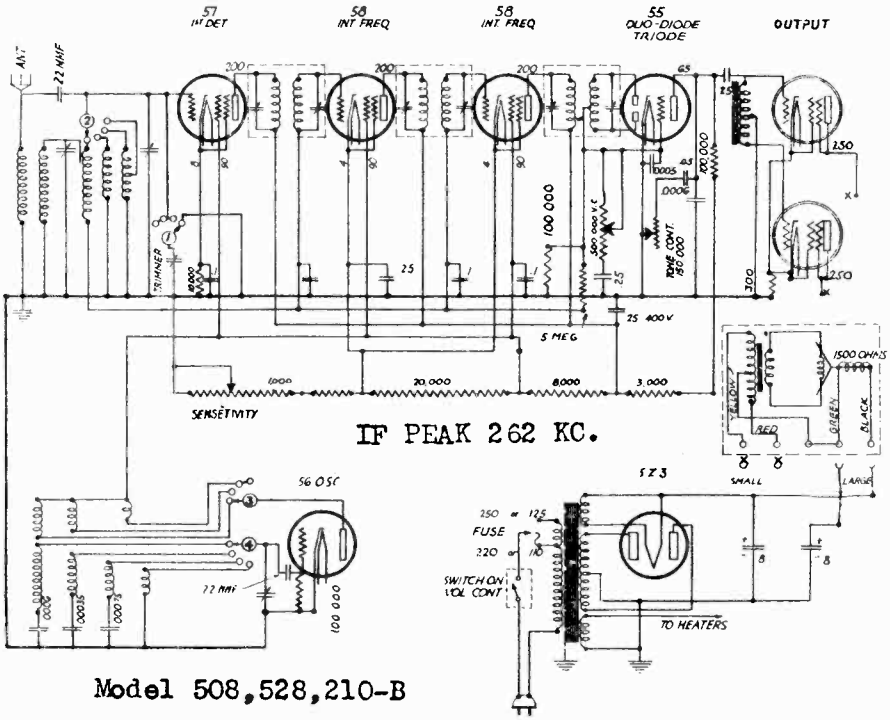
PILOT RADIO & TUBE CORP.



RADIOBAR COMPANY OF AMERICA

MODEL 505
MODEL 508,526,210-B
Schematic





REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K. C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section rear of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

SERVICE DATA

This model has the diode type AVC controlling the first detector and the intermediate frequency stages. The AVC makes it impossible to service and rebalance the set without the proper type of equipment. We advise building a VTVM as shown in the diagram. This meter can be used on any set that uses automatic volume control by connecting the hot lead to the Grid return of the tubes controlled by the AVC. Connect the ground lead to the cathodes of the same tubes. On this 8-tube model connect the hot lead to the 5 meg. resistor and the ground lead to the chassis.

OVERLOADING--OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

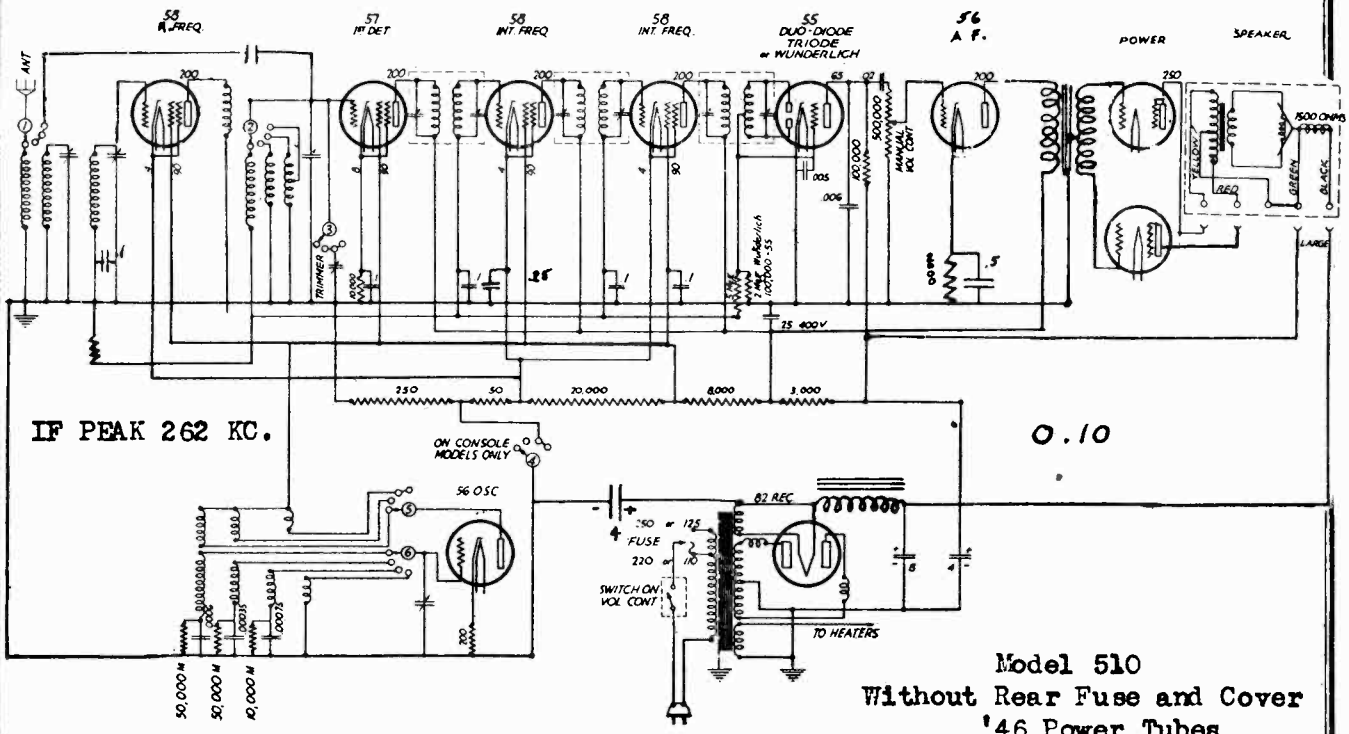
If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

NOISY OPERATION (Not Static)

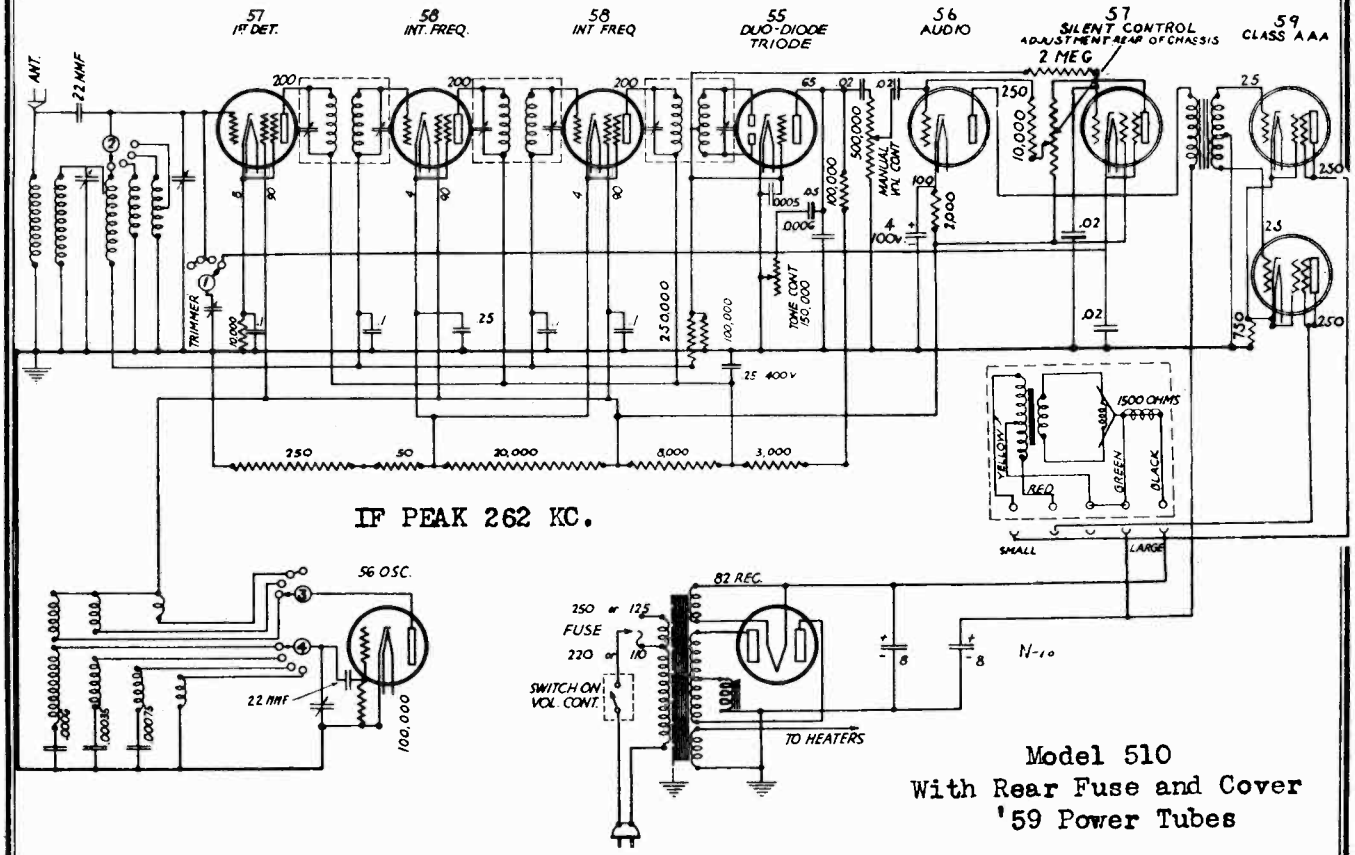
In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

MODEL 510 w/'46s
MODEL 510 w/'59s
Schematic

RADIOBAR COMPANY OF AMERICA



Model 510
Without Rear Fuse and Cover
'46 Power Tubes



Model 510
With Rear Fuse and Cover
'59 Power Tubes

RADIOBAR COMPANY OF AMERICA

MODEL 510
Service notes

SERVICE DATA (All Models)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262 K.C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial. Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 5 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective 82 tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter over the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

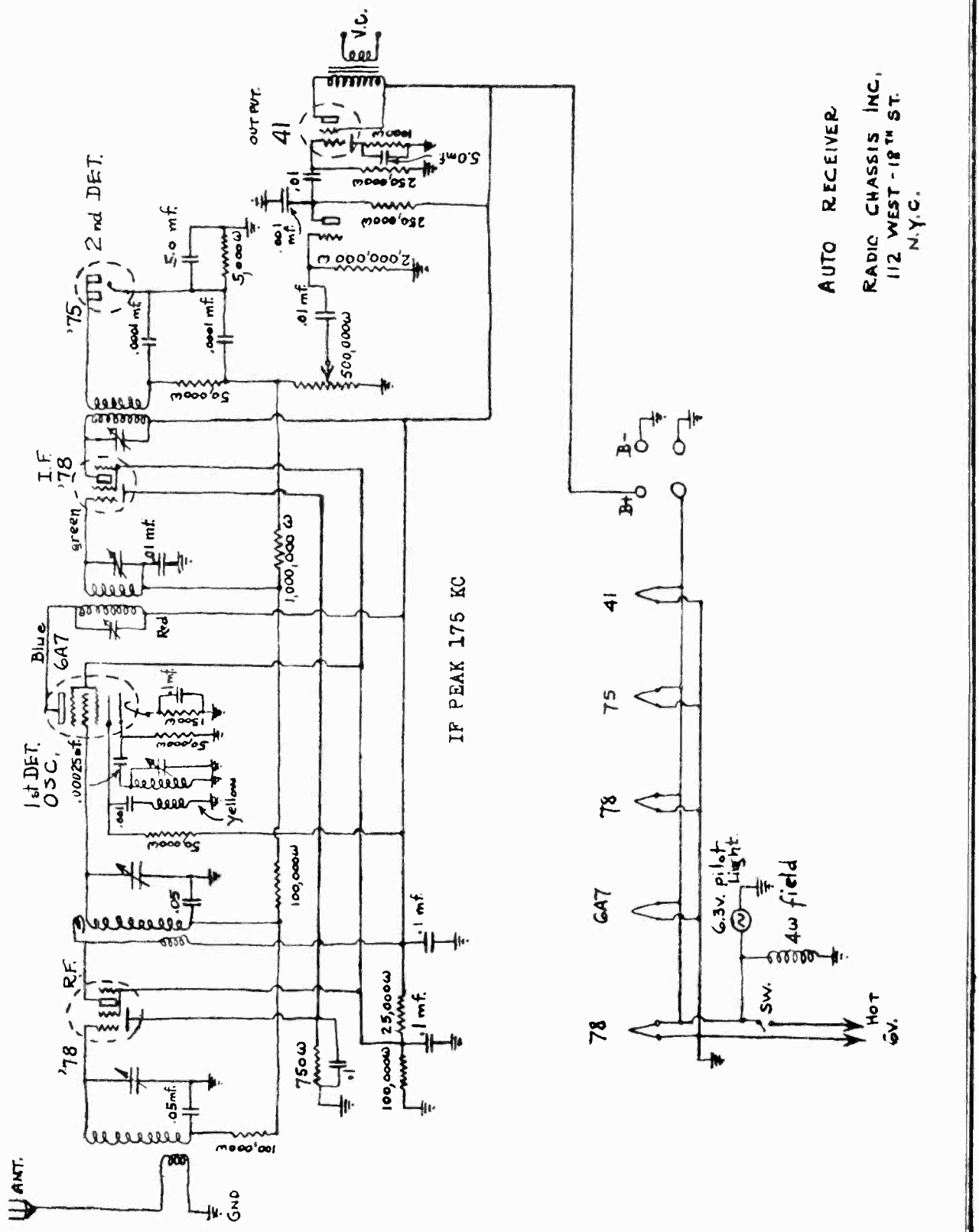
99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

SILENT AUTOMATIC VOLUME CONTROL *(10 tube models only)*

Adjust tuning dial to greatest noise level between stations with right hand trimmer switch turned to extreme left. Then close switch by turning trimmer to extreme right; adjust screw driver control just below point that eliminates all noise.

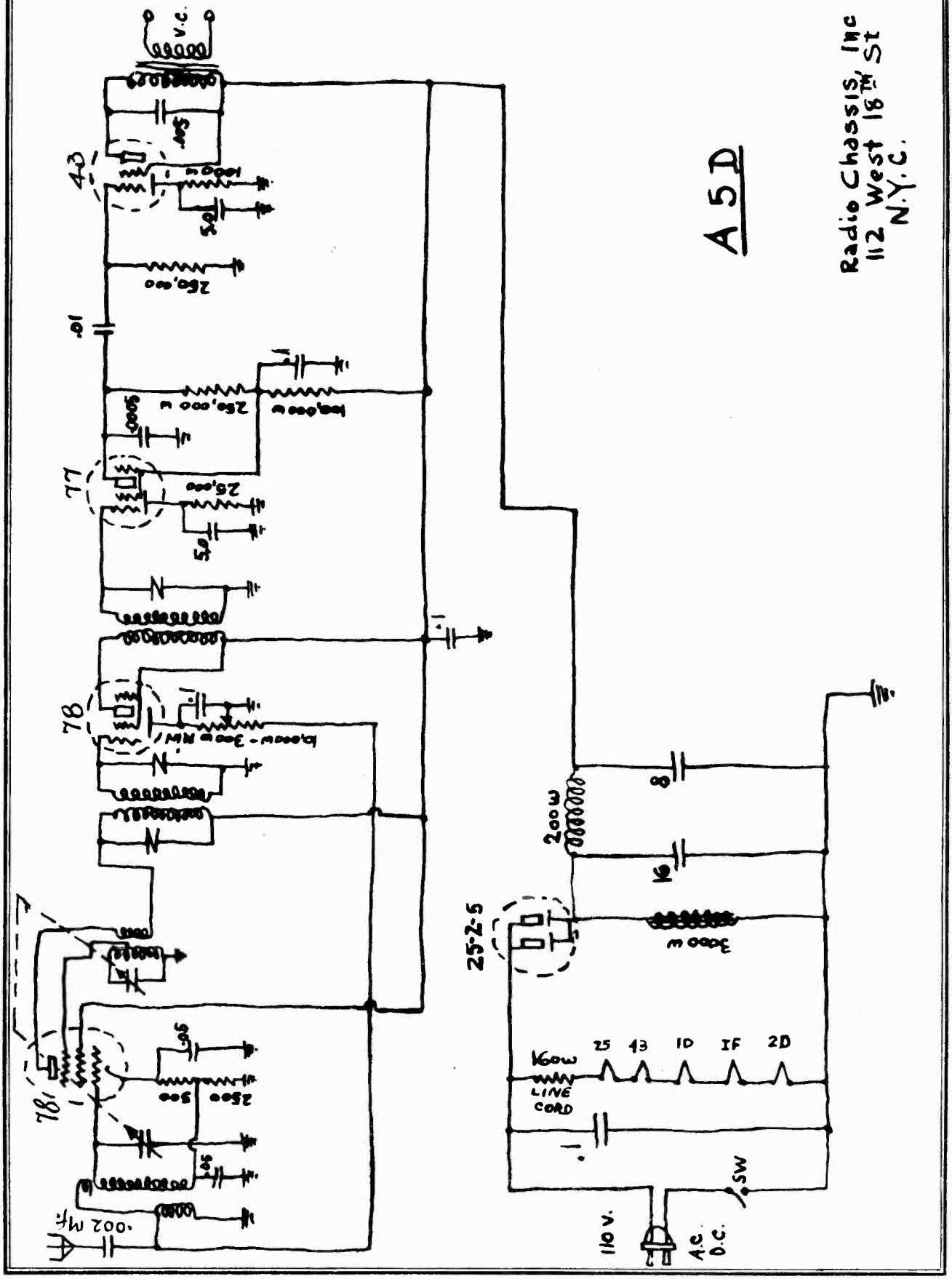
RADIO CHASSIS, INC.

MODEL Auto Receiver
Schematic



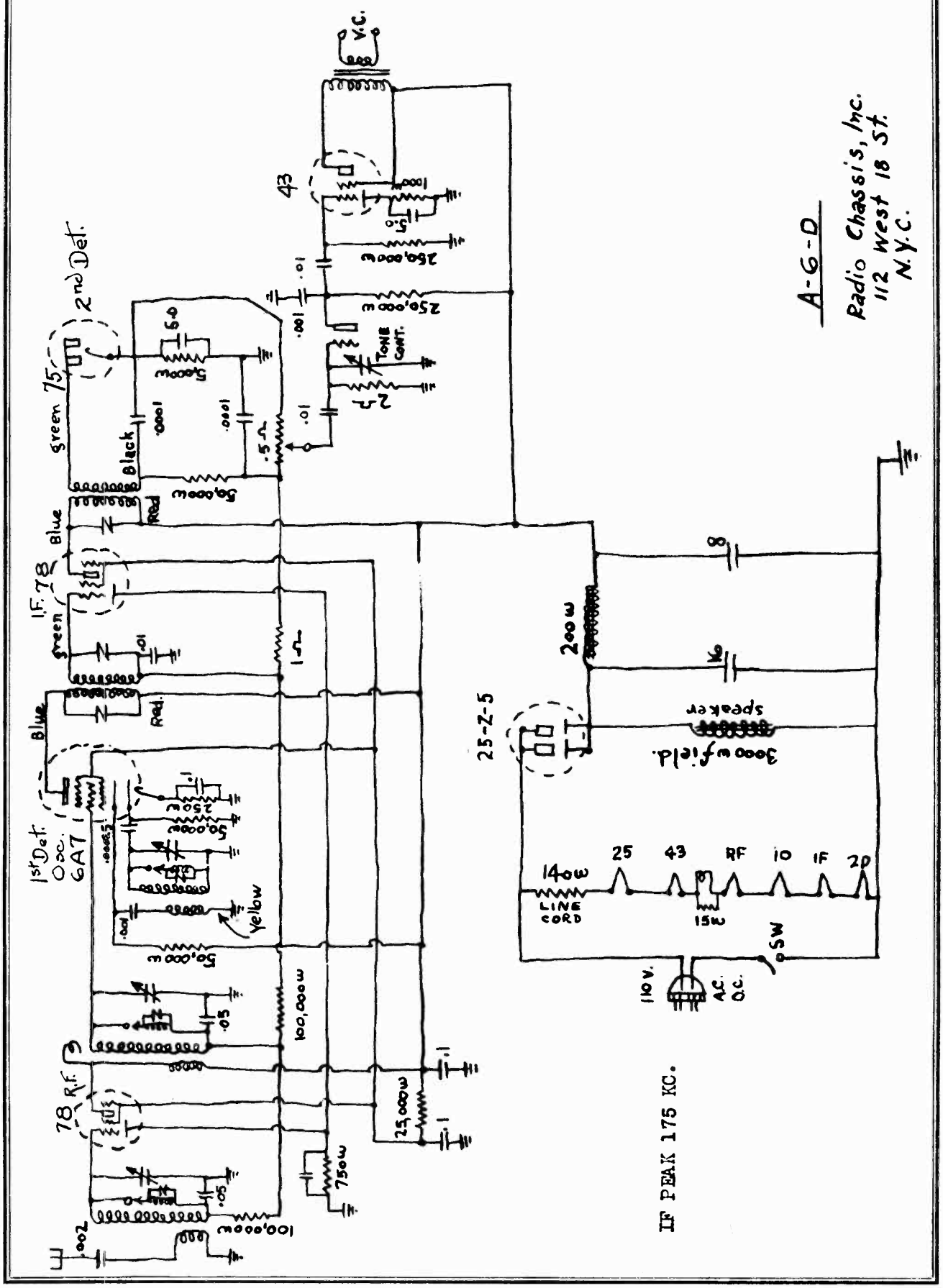
MODEL A-5-D
Schematic

RADIO CHASSIS, INC.



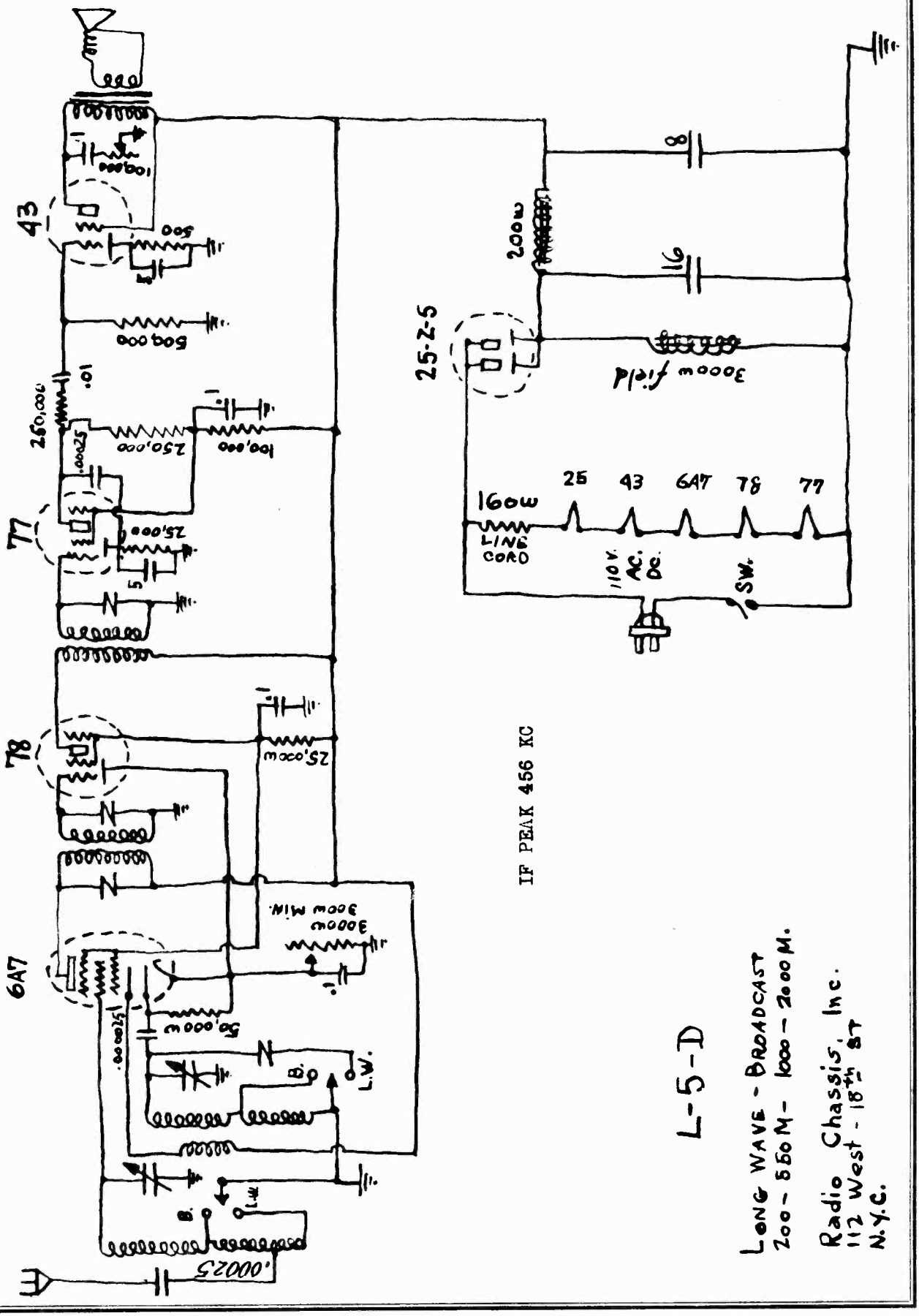
RADIO CHASSIS, INC.

MODEL A-6-D
Schematic



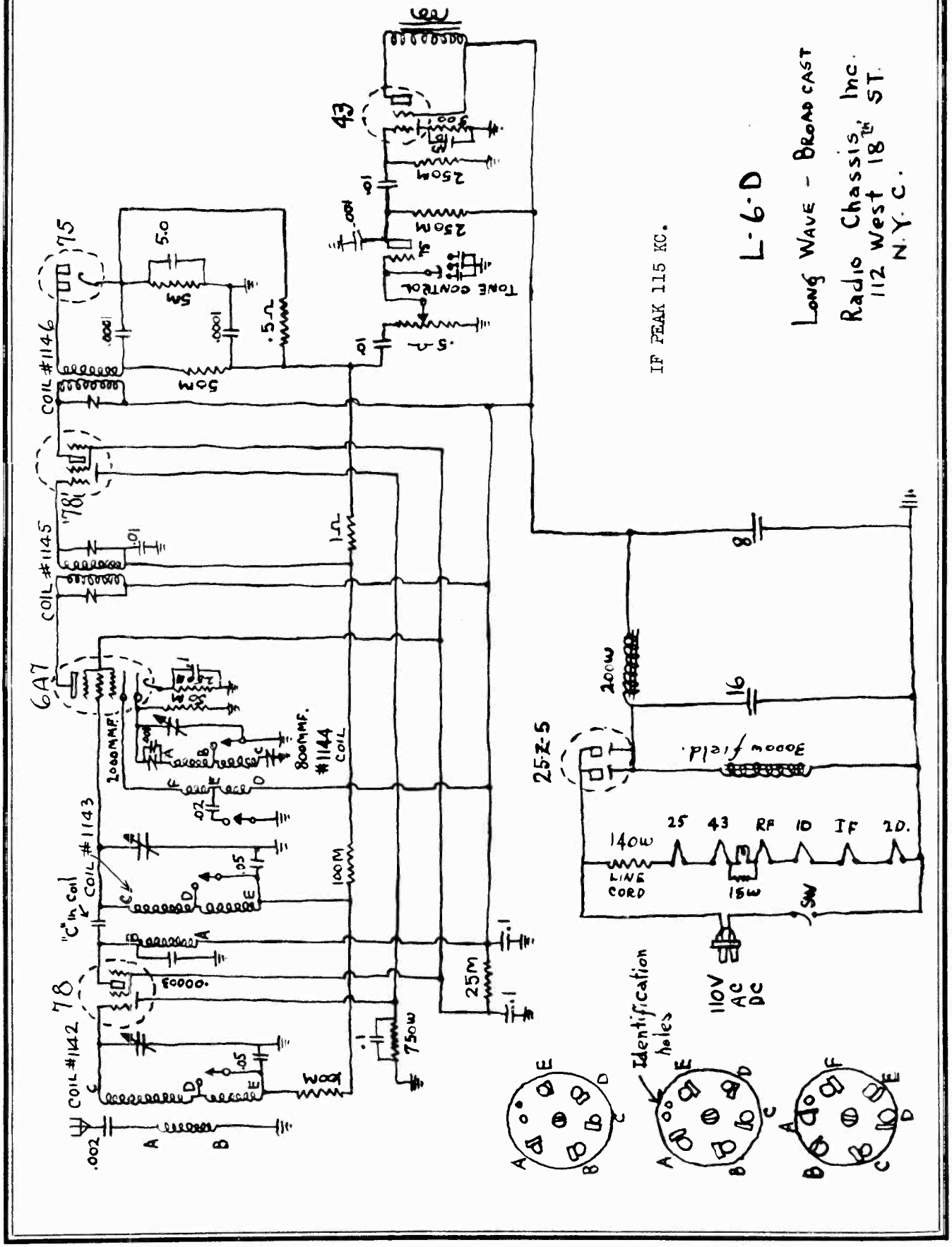
MODEL **L-5-D**
Schematic

RADIO CHASSIS, INC.



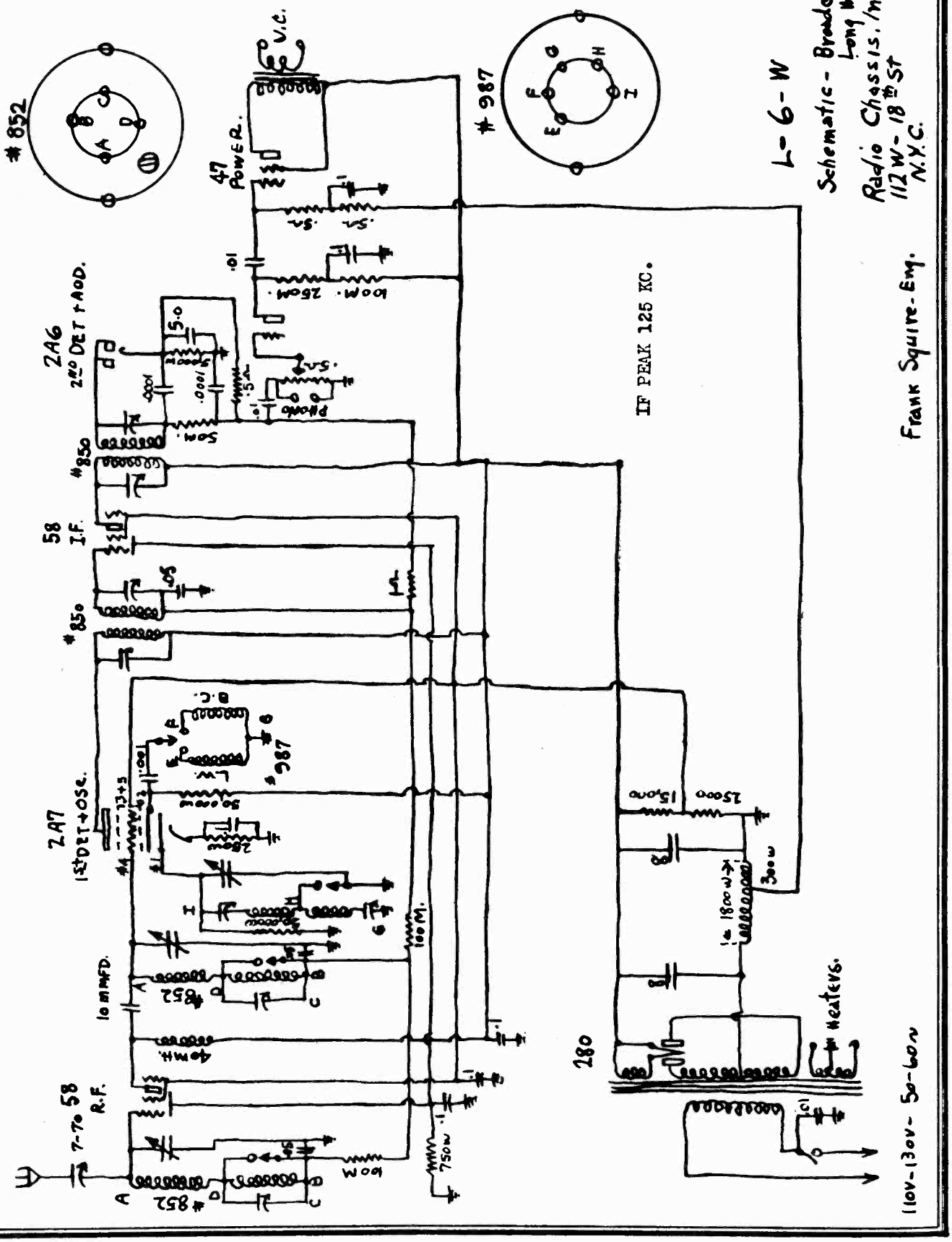
MODEL L-6-D
Schematic

RADIO CHASSIS, INC.



MODEL L-6-W
Schematic

RADIO CHASSIS, INC.



MODEL Premax P-1
Data

RCA-VICTOR CO., INC.

PREMAX

Model P-1

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Important—After unpacking the instrument, uncoil the antenna lead and the power cord. Then take off the rear cover (held by two screws through the flange) and *remove the interior packing material used to protect the Radiotrons during shipment.* Before replacing the cover, make certain that all tubes are firmly in the sockets and that the three grid leads are securely connected (by means of the spring contact clips) to the dome terminals of the proper Radiotrons, as shown by the tube location diagram on the bottom of the receiver.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

Important—When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the foregoing procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

Note—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

RCA-VICTOR CO., INC.

MODEL Premax P-1
Schematic, Voltage
Chassis, Data

SERVICE DATA

Electrical Specifications

Voltage Rating . . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . . 40 Watts
Frequency Range . . . . . 540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

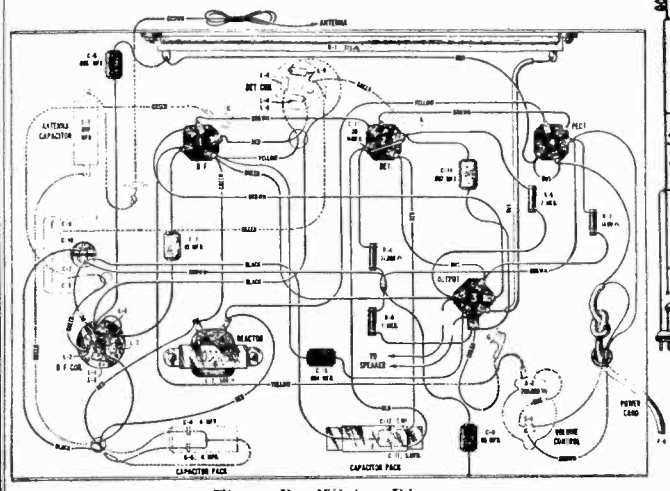


Figure B—Wiring Diagram

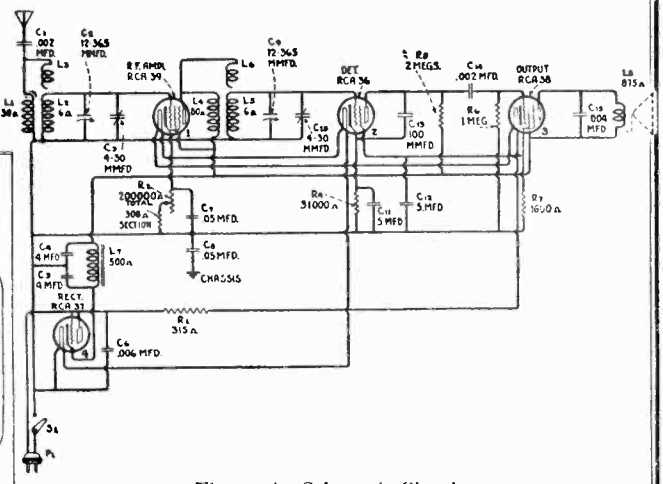


Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume 115 Volt A. C. Line

All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	—	—	115	15.0	6.0

*Impossible to measure on ordinary voltmeter.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5	$1.00
3456	Capacitor—.05 mfd.	.44
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10
3537	Reactor—Filter reactor	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18
3542	Volume control—Complete with mounting nut	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00
3560	Resistor—1,600 ohms—Carbon type—½ watt—Package of 5	1.00
3561	Capacitor—0.004 mfd.	.42
3562	Capacitor—0.006 mfd.	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3635	Resistor—Filament resistor—315 ohms	1.00

Stock No.	DESCRIPTION	List Price
3714	Coil—Detector coil	$0.98
3715	Coil—R. F. coil complete	1.08
3716	Escutcheon—Volume control escutcheon—Package of 2	.25
3717	Escutcheon—Station selector escutcheon—Package of 2	.25
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6451	Condenser—Two gang variable tuning condenser	2.04
7484	Socket—Radiotron socket—5 contact	.35
10405	Capacitor—Antenna series capacitor—.002 mfd	.40
10820	Capacitor—100 mmfd.	.40
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7564	Cone—Speaker cone—Package of 5	5.00
7595	Support—Cone support	.60
7596	Mechanism—Speaker mechanism complete with magnet	3.00
9426	Loudspeaker complete	4.38

RCA-VICTOR CO., INC.

MODEL SW-3 Converter Data

RCA Victor
Short Wave Converter SW-3

SERVICE NOTES

SPECIFICATIONS

Type of Circuit ..... Super-Heterodyne Converter for use with standard broadcast receiver

Type and Number of Radiotrons—A. C. ..... 1 RCA-58, 1 RCA-56—Total, 2

Type and Number of Radiotrons—Battery ..... 1 RCA-230, 1 RCA-232—Total, 2

Type of Tuning ... All tuning is done by means of the I. F. Amplifier which is the broadcast receiver

Broadcasting Ranges ..... 6000 K. C. to 6150 K. C.—49 Meters; 9500 K. C. to 9600 K. C.—31 Meters; 11700 K. C. to 11900 K. C.—25 Meters; 15100 K. C. to 15350 K. C.—19 Meters

Requirements of Receiver for use with Converter ..... High impedance antenna transformer primary insulated from the chassis or other circuits; a source of 2.5 volt current capable of supplying 2 amperes additional and a source of 180-260 volt plate current supplying an additional 5 M. A. The cabinet must also be acoustically correct as the tendency to howl is increased by the addition of the converter.

The RCA Victor Short Wave Converter SW-3 is a two-tube Super-Heterodyne Converter that may be used with standard broadcast band receivers. By means of the Converter, short wave broadcasting stations may be received merely by tuning with the broadcast receiver. A selector switch allows choice of the short wave band that it is desired to receive.

A number of RCA Victor receivers include this Converter. The assembly wiring diagrams, together with any schematic changes for the models are contained in this booklet. The regular Service Notes should be consulted for service information pertinent to the broadcast receivers.

SERVICE DATA

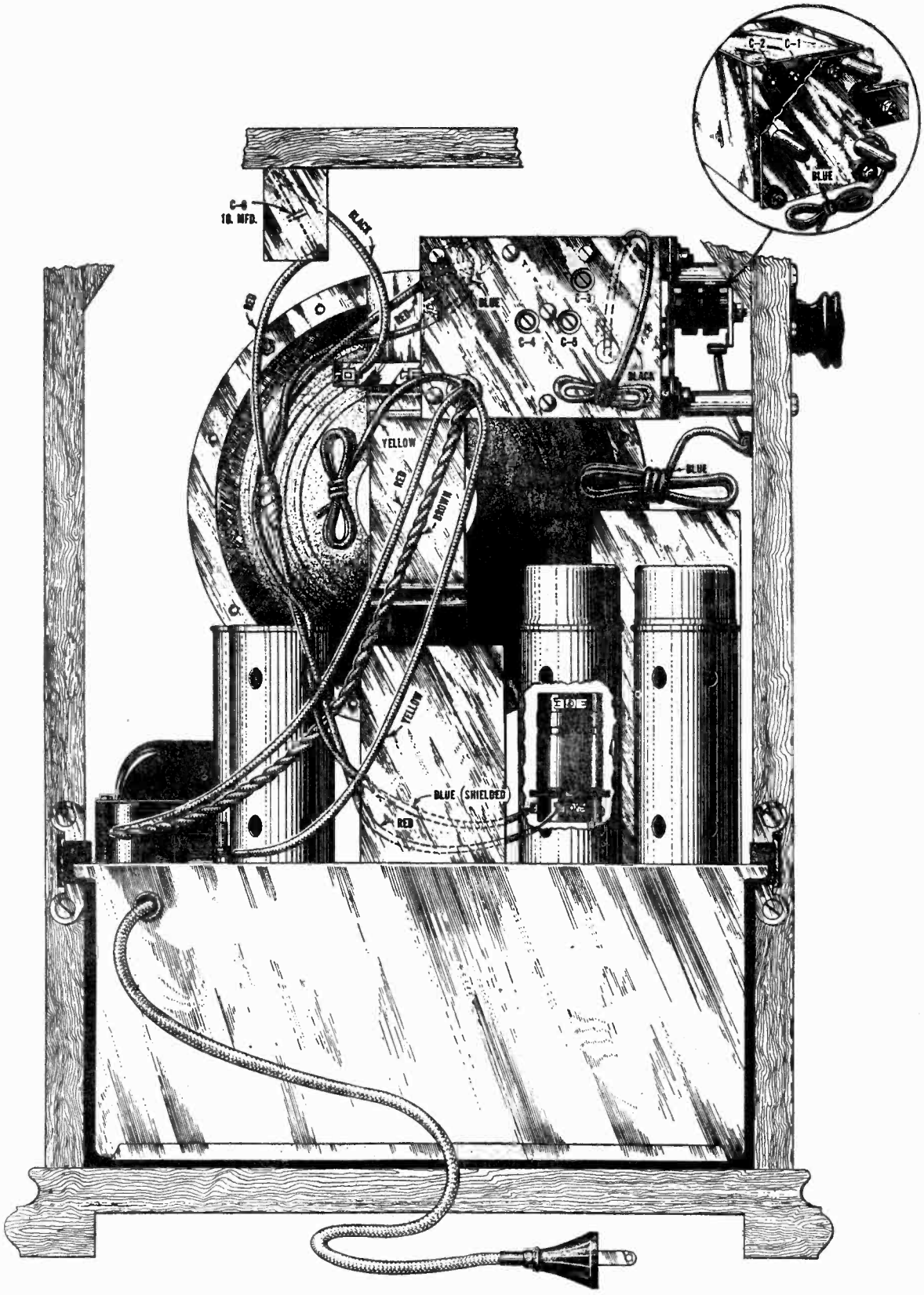
A three-section, five position switch, located on the side or front of the cabinet provides for readily changing the detector fixed tuning inductance and the oscillator fixed tuning capacitance (both in the short wave converter) for operation in any desired short wave broadcasting band. Such changes are effected by shifting the tap switch contact arm through its first four positions, the fifth, or remaining position being employed for standard (long wave) broadcast reception. In the latter case, the short wave circuits are isolated and grounded and the incoming signals are transferred to the input of the standard broadcast receiver.

The following tabulation shows the frequency range of the instrument for each position of the switch and, in addition, the width of the important short wave bands included in those ranges:

Switch Position	*Range (K. C.)*	*Broadcast Band Included (Meters)*	*Band Width (K. C.)*
1	15600–14650	19	15340–15100
2	12350–11400	25	11900–11700
3	9950– 9000	31	9600–9500
4	6700– 5750	49	6150–6000
5	1500– 550	Standard	1500–550

MODEL SW-3 w/R-24
Assembly wiring

RCA-VICTOR CO., INC.



(Some Models have Converter Unit on the opposite side from that shown)

Figure 1—Assembly Wiring of Model R-24

RCA-VICTOR CO., INC.

MODEL SW-3 AC
Schematic
MODEL SW-3 Battery
Schematic

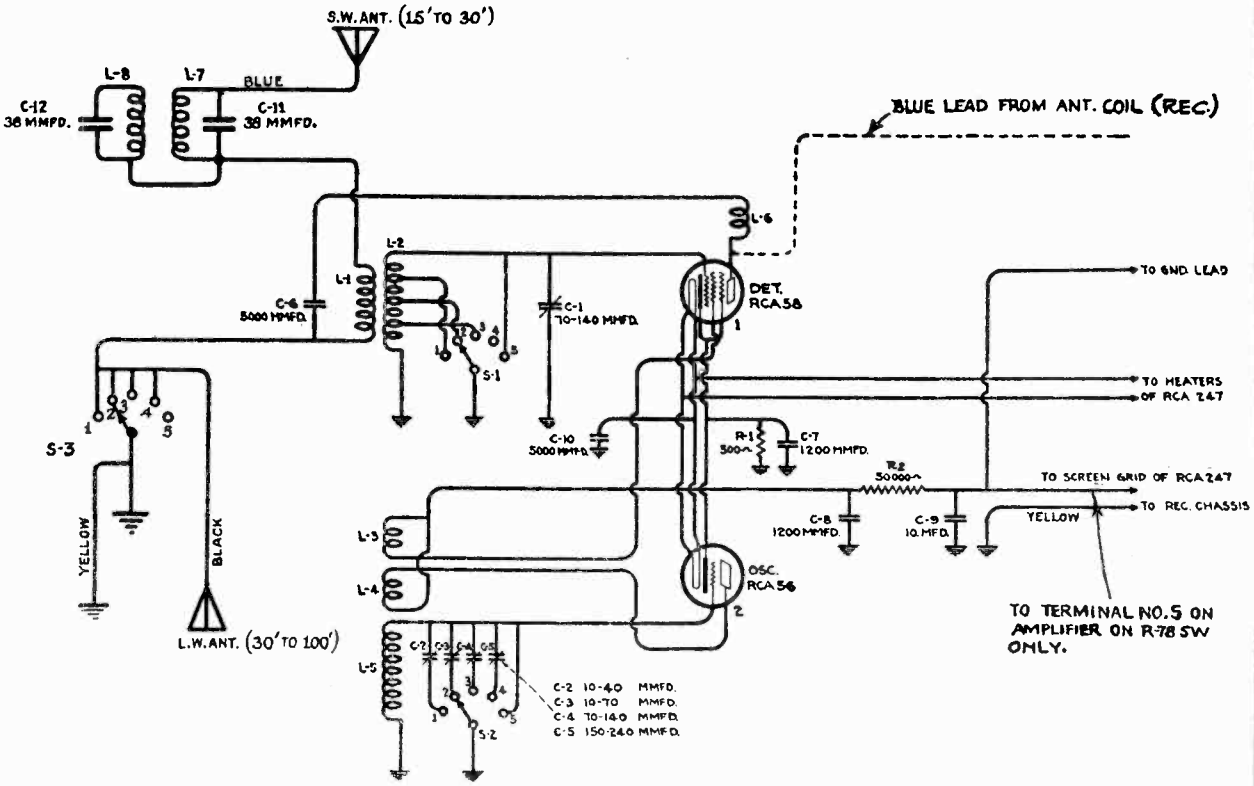


Figure 2—Schematic Diagram of A. C. SW-3

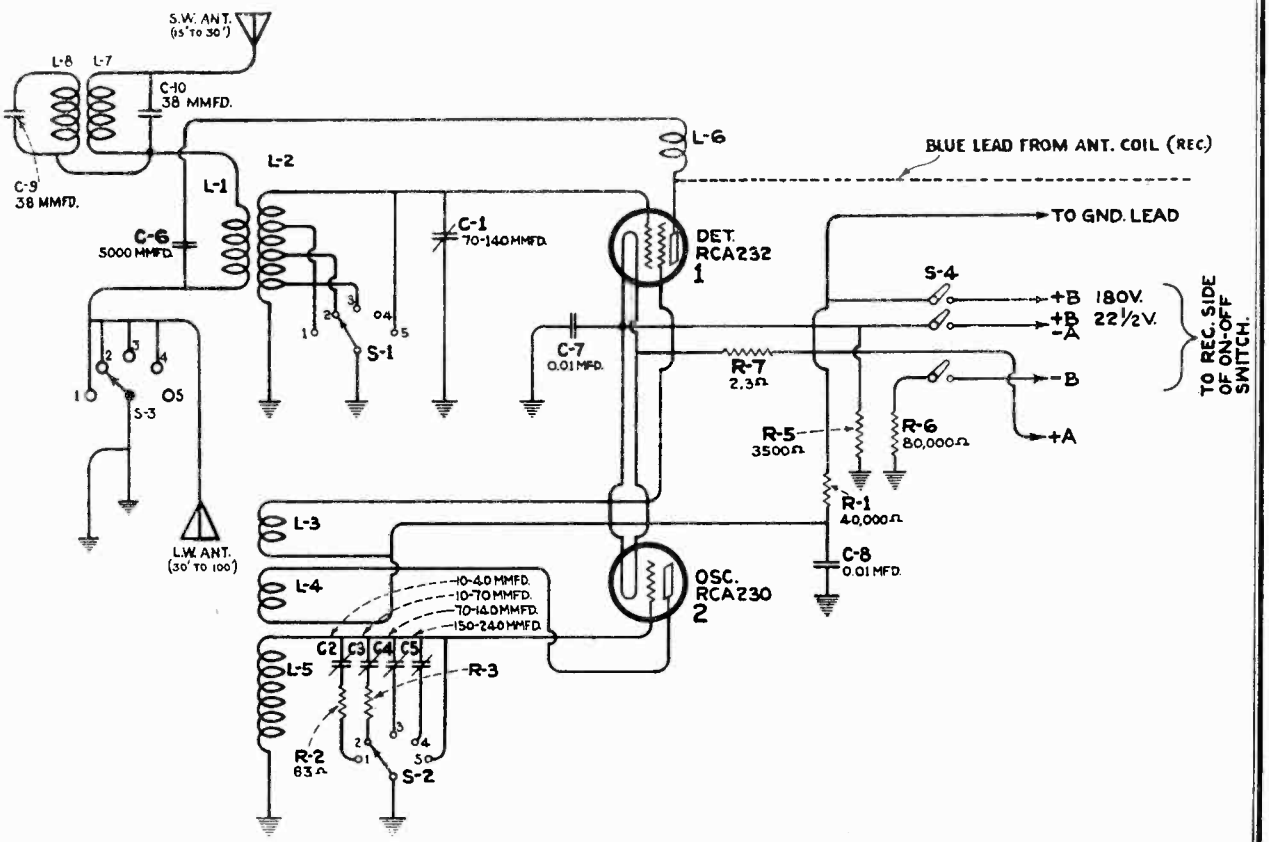


Figure 3—Schematic Diagram of Battery SW-3

By examination of the above table, it will be seen that considerable latitude is provided on either side of the actual extremities of each standardized short wave band. This provision further increases the usefulness of the receiver since several stations are now operating on frequencies slightly outside of the actual band range limits.

Since all tuning adjustments are effected from the single dial, it will be appreciated that considerable interference with short wave reception may be caused by nearby, powerful, long wave (200 to 546 meter) broadcasting stations. Since when correctly adjusted, all short wave broadcasting bands fall within 950–1300 K. C., the possibility of interference is limited to that caused by local stations operating within these frequencies. Such interference may be eliminated in each range by a slight shift of the oscillator frequency. This result is accomplished by adjustment of one of the four, spring-plate, tuning capacitors on the short wave converter chassis, one of which is effective for each position of the tap switch. Any adjustment of these capacitors, of course, will change the dial positions of all stations in that particular range an equal number of dial divisions (10 K. C. per dial division) to an extent corresponding to the frequency shift from the original position at which interference was encountered. If local stations are present within 950–1300 K. C. range, adjust the oscillator tuning capacitors so that no short wave signals are received at the same dial setting.

(1) OSCILLATOR ADJUSTMENTS

The oscillator frequencies should be the following values for the taps indicated:

Band	*Oscillator Frequency*	*Trimming Capacitor*
19 Meter	14100 K. C.	C-2
25 Meter	12900 K. C.	C-3
31 Meter	8450 K. C.	C-4
49 Meter	7250 K. C.	C-5

If a frequency meter or a calibrated receiver is available, either will be suitable for checking or adjusting these capacitors. If such equipment is not available then the following method may be used:

The frequency of the oscillator may be checked by adding or subtracting the dial reading in kilocycles from the operating frequency of the station being received. The instruction book lists a number of stations with their correct operating frequency. The dial reading should be added or subtracted as follows:

19 Meter Tap.....Subtract dial reading.
25 Meter Tap.....Add dial reading.
31 Meter Tap.....Subtract dial reading.
49 Meter Tap.....Add dial reading.

It will be noted that when the oscillator trimmer capacitors are properly adjusted, all stations operating in the assigned bands will fall between 950 and 1300 K. C. on the receiver dial. The purpose of the oscillator capacitors is to adjust this range and is *not* a sensitivity adjustment.

In the event that they are so badly out of adjustment that one or more of the bands falls entirely out of the receiver tuning range and no short wave broadcasting stations are heard, the following procedure may be used for realigning them:

1. By means of a set using the SW-3 Converter and working properly, determine that a station can be heard on the band to be adjusted.

2. Tune in a signal, on the receiver working properly, in the band it is desired to adjust the defective receiver. Then set the band switch and dial at the same position on the defective receiver as that of the receiver tuned to the signal.

3. For the 49 and 25 meter bands, turn C-3 or C-5 as the case may be, Figure 1, to the extreme minimum capacity position, counter-clockwise. Then turn slowly clockwise until the station being received on the first receiver is heard. For the 19 and 31 meter positions, the capacitors C-2 and C-4, as the case may be, should be first tuned to their maximum capacity position clockwise and then turned counter-clockwise until the signal is heard. This order should be carefully followed. The first point, after starting from the maximum or minimum position at which the signal is heard, is the correct adjustment. On some settings, two positions may be found but any one other than the first will result in improper tuning.

(2) DETECTOR ADJUSTMENT

The detector trimmer capacitor, if not properly adjusted, will cause insensitivity or excessive background noise on all bands.

This adjustment can only be made at the time of day when 49 meter stations can be received unless equipment for generating an artificial high-frequency (6075 K. C.) test signal of accurate frequency is available.

The adjustment should be made as follows:

1. Remove screws holding converter in cabinet and place converter at the rear of the chassis on a wooden box or other rest made of non-conductive material, leaving all connections intact so that proper operation is maintained. In models not having a hole in mounting plate to enable adjustment of C-1, the mounting plate must also be removed and so placed that it is not in the field of the coils of the converter.

2. Then tune in a station operating near the center of the 49 meter band (6075 K. C.) and adjust detector trimmer (C-1) for maximum volume. Rock the main tuning capacitor back and forth while making this adjustment.

   If no station operating close to 6075 K. C. can be heard, adjust for maximum volume on two stations successively, one on either side of 6075 K. C., noting position of trimmer and then placing the trimmer at the mean of the two positions.

3. Use of Station Finding Chart.

By thorough understanding and use of the Station Finder, the customer can obtain much greater satisfaction by enabling the rapid identification and dial setting of short wave stations.

In effect the Station Finder provides a calibration of the receiver tuning dial, converting the long wave markings 540 to 1500 K. C. to higher frequency calibrations, depending on the position of the range switch.

This is made possible by the fact that no matter what frequency is being received one dial division always represents 10 K. C.

The following example explains the operation:

With Range Switch in 49 meter position, assume that W8XK is tuned in at 1080 dial position. By reference to the Station Finder, it will be seen that in the section bracketed 49 M., W8XK is marked opposite 6140 K. C. the operating frequency of W8XK. This then means that 1080 corresponds to 6140 K. C. Rotate the inner circle so that 1080 is exactly opposite 6140, the point at which

W8XK is marked. Then by reference to chart it will be seen that with the receiver tuned to 1180 it will be tuned to 6040 K. C. or the operating frequency of W4XB. Now, by outlining the index hole we can record, permanently, the point to set the Station Finder in order to find the dial setting for any 49 meter station. By looking on the Short Wave Broadcast Station List and Program Schedule we find that W3XAL operates on 6100 K. C.; then for the example given above we can immediately find that W3XAL will be received at 1120 K. C. and when received, the call letters may be marked in the margin opposite 6100 K. C.

Thus it is only necessary to log one station in a band to obtain the dial position for all stations in that band. The same procedure should be repeated for all bands.

In case it is found that any stations operating within the bands fall outside of the region from 950–1300 K. C., the oscillator trimmer condenser for that band should be readjusted so as to bring all stations within the region of 950–1300 K. C. in order to obtain maximum efficiency.

It is recommended that each receiver be checked and the Station Finder be logged for the particular set, marking the serial number on the Station Finder before sending to customer's house. Then when installed the operation of the Station Finder should be demonstrated, stressing the ease of tuning and separation of stations obtained.

(3) GENERAL NOTES

The following general notes will help in the performance of service work in conjunction with receivers using the SW-3.

1. Keep the antenna lead of the converter as far as possible from the broadcast receiver chassis

2. If modulation hum is encountered, connect a 5000 mmfd. capacitor from either heater lead to ground. Later production instruments include this capacitor.

3. The shielding on the grid of the R. F. tube should be kept as loose as possible. If it is drawn tight it will affect the adjustment of the R. F. Trimmer Capacitor on the broadcast receiver

4. Keep all other shielding tight, especially the shield over the lead from the converter to the shielded antenna coil, pushing it tight against the coil shield and thus covering the wire entirely.

5. If it is desired to use only one antenna, connect the antenna permanently to the blue lead from the Converter. If sufficient signal strength is not obtained on long wave reception, provide a single pole, single throw switch for connecting the black lead to the blue when long wave reception is desired. A clip on the black lead can be used if a switch is not available.

6. In buildings of metal framework or even with a metal roof, an indoor antenna or an outdoor antenna that does not extend beyond the shielding effect of the building will not be satisfactory. For such installations, an outdoor antenna must be used and the lead-in placed away from any metal parts of the building.

RCA-VICTOR CO., INC.

MODEL SW-3 AC
Chassis wiring
MODEL SW-3 Battery
Chassis wiring

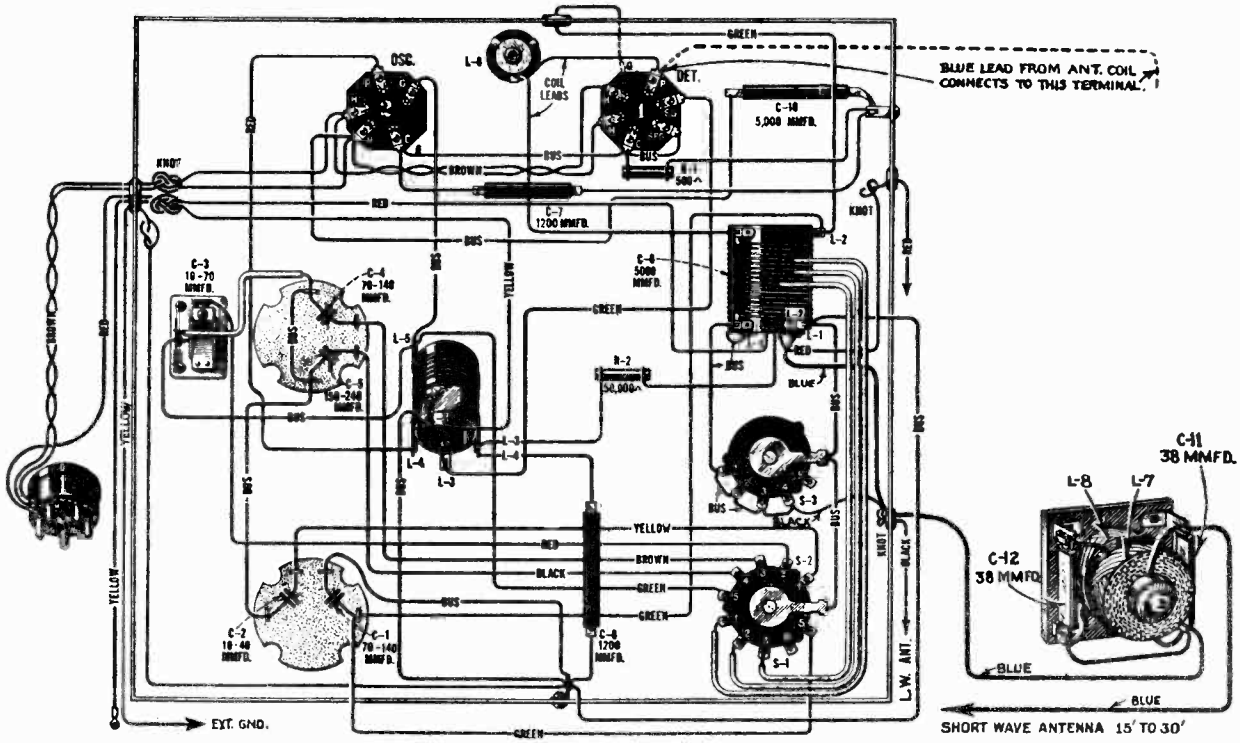


Figure 4—Wiring Diagram of A. C. SW-3

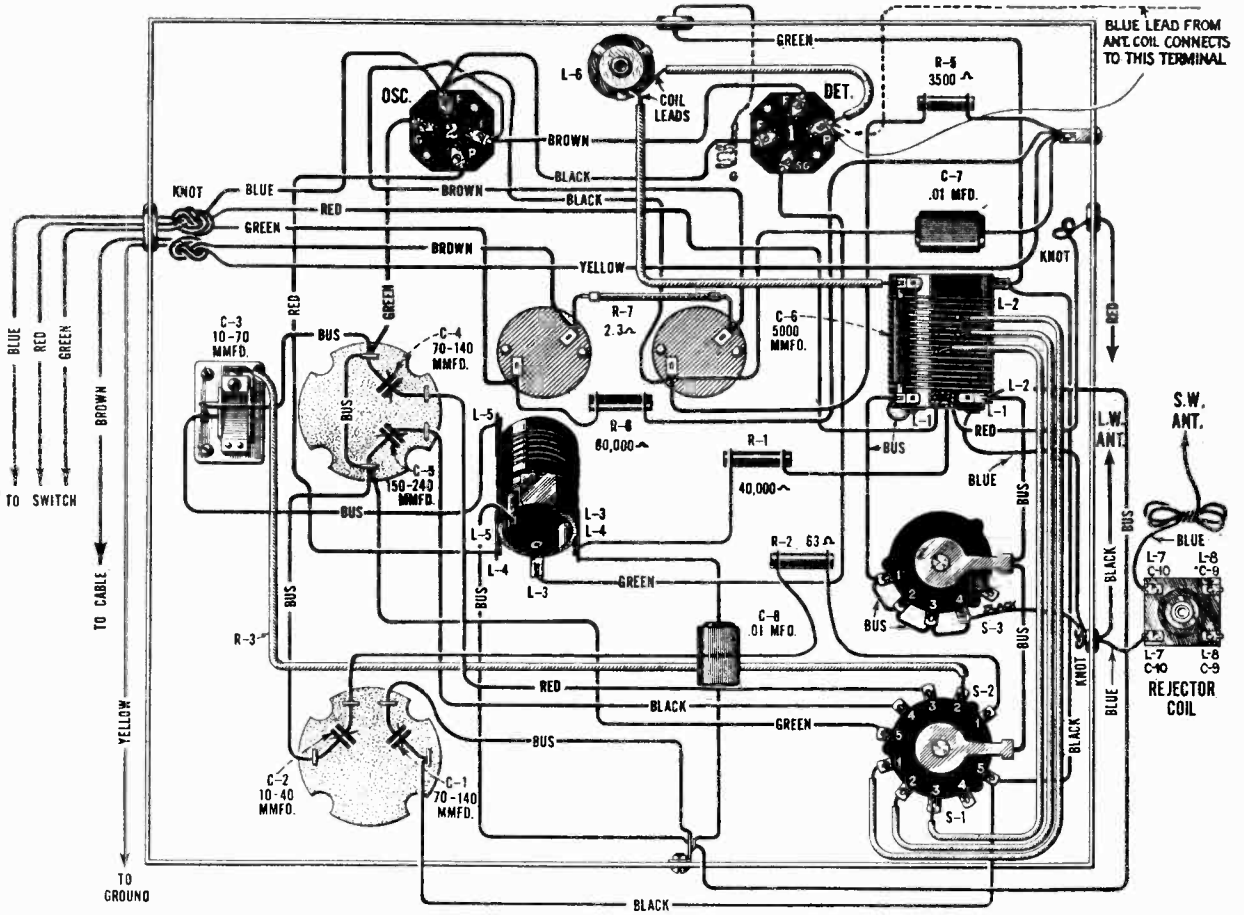


Figure 5—Wiring Diagram of Battery SW-3

MODEL SW-3 w/R-24-A
Assembly wiring

RCA-VICTOR CO., INC.

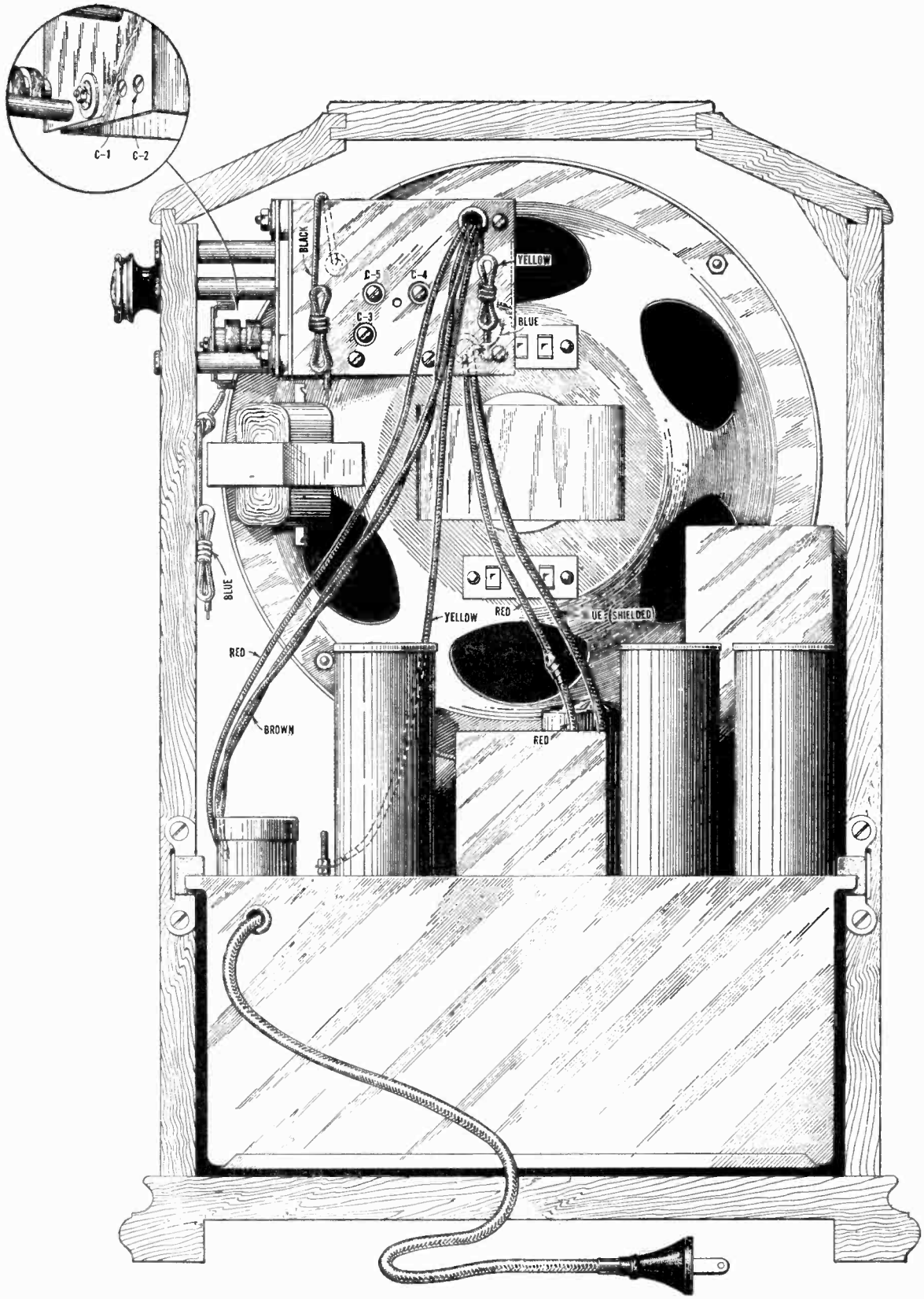


Figure 6—R-24-A Assembly Wiring

RCA-VICTOR CO., INC.

MODEL SW-3 w/ R-24-B
Assembly wiring

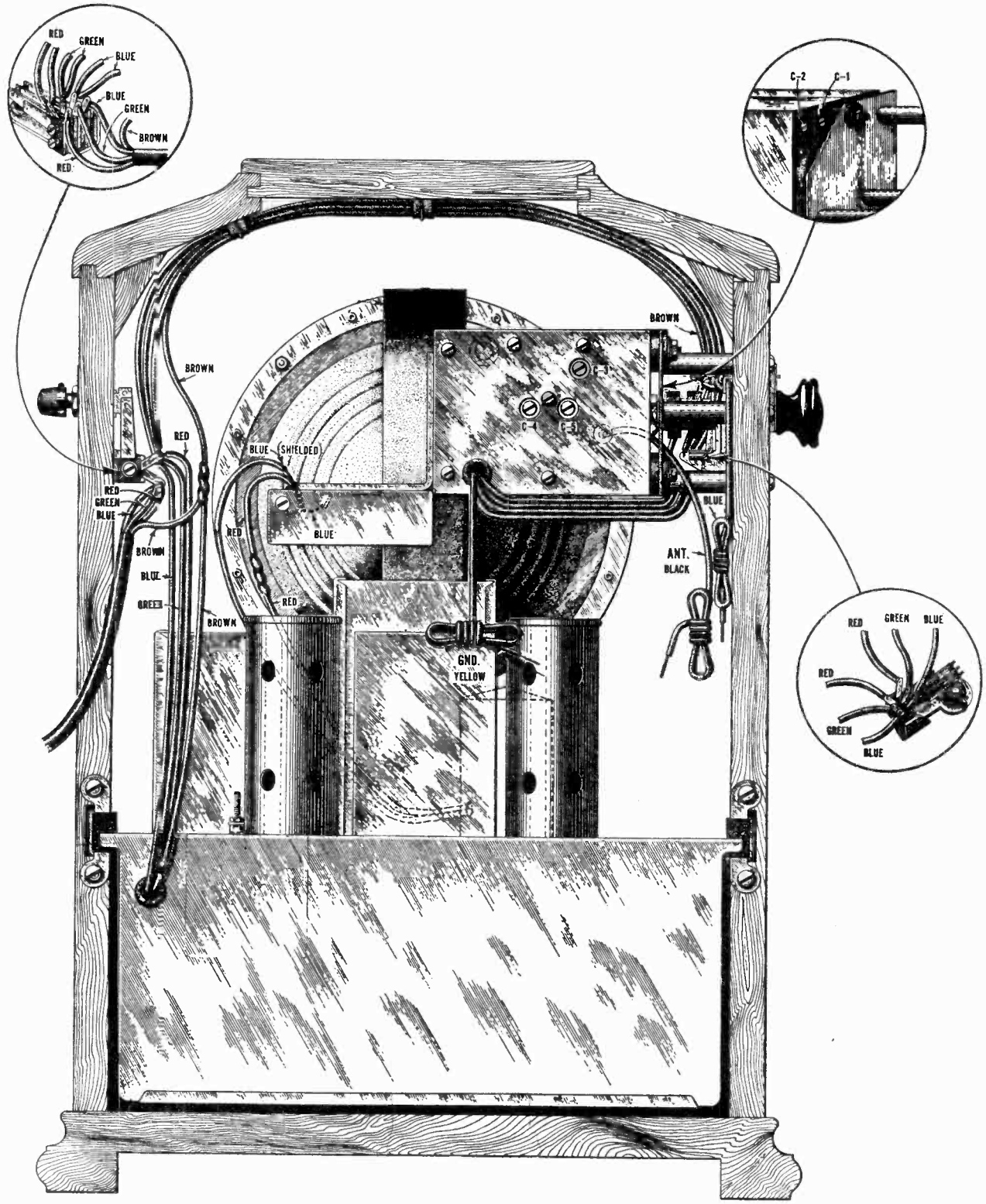


Figure 7—R-24-B Assembly Wiring

MODEL SW-3 w/R-78 SW
Assembly wiring

RCA-VICTOR CO., INC.

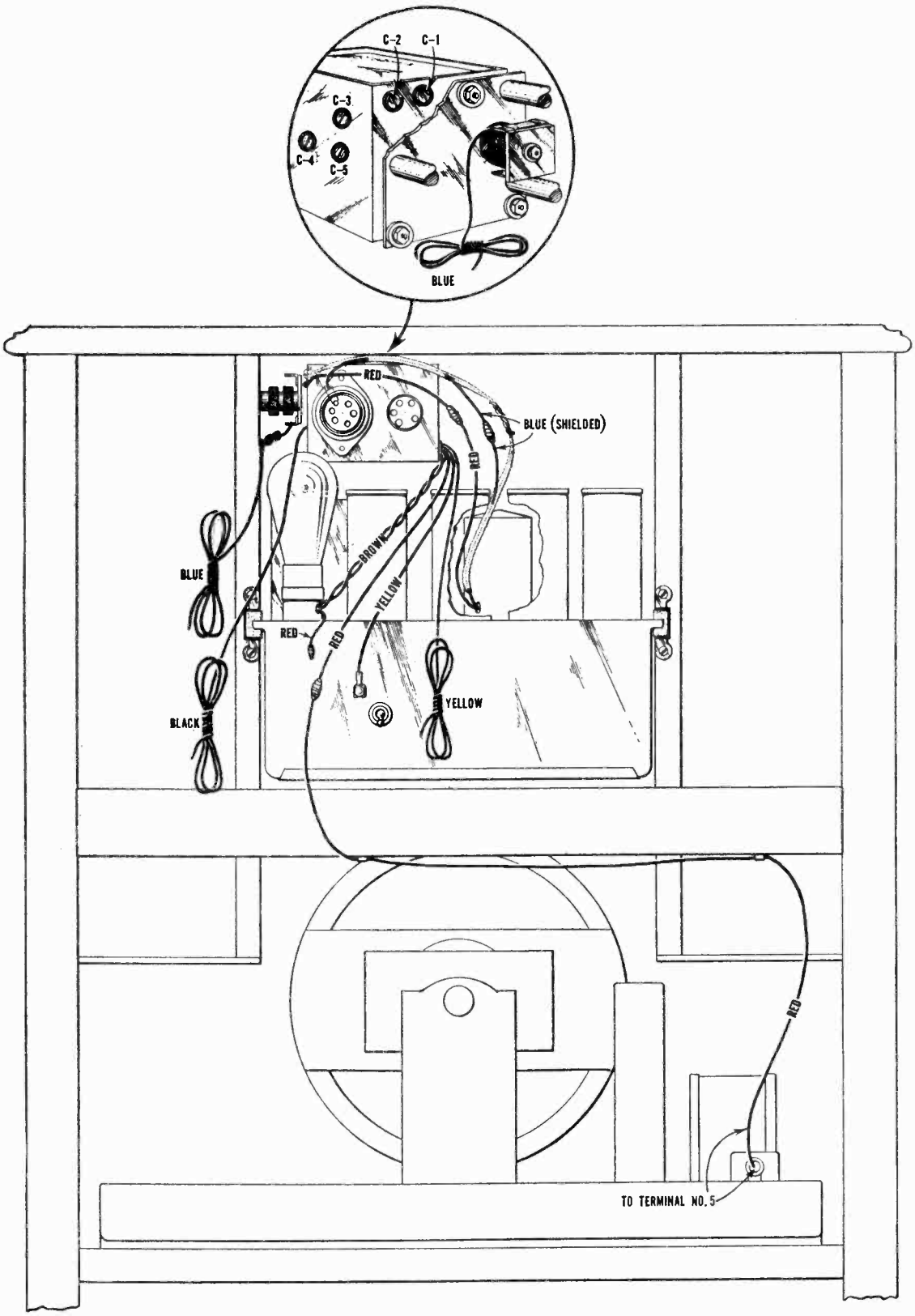


Figure 8—R-78-S. W. Assembly Wiring

RCA-VICTOR CO., INC.

MODEL SW-3 w/ RE-81
Assembly wiring
MODEL SW-3 w/ RAE-84
Assembly wiring

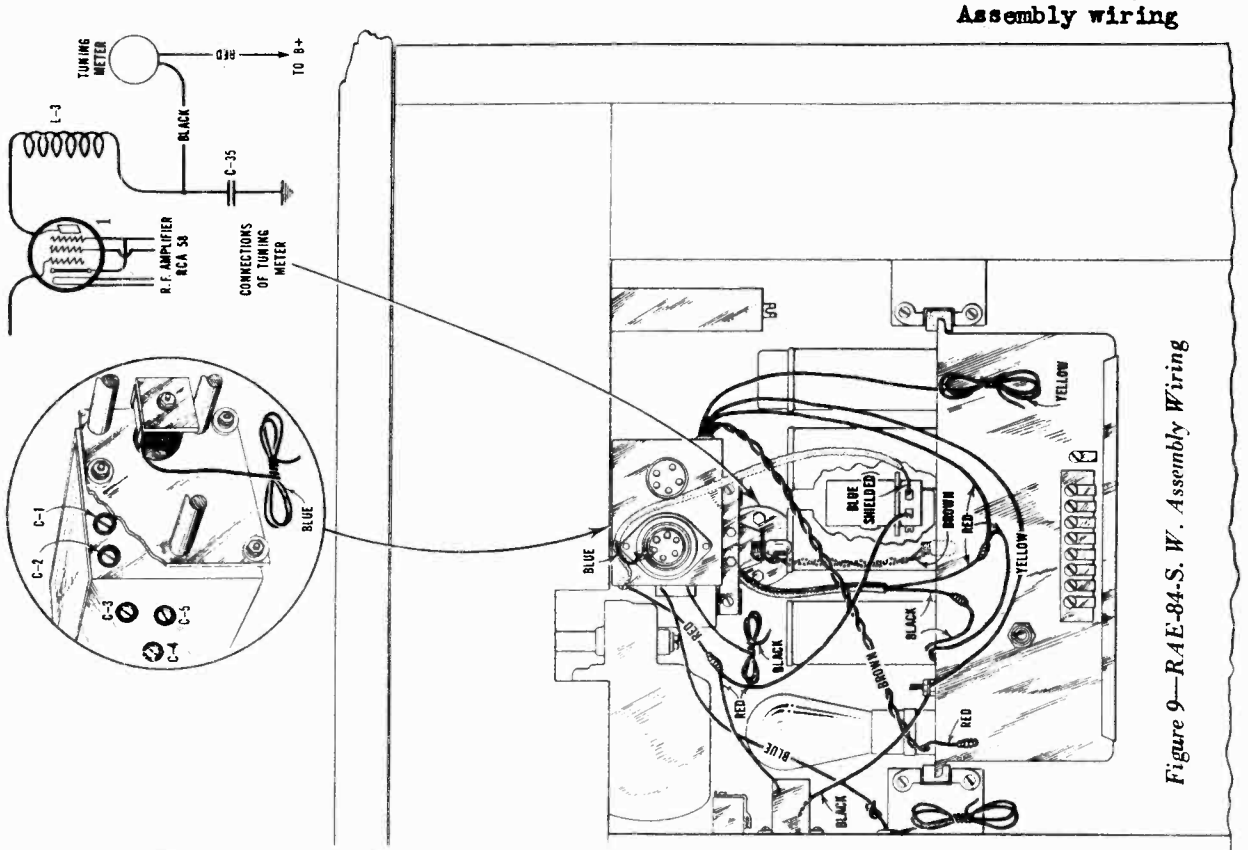


Figure 9—RAE-84-S. W. Assembly Wiring

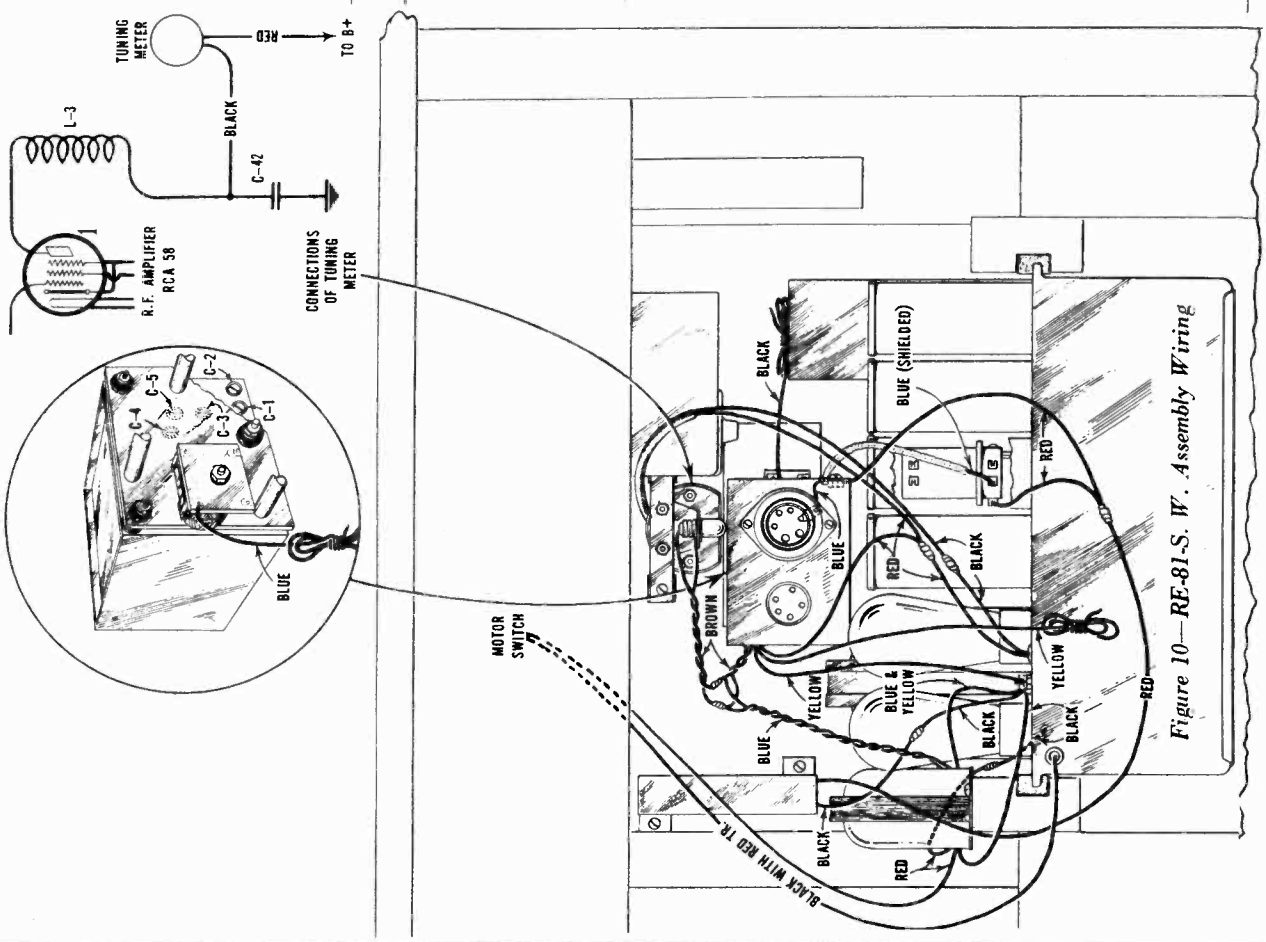


Figure 10—RE-81-S. W. Assembly Wiring

MODEL SW-3 Converter
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	SW-3 A. C.	
2012	Capacitor—1200 mmfd.	$0.55
2747	Contact cap—Package of 5	.50
2969	Resistor—50,000 ohms—Carbon type—1 watt—Package of 5	2.50
2932	Capacitor—5000 mmfd.	1.00
3383	Resistor—500 ohms—Carbon type—½ watt—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3421	Coil—Oscillator coil	1.10
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3424	Coil—Detector coil	1.60
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3427	Capacitor—10 mfd. capacitor	2.15
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil—Located on mounting plate	1.46
3501	Capacitor — 38 mmfd. — Located on resistor board	.44
3504	Shield—Detector shield	.34
6100	Coil—Choke coil	.75
6109	Knob—Range selector switch knob—Package of 5	1.75
6350	Adaptor—Five prong adaptor plug complete with leads	1.25
7484	Socket—UY type Radiotron socket	.65
7485	Socket—Radiotron 6 contact socket	.70
	SW-3 (Battery)	
2747	Contact cap—Package of 5	.50
2932	Capacitor—5000 mmfd.	1.00
3045	Resistor—40,000 ohms—1 watt—Carbon type—Package of 5	2.50
3297	Resistor—80,000 ohms—½ watt—Carbon type—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil	1.46
3501	Capacitor — 38 mmfd. — Located on rejector coil	$0.44
3504	Shield—Detector shield	.34
3576	Resistor—2.3 ohms—Flexible type—Package of 5	1.20
3577	Resistor—3,500 ohms—½ watt—Carbon type—Package of 5	1.00
3578	Capacitor—0.01 mfd.	.38
3579	Resistor—63 ohms—½ watt—Carbon type—Package of 5	1.00
6100	Coil—Choke coil	.75
6109	Knob—Range switch selector knob—Package of 5	1.75
6300	Socket—4 contact Radiotron socket	.55
6379	Coil—Detector coil	1.52
6380	Coil—Oscillator coil	1.08
7488	Shield—Detector tube shield top	.50
	SPECIAL PARTS FOR R-24-A, R-24-B, RE-81 and RAE-84 RECEIVER ASSEMBLIES	
3502	Base and mounting bracket for R. F. coil	.32
3503	Shield—R. F. coil shield	.36
6411	Coil—R. F. coil complete with mounting bracket	1.54
	SPECIAL PARTS FOR R-24-A RECEIVER ASSEMBLIES	
3522	Resistor—17,000 ohms—Carbon type—½ watt—Package of 5	1.00
	REPRODUCER ASSEMBLIES	
6390	Transformer—Output transformer	2.12
8976	Coil assembly—Comprising field coil magnet and cone support	4.30
	SPECIAL PARTS FOR R-24-B RECEIVER ASSEMBLIES	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3079	Resistor—40,000 ohms—Carbon type—½ watt—Package of 5	2.50
6312	Capacitor—650 mmfd.—Package of 5	2.50
	SPECIAL PARTS FOR RE-81	
7587	Transformer—Filament transformer	4.25
	SPECIAL PARTS FOR RAE-84	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3505	Capacitor—0.1 mfd.	.36
3506	Knob—Range switch selector knob	.50
3523	Capacitor pack—Comprising two 0.05 mfd. capacitors in metal container	.72
	SPECIAL PARTS FOR RE-81 and RAE-84	
6412	Capacitor—10 mfd.	1.62
6413	Meter—Tuning meter	2.38

RCA-VICTOR CO., INC.

