R.C.A. Victor Co., Inc.

Model: 221	Chassis:	Year: Pre October 1934
Power:	Circuit:	IF:
Tubes:		
Bands:		

Resources
Riders Volume 5 - RCA 5-43
Riders Volume 5 - RCA 5-44
Riders Volume 5 - RCA 5-45
Riders Volume 5 - RCA 5-46
Riders Volume 5 - RCA 5-91
Riders Volume 5 - RCA 5-92
Riders Volume 5 - RCA 5-93
Riders Volume 5 - RCA 5-94

RCA-VICTOR CO., INC.

MODEL 118,211
Schematic
Trimmer Locations

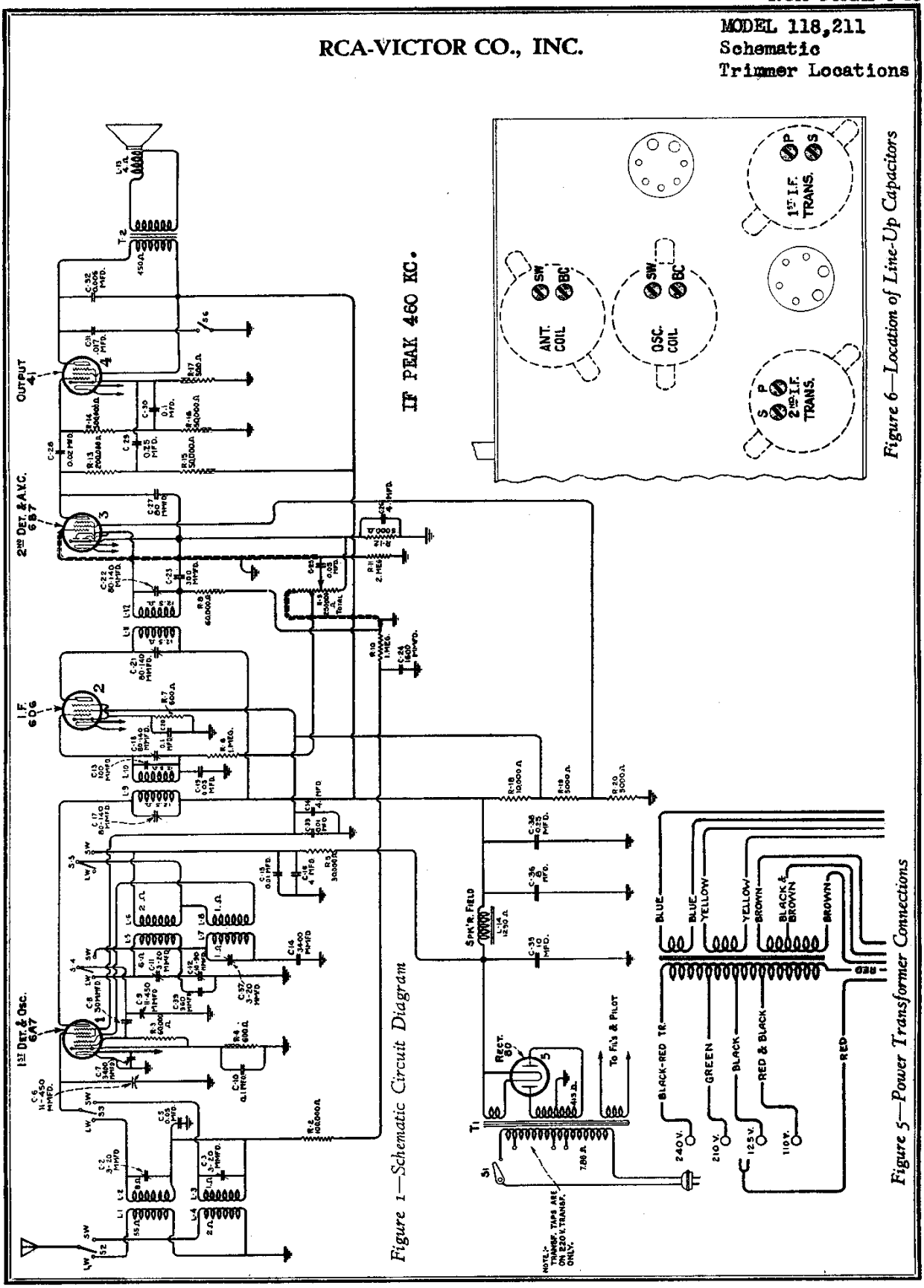

Figure 1—Schematic Circuit Diagram

Figure 5—Power Transformer Connections

Figure 6—Location of Line-Up Capacitors

MODEL 118,211
Chassis Wiring

RCA-VICTOR CO., INC.

