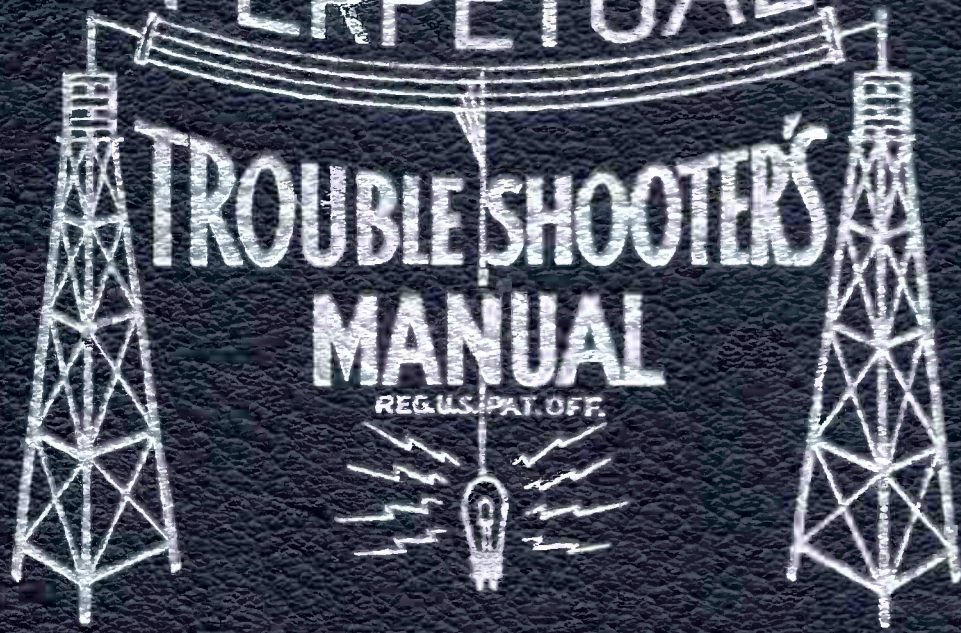


VOLUME IX

PERPETUAL



JOHN F. RIDER

DETROLA RADIO CORP.

MODELS 175 Series (T1, C1)
190, 193 Series (T2, T3)
195 Series (C4)

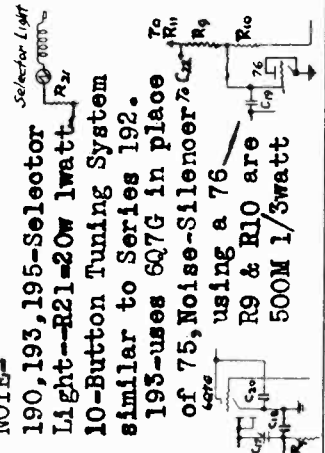
- Tubes required are:
1—6A7 Oscillator-translator
1—6D6 Intermediate Frequency Amplifier
1—75 Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter *See Note*
2—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Frequency Ranges Adjustment & Operation
B----540-1600KC of 175 Electric Auto-
P---1650-5400KC matic Tuning System
F--5400-16000KC SAME AS FOR MODEL 183

Schematic, Socket, Trimmers
Parts

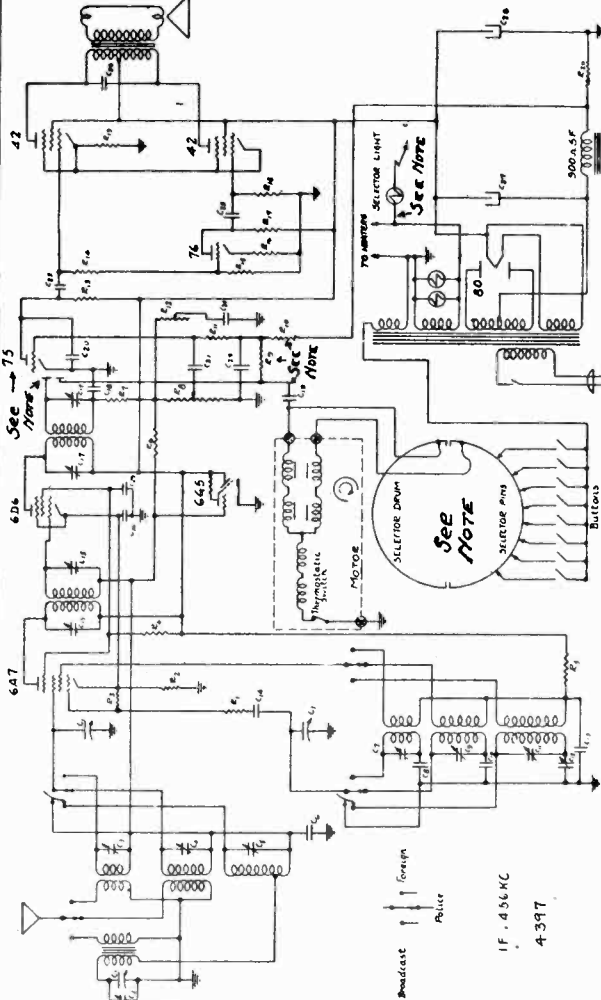
Unless specifically stated otherwise, these receivers are designed to operate on 115 volts 60 cycles alternating current only.

Symbol	Part No.	Description
C1	4354	12-375 mmf Variable
C3,11	1611	3-35 mmf trimmer
C4,5,7,9	2597	1-10 mmf trimmer
C6,22	572	.1-200v
C8	2793	.006 padder
C10	2741	1330 padder
C12	2560	200-400 mmf padder
C13	575	.1-400v
C14	2780	50 mmf mica
C15,17		IF trimmers
C16	2792	.2-200v
C18,20	1286	250 mmf mica
C19	580	.05-200v
C21	565	.01-200v
C23,25	576	.02-400v
C24	581	.005-600v
C26	824	.002-600v
C27	3375	16 mf 450v
C28	3351	8 mf 225 V. reg.
C29	3358	.2-400v
R1,2	2689	100 ohm 1/3w
R3,7,17	631	50M 1/3w
R4	636	40M 1/3w
R5	617	20M 1/3w
R6,9,10,11	624	1 meg. 1/3w
R8	2726	500M VC
R12	2737	2 meg TC
R13	2730	200M 10% 1/3w
R14	2881	400M 10% 1/3w
R15	2880	100M 10% 1/3w
R16	2883	5M 10% 1/3w
R18	2731	500 M 10% 1/3w
R19	3353	250 ohm 2 W.
R20	2882	15 ohm 10% 1/3w



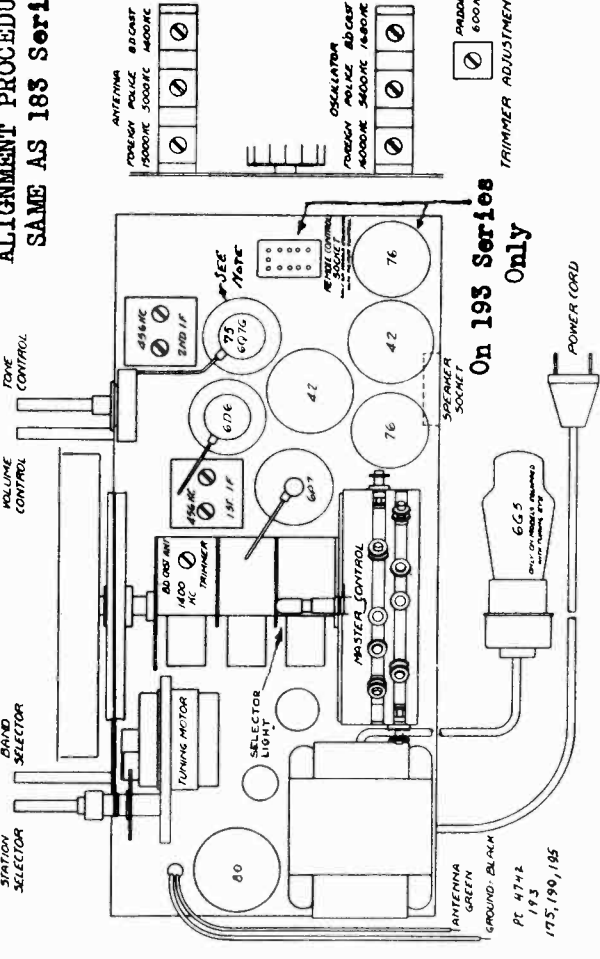
NOTE-

190, 193, 195-Selector Light--R21=20w Iwatt. 10-Button Tuning System similar to Series 192. 195--uses 6Q7G in place of 75, Noise-Silencer² C₁₀ using a 76 R9 & R10 are 500M 1/3watt



Do not use tubes of types different from those shown above.

ALIGNMENT PROCEDURE SAME AS 183 Series



DETROLA RADIO CORP.

MODEL 178
 MODEL 197, Peewee
 Schematics, Socket
 MODEL 184 Series
 Schematic
 Alignment

ALINEMENT PROCEDURE

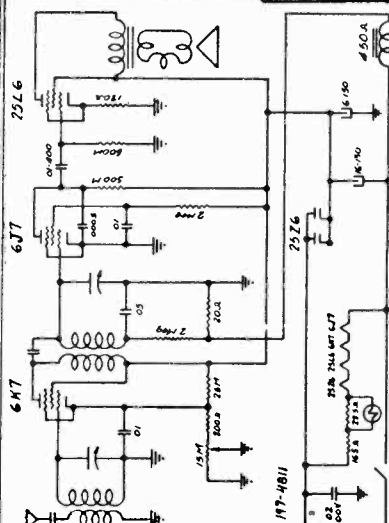
Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.
 IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See diagram for location of tubes and transformers.)
 RF. Using 200 mmf condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc. tune receiver to signal and adjust antenna trimmer.

MODEL 184 Series

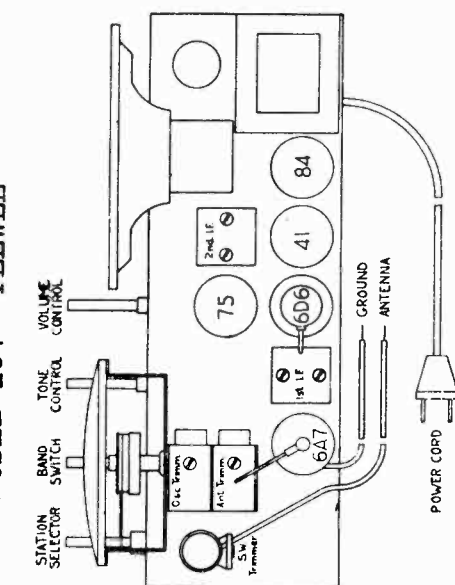
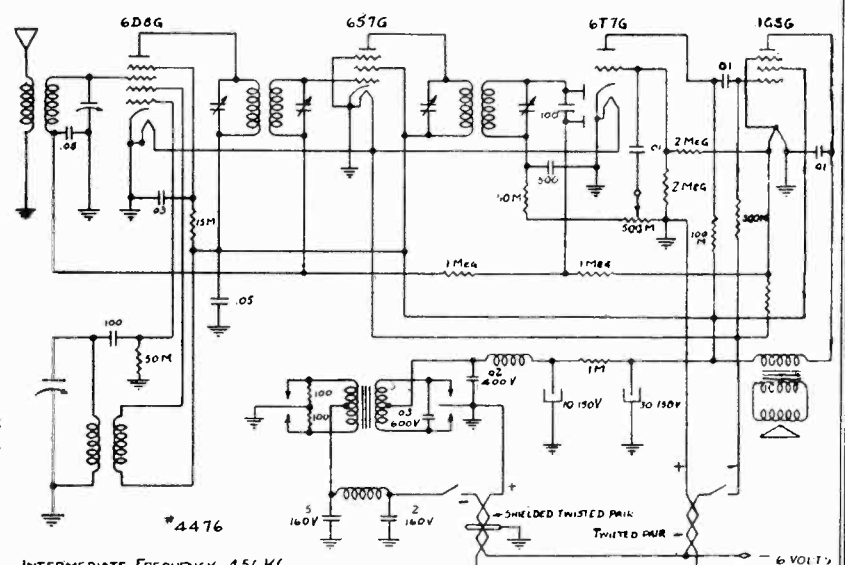
- Tubes: Tubes required are:
 1—6D8G Oscillator-Translator.
 1—6S7G Intermediate frequency amplifier.
 1—6T7G Detector—automatic volume control—first audio amplifier.
 1—1G5G Power output.

Do not use tubes of types different from those shown above.

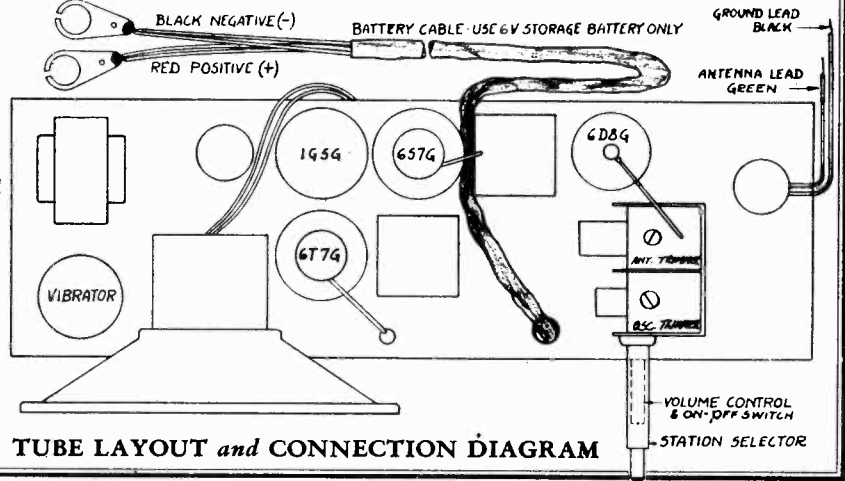
Range 540KC-1725KC



MODEL 197 "PEEWEE II"



MODEL 178

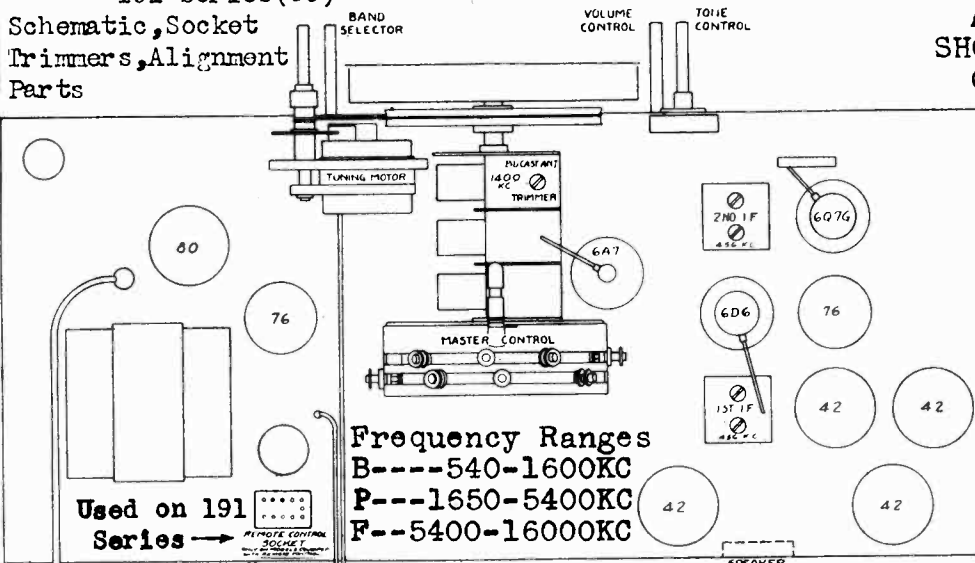


TUBE LAYOUT and CONNECTION DIAGRAM

MODELS 183 Series,
191 Series(C5)
Schematic, Socket
Trimmers, Alignment
Parts

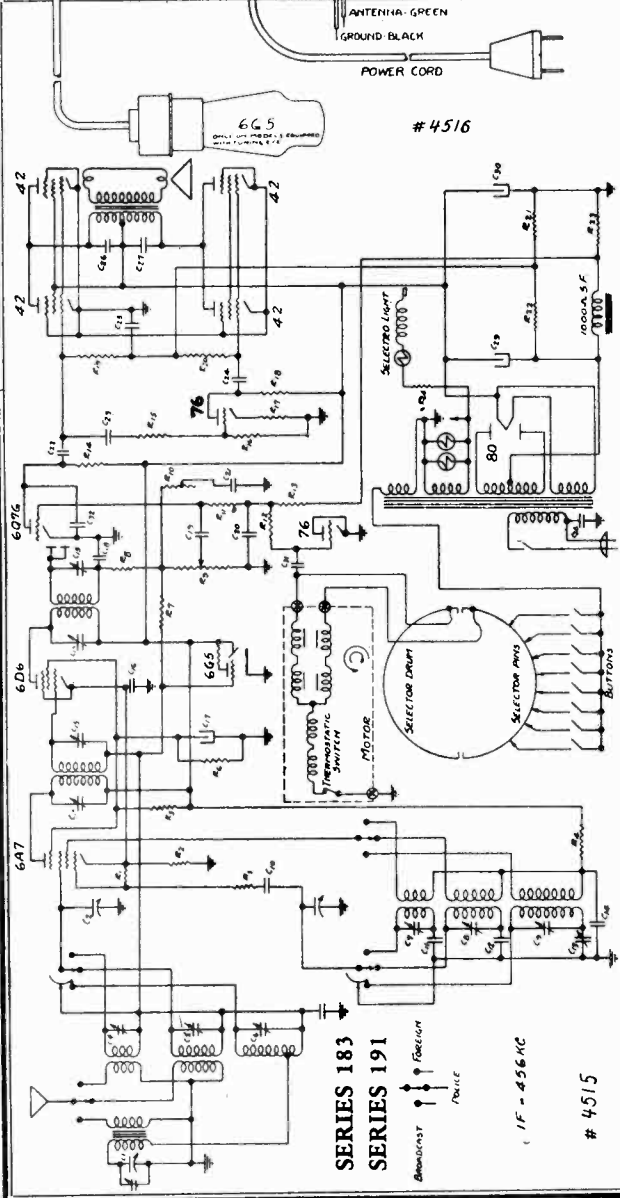
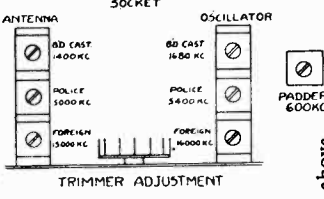
DETROLA RADIO CORP.

ALIGNMENT OF
SHORT-WAVE BANDS
ON NEXT PAGE



Used on 191 Series

Frequency Ranges
B----540-1600KC
P---1650-5400KC
F--5400-16000KC



SERIES 183
SERIES 191



f IF = 456 KC

4515

Symbol	Part No.	Description
C1,2,3	4354	Variable Condenser
C4,9	1611	3-35 MMF trimmer
C5,6,7,8	2597	1-10 MMF trimmer
C10	2780	50 MMF mica
C11	2793	.006-.600 V 5%
C12	2741	1330 MMF mica 5%
C13	2560	200-400 MMF padder
C14	576	.02-.400 V
C15		IF trimmers
C16,25	2792	.2-200 V
C17	4528	4 MF--150 V
C18,32	1286	250 MMF mica
C19	576	.02-.400 V
C20	572	.1-200 V
C21	581	.005-.600 V
C22,24	2600	.02-.600 V
C23	563	.05-.400 V
C26,27	2601	.01-.600 V
C28	3135	.003-.800 V
C29	3375	16 MF--450 V
C30	4062	30 MF--275 V
C31	580	.05-.200 V
R1,6,8	631	50 M 1/3 W
R2,3	2689	100 ohm 1/3 W 10%
R4	617	20 M 1/3 W
R5	4530	30 M 1 W
R7,11,13	624	1 Meg 1/3 W
R9		500 M volume control
R10		2 Meg tone control
R12,22	2731	500 M 1/3 W 10%
R14,18,19,20,21	2730	200 M 1/3 W 10%
R15	2599	1 Meg 1/3 W 10%
R16	2568	300 M 1/3 W 10%
R17	4529	10 M 1/3 W 10%
R23	3580	10 ohm 1/2 W 10%
R24	4535	20 ohm 1 W 10%

Do not use tubes of types different from those shown above.

ALIGNMENT PROCEDURE

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier tube and align second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.

Unless specifically stated otherwise, these receivers are designed to operate on 115 volts 60 cycles alternating current only.

DETROLA RADIO CORP.

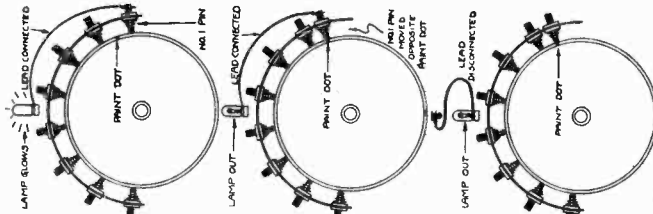
MODELS 183 Series,
191 Series (C5)
Tuner Data, S-W Alignment

ALIGNMENT OF SHORT-WAVE BANDS

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5400 kc., then align the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and align the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmed down tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

- Tubes required are:
- 1-6A7 Oscillator-translator
 - 1-6D6 Intermediate Frequency Amplifier
 - 1-6QG Detector AVC—First, Audio Amplifier
 - 1-76 Driver—Phase Inverter
 - 1-76 Silencer
 - 4-42 Power Output
 - 1-80 Rectifier
 - 1-6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

191 Series has 10-Button tuning System similar to 192 Series



3. Face the rear of the chassis. Attach the lead from the Selector Light to the No. 1 Contact Pin; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.
4. Observe the position of the Paint Dot on the edge of the Drum. Grasp the No. 1 pin firmly and slide it toward the Paint Dot, being careful not to break the connection between the Selector Light lead and the pin. When the pin is directly opposite the Paint Dot, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making this setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. Be very careful not to move the Selector Drum while the pin is being set. When the pin is definitely in its proper position, Disconnect the Selector Light Lead from the Pin.
5. Repeat the above procedure for the No. 2 station; tune in the station, connect the Selector Light lead to the No. 2 contact pin, move this pin opposite the Paint Dot so that the light goes out, then Disconnect the Selector Light Lead.
6. Using similar procedure, set up the other six stations, in each case using the Contact Pin bearing the same number as that assigned to the station being set up. Always Disconnect the Selector Light Lead as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.
7. After all the stations have been set up, locate the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets, and insert them in the proper pockets above the push buttons.
8. The only operations necessary to receive any of the eight stations set up as outlined above are: Turn the power switch on by rotating the lower left knob to the right—turn the control a few degrees beyond the point at which the switch snaps on—allow about one minute for the tubes to heat, press the button under the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast Stations.

OPERATING SUGGESTIONS

- Be sure that your stations are listed in the proper order according to frequency or position on the dial.
- Do not confuse frequency (kilocycles) with wave length (meters).
- Be sure that your stations are tuned in exactly before setting the contact pins.
- Do not set up weak stations, or distant stations too weak to afford clear reception at all times.
- Do not press more than one button at a time. Holding down more than one button will cause inaccurate tuning, or the motor will not turn at all.
- Do not leave the Selector Light Lead connected after the pins are set up.
- Do not run the motor for excessively long periods of time. While no damage will result, a protective cut-out will shut off the power after four to five minutes of continuous operation, and the automatic tuning will not function again until the motor has been allowed to cool for several minutes.
- When tuning stations, do not release the button until the pointer stops moving.
- Do not attempt to set adjacent pins in the same slot too close together.
- Do not expect good results unless a good outdoor antenna is used.
- Do not change the relative positions of the contact pins; keep them in the same order as shown on the diagram (Figure 3).

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE SERIES 183 ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the Master Selector requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows: Master Selector; Selector Drum, the Selector Pins, and the Selector Light. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the Manual Station Selector drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the enclosure below the dial. Stations are tuned in automatically when the button under the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list eight of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 1600 kc) the No. 1 station, and number the other

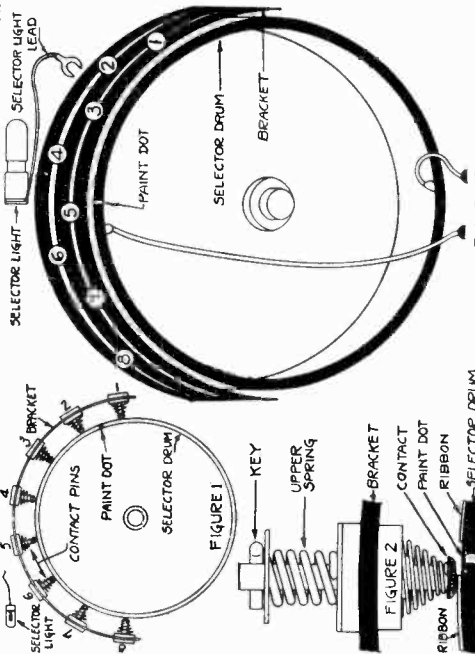


FIGURE 3

stations similarly going from left to right across the dial. For example, assume that you favorite stations are: 1500 kc. 1400 kc. 1300 kc. 1200 kc. 1000 kc. 900 kc. 700 kc. and 600 kc. The station nearest 1600 kc. would be No. 1, the 1400 kc. station would be No. 2, and so on down the list with the 600 kc. station designated No. 8. Reference to the push buttons is not necessary since they are not used until after the Master Selector has been set up.

On the back of the receiver will be found the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, Fig. 1 shows the general layout and relation of the drum and contacts. Fig. 2 shows the contact pins in detail; note that while the position of the contact may be varied at will by sliding it along the drum, it is held securely by a strong spring which will not allow it to move when the selector drum turns. Fig. 3 shows the arrangement of the Contact Pins, each pin being numbered according to the system suggested for numbering the stations, thus pin No. 1 will be used for Station No. 1, pin No. 2 will be used for Station No. 2, and so on down the list.

On the Selector Drum are two pairs of Contact Ribbons. Note that there is a Paint Dot on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This Paint Dot is for the purpose of locating the approximate position at which a given Contact Pin should be set in order to have the station on tune.

1. Set the receiver for "Operation." Turn the selector knob to the "On" position and let it run for at Least Ten Minutes to allow the tubes to reach their final operating temperature.
2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.

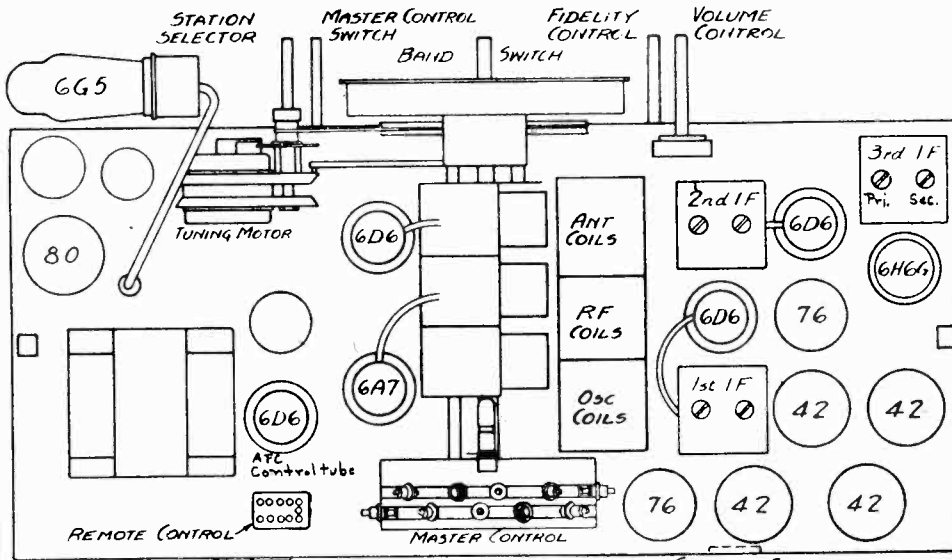
It is very important that the following steps be followed exactly as outlined: any deviation may result in setting some of the stations; the station nearest the left-hand end of the dial (nearest 1600 kc) will be set first.

1. Set the receiver for "Operation." Turn the selector knob to the "On" position and let it run for at Least Ten Minutes to allow the tubes to reach their final operating temperature.

2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.

MODEL 192 Series (C3)
Schematic, Socket
Trimmers, Parts

DETROLA RADIO CORP.

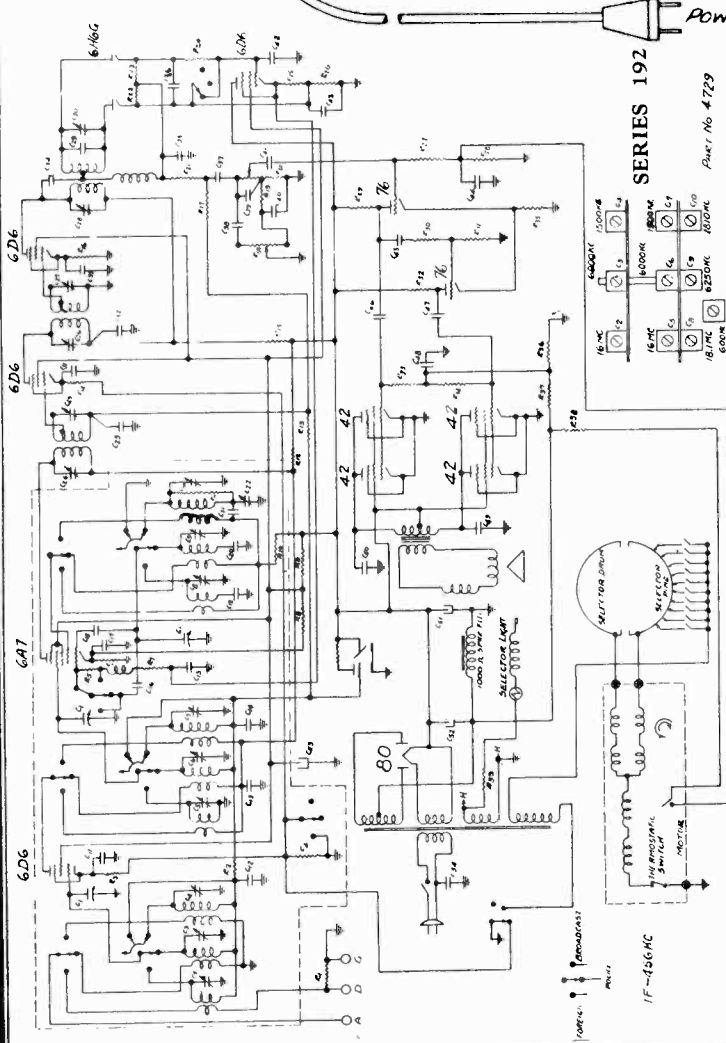


Frequency Ranges
B-----540-1800KC
P-----1800-6250KC
F-----6250-18100KC

Power Supply: Unless specifically stated otherwise, these receivers are designed to operate on 115 VOLTS 60 CYCLES ALTERNATING CURRENT ONLY.

ANTENNA & GROUND TERMINALS
Part No 4728

DOUBLET ANTENNA CONNECTS TO "D" & "A". SINGLE-WIRE ANTENNA TO "A", LINK "D" TO "G". GROUND-WIRE TO "G".



SERIES 192
Part. No 4729

Symbol	Part No.	Description
R1,13,29,32	2880	100 M 1/3W 10%
R2,7,21	631	50 M 1/3W
R3,12,14,15,16	2421	1000 ohm 1/3W
R4	2421	1000 ohm 1/3W 10%
R5	2783	2500 ohm 1/3W 10%
R6	3937	500 ohm 1/2 W Wire-wound ±10%
R8	3805	7000 ohm 3 1/2 W Wirewound
R9	3805	8000 ohm 1 1/2 W Wirewound
R10	600	10M 1/3W
R11	3581	3M 1/3W ±10%
R17,22,23,24,28,27,30	2599	1 meg 1/3W 10%
R18	2737	2 meg tone control
R20	3800	3 meg volume control
R25	2572	400 ohm 1/3W 10%
R26	2691	500 ohm 1/3W 10%
R33,34,19	2730	200 M 1/3W 10%
R36	150 M	1/3W 10%
R38,37	2731	500 M 1/3W 10%
R39	20	ohm 1 W
C1	400	mmf variable
C2,3,4	3822	2-35 mmf triple trimmer
C5,6,7	3822	2-35 mmf triple trimmer
C8,9,10	3822	2-35 mmf triple trimmer
C11,12,14,17,31,33	580	.05-200 V
C13,32	575	.1-400 V
C15,23,42,43,44	572	.1-200 V
C16	2925	25 mmf mica
C18	4676	8 mmf
C19	2694	.005-600 5%
C20	2741	1330 mmf 5%
C21	2560	.01-400 V
C22	350	mmf variable padder
C34,35	1285	100 mmf mica
C36,48	2792	2-200 V
C37,41	576	.02-400 V
C38,40	824	.002-600 V
C39	2780	50 mmf mica
C45,46,47	2600	.02-600 V
C49,50	2601	.01-600 V
C51	4062	30 MF 275 V
C52	4649	24 MF 450 V
C53	3079	8 MF 150 V
C54	3135	.003-800 V

DETROLA RADIO CORP.

MODEL 192 Series (C3) Tuner Data, Alignment

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE SERIES 192 ELECTRIC AUTOMATIC TUNING SYSTEM

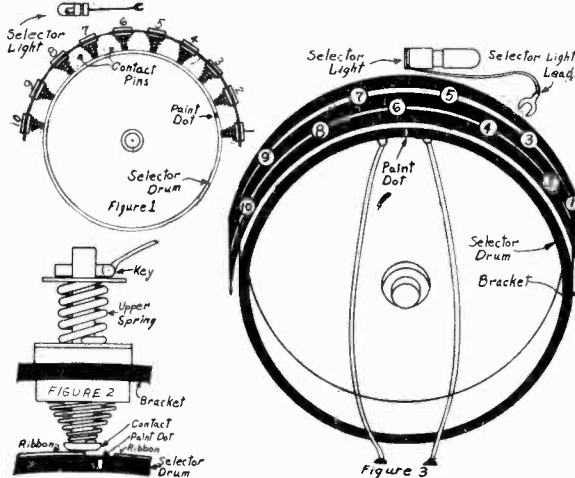
Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:
Master Selector: This includes the *Selector Drum*, the *Selector Pins*, and the *Selector Light*. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the *Manual Station Selector* drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the escutcheon above the dial. Stations are tuned in automatically when the button with the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR



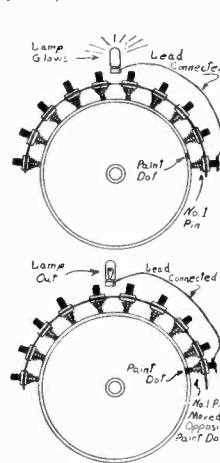
As a means of simplifying these operations, list ten of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 600 kc) the No. 1 station, and number the other stations similarly going from left to right across the dial. For example, assume that your favorite stations operate on frequencies of 600 kc, 700 kc, 800 kc, 900 kc, 1000 kc, 1100 kc, 1200 kc, 1300 kc, 1400 kc, and 1500 kc. Then the 600 kc station would be No. 1, the 700 kc station would be No. 2, and so on down the list with the 1500 kc station being designated No. 10. Reference to the push buttons is not necessary since they are not used until after the Master Selector has been set up.

On the back of the receiver will be found the *Selector Drum* and the ten *Contact Pins* which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, Fig. 1 shows the general layout and relation of the drum and contacts. Fig. 2 shows one of the contact pins in detail; note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. Fig. 3 shows the arrangement of the *Contact Pins*, each pin being numbered according to the system suggested for numbering the station; thus pin No. 1 will be used for Station No. 1, pin No. 2 will be used for Station No. 2, and so on down the list.

On the *Selector Drum* are two pairs of *Contact Ribbons*. Note that there is a *Paint Dot* on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This *Paint Dot* is for the purpose of locating the approximate position at which a given *Contact Pin* should be set in order to have the Drum stop for a particular station.

It is very important that the following steps be followed exactly as outlined; any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of Standard Broadcast Stations as outlined previously under "Operation." Turn the Master Control Switch to the extreme right-hand position and wait about ten minutes to allow the tubes to reach their final operating temperature.
2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.



3. Face the rear of the chassis. Attach the lead from the *Selector Light* to the No. 1 *Contact Pin*; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

4. Observe the position of the *Paint Dot* on the edge of the Drum. Grasp the No. 1 pin firmly and slide it toward the *Paint Dot*, being careful not to break the connection between the *Selector Light* lead and the pin. When the pin is directly opposite the *Paint Dot*, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making the setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. **Be very careful not to move the Selector Drum while the pin is being set.** When the pin is definitely in its proper position. **Disconnect the Selector Light Lead from the Pin.**

5. Repeat the above procedure for the No. 2 station; tune in the station, connect the *Selector Light* lead to the No. 2 contact pin, move this pin opposite the *Paint Dot* so that the light goes out, then **Disconnect the Selector Light Lead.**

6. Using similar procedure, set up the other eight stations, in each case using the *Contact Pin* bearing the same number as that assigned to the station being set up. Always **Disconnect the**

ALINEMENT PROCEDURE

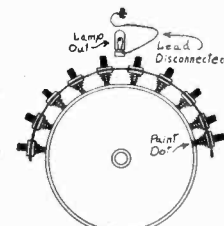
The Master Control Switch must be turned to the extreme right hand position for all alignment.
IF: Connect generator ground to receiver chassis. Using .1 mfd. condenser in series with the high side of the generator, apply 456 kc. signal to the grid of the 6D6 second IF amplifier tube and align the PRIMARY only of the third IF transformer. (See above diagram.) Connect generator to grid of 6D6 first IF tube and align the second IF transformer. Repeat for transformer No. 1 applying signal to grid of 6A7 transistor.

RF: (See circuit diagram for location of trimmers.) Using a 200 mfd. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer to frequency. Set generator frequency at some point around 1500-1600 kc. and adjust broadcast antenna and RF trimmer for 600 kc., tune receiver to signal and adjust the paddler. The tuning condenser should be rocked back and forth through the signal while varying the paddler in order to assure perfect alignment.

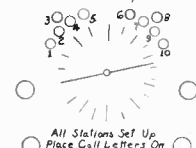
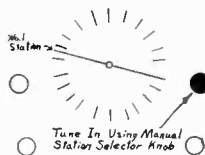
A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short leads. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc. then align the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, align the top frequency of the high frequency to 18,100 kc. and align the antenna and RF trimmers at about 16,000 kc. in order to make sure that the top end of the last band is set properly; it is best to screw the oscillator trimmer right, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrew to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set to the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will be incorrect. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

AFC: Connect a high resistance DC voltmeter between the cathode of the 6D6 AFC control tube and ground. Turn the Master Control Switch to the CENTER position and the Band Selector Switch to the extreme left hand position. Apply a strong 456 kc. signal to the grid of the 6A7 translator and adjust the secondary of the third IF transformer until the voltage is the same as with no signal.

FOR OPERATING SUGGESTIONS SEE MODEL 183



Master Selector Set Up For Station No. 1. Repeat Similar Operations For Station No. 2 Using No. 2 Pin, Etc.



All Stations Set Up. Place Call Letters On Buttons As Numbered.

- Tubes required are:
- 1-6D6 Radio Frequency Amplifier
 - 1-6A7 Oscillator-Translator
 - 2-6D6 Intermediate Frequency Amplifiers
 - 1-6H6G Detector AVC-Discriminator
 - 1-6C5 Cathode Ray Tuning Tube
 - 1-6D6 AFC Control
 - 1-76 Diode
 - 1-76 Phase Inverter
 - 4-42 Power Output
 - 1-80 Rectifier

Selector Light Lead as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, located the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter discs from the sheets. Remove the metal ferrules from the buttons, place the call letter discs behind the celluloid and press the ferrules back on the proper buttons.

8. The only operations necessary to receive any of the ten stations set up as outlined above are: Turn the Master Control Switch to the Center position, allow about one minute for the tubes to heat, press the button with the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast stations.

Master Control Switch: The extreme left position turns the power off. The center position connects the motor and the automatic frequency control for automatic tuning. The right hand position disconnects the motor and automatic frequency control, and increases sensitivity for manual tuning of weak stations. (The right hand position is also used for setting up stations for automatic tuning.)

MODEL 204 Series
Schematic, Socket
Trimmers, Tuner
Parts

DETROLA RADIO CORP.

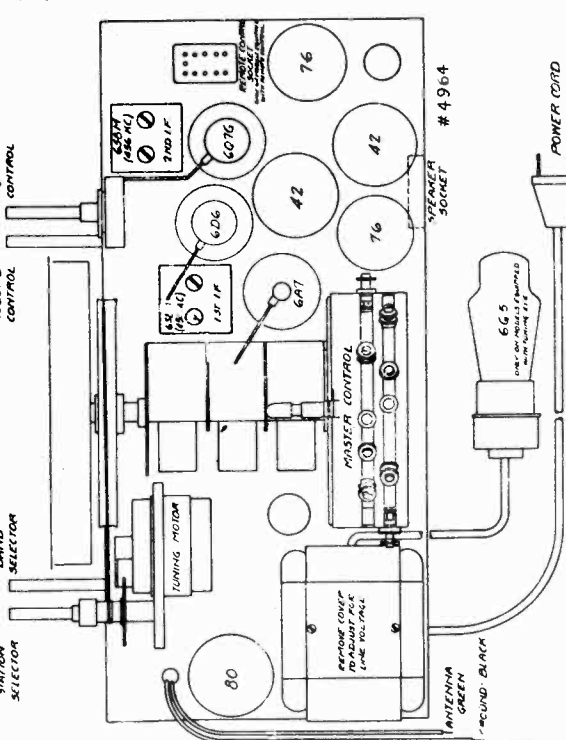
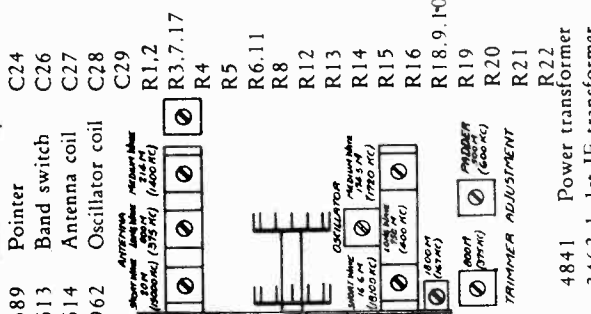
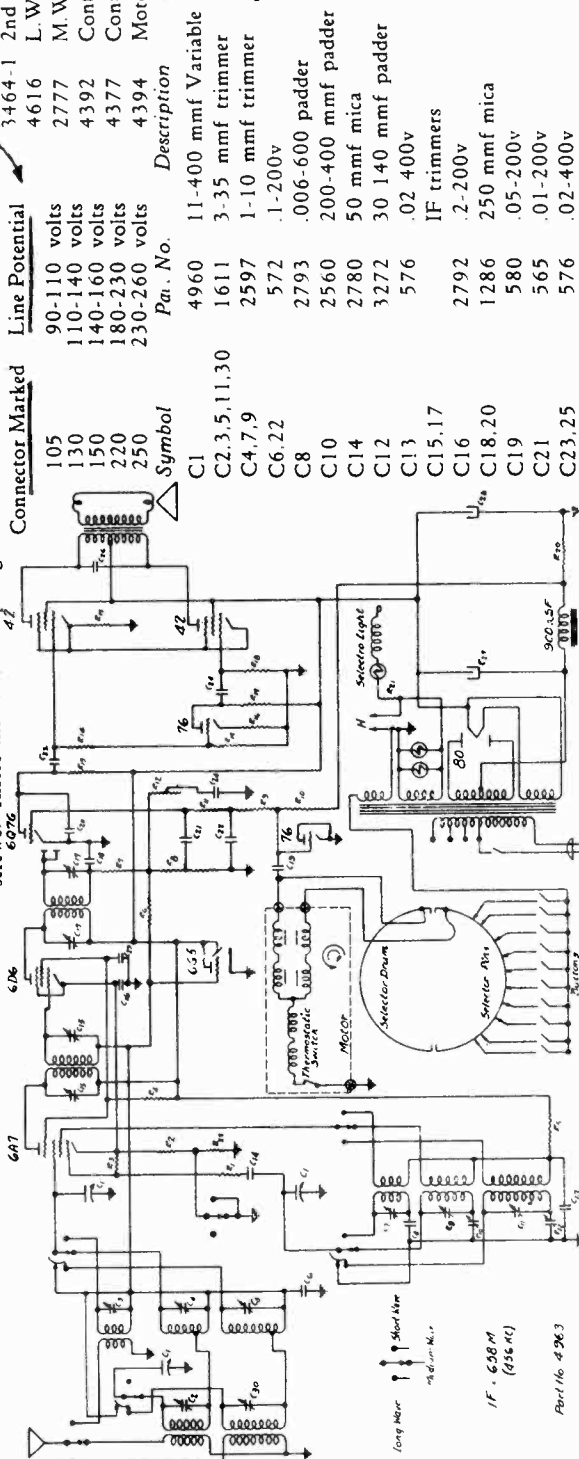
FOR ALIGNMENT,
SEE INDEX

For INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE
SERIES 204 ELECTRIC AUTOMATIC TUNING SYSTEM See SERIES 192

This receiver is designed to operate on 50 to 60 cycle alternating current only. The power transformer may be connected to operate on a number of voltages as shown in table below. To set the transformer to POWER SUPPLY correspond to your line potential, remove the small cover from top of transformer by taking out the screws. Insert the connector prong on end of lead into the connector desired: (See table below.)