RCA Model R-7-LW

ELECTRICAL SPECIFICATIONS

Voltage Rating	100-230 Volts
Frequency Rating	40-60 Cycles
Power Consumption	100 Watts
Antenna Length	25-75 Feet
Circuit	A.C. Screen Grid Super-Heterodyne
Radiotrons	2 RCA-235, 1 UY-224, 2 UY-227, 2 UX-245, 1 UX-280 Total of 8
Radio Frequency Stages	One
First Detector	Tuned Input Grid Bias
Intermediate Stages	One
Second Detector	Power Grid Bias
Audio Stages	One (Push-Pull)
Rectifier	Full Wave UX-280
Loudspeaker	Dynamic
Undistorted Output	3.0 Watts
Frequency Range	550-1500 K.C. and 150-300 K.C.

PHYSICAL SPECIFICATIONS

Height	19 inches
Depth	10 inches
Width	14 inches
Weight alone	37 pounds
Weight (Packed for Shipment)	44 pounds
Packing Case Dimensions	16¾" x 12⅞" x 23¼"

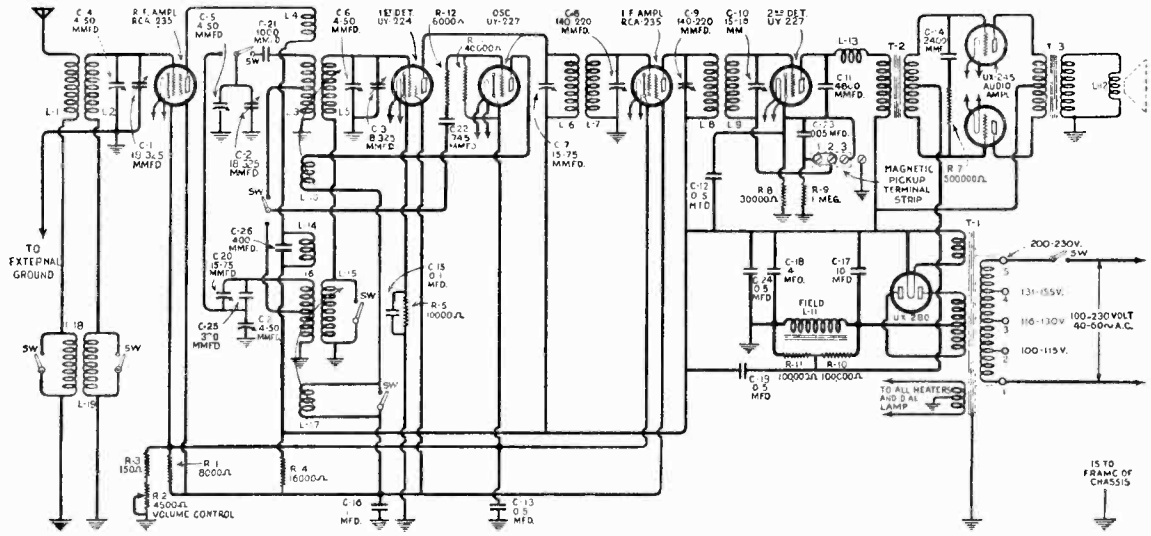


Figure 1—Schematic circuit diagram of R-7-LW

MODEL R-7-LW
Chassis wiring

RCA-VICTOR CO., INC.

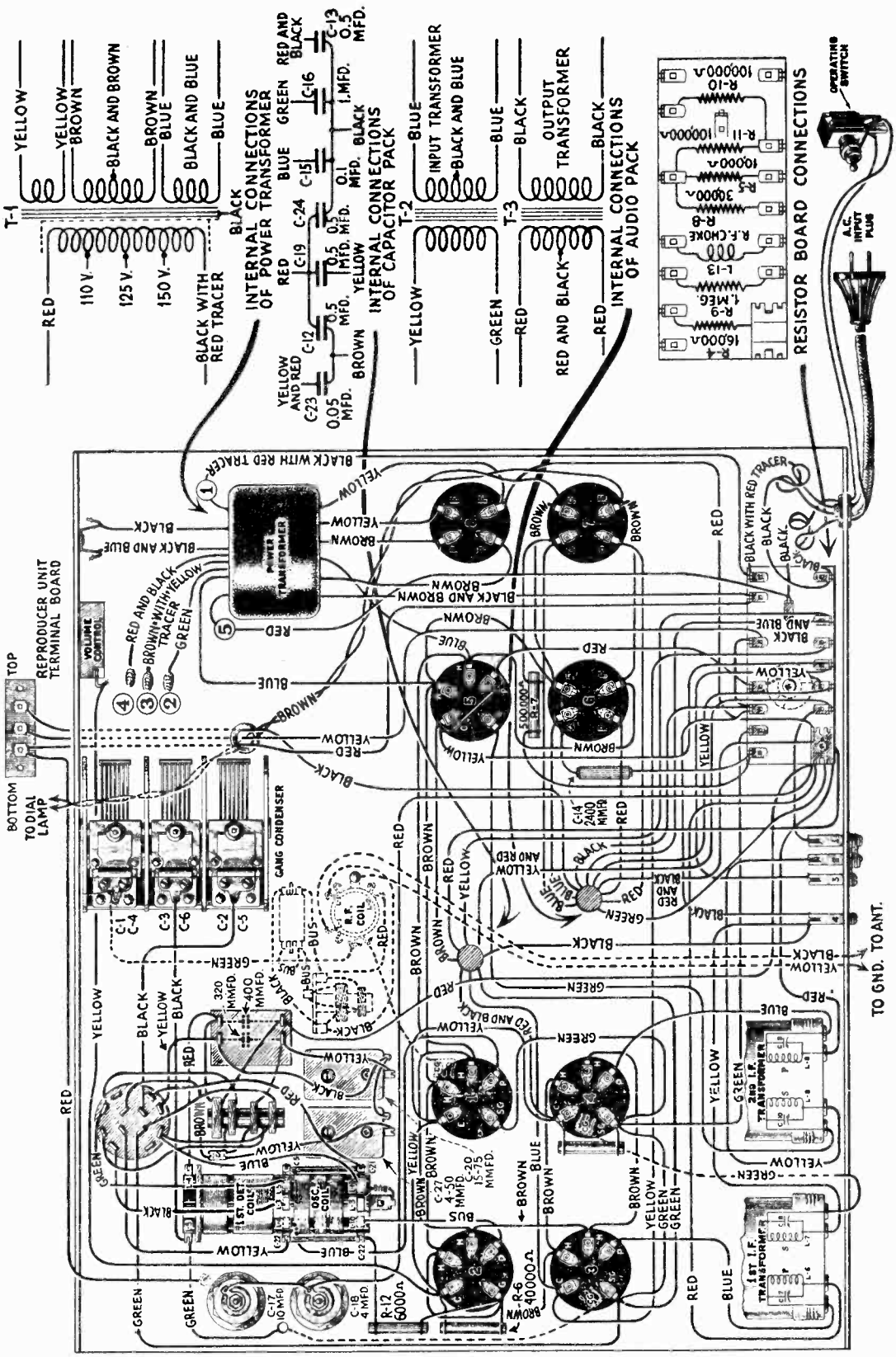


Figure 4—Wiring diagram of R-7-LW

INTRODUCTION

The RCA Model R-7-LW is an eight tube screen grid Super-Heterodyne Receiver incorporating all the features inherent in this circuit and with the additional feature of covering two frequency bands. By means of a Selector Switch the tuning range may be changed from the broadcast range—550 to 1500 K.C.—to the intermediate range of 150 to 300 K.C. The entire mechanism is of compact construction and mounted on a table model cabinet of pleasing design.

SERVICE DATA

A reference to the RCA Superette Model R-7 Service Notes will give the details of the usual service work necessary with this type of receiver.

Figure 1 shows the schematic circuit diagram. Figure 2 shows the location of the various line-up capacitors. Figure 3 gives the correct connections for attaching a magnetic pickup to the R-7-L.W. and Figure 4 shows the wiring diagram. The voltage readings obtained at the Radiotron sockets with one of the usual set analyzers are given on page 3.

I. F. TRANSFORMER ALIGNMENT

A single intermediate frequency amplifier stage is used in this receiver. Two transformers are used and all circuits are tuned to 110 K.C. The circuits are peaked and when alignment adjustments are made, the condensers are adjusted for maximum output.

A detailed procedure for making these adjustments follows:

(a) Procure a modulated R. F. oscillator giving a signal at 110 K.C. A non-metallic screw driver is also necessary. A suitable screw driver is listed in the Replacement Part List (Stock No. 7065).

(b) Connect an output meter in the circuit. This may be a current square thermo-galvanometer connected to the secondary of the output transformer instead of the reproducer unit cone coil, a 0-5 milliameter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the cone coil of the reproducer.

(c) Remove the oscillator tube, socket No. 2, and make a good ground connection to the chassis. Place the oscillator in operation and connect its output to the control grid cap of the first detector, socket No. 3. Adjust the oscillator output or the receiver volume control until a deflection is obtained in the output meter.

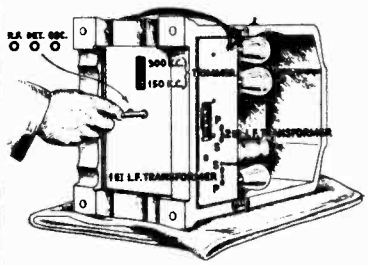


Figure 2—Location of various line-up capacitors

(d) Now adjust the secondary and primary of the second and first I.F. transformers until a maximum reading is obtained in the output meter. See Figure 2. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made, the set should perform at maximum efficiency. However, due to the interlocking of the adjustments, it is a good plan to follow the I.F. adjustments with R.F. and oscillator line-up condenser adjustments. The correct method of doing this is given in the following section.

OSCILLATOR ADJUSTMENTS

Five adjustable condensers are provided for aligning the R.F. circuits and adjusting the oscillator frequency so that it will be at a 110 K.C. difference from the incoming R.F. signal throughout the tuning range of the set. Poor quality, insensitivity, and possible inoperation of the receiver may be caused by these condensers being out of adjustment.

If the other adjustments have not been tampered with and are correctly aligned—the intermediate tuning condensers—the following procedure may be used for adjusting these condensers.

(a) Procure an R.F. oscillator giving a modulated signal at exactly 1400 K.C., 300 K.C. and 150 K.C. Also procure a non-metallic screw driver, such as Stock No. 7065 and a small socket wrench.

(b) An output indicator is necessary. This may be a current squared thermo-galvanometer connected to the secondary of the output transformer instead of the cone coil of the reproducer unit, a 0-5 milliameter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the reproducer unit cone coil.

(c) Turn the station selector until the dial reads exactly 100. Then remove the chassis from the cabinet, being careful not to disturb the setting of the dial. The gang condenser rotor plates should be fully meshed with the stator plates. If not, then the dial drum must be adjusted until such a condition exists. Be sure and tighten the set screws that hold the drum to the condenser shaft.

(d) Place the oscillator in operation at exactly 1400 K.C. and couple it to the antenna. Set the dial scale at 11 and turn the cabinet on its side. Place a soft pad under the instrument to prevent damage to the cabinet finish. Adjust the coupling between the oscillator and the antenna lead of the set or the volume control until a deflection is obtained in the output meter.

(e) With the socket wrench adjust the oscillator, first detector and R.F. line-up condensers until a maximum deflection is obtained in the output meter. (See Figure 2).

(f) Set the oscillator at 300 K.C. Set the Selector Switch to the right for the low frequency band and tune in this signal with the receiver. Adjust the Volume control for a deflection in the output meter. Now adjust the 300 K.C. condenser Figure 2 until maximum output has been obtained. Rock the gang condenser back and forth while making this adjustment.

(g) Set the oscillator at 150 K.C. and repeat as in (f) only adjust the 150 K.C. trimming condenser shown in Figure 2.

Change the frequency of the oscillator to 1400 K.C. and set the Dial at 11. Shift to the high frequency band. Again make the adjustment given under (d) and (e).

So adjusted, the R.F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R.F. signal.

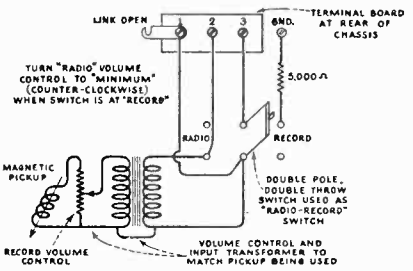


Figure 3—Magnetic Pickup Connections

MODEL R-7-LW
Voltage, Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES

Line Voltage correct for the transformer tap being used

These voltages are taken with the usual Set Analyzers and are not the true voltages at which the Radiotrons operate

Tube No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Screen Grid Current M. A.	Heater or Filament Volts, A. C.
VOLUME CONTROL AT MINIMUM							
1	40	40	55	200	0	0	2.4
2	40	0	—	50	4.0	—	2.4
3	8.0	7.0	90	240	0.5	0.25	2.4
4	40	40	55	200	0	0	2.4
5	25	*5.0	—	220	0.5	—	2.4
6	—	*30.0	—	245	30.0	—	2 4
7	—	*30.0	—	245	30.0	—	2.4
VOLUME CONTROL AT MAXIMUM							
1	3 5	3.5	70	240	5.0	**0.7	2.4
2	2.5	0	—	65	5.5	—	2.4
3	5.0	5.0	70	235	0.5	0.25	2.4
4	3.5	3.5	70	240	5.0	**0.7	2.4
5	25	*5.0	—	220	0.5	—	2.4
6	—	*30	—	245	25.0	—	2.4
7	—	*30	—	245	25.0	—	2.4

*Not true reading due to resistance in circuit.
**This reading may be + or − depending on age of tube.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLY	
2240	Resistor—30,000 Ohms—Carbon type—Package of 1	$0.70
2546	Resistor—1,000,000 Ohms—Carbon type—Package of 5	3.00
2563	Resistor—6,000 Ohms—Carbon type—Package of 5	3.00
2731	Resistor—10,000 Ohms—Carbon type—Package of 5	2.00
2746	Socket—Dial lamp socket	.50
2747	Caps—Grid contactor caps—Package of 5	.50
2749	Capacitor—2400 MMFD	1.50
2875	Knobs—Station selector, band selector or volume control knob—Package of 5	1.50
2881	Bracket—Dial lamp bracket—Package of 5	.50
2882	Socket—UY Radiotron socket complete with insulator—5 used	.50
2957	Condenser—10 MFD Electrolytic condenser with mounting nut and washers	3.00
2963	Resistor—8 000 Ohms—Carbon type—Package of 5	2.50
2968	Socket—UX Radiotron socket complete with insulator—3 used	.50
2970	Resistor—500,000 Ohms—Carbon type—Package of 5	2.50
2973	Board—Magnetic pickup terminal board—Package of 2	.50
2994	Coil—2d detector R.F. choke coil	.60
2997	Coil—R F. coil	1.90
2999	Shaft assembly—Dial scale drive shaft	.50
3000	Dial—Dial drum and scale complete	.60
3003	Cushions—Receiver chassis mounting cushions—Package of 4	.50
3006	Capacitor—1000 MMFD	.50
3056	Shield—Radiotron shield—3 used—Package of 2	.50
305	Condenser—4 MFD. Electrolytic condenser with mounting nuts and washers	2.50
3058	Resistor—100,000 Ohms—Carbon type—Package of 5	2.50
3060	Resistor—40,000 Ohms—Carbon type—Package of 5	3.50
3061	Switch—Toggle type—Operating switch with mounting nut	.70
3081	Resistor—16,000 Ohms—Carbon type—Package of 1	.60
3085	Capacitor—400 MMFD	.60
3225	Lever—Switch lever—Package of 2	1.00
3226	Coil—Oscillator and 1st detector loading coil	1.25
3227	Coil—Antenna loading coal	$1.10
3228	Switch—Toggle switch for band changing	1.50
3230	Coil—1st detector and oscillator coil	3.00
3231	Control—Volume control—Complete with mounting nut	1.55
3232	Capacitor—280 MMFD—Package of 5	2.50
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable oscillator trimmer capacitor—15-70	1.00
7063	Capacitor—Adjustable trimmer capacitor 5-40	1.00
7065	Screwdriver—Non-metallic screwdriver for line-up adjustments	1.10
7238	Capacitor—Comprising four 0.5 MFD., one 0.05 MFD., one 0.1 MFD. and one 1.0 MFD. capacitors in metal container	3.50
7239	Transformer—Audio transformer assembly	6.00
7241	Capacitor—3 gang tuning condenser	8.00
7299	Capacitor—745 MMFD	.70
7336	Transformer—1st intermediate transformer	3.00
7337	Transformer—2d intermediate transformer	3 00
7338	Board—Resistor board complete less resistors and coil	1.00
7339	Switch—Rotary Band Selector switch—Complete with mounting nut and washers	1.90
8680	Transformer—Power transformer—105-125 volts—25-40 cycles	12.00
8768	Coil capacitor and switch—Complete with mounting nuts and escutcheon	9.00
8769	Transformer—Power transformer—100-230—40-60 cycles	12.50
	REPRODUCER	
8559	Ring—Cone retaining ring	.80
8601	Cone—Reproducer paper cone—Package of 5	15.00
8639	Coil—Reproducer field coil assembly—Comprising field coil, magnet and cone housing	5.00
	CABINET	
3005	Screw assembly—Reproducing mounting screws, nut and washers—Package of 1 set of 4 each	.50
3229	Escutcheon—Station selector escutcheon—Complete with mounting screws	.70
7242	Baffle board and grill cloth	1.00
9391	Cabinet—Cabinet complete less equipment	15.00

RCA-VICTOR CO., INC.

MODEL RE-16-A
Schematic, Notes

SERVICE NOTES
for
RCA Victor Model RE-16A

The RCA Victor Model RE-16A is a radio phonograph combination instrument that utilizes the standard RCA Victor R-7A chassis and loudspeaker together with the phonograph equipment used in RCA Victor combination instruments. This consists of the low impedance magnetic pickup and inertia type tone arm, induction disc motor, radio-record switch and record volume control. A manually operated automatic switch. similar to that used in the T-5 Electrola is included in the motor and turntable assembly.

Service information, other than that pertaining to replacement parts, may be obtained from Service Notes already issued on the RCA Victor R-7A and the RCA Radiola 86.

The schematic wiring diagram is shown in Figure 1 and the assembly wiring in Figure 2. The chassis wiring, with the exception of the power leads added for the phonograph motor, is the same as that shown in the RCA Victor R-7A Service Notes.

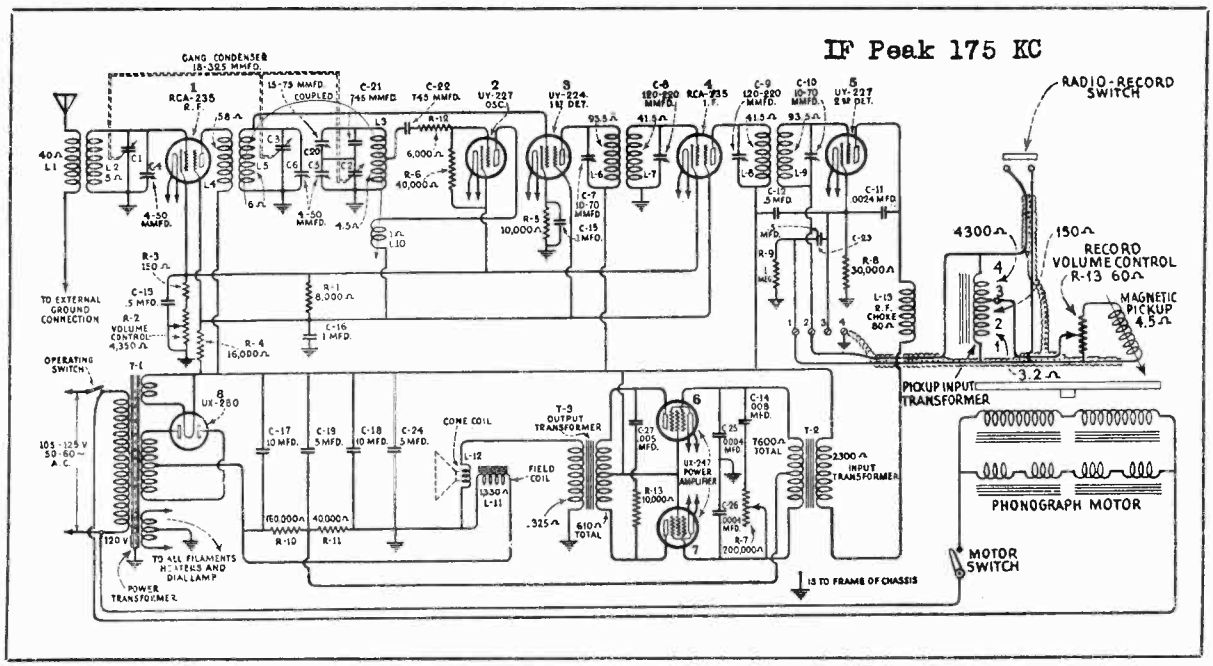


Figure 1—Schematic Wiring Diagram of Model RE-16A

MODEL RE-16-A
Assembly wiring

RCA-VICTOR CO., INC.

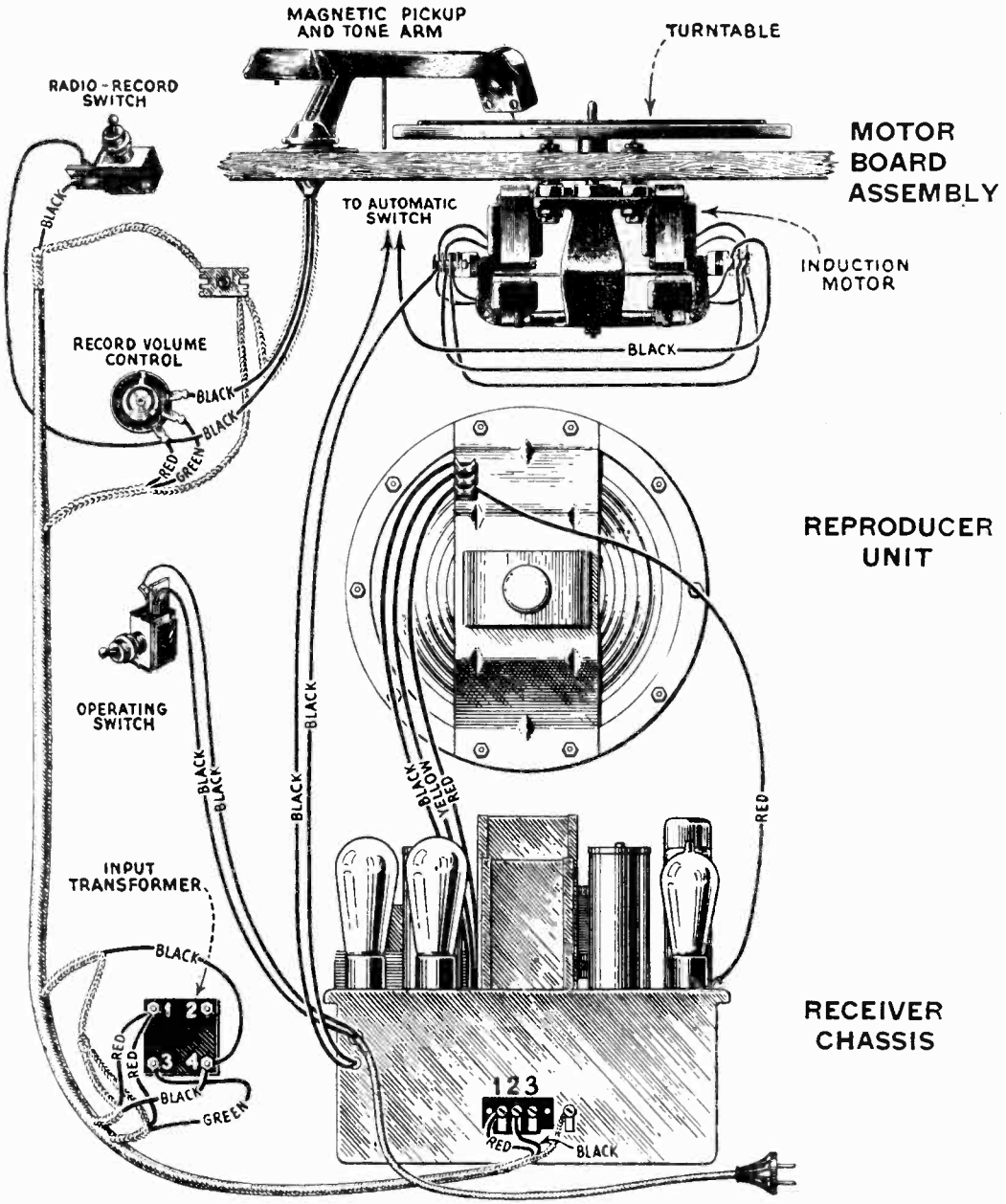


Figure 2—Assembly Wiring Diagram of Model RE-16A

RCA-VICTOR CO., INC.

MODEL R-17-M
Notes

RCA Victor R-17-M

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Important—After unpacking the instrument, uncoil the antenna lead and the power cord. Then take off the rear cover (held by two screws through the flange) and *remove the interior packing material used to protect the Radiotrons during shipment.* Before replacing the cover, make certain that all tubes are firmly in the sockets and that the three grid leads are securely connected (by means of the spring contact clips) to the dome terminals of the proper Radiotrons, as shown by the tube location diagram on the bottom of the receiver.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

Important—When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the foregoing procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

Note—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

MODEL R-17-M
Schematic, Chassis
Voltage, Parts List

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating..105-120 Volts, 25-133 Cycles A. C. or D. C.
Power Consumption.....40 Watts
Frequency Range.....540 K. C.-1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.-D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	——	——	115	15.0	6.0

*Impossible to measure on ordinary voltmeter.

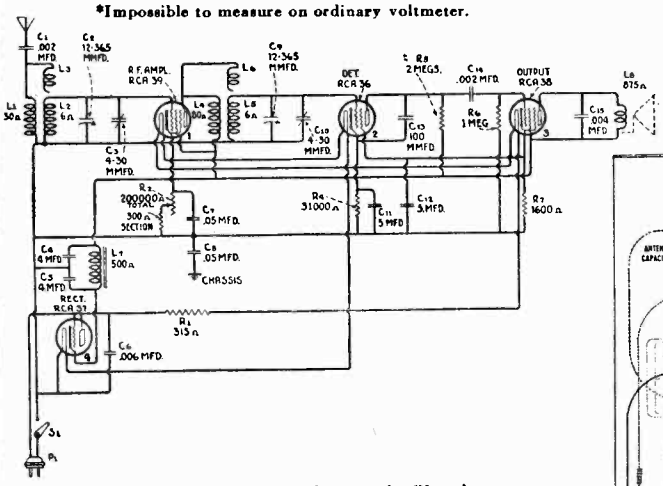


Figure A—Schematic Circuit

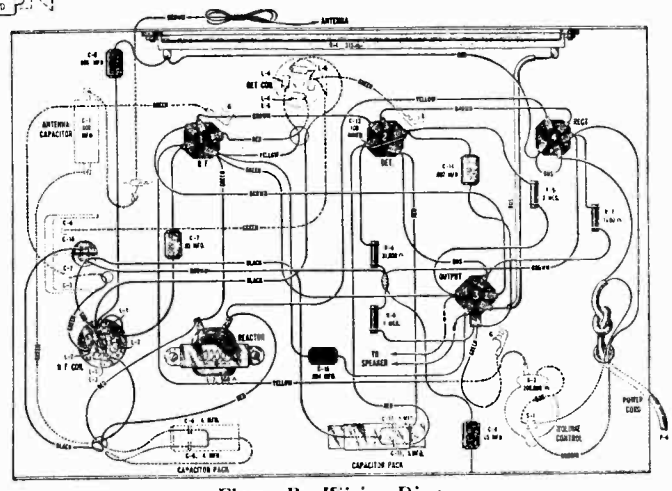


Figure B—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
2747	Cap—Contact cap
3076	Resistor—1 megohm—Carbon type—½ watt
3456	Capacitor—.05 mfd.
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors
3537	Reactor—Filter reactor
3538	Capacitor—Filter capacitor—Two 4.0 mfd.
3542	Volume control—Complete with mounting nut
3557	Capacitor—0.002 mfd.
3559	Resistor—31,000 ohms—Carbon type—½ watt
3560	Resistor—1,600 ohms—Carbon type—½ watt
3561	Capacitor—0.004 mfd.
3562	Capacitor—0.006 mfd.
3635	Resistor—Filament resistor—315 ohms
3686	Escutcheon—Volume control escutcheon
3687	Escutcheon—Station selector escutcheon
3709	Knob—Station selector or volume control knob
3714	Coil—Detector coil
3715	Coil—R. F. coil complete
6188	Resistor—2 megohm—Carbon type—½ watt
6451	Condenser—Two gang variable tuning condenser
7484	Socket—Radiotron socket—5 contact
10405	Capacitor—Antenna series capacitor—.002 mfd.
10820	Capacitor—100 mmfd.
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE
7594	Cone—Speaker cone
7595	Support—Cone support
7596	Mechanism—Speaker mechanism complete with magnet
9426	Loudspeaker complete

RCA-VICTOR CO., INC.

MODEL R-18-W
Notes

Instructions for

RCA Victor R-18-W

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current).

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Preliminary—After unpacking the instrument, remove the antenna lead and the power cord from the rear compartment formed at the top of the cabinet. Then remove the interior packing material (used to protect the Radiotrons during shipment). Refer to the tube location diagram on the license label (located on inside of rear cover), and make certain that all tubes are in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

Antenna Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

Power Supply—Before connecting the power cord to the electrical outlet, make certain (1) that the supply voltage does not exceed 125 volts and (2) that the A. C.–D. C. line switch at the rear of the chassis is correctly set (as indicated on the tube location diagram on the inside of the rear cover)—to the right (facing rear of set) for A. C. and to the left for D. C. supply.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow a minute or two for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

Important: When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

Note 1—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

Note 2—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the volume control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES, OR METAL PARTS INSIDE CABINET.

MODEL R-18-W
Schematic, Chassis
Voltage, Parts List

RCA-VICTOR CO., INC.

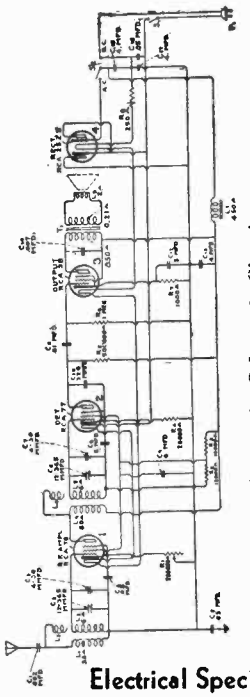


Figure A—Schematic Circuit

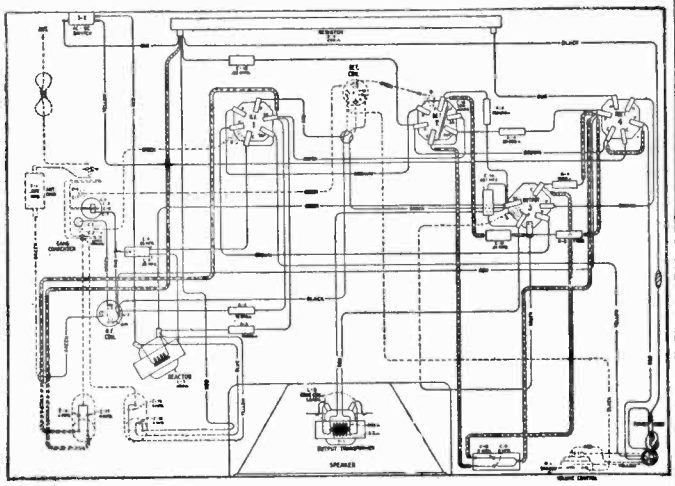


Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating . . 105–125 Volts, 25–133 Cycles, A. C. or D. C.
Power Consumption . . . . . 50 Watts at 115 Volts, 60 Cycles
Frequency Range . . . . . 540–1710 K. C.
Type and Number of Radiotrons—
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total 4
Undistorted Output . . . . . A. C. 0.55 Watts
D. C. 0.15 Watts

This receiver is a four tube A. C.–D. C. table model R. F. type broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, dynamic loudspeaker, excellent performance and compact construction characterize this instrument. Due to the use of a voltage doubling circuit in the rectifier, the receiver has considerably greater output when operated on alternating current than when operated on direct current.

Figures A and B show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles and 115 Volts D. C.

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Filament or Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78, R. F.	2.5	1.5	100	50	200	100	8.0	5.0	6.0
RCA-77, Detector	*5.0	*3.0	95	45	*100	*50	0.2	0.1	6.0
RCA-38, Output	18.0	9.0	180	95	170	90	14.0	7.0	6.0
RCA-25Z5, Rectifier	—	—	—	—	115	—	30.0	20.0	25.0

* Impossible to measure on ordinary voltmeter.

NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2731	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5	$1.10
2981	Capacitor—320 mmfd.	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3066	Resistor—12,000 ohms—Carbon type—1 watt—Package of 5	1.10
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3472	Capacitor—0.0024 mfd.	.32
3536	Capacitor—Filter capacitor—Comprising two 5.0 mfd. capacitors	1.10
3538	Capacitor—Filter capacitor—Comprising two 4.0 mfd. capacitors	1.18
3542	Volume control—Complete with mounting nut	1.18
3567	Escutcheon—Station selector escutcheon—Package of 2	.42
3568	Escutcheon—Volume control escutcheon—Package of 2	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3684	Switch—Single pole double throw—Toggle switch	.94
3701	Capacitor—0.01 mfd.	.30
3713	Capacitor—0.05 mfd.	.32
3714	Coil—Detector coil	$0.98
3715	Coil—R. F. coil	1.08
3720	Resistor—250 ohms—Filament resistor	1.00
3721	Resistor—1,000 ohms—Carbon type—½ watt—Package of 5	1.00
3722	Capacitor—Comprising two 0.05 mfd. capacitors	.70
3723	Capacitor—0.007 mfd.	.45
3724	Reactor—Filter reactor	1.10
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6451	Condenser—Two gang variable tuning condenser	2.04
6535	Capacitor—Comprising two 4.0 mfd. capacitors—High voltage	1.25
7484	Socket—Radiotron socket—5 contact	.35
7485	Socket—Radiotron socket—4 contact	.40
10405	Capacitor—Antenna series capacitor—0.002 mfd.	.40
	REPRODUCER ASSEMBLIES—DYNAMIC TYPE	
3610	Magnet	1.04
6477	Transformer—Output transformer	1.32
7598	Cone—Reproducer cone complete—Package of 5	4.35
7599	Housing—Cone housing and cone assembly	1.16
9429	Reproducer—Complete	4.85

RCA-VICTOR CO., INC.

MODEL R-22
Schematic, Voltage
Parts List

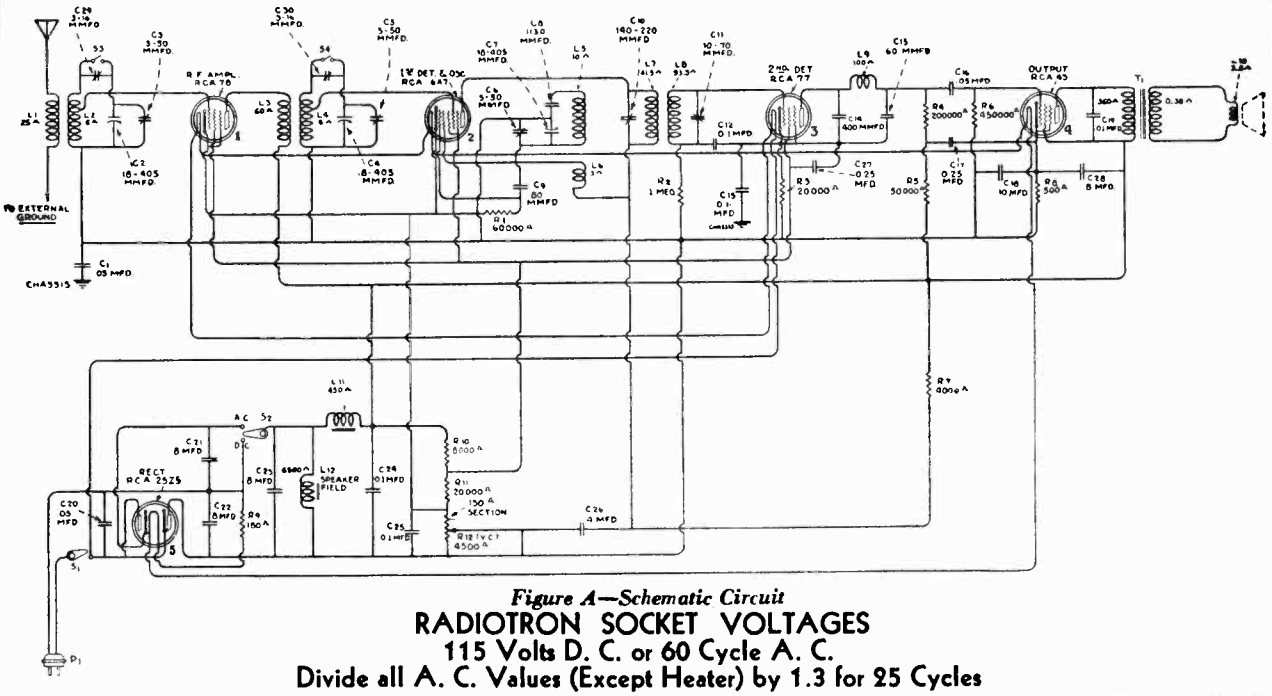


Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycle A. C.
Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-2525 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185; 115 Volts, 25 Cycles—140; 115 Volts, D. C.—105)

REPLACMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor—8,000 ohms—Carbon type—1 watt—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Connected across loudspeaker field	.36
3569	Knob—Station selector and volume control knob—Package of 5	.65
3572	Socket—7 contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3623	Shield—Antenna. R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield body	.22
3683	Shield—Radiotron shield cap	.20
3684	Switch—Toggle type—AC-DC operation	.94
3685	Coil—Choke coil—Second detector plate	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt—Package of 5	1.00
3701	Capacitor—0.01 mfd.	.30
3702	Capacitor—0.25 mfd.	.42
3710	Capacitor—60 mmfd.	.36
3711	Capacitor—80 mmfd.	.40
3712	Capacitor—400 mmfd.	$0.40
3713	Capacitor—0.05 mfd.	.32
3725	Capacitor—1,130 mmfd.	.50
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three gang variable condenser assembly	3.24
6507	Resistor—180 ohms—Porcelain type	.60
6508	Volume control—Complete with mounting nut	1.36
6510	Capacitor—8.0 mfd.	1.00
6511	Capacitor—Comprising one 8.0 mfd. one 10 mfd. and 4.0 mfd.	1.49
6518	Capacitor—Comprising two 8.0 mfd. capacitors	1.58
6519	Coil—Antenna coil	.88
6520	Coil—R. F. coil assembly	.94
6521	Coil—Oscillator coil assembly	.60
7485	Socket—6 contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support	2.06
8987	Cone—Reproducer cone complete with voice coil—Package of 5	5.00

MODEL R-22
Chassis wiring
Alignment

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating.....100–125 A. C. or D. C.
Frequency Rating (A. C.).....25–133 Cycles
Power Consumption: A. C. 60 Cycles, 115 Volts—60 Watts
D. C. 115 Volts—40 Watts
Number and Types of Radiotrons.....1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5
Undistorted Output (A. C.).....1.5 Watts
Undistorted Output (D. C.).....0.5 Watts
Frequency Range.....540–1710 K. C. and 2400–2500 K. C.

This receiver is a five tube Super-Heterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5 which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

LINE-UP CAPACITOR ADJUSTMENTS

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C. coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points since these R. F. stages act as fixed tuned circuits. Adjust the two high frequency trimmers, located on the lower side of the gang capacitor until maximum output is obtained.

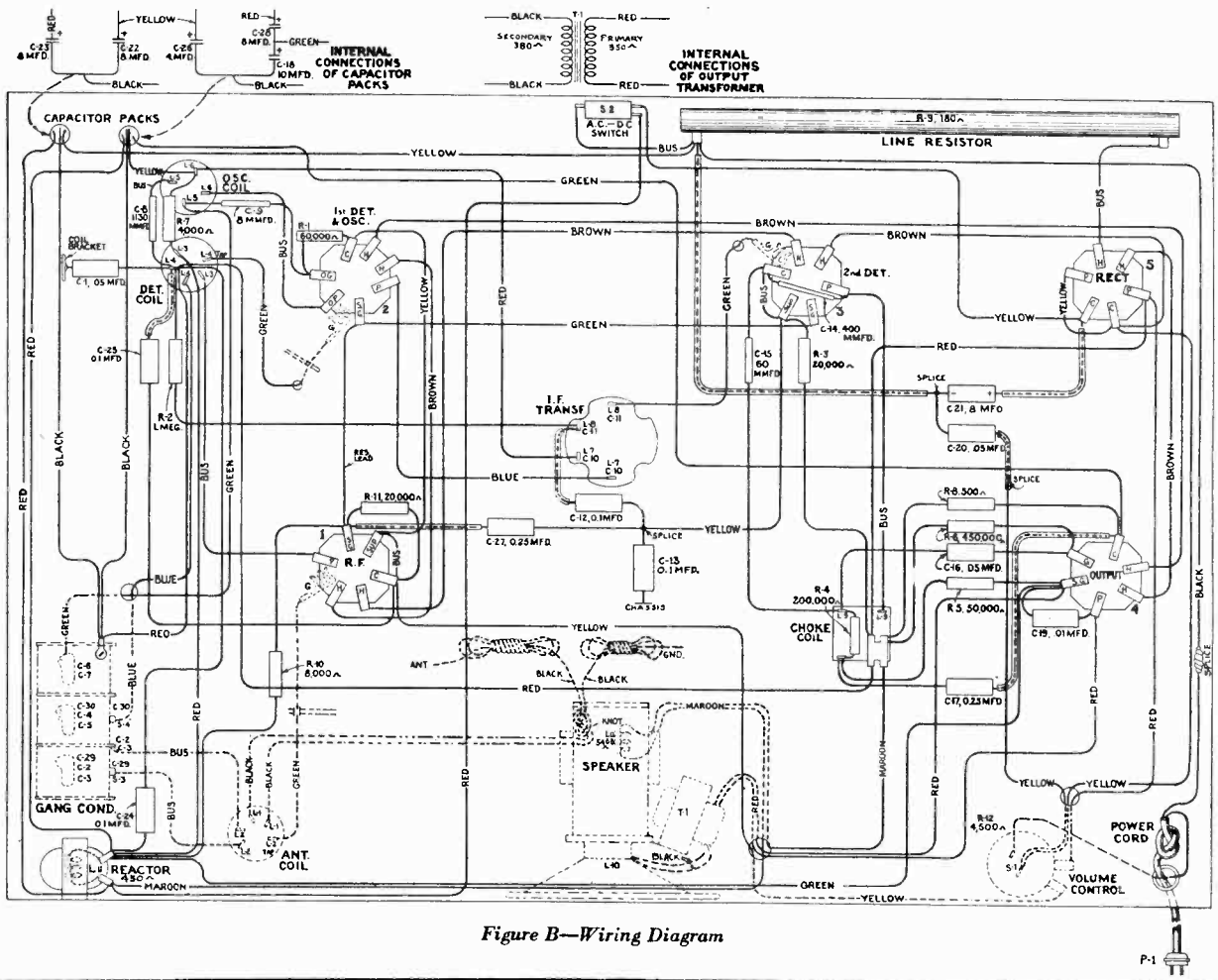


Figure B—Wiring Diagram

P-1

RCA-VICTOR CO., INC.

MODEL R-27
Voltage, Parts List

SERVICE DATA

Electrical Specifications

Voltage Rating . . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . . 40 Watts
Frequency Range . . . . . 540 K. C.–1710 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Meximum Volume—115 Volt A. C. Line
All Voltages on D C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	——	——	115	15	6.0

*Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5	$2.50
3456	Capacitor—.05 mfd.	.44
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10
3537	Reactor—Filter reactor	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18
3539	Coil—R. F. coil complete	1.08
3540	Coil—Detector coil	.98
3542	Volume control—Complete with mounting nut	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt—Package of 5	1.00
3561	Capacitor—0.004 mfd.	.42
3562	Capacitor—0.006 mfd.	.42
3567	Escutcheon — Station selector escutcheon Package of 2	.42
3568	Escutcheon — Volume control escutcheon Package of 2	$0.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
3635	Resistor—Filament resistor—315 ohms	1.00
6188	Resistor—2 megohm—Carbon type—½ watt Package of 5	2.00
6451	Condenser—Two gang variable tuning condenser	2.04
7484	Socket—Radiotron socket—5 contact	.65
10405	Capacitor—Antenna series capacitor—.002 mfd.	.50
10820	Capacitor—100 mmfd.	.50
	REPRODUCER ASSEMBLIES DYNAMIC TYPE	
3610	Magnet	1.04
6477	Transformer—Output transformer	1.32
7598	Cone—Reproducer cone complete—Package of 5	4.35
7599	Housing—Cone housing and core assembly	1.16
9429	Reproducer—Complete	4.85

MODEL R-27
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

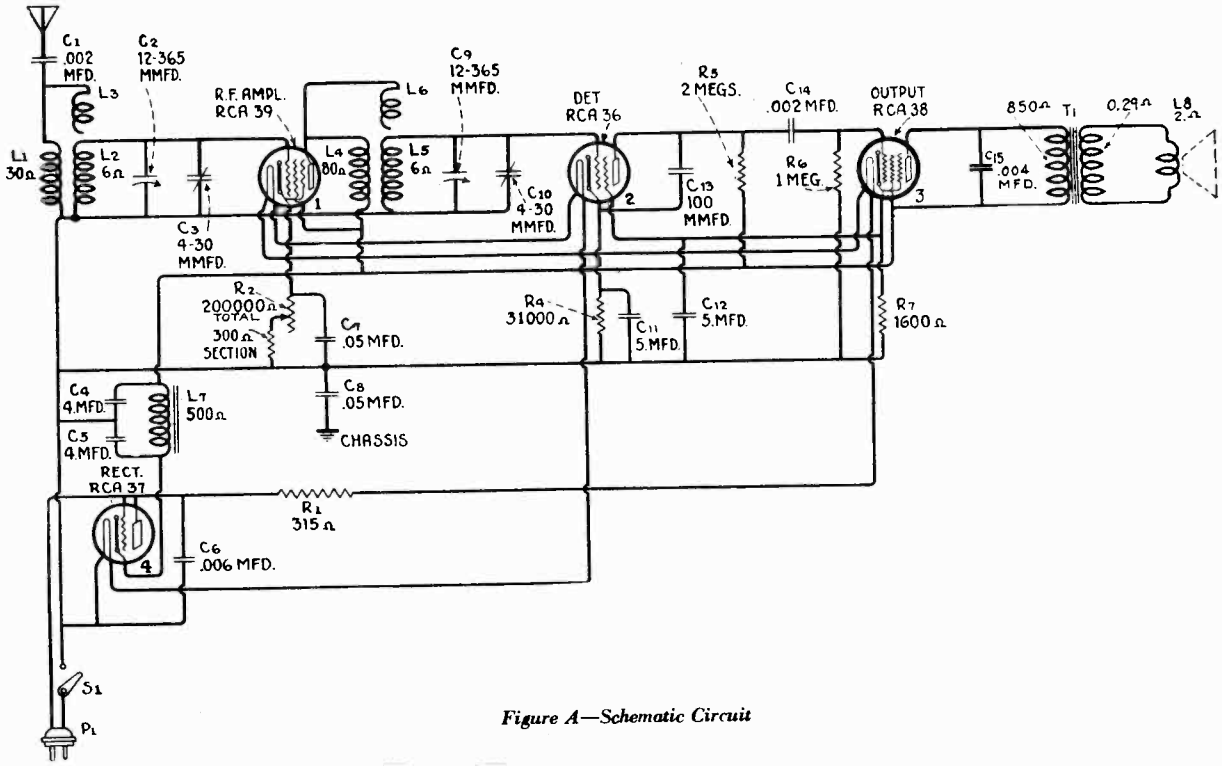


Figure A—Schematic Circuit

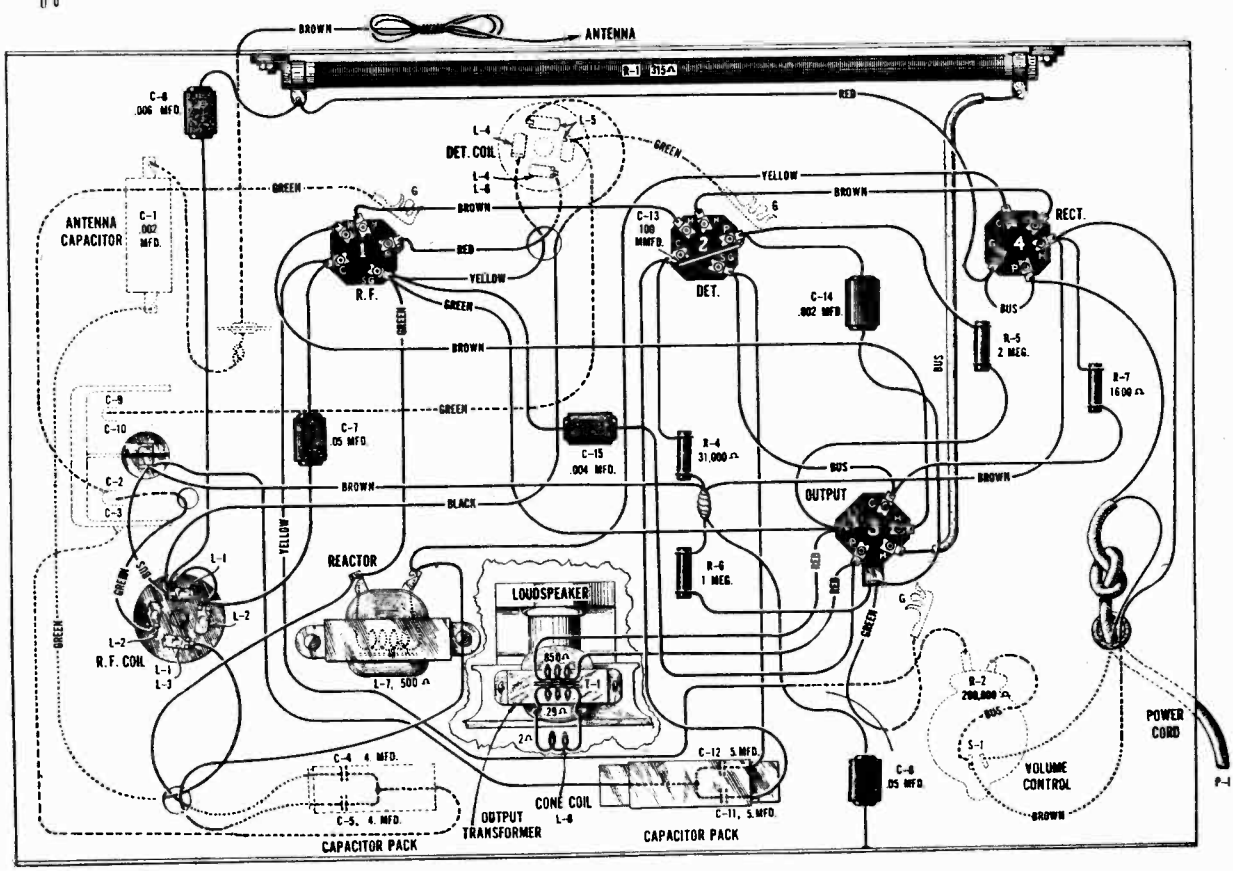


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL R-28-P
Schematic
Chassis wiring

IF Peak 175 KC

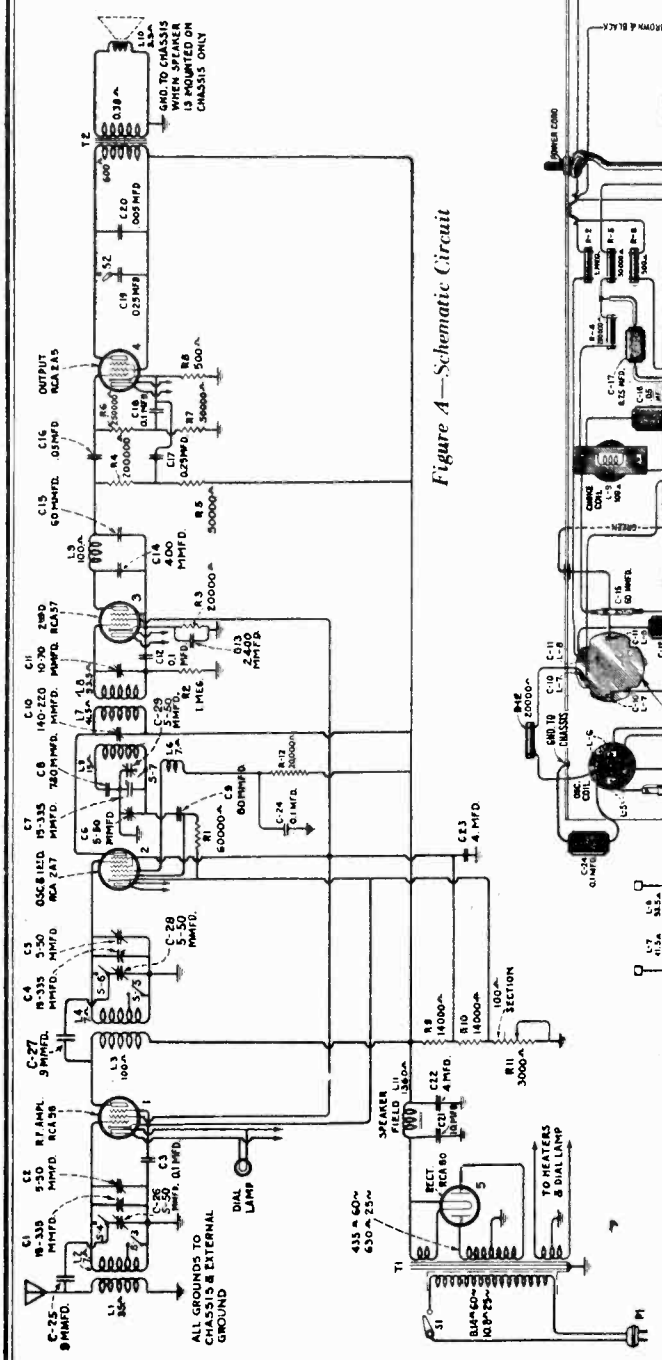


Figure A—Schematic Circuit

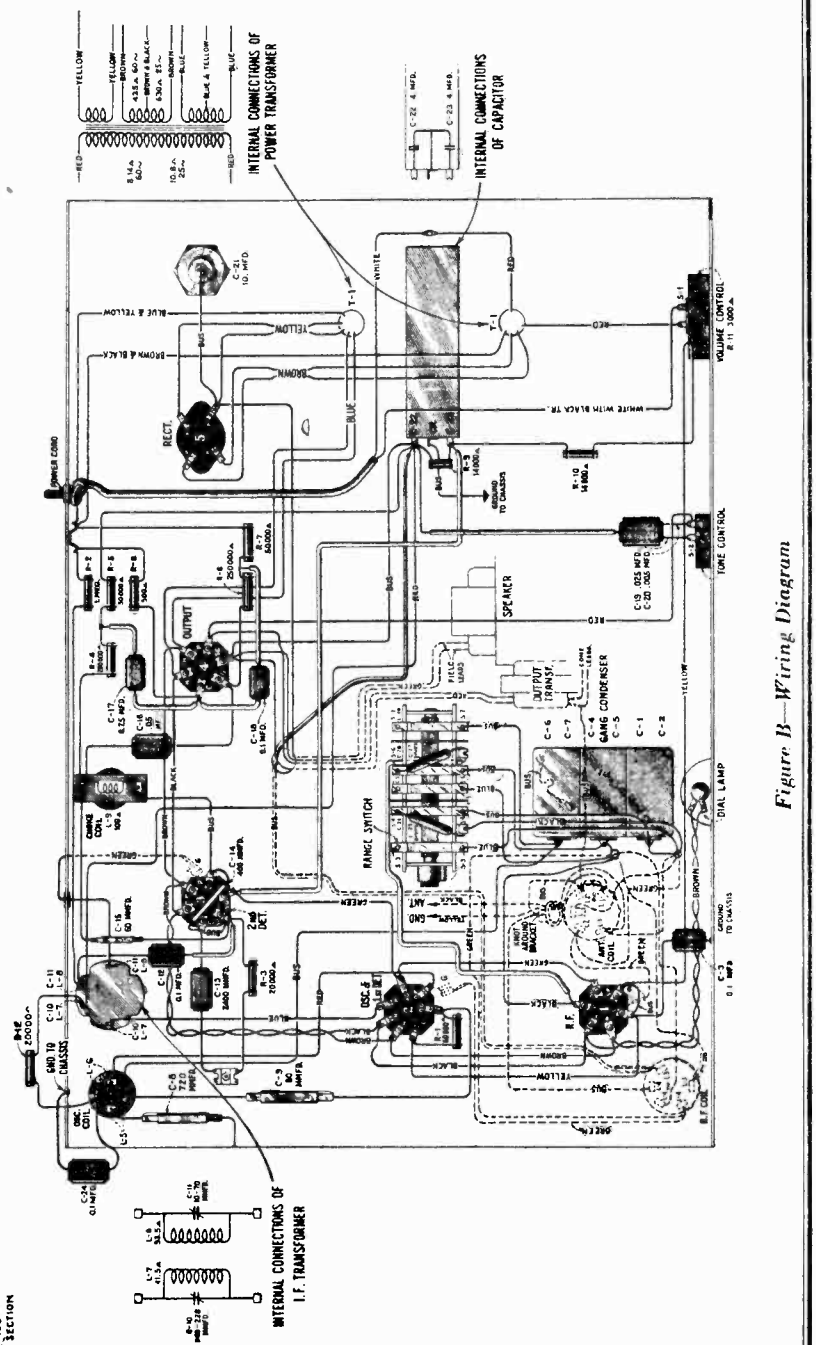


Figure B—Wiring Diagram

Voltage Rating	115 Volts
Frequency Rating	25-40 Cycles and 50-60 Cycles
Power Consumption	70 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

MODEL R-28-P
Voltage, Parts List
Alignment

RCA-VICTOR CO., INC.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	.35
3024	Capacitor—9 mmfd.—Package of 2	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Registor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3590	Escutcheon—Station selector escutcheon—Package of 5	1.40
3591	Escutcheon—Name plate escutcheon—Package of 5	1.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors	.40
3615	Knob—Tone control or range switch knob—Package of 5	$0.60
3623	Shield—Antenna or R. F. Coil shield	.30
3705	Scale—Dial scale assembly	.50
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch—Short shaft	1.25
6530	Switch—Range switch—Long shaft	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—Three gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10.0 mfd.	1.40
8985	Transformer—Power transformer—105–125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200–250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support	2.35

RCA-VICTOR CO., INC.

MODEL R-37-P, R-38-P
Alignment, Voltage

SERVICE DATA

Electrical Specifications

Voltage Rating.....115 Volts
Frequency Rating.....25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons.....2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output.....1.75 Watts
Frequency Range.....540 K. C. to 1500 K. C.
and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

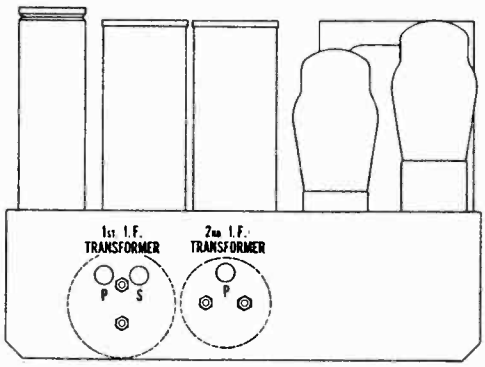


Figure C—Location of I. F. Line-up Adjustment Screws

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL R-37-P, R-38-P
Schematic, Chassis

RCA-VICTOR CO., INC.

IF Peak 175 KC

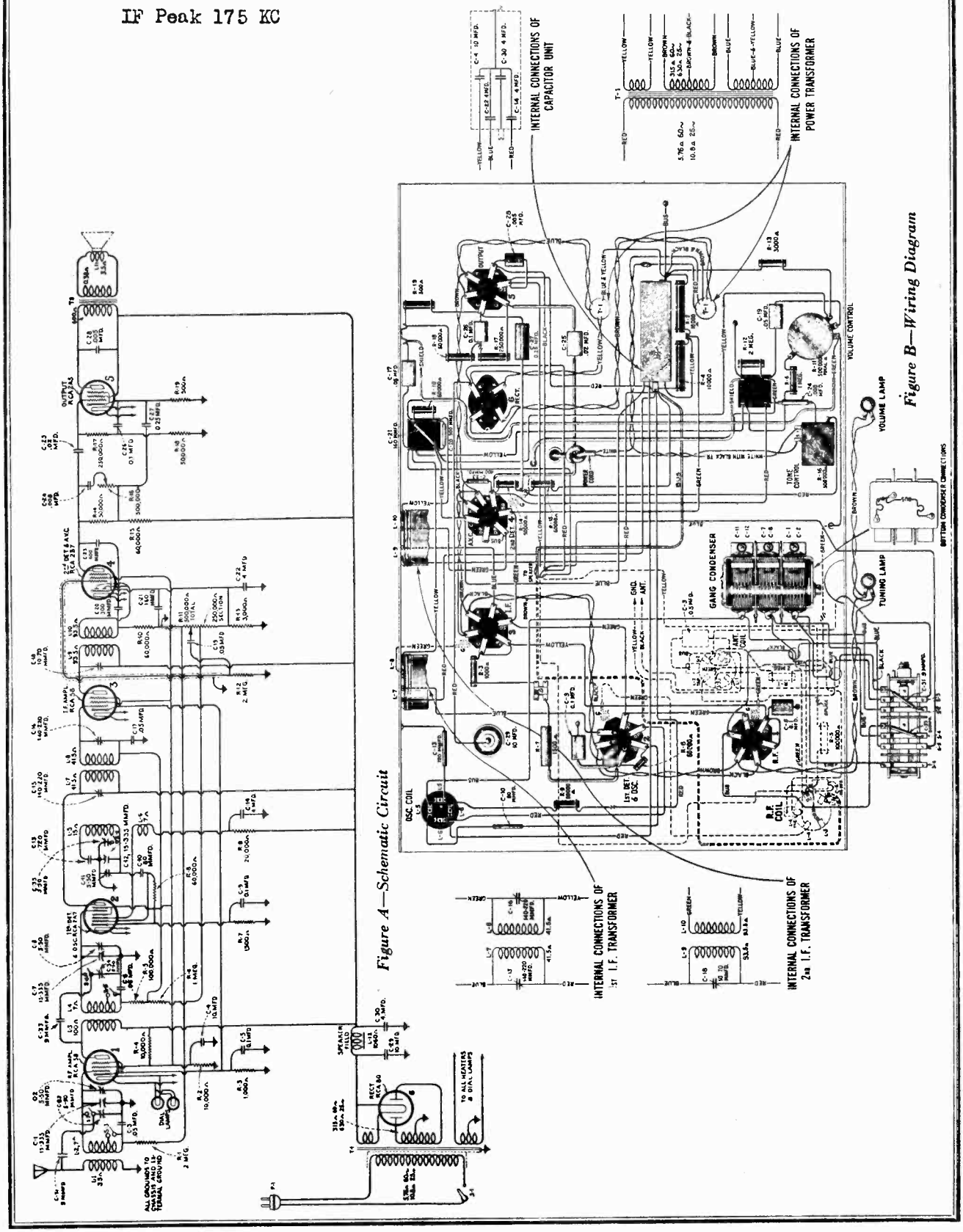


Figure A—Schematic Circuit

Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL RE-40-P
Schematic, Chassis

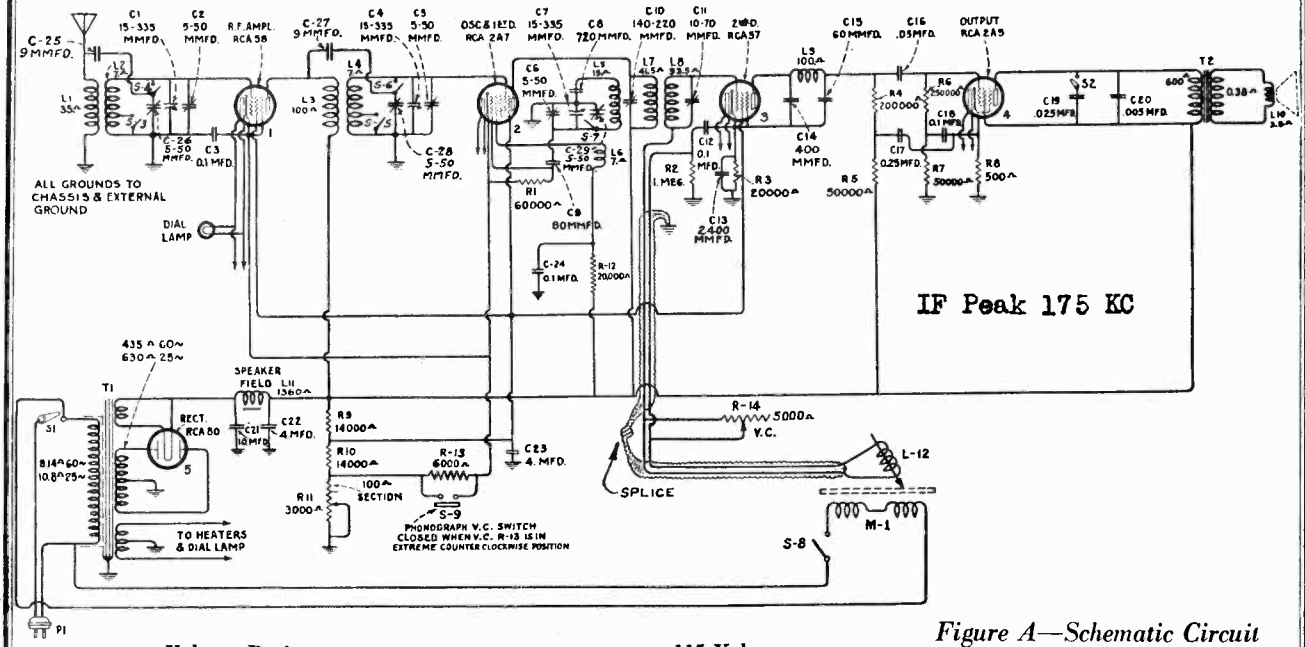


Figure A—Schematic Circuit

Voltage Rating	**115 Volts**
Frequency Rating	**25–40 Cycles and 50–60 Cycles**
Power Consumption	**60 Cycles, 95 Watts**
Number and Types of Radiotrons	**1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5**
Undistorted Output	**1.75 Watts**
Frequency Range	**540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.**

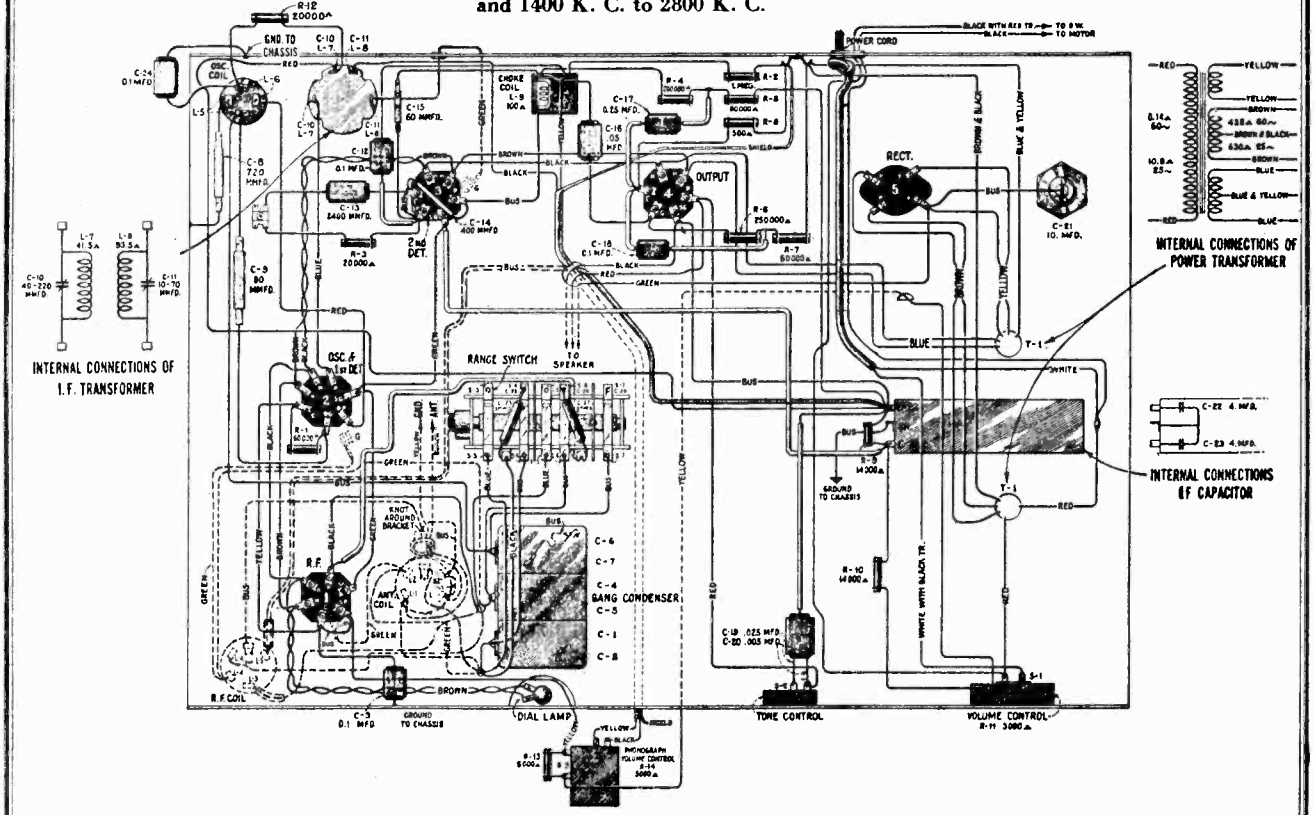


Figure B—Wiring Diagram

MODEL RE-40-P
Alignment, Voltage
Pickup data

RCA-VICTOR CO., INC.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, two-point tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard RCA Victor two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

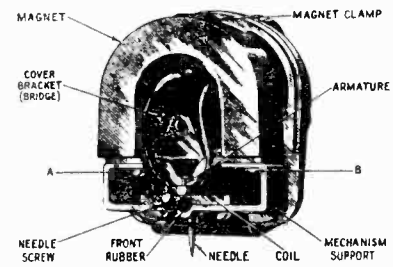


Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

RCA-VICTOR CO., INC.

MODEL RE-40-P
Assembly wiring

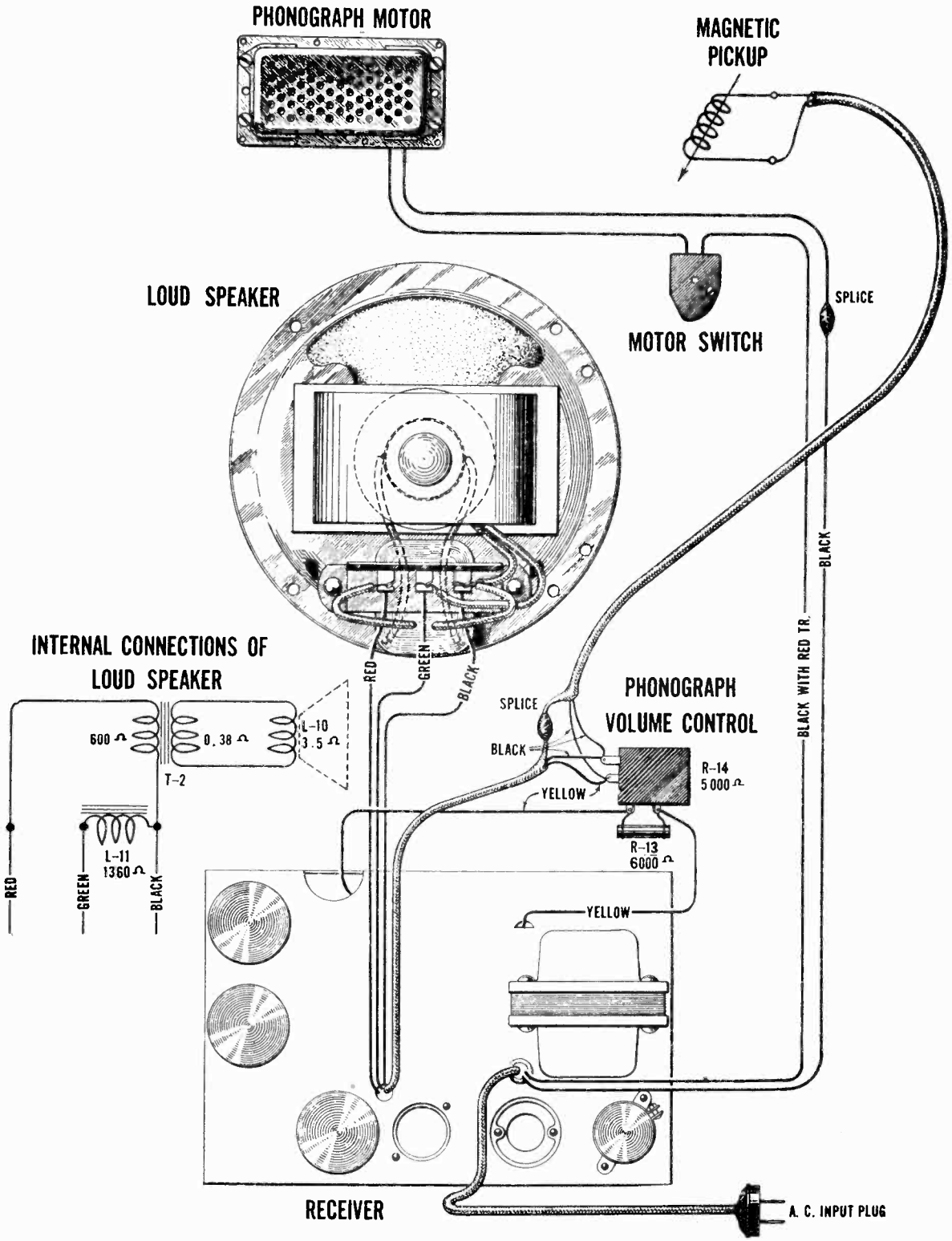


Figure B—Assembly Wiring

MODEL RE-40-P
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2563	Resistor—6,000 ohms—Carbon type—1 watt—Located on volume control—Package of 5	1.10
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	.35
2994	Coil—R. F. choke coil	.45
3024	Capacitor—9 mmfd.—Package of 2	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors	.40
3623	Shield—R. F. or oscillator coil shield	.30
3705	Scale—Dial scale assembly	.50
G5027	Escutcheon—Station selector escutcheon—Package of 2	.70
G5028	Escutcheon—Name plate escutcheon—Package of 2	.70
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200-250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9003	Coil assembly—Comprising field coil, magnet and cone support	2.35

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3599	Motor mounting washer assembly—Comprising one screw, one washer and one lock washer—Package of 3 sets	$0.30
8989	Motor—Motor complete 105-125 volts—60 cycles	18.52
8990	Motor—Motor complete 105-125 volts—50 cycles	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—Motor complete 105-125 volts—25 cycles	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycles motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycles motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycles motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycles motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycles motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycles motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycles motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycles motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
G5026	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete, less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control, band selector or operating switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control	1.25
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

RCA-VICTOR CO., INC.