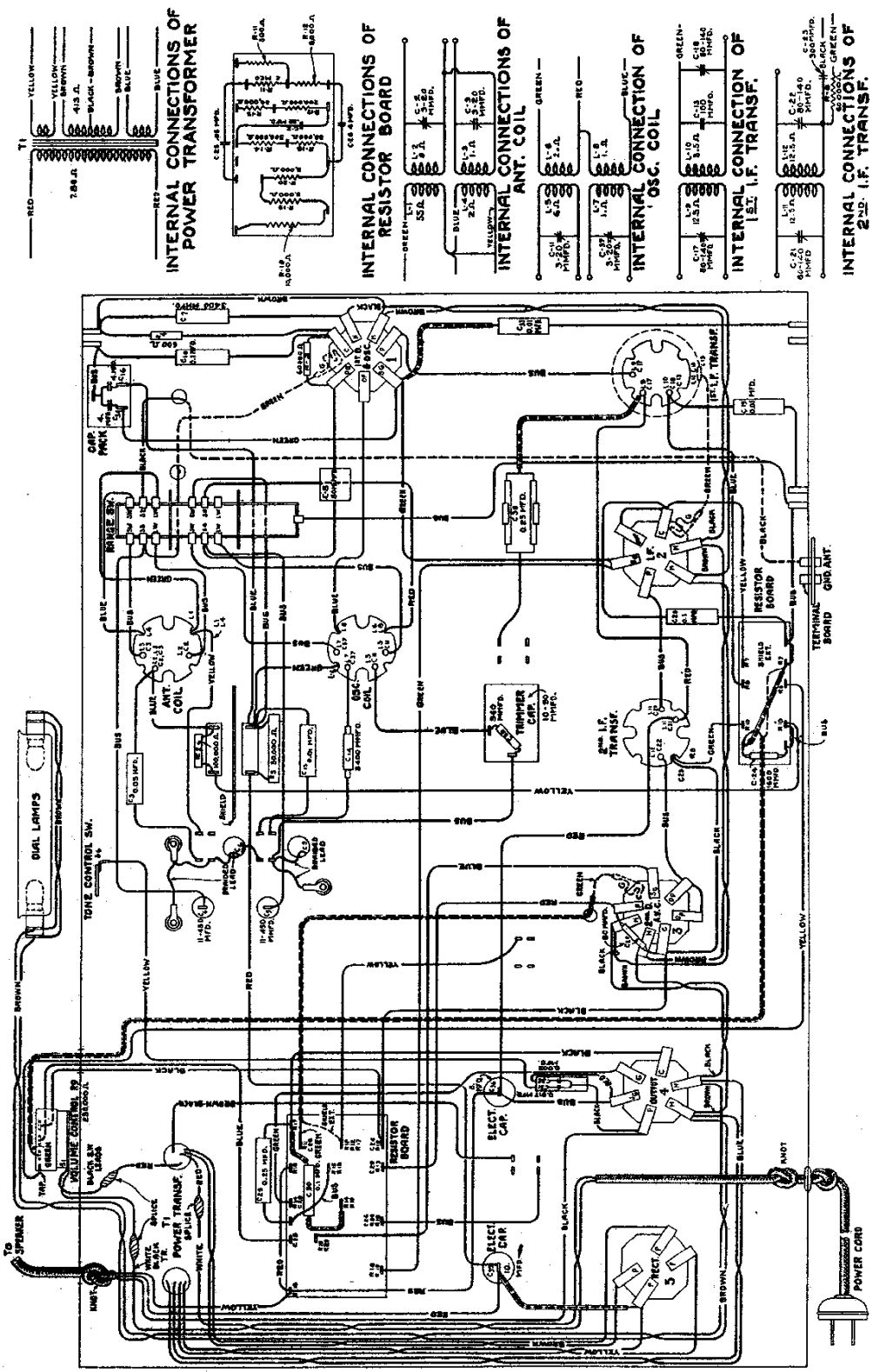

Figure 2—Wiring Diagram

RCA-VICTOR CO., INC.

MODEL 118,211
Voltage
Socket Layout
Loud Speaker Wiring

RADIOTRON SOCKET VOLTAGES

115-Volt, A. C. Line—Maximum Volume Control—No Signal

		Cathode to Grid Volts	Screen Grid to Ground	Plate to Ground	Plate M.A.	Heater Volts
	Detector		105	265	3.5	
6A7		6.0				6.3
	Oscillator		---	220	4.5	
6D6	I.F.	6.0	105	265	9.0	6.3
6B7	2nd Det. AVC	3.0	50*	90*	0.7	6.3