Line Potential	Connector Marked	Symbol	Pa. No.	Description
90-110 volts	105	C1	4960	11-400 mmf Variable
110-140 volts	130	C2,3,5,11,30	1611	3-35 mmf trimmer
140-160 volts	150	C4,7,9	2597	1-10 mmf trimmer
180-230 volts	220	C6,22	572	1-200v
230-260 volts	250	C8	2793	.006-600 padder
		C10	2560	200-400 mmf padder
		C14	2780	50 mmf mica
		C12	3272	30 140 mmf padder
		C13	576	.02 400v
		C15,17	2792	IF trimmers
		C16	1286	250 mmf mica
		C18,20	580	.05-200v
		C19	565	.01-200v
		C21	576	.02-400v
		C23,25	581	.005-600v
		C24	824	.002-600v
		C26	3375	16 mf 450v
		C27	3351	8 mf 225v reg.
		C28	3358	2-400v
		C29	2689	100 ohms 1/2w
		R1,2	631	50 M 1/2w
		R3,7,17	636	40 M 1/2w
		R4	617	20 M 1/2w
		R5	624	1 meg. 1/2w
		R6,11	2726	500 M.V.C.
		R8	2737	2 meg. T.C.
		R12	2730	200M 10% 1/3w
		R13	2881	400M 10% 1/3w
		R14	2880	100M 10% 1/3w
		R15	2883	5M 10% 1/3w
		R16	2731	500M 10% 1/3w
		R18,9,10	3353	250 ohm 2w
		R19	2882	15 ohm 10% 1/3w
		R20	4535	20 ohm 1w
		R21	634	500 ohm 1/3w
		R22	3346	Speaker 8"
		R23	3710	Speaker 10"

Tubes required are:
1—6A7 Oscillator-translator
1—6D6 Intermediate Frequency Amplifier
1—6Q7G Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
1—76 Squelch Rectifier
2—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

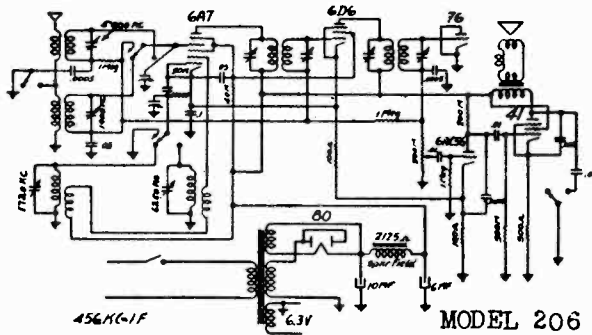


Factory 204 Series

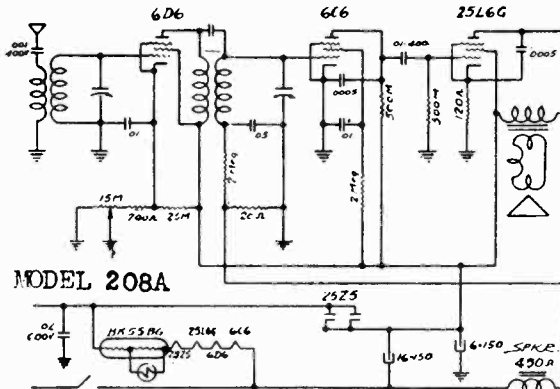
MODEL 211
Schematics, Socket
Trimmers

DETROLA RADIO CORP.

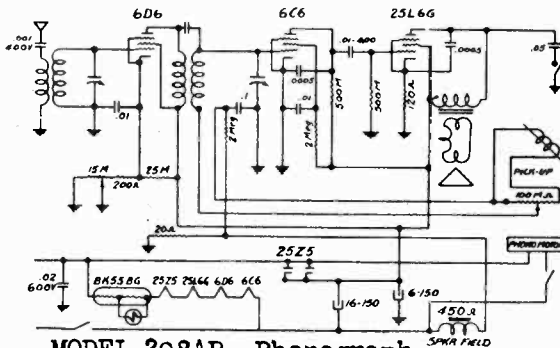
MODEL 206
MODEL 208A
MODEL 208AP(Phono.)



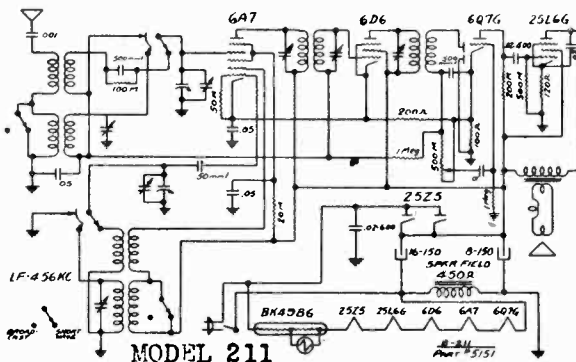
In left hand position broadcast stations operating on frequencies of 540 to 1720 kilocycles will be received. In the right hand position of the wave switch, short wave stations operating on frequencies of 2300 to 6250 kilocycles will be heard.



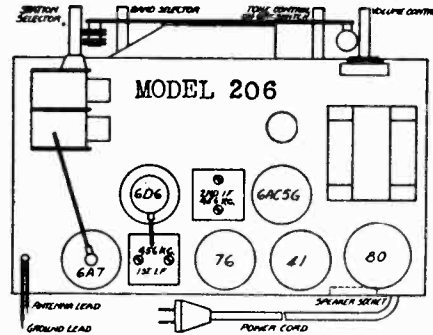
This receiver is designed to receive broadcast stations operating on frequencies between 540 K.C. and 1600 K.C. and police stations operating between 1600 K.C. and 1712 K.C.



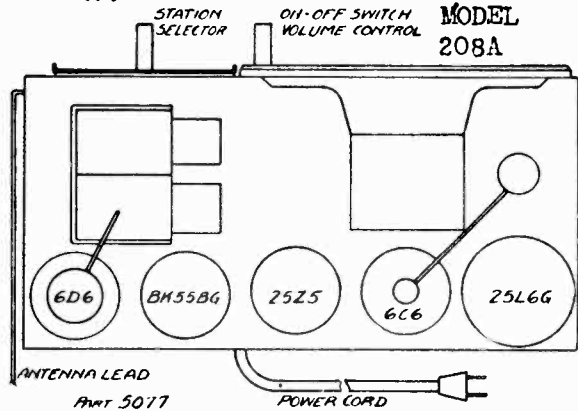
MODEL 208AP Phonograph This receiver is designed to receive broadcast stations operating on frequency between 1600 K.C. and 1712 K.C.



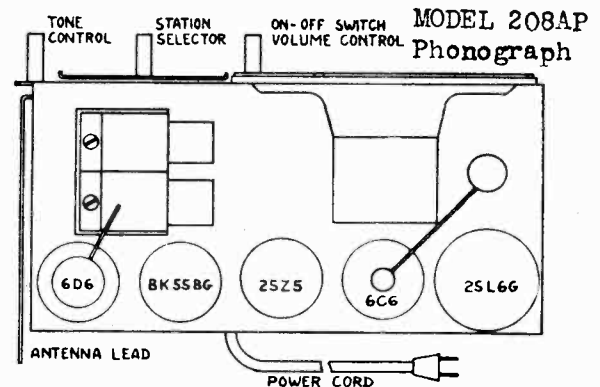
MODEL 211 In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.



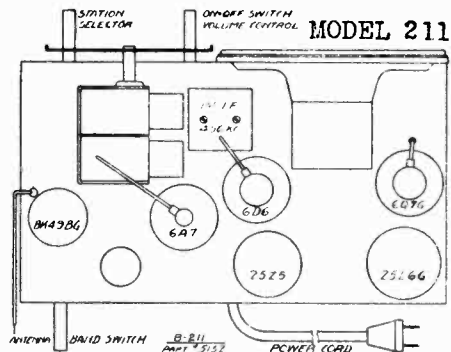
This receiver is designed to operate on 105 to 125 volts, 60 cycles. Do not connect to any other supply.



This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



THIS RECEIVER IS DESIGNED TO OPERATE ON 105 TO 125 VOLTS 60 CYCLE ALTERNATING CURRENT ONLY.



This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

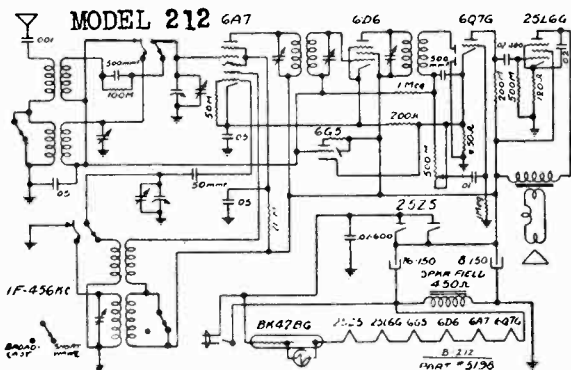
MODEL 212

MODEL 216, Detrola Jr. Pee-wee Schematics, Socket, Trimmers

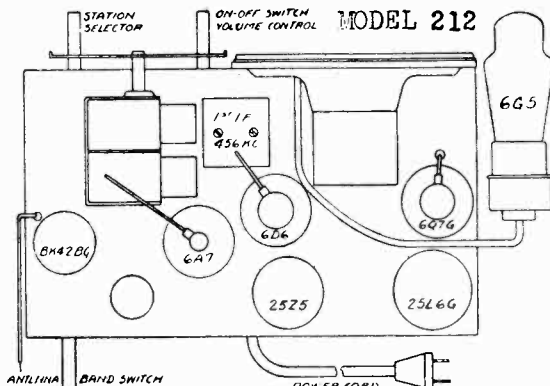
DETROLA RADIO CORP.

MODEL 220

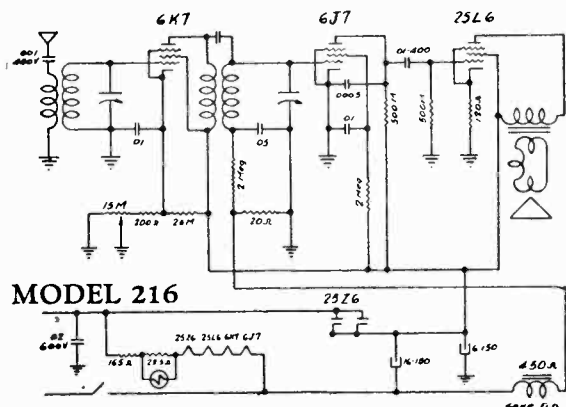
Schematic, Socket, Trimmers Tuner



In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.

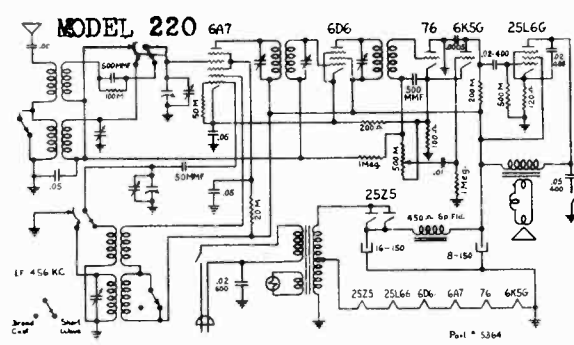
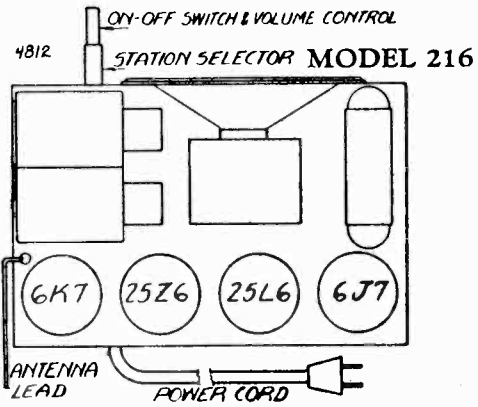


This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

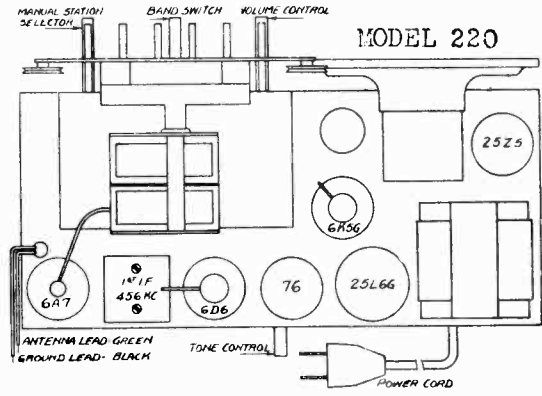


DETROLA JR. PEE-WEE

This receiver is designed to operate on 105 to 125 volts, direct or alternating current. Do not connect to any other source.



In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.



This receiver is designed to operate on 105 to 125 volts, 60 cycle alternating current only.

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF MECHANICAL AUTOMATIC TUNING SYSTEM

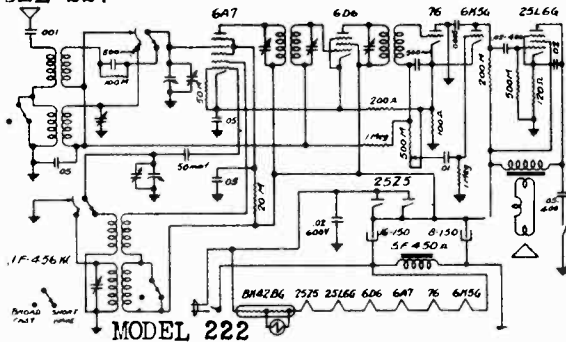
The following simple procedure should be followed to set up the automatic tuning mechanism to select your favorite stations. Any of your favorite stations may be set up on any button, but it is recommended that the buttons be set up in the same sequence as they are received on the dial. Loosen one of the selector buttons located below the dial by turning it to the left. A slot is provided in the button into which a coin may be inserted to facilitate turning. After turning the button a few

turns to the left press it in as far as it will go. While holding button in this position, tune in station desired very carefully in regular way with the manual tuning knob. Still holding the button in, fix the adjustment by turning the button to right until tight. Thereafter, the station set up on this button will be received whenever this button is pressed in as far as it will go. All buttons are set up in the same way. After all buttons are set up, locate and remove the corresponding station tabs from accompanying call letter sheets and, after moistening slightly, press them in the ends of the buttons. Do not set up weak stations, or distant stations too weak to afford clear reception at all times.

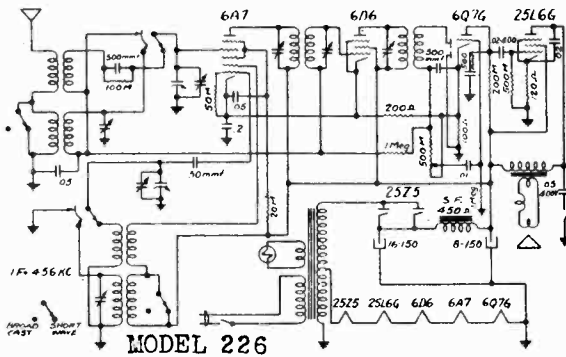
MODEL 222
MODEL 226
MODEL 227

DETROLA RADIO CORP.

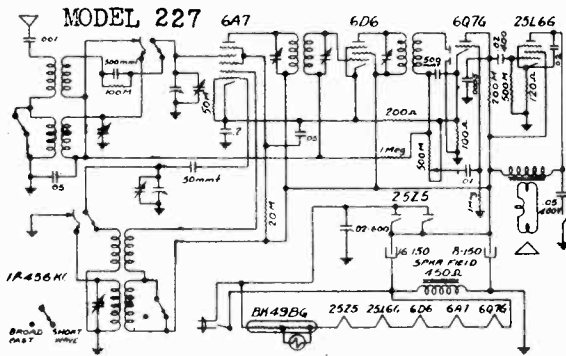
MODEL 235 Phono.
Schematics, Socket
Trimmers



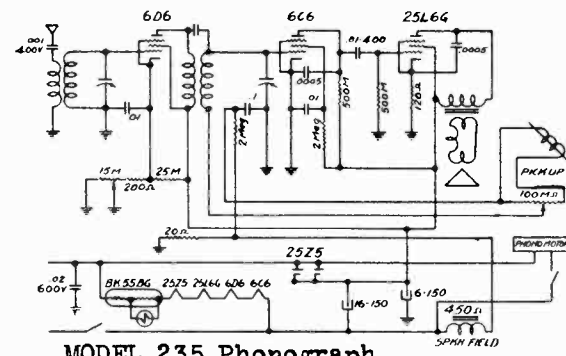
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.
FOR AUTOMATIC TUNING SYSTEM-See MODEL 220



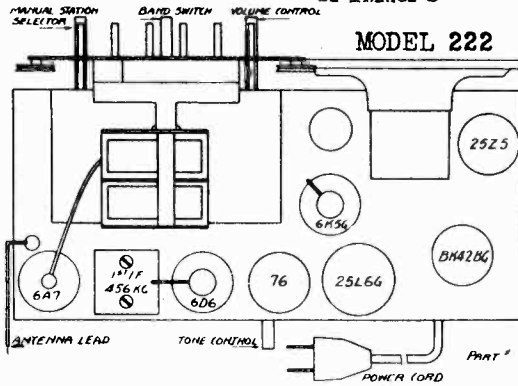
This receiver is designed to operate on 105 to 125 volts, 60 CYCLE, ALTERNATING CURRENT ONLY.
AUTOMATIC TUNING SYSTEM-See MODEL 220



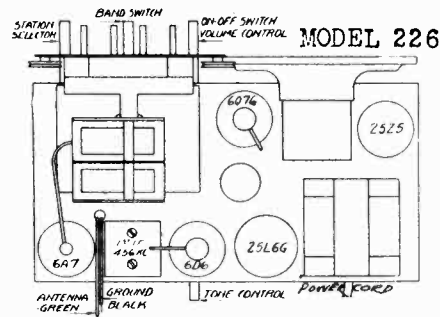
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.
AUTOMATIC TUNING SYSTEM See MODEL 220



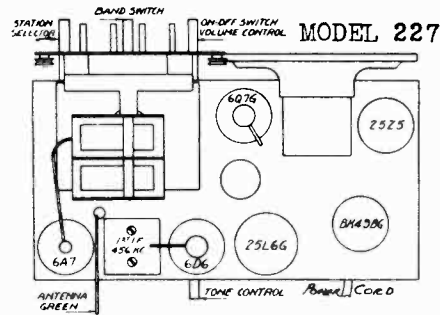
105 TO 125 VOLTS 60 CYCLE ALTERNATING CURRENT ONLY.



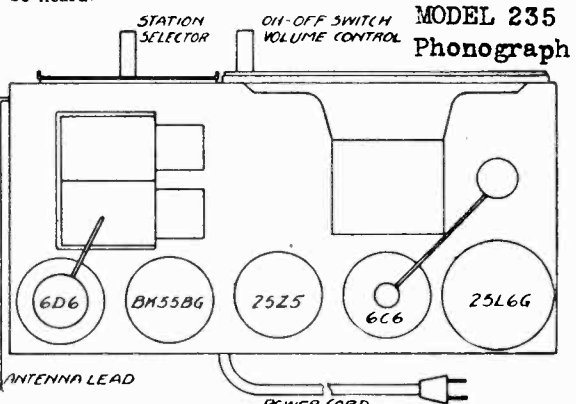
In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.



In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.



In left hand position, broadcast stations on frequencies between 540 and 1720 K.C. will be received. When the band switch is set to the right hand position, short wave stations operating on wave lengths from 2300 to 6250 K.C. will be heard.



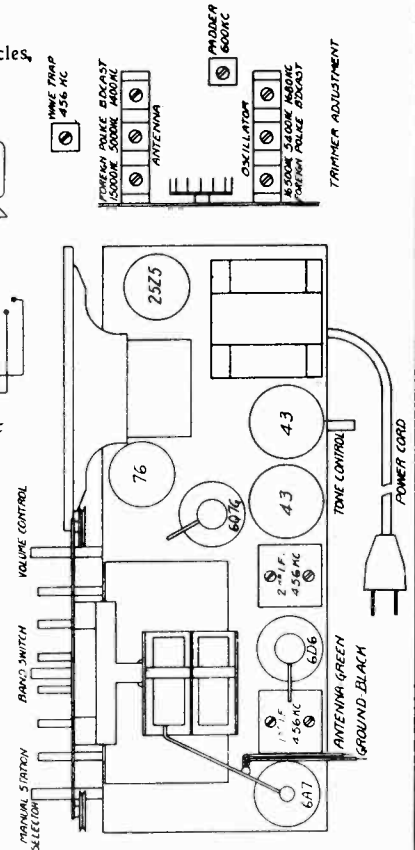
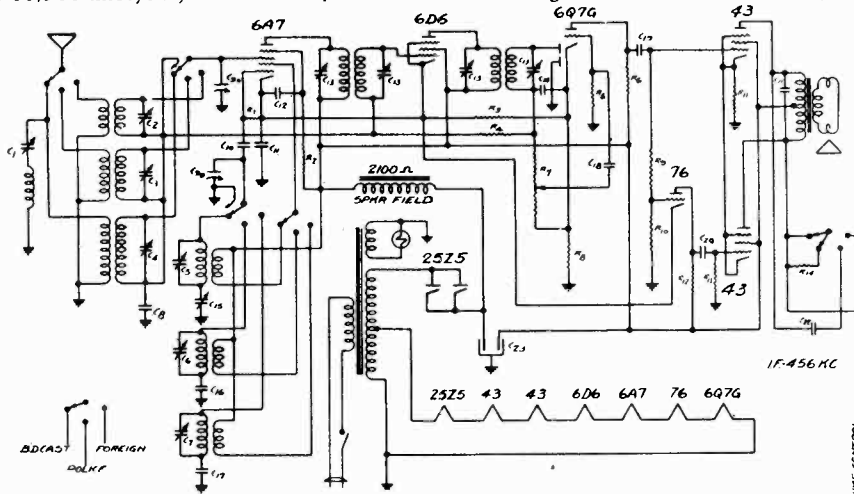
Band-1600 K.C. and 1712 K.C.

DETROLA RADIO CORP.

MODEL 223
Schematic, Socket
Trimmers, Parts
Tuner, Alignment

Unless specifically stated otherwise, these receivers are designed to operate on **117 volts 60 cycles alternating current only.**

This receiver covers a continuous short wave range of 1.6 to 16.5 megacycles (1600 to 16,500 kilocycles) in two bands, standard broadcast range from 540 to 1600 kilocycles.



FACTORY 223 SERIES

Automatic Tuning System,
See MODEL 220

Symbol	Part No.	Description
C-1	3272	30-140 mmf Trimmer
C-2, 5, 7	1611	3-35 mmf Trimmer
C-3, 4, 6	2597	1-10 mmf Trimmer
C-8, 11	572	.1 200 V.
C-9a, b	5377	Tuning Condenser
C-10	2780	50 mmf Mica
C-12	580	.05 200 V.
C-13		IF Trimmer
C-14	4810	.0005 400 V.
C-15	2560	220-500 mmf Padder
C-16	2741	1330 mmf 5%
C-17	3871	.006 600 V. 5%
C-18	568	.01 400 V.
C-19, 20		.02 400 V.
C-21	581	.005 600 V.
C-22	2600	.02 600 V.
C-23	5389	20, 12 mf Electrolytic
R-1, 10	631	50M 1/3 W.
R-2	617	20M 1/3 W.
R-3	2605	200 ohm 1/3 W. 10%
R-4, 5	624	1 Meg. 1/3 W.
R-6	598	200M 1/3 W.
5393		Power Transformer
3463-10		1st IF Transformer
3463-4		2nd IF Transformer
5096		Oscillator Coil
5392		Antenna Coil
5390		Band Switch
5394		Tone Control Switch
530		Pilot Light Bulb
5387		Dial Chart
5396		Escutcheon
5397		Button escutcheon
5353		Tuning Buttons
5357		Call Letter Sheets
5388		Speaker
3904		Knobs

Symbol	Part No.	Description
R-7	5332	500M Volume Control
R-8	2698	100 ohm 1/3 W. 10%
R-9	2881	400M 1/3 W. 10%
R-11	5395	500 ohm wire wound 10%
R-12	603	100M. 1/3 W.
R-13	615	500M 1/3 W.
R-14	4529	10M 1/3 W. 10%

Tubes required are:

- 1—6A7 Oscillator Translator
- 1—6D6 Intermediate Frequency Amplifier
- 1—6Q7G Detector—AVC—First Audio Amplifier
- 1—76 Phase Inverter
- 2—43 Power Output
- 1—2525 Rectifier

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline generator to grid of 6A7 tube and aline transformer No. 1.

RF. (See above diagram for location of trimmers.)

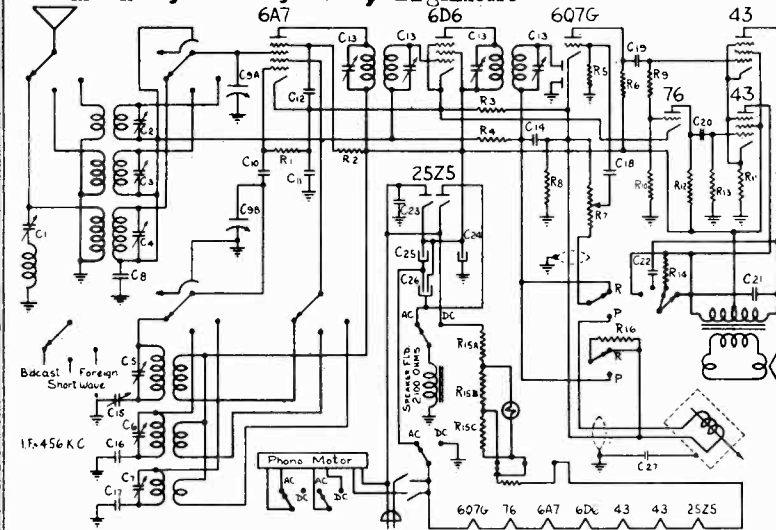
Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to left hand position, and the tuning condenser to about 600 kc. Feed a 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1660 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 16,500 kc—screw trimmer down tight, then unscrew to second peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to first peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.

MODEL 225 Series
MODEL 228 Series, Phono. DETROLA RADIO CORP.

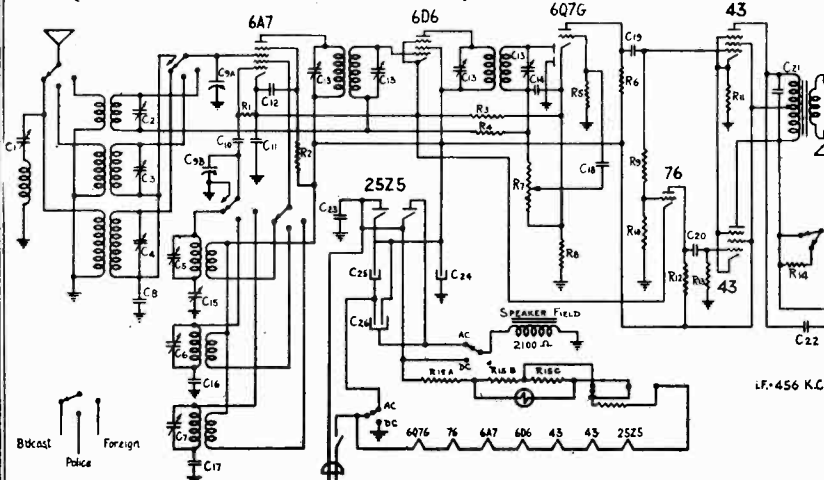
Schematics, Socket, Parts, Alignment



A.C.-D.C. SUPERHETERODYNE SERIES 228
(Phonograph pick up)

Tubes required For Series 225 and 228:

- 1—6A7 Oscillator Translater
- 1—6D6 Intermediate Frequency Amplifier
- 1—6Q7G Detector—AVC—First Audio Amplifier
- 1—76 Phase Inverter
- 2—43 Power Output
- 1—25Z5 Rectifier



A.C.-D.C. SUPERHETERODYNE SERIES 225
Series 225 and 228.

Symbol	Part No.	Description	Part No.	Description
C-1	3272	30-140 mmf	C-16	2741 1330 mmf 5%
C-2, 5, 7	1611	3-35 mmf Trimmer	C-17	3871 .006 600 V. 5%
C-3, 4, 6	2597	1-10 mmf Trimmer	C-18	568 .01 400 V.
C-8, 11	572	.1 200 V.	C-19, 20	581 .02 400 V.
C-9a, b	5377	Tuning Condenser	C-21	581 .005 600 V.
C-10	2780	50 mmf Mica	C-22, 23	2600 .02 600 V.
C-12	580	.05 200 V.	C-24	5272 Electrolytic
C-13		IF Trimmer	C-25	5420 8 MF. 150 V.
C-14	4810	.0005 400 V.	C-26	5419 Electrolytic
C-15	2560	220-500 mmf		8/8 MF. 250 V.
		Padder	R-1, 10	631 50M 1/3 W.
			R-2	617 20M 1/3 W.

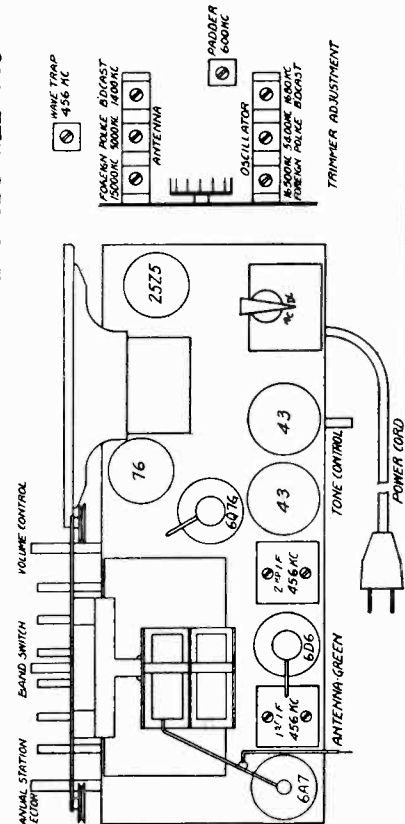
NOTE: Series 225 and 228 are designed to operate on 105 to 125 volts AC or DC. No ground is necessary on these models.

Series 225 and 228 have standard broadcast range from 540 to 1600 kilocycles and continous S.W. range of 1600 to 16,500 kilocycles in two bands.

For mechanical Automatic-Tuning System, of both Models, -See Model 220.

ALIGNMENT PROCEDURE for both series -- SEE MODEL 223.

CHASSIS LAYOUT FOR SERIES 225 and 228

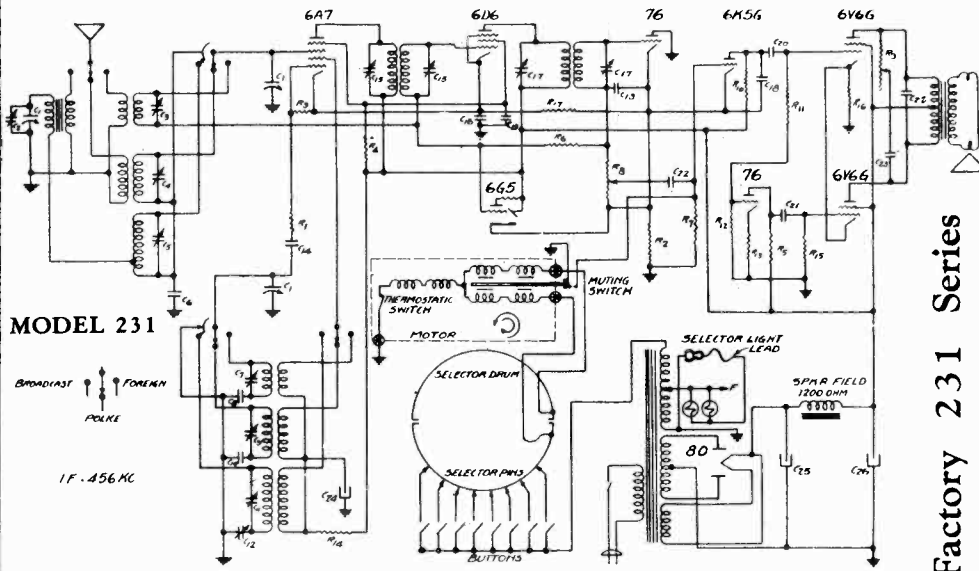


R-3	2605	200 ohm 1/3 W. 10%
R-4, 5	624	1 Meg. 1/3 W.
R-6	598	200M 1/4 W.
R-7	5332	500M Volume Control
R-8	2698	100 ohm 1/3 W. 10%
R-9	2881	400M 1/3 W. 10%
R-11	5395	500 ohm wire wound 10%
R-12, 16	603	100M. 1/3 W.
R-13	615	500M 1/3 W.
R-14	4529	10M 1/3 W. 10%
R-15A	5421	30 ohm } Wire Wound 10 ohm } 20 ohm }
B		
C		
Tuning Buttons	3463-10	1st IF Transformer
Call Letter Sheets	3463-4	2nd IF Transformer
Speaker	5096	Oscillator Coil
Knobs	5392	Antenna Coil
	5390	Band Switch
	5394	Tone Control Switch
	5390	Band Switch
	5394	Tone Control Switch
	530	Pilot Light Bulb
	5387	Dial Chart
	5396	Escutcheon
	5397	Button escutcheon
	2725	AC-DC Switch
	2234	Phono Pick Up
	5233	Turn Table
	5240	Radio-Phono Switch
	5465	Phono Motor
	5422	AC-DC Switch

Series 228 only

DETROLA RADIO CORP.

MODEL 231 Series
Schematic, Socket
Trimmers, Parts

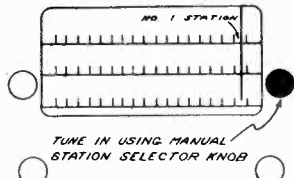


MODEL 231

BROADCAST FOREIGN
POLKE
IF - 456 KC

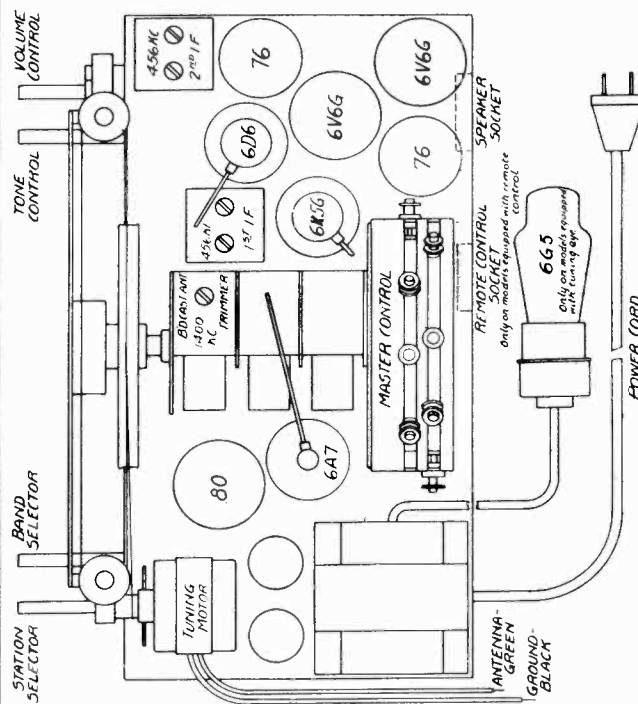
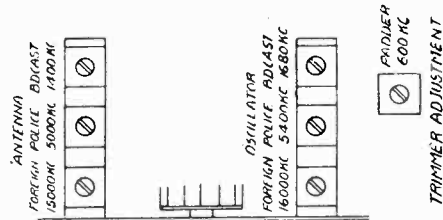
Factory 231 Series

- Tubes required are:
- 1-6A7 Oscillator-translator
 - 1-6D6 Intermediate Frequency Amplifier
 - 1-6K5G First Audio Amplifier
 - 1-76 Driver—Phase Inverter
 - 2-6V6G Power Output
 - 1-80 Rectifier
 - 1-6G5 Cathode Ray Tuning Tube (on model equipped with "eye" tuning indicator)



Series 231 - Designed to operate on 117 volts 60 cycles.
Bands, 540-1600, 1650-5400, 5400-16,000 kilocycles.
FOR ALIGNMENT AND AUTOMATIC TUNING SYSTEM :-see 183 Series.

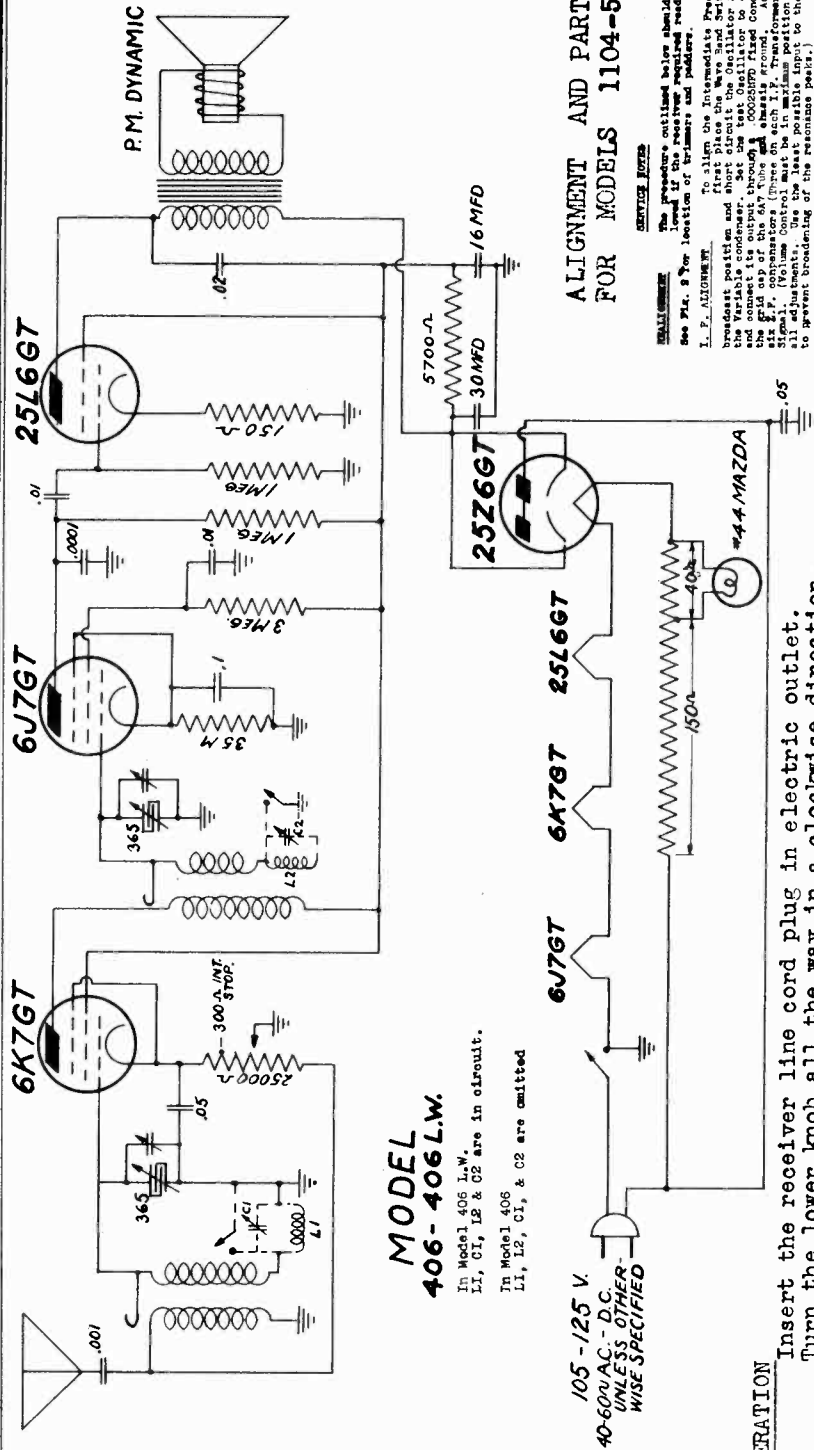
SUPERHETERODYNE SERIES-231



Symbol	Part No.	Description	Symbol	Part No.	Description
C1	5508	3-gang 365 mmfd. Variable	R8	5512	500M Volume Control
C2	1611	Trimmer on Variable	R9	5511	100M Tone Control
C3, 7, 11	2597	3-35 mmfd. Trimmer	R10	2730	200M 1/3 W.
C4, 5, 9	572	1-10 mmfd. Trimmer	R11	2881	400M 1/3 W.
C6, 19	572	.1 mfd. 200 V.	R12	2880	100M 1/3 W.
C8	2793	.006 600 V. Padder	R13, 14	2883	5M 1/3 W.
C10	2741	1330 mmfd. Padder	R15	2731	500M 1/3 W.
C12	2560	350 mmfd. Variable Padder	R16	3353	250 ohm 2 W. Flexohm
C13, 18	4810	.0005 mfd. 400 V.	R17	2605	200 ohm 1/3 W.
C14	2780	50mmfd. Mica	5506	5506	Power Transformer
C15, 17	2792	I.F. Trimmers	3463-11	3463-11	First I.F. Transformer
C16	2792	.2 mfd. 200 V.	3463-12	3463-12	Second I.F. Transformer
C24	5516	.8 mfd. 250 W.V. Elect.	2845	2845	B.C. Antenna Coil
C20, 21, 22	576	.02 mfd. 400 V.	5095	5095	S.W. Antenna Coil
C23	2601	.01 mfd. 600 V.	5096	5096	Oscillator Coil
C25	5507	16 mfd. 350 W.V. Elect.	4395	4395	Drive Cable
C26	5101	16 mfd. 225 W.V. Reg. Elect.	5520	5520	8" Speaker
C27	824	.002 mfd. 600 V.	5515	5515	Motor
R1, 2	2689	100 ohms 1/3 W.	5513	5513	Band Switch
R3, 5	631	50M 1/3 W.	4392	4392	Contact Ribbon
R4	636	40M 1/3 W.	4377	4377	Contact Pins
R6, 7	624	1 Meg. 1/3 W.			

DEWALD RADIO

MODELS 406, 406LW
Schematic, Parts
MODELS 1104, 1105
Alignment, Parts



MODEL 406-406LW.

In Model 406 L.W.
L1, C1, L2 & C2 are in circuit.
In Model 406
L1, L2, C1, & C2 are omitted

ALIGNMENT AND PARTS FOR MODELS 1104-5

WARNING
The procedure outlined below should be followed only when the receiver is in a condition to receive and transmit. See Part 9 for location of controls and switches.