MODEL R-51-B, R-53-B
Schematic, Chassis

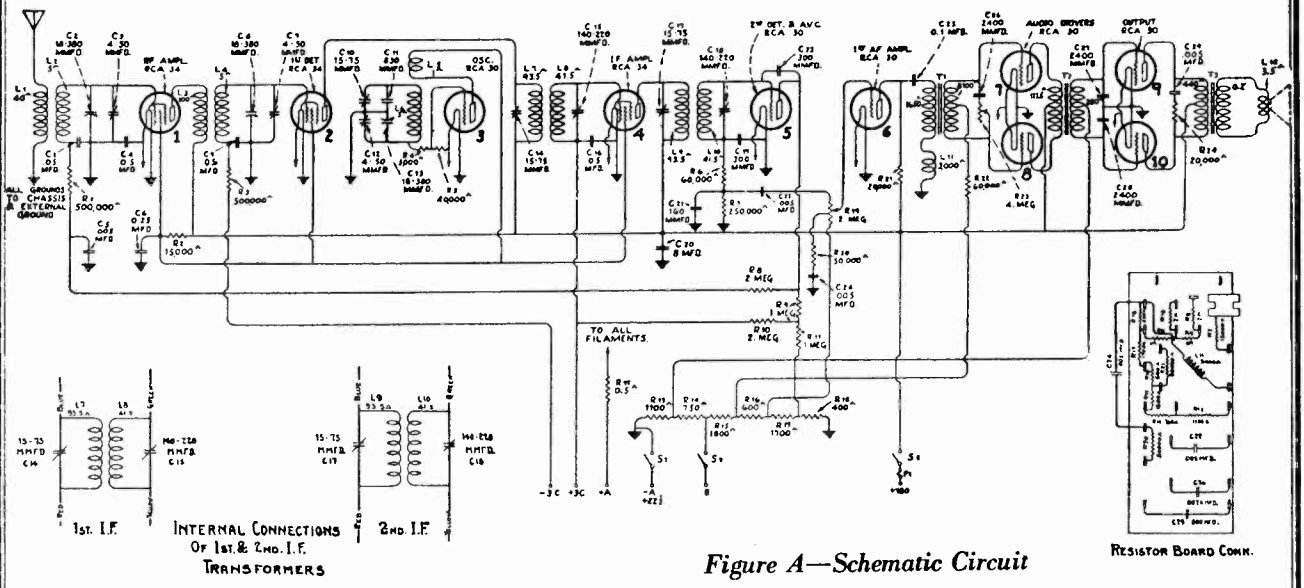


Figure A—Schematic Circuit

Total "A" Battery Current	0.6 Ampere
Average "B" Battery Current	18 M. A.
Type and Number of Radiotrons	7 RCA-230, 3 RCA-234—Total, 10
Undistorted Output	1.6 Watts

This receiver is a ten-tube battery operated Super-Heterodyne giving excellent performance. Features such as automatic volume control, continuously variable tone control, double class "B" audio amplifier, low "A" and "B" battery current drain, permanent magnet dynamic loudspeaker, exceptional fidelity, large undistorted output, compensated volume control, and the inherent sensitivity, selectivity, and tone quality of the Super-Heterodyne characterize this instrument. The performance of this receiver is comparable in all respects to a modern A. C. receiver of similar design.

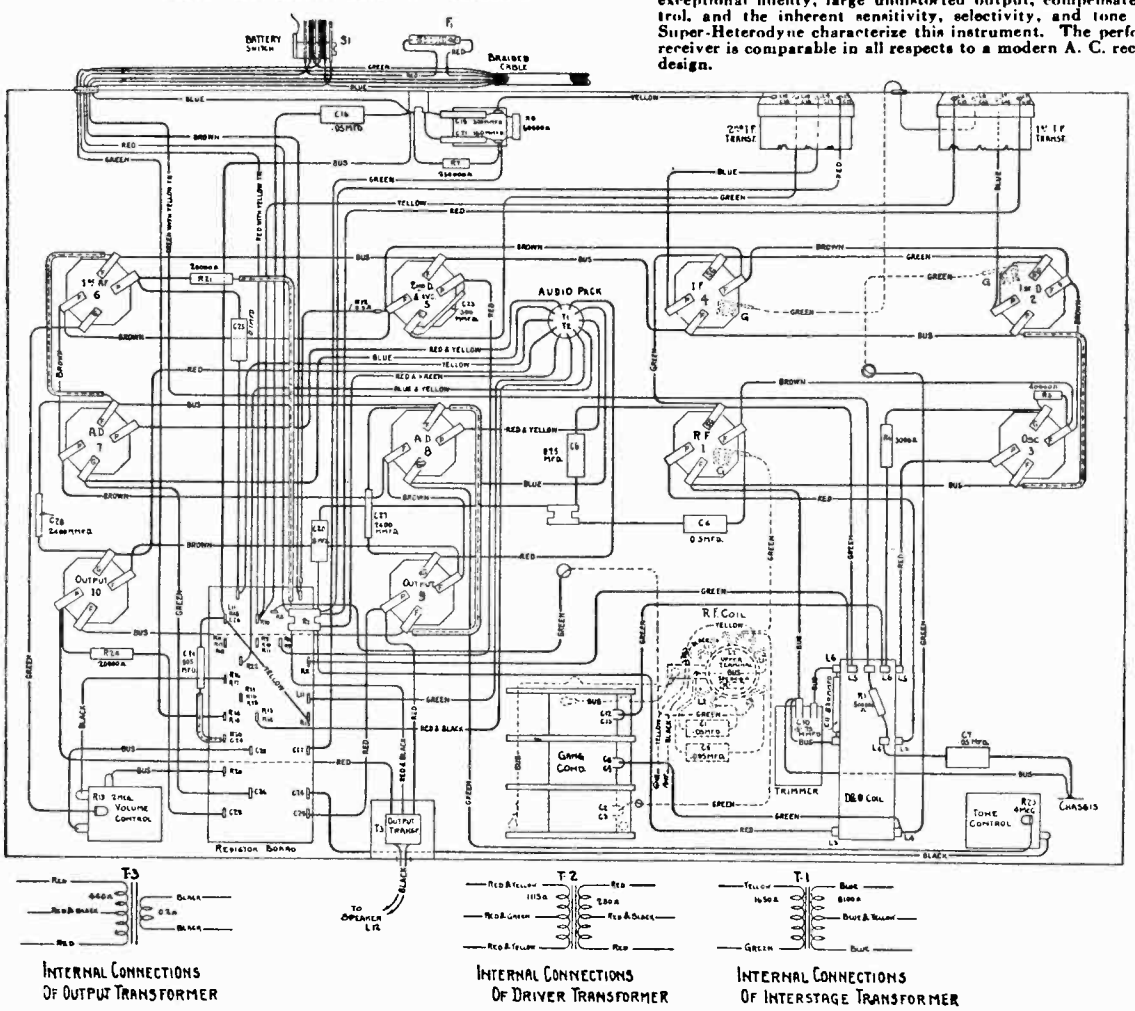


Figure B—Wiring Diagram

MODEL R-51-B, R-53-B
Voltage, Alignment
Parts List

RCA-VICTOR CO., INC.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.

(c) Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter. Also a socket wrench is necessary for the main tuning capacitor trimmers.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the first line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
R. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Oscillator—RCA-230	—	—	65.0	4.0	2.15
First Detector—RCA-234	5.0	65.0	157.5	1.0	2.15
I. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Second Detector—RCA-230	0	—	—2.0	0	2.15
First A. F.—RCA-230	10.5	—	130.0	1.25	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15

REPLACEMENT PARTS

Insist on genuine factory tested parts which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushion—Package of 4	.30
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3088	Knob—Operating switch knob—Package of 5	.50
3114	Resistor—50,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3238	Screw—Set screw for switch knob No. 3088—Package of 10	.25
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3382	Resistor—750 ohms—Carbon type—½ watt—Package of 5	1.00
3449	Coil—Choke coil located on resistor board	1.12
3472	Capacitor—0.0024 mfd.	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil	.34
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3616	Capacitor—300 mmfd.	.34
3634	Capacitor—160 mmfd.	.34
3640	Capacitor—0.05 mfd.	.25
3643	Capacitor—0.005 mfd.	.25
3703	Resistor—1,700 ohms—Carbon type—¼ watt—Package of 5	1.00
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5	1.00
3706	Resistor—1,800 ohms—Carbon type—¼ watt—Package of 5	1.00
3707	Volume control—Complete with mounting nut	1.40
3708	Resistor—600 ohms—Carbon type—¼ watt—Package of 5	1.00
3743	Resistor—0.5 ohm—Flexible type—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3748	Fuse—½ ampere—Package of 5	.40
3749	Capacitor—0.1 mfd.	.30
3750	Capacitor—0.25 mfd.	.36
3751	Capacitor—0.5 mfd.	.40
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6176	Escutcheon—Operating switch escutcheon—Package of 5	$0.50
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6192	Spring—3 gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang tuning condenser drive cord—Package of 5	.60
6300	Socket—UX Radiotron socket	.35
6320	Capacitor—670 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6332	Switch—Operating switch	1.60
6449	Tone control complete with mounting nut	1.06
6512	Capacitor—0.005 mfd.	.28
6516	Connector—Fuse connector	.16
6522	Shield—Radiotron shield	.30
6523	Transformer—Audio transformer assembly comprising driver transformer and interstage transformer	5.24
6524	Transformer—First intermediate frequency transformer	2.28
6525	Transformer—Second intermediate frequency transformer	2.25
6526	Transformer—Output transformer	1.80
6533	Condenser—3 gang variable tuning condenser	5.55
6544	Coil—Antenna coil assembly	.85
6545	Coil—Detector oscillator coil	2.44
6546	Scale—Dial and dial scale	.75
6548	Capacitor—8.0 mfd. capacitor	.95
6549	Cable—Battery connecting cable	1.25
7062	Capacitor—Adjustable trimming capacitor 15 to 70 mmfd.	.50
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.35
7523	Escutcheon—Station selector escutcheon	.50
	REPRODUCER ASSEMBLIES	
8920	Ring—Cone retaining ring	.35
9431	Bracket—Cone bracket and magnet assembly	8.10
9432	Cone—Reproducer cone complete with voice coil	1.89

RCA-VICTOR CO., INC.

MODEL R-70
Data, Parts List

SERVICE DATA

Electrical Specifications

Voltage Rating ..... 105–125 Volts
Power Consumption ..... 85 Watts
Radiotrons Required
3 RCA-58, 2 RCA-56, 1 RCA-247, 1 UX-280—Total 7
Undistorted Output ..... 2.25 Watts
Intermediate Frequency ..... 175 K. C.
R. F. and Oscillator Line-up Frequency ..... 1400 K. C. Only

This receiver is a seven tube Super-Heterodyne receiver incorporating such features as new high efficiency Radiotrons. Pentode Output Stage, continuously variable tone control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier consists of an untuned transformer and one tuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial and oscillator are both set at 1400 K. C.

Figure A shows the loudspeaker wiring, Figure B the schematic wiring and Figure C, the chassis wiring. The voltage readings are given on the next page and the replacement parts below.

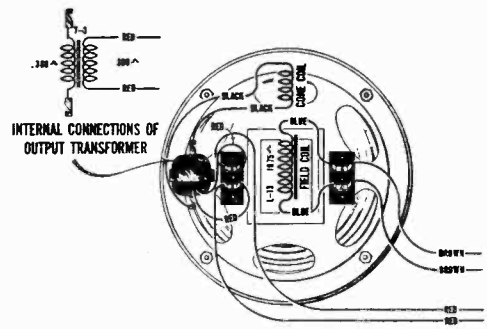


Figure A—Loudspeaker Wiring

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2532	Capacitor—230 mmfd.—Package of 5	$3.15
2746	Socket—Dial lamp socket	.50
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	1.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3077	Resistor—30,000 ohms—Carbon type—½ watt—Package of 5	2.50
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5	2.50
3461	Coil—Second detector plate choke coil	.88
3462	Resistor—2,500 ohms—Carbon type—1 watt—Package of 5	1.10
3463	Resistor—6,500 ohms—Carbon type—1 watt—Package of 5	1.10
3464	Resistor—70,000 ohms—Carbon type—½ watt—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt—Package of 5	1.10
3470	Resistor—6,500 ohms—Carbon type—1 watt—Package of 5	1.10
3471	Capacitor—0.025 mfd.	.32
3472	Capacitor—0.0024 mfd.	.32
3490	Screw assembly—Chassis mounting screw assembly comprising 4 screws, 4 washers and 4 spacers—1 set	.50
3495	Capacitor—320 mmfd.	
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6288	Knob—Station selector—Volume control or tone control knob—Package of 5	1.50
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	1.00
6300	Socket—4 prong Radiotron socket	.55
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	2.50
6312	Capacitor—650 mmfd.—Oscillator series—Package of 5	2.50
6318	Resistor—10,000 ohms—Porcelain type—20 watts	1.00
6372	Volume control	1.34
6373	Coil—R. F. coil complete	1.06
6374	Coil—Detector and oscillator coil	2.14
6375	Transformer—Second Intermediate frequency transformer	$1.88
6376	Transformer—First intermediate transformer	2.12
6377	Shaft—Tuning capacitor drive shaft with one flat washer and two "C" washers	.32
7484	Socket—UY type Radiotron socket	.65
7485	Socket—Radiotron 6 contact socket	.70
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws	5.20
7510	Shield—Radiotron tube shield—Maroon finish	.50
7522	Tone control	1.90
7557	Scale—Dial and dial scale	.80
7558	Transformer—Interstage audio transformer in metal container	2.48
7559	Capacitor pack—Comprising one 0.05 mfd., one 0.5 mfd., one 10.0 mfd., one 8.0 mfd., one 0.3 mfd., one 1.0 mfd. and three 0.1 mfd. capacitors in metal container	6.70
7560	Transformer—Power transformer—105–125 volts—50–60 cycles	6.14
7570	Transformers—Power transformer—105–125 volts—25–40 cycles	7.40
7571	Transformer—200–250 volts—50–60 cycles	6.28
	REPRODUCER ASSEMBLIES	
3005	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board with 3 terminals—Package of 5	.50
6378	Transformer—Output transformer	1.94
8920	Ring—Cone retaining ring	.50
8935	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
9422	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
6113	Foot—Felt foot—Package of 15	
7437	Escutcheon—Tuning selector escutcheon	
X190	Cabinet—Complete less all equipment	
X191	Baffle board and cloth grille	
	PARTS SPECIAL FOR NURSERY MODEL	
3492	Knob—Blue knob	.30
3493	Knob—Red knob	.30
3494	Knob—Orange knob	.30
X194	Escutcheon—Station selector escutcheon—Red finish	
X195	Baffle board and grille cloth	
X196	Cabinet—Cabinet complete less all equipment	

MODEL R-70
Schematic, Voltage
Chassis wiring

RCA-VICTOR CO., INC.

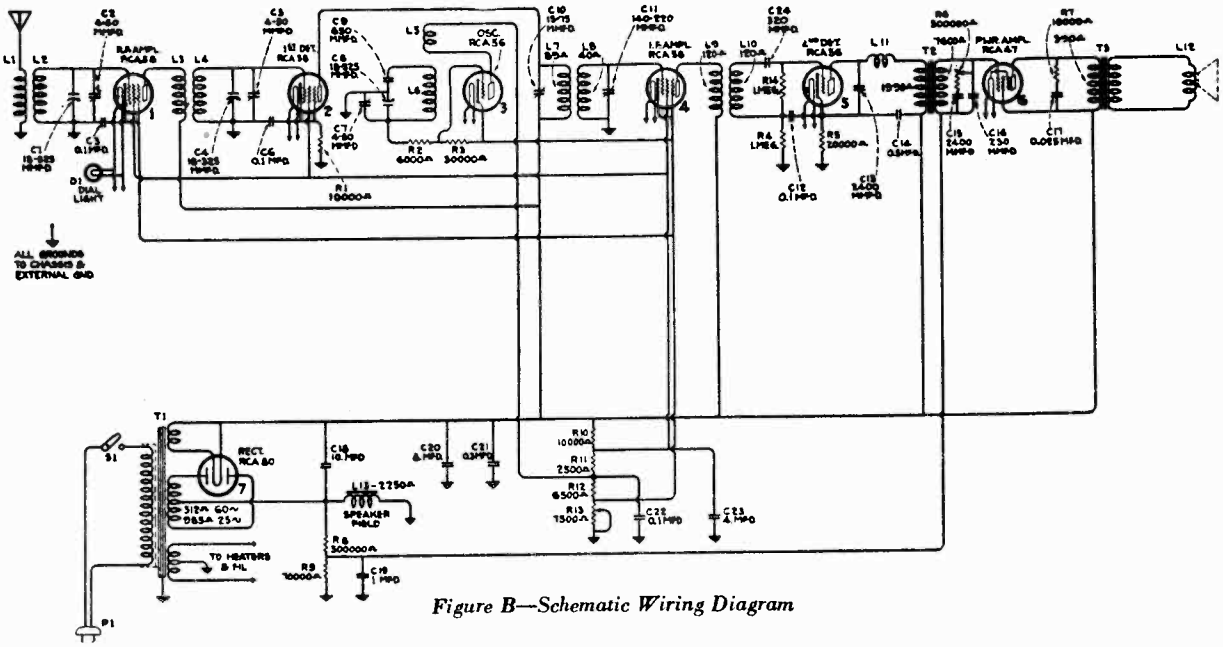


Figure B—Schematic Wiring Diagram

RADIOTRON SOCKET VOLTAGES

All Voltages Measured at Maximum Volume with no Signal Impressed on Input. 120 Volt 60 Cycle A. C. Source Used

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	245	6.0	2.37
2. Oscillator RCA-56	—	—	60	4.5	2.37
3. First Detector RCA-58	13.0	90	235	1.3	2.37
4. I. F. RCA-58	4.5	100	245	6.0	2.37
5. Second Detector RCA-56	18.0	—	230	1.0	2.37
6. Power RCA-247	16.5	250	240	30.0	2.37
7. Rectifier UX-280	370 Volts R. M. S. each plate			70.0	5.0

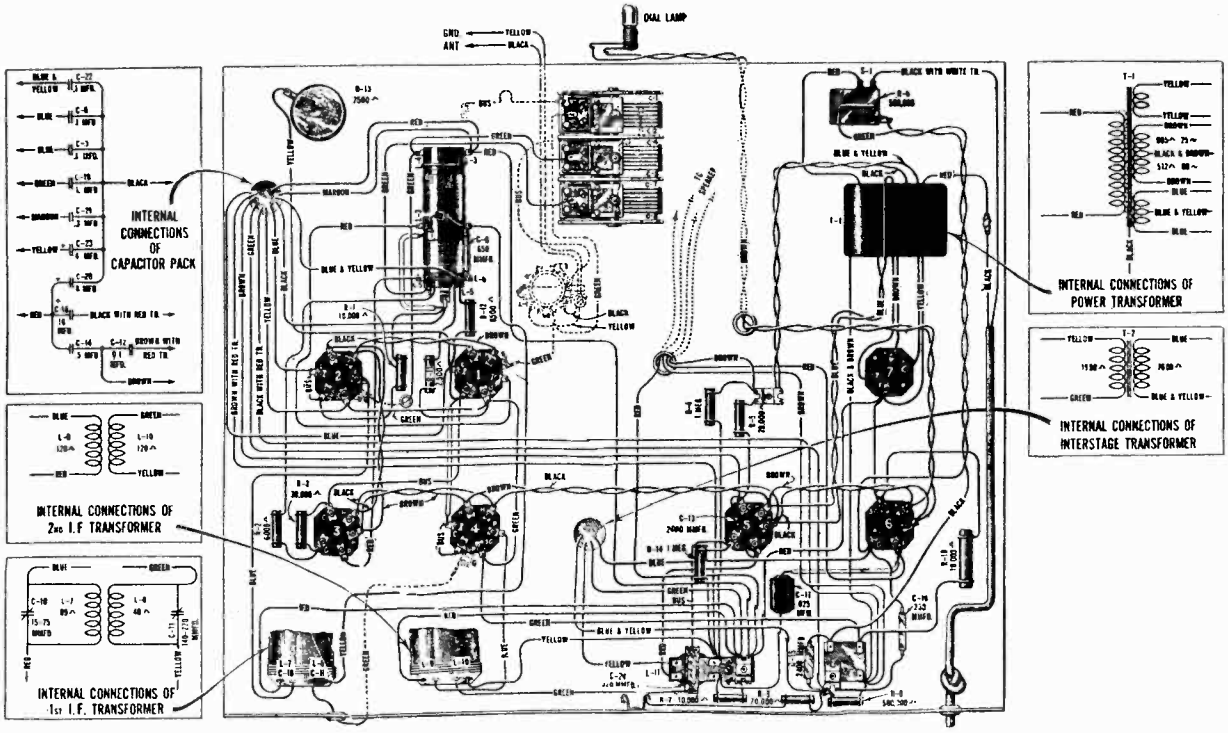


Figure C—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

MODEL R-73-A
Alignment, Voltage
Speaker data

SERVICE DATA

Electrical Specifications

Voltage Rating.....105–125 Volts
Power Consumption.....100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output.....3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency.....175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage, Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

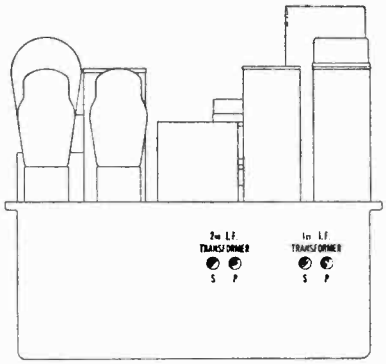


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

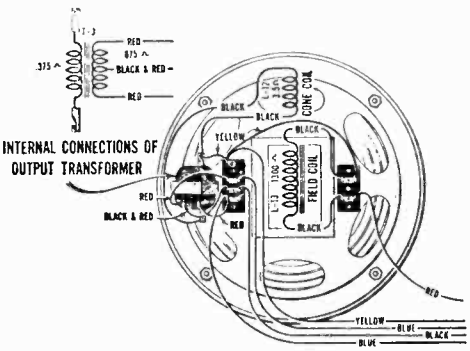


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4

Rectifier—370 Volts R.M.S. Each Plate

MODEL R-73-A
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

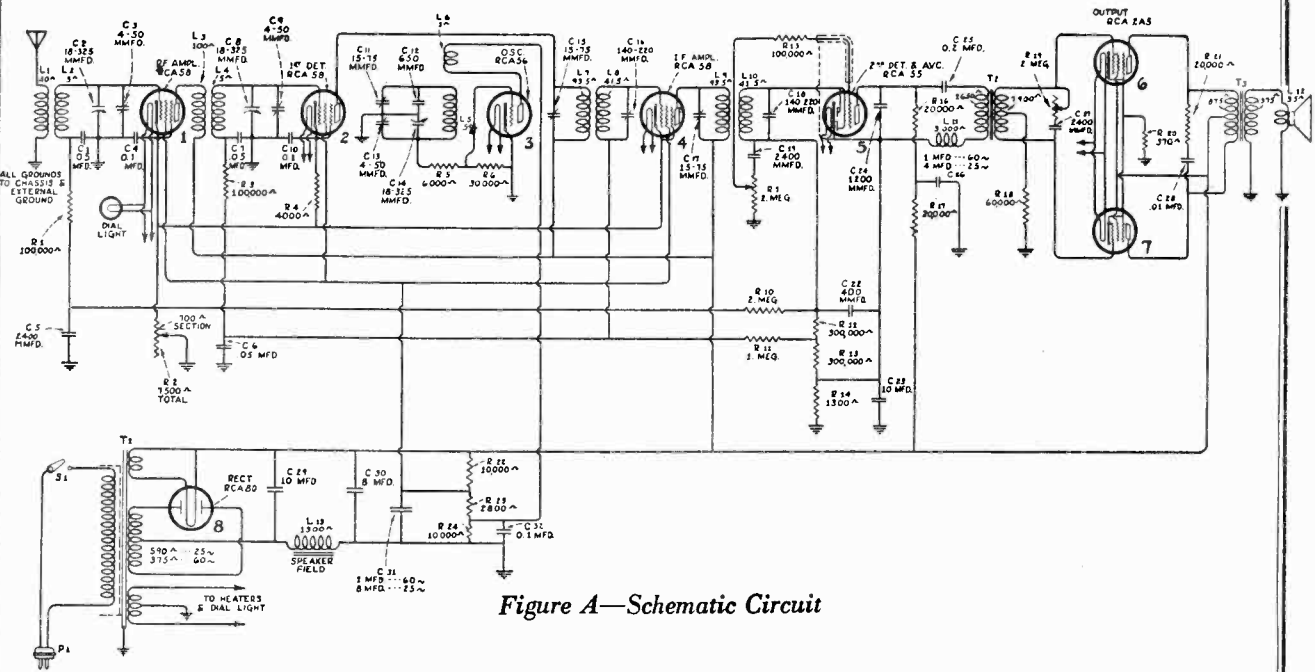


Figure A—Schematic Circuit

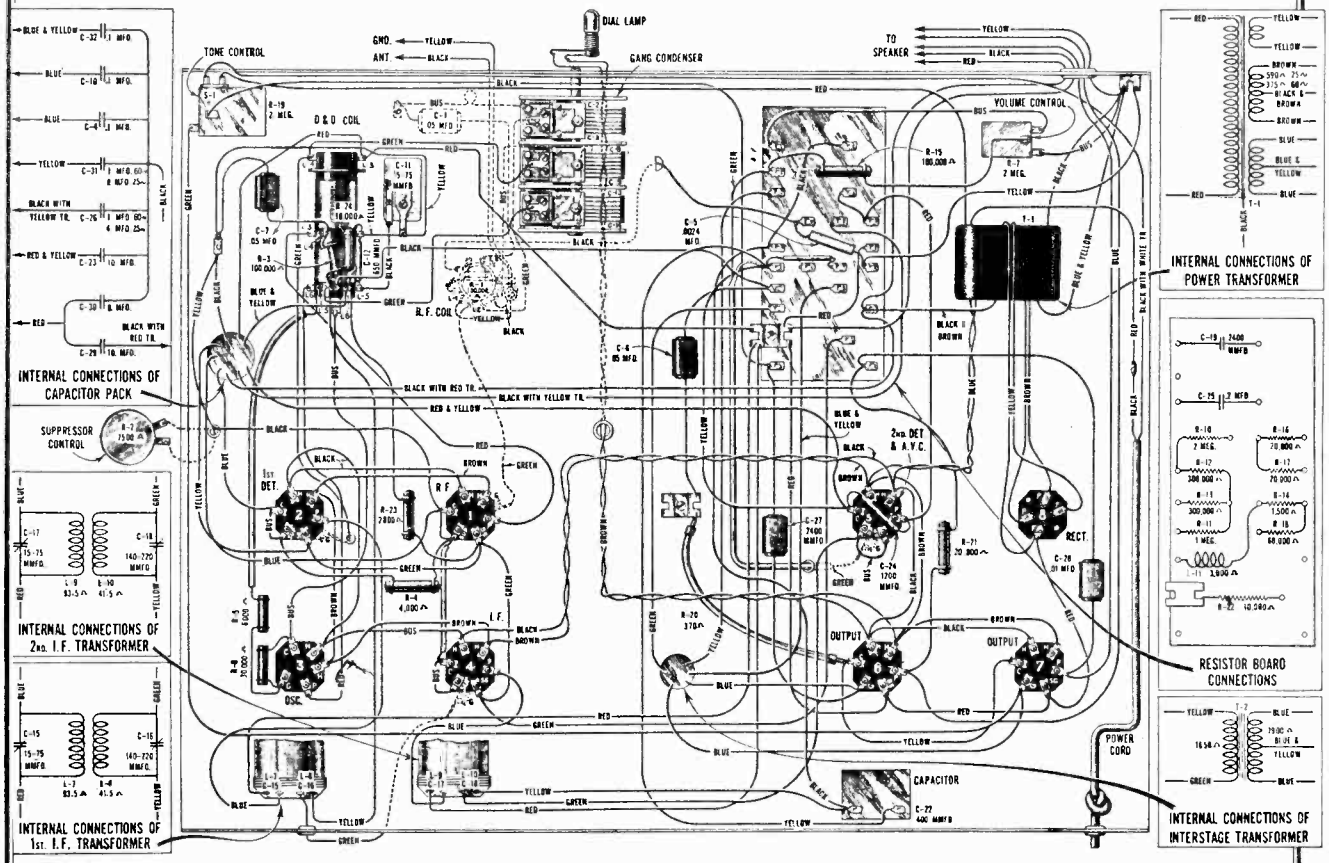


Figure B—Chassis Wiring Diagram

RCA-VICTOR CO., INC.

MODEL R-73-A
Parts List

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	1.00
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd	.46
3451	Bracket—Dial lamp bracket and indicator... Package of 2	.38
3455	Capacitor—0.01 mfd	.44
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd	.30
3472	Capacitor—0.0024 mfd	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6188	Resistor — 2 megohm — Carbon type — ½ watt—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6250	Resistor — 4,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variabe tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	.80
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd	.50
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105–125 volts—50–60 cycles	5.72
7585	Transformer—Power transformer—105–125 volts—25–50 cycles	9.86
7586	Transformer—Power transformer 200–250 volts—50–60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

MODEL RE-80
Alignment, Voltage
Speaker data, Notes

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating ..... 105-125 Volts
Power Consumption ..... 120 Watts
Type and Number of Radiotrons ..... 3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit ..... Super-Heterodyne with A. V. C., tone control and push pull Pentode Output
Undistorted Output ..... 3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency ..... 175 K. C.
Type of Magnetic Pickup Low Impedance with Inertia Type Tone Arm
Type of Turntable ..... Two Speed with Ball Race Reducer

This combination instrument uses an eight tube chassis incorporating automatic volume control, tone control, noise suppressor and push-pull Pentode output stage. Due to the excellent high frequency response of this receiver, a switch is provided for reducing the high frequency response when playing records having a high value of needle scratch. The radio-record switch and record volume control are one unit, accessible from the front. High and low frequency compensation is incorporated in the record audio system.

Service work will be found to be similar to that of other Super-Heterodyne receivers incorporating automatic volume control.

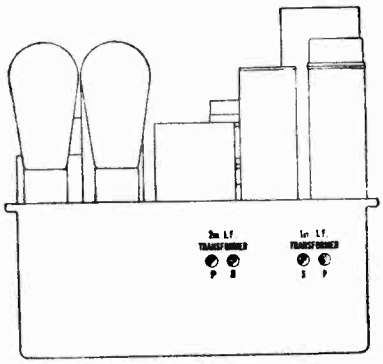


Figure C—I. F. Alignment Location

Line-Up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

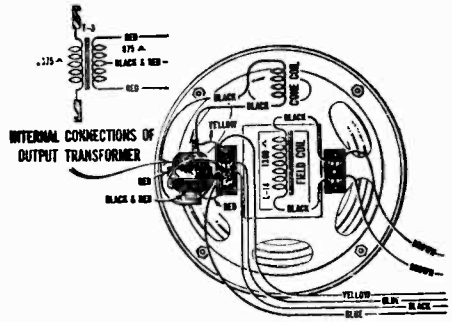


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal.

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field ..... 90 Volts
Voltage Across Field ..... 120 Volts
Rectifier . . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

RCA-VICTOR CO., INC.

MODEL RE-80
Schematic
Chassis wiring

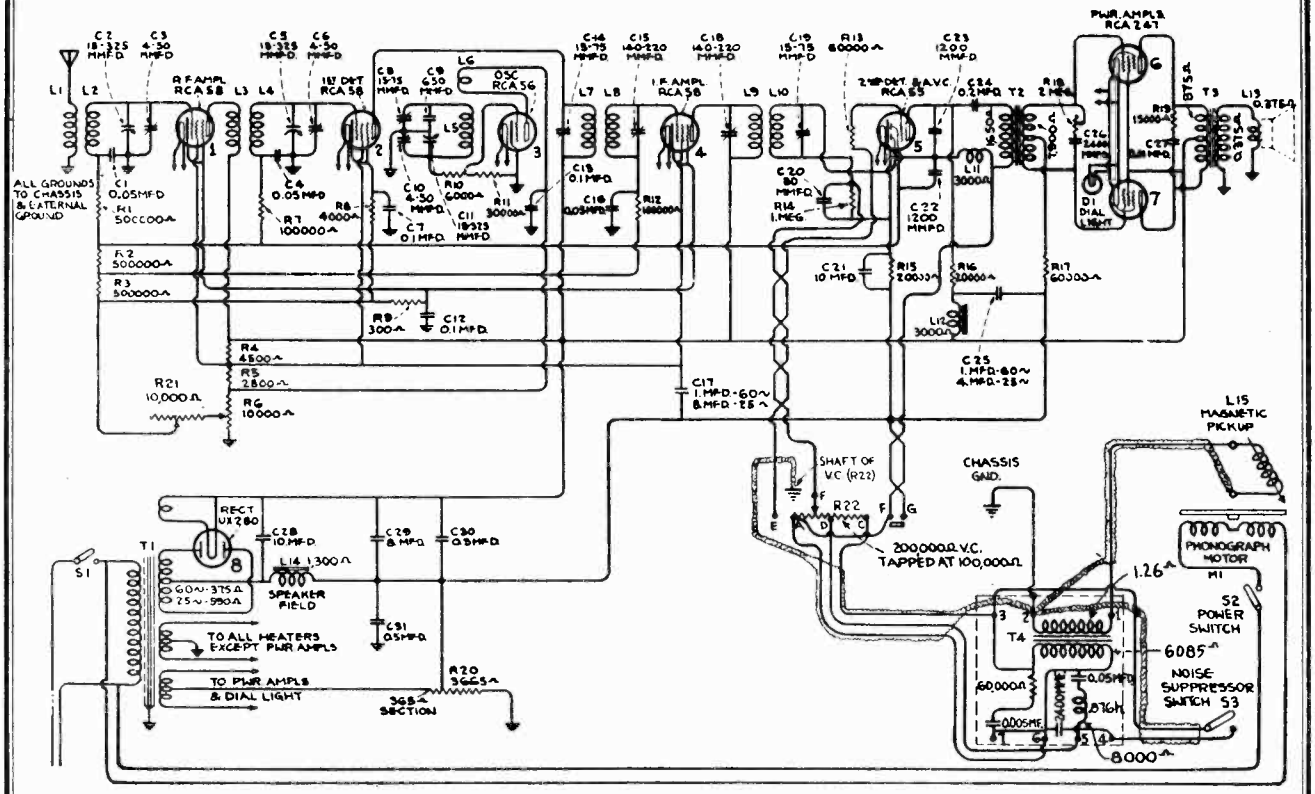


Figure A—Schematic Wiring Diagram

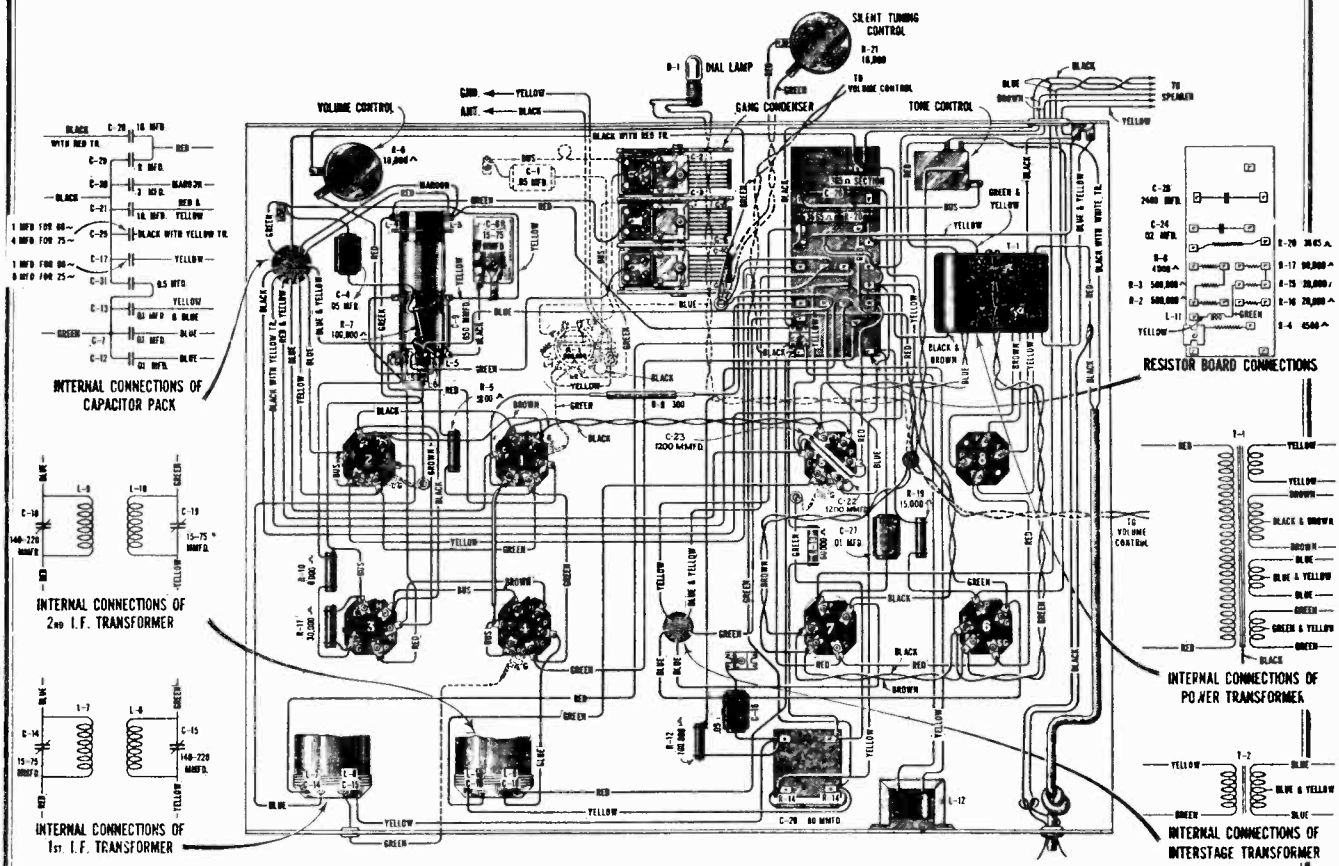


Figure B—Chassis Wiring Diagram

MODEL RE-80
Assembly wiring

RCA-VICTOR CO., INC.

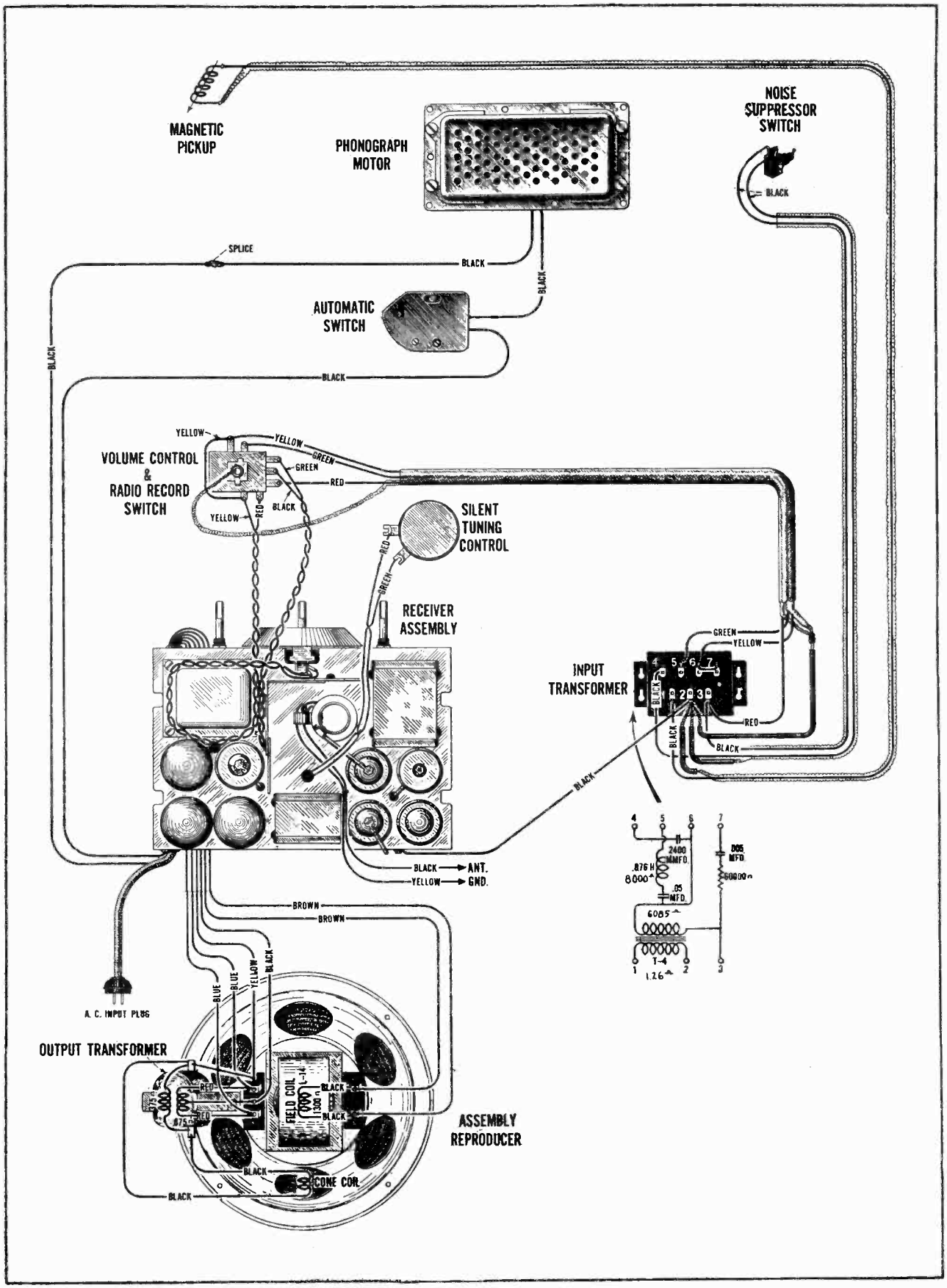


Figure E—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL RE-80
Pickup data

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of the viscoloid damping block.

The use of the viscoloid damping block, which vibrates as a whole on the low frequencies, yet absorbs the armature vibration at the higher frequencies, eliminates any bad peaks in the frequency range. This pickup output is substantially flat from 50 to 5000 cycles.

REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

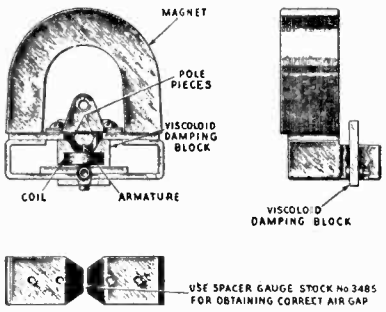


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered, being careful not to use too much heat as damage to the viscoloid damping block may result.

(f) Before reassembling the pole pieces the air gap should be correctly set by use of a Spacer Gauge—Stock No. 3485. The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position, making sure that the viscoloid damping block is entirely free from touching any parts, including the cover.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

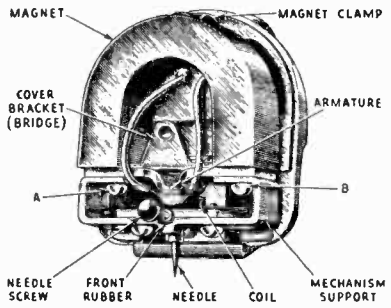


Figure G

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered. If the air gap is previously checked by means of Space Gauge, Stock No. 3485, no difficulty will be had in properly centering the armature.

REPLACING THE VISCOLOID DAMPING BLOCK

If it is desired to replace the viscoloid damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism frame.

(c) Remove the damping block from the armature.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the viscoloid in place. The iron should be applied long enough to slightly melt the viscoloid and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling of the viscoloid. The pickup should then be reassembled as described in the preceding section.

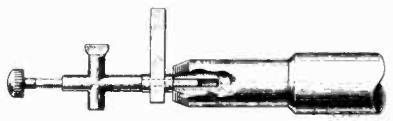


Figure H

Only rosin core solder should be used for any soldering in conjunction with the pickup. However if great care to wipe clean and use as small amount as possible is exercised paste or liquid flux may be used for soldering the end of the spring.

MODEL RE-80
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
2746	Socket—Dial lamp socket
2747	Cap—Contact cap
2749	Capacitor—2,400 mmfd. capacitor
3003	Cushion—Sponge rubber chassis support cushions
3048	Resistor—500,000 ohms—Carbon type—½ watt
3076	Resistor—1 megohm—Carbon type—½ watt
3077	Resistor—30,000 ohms—½ watt—Carbon type
3252	Resistor—100,000 ohms—½ watt—Carbon type
3369	Resistor—4,500 ohms—Porcelain type—20 watt
3449	Coil—Choke coil mounted on resistor board
3450	Capacitor—0.2 mfd. mounted on resistor board
3451	Bracket—Dial lamp bracket and indicator
3455	Capacitor—0.01 mfd.
3456	Capacitor—0.05 mfd.
3457	Resistor—Porcelain type—3,665 ohms—Tapped at 365 ohms
3458	Resistor—2,800 ohms—Carbon type—½ watt
3459	Capacitor—80 mmfd. capacitor
3460	Capacitor—1,200 mmfd. capacitor
3468	Resistor—300 ohms—Flexible type
3485	Guage—Pole piece spacing guage
6142	Resistor—6,000 ohms—½ watt—Carbon type
6192	Spring—3 gang tuning capacitor drive cord tension spring
6279	Resistor—15,000 ohms—½ watt—Carbon type
6282	Resistor—60,000 ohms—Carbon type—½ watt
6288	Knob—Station selector, tone control or volume control knob
6298	Cord—3 gang variable tuning capacitor drive cord
6300	Socket—4 contact Radiotron socket
6301	Reactor—Filter reactor
6303	Resistor—20,000 ohms—½ watt—Carbon type
6308	Coil—R. F. coil complete with mounting bracket
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers
6367	Transformer—First intermediate frequency transformer
6368	Transformer—Second intermediate frequency transformer
6369	Volume control—Complete with mounting nut
6370	Tone control—Complete with mounting nut
7054	Cord—Power cord
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers
7439	Drum—Dial drum with 3 dial mounting nuts
7440	Scale—Dial and dial scale
7481	Coil—Detector and oscillator coil complete with mounting bracket
7484	Socket—UY type Radiotron socket
7485	Socket—6 contact Radiotron socket
7510	Shield—Radiotron tube shield—Maroon finish
7511	Shield—Radiotron tube shield top—Maroon finish
7549	Transformer—Interstage audio transformer
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation
7551	Transformer—Power transformer—105-125 volts—50-60 cycles
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers
7556	Transformer—Power transformer—105-125 volts—25-50 cycles
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation
	MOTOR BOARD ASSEMBLIES
2947	Leather—Friction leather
3322	Switch—Automatic brake switch with mounting screws
3391	Suspension spring and washer assembly for motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 1 "C" washer, 2 cup washers and 1 nut
3430	Box—Needle box with lid
3396	Receptacle—Needle receptacle with mounting screws

Stock No.	DESCRIPTION
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets
10184	Plate—Automatic brake latch trip plate with mounting screws
10635	Switch—Scratch filter switch—Toggle type
	PICKUP AND PICKUP ARM ASSEMBLIES
3385	Coil—Pickup coil
3386	Cover—Pickup cover
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer
3388	Screw—Pickup needle holding screw
3389	Rod—Automatic brake trip rod with lock nut
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets
3417	Armature—Pickup armature
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing
3419	Screw—Pickup cover mounting screw
6335	Pickup—Pickup unit complete
6346	Back—Pickup housing back
7538	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer
	TURNTABLE ASSEMBLIES
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud
3340	Washer—Thrust washer
3341	Pin—Groov-Pin
3342	Spring—Latch spring—Located on clamping ring
3343	Sleeve—Sleeve complete with ball race
3344	Cover—Grease retainer cover
3346	Bushing—Speed shifter lever bushing
3347	Spring—Speed shifter lever spring
3399	Lever—Speed shifter lever with mounting screws
8948	Turntable—Complete
	MOTOR ASSEMBLIES
3398	Motor mounting washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer
7389	Rotor and shaft for 105-125 volts, 60 cycle motor
7443	Rotor and shaft for 105-125 volts, 25 cycle motor
8939	Motor—Motor complete 105-125 volts—60 cycle
8940	Motor—Motor complete 105-125 volts—50 cycle
8941	Motor—Motor complete 105-125 volts—25 cycle
8943	Rotor and shaft for 105-125 volts, 50 cycle motor
8945	Spindle—Turntable spindle with fibre gear for 60 cycle motor
8947	Spindle—Turntable spindle with fibre gear for 25 cycle motor
	REPRODUCER ASSEMBLIES
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets
6184	Board—Terminal board complete with 3 terminals
6371	Transformer—Output transformer
8920	Ring—Cone retaining ring
8969	Cone—Reproducer cone complete with voice coil
9421	Coil assembly—Comprising field coil, magnet and cone support
	MISCELLANEOUS PARTS
3437	Knob—Selector switch and volume control knob
6385	Volume control—Phonograph volume control and selector switch
6386	Cable—3 conductor shielded cable—From phonograph to volume control and input transformer pack
7572	Transformer pack—Comprising input transformer, reactor, capacitors and resistor in metal container
	CABINET ASSEMBLIES
2776	Catch assembly—Door catch and strike with nails
8938	Board—Motor board—Less equipment
X168	Escutcheon—Station selector escutcheon
X173	Hinge—Lid hinge
X184	Panel—Control panel
X185	Leg—Cabinet end leg
X186	Foot—Cabinet foot
X187	Stretcher assemhly—Comprising front, back and end rails
X188	Lid—Cabinet lid
X189	Baffle board and grille cloth
6341	Support—Lid support with mounting screws

RCA-VICTOR CO., INC.

MODEL R-90-P
Alignment data

SERVICE DATA

Electrical Specifications

Voltage Rating	105-125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range	540 K. C.–1500 K. C. 1400 K. C.–2800 K. C.
Undistorted Output	4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D. the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor. Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

6. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

MODEL R-90-P
Schematic, Speaker Voltage, Trimmers

RCA-VICTOR CO., INC.

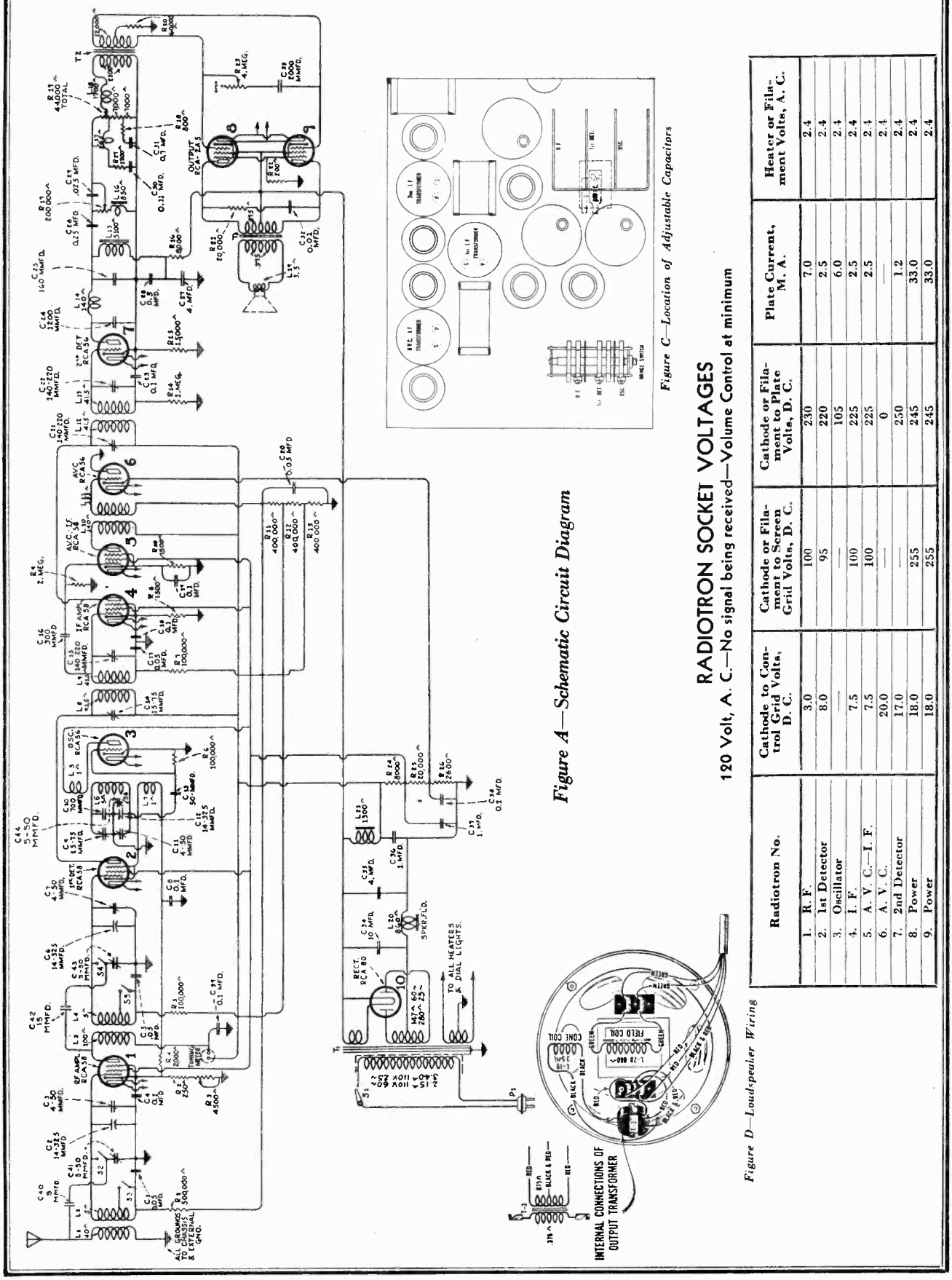


Figure A—Schematic Circuit Diagram

Figure C—Location of Adjustable Capacitors

Figure D—Loudspeaker Wiring

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

RCA-VICTOR CO., INC.

MODEL R-90-P
Chassis wiring

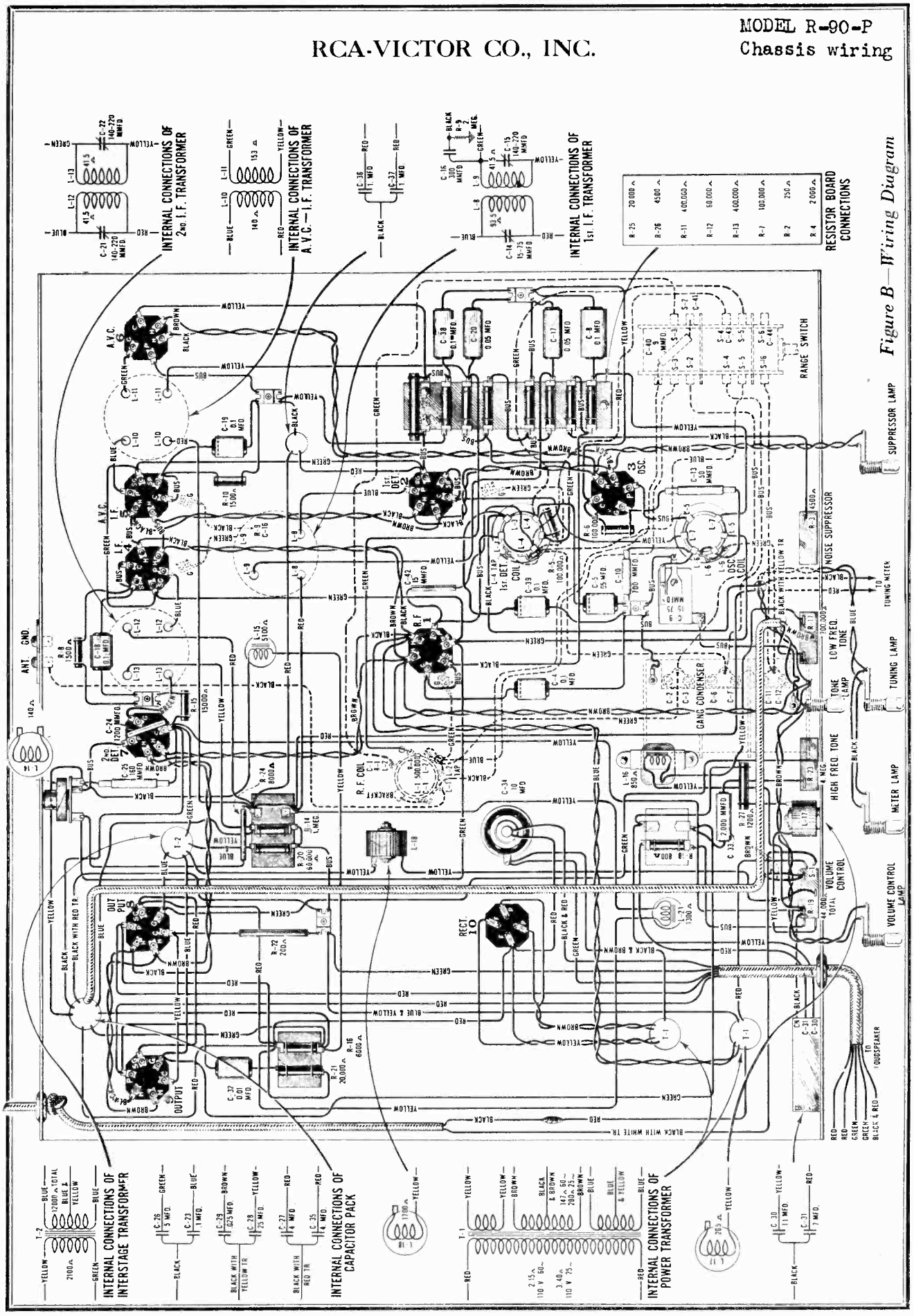


Figure B—Wiring Diagram

MODEL R-90-P
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor	.44
3460	Capacitor—1,200 mmfd.	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd.	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency excutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6536	Condenser—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105–120 volts—50–60 cycles	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

RCA-VICTOR CO., INC.

MODEL RCA-100,101
Alignment, Speaker
Schematic,Voltage

SERVICE DATA

Voltage Rating.....105–125 Volts
Frequency Rating.....25–60 or 50–60 Cycles
Power Consumption.....40 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-38, 1 RCA-1-V
Undistorted Output.....1.6 Watts
Frequency Range.....540–1500 K. C. and 1600–3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

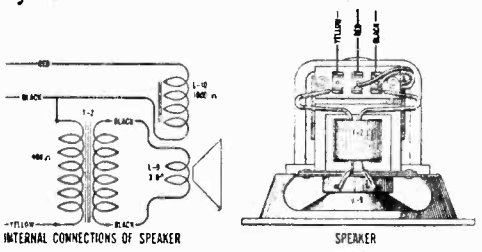


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-38.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

FigureA shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

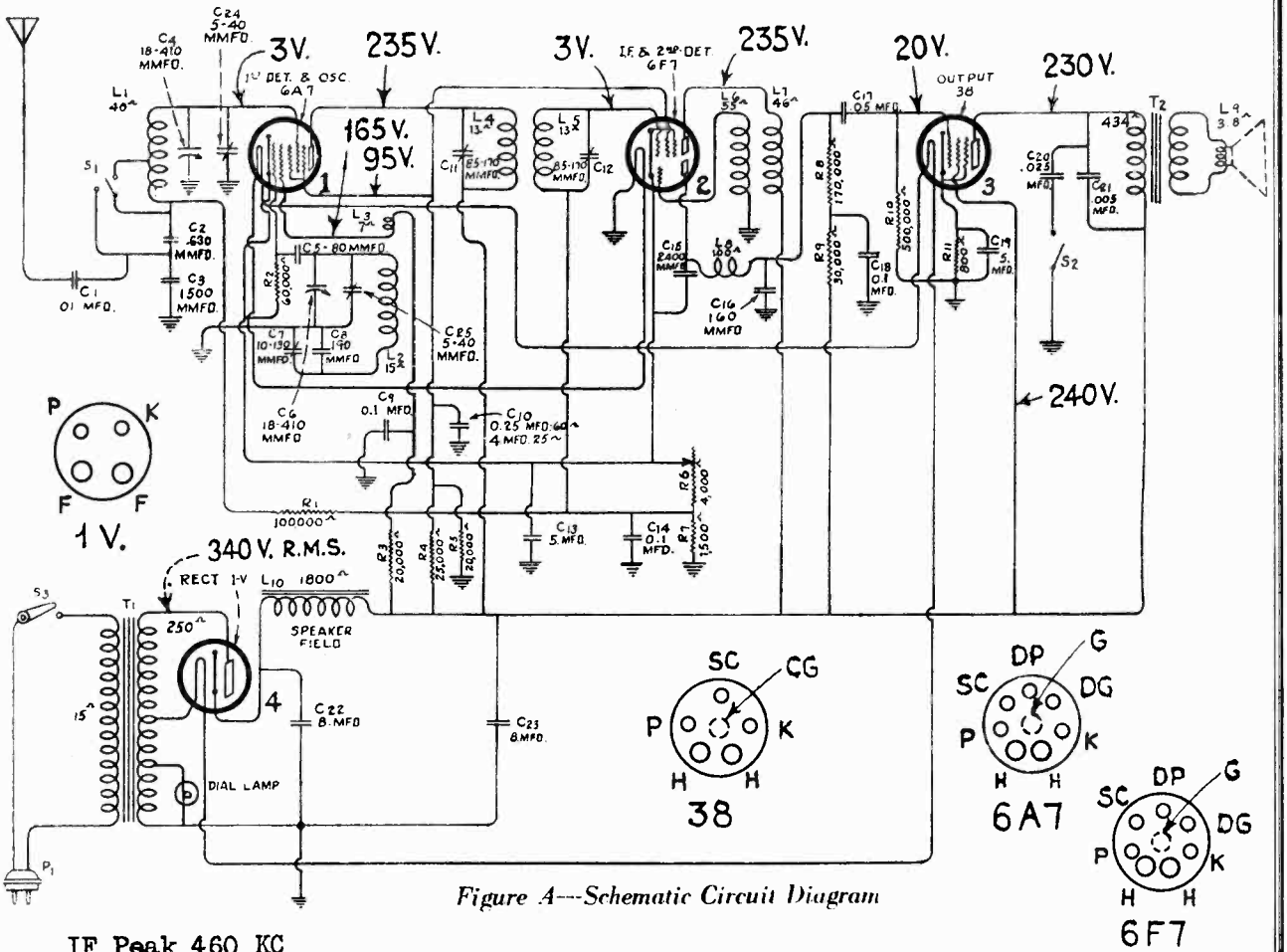


Figure A—Schematic Circuit Diagram

IF Peak 460 KC

MODEL RCA-100,101
Chassis wiring
Parts List

RCA-VICTOR CO., INC.

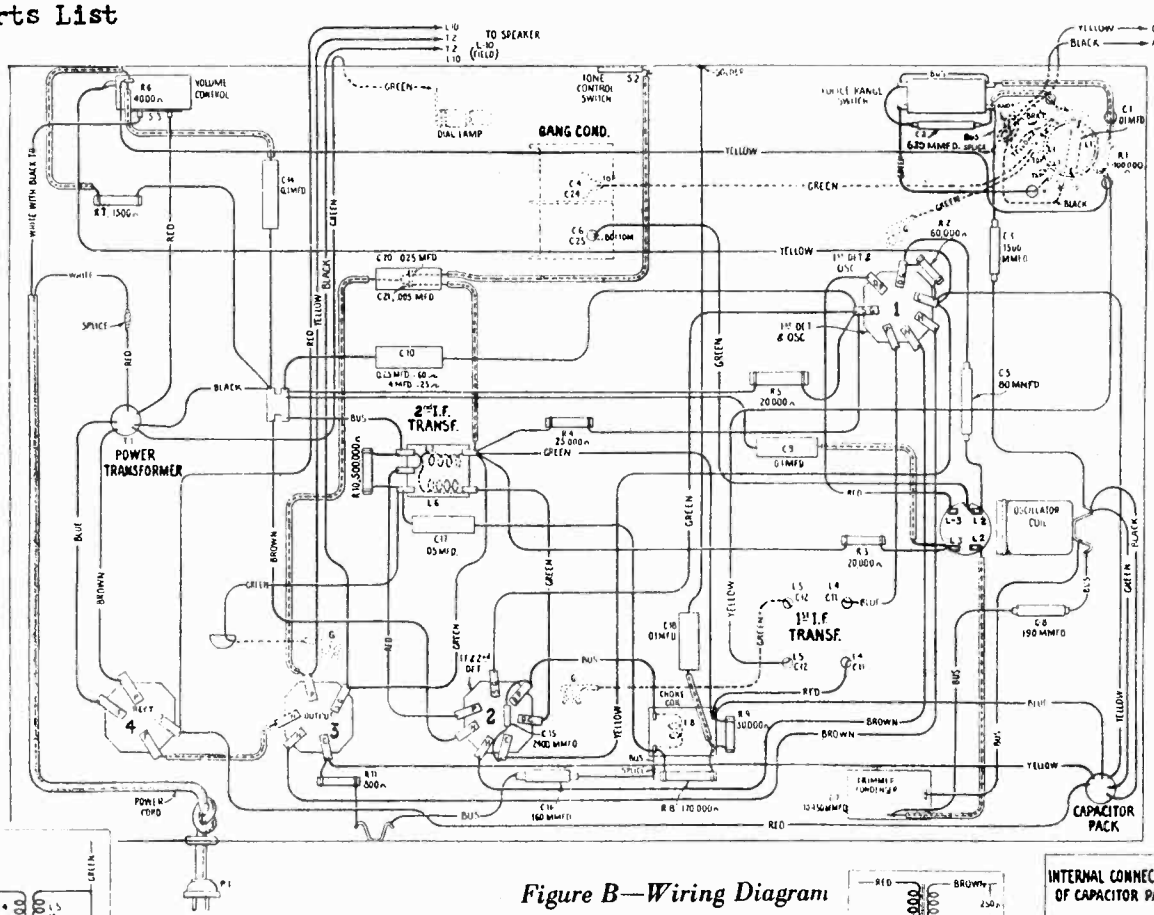
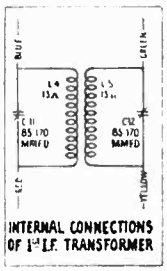
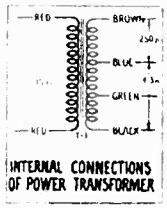
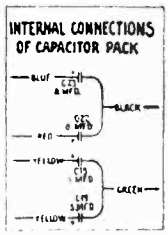


Figure B—Wiring Diagram







REPLACEMENT PARTS

Stock No	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2717	Contact cap—Package of 5	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3592	Knob—Tone control switch knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3606	Capacitor—Comprising one 0.005 and one 0.025 mfd. capacitors (C20, C21)	.40
3615	Knob—Volume control or range switch knob—Package of 5	.60
3641	Capacitor—0.1 mfd. (C9)	.35
3682	Shield—Radiotron shield	.22
3701	Capacitor—0.01 mfd. (C1)	.30
3702	Capacitor—0.25 mfd. (C10) (60 cycle)	.42
3713	Capacitor—0.05 mfd. (C17)	.32
3749	Capacitor—0.1 mfd. (C18)	.30
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3860	Socket—5-contact Radiotron socket	.32
3861	Capacitor—Adjustable capacitor (C7)	.78
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3868	Resistor—800 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3873	Capacitor—1,500 mmfd. (C3)	.30
3877	Capacitor—0.1 mfd. (C14)	$0.32
3885	Knob—Station selector knob—Package of 5	1.00
3886	Reflector—Dial light reflector	.30
3887	Dial—Station selector dial—Package of 5	.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3890	Capacitor—190 mmfd. (C8)	.30
3932	Capacitor—2,400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
7641	Capacitor—4.0 mfd. (C10) (25 cycle)	.86
9045	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	4.84
9047	Transformer—Power transformer—105–125 volts—25–40 cycles	5.25
9048	Transformer—Power transformer—200–250 volts—50–60 cycles	5.50
	REPRODUCER ASSEMBLIES	
6659	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone (L9)—Package of 5	5.00
9436	Reproducer complete	5.30
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72

RCA-VICTOR CO., INC.

MODEL RCA 110,111,115
Alignment, Voltage
Parts List

SERVICE DATA

This receiver is a five-tube Super-Heterodyne incorporating a dynamic loudspeaker as a part of the chassis; continuously variable tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd. (C8)	$0.75
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt (R2)—Pkg. of 5	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Seven contact Radiotron socket	.38
3573	Socket—Four contact Radiotron socket	.32
3574	Coil—Choke coil (L9)	.68
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3590	Escutcheon—Station selector escutcheon—Pkg. of 5	1.40
3591	Escutcheon—Name plate escutcheon—Pkg. of 5	1.40
3592	Knob—Station selector, volume control or tone control knob—Pkg. of 5	.80
3594	Resistor—50,000 ohms—carbon type—½ watt (R5, R7)—Pkg. of 5	1.00
3596	Capacitor—60 Mmfd. (C15)	.36
3597	Capacitor—0.25 Mfd. (C17)	.40
3602	Resistor—60,000 ohms—carbon type—¼ watt (R1)—Pkg. of 5	1.00
3604	Capacitor—400 Mmfd. (C14)	.30
3615	Knob—Range switch knob—Pkg. of 5	.60
3623	Shield—Antenna or R. F. coil shield	.30
3632	Resistor—500 ohms—carbon type—1 watt (R8)—Pkg. of 5	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3682	Shield—Radiotron shield—oscillator	.22
3713	Capacitor—.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd. (C25, C27)—Pkg. of 2	.50
3789	Shield—Radiotron shield—R. F. or 2nd Detector	.25
3842	Screw—Chassis mounting screw assembly—Package of 4	.26
6228	Resistor—200,000 ohms—carbon type—½ watt (R4)—Pkg. of 5	$1.00
6303	Resistor—20,000 ohms—carbon type—½ watt (R12, R3)—Pkg. of 5	1.00
6306	Resistor—14,000 ohms—carbon type—1 watt (R10)—Pkg. of 5	1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6465	Volume control (R11)	1.22
6471	Coil—Oscillator coil (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6620	Capacitor—Comprising one .005 and one .035 mfd. (C20, C30)	.50
6622	Dial—Condenser dial and drive assembly	.95
6623	Tone control (R13)	1.25
6624	Condenser—3-gang variable tuning condenser	3.50
6625	Switch—Range switch	1.60
6676	Socket—6-contact Radiotron socket—Output tube	.40
7485	Socket—6-contact Radiotron socket	1.64
7589	Capacitor—Comprising two 4.0 mfd. capacitors (C22, C23)	1.40
7590	Capacitor—10 mfd. (C21)	4.26
8985	Transformer—Power transformer 105–125 volts, 50–60 cycles (T1)	4.38
8986	Transformer—Power transformer 220–250 volts, 50–60 cycles (T1)	6.00
9002	Transformer—Power transformer 105–125 volts, 25–40 cycles (T1)	
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
8987	Cone—Reproducer cone (L10)—Pkg. of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.35
9435	Reproducer complete	4.75

MODEL RCA 110,111,115
Schematic, Data
Chassis wiring

RCA-VICTOR CO., INC.

IF Peak 175 KC

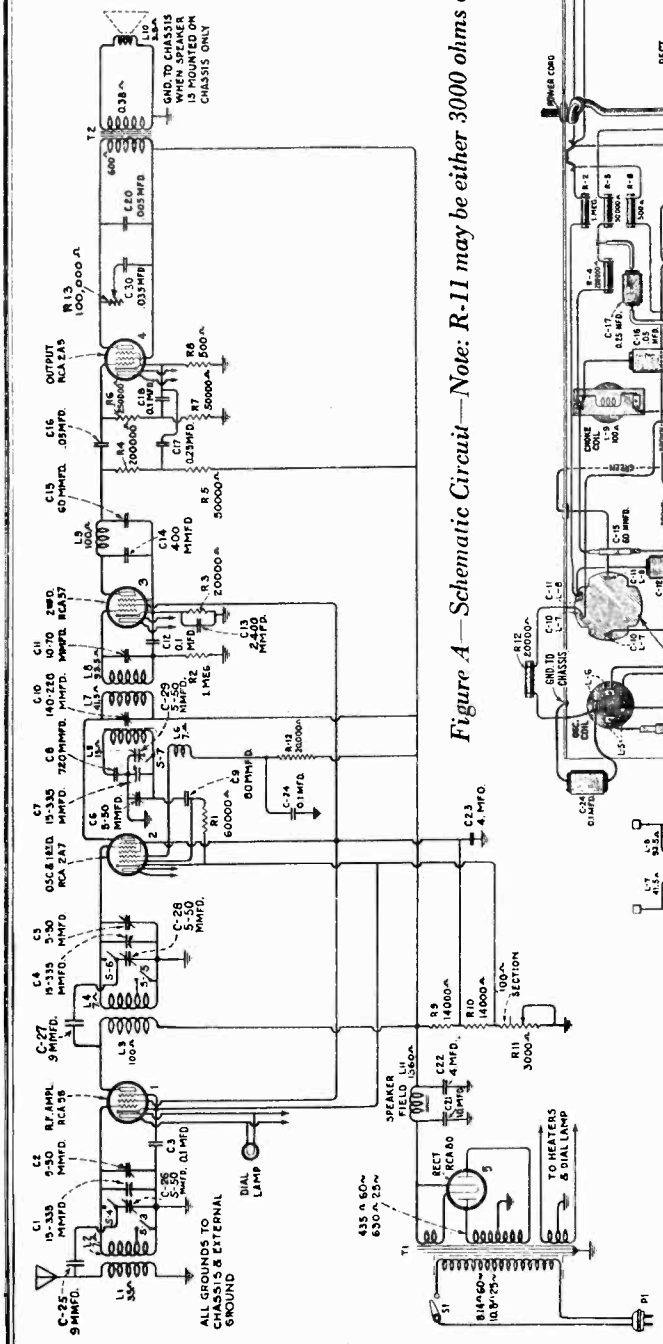


Figure A—Schematic Circuit—Note: R-11 may be either 3000 ohms or 4500 ohms

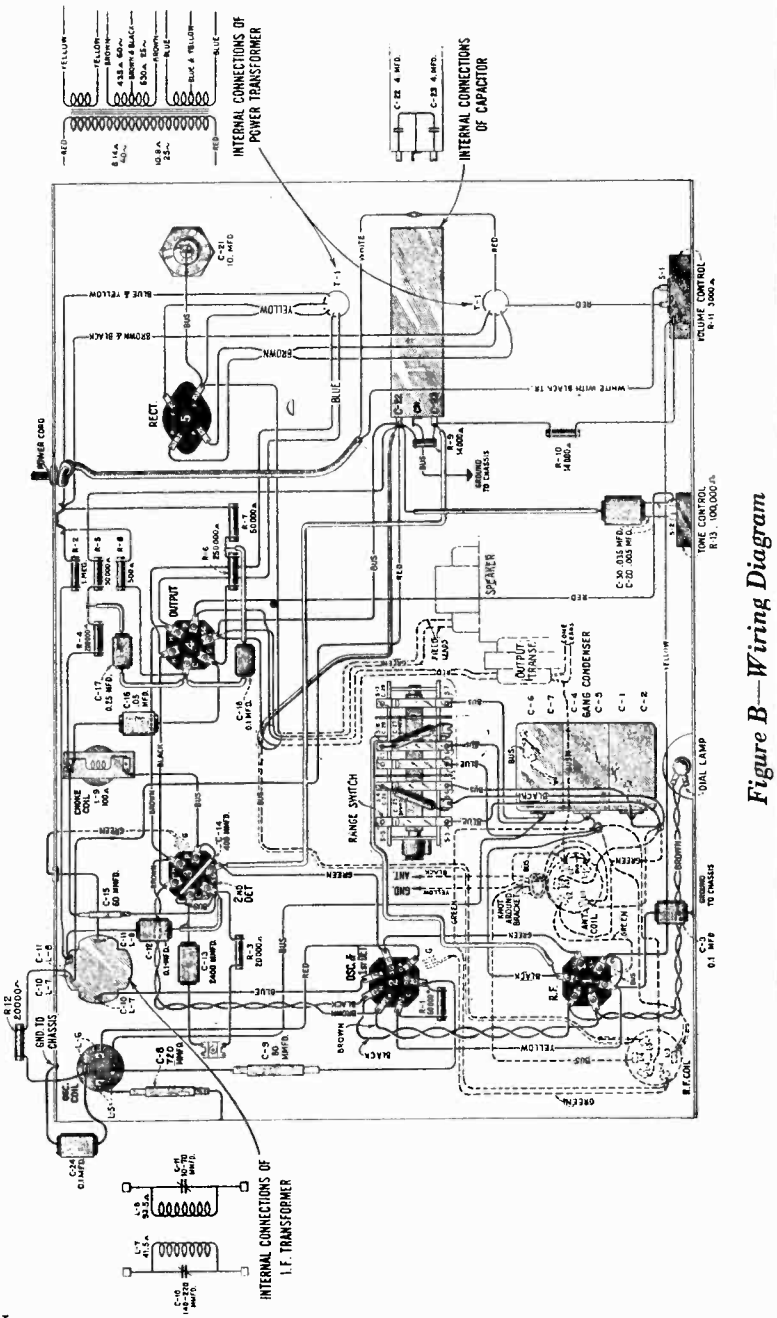


Figure B—Wiring Diagram

Voltage Rating	115 Volts
Frequency Rating	25–60 Cycles and 50–60 Cycles
Power Consumption	60 Cycles—70 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

RCA-VICTOR CO., INC.

MODEL 112 AC-DC 220V
Alignment, Parts List

220 Volt AC/DC Universal Receiver

Five-Tube Superheterodyne Table Model

SERVICE DATA

Electrical Specifications

Voltage Rating	200–230 AC or DC
Frequency Rating (AC)	50–60 Cycles
Power Consumption	AC 60 Cycles–105 Watts—DC–85 Watts
Number and Types of Radiotrons	1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total 5
Undistorted Output	1.5 Watts
Frequency Range	540 KC–1500 KC

This receiver is a five tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3 which is used in a half-wave circuit.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 K. C. Prior to making the adjustment however, the dial should be checked. This is done by making sure the dial indicator reads 530 when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2875	Knob—Volume control or station selector knob—Package of 5	1.50
2963	Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, RF or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, RF or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. (C12, C13, C27)	.60
3859	Socket—4-contact Radiotron socket	.30
3888	Capacitor—.05 mfd. (C16)	.25
3914	Resistor—30 ohms—Flexible type (R13)	.28
3915	Resistor—Porcelain type—320 ohms (R14, R15)	.88
3916	Capacitor—.05 mfd. (C20)	.32
3917	Capacitor—.25 mfd. (C17)	.40
3919	Socket—Dial lamp socket	.28
3950	Shield—Radiotron shield	.26
3993	Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10	$0.25
4005	Escutcheon—Volume control escutcheon	.42
6114	Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—RF coil (L3, L4)	.94
6521	Coil—Oscillator coil (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. (C1, C25)	.46
6676	Socket—6-contact Radiotron socket	.40
6723	Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7)	4.15
6724	Volume control (R12, S1)	1.20
6725	Dial—Tuning condenser dial and drive assembly	.88
6726	Coil—Choke coil (L9)	.62
6727	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.68
6728	Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31)	2.94
7065	Screwdriver—For IF, RF and oscillator condenser adjustment	.80
7485	Socket—6-contact Radiotron socket—Second detector	.40
7822	Escutcheon—Station selector escutcheon	.42
9050	Oscillator—Test oscillator 15–20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6730	Transformer—Output transformer (T1)	1.52
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
9447	Reproducer complete	5.25
9448	Coil—Field coil magnet and cone support (L11)	2.74

MODEL 112 AC-DC 220V
Schematic, Voltage
Trimmer locations

RCA-VICTOR CO., INC.

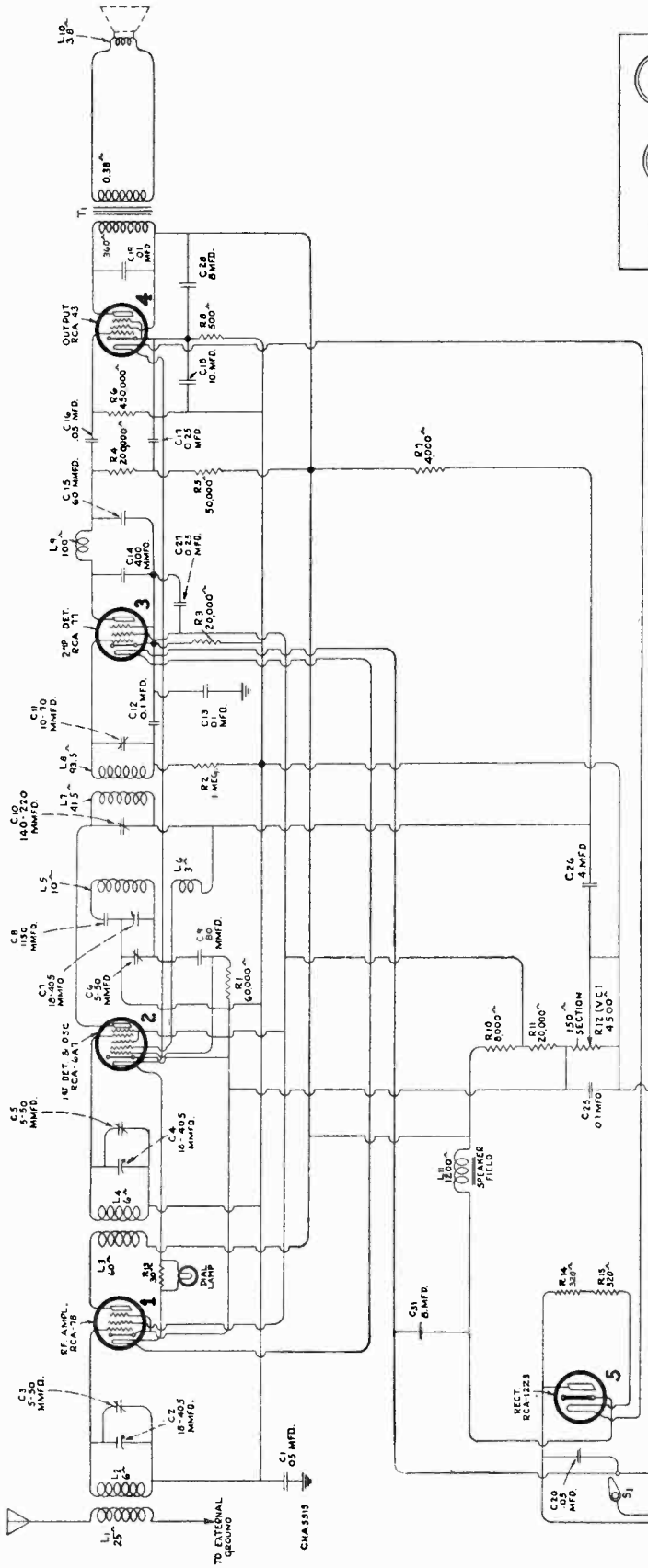


Figure A—Schematic Diagram

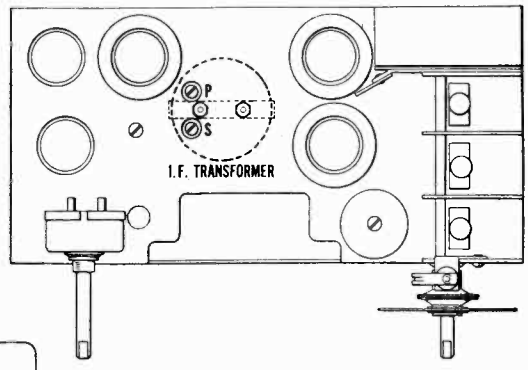


Figure C—Location of Line-up Capacitors

RADIOTRON SOCKET VOLTAGES

*Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-12Z3 Rectifier	220 RMS			—	12.0

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

RCA-VICTOR CO., INC.