41	Power Output	16.5	265	245	30.0	6.3
80	Rectifier	---	---	690**	64.0	5.0

* = Voltage calculated from 265 v. +B
** = Plate to plate

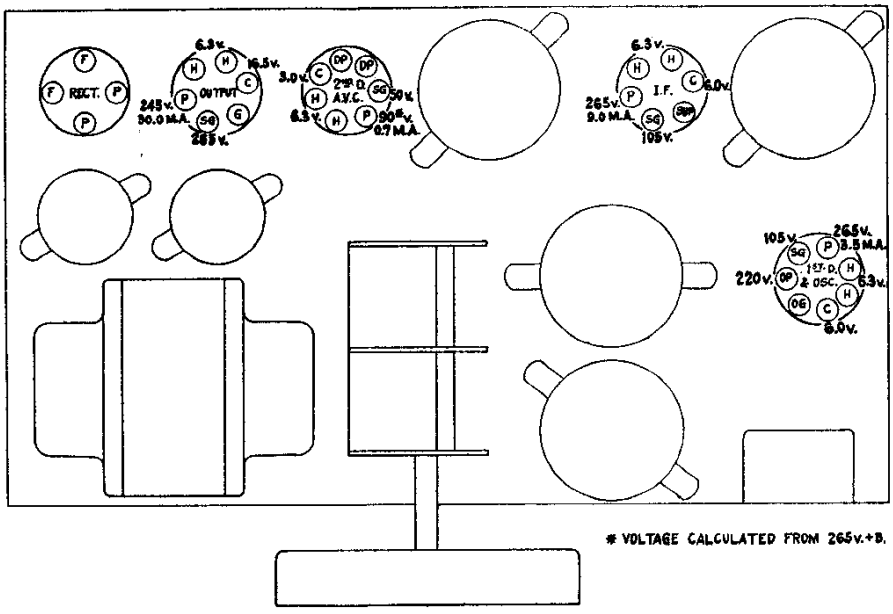

Figure 7—Radiotron Socket Voltages

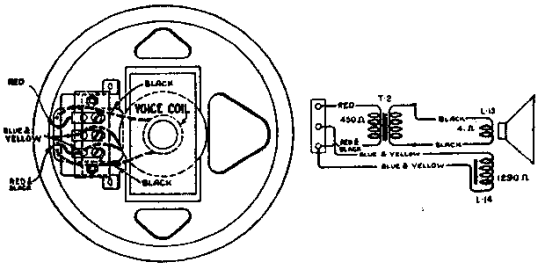

Figure 3—Table Model Loudspeaker Wiring

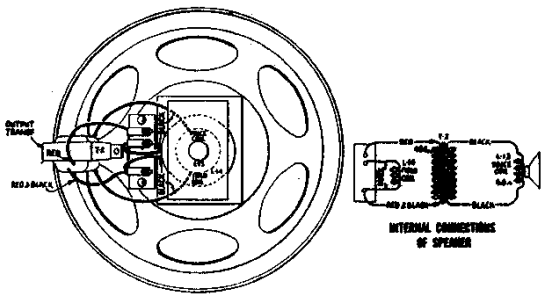

Figure 4—Console Model Loudspeaker Wiring

SERVICE DATA

(1) Line-Up Capacitor Adjustments:

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 5 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 460 K. C. and the adjustment screws are accessible as shown in Figure 6. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(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 secondary and primary of the first and then the second 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 top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals 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 540. Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720 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 two trimmers under the two R. F. coils, designated as BC in Figure 6, 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 top 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 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 5 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector 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, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Both of these adjustments must be made as indicated irrespective of output.

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 and detector adjustments.

(2) Radiotron Socket Voltages:

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made:

(3) Power Transformer Connections:

Models supplied for 220-volt power supply, use a power transformer having a tapped primary. The tapped primary permits it to be used either on lines of 100–130 volts or 195–250 volts. Figure 5 shows the internal connections of the transformer and the voltages to be used with the various taps. The taps are located on a terminal strip at the top of the transformer so that necessary changes may be made without removing the receiver from the cabinet.

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	
10194	Ball—Steel ball for condenser drive assembly—Package of 20	$0.25
4358	Bracket—Capacitor mounting bracket	.15
4427	Bracket—Volume control mounting bracket	.18
2747	Cap—Contact cap—Package of 5	.50
4428	Capacitor—8 mfd. (C36)	1.05
7790	Capacitor—10 mfd. (C35)	1.05
4442	Capacitor—50 mmfd. (C8)	.22
4509	Capacitor—80 mmfd. (C27)	.15
4413	Capacitor—360 mmfd. (C39)	.22
4441	Capacitor—1600 mmfd. (C24)	.35
4439	Capacitor—3400 mmfd. (C14)	.35
4471	Capacitor—3400 mmfd. (C7)	.44
4443	Capacitor—0.01 mfd. (C15)	.25
4444	Capacitor—0.01 mfd. (C33)	.22
4435	Capacitor—0.02 mfd. (28)	.25
3888	Capacitor—0.05 mfd. (C25)	.25
4417	Capacitor—0.05 mfd. (C5)	.25
3901	Capacitor—0.05 mfd. (C19)	.36
3877	Capacitor—0.1 mfd. (C20, C30)	.32
4415	Capacitor—0.1 mfd. (C10)	.22
3597	Capacitor—0.25 mfd. (C29, C38)	.40
3796	Capacitor—4.0 mfd. (C26)	.60
3861	Capacitor—Adjustable trimmer capacitor (C12)	.78
6787	Capacitor pack—Comprising one 0.005 and one 0.017 mfd. capacitors (C31, C32)	.30
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64
4422	Clutch—Condenser drive clutch assembly complete	.88
4430	Coil—Antenna coil (L1, L2, L3, L4, C2, C3)	1.92
4432	Coil—Oscillator coil (L5, L6, L7, L8, C11, C37)	1.65
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4434	Drive—Tuning condenser drive assembly complete	2.42
3632	Resistor—500 ohms—Carbon type—¼ watt (R17)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
4436	Resistor—5,000 ohms—Carbon type—¼ watt (R12)—Package of 10	2.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R6, R10)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3891	Resistor—5,000 ohms—Carbon type—1 watt (R19, R20)—Package of 5	1.10
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	.22
6318	Resistor—10,000 ohms—Porcelain type (R18)	.80
3943	Screen—Translucent screen for dial lamps—Package of 2	.18
4445	Screen—Chassis mounting screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 4 spacers and 4 cushions	.28
3993	Screw—No. 6–32–5/16" square head set screw for condenser drive—Package of 10	$0.25
7800	Shield—Antenna, oscillator or I. F. transformer coil shield	.45
4145	Shield—First detector and oscillator Radiotron shield	.30
4103	Shield—I. F. Radiotron shield	.20
4438	Shield—Second detector—AVC Radiotron shield	.25
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
7485	Socket—6-contact Radiotron socket	.40
6676	Socket—6-contact output Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4426	Switch—Tone control switch (S6)	.35
4437	Switch—Range switch (SW-BC) (S2, S3, S4, S5)	2.35
9511	Transformer—105–125 volts—50–60 cycles	4.78
4431	Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18)	2.28
9512	Transformer—Power transformer—105–125 volts—25–40 cycles	6.58
9513	Transformer—Power transformer—200–230 volts—50–60 cycles (T1)	4.85
4433	Transformer—Second intermediate frequency transformer (L11, L12, R8, C21, C22, C23)	2.15
4429	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES (CONSOLE)	
4473	Board—Reproducer terminal board	.26
4445	Cable—3-conductor-reproducer cable	.36
9460	Coil—Field coil—Magnet and cone support	6.00
8935	Cone—Reproducer cone—Package of 5	5.25
9527	Reproducer complete	8.00
4472	Transformer—Output transformer	1.40
	REPRODUCER ASSEMBLIES (TABLE)	
4448	Board—Reproducer terminal board	.25
4445	Cable—3-conductor-reproducer cable	.36
9531	Coil—Field coil magnet and cone support	2.75
9492	Cone—Reproducer cone (L13)—Package of 5	3.70
9514	Reproducer complete	6.00
4447	Shield—Terminal board shield	.18
4505	Transformer—Output transformer (T2)	1.55
	MISCELLANEOUS ASSEMBLIES	
6706	Bezel—Station selector dial escutcheon bezel—Model 118	.42
4450	Dial—Station selector dial—Model 211	.52
4474	Dial—Station selector dial—Model 118	.76
6840	Escutcheon—Station selector escutcheon—Model 211	.56
6707	Glass—Station selector dial glass—Model 118	.20
6614	Glass—Station selector dial glass—Model 211	.30
4449	Knob—Station selector, volume control, tone or range switch knob—Package of 5	.60
4348	Lamp—Pilot lamp	.38
4363	Pointer—Station selector indicator pointer—Model 211	.18
4475	Pointer—Station selector indicator pointer—Model 118	.18
6708	Ring—Spring retaining ring for dial glass—Package of 5—Model 118	.44
6615	Ring—Spring retaining ring for dial glass—Package of 5—Model 211	.34
4613	Screw—8–32–7/16" headless set screw for knob—Package of 10	.25