I. P. ALIGNMENT
To align the Intermediate Frequency stages, broadcast position and short circuit the Wave Band Switch of the 6J7GT. Turn the 500KHz Oscillator Section of the 6J7GT to 540 KHz. Connect the 500KHz Oscillator to the grid cap of the 6J7 Tube and adjust the 500KHz Oscillator (Turn on each I.F. Transformer) for the highest signal strength. Use the least possible input to the receiver to prevent broadening of the resonance peaks.

BROADCAST ALIGNMENT
After the Intermediate Frequency stages external test signals have been completely aligned, connect the set. See Part 9, Set the antenna and ground binding posts of the 6J7GT to 1500 K.C. and adjust the three 500KHz condensers for maximum gain. Next, set dial at 1000 K.C. and adjust the 500KHz condenser for maximum gain. Now repeat re-aligning operation at 1000 K.C.

INTERMEDIATE F.W.
Turn Wave Band switch to Intermediate S. W. position and set Variable Condenser to 5000 K.C. Adjust test oscillator to maximum gain. Next set dial at 1000 K.C. and adjust Intermediate Variable Condenser for maximum signal. Now repeat re-aligning operation at 1000 K.C.

ALIGNMENT
Turn Wave Band switch to S. W. position and set Variable Condenser to 18 megacycles. Adjust test oscillator to mid frequency and adjust three S. W. Transformers for maximum signal.

LOW WAVE ALIGNMENT
Turn Wave Band Switch to L. W. position and align Transformers in 300 wave coils to 400 K.C. Adjust L. W. Padder at 100 K.C.

OPERATION

Insert the receiver line cord plug in electric outlet. Turn the lower knob all the way in a clockwise direction. Allow approximately one minute for the tubes to heat up and receiver is then ready for operation.

NOTE

If receiver is being operated on D.C. and no signals are heard after one minute, reverse the line cord plug in the outlet. To turn receiver "off", rotate the lower knob all the way in a counter clockwise direction until a snap is heard and the dial lamp goes out.

These receivers are designed to operate on 105-125 volts 40-60 cycles A.C. or D.C. The broadcast range coverage is 540-1750 K.C.

LOW PRICES OF REPLACEMENT PARTS

1245	filter choke	2.00	2428	5 gang var. cond.	9.50
1339	cap. 500 p.	1.00	2440	500KHz osc. coil	1.10
1340	cap. 500 p.	1.00	3453	comb. tone cont.	1.75
1340	cap. 500 p.	1.00	3453	comb. tone cont.	1.75
1448	first tube	2.00	8548	pilot lamp	10.10 net
1448	second I.F.	2.00	8838	P.T. assembly	.15
2099	push-pull trans	1.00	8939	wave band switch	1.00
2314	40 mfd. elect. (test)	1.25	8941	dial assembly	4.00
2335	50 " "	.50	9847	knob	22.50
2338	10 " "	.50		cabinet	

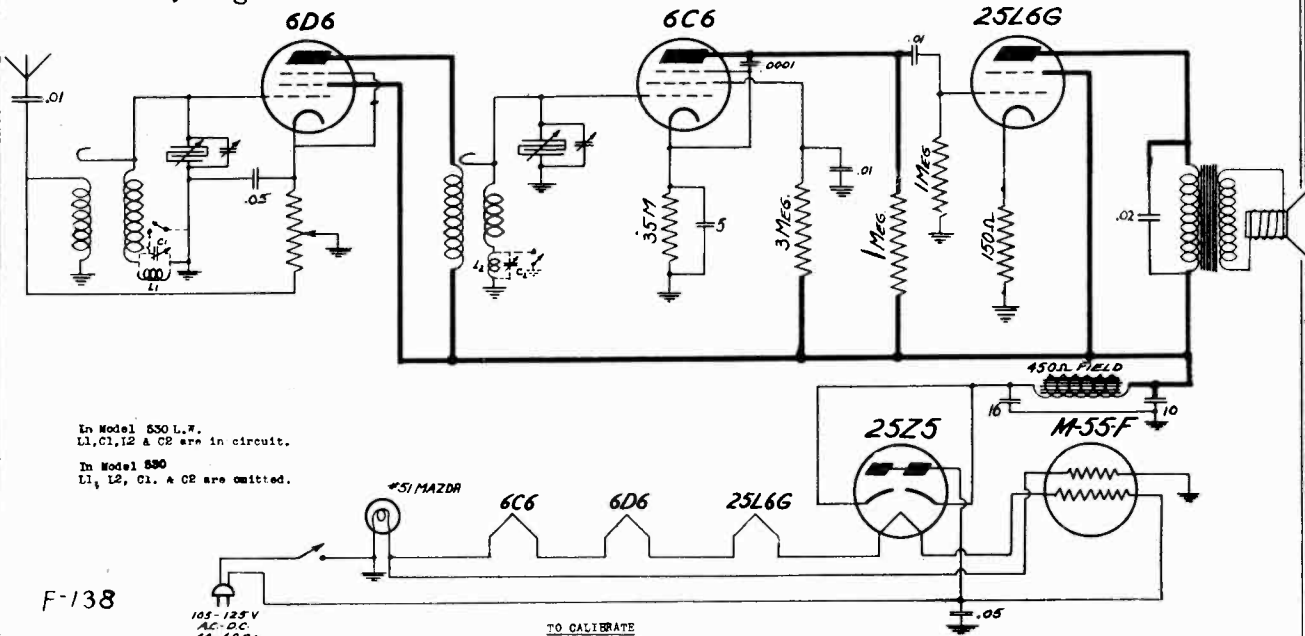
1510	Antenna Coil	.50	3446	comb. vol. cont.	1.00
1511	Det Coil	.50	8607	pilot lamp	.10 net
2447	2 gang var. cond.	2.00	8882	knobs	.10
2448	comb. electrolytic	.25		Walnut cabinet	2.50
6098	scale	.25		Colored cabinet	3.50
7240	speaker	3.50			

MODEL 406 - 406 LW LIST PRICES OF REPLACEMENT PARTS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 530,530LW,531
531LW,534
MODELS 533,533LW
Schematics,Alignment

DEWALD RADIO

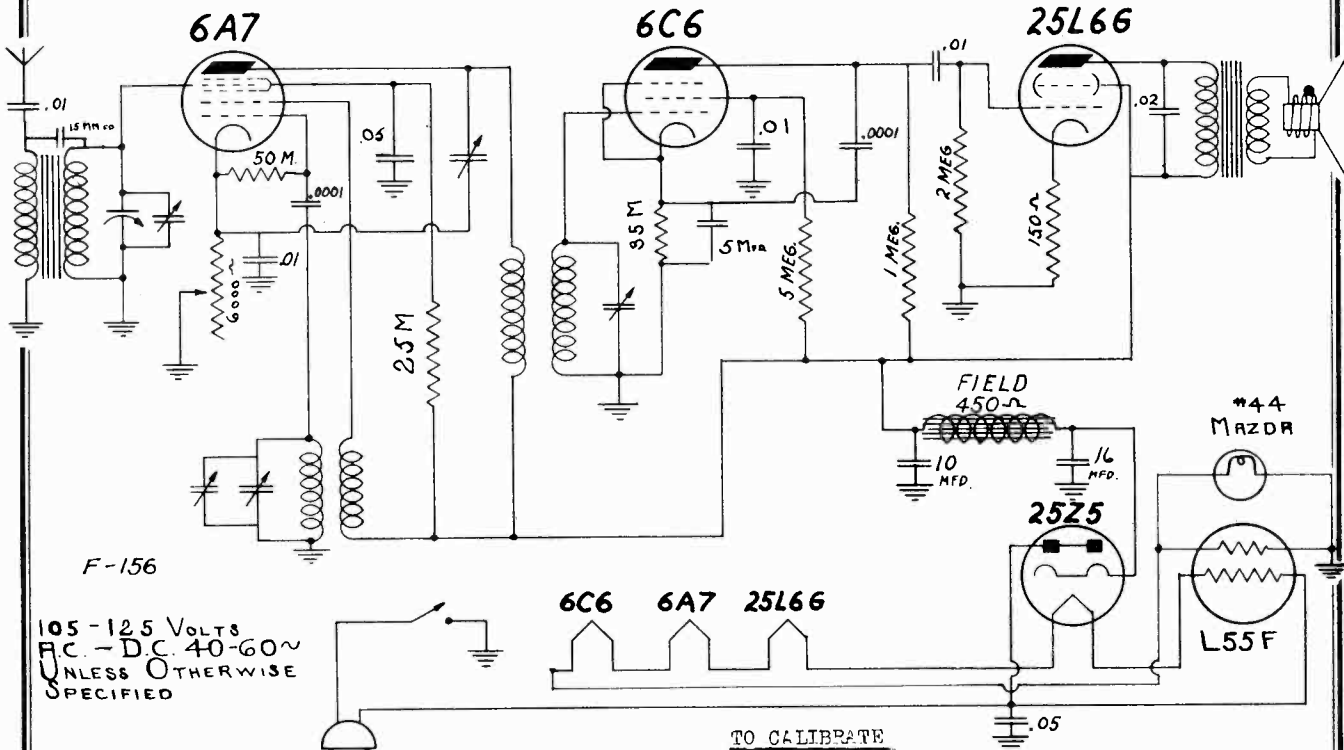


In Model 530 L.W.
L1, C1, I2 & C2 are in circuit.
In Model 530
L1, L2, C1, & C2 are omitted.

range coverage is 540-1750K.C.

Connect external Oscillator's hot lead to reel antenna of receiver. Connect oscillator cold lead in series with a 4 or .1 MFD condenser to receiver chassis. Set oscillator at 1500KC and peak Variable Condenser trimmers for Maximum signal with condenser set approximately where 1500 comes in on scale.

MODELS 530,530LW,531
531LW,534



105-125 VOLTS
AC - DC 40-60V
UNLESS OTHERWISE
SPECIFIED

MODEL 533
533L.W.

Connect the antenna lead from the signal generator to the antenna of the receiver and the ground lead to the receiver chassis. Adjust the generator to 456 KC and adjust the two I.F. trimmers for maximum signal. Then adjust the generator and receiver to 1500 KC. and peak the variable condenser trimmers for maximum signal.

MODELS 645, 645LW, 652
Schematic, Alignment

DEWALD RADIO

These models are superheterodyne receivers, with full automatic volume control on all bands. They have been designed to operate on 110-125 volts, 40-60 cycles AC or DC unless otherwise specified. A slide rule instrument type dial which simplifies tuning is featured in these receivers. The ranges of the models are as follows: →

MODEL	RANGE COVERAGE
645	555-174 meters 540-1725 K.C.
645 L.W.	555-174 meters 540-1725 K.C.
652	555-174 meters 540-1725 K.C.

50-16 meters
6.0-18.5 M.C.

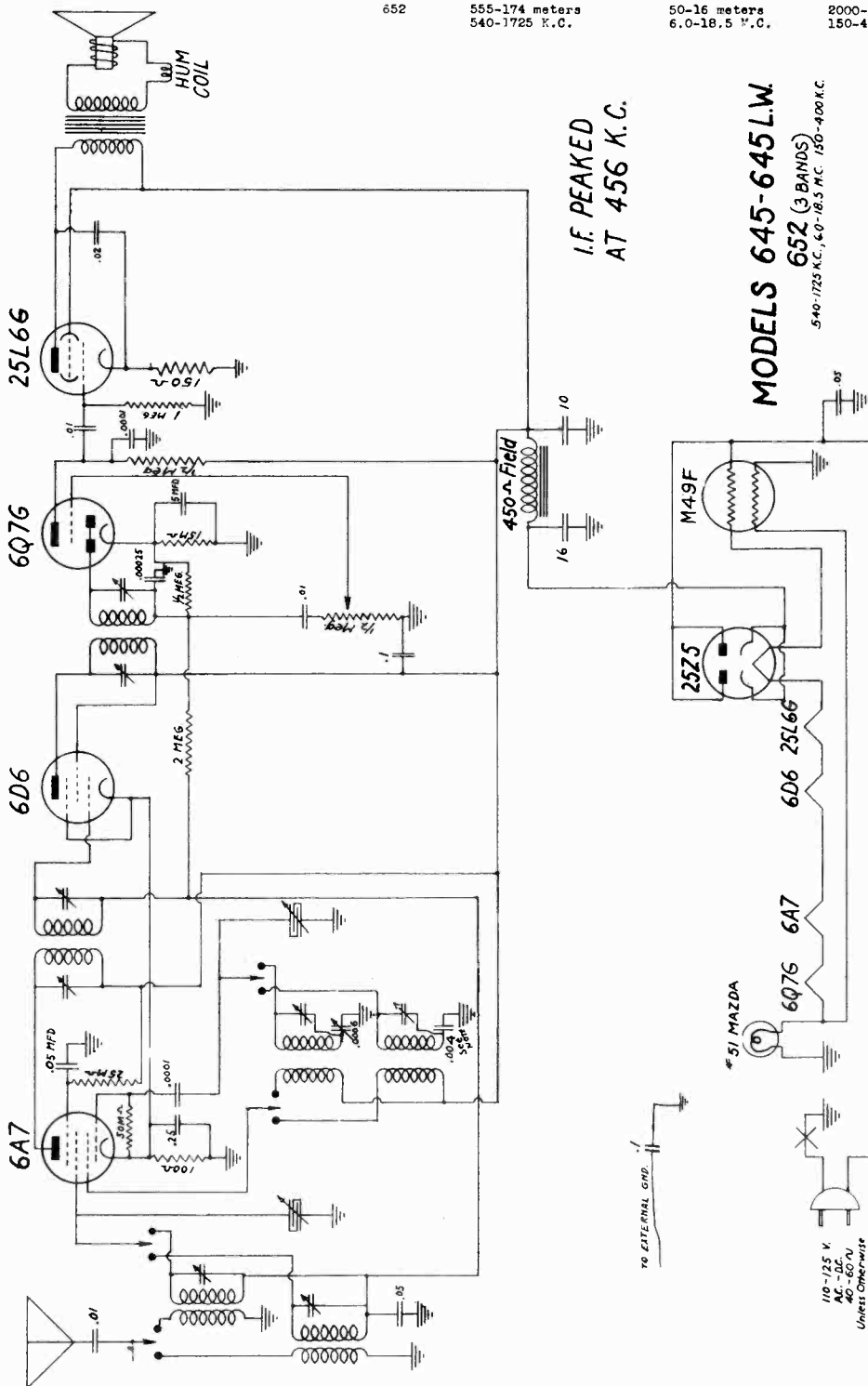
2000-750 meters
150-400 K.C.

SHORT WAVE ALIGNMENT Turn wave band switch to the short wave band. Adjust generator and receiver to 16.0 K.C. Peak trimmers for alignment. The low frequency is automatically adjusted by a fixed calibrated padler.

LONG WAVE ALIGNMENT Turn wave band switch to Long Wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave padler for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

I.F. ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 486 K.C. and Peak I.F. trimmers for maximum signal.

BROADCAST ALIGNMENT Remove short from variable condenser. Have wave band switch on broadcast position. Adjust generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C. Peak the broadcast padler for maximum signal. The variable condenser should be "rocked" during this operation.

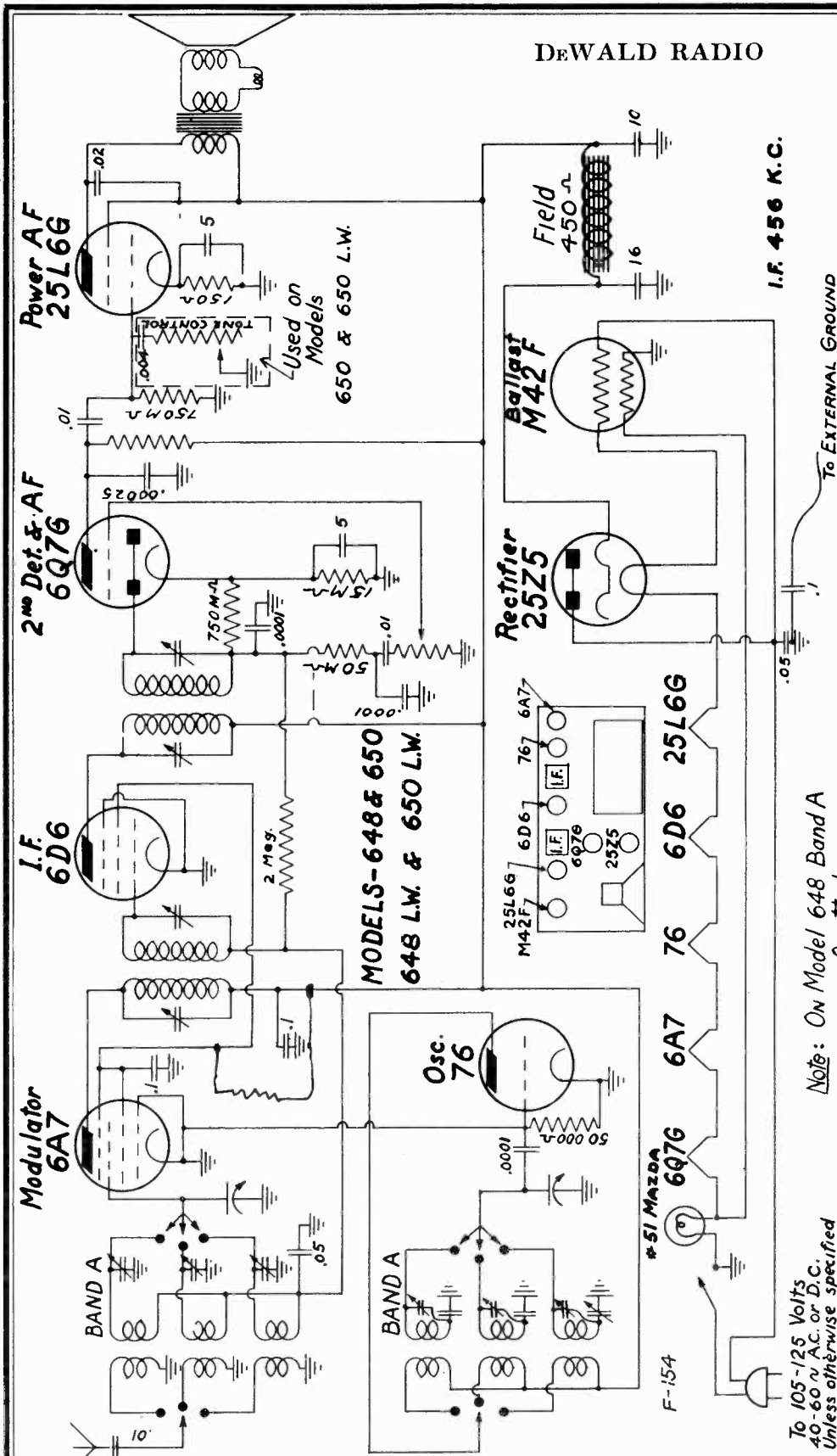


I.F. PEAKED
AT 456 K.C.

MODELS 645-645LW
652 (3 BANDS)
540-1725 K.C., 60-18.5 M.C. 150-400 K.C.

NOTE: On Models 645 L.W. This condenser is .00025

MODELS 648, 648LW
650, 650LW
Schematic, Tuner
Alignment



LONG WAVE ALIGNMENT
 Turn wave band switch to Long Wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave paddler for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

SHORT WAVE ALIGNMENT
 Turn wave band switch to Short Wave band. Adjust the generator and receiver to 7.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated paddler.

BROADCAST ALIGNMENT
 Remove short from variable condenser. Have wave band switch on broadcast position. Adjust generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C., peak the broadcast paddler for maximum signal. The variable condenser should be "rocked" during this operation.

I.F. ALIGNMENT
 Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 456 K.C. and peak I.F. trimmers for maximum signal.

Note: On Model 648 Band A is Omitted

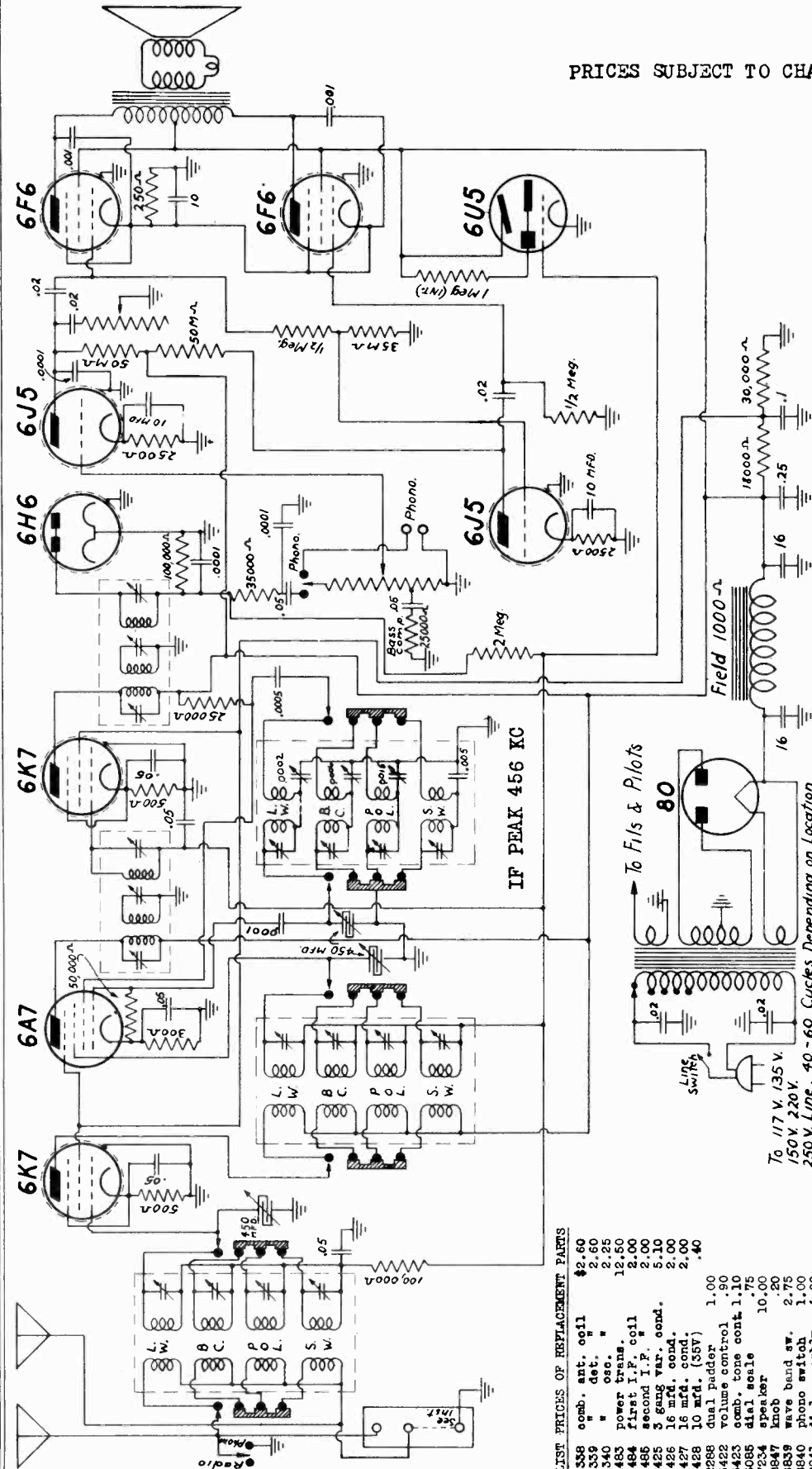
MODEL	RANGE COVERAGE		
648	555-174 meters, 50-16 meters	540-1725 K.C., 6.0-18.5 M.C.	
648 L.W	555-174 meters, 50-16 meters, 2000-750 meters	540-1725 K.C. 6.0-18.5 M.C.	150-400 K.C.
650	555-174 meters, 112-37 meters, 38-12.5 meters	840-1725 K.C. 2.7-8.2 M.C.	7.8-24.0 M.C.

HOW TO ADJUST THE PUSH-BUTTONS
 Tune in the desired station with the station selector knob. Determine which button is to be used to receive this station. Loosen this button by turning it in a counterclockwise direction approximately one full turn. Then push the button in as far as it will go and tighten with a coin in the button slot. The adjustment may be checked by setting the pointer in any position, pushing the button in as far as it will go and noting if the intended station is received. After all adjustments have been made the station tabs and celluloids may be put on the buttons.

MODELS 1002, 1003
Schematic, Alignment
Parts

DEWALD RADIO

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



position. Set test Oscillator to 1500 K.C. and adjust the three broadcast Compensators for maximum gain. Next, set dial at 600 K.C. and adjust broadcast padder for maximum signal, rocking Variable Condenser at the same time. Now repeat reworking operation at 1500 K. C.

INTERMEDIATE S.W. ALIGNMENT
Turn Wave Band Switch to Intermediate S. W. position and set Variable Condenser to 3000 K. C. Adjust test oscillator to this frequency and adjust 3 Intermediate s. w. trimmers for maximum gain. Next set dial at 1900 K. C. and adjust Intermediate s. w. padder for maximum signal. Now repeat reworking operation at 3000 K. C.

SHORT WAVE ALIGNMENT
Turn Wave Band Switch to S. W. position and set Variable Condenser to 16 megacycles. Adjust test oscillator to this frequency and adjust three S. W. trimmers for maximum signal. Turn Wave Band Switch to L. W. position and align trimmers on long wave coils to 400 K. C. Adjust L. W. Padder at 160 K. C.

MODEL 1002
-Range-
520 — 1800 K.C.
1650 — 5750 K.C.
5.5 — 20 MC.

MODEL 1003
Range as above but Long Wave Bands added
150 — 450 K.C.

LIST PRICES OF REPLACEMENT PARTS

1358 comb. ant. coil	\$2.60
1359 " det. "	2.60
1340 " osc. "	2.25
1483 power trans.	12.50
1484 first I.F. coil	2.00
1485 second I.F. "	2.00
2425 3 gang var. cond.	5.10
2426 16 mfd. cond.	2.00
2427 16 mfd. cond.	2.00
2428 10 mfd. (.55V)	.40
2288 dual padder	1.00
3422 volume control	.90
3423 comb. tone cont.	1.10
6085 dial scale	.75
7234 speaker	10.00
8847 knob	2.20
8839 wave band sw.	2.75
8840 phono switch	1.00
8841 dial assembly	4.00
8842 cabinet	22.50

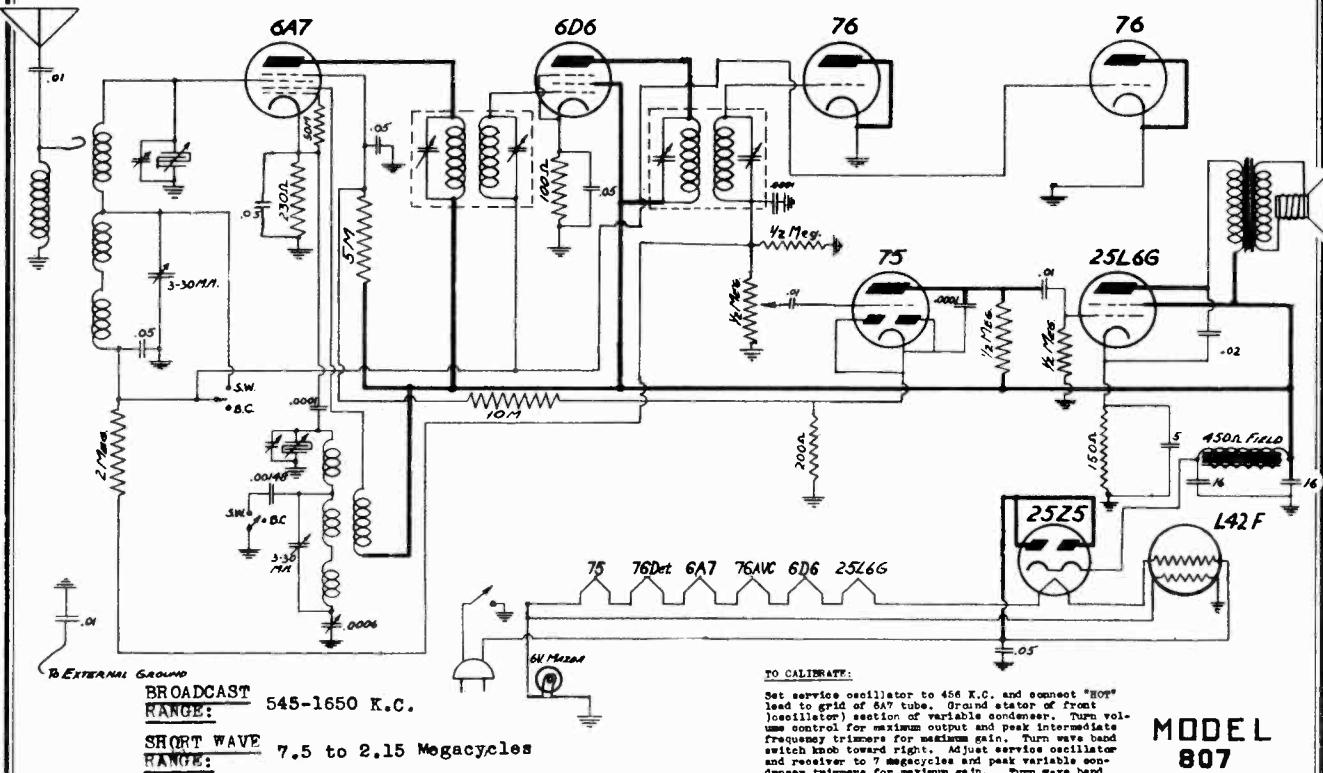
The procedure outlined below should be followed if the receiver requires readjusting.

REALIGNMENT
To align the Intermediate Frequency stages, first place the Wave Band Switch in broadcast position and short circuit the Oscillator Section of the Variable Condenser. Set the test Oscillator to 456 K.C. and connect its output through a .00025MFD fixed Condenser to the grid cap of the 6A7 Tube and chassis ground. Adjust the six I.F. compensators (three on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least possible input to the receiver to prevent broadening of the resonance peaks.)

BROADCAST ALIGNMENT
After the Intermediate Frequency stages have been completely aligned, connect external test oscillator to the Antenna and Ground binding posts of the set. See FIG. 3-A. Set the band switch to broadcast

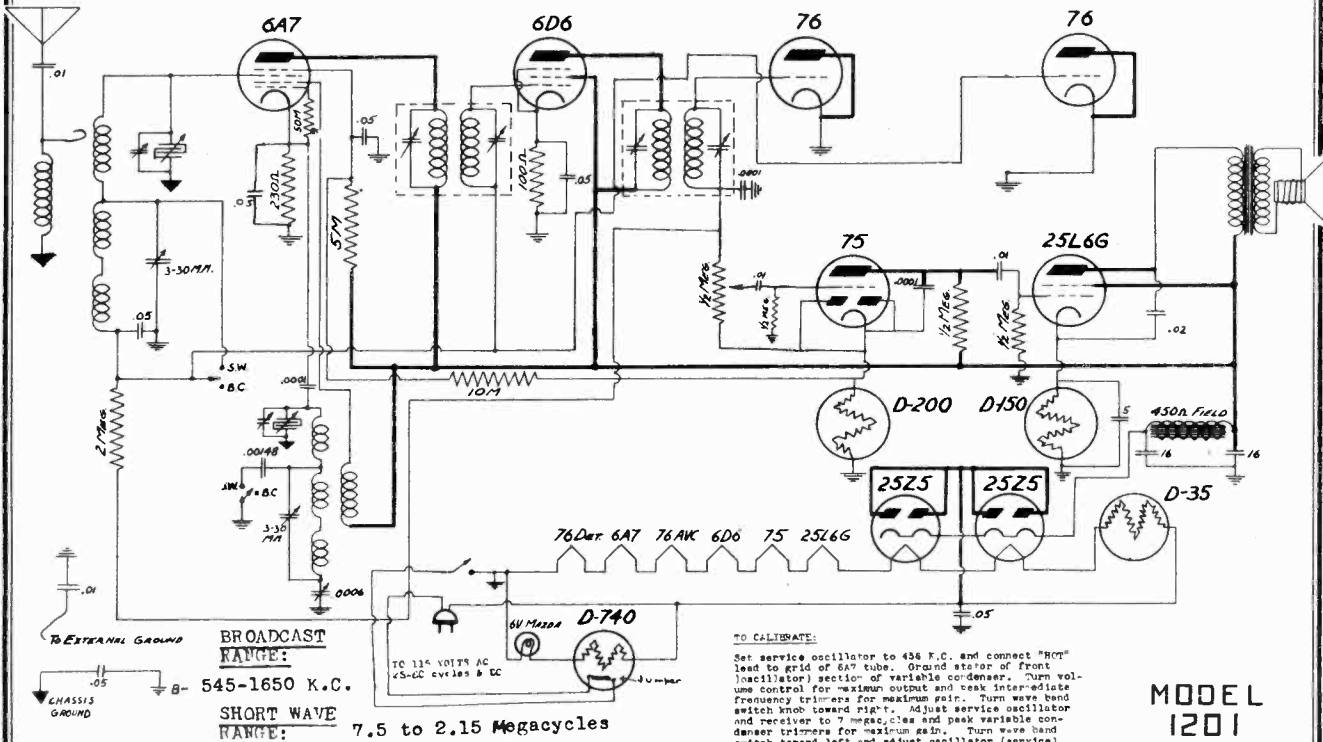
MODEL 807
MODEL 1201
Schematics, Alignment

DEWALD RADIO



This receiver is designed to operate on 115 Volts AC 40-60 cycles and DC. The current consumption is 40 watts.

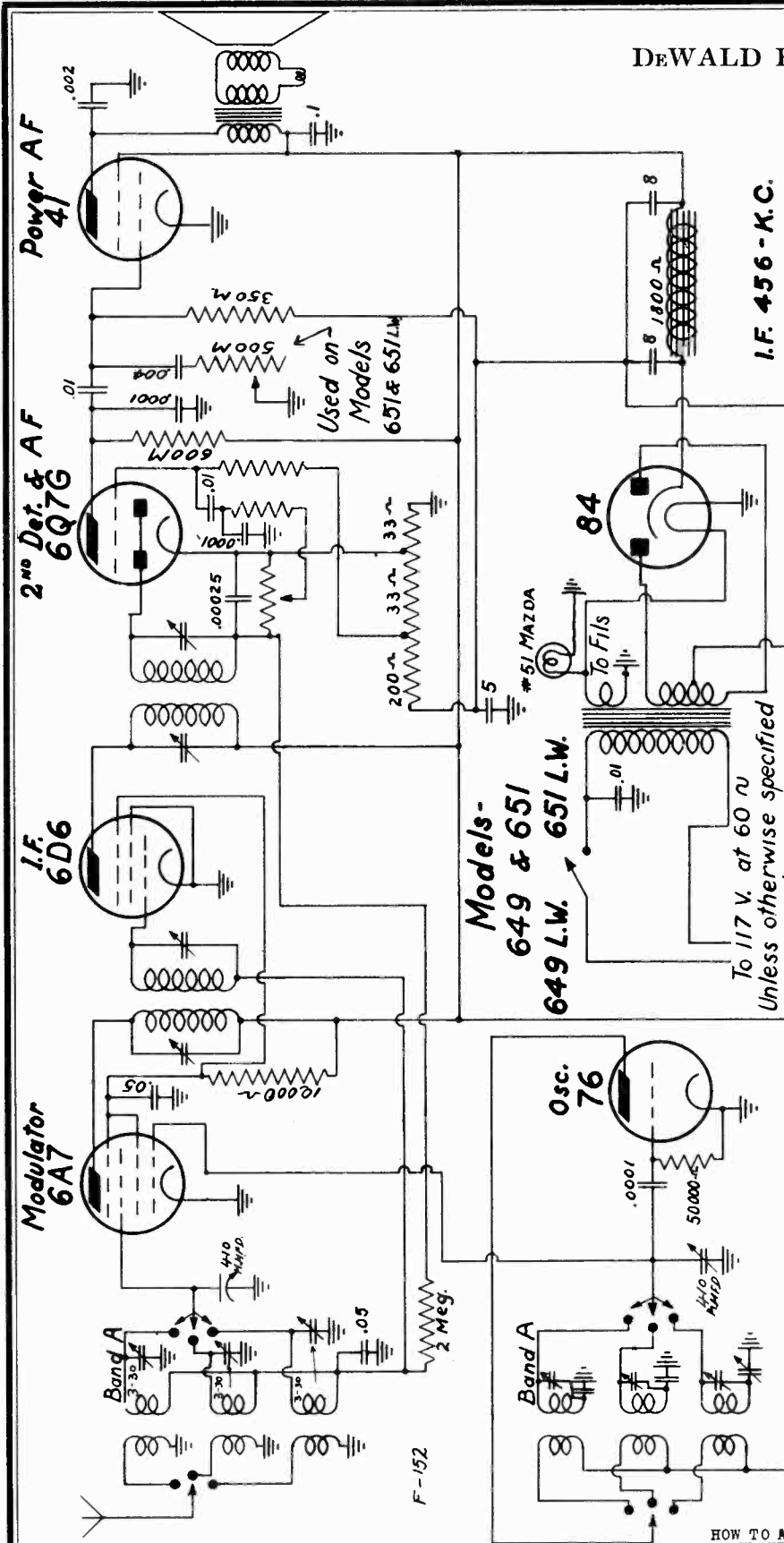
IF PEAK 456 KC.



This receiver is designed to operate on 115 Volts AC 25-60 cycles and DC. The current consumption is 65 watts.

DEWALD RADIO

MODELS 649, 649LW
651, 651LW
Schematic, Tuner
Alignment



I.F. 456 - K.C.

this band. Adjust the generator and receiver to 16.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated paddler.

(Model 649 L.W.) Turn wave band switch to long wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave paddler for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

LONG WAVE ALIGNMENT

Remove short from variable condenser. Have wave band switch on broadcast position. Adjust generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C., peak the broadcast paddler for maximum signal. The variable condenser should be "rocked" during this operation.

TO CALIBRATE RECEIVER

Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 456 K.C. and peak I.F. trimmers for maximum signal.

BROADCAST ALIGNMENT

Remove short from variable condenser. Have wave band switch on broadcast position. Adjust generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C., peak the broadcast paddler for maximum signal. The variable condenser should be "rocked" during this operation.

SHORT WAVE ALIGNMENT

For 2.7-8.2 M.C. (Model 651). Turn wave band switch to this band. Adjust the generator and receiver to 7.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated paddler.

LONG WAVE ALIGNMENT

For 7.8-24.0 M.C. (Model 651) Turn wave band switch to this band. Adjust the generator and receiver to 22.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated paddler.

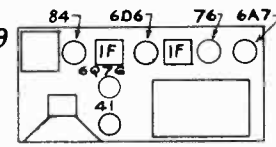
SHORT WAVE ALIGNMENT

For 6.0-18.5 M.C. (Model 649) Turn wave band switch to this band. Adjust the generator and receiver to 11.2 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated paddler.

MODEL	RANGE COVERAGE
649	555-174 meters, 50-16 meters 540-1725 K.C., 6.0-18.5 M.C.
649 L.W.	555-174 meters, 50-16 meters, 2000-750 meters 540-1725 K.C., 6.0-18.5 M.C., 150-400 K.C.
651	555-174 meters, 112-37 meters, 39-12.5 meters 540-1725 K.C., 2.7-8.2 M.C., 7.8-24.0 M.C.

HOW TO ADJUST THE PUSH-BUTTONS

Note: On Model 649 Band A is omitted.



Tune in the desired station with the station selector knob. Determine which button is to be used to receive this station. Loosen this button by turning it in a counterclockwise direction approximately one full turn. Then push the button in as far as it will go and tighten with the button slot. The adjustment may be checked by setting the pointer in any position, pushing the button in as far as it will go and noting if the intended station is received. After all adjustments have been made the station tabs and celluloids may be put on the buttons.

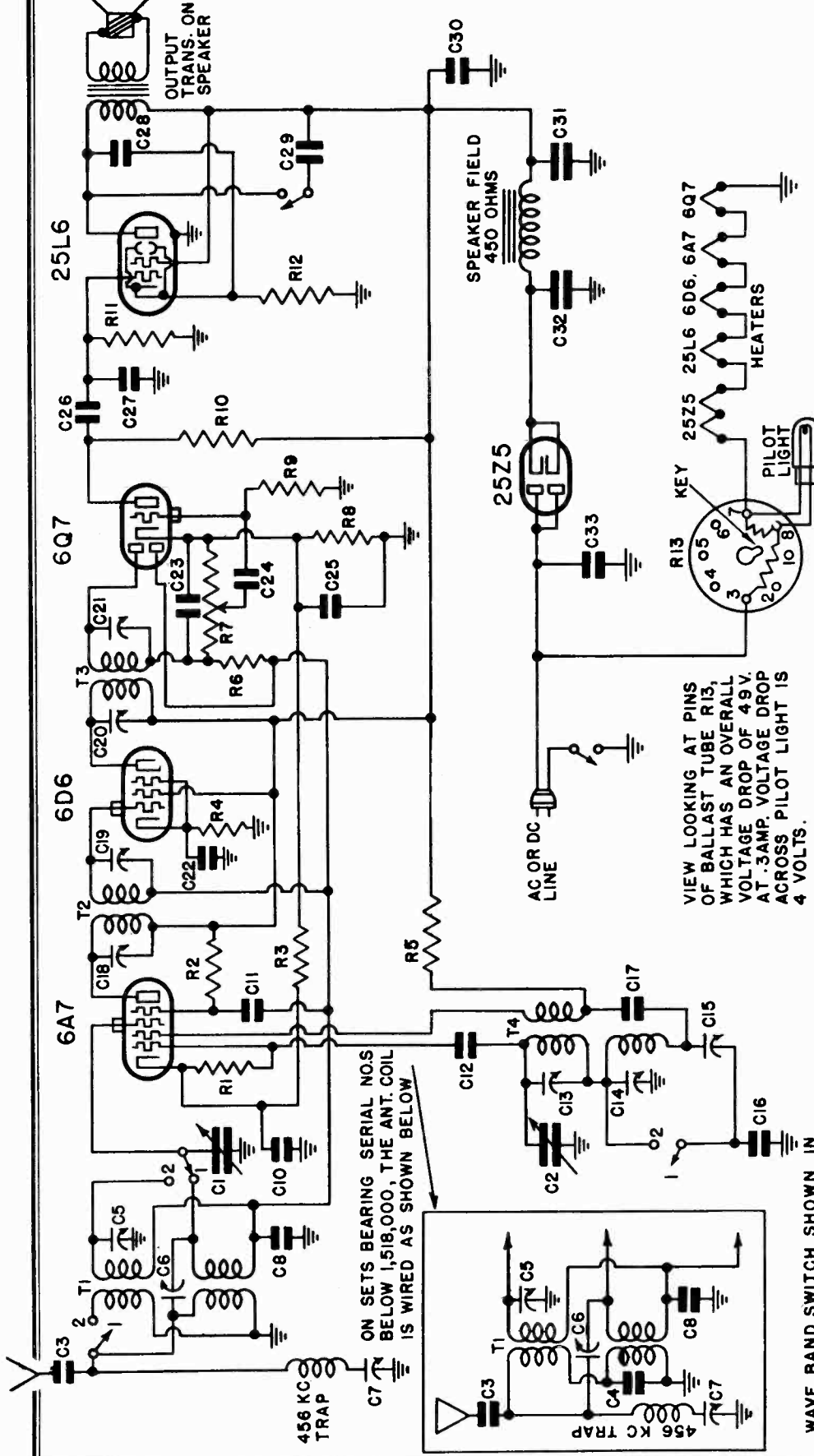
Chassis AM and BF Schematic, Voltage

EMERSON RADIO & PHONO. CORP.

MODELS AM131, AM169

AM187 Late

MODELS AM153, BF191



1-F PEAKED AT 456 KC
6 TUBE AC DC RECEIVER

Tube Data

The tube complement is as follows:
 1—6A7 pentagrid oscillator-modulator.
 1—6D6 first 1-f amplifier.
 1—6Q7 diode detector, a-f amplifier, a.v.c.
 1—25L6 beam power output.
 1—25Z5 dual half-wave rectifier.
 1—2UR-224 ballast tube (R13 on schematic).