MODEL 112 AC-DC 220V
Chassis wiring

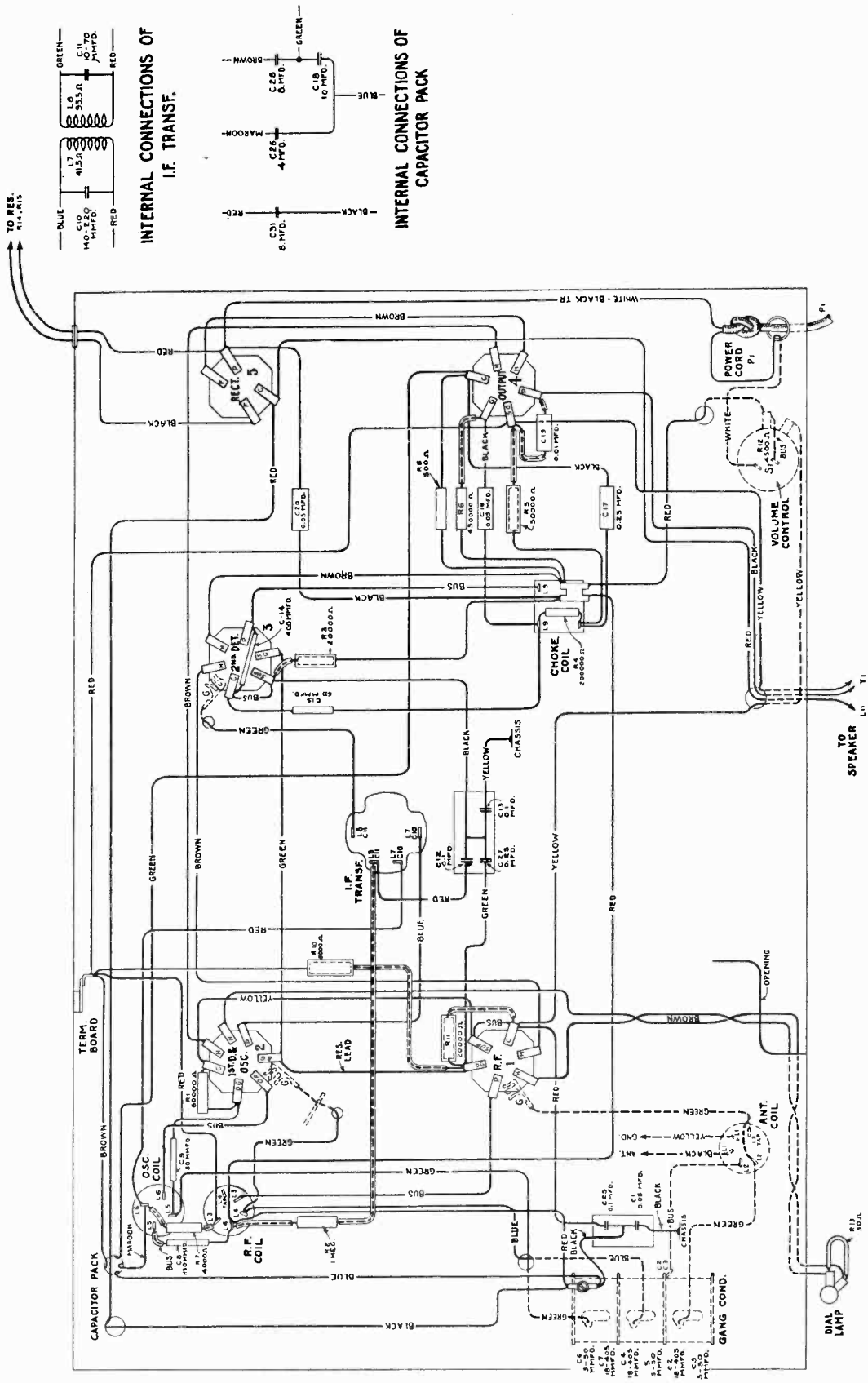


Figure B—Wiring Diagram

MODEL 114
Voltage, Alignment

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating.....100–125 A. C. or D. C.
Frequency Rating (A. C.).....25–133 Cycles
Power Consumption: {A. C. 60 Cycles, 115 Volts—60 Watts / D. C. 115 Volts—40 Watts
Number and Types of Radiotrons.....1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5

Undistorted Output (A. C.).....1.5 Watts
Undistorted Output (D. C.).....0.5 Watt
Frequency Range.....540–1710 K. C. and 2400–2500 K. C.

This receiver is a five-tube Superheterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5, which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator such as Stock No. 9050, giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver (Stock No. 7065) are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F., line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band, but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points, since the R. F. stage acts as a fixed tuned circuit. Adjust the two high-frequency trimmers, located on the lower side of the gang capacitor, until maximum output is obtained.

RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycles A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator 1st Detector	—	—	—	—	157	88.5	1.7	1.0	6.0
	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185 / 115 Volts, 25 Cycles—140 / 115 Volts, D. C.—105)

RCA-VICTOR CO., INC.

MODEL 114
Schematic
Chassis wiring

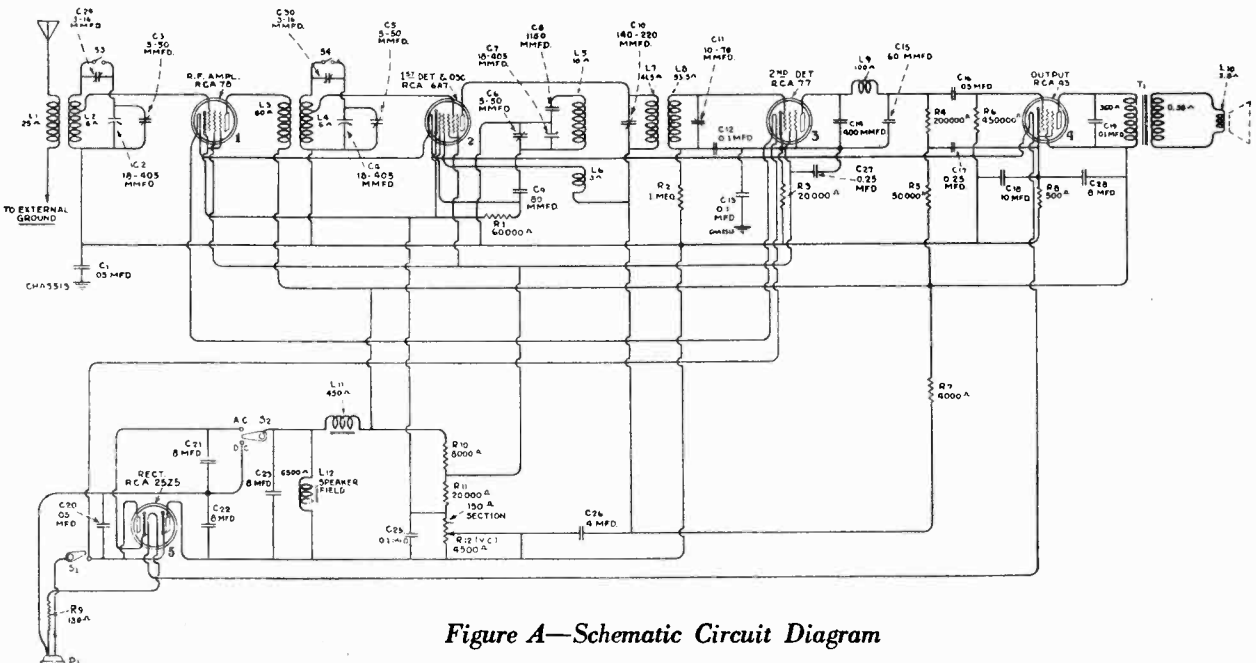


Figure A—Schematic Circuit Diagram

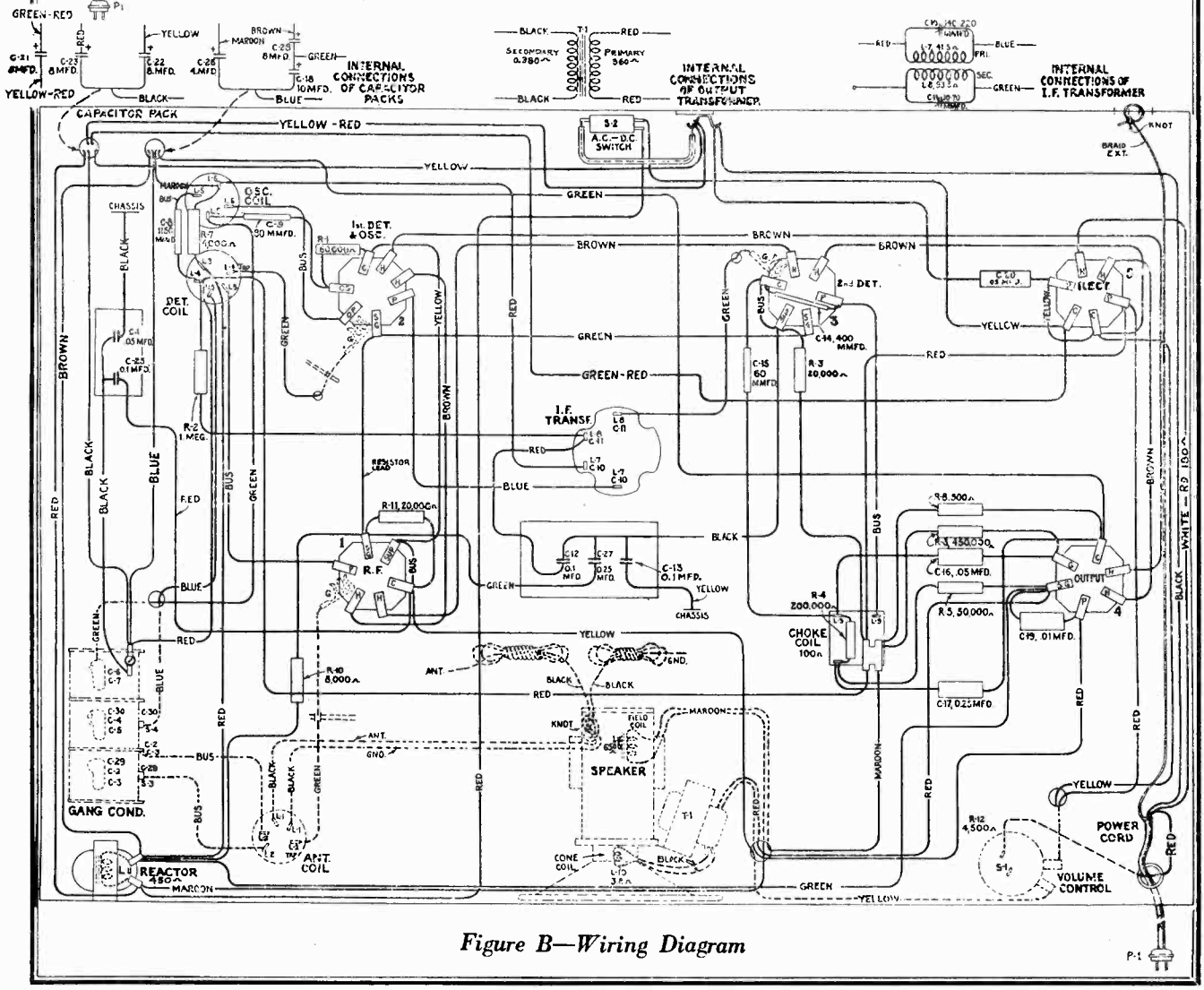


Figure B—Wiring Diagram

MODEL 114
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor — 8,000 ohms — Carbon type — 1 watt (R10)—Package of 5	1.10
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt —Package of 5	1.10
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield body	.22
3684	Switch—Toggle type—AC-DC operation (S2)	.94
3685	Coil—Choke coil—Second detector plate (L9)	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—0.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3713	Capacitor—0.05 mfd. (C20)	.32
3752	Shaft—Range switch shaft	.50
3753	Contact—Ranges witch contact—Pkg. of 2	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. capacitors (C12, C13, C27)	.60
3901	Capacitor—.05 mfd. (C16)	$0.36
3917	Capacitor—.25 mfd. (C17)	.40
4014	Cord—Power cord—180 ohms (R9)	1.15
4015	Knob—Station selector or volume control knob	.85
4016	Foot—Cabinet foot—Package of 4	.22
6114	Resistor — 20,000 ohms — Carbon type — 1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor — 4,000 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ Watt (R3)—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three-gang variable condenser assembly (C2, C3, C4, C5, C6, C7)	3.24
6508	Volume control—Complete with mounting nut (R12, S1)	1.36
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—R. F. coil assembly (L3, L4)	.94
6521	Coil—Oscillator coil assembly (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. capacitors (C1, C25)	.46
6783	Capacitor—Comprising four 8. mfd., one 4. mfd. and one 10. mfd. capacitors (C18, C21, C22, C23, C26, C28)	4.38
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer (T1)	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support (L12)	2.06
8987	Cone—Reproducer cone complete with voice coil (L10)—Package of 5	5.00
9462	Reproducer complete	5.14

MODEL 120
Alignment, Voltage
Speaker data

RCA-VICTOR CO., INC.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating.....105–125 Volts
Frequency Rating.....25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons.....2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output.....1.75 Watts
Frequency Range.....540 K. C. to 1500 K. C. and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

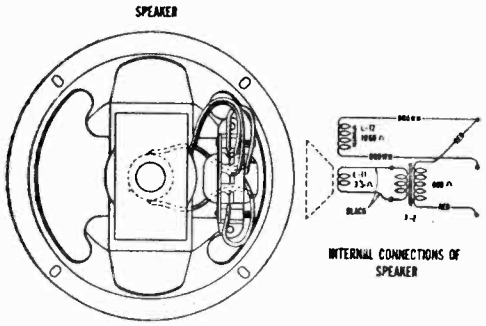


Figure C—Loudspeaker Wiring

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

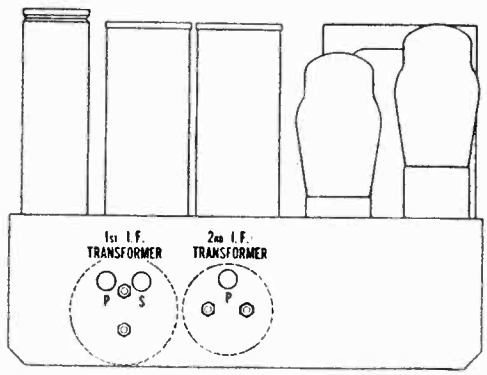


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL 120
Schematic, Chassis

RCA-VICTOR CO., INC.

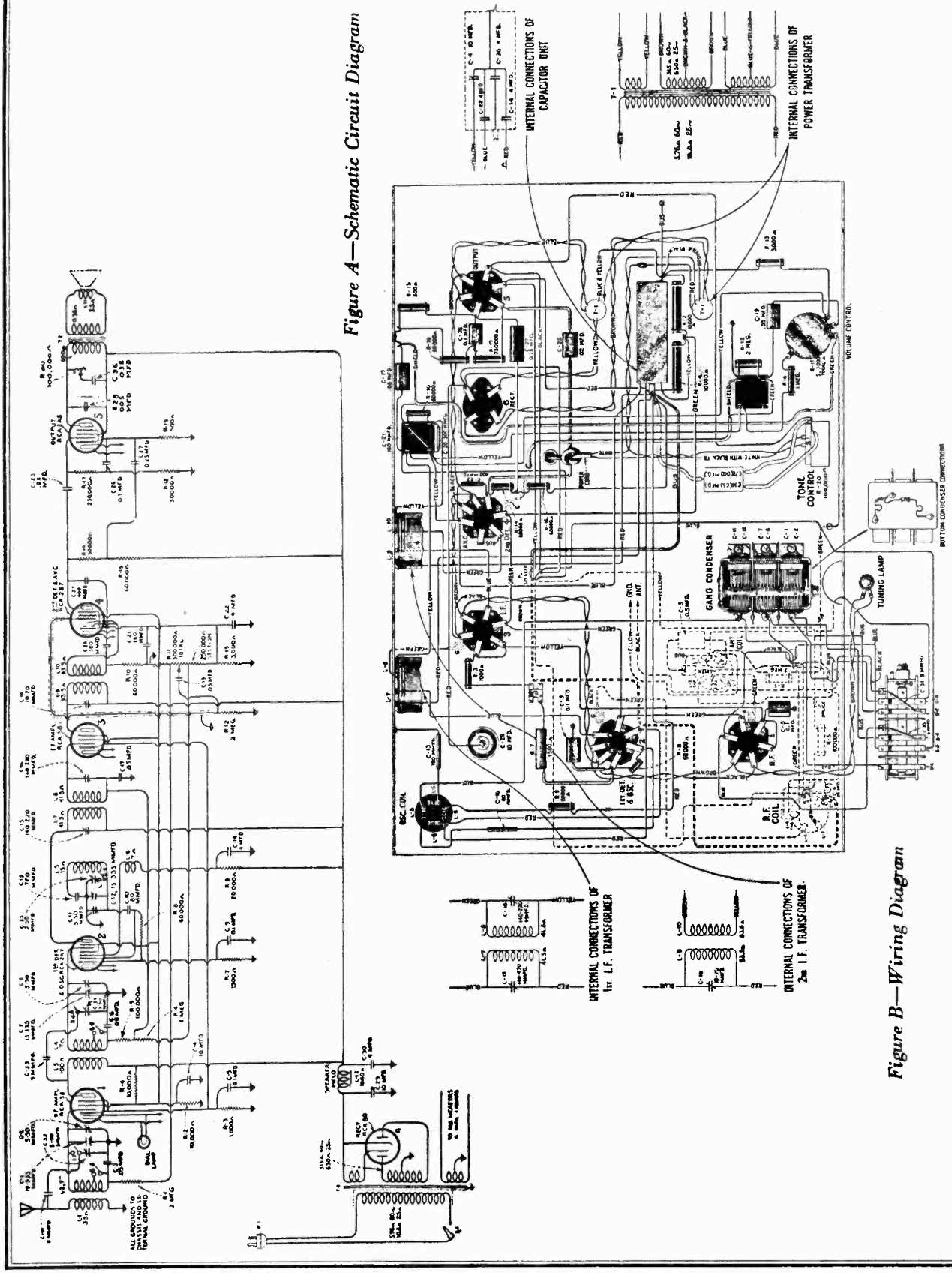


Figure A—Schematic Circuit Diagram

Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 120
Parts List

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—(C13)	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor — 1500 ohms — Carbon type — ½ watt—(R7)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt—(R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—(R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—(R13)—Package of 5	1.00
3459	Capacitor—80 mmfd.—(C10)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt—(R17)—Package of 5	1.00
3572	Socket—Radiotron 7 contact socket	.38
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—(R14, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd.—(C27)	.40
3598	Capacitor—0.1 mfd.—R. F. and I. F. by-pass—(C5)	.36
3615	Knob—Tone control or range switch knob—Package of 5	.60
3616	Capacitor—300 mmfd.—(C20)	.34
3622	Shield—Radiotron shield—2nd detector	.36
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3626	Shield—Oscillator coil shield	.22
3627	Knob—Station selector or volume control knob—Package of 5	.75
3630	Resistor — 10,000 ohms — Carbon type — 3 watt—(R2, R4)	.25
3632	Resistor — 500 ohms — Carbon type—1 watt—(R19)—Package of 5	1.10
3633	Capacitor—400 mmfd.—(C23)	.38
3634	Capacitor—160 mmfd.—(C21)	.34
3639	Capacitor—0.02 mfd.—(C25)	.25
3640	Capacitor—0.05 mfd.—(C3, C6, C17, C19)	.25
3641	Capacitor—0.1 mfd.—(C9, C26)	.35
3642	Capacitor—0.008 mfd.—(C24)	.25
3682	Shield—Radiotron shield—1st detector	.22
3721	Resistor — 1,000 ohms — Carbon type — ½ watt—(R3)—Package of 5	1.00
3783	Capacitor—9 mmfd.—(C31, C33)—Package of 2	$0.50
3789	Shield—Radiotron shield—I. F. or R. F.	.25
3881	Escutcheon—Station selector escutcheon	.42
3882	Escutcheon—Volume control escutcheon	.42
6188	Resistor — 2 megohm — Carbon type — ½ watt—(R1, R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—(R8, R10, R15)—Package of 5	1.00
6300	Socket—Radiotron 4 contact socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—(R9)—Package of 5	1.00
6471	Coil—Oscillator coil—(L5, L6)	.74
6483	Transformer—1st intermediate frequency transformer—(L7, L8, C15, C16)	1.84
6484	Transformer—2nd intermediate frequency transformer—(L9, L10, C18)	1.70
6485	Volume control—With mounting nut—(R11)	1.20
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors—(C4, C14, C22, C30)	2.90
6527	Coil—Antenna coil—(L1, L2)	1.08
6528	Coil—R. F. coil—(L3, L4)	.94
6534	Switch—Range switch	1.25
6598	Condenser—3 gang variable tuning condenser	3.00
6619	Tone control with mounting nut—(R20)	1.44
6620	Capacitor—Comprising one .005 and one .035 mfd.—(C28, C36)	.50
6622	Scale—Dial scale and drive assembly	.95
7485	Socket—Radiotron 6 contact socket	.40
7590	Capacitor—10.0 mfd.—(C29)	1.40
9005	Transformer—Power transformer—105–125 volts, 50–60 cycles—(T1)	4.60
9006	Transformer—Power transformer—200–250 volts, 50–60 cycles	5.05
9024	Transformer—Power transformer—105–125 volts, 25–40 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer—(T2)	1.44
9032	Coil assembly—Comprising coil, magnet and cone support—(L12)	2.35
9428	Cone — Reproducer cone — (L11) — Package of 5	5.00
9440	Reproducer complete	4.75

MODEL 121,122
Alignment, Voltage
Trimmer location

RCA-VICTOR CO., INC.

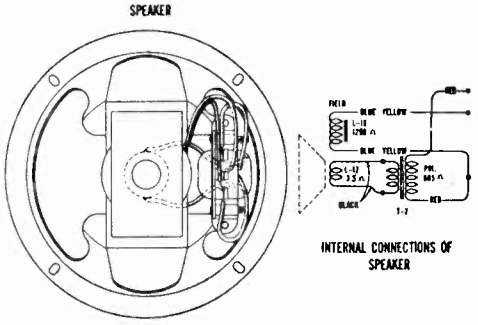


Figure C—Loudspeaker Wiring

This receiver is a six tube two band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground leads of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator. The position that uses a maximum capacitance is correct for the detector and R. F. In conjunction with the detector adjustment, it is advisable to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator adjustment.

Power Transformer Connections

The power transformer used in this Model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts

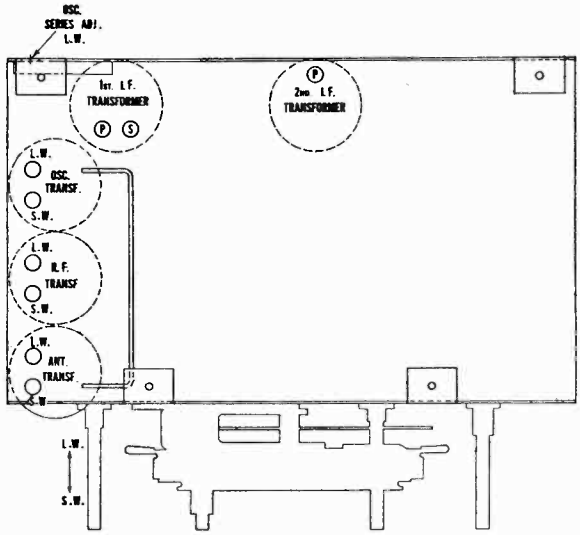


Figure D—Location of Line-Up Capacitors

the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

*The voltages and current refer to the detector part of the tube.

RCA-VICTOR CO., INC.

MODEL 121,122
Schematic

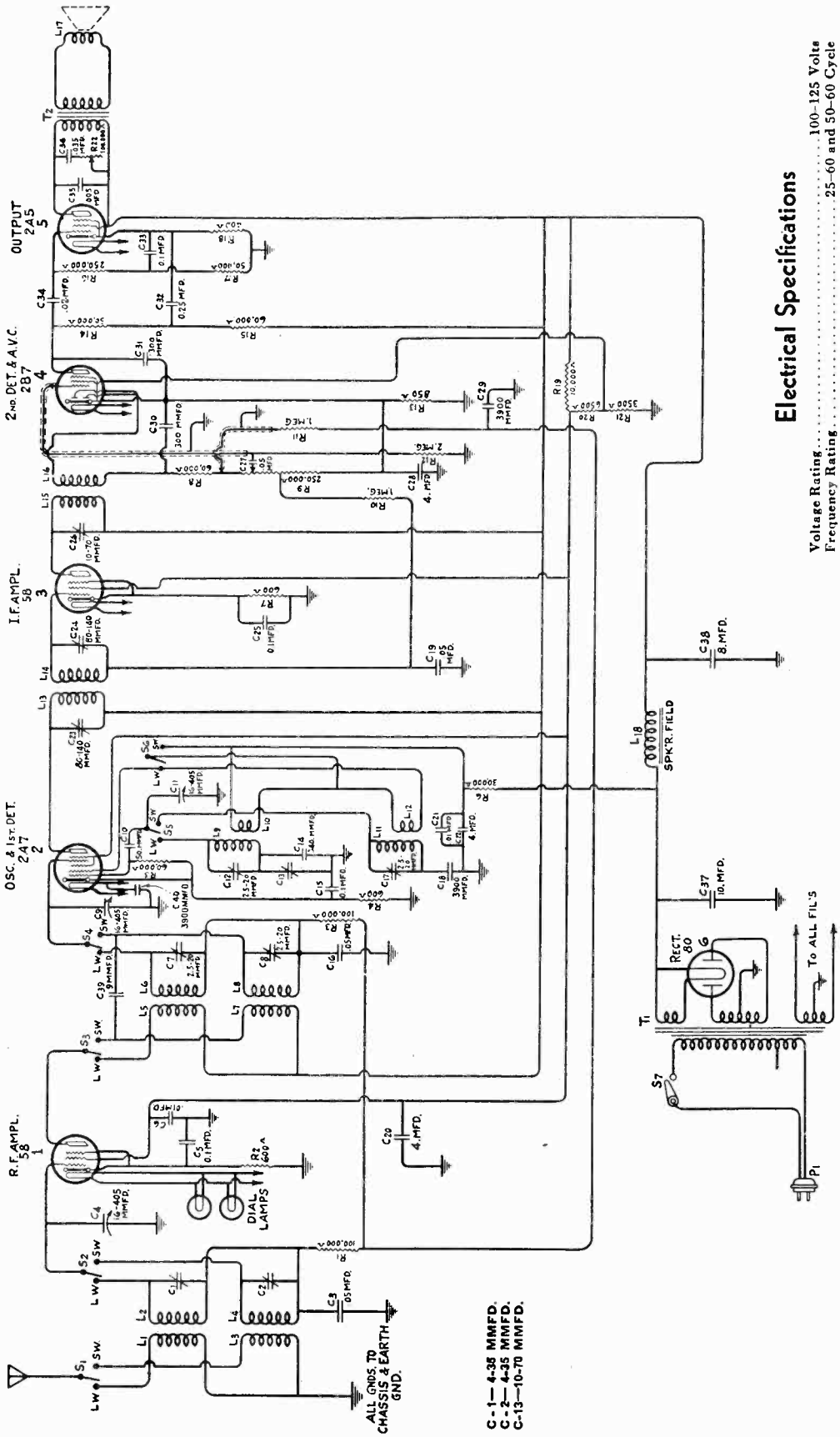


Figure A—Schematic Diagram

Electrical Specifications

Voltage Rating . . . . . 100-125 Volts
Frequency Rating . . . . . 25-60 and 50-60 Cycle
Power Consumption . . . . . 60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Radiotrons 2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges . . . . . 540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output . . . . . 1.75 Watts

MODEL 121,122
Chassis wiring

RCA-VICTOR CO., INC.

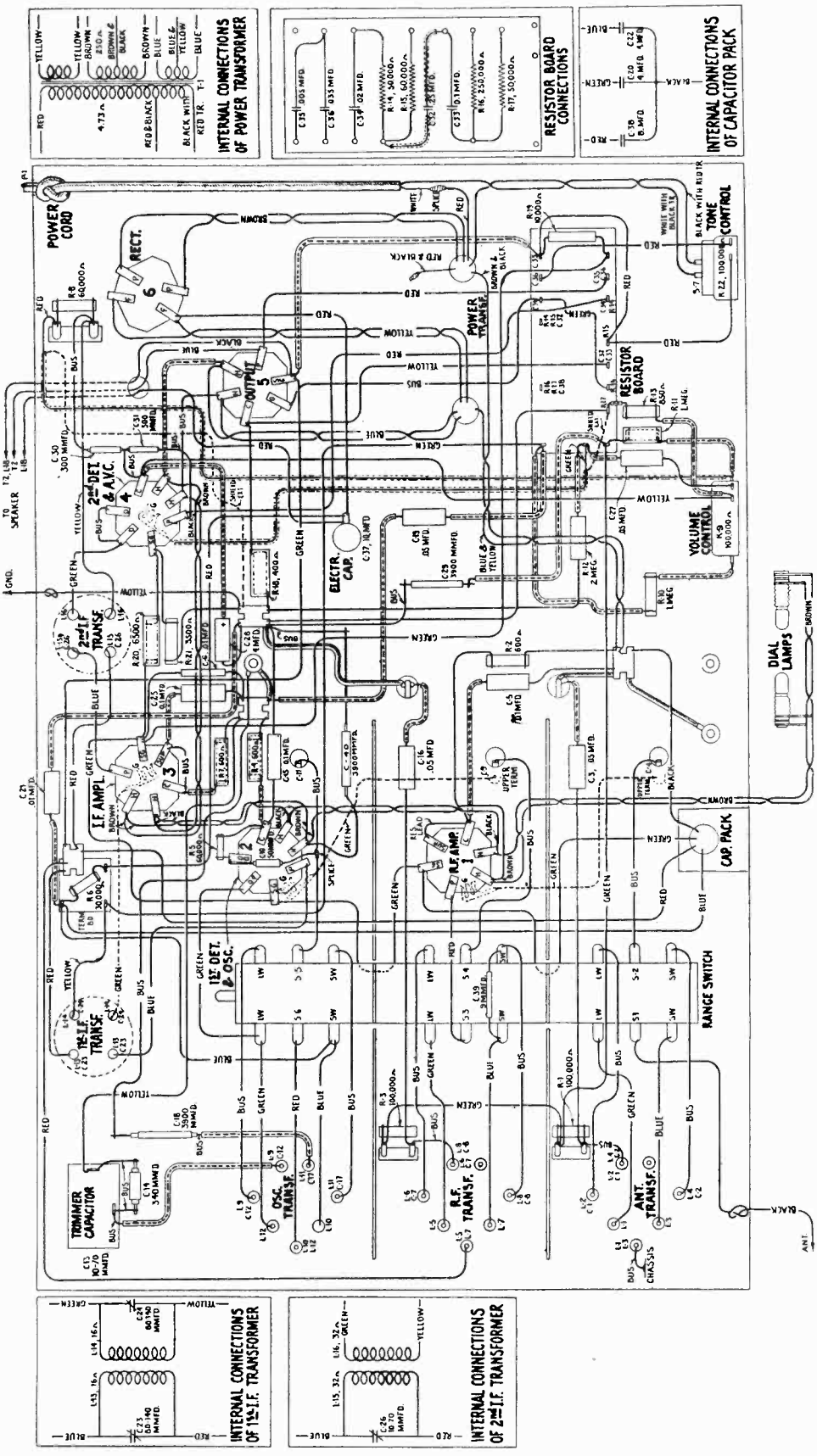


Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 121,122
Parts List

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—2nd detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3615	Knob—Range switch or tone control knob (Model 121)—Package of 5	.60
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—.01 mfd. (C6, C21)	.30
3702	Capacitor—.25 mfd. (C32)	.42
3768	Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3796	Capacitor—4. mfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4-40-$\frac{3}{16}$" screw for fastening station selector pointer—Package of 20	.25
3888	Capacitor—.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3901	Capacitor—.05 mfd. (C3, C16)	.36
3902	Knob — Station selector knob complete (Model 121)	.44
3903	Screw—No. 8-32-$\frac{3}{16}$" headless cup point set screw for station selector knob—Package of 20	.36
3904	Knob—Volume control knob (Model 121)—Package of 5	.88
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	.46
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	.28
3935	Capacitor—340 mmfd. (C14)	.34
3936	Capacitor—3,900 mmfd. (C18, C29, C40)	.68
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)—Package of 5	1.00
3940	Pointer—Station selector pointer—Package of 5	.50
3941	Dial—Station selector dial—Package of 5	1.75
3942	Shield—1st detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	$0.18
3944	Shield—Antenna, R. F. or oscillator coil shield	.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6706	Bezel—Metal bezel for station selector dial glass (Model 121)	.42
6707	Glass—Station selector dial glass	.20
6708	Ring—Retaining ring for dial glass—Package of 5	.44
6752	Knob—Station selector knob (Model 122)—Package of 5	.60
6753	Knob—Volume control knob (Model 122)—Package of 5	.60
6754	Knob—Range switch or tone control knob (Model 122)—Package of 5	.60
6755	Bezel—Metal bezel for station selector dial glass (Model 122)	.50
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9446	Transformer—Power transformer—105–125 volts 50–60 cycles (T1)	5.40
9451	Transformer—Power transformer—105–125 volts 25–40 cycles	5.40
9452	Transformer—Power transformer—200–250 volts 50–60 cycles	5.52
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES (Models 121 and 122)	
6476	Transformer—Output transformer (T2)	1.44
9428	Cone—Reproducer cone complete (L17)—Package of 5	5.00
9449	Reproducer complete	5.20
9450	Coil—Field coil magnet and cone support (L18)	2.80

MODEL 140,141,141-E,
240,AVR-1
Alignment,Voltage

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating.....100–125 Volts and 200–250 Volts
Frequency Rating
25–60 (100–125 Volt Only) and 50–60 Cycles
Power Consumption.....110 Watts
Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.
Undistorted Output.....6 Watts

This all wave super-heterodyne receiver is of the continuous tuning type utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–30
D	8000–18000	37.5–16.7

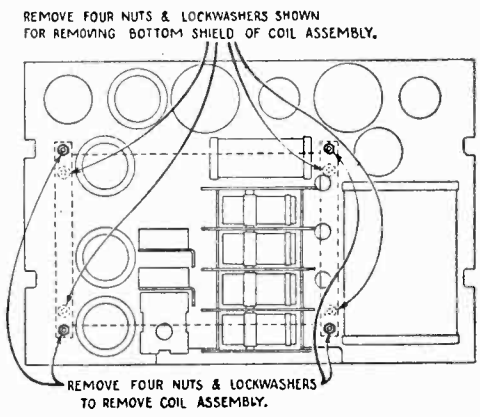


Figure D—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing Radiotrons and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and 445 K. C. signals or static.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and makes easier alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

RCA-VICTOR CO., INC.

MODEL 140,141,141-E, 240,AVR-1
Alignment,Switch data

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position.

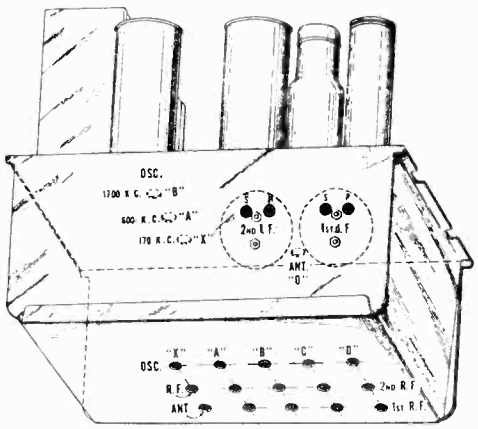


Figure E—Location of line-up capacitors.

The external oscillator output should be connected between antenna and ground for the R. F. and oscillator adjustments and between the first detector grid and ground for the I. F. adjustments. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115-125 volt lines but the connection shown in Figure I may be used for 100-115 volt lines.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output.	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. Adjust oscillator trimmer until two points are noted where signal is heard. Use for adjustment the higher frequency of these two points. This will be the point lying counter-clockwise from the other point.	4

MODEL 140,141,141-E,
240,AVR-1
Schematic,Voltage

RCA-VICTOR CO., INC.

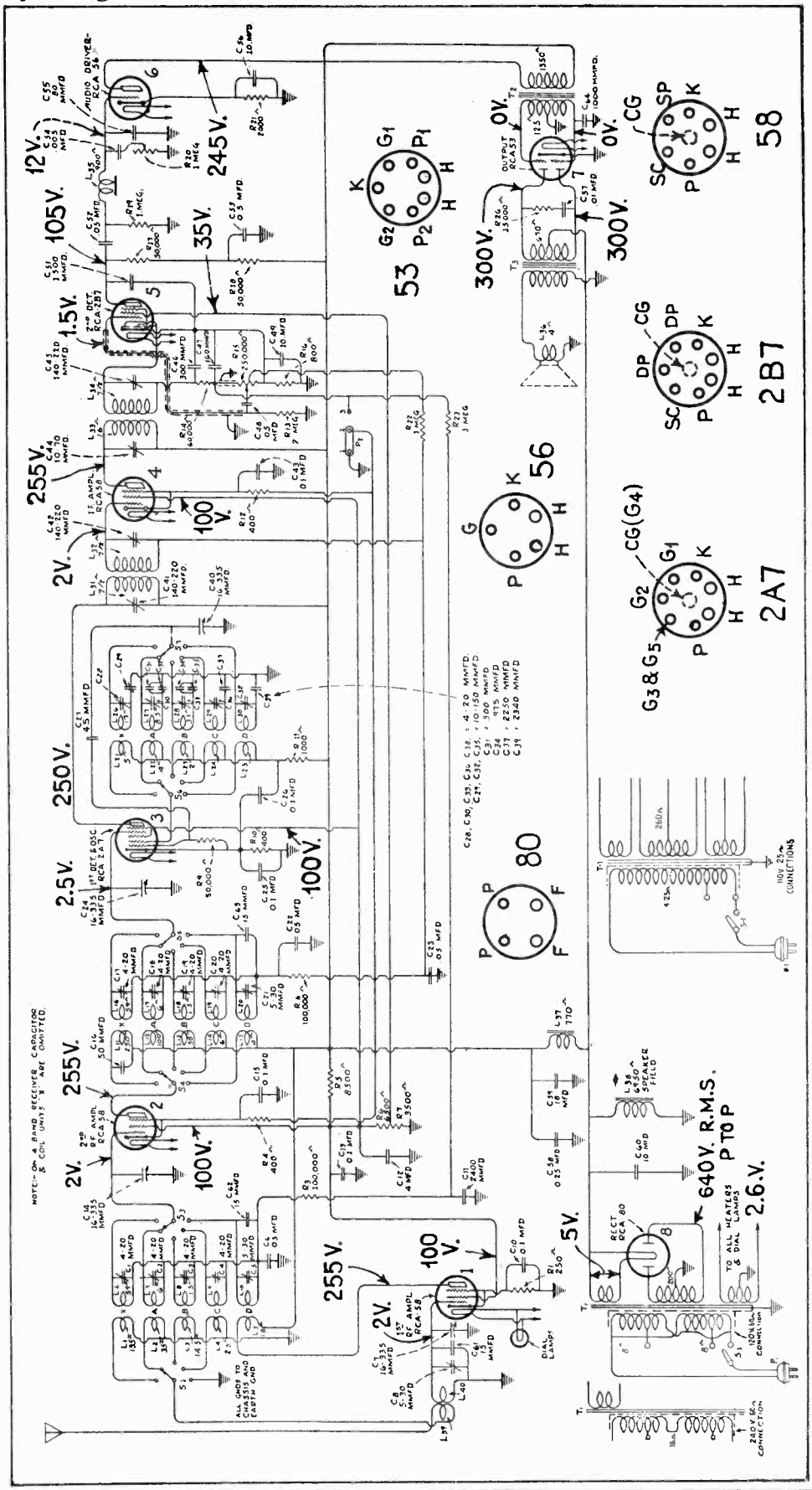


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 140,141,141-E, 240,AVR-1
Chassis wiring

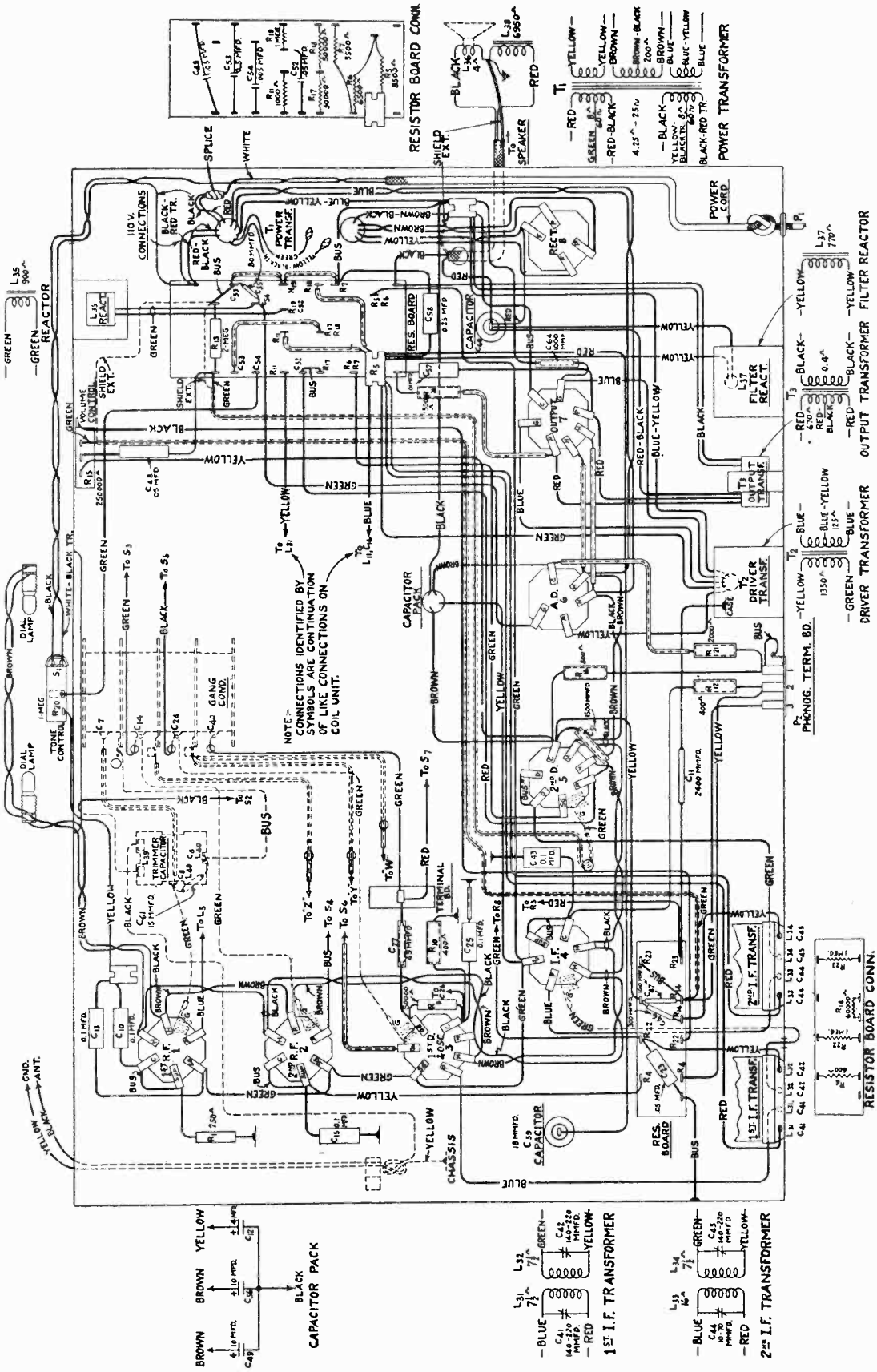


Figure B—Wiring Diagram of Chassis Assembly

MODEL 140,141,141-E,
240,AVR-1
Coil assembly wiring

RCA-VICTOR CO., INC.

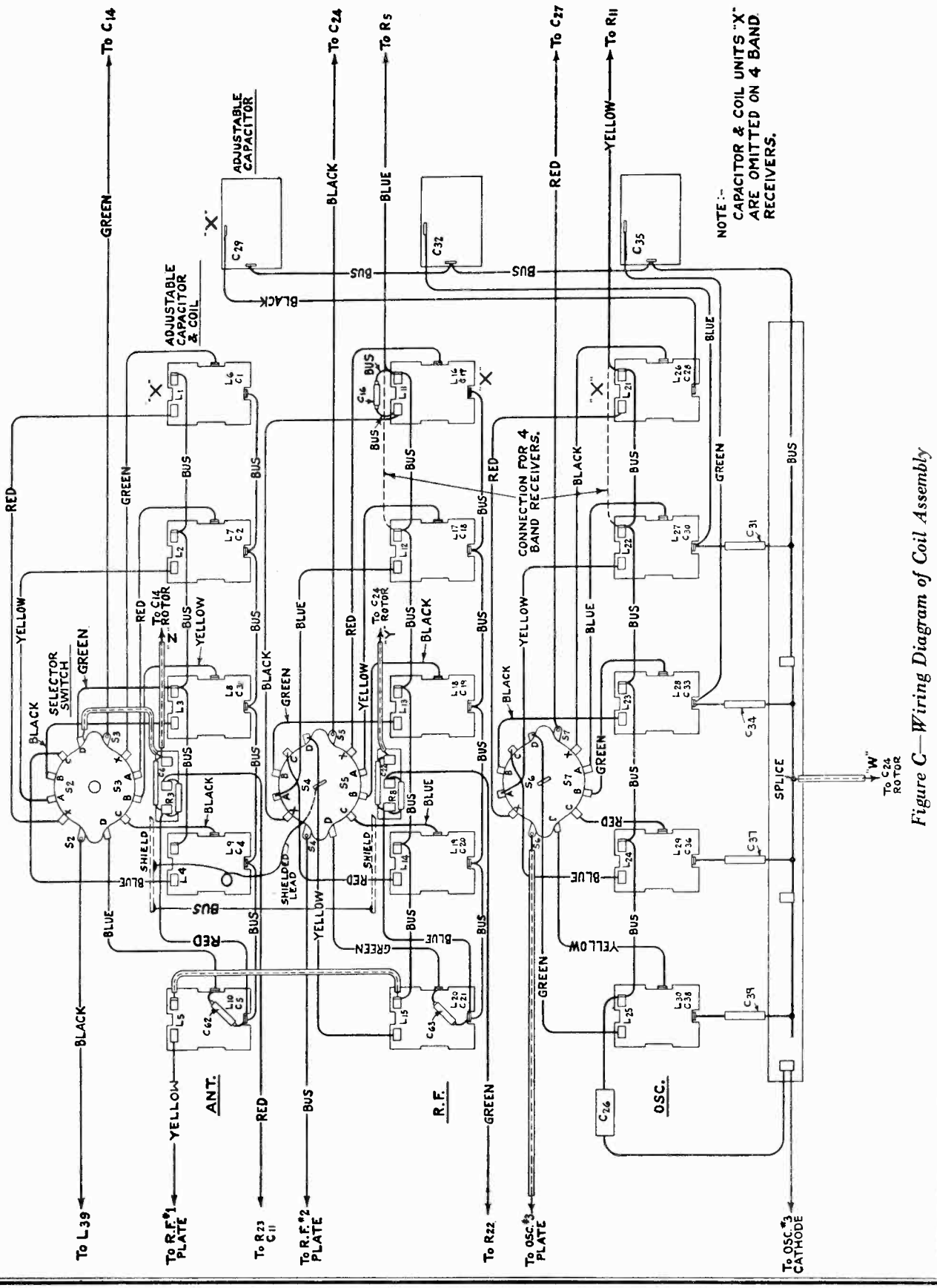


Figure C—Wiring Diagram of Coil Assembly

RCA-VICTOR CO., INC.

MODEL 140,141,141-E, 240,AVR-1
Power transformer wiring.

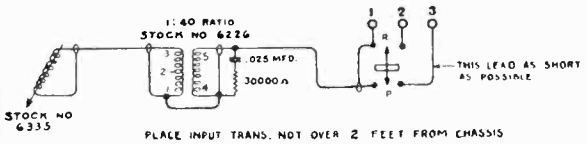


Figure F—Typical Pickup Connections

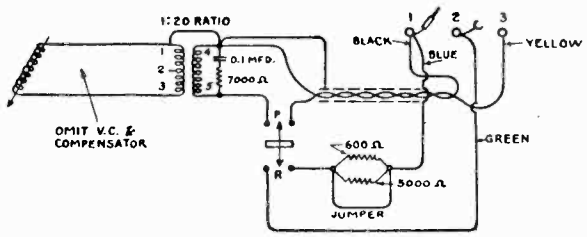


Figure G—Table Phonograph Connections

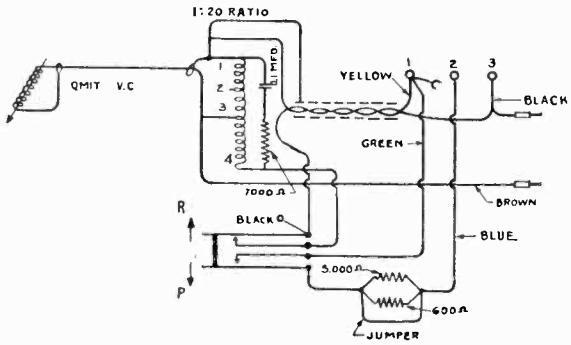


Figure H—End Table Connections

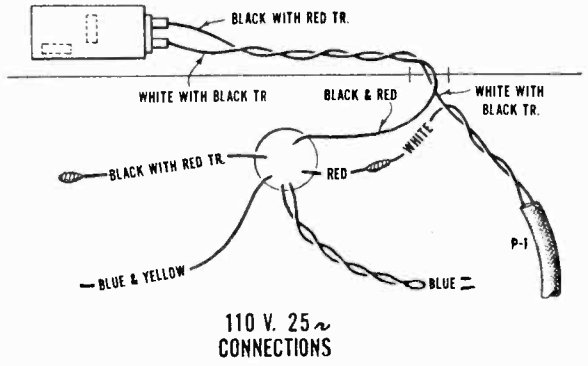
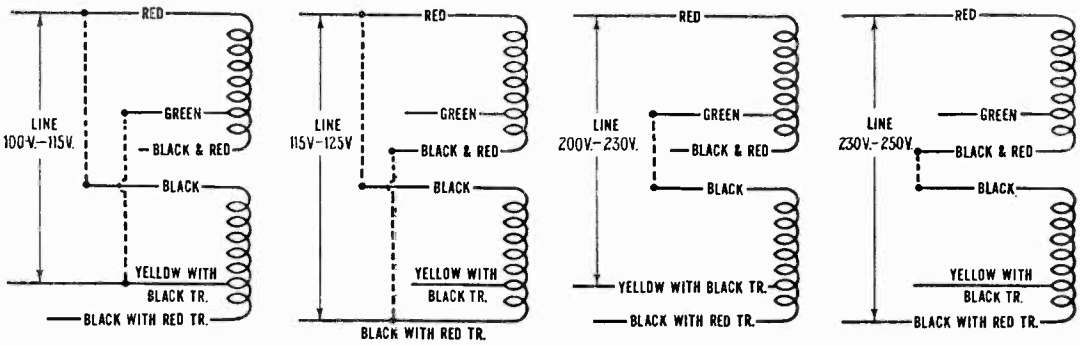


Figure I—100-115 Volt Connection of 25-60 Cycles Transformer



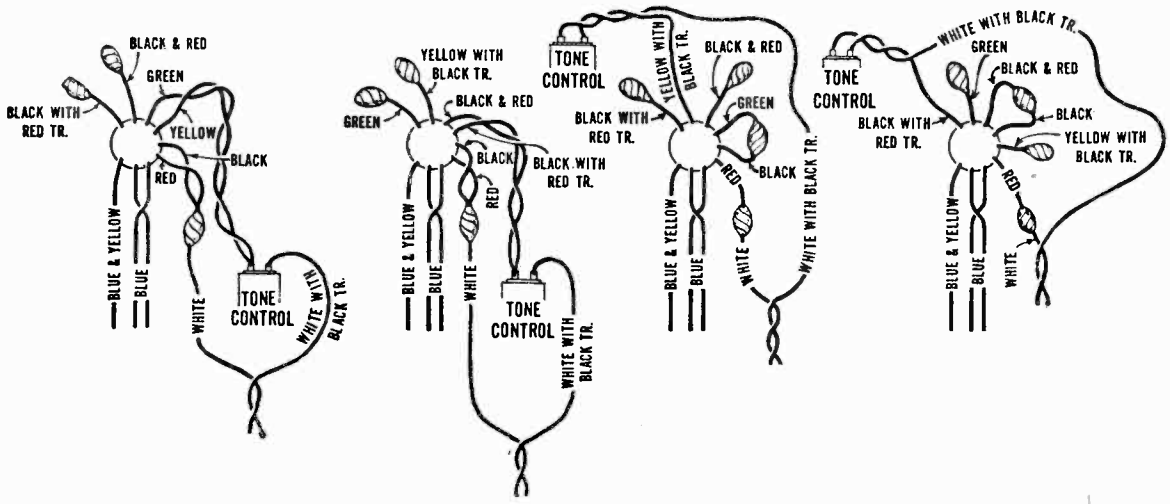


Figure J—Power Transformer Connections (50–60 cycles)

MODEL 140,141,141-E, 240,AVR-1
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3472	Capacitor—.0024 mfd. (C11)	.32
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3683	Shield—Radiotron shield top	.20
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3787	Capacitor—.01 mfd. (C57)	.30
3844	Capacitor—15 mmfd. (C61, C62, C63)	.30
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3866	Capacitor—1,500 mmfd. (C51)	.34
3867	Capacitor—0.1 mfd. (C13, C43)	.32
3888	Capacitor—.05 mfd. (C6, C22, C23, C48, C52)	.25
3931	Capacitor—45 mmfd. (C27)	.30
3942	Shield—I. F. Radiotron shield	.18
3973	Capacitor—1,000 mmfd. (C64)	.34
3974	Capacitor—975 mmfd. (C34)	.34
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5	1.10
6188	Resistor—2 megohm—Carbon type—½ watt (R13)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—.005 mfd. (C54)	.28
6571	Capacitor—10 mfd. (C60)	1.20
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6610	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	1.55
6611	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	1.62
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	$1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6627	Tone control (R20)	1.44
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000-18,000 kilocycles—4 or 5 band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150-410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150-410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150-410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540-1,500 kilocycles—4 or 5 band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540-1,500 kilocycles—4 or 5 band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540-1,500 kilocycles—4 or 5 band (L22, L27, C30)	1 40
6637	Coil and capacitor—Antenna coil and capacitor assembly 1,500-4,000 kilocycles—4 or 5 band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500-4,000 kilocycles—4 or 5 band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500-4,000 kilocycles—4 or 5 band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000-10,000 kilocycles—4 or 5 band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000-10,000 kilocycles—4 or 5 band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000-10,000 kilocycles—4 or 5 band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000-18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly 8,000-18,000 kilocycles—4 or 5 band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	.80
7065	Screwdriver—For R. F. or I. F. adjustment	.35
7484	Socket—5-contact Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.25
7487	Shield—First detector and R. F. Radiotron shield	.48
8837	Support—Metal supports for chassis—Package of 4	6.84
9042	Transformer—Power transformer—105-250 volt—50-60 cycles (T1)	9.22
9046	Transformer—Power transformer—105-125 volts—25-40 cycles	33.50
9050	Oscillator—Test oscillator—15 to 20,000 K .C	.25
10194	Ball—Steel ball for condenser drive assembly—Package of 20	
	MISCELLANEOUS	
3829	Knob—Volume control or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor for loudspeaker—4-band	.60
3878	Screws—No. 4-40-$\frac{3}{8}$ fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	.10
3992	Escutcheon—Range switch escutcheon—4-band	.10
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

RCA-VICTOR CO., INC.

MODEL 142-B,241-B
Aligmment, Voltage

SERVICE DATA

Total "A" Battery Current.....0.48 Ampere
Average "B" Battery Current.....15 M. A.
Type and Number of Radiotrons:
2 RCA-34, 1 RCA-32, 5 RCA-30—Total, 8
Tuning Range.....540–1500 K. C.
Maximum Undistorted Output.....1.0 Watt

This receiver is an eight tube battery operated Superheterodyne giving excellent performance. Features such as Class "B" output stage, two point tone control, permanent magnet dynamic loudspeaker, local-distant switch, adaptability for either Air Cell or storage battery operation and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are incorporated in this instrument.

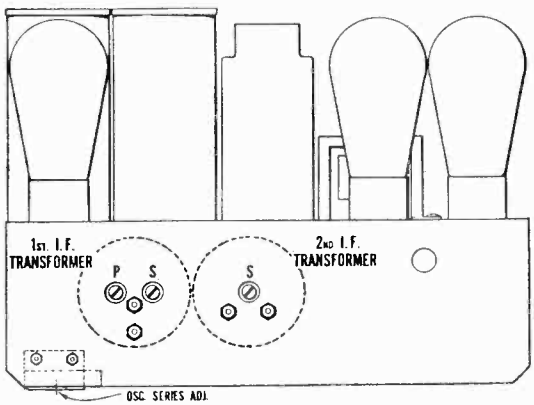


Figure C—Location of Line-up Capacitor

The circuit consists of an R. F. stage using Radiotron RCA-34, a Radiotron RCA-32 as a first detector, an oscillator using Radiotron RCA-30, an I. F. using Radiotron RCA-34, and a second detector utilizing Radiotron RCA-30. Two audio stages are used, the first using an RCA-30 and the second using two RCA-30 as a Class "B" output stage. The local distance switch is in the antenna circuit so that the antenna may be disconnected when receiving strong local stations. The volume control varies the control grid bias on the R. F. and I. F. Radiotrons. The tone control consists of a capacitor that is connected across one half of the secondary of the input audio transformer at the maximum low position. At the maximum high position this capacitor is disconnected.

Line-up Adjustments

I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K. C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that a slight deflection is obtained in the output meter

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments: The three gang capacitor screws and 600 K. C. oscillator trimmer are accessible from beneath the receiver chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should point toward the small arrow at the edge of the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained.

(c) With a non-metallic screwdriver, adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received—Volume Control at Maximum

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
1. R. F.—RCA-34	*3.0	65	155	2.5	2.0
2. Oscillator—RCA-30	—	—	55	4.0	2.0
3. 1st Detector—RCA-32	*4.0	65	155	0.5	2.0
4. I. F.—RCA-34	*3.0	65	155	2.5	2.0
5. 2nd Detector—RCA-30	*10.0	—	*130	0.25	2.0
6. A. F.—RCA-30	*7.0	—	150	2.5	2.0
7. Power—RCA-30	*14.0	—	155	2.0 Total	2.0
8. Power—RCA-30	*14.0	—	155		2.0

*Voltages are obtained by means of high resistance dividers and it is not possible to accurately measure them with ordinary equipment.

MODEL 142-B,241-B
Schematic

RCA-VICTOR CO., INC.

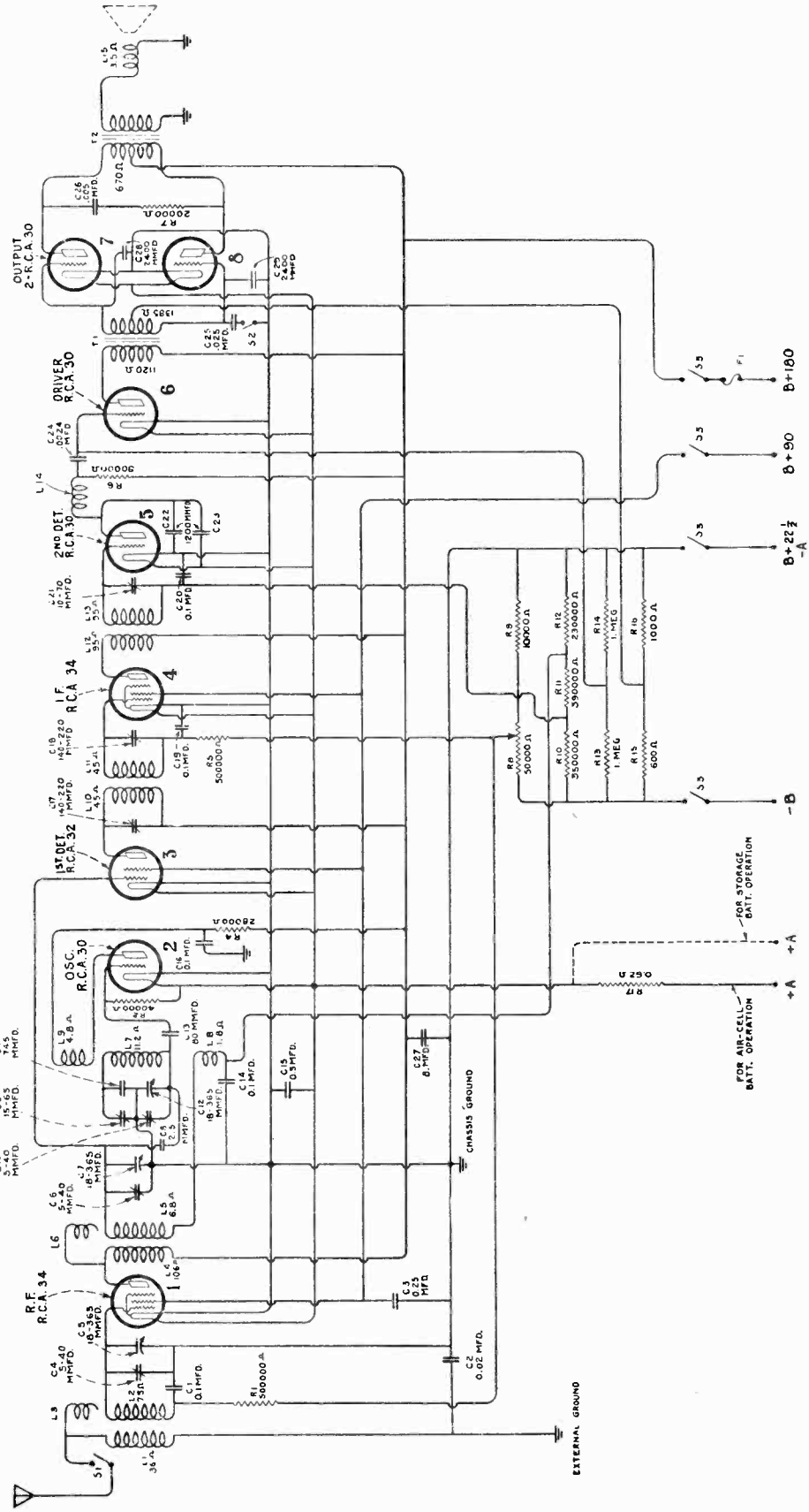


Figure A—Schematic Diagram

RCA-VICTOR CO., INC.

MODEL 142-B, 241-B
Chassis wiring

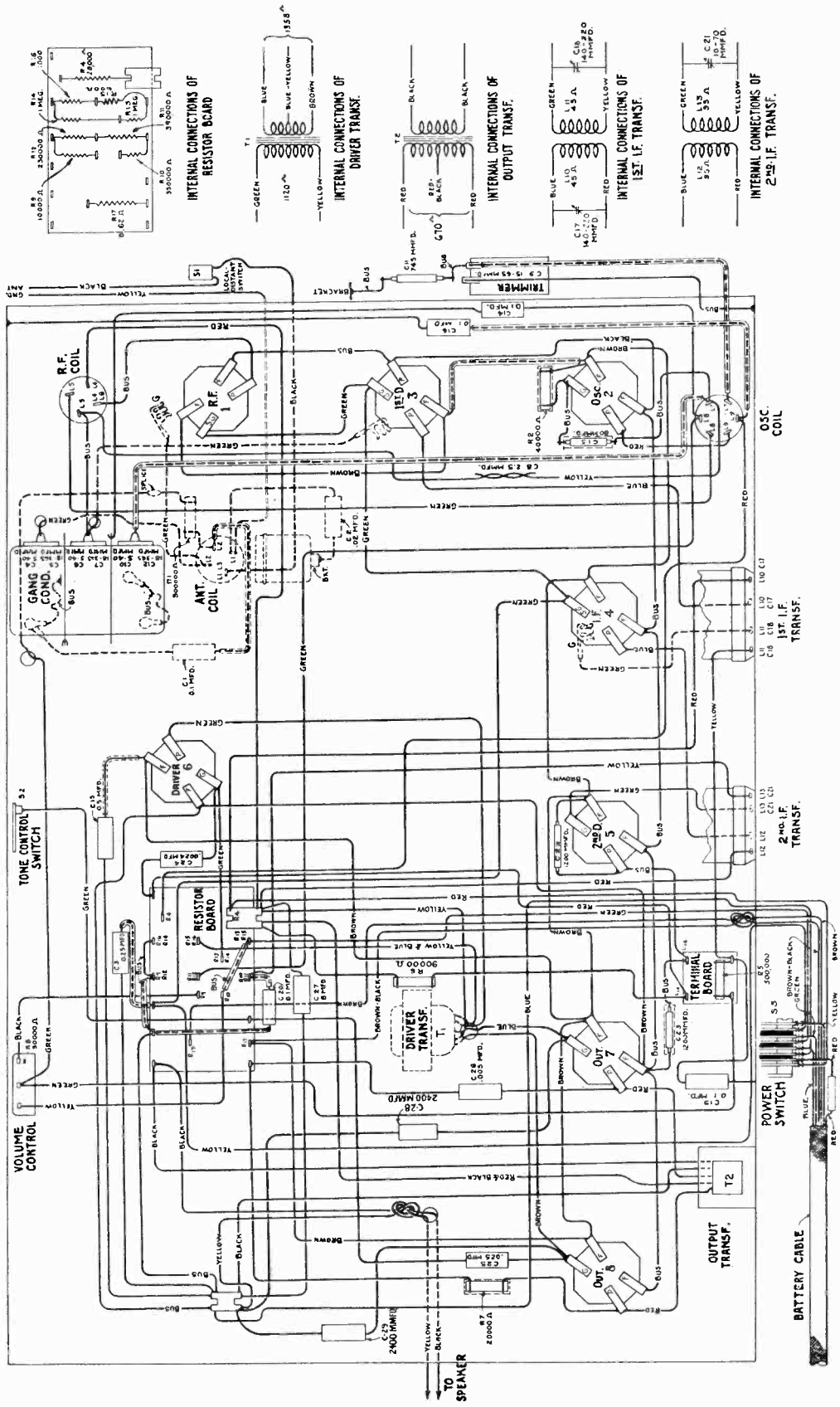


Figure B—Wiring Diagram

MODEL 142-B,241-B
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
2734	Capacitor—745 mmfd. (C11)
2737	Escutcheon—Local-Distant switch escutcheon
2747	Cap—Contact cap
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R16)
2966	Resistor — 28,000 ohms — Carbon type — 1 watt (R4)
3048	Resistor—500,000 ohms—Carbon type—½ watt (R1, R5)
3056	Shield—Radiotron shield—R. F. or oscillator
3076	Resistor—1 megohm—Carbon type—½ watt (R13, R14)
3088	Knob—Operating switch knob
3238	Screw—Set screw for switch knob
3472	Capacitor—2,400 mmfd. (C24)
3584	Ring—R. F., oscillator or antenna coil retaining ring
3592	Knob—Station selector, tone or volume control knob
3623	Shield—R. F., oscillator or antenna coil shield
3639	Capacitor—0.02 mfd. (C2)
3702	Capacitor—0.25 mfd. (C3)
3711	Capacitor—80 mmfd. (C13)
3748	Fuse—½ ampere fuse (F1)
3765	Capacitor—0.025 mfd. (C25)
3768	Screw—Volume indicator or station selector dial scale set screw
3859	Socket—4-contact Radiotron socket—Audio driver and output Radiotrons
3877	Capacitor—0.1 mfd. (C1, C14, C16, C19, C20)
3892	Resistor—600 ohms—Carbon type—½ watt (R15)
3908	Switch—Local-Distant switch—For table models
3909	Switch—Local-Distant switch—For console models
3910	Screw assembly—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 spacers
3911	Resistor—40,000 ohms—Carbon type—½ watt (R2)
3912	Resistor—90,000 ohms—Carbon type—½ watt (R6)
3913	Switch—Operating switch—4-pole, single throw
3932	Capacitor—2,400 mmfd. (C28, C29)
3945	Resistor — 7,500 ohms — Carbon type — ½ watt (R9)
3946	Resistor—230,000 ohms—Carbon type—½ watt (R12)
3947	Resistor—390,000 ohms—Carbon type—½ watt (R11)
3948	Resistor—350,000 ohms—Carbon type—½ watt (R10)
3950	Shield—Radiotron shield
6176	Escutcheon—Operating switch escutcheon
6251	Capacitor—1,200 mmfd. (C22, C23)
6300	Socket—4-contact Radiotron socket
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)
6489	Coil—Antenna coil (L1, L2, L3)
6512	Capacitor—0.005 mfd. (C26)
6516	Connector—Fuse connector
6548	Capacitor—8.0 mfd. (C27)
6604	Capacitor—0.5 mfd. (C15)
6709	Transformer—Output transformer (T2)
6710	Transformer—Audio driver transformer (T1)
6711	Coil—Choke coil (L14)
6712	Transformer—First intermediate frequency transformer (L10, L11, C17, C18)
6713	Transformer—Second intermediate frequency transformer (L12, L13, C21)
6714	Volume control (R8)
6715	Dial—Volume indicator dial assembly
6716	Switch—Tone control switch
6717	Condenser—3-gang variable tuning condenser (C4, C5, C6, C7, C10, C12)
6718	Scale—Station selector dial scale assembly
6719	Coil—R. F. coil (L4, L5, L6)
6720	Coil—Oscillator coil (L7, L8, L9)
6721	Cable—Main cable—For table models
6737	Resistor—0.62 ohms—Wire wound (R17)
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd. (C9)
	REPRODUCER ASSEMBLIES
8920	Ring—Cone retaining ring
9431	Bracket—Cone bracket and magnet assembly
9432	Cone—Reproducer cone complete (L15)
9455	Reproducer complete
	REPRODUCER ASSEMBLIES
3949	Magnet
9428	Cone—Reproducer cone
9453	Reproducer complete
9454	Housing—Cone housing and core assembly

RCA-VICTOR CO., INC.

MODEL 210
Alignment, Voltage
Speaker wiring

SERVICE DATA

Voltage Rating.....105-125 Volts
Frequency Rating.....25-60 Cycles and 50-60 Cycles
Power Consumption.....60 Cycles—70 Watts
Number and Types of Radiotrons.....1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7, 1 RCA-80—Total 5
Maximum Undistorted Output.....1.75 Watts
Tuning Frequency Range.....540 K. C. to 1500 K. C.
1400 K. C. to 2800 K. C.

This five tube Super-Heterodyne Receiver is of compact design and excellent construction. Features such as a large electrodynamic loudspeaker, vernier dial, continuously variable tone control, single heater-type Pentode output tube,

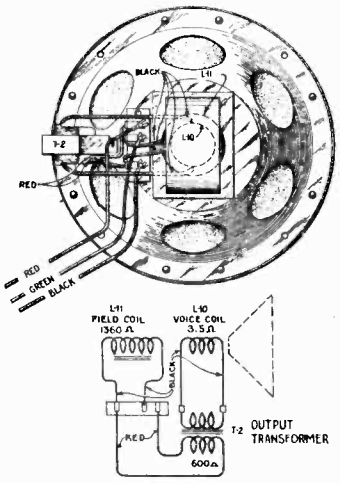


Figure C—Loudspeaker Wiring

wide tuning frequency range, and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne characterize this instrument.

Figure "A" shows the schematic diagram, Figure "B" the wiring and Figure "C" the loudspeaker wiring. The circuit consists of an R. F. stage, a combined oscillator and first detector, two intermediate tuned circuits, a high gain second detector and a single Pentode output stage. A full wave rectifier circuit is used together with a filter circuit in which the loudspeaker field functions as the filter reactor. The volume control varies the control grid bias on the R. F. and first detector tubes, while the tone control consists of a capacitor and variable resistor connected in series from the plate to the screen grid of the output tube.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments of the I. F. stage, gang capacitor and high frequency circuit are made in the following manner:

(a) Procure a modulated oscillator such as stock No. 9050, giving a signal at 175 K. C., 600 K. C., 1400 K. C. and 2440 K. C., a non-metallic screwdriver (Stock No. 7065), and an output meter.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. alignment, the broadcast band R. F. circuits are adjusted at 1400 and 600 K. C. For these adjustments the Range Switch must be set in the broadcast position and the oscillator output connected to the antenna and ground leads of the receiver. First set the oscillator at 1400 K. C. and the receiver dial at 140 and adjust the three trimmer capacitors located on top of the gang capacitor for maximum output. Shift the oscillator to 600 K. C., tune in the signal and adjust the oscillator series capacitor (accessible at the right-hand side of the chassis) for maximum output while rocking the variable condenser back and forth. Then repeat the 1400 K. C. adjustments, as there is a tendency toward interaction.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the broadcast band R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector—Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82

TOTAL CATHODE CURRENT—11 M. A.

MODEL 210
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

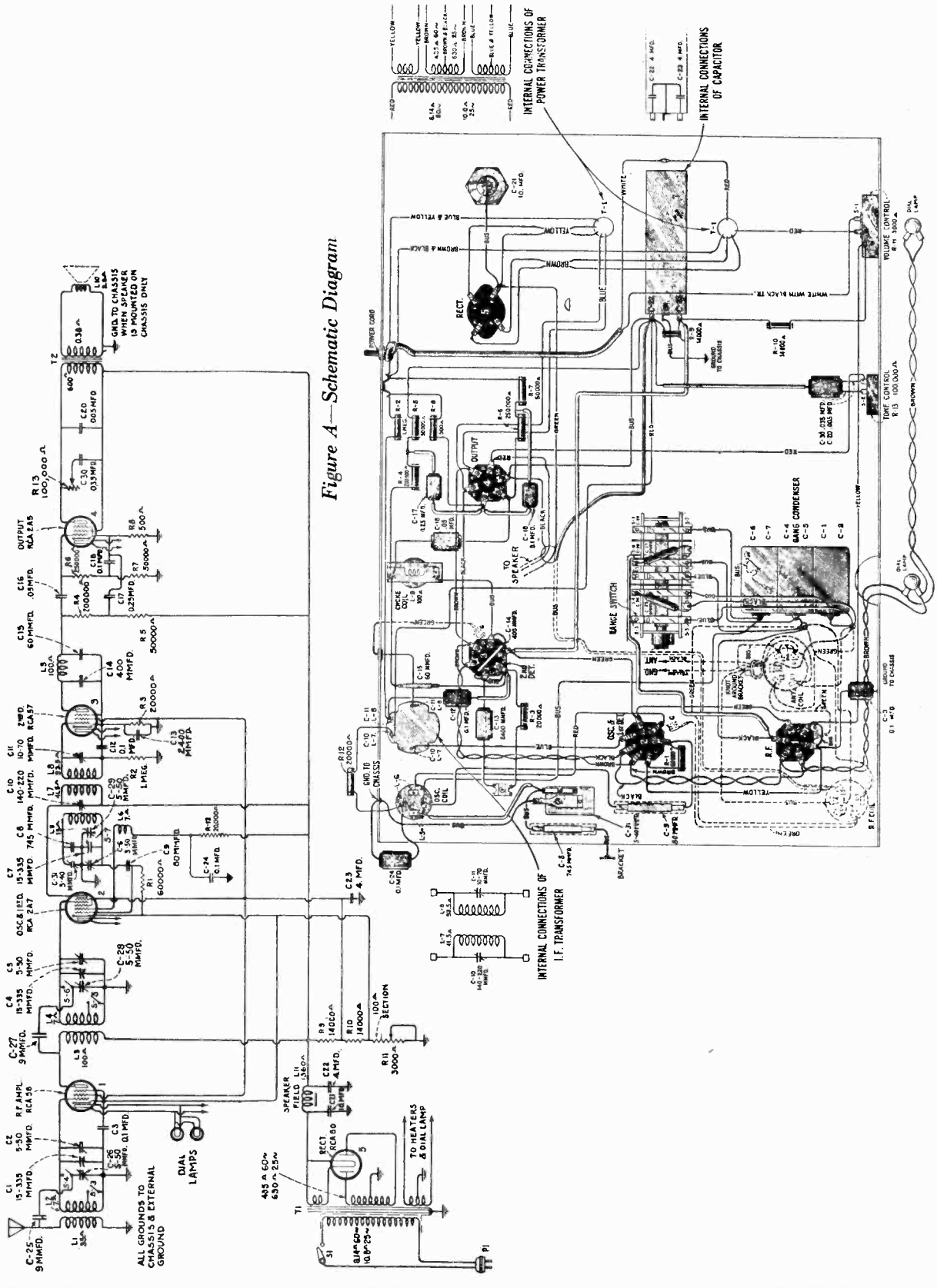


Figure A—Schematic Diagram

Figure B—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 210
Parts List

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	Price List
	RECEIVER ASSEMBLIES	
2734	Capacitor—745 mmfd. (C8)—Package of 5	$1.50
3050	Resistor — 14,000 ohms — Carbon type — 3 watt (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt (R2)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3555	Capacitor—.1 mfd. (C24)	.36
3572	Socket—7-contact Radiotron socket	.38
3574	Coil—Choke coil assembly (L9)	.68
3584	Ring—R. F., antenna or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5, R7)—Package of 5	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
3604	Capacitor—400 mmfd. (C14)	.30
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket	.40
3625	Dial—Volume indicator dial assembly	.40
3628	Escutcheon—Volume control escutcheon	.42
3629	Escutcheon—Station selector escutcheon	.42
3641	Capacitor—.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd. (C25, C27)—Package of 2	.50
3932	Capacitor—2,400 mmfd. (C13)	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3, R12)—Package of 5	1.00
6306	Resistor — 14,000 ohms — Carbon type — 1 watt (R10)—Package of 5	1.10
6464	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.88
6471	Coil—Oscillator coil (L5, L6)	$0.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6573	Switch—Range switch (S3, S4, S5, S6, S7, C26, C28, C29)	1.25
6598	Condenser—3-gang variable tuning condenser (C1, C2, C4, C5, C6, C7)	3.00
6599	Volume control (R11, S1)	1.25
6620	Capacitor—Comprising .005 and one .035 mfd. capacitors (C20, C30)	.50
6622	Dial—Condenser dial and drive assembly	.95
6645	Tone control (R13)	1.20
6676	Socket—6-contact Radiotron socket—Output	.40
6754	Knob—Range switch knob—Package of 5	.50
6769	Socket—4-contact Radiotron socket	.35
6771	Knob—Station selector, tone or volume control knob—Package of 5	.85
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd. (C31)	.50
7065	Screwdriver—For R. F., fixed oscillator condenser	.80
7485	Socket—6-contact Radiotron socket	.40
7589	Capacitor—Comprising two 4. mfd. capacitors (C22, C23)	1.64
7590	Capacitor—10 mfd. (C21)	1.40
8985	Transformer—Power transformer 105–125 volts 50–60 cycles (T1)	4.26
8986	Transformer—Power transformer 200–250 volts 50–60 cycles	4.38
9002	Transformer—Power transformer 105–125 volts 25–40 cycles	6.00
9050	Oscillator—Test oscillator—15 to 20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	2.00
8935	Cone—Reproducer cone (L10)—Package of 5	5.25
9460	Coil—Field coil, magnet and cone support (L11)	6.00
9461	Reproducer complete	8.50

MODEL 220,222
Voltage, Alignment
Trimmer location

RCA-VICTOR CO., INC.

SERVICE DATA

Electrical Specifications

Voltage Rating.....105-125 Volts
Frequency Rating.....25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons.....2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output.....1.75 Watts
Frequency Range.....540 K. C. to 1500 K. C.
and 1600 K. C. to 3500 K. C.

This receiver is a six tube Superheterodyne incorporating features such as electro-dynamic loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control, "airplane" dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

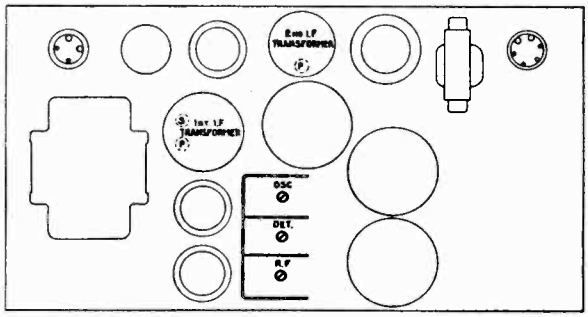


Figure C—Location of Line-up Capacitors

A feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1600 to 3500 K. C. band. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the line-up capacitors.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning as a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator pointer should be set on the white inner radial line located at approximately 530 K. C. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the top of the chassis, for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

(d) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 244. The three line-up capacitors located on the Range Switch and accessible from the bottom of the chassis should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.5	100	260	5.0	2.32
2. RCA-2A7 1st Det. Osc.	5.5*	100*	260*	2.0*	2.32
3. RCA-58 I. F.	3.5	100	260	5.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	4.5	50	90	0.7	2.32
5. RCA-2A5 Power	16.5	255	245	34.0	2.32
6. RCA-80 Rectifier	725 RMS			73.0 Total	4.82

*The voltages and current refer to the detector part of the tube.

RCA-VICTOR CO., INC.