RCA-VICTOR CO., INC.

MODEL 221
Trimmer Data
Alignment Data
Voltage

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 Tubes.....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

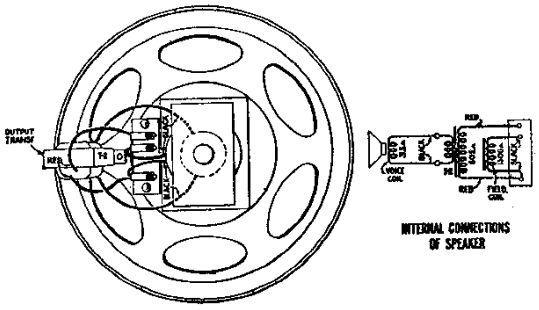

Figure C—Loudspeaker Wiring

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, ten-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 four tuned circuits 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 terminals 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 secondary and primary of the first and then the second 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 terminals 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 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 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 15 on the megacycle scale. Adjust the three trimmer capacitors designated as S. W. in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector 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, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary 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 and detector adjustments.

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,

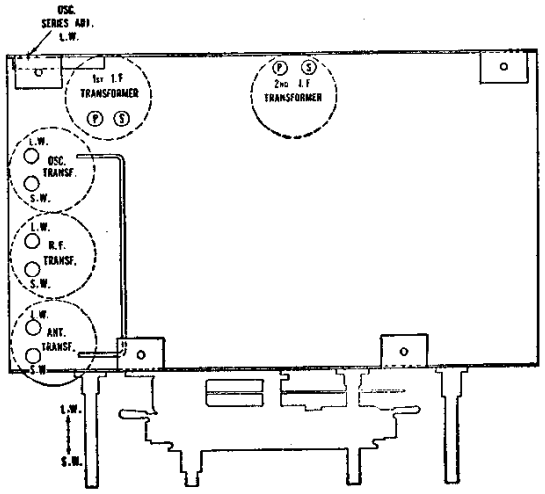

Figure D—Location of Line-Up Capacitors

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.

115 Volts, A. C. Line—No Signal

Type 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	2.42
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.42
3. RCA-58 I. F.	3.0	100	265	6.0	2.42
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.42
5. RCA-2A5 Power	16.0	255	240	35.0	2.42
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.

MODEL 221
Chassis Wiring

RCA-VICTOR CO., INC.