VOLTAGE ANALYSIS

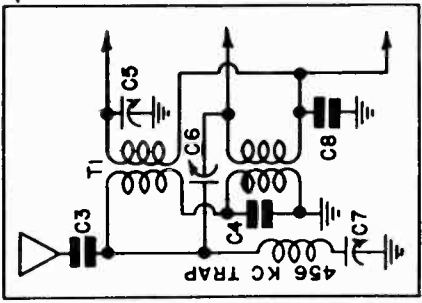
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. All readings except cathode and heater voltages were taken on 250 volt scale. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	96	45	2.3	74	6.3
6D6	96	96	4.5	—	6.3
6Q7	40	—	1.0	—	6.3
25L6	92	100	6.2	—	25.0

Voltage at 25Z5 cathode—125 volts.
 Voltage across speaker field—29 volts.
 Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
 Voltage drop across pilot light section (pins Nos. 8, 7)—4 volts.

VIEW LOOKING AT PINS OF BALLAST TUBE R13, WHICH HAS AN OVERALL VOLTAGE DROP OF 49V. AT .3AMP. VOLTAGE DROP ACROSS PILOT LIGHT IS 4 VOLTS.

ON SETS BEARING SERIAL NOS BELOW 1,518,000, THE ANT. COIL IS WIRED AS SHOWN BELOW



WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
 POSITION NO1 BROADCAST
 POSITION NO2 SHORT WAVE

MODELS AM131, AM169
AM187 Late
MODELS AM153, BF191

EMERSON RADIO & PHONO. CORP.

Chassis AM and BF
Changes, Alignment
Notes, Parts

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1400 and 15,000 kc should be used. In addition an output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The medium adjusting trimmer should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never use a screw with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, short-wave antenna coil, and 456 kc wave-trap are one assembly mounted underneath the chassis deck, to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the chassis deck. The antenna coil trimmer is located on the front of the chassis. The short-wave antenna coil trimmer is to the broadcast antenna coil, and the trimmer farthest from front is for short-wave antenna coil.

The broadcast oscillator and short-wave oscillator coils are wound on one form and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left-hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the top of the chassis, to the left of the variable condenser. The adjusting screw is reached through a hole in the top of the chassis.

i-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc through a .02 mf condenser to the grid cap of 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a .0002 mf condenser to the antenna and adjust the wave-trap trimmer (front screw beside variable condenser) for minimum response.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (rear screw beside variable condenser) for maximum response. The variable condenser should be rotated while adjusting the antenna trimmer. (Rotate variable condenser rotor start back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 140, feed 1400 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser, rocking the variable condenser for maximum response.

GENERAL NOTES

- If replacements are made or the wiring disturbed in the i-f portion of the circuit, the receiver should be carefully re-aligned.
- One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
- The filament dropping resistor (R43 on schematic) is in a special tube at the rear of the chassis. This tube will be removed when the receiver is to be shipped. For proper operation, see below for special instructions.
- When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
- The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f transformer, it is held in its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
- The color coding of the i-f transformer leads is as follows:
Plate—blue
Grid—green
Grid return—black
B plus—red
- An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-8, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of the antenna are given with the receiver.
- In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
- The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Voltage rating 105-125 volts, a.c. or d.c.
Power consumption 50 watts.
Frequency ranges 540 to 1,730 kc, and 5.6 to 18.0 megacycles.

REPLACEMENT PARTS LIST

List Price, E. S. Edwards Co. Inc., Feb. 15th, 1933 (Subject to change without notice)

Item	Part No.	DESCRIPTION	PRICE
T1, L1	4RT-418	Two-band antenna coil	\$1.75
T2	4VT-420A	456 kc first i-f transformer	1.25
T3	4VT-420A	Second i-f transformer	1.25
T4	3CT-260A	Two-band oscillator	1.15
R1	KR-53	50,000 ohm 1/2 watt carbon resistor	.15
R2	ZZR-196	30,000 ohm 1/2 watt carbon resistor	.16
R3	3RR-276	310 ohm 1/2 watt wire-wound resistor	.16
R4	3CR-296	410 ohm 1/2 watt wire-wound resistor	.16
R5	HR-22	2 megohm 1/2 watt carbon resistor	.15
R6	HR-22	2 megohm 1/2 watt carbon resistor	.15
R7	3FR-256B	Volume control, 500,000 ohms, with line switch	1.00
R8	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	KR-55	250,000 ohm 1/2 watt carbon resistor	.16
R10	KR-55	250,000 ohm 1/2 watt carbon resistor	.16
R11	KR-55	250,000 ohm 1/2 watt carbon resistor	.16
R12	KR-55	250,000 ohm 1/2 watt carbon resistor	.16
R13	2UR-224	Plug-in balast tube (see changes)	.30
C1, C2	4VC-369	Two-gang variable condenser (see changes)	4.15
C3	NAG-199	0.001 mf, 600 volt tubular condenser	.20
C4, C12	AAAC-106A	0.00005 mf mica condenser	.20
C5, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33	BC-12	0.05 mf, 200 volt tubular condenser	.20
AC-6	AC-6	0.1 mf, 200 volt tubular condenser	.20
KC-59	KC-59	0.005 mf, 400 volt tubular condenser	.20
NC-231	NC-231	Trimmers; part of oscillator coil assembly	.50
3FC-267	3FC-267	0.0042 mf mica condenser. Range 300-600 mmf	.40
KC-58	KC-58	0.01 mf, 400 volt tubular condenser	.20
5AC-684	5AC-684	Trimmers; part of first i-f transformer.	.20
3CC-337	3CC-337	Trimmers; part of second i-f transformer.	.20
3CC-261	3CC-261	0.02 mf, 400 volt tubular condenser	.20
3CC-337	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
2YC-242A	2YC-242A	40 mf, 150 volt wet electrolytic condenser	.90
3CS-254	3CS-254	0.1 mf, 400 volt molded condenser	.20
3CS-254	3CS-254	54 dynamic speaker	5.25
4MS-316	4MS-316	Wave-band switch, 25 amp. Mazda No. 44	.60
3ES-268P	3ES-268P	Wave-band switch, 25 amp. Mazda No. 44	.60
5FZ-765	5FZ-765	Tone control switch	.10
4MZ-588	4MZ-588	Dial face	.25
3CZ-339	3CZ-339	Dial pointer	.05
3CZ-340	3CZ-340	Idle pulley	.05
3CZ-340A	3CZ-340A	Idle spring	.05
3CZ-341	3CZ-341	Condenser shaft, pulley	.10
3CZ-337C	3CZ-337C	Drive shaft and pulley	1.05
3CZ-350	3CZ-350	Escutcheon with crystal (131 and 169 cabinets)	.50
4PZ-754	4PZ-754	Pyralin crystal (187 cabinet)	.10
5PZ-758	5PZ-758	Pyralin crystal (191 cabinet)	.45

When ordering replacement parts specify part number

*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and cannot be supplied separately.

PRODUCTION CHANGES

In AM receivers bearing serial numbers below 1533750 and BF receivers bearing serial numbers below 1523000:

- (a) R7 and R9 were megohm resistors, part no. KR-57.
- (b) R7 and R9 were 250,000 ohm resistors, part no. KR-55.
- (c) C23 and C27 were .00025 mf mica condensers, part no. AC-7A.
- (d) C24 was .02 mf, 200 volt condenser, part no. KC-29.

In AM receivers bearing serial numbers below 1518000:

- (a) T1 was part no. 3CT-289A.
- (b) T2 was part no. 3CT-274.
- (c) T3 was part no. 3CT-275.
- (d) Wave-band switch was part no. TTS-111G.

In AM receivers bearing serial numbers below 1184290:

- (a) The variable condenser was part no. 3CC-275.
- (b) Dial pointer was part no. 4MZ-590.

In AM receivers bearing serial numbers between 1184290 and 1518000:

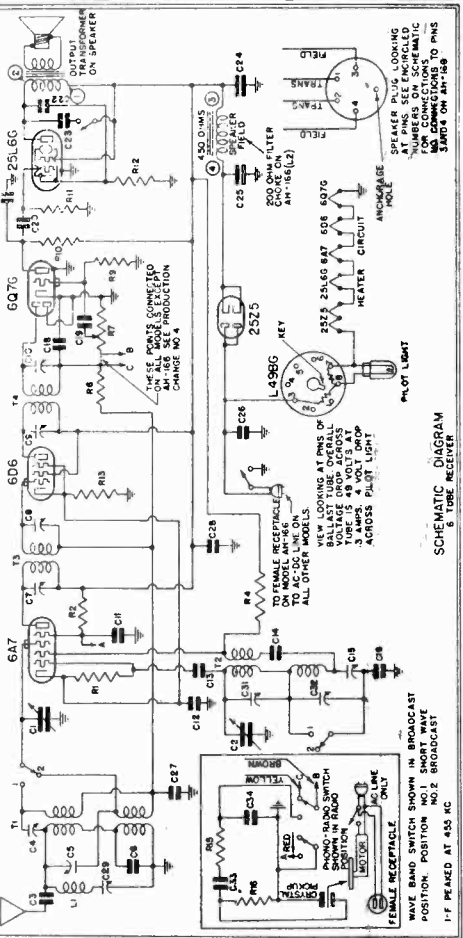
- (a) Variable condenser was part no. 3CC-276A.
- (b) Dial face was part no. 3CZ-514.

MODELS AH166, -171, -173, -174, -176, -179, -180, -185
 MODELS BG138, -140, -146, -178, -182, -183
 EMERSON RADIO & PHONO. CORP.
 Chassis AH -185
 Chassis BG -142
 Schematics, Voltage

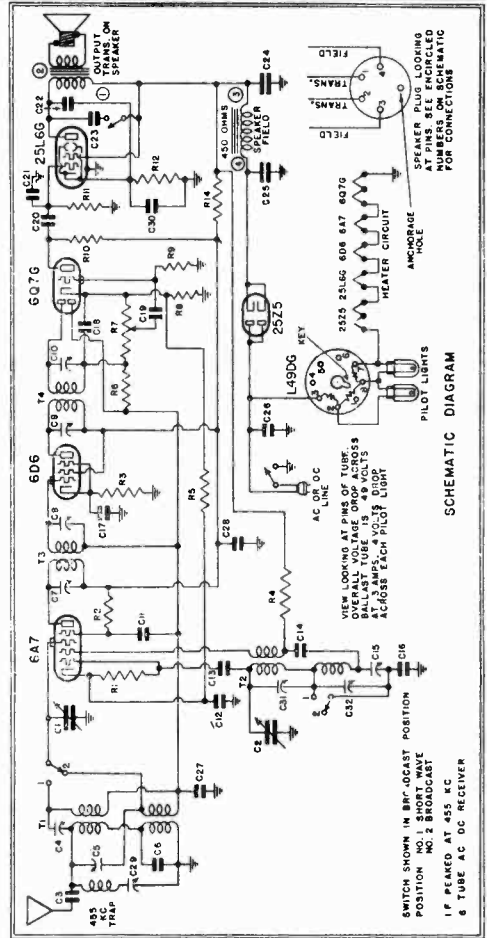
MODELS AH-166, AH-171, AH-173, AH-174, AH-176, AH-179, AH-180 and AH-185
 CHASSIS MODEL AH
 Voltage rating 105-125 volts
 Power consumption 50 watts for receiver, 20 watts for phonograph motor.
 Frequency ranges 540 to 1,730 kc, and 2.2 to 7 megacycles.

A.C. Radio-Phonograph Combination
 MODEL AH-166 (See Note No. 6)
 CHASSIS MODEL AH
 MODELS BG-138, BG-140, BG-146, BG-178, BG-182, and BG-183
 (Seven Tubes, Including Ballast Tube)
 CHASSIS MODEL BG

VOLTAGE ANALYSIS
 Voltage drop across pilot light section (pins 7, 8)—4 volts.
 *AH receivers bearing serial numbers below 1,711,701
 Cathode 6D6—3.3 volts. Cathode 6Q7G—1 volt.



SCHEMATIC DIAGRAM No. 1 for AH RECEIVERS ABOVE SERIAL No. 1,711,701



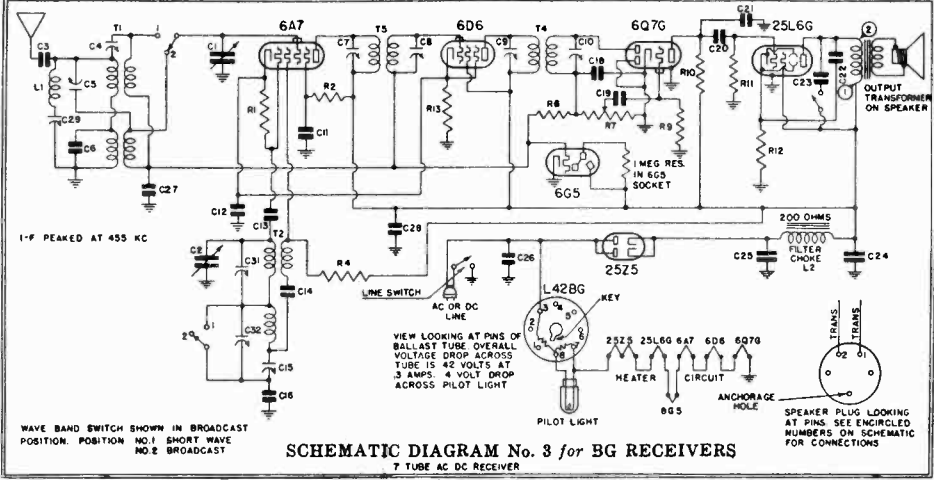
SCHEMATIC DIAGRAM No. 2 for AH RECEIVERS BELOW SERIAL No. 1,711,701

MODEL AH					MODEL BG and AH-166				
Tube	Plate	Screen	Osc. Plate	Cathode	Plate	Screen	Osc. Plate	Cathode	Heaters All Models
6A7	103	60	85	2.2	115	65	95	2.4	6.3
6D6	103	103	—	*2.2	115	115	—	2.4	6.3
6Q7G	40	—	—	*0	45	—	—	0	6.3
25L6G	90	103	—	6.5	108	115	—	7	25.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Voltage at 25Z5 cathode—130 volts.
 Voltage across field—27 volts.
 Voltage drop across ballast tube (pins 3, 7)—49 volts.

Voltage at 25Z5 cathode—126 volts.
 Voltage across filter choke—11 volts.
 Voltage drop across ballast tube (pins 3, 7)—42 volts.



SCHEMATIC DIAGRAM No. 3 for BG RECEIVERS

Part No. BG
Schematic Diagram
Nos. 1 and 2

Part No. AH
Schematic Diagram
Nos. 1 and 2

Part No. BG
Schematic Diagram
Nos. 1 and 2

*Item

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.

2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.

3. The filament dropping resistor is in a special tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.

4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.

5. The wave-trap in the receiver has been adjusted for maximum signal rejection at 405 kc. If, however, persistent interference is experienced, the frequency of the wave-trap trimmer should be readjusted to the antenna response from the interfering station is at a minimum.

6. The motor used in this combination is of the a.c. self-starting type and will operate on ALTERNATING CURRENT ONLY. To avoid damaging the motor the combination should never be used on direct current.

PRODUCTION CHANGES

1. In AH receivers bearing serial numbers below 1102142, C11 was .01 mf, 400 volt condenser.

2. In AH receivers bearing serial numbers below 1149148, C22 was connected from plate to B plus.

3. AH receivers bearing serial numbers below 1711701 differ from parts list as follows:

DESCRIPTION

Item	Was Part No.	DESCRIPTION
(a)	T3	First i-f transformer 455 kc
(b)	T7	5 megohm volume control with line switch
(c)	3R-284	1 megohm 1/2 watt carbon resistor
(d)	3R-285	2 megohm 1/2 watt carbon resistor
(e)	HR-42	Ballast tube (for 2 dial lights)
(f)	L49-DG	Two-gang variable condenser
(g)	C1, C2	0.002 mf, 600 volt tubular condenser
(h)	C11	0.00015 mf mica condenser
(i)	C12	0.002 mf, 200 volt tubular condenser
(j)	AC-5	0.00025 mf mica condenser
(k)	FC-29	0.03 mf, 400 volt tubular condenser
(l)	AC-7A	0.002 mf, 200 volt tubular condenser
(m)	C23	0.03 mf, 400 volt tubular condenser
(n)	EC-23	0.002 mf, 600 volt tubular condenser
(o)	BC-12	Dial light, 6.3 volt, .25 amp. Mazda No. 46 (Screw type base.)
(p)	XL-9	Dial pointer switch circuit used on AH-166 is shown in the small panel at the left side of Schematic Diagram No. 1.
(q)	3S2-486	Dial pointer switch lug marked A goes to the screen grid of the 6A7 tube. Switch lug marked B goes to the volume control and lug marked C goes to the junction of R6 and the black lead from the diode i-f transformer.

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600 and 6,000 kc should be used.

If the meter is not at all disturbed, the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be tightening or moving the trimmer in the direction of the trimmer.

Always use as weak a test signal as possible during alignment.

Use a standard dummy antenna for aligning either of the bands. A .0002 mf condenser may be used for the broadcast band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coil for the broadcast and short-wave bands is wound on one form and the antenna trimmer is wound on another form. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 455 kc wave-trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

i-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and tune to 485 kc through a .02 mf paper condenser to the grid tap of the antenna coil. Adjust the standard dummy antenna and adjust the wave-trap trimmer for minimum response. (See General Note No. 5.)

Short-Wave Alignment

Rotate the wave-band switch to the short-wave, (counter-clockwise) position, and set the dial pointer exactly at 6 megacycles (6,000 kc) to the antenna and adjust the short-wave oscillator trimmer for the minimum response, then adjust the antenna trimmer for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

Rotate the wave-band switch to the broadcast position (clockwise) and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna. Adjust the broadcast antenna padding condenser for maximum response. (See General Note No. 6.)

Adjust the broadcast antenna trimmer for minimum response and the broadcast antenna trimmer for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

Part No. AH
Schematic Diagram
Nos. 1 and 2

Part No. BG
Schematic Diagram
Nos. 1 and 2

Part No. BG
Schematic Diagram
Nos. 1 and 2

*Item

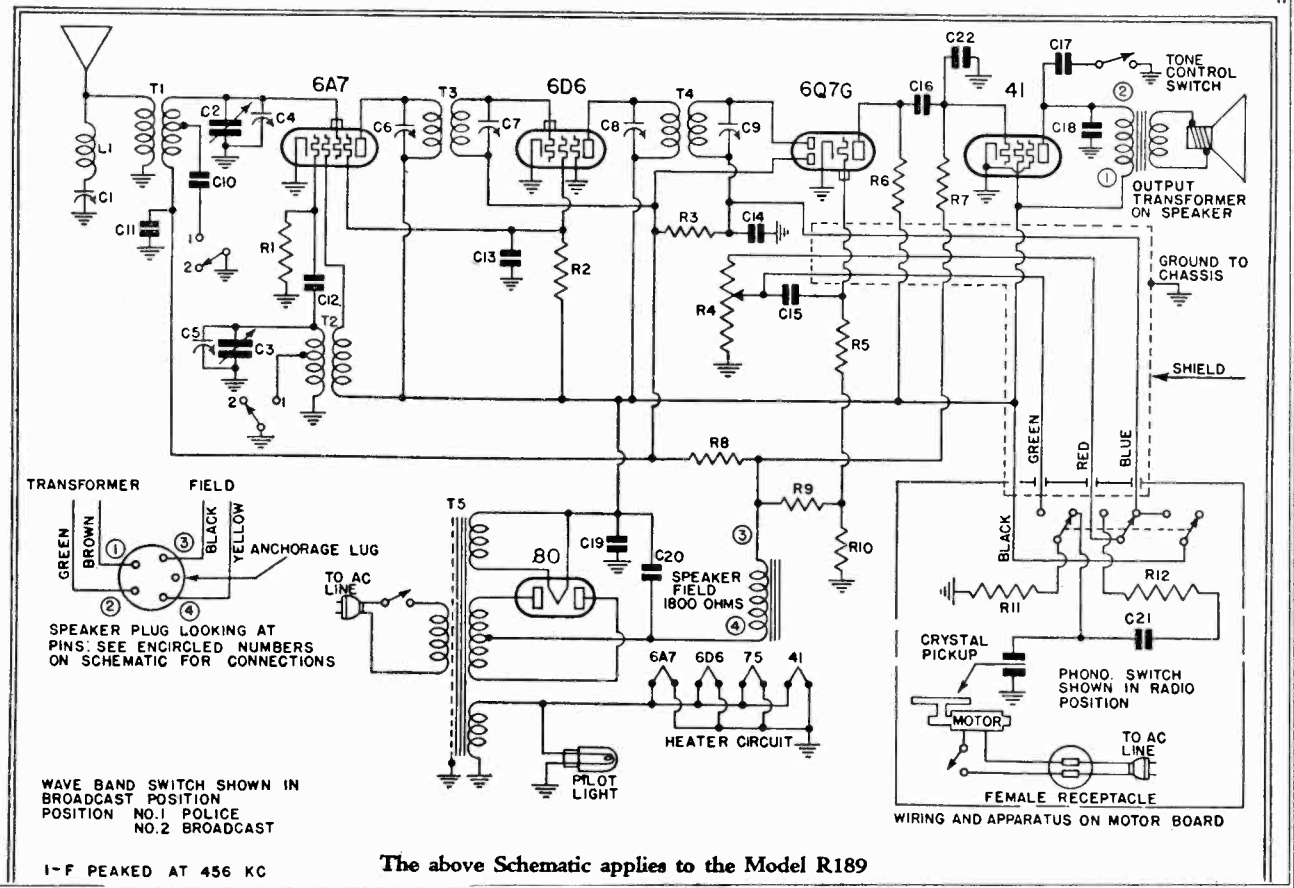
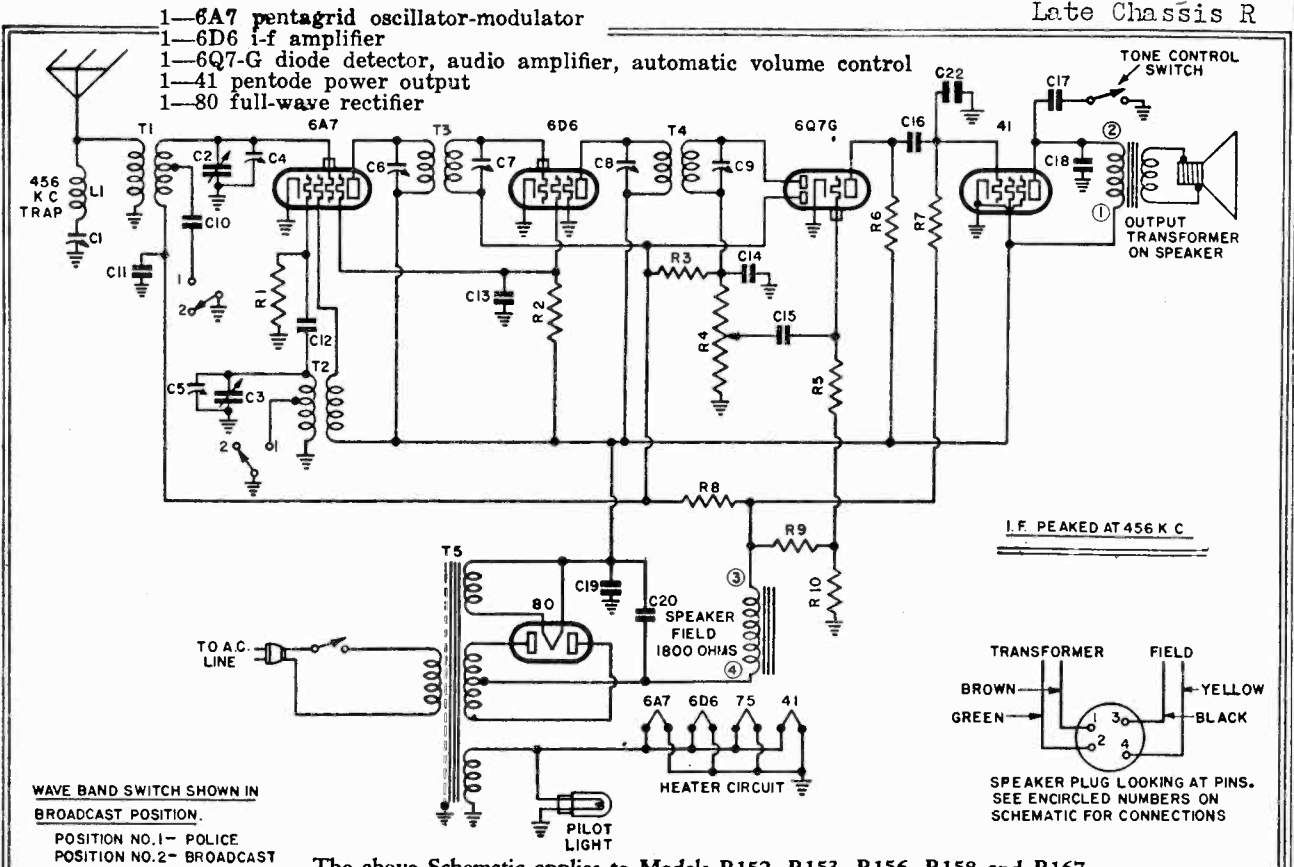
Part No.	Description	Price
4HT-360	Two-band antenna coil with 455 kc wave-trap	\$1.65
4HT-361	Double-tuned 455 kc second i-f transformer	1.06
4HT-362	100,000 ohm 1/2 watt carbon resistor (see prod. ch. No. 3a)	1.20
4HT-363A	100,000 ohm 1/2 watt carbon resistor	1.16
4HT-364	100,000 ohm 1/2 watt carbon resistor	1.16
ZR-196	30,000 ohm 1/2 watt carbon resistor	.16
LR-65	40,000 ohm 1/2 watt wire-wound resistor	.16
LR-66	10,000 ohm 1/2 watt carbon resistor	.16
KR-87	310 ohm 1/2 watt wire-wound resistor (see production change No. 3d)	.16
KR-88	1 megohm 1/2 watt carbon resistor (see production change No. 3e)	.16
KR-89	5 megohm 1/2 watt carbon resistor with line sw. (see prod. ch. No. 3b)	.16
3PR-258	Volume control, 250,000 ohms	.75
3R-284	240 ohm 1/2 watt wire-wound resistor	.16
3R-285	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-286	250,000 ohm 1/2 watt carbon resistor	.16
3R-287	500,000 ohm 1/2 watt carbon resistor	.16
3R-288	500,000 ohm 1/2 watt carbon resistor	.16
3R-289	500,000 ohm 1/2 watt carbon resistor	.16
3R-290	Ballast tube (see production change No. 3e)	.55
3R-291	Two-gang variable condenser (see production change No. 3f)	4.00
3R-292	Two-gang variable condenser (see production change No. 3f)	3.50
3R-293	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-294	1 megohm 1/2 watt carbon resistor	.16
3R-295	5 megohm 1/2 watt carbon resistor	.16
3R-296	240 ohm 1/2 watt wire-wound resistor	.16
3R-297	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-298	250,000 ohm 1/2 watt carbon resistor	.16
3R-299	500,000 ohm 1/2 watt carbon resistor	.16
3R-300	500,000 ohm 1/2 watt carbon resistor	.16
3R-301	Ballast tube (see production change No. 3e)	.55
3R-302	Two-gang variable condenser (see production change No. 3f)	4.00
3R-303	Two-gang variable condenser (see production change No. 3f)	3.50
3R-304	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-305	1 megohm 1/2 watt carbon resistor	.16
3R-306	5 megohm 1/2 watt carbon resistor	.16
3R-307	240 ohm 1/2 watt wire-wound resistor	.16
3R-308	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-309	250,000 ohm 1/2 watt carbon resistor	.16
3R-310	500,000 ohm 1/2 watt carbon resistor	.16
3R-311	500,000 ohm 1/2 watt carbon resistor	.16
3R-312	Ballast tube (see production change No. 3e)	.55
3R-313	Two-gang variable condenser (see production change No. 3f)	4.00
3R-314	Two-gang variable condenser (see production change No. 3f)	3.50
3R-315	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-316	1 megohm 1/2 watt carbon resistor	.16
3R-317	5 megohm 1/2 watt carbon resistor	.16
3R-318	240 ohm 1/2 watt wire-wound resistor	.16
3R-319	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-320	250,000 ohm 1/2 watt carbon resistor	.16
3R-321	500,000 ohm 1/2 watt carbon resistor	.16
3R-322	500,000 ohm 1/2 watt carbon resistor	.16
3R-323	Ballast tube (see production change No. 3e)	.55
3R-324	Two-gang variable condenser (see production change No. 3f)	4.00
3R-325	Two-gang variable condenser (see production change No. 3f)	3.50
3R-326	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-327	1 megohm 1/2 watt carbon resistor	.16
3R-328	5 megohm 1/2 watt carbon resistor	.16
3R-329	240 ohm 1/2 watt wire-wound resistor	.16
3R-330	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-331	250,000 ohm 1/2 watt carbon resistor	.16
3R-332	500,000 ohm 1/2 watt carbon resistor	.16
3R-333	500,000 ohm 1/2 watt carbon resistor	.16
3R-334	Ballast tube (see production change No. 3e)	.55
3R-335	Two-gang variable condenser (see production change No. 3f)	4.00
3R-336	Two-gang variable condenser (see production change No. 3f)	3.50
3R-337	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-338	1 megohm 1/2 watt carbon resistor	.16
3R-339	5 megohm 1/2 watt carbon resistor	.16
3R-340	240 ohm 1/2 watt wire-wound resistor	.16
3R-341	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-342	250,000 ohm 1/2 watt carbon resistor	.16
3R-343	500,000 ohm 1/2 watt carbon resistor	.16
3R-344	500,000 ohm 1/2 watt carbon resistor	.16
3R-345	Ballast tube (see production change No. 3e)	.55
3R-346	Two-gang variable condenser (see production change No. 3f)	4.00
3R-347	Two-gang variable condenser (see production change No. 3f)	3.50
3R-348	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-349	1 megohm 1/2 watt carbon resistor	.16
3R-350	5 megohm 1/2 watt carbon resistor	.16
3R-351	240 ohm 1/2 watt wire-wound resistor	.16
3R-352	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-353	250,000 ohm 1/2 watt carbon resistor	.16
3R-354	500,000 ohm 1/2 watt carbon resistor	.16
3R-355	500,000 ohm 1/2 watt carbon resistor	.16
3R-356	Ballast tube (see production change No. 3e)	.55
3R-357	Two-gang variable condenser (see production change No. 3f)	4.00
3R-358	Two-gang variable condenser (see production change No. 3f)	3.50
3R-359	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-360	1 megohm 1/2 watt carbon resistor	.16
3R-361	5 megohm 1/2 watt carbon resistor	.16
3R-362	240 ohm 1/2 watt wire-wound resistor	.16
3R-363	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-364	250,000 ohm 1/2 watt carbon resistor	.16
3R-365	500,000 ohm 1/2 watt carbon resistor	.16
3R-366	500,000 ohm 1/2 watt carbon resistor	.16
3R-367	Ballast tube (see production change No. 3e)	.55
3R-368	Two-gang variable condenser (see production change No. 3f)	4.00
3R-369	Two-gang variable condenser (see production change No. 3f)	3.50
3R-370	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-371	1 megohm 1/2 watt carbon resistor	.16
3R-372	5 megohm 1/2 watt carbon resistor	.16
3R-373	240 ohm 1/2 watt wire-wound resistor	.16
3R-374	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-375	250,000 ohm 1/2 watt carbon resistor	.16
3R-376	500,000 ohm 1/2 watt carbon resistor	.16
3R-377	500,000 ohm 1/2 watt carbon resistor	.16
3R-378	Ballast tube (see production change No. 3e)	.55
3R-379	Two-gang variable condenser (see production change No. 3f)	4.00
3R-380	Two-gang variable condenser (see production change No. 3f)	3.50
3R-381	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-382	1 megohm 1/2 watt carbon resistor	.16
3R-383	5 megohm 1/2 watt carbon resistor	.16
3R-384	240 ohm 1/2 watt wire-wound resistor	.16
3R-385	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-386	250,000 ohm 1/2 watt carbon resistor	.16
3R-387	500,000 ohm 1/2 watt carbon resistor	.16
3R-388	500,000 ohm 1/2 watt carbon resistor	.16
3R-389	Ballast tube (see production change No. 3e)	.55
3R-390	Two-gang variable condenser (see production change No. 3f)	4.00
3R-391	Two-gang variable condenser (see production change No. 3f)	3.50
3R-392	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-393	1 megohm 1/2 watt carbon resistor	.16
3R-394	5 megohm 1/2 watt carbon resistor	.16
3R-395	240 ohm 1/2 watt wire-wound resistor	.16
3R-396	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-397	250,000 ohm 1/2 watt carbon resistor	.16
3R-398	500,000 ohm 1/2 watt carbon resistor	.16
3R-399	500,000 ohm 1/2 watt carbon resistor	.16
3R-400	Ballast tube (see production change No. 3e)	.55
3R-401	Two-gang variable condenser (see production change No. 3f)	4.00
3R-402	Two-gang variable condenser (see production change No. 3f)	3.50
3R-403	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-404	1 megohm 1/2 watt carbon resistor	.16
3R-405	5 megohm 1/2 watt carbon resistor	.16
3R-406	240 ohm 1/2 watt wire-wound resistor	.16
3R-407	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-408	250,000 ohm 1/2 watt carbon resistor	.16
3R-409	500,000 ohm 1/2 watt carbon resistor	.16
3R-410	500,000 ohm 1/2 watt carbon resistor	.16
3R-411	Ballast tube (see production change No. 3e)	.55
3R-412	Two-gang variable condenser (see production change No. 3f)	4.00
3R-413	Two-gang variable condenser (see production change No. 3f)	3.50
3R-414	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-415	1 megohm 1/2 watt carbon resistor	.16
3R-416	5 megohm 1/2 watt carbon resistor	.16
3R-417	240 ohm 1/2 watt wire-wound resistor	.16
3R-418	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-419	250,000 ohm 1/2 watt carbon resistor	.16
3R-420	500,000 ohm 1/2 watt carbon resistor	.16
3R-421	500,000 ohm 1/2 watt carbon resistor	.16
3R-422	Ballast tube (see production change No. 3e)	.55
3R-423	Two-gang variable condenser (see production change No. 3f)	4.00
3R-424	Two-gang variable condenser (see production change No. 3f)	3.50
3R-425	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-426	1 megohm 1/2 watt carbon resistor	.16
3R-427	5 megohm 1/2 watt carbon resistor	.16
3R-428	240 ohm 1/2 watt wire-wound resistor	.16
3R-429	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-430	250,000 ohm 1/2 watt carbon resistor	.16
3R-431	500,000 ohm 1/2 watt carbon resistor	.16
3R-432	500,000 ohm 1/2 watt carbon resistor	.16
3R-433	Ballast tube (see production change No. 3e)	.55
3R-434	Two-gang variable condenser (see production change No. 3f)	4.00
3R-435	Two-gang variable condenser (see production change No. 3f)	3.50
3R-436	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-437	1 megohm 1/2 watt carbon resistor	.16
3R-438	5 megohm 1/2 watt carbon resistor	.16
3R-439	240 ohm 1/2 watt wire-wound resistor	.16
3R-440	15 megohm 1/2 watt carbon resistor (see prod. ch. No. 3c)	.16
3R-441	250,000 ohm 1/2 watt carbon resistor	.16
3R-442	500,000 ohm 1/2 watt carbon resistor	.16
3R-443	500,000 ohm 1/2 watt carbon resistor	.16
3R-444	Ballast tube (see production change No. 3e)	.55
3R-445	Two-gang variable condenser (see production change No. 3f)	4.00
3R-446	Two-gang variable condenser (see production change No. 3f)	3.50
3R-447	0.002 mf, 600 volt tubular condenser (see prod. ch. No. 3k)	.20
3R-448	1 megohm 1/2 watt carbon resistor	.16
3R-449	5 megohm 1/2 watt carbon resistor	.16
3R-450	240 ohm 1/2 watt wire-wound resistor	.16

MODELS R167, R189
Schematics

EMERSON RADIO & PHONO. CORP.

MODELS R152, R153
R156, R158

Late Chassis R



MODELS R152, R153, R156, R153
R167, R189

EMERSON RADIO & PHONO. CORP.

Late Chassis R
Changes, Alignment, Voltage
Parts

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,364,351:
a. The pilot light was the screw type, part no. XL-9.
b. The pilot light socket was part no. 3RB-38.
IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,405,542:
a. C22 was not in the circuit.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the 6AT tube. The trimmers for the two i-f transformers are available through holes in the tops of the cans. The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.
The 456 kc wave-trap is mounted on the rear chassis wall directly beneath the wave-band switch. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

i-f and Wave-trap Alignment

Rotate the wave-band switch (located on the rear wall of the chassis) to the broadcast position, clockwise, and swing the wave-trap trimmer clockwise to the 456 kc position. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for maximum response. (See General Notes, para-graph No. 1.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

GENERAL NOTES

- The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
- The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
- The pilot light may be replaced by removing the snap-on socket from the dial and then removing the bulb. It is not necessary to remove either the dial or chassis from the cabinet.
- The color coding of the leads of the i-f transformers, is as follows:
Grid—green
B plus—blue
B minus—black
Plate—blue
Plate—blue
Plate—blue
A.v.c. and cathode—white or yellow
Grid—green
Filament and ground—black
Screen—brown
- With a few exceptions the motor coding of the general wiring is as follows:
B plus—red
Plate—blue
Plate—blue
Screen—brown
Filament and ground—black
- The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed of the motor, part No. 3LPM-3, remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation will increase the speed and a counter-clockwise rotation will decrease it. The speed should be checked with the pick-up and record in playing position.
- The color coding of the power transformer leads is as follows:
Primary—two black leads
High voltage sec.—two red leads
5 v. sec.—two heavy green leads
High voltage sec. center tap—yellow and red

Tube Data

Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	70	0	182	6.3
6D6	70	0	—	6.3
6Q7-G	67	—	—	6.3
41	182	0	—	—

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—262.

The tube complement is as follows:

VOLTAGE ANALYSIS

Readings should be taken on the 250 volt scale of a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	PRICE
L1	MMT-149A	456 kc wave-trap	\$.80
L2	3RT-385A	Wave-band switch, coil	.80
L3	3RT-385A	Wave-band switch, coil	.80
L4	3RT-321A	456 kc i-f transformer	1.10
L5	3RT-322	Power transformer	3.20
L6	3RT-322	Power transformer	3.20
L7	3RT-322	Power transformer	3.20
L8	3RT-322	Power transformer	3.20
L9	3RT-322	Power transformer	3.20
L10	3RT-322	Power transformer	3.20
L11	3RT-322	Power transformer	3.20
L12	3RT-322	Power transformer	3.20
L13	3RT-322	Power transformer	3.20
L14	3RT-322	Power transformer	3.20
L15	3RT-322	Power transformer	3.20
L16	3RT-322	Power transformer	3.20
L17	3RT-322	Power transformer	3.20
L18	3RT-322	Power transformer	3.20
L19	3RT-322	Power transformer	3.20
L20	3RT-322	Power transformer	3.20
L21	3RT-322	Power transformer	3.20
L22	3RT-322	Power transformer	3.20
L23	3RT-322	Power transformer	3.20
L24	3RT-322	Power transformer	3.20
L25	3RT-322	Power transformer	3.20
L26	3RT-322	Power transformer	3.20
L27	3RT-322	Power transformer	3.20
L28	3RT-322	Power transformer	3.20
L29	3RT-322	Power transformer	3.20
L30	3RT-322	Power transformer	3.20
L31	3RT-322	Power transformer	3.20
L32	3RT-322	Power transformer	3.20
L33	3RT-322	Power transformer	3.20
L34	3RT-322	Power transformer	3.20
L35	3RT-322	Power transformer	3.20
L36	3RT-322	Power transformer	3.20
L37	3RT-322	Power transformer	3.20
L38	3RT-322	Power transformer	3.20
L39	3RT-322	Power transformer	3.20
L40	3RT-322	Power transformer	3.20
L41	3RT-322	Power transformer	3.20
L42	3RT-322	Power transformer	3.20
L43	3RT-322	Power transformer	3.20
L44	3RT-322	Power transformer	3.20
L45	3RT-322	Power transformer	3.20
L46	3RT-322	Power transformer	3.20
L47	3RT-322	Power transformer	3.20
L48	3RT-322	Power transformer	3.20
L49	3RT-322	Power transformer	3.20
L50	3RT-322	Power transformer	3.20
L51	3RT-322	Power transformer	3.20
L52	3RT-322	Power transformer	3.20
L53	3RT-322	Power transformer	3.20
L54	3RT-322	Power transformer	3.20
L55	3RT-322	Power transformer	3.20
L56	3RT-322	Power transformer	3.20
L57	3RT-322	Power transformer	3.20
L58	3RT-322	Power transformer	3.20
L59	3RT-322	Power transformer	3.20
L60	3RT-322	Power transformer	3.20
L61	3RT-322	Power transformer	3.20
L62	3RT-322	Power transformer	3.20
L63	3RT-322	Power transformer	3.20
L64	3RT-322	Power transformer	3.20
L65	3RT-322	Power transformer	3.20
L66	3RT-322	Power transformer	3.20
L67	3RT-322	Power transformer	3.20
L68	3RT-322	Power transformer	3.20
L69	3RT-322	Power transformer	3.20
L70	3RT-322	Power transformer	3.20
L71	3RT-322	Power transformer	3.20
L72	3RT-322	Power transformer	3.20
L73	3RT-322	Power transformer	3.20
L74	3RT-322	Power transformer	3.20
L75	3RT-322	Power transformer	3.20
L76	3RT-322	Power transformer	3.20
L77	3RT-322	Power transformer	3.20
L78	3RT-322	Power transformer	3.20
L79	3RT-322	Power transformer	3.20
L80	3RT-322	Power transformer	3.20
L81	3RT-322	Power transformer	3.20
L82	3RT-322	Power transformer	3.20
L83	3RT-322	Power transformer	3.20
L84	3RT-322	Power transformer	3.20
L85	3RT-322	Power transformer	3.20
L86	3RT-322	Power transformer	3.20
L87	3RT-322	Power transformer	3.20
L88	3RT-322	Power transformer	3.20
L89	3RT-322	Power transformer	3.20
L90	3RT-322	Power transformer	3.20
L91	3RT-322	Power transformer	3.20
L92	3RT-322	Power transformer	3.20
L93	3RT-322	Power transformer	3.20
L94	3RT-322	Power transformer	3.20
L95	3RT-322	Power transformer	3.20
L96	3RT-322	Power transformer	3.20
L97	3RT-322	Power transformer	3.20
L98	3RT-322	Power transformer	3.20
L99	3RT-322	Power transformer	3.20
L100	3RT-322	Power transformer	3.20

PHONOGRAPH PARTS

R11	OR-73	25,000 ohm 1/4 watt carbon resistor
R12	L1R-154	75,000 ohm 1/4 watt carbon resistor
C21	11C-58	.002 mf mica condenser
	11C-59	.01 mf mica condenser
	3LS-201	8 1/2 volt a.c. phonograph motor
	3LS-202	8 1/2 volt a.c. phonograph motor
	3LS-211A	Phono-radio switch
	3RS-202	On-off switch for motor
	3ZZ-564	Crystal pick-up

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†See production changes.
‡These trimmers are parts of assemblies and cannot be supplied separately.

PRODUCTION CHANGES

In early receivers the oscillator coil was part number 3RT-319. When replacing this coil with the new coil part number 3RT-319A, it will be necessary to remove the short length of shielding over the white lead (lead from wave-band switch to tap on coil).

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,019,000:

- a. R3 was a 3 megohm 1/4 watt carbon resistor, part no. NNR-220U.
- b. The first i-f tube was a type 78.
- c. The second i-f transformer was part no. 3RT-321.

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,043,350:

- a. The first i-f tube was a type 78.
- b. The second i-f transformer was part no. 3RT-321.

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,180,983:

- a. The pointer pulley was part no. 3RT-479.
- b. The dial pointer was part no. 3FZ-353.