MODEL 220,222
Schematic
Chassis wiring

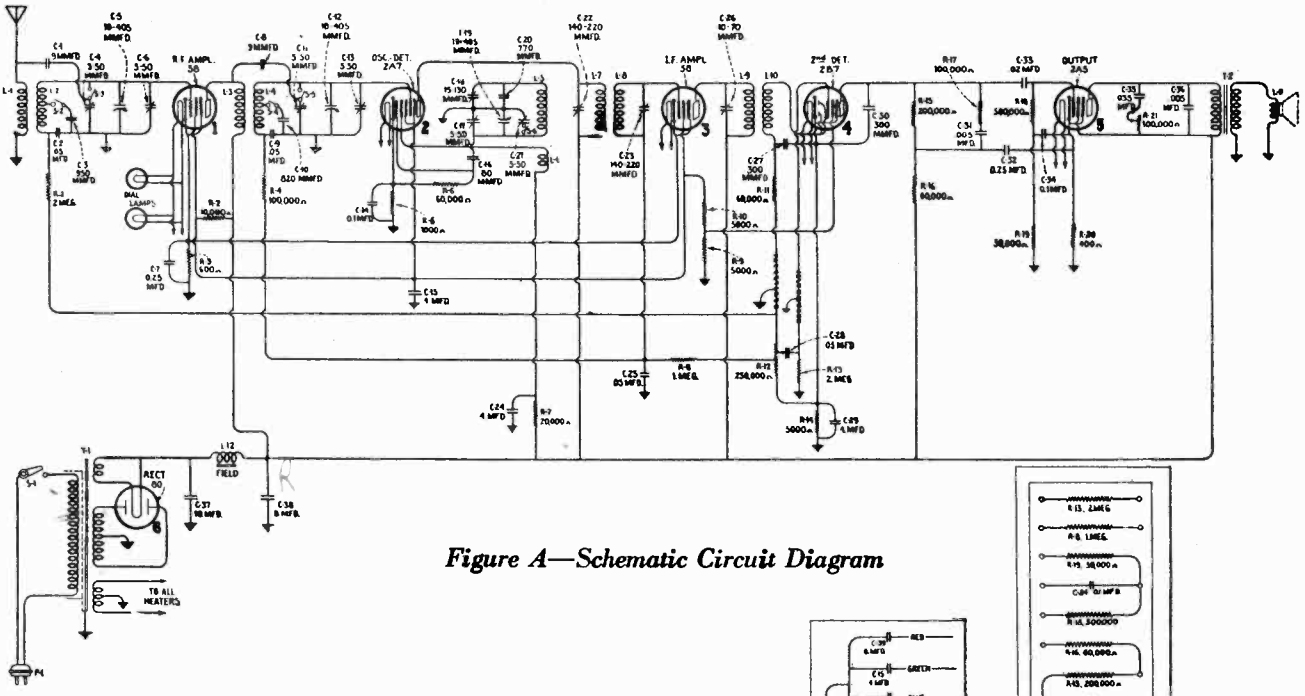


Figure A—Schematic Circuit Diagram

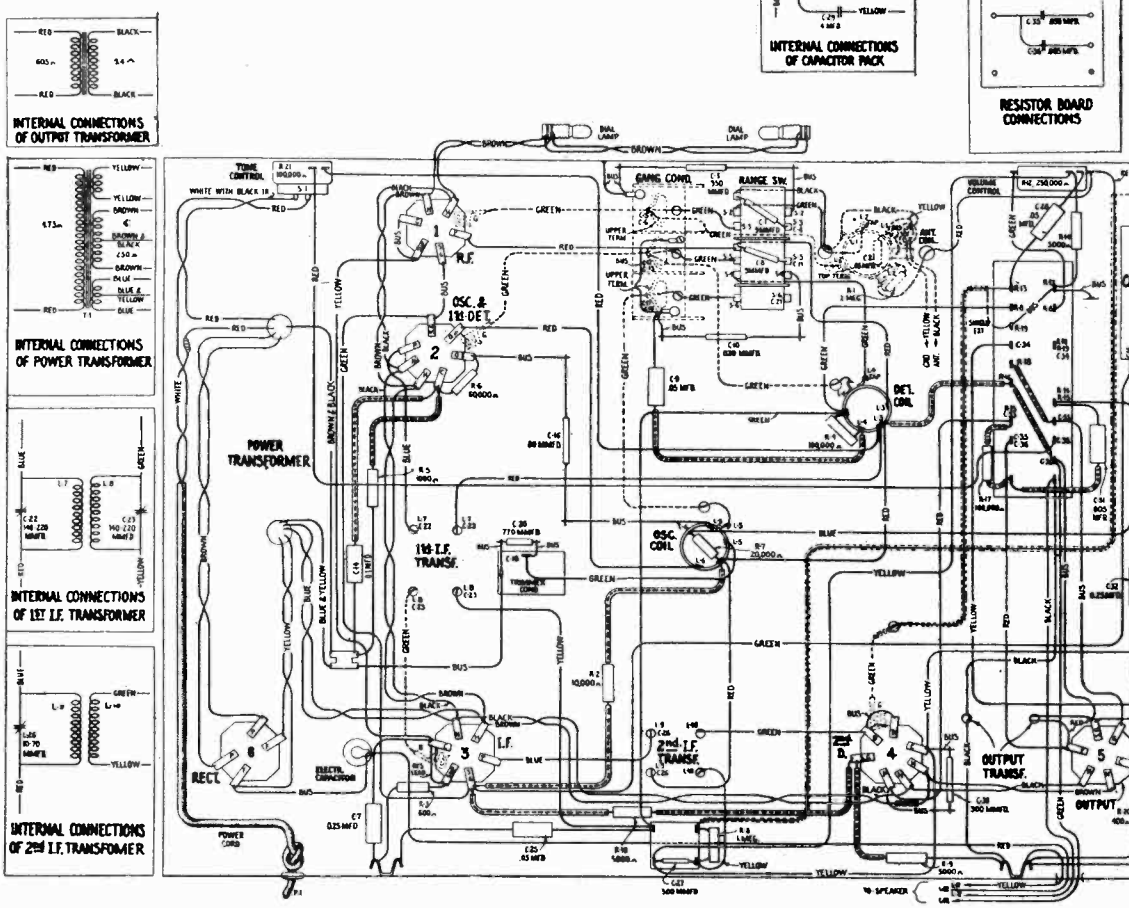


Figure B—Wiring Diagram

MODEL 220,222
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R8)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R4, R17)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C2)	.34
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C27, C30)	.34
3620	Capacitor—770 mmfd. (C20)	.40
3622	Shield—Radiotron shield—Second detector and output	.36
3630	Resistor—10,000 ohms—Carbon type—3 watt (R2)	.25
3639	Capacitor—0.02 mfd. (C33)	.25
3682	Shield—Radiotron shield—Oscillator and first detector	.22
3702	Capacitor—0.25 mfd. (C7, C32)	.42
3711	Capacitor—80 mmfd. (C16)	.40
3768	Screw—Square head—No. 6-32-¼" set screw for condenser drive—Package of 10	.35
3783	Capacitor—9 mmfd. (C1, C8)—Package of 2	.50
3789	Shield—Radiotron shield—R. F. and I. F.	.25
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor	.78
3877	Capacitor—0.1 mfd. (C14, C34)	.32
3878	Screw—No. 4-40 screw and washer assembly for fastening station selector indicator—Package of 20	.25
3891	Resistor—5,000 ohms—Carbon type—1 watt (R9, R10)—Package of 5	1.10
3892	Resistor—600 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3893	Resistor—5,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3894	Capacitor—820 mmfd. (C10)	.36
3895	Capacitor—950 mmfd. (C3)	.40
3896	Capacitor—0.05 mfd. (C9, C25, C28)	.36
3897	Resistor—400 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3898	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.90
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	$1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R6, R11, R16)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6512	Capacitor—0.005 mfd. (C31)	.28
6571	Capacitor—10.0 mfd. (C37)	1.20
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C35, C36)	.50
6672	Screen—Translucent screen for dial light—Package of 5	.30
6673	Pointer—Station selector indicator—Package of 5	.64
6676	Socket—6-contact output Radiotron socket	.40
6680	Condenser—3-gang variable tuning condenser	3.80
6681	Tone control (R21, S1)	1.25
6682	Volume control (R12)	1.25
6683	Coil—Antenna coil (L1, L2, C2, R1)	1.38
6684	Coil—Detector coil (L3, L4)	1.10
6685	Coil—Oscillator coil (L5, L6)	1.05
6686	Transformer—First intermediate frequency transformer (L7, L8, C22, C23)	1.80
6687	Transformer—Second intermediate frequency transformer (L9, L10, C26)	1.78
6688	Shield—Antenna, detector or oscillator coil shield	.60
6689	Switch—Range switch	1.48
6690	Transformer—Output transformer (T2)	1.46
6691	Capacitor pack—Comprising one 8.0 mfd. and three 4.0 mfd. capacitors (C15, C24, C29, C38)	2.16
6693	Drive—Variable tuning condenser drive assembly complete	1.40
6722	Dial—Station selector dial—Package of 5	1.20
7485	Socket—6-contact Radiotron socket	.40
9441	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	4.92
9442	Transformer—Power transformer—105–125 volts—25–40 cycles	6.80
9443	Transformer—Power transformer—200–250 volts—50–60 cycles	5.04
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone (L11)—Package of 5	6.35
9444	Coil—Field coil, magnet and cone support (L12)	5.00
9445	Reproducer complete	7.14

RCA-VICTOR CO., INC.

MODEL 260
Alignment, Voltage

SERVICE DATA

Electrical Specifications

Voltage Rating ..... 105-125 Volts
Power Consumption ..... 120 Watts
Type and Number of Radiotrons ..... 3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range ..... 540 K. C.-1500 K. C. 1400 K. C.-2800 K. C.
Undistorted Output ..... 4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loud-speaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor. Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

MODEL 260
Schematic, Trimmers
Speaker data

RCA-VICTOR CO., INC.

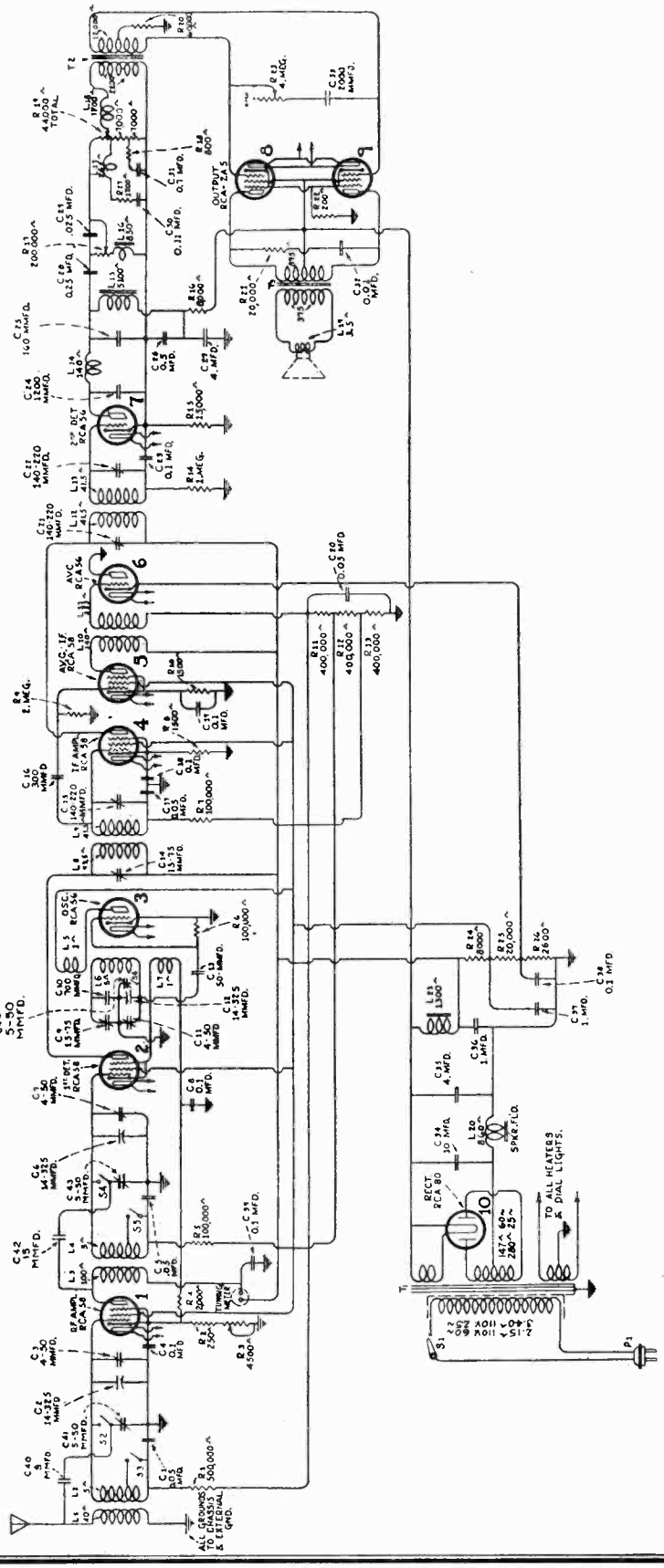


Figure A—Schematic Circuit Diagram

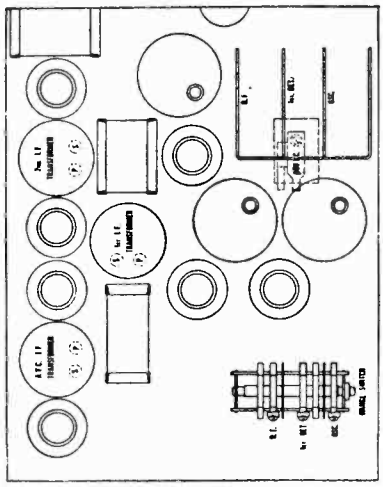


Figure C—Location of Adjustable Capacitors

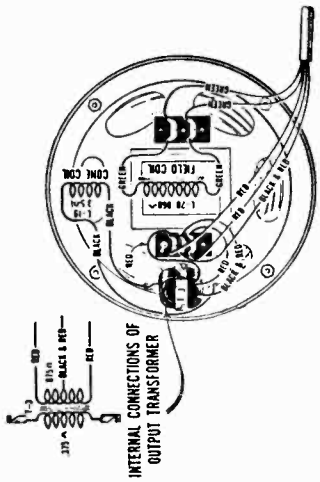


Figure D—Loudspeaker Wiring

RCA-VICTOR CO., INC.

MODEL 260
Chassis wiring

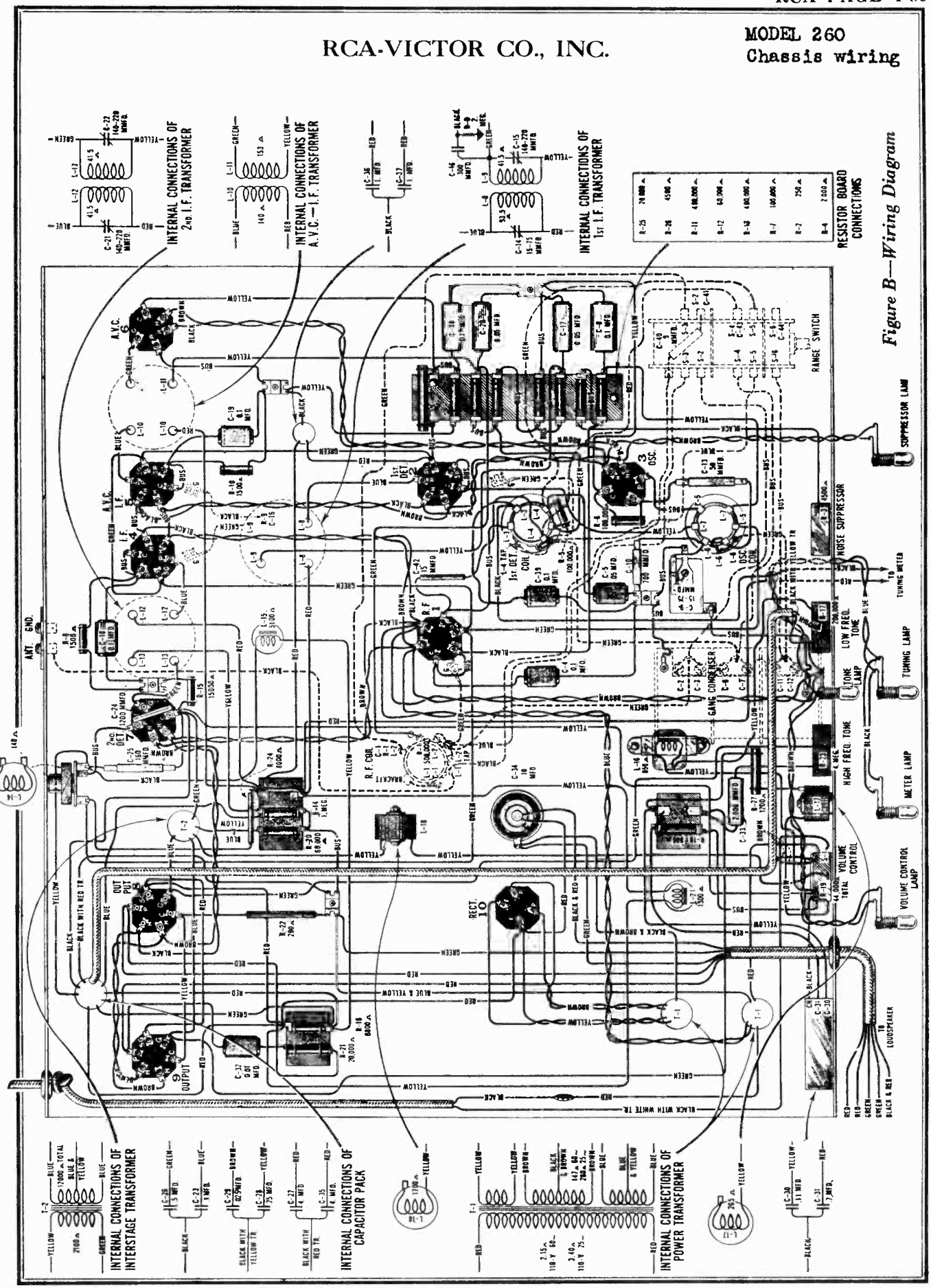


Figure B—Wiring Diagram

MODEL 260
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd capacitor	.44
3460	Capacitor—1,200 mmfd	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3546	Capacitor—150 mmfd	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor—Tuning meter	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mfd	.36
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
3900	Resistor—2 600 ohms—Carbon type—½ watt—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency escutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6536	Condenser—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105–120 volts—50–60 cycles	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

RCA-VICTOR CO., INC.

MODEL 261
Alignment, Voltage
Speaker wiring

SERVICE DATA

Electrical Specifications

Voltage Rating ..... 105–125 Volts
Power Consumption ..... 120 Watts
Type and Number of Radiotrons ..... 3 RCA-56, 4 RCA-58, 1 RCA-80, 2 RCA-2A5—Total, 10
Frequency Range ..... 540 K. C.—1500 K. C.
1400 K. C.—2800 K. C.
Undistorted Output ..... 4.0 Watts

This receiver is a ten-tube Superheterodyne radio receiver. Features such as improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator such as Stock No. 9050 giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screwdriver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

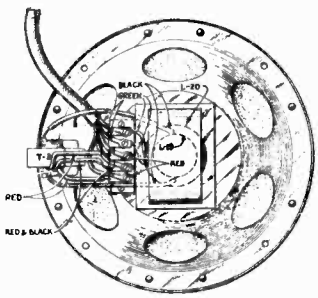
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).



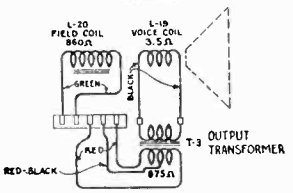


Figure D—Loudspeaker Wiring

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

MODEL 261
Schematic, Notes
Trimmer location

RCA-VICTOR CO., INC.

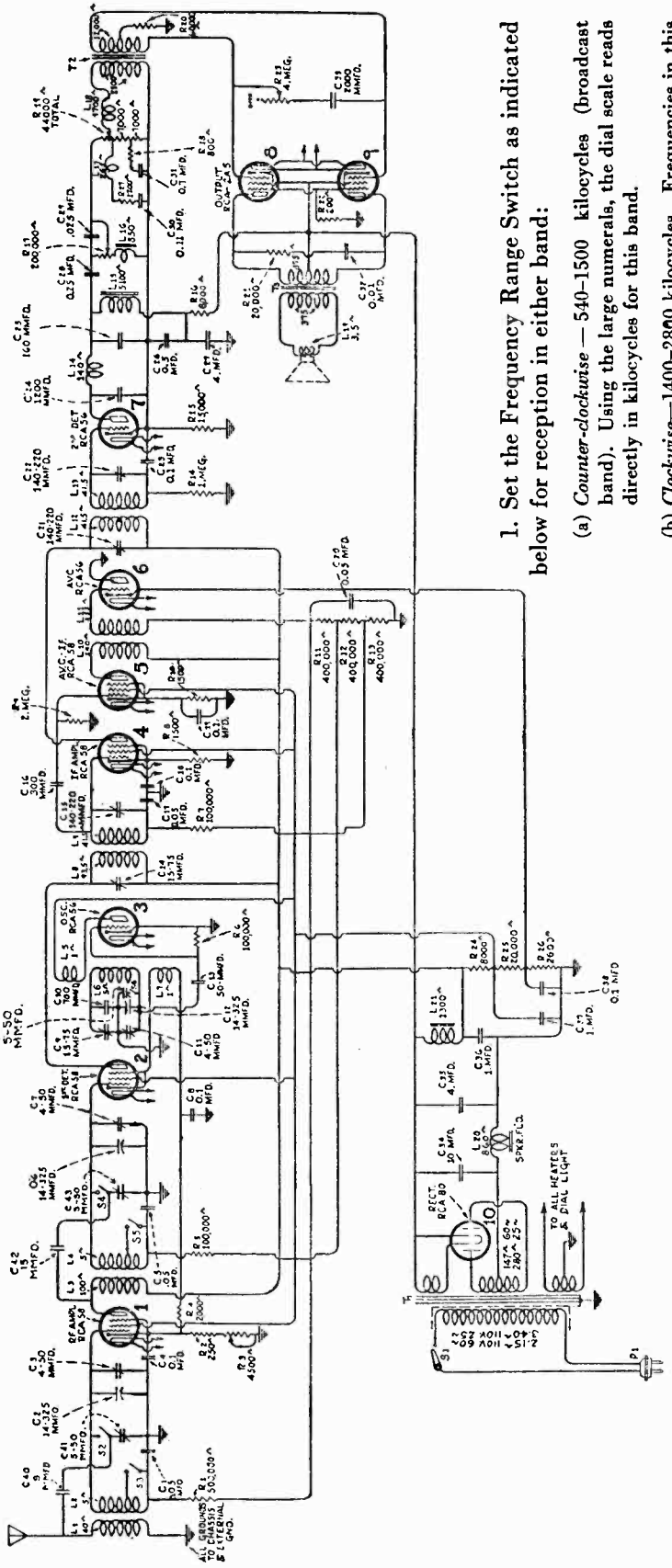


Figure A—Schematic Circuit Diagram

1. Set the Frequency Range Switch as indicated below for reception in either band:

(a) *Counter-clockwise* — 540–1500 kilocycles (broadcast band). Using the large numerals, the dial scale reads directly in kilocycles for this band.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the bottom of the dial (add two ciphers to obtain kilocycles). Available services therein include the following:

(1) **Police Calls**—Stations operating at 1574 and 1712 kilocycles and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1800–2000 kilocycles.

(3) **Aviation Communications "Phone"**—Between 2500 and 2800 kilocycles.

NOTE—The majority of stations in this range do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

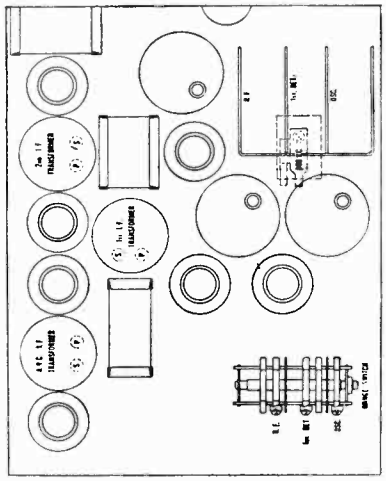


Figure C—Location of Adjustable Capacitors

RCA-VICTOR CO., INC.

MODEL 261
Chassis wiring

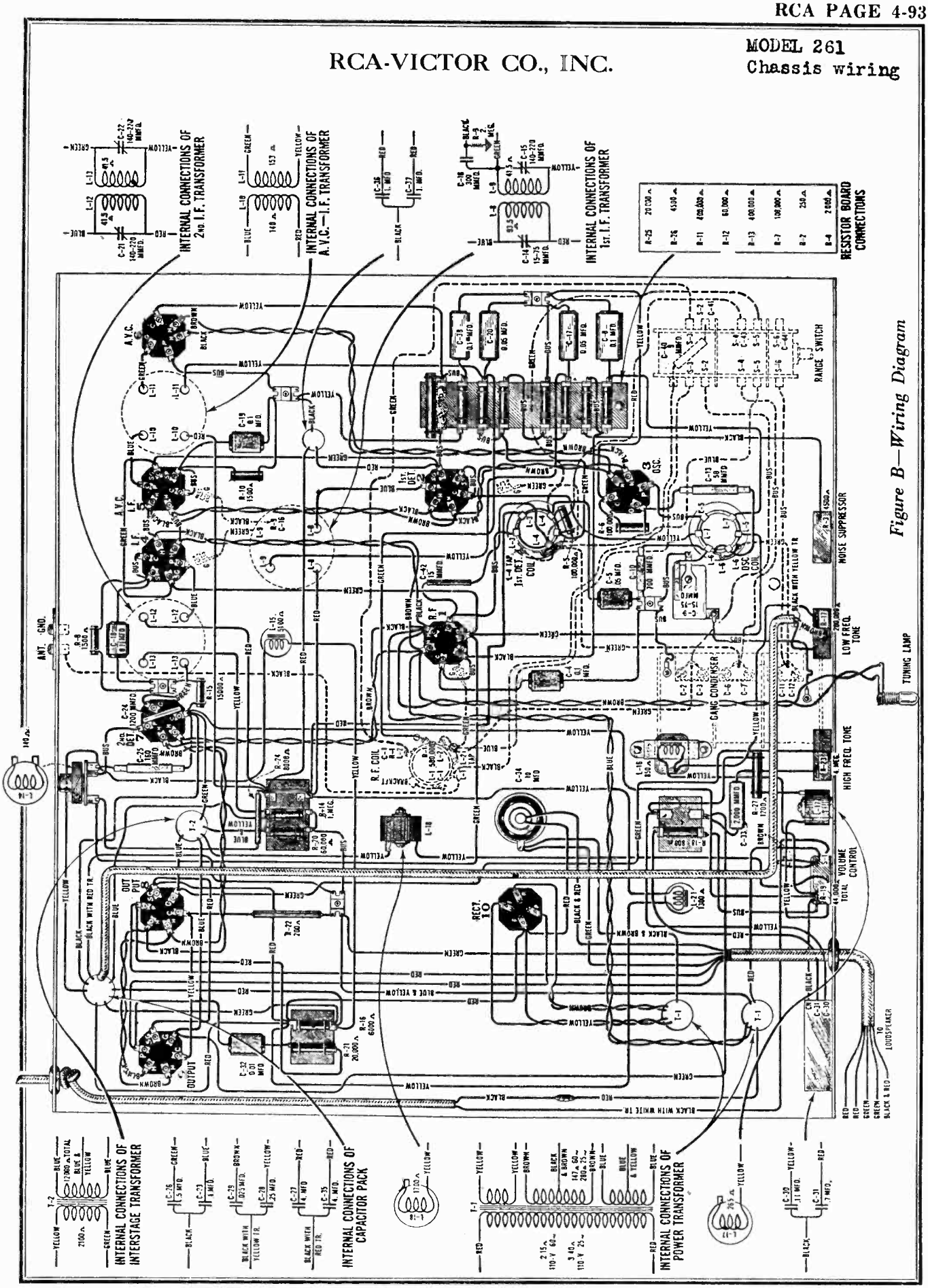


Figure B—Wiring Diagram

MODEL 261
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd. (C40)—Package of 2	$0.50
3047	Resistor — 1,500 ohms — Carbon type — ½ watt (R8, R10)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt (R14)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R5, R6, R7)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor (C32)	.44
3460	Capacitor—1,200 mmfd. (C24)	.30
3513	Capacitor—700 mmfd. (C10)	.48
3526	Resistor — 2,000 ohms — Carbon type — ½ watt (R4)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3530	Coil—Second detector plate choke coil (L14)	.72
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers	.68
3552	Resistor—200 ohms—Porcelain type—20 watts (R22)	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts (R24)	.80
3554	Resistor — 1,200 ohms — Carbon type — ½ watt (R27)—Package of 5	1.00
3556	Capacitor—0.05 mfd. capacitor (C1, C5, C17, C20)	.34
3557	Capacitor—0.002 mfd. capacitor (C33)	.30
3558	Capacitor—50 mmfd. capacitor (C13)	.36
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mmfd. (C4, C8, C18, C19, C38)	.36
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3747	Capacitor—15 mmfd. (C42)	.36
3900	Resistor — 2,600 ohms — Carbon type — ½ watt (R26)—Package of 5	1.00
4022	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.54
4023	Escutcheon—Station selector escutcheon	.42
4080	Knob—Range switch knob—Package of 5	.75
4081	Knob—Volume control or noise suppressor knob—Package of 5	1.08
4082	Knob—High or low frequency tone control knob—Package of 5	1.08
6114	Resistor — 20,000 ohms — Carbon type — 1 watt (R21, R25)—Package of 5	1.10
6142	Resistor — 6,000 ohms — Carbon type — ½ watt (R16)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt (R9)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R20)—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—Four contact Radiotron socket—Package of 5	.35
6314	Capacitor—160 mmfd. (C25)—Package of 5	2.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	$0.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container (C30, C31)	.98
6430	Capacitor pack—Comprising two 4.0 mmfd., one 0.25, one 0.025, one 0.1, and one 0.5 mfd. capacitors in metal container (C23, C26, C27, C28, C29, C35)	3.78
6431	Reactor—Filter reactor (L21)	1.92
6432	Transformer—Interstage audio transformer (T2)	3.69
6434	Reactor—Second detector plate coupling reactor (L15)	1.96
6435	Transformer—First intermediate frequency transformer (L8, L9, C14, C15, C16, R9)	2.54
6436	Reactor—High frequency tone control compensating reactor (L17)	.70
6437	Coil—Oscillator coil assembly (L5, L6, L7)	1.24
6439	Reactor—High frequency tone control reactor (L16)	1.14
6440	Transformer—Second intermediate frequency transformer (L2, L3, C21, C22)	1.94
6441	Transformer—Third intermediate frequency transformer (L10, L11)	1.76
6442	Reactor—Volume control series reactor (L18)	.88
6443	Capacitor—10 mmfd. (C34)	1.50
6447	Volume control—Complete with mounting nut (R19)	1.92
6448	Tone control—Low frequency tone control complete with mounting nut (R17)	1.04
6449	Tone control—High frequency tone control complete with mounting nut (R23)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6537	Switch—Range switch (S2, S3, S4, S5, S6, C41, C43, C44)	1.30
6538	Coil—Antenna coil (L1, L2, R1, C1)	1.80
6539	Coil—Detector coil (L3, L4)	1.44
6541	Scale—Dial and dial scale	.75
6785	Cable—Braid covered—Five conductor reproducer cable	.80
6786	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C11, C12)	7.12
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd. (C9)	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7484	Socket—Five contact Radiotron socket	.35
7485	Socket—Six contact Radiotron socket	.40
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105–120 volts—50–60 cycles (T1)	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
9050	Oscillator—Test oscillator—150–25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer (T3)	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone (L19)—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support (L20)	4.94
9463	Reproducer complete	9.42

RCA-VICTOR CO., INC.

MODEL 280
Alignment
Trimmer location

SERVICE DATA

Electrical Specifications

Voltage Rating.....105–125 Volts
Power Consumption.....120 Watts
Type and Number of Radiotrons.....4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range. 540 K. C.-1500 K. C.—1400 K. C.-2800K. C.
Undistorted Output.....10.0 Watts

This receiver is a twelve tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, class B output stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

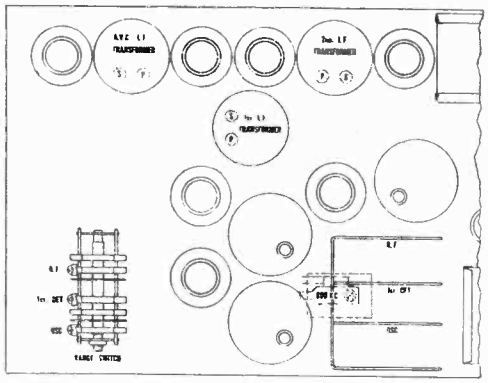


Figure C

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the adjustable capacitors. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should he a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counterclockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections

It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

RF-5203 shield kit which comprises a combination antenna insulator, lightning arrester, transformer assembly, and 75 feet of shielded wire is recommended. When such an antenna system is used, it is necessary to connect a 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the RF-5203 Kit. However, in event an assembly of parts from other type kits are used, it must be added.

MODEL 280
Schematic, Voltage

RCA-VICTOR CO., INC.

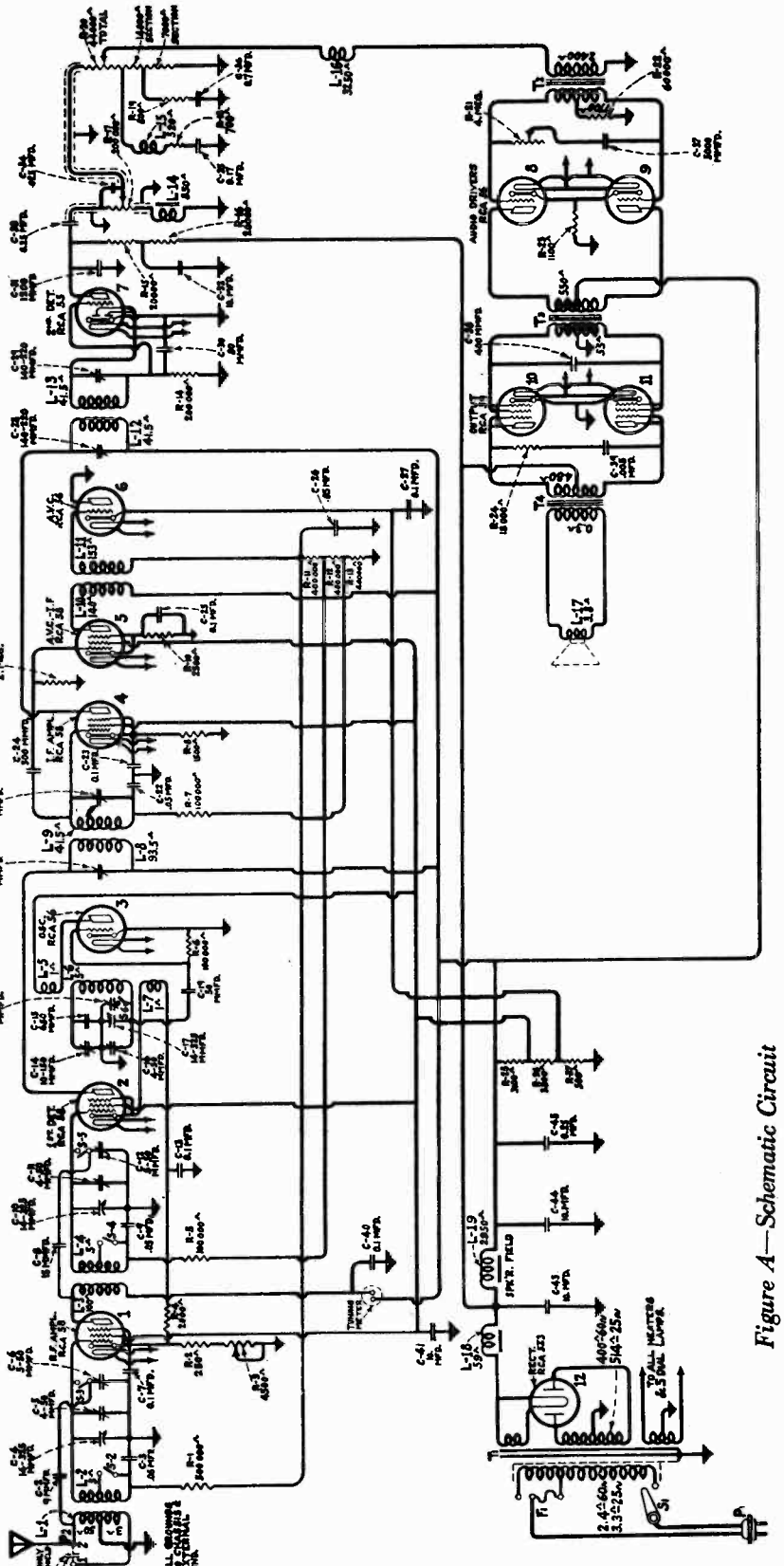


Figure A—Schematic Circuit

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-523 Rect.	990-495 R. M. S.			92 Total	5.0

RCA-VICTOR CO., INC.

MODEL 280
Chassis wiring

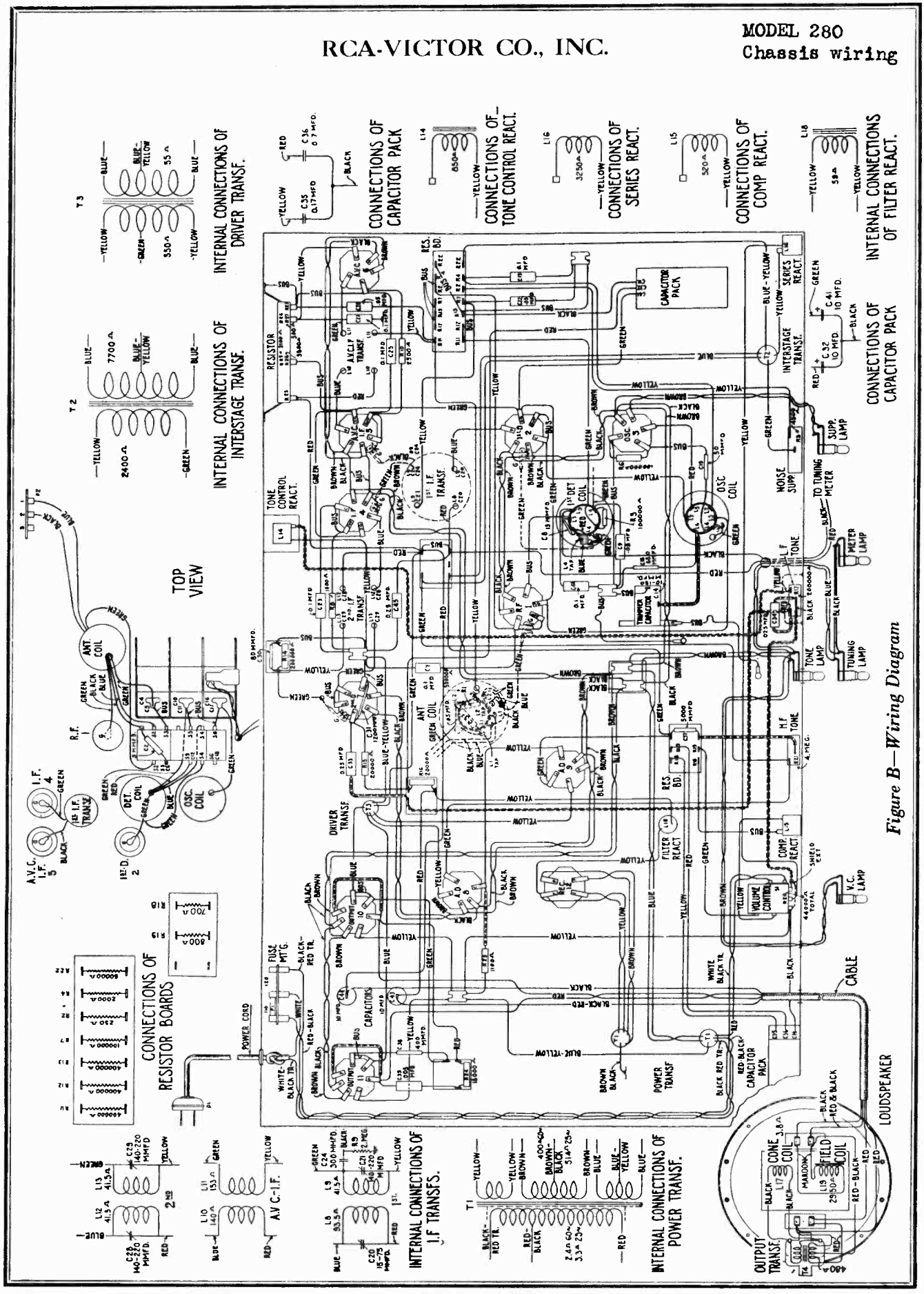


Figure B—Wiring Diagram

MODEL 280
Parts List

RCA-VICTOR CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2725	Fuse—1.5 ampere—Package of 5	$0.40
2730	Resistor — 18,000 ohms — Carbon type — 1 watt—R24—Package of 5	1.10
3024	Capacitor—9 mmfd.—C2—Package of 2	.50
3047	Resistor — 1,500 ohms — Carbon type — ½ watt—R8—Package of 5	1.00
3085	Capacitor—400 mmfd.—C38	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt—R5—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—R6, R7—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—R2—Package of 5	1.00
3460	Capacitor—1,200 mmfd.—C31	.30
3526	Resistor — 2,000 ohms — Carbon type — ½ watt—R4—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—R19—Package of 5	1.00
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3533	Shutter — High frequency tone control shutter	.50
3534	Shutter — Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 8 cushions and 4 spacers—One set	.68
3556	Capacitor—0.05 mfd.—Located on antenna coil—C3	.34
3558	Capacitor—50 mmfd.—C19	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp bracket	.25
3565	Socket—Dial lamp socket	.50
3597	Capacitor—0.25 mfd.—C33, C45	.40
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning meter scale—Package of 5	.60
3640	Capacitor—0.05 mfd.—C9, C22, C26	.25
3641	Capacitor—0.1 mfd.—C7, C13, C23, C25, C27	.35
3643	Capacitor—0.005 mfd.—Output stage—In series with 18,000 ohm resistor—C39	.25
3719	Socket—7 contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd.—C8	.36
3749	Capacitor—0.1 mfd.—Tuning meter filter—C40	.30
3765	Capacitor—0.025 mfd.—C34	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms—R25, R26, R27	.80
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
3782	Shield—Radiotron shield—Second detector	.26
3797	Reactor — Volume control compensating reactor—L15	.64
3798	Resistor—700 ohms—Carbon type—½ watt—R18—Package of 5	1.00
3799	Capacitor—80 mmfd.—C30	.70
5817	Resistor — 20,000 ohms — Carbon type — 3 watts—R15, R16—Package of 5	.25
6186	Resistor — 500,000 ohms — Carbon type — Located on antenna coil—R1—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt—R14—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—R11, R12, R13—Package of 5	$1.00
6281	Resistor — 1,100 ohms — Carbon type — ½ watt—R23—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—R22—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6312	Capacitor—650 mmfd.—C15—Package of 5	1.50
6316	Resistor — 2,500 ohms — Carbon type — ½ watt—R10—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6437	Coil—Oscillator coil—L5, L6, L7	1.24
6447	Volume control complete with mounting nut—R20	1.92
6448	Tone control—Low frequency tone control complete with mounting nut—R17	1.04
6449	Tone control—High frequency tone control complete with mounting nut—R21	1.06
6450	Rheostat—Noise suppressor rheostat—R3	1.24
6461	Meter—Tuning meter	2.14
6512	Capacitor — 0.005 mfd. — High frequency tone control—C37	.28
6536	Capacitor—3 gang variable tuning condenser assembly	5.00
6537	Switch—Range switch—L3, L4	1.30
6539	Coil—Detector coil—L3, L4	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning meter bezel	.45
6561	Coil—Antenna coil—L1, L2, R1	1.65
6562	Transformer—Driver transformer—T3	3.04
6563	Reactor—Volume control series reactor—L16	1.06
6564	Transformer—First intermediate frequency transformer—C20, C21, C24, L8, L9, R9	2.30
6565	Transformer—Second intermediate frequency transformer—L10, L11	2.10
6566	Transformer—Third intermediate frequency transformer—C28, C29, L12, L13	1.72
6567	Capacitor pack—Comprising one 0.17 mfd. and one 0.7 mfd. capacitors—C35, C36	.95
6568	Transformer—Interstage audio transformer—T2	3.10
6571	Capacitor—10.0 mfd.—C43, C44	1.20
6572	Reactor—Tone control reactor—L14	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors—C32, C41	1.80
6578	Reactor—Filter reactor—L18	3.22
6618	Cable—Braid covered—4 conductor—reproducer cable	.54
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield top	.20
9028	Transformer—Power transformer—105–125 volts—50–60 cycles—T1	7.75
9029	Transformer—Power transformer—105–125 volts—25–50 cycles	12.25
9030	Transformer—Power transformer—200–250 volts—50–60 cycles	8.00
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6569	Transformer—Output transformer—T4	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—L17—Package of 5	6.35
9031	Coil assembly—Comprising field coil, magnet and cone support—L19	4.90

RCA-VICTOR CO., INC.

MODEL 300
Voltage, Pickup data

Electrical Specifications

Voltage Rating ..... 105–115 Volts
Frequency Rating ..... 25, 50, and 60 Cycles
Power Consumption ..... 55 Watts
Tuning Range ..... 540–1710 K. C.
Type and number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total, 4
Undistorted Output ..... 0.3 Watts at 60 Cycles

This table type combination instrument consists of a four tube tuned R. F. receiver and a new compactly constructed motor board assembly. It is designed for A. C. operation only. Features such as wide tuning range, electro-dynamic loudspeaker, ability to play both 10 and 12 inch records and excellent quality of reproduction characterize this instrument. Figures C and D show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below:

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles

Radiotron No.	Cathode to Control Grid, Volts D.C.	Cathode to Screen Grid, Volts D.C	Cathode to Plate, Volts D.C.	Plate Current M. A	Filament or Heater Volts
RCA-78, R. F.	2.5	100	200	8.0	6.0
RCA-77, Detector	*5.0	95	*100	0.2	6.0
RCA-38, Output	18.0	180	170	14.0	6.0
RCA-25Z5, Rectifier	—	—	115	30.0	25.0

* Impossible to measure on ordinary voltmeter
NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Pickup Service Data

The magnetic pick-up and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

Disassembling the Pickup

The pick-up may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pick-up assembly from the arm and housing.

(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.

(e) If centering of the armature is the only adjustment required, such centering can be done without further disassembly. The armature is centered by loosening screw F and holding the armature with the finger in proper position while screw F is tightened. A visual inspection is sufficiently accurate for centering. When centering after any work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pick-up must be further disassembled. This is done by first removing the magnet and then removing screws C and D. The pole piece is now removed, paper sleeve pushed out and the magnet coil slipped from between the pole pieces. Be careful to replace the paper sleeve that centers the coil and to replace it in the new coil assembly.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

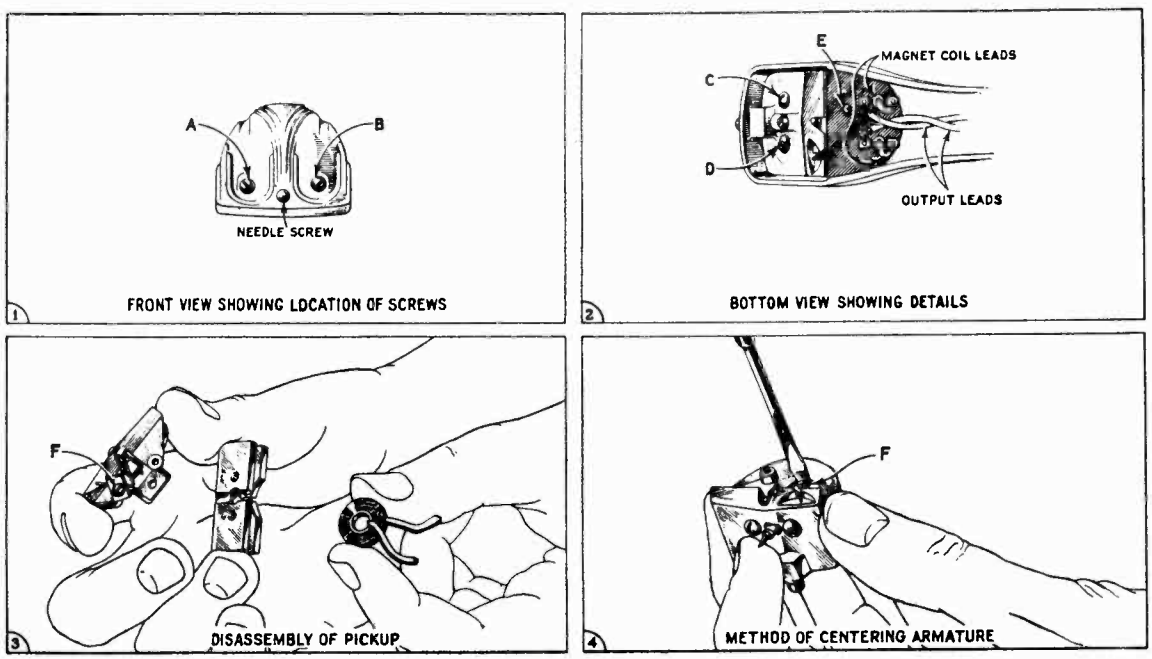


Figure A—Pickup Details

MODEL 300
Schematic, Voltage
Chassis wiring

RCA-VICTOR CO., INC.

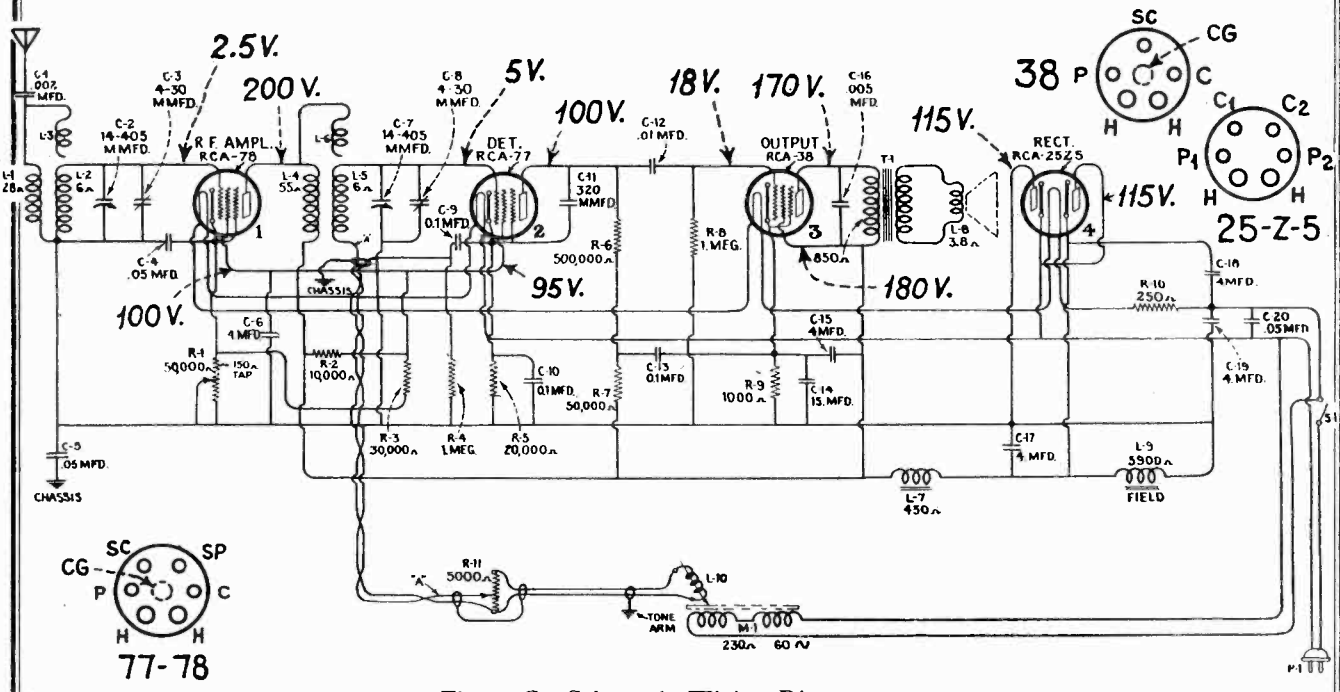


Figure C—Schematic Wiring Diagram

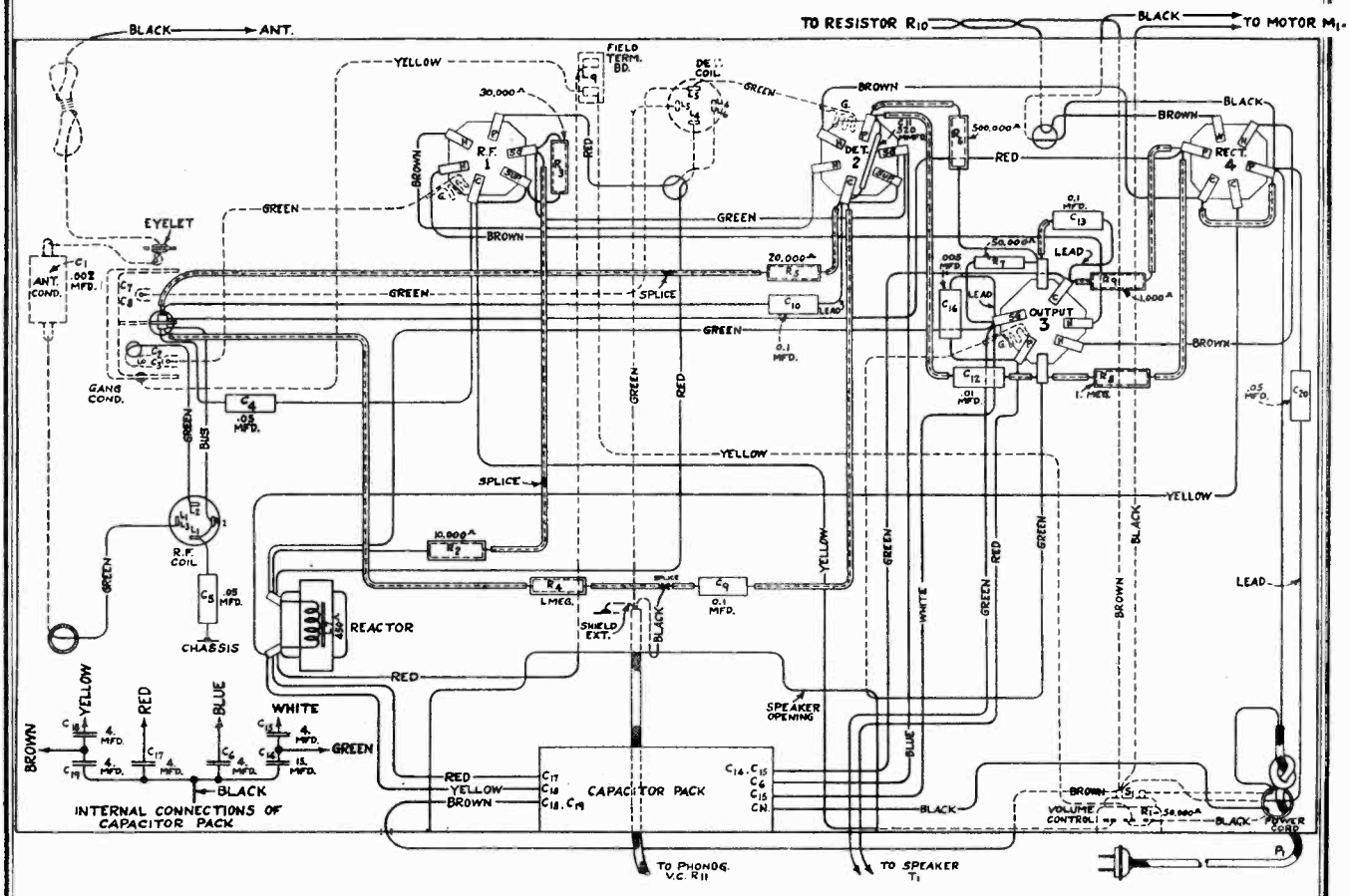


Figure D—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 300
Assembly wiring

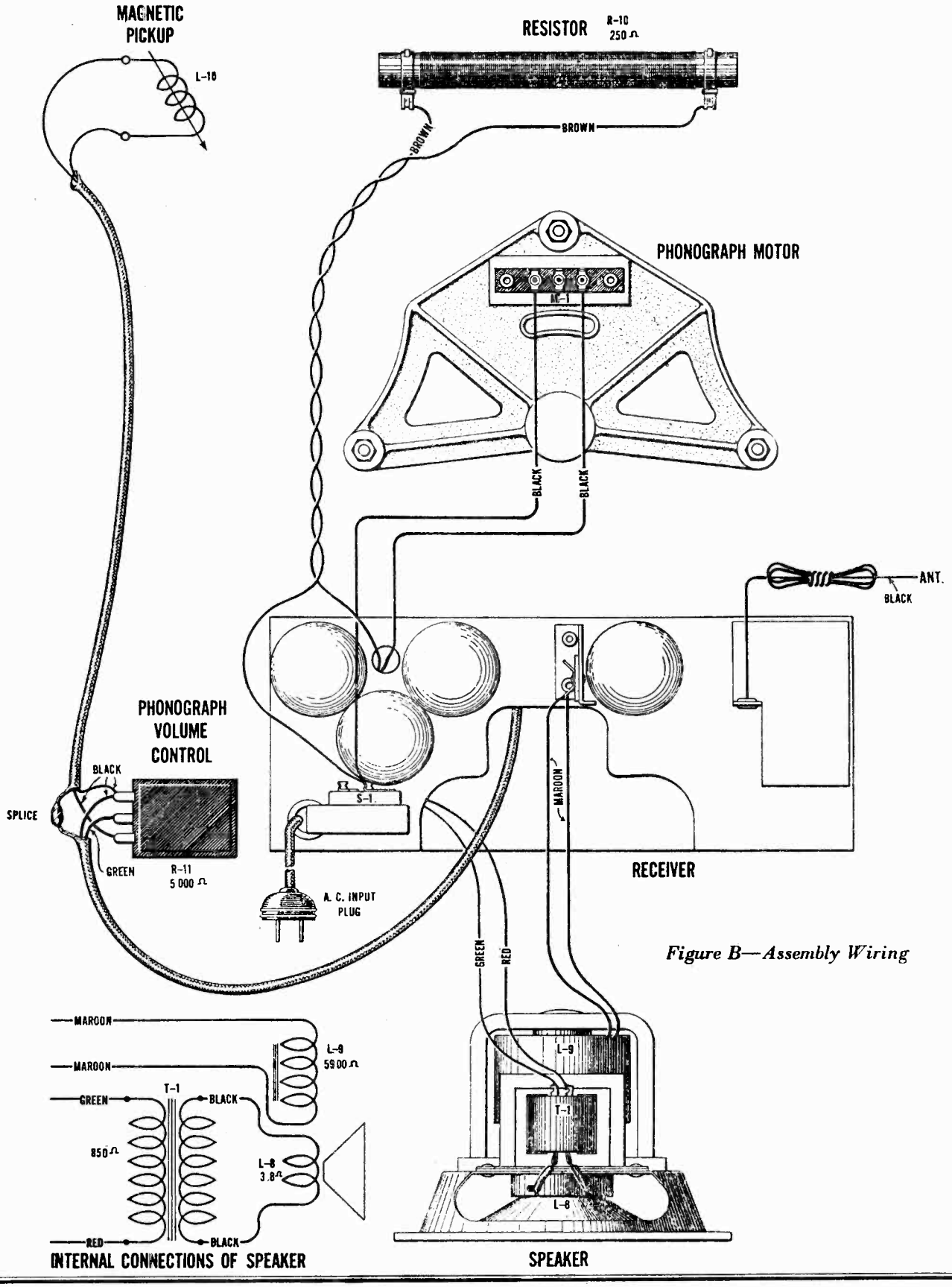


Figure B—Assembly Wiring

MODEL 300
Phono Motor data

RCA-VICTOR CO., INC.

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

Operation—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

Difficult to Start—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

Slow Speed—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal. This is due to the decreased load that occurs with the pickup removed.

Excessive Vibration and Hum — A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

Power Consumption—The motor consumes 3.3 watts while not running, 3.5 watts while running, but with no load, and 4 watts while running with full load. The motor should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.

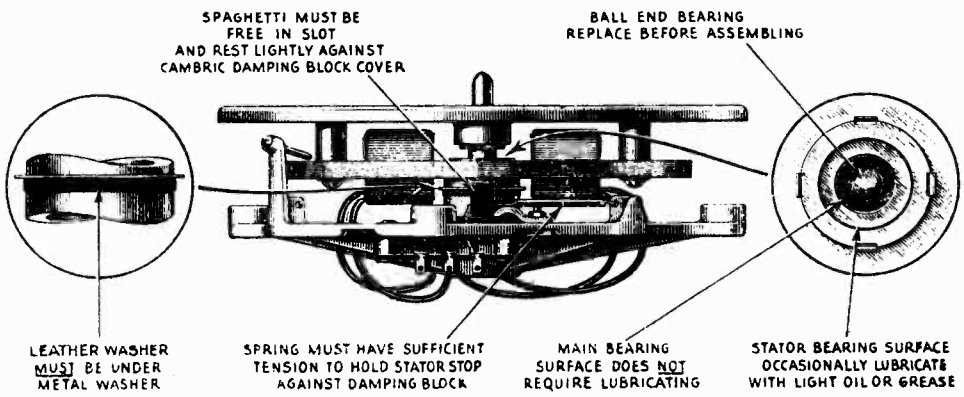


Figure E—Details of Motor

RCA-VICTOR CO., INC.

MODEL 310
Alignment
Pickup data

SERVICE DATA

Voltage Rating	115 Volts
Frequency Rating	25, 50 and 60 Cycles
Power Consumption	60 Cycles, 95 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, continuously variable tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

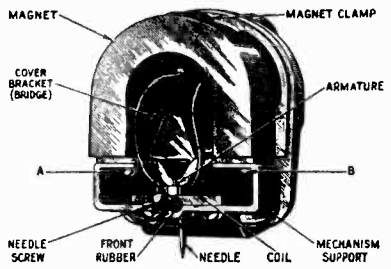


Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

MODEL 310
Schematic
Chassis wiring

RCA-VICTOR CO., INC.

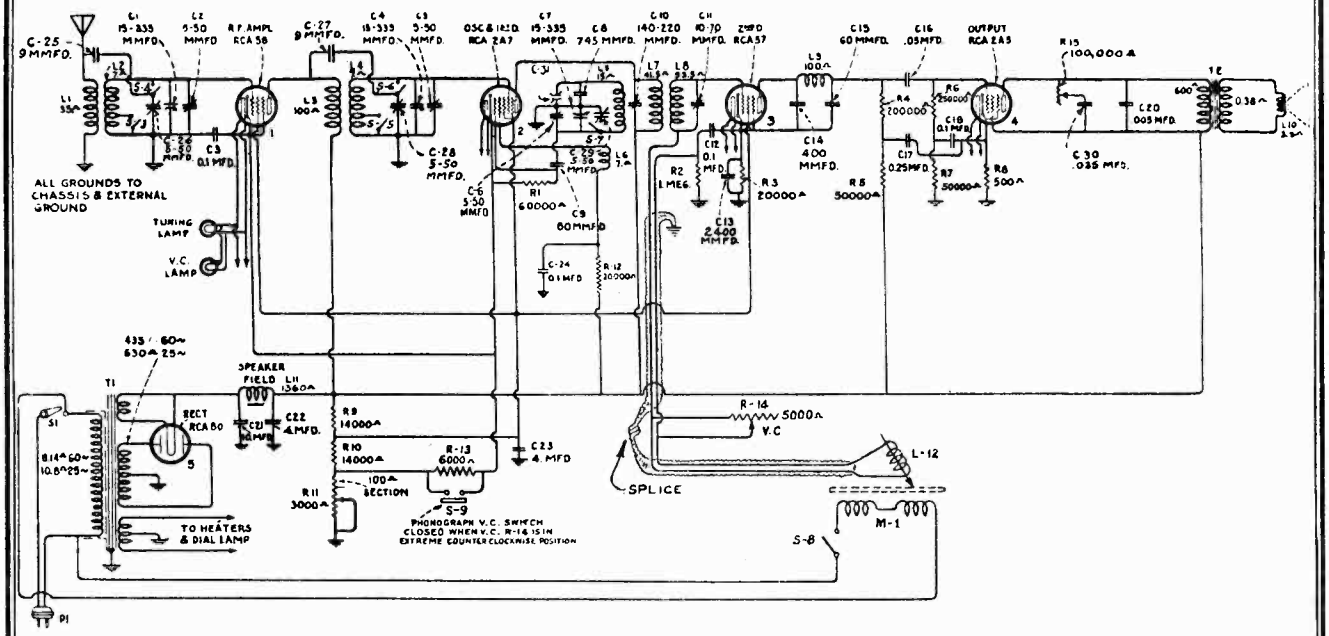


Figure C—Schematic Circuit Diagram—Note: R-11 may be either 3000 ohms or 4500 ohms

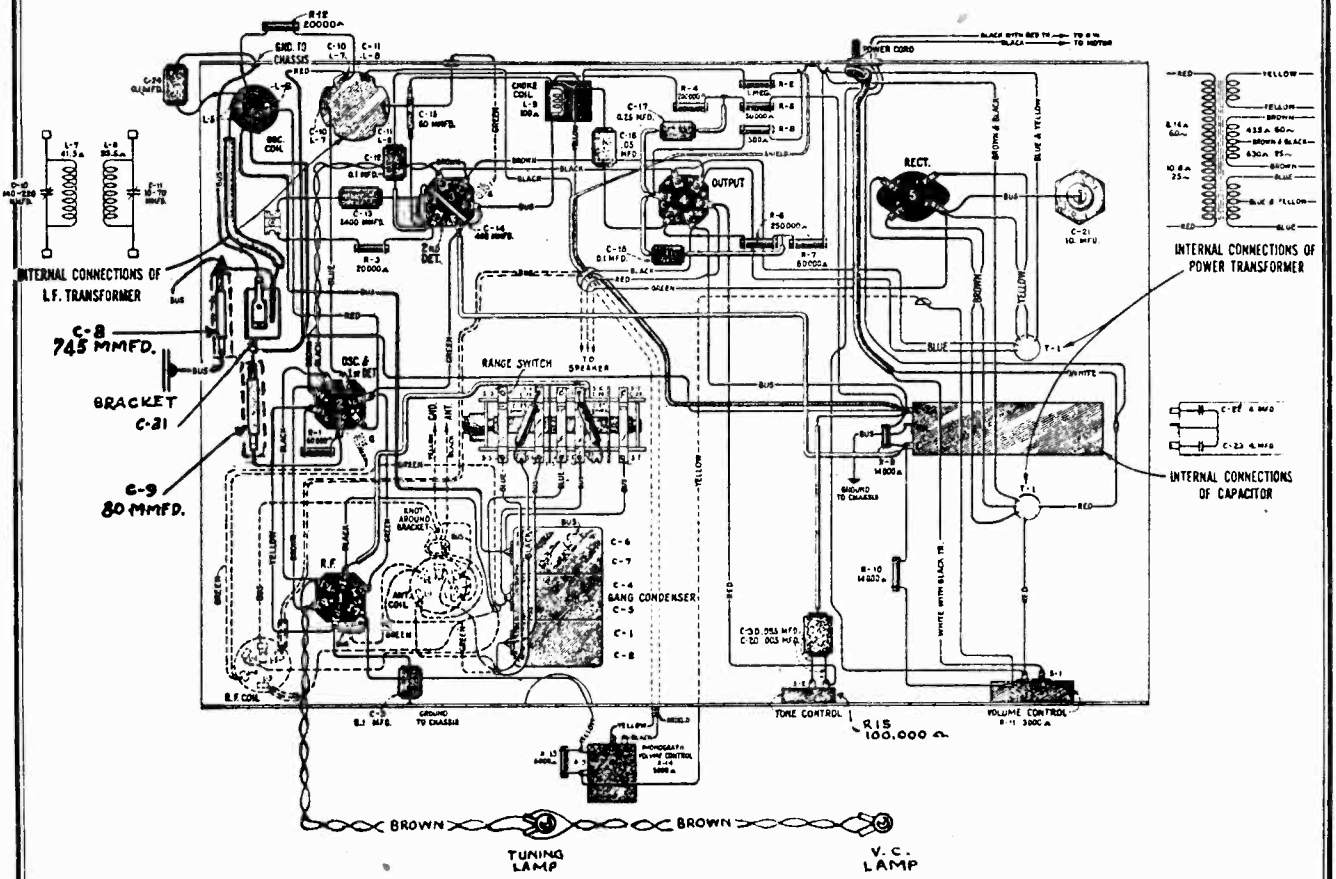


Figure D—Wiring Diagram—C-31 is 15–70 mmfd.

RCA-VICTOR CO., INC.

MODEL 310
Assembly wiring

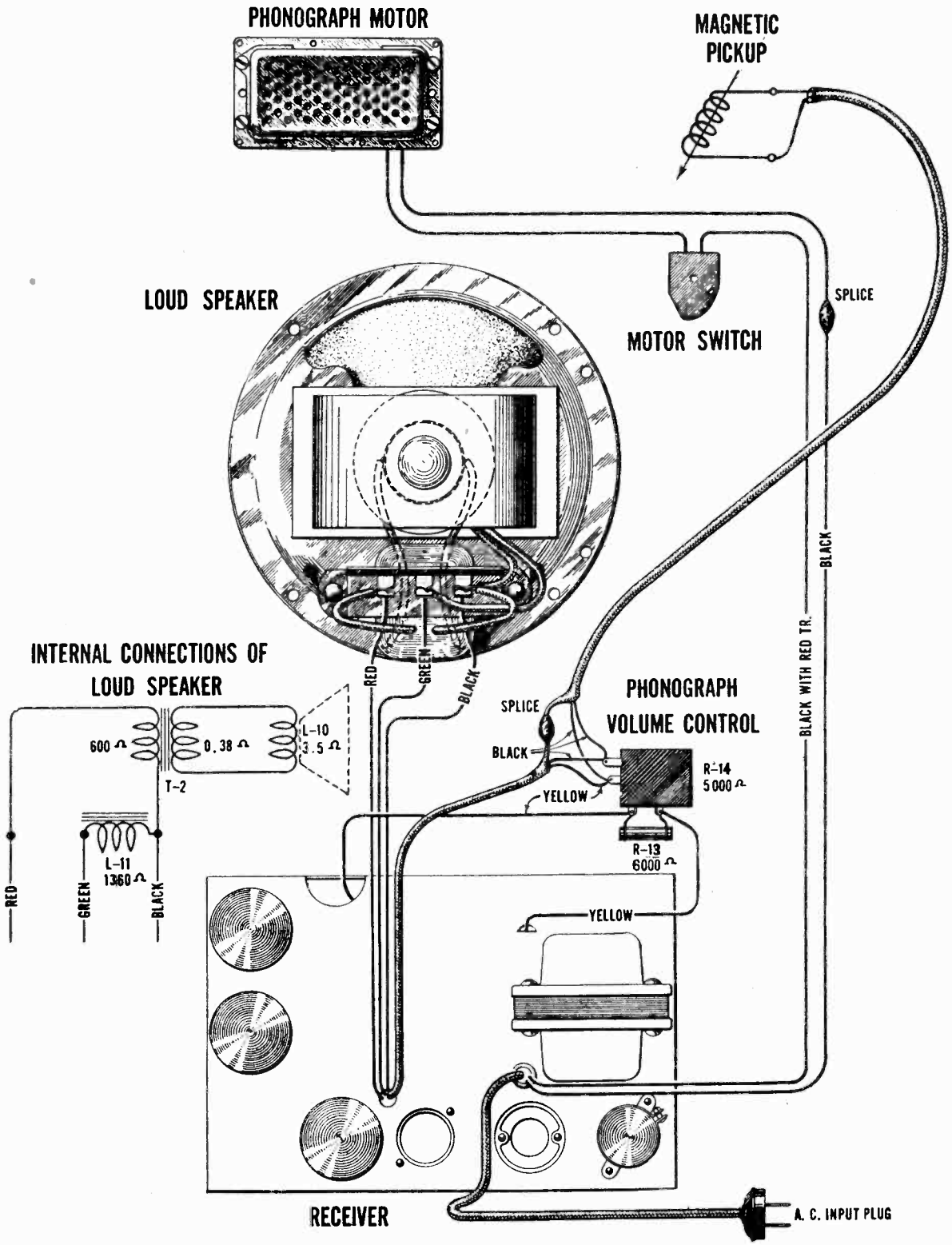


Figure B—Assembly Wiring

MODEL 310
Voltage, Parts List

RCA-VICTOR CO., INC.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2563	Resistor—6,000 ohms—Carbon type—1 watt—Pkg. of 5 (R13)	$1.10
2734	Capacitor—745 mmfd. (C8)—Package of 5	1.50
2747	Contact cap—Package of 5	.50
2994	Coil—R. F. choke coil (L9)	.45
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5 (R2)	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Pkg. of 5 (R6)	1.00
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3592	Knob—Station selector, volume or tone control knob—Package of 5	.80
3594	Resistor—50,000 ohms—Carbon type—½ watt—Pkg. of 5 (R5, R7)	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—0.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt—Pkg. of 5 (R1)	1.00
3604	Capacitor—400 mmfd. (C14)	.30
3623	Shield—R. F. or oscillator coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3625	Indicator—Volume control indicator	.40
3632	Resistor—500 ohms—Carbon type—1 watt—Pkg. of 5 (R8)	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—0.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd.—Package of 2 (C25, C27)	.50
3785	Screw—Chassis mounting screw—Package of 10	.40
6228	Resistor—200,000 ohms—Carbon type—½ watt—Pkg. of 5 (R4)	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5 (R3, R12)	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Pkg. of 5 (R10)	1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil assembly (L3, L4)	.94
6573	Switch—Range switch	1.25
6598	Capacitor—Three gang variable tuning capacitor	3.00
6599	Volume control—Complete with mounting nut (R11)	1.25
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C20, C30)	.50
6622	Dial—Station selector dial assembly	.95
6645	Tone control (R15)	1.20
7063	Capacitor—Adjustable—5-40 mmfd. (C31)	.50
7485	Socket—Radiotron 6-contact socket	.40
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container (C22, C23)	1.64
7590	Capacitor—10.0 mfd. (C21)	1.40
8985	Transformer—Power transformer—105-125 volts—50-60 cycles	1.26
9002	Transformer—Power transformer—105-125 volts—25-50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
9041	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.92
9043	Reproducer complete	5.50
9428	Cone—Reproducer cone (L10)—Package of 5	5.00

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3731	Motor mounting assembly—Comprising three felt washers, three cushions, six metal washers and three studs	$0.46
8989	Motor—Motor complete—105-125 volts—60 cycle	18.52
8990	Motor—Motor complete—105-125 volts—50 cycle	18.52
8991	Motor—105-125 volts—40 cycle	23.36
8992	Motor—Motor complete—105-125 volts—25 cycle	23.36
8993	Rotor and shaft for 105-125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105-125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105-125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105-125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Pkg. of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkg. of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Phonograph volume control or range switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control (R14)	1.25
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

RCA-VICTOR CO., INC.

SERVICE DATA

MODEL 330
Alignment, Voltage
Trimmer location

Voltage Rating ..... 105–125 Volts
Frequency Rating ..... 25, 30, 40, 50, and 60 Cycles
Power Consumption ..... 25 Cycle–115 Watts;
30 Cycle–115 Watts; 40 Cycle–125 Watts;
50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons ... 2 RCA-58, 1 RCA-2A7, 1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output ..... 5 Watts
Frequency Range ..... 540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the standard two-speed motorboard and a new seven tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

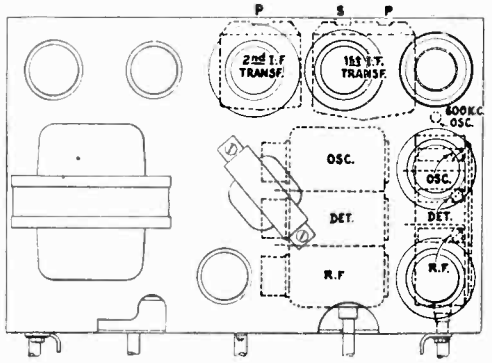


Figure C—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, and RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2400 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (a) and (b).

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Fidelity—A link is provided in the filter circuit connected across the plates of the Radiotron RCA-53. Opening this link increases the high frequency range of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

MODEL 330
Schematic, Voltage

RCA-VICTOR CO., INC.

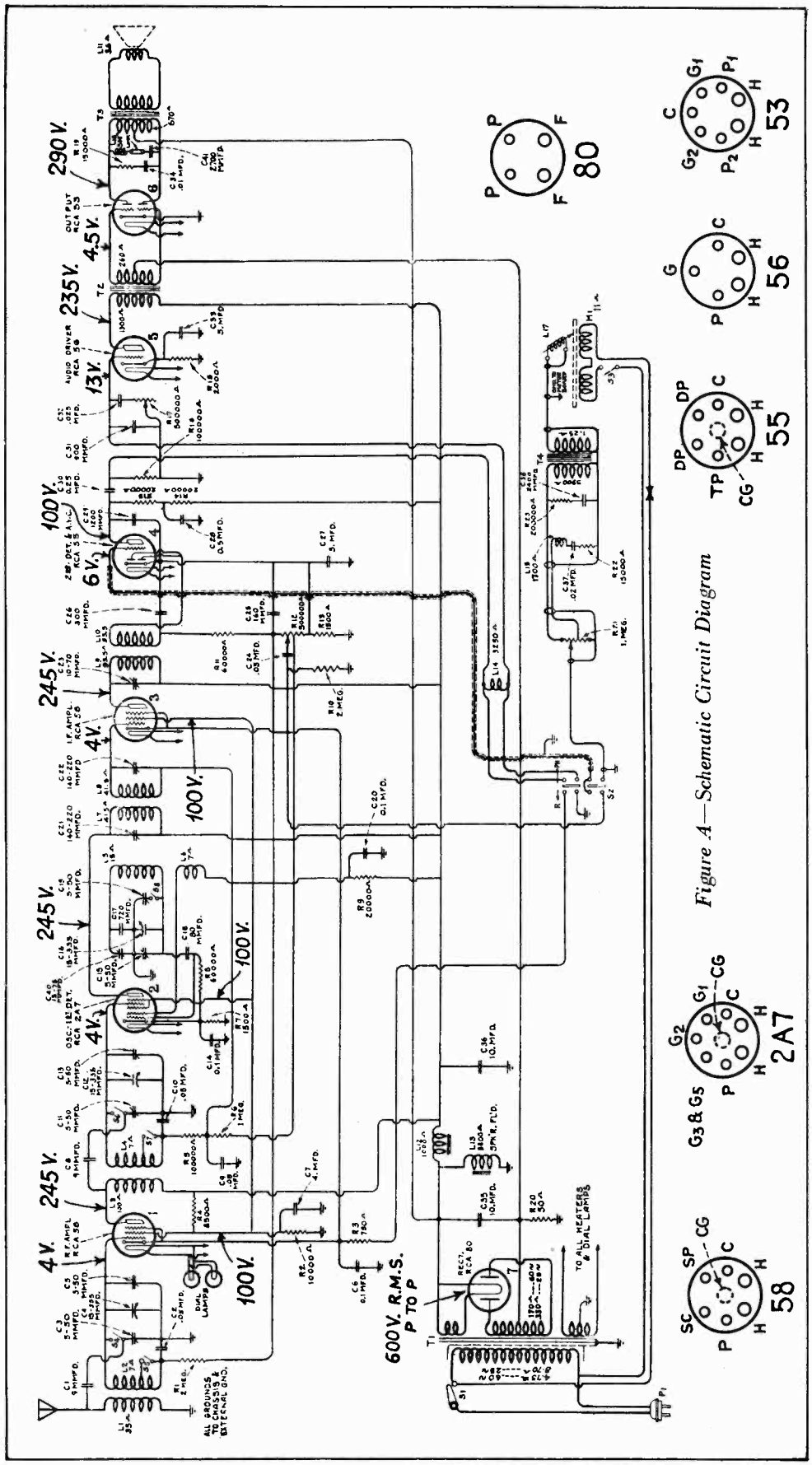


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 330
Chassis wiring

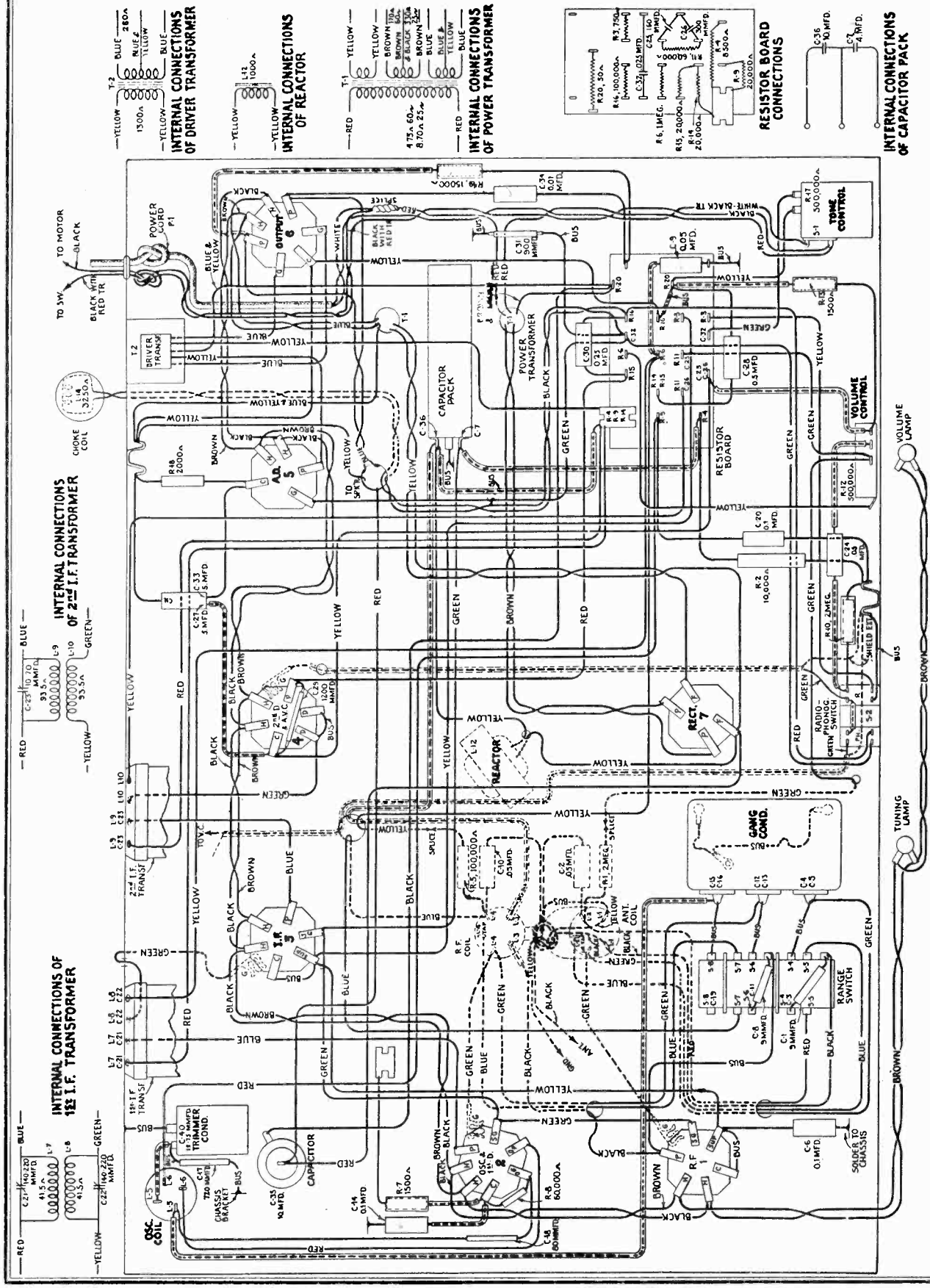


Figure B—Receiver Wiring Diagram

MODEL 330
Assembly wiring

RCA-VICTOR CO., INC.