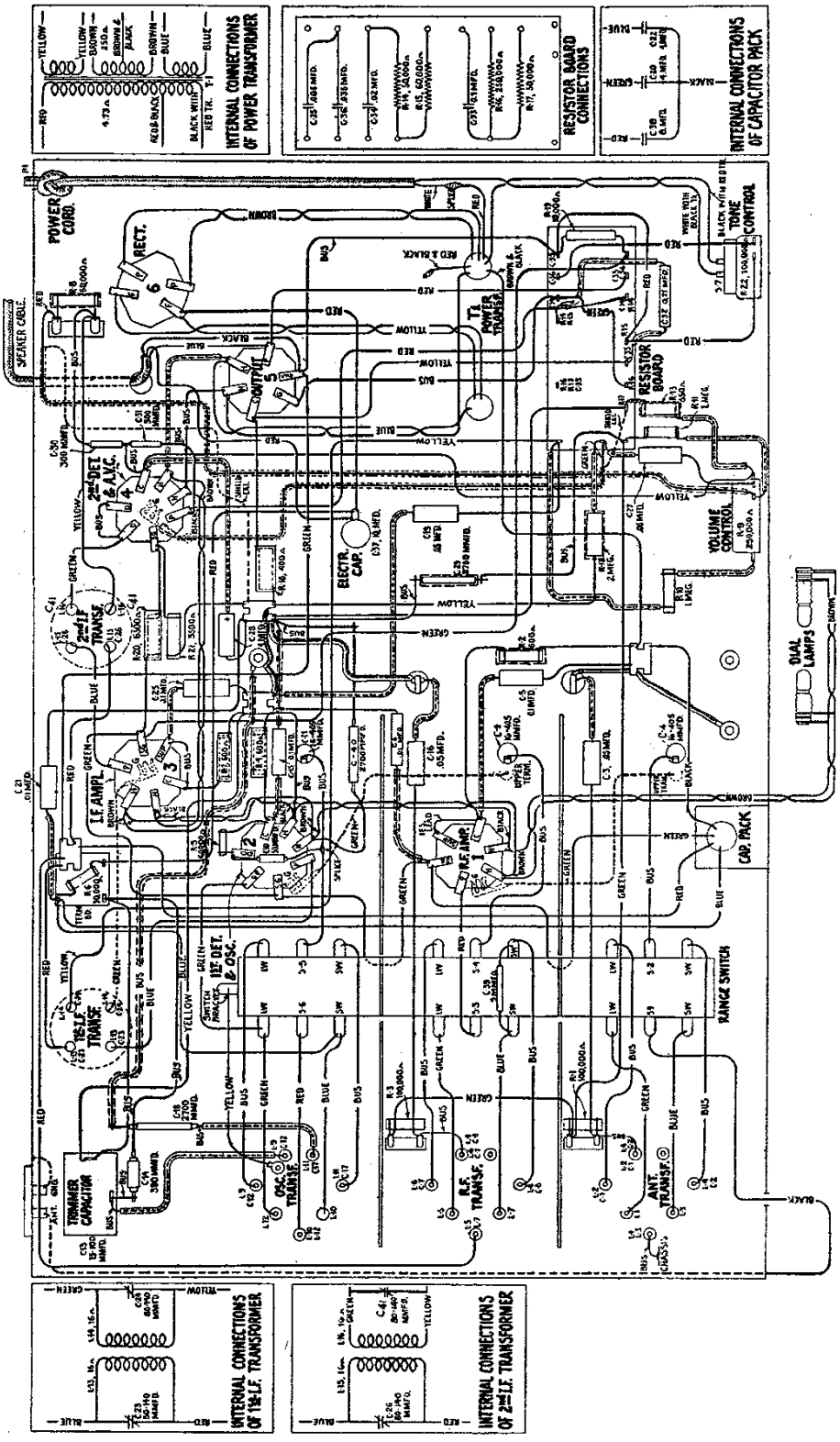

Figure B—Wiring Diagram

MODEL 221
Schematic

RCA-VICTOR CO., INC.