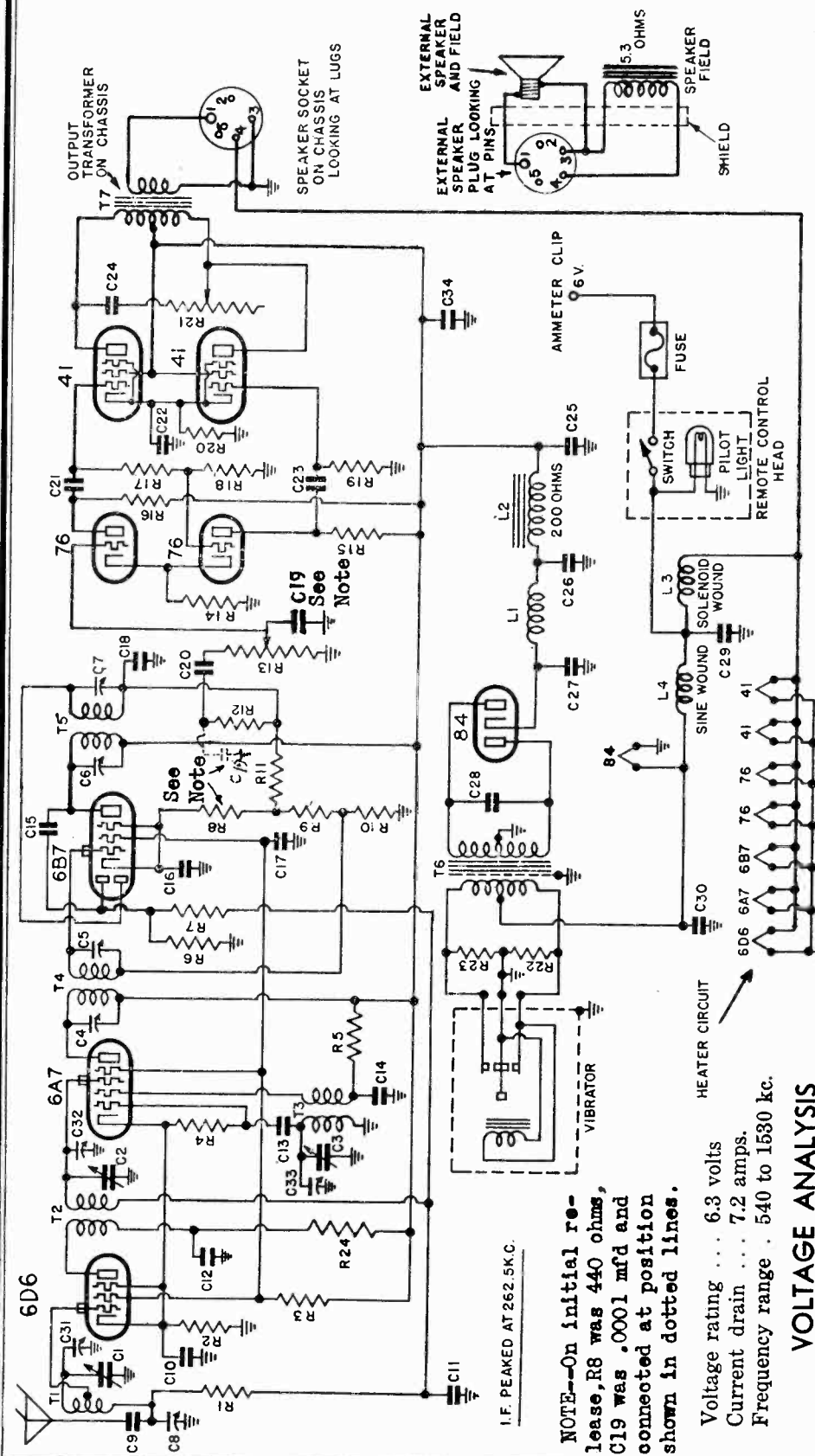
IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,284,001:

- a. The antenna coil was part no. 3RT-318.

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 1,311,103:

- a. R5 type 15 tube was used in place of the 607-G.
- b. R8 was a 310 ohm resistor, part no. 3RR-276.
- c. R9 was a 23 ohm resistor, part no. 3RR-266.

EMERSON RADIO & PHONO. CORP. MODEL V155 Early
 Chassis V. Below Ser. 951850
 Schematic, Voltage
 Notes



NOTE--On initial re-lease, R8 was 440 ohms, C19 was .0001 mfd and connected at position shown in dotted lines.

Voltage rating . . . 6.3 volts
 Current drain . . . 7.2 amps.
 Frequency range . 540 to 1530 kc.

VOLTAGE ANALYSIS

All voltages should be measured with a 1000 ohms-per-volt meter. Voltages measured from the point indicated to ground (chassis) with no signal and volume control turned on full. Readings taken with battery voltage of 6.0 volts.

Tube	Plate	Screen	Cathode	Osc. Plate
6D6	208	80	4	—
6A7	212	80	4	130
6B7	212	80	7	—
76	130	—	8.7	—
76	130	—	8.7	—
41	210	212	17	—
41	210	212	17	—

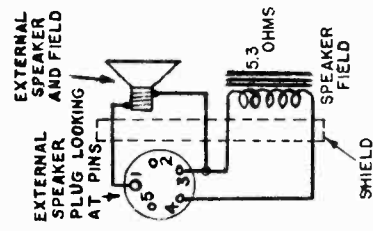
B plus from 84 cathode to chassis—226
 Voltage across heaters—6.0

Voltage across filter choke L2—10.4
 Voltage across speaker field—6.0

Antenna Adjustment
 To adjust antenna circuit of this receiver to the car antenna, tune the receiver to a signal in the vicinity of 600 KC. Adjust the antenna padder condenser until the signal is received at maximum volume. Keep the volume control turned down as low as possible while making the adjustment.

OUTPUT TRANSFORMER ON CHASSIS T7

SPEAKER SOCKET ON CHASSIS LOOKING AT LUGS



MODEL V155 Early
Chassis V
Alignment, Changes
Notes, Parts

EMERSON RADIO & PHONO. CORP.

has wooden floor boards, place a screen underneath floor mat and note if interference is decreased, particularly with passengers in car.
Check antenna wiring, making sure it is shielded completely.
Try bonding windshield wiper pipe.
Check ignition system for defects.
When condensers are used for by-passing ignition interference, their leads should be as short as possible, since often a condenser with leads a fraction of an inch long will be very effective in places where the same condenser with longer leads would be useless.

NOTE: It is recommended that the charging rate of the car generator be increased slightly to compensate for the added drain of the receiver.

REPLACEMENT PARTS

ITEM	PART NO.	DESCRIPTION
L1	00T-166A	R-f "B" choke
L2	3VT-329	Iron-core filter choke—200 ohms
L3	00T-167	R-f "A" choke—selenoid
L4	3VT-328	R-f "A" choke—sine wound
T1	3VT-323	Antenna coil
T2	3VT-324	R-f interstage coil
T3	3VT-325	Oscillator coil
T4	3VT-326	262.5 kc first i-f transformer
T5	3VT-327	262.5 kc second i-f transformer
R1, R12,	KR-54	100,000 ohm 1/4 watt carbon resistor
R15, R16	3VR-269	440 ohm 1/2 watt wire-wound resistor
R2	AR-7	30,000 ohm 1 watt carbon resistor
R3	3VR-272	20,000 ohm 1/4 watt carbon resistor
R4	DDR-122	1 megohm 1/4 watt carbon resistor
R5	KR-56	1,100 ohm 1/4 watt carbon resistor
R6, R7	3VR-270	500,000 ohm 1/4 watt carbon resistors
R8, R9, R8	QAR-180	Volume control—1 megohm
R10	KR-56	5,000 ohm 1/4 watt carbon resistor
R11, R17, R19	3VR-271	50,000 ohm 1/4 watt carbon resistor
R13	KR-53	150 ohm 1 watt wire-wound resistor
R14	3VR-279	Tone control—50,000 ohms
R15	3VR-270	90 ohm 1/2 watt wire-wound resistor
R20	GR-85	2,000 ohm 1/4 watt carbon resistor
R21	3VC-319	3 gang variable condenser
R22, R23	C1, C2, C3	Trimmer, part of first i-f transformer assembly
R24	C4, C5	Trimmer, part of second i-f transformer assembly
C4, C5	3VC-324	Antenna padding condenser. Range—150 to 300 mmf.
C6, C7	FC-29	0.02 mf, 200 volt tubular condenser
C8	BC-12	0.05 mf, 200 volt tubular condenser
C9, C11, C20	KC-58	0.01 mf, 400 volt tubular condenser
C10	AC-7A	0.0025 mf mica condenser
C12, C27, C15, C18, C29, C19	EC-23	Dual 0.1 mf, 200 volt tubular condenser with mounting strap
C13, C14, C15, C16, C17	3VC-320	0.03 mf, 400 volt tubular condenser
C21, C23, C24	EC-23	Three trimmer capacitors in cardboard container
C22, C25, C26	3VC-321	0.1 mf, 400 volt tubular condenser
C31	3VC-322	0.1 mf, 400 volt tubular condenser
C32	3VC-322	0.05 mf, 2,000 volt tubular condenser
C33	3VC-322	0.5 mf, 50 volt tubular condenser with mounting foot
C34, C32, C33	00C-164	Trimmer on variable condenser
C35	00C-165	Special 0.5 mf ammeter condenser
C36	3VS-247	8" dynamic speaker
C37	3VZ-510	Rubber tone control knob
C38	00Z-165	Distributor suppressor
C39	3VY-10	Non-synchronous vibrator
C40	3VZ-540	Tuning control cable
C41	3VZ-541	Volume control cable

* Item number locates the article on the schematic diagram.
† These trimmer condensers are part of the i-f coil assemblies and can not be supplied separately.
‡ These trimmer condensers are part of the variable condenser and can not be supplied separately.

PRODUCTION CHANGES

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 950,300:
(a) C4 was part number 2KC-178 with a range of 200 to 400 mmf.

ALIGNMENT PROCEDURE

The receiver was carefully adjusted and tested at the factory, and should reach the customer in perfect condition. Except for the antenna padding these adjustments should not be disturbed unless it is absolutely necessary, as in the repairing of a damaged set. This should be done by an experienced auto service man only.

I-f Alignment

To align the intermediate frequency transformers, use a good modulated oscillator set for 262.5 kc. Rotate the variable condenser to the minimum capacity position, turn the volume control on full and ground the antenna to the chassis.

Connect the test oscillator lead, through a paper condenser (.02 mf or larger) to the grid cap of the 6A7 tube. Do not remove the grid clip from the tube. Connect the other end of the paper condenser to the primary of the speaker transformer or across the rice coil. Using the speaker output from the test oscillator that will give a definite reading on the meter, adjust the two i-f transformers for maximum response. Use a non-metallic screw driver, if possible.

Radio Frequency and Oscillator Alignment

Connect the test oscillator lead through a standard dummy antenna. (a .0002 mf condenser may be substituted) to the antenna connector of the receiver. Rotate the variable condenser to the minimum capacity position. Feed 1530 kc and adjust the oscillator trimmer (center) on the variable condenser for maximum response. Set the test oscillator to some frequency near 1400 kc and swing the variable until this signal is heard. Adjust the two i-f trimmers (front and rear) for maximum response. The test oscillator should be set to 1400 kc and swing the variable until this signal is heard. Adjust the antenna padding (on chassis) below the variable condenser for maximum response. Reset the test oscillator to some frequency near 1400 kc and readjust the two r-f trimmers for maximum response. Reduce the output of the test oscillator and repeat this adjustment.

NOTE: The antenna padding should be readjusted after the receiver is installed in the car.

Tube Data

The tube complement is as follows:

- 1—6D6 r-f amplifier.
- 1—6AT pentagrid oscillator-modulator.
- 1—5B7 i-f amplifier, diode detector and a.v.c.
- 1—6 audio amplifier (near variable transformer).
- 1—76 phase-inverter (near variable condenser).
- 2—41 phase-inverter (near power output).
- 1—84 full-wave thermionic rectifier.
- 1—Primary type vibrator.

The function of the vibrator is to convert the direct current from the battery into alternating current to operate the power transformer. The stepped-up voltage is then rectified into direct current by the 84 tube for use as plate supply.

GENERAL NOTES

1. Before removing the chassis from the case pull the speaker plug out of its socket. The speaker plug should be replaced before the receiver is turned on.
2. Before removing the chassis from its case, remove the tone control from the case. The large rubber knob is forced over a knurled bushing on the tone control shaft and may be removed by pulling the knob away from the case.
3. It should be noted that one side of the speaker holder is grounded to the speaker frame.
4. A 15 ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, remove the cap, insert the fuse and replace the cap. The fuse is intended to protect the receiver and in no case should one larger than 15 amperes be used.

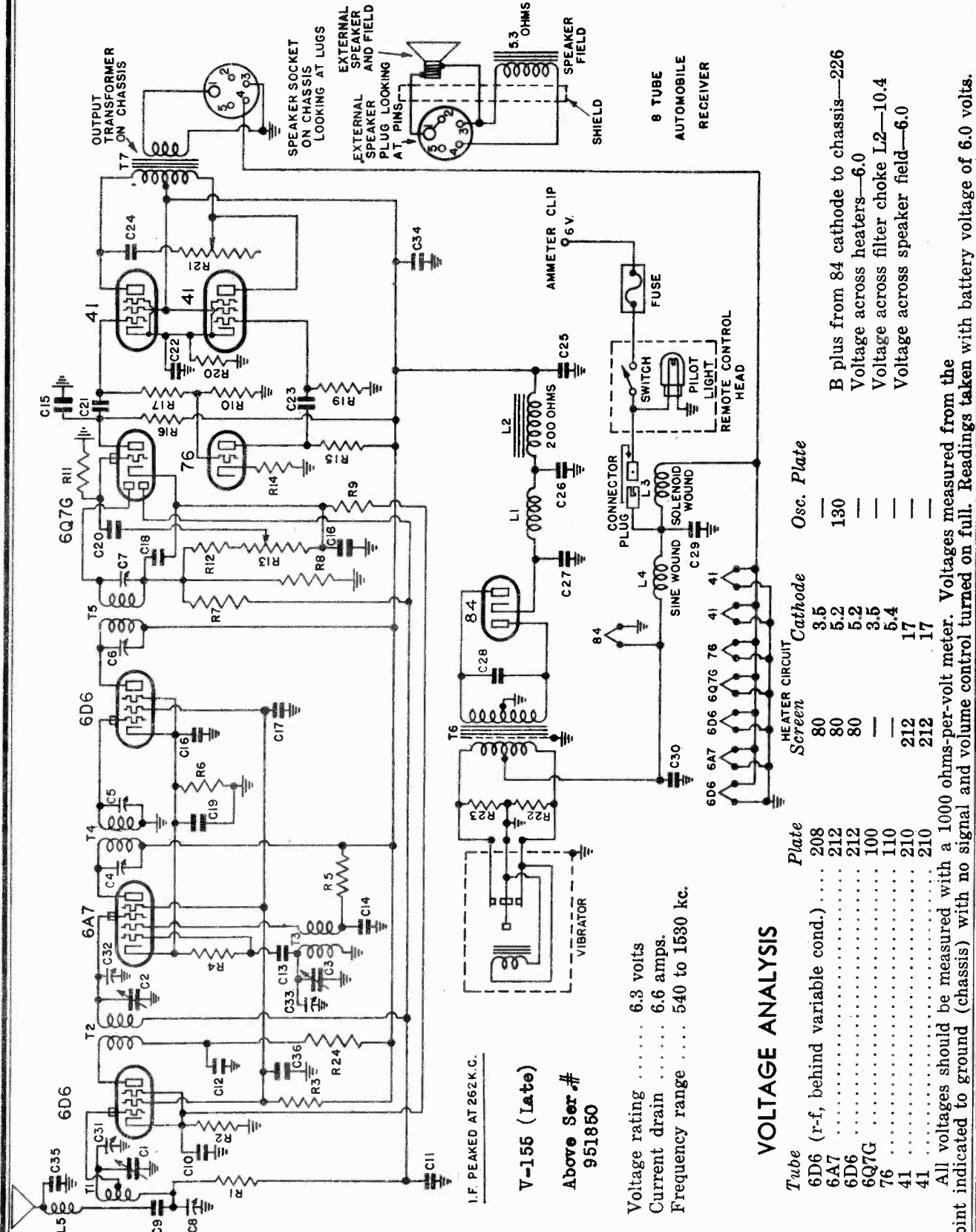
Suppression of Ignition Interference

If, when the receiver is in operation, and the motor is running, the ignition interference is excessive the following suggestions should help to reduce it to a satisfactory level.

- By-pass dome light wire at instrument panel with a 1/2 mf condenser.
- By-pass the low tension lead to the ignition coil with a 1/2 mf condenser.
- Shield high tension lead from coil and ground to fire wall.
- Shield low tension leads to ignition coil.
- Try grounding antenna shield at various points, and also try leaving shield ungrounded, except at point where it is automatically grounded at receiver by means of the metal connector. Move all adjacent wiring slightly, and note if it may be coupling to the battery lead to receiver.
- Bond steering column to fire wall.
- Try bonding exhaust pipe, particularly if interference is increased with passengers in car.
- Bond metal cables or pipes coming through fire wall, connecting them to the fire wall. If car

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 Chassis V. Above Ser. 951850
 Schematic, Voltage

If for any reason during the operation of the receiver the dial goes off calibration, rotate the tuning knob counter-clockwise until the pointer (or dial) reaches the stop at the left-hand end of the control and then rotate the knob clockwise until the stop is reached at the right-hand end of the control. This procedure will automatically recalibrate the dial.



MODEL V155 Late
Chassis V
Alignment, Notes
Parts, Change

EMERSON RADIO & PHONO. CORP.

Try bonding exhaust pipe, particularly if interference is increased with passengers in car. Bond metal cables or pipes coming through fire wall, connecting them to the fire wall. If car has wooden floor boards, place a screen underneath floor mat and note if interference is decreased, particularly with passengers in car.
Check antenna wiring, making sure it is shielded completely.
Try bonding windshield wiper pipe.
Check ignition system for defects.
When condensers are used for by-passing ignition interference, their leads should be as short as possible, since often a condenser with leads a fraction of an inch long will be very effective in places where the same condenser with longer leads would be useless.

NOTE: It is recommended that the charging rate of the car generator be increased slightly to compensate for the added drain of the receiver.

Item	Part No.	DESCRIPTION
L1	OPT-165A	R-f "B" choke
L2	OPT-399	Iron-core filter choke—200 ohms
L3	OPT-167	R-f "A" choke—solenoid
L4	3VT-828	R-f "A" choke—sine wound
L5	3VT-829	Antenna choke
T1	3VT-824	R-f interstage coil
T2	3VT-825	Oscillator coil
T3	3VT-327	262 kc first i-f transformer
T4	3VT-327	262 kc second i-f transformer
T5	3VT-330	Power transformer
T6	3VT-341	Output transformer
T7	R1, R12, R16	100,000 ohm 1/4 watt carbon resistor
T8	R2, R6	510 ohm 1/2 watt wire-wound resistor
R3	4ER-286	30,000 ohm 1 watt carbon resistor
R4	AR-7	60,000 ohm 1/2 watt carbon resistor
R5	DDR-122	20,000 ohm 1/2 watt carbon resistor
R8	KR-57	1 megohm 1/4 watt carbon resistor
R9, R22, R23	KR-56	250,000 ohm 1/4 watt carbon resistor
R10	3VR-270	96 ohm 1/2 watt wire-wound resistor
R11	NVR-204	500 ohm 1/2 watt carbon resistor
R13	3R-267	5,000 ohm 1/4 watt carbon resistor
R14	L1, R154	75,000 ohm 1/4 watt carbon resistor
R15	3VR-271	500,000 ohm 1/4 watt carbon resistor
R17	3VR-271	510 ohm 1 watt wire-wound resistor
R20	GR-85	Tone control—50,000 ohms
R21	3VC-319	3 gang variable condenser
R24	C2, C3	Trimmer, part of first i-f transformer assembly
C1, C5	3VC-342	Antenna padding condenser. Range 75 to 300 mmf
C6, C7	IC-47A	0.00025 mf mica condenser
C8	BC-13	Dial 0.1 mf, 200 volt tubular condenser
C9	FC-29	0.02 mf, 200 volt tubular condenser
C10, C19	KC-58	Three section dry electrolytic condenser in cardboard container
C11	AG-7A	0.005 mf, 2,000 volt tubular condenser
C12, C27	FC-523	Dial 0.1 mf, 200 volt tubular condenser
C13, C14, C16, C17	3VC-320B	0.005 mf, 2,000 volt tubular condenser
C15	3VC-322	0.5 mf, 50 volt tubular condenser
C18, C29	EEC-132	Trimmer on variable condenser
C20, C23, C24	YC-339	0.1 mf, 400 volt tubular condenser
C21, C22, C26	YC-98B	0.00005 mf mica condenser on isolantite base
C25	OC-164	4 mf, 150 volt tubular dry electrolytic condenser
C28	OC-165	Special 0.5 mf ammeter condenser
C30	3VS-247	8 dynamic speaker
C31	3VZ-510	Rubber tone control knob
C32	OOZ-165	Distributor suppressor
C33	3VZ-10	Non-synchronous vibrator
C34	3VZ-540	Tuning control cable
C35	3VZ-541	Volume control cable
C36		

IN RECEIVERS BEARING SERIAL NUMBERS BELOW 456,300:
(a) C8 was part number 2EC-198 with a range of 200 to 400 mmf.
* Item number located in the article on the schematic diagram.
† Trimmer condensers are part of the i-f coil assemblies and can not be supplied separately.
‡ These trimmer condensers are part of the variable condenser and can not be supplied separately.

ALIGNMENT PROCEDURE

The receiver was carefully adjusted and tested at the factory, and should reach the customer in perfect condition. Except for the antenna padder these adjustments should be disturbed unless it is absolutely necessary, as in the repairing of a damaged set. This should be done by an experienced auto service man only.

I-f Alignment

To align the intermediate frequency transformers, use a good modulated oscillator set for 262 kc. Rotate the variable condenser to the minimum capacity position, turn the volume control on full and ground the antenna to the chassis.

Connect the test oscillator lead, through a paper condenser (.02 mf or larger), to the grid cap of the 6A7 tube. Do not remove the grid clip from the tube. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a definite reading on the meter, adjust the two i-f transformers for maximum response. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator Alignment

Connect the test oscillator lead through a standard dummy antenna (a .0002 mf condenser may be substituted) to the antenna connector of the receiver. Rotate the variable condenser to the minimum capacity position. Feed 1500 kc and adjust the oscillator trimmer (center) on the variable condenser for maximum response. Set the test oscillator to some frequency near 1400 kc and swing the variable until this signal is heard. Adjust the two i-f trimmers (front and rear) on the variable condenser for maximum response. Set test oscillator to 600 kc and swing the variable until this signal is heard. Adjust the antenna padder (behind variable condenser) for maximum response. Reset the test oscillator to some frequency near 1400 kc and adjust the two i-f trimmers for maximum response. Reduce the output of the test oscillator and repeat this adjustment.

NOTE: The antenna padder should be readjusted after the receiver is installed in the car.

To adjust the receiver antenna circuit to the car antenna, an adjustable condenser (padder) is provided in the receiver. This antenna padder is located on the cable chuck side of the receiver with its screw adjustment accessible through a hole in the receiver wall.

Turn the receiver on and tune in a station in the vicinity of 600 kc. Adjust the antenna padder until the station is received at maximum volume. Keep the volume control turned down as low as possible, while making this adjustment. In extreme conditions the car antenna capacity may be such that a sharp peak on the antenna padder is not obtainable. In such a case adjust for maximum gain.

Tube Data

- 1—6D6 r-f amplifier (behind variable condenser).
- 2—41 push-pull pentode power output.
- 1—6A7 pentagrid oscillator-modulator.
- 1—6D6 i-f amplifier.
- 1—6Q7G audio amplifier, diode detector, and a.v.c. 1 Primary type vibrator.

GENERAL NOTES

1. Before removing the chassis from the case pull the speaker plug out of its socket. The speaker plug should be replaced before the receiver is turned on.
2. Before removing the chassis from its case, remove the tone control from the case. The large rubber knob is forced over a knurled bushing on the tone control shaft and may be removed by pulling the knob away from the case.
3. It should be noted that one side of the speaker field is grounded to the speaker frame.
4. A 15 ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, remove the cap, insert the fuse and replace the cap. The fuse is intended to protect the receiver and in no case should one larger than 15 amperes be used.

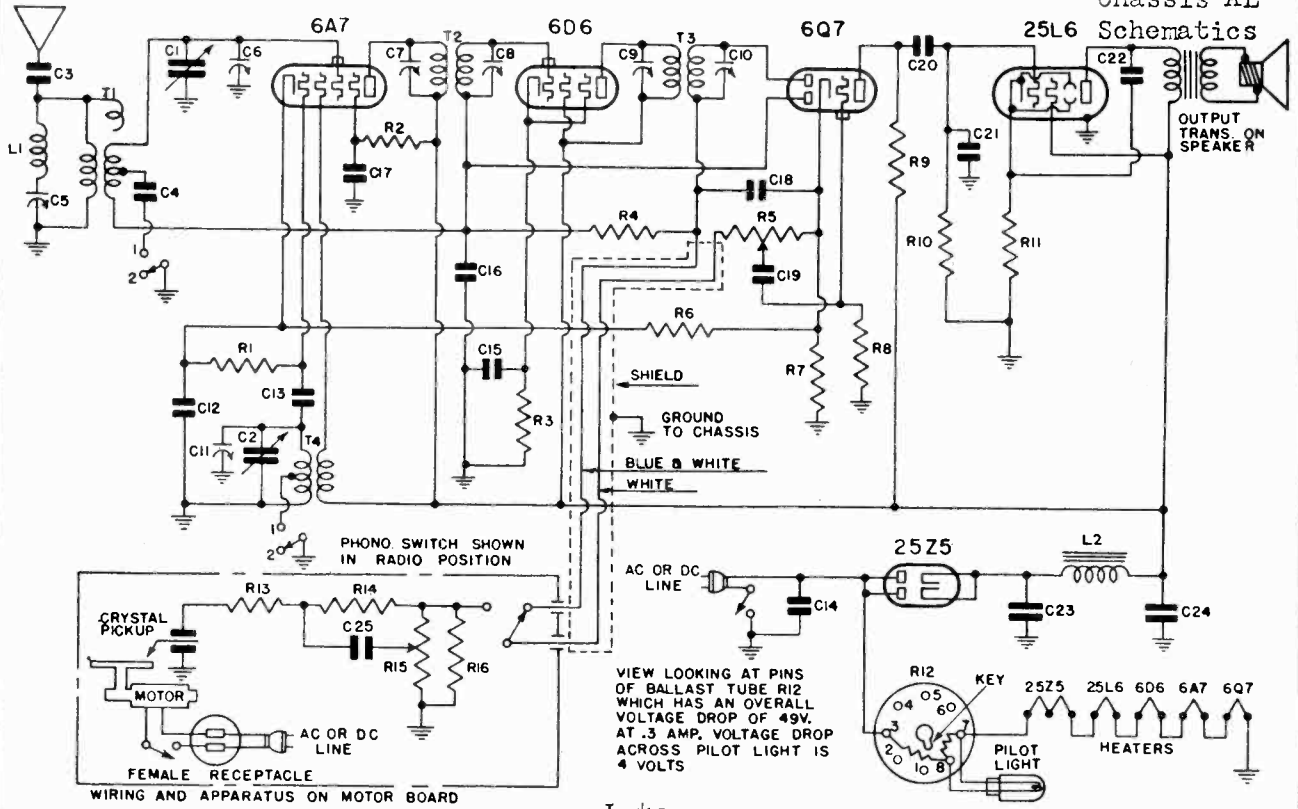
Suppression of Ignition Interference

If, when the receiver is in operation, and the motor is running, the ignition interference is excessive the following suggestions should help to reduce it to a satisfactory level.
(See paragraph (a) on page three).

- Insulate the speaker unit from the firewall, using the fibre washer supplied in the speaker kit.
- By-pass dome light wire at instrument panel with a 1/2 mf condenser to ground.
- By-pass the low tension lead to the ignition coil with a 1/2 mf condenser to ground.
- Shield high tension lead from coil and ground to fire wall.
- Shield low tension leads to ignition coil.
- Try grounding antenna shield at various points, and also try leaving shield ungrounded, except at point where it is automatically grounded at receiver by means of the metal connector. Move all adjacent wiring slightly, and note if it may be coupling to the battery lead to receiver.
- Bond steering column to fire wall.

EMERSON RADIO & PHONO. CORP.

MODEL AL 164
 MODEL AL 202
 Chassis AL
 Schematics

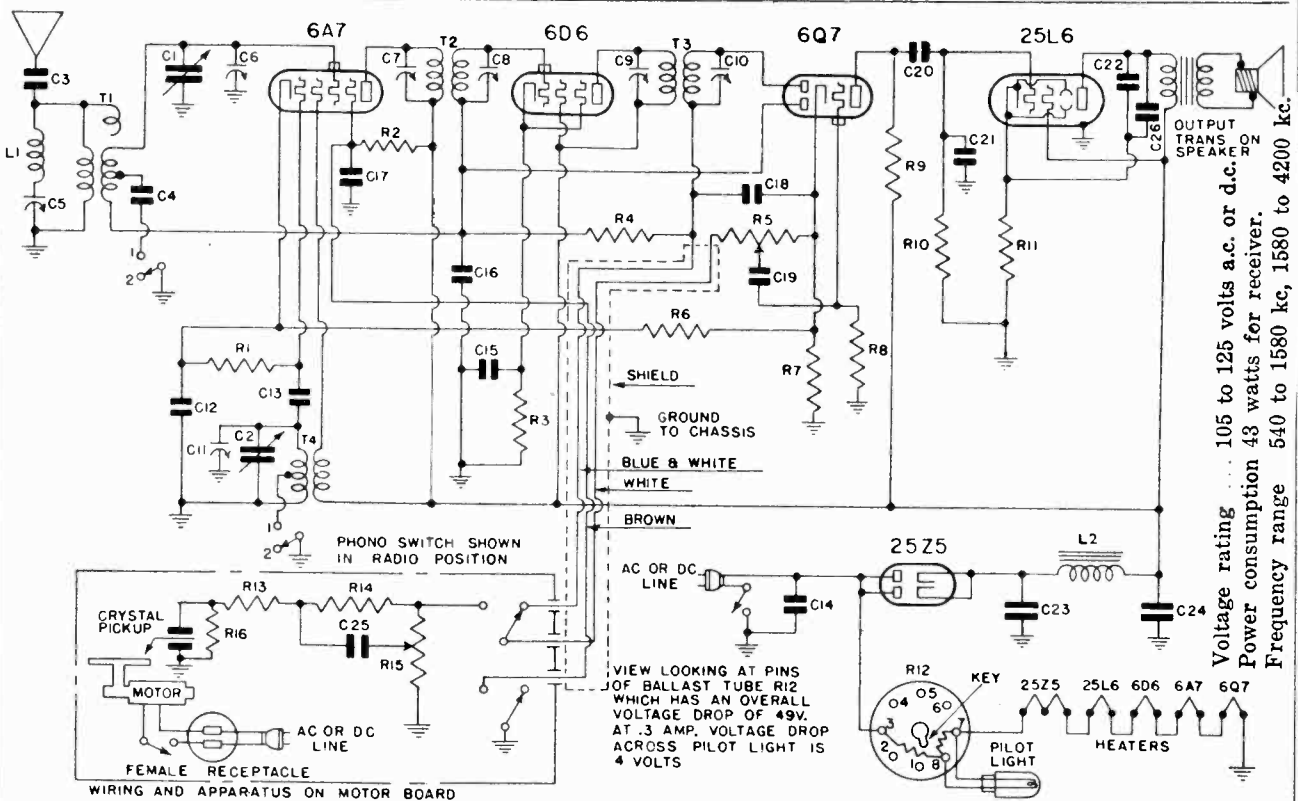


I.F. PEAKED AT 456 KC

6 TUBE AC - DC RECEIVER

MODEL AL-164

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION. POSITION NO. 1 POLICE NO. 2 BROADCAST



I.F. PEAKED AT 456 KC

MODEL AL-202

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION. POSITION NO. 1 POLICE NO. 2 BROADCAST

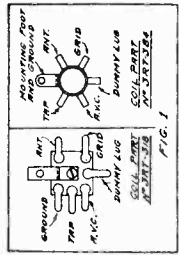
6 TUBE AC-DC RECEIVER

Voltage rating ... 105 to 125 volts a.c. or d.c.
 Power consumption 43 watts for receiver.
 Frequency range 540 to 1580 kc, 1580 to 4200 kc.

MODELS AL164, AL202
Chassis AL
Voltage, Alignment
Changes, Notes, Parts

EMERSON RADIO & PHONO. CORP.

PRODUCTION CHANGES



Note: 3RT-384A lug arrangement as shown at 3RT-384.

1. Receivers bearing serial numbers below 1,214,000 had a phono-motor on-off switch instead of tone control with switch.
2. Receivers bearing serial numbers below 1,436,000 did not have the turn-table insulator. These receivers also used speaker, part no. 3FS-251, pick-up, part no. 3Z2-564A, and did not use the filter choke, part no. 4FT-404.
3. On Model AL-164: C26 has been omitted; R16 is .5 megohm.
4. In AL receivers bearing serial numbers below 1,342,161 the antenna coil was part no. 3RT-318. Antenna coils, part nos. 3RT-313 and 3RT-384, are interchangeable. The lug arrangement for both coils is shown in Fig. 1 and is interchangeable. The lug arrangement for both coils is shown in Fig. 1 and is interchangeable. The lug arrangement for both coils is shown in Fig. 1 and is interchangeable.
5. In AL receivers bearing serial numbers 1,342,161 to 1,436,458 and between 1,468,933 to 1,471,250 the antenna coil was part no. 3RT-384 and C4 was .001 mf. Part no. 3RT-384A is interchangeable for 3RT-384 if C4 is made 0.012 mf, part no. 4DC-361.

ADJUSTMENTS

An oscillator with frequencies of 465, 600 and 1400 kc should be used. An output meter should be used across the voice coil or output transformer for observing maximum response. The set's oscillator is higher in frequency than the signal, so lineups should be observed on the low frequency side of the signal.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Signal as possible during alignment.

Always use as weak a test signal as possible during alignment.

Use a .0001 mf mica condenser as a dummy antenna during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 465 kc wave-trap is mounted on the right side of the front chassis wall. Its trimmer is accessible at the bottom of this.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

i-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and relate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 466 kc to the antenna and adjust the wave-trap trimmer for minimum response. (See General Notes, No. 8.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer on rear section of variable condenser then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-adjusted. The power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
2. The filament dropping resistor (R12 on schematic) is in a special tube at the rear of the chassis. This tube will become quite hot under normal operating conditions, or voltage drop specifications, set before the correct polarity.
3. When operating the receiver, the antenna lead should be held to the chassis by snap-on fasteners. To remove an i-f, unsolder its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
4. The color coding of the i-f transformer leads is as follows:
Grid-green
Grid-blue
Grid-yellow
Grid-red
Grid-black
5. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers. Featuring construction and portability similar to the Emerson Mast Antenna, it will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with the receiver. Instructions for the installation of this compact and efficient outside antenna are supplied with the receiver. Instructions for the installation of this compact and efficient outside antenna are supplied with the receiver.
6. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers. Featuring construction and portability similar to the Emerson Mast Antenna, it will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with the receiver. Instructions for the installation of this compact and efficient outside antenna are supplied with the receiver.
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9. The phono-graph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the number of revolutions the motor makes in 15 seconds. The motor bulb is lighted from a 60 cycle a.c. supply.
10. An a.c.-d.c. motor is provided to switch the motor for a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.

REPLACEMENT PARTS LIST

Part No.	Description	Price
4PT-404	Iron-core filter choke (see production changes)	\$1.80
T1	456 kc first i-f transformer	.85
3KT-201B	456 kc second i-f transformer	1.10
3RT-318A	Two-band oscillator coil	.60
4D1-343	150 ohm adjustable wave-trap	.16
4D1-345	300,000 ohm 1/2 watt carbon resistor	.16
2CR-198	30,000 ohm 1/2 watt carbon resistor	.16
3CR-295	410 ohm 1/2 watt wire wound resistor	.16
HR-22	2 megohm 1/2 watt carbon resistor	.16
3CR-296	240 ohm 1/2 watt wire wound resistor	.16
3CR-294	240 ohm 1/2 watt wire wound resistor	.16
KR-55	500,000 ohm 1/2 watt carbon resistor (see production changes)	.16
KR-56	500,000 ohm 1/2 watt carbon resistor (see production changes)	.16
R10, R13, R16	10 ohm 1/2 watt carbon resistor (L498B and L498G are interchangeable)	.16
R11	10 ohm 1/2 watt carbon resistor (L498B and L498G are interchangeable)	.16
R12	1.5 megohm 1/2 watt carbon resistor	.16
4LR-312A	1.5 megohm 1/2 watt carbon resistor (see production changes)	.16
4CC-350A	Tone control and motor on-off switch (see production changes)	.20
4CC-350B	Two-gang variable condenser	.20
4DC-361	0.0012 mf mica condenser (see production changes)	.30
—	Trimmer, part of wave-trap assembly.	.20
—	Trimmer, part of first i-f transformer assembly.	.20
—	Trimmer, part of second i-f transformer assembly.	.20
—	0.1 mf, 200 volt tubular condenser	.20
AC-5	0.00005 mf mica condenser	.20
AAG-106A	0.1 mf, 400 volt, midget condenser	.20
2YC-242A	0.05 mf, 200 volt tubular condenser (see production changes)	.20
BC-12	0.05 mf, 200 volt tubular condenser	.20
5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
KC-55	0.01, 400 volt tubular condenser	.20
LC-59	0.025 mf, 400 volt tubular condenser	.20
LC-596	0.025 mf, 400 volt tubular condenser	.20
3CC-281	20 mf, 150 volt wet electrolytic condenser	.20
AC-7A	0.00025 mf mica condenser	.20
3FS-231A	Wave-band switch	.70
4BT-84	Pilot light, 6.3 volt, 25 amp, Mazda No. 44	.20
3CZ-836	Dial drive belt	.10
3CZ-837B	Dial drive shaft and pulley	.10
3CZ-838	Idler pulley spring	.06
3CZ-839	Idler pulley	.10
8CZ-841	Condenser shaft pulley	.10
4MZ-583	Dial pointer	.25
3FZ-351	Eucalyptone with crystal	1.06
3GFR-1	A.c.-d.c. phono-graph motor complete with accessories	46.00

MODEL 164 ONLY (L.A.T.E.)

8GS-202	Phono-radio switch	50
3FS-251	8" dynamic speaker (see production changes)	7.80
3FS-252	8" dynamic speaker (see production changes)	7.80
3M-251	Phono-graph needle-cup	.75
3Z2-564A	Phono-graph needle-cup	.75
3Z2-564B	Crystal pick-up (see production changes)	18.00
4LZ-761	Crystal pick-up (see production changes)	18.00

MODEL 202 ONLY

4LS-322	Phono-radio switch	50
4LS-321	8" permanent magnet dynamic speaker	7.80
3LM-253	Needle-cup	.20
3LM-254	Needle-cup	.20
4LZ-763A	Crystal pick-up	18.00

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohm-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters are taken on the scale.

Tube	Screen	Control	Grid	Plate	Wt. Plate	Fil.
6A7	100	100	2.3	100	6.8	6.8
6D6	100	100	3.5	100	6.8	6.8
6G7	100	100	1.2	100	6.8	6.8
25L6G	100	100	1.2	100	25.0	25.0

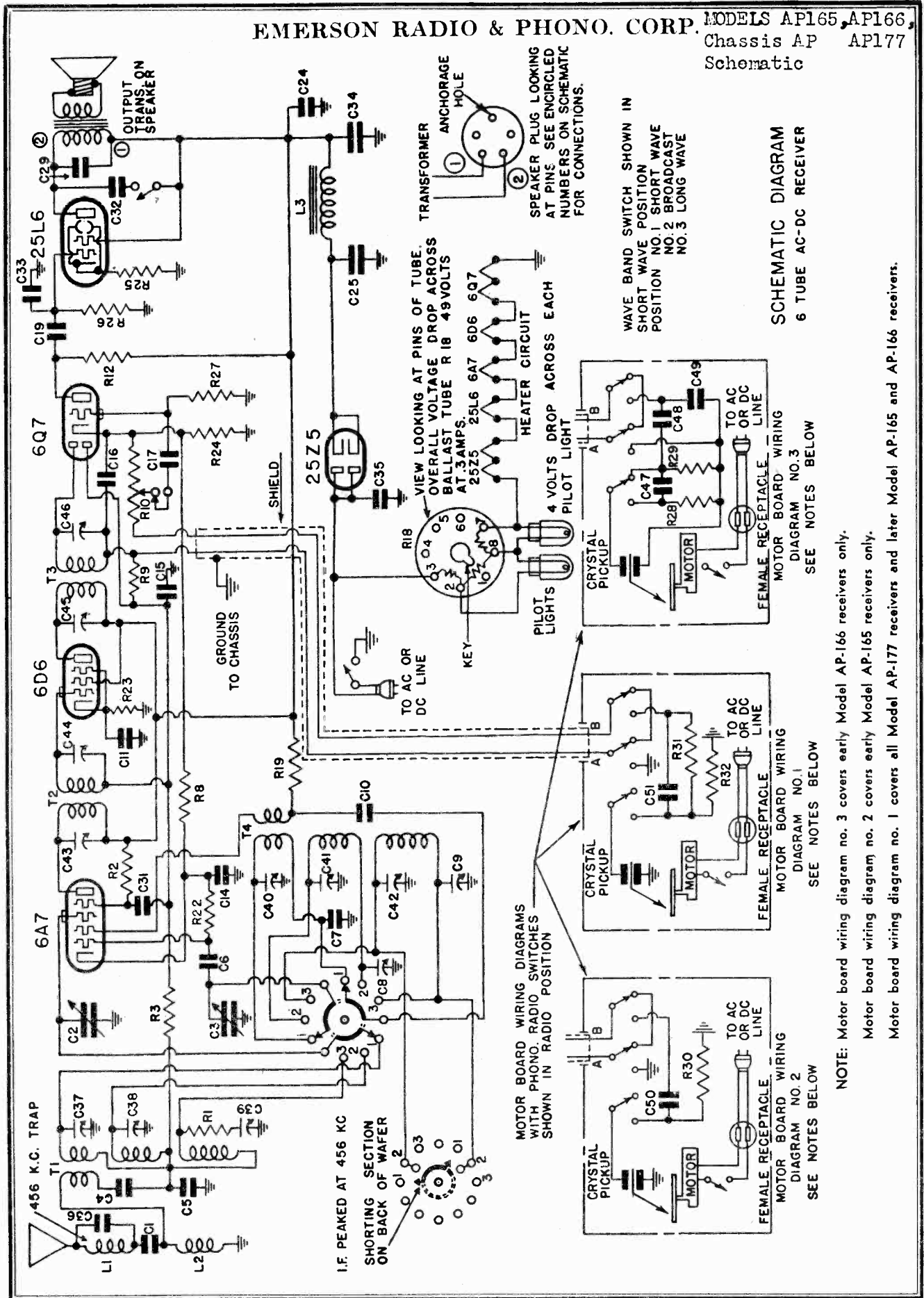
Voltage at 2525 reads 120 volts.
Voltage drop across field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

Tube Data

The tube complement is as follows:
 1—6A7 pentagrid oscillator-modulator.
 1—6D6 pentode amplifier.
 1—6G7 pentode amplifier.
 1—25L6G beam power output.
 1—25Z6 dual half-wave rectifier.
 1—2UR-224 ballast tube (R12 on schematic). (L498B and L498G are interchangeable with 2UR-224.)
 Unless otherwise specified all octal-base tubes may be replaced with their metal or octal-base glass tubes.