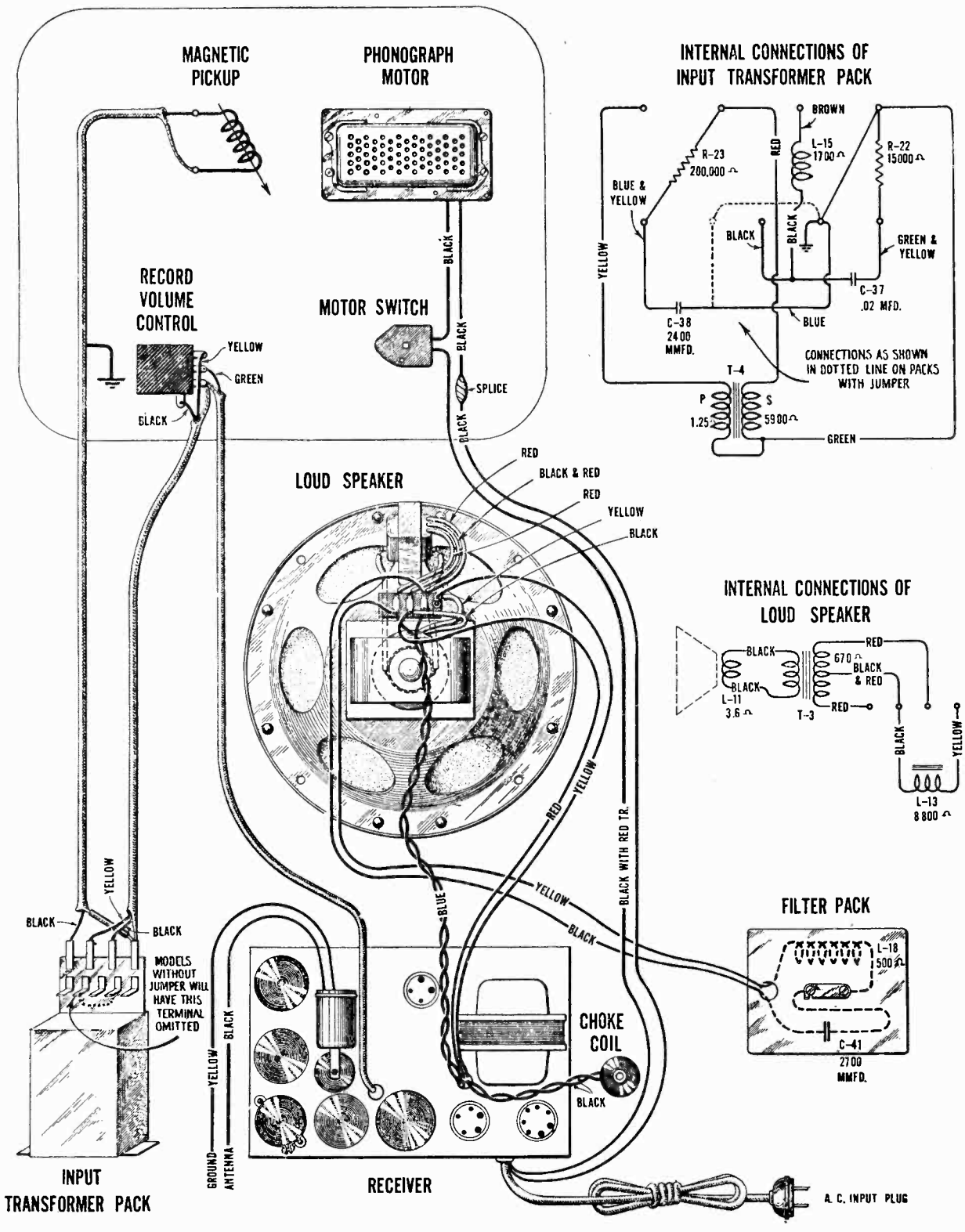


Figure D—Assembly Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 330
Pickup data

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by meaes of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. This pickup output is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pick-up cover by removing the center holding screw and needle screw.

(b) Remove the pick-up magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

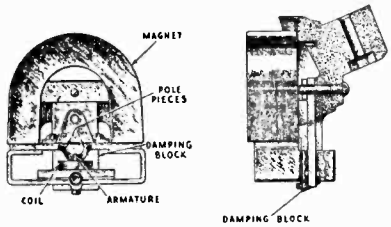


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered, being careful not to use too much heat as damage to the damping block may result.

The damping block must be removed and then the rear pivot rubber may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pick-up returned to the tone arm.

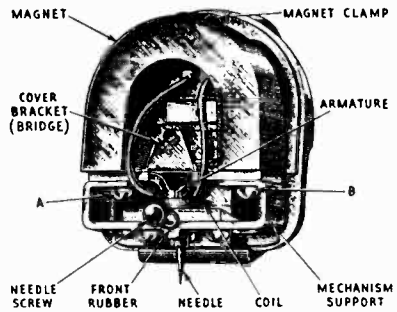


Figure G

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pick-up as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pick-up should then be reassembled as described in the preceding section.

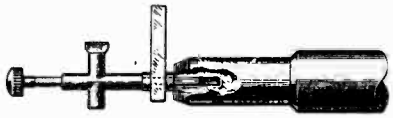


Figure H

Only rosin core solder should be used for any soldering in conjunction with the pick-up. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

MODEL 330
Parts List

RCA-VICTOR CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—C17	$0.75
3047	Resistor—1500 ohms—Carbon type—½ watt—Pkg. of 5—R-7, R-13	1.00
3076	Resistor—1 megohm—carbon type—½ watt—Pkge of 5—R6	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Pkge of 5—R5, R16	1.00
3459	Capacitor—80 mmfd.—C18	.44
3460	Capacitor—1200 mmfd.—C29	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkge of 5—R-18	1.00
3536	Capacitor—Comprising two 5.0 mfd.—C27, C33	1.10
3555	Capacitor—0.1 mfd. C6	.36
3572	Socket—7 contact radiotron socket	.38
3584	Ring—Antenna, R.F. or oscillator coil retaining ring—Pkge of 5	.40
3592	Knob—Station selector, radio-phonograph switch or volume control knob—Pkge of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkge of 5—R-8	1.00
3616	Capacitor—300 mmfd.—C26	.34
3623	Shield—Antenna or R.F. coil shield	.30
3627	Knob—Range switch or tone control knob—Pkge of 5	.75
3630	Resistor—10,000 ohms—Carbon type—3 watt—R2	.25
3634	Capacitor—160 mmfd.—C25	.34
3640	Capacitor—.05 mfd.—C2, C9, C10, C24	.25
3641	Capacitor—0.1 mfd. C14, C20	.35
3719	Socket—7 contact radiotron socket—Output	.30
3761	Scale—Volume control dial scale	.60
3765	Capacitor—.025 mfd.—C32	.34
3769	Resistor—750 ohms—Carbon type—½ watt—Pkge of 5—R3	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type—R20	.34
3771	Resistor—8500 ohms—Carbon type—3 watt—R4	.25
3772	Capacitor—0.5 mfd.—C28	.32
3773	Capacitor—0.25 mfd.—C30	.36
3783	Capacitor—9 mmfd.—Pkge of 2—C1, C8	.50
3784	Capacitor—900 mmfd. C31	.30
3787	Capacitor—.01 mfd.—C34	.30
3788	Coil—High frequency compensator choke coil—L14	1.00
3814	Socket—Station selector or volume control lamp socket	.32
6188	Resistor—2 megohm—Carbon type—½ watt—Pkge of 5—R1	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkge of 5—R19	1.00
6282	Resistor—60,000 ohms—Garbon type—½ watt—Pkge of 5—R11	1.00
6300	Socket—4 contact radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkge of 5—R9, R14, R15	1.00
6471	Coil—Oscillator coil—L5, L6	.74
6527	Coil—Antenna coil—L1, L2	1.08
6528	Coil—R. F. coil assembly—L3, L4	.94
6551	Transformer—Audio driver transformer—T2	1.48
6552	Reactor—Filter reactor—L12	1.04
6553	Transformer—First intermediate frequency transformer—L7, L8, C21, C22	1.56
6554	Transformer—Second intermediate frequency transformer L9, L10, C23	1.64
6555	Capacitor Assembly—Comprising one 10 mfd. and one 4 mfd. capacitor—C7, C36	1.64
6557	Scale—Station selector dial scale	.78
6593	Condenser—3 gang variable tuning condenser	3.25
6594	Volume Control—R12	1.40
6595	Tone Control—R17	1.46
6596	Switch—Range switch	1.25
6597	Switch—Radio phonograph switch	1.10
6674	Output Filter—Comprising reactors and capacitor—L18, C41	1.60
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.—C40	.50
7484	Socket—5 contact radiotron socket	.35
7485	Socket—6 contact radiotron socket	.40
7590	Capacitor—10 mfd.—C35	1.40
9026	Transformer—Power transformer—105-125 volt—50-60 Cycles—T1	4.80
9035	Transformer—Power transformer—105-125 volts—25-40 cycles	6.00

Stock. No.	DESCRIPTION	List Price
	MISCELLANEOUS	
3322	Switch—Automatic brake switch with mounting screws	$0.75
3391	Motor board suspension spring assembly—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
3430	Box—Needle box with lid—Pkge of 2	.90
3824	Nut—Cap nut—Pkge of 4	.82
6288	Knob—Phonograph volume control knob—Pkge of 5	1.00
6560	Volume Control—Phonograph volume control—R21	1.60
6657	Cable—Two conductor shielded cable—From transformer pack to volume control	.20
7632	Transformer Pack—Comprising input transformer, two reactors, one 2400 mmfd., one 300 mmfd., one .02 mfd. capacitors, one 200,000 ohm, one 15000 ohm resistor—In metal container—T4, L5, L16, C37, C38, C39, R22, R23	5.45
10174	Springs—Automatic brake springs—Pkge of 4	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Pkge of 5	.40
	MOTOR ASSEMBLIES	
3398	Motor Mounting Assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—105-125 volts—60 cycles	18.52
8990	Motor—105-125 volts—50 cycles	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—105-125 volts—25 cycles	23.36
	PICKUP AND PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw Assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Pkge of 10	.60
3389	Rod—Automatic brake trip rod—Pkge of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Cover mounting screw—Pkge of 10	.40
3516	Damper Assembly—Comprising 1 upper and 1 lower drawer, 1 upper and 1 lower bearing—For pickup base	.14
3521	Cover—Pickup back cover	.18
3737	Damper—Viscoloid damping block—Pkge of 5	.65
6346	Back—Pickup housing back	.45
6601	Pickup—Magnetic pickup complete	4.54
6602	Coil—Pickup coil—L17	.65
7659	Arm—Pickup arm complete less pickup and escutcheon	4.60
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Pkge of 2	.56
3341	Pin—Groove pin—Pkge of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkge of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Pkge of 2	.70
3346	Bushing—Speed shifter lever brushing—Pkge of 4	.66
3347	Spring—Speed shifter lever spring—Pkge of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable Complete	5.50
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Pkge of 5	.50
6556	Transformer—Output transformer—T3	1.50
8969	Cone—Reproducer cone—L11—Pkge of 5	6.35
9434	Coil Assembly—Comprising field coil magnet and cone support—L13	4.66

RCA-VICTOR CO., INC.

MODEL 331
Voltage, Alignment
Trimmer location

Voltage Rating.....105–125 Volts
Frequency Rating.....25, 30, 40, 50, and 60 Cycles.
Power Consumption.....25 Cycle–115 Watts:
30 Cycle–115 Watts; 40 Cycle–125 Watts;
50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons...2 RCA-58, 1 RCA-2A7, 1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output.....5 Watts
Frequency Range.....540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the new perfected automatic record changing mechanism and a new seven tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

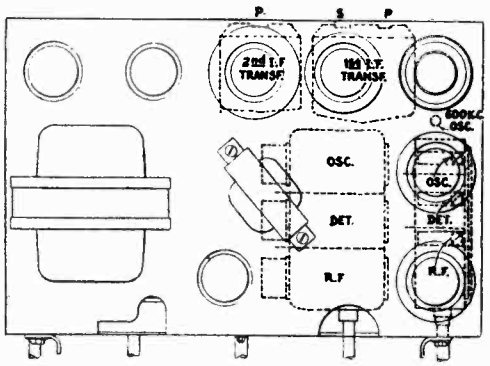


Figure B—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure C the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under A and B.

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

Fidelity—A link is provided in the filter circuit connected across the plates of Radiotron RCA-53. Opening this link increases the bigh frequency output of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

MODEL 331
Schematic

RCA-VICTOR CO., INC.

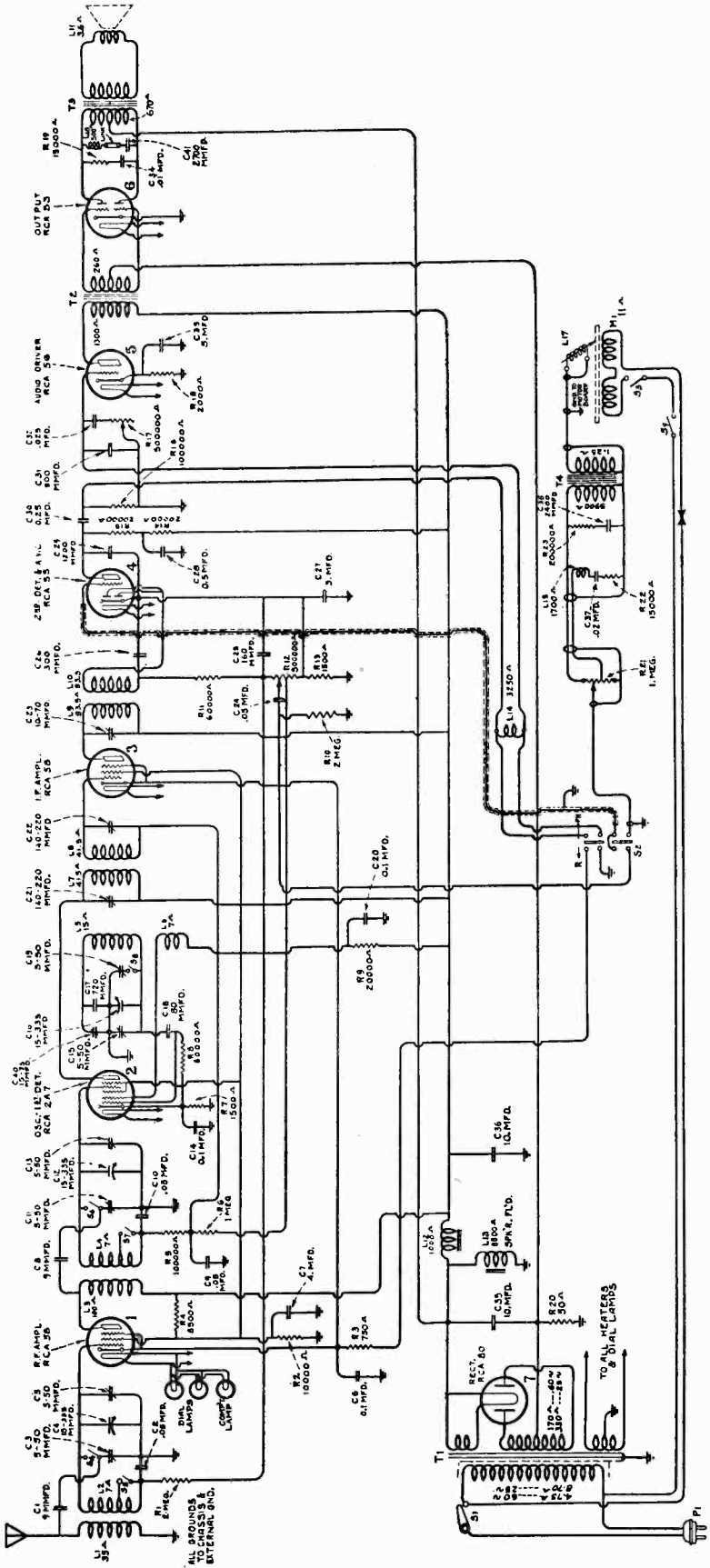


Figure A—Schematic Circuit Diagram

RCA-VICTOR CO., INC.

MODEL 331
Chassis wiring

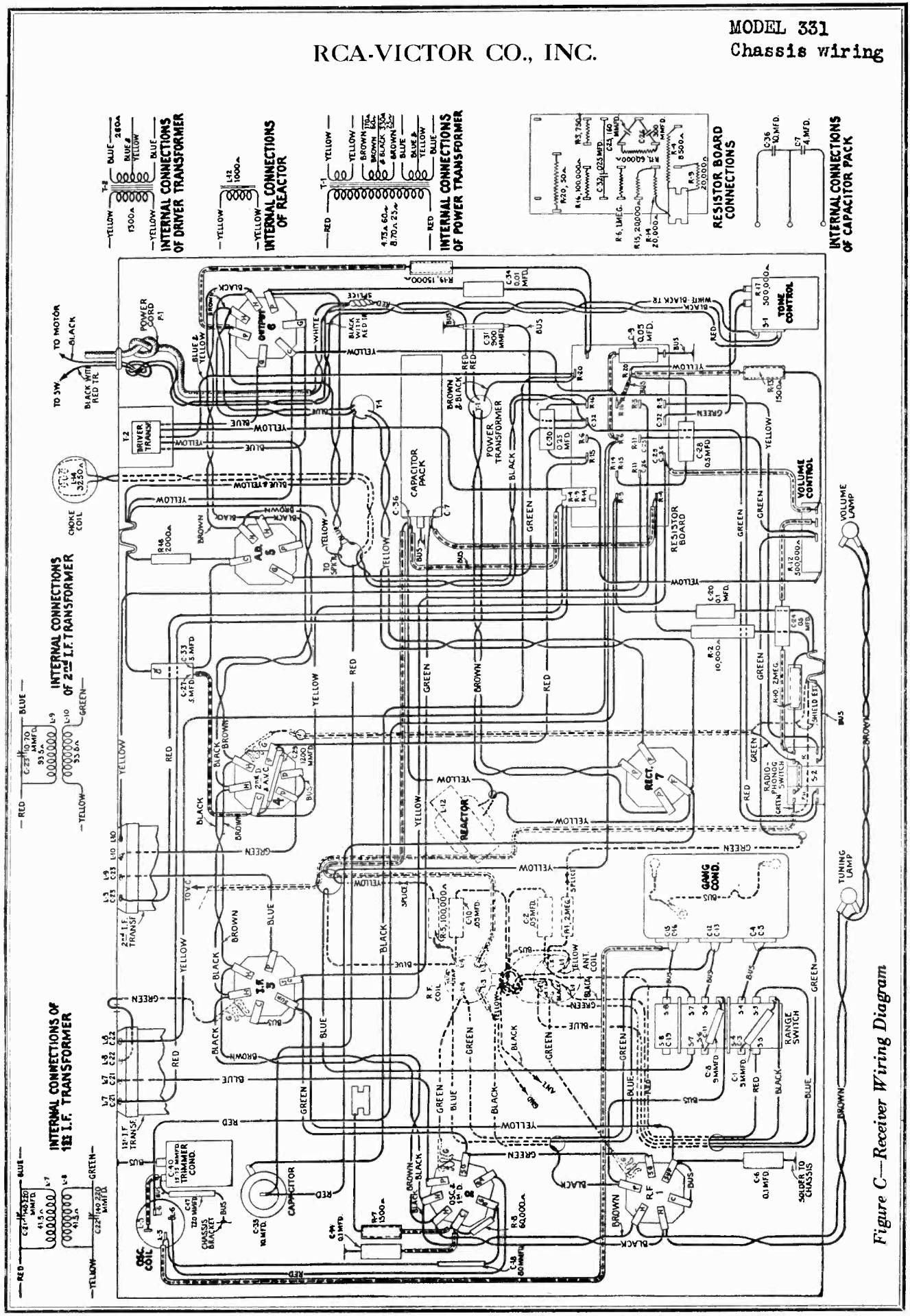


Figure C—Receiver Wiring Diagram

MODEL 331
Assembly wiring

RCA-VICTOR CO., INC.

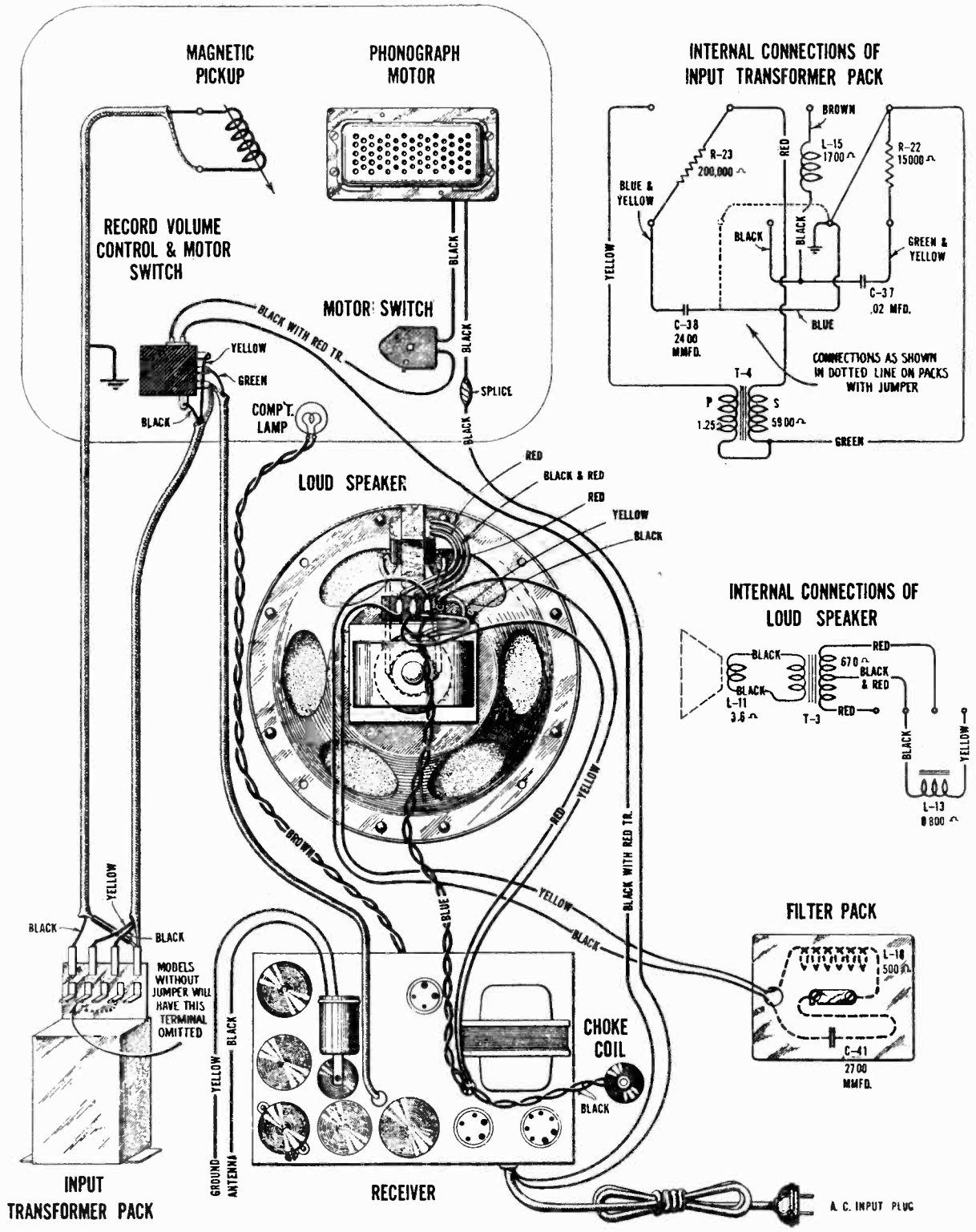


Figure D—Assembly Wiring Diagram

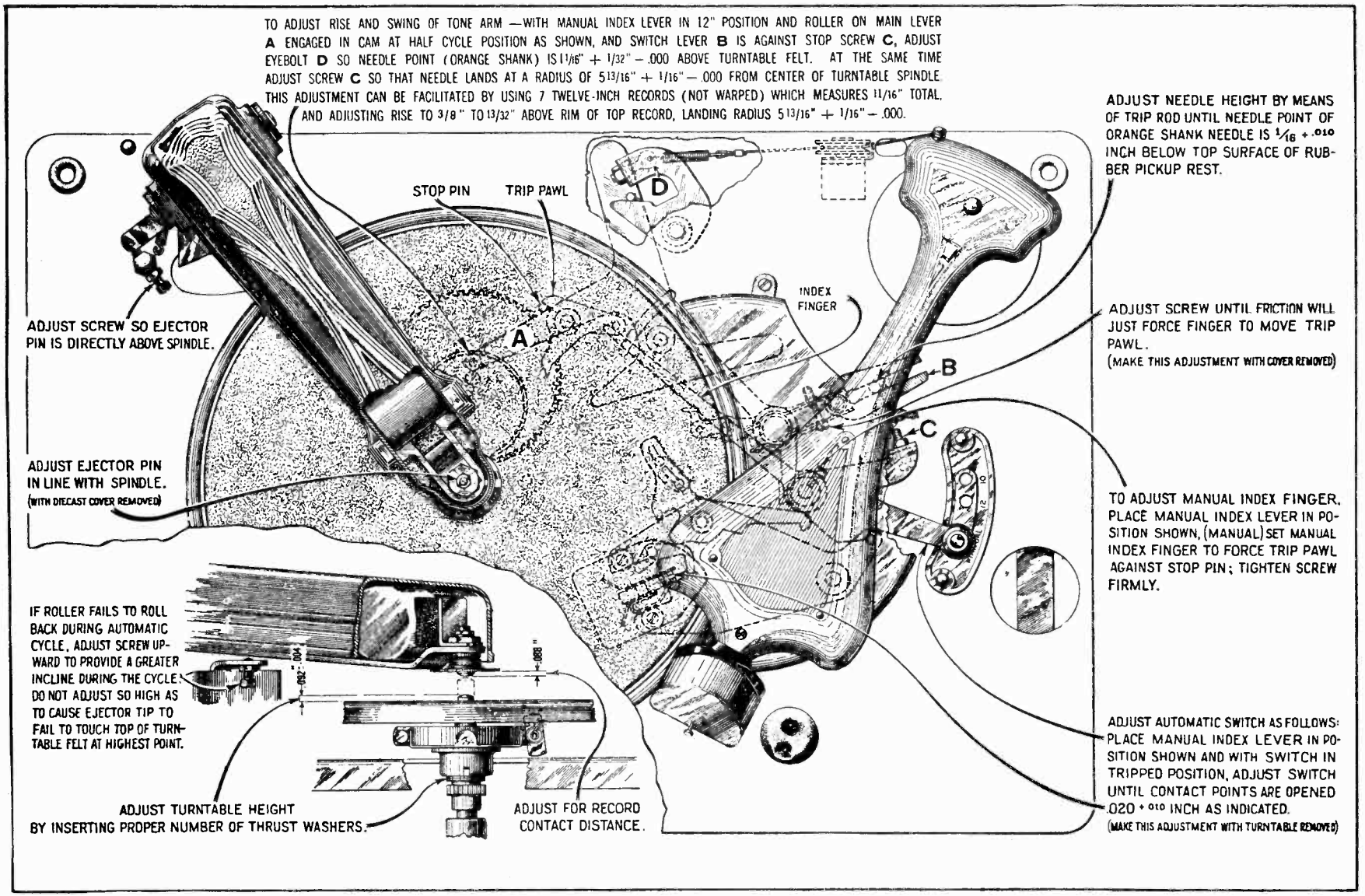


Figure E—Automatic Record Changer Adjustments

MODEL 331
Parts List

RCA-VICTOR CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Pkg. of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd.	.44
3460	Capacitor—1,200 mmfd.	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
3536	Capacitor—Filter capacitor—Two 5.0 mfd.	1.10
3555	Capacitor—0.1 mfd.—R. F. and I. F. Bias	.36
3572	Socket—7 contact Radiotron socket—Oscillator	.38
3584	Ring—Antenna, R. F. and oscillator coil retaining ring—Package of 5	.40
3592	Knob—Station selector, volume control, or radio-phonograph knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3615	Knob—Range switch or tone control knob—Package of 5	.60
3616	Capacitor—300 mmfd.	.34
3622	Shield—Radiotron shield—Second detector	.36
3624	Socket—Station selector or volume control lamp socket and bracket assembly	.40
3630	Resistor—10,000 ohms—Carbon type—3 watt	.25
3634	Capacitor—160 mmfd.	.35
3640	Capacitor—0.05 mfd.	.34
3641	Capacitor—0.1 mfd.	.25
3682	Shield—Radiotron shield—Oscillator and 1st detector	.22
3719	Socket—7 contact Radiotron socket	.30
3760	Switch—Radio-phonograph—Rotary type—Double pole—Double throw	.98
3761	Scale—Volume control dial and scale assembly	.60
3762	Screw—Chassis mounting screw and washer	.32
3765	Capacitor—0.025 mfd.	.34
3766	Extension—Tone control, rotary switch, volume control, or range switch shaft extension	.36
3767	Extension—Station selector shaft extension	.36
3768	Screw—Set screw for shaft extension coupling—Pkg. of 10	.35
3769	Resistor—750 ohms—Carbon type—½ watt—Package of 5	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type	.34
3771	Resistor—8,500 ohms—Carbon type—3 watt	.25
3772	Capacitor—0.5 mfd.	.32
3783	Capacitor—9 mmfd.—Package of 2	.50
3784	Capacitor—900 mmfd.	.30
3787	Capacitor—0.01 mfd.	.30
3788	Coil—High frequency compensator choke coil	1.00
3789	Shield—Radiotron shield—R. F. and I. F.	.25
6188	Resistor—2 megohm—Carbon type—½ watt—Pkg. of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5	1.00
6471	Coil—Oscillator coil	.74
6485	Volume control with mounting nut	1.20
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil	.94
6534	Switch—Range switch	1.25
6551	Transformer—Driver transformer	1.48
6552	Reactor—Filter reactor	1.04
6553	Transformer—First intermediate frequency transformer	1.56
6554	Transformer—Second intermediate frequency transformer	1.64
6555	Capacitor assembly—Comprising one 10.0 mfd. and one 4.0 mfd. capacitors	1.64
6557	Scale—Dial and dial scale—Tuning capacitor	.78
6559	Tone control complete with mounting nut	1.60
6648	Capacitor—0.25 mfd.	.42
6674	Output Filter—Comprising reactor and capacitor	1.60
7062	Capacitor—Adjustable trimming capacitor	.50
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7588	Condenser—3 gang variable tuning condenser	2.85
7590	Capacitor—10.0 mfd.	1.40
9026	Transformer—Power transformer 105–125 volt 50–60 cycle	4.80
9035	Transformer—Power transformer 105–125 volt 25–40 cycle	6.00
	MISCELLANEOUS	
3759	Receptacle—Needle receptacle with mounting screws	.50
3763	Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, 2 springs, one "C" washer, and one cap nut	.42
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
6288	Knob—Phonograph volume control knob—Package of 5	1.00
6560	Volume control—Phonograph volume control	1.60
6576	Cable—Shielded two conductor cable from phonograph volume control to transformer pack	.32
6646	Socket and base assembly—For compartment lamp	.60
6647	Shade—Compartment lamp shade	.30
6649	Escutcheon—Station selector—Package of 2	.44
6650	Escutcheon—Volume control—Package of 2	.44
7632	Transformer pack—Comprising input transformer, two reactors, one 2,400 mmfd., one 300 mmfd., one 0.02 mfd. capacitors, one 200,000 ohm and one 15,000 ohm resistor—In metal container	5.45
10241	Box—Needle box with lid—Package of 2	.69

Stock No.	DESCRIPTION	List Price
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	$0.50
6556	Transformer—Output transformer	1.50
8969	Cone—Reproducer cone—Package of 5	6.35
9434	Coil assembly—Comprising field coil, magnet and cone support	4.66
	AUTOMATIC RECORD CHANGER EJECT ARM ASSEMBLIES	
2917	Washer—Spring washer—Package of 10	.25
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3660	Shaft—Eject arm shaft	.40
3661	Yoke—Eject arm yoke assembly	.80
3662	Plate—Ejector plate and felt pad—Package of 5	.95
3663	Spring—Eject arm horizontal action tension spring—Package of 10	.50
3665	Screw—Eject arm adjustment screw and nut—Package of 5	.25
3729	Roller—Counter balance roller—Located inside of eject arm	.45
3930	Cushion—Counter balance roller stop Cushion and bracket Located inside of eject arm	.18
6575	Cover—Eject arm cover	.90
7605	Arm—Eject arm assembly complete	4.30
	MOTOR ASSEMBLIES	
9011	Motor—Motor complete 105–125 volts—60 cycles	19.72
9012	Motor—Motor complete 105–125 volts—25 cycles	24.16
9013	Motor—Motor complete 105–125 volts—40 cycles	24.16
9014	Motor—Motor complete 105–125 volts—50 cycles	19.72
9015	Rotor and shaft for 60 cycle motor	7.00
9017	Rotor and shaft for 25 cycle motor	9.00
9019	Rotor and shaft for 40 cycle motor	9.00
9021	Rotor and shaft for 50 cycle motor	7.00
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever tension spring—Package of 10	.30
2897	Screw—Cable lever tension spring adjustment screw and nut—Package of 5	.50
3322	Switch—Motor switch complete	.75
3653	Spring—Phosphor bronze—Trip pawl spring—Package of 5	.30
3654	Roller—Guide roller assembly—Comprising bracket, roller, and guide pin	.34
3666	Spring—Cable lever tension spring—Package of 10	.44
3667	Plate—Actuating plate assembly	.42
3669	Screw—Special screw for holding main lever to actuating plate—Package of 5	.25
3670	Finger—Friction finger assembly	.32
3671	Lever—Manual index lever	.45
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3674	Escutcheon—Engraved MANUAL 12-10	.32
3675	Lever—Trip lever assembly	.90
3676	Spring—Cam and gear tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
3777	Motor mounting spring, washer, and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs—Package of 1 set	.62
3778	Spring—Main lever and link assembly tension spring—Package of 10	.55
6502	Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6504	Lever—Main lever and link assembly	.80
10174	Springs—Automatic brake springs—One set of four springs—Package of 2 sets of 4	.50
10184	Plate—Automatic brake latch plate—Package of 5	.40
	PICKUP AND PICKUP ARM ASSEMBLIES	
3388	Screw—Pickup needle holding screw—Package of 10	.60
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Located at bottom of pickup arm base—Package of 1 set	.14
3680	Rest—Pickup rest	.18
3728	Coil—Pickup coil	.50
3732	Cover—Pickup cover	.50
3733	Back—Pickup housing back	.60
3734	Cover—Pickup back cover	.30
3735	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3736	Rod—Automatic brake trip rod with lock nut—Pkg. of 5	.30
3737	Damper	.20
3779	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6542	Pickup—Pickup unit complete	4.15
6543	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut, and washer	4.00
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever, and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3678	Sleeve—Sleeve complete with ball race	2.24
3679	Lever—Speed shifter lever with mounting screws	.50
9010	Turntable—Complete	5.50

AMPLIFIER RACK

The amplifier rack assembly consists of the voltage amplifier, power amplifier, field supply and their various controls, mounted on a rack one above the other. Each unit consists of a vertical panel, on the rear of which are mounted the capacitors, transformers, disc rectifiers, etc., that make up the individual assemblies. The panels are in turn bolted to the rear of the iron channel frame in such a manner that each panel may be installed or removed through the front of the rack.

The Radiotron sockets in both the voltage and power amplifiers are mounted on shelves placed at right angles to the respective panels so that vertical operation of the Radiotrons is secured.

INSTALLATION

CHECKING INSTALLATION

After completion of the installation of an amplifier rack by the contractor, check all external and internal connections to the main terminal boards at the top and bottom of the rack to ascertain that the electrical work has been accurately and neatly done. Examine each carbon type resistor for breakage or open terminal connections. The volume control should operate smoothly throughout its entire range.

SETTING POWER SUPPLY SWITCHES

The voltage amplifier, power amplifier, and loudspeaker field supply panels are equipped with switches marked 110/120. These switches are used to allow for small variations in line voltage and the "ageing" characteristics of disc rectifier units. If the average line voltage at the main power supply switch is in excess of 115 volts *during operating hours*, set the switches on both the power and voltage amplifiers in the 120 volt position, while if the average line voltage under the same conditions is less than 115 volts set the switches in the 110 volt position.

In the model PB45A1 power amplifier a tumbler switch, with no marking is provided. With the operating lever in the right hand position this switch is set for 110 volts, while in the opposite direction the switch is set in the 120 volt position.

At the time of installation set the 110/120 volt switches on the loudspeaker field supply panel in the 120 volt position regardless of the line voltage. After about six months of operation the "ageing" of the rectifier units will necessitate resetting these switches in the 110 volt position. No further adjustment will be necessary.

Access to these various switches may be had by removing the cover panels on the front of the rack.

RADIOTRONS

In the case of the push-pull stages, it is good practice to match the tubes of the various stages with respect to plate current as accurately as possible. For example, if four Radiotrons UX-245 and UX-250 are available, the two of each type that match most closely with respect to plate current should be used in each stage.

The Radiotron socket voltages given in the following pages are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a Set Analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the test meter is known.

HUM ADJUSTMENT

The voltage amplifier should be adjusted to the point of minimum hum by means of the two hum adjusting potentiometers with which the voltage amplifier is equipped. The arm of the potentiometer located between the Radiotron UX-245 and the Radiotron UX-280 selects the point of cathode return of the Radiotrons UY-224-A and RCA-56 to the heater circuit and thereby regulates the hum component contributed by these Radiotrons.

The arm of the potentiometer located between the Radiotrons UX-245 selects the point of grid return of the UX-245 Radiotrons to the filament circuit and thereby regulates their hum component.

LOUDSPEAKERS

The stage loudspeakers used with the public address equipments are of the electro-dynamic type. The loudspeaker unit is mounted in a wooden directional baffle which may be suspended in a rack placed on the stage.

The speaker unit consists of a six-inch corrugated paper cone with an aluminum voice coil, a cone support, and an aluminum casting, with a four-inch square hole, which holds the cone in position on the cone support. The square opening in the aluminum casting matches a similar opening in the throat of the directional baffle.

MOUNTING LOUDSPEAKER UNIT IN DIRECTIONAL BAFFLE

To install the speaker unit in the housing at the rear of the directional baffle, proceed as follows:

(a) Place the baffle on the floor so that the widest dimension across the mouth of the baffle is parallel with the floor.

(b) Place the speaker unit in the housing so that the plug and terminal posts are toward the right and the square opening of the aluminum throat on the speaker lines up with the square opening in the throat of the baffle.

(c) Secure the speaker unit in position by means of the four bolts and nuts provided with the baffle.

LOUDSPEAKER COUPLING TRANSFORMER

The special coupling device designated as XT-736 is an impedance matching transformer having eight terminals. Each terminal is marked with an index number.

The XT-736 speaker coupling transformer in addition to allowing all loudspeakers to be connected in parallel, also will permit the speakers to be operated at different power levels. Differences in power level between speakers may be required in auditoriums having a large balcony, where it would be necessary to raise the volume level of all the speakers in order to obtain the proper level in the balcony. This would naturally result in excessive volume level in the orchestra, a condition that would be undesirable.

The taps of this transformer are so arranged that a difference in power output of 3 decibels may be obtained between the full winding and the tap marked 0.5. Also a difference of 3 decibels may be obtained between tap 0.5 and tap 0.25 and so on. Of course in working the speakers at different power levels from the same transformer some mismatching of impedance will be present.

To secure as close an impedance match as possible between loudspeakers and the coupling transformer and still get the the required difference in power level between speakers, use the following procedure for connecting the speakers to the transformer.

Connect the speakers between terminal S and certain taps such that the sum of all the index numbers used will be as close as possible to 1. The allowable limits between which the sum of these index numbers may fall is from 0.7 to 1.3.

As an example, assume that four loudspeakers are to be connected for the same power level. Connect all four in parallel between terminals S and 0.25.

Public Address Notes
Part #2

RCA-VICTOR CO., INC.

Thus the total of the index numbers used would be 4 x 0.25 or 1.0 which shows that the speakers and transformer are matched correctly for impedance. Now assume that two speakers are to operate at 3 decibels above two other speakers. Connect two in parallel between terminals S and 0.25 and connect the remaining speakers between terminals S and 0.13. The sum of the index numbers will then be 2 x 0.25 + 2 x 0.13 or 0.76. As this number falls within the allowable limits the speakers will operate satisfactorily.

PHASING LOUDSPEAKERS

When more than one loudspeaker is used it is necessary that all the speakers be in phase. That is, the motion of all cones must be in the same direction at a given instant when a signal is impressed on them. To phase the stage loudspeakers proceed as follows:

Set the volume control on the amplifier so that it is operating at high gain and producing an appreciable hum in the loudspeakers.

If the outputs of two power amplifiers are worked in parallel, the phase relation of both amplifiers must be checked before the phasing of the speakers is done. If the power amplifiers are not in phase very little sound will be obtained from any of the stage speakers as the output transformers will be working at a phase difference of 180°.

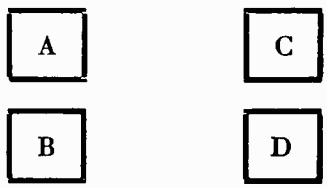


Figure A

TWO LOUDSPEAKERS

Two Speakers Mounted Side By Side—Walk across the stage in front of the two baffles from the outer edge of one to the outer edge of the other. If the sound level of the hum is approximately uniform, the loudspeakers are in phase. If the sound level is appreciably lower in the vertical plane between the two baffles than at either of their outer edges, the speakers are out of phase.

If the speakers are out of phase, reverse the voice coil connections to one of the cones.

Two Speakers Mounted One Above the Other—The procedure is similar to that for two loudspeakers mounted side by side except that the ear is moved in a vertical direction between the baffles.

FOUR LOUDSPEAKERS

Assume that the arrangement of the four loudspeakers are as shown in Figure A. The procedure for phasing the loudspeakers is as follows:

(a) Make speakers A and C inoperative by open circuiting the voice coils of both speakers.

(b) Walk across the stage in front of the two baffles, B and D, from the outer edge of one to the outer edge of the other. If the sound level of the hum is approximately uniform, the loudspeakers are in phase. If the sound level is appreciably lower in the vertical plane between the two baffles than at either of their outer edges, the speakers are out of phase. If the speakers are out of phase, reverse the voice coil connections to one of the cones.

(c) Complete the circuit to A and open circuit the voice coil in D. Phase speakers A and B by moving the ear in a vertical direction between the baffles. If the speakers are out of phase reverse the voice coil connections to A only.

(d) Complete the circuit to C and D and open circuit A and B. Phase C and D in a manner similar to that used in phasing A and B.

REPLACING THE STAGE LOUDSPEAKER CONE

To remove the old cone proceed as follows:

(a) Remove the voice coil leads from the terminal posts.
(b) Remove the center clamping screw and washer.
(c) Remove the nine bolts which hold the aluminum casting and cone to the cone support ring.
(d) Remove the aluminum casting.
(e) Remove the cone.
(f) Remove the heavy paper spacers.

To install the new cone, use the following procedure:

(a) Place the new cone on the cone support with the cone leads toward the terminal posts. See Figure B.

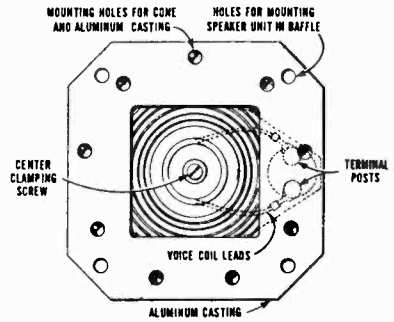


Figure B—Position of Cone in Mounting

Due to manufacturing tolerances, the dimensions of the cones and cone supports will vary. To compensate for these small variations, paper spacers are provided which can be placed either between the cone and cone support to secure proper position of the voice coil in the air gap, or between the cone and aluminum casting to obtain proper clearance (1/8 inch) between the casting and the cone, or possibly for both reasons.

If sufficient spacers are not available, additional spacers may be cut from heavy paper using one of the spacers as a template.

The number of spacers required between the cone and cone support should be such that the cone center will just touch the boss on the center field pole.

The number of spacers required between the cone and the aluminum casting should be such that the cone is 1/8 inch from the conical surface of the casting. To measure this distance, place a rule against the side of the square opening in the aluminum casting and push the rule down until it just touches the cone. The clearance between the cone and casting should be checked at all four surfaces of the casting.

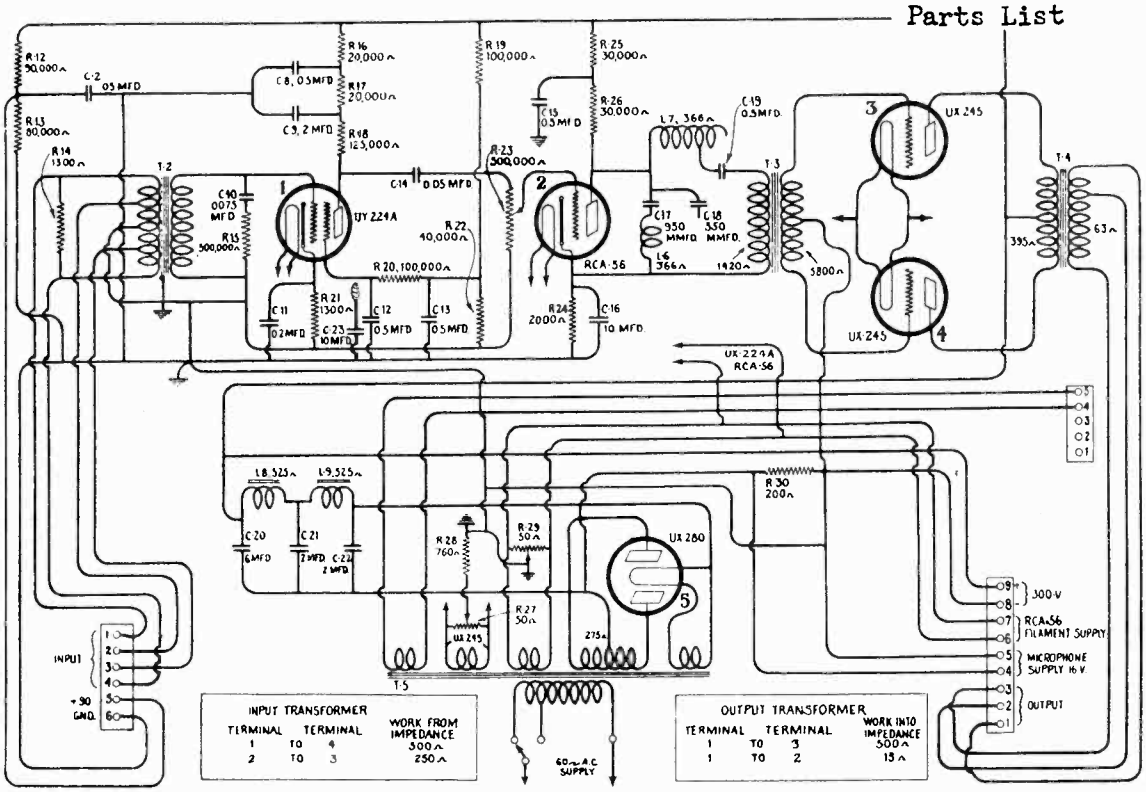
(b) With the center clamping screw out, bolt the casting, spacers and cone loosely to the cone support. Then adjust the relative positions of the cone, aluminum casting and the cone support until the cone is held centered by the aluminum casting. In this position you should be able to move the voice coil freely in all directions perpendicular to the axis of the field pole piece. Also the hole in the center should line up with the hole in the field pole piece. Screw down the nine bolts which hold the aluminum casting and cone in position. *Care should be taken not to shift the position of the cone while the bolts are being tightened.*

(c) Place the center clamping screw and washer in place and screw down. Be sure that the cone center is not twisted or shifted when the screw is tightened down.

IMPORTANT NOTE—The center clamping screw is not a centering screw, but is merely a holding screw to hold the cone center to the pole piece. Centering of the voice coil should be done as outlined under (a) and (b). Under no circumstances should the voice coil be centered by means of the clamping screw. To do this will distort the flexible cone center and increase the possibility of cone rattle.

RCA-VICTOR CO., INC.

MODEL PB 23 H1 Amp.
Schematic, Voltage
Parts List



Schematic Wiring Diagram

REPLACEMENT OF INPUT TRANSFORMER

Should it become necessary to replace the input transformer in the first stage of the voltage amplifier, care must be used to replace it in such a position that maximum shielding is obtained. The position of the transformer with respect to the amplifier panel which gives minimum hum is the correct position for maximum shielding.

RADIOTRON SOCKET VOLTAGES
120 Volt A. C. Line

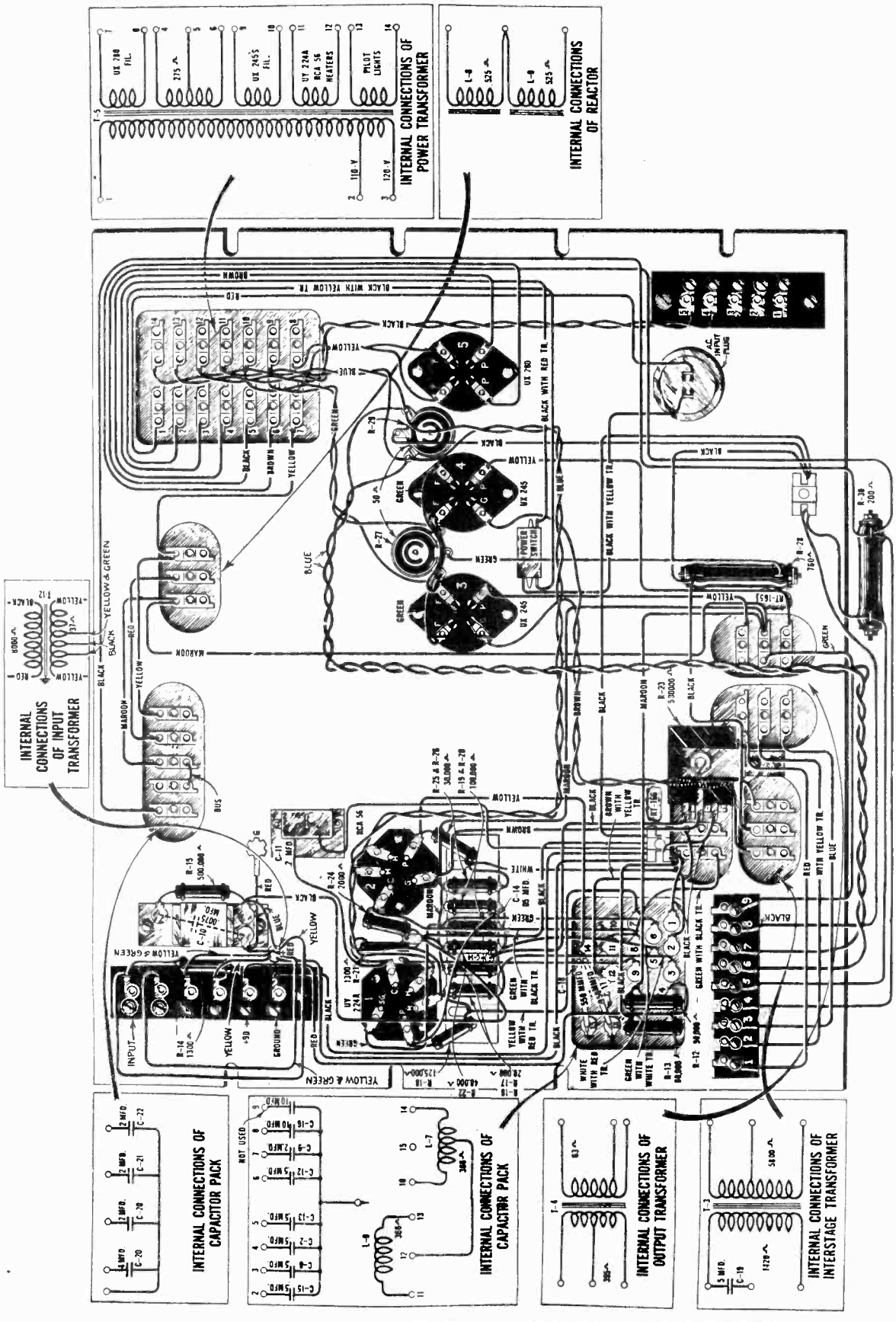
Radiotron	Control Grid Volts	Screen Grid Volts	Plate Volts	Plate Current M. A.	Filament or Heater Volts
UY-224A	1.3	45	185	.7	2.5
RCA-56	6.0	—	130	2.3	2.5
UX-245	48.0	—	250	30.0	2.5
UX-245	48.0	—	250	30.0	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb screws for securing perforated panel	$0.60
20096	Screws—One set of two thumb screws for fastening input shields	1.00
21630	Switch—Single pole, double throw toggle type switch—Mounted on tube shelf	2.00
21632	Cap—First stage Radiotron control grid cap	.75
22178	Connector—Two contact male connector	.26
22186	Resistor—760 ohm porcelain type resistor	.90
22195	Resistor—500,000 ohm carbon type resistor—½ watt	.50
22868	Resistor—80,000 ohm carbon type resistor—½ watt	.50
22932	Socket—UX type socket complete with two mounting screws, two lockwashers and two nuts	.60
23000	Capacitor—550 mmfd. fixed capacitor	1.20
23001	Resistor—90,000 ohm carbon type resistor—½ watt	.50
23002	Capacitor—950 mmfd. fixed capacitor	1.20
23003	Resistor—30,000 ohm carbon type resistor—½ watt	.50
23004	Resistor—40,000 ohm carbon type resistor—½ watt	.50
23005	Resistor—20,000 ohm carbon type resistor—½ watt	.50
23006	Resistor—100,000 ohm carbon type resistor—½ watt	.50
23007	Resistor—120,000 ohm carbon type resistor—½ watt	.50
23008	Resistor—3,000 ohm carbon type resistor—½ watt	.50
23009	Resistor—1,300 ohm carbon type resistor—½ watt	.50
23012	Potentiometer—Volume control potentiometer complete with mounting nut	6.25
23014	Potentiometer—50 ohm hum control potentiometer complete with mounting nut	2.50
23015	Capacitor—0.0075 mfd. fixed capacitor complete with two mounting screws (CX-43)	2.50
23016	Capacitor—0.05 mfd. fixed capacitor (CX-45)	2.00
23017	Socket—UX type socket complete with insulator, two mounting screws, two lockwashers and two nuts	.65
23018	Knob—Volume control potentiometer push on type knob	1.10
23019	Cable—Remote volume control contact switch cable	3.00
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-77)	25.00
25376	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-165)	$35.00
25377	Transformer—Interstage transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-166)	25.00
25381	Cushion—One set of two sponge rubber cushions for input transformer (¼" x 1" x 3⅛")	2.25
25382	Cushions—One set of three rubber cushions for input transformers (located in metal container)	5.00
25383	Board—Terminal board engraved "1, 2, 3, 4, 5" complete with five terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under power transformer)	4.50
25553	Resistor—200 ohm porcelain type resistor	1.40
25587	Transformer—Voltage amplifier input transformer—Less container (RT-188)	12.95
27328	Capacitor pack—Capacitor pack comprising three 2.0 mfd. condensers and one 4.0 mfd. condenser in metal container complete with four mounting screws, four lockwashers and four nuts (CP-31)	24.00
27459	Transformer—Power transformer (50–60 cycle) complete with four mounting screws, four lockwashers and four nuts (RT-168)	50.00
27505	Capacitor pack—Comprising two reactors, two 10.0 mfd. electrolytic condensers, one 2.0 mfd. capacitor and five 0.5 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts (CX-67)	43.10
27514	Board—Terminal board complete with nine terminals, two mounting screws, two lockwashers, two washers and two spacers (located under capacitor pack)	3.95
27515	Board—Terminal board complete with six terminals, two mounting screws, two lockwashers, two washers and two spacers	3.65

MODEL PB 23 H1 Amp
Chassis wiring

RCA-VICTOR CO., INC.

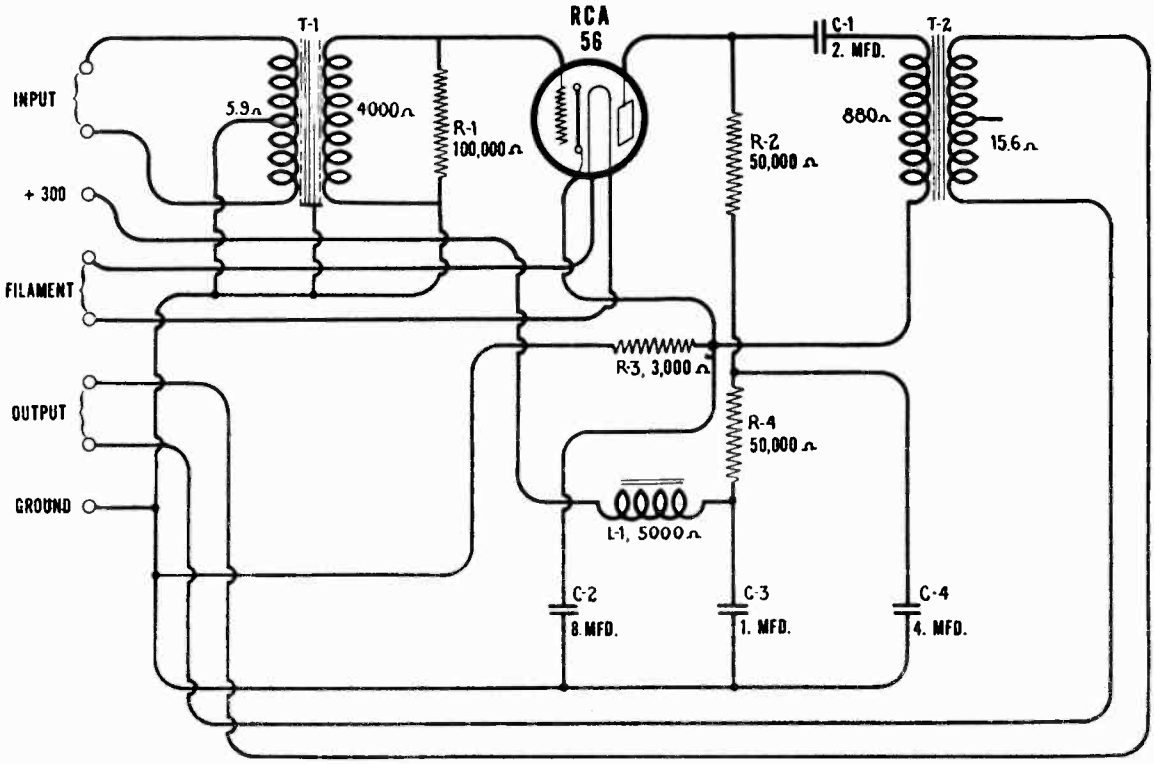


Voltage Amplifier Panel Wiring (PB23 H1)

RCA-VICTOR CO., INC.

MODEL PA 90 A1 Amp
Schematic, Voltage
Parts List

PRE-AMPLIFIER PA90A1



Schematic Wiring Diagram

PRE-AMPLIFIER

For program pick-up, or where the velocity microphone is used for any purpose except close talking, a pre-amplifier is required for each microphone. The supply voltages for one PA90 pre-amplifier may be obtained from the PB23H1 voltage amplifier. Where a larger number of pre-amplifiers is used the supply voltages are obtained from a PK24A1 power supply unit.

The pre-amplifier is designed to work from a 250 ohm source and into a 250 ohm line.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

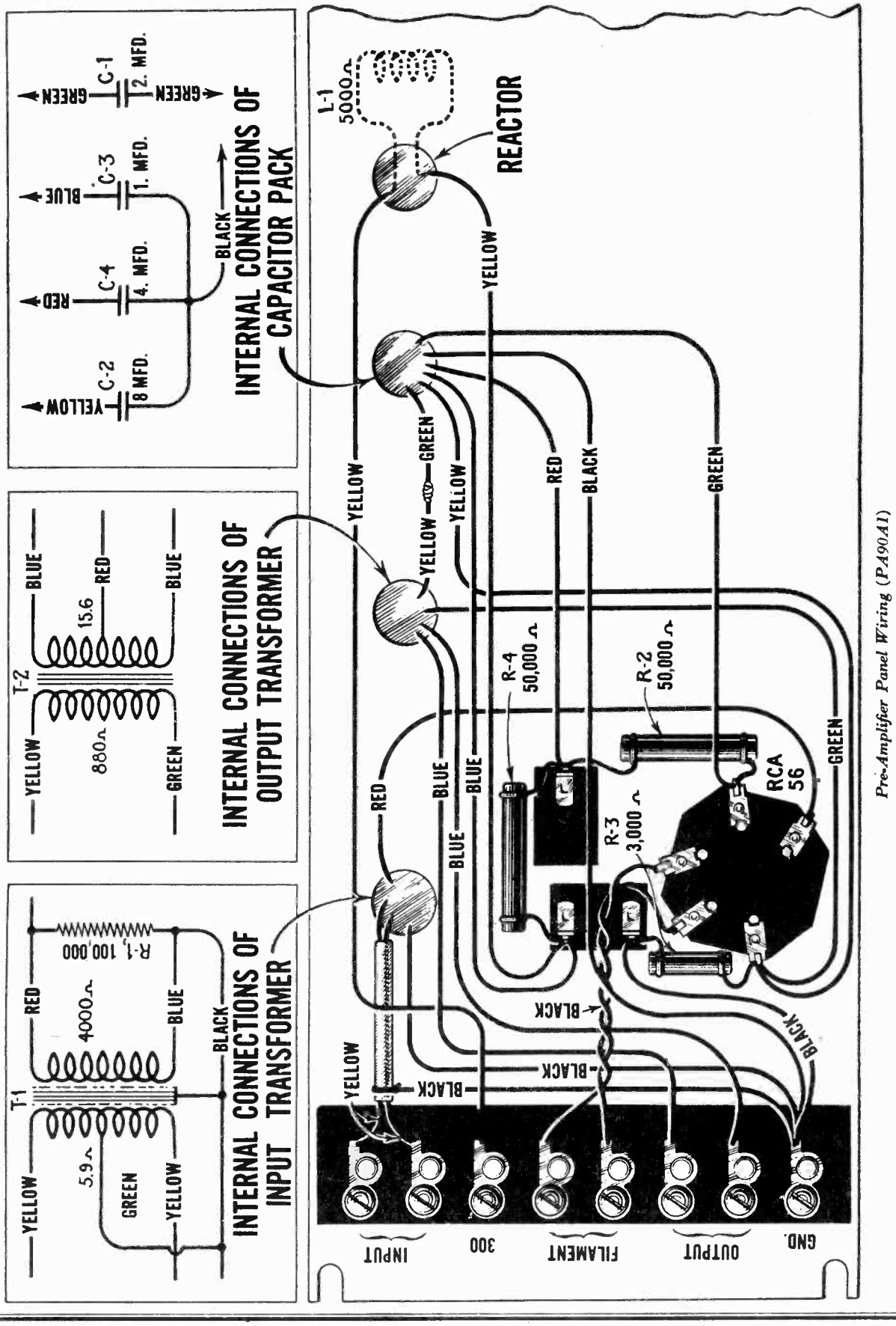
Radiotron	Control Grid Volts	Plate Volts	Plate Current M. A.	Heater Volts
RCA-56	6.0	130	2.3	2.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20141	Screws—Thumb screw for fastening Radiotron cover	$1.05
23006	Resistor—100,000 ohm input transformer loading resistor—Carbon type	.50
23008	Resistor—3,000 ohm carbon type resistor—Bias resistor	.50
23011	Resistor—50,000 ohm carbon type resistor—Plate resistor	.50
23017	Socket—UY type Radiotron socket complete with two mounting screws, two lockwashers and two nuts	.65
25382	Cushions—One set of three rubber cushions for input and output transformers	5.00
25592	Reactor—Filter reactor complete with four mounting screws, four lockwashers and four nuts (XT-552-C)	5.00
25593	Board—Terminal board complete with eight terminals, two spacers, two mounting screws, two lockwashers and two nuts	$5.20
25594	Cushion—One set of two rubber cushions for suspending tube socket shelf	.65
27516	Capacitor pack—Comprising one 8.0 mfd., one 1.0 mfd. and one 4.0 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts	12.50
27517	Transformer—Input transformer complete with leads	8.70
27518	Transformer—Output transformer complete with leads	7.90

MODEL PA 90 A1 Amp
Chassis wiring

RCA-VICTOR CO., INC.

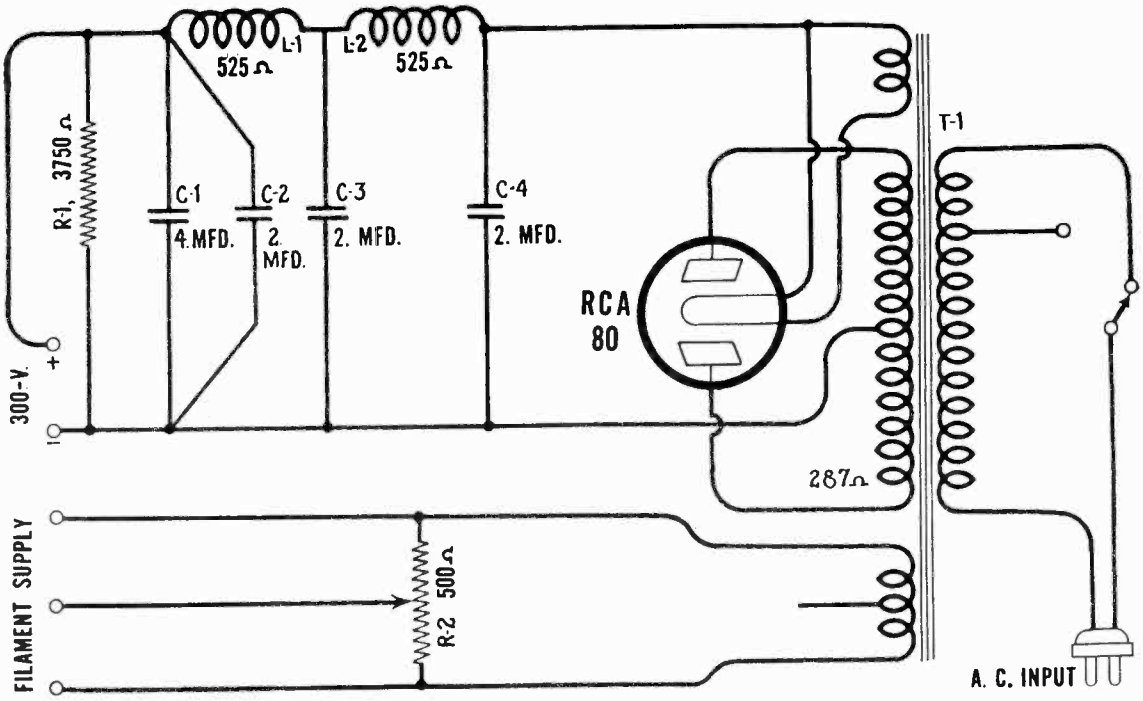


Pre-Amplifier Panel Wiring (PA90A1)

RCA-VICTOR CO., INC.

MODEL PK 23 A1 Amp
Schematic, Parts

POWER SUPPLY PANEL PK24A1



Schematic Wiring Diagram

POWER SUPPLY PANEL

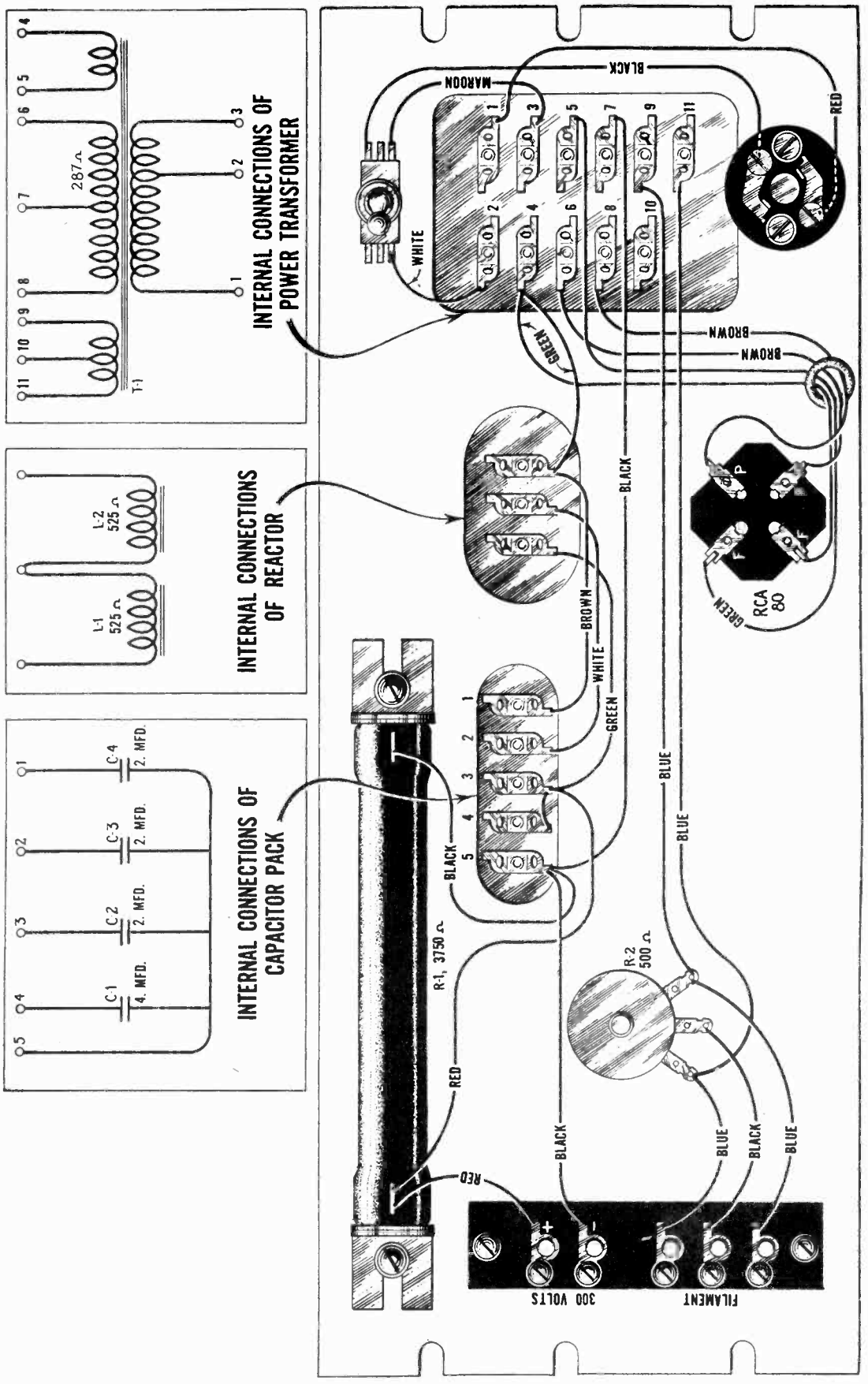
The power supply panel PK24A1 is employed as a power source for the filament and plate voltage required in the PA90A1 pre-amplifier unit, when more than one pre-amplifier is used in connection with the voltage amplifier PB23H1. This power supply panel will furnish sufficient power to operate eight pre-amplifiers.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
21630	Switch—Single pole, double throw toggle type switch—Line voltage selector switch	$2.00
22178	Connector—Two contact male connector	.26
25065	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-77)	25.00
25536	Socket—UX type Radiotron socket complete with insulator	.35
25603	Resistor—3,750 ohm porcelain type bleeder resistor	4.25
25604	Potentiometer—500 ohm potentiometer complete with nut, centering and insulating washers	1.80
27328	Capacitor pack—Comprising three 2.0 mfd. and one 4.0 mfd. capacitors in metal container complete with four mounting screws, four lockwashers and four nuts (CP-31)	$24.00
27519	Board—Terminal board complete with five terminals, two spacers, two screws, two lockwashers and two nuts	4.35
27520	Shield—Perforated metal shield complete with two mounting screws and two lockwashers	3.55
27521	Transformer—110 volt, 60 cycle power transformer complete with four mounting screws, four lockwashers and four nuts (XT-1071)	37.50

MODEL PK 23 A1 Amp
Chassis wiring

RCA-VICTOR CO., INC.



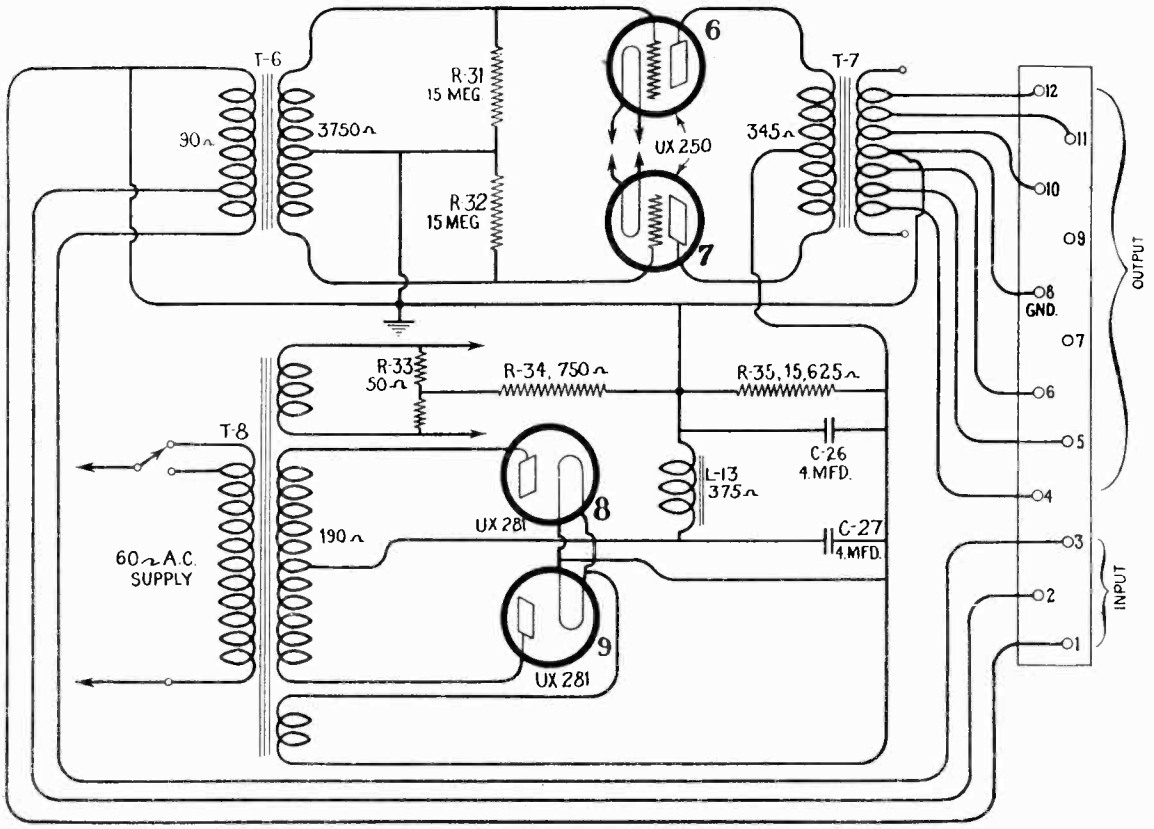
Power Supply Panel Wiring Diagram (PK24A1)

MODEL PB 24 C2 Amp
Schematic, Voltage
Parts List

RCA-VICTOR CO., INC.

POWER AMPLIFIER PB24C2

(10 Watt)



Schematic Wiring Diagram

TRANSFORMER IMPEDANCES

INPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work from Impedance in Ohms
1	2	500 Ohms
1	3	1000 Ohms

OUTPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work into Impedance in Ohms
6	10	10 Ohms
6	11	23 Ohms
5	11	40 Ohms
4	12	120 Ohms

IMPEDANCES

If an output impedance to work into 480 ohms is desired, connect terminals No. 4 and No. 12 on the output transformer to terminals No. 9 and No. 7 on the terminal board respectively

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

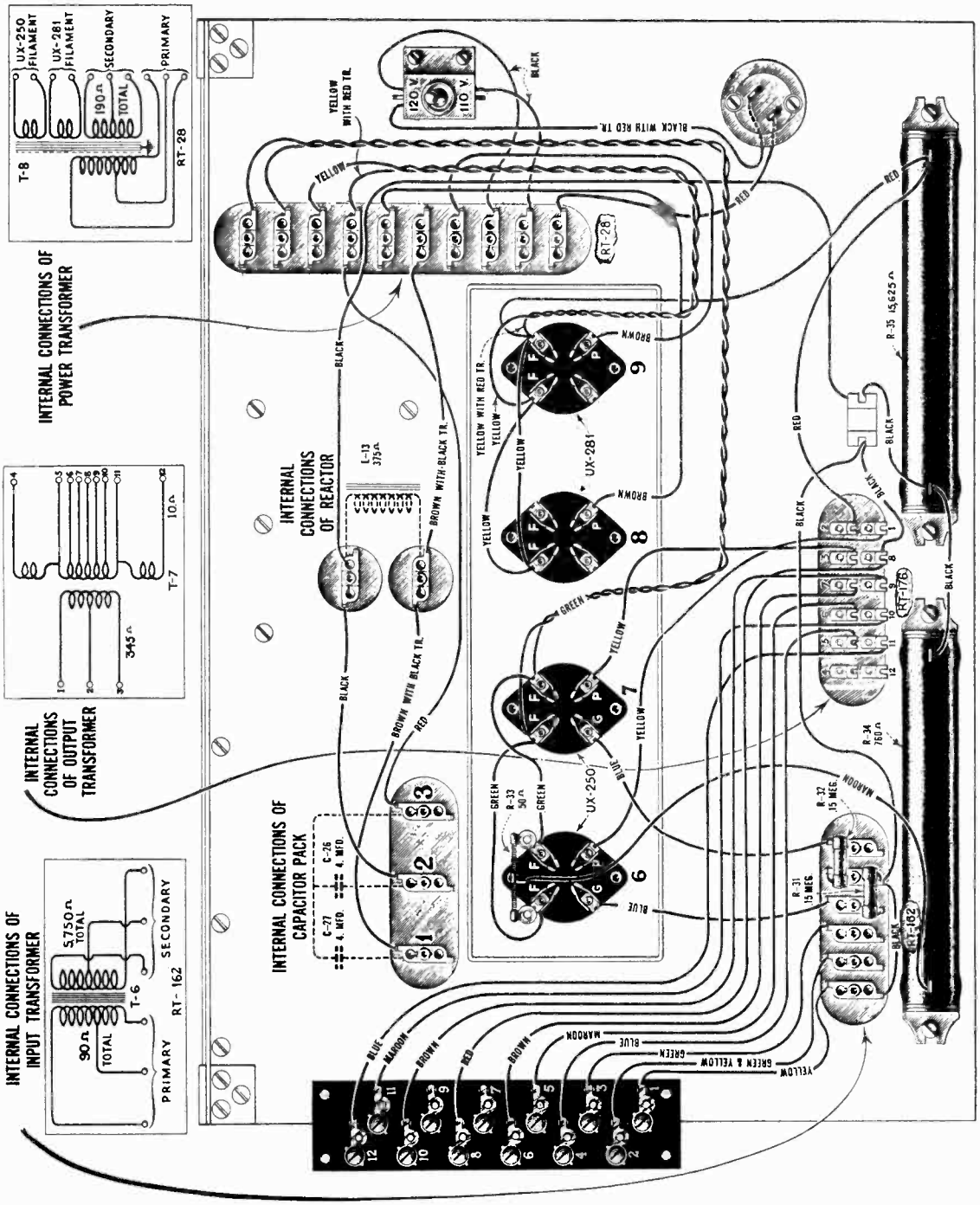
Radiotron	Control Grid Volts	Plate Volts	Plate Current M. A.	Filament Volts
UX-250	80	450	55	7.5
UX-250	80	450	55	7.5

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
21289	Resistor—750 ohm porcelain type resistor—Grid bias resistor	$2.80
21290	Resistor—15,625 ohm porcelain type resistor—Bleeder resistor	2.80
21630	Switch—Single pole, double throw toggle type switch—Line voltage regulator switch	2.00
22178	Connector—Two contact male connector	.26
22194	Resistor—50 ohm wire wound center tapped resistor	.30
22198	Resistor—150,000 ohm carbon type resistor	.50
22932	Socket—UX type Radiotron socket complete with two mounting screws, two lockwashers and two nuts	.60
24279	Reactor—Filter reactor complete with four mounting screws, four lockwashers, and four nuts (RT-20)	23.55
25379	Transformer—Input transformer complete with four mounting screws, four lockwashers and four nuts (RT-162)	$35.00
27302	Transformer—Power transformer (110 volt, 50-60 cycle) complete with six mounting screws, six lockwashers and six nuts (RT-28)	35.00
27303	Capacitor pack—Comprising two 4.0 mfd. capacitors in metal container complete with six mounting screws, six lockwashers and six nuts (CP-32)	35.00
27501	Transformer—Output transformer complete with four mounting screws, four lockwashers and four nuts (RT-176)	34.45

MODEL PB 24 C2 Amp
Chassis wiring

RCA-VICTOR CO., INC.