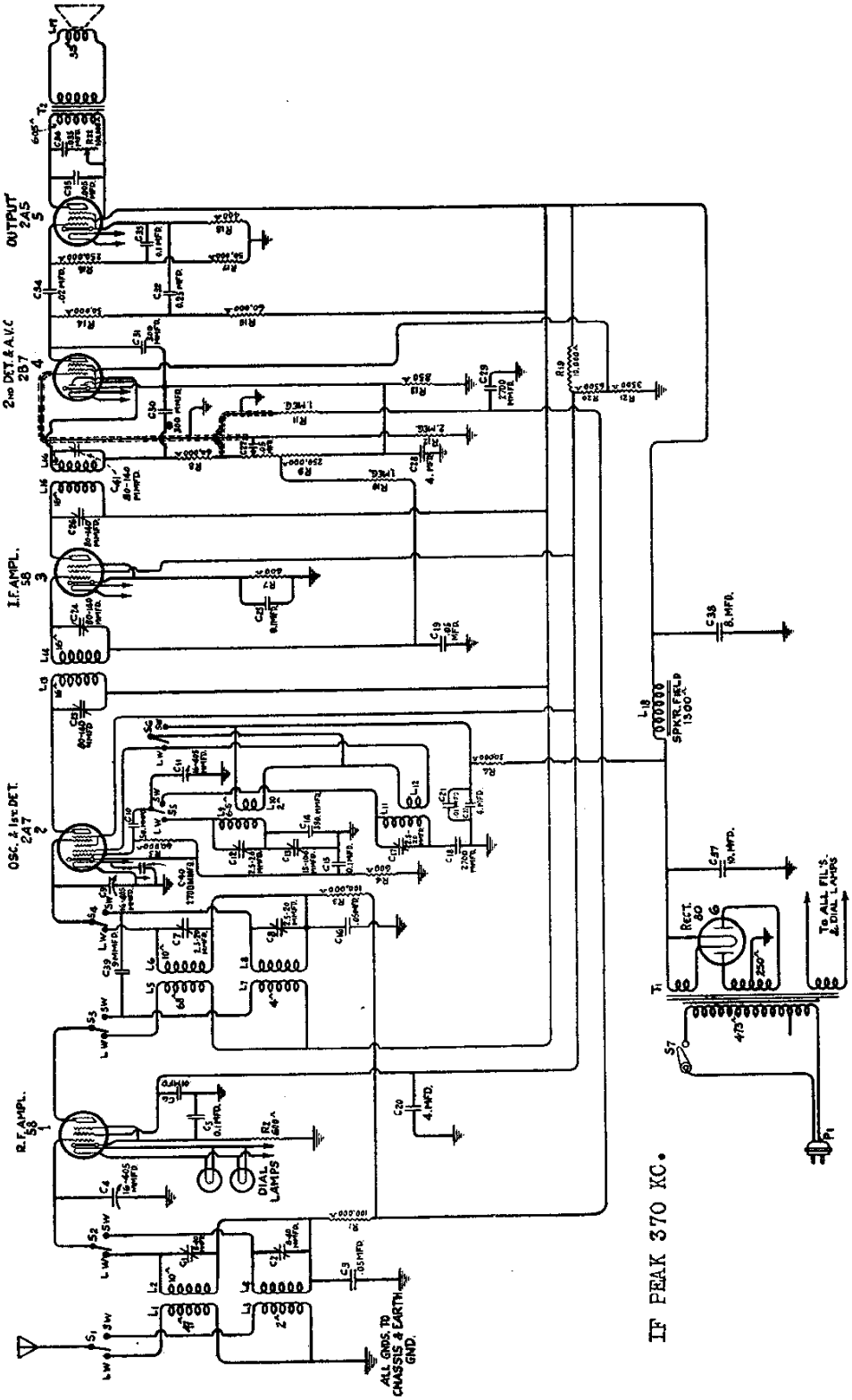

Figure A—Schematic Circuit Diagram

MODEL 221
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	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	
2747	Cap—Contact cap	
3056	Shield—2nd detector Radiotron shield	
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)	
3252	Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)	
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)	
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)	
3529	Socket—Dial lamp socket	
3572	Socket—7-contact Radiotron socket	
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)	
3631	Resistor—850 ohms—Carbon type—½ watt (R13)	
3639	Capacitor—.02 mfd. (C34)	
3683	Shield—Radiotron shield top	
3701	Capacitor—.01 mfd. (C6, C21)	
3702	Capacitor—.25 mfd. (C32)	
3768	Screw—Square head No. 6–32–¼" set screw for condenser drive	
3796	Capacitor—4. mfd. (C28)	
3849	Capacitor—50 mmfd. (C10)	
3859	Socket—4-contact Radiotron socket	
3861	Capacitor—Adjustable capacitor (C13)	
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	
3878	Screw—No. 4–40–$\frac{3}{16}$" screw for fastening station selector pointer	
3888	Capacitor—.05 mfd. (C19, C27)	
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)	
3897	Resistor—400 ohms—Carbon type—1 watt (R18)	
3901	Capacitor—.05 mfd. (C3, C16)	
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	
3937	Capacitor—300 mmfd. (C30, C31)	
3938	Capacitor—9 mmfd. (C39)	
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)	
3942	Shield—1st detector Radiotron shield	
3943	Screen—Translucent screen for dial light	