EMERSON RADIO & PHONO. CORP. MODELS AP165, AP166, Chassis AP AP177

Schematic



MODELS AP165, AP166, EMERSON RADIO & PHONO. CORP.
Chassis AP AP177

Alignment, Changes, Parts
Voltage

PRODUCTION CHANGES

- Model AP-165 receivers differ from the schematic diagram as follows:
 a. C25 is a .02 mf. 300 volt dry electrolytic condenser, part no. 47C-364, price \$1.55
 b. C26 is a .02 mf. 300 volt dry electrolytic condenser, part no. 47C-365, price 1.75
 c. Receivers bearing serial numbers below 1,291,850 do not use the automatic stop. A manual switch, part no. 3LS-232, is used instead—price 8.70.
 d. Receivers bearing serial numbers below 1,291,849 use electro-dynamic speakers. The speaker field is used in place of the filter choke L3. The 6 1/2" speaker is part no. 4PS-271. The 10" speaker is part no. 4PS-269.
 e. Receivers bearing serial numbers below 1,292,600 use the following parts instead of the corresponding parts indicated on the previous pages:

Part No.	DESCRIPTION	Price
47C-343A	Variable condenser	\$3.06
31Z-403	Dial drive belt	.10
3CZ-337B	Dial drive shaft and pulley	.10
47Z-562	Idle pulley spring	.06
3CZ-341	Condenser shaft pulley	.10
XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46, screw type base	.20

DESCRIPTION

ADJUSTMENTS

- An oscillator with frequencies of 160, 360, 456, 600, 1500 kc should be used.
 Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with a 20 ohm resistor).
 a. Always use the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
 b. Always use as weak a test signal as possible during alignment.
 c. Never leave a trimmer with its outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmers

The two i-f transformers are located on top of the chassis deck. The second i-f transformer is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of cans.
 The dual adjustable padding condenser is mounted on the left side of the front chassis wall.
 The antenna coils for the three bands are on the left side of the front chassis wall. The trimmer for the long-wave antenna is the trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.
 The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are also accessible underneath the chassis deck. The trimmer nearest the front of the chassis is the medium-wave oscillator trimmer. The central trimmer is the short-wave oscillator trimmer. The trimmer farthest from the front of the chassis is the long-wave oscillator trimmer.

i-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 465 kc to the grid cup of the 6AT tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 150 and feed 150 kc to antenna. Adjust the long-wave series paddler (hex nut on dial padder) for maximum response. Move pointer to 360 and feed 360 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 456 kc and rock (rotate back and forth) through a small range, the variable condenser while adjusting the series paddler. Set pointer to 600, feed 360 kc and repeat entire procedure. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set pointer to 600 (central) position and dial pointer at 600. Feed 600 kc to antenna and adjust medium-wave series paddler (slotted screw dial padder) for maximum response. Move pointer to 1500, feed 1500 kc and adjust wave series oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 600 kc and rock variable condenser while readjusting medium-wave series paddler for maximum response. Repeat pointer to 1500, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

Current drain 0.4 ampere for receiver and 0.2 ampere for motor.

Frequency range 150 to 375 kc, 640 to 1600 kc, 6.7 to 17.5 mc.

One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.

When operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity. When replacing the chassis in the cabinet, take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.

The color coding of the i-f transformers is as follows:

Grid—green

B plus—red

Grid return—black

Plate—blue

The phonograph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a strobeoscope disc and a neon light (the strobeoscope method will work only when the neon bulb is supplied from a 60 cycle a.c. supply).

The chassis should be checked to switch the motor on a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.

REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION	PRICE
L1	2T-268A	456 kc wave-trap	.75
L2	3E7-229	R-f choke—5 millihenrics	.66
L3	4P7-404	Iron core filter choke	1.00
T1	2N7-260	150 kc i-f transformer	2.06
T2	2N7-260	456 kc i-f transformer	1.35
T3	2N7-260	456 kc second i-f transformer	1.35
T4	2N7-298	Three-band oscillator coil	1.90
R1	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R2	3ER-263	60,000 ohm 1/4 watt carbon resistor	.16
R3	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R4	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R5	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R6	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R7	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R8	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R9	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R10	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R11	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R12	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R13	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R14	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R15	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R16	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R17	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R18	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R19	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R20	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R21	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R22	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R23	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R24	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R25	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R26	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R27	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R28	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R29	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R30	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R31	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R32	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R33	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R34	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R35	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R36	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R37	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R38	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R39	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R40	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R41	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R42	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R43	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R44	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R45	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R46	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R47	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R48	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R49	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R50	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R51	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R52	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R53	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R54	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R55	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R56	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R57	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R58	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R59	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R60	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R61	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R62	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R63	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R64	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R65	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R66	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R67	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R68	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R69	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R70	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R71	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R72	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R73	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R74	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R75	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R76	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R77	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R78	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R79	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R80	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R81	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R82	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R83	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R84	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R85	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R86	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R87	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R88	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R89	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R90	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R91	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R92	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R93	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R94	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R95	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R96	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R97	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R98	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R99	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
R100	3R9-201	3,000 ohm 1/4 watt carbon resistor	.16
C1	FC-29	0.02 mf, 200 volt tubular condenser	.20
C2	FC-29	0.02 mf, 200 volt tubular condenser	.20
C3	4PC-266	0.00025 mf mica condenser	.20
C4	2ZC-253	0.0025 mf mica condenser	.20
C5	2ZC-253	0.0025 mf mica condenser	.20
C6	2ZC-253	0.0025 mf mica condenser	.20
C7	2ZC-253	0.0025 mf mica condenser	.20
C8	2ZC-253	0.0025 mf mica condenser	.20
C9	2ZC-253	0.0025 mf mica condenser	.20
C10	2ZC-253	0.0025 mf mica condenser	.20
C11	2ZC-253	0.0025 mf mica condenser	.20
C12	2ZC-253	0.0025 mf mica condenser	.20
C13	2ZC-253	0.0025 mf mica condenser	.20
C14	2ZC-253	0.0025 mf mica condenser	.20
C15	2ZC-253	0.0025 mf mica condenser	.20
C16	2ZC-253	0.0025 mf mica condenser	.20
C17	2ZC-253	0.0025 mf mica condenser	.20
C18	2ZC-253	0.0025 mf mica condenser	.20
C19	2ZC-253	0.0025 mf mica condenser	.20
C20	2ZC-253	0.0025 mf mica condenser	.20
C21	2ZC-253	0.0025 mf mica condenser	.20
C22	2ZC-253	0.0025 mf mica condenser	.20
C23	2ZC-253	0.0025 mf mica condenser	.20
C24	2ZC-253	0.0025 mf mica condenser	.20
C25	2ZC-253	0.0025 mf mica condenser	.20
C26	2ZC-253	0.0025 mf mica condenser	.20
C27	2ZC-253	0.0025 mf mica condenser	.20
C28	2ZC-253	0.0025 mf mica condenser	.20
C29	2ZC-253	0.0025 mf mica condenser	.20
C30	2ZC-253	0.0025 mf mica condenser	.20
C31	2ZC-253	0.0025 mf mica condenser	.20
C32	2ZC-253	0.0025 mf mica condenser	.20
C33	2ZC-253	0.0025 mf mica condenser	.20
C34	2ZC-253	0.0025 mf mica condenser	.20
C35	2ZC-253	0.0025 mf mica condenser	.20
C36	2ZC-253	0.0025 mf mica condenser	.20
C37	2ZC-253	0.0025 mf mica condenser	.20
C38	2ZC-253	0.0025 mf mica condenser	.20
C39	2ZC-253	0.0025 mf mica condenser	.20
C40	2ZC-253	0.0025 mf mica condenser	.20
C41	2ZC-253	0.0025 mf mica condenser	.20
C42	2ZC-253	0.0025 mf mica condenser	.20
C43	2ZC-253	0.0025 mf mica condenser	.20
C44	2ZC-253	0.0025 mf mica condenser	.20
C45	2ZC-253	0.0025 mf mica condenser	.20
C46	2ZC-253	0.0025 mf mica condenser	.20
C47	2ZC-253	0.0025 mf mica condenser	.20
C48	2ZC-253	0.0025 mf mica condenser	.20
C49	2ZC-253	0.0025 mf mica condenser	.20
C50	2ZC-253	0.0025 mf mica condenser	.20
C51	2ZC-253	0.0025 mf mica condenser	.20
C52	2ZC-253	0.0025 mf mica condenser	.20
C53	2ZC-253	0.0025 mf mica condenser	.20
C54	2ZC-253	0.0025 mf mica condenser	.20
C55	2ZC-253	0.0025 mf mica condenser	.20
C56	2ZC-253	0.0025 mf mica condenser	.20
C57	2ZC-253	0.0025 mf mica condenser	.20
C58	2ZC-253	0.0025 mf mica condenser	.20
C59	2ZC-253	0.0025 mf mica condenser	.20
C60	2ZC-253	0.0025 mf mica condenser	.20
C61	2ZC-253	0.0025 mf mica condenser	.20
C62	2ZC-253	0.0025 mf mica condenser	.20
C63	2ZC-253	0.0025 mf mica condenser	.20
C64	2ZC-253	0.0025 mf mica condenser	.20
C65	2ZC-253	0.0025 mf mica condenser	.20
C66	2ZC-253	0.0	

EMERSON RADIO & PHONO. CORP. MODELS AR165, -166, -177 Chassis AR, Early, Late Above, below Ser. 1326200 Schematics, Changes, Parts

List Price as of Oct. 14, 1937 (Subject to change without notice)

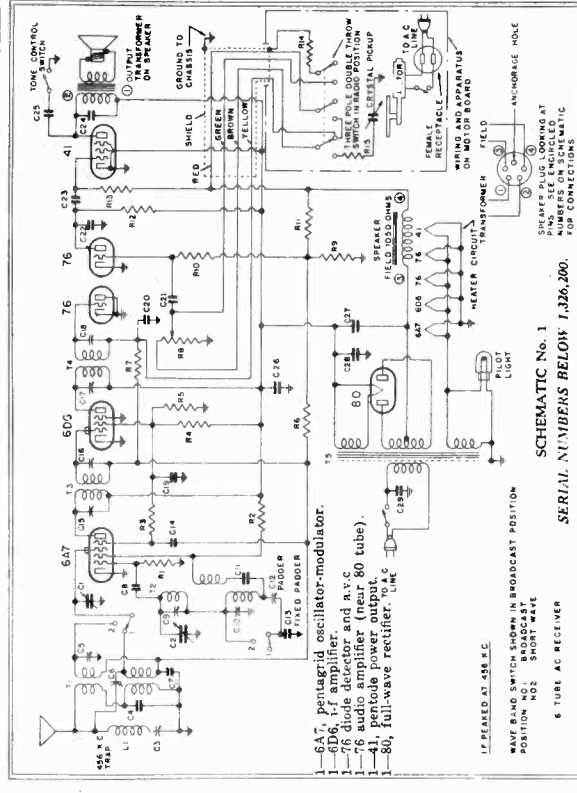
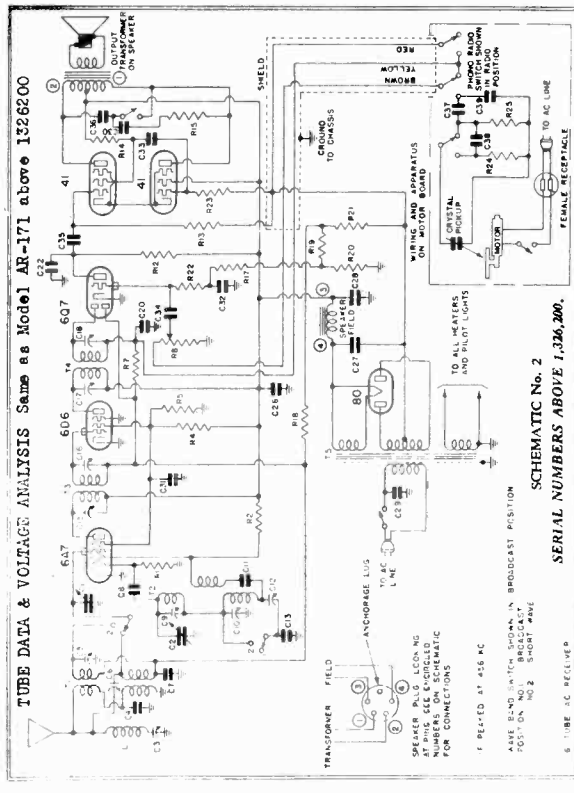
*Item number locates the article on the schematic diagram. †See production changes. ‡These trimmer condensers are part of the coil assemblies and can not be supplied separately. (Subject to change without notice)

REPLACEMENT PARTS table with columns: PART No., DESCRIPTION, PRICE. Lists various components like coils, resistors, capacitors, and tubes.

*Item number locates the article on the schematic diagram. †See production changes. ‡These trimmer condensers are part of the coil assemblies and can not be supplied separately. (Subject to change without notice)

REPLACEMENT PARTS table (continued) with columns: PART No., DESCRIPTION, PRICE. Lists various components like coils, resistors, capacitors, and tubes.

GENERAL NOTES, ADJUSTMENTS, ALIGNMENT --- SAME AS MODEL AR-171



MODELS AR-165, AR-166, AR-177 CHASSIS MODEL AR 105-125 VOLTS 60 CYCLE A.C. 540-1730 K.C. & 5.6-18 MEGACYCLES 55WATTS FOR RECEIVER-20WATTS FOR MOTOR

PRODUCTION CHANGES-RECEIVERS BEARING SERIAL NUMBERS BELOW 1327843 DID NOT USE THE AUTOMATIC STOP. A MANUAL SWITCH (PART NO. 315-532) WAS USED INSTEAD (PRICE-\$.70). OTHER CHANGES - SAME AS MODEL AR-171

MODELS AR165, -166, -177
 MODELS AR171, -173, -174
 -176, -180, -185

EMERSON RADIO & PHONO. CORP.

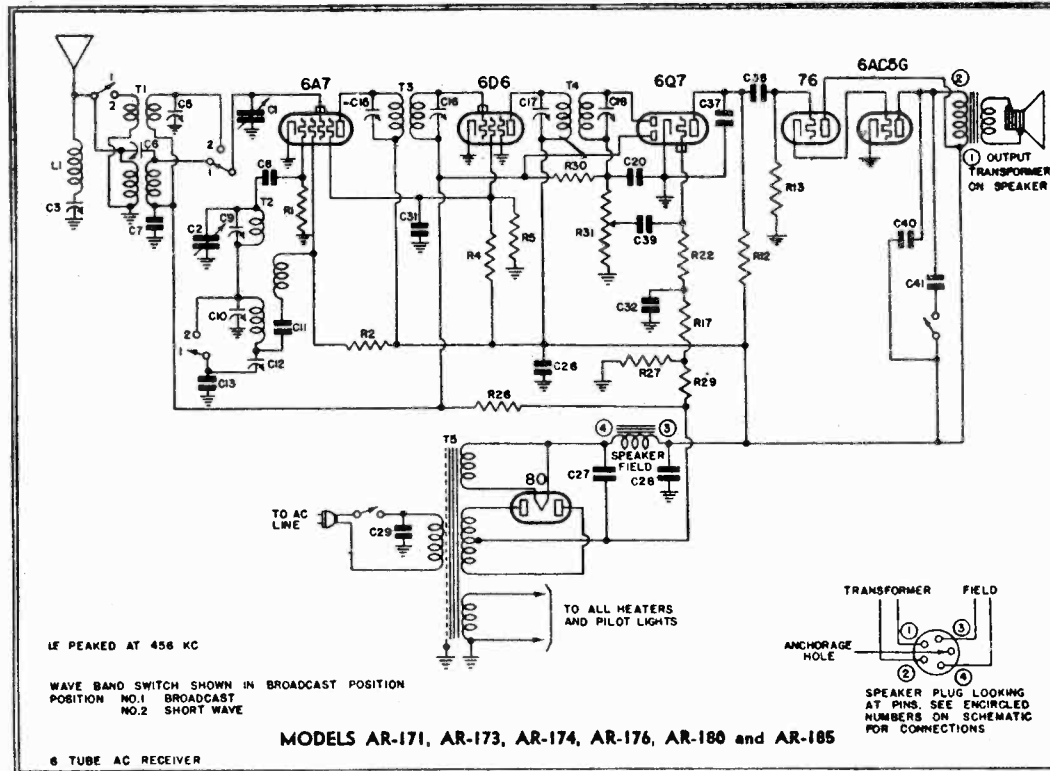
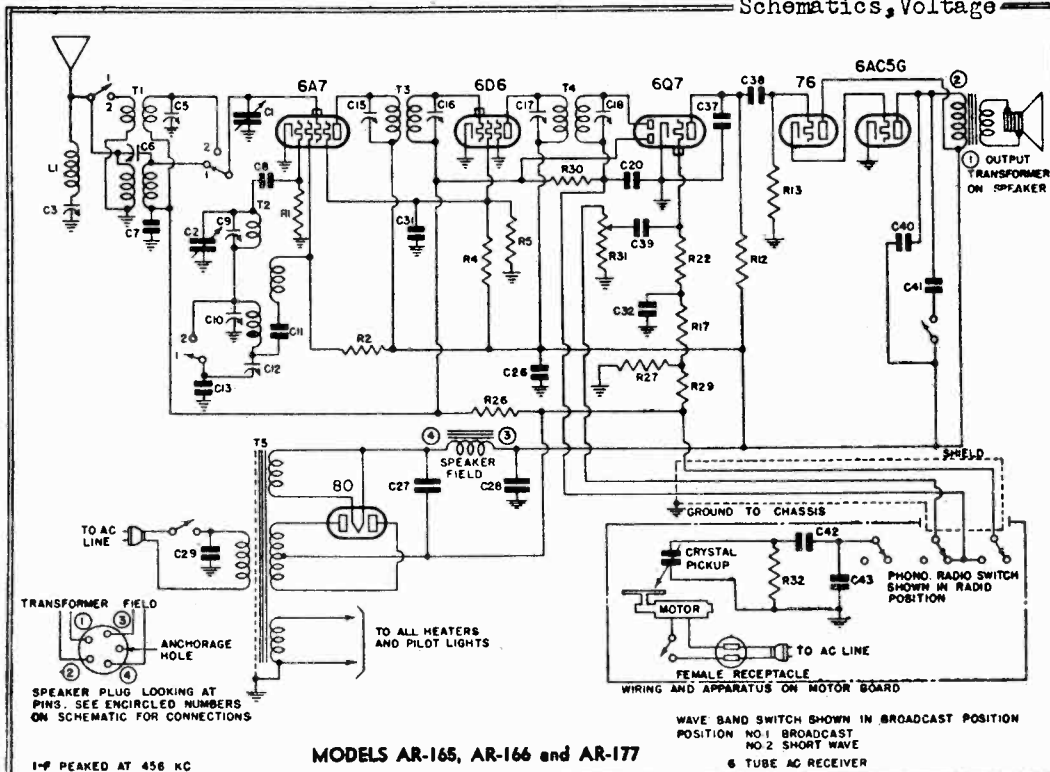
Chassis AR, Between Ser. 1412601-1413601. Above Ser. 1416650. 3rd Type Schematics, Voltage

- 1-6A7, pentagrid oscillator-modulator.
- 1-6D6, i-f amplifier.
- 1-6Q7G, diode detector, audio amplifier and a.v.c.
- 1-76, audio amplifier.
- 1-6AC5G, power output.
- 1-80, full-wave rectifier.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Voltage rating 105-125 volts, 60 cycle, a.c.
 Power consumption 55 watts for receiver and 20 watts for motor
 Frequency ranges 540 to 1780 kc and 5.6 to 18 megacycles.

VOLTAGE ANALYSIS



Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	250	80	0	100	6.3 a.c.
6D6	250	80	0	—	6.3 a.c.
6Q7G	175	—	0	—	6.3 a.c.
76	250	—	12	—	6.3 a.c.
6AC5G	220	—	0	—	6.3 a.c.

Voltage at 80 filament to B minus (center tap of high voltage winding on power transformer)—325 volts.
 Voltage across speaker field—75 volts.
 The grid bias for all tubes is developed across resistors R-27 and R-29 (see schematic). The total voltage measured across R-27 and R-29 should be 15 volts.

Chassis AT
Above Ser. 1386551
Alignment

EMERSON RADIO & PHONO. CORP.

Chassis AR, 3rd Type
Parts, Changes,
Alignment

Models AR165, AR166, AR177, AR171, AR173, AR174, AR176, AR180, AR185
Models AT170, AT172, AT181

REPLACEMENT PARTS

Table with columns: Part No., Description, Price. Lists various electronic components like coils, capacitors, resistors, and their respective prices.

GENERAL NOTES

- 1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. The chassis should be held in position by the screws touching the cabinet, otherwise microphonism will result.
3. The color coding of the I-F transformers is as follows: Grid—green; B plus—red; Plate—blue.
4. The color coding of the power transformer is as follows: B plus—red; Plate—blue; High-voltage secondary—two red leads; High-voltage secondary center tap—red and yellow lead; 6.3 volt secondary—two green leads; 5 volt secondary—two yellow leads.
5. The adjustable padding condenser (on the band) is mounted underneath the chassis (in the corner near the band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. The wave-trap in the receiver has been adjusted for maximum signal rejection at 466 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the desired signal is obtained.
7. On the AT model, if for any reason the automatic dial assembly has been taken apart, care should be taken in re-aligning the circular button housing with the variable condenser. With the circular housing in the extreme clockwise position, the variable condenser should be about 5 degrees open from the maximum capacity position. (Five degrees is about 3.22 between the rotor plate tie-bar and the edges of the stator plates on the variable condenser.)
The phono-graph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. To readjust the speed remove the turntable and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

ADJUSTMENTS

An oscillator with frequencies of 466, 600, 1600 and 16,000 kc should be used. The output transformer for the oscillator should be checked for correct tuning. If the circuit is at all disturbed, both the broadcast and antenna trimmers. The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals. Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one. The set should be checked with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two I-F transformers are located on top of the chassis deck. The second I-F is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the chassis. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the antenna secondary winding through a hole in the top of the chassis. The wave-trap for these coils are mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 466 kc wave trap. The chassis deck inductor coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck inductor coils for the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-F and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 466 kc through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid cap from the tube). Adjust the four trimmers for maximum response. Feed 466 kc to the antenna through a 0.02 mf paper condenser. Adjust the broadcast antenna trimmer for maximum response. Feed 16,000 kc to the antenna through a 0.0002 mica condenser (see General Note No. 7) from front on left side of the chassis) for minimum response. (See General Note No. 7).

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial indicator exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer for maximum response. Adjust the broadcast antenna trimmer (central trimmer at left side of chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

By adding a cipher to each figure on the broadcast band calibration, this scale can be made to read directly in kilocycles. Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the dial indicator at 600 on the dial and feed 1600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Adjust the variable condenser for maximum response and then adjust the broadcast antenna trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

PRODUCTION CHANGES

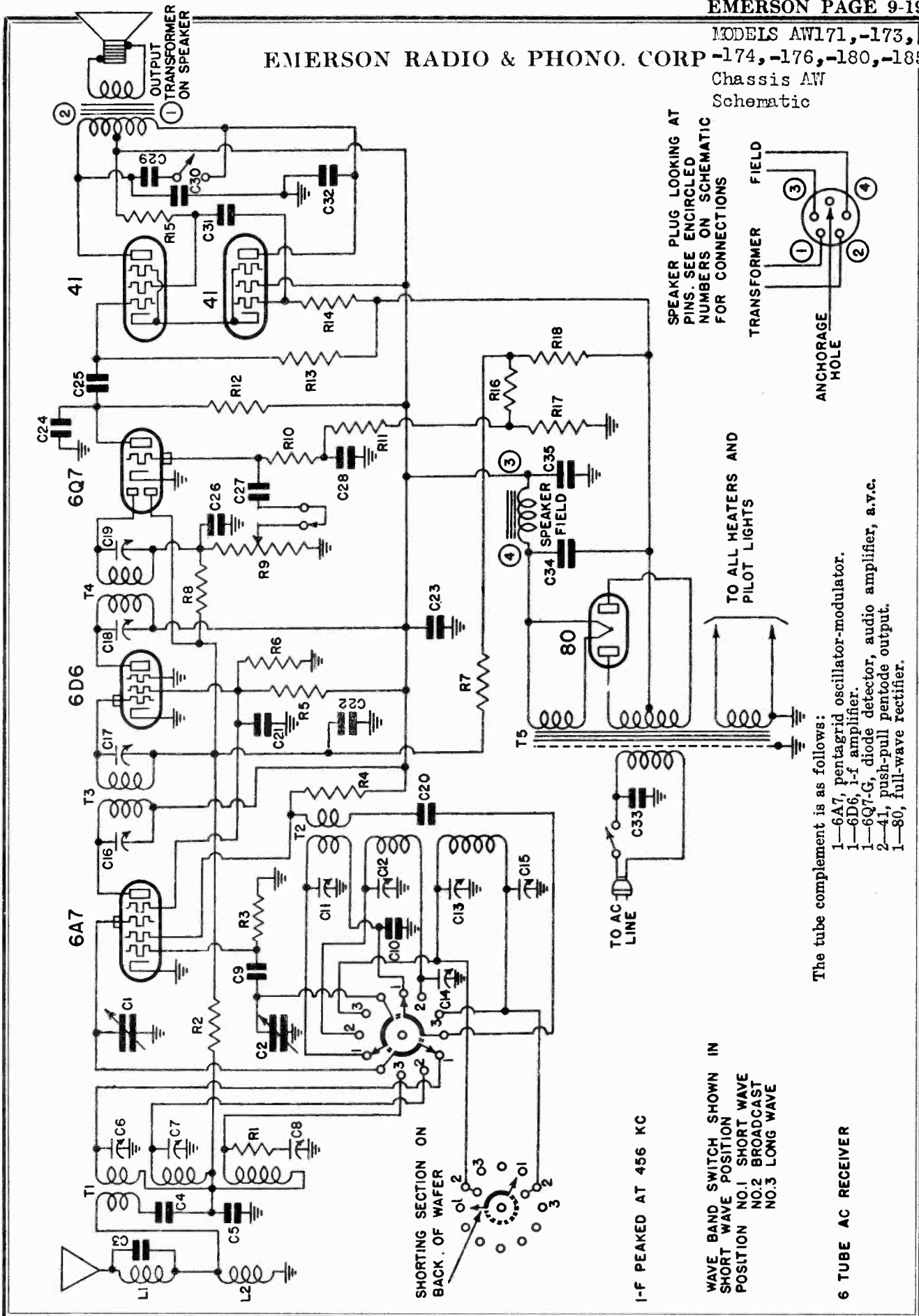
In receivers bearing serial numbers between 1412,601 and 1,413,601: Models AR-174 and AR-165 receivers differ from the schematic diagram as follows: a. C27 is a 12 mf, 450 volt dry electrolytic condenser part no. 31C-314. b. C28 is a 24 mf, 400 volt dry electrolytic condenser part no. 32C-341. c. A .25 mf, 200 volt condenser is connected from the screen grid of the 6D6 i-f amplifier to ground. In receivers bearing serial numbers 1,473,958-1,474,958: The wave-band switch was part no. TTS-111K. The receivers bearing serial numbers below 1477,899: The 6 1/2" speaker was part no. 4R8-270B.

FOR ADJUSTMENT OF AUTOMATIC DIAL ON CHASSIS "AR" MODELS--SEE INDEX

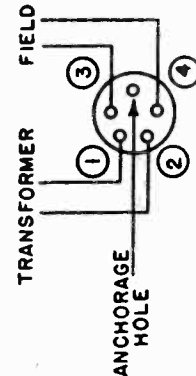
Alignment Procedure for Model AT: It will first be necessary to fasten a short, stiff piece of wire to a fixed part of the chassis in such a way that when the variable condenser is set at minimum capacity, the wire will point to the heavy vertical line at the high frequency end of the dial scale. Thereafter, using this wire as an indicator, the alignment procedure will be the same as that outlined above for Model AR.

EMERSON RADIO & PHONO. CORP -174, -176, -180, -185

Chassis AW
Schematic



SPEAKER PLUG LOOKING AT
PINS. SEE CIRCLED
NUMBERS ON SCHEMATIC
FOR CONNECTIONS



TO ALL HEATERS AND
PILOT LIGHTS

I-F PEAKED AT 456 KC

WAVE BAND SWITCH SHOWN IN
SHORT WAVE POSITION
POSITION NO.1 SHORT WAVE
NO.2 BROADCAST
NO.3 LONG WAVE

The tube complement is as follows:

- 1-6A7, pentagrid oscillator-modulator.
- 1-6D6, 1-f amplifier.
- 1-6Q7-G, diode detector, audio amplifier, a.v.c.
- 2-41, push-pull pentode output.
- 1-80, full-wave rectifier.

6 TUBE AC RECEIVER

MODELS AW171, -173, -174

-176, -180, -185 EMERSON RADIO & PHONO. CORP.

Chassis AW

Alignment, Voltage, Parts

Notes

ADJUSTMENTS

An oscillator with frequencies of 160, 360, 466, 600, 1600 and 15,000 kc should be used. An output meter should be used across the voice coil or output transformer for observing maximum response. Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0022 mf condenser may be used in place of the antenna. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead). Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one. Always use as weak a test signal as possible during alignment. Never leave a trimmer with its outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmers

The two i-f transformers are located on top of the chassis deck. The second i-f transformer is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans. The dial adjustable padding condenser is mounted on the left side of the front chassis wall. The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the variable condenser. The three bands are accessible through holes in the top of the chassis deck. The trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The trimmer nearest the rear of the chassis is the long-wave antenna trimmer. The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave oscillator trimmer. The central trimmer is the short-wave oscillator trimmer. The trimmer farthest from the front of the chassis is the long-wave oscillator trimmer.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 466 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 160 and feed 160 kc to antenna. Adjust the long-wave series paddler (hex nut on dial paddler) for maximum response. Move pointer to 360 and feed 360 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 160, feed 160 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting the antenna trimmer. Repeat procedure for 360, feed 360 kc and check alignment. If readjustment is necessary return to 160 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 600. Feed 600 kc to antenna and adjust medium-wave series paddler (slotted screw on dial paddler) for maximum response. Move pointer to 1600, feed 1600 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 600, feed 600 kc and rock variable condenser while readjusting medium-wave series paddler for maximum response. Reset pointer to 1600, feed 1600 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

Voltage rating	105-125 volts, 60 cycle, a.c.
Power consumption	55 watts.
Frequency ranges	160 to 375 kc, 540 to 1600 kc, 5.7 to 17.5 megacycles.

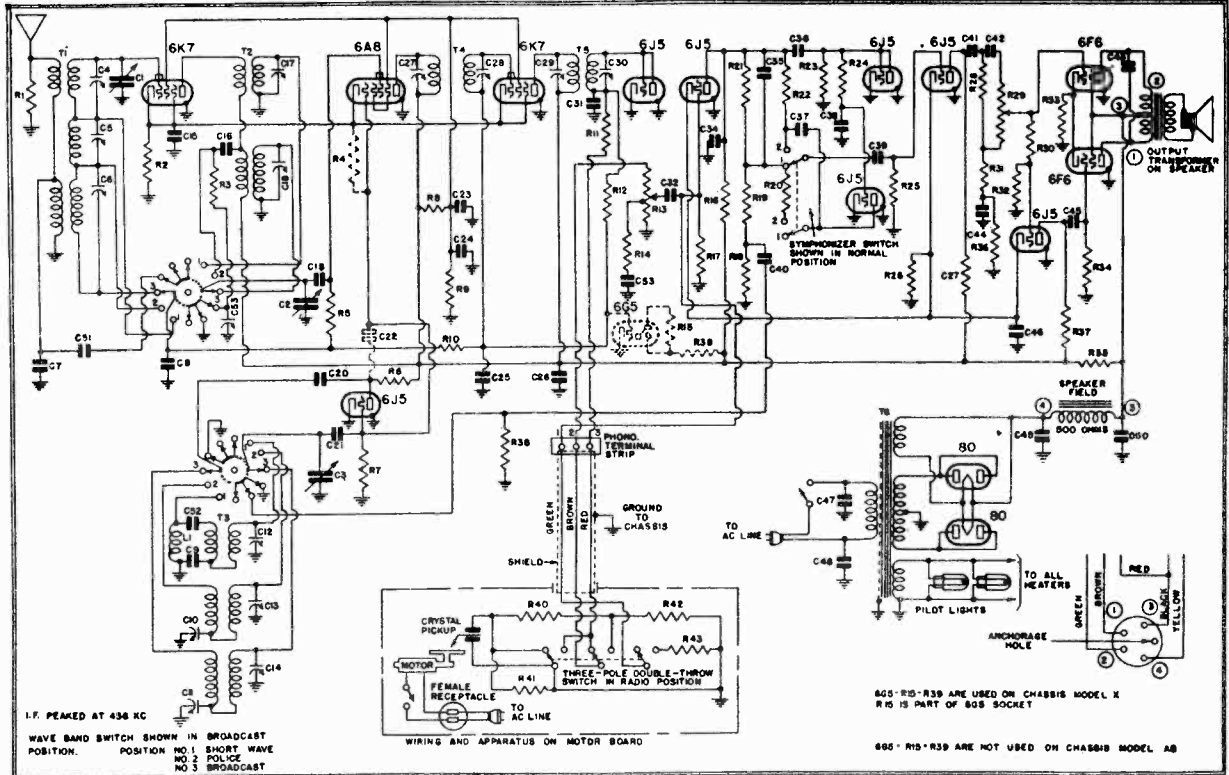
GENERAL NOTES

- The receiver should never be turned on with either the speaker plug or the 41 tubes out of their respective sockets, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
- When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
- The color coding of the i-f transformers is as follows:
Grid—green
B plus—red
Grid return—black
Plate—blue.
- The color coding of the power transformer is as follows:
Primary—two black leads.
Secondary—two red leads.
High-voltage secondary—center tap—red and yellow lead.
6.3 volt secondary—two green leads.
5 volt secondary—two yellow leads.
- The adjustable padding condenser for the long-wave and medium-wave bands is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the front of the chassis. The short-wave band has a fixed paddler, C10 on schematic. When replacing this fixed paddler be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

REPLACEMENT PARTS

Item	Part No.	DESCRIPTION	Price
L1	22T-268	466 kc fixed wave-trap	.76
L2	32T-299	R-4 choke	.56
L3	32T-297	Three-band antenna coil	2.05
L4	32T-298	Three-band oscillator coil	1.90
L5	32T-242	466 kc second i-f transformer	1.35
L6	22T-231	466 kc second i-f transformer	1.35
L7	32T-345	Power transformer	4.45
R1	32T-201	3,000 ohm 1/4 watt carbon resistor	.16
R2	KR-56	250,000 ohm 1/4 watt carbon resistor	.16
R3	KR-55	40,000 ohm 1/4 watt carbon resistor	.16
R4	32R-247	40,000 ohm 1/4 watt carbon resistor	.16
R5	BR-12	25,000 ohm 1/4 watt carbon resistor	.16
R6	32R-265	10,000 ohm 1/4 watt carbon resistor	.16
R7	32R-276	10 megohm 1/4 watt carbon resistor	.16
R8	32R-268	5 megohm 1/4 watt carbon resistor	.16
R9	KR-57	1 megohm 1/4 watt carbon resistor	.16
R10	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R11	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R12	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R13	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R14	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R15	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R16	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R17	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R18	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R19	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R20	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R21	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R22	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R23	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R24	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R25	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R26	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R27	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R28	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R29	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R30	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R31	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R32	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R33	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R34	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R35	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R36	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R37	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R38	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R39	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R40	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R41	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R42	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R43	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R44	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R45	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R46	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R47	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R48	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R49	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R50	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R51	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R52	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R53	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R54	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R55	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R56	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R57	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R58	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R59	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R60	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R61	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R62	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R63	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R64	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R65	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R66	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R67	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R68	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R69	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R70	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R71	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R72	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R73	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R74	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R75	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R76	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R77	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R78	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R79	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R80	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R81	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R82	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R83	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R84	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R85	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R86	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R87	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R88	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R89	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R90	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R91	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R92	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R93	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R94	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R95	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R96	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R97	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R98	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R99	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
R100	32R-260	3,500 ohm 1/4 watt carbon resistor	.16
C1	4FC-366	Two-gang variable condenser	4.00
C2	FC-29	0.02 mf, 200 volt tubular condenser	.30
C3	22C-283	0.0025 mf mica condenser	.30
C4	22C-283	0.0025 mf mica condenser	.30
C5	22C-283	0.0025 mf mica condenser	.30
C6	22C-283	0.0025 mf mica condenser	.30
C7	22C-283	0.0025 mf mica condenser	.30
C8	22C-283	0.0025 mf mica condenser	.30
C9	22C-283	0.0025 mf mica condenser	.30
C10	AA-C-106A	Trimmers; part of antenna coil	.50
C11	35C-286	Trimmers; part of oscillator coil	.50
C12	35C-286	Trimmers; part of second i-f transformer	.50
C13	35C-286	Trimmers; part of first i-f transformer	.50
C14	35C-286	Trimmers; part of second i-f transformer	.50
C15	35C-286	Trimmers; part of first i-f transformer	.50
C16	35C-286	Trimmers; part of second i-f transformer	.50
C17	35C-286	Trimmers; part of first i-f transformer	.50
C18	35C-286	Trimmers; part of second i-f transformer	.50
C19	35C-286	Trimmers; part of first i-f transformer	.50
C20	35C-286	Trimmers; part of second i-f transformer	.50
C21	35C-286	Trimmers; part of first i-f transformer	.50
C22	35C-286	Trimmers; part of second i-f transformer	.50
C23	35C-286	Trimmers; part of first i-f transformer	.50
C24	35C-286	Trimmers; part of second i-f transformer	.50
C25	35C-286	Trimmers; part of first i-f transformer	.50
C26	35C-286	Trimmers; part of second i-f transformer	.50
C27	35C-286	Trimmers; part of first i-f transformer	.50
C28	35C-286	Trimmers; part of second i-f transformer	.50
C29	35C-286	Trimmers; part of first i-f transformer	.50
C30	35C-286	Trimmers; part of second i-f transformer	.50
C31	35C-286	Trimmers; part of first i-f transformer	.50
C32	35C-286	Trimmers; part of second i-f transformer	.50
C33	35C-286	Trimmers; part of first i-f transformer	.50
C34	35C-286	Trimmers; part of second i-f transformer	.50
C35	35C-286	Trimmers; part of first i-f transformer	.50
C36	35C-286	Trimmers; part of second i-f transformer	.50
C37	35C-286	Trimmers; part of first i-f transformer	.50
C38	35C-286	Trimmers; part of second i-f transformer	.50
C39	35C-286	Trimmers; part of first i-f transformer	.50
C40	35C-286	Trimmers; part of second i-f transformer	.50
C41	35C-286	Trimmers; part of first i-f transformer	.50
C42	35C-286	Trimmers; part of second i-f transformer	.50
C43	35C-286	Trimmers; part of first i-f transformer	.50
C44	35C-286	Trimmers; part of second i-f transformer	.50
C45	35C-286	Trimmers; part of first i-f transformer	.50
C46	35C-286	Trimmers; part of second i-f transformer	.50
C47	35C-286	Trimmers; part of first i-f transformer	.50
C48	35C-286	Trimmers; part of second i-f transformer	.50
C49	35C-286	Trimmers; part of first i-f transformer	.50
C50	35C-286	Trimmers; part of second i-f transformer	.50
C51	35C-286	Trimmers; part of first i-f transformer	.50
C52	35C-286	Trimmers; part of second i-f transformer	.50
C53	35C-286	Trimmers; part of first i-f transformer	.50
C54	35C-286	Trimmers; part of second i-f transformer	.50
C55	35C-286	Trimmers; part of first i-f transformer	.50
C56	35C-286	Trimmers; part of second i-f transformer	.50
C57	35C-286	Trimmers; part of first i-f transformer	.50
C58	35C-286	Trimmers; part of second i-f transformer	.50
C59	35C-286	Trimmers; part of first i-f transformer	.50
C60	35C-286	Trimmers; part of second i-f transformer	.50
C61	35C-286	Trimmers; part of first i-f transformer	.50
C62	35C-286	Trimmers; part of second i-f transformer	.50
C63	35C-286	Trimmers; part of first i-f transformer	.50
C64	35C-286	Trimmers; part of second i-f transformer	.50
C65	35C-286	Trimmers; part of first i-f transformer	.50
C66	35C-286	Trimmers; part of second i-f transformer	.50
C67	35C-286	Trimmers; part of first i-f transformer	.50
C68	35C-286	Trimmers; part of second i-f transformer	.50
C69	35C-286	Trimmers; part of first i-f transformer	.50
C70	35C-286	Trimmers; part of second i-f transformer	.50
C71	35C-286	Trimmers; part of first i-f transformer	.50
C72	35C-286	Trimmers; part of second i-f transformer	.50
C73	35C-286	Trimmers; part of first i-f transformer	.50
C74	35C-286	Trimmers; part of second i-f transformer	.50
C75	35C-286	Trimmers; part of first i-f transformer	.50
C76	35C-286	Trimmers; part of second i-f transformer	.50
C77	35C-286	Trimmers; part of first i-f transformer	.50
C78	35C-286	Trimmers; part of second i-f transformer	.50
C79	35C-286	Trimmers; part of first i-f transformer	.50
C80	35C-286	Trimmers; part of second i-f transformer	.50
C81	35C-286	Trimmers; part of first i-f transformer	.50
C82	35C-286	Trimmers; part of second i-f transformer	.50
C83	35C-286	Trimmers; part of first i-f transformer	.50</

EMERSON RADIO & PHONO. CORP. MODEL AB184, Chassis AB
 MODEL X175, Chassis X, Late Schematic, Voltage, Notes



The schematic diagram is drawn for the Model AB. Model X receivers differ from the schematic as follows:
 R42 is omitted. R40 is changed to a 500,000 ohm resistor, part no. KR-56; and C54 (shown dotted) is added across R40.
 In addition, the 6G5 tube and resistors R15 and R39 (shown dotted) are added for the Model X only.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Fil.
6K7 r-f amplifier	240	90	2	6.3 a.c.
6A8 modulator	240	90	2	6.3 a.c.
6J5 oscillator	80	—	—	6.3 a.c.
6K7 i-f amplifier	240	90	2	6.3 a.c.
6J5 diode detector	—	—	—	6.3 a.c.
6J5 1st a-f amplifier	125	—	5.6	6.3 a.c.
6J5 2nd a-f amplifier	140	—	5.6	6.3 a.c.
6J5 phase inverter	140	—	5.6	6.3 a.c.
6F6 output	280	300	18	6.3 a.c.
6F6 output	280	300	18	6.3 a.c.
6J5 symphonizer rectifier	—	—	—	6.3 a.c.
6J5 symphonizer amplifier	15 (symph. position—50 V. scale)	—	—	6.3 a.c.

Voltage across speaker field—75.
 Voltage at 80 filament—375.

*See production changes.

Voltage rating 105-125 volts, 60 cycles, a.c.
 Power consumption 130 watts at 117.5 volts.
 Frequency ranges 540 to 1800 kc, 1800 to 6,250 kc and 5.8 to 22.0 megacycles.

(See production changes for frequency ranges of early receivers)

GENERAL NOTES

- In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
- The color coding of the power transformer leads is as follows:
 Primary—two black leads
 High voltage sec.—two red leads
 High voltage secondary center tap—red and yellow lead
 6.3v sec.—two heavy green leads
 5v sec.—two heavy yellow leads
- The tuning indicator (6G5 tube—used in Model X chassis only) is mounted in the cabinet above the dial. The color coding of the tuning indicator tube cable is as follows:
 Black, white tracer—cathode
 Red—target
 Black—filament
 Green—grid
- The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed of the motor, part No. 4BPM-11, remove the turn-table and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position. The phonograph motor on part No. 3XZ-695 record changer, has the speed adjustment brought out to an indicator arm and escutcheon. The speed of this motor is adjusted by shifting the indicator to the right or left.