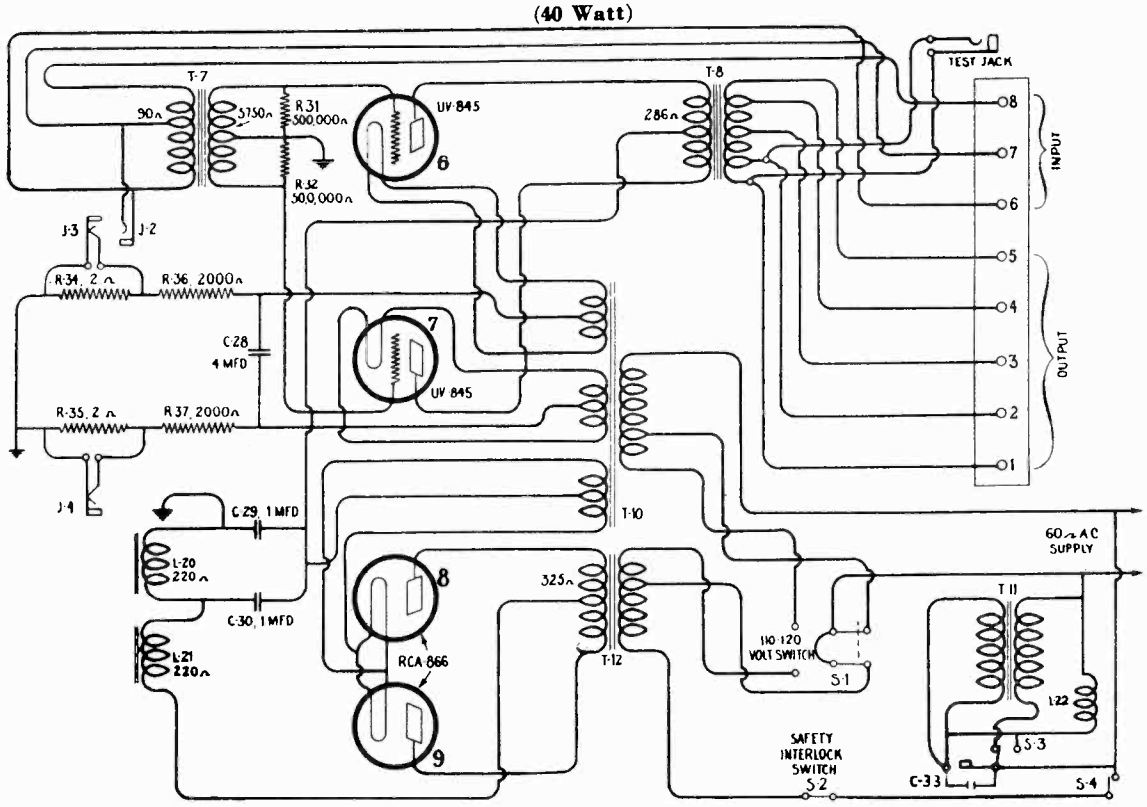
Power Amplifier Panel Wiring Diagram (PB24C2)

MODEL PB 45 A1 Amp
Parts List, Data

RCA-VICTOR CO., INC.

POWER AMPLIFIER PB45A1

(40 Watt)



Schematic Wiring Diagram

TRANSFORMER IMPEDANCES

INPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work from Impedance in Ohms
6	7	500
6	8	1000

OUTPUT TRANSFORMER

From Terminal No.	To Terminal No.	Work into Impedance in Ohms
1	5	30
1	4	15
1	3	10
1	2	3

RADIOTRONS UV-845

To measure the plate current of the Radiotrons UV-845 a low range voltmeter or a millivoltmeter is required. The meter should be connected to a Yaxley No. 75 phone plug or a similar plug and the plug inserted into the plate current metering jacks on the base of the power amplifier. The normal plate current is between 60 and 75 milliamperes. Filament voltage is 10 volts.

Two millivolts read on the test meter equals one milliampere of plate current.

RADIOTRONS UX-866

During shipment the mercury in the Radiotrons RCA-866 may spatter on the filament and plate, and therefore, when this type of tube is first placed in operation, the filament should be heated for fifteen minutes with no plate voltage applied to the tube in order to properly distribute the mercury. Heating the filament may be accomplished by removing the perforated cover from the power amplifier, which automatically opens the plate circuit of the rectifier tubes.

TIME DELAY RELAY

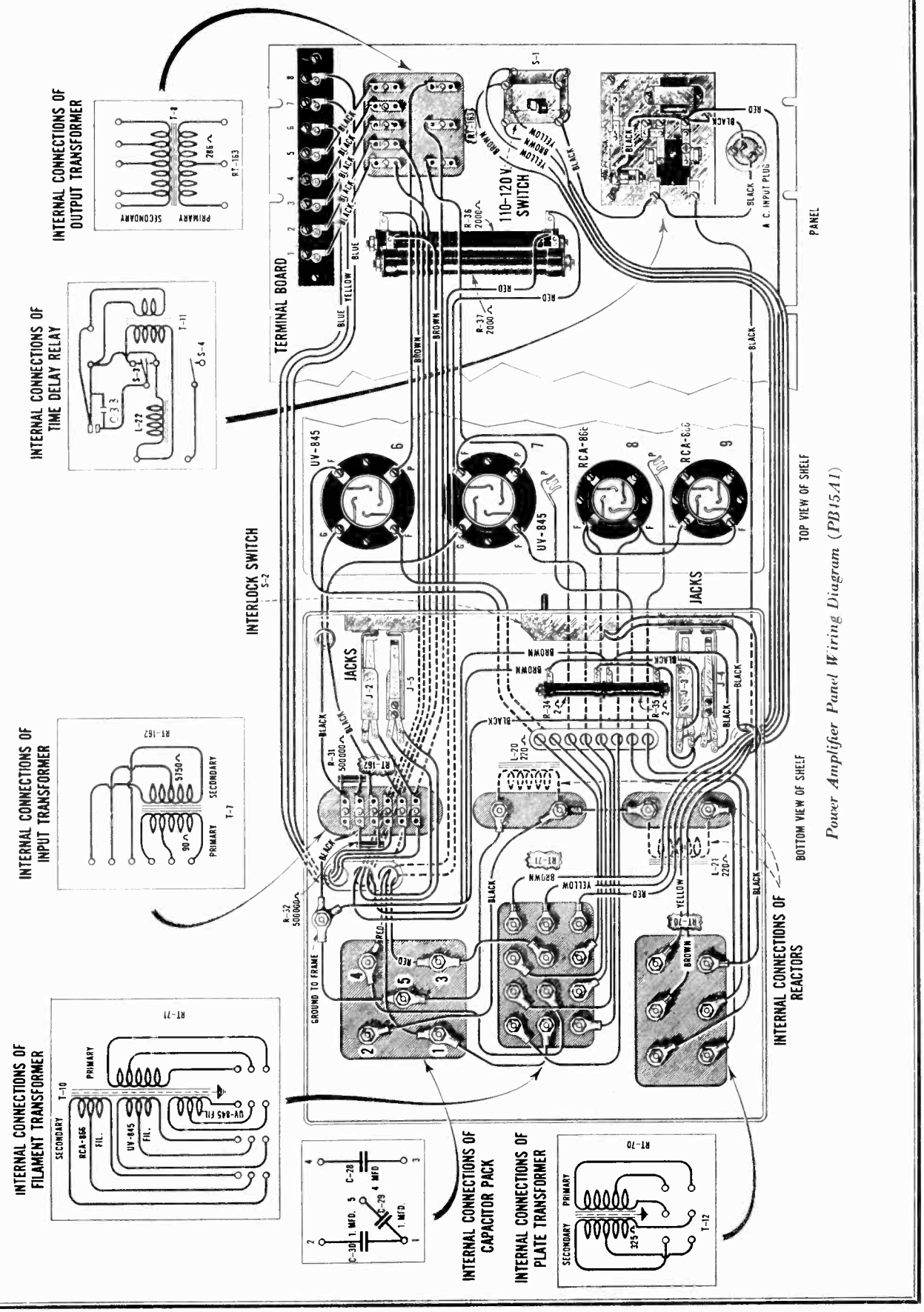
The time delay relay in the power amplifier panel should be adjusted to close in approximately 25 to 30 seconds. To increase the time delay action, the distance should be increased between the time delay contacts. To reduce the time delay action this distance should be decreased.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
20058	Screws—One set of two special thumb screws for fastening perforated covers	$0.60
22178	Connector—Two contact male connector	.26
22195	Resistor—0.5 megohm carbon type resistor—½ watt—Connected across secondaries of input transformer	.50
22613	Jack—Plate current metering jack	1.65
22616	Jack—Power amplifier input or output monitoring jack	1.50
22620	Switch—Interlock switch for power amplifier	5.00
24475	Socket—Porcelain base socket for UV-845 Radiotrons	7.00
25075	Socket—Porcelain base socket for UX-866 Radiotrons	6.00
25379	Transformer—Input transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-162)	35.00
25380	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (RT-164)	35.00
25390	Resistor—Double porcelain resistor assembly—Each resistor 2,000 ohms	7.50
25391	Resistor—2 ohm porcelain type resistor	1.95
25392	Switch—Double pole, double throw, tumbler switch—110–120 volt line switch	$3.00
25393	Board—Terminal board engraved "Output, Input" complete with eight terminals, two mounting screws, two lockwashers, two washers and two spacers	1.25
27397	Transformer—Filament transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-71)	85.00
27398	Transformer—Plate transformer in metal container complete with six mounting screws, six lockwashers and six nuts (RT-70)	85.00
27460	Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers and four nuts (RT-163)	35.00
27461	Relay—Time delay relay	23.00
27462	Capacitor pack—Capacitor pack comprising two 1.0 mfd. and one 4.0 mfd. capacitors in metal container complete with six mounting screws, six lockwashers and six nuts (CX-29)	24.75

MODEL PB 45 A1 Amp
Chassis wiring

RCA-VICTOR CO., INC.

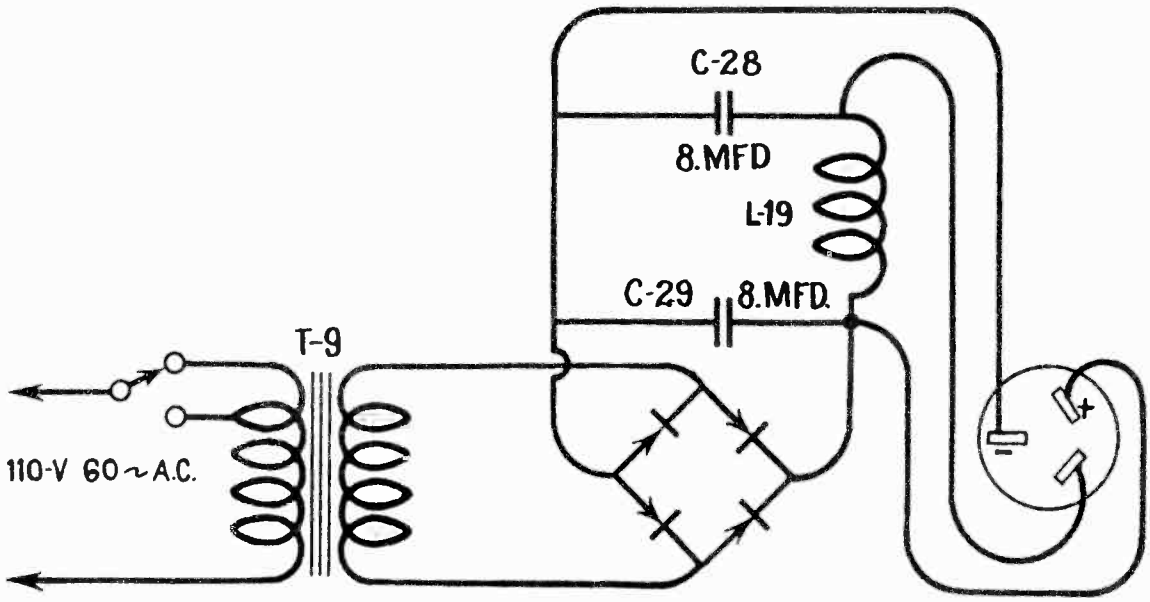


Power Amplifier Panel Wiring Diagram (PB15A1)

RCA-VICTOR CO., INC.

MODEL PK 15 B1
Speaker Field Supply
Schematic, Part List

LOUDSPEAKER FIELD SUPPLY PANEL PK15B1



Schematic Wiring Diagram

LOUDSPEAKER FIELD SUPPLY

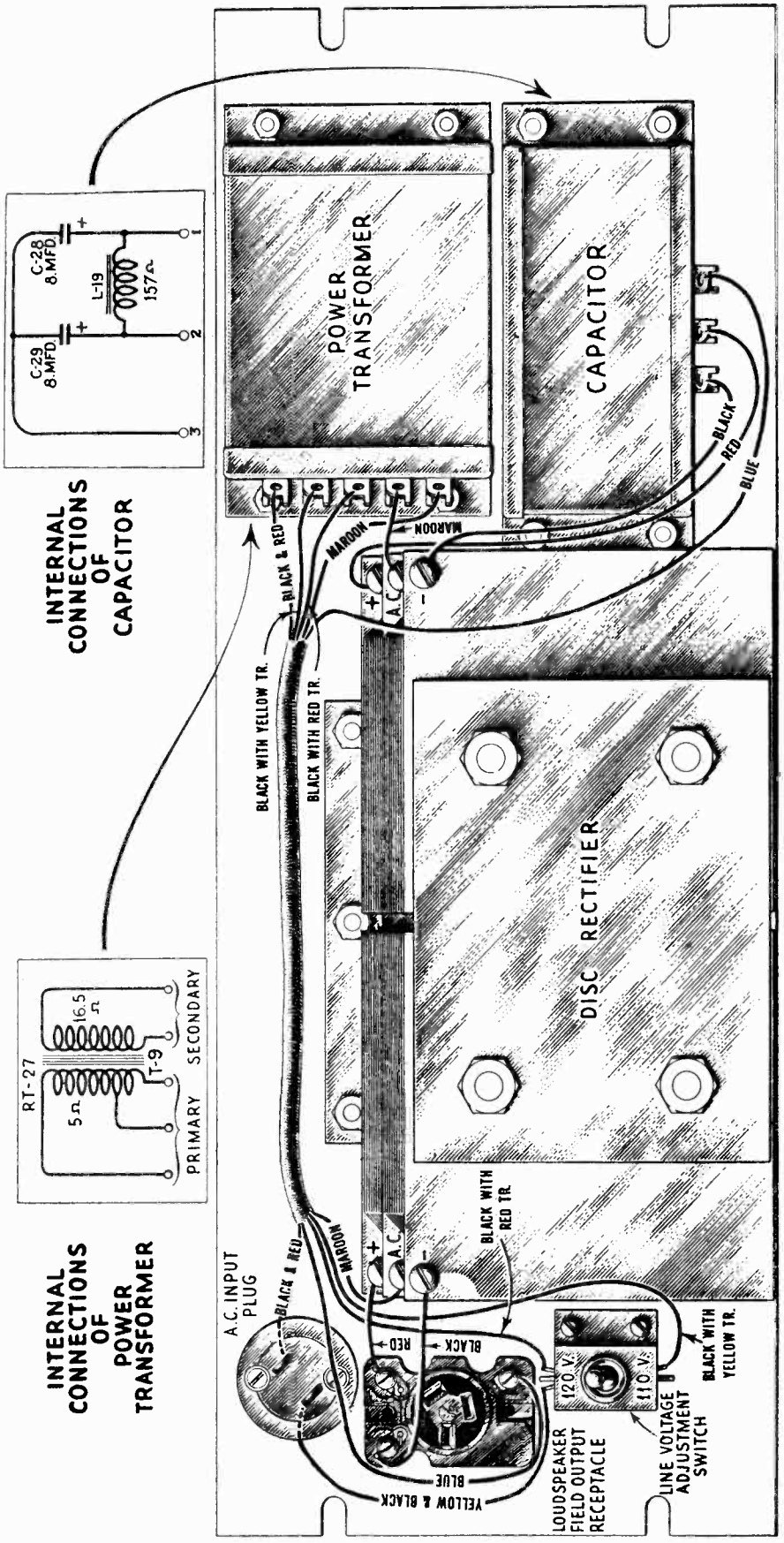
The Model PK15B1 loudspeaker field supply panel will furnish field current for five dynamic loudspeakers, each consuming 100 M. A. This unit consists of a power transformer and a dry disc rectifier for converting the A. C. to D. C. Plug type connectors are provided on the panel for making connections to the A. C. supply source and to the speaker lines.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
21630	Switch—Single pole, double throw toggle type switch—Line voltage regulator switch	$2.00	27304	Rectifier—Rectifier stack complete—Comprising four rectox units, mounting bracket, six mounting screws, six lockwashers and six nuts	$50.00
22178	Connector—Two contact male connector	.26			
24559	Receptacle—Three contact female receptacle	1.70			
24735	Transformer—Power transformer complete with four mounting screws, four lockwashers and four nuts (RT-27)	21.00	27507	Capacitor pack—Comprising two 8.0 mfd. capacitors and one filter reactor in metal container (CX-68)	19.30

MODEL PK 15 B1
Speaker Field Supply
Assembly wiring

RCA-VICTOR CO., INC.

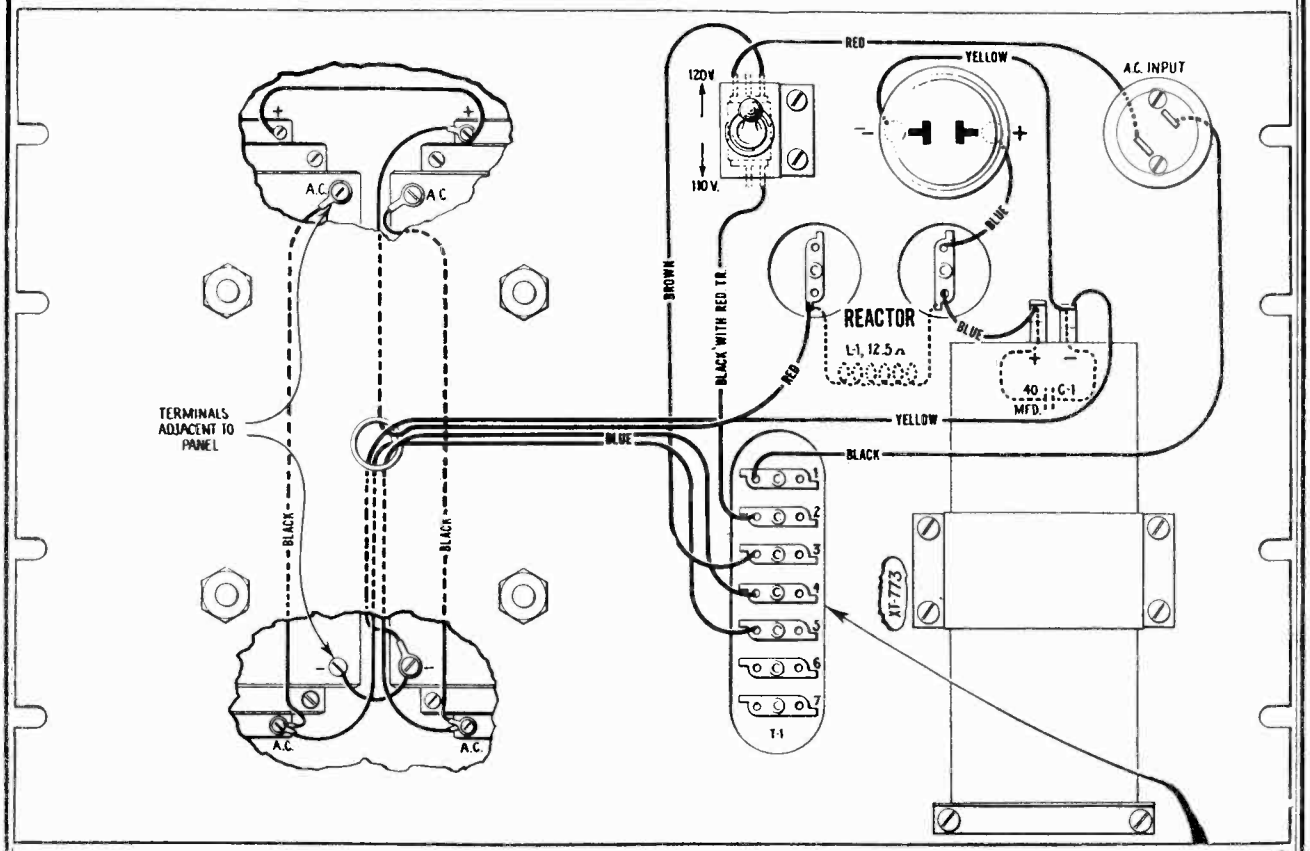


Loudspeaker Field Supply Panel Wiring Diagram (P K15B1)

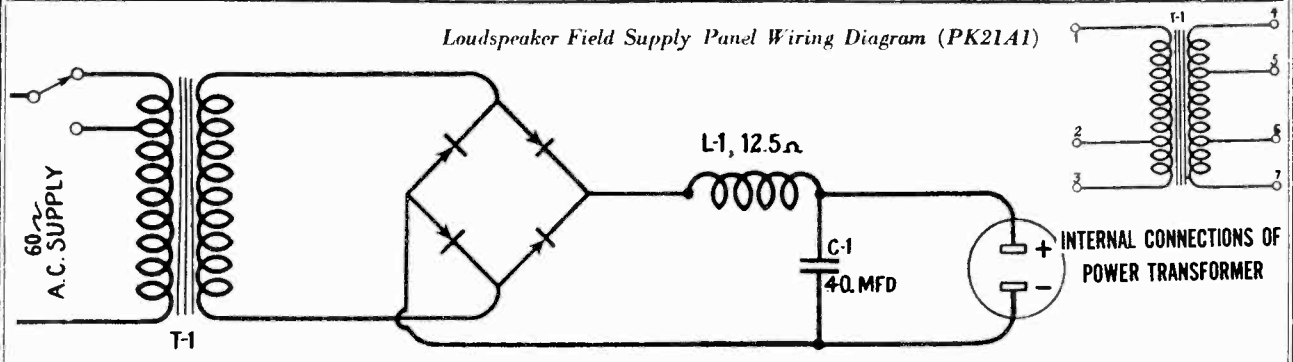
RCA-VICTOR CO., INC.

MODEL PK 21 A1
Speaker Field Supply
Panel wiring, Schematic

LOUDSPEAKER FIELD SUPPLY PANEL PK21A1



Loudspeaker Field Supply Panel Wiring Diagram (PK21A1)



Schematic Wiring Diagram

LOUDSPEAKER FIELD SUPPLY

The Model PK21A1 loudspeaker field supply panel will furnish field current for eight dynamic loudspeakers, each consuming 100 M. A. This unit consists of a power transformer and a dry disc rectifier for converting the A. C. to D. C. Plug type connectors are provided on the panel for making connections to the A. C. supply source and to the speaker lines.

REPLACEMENT PARTS

Stock No	DESCRIPTION	List Price	Stock No	DESCRIPTION	List Price
21630	Switch—Single pole, double throw, toggle type switch	$2.00	27523	Transformer—Power transformer complete with six mounting screws, six lockwashers and six nuts (XT-773).	$24.00
22178	Connector—Two contact male connector	.26	27524	Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers and four nuts (XT-774)	10.20
22206	Receptacle—Two contact female receptacle—Porcelain base	.60	27525	Capacitor—40 mfd filter capacitor complete with four mounting screws and four lockwashers (CX-53)	9.30
27522	Rectox—Copper oxide rectox unit	9.40			

MODEL PG 62
Assembly wiring

RCA-VICTOR CO., INC.

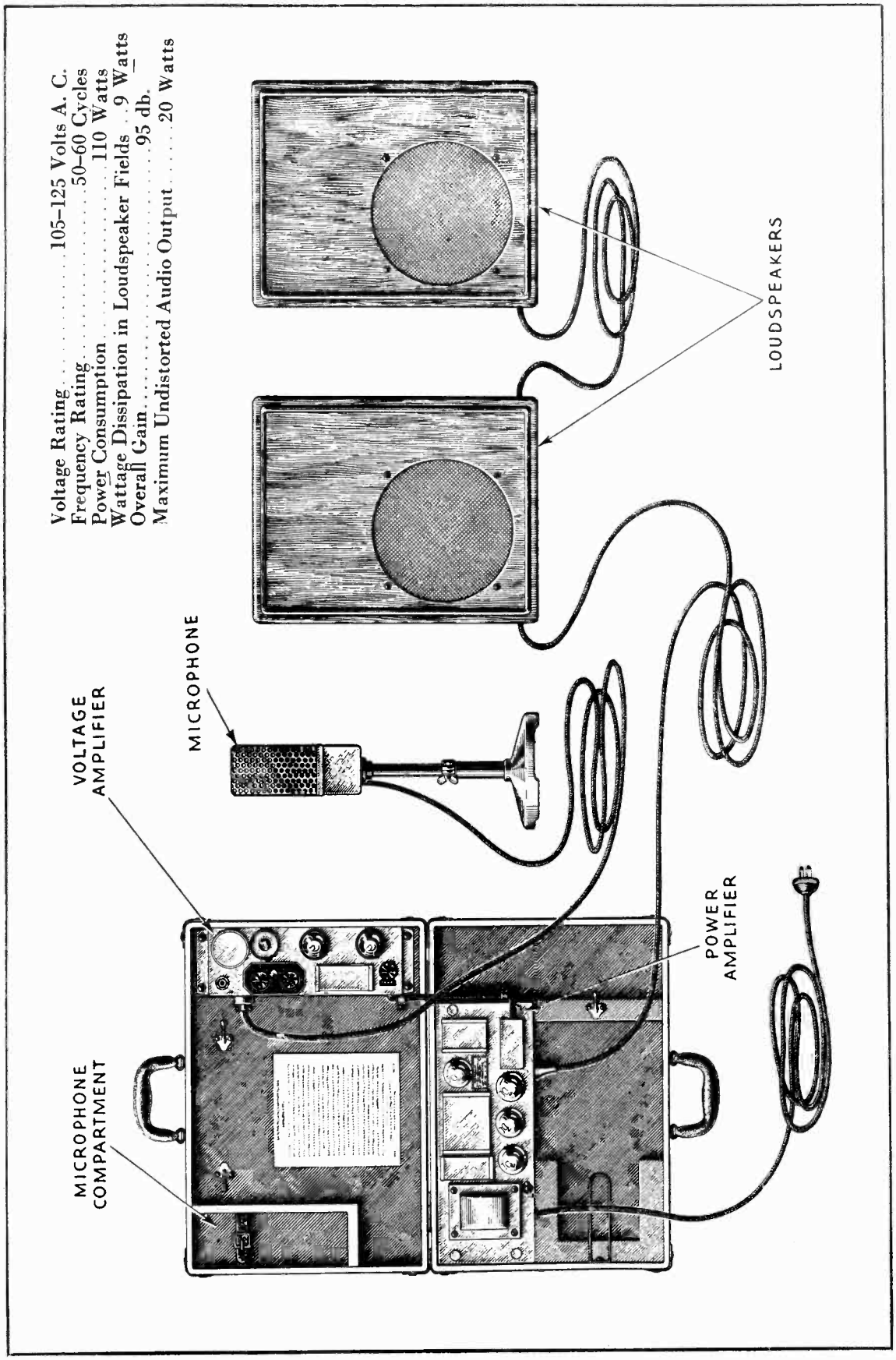


Figure 1—View of PG-62 Equipment set up for operation

RCA-VICTOR CO., INC.

MODEL PG 62
Chassis views

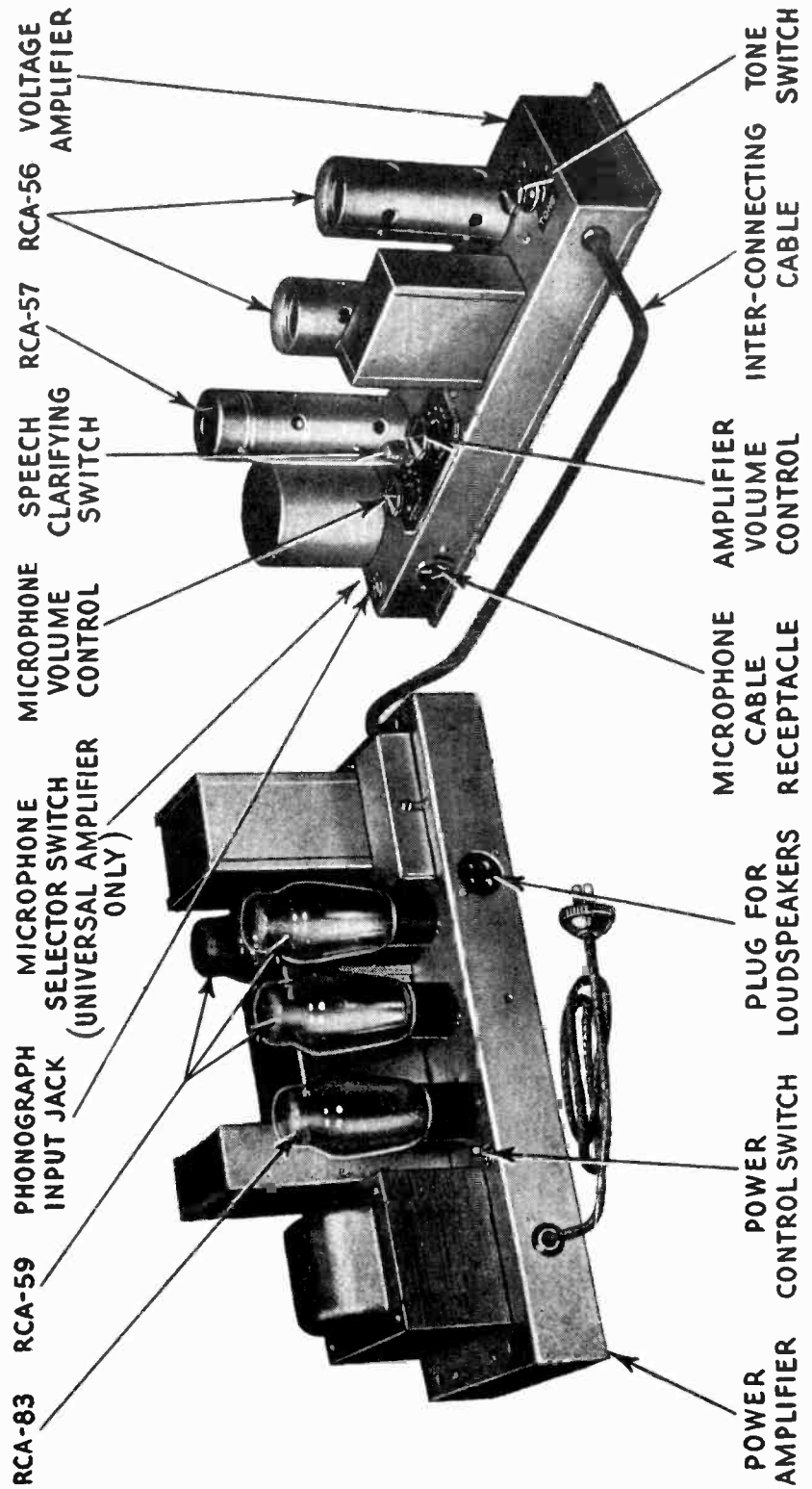


Figure 2—View of Voltage and Power Amplifiers Showing Parts

MODEL PG 62
Notes

RCA-VICTOR CO., INC.

The RCA Victor Portable Public Address System, Type PG-62 is a complete amplifying system consisting of an amplifier, a microphone, and two loudspeakers. It is designed for use as a sound reinforcing system in auditoriums, theatres and churches or for outdoor gatherings. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 20 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 2,500 seats.

The amplifier consists of two units; the voltage and power amplifier units both mounted in a carrying case. The loudspeakers, two of which are supplied with the equipment, are each mounted in a wooden housing. A special carrying case is provided for the loudspeakers when they are to be transported.

A velocity type microphone, the latest type developed by the RCA Victor engineers, is also furnished as a standard part of the equipment. Provision is made for placing microphone and stand together with the microphone interconnecting cables in the amplifier carrying case when the equipment is to be transported. Figure 1 shows the equipment set up for operation.

All the controls except the power control switch are mounted on the voltage amplifier base and are easily accessible to the operator. The controls consist of the power control switch mounted on the power amplifier base, the microphone volume control, amplifier volume control, the speech clarifying switch and the tone switch. Figure 2 shows the location of the various controls.

Facilities are provided for operating the equipment with a phonograph turntable. If it is desired, phonograph music may be played as a background for the microphone pick-up, the volume of each being controlled independently of each other. In the Universal Amplifier Assembly a microphone selector switch is mounted on the voltage amplifier to permit the use of a carbon type microphone with the equipment.

MODEL PG62B1 EQUIPMENT

Amplifier (Model PA97A1)

Model	*Amplifier*	*Number of Stages*
PB88A1	Voltage	3
PB89A1	Power	2

Loudspeakers

Model	*Field Resistance*
PL71A1	1,350 Ohms
PL71B1	1,950 Ohms

Microphone

Model	*Type*
PB90A1	Velocity

UNIVERSAL AMPLIFIER ASSEMBLY

Voltage Amplifier

Model	*Number of Stages*
PB88A2	3

Power Amplifier

Model	*Number of Stages*
PB89B1	2

PART I—SETTING UP THE EQUIPMENT

(1) TYPE PG-62 EQUIPMENT

The equipment is set up for operation in the following manner:

1. Open the amplifier carrying case and lay the two halves on the floor or a table so that the Radiotrons will be in an upright position. Remove the microphone and microphone stand and support.

2. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. See Figure 2.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Open the loudspeaker carrying case and remove the two loudspeakers. Place the loudspeakers in a position so that the loudspeaker grilles face in the direction in which the sound beams are desired. Interconnect the two loudspeakers with the cable and plug provided. Connect the loudspeakers to the amplifier by means of the four-pole plug provided on the other loudspeaker cord.

4. Assemble the microphone and the microphone stand and support. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

5. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the Rectifier Tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

(2) UNIVERSAL AMPLIFIER

Before the equipment may be set up for operation, certain accessories must be obtained. They are as follows:

1. Microphone, such as the Type PB-90.

2. Microphone stand, such as the table stand, Type PB-96 or the floor stand, Type AZ-4090.

3. One, two, or four loudspeakers having a voice coil impedance of 7½ ohms or 15 ohms each. Each loudspeaker should have its own source of supply for field current. The dry disc rectifier type or the vacuum tube rectifier type is suitable for this purpose.

4. A two conductor loudspeaker cable.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place both the voltage and power amplifiers on a table or on the floor so that the Radiotrons will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instruments unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Connect the voltage and power amplifiers together by means of the interconnecting cable as shown in Figure 10.

4. Make connections between the loudspeakers and the four pole loudspeaker plug, furnished with the amplifier, as indicated in Figure 3. Insert the loudspeaker plug into the corresponding receptacle on the side of the power amplifier base.

NOTE: If a loudspeaker having a voice coil of 7½ ohms impedance is used, the link between the output transformer and the loudspeaker receptacle should remain connected between terminals 1 and 2, as indicated in Figure 10. If the voice coil impedance is 15 ohms, shift the link so that it connects terminals 2 and 3 on the link terminal board.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

6. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the rectifier tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

PART II—OPERATION

After the equipment has been properly located and connected, it may be operated in the following manner. (Refer to Figure 2.) This operating procedure applies to both the PG-62 equipment and the Universal Amplifier.

1. Apply power by turning the power control switch "on," located on the base of the power amplifier.

MODEL PG 62
Loudspeaker wiring

RCA-VICTOR CO., INC.

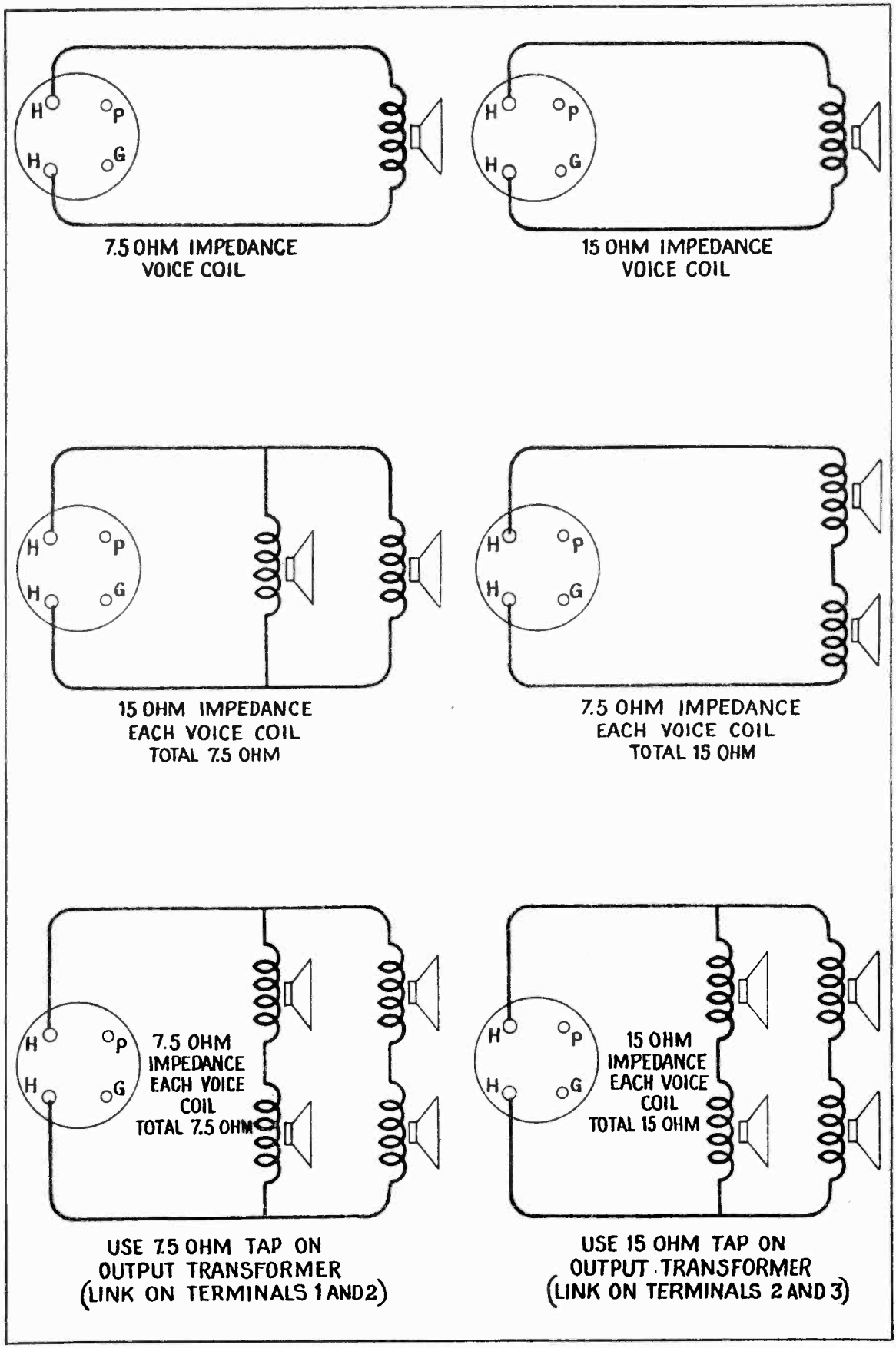


Figure 3—Loudspeaker Wiring

2. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located either directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with both volume controls at maximum, until the position where the least sound is produced in the loudspeakers due to feedback, will allow best operation.

NOTE: The Universal Amplifier Assembly is equipped with a microphone selector switch located on one end of the voltage amplifier. Set this switch in the "Velocity" position when a Velocity Type Microphone is used. When a carbon type microphone is used, set the switch at the "Carbon" position.

Set the Microphone Volume Control, located on the voltage amplifier, at its mid-position. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the Amplifier Volume Control until the desired volume is obtained from the loudspeakers.

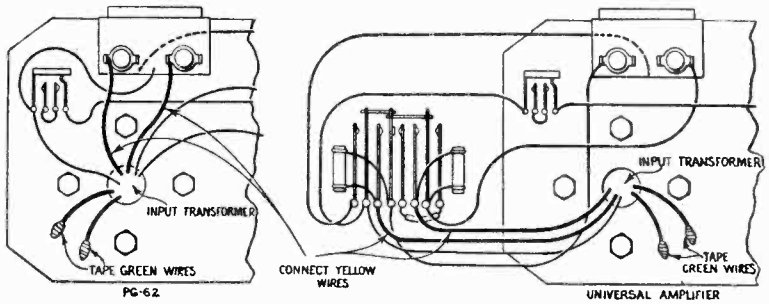


Figure 4—Wiring changes for two microphone operation

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup, the "music" position will give better reproduction. In either case, the "tone" dial, located on the base of the voltage amplifier, should be adjusted for most pleasing reproduction.

PART III—SPECIAL OPERATION

In some instances, it may be desirable or necessary to use two velocity microphones or more than one power amplifier operated from one voltage amplifier. The following sections cover these special uses of the equipment.

(1) TWO MICROPHONE OPERATION

In general, the use of more than one velocity microphone with either the PG-62 Equipment or Universal Amplifier is not recommended. This would presume a microphone mixer which is undesirable as the overall gain is insufficient to overcome the attenuation in the mixer.

If it is necessary to use two microphones (not more than two) and keep both in the circuit at the same time, using no fading or mixing arrangement, other than the volume controls on the voltage amplifier, the connections and changes in the amplifier wiring are as follows:

PG-62 Equipment

(a) Disconnect and tape the two green leads between the microphone receptacle on the voltage amplifier and input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone receptacle. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

Universal Amplifier

(a) Disconnect and tape the two green leads between the microphone selector switch on the voltage amplifier and the input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone selector switch at the points from which the two green leads were removed. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

MODEL PG 62
Multiple operation
of amplifiers

RCA-VICTOR CO., INC.

(2) MULTIPLE OPERATION OF POWER AMPLIFIERS

The Type PB-88 Voltage Amplifier may be used to operate as many as three Type PB-89 Power Amplifiers. The requirements for such operation are as follows:

(a) In each power amplifier, remove the resistor R-18 (50,000 ohms) and replace with a 100,000 ohm, one-watt resistor, Catalog No. 3058.

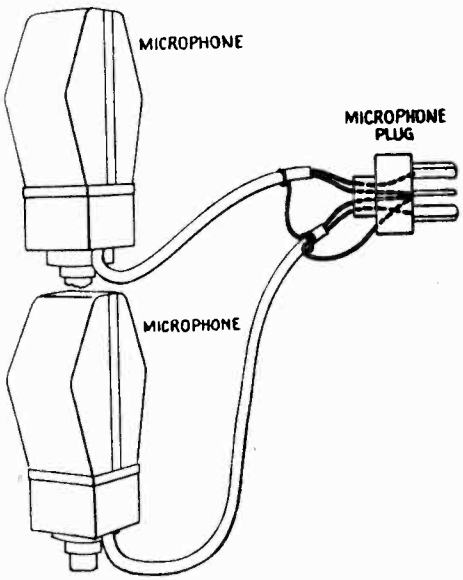


Figure 5—Two microphones wired to one plug

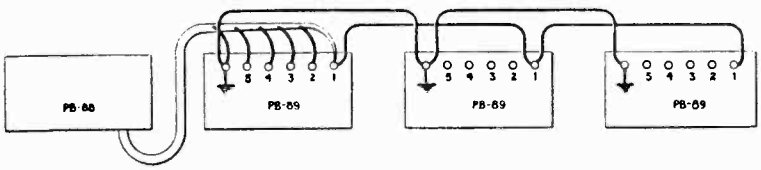


Figure 6—Multiple Operation of Power Amplifier

(b) Connect the power amplifiers to the voltage amplifier as shown in Figure 6.

(c) If the Model PB89A1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 8. If the Model PB89B1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 3.

(d) Each power amplifier must be connected to a source of A. C. 110 volt, 60 cycle power.

PART IV—SERVICE DATA ON AMPLIFIER EQUIPMENT

(1) ELECTRICAL DESCRIPTION OF CIRCUIT

The velocity microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone transformer and the input transformer is of 250 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid.

The RCA-57 is resistance coupled to the RCA-56 in the second stage. Another potentiometer is provided in the grid circuit of this RCA-56 to control the output volume of the entire equipment. The RCA-56 is in turn resistance coupled to the RCA-56 in the third stage of the voltage amplifier. The last stage of the voltage amplifier is coupled to the single RCA-59 which is the driver for two Radiotrons RCA-59 in the Class "B" output stage. The output stage supplies power to two loudspeakers through a step-down transformer. This transformer has an output impedance of 15 ohms with a tap at 7½ ohms.

RCA-VICTOR CO., INC.

MODEL PG 62
Schematic

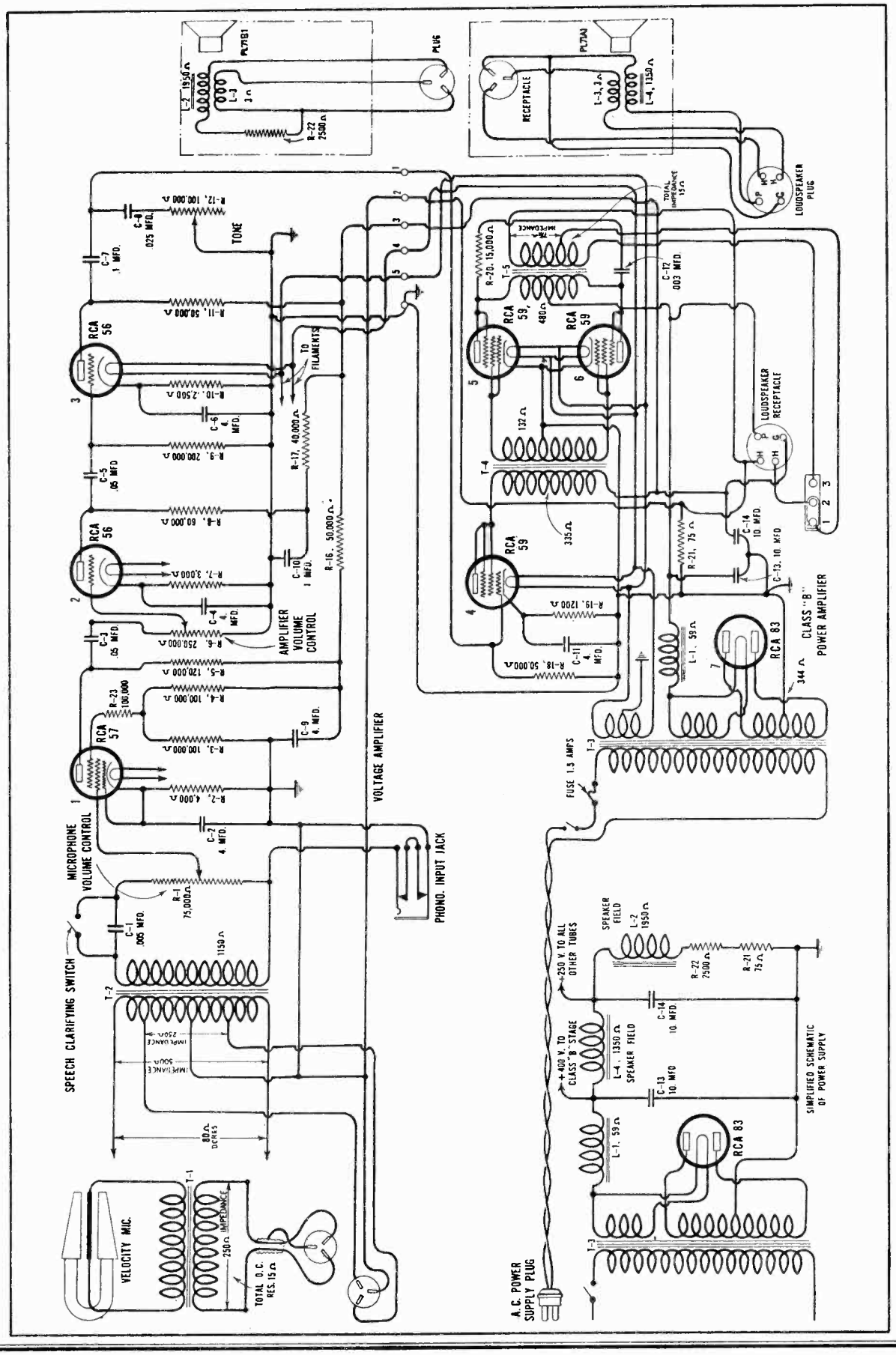


Figure 7—Schematic Circuit Diagram—PG-62 Equipment

MODEL PG 62
Chassis wiring

RCA-VICTOR CO., INC.

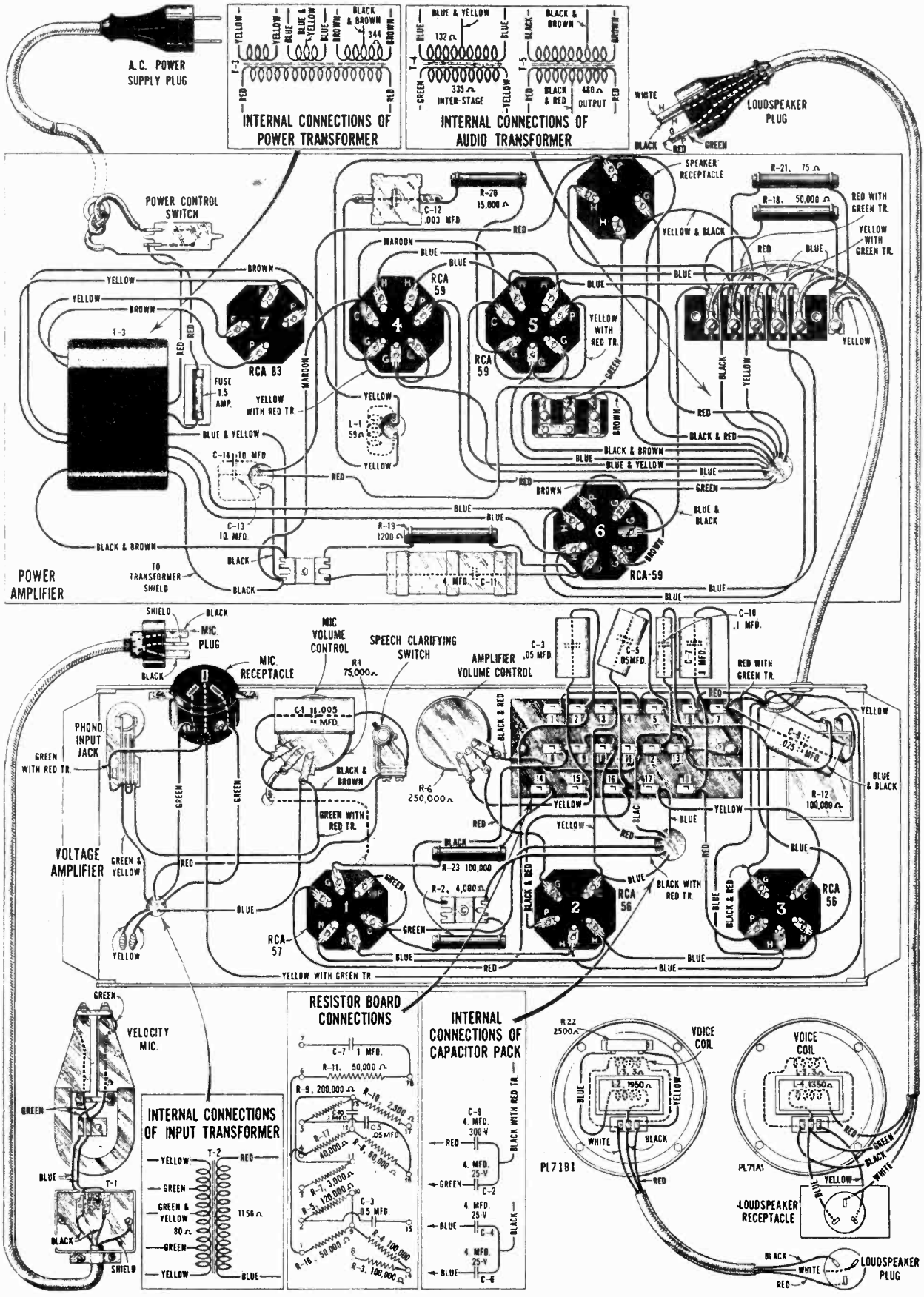


Figure 8—Wiring Diagram—PG-62 Equipment

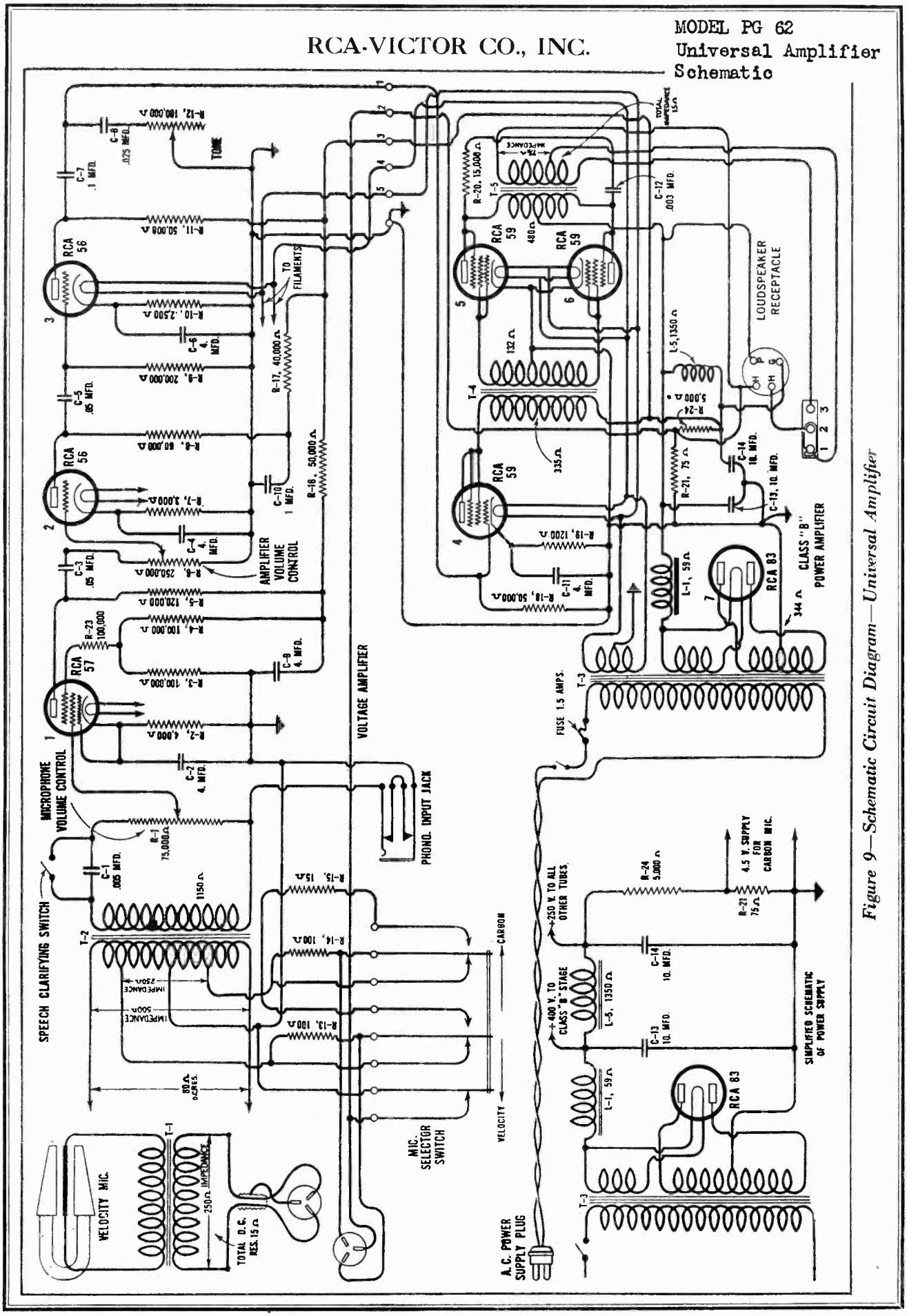


Figure 9—Schematic Circuit Diagram—Universal Amplifier

MODEL PG 62
Universal Amplifier
Chassis wiring

RCA-VICTOR CO., INC.

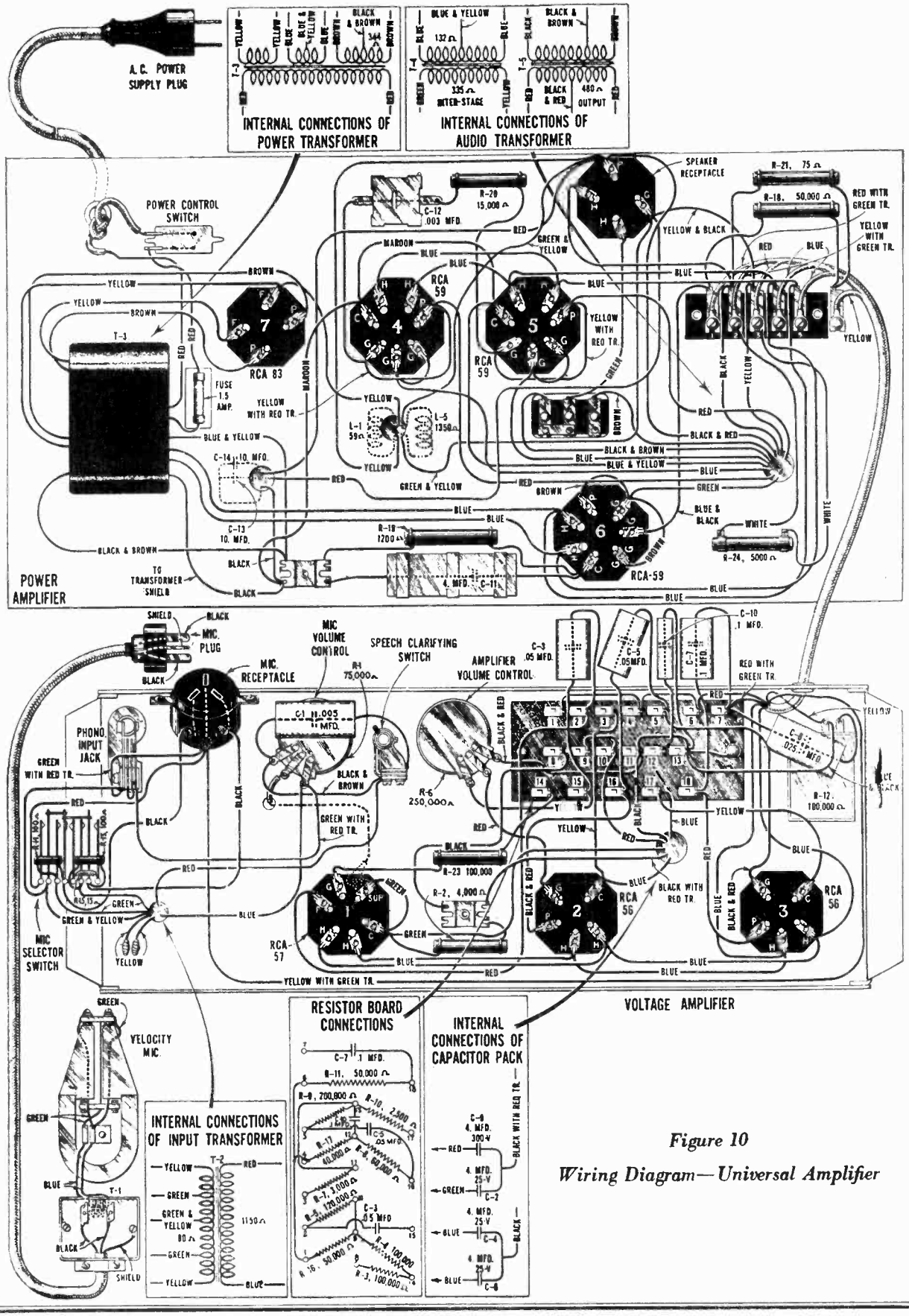


Figure 10

Wiring Diagram—Universal Amplifier

The power supply for both the voltage and power amplifiers is obtained from the RCA-83 and a filter system located on the power amplifier base. The field coil of one loudspeaker in the PG-62 Equipment is used as a filter reactor in the power supply system in the power amplifier. In the Universal Amplifier an additional reactor is used in the filter circuit in place of the loudspeaker field mentioned above.

(2) CARBON MICROPHONE CONNECTIONS (Universal Amplifier Only)

The Universal Amplifier Equipment is designed so that it will operate with a double button carbon microphone of 250 ohms impedance. A three-pole plug, similar to that employed with the velocity microphone, should be used. Each button on the microphone should be connected to each of the symmetrical poles on the plug. The remaining pole on the plug should be used to connect to the midpoint of the microphone. When using the carbon microphone, the microphone selector switch should be placed at the "Carbon" position.

(3) PHONOGRAPH CONNECTIONS

An input jack is provided in the grid circuit of the RCA-57 which permits the use of a phonograph turntable RCA Victor Type PT-14 or Type PT-15. The instructions for operation of the turntables are included with the phonograph equipment.

(4) WIRING

The schematic wiring diagram for the PG-62 Equipment is shown in Figure 7. The wiring diagram for the complete PG-62 Equipment is shown in Figure 8. Figures 9 and 10 show the schematic and wiring diagrams respectively for the Universal Amplifier.

(5) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

115 VOLT A. C. LINE—NO INPUT SIGNAL VOLTAGE

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.0	80	145	.25	2.5
2. RCA-56	3.5	—	120	1.2	2.5
3. RCA-56	4.0	—	165	1.6	2.5
4. RCA-59	2.8	—	242	23.0	2.5
5. RCA-59	0	—	390	13.0	2.5
6. RCA-59	0	—	390	13.0	2.5

CAUTION: Whenever the Radiotron RCA-83 rectifier is removed from or installed in its socket, the A. C. power control switch should be in the "off" position.

(6) PHASING LOUDSPEAKERS (PG-62 Equipment)

If either of the loudspeaker cones are replaced, the two loudspeakers must be properly phased after the replacement work is done. That is, the motion of both cones must be in the same direction at a given instant when a signal is impressed on them. The following procedure may be used to phase the loudspeakers.

1. Place the two loudspeakers side by side and connect them together by means of the cord and plug provided.

MODEL PG 62
Replacement parts

RCA-VICTOR CO., INC.

2. Turn the equipment on so that field coils are energized. Apply 6 volts D. C. intermittently to the voice coil terminals at one loudspeaker (black lead and yellow lead on PL71A1 or white lead and red lead on PL71B1). If both cones do not move in the same direction, reverse the voice coil leads to the terminal board of one loudspeaker only.

CAUTION: The loudspeaker fields are at approximately 400 volts above ground. Therefore care must be observed in making tests on the loudspeakers.

(7) DIRECTIONAL BAFFLE LOUDSPEAKER

It is sometimes desirable to use a directional baffle type of loudspeaker with this amplifying equipment. In this case it is necessary to compensate for the difference between the response frequency characteristic of the flat baffle and the directional baffle. The compensation should consist of a .0005 MFD capacitor (Catalog No. 21648) connected in series with the .005 MFD capacitor C-1, and a 250,000 ohm resistor (Catalog No. 23114) shunted across the speech clarifying switch.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	PORTABLE AMPLIFIER ASSEMBLY MODEL PA97A1	
	POWER AMPLIFIER MODELS PB89A1 AND PB89B1	
2725	Fuse—1½ ampere cartridge fuse—Package of 5	$0.40
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21623	Resistor—15,000 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle type	.50
22853	Plug—Four contact male connector plug (for PB89B1)	.50
23113	Resistor—1,200 ohms—Carbon type—1 watt	.65
23119	Resistor—75 ohms—Carbon type—1 watt	.50
23120	Resistor—5,000 ohms porcelain resistor	2.00
25536	Socket—Four contact Radiotron socket	.35
25626	Socket—Seven contact Radiotron socket	.45
25627	Capacitor—4.0 mfd. filter capacitor	1.00
25628	Board—Terminal board complete with five terminals	1.50
25629	Capacitor—0.003 mfd. capacitor	1.30
25630	Capacitor pack—Comprising two 10.0 mfd. capacitors in container	9.30
25631	Reactor—Filter reactor (for PB89A1)	6.15
25633	Cord—Two conductor power cord and plug	6.70
25634	Reactor—Double filter reactor (RT-200) (for PB89B1)	8.00
27526	Transformer—Power transformer (RT-189)	12.30
27527	Transformer—Audio transformer pack—Interstage and output transformers (RT-190)	15.30
	VOLTAGE AMPLIFIER MODELS PB88AZ AND PB88A2	
3294	Resistor—15 ohms—Flexible type resistor (for PB88A2)	.20
3471	Capacitor—0.025 mfd. capacitor	.32
3555	Capacitor—0.1 mfd. capacitor	.36
7487	Shield—Metal shield for Radiotrons	.25
7488	Cap—Radiotron shield cap for RCA-57 Radiotron	.20
21581	Resistor—50,000 ohms—Carbon type—1 watt	.50
21632	Cap—Control grid cap	.75
22197	Resistor—2,500 ohms—Carbon type—1 watt	.50
22451	Switch—Single pole, single throw—Toggle switch	.50
22621	Resistor—200,000 ohms—Carbon type—½ watt	.50
23004	Resistor—40,000 ohms—Carbon type—½ watt	.50
23006	Resistor—100,000 ohms—Carbon type—½ watt	.50
23007	Resistor—120,000 ohms—Carbon type—½ watt	.50
23008	Resistor—3,000 ohms—Carbon type—½ watt	.50
23011	Resistor—50,000 ohms—Carbon type—½ watt	.50
23115	Resistor—60,000 ohms—Carbon type—½ watt	$0.50
23116	Resistor—4,000 ohms—Carbon type—½ watt	.50
23117	Resistor—100 ohms—Carbon type—½ watt	.50
25531	Socket—Five contact Radiotron socket	.35
25532	Socket—Six contact Radiotron socket	.40
25615	Transformer—Core and coil for input transformer	10.60
25617	Capacitor—0.05 mfd. capacitor	1.25
25618	Capacitor—0.005 mfd. capacitor	1.40
25619	Rheostat—100,000 ohms—Tone control rheostat	3.70
25620	Switch—Triple pole, double throw—Key type switch	2.60
25621	Receptacle—Three contact female receptacle	3.60
25622	Jack—Phonograph input jack	1.05
25623	Knob—Moulded knob and pointer	.30
25624	Cushion—One set of four rubber cushions for input transformer	3.00
25625	Cable—Six conductor braid covered interconnecting cable	5.80
25778	Potentiometer—75,000 ohms—Microphone volume control potentiometer	1.35
25779	Potentiometer—150,000 ohms—Amplifier volume control potentiometer	1.75
27529	Capacitor pack—Comprising four 4.0 mfd. capacitors in container	8.35
	VELOCITY MICROPHONE MODEL PB90A1	
25782	Guard—Front and rear guard for microphone	11.00
25783	Transformer—Microphone transformer	18.00
25784	Cable—30 foot, two conductor, rubber covered, shielded cable	7.30
25785	Plug—Two conductor male connector plug	1.75
	LOUDSPEAKER—MODEL PL71A1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9421	Coil—Field coil—Comprising coil, cone housing and magnet	4.32
25780	Cable—30 foot, 4-conductor, rubbered covered, cable—Complete with 4-contact plug	7.30
	LOUDSPEAKER—MODEL PL71B1	
6184	Board—Terminal board complete with three terminals	.10
8969	Cone—Loudspeaker cone with voice coil	1.27
9416	Coil—Field coil comprising coil, cone housing and magnet	4.00
25781	Cable—50 foot, 3-conductor, rubber covered, cable—Complete with 3-contact plug	11.00

RCA-VICTOR CO., INC.

MODEL PG 63
Notes

RCA Victor
Portable Sound Amplifier Type PG-63
and
Universal Amplifier Assembly

INSTRUCTIONS FOR OPERATION AND SERVICE

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles
Power Consumption	55 Watts
Number and Type of Radiotrons	1 RCA-57, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 4
Number of Amplifier Stages	Three
Overall Gain	75 DB.
Type of Loudspeaker	Electro-Dynamic
Number of Loudspeakers	One
Maximum Undistorted Audio Output	6 Watts

PHYSICAL SPECIFICATIONS

(Complete Amplifier in Carrying Case)

Height	11½ Inches
Width	16⅝ Inches
Depth	7 Inches
Weight of Entire Equipment	24½ Pounds

(Universal Amplifier Assembly)

Height	9¼ Inches
Width	16 Inches
Depth	3½ Inches
Weight	13¾ Pounds

The RCA Victor Portable Sound Amplifier System, Type PG-63 is a complete self contained amplifying system consisting of a microphone, a loudspeaker and a high gain amplifier. The entire equipment is enclosed in a small portable container. The equipment is designed for use as a sound reinforcing system in small auditoriums, theatres, churches or for outdoor gatherings. It is especially suitable for store window advertising use where the loudspeaker is placed outdoors while the person speaking remains in view through a window. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 6 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 600 seats.

The amplifier consists of two stages of voltage amplification and one class "B" power output stage, all mounted on a single chassis. The amplifier chassis is mounted in a small carrying case, and the dynamic speaker is mounted in the cover of the carrying case. A double button carbon microphone is supplied as a standard part of the equipment. Provision is made for placing the microphone together with all interconnecting cables in the carrying case when the equipment is to be transported. The weight of the complete equipment packed in the carrying case is 24½ pounds. Figure 1 shows the equipment set up for operation.

MODEL PG 63
View

RCA-VICTOR CO., INC.

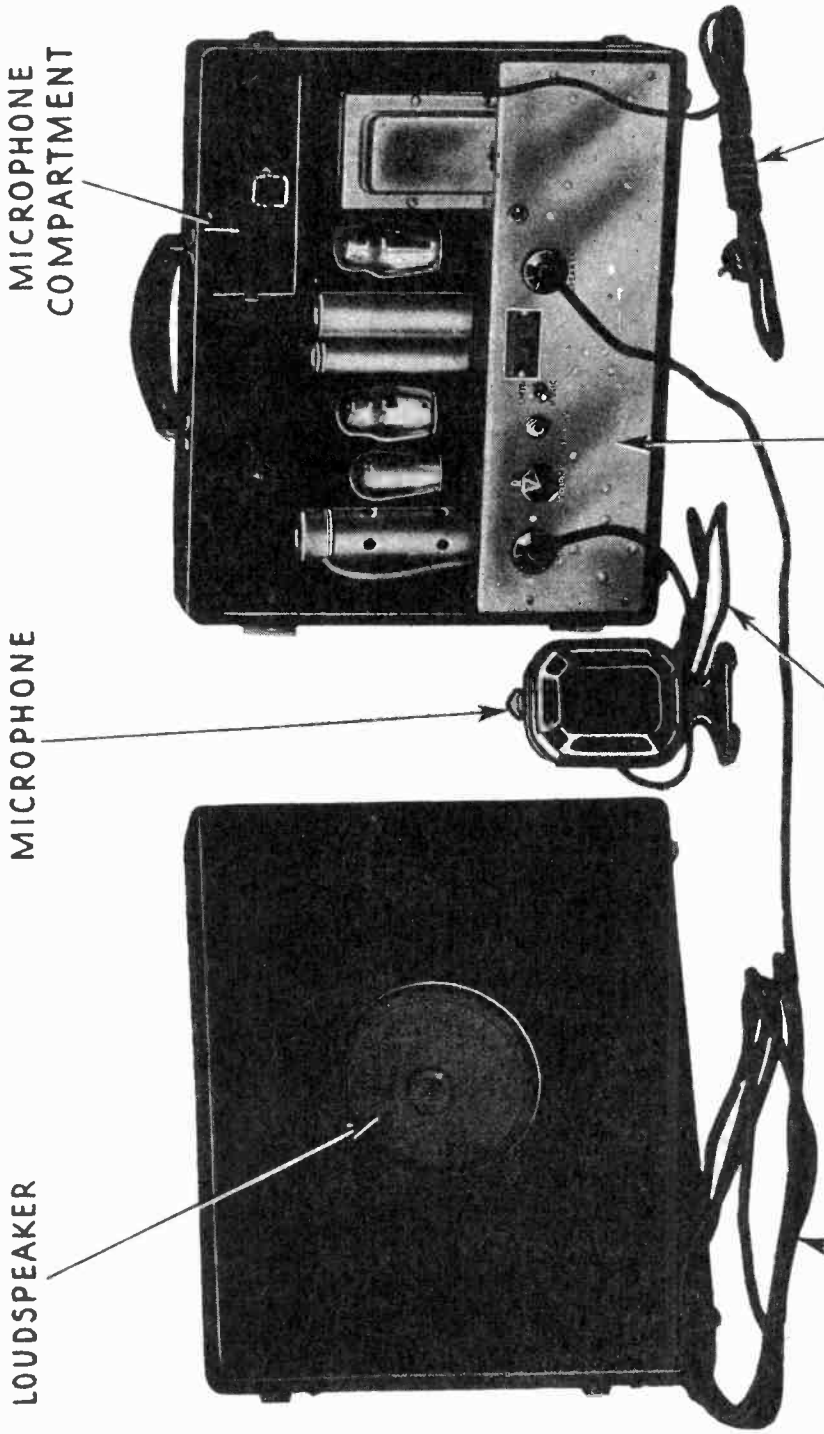


Figure 1—Type PG-63 Equipment Set Up for Operation

RCA-VICTOR CO., INC.

MODEL PG 63
Chassis view

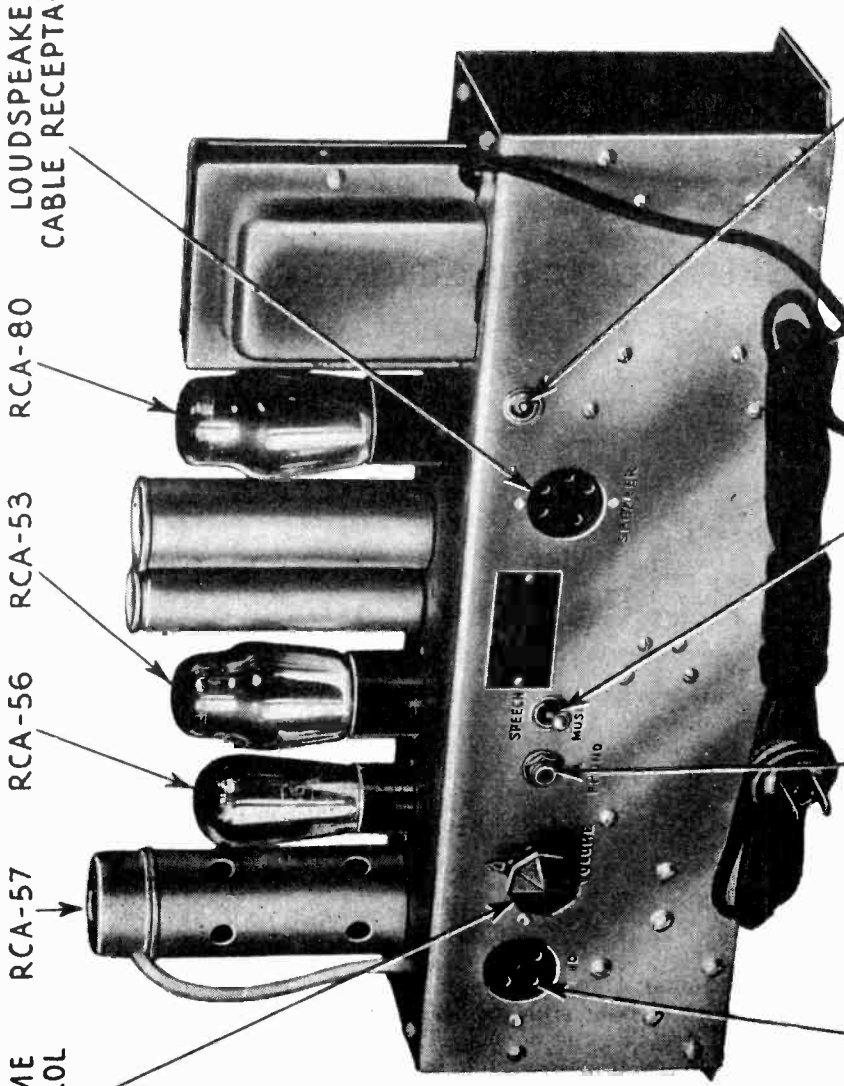


Figure 2—View of Amplifier Showing Parts

MODEL PG 63
Notes

RCA-VICTOR CO., INC.

All controls are mounted on the amplifier base and are easily accessible to the operator. The controls consist of the power control switch, speech clarifying switch and the volume control knob. Figure 2 shows the locations of these controls.

The six watt Universal Amplifier is similar to the amplifier in the PG-63 equipment with the exception that a 10,000 ohm resistor is employed as a bleeder in the power supply circuit in place of the 10,000 ohm field coil

The equipment is also adaptable for use with a phonograph turntable such as the RCA Victor Type PT-14 or PT-15. A phonograph input jack is provided on the side of the amplifier base for making suitable connections.

The following tabulation gives the model numbers of the various parts of the equipment covered in this booklet:

MICROPHONE

Model	*Type*
RP-91	Carbon

AMPLIFIER

Model	*Where Used*	*Number of Stages*
PB100A1	Type PG-63	3
PB100B1	Universal Amplifier	3

LOUDSPEAKER

Model	*Field Resistance*
RL-55	10,000 Ohms

Part I—Setting Up the Equipment

(1) TYPE PG–63

The equipment is set up for operation in the following manner:

1. Open the carrying case and separate its two sections by slipping them apart at the hinges. Place the loudspeaker in a position so that the loudspeaker grille faces in the direction in which the sound beam is desired. The loudspeaker may be hung on the wall of an auditorium or outside of a store window, a hook for this purpose being provided on the rear of the loudspeaker part of the carrying case. Unwind the speaker cord.

2. Place the other section of the carrying case on a table or on the floor so that the tubes will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That the shield is rigidly in place and the cap is on the shield over the Radiotron RCA-57.

3. Insert the loudspeaker five-pole male plug in the corresponding receptacle on the side of the amplifier base.

4. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle.

5. Remove the microphone from the carrying case. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the amplifier. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with the volume control advanced, until the position where the least sound is produced in the loudspeakers due to feedback, will result in best operation.

The equipment is now ready for operation.

RCA-VICTOR CO., INC.

MODEL PG 63
Schematic

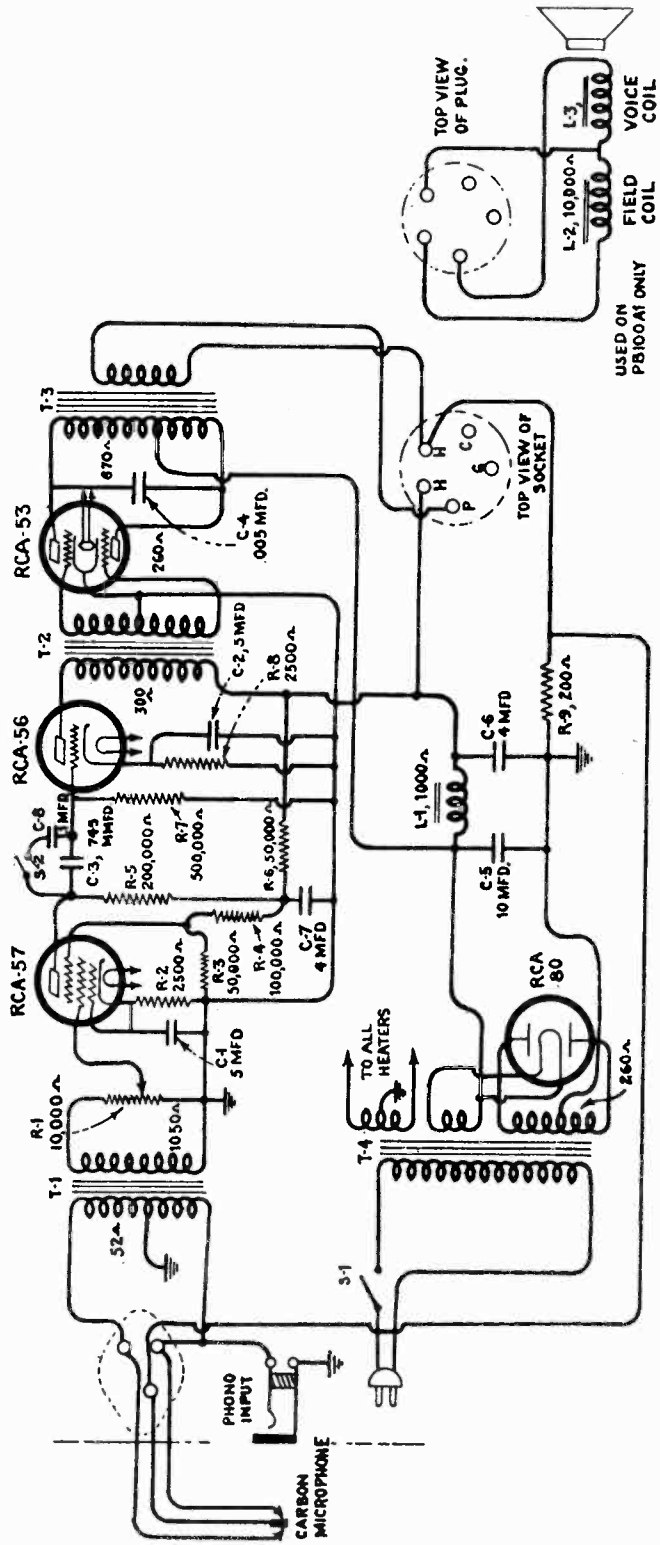


Figure 3—Schematic Circuit Diagram—PG-63

(2) UNIVERSAL AMPLIFIER

Before the Universal Amplifier may be set up for operation certain accessories must be obtained. They are as follows:

1. Microphone, cable, and plug such as the Model RP-91.

2. One loudspeaker having a voice coil impedance of either 4 ohms, 7½ ohms or 15 ohms. The loudspeaker should have its own source of supply for field current. The dry disc or the vacuum tube types of rectifier are suitable for this purpose.