3944	Shield—Antenna, R. F. or oscillator coil shield	
3991	Resistor—10,000 ohms—Porcelain type (R19)	
4031	Capacitor—2,700 mmfd. (C18, C29, C40)	
4032	Capacitor—390 mmfd. (C14)	
4075	Knob—Range switch or tone control knob	
4119	Screw—No. 8–32–¼" headless cup point set screw for station selector knob	
4120	Knob—Volume control knob	
4121	Knob—Station selector knob	
6188	Resistor—2 megohm—Carbon type—½ watt (R12)	
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)	
6571	Capacitor—10 mfd. (C37)	
6614	Glass—Station selector dial glass	
6615	Ring—Retaining ring for dial glass	
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	
6676	Socket—6-contact Radiotron socket—Output	
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	
6695	Volume control (R9)	
6696	Switch—Range switch (S1, S2, S3, S4)	
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	
6702	Drive—Variable tuning condenser drive assembly complete	
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	
6704	Shaft—Tuning condenser drive assembly shaft	
6705	Tone control complete (R22)	
6841	Dial—Station selector dial	
6842	Pointer—Station selector pointer	
7485	Socket—6-contact Radiotron socket	
7487	Shield—I. F. and R. F. amplifier Radiotron shield	
9446	Transformer—Power transformer—105–125 volts 50–60 cycles (T1)	
9451	Transformer—Power transformer—105–125 volts 25–40 cycles	
10194	Ball—Steel ball for condenser drive assembly	
	REPRODUCER ASSEMBLIES	
6770	Transformer—Output transformer (T2)	
6843	Cable—3-conductor reproducer cable	
8935	Cone—Reproducer cone (L17)	
9460	Coil—Field coil, Magnet and cone support (L18)	
9461	Reproducer complete	