MODEL AB184, Chassis AB
 MODEL X175, Chassis X, EMERSON RADIO & PHONOGRAPH CORP.
 Changes, Parts Late

REPLACEMENT PARTS

CHASSIS PARTS

Part No.	Description	Price
4BT-396	Three-band antenna coil (See Production Changes)	2.00
4BT-397	Three-band interstage coil (See Production Changes)	1.80
4BT-398	Three-band oscillator coil (See Production Changes)	2.00
4BT-399	456 kc first I-F transformer	2.00
4BT-400	Power transformer	6.00
4BT-401	Oscillator choke (See Production Changes)	2.25
4BT-399	Oscillator choke (See Production Changes)	2.25
LR-64	5,000 ohm, 1/4 watt carbon resistor	1.16
3VR-270	90 ohm, 1/2 watt wire-wound resistor	1.16
LR-60	20,000 ohm, 1/4 watt carbon resistor	1.16
KR-53	50,000 ohm, 1/4 watt carbon resistor	1.16
KR-57	1 megohm, 1/4 watt carbon resistor	1.16
R27, R28, R37	1 megohm, 1/4 watt carbon resistor (See Production Changes)	1.16
R5, R23, R25	1 megohm, 1/4 watt carbon resistor	1.16
R6	25,000 ohm, 1 watt carbon resistor	1.16
R10	12,000 ohm, 2 watt carbon resistor	2.28
2TR-226	2 megohm, 1/4 watt carbon resistor	1.16
R17, R22	2 megohm, 1/4 watt carbon resistor	1.16
HR-42	Volume control—500,000 ohms	.90
R13	1 megohm resistor in 6G5 socket (See Production Changes)	1.16
R15	20,000 ohm, 1/4 watt carbon resistor	1.16
R20	75,000 ohm, 1/4 watt carbon resistor	1.16
R21	1,500 ohm, 1/4 watt carbon resistor	1.16
R24	1,500 ohm, 1/4 watt carbon resistor	1.16
R26	Tone control with line switch—500,000 ohms	1.00
R29	50,000 ohm, 1/4 watt carbon resistor	1.16
R32	35,000 ohm, 1/4 watt carbon resistor	1.16
R34	220 ohm, 2 watt wire-wound resistor	1.16
R35	1,500 ohm, 2 watt carbon resistor	2.28
R38	25,000 ohm, 1/4 watt carbon resistor (See Production Changes)	1.16
OR-73	75,000 ohm, 1/4 watt carbon resistor with gear train for dial (See Production Changes)	7.16
C1, C2, C3	Trimmer, part of antenna coil	.20
C4, C5, C6	0.00005 mf mica condenser (See Production Changes)	.20
C7, C8	0.006 mf, 200 volt tubular condenser	.40
C9	0.0042 mf mica condenser (See Production Changes)	.40
C10, C11	Dual adjustable padding condenser C10—1,200 to 2,000 mmf C11—300 to 600 mmf	.96
+C12, C13, C14	Trimmer, part of oscillator coil	.20
C15, C38	0.25 mf, 200 volt tubular condenser	.20
C16	0.1 mf, 200 volt tubular condenser (See Production Changes)	.20
C18, C53	Trimmer, part of interstage coil	.20
C19, C33	0.0001 mf mica condenser	.20
C20, C32, C37	0.01 mf, 400 volt tubular condenser	.20
C42, C51	0.00015 mf mica condenser (See Production Changes)	.20
C21, C22	4-150,000 ohm, 1/4 watt carbon resistor	1.16
C24, C38	0.1 mf, 200 volt tubular condenser	.20
C25	0.02 mf, 200 volt tubular condenser	.20
C26	0.1 mf, 600 volt tubular condenser	.20
C28, C28	Trimmer, part of first I-F transformer	.20
C29, C30	0.0005 mf mica condenser	.20
C31, C41	0.1 mf, 400 volt tubular condenser	.20
C32, C34	0.02 mf, 400 volt tubular condenser	.20
C40	0.5 mf, 200 volt tubular condenser	.20
C43	0.012 mf, 400 volt tubular condenser	.20
C44	0.012 mf, 400 volt tubular condenser	.20
C45	0.05 mf, 400 volt tubular condenser	.20
C46	5 mf, 25 volt tubular dry electrolytic condenser	.90
C47, C60	0.01 mf, 400 volt molded type paper condenser	.20
C48	30 mf, 400 volt wet electrolytic condensers	1.46
C49	Dynamic speaker complete (See Production Changes)	18.76
	Dynamic speaker complete (for Model X)	18.76
	Wave-band switch	1.90
	Symphonizer switch	1.90
	2XS-137A	2.00
	XL-9 or	2.00
	4BL-94	2.00
	4BL-95	2.00
	3XM-277	2.00
	4BZ-678	1.80
	Idle pulley	.06
	Idle pulley spring	.06
	3XZ-587	.06
	3XZ-587	.06
	3XZ-587	.06
	3XZ-587	.06
	Frequency indicating pointer (screw-type)	1.10
	Frequency indicating pointer (push-on type)	.80
	Band-spread pointer	.10
	Dial drive shaft and pulley	.30
	Drive shaft bushing	.20
	Drive shaft bushing	.20
	Electron Ray escutcheon	2.00
	Electron Ray escutcheon	2.00
	Dial escutcheon with crystal	1.66

PHONOGRAPH PARTS

Part No.	Description	Price
R40	1 megohm, 1/4 watt carbon resistor	1.16
R41, R42, R43	600,000 ohm, 1/4 watt carbon resistor	1.16
C54	0.002 mf, 600 volt tubular condenser	.20
KR-57	600,000 ohm, 1/4 watt carbon resistor	1.16
KR-56	300,000 ohm, 1/4 watt carbon resistor	1.16
3H57-74	Crystalline motor with accessories (for Model AB)	28.00
3Z2-564	Crystalline motor with accessories (for Model AB)	28.00
3Z2-695	Record changer complete with motor and pickup (for Model X)	127.60
3LS-282	On-off switch for phonograph motor	.70
4RS-301	Automatic stop switch for motor	2.60
3LW-253	Phono-radio switch cup	1.00
3LW-255	Phonograph needle cup	1.16
3XZ-711	Phonograph record album (for Model X-175)	6.60

PRODUCTION CHANGES

Model X receivers bearing serial numbers below 1,472,743 differed from the schematic diagram and parts list as follows:

a. C26 was a 0.1 mf, 400 volt tubular condenser.

In addition, Model X receivers bearing serial numbers below 1,328,650 and Model AB receivers below 1,373,394 differ from the schematic diagram as follows:

6G5 tubes are used instead of 6J5 tubes.

In addition, Model X receivers bearing serial numbers below 1,328,250 differed from the schematic diagram and parts list as follows:

The 1 megohm resistor R15 was in the chassis and not in the 6G5 socket as indicated. The 6G5 socket and cable assembly was part no. 3AZ-322C and was color coded as follows:

Shield—Cathode, Blue—plate, Red—target, Black—filament, Green—grid.

In addition, Model X receivers bearing serial numbers below 1,293,633 and Model AB receivers bearing serial numbers below 1,320,357 differed from the schematic and parts list as follows:

a. R4 and C22 were connected in the circuit as shown by the dotted lines on the schematic diagram. When these parts are in the circuit there is no direct connection between the 6A8 oscillator plate and the grid of the 6C5 oscillator.

b. The antenna coil was part no. 3XT-335. The interstage coil was part no. 3XT-336. The oscillator coil was part no. 3XT-337. The variable condenser was part no. 3XC-328. The dial face was part no. 3XZ-495.

c. The short-wave fixed padder, C9 on schematic diagram, was a 0.0038 mf mica condenser.

d. The trimmer condenser C53 on the schematic diagram, was a 0.0005 mf mica condenser.

e. R6 was a 40,000 ohm 1 watt resistor.

f. C21 was a 0.00005 mf mica condenser.

g. C16 was a 0.01 mf, 400 volt paper condenser.

h. R3 was returned to ground instead of to the wave-band switch as shown on the schematic diagram.

NOTE: When the above parts are used in the receiver the frequency range is as follows: Broadcast—560 to 1750 kc, Police—1750 to 6,250 kc and Short-wave—5.6 to 18.0 megacycles.

In addition, Model X receivers bearing serial numbers below 1,216,700 and Model AB receivers bearing serial numbers below 1,291,097 differed from the schematic diagram and parts list as follows:

a. C22 shown dotted on the schematic diagram was a 0.00005 mf mica condenser.

In addition, Model X receivers bearing serial numbers below 1,156,977 differed from the schematic diagram and parts list as follows:

a. No phonograph terminal strip was used. The volume control was connected directly to R11.

b. R4 was a 200,000 ohm resistor.

In addition, Model X receivers bearing serial numbers below 1,065,450 differed from the schematic diagram as follows:

a. R39 was not in the circuit.

In addition, earlier Model AB combinations use phonograph motor, part no. 3LPM-3.

This motor is equipped with a mounting plate. Later combinations use phonograph motor, part no. 4BPMM-1, mounted on a separate mounting panel which is not supplied with motor.

EMERSON RADIO & PHONOGRAPH CORP. MODEL AB184, Chassis AB
 MODEL X175, Chassis X, Late Alignment

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 6000, 18,000 and 20,000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on *all three bands*, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, *not* a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

In aligning antenna trimmers on the high-frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

Location of Coils and Trimmer Adjustments

The i-f transformers are located on the left-hand side of the top of the chassis. The first i-f transformer is the one nearest the rear of the chassis. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The antenna coils for the three bands are wound on one form located on the front wall of the chassis with the trimmers accessible through holes in the chassis. The left-hand trimmer is for the broadcast band, the right-hand trimmer is for the short-wave band and the central trimmer is for the police band.

The r-f interstage coils are also wound on one form and mounted underneath the chassis on the right-hand side of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer closer to the variable is for the short-wave band and the one farthest from the variable is for the broadcast band. On coils 4BT-397 only, a middle trimmer will be found. This trimmer is for compensating the short-wave band at 6 mc.

The oscillator coils are wound on one form and mounted underneath the chassis directly behind the r-f interstage coil. The trimmers are accessible through holes in the top of the chassis. The trimmer closest to the variable condenser is for the broadcast band, the trimmer farthest from the variable is for the short-wave band and the central trimmer is for the police band.

The oscillator series padder for the broadcast and police bands are mounted underneath the chassis near the oscillator coils. The adjusting screws are available through holes in the top of the chassis. The padder nearest the front of chassis is for the broadcast band. The padder for the short-wave band is a fixed mica condenser, C9 on the schematic diagram. If this condenser is to be replaced use a condenser with a value within 2% of that specified.

I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube through a .02 mf condenser and adjust the four i-f trimmers for maximum response. (Do not remove the grid clip from the tube.)

Broadcast Alignment

Both pointers on the dial should coincide vertically at 890 kc. (For adjustment the thinner pointer may be slipped around on its shaft.)

Set the wave-band switch at the broadcast (clockwise) position, and the dial pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the pointer at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

Set the wave-band switch at the police-band (central) position and the dial pointer at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the dial pointer to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure.

Short-Wave Alignment

The following alignment procedure is used when aligning receivers on which the short-wave band covers frequencies up to 22 mc. These receivers will bear serial numbers above 1,293,633 on the Model X Chassis, and above 1,320,357 on the Model AB Chassis:

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak. Move the pointer to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer (central trimmer at right of variable condenser) for maximum response.

The following alignment procedure is used when aligning receivers on which the short-wave band extends only to 18 mc. These receivers will bear serial numbers below 1,293,633 on the Model X Chassis, and below 1,320,357 on the Model AB Chassis:

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial pointer to 18 and feed 18,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

Tube Data

- 1-6K7—R-f amplifier (opposite front section of variable condenser)
- 1-6A8—Modulator (opposite rear section of variable condenser)
- *1-6J5—Oscillator (behind variable condenser)
- 1-6K7—I-f amplifier (between i-f transformers)
- *1-6J5—Diode detector, a.v.c. (left side of chassis nearest front)
- *1-6J5—First a-f amplifier (left side of chassis second from front)
- *1-6J5—Symphonizer rectifier (left side of chassis third from front)
- *1-6J5—Symphonizer amplifier (left side of chassis fourth from front)
- 2-6F6—Pentode power output (two large tubes at rear)
- *1-6J5—Phase inverter (rear between 6F6 tubes)
- *1-6J5—Second a-f amplifier (behind 6A8 tube)
- 2-80—Rectifiers (beside power transformer)
- 1-6G5—Tuning indicator (Model X Chassis only).

If the metal type 6F6 power output tubes are replaced with the equivalent glass type 6F6G, the one nearest the center of the chassis must be shielded, otherwise audio oscillation may result.

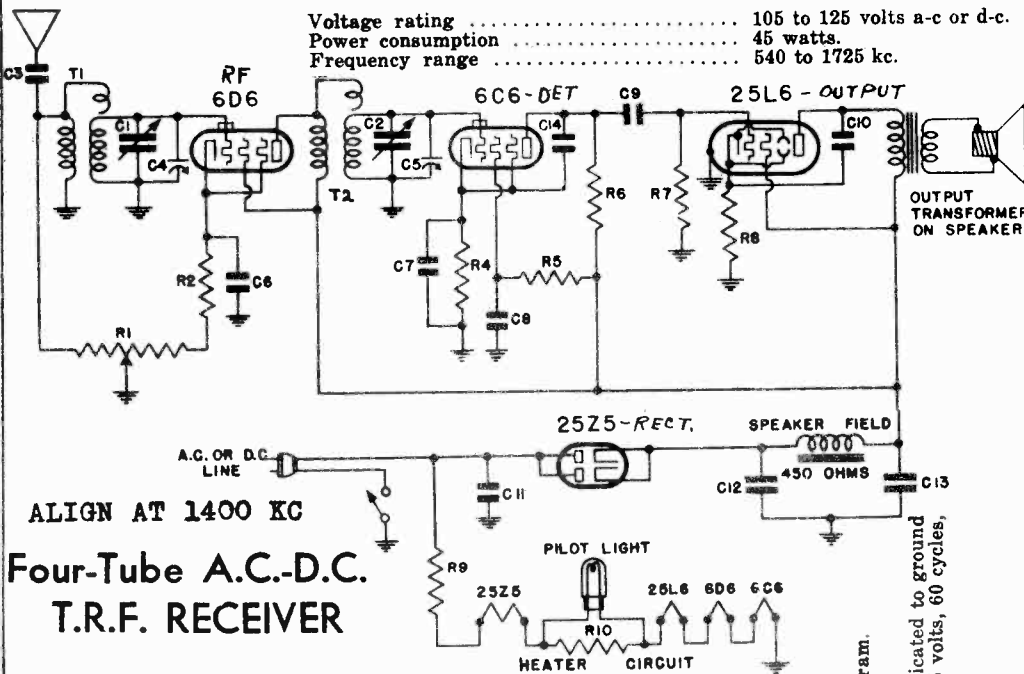
MODEL Q157
Chassis Q
Schematic, Changes
Voltage, Alignment
Parts

EMERSON RADIO & PHONO. CORP.

MODEL Q157

CHASSIS MODEL Q

Voltage rating 105 to 125 volts a-c or d-c.
Power consumption 45 watts.
Frequency range 540 to 1725 kc.



ALIGN AT 1400 KC
Four-Tube A.C.-D.C.
T.R.F. RECEIVER

*ITEM	PART NO.	DESCRIPTION	PRICE
T1	2VT-241B	Broadcast antenna coil	.60
T2	3QT-344	Broadcast detector coil	.55
R1	2VR-219D	Volume control—75,000 ohms	1.00
R2	3RR-276	310 ohm 1/2 watt wire-wound molded resistor	.16
R4	OR-73	250,000 ohm 1/4 watt carbon resistor	.16
R5	HR-42	2 megohm 1/4 watt carbon resistor	.16
R6	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R7	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R8	3QR-297	110 ohm 1/2 watt wire-wound resistor	.16
R9	3QR-297	185 ohm 1/2 watt wire-wound resistor	.16
R10	2DR-213	40 ohm metal clad wire-wound resistor	.30
C1, C2	3QC-332	Two gang variable condenser	2.45
C3	NNC-199	.0001 mf roll type condenser	.20
+C4, C5		Trimmer part of variable condenser	
C6, C8	AC-6	0.1 mf, 200 volt roll type condenser	.20
C7	BC-13	0.25 mf, 200 volt roll type condenser	.20
C9	LC-65	0.02 mf, 400 volt roll type condenser	.20
C10	EC-23	0.03 mf, 400 volt roll type condenser	.20
C11	2VC-242A	0.1 mf, 400 volt molded type paper condenser	.20
C12, C13	3QC-338	Dual 16 mf, 100 volt dry electrolytic condenser	1.05
C14	EC-24A	0.0001 mf mica condenser	.20
	3QS-257A	5" dynamic speaker	4.85
	XL-9	Pilot light, 6.3 volt 25 amp., Mazda No. 46	1.05
	KKW-46A	Line cord with built-in resistor (R9)	.15
	3QZ-527	Condenser pulley	.02
	3QZ-528	Pointer pulley	.02
	3RZ-484	Drive cord	.20
	3RZ-519	Drive cord spring	.20
	3QZ-530	Dial pointer	.35
	3QZ-525	Wire screen grille	.35

List Price as Effective as of May 1st, 1937 (Subject to change without notice)

*Item number locates the article on the schematic diagram.
†These trimmers cannot be supplied separately.

PRODUCTION CHANGES

1. In receivers bearing serial numbers below 1,109,446
 a) C10 was returned to B plus instead of the 25L6 cathode as shown on the schematic diagram.
 b) A 250,000 ohm 1/4 watt carbon resistor was connected from the cathode of the 6D6 to B plus.
 c) C14 was connected from the 25L6 grid to ground.

2. In receivers bearing serial numbers below 1,200,886 the speaker was part No. 3QS-257.

3. In receivers bearing serial numbers between 1,308,161 and 1,317,310,
 a) The speaker was part No. 2VS-157. The voltage across its field was 130 volts.
 b) A filter choke, part No. ZZZ-196A, was used in series with the B+ lead.

below 1,203,000 - C14 was returned to ground instead of the 6C6-cathode as shown on the schematic diagram.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a-c.

Tube	Plate	Screen	Cathode	Fil.
6D6	100	100	2.8	6.3
6C6	30	15	1.4	6.3
25L6	93	100	5.7	25-0

Voltage across speaker field—30 volts.
25Z5 cathode to ground—130 volts.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc. is required. Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark above 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a standard dummy antenna (a .0001 mf mica condenser may be used as a substitute), adjust both trimmer condensers on the variable condenser for maximum response.

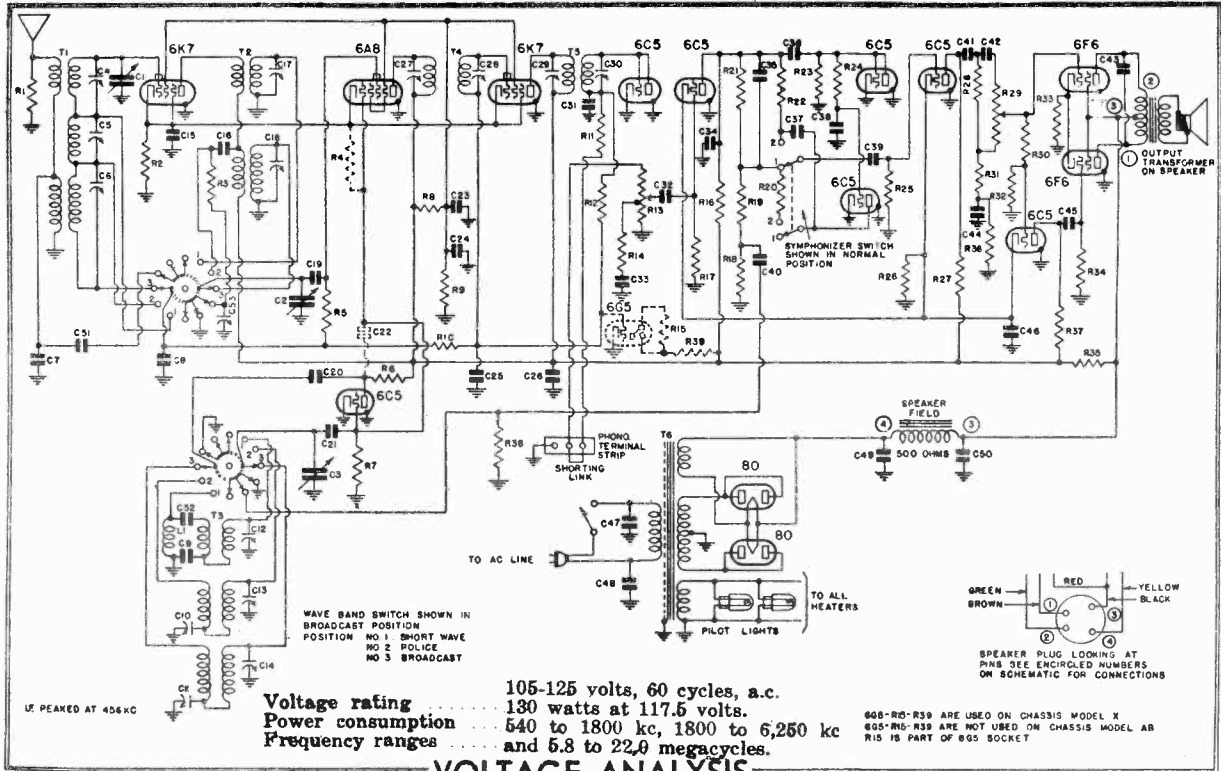
TUBE DATA

The tube complement is as follows:
 1—6D6, r-f amplifier.
 1—6C6, biased detector.
 1—25L6, beam power output.
 1—25Z5, dual half-wave rectifier.

Chassis X, Late
Schematic, Voltage
Changes

EMERSON RADIO & PHONO. CORP.

MODELS AB178, -182, -183
Chassis AB
MODELS X146, -178, -183



Chassis AB and Late X Alignment, Parts

EMERSON RADIO & PHONO. CORP.

REPLACEMENT PARTS

MODEL NUMBERS FOR THESE CHASSIS ARE IDENTIFIED IN THE INDEX

Table with columns: Item, Part No., Description, Price. Lists various electronic components like resistors, capacitors, coils, and trimmers with their respective part numbers and prices.

*Item number locates the article on the schematic diagram. †These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 6000, 18,000 and 20,000 kc should be used. An output meter should be used across the voice coil or speaker output transformer for observing maximum re...

Location of Coils and Trimmer Adjustments
The i-f transformers are located on the left-hand side of the top of the chassis. The first i-f transformer is the one nearest the rear of the chassis. The four trimmers for the i-f adjustment are available through holes in the tops of the...

Short-Wave Alignment
Set the wave-band switch at the broadcast (clockwise) position and the variable condenser and adjust the four i-f trimmers for maximum response. (Do not remove the grid clip from the tube.)

Police Alignment
Both pointers on the dial should coincide vertically at 890 kc. (For adjustment the black pointer may be slipped around on its shaft.)

Wave-Band Alignment
Set the wave-band switch at the police-band (central) position and the dial pointer at 1.8. Feed 1800 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series paddler for maximum response.

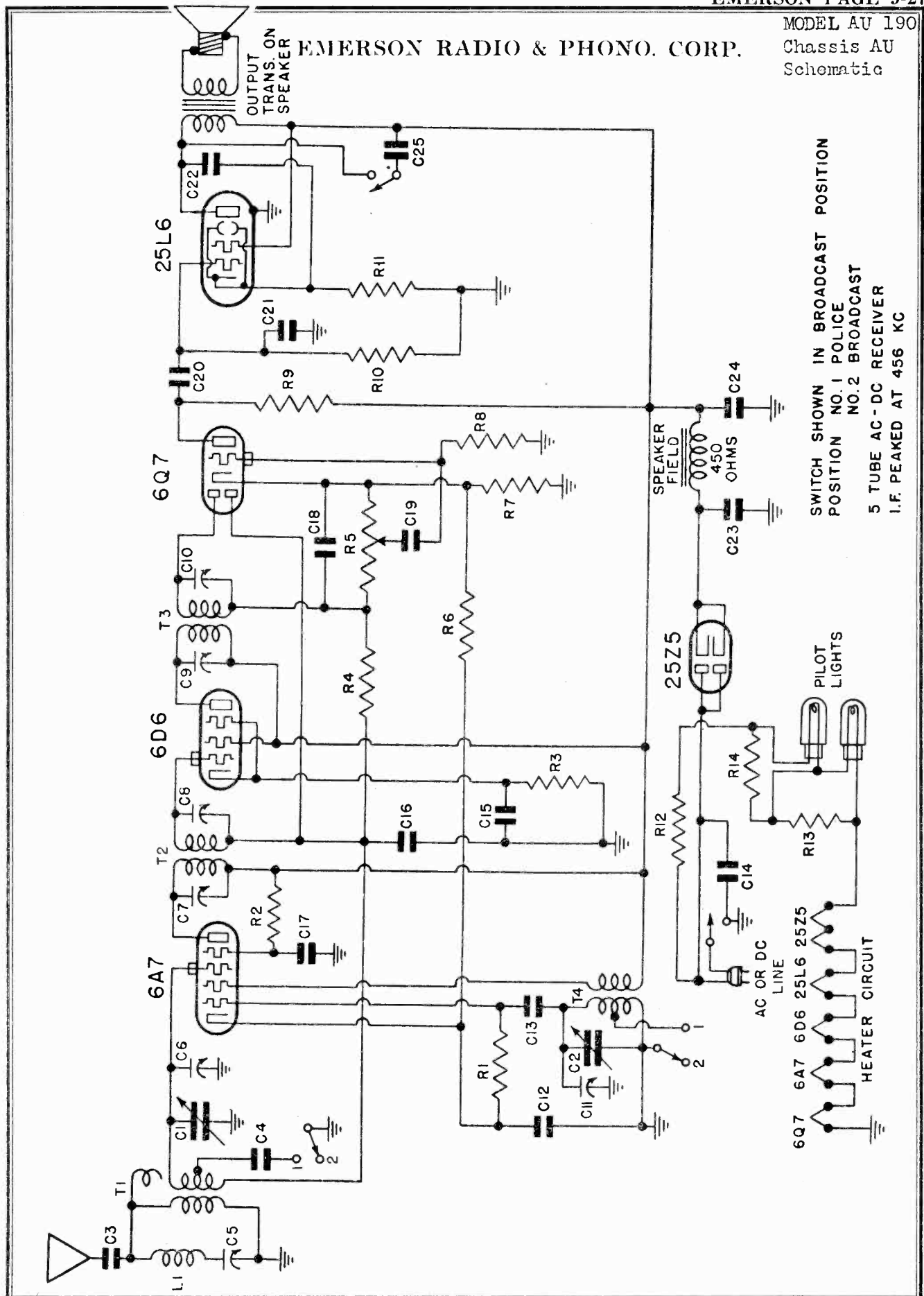
General Notes
1. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knob on set far that they touch the...

Color Coding
The color coding of the power transformer leads is as follows:
Primary—two black leads
High voltage sec.—two red leads
High voltage secondary center tap—red and yellow lead
The tuning indicator (chassis only) is mounted in the cabinet above the dial. The color coding of the indicator tube cable is as follows:
Black—filament
White tracer—cathode
Red—target

MODEL AU 190

Chassis AU
Schematic

EMERSON RADIO & PHONO. CORP.



SWITCH SHOWN IN BROADCAST POSITION
POSITION NO.1 POLICE
NO.2 BROADCAST
5 TUBE AC-DC RECEIVER
I.F. PEAKED AT 456 KC

MODEL AU 190

Chassis AU
Alignment, Voltage
Parts, Notes

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 466 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.
The second i-f transformer is mounted underneath the chassis in the right hand front corner. The trimmers are accessible through holes in the top of the chassis directly in front of the first i-f transformer.
The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 466 kc wave-trap is mounted on the metal strip at the rear of the chassis directly behind the variable condenser. The trimmer for the 466 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

i-f and Wave-trap Alignment

Rotate the wave-band switch (located at the rear of the chassis) to the broadcast position, clockwise, and swing the variable condenser to the minimum capacity position. Feed 466 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 466 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-aligning and does not require any adjustment.

Voltage rating 105-125 volts, a.c. or d.c.
Power consumption 50 watts
Frequency ranges 540 to 1680 kc and 1680 to 4200 kc.

GENERAL NOTES

- If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
- One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
- The filament dropping resistor (R-12—see schematic) is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
- In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
- The color coding of the i-f transformer leads is as follows:
Grid—green
Plate—blue
B plus—red

- In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-32. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
- Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
- The wave-trap in the receiver has been adjusted for maximum signal rejection at 466 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Tube Data

The tube complement is as follows:
1—6A7, pentagrid oscillator-modulator.
1—6D6, first i-f amplifier.
1—6Q7, diode detector, a-f amplifier, a.v.c.
1—25L6, beam power output.
1—25Z5, dual half-wave rectifier.

All octal-base tubes are replaceable with either metal or equivalent octal-base glass tubes.

REPLACEMENT PARTS LIST

Item	Part No.	DESCRIPTION	PRICE
L1	4DT-348	466 kc adjustable wave-trap	.60
T1	3RT-384A	Two-band antenna coil	.85
T2	3RT-320B	466 kc first i-f transformer	1.10
T3	4DT-362	Two-band oscillator coil	1.10
T4	3RT-319A	Two-band oscillator coil	1.10
C1	4UC-366	0.002 mf, 600 volt tubular condenser	3.60
C3	3HC-274	0.0012 mf, mica condenser	.20
C4	4DC-367	Trimmer, part of 466 kc wave-trap	.30
IC5, C11		Trimmer, part of variable condenser	
IC7, C8, C9, C10		Trimmer, part of i-f coil assembly	
C12, C15, C17	AA-C-106A	0.1 mf, 200 volt tubular condenser	.20
C13	2VC-242A	0.00005 mf mica condenser	.20
C16, C25	BC-12	0.05 mf, 200 volt molded paper condenser	.20
C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	CCG-127	0.01 mf, 200 volt tubular condenser	.20
C20	LC-56	0.02 mf, 400 volt tubular condenser	.20
C22	3FC-398	0.025 mf, 400 volt tubular condenser	.20
C23, C24	4DC-346	Dual 16 mf, 160 volt tubular dry electrolytic condenser	1.60
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	3CR-395	410 ohm 1/2 watt wire-wound resistor	.16
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	3FR-256A	Volume control with line switch—500,000 ohm	1.00
R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	KR-56	250,000 ohm 1/4 watt carbon resistor	.16
R10	KR-55	500,000 ohm 1/4 watt carbon resistor	.16
R11	3FR-293	145 ohm, 1/2 watt wire-wound resistor	.16
R12		80 ohm, 1/2 watt wire-wound resistor	.16
R13, R14	4UR-322	80 ohm tapped wire-wound metal clad resistor: R13—40 ohms, R14—40 ohms	.30
	3QS-257B	5" dynamic speaker	4.85
4DS-264		Wave-band switch	.85
3FS-256D		Tone control switch	.20
4BL-94		Pilot light 6.3 volt, .25 amp, Mazda No. 44, Bayonet type	.90
4UV-103		Line cord with built-in resistor wire—R12	.90
4UM-389		Metal plate for dial face	.10
4UZ-699		Dial face	.70
4UZ-700		Dial pointer	.15

When ordering replacement parts specify part number

Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the variable condenser and can not be supplied separately.

‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

VOLTAGE ANALYSIS

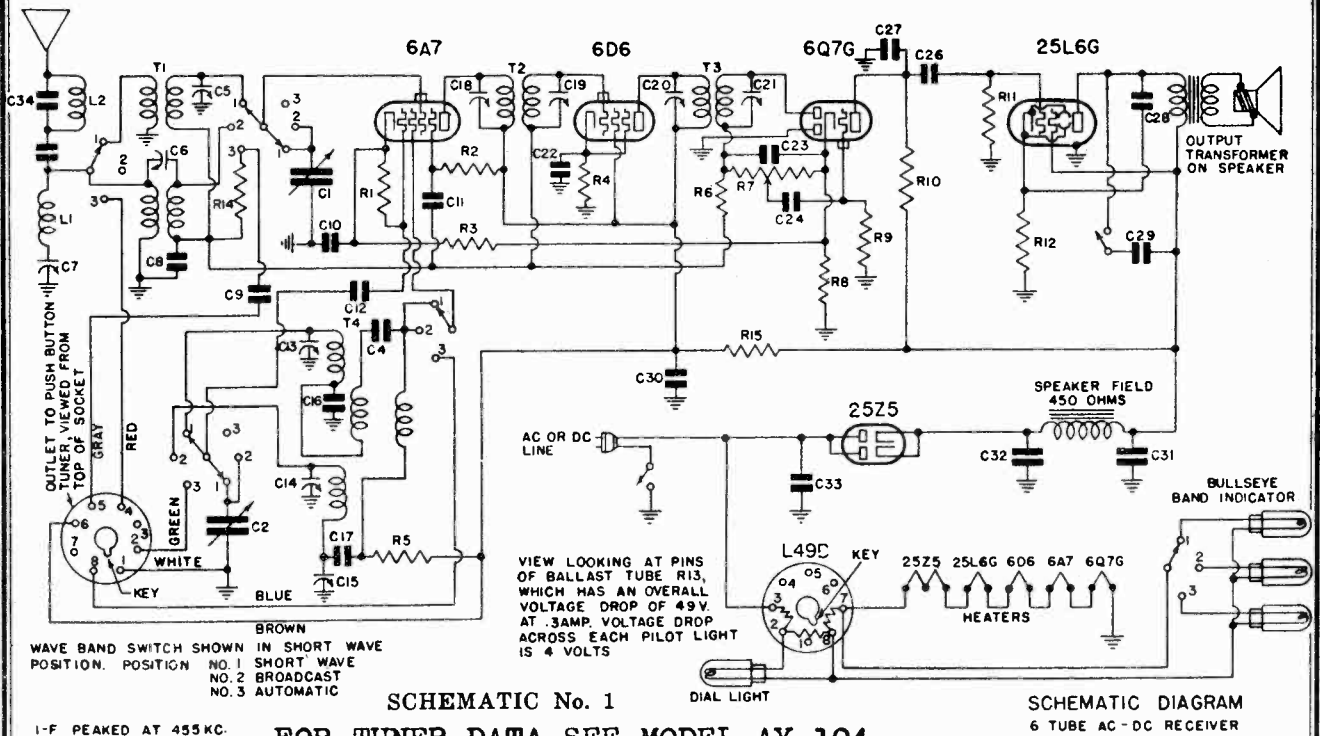
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. Meter

Table	Point	Screen	Coil/Plate	Over. Plate	V _L
6A7	100	60	100	—	6.3
6D6	100	3.5	—	—	6.3
6Q7	43	—	—	—	1.2
25L6	92	100	—	—	6.5
25Z5	—	—	—	—	25.0

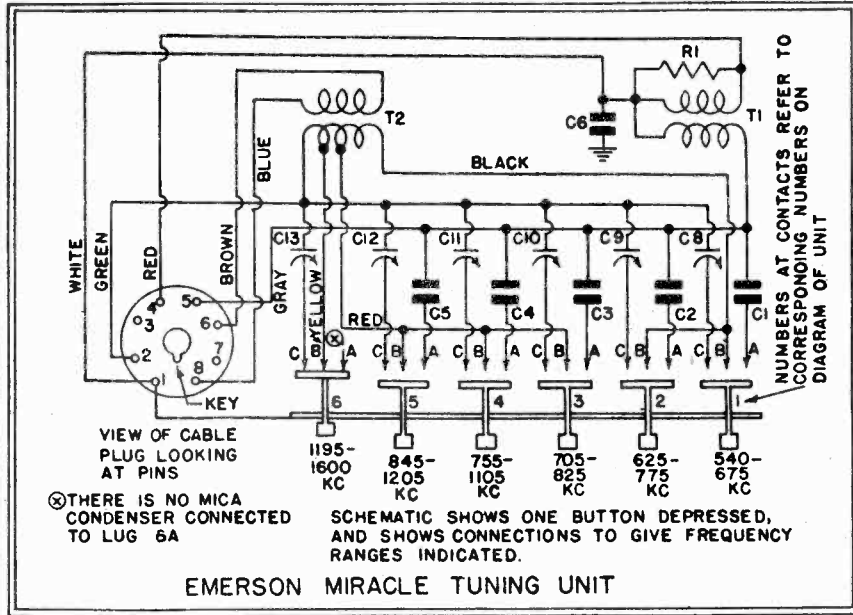
Voltage at 25Z5 cathode—123 volts.
Voltage across speaker field—28 volts.

EMERSON RADIO & PHONO. CORP.

MODEL AV 193
Chassis AV
Schematic, Voltage
Tuner



SCHMATIC No. 1
6 TUBE AC-DC RECEIVER



SCHMATIC No. 2

Tube Data

- 1-6A7, pentagrid oscillator-modulator.
 - 1-6D6, first i-f amplifier.
 - 1-6Q7G, diode detector, a-f amplifier, a.v.c.
 - 1-25L6G, beam power output.
 - 1-25Z5, dual half-wave rectifier.
 - 1-L49D or L49DG, ballast tube.
- All octal-base tubes may be replaced with either metal or equivalent octal-base glass tubes.

Voltage rating 105-125 volts, a.c. or d.c.
Power consumption 50 watts.
Frequency ranges 540 to 1,730 kc, and 5.6 to 18.0 megacycles.

CHASSIS MODEL AV
MODEL AV-193

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. All readings except cathode and heater voltages were taken on 250 volt scale. Line voltage for all readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	104	45	2.3	82	6.3
6D6	104	104	3.8	—	6.3
6Q7G	45	—	1.2	—	6.3
25L6G	95	104	6.2	—	25.0

Voltage at 25Z5 cathode—133 volts.
Voltage across speaker field—29 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light sections of ballast tube (pins Nos. 8, 7); (pins Nos. 2, 8)—4 volts.

MODEL AV 193

Chassis AV
Alignment, Notes
Parts

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
Always use as weak a test signal as possible during alignment.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and 455 kc wave-trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer farthest from the front of the chassis is for the 455 kc trap. The central trimmer is for the broadcast antenna coil and the trimmer closest to the chassis front is for the short-wave antenna coil. The broadcast antenna coil is mounted on the right-hand side of the chassis. The short-wave antenna coil is mounted on the left-hand side of the chassis. The trimmers for these coils are accessible through holes in the back of the chassis. Looking at the rear of the chassis, the left-hand trimmer is for short-wave and the right-hand trimmer for broadcast.
The two i-f transformers are in oblong cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The second i-f transformer is the one located just to the right of the speaker.
The broadcast series padding condenser is located on the top of the chassis to the left of the variable condenser.

i-f Transformer and Wave-Trap Alignment

Turn the switch to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 465 kc to the grid cap of the 6A7 tube through a .02 mf condenser and adjust the four i-f trimmers for maximum response. Feed 465 kc to the antenna through a .0022 mf condenser and adjust the wave-trap trimmer (rear screw, to the right of variable condenser) for minimum response. (See General Note, No. 8.)

Short-wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.
Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (screw to left of variable condenser to 6A7) for maximum response and then adjust the short-wave antenna trimmer (screw to right of variable condenser) for maximum response. (Rotate variable condenser rotor shaft back and forth through a small arc.)

Broadcast Alignment

Rotate the wave-band switch to the broadcast position (central) and set dial at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute). Adjust the broadcast series padding screw to left of variable condenser, near front of chassis) for maximum response. Rotate the dial to 140, feed 1400 kc and adjust the broadcast oscillator trimmer (screw to left of variable condenser, nearest electrolytic) for maximum response and then the antenna trimmer (center screw to right of variable condenser) for maximum response. Return dial to 60, feed 600 kc and readjust the series padder, rocking the variable condenser for maximum response.

GENERAL NOTES

- If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
- One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
- The filament dropping resistor (L-49D on schematic) is in a special tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
- When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
- The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
- The color coding of the i-f transformer leads is as follows:
Grid return—black
B plus—blue
B minus—red
- An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
- The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from a neighboring station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
- The receivers are adjusted at the factory so that the entire broadcast frequency range is divided, and so covered, by the six buttons. In rare cases where two or more of the desired stations fall within the frequency range of one button, the internal connections in the automatic unit may be changed so that any of these stations may be selected by the automatic unit. The changes to be made are simple, and may be accomplished by following the instructions given in these notes.

REPLACEMENT PARTS LIST

See Price of Unit in Part No. (Subject to change without notice)

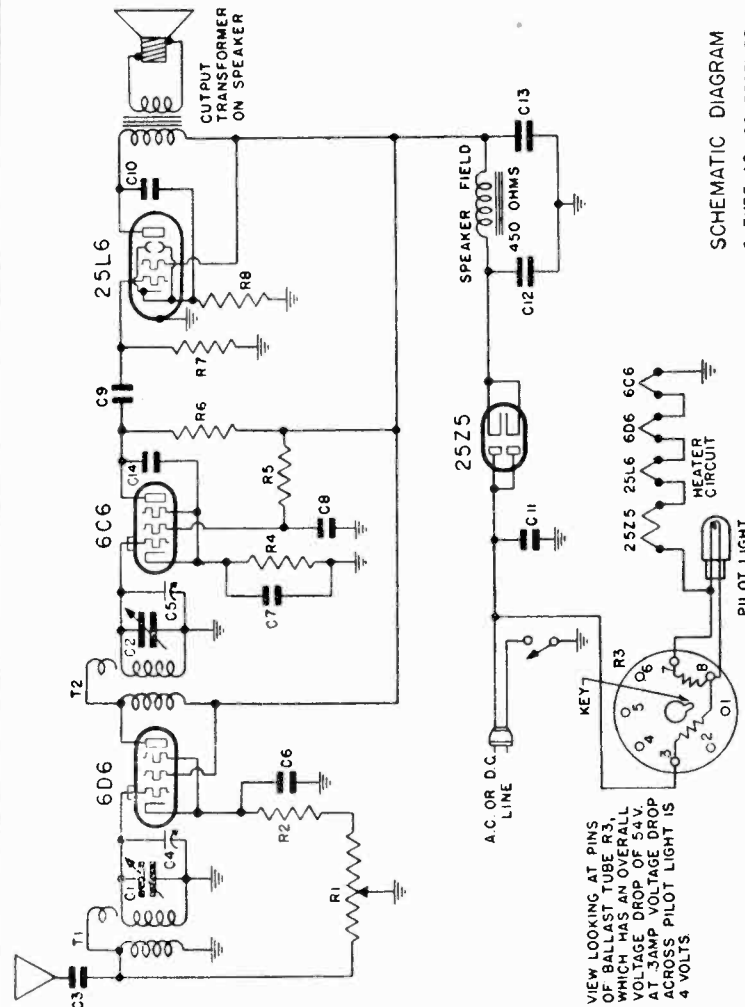
Schematic No. 1
DESCRIPTION

Part No.	DESCRIPTION	PRICE
4VT-419	455 kc fixed wave-trap	.75
4RT-418	Two-band antenna coil	1.86
4VT-420	455 kc first i-f transformer	1.35
4VT-421	455 kc second i-f transformer	1.25
4VT-422	455 kc antenna trimmer	1.50
4VT-423	455 kc antenna trimmer	1.25
4VT-424	455 kc antenna trimmer	1.25
4VT-425	455 kc antenna trimmer	1.25
4VT-426	455 kc antenna trimmer	1.25
4VT-427	455 kc antenna trimmer	1.25
4VT-428	455 kc antenna trimmer	1.25
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4VT-619	455 kc antenna trimmer	1.25
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4VT-693	455 kc antenna trimmer	1.25
4VT-694	455 kc antenna trimmer	1.25

Schematic, Voltage Alignment, Parts

EMERSON RADIO & PHONOGRAPH CORP.

MODELS BA199, BA201
Chassis BA



SCHEMATIC DIAGRAM
5 TUBE AC - DC RECEIVER

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Fil.
6D6	100	100	2.3	6.3
6C6	30	15	2.1	6.3
25L6G	93	100	6	25.0

Voltage across speaker field—26 volts.
25Z5 cathode to ground—126 volts.

The tube complement is as follows:
 1—6D6, r-f amplifier.
 1—6C6, biased detector.
 1—25L6G, beam power output.
 1—25Z5, dual half-wave rectifier.
 1—L55BG, ballast tube.

Voltage rating	105 to 125 volts, a.c. or d.c.
Power consumption	45 watts
Frequency range	540 to 1725 kc.