3. A two conductor loudspeaker cable with a five-pole plug to fit the loudspeaker receptacle on the amplifier base.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place the amplifier on a table or on the floor so that the tubes will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That the shield is rigidly in place and the cap is on the shield over the Radiotron RCA-57.

3. Make connections between the voice coil of the loudspeaker and two prongs of the five-pole plug so that the proper impedance match is obtained between the loudspeaker and the output transformer. See Figure 4. Insert the loudspeaker plug into the corresponding receptacle on the side of the amplifier base.

4. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the amplifier. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with the volume control at maximum, until the position where the least sound is produced in the loudspeakers due to feedback will result in best operation.

The equipment is now ready for operation.

Part II—Operation

After the equipment has been properly located and connected, it may be operated in the following manner: (Refer to Figure 2.)

1. Apply power by turning the power control switch "on." This switch is located on the front side of the amplifier base.

2. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the volume control, located on the voltage amplifier, until the desired volume is obtained from the loudspeakers. Always talk into the microphone from the side which does not have the felt pad behind the screen.

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup and phonograph input, the "music" position will give better reproduction.

Part III Service Data on Amplifier Equipment

(1) ELECTRICAL DESCRIPTION OF CIRCUIT

The microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone and the input transformer is 400 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid, thus controlling the output volume of the entire equipment.

RCA-VICTOR CO., INC.

MODEL PG 63 (PB100B1)
Universal Amplifier
Schematic

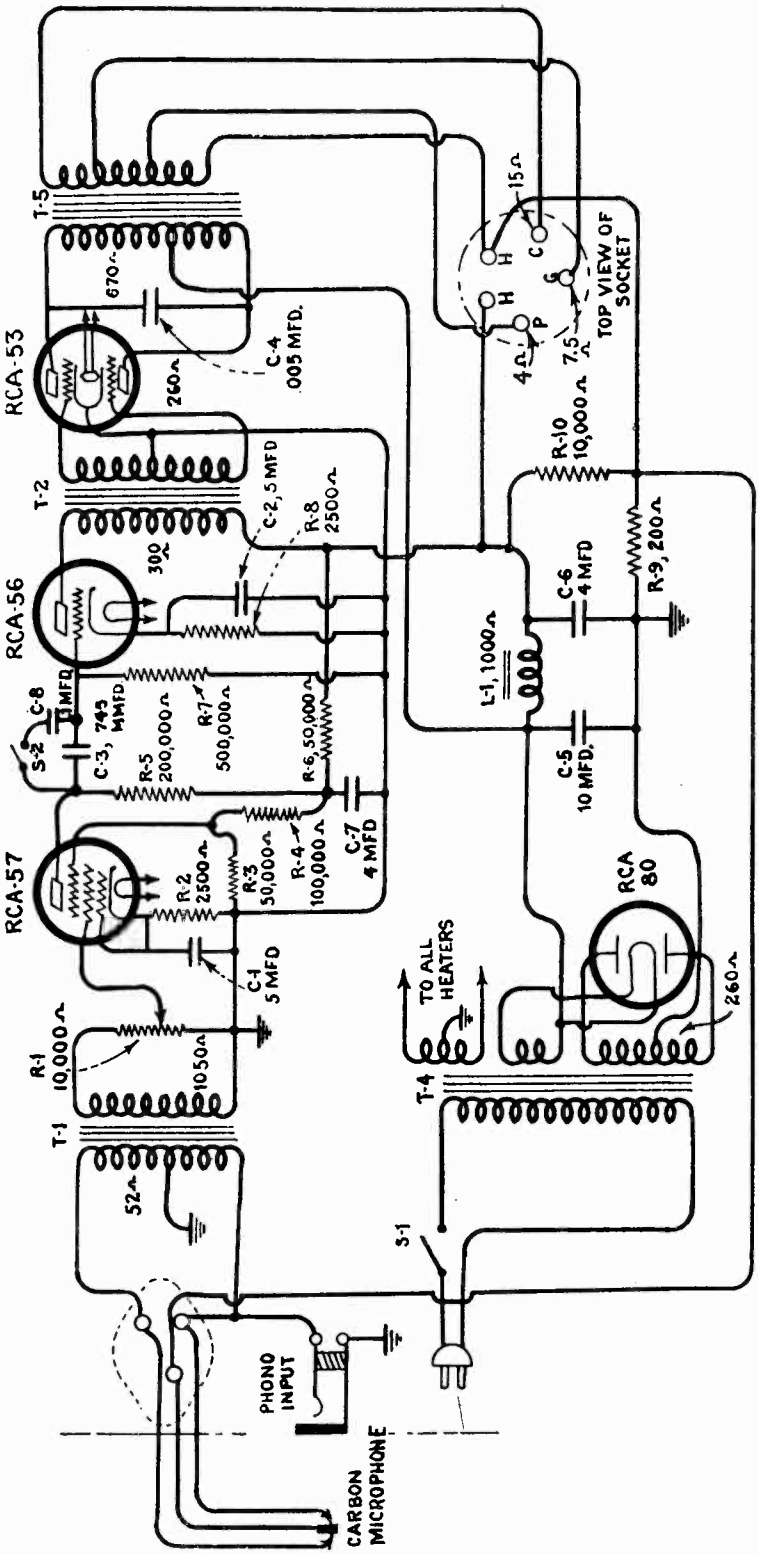


Figure 4—Schematic Circuit Diagram—PB-100B1

MODEL PG 63 Amp
Chassis wiring

RCA-VICTOR CO., INC.

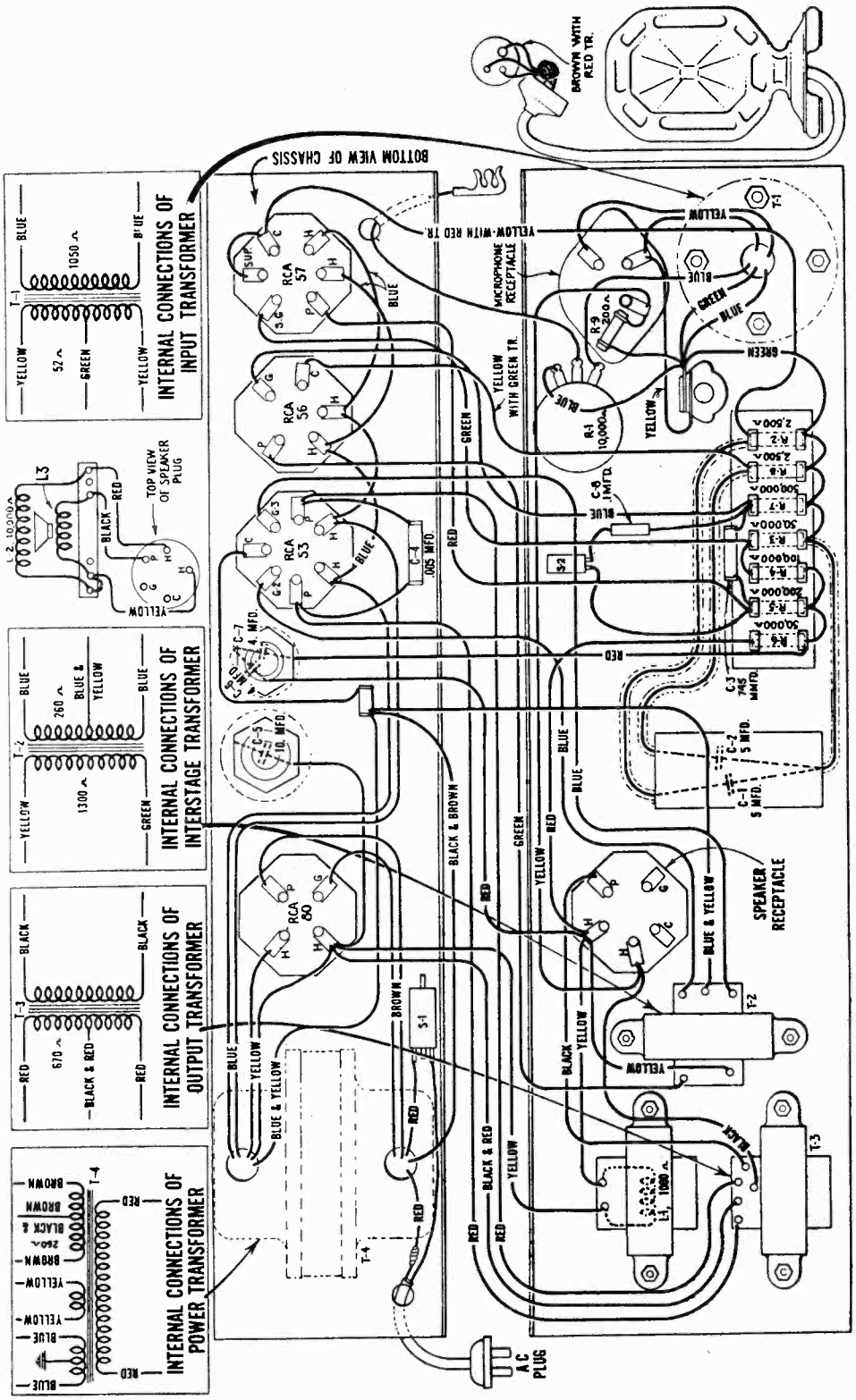


Figure 5 — Wiring Diagram — PG-63

RCA-VICTOR CO., INC.

MODEL PG 63 (PB100B1)
Universal amplifier
Chassis wiring

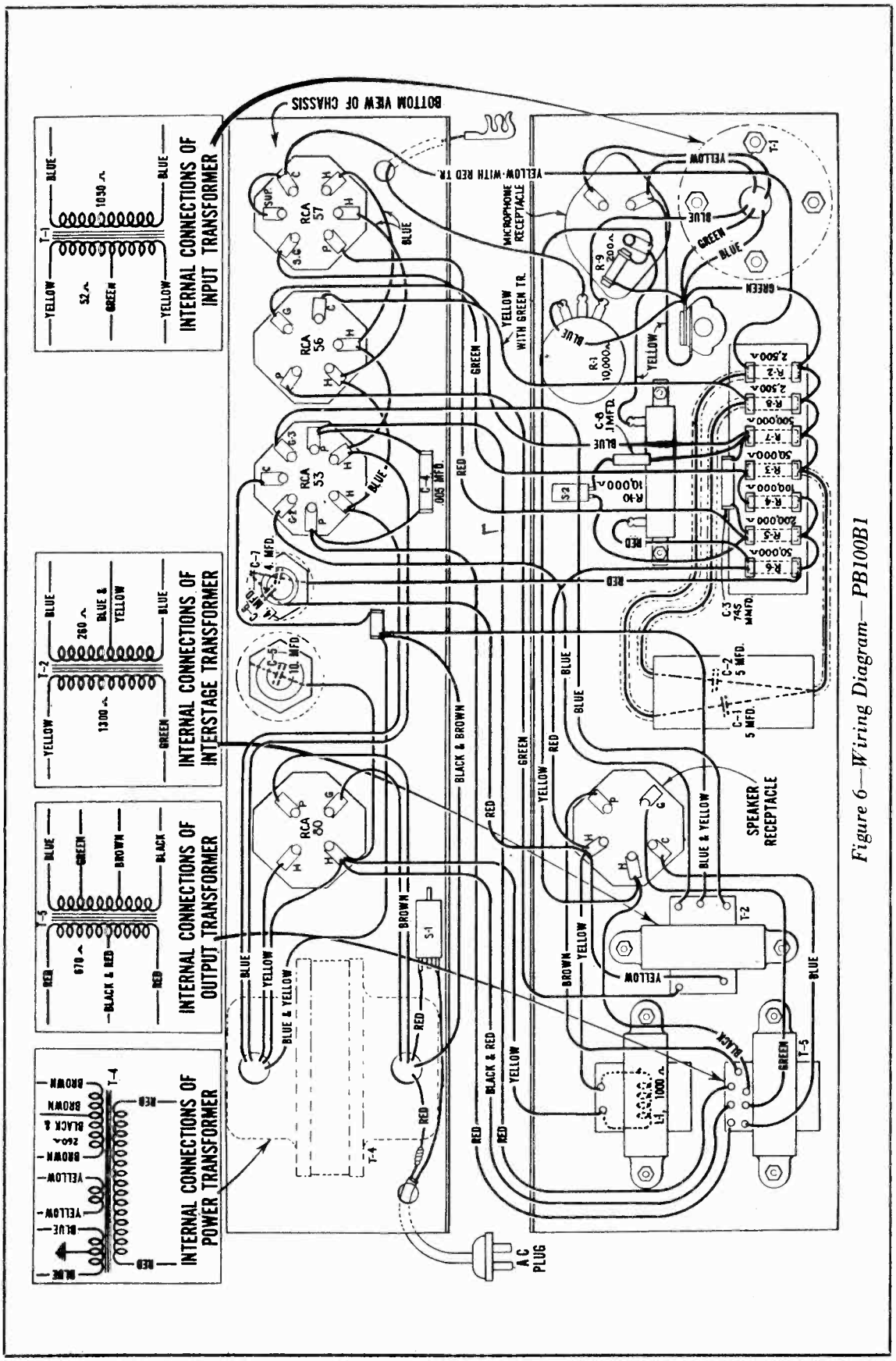


Figure 6—Wiring Diagram—PB100B1

MODEL PG 63
Voltage, Parts List

RCA-VICTOR CO., INC.

The RCA-57 is resistance coupled to the RCA-56 in the second stage which is the driver for the RCA-53 in the class "B" output stage. The output stage supplies power to one dynamic loudspeaker through a stepdown transformer. This transformer has an output impedance of 4 ohms.

The power supply for the amplifier is obtained from the RCA-80 and a filter system located on the amplifier base. The field coil of the loudspeaker in the PG-63 equipment is used as a "bleeder" across the output of the power supply system. In the Universal Amplifier (PB100B1) a 10,000 ohm resistor is used as the "bleeder."

(2) PHONOGRAPH CONNECTIONS

An input jack is provided in the primary circuit of the input transformer which permits the use of a phonograph turntable RCA Victor Type PT-14 or PT-15. The instructions for operation are included with the phonograph equipment.

(3) WIRING

The schematic wiring diagram for the PB100A1 amplifier equipment is shown in Figure 3 and that for the PB100B1 is shown in Figure 4. The wiring diagram for the complete PG-63 equipment is shown in Figure 5. Figure 6 shows the wiring diagram for the PB100B1 amplifier.

(4) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

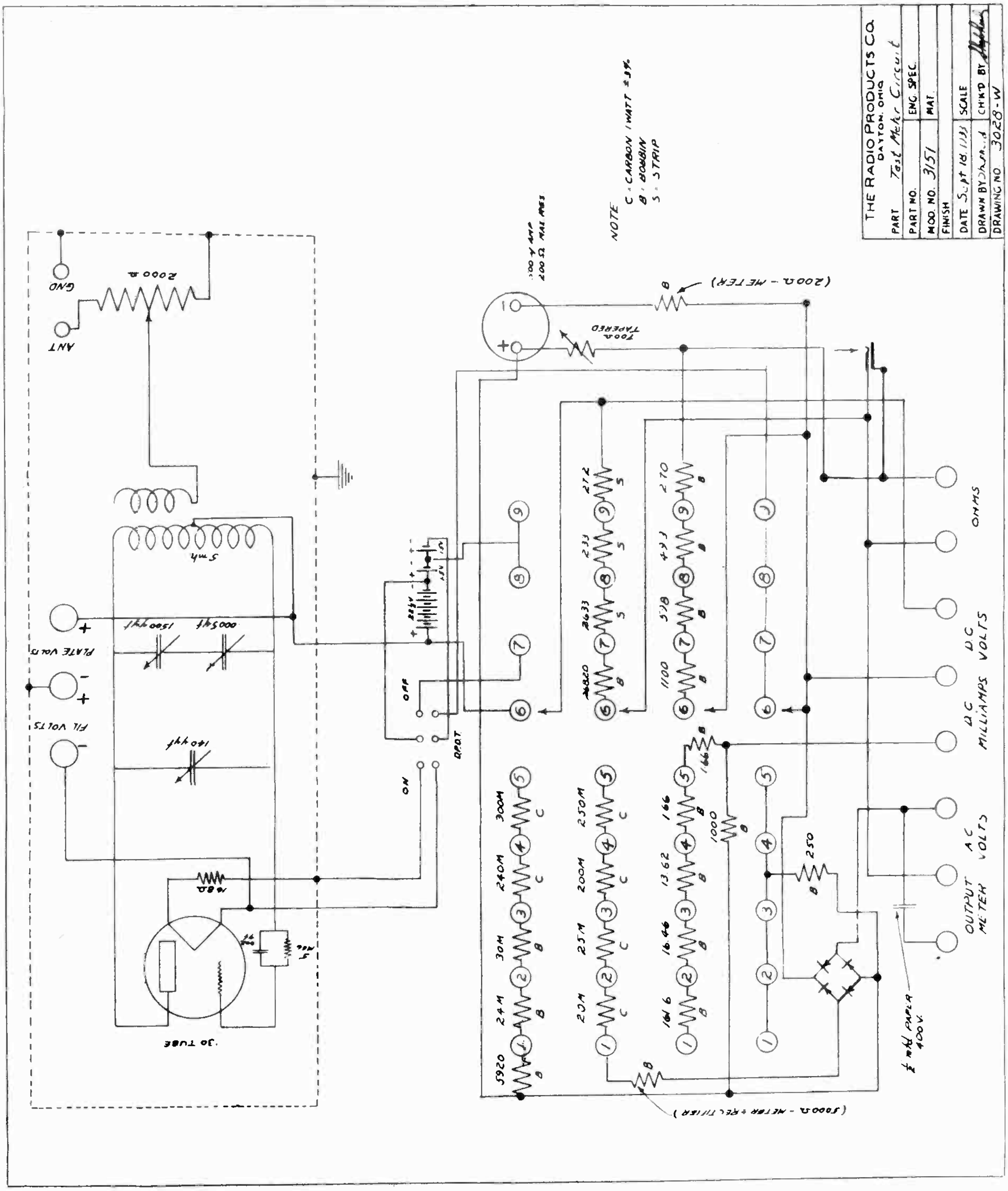
115 Volt A. C. Line—No Input Signal Voltage

Radiotron No.	Control Grid to Cathode or Filament Volts	Screen Grid to Cathode or Filament Volts	Plate to Cathode or Filament Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-57	1.4	53	65	0.6	2.5
2. RCA-56	13.5	—	240	5.0	2.5
3. RCA-53	0	—	275	15 per Plate	2.5

Stock No.	DESCRIPTION	List Price
	PB-100A1 AND PB-100B1 AMPLIFIER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3183	Socket—3 contact socket—For microphone connection—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3581	Resistor—200 ohms—Carbon type—½ watt—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3643	Capacitor—0.005 mfd.	.25
3699	Capacitor—720 mmfd.	.40
3719	Socket—7 contact Radiotron socket	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6300	Socket—4 contact Radiotron socket	.35
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	1.00
6513	Capacitor—Comprising two 5.0 mfd. capacitors	1.00
7054	Cord—Power cord	.60
7484	Socket—5 contact socket—For speaker connection	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield cap	.20
7610	Transformer—Power transformer	5.92
7611	Capacitor—10.0 mfd.	$1.72
7612	Capacitor—Comprising two 4.0 mfd. capacitors	1.60
7613	Volume control—100,000 ohms	1.55
7614	Transformer—Input transformer	12.80
7615	Jack—Long frame open circuit jack	1.28
7616	Transformer—Driver transformer	3.52
7617	Transformer — Output transformer—For use in PB100A1 amplifier only	4.48
7618	Switch—Single pole—Single throw—Toggle type	1.68
7619	Reactor—Filter reactor	2.80
7620	Resistor—10,000 ohms—Porcelain type—For use in PB-100B1 amplifier only	1.28
7623	Transformer—Tapped output transformer—For use in PB-100B1 amplifier only	5.20
25623	Knob—Volume control knob	.30
	MICROPHONE ASSEMBLIES	
3215	Plug—Microphone cord plug	.40
3216	Cushion—Microphone rubber cushion—Package of 6	.24
7533	Mechanism—Microphone mechanism, less housing	6.80
7534	Cord—Microphone cord	.70
	LOUDSPEAKER ASSEMBLIES	
9428	Cone—Loudspeaker cone—Package of 5	5.00
9433	Coil assembly—Comprising field coil, cone bracket and magnet assembly	4.75
27445	Cable—Loudspeaker cable and plug	3.80

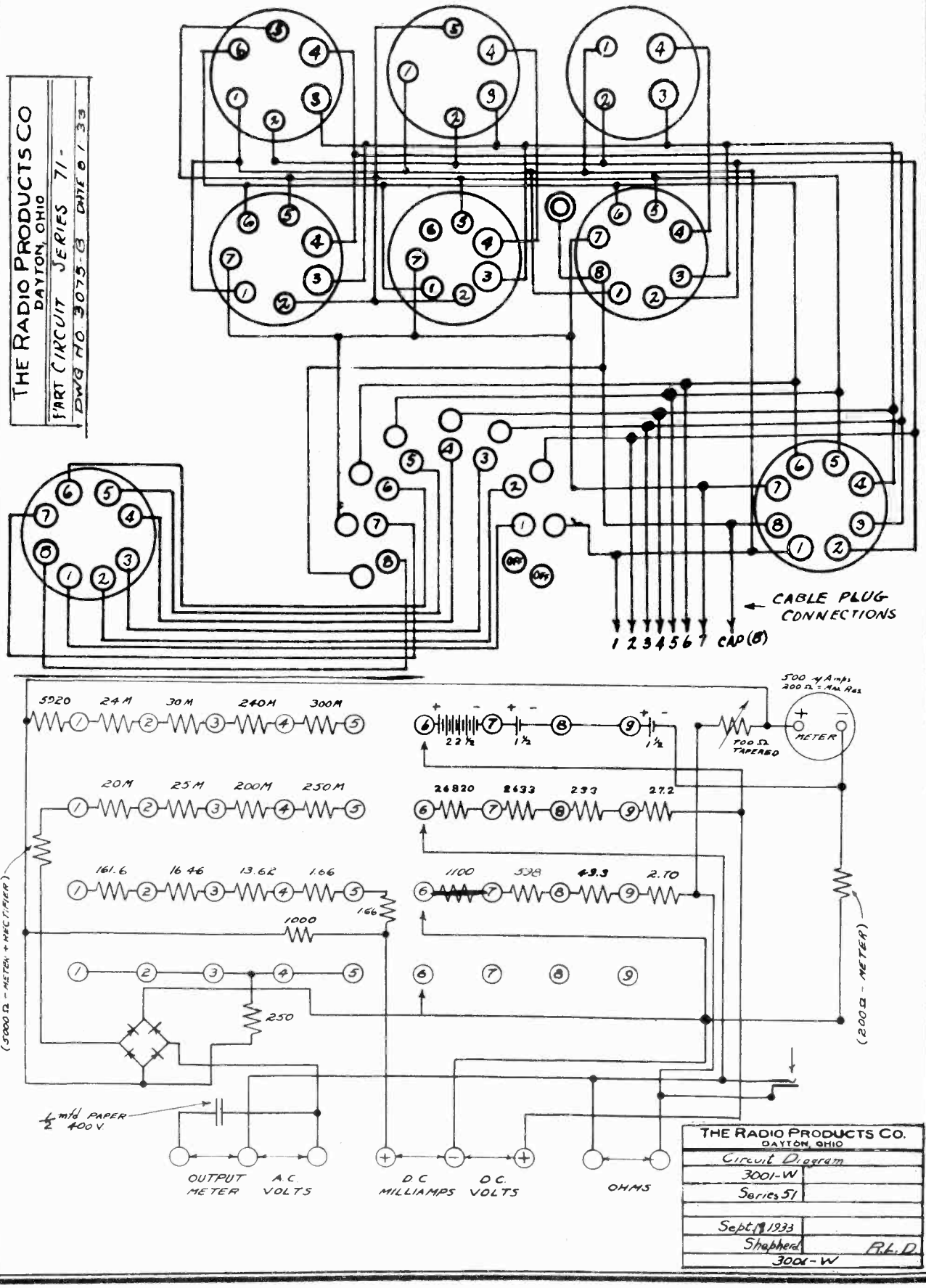
RADIO PRODUCTS CORP.

MODEL 3151
Tester Schematic



MODEL 51 (3001-W)
Tester Schematic

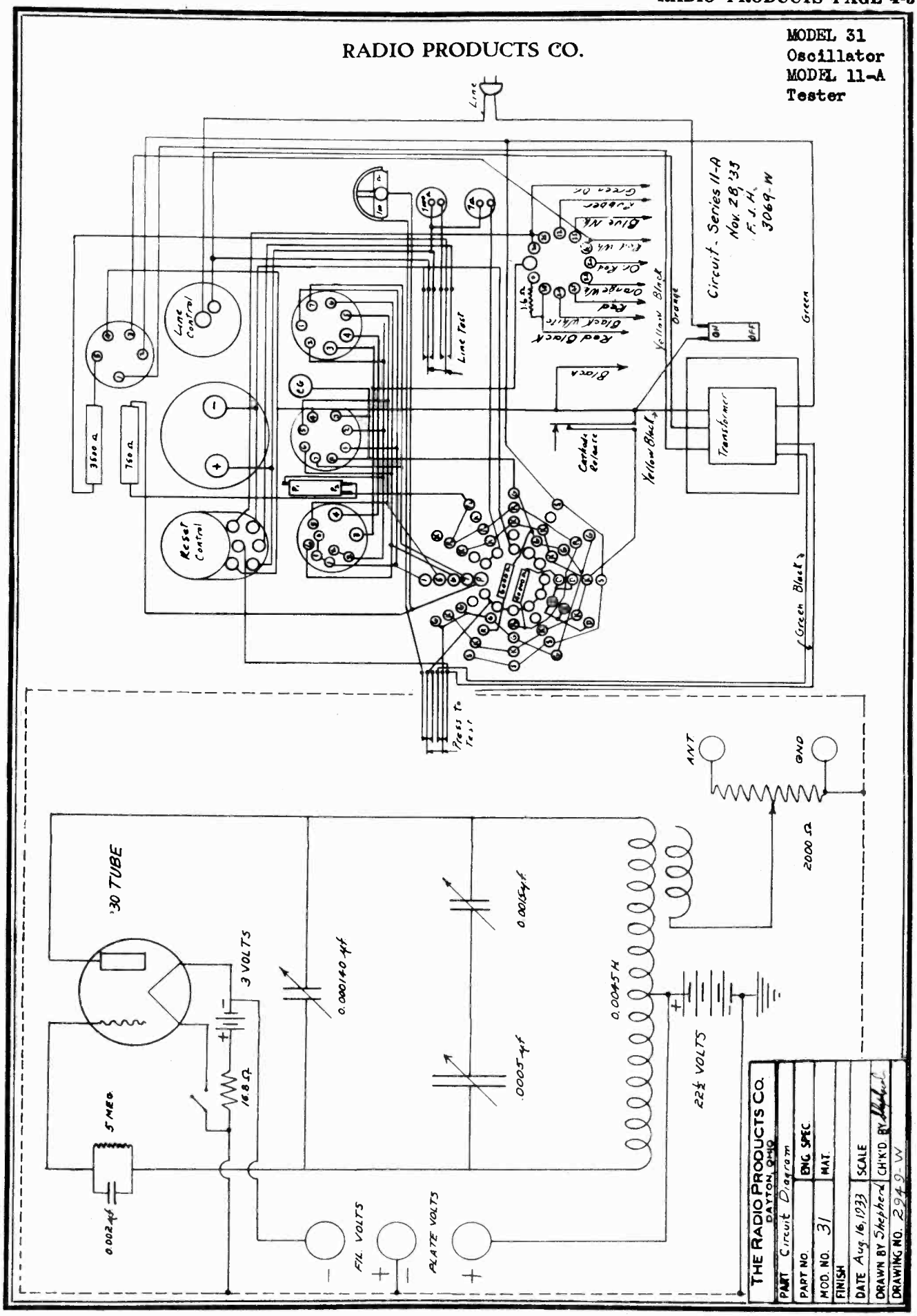
RADIO PRODUCTS CO.



THE RADIO PRODUCTS CO. DAYTON, OHIO	
Circuit Diagram	
3001-W	
Series 51	
Sept 1 1933	
Shepherd	R.L.D.
3001-W	

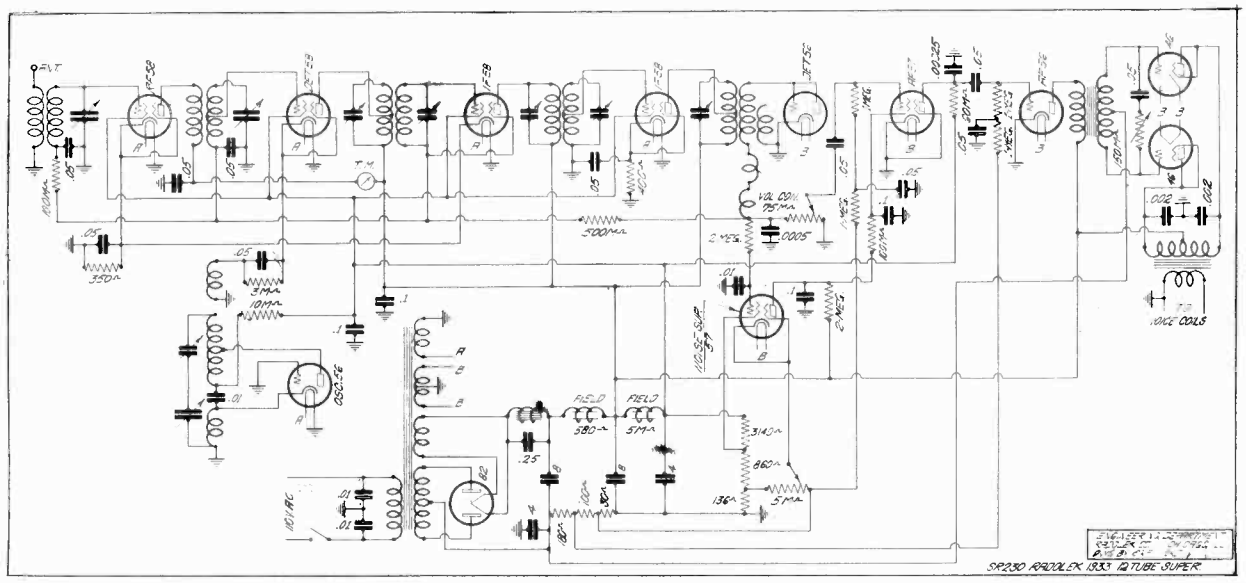
RADIO PRODUCTS CO.

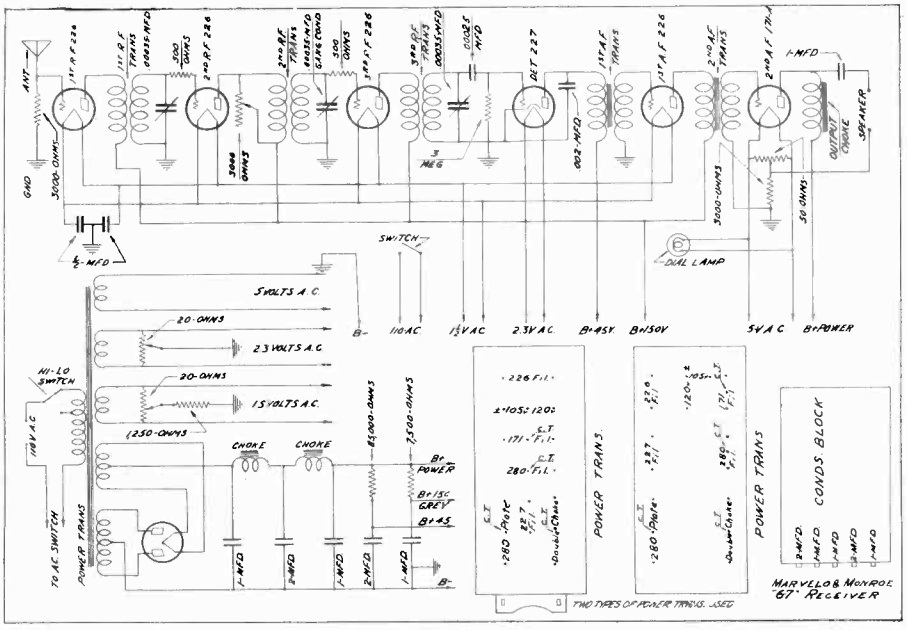
MODEL 31
Oscillator
MODEL 11-A
Tester



RAD OLEK

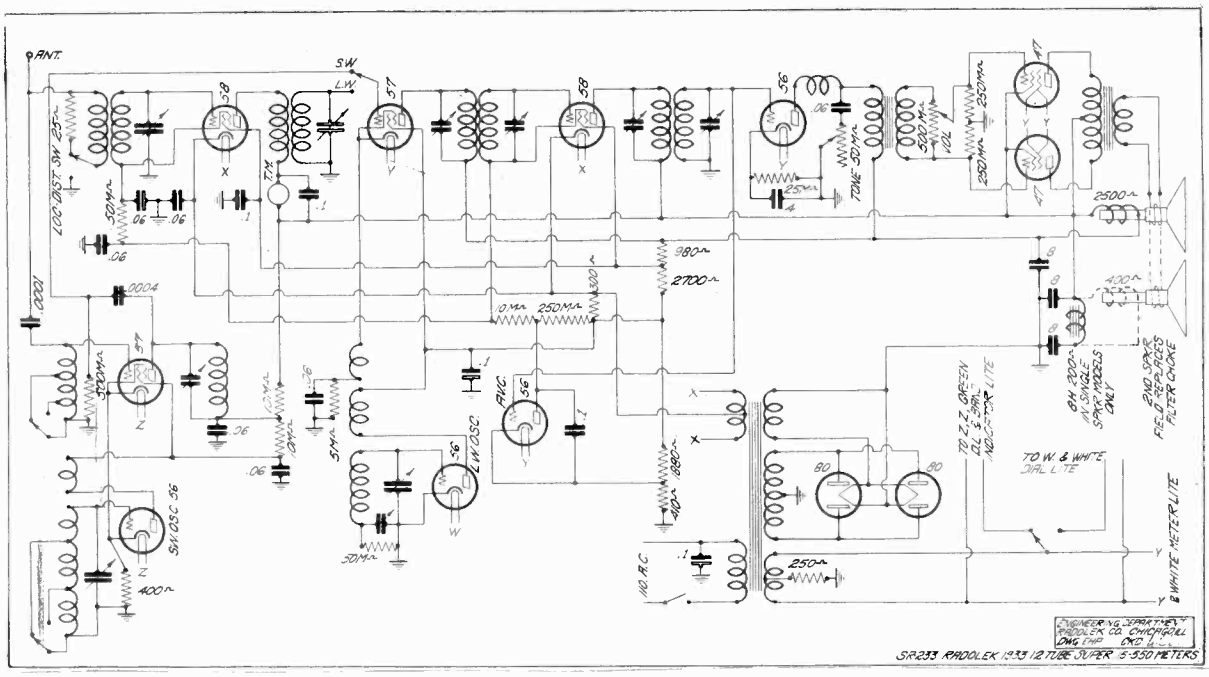
MODEL SR-230
MODEL Marvelo-
Monroe 6-7



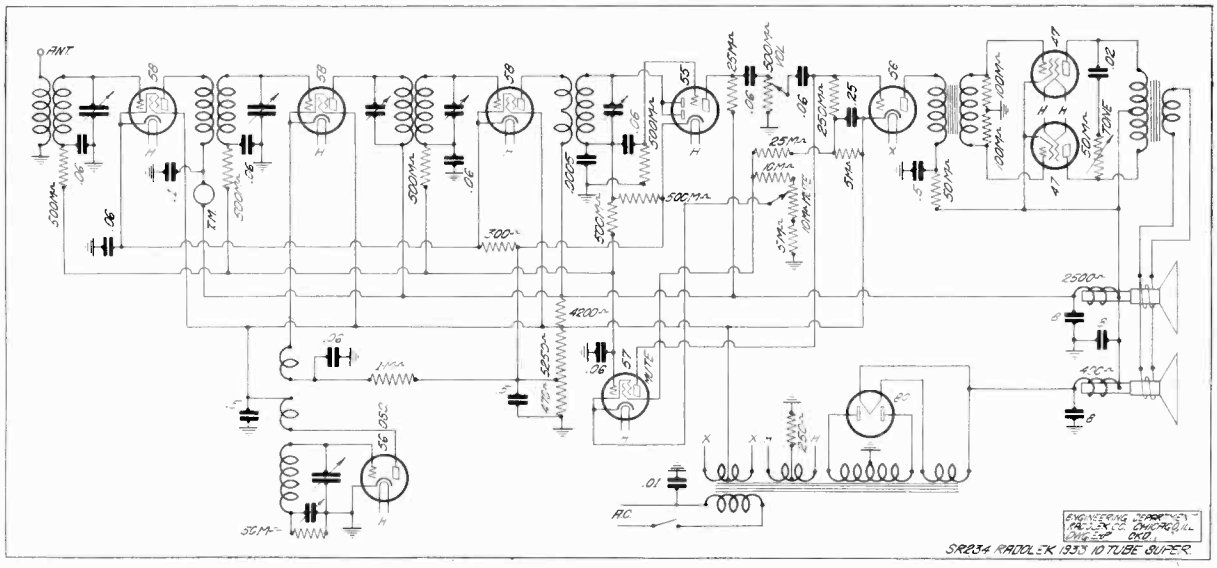


MODEL SR-233
MODEL SR-234
MODEL SR-236

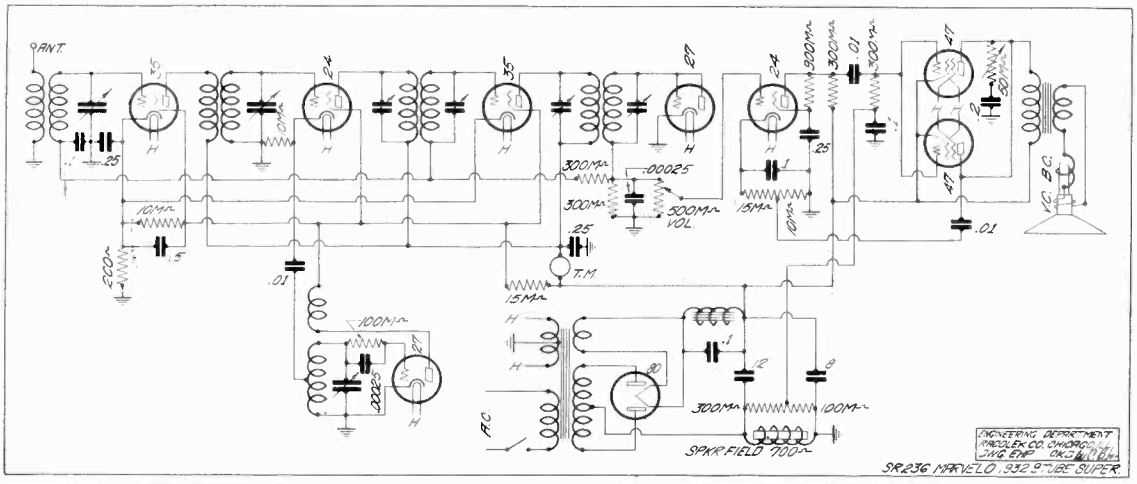
RAD OLEK



SR 233 RADOLEK 1933 12 TUBE SUPER 5-550 METERS



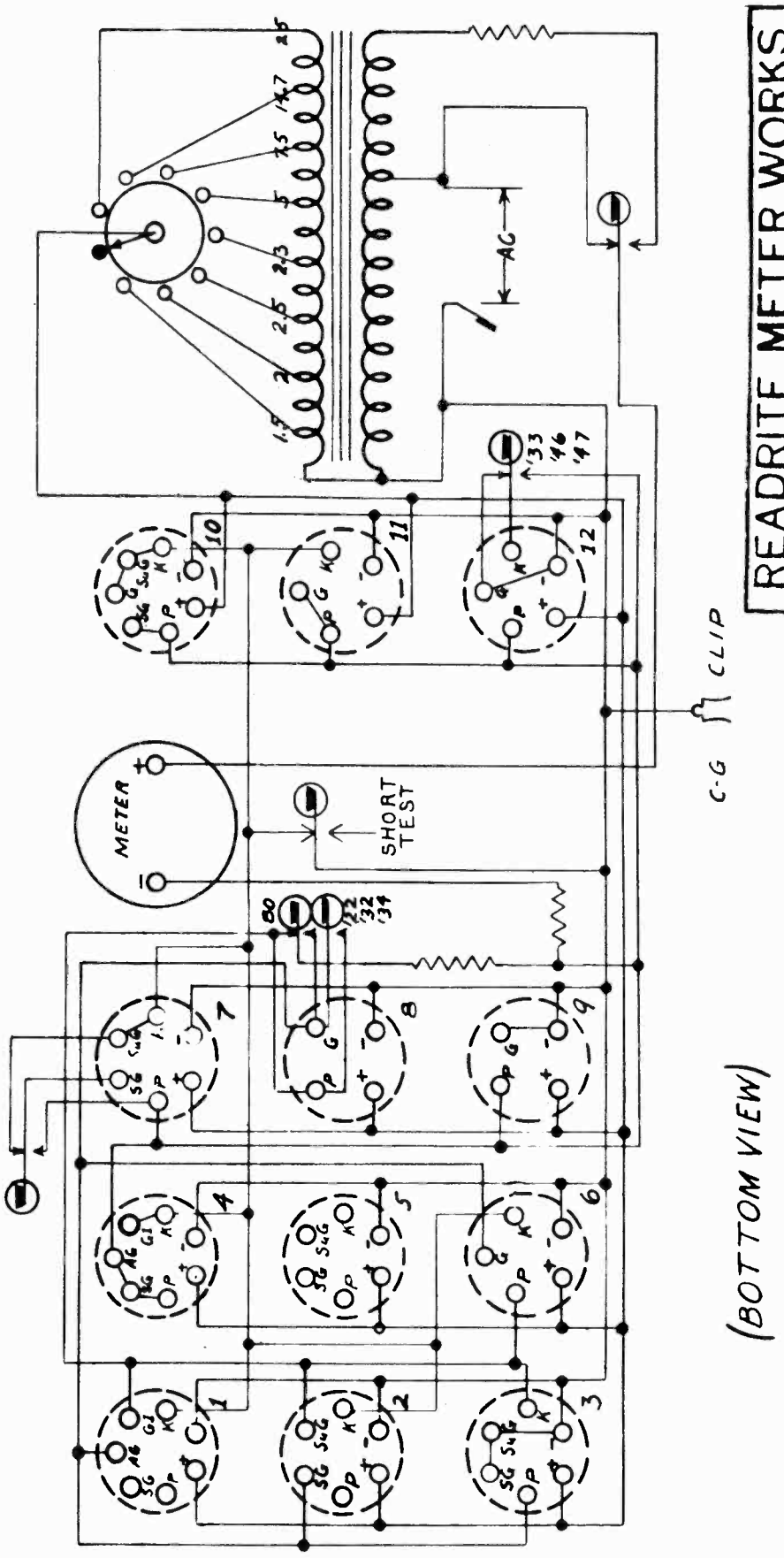
SR 234 RADOLEK 1933 10 TUBE SUPER



SR 236 MARVELO 1932 9 TUBE SUPER

READRITE METER WORKS

MODEL 410
Tube Checker

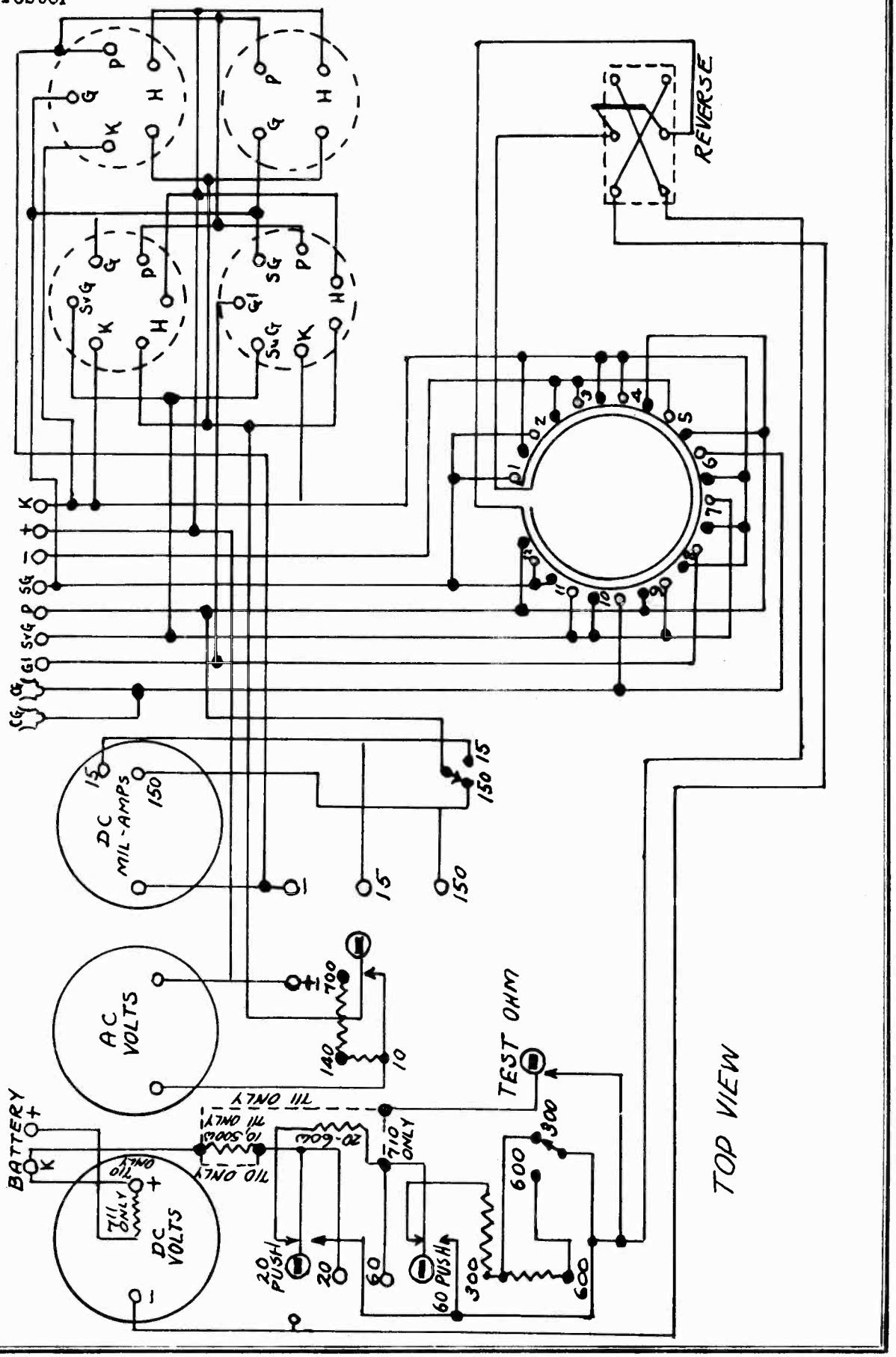


READRITE METER WORKS
BLUFFTON, OHIO

TITLE WIRING DIAGRAM
FOR # 410
MAT. NO REQ. FILE NO.
PART NO. DWG. NO.
DATE DRAWN BY D.W.B. CHECKED BY F.E.W.

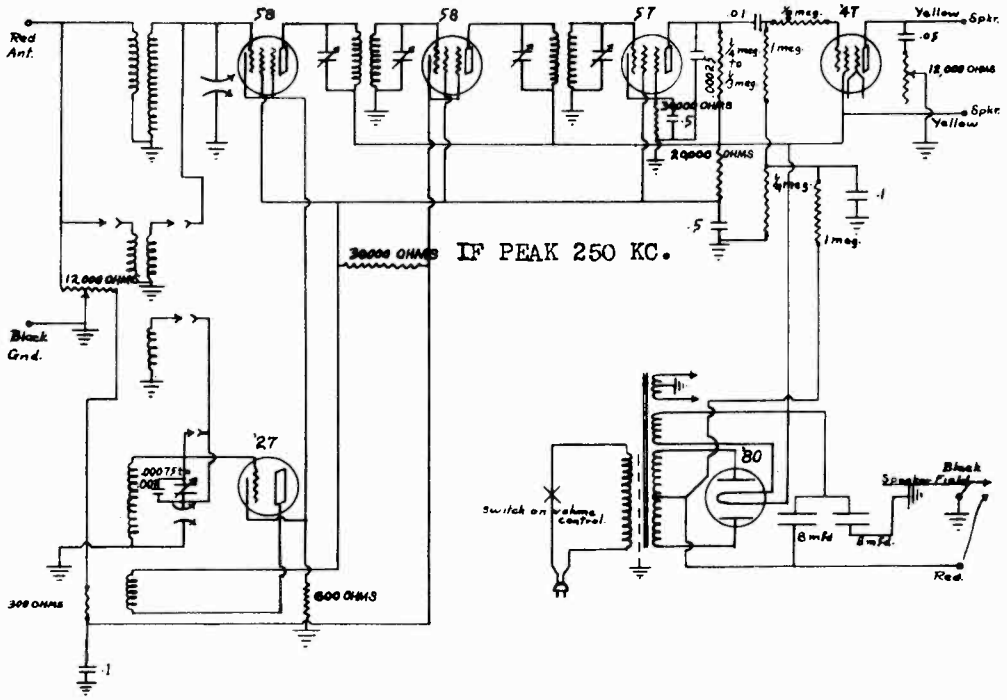
MODEL 710
Set Tester

READRITE METER WORKS



REMLER COMPANY, LTD.

MODEL 10-3
Schematic, Voltage
Alignment



MODEL #10-3

This Radio Receiver is of the Conventional Super-heterodyne type, employing the following tubes:

#380 as rectifier; #58 as mixer; #58 as intermediate frequency amplifier; #57 as detector; #47 as audio power amplifier and #327 as oscillator. These tubes are noted in the order of their placement on the chassis, beginning with the #380 tube nearest the power transformer.

INSTALLATION:

This set is designed to operate from a standard power supply of 110 to 125 volts, 50 or 60 cycles, alternating current. Best results will be obtained when operated from a fifty foot antenna and a good ground - connected respectively to the Red and Black wires at the back of the chassis.

CONTROLS:

The knob at the left controls the volume increasing in a clockwise rotation. This knob also controls the line power switch. The center knob controls the station selector dial. The knob at the right operates the variable tone control. In the center and below the station selector knob is the wave changing switch, the two positions of which are designated as "Short Wave" and "Long Wave".

The dual wave operation allows signal reception covering 6500 kilocycles to 2000 when the wave changing switch is in the Short Wave position and from 2000 K.C. to 550 K.C. when the wave changing switch is in the Long Wave (standard broadcast) position.

SERVICE DATA:

The circuits and associated apparatus in their sequence are as follows:

On the under side of the chassis and directly behind the two gang variable condenser will be found the "resonated" antenna coil and the secondary or grid coil of the mixer tube. Inductively coupled to the secondary coil and wound upon the same coil form are the grid and plate coils of the Oscillator. The front section of the gang condenser, with its adjustable series padding condenser, tune the Oscillator grid coil while the second gang condenser simultaneously tunes the grid coil of the mixer tube.

The blue plate lead of the mixer tube goes to the primary of the 250 K.C. intermediate transformer located directly beneath the mixer tube. The secondary of this transformer connects by a flexible lead to the grid of the shielded intermediate amplifier tube. The blue plate lead of the intermediate tube goes to the primary of the 250 K.C. detector transformer (located on the top of the chassis near the detector tube) while the secondary or grid coil connects to the grid cap or the #57 detector. The plate of the detector tube is "capacity coupled" to the grid of the power tube. Inspection of the circuit diagram will show the method of wave changing - the three short wave coils being placed in shunt with the broadcast coils for short wave operation.

The grid bias for the power tube is obtained by a voltage divider system across the choke (dynamic speaker field) on the negative side of the high voltage circuit.

Voltage readings for servicing purposes follow:

A.C.Voltages:

Line	--	120 volts
Heater filaments	--	2.3 "
Power tube filament	--	2.3 "
Rectifier filament	--	5.0 "

D.C.Voltages:

From Ground to:

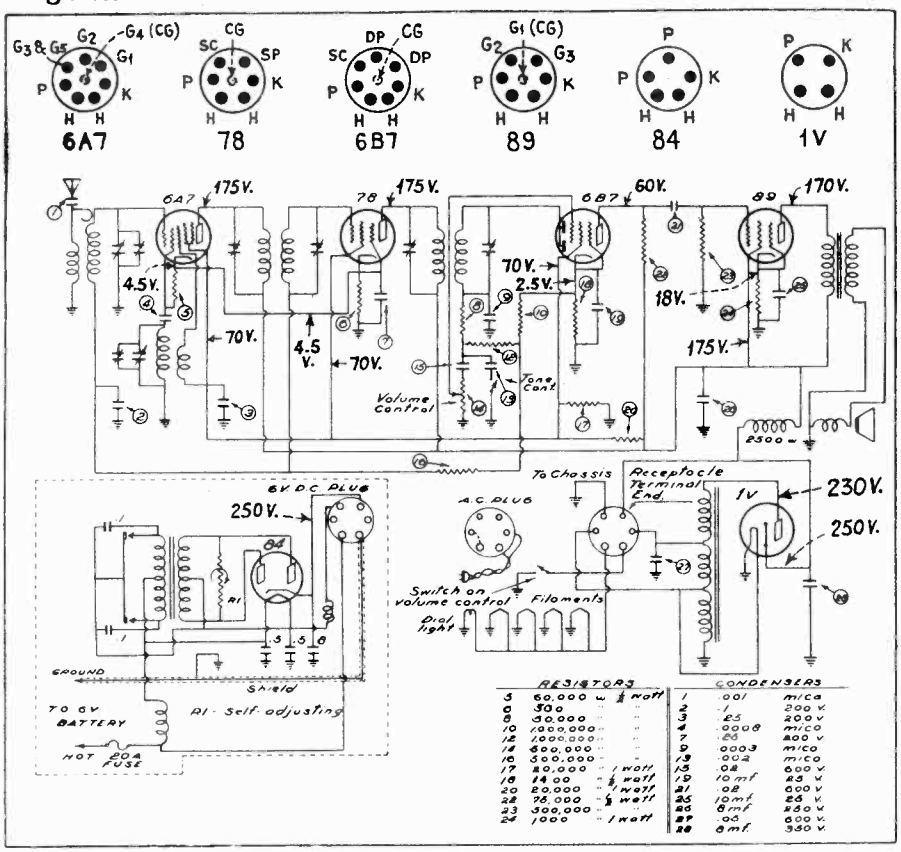
#380	Rectifier tube	filament	--	235 volts
#347	Power "	screen grid	--	235 "
#347	" "	plate	--	230 "
#347	" "	grid	--	17 "
#58	Mixer "	plate	--	235 "
#58	" "	screen grid	--	80 "
#58	" "	kathode	--	4 "
#58	Intermediate"	Plate	--	235 "
#58	" "	screen grid	--	80 "
#58	" "	kathode	--	2 to 20 volts
#57	Detector Tube	plate	--	120 volts
#57	" "	screen grid	--	60 "
#57	" "	kathode	--	3½ "
#327	Oscillator Tube	plate	--	60 "
#327	" "	kathode	--	4 "

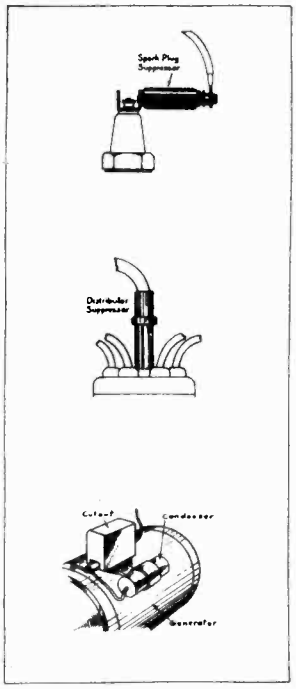
Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

Speaker field (red lead) -- 105 volts negative.

MODEL 27
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.





SUPERHETERODYNE MODEL #27

This radio receiver is of the superheterodyne type with automatic volume control; and is intended for use on 110 to 125 volt, 50 - 60 cycles A.C. or from a 6 volt battery, using the power box.

INSTALLATION IN AUTOMOBILE:

Supplied with the radio receiver are the power box, eight spark plug type suppressors, one distributor suppressor and one generator condenser.

The power box may be mounted under the dash, high enough up to leave room for the feet on the toe board; or it may be placed under the front seat by those who do not care to permanently attach the box to the car. The metal shielded cable terminating in two connecting lugs is the battery cable. The lug connected to the metal shield should be connected to the car chassis, or the grounded side of the battery. The lug terminating the insulated wire may be connected to a terminal of the ammeter, or to the "hot," or ungrounded side of the battery.

After making the above connections, run the black thick cotton covered cable under the floor mat, or under the seat, and plug into radio receiver.

Later model automobiles have antennas built in the tops with a lead in wire usually brought down the right front door post. An extension may be made to this wire and connected to the antenna wire extending from the radio receiver. Older model cars may be equipped with either a top antenna or a running board type at slight cost.

In order to reduce the noise from the ignition system in the car, a spark plug suppressor should be connected in series with each spark plug wire at the plug, and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached.

Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

The on-and-off switch operated by the volume knob controls both the six volt battery supply and the 110 - 125 volt AC supply when used in the home with AC line cord supplied.

SERVICE DATA:

When operated from 110 - 125 volt A.C. source, an auto-transformer in the receiver is used to provide the high voltage for the plate and field supply, and the filament supply for the tubes. The chassis is directly connected to the power source, and contact between chassis and ground should be avoided.

On battery operation, the cable plug connects the six volt supply to the filaments of the tubes, and the plate and field supply from the power box to the filter in the set. Neither the auto transformer nor the 1v rectifier is in use when the set is battery operated.

To take the chassis out of the cabinet, first, remove the knobs then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The mixer coil is in the aluminum shield can in back of the variable condenser.

The oscillator coil is inside the chassis and is trimmed with the front section trimmer on the variable condenser.

Mounted with the oscillator coil is the first I.F. coil which is trimmed by the condensers accessible from the back of the chassis.

The second I.F. transformer is also located within the chassis and may be trimmed by the condensers located under the holes in the chassis bottom.

The power box contains a vibrator type interrupter and transformer, and a rectifier tube with necessary filter system. A 20 ampere auto type fuse is provided for protection to battery and wiring system. The cover of the power unit may be removed for servicing by taking out the four screws around the edge of the base. After several hundred hours' use, the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in the plate supply voltage.

On account of the action of the A.V.C., when aligning the set, use a weak signal or oscillator input; and an output meter to indicate resonance.

The following tubes are used:

6A7 as oscillator-mixer,
78 as I.F. amplifier,
6B7 as detector and amplifier,
89 as power amplifier,
1v as rectifier,
6.3 volt dial lamp.

An 84 rectifier is used in the power box.

A.C. VOLTAGE READINGS:

Line	120 volts
Filaments	6 "
Plate 1v rectifier to chassis	230 "

D. C. VOLTAGE READINGS:

From chassis to:

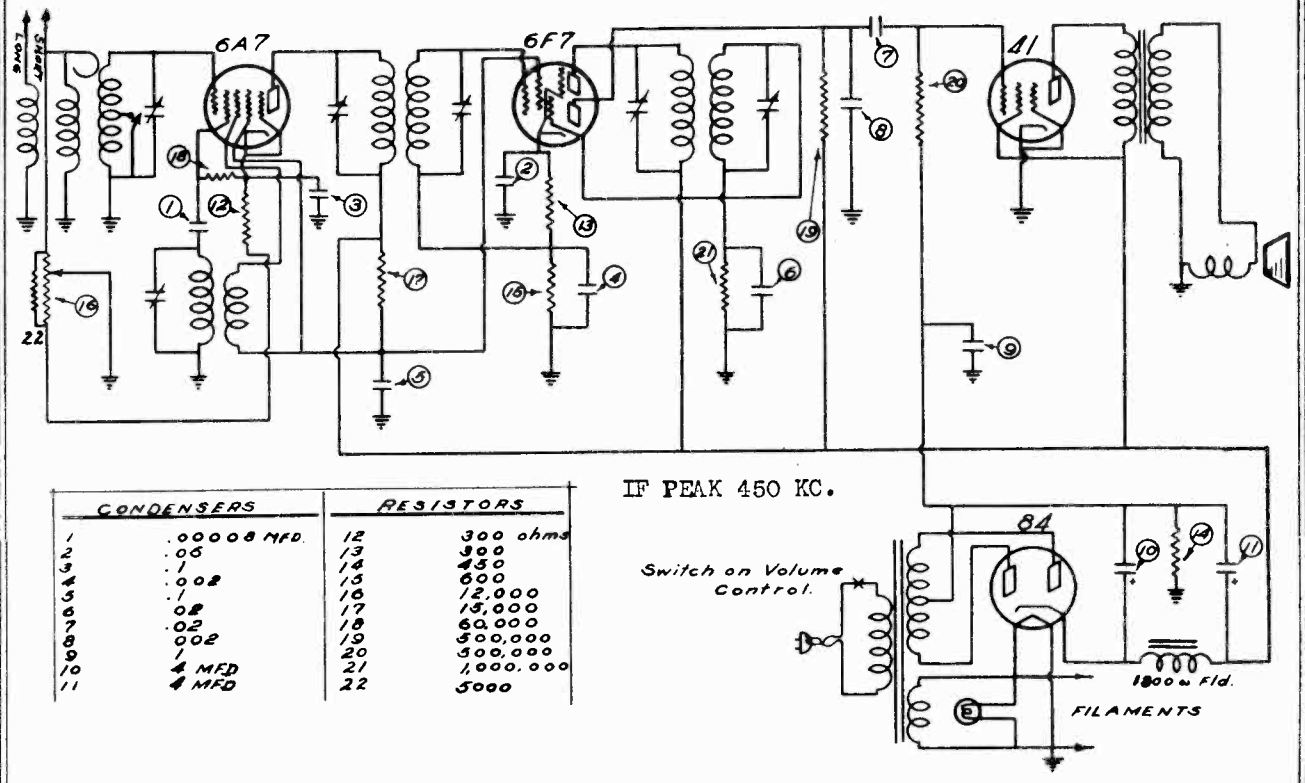
1v	Rectifier tube	cathode	250 volts
89	Power "	plate	170 "
89	" "	screen grid	175 "
89	" "	cathode	18 "
6B7	Detector Amp. "	plate	60 "
6B7	" " "	screen grid	70 "
6B7	" " "	cathode	2.5 "
78	I.F. " "	plate	175 "
78	I.F. " "	screen grid	70 "
78	I.F. " "	cathode	4.5 "
6A7	Mixer Osc. "	plate	175 "
6A7	" " "	screen grid	70 "
6A7	" " "	cathode	4.5 "
84	Rectifier "	cathode	250 "

Voltage across field 75 volts.

Total current from battery 4.5 amperes.

REMLER COMPANY, LTD.

MODEL 30,40
Schematic, Voltage
Alignment



CONDENSERS		RESISTORS	
1	.00008 MFD.	12	300 ohms
2	.05	13	900
3	.1	14	450
4	.002	15	600
5	.1	16	12,000
6	.08	17	15,000
7	.02	18	60,000
8	.002	19	500,000
9	1	20	300,000
10	4 MFD	21	1,000,000
11	4 MFD	22	5000

REMLER SUPERHETERODYNES

Model #30 - Model #40

TUBES:

This is a four tube superheterodyne receiver employing the following tubes:

#84 as full wave rectifier; #6A7 as oscillator and mixer; #6F7 as I.F. amplifier and fixed bias detector; and #41 as pentode power amplifier.

INSTALLATION:

This set is designed to operate from a 110 to 125 volts, 50 or 60 cycle A.C. power supply. Two antenna leads are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

CONTROLS:

The knob at the left controls the volume and also operates the ON and OFF switch. The knob at the right is the station selector. The dial is calibrated in hundreds of kilocycles. The short wave switch allows the reception of the higher frequency police band when the switch is to the right, and the selector is turned to from 15 to 16 on the dial. The lower frequency police band is received at 17 on the dial with the switch to the left, or broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

A. C. VOLTAGES:

Line	- 120 volts
Filaments	6.3 "

D. C. VOLTAGES:

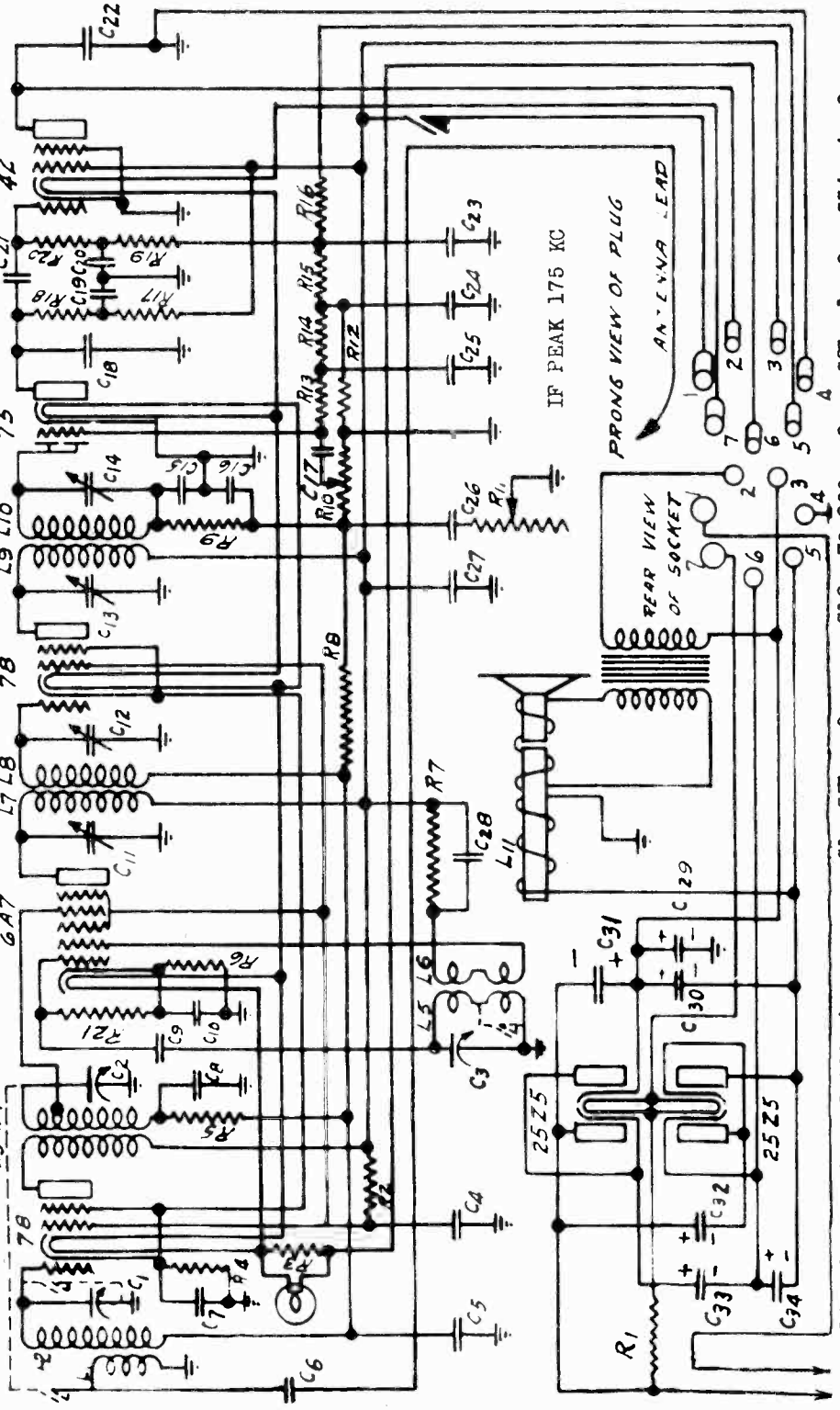
From ground to:

#84	Rectifier cathode	- 330 volts
#41	Plate	240 "
#41	Screen grid	250 "
#41	Grid	20 "
#6F7	Triode plate	100 "
#6F7	Pentode plate	250 "
#6F7	Screen grid	100 "
#6F7	Cathode	8 "
#6F7	Pentode grid	5 "
#6A7	Plate	250 "
#6A7	Screen grid	100 "
#6A7	Oscillator plate	100 "
#6A7	Cathode	3½ - 23 volts

Due to current taken by voltmeter used, readings of detector plate and grid voltages may be slightly less than values shown above.

REPUBLIC INDUSTRIES

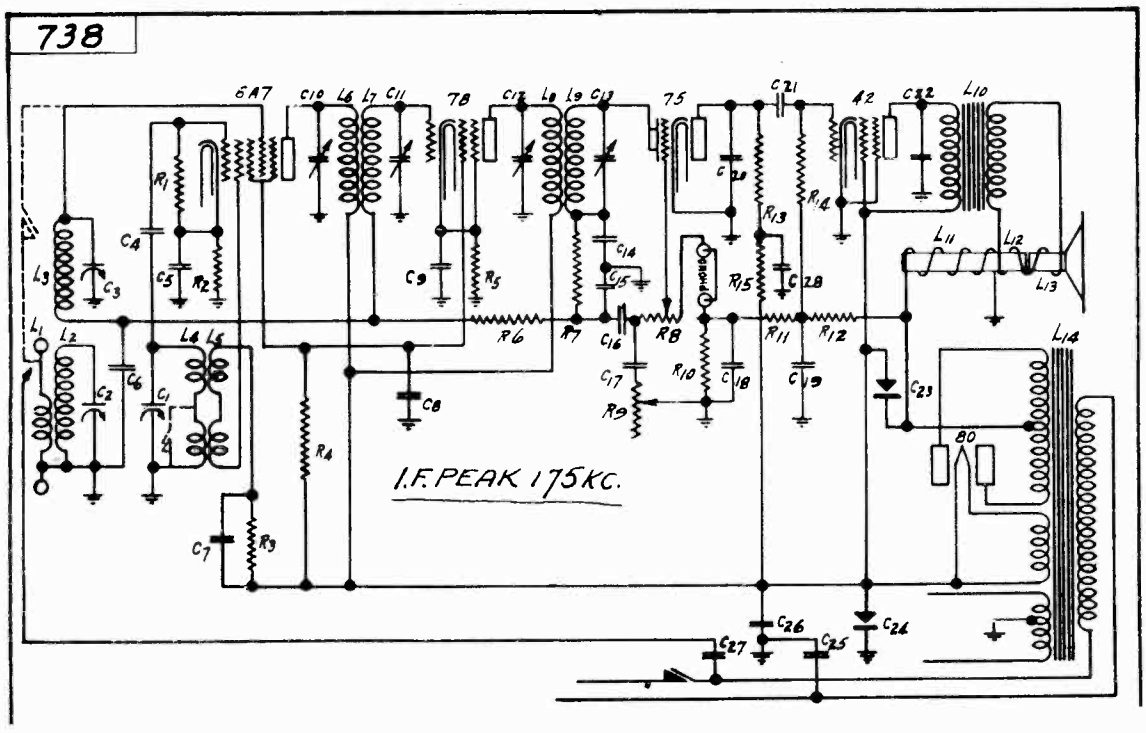
MODEL "Skyhawk" RC-5,RC-6
Schematic



R1	100 ohms	R12	5,000 ohms	C1	371 mmf.	C12	70-200 mmf.	C23 .1 mf.	C34 4 mf.
R2	75,000 "	R13	500,000 "	C2	371 mmf.	C13	75-150 mmf.	C24 .5 mf.	
R3	9 "	R14	500,000 "	C3	336 mmf.	C14	75-150 mmf.	C25 .5 mf.	L7,L8
R4	250 "	R15	75,000 "	C4	.1 mf.	C15	.0001 mf.	C26 .01 mf.	are 8000
R5	100,000 "	R16	500,000 "	C5	.1 mf.	C16	.0001 mf.	C27 1.0 mf.	microhenrys.
R6	250 "	R17	40,000 "	C6	.001 mf.	C17	.01 mf.	C28 .1 mf.	L9 and L10
R7	10,000 "	R18	100,000 "	C7	.5 mf.	C18	.002 mf.	C29 4.0 mf.	are 6000
R8	2,000,000 "	R19	40,000 "	C8	.1 mf.	C19	.1 mf.	C30 4.0 mf.	microhenrys.
R9	50,000 "	R20	500,000 "	C9	.00025 mf.	C20	.5 mf.	C31 4.0 mf.	L11 2500
R10	500,000 "	R21	40,000 "	C10	.1 mf.	C21	.01 mf.	C32 8.0 mf.	Speaker Fld.
R11	250,000 "			C11	70-200 mmf.	C22	.004 mf.	C33 8.0 mf.	

MODEL "Skyhawk" SL-5-D
Schematic

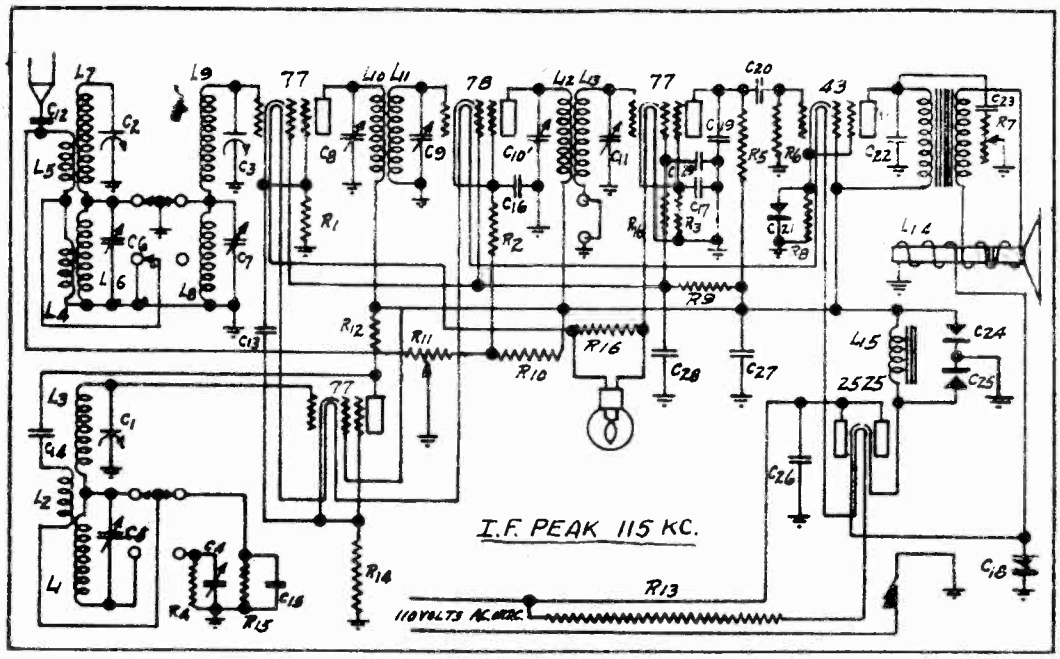
REPUBLIC INDUSTRIES



Code	Part No.	
		RESISTORS
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	272	.1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser
		INDUCTANCES
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

REPUBLIC INDUSTRIES

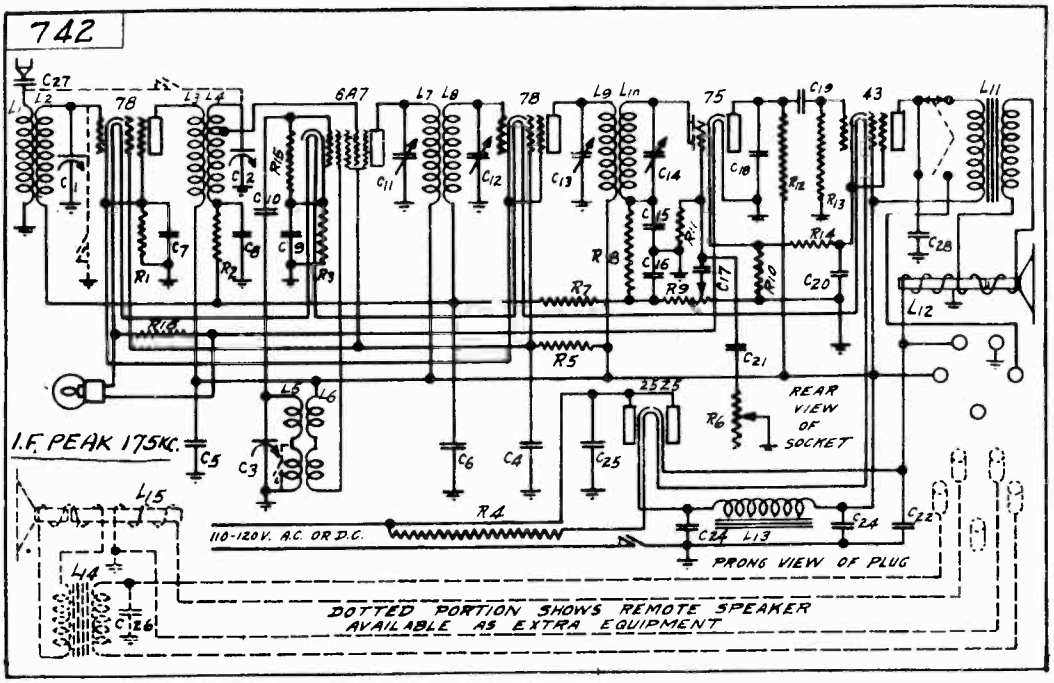
MODEL "Skyhawk" SL-6
Schematic



Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1063	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator Condenser
C16	272	.1 Mfd. I.F. Cathode By-pass Condenser
C17	569	.2 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser
		INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	14,000 Microhenries Second I.F. Secondary U.W.
L14	917	3,000 Ohm Speaker Field
L15	940	20 Henry Choke

MODEL "Skyhawk" SL-6-D
Schematic

REPUBLIC INDUSTRIES



Code	Part No.		
			RESISTORS
R1	1062	250	Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000	Ohm A.V.C. Network Resistor
R3	1062	250	Ohm 6A7 Cathode Resistor
R4	1125	130	Ohm Resistor In Power Cord
R5	941	20,000	Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000	Ohm Tone Control
R7	926	1	Megohm A.V.C. Network Resistor
R8	898	50,000	Ohm A.V.C. Network Filter Resistor
R9	535	500,000	Ohm Volume Control & Power Switch
R10	1122	40	Ohm Bias Network Resistor
R11	925	500,000	Ohm 75 Grid Leak Resistor
R12	923	100,000	Ohm 75 Plate Resistor
R13	925	500,000	Ohm 43 Grid Resistor
R14	1063	500	Ohm Bias Resistor
R15	921	40,000	Ohm Oscillator Grid Leak Resistor
R16	1119	36	Ohm Pilot Light Shunt Resistor
			CONDENSERS
C1	833	371	MMFD. Preselector Section of Tuning Condenser
C2	833	371	MMFD. Preselector Section of Tuning Condenser
C3	833	336	MMFD. Oscillator Section of Tuning Condenser
C4	272	.1	MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1.	MFD. B By-pass Condenser
C6	272	.1	MFD. A.V.C. Network By-pass Condenser
C7	272	.1	MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1	MFD. First Detector R.F. By-pass Condenser
C9	272	.1	MFD. 6A7 Cathode By-pass Condenser
C10	266	.00025	MFD. Oscillator Coupling Condenser
C11	1104	70-200	MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200	MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200	MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200	MMFD. Second I.F. Secondary Trimmer Condenser
C15	359	.0001	MFD. Diode Filter Condenser
C16	339	.0001	MFD. Diode Filter Condenser
C17	269	.01	MFD. First Detector Feed Condenser
C18	516	.001	MFD. 75 Plate Filter Condenser
C19	269	.01	MFD. Audio Feed Condenser
C20	928	25	MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01	MFD. Tone Control Condenser
C22	1085	4	MFD. Dry Electrolytic Condenser
C23	1085	4	MFD. Dry Electrolytic Condenser
C24	1085	11	MFD. Dry Electrolytic Condenser
C25	272	.1	MFD. Line By-pass Condenser
C26	1085	19	MFD. Dry Electrolytic Condenser
C27	269	.01	MFD. Antenna Series Condenser
C28	1132	.002	MFD. Output Plate Filter Condenser
			INDUCTANCES
L1	1138		Preselector Primary 450 Turns #36 S.S.E.
L2	1139		Preselector Secondary 144 Turns #36 D.D.C.
L3	1137		Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137		Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111		Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111		Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000	Microhenries First I.F. Primary
L8	1101	8,000	Microhenries First I.F. Secondary
L9	1101	8,000	Microhenries Second I.F. Primary
L10	1101	8,000	Microhenries Second I.F. Secondary
L11			#43 Output Transformer
L12		3,000	Ohm Speaker Field
L13	940	20	Henry Choke
L14			#43 Output Transformer
L15		2,500	Ohm Speaker Field