*ITEM	PART NO.	DESCRIPTION	PRICE
T1	5AT-422	Broadcast antenna coil	.50
T2	5AT-423	Broadcast detector coil	.50
R1	2VR-219D	Volume control—75000 ohms, with line switch	1.00
R2	3CR-294	240 ohm, 1/2 watt wire-wound resistor	.16
R3	L55-BG	Plug-in ballast tube	.55
R4	OR-73U	25000 ohm, 1/4 watt carbon resistor	.16
R5	HR-42U	2 megohm, 1/4 watt carbon resistor	.16
R6, R7	KR-56U	500,000 ohm, 1/4 watt carbon resistor	.16
R8	3QR-297	110 ohm, 1/2 watt wire-wound resistor	.16
C1, C2	5AC-376	Two-gang variable condenser	2.40
C3	NNC-199	.001 mf, 600 volt tubular condenser	.20
+C4, C5		Trimmers, part of variable condenser.	
C6, C8	AC-6	.1 mf, 200 volt tubular condenser	.20
C7	BC-13	.25 mf, 200 volt tubular condenser	.20
C9	LC-65	.02 mf, 400 volt tubular condenser	.20
C10	LC-64	.05 mf, 400 volt tubular condenser	.20
C11	EEC-132	.1 mf, 400 volt tubular condenser	.20
C12, C13	4DC-345A	Dual-16 mf, 100 volt dry electrolytic condenser	1.20
C14	5AC-384	.0002 mf, 600 volt tubular condenser	.20
	3TS-312	5" dynamic speaker	4.20
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	5AZ-745	Brass condenser pulley	.05
	5AZ-746	Brass condenser pulley	.05
	5AZ-747	Dial pointer	.05
	3RZ-484	Drive cord	.02
	3RZ-519	Drive cord spring	.02
	5AZ-792	Dial face	.05
	5AZ-779A	Dial crystal for Model BA-199	.05
	5AZ-794	Dial crystal for Model BA-201	.10

List Price as Effective as of Feb. 15, 1938

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc. is required. Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response. Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS AY194, AY195
 Chassis AY
 MODEL BD 197
 Chassis BD
 Tuner Data

EMERSON RADIO & PHONO. CORP.

MODEL AV193
 MODEL AZ196
 Tuner Data

The Switching Assembly

Removal of the rear cover will show switch lugs arranged in groups of three's as indicated in the diagram. Lugs lettered B for each button are connected to the oscillator taps which have the following frequency ranges.

- Black covered wire—540-775 kc.
- Red covered wire—705-1205 kc.
- Yellow covered wire—1195-1600 kc.

Lugs lettered A for each button are connected to fixed condensers (C1, C2, C3, C4, C5) which tune the antenna coil properly in each of the following bands, respectively:

- 1. 540-675 kc.
- 2. 625-775 kc.
- 3. 705-825 kc.
- 4. 755-1105 kc.
- 5. 845-1205 kc.
- 6. 1195-1600 kc.

Lugs lettered C are connected to adjustable trimming condensers (C6, C9, C10, C11, C12, C18) which tune the oscillator coil.

All of these trimmers have the same capacity range.

Change of Internal Connections

If the button covering a certain frequency band is already in use and it is desired to tune in another station in that same band, the range of any other button may be changed to accommodate that station by observing the following procedure:

(It is not necessary to remove the tuning assembly from the shield box.)

1. Place the box in a position which corresponds to Fig. 3 above. Disconnect the molded mica condenser (C1 or C2 or C3 or C4 or C5) of the button to be changed and, with a short piece of wire reconnect this lug A to lug C of the button which covers the desired range and also connect the other end of this wire to the lug ED (C6, C9, C10, C11, C12, C18) of the button to be changed. **DO NOT DISCONNECT THE MOLDED MICA CONDENSER.** To allow for future changes tape-up the end of the disconnected molded condenser.

2. If lug B of the button being changed is already connected to the colored tap lead which includes the desired frequency no further operation is necessary. However, if lug B is not connected to an oscillator tap which includes the desired frequency then connect this lug B with another piece of wire to the correct tap lead which already is connected to the tap-lead of the correct color (band).

3. Tune in the new station and check the results. Replace rear cover on the box and mount the box in the cabinet. Insert proper station name-tabs and retune all stations.

EXAMPLES

Button 4 is in use and it is desired to shift button 5 to tune in a station on 830 kc.

1. Cut C5 (50 mmf) mica condenser from lug 5A. (Tape end.)
2. Connect lug 5A to lug 4A. (Button 4 covers the desired frequency.)
3. Since lug 5B is already connected to the red oscillator lead which includes 830 kc. in its range, the operation has been completed. Retune the new station.

Button 2 is in use and it is desired to shift button 3 to tune in a station on 700 kc.

1. Cut C3 (120 mmf) mica condenser from lug 3A. (Tape end.)
2. Connect lug 3A to lug 2A. (Button 2 covers the desired frequency.)
3. Disconnect the wire joining lug 3B to the red oscillator lead at 4B and resolder to lug 2B where it will connect with the black oscillator lead which covers the desired frequency. Retune the new station.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly connected to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R13 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
 Plate—blue
 B plus—red
 Grid return—black

7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of the interference of neighboring stations on a particular frequency, a high efficiency antenna system is recommended. Instructions for the installation of these antennas are supplied with each kit.

8. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

9. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

10. To change the dial light the chassis should be removed from the cabinet.
 Model AY receivers are adjusted at the factory so that the entire broadcast frequency range is divided, and so covered, by the six buttons. In rare cases where two or more of the desired stations fall within the frequency range covered by one button, the dial light may be readjusted so that the desired station is selected by following the instructions given in these notes.

MIRACLE TUNING UNIT

Pre-adjustment of Station Buttons

The six push-buttons provide a choice of six favorite stations for Miracle Tuning. Adjustments for any particular station must be made by means of the small cross-slotted button next to the chosen push-button. The following procedure must be carefully observed in making these adjustments.

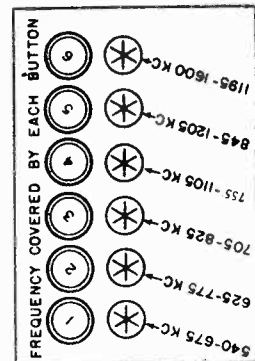


Fig. 1. The above illustration will also be found on a label on the cabinet.

1. Select six (or less) nearby broadcast stations desired for Miracle Tuning and determine their frequencies. Stations are usually listed in newspapers with their frequencies in kilocycles.
2. The frequency ranges covered by each button is shown in the figure on the left. Of the chosen stations select the one with the lowest frequency. The button with a frequency range which includes this station frequency is the one to be adjusted for that particular station.
 For example, a desired station has a frequency of 600 kilocycles. Button No. 1 covers a range of 540 to 675 kilocycles. This button, therefore, is the one to be used for that station.

Where a station has a frequency which falls within the range of two buttons use the button with the lower frequency range except when this lower button has already been reserved for another station.

3. Locate the station call letters on one of the four cards supplied in an envelope with the receiver. Push out the cross-slotted button bearing the station call letters from the celluloid disc over this tab and press it in firmly.

4. Turn the receiver on and wait at least 15 minutes in order that all of the internal parts of the receiver attain a uniform temperature. Rotate the wave-band switch to the central position for broadcast reception. Tune in the desired station by means of the station selector knob. Rotate the wave-band switch to the automatic position, clockwise. Press in the push-button to be used for this station. Be sure this button is pushed all the way in until a click is heard and the button remains depressed. The cross-slotted button next to the selected push-button is the one to be adjusted. (See Fig. 2.) Insert a small thin coin in one of the slots in the button and rotate it slowly in either direction until the desired station is heard. Once the station is heard rotate the adjusting button back and forth through a very small arc until the station is received at maximum volume and the reception is clear and undistorted. Check to be sure that you have adjusted the button for the proper station by rotating the wave-band switch for a moment to the broadcast position (central) and then back to the automatic position.

5. Select the desired station of the next highest frequency and adjust the proper button, carefully observing the procedure outlined above. In similar fashion adjust for any remaining stations chosen.

6. Once the buttons have been adjusted a slight readjustment of each button may be necessary. Starting with the first button repeat the entire adjusting procedure, being very careful to adjust the buttons to the middle of the stations. When rotating the adjusting button, do not exert any undue pressure on it since this may disturb the final adjustment.



Adjusting the Button With a Coin. Fig. 2

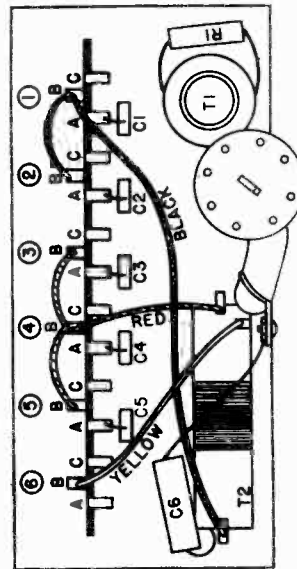
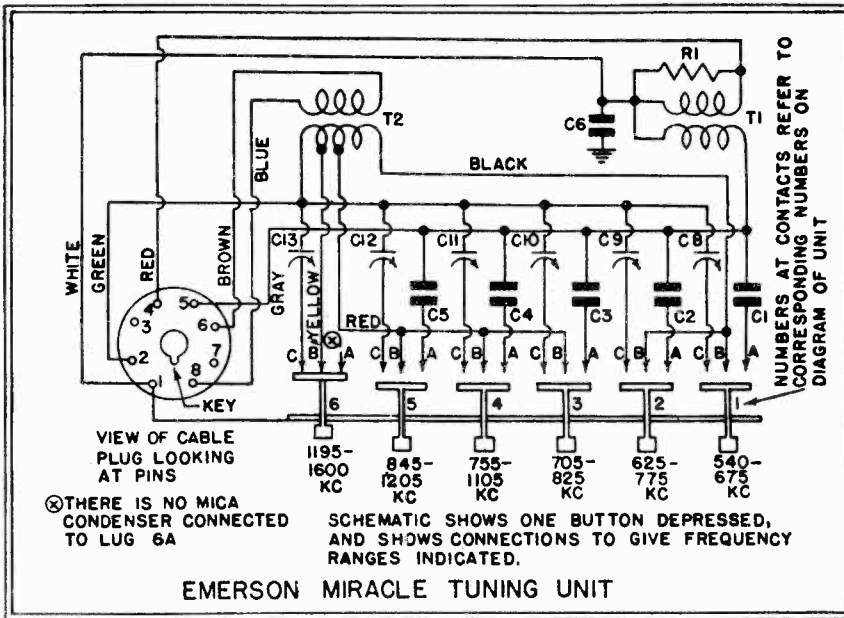


Fig. 3. Rear View of Push Button Unit

EMERSON RADIO & PHONO. CORP. MODELS AY194, AY195

Chassis AY
MODEL BD197
Chassis BD
Schematics



EMERSON MIRACLE TUNING UNIT

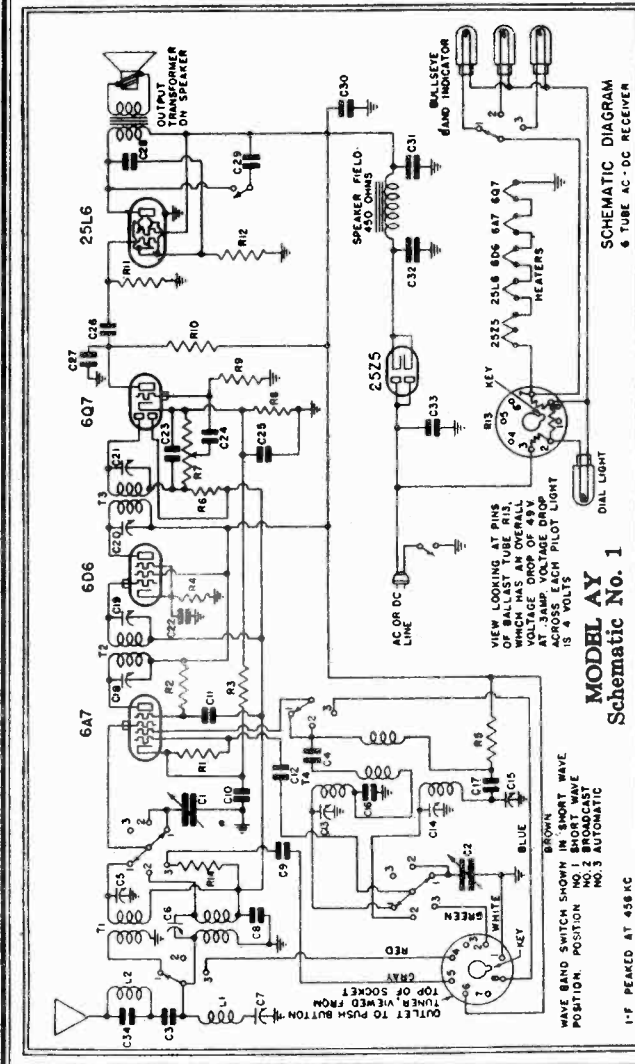
Schematic No. 3

Tube Data

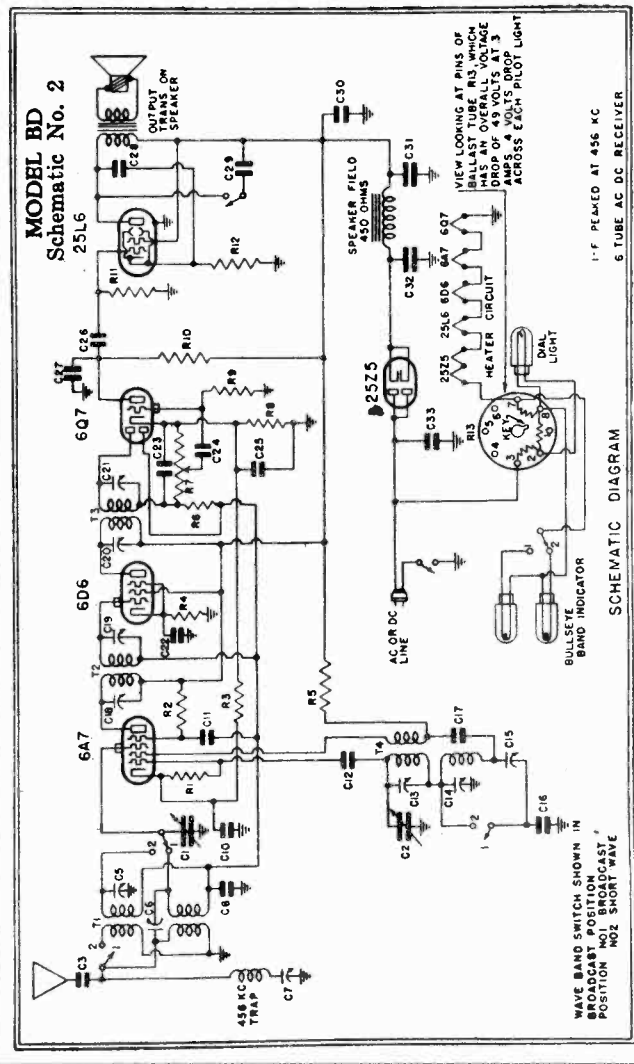
The tube complement is as follows:

- 1-6A7, pentagrid oscillator-modulator.
- 1-6D6, first i-f amplifier.
- 1-6Q7, diode detector, a-f amplifier, a.v.c.
- 1-25L6, beam power output.
- 1-25Z6, dual half-wave rectifier.
- 1-3CR-241, ballast tube (R13 on schematic).

All octal-base tubes may be replaced with either metal or equivalent octal-base glass tubes.



MODEL AY
Schematic No. 1



MODEL BD
Schematic No. 2

MODELS AY194, AY195
Chassis AY
MODEL BD197
Chassis BD

EMERSON RADIO & PHONO CORP.

Alignment, Voltage
Changes, Parts

PRODUCTION CHANGES

BD Chassis bearing serial numbers above 1,589,950 differ from the schematic as follows:
(a) C27 is changed to C28.
(b) C27 is connected from 25L6 grid to cathode.
(c) A 4 point tone control has been added, consisting of the following parts:
One 0.04 mf, 400 volt tubular condenser, part no. 4DC-349 price .80
One 0.07 mf, 400 volt tubular condenser, part no. 5DC-389 price .20
One 0.07 mf, 400 volt tubular condenser, part no. 5DC-389 price .20

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1400 and 15,000 kc should be used. In addition an output meter should be used across the voice coil or output transformer for observing maximum response.
The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers.
The last method in adjusting trimmers should be used, i.e., turning one, not a loosening one.
Never have a trimmer with the outside plate so loose that there is not tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments:

The broadcast antenna coil, short wave antenna coil, and 455 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short wave antenna coil. The central trimmer is for the broadcast antenna coil. The trimmer farthest from the front of the chassis is for the 455 kc trap.
The broadcast and short-wave oscillator coils are on one form which is mounted below and to the left of the variable condenser. The short-wave oscillator coil is mounted on a separate form which is in the top of the chassis for the broadcast oscillator coil.
The two I-F transformers are in oblong cans located on the top of the chassis. The first I-F transformer is the one behind and to the left of the variable condenser. The second I-F transformer is the one located just to the right of the speaker.
The broadcast series padding condenser is located on the top of the chassis to the left of the variable condenser.

I-F Transformer and Wave-Trap Alignment

Turn the switch to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 610 455 kc to the grid cap of the 6A7 tube through a .02 mf condenser and adjust the four I-F trimmers for maximum response. Feed 455 kc to the antenna through a .0002 mf condenser and adjust the wave-trap trimmer (near screw, to the right of variable condenser) for minimum response.
NOTE: Since the dial indicator is fastened to the cabinet, a piece of wire should be fastened to the variable condenser and bent over to form a pointer when the chassis is removed from cabinet.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.
Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (screw to left of variable, closest to 6A7) for maximum response and then adjust the short-wave antenna trimmer (screw to left of variable, nearest electrolytic) for maximum response and then the antenna trimmer (rod in variable condenser rear shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position (central) and set dial at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute). Adjust the broadcast series paddler (screw to left of variable condenser, near front of chassis) for maximum response. Rotate the dial to 140 feed 1400 kc and adjust the broadcast oscillator trimmer (screw to left of variable, nearest electrolytic) for maximum response and then the antenna trimmer (center screw to right of variable condenser) for maximum response. Return dial to 60, feed 600 kc and readjust the series paddler, rocking the variable condenser for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. All readings except cathode and heater voltages were taken on 250 volt scale. Line voltage for all readings was 117.3 volts, 60 cycles, a.c.

Point	Plate	Screen	Cathode	Org. Plate	File
1.40	104	46	82	—	6.8
1.50	606	33	—	—	6.3
1.60	607	104	1.2	—	6.8
1.86	25L6	104	6.2	—	25.0

Voltage at 25L6 cathode—133 volts.
Voltage across speaker field—29 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light sections (pins Nos. 8, 7); (pins Nos. 2, 8)—4 volts.

Voltage rating 105-125 volts, a.c. or d.c.
Power consumption 60 watts.
Frequency ranges 540 to 1,730 kc, and 5.6 to 18.0 megacycles.

REPLACEMENT PARTS LIST
FOR CHASSIS MODELS BD AND AY

List Price
Emerson
Mar. 1st, 1938
Price
(Subject to change without notice)

Part No.	DESCRIPTION	PRICE
T1	Two-hand antenna coil	1.75
T2	455 kc first I-F transformer	1.35
T3	455 kc second I-F transformer	1.30
R1	50,000 ohm 1/4 watt carbon resistor	.16
R2	30,000 ohm 1/4 watt carbon resistor	.16
R3	410 ohm 1/2 watt wire-wound resistor	.16
R4	10,000 ohm 1/4 watt carbon resistor	.16
R5	2 megohm 1/4 watt carbon resistor	.16
R6	10,000 ohm volume control with line switch	.16
R7	500,000 ohm volume control with line switch	.16
R8	240 ohm 1/2 watt wire-wound resistor	.16
R9	100,000 ohm 1/4 watt carbon resistor	.16
R10	140 ohm 1/2 watt wire-wound resistor	.16
R11	Plug-in type ballast tube	.30
R12	Two-gang variable condenser	.20
R13	0.001 mf, 600 volt tubular coil assembly	.20
R14	0.05 mf, 200 volt tubular condenser (see Production Changes)	.20
C1	0.1 mf, 200 volt tubular condenser (see Production Changes)	.20
C2	0.006 mf mica condenser	.20
C3	0.0005 mf mica condenser	.20
C4	Single adjusting padding condenser. Range: 300 to 600 mmf	.20
C5	0.042 mf mica condenser	.20
C6	0.01 mf, 400 volt tubular condenser	.20
C7	Trimmer, part of first I-F transformer.	.20
C8	Trimmer, part of second I-F transformer.	.20
C9	0.02 mf, 400 volt tubular condenser (see Production Changes)	.20
C10	40 mf, 150 volt wet electrolytic condenser	.20
C11	20 mf, 150 volt wet electrolytic condenser	.20
C12	0.1 mf, 400 volt molded paper condenser	.20
C13	6 1/2" x 1 1/2" speaker amp. Mazda No. 44	.20
C14	4BL-56	.20
C15	4ZM-347	.20
C16	Condenser drive pulley	.20
C17	Conical dial face	.20
C18	Conical escutcheon with crystal	.20
C19	Drive cord springs	.20
C20	Drive shaft	.20
C21	Drive pulley	.20
C22	Tone control switch (see Production Changes)	.20
C23	Two-hand oscillator coil	.20
C24	455 kc fixed wave-trap	.20
C25	1 megohm 1/4 watt carbon resistor	.20
C26	0.0004 mf, 600 volt tubular condenser	.20
C27	0.00005 mf mica condenser	.20
C28	Wave-band switch	.20
C29	Wave-band switch	.20
C30	Two-hand oscillator coil	.20
C31	Wave-band switch	.20
C32	Conical speaker grille assembly	.20
C33	Antenna coil	.20
C34	Oscillator coil	.20
C35	.00025 mf mica condenser	.20
C36	.00015 mf mica condenser	.20
C37	.000075 mf mica condenser	.20
C38	.00005 mf mica condenser	.20
C39	.001 mf, 600 volt tubular condenser	.20
C40	Dual trimming condenser	.20
C41	25L6 1/2 watt carbon resistor	.20
C42	6 gang push-button selector switch	.20
C43	6 wire cable with oval plug assembly	.20
C44	Push-button	.20
C45	Celluloid push-button cap	.20
C46	Trimmer button	.20
C47	Station name-dab cards (complete set)	.20
C48	Station name-dab cards (complete set)	.20
C49	Station name-dab cards (complete set)	.20
C50	Station name-dab cards (complete set)	.20
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C96	Station name-dab cards (complete set)	.20
C97	Station name-dab cards (complete set)	.20
C98	Station name-dab cards (complete set)	.20
C99	Station name-dab cards (complete set)	.20
C100	Station name-dab cards (complete set)	.20

MIRACLE TUNING UNIT PARTS (Schematic No. 3)

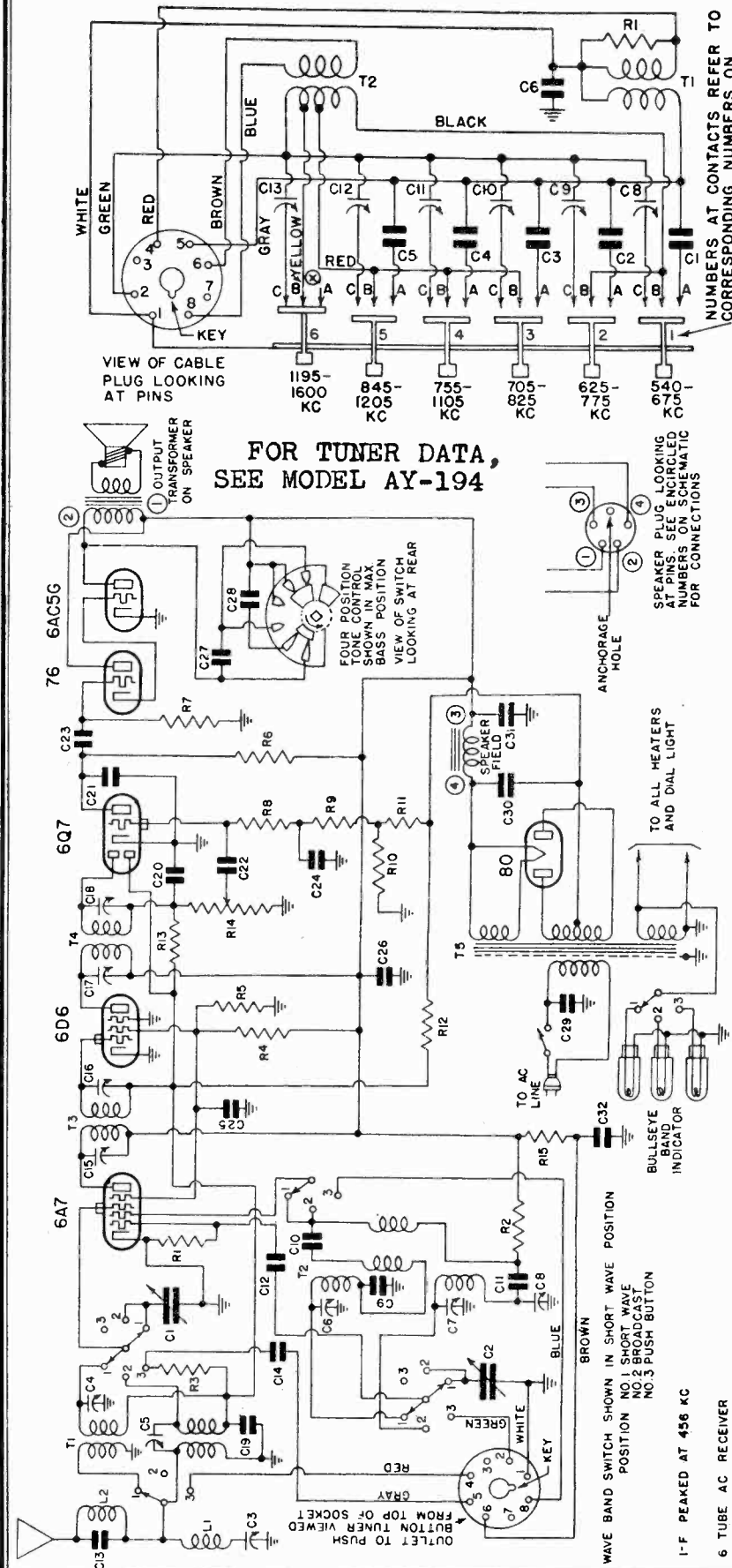
Part No.	DESCRIPTION	PRICE
T1	Two-hand oscillator coil	1.86
T2	Wave-band switch	.80
T3	Conical speaker grille assembly	.80
T4	Antenna coil	.80
C1	0.00025 mf mica condenser	.20
C2	.00015 mf mica condenser	.20
C3	.000075 mf mica condenser	.20
C4	.00005 mf mica condenser	.20
C5	.001 mf, 600 volt tubular condenser	.20
C6	Dual trimming condenser	.20
C7	25L6 1/2 watt carbon resistor	.20
C8	6 gang push-button selector switch	.20
C9	6 wire cable with oval plug assembly	.20
C10	Push-button	.20
C11	Celluloid push-button cap	.20
C12	Trimmer button	.20
C13	Station name-dab cards (complete set)	.20
C14	Station name-dab cards (complete set)	.20
C15	Station name-dab cards (complete set)	.20
C16	Station name-dab cards (complete set)	.20
C17	Station name-dab cards (complete set)	.20
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C97	Station name-dab cards (complete set)	.20
C98	Station name-dab cards (complete set)	.20
C99	Station name-dab cards (complete set)	.20
C100	Station name-dab cards (complete set)	.20

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and cannot be supplied separately.
‡These trimmers are supplied in pairs.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL AZ 196
Chassis AZ
Schematic Voltage
Tuner



VIEW OF CABLE
PLUG LOOKING
AT PINS

FOR TUNER DATA,
SEE MODEL AY-194

FOUR POSITION
TONE CONTROL
SHOWN IN MAX.
BASS POSITION
VIEW OF SWITCH
LOOKING AT REAR

SPEAKER PLUG LOOKING
AT PINS. SEE SCHEMATIC
NUMBERS ON SCHEMATIC
FOR CONNECTIONS

TO ALL HEATERS
AND DIAL LIGHT

ANCHORAGE
HOLE

⊗ THERE IS NO MICA
CONDENSER CONNECTED
TO LUG 6A

⊗ THERE IS NO MICA
CONDENSER CONNECTED
TO LUG 6A

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground (chassis). All readings except cathodes, heaters, and B plus at rectifier were taken on 260 volt scale. Line voltage for these readings was 117.5 volts, 60 cycle, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	227	78	0	165	6.3 a.c.
6D6	227	78	0	—	6.3 a.c.
6Q7G	105	—	0	—	6.3 a.c.
76	227	—	11.5	—	6.3 a.c.
6AC5G	213	—	0	—	6.3 a.c.

B plus at 80 filament—300 volts.
Voltage across field—75 volts.
Grid bias for all tubes is developed across resistors R10 and R11. The total voltage should be 11.5 volts. Voltage measured across R10 should be 2.25 volts. To check bias on 6A7 and 6D6 tubes, measure the values of R12, R13 and R14. See schematic.

EMERSON MIRACLE TUNING UNIT

Tube Data

The tube complement is as follows:

- 1—6A7, oscillator-modulator
- 1—6D6, I.F. amplifier
- 1—6Q7G, diode detector, a.v.c., a.f. amplifier
- 1—76, audio amplifier
- 1—6AC5G, power output
- 1—80, full-wave rectifier.

NUMBERS AT CONTACTS REFER TO
CORRESPONDING NUMBERS ON
DIAGRAM OF UNIT

SCHEMATIC SHOWS ONE BUTTON DEPRESSED,
AND SHOWS CONNECTIONS TO GIVE FREQUENCY
RANGES INDICATED.

Voltage rating 105-125 volts, 60 cycles, a.c.
Power consumption 53 watts
Frequency ranges 540 to 1730 kc and 5.6 to 18 megacycles

MODEL AZ 196

Chassis AZ

Alignment, Changes
Notes, Parts

EMERSON RADIO & PHONOGRAPH CORP.

ADJUSTMENTS

An oscillator with frequencies of 466, 600, 1400 and 15,000 kc should be used. In addition an output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the higher frequency.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, short-wave antenna coil and 466 kc adjustable wave-trap are on one assembly mounted on a bracket on the top of the chassis, to the right of the 6A7 tube. The trimmers for these coils are accessible through holes in the coil bracket. The hole closest to top is for the trap. The central hole is for the broadcast antenna coil and bottom hole for short-wave antenna coil.

The broadcast and short-wave oscillator coils are mounted on the inside of the right-hand chassis wall. The trimmer is for the broadcast oscillator.

The two I-F trimmers are in oblong cans located on the top of the chassis. The first I-F is the one behind the antenna coil. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the right-hand side of the chassis with its adjusting screw accessible through a hole in the chassis wall.

I-F and Wave-trap Alignment

Turn the switch to the broadcast position (central) and rotate the variable condenser to the minimum capacity position. Feed 466 kc through a .02 mf condenser to the grid cap of the 6A7 tube and adjust the four I-F trimmers for maximum response. Feed 466 kc to the antenna through a .0002 and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

Since the indicator is fastened to the cabinet, a wire should be fastened to the variable condenser and bent over to form a dial pointer when the chassis is removed from the cabinet.

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer for maximum response. The variable condenser should be rotated while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc.)

Broadcast Alignment

Rotate the wave-band switch to the broadcast position and set the dial at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser for maximum response. Rotate the dial to 140, feed 1400 kc and adjust the broadcast antenna trimmer for maximum response. Return the dial to 60, feed 600 kc and readjust the series padding condenser, locking the variable condenser for maximum response.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 6AC5G tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the I-F transformers is as follows:
Grid—green
Grid—red
Plate—black
Plate—blue.
4. The color coding of the wave-trap transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
6.3 volt secondary—two yellow leads
5. The adjustable padding condenser band is mounted on the front of the chassis near the tuning control, with the screw adjustment accessible through a hole in the front of the chassis. The short-wave band has a fixed padder; C9 on the schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. The wave-trap in the receiver has been adjusted for maximum signal rejection at 466 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
7. An efficient antenna system is necessary to fully realize the merits of the receiver. For reduction of noise, the Emerson All-Wave Antenna System, Model W-89, is recommended. Instructions for the installation of these antennas are supplied with each kit.
In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
8. To supply the dial light the chassis should be removed from the cabinet.
9. The receiver is adjusted at the factory so that the entire broadcast frequency range is divided, and so covered, by the six buttons. In rare cases where two or more of the desired stations fall within the frequency range of one button, the internal connections in the automatic unit may be changed so that any of these stations may be selected by the automatic unit. The changes to be made are simple and may be accomplished by following the instructions given in these notes.

REPLACEMENT PARTS

Part No.	DESCRIPTION	PRICE
4RT-418	Two-band antenna coil with 466 kc trap	\$1.75
4VT-417	466 kc first I-F transformer	1.40
4ZC-426	466 kc second I-F transformer	1.40
381-321A	Power transformer	4.30
4ZT-419	466 kc fixed wave-trap	.55
4VY-420	ohm, 1/4 watt carbon	.16
4VZ-421	ohm, 1/4 watt carbon	.16
4XK-422	1 megohm, 1/4 watt carbon resistor	.16
4XK-423	25,000 ohm, 1/4 watt carbon resistor	.16
4XK-424	40,000 ohm, 1/4 watt carbon resistor	.16
4XK-425	250,000 ohm, 1/4 watt carbon resistor	.16
4XK-426	45 ohm, 1/4 watt wire-wound resistor	.16
4XK-427	175 ohm, 1/4 watt metallized resistor	.16
4XK-428	10 megohm, 1/4 watt carbon resistor	.16
4XK-429	500,000 ohm volume control, with line switch	1.00
4XK-430	Two-gang variable condenser	3.35
4XK-431	Trimmer, part of antenna coil	.50
4XK-432	Trimmer, part of oscillator coil	.40
4XK-433	Adjustable padding condenser, 300-900 mmf	.40
4XK-434	1000000 mf mica condenser	.20
4XK-435	.01 mf, 400 volt tubular condenser	.20
4XK-436	.0004 mf, 600 volt tubular condenser	.20
4XK-437	Trimmer, part of first I-F transformer	.20
4XK-438	Trimmer, part of second I-F transformer	.20
4XK-439	.0002 mf, 600 volt tubular condenser	.20
4XK-440	.02 mf, 400 volt tubular condenser	.20
4XK-441	1 mf, 200 volt tubular condenser	.20
4XK-442	25 mf, 200 volt tubular condenser	.20
4XK-443	100 mf, 200 volt tubular condenser	.20
4XK-444	.015 mf, 400 volt tubular condenser	.20
4XK-445	.03 mf, 400 volt tubular condenser	.20
4XK-446	.01 mf, 400 volt molded condenser	.20
4XK-447	16 mf, 375 volt wet electrolytic condenser	.80
4XK-448	16 mf, 250 volt wet electrolytic condenser	.80
4XK-449	6 1/2" dynamic speaker	5.70
4XK-450	Pilot light, 6.3 volt, 25 amp, Mazda No. 44	1.40
4XK-451	Wave-band switch	1.90
4XK-452	Conical escutcheon with crystal	.02
4XK-453	Drive cord springs	.20
4XK-454	Drive shaft and pulley	.20

MIRACLE TUNING UNIT PARTS

4YT-424	Antenna coil	\$.30
4VT-412	Oscillator coil	.66
AC-7-A	.0025 mf mica condenser	.20
AC-7-B	.0012 mf mica condenser	.20
4ZC-382A	.00012 mf mica condenser	.20
4ZC-381A	.000075 mf mica condenser	.20
AAC-106A	.00006 mf mica condenser	.20
4ZC-381B	.001 mf, 500 volt tubular condenser	.20
4VC-368	Dual trimming condenser	.40
TTT-201	3000 ohm, 1/4 watt carbon resistor	.16
4VS-309	6 gang push-button selector switch	2.65
4VZ-721	6 wire cable with octal plug assembly	1.75
4VZ-722	Push-button	.06
4VZ-723	Control knob	.06
4VZ-724	Trimmer button	.06
4VZ-725	Station name-tab cards (complete set)	.45

When ordering replacement parts specify part numbers.

PRODUCTION CHANGES

A 3 ohm 1/4 watt wire-wound resistor, part no. 4ZR-326, is located in series with the dial light.

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

‡These trimmers are supplied in pairs.

EMERSON RADIO & PHONOGRAPH CORP.

I-F PEAKED AT 456 KC

The tube complement is as follows:

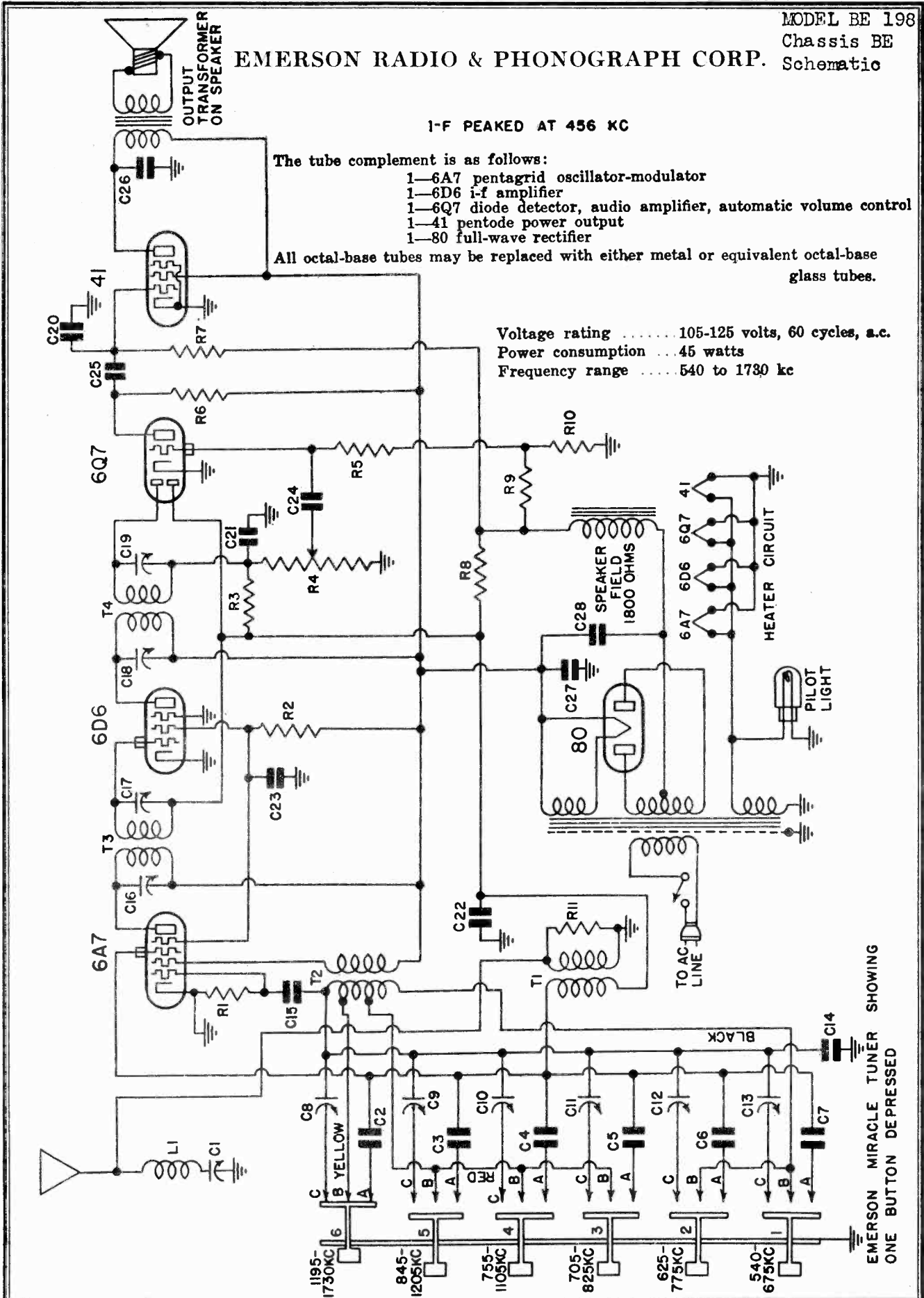
- 1—6A7 pentagrid oscillator-modulator
- 1—6D6 i-f amplifier
- 1—6Q7 diode detector, audio amplifier, automatic volume control
- 1—41 pentode power output
- 1—80 full-wave rectifier

All octal-base tubes may be replaced with either metal or equivalent octal-base glass tubes.

Voltage rating 105-125 volts, 60 cycles, a.c.

Power consumption 45 watts

Frequency range 540 to 1730 kc



EMERSON MIRACLE TUNER SHOWING ONE BUTTON DEPRESSED

MODEL BE 198
Chassis BE
Alignment, Notes
Voltage, Parts

EMERSON RADIO & PHONOGRAPH CORP.

ADJUSTMENTS

An oscillator with frequency of 456 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the push-button switch. The trimmers for the two i-f transformers are available through holes in the tops of the cans.
The antenna coil is located above the chassis, in front of the 6A7 tube.
The oscillator coil is located under the chassis, behind the volume control.
The 456 kc wave-trap is mounted on the front chassis wall beneath the push-button switch. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

i-f and Wave-Trap Alignment

Push the button at the extreme right and feed 456 kc through a .02 mf condenser to the grid cap of the 6A7 tube (do not touch the grid cap). Adjust the two i-f trimmers for maximum response. Feed 456 kc to the antenna through standard dummy antenna leads (4002). The condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response. (See General Note No. 1.)

Repairs to this receiver should be made only by a qualified radio serviceman.

Should this receiver require servicing at any time insist that the dealer or serviceman supply genuine Emerson parts. If parts or servicing notes are not available at dealers, write directly to manufacturer.

In all correspondence concerning this receiver be sure to mention the complete serial number, which will be found at the rear of the chassis.

GENERAL NOTES

- The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
- The receiver should never be turned on with the 41 tube out of its socket since the rapid rise in rectifier voltage would damage the electrolytic condensers.
- The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
- The color coding of the leads of the i-f transformers is as follows:
Grid—green
Plate—blue
B plus—red
Grid return—black

- The color coding of the power transformer leads is as follows:
High voltage sec.—two red leads
High voltage sec. center tap—red and yellow lead
Plate—blue
B plus—red
Screen—brown
Filament and ground—black

- With a few exceptions, the color coding of the general wiring is as follows:
A.v.c. and cathode—white or yellow
Grid—green
Filament and ground—black

The receiver is adjusted at the factory so that the entire broadcast frequency range is divided, and so covered, by the six buttons. In rare cases where two or more of the desired stations fall within the frequency range of one button, the internal connections in the automatic unit may be changed so that any of these stations may be selected by the automatic unit. The changes to be made are simple and may be made by following the instructions given in these notes.

REPLACEMENT PARTS

List Price as of March 1st, 1938
(Subject to change without notice)

Item	Part No.	DESCRIPTION	Price
T1	4VT-411	Antenna coil	\$.40
T2	4VT-412	Oscillator coil	.66
T3	3RT-320B	456 kc first i-f transformer	1.10
T4	3RT-321B	456 kc second i-f transformer	1.10
T5	3RT-322A	Power transformer	3.30
L1, C1	4VT-413	Adjustable 456 kc wave-trap	.60
R1	KR-53U	50,000 ohm 1/4 watt carbon resistor	.16
R2	3LR-265U	40,000 ohm 1/4 watt carbon resistor	.16
R3	HR-42U	2 megohm 1/4 watt carbon resistor	.16
R4	3FR-256B	500,000 ohm volume control with line switch	1.00
R5	3FR-274U	5 megohm 1/4 watt carbon resistor	.16
R6	KR-56U	250,000 ohm 1/4 watt carbon resistor	.16
R7	3FR-275U	500,000 ohm 1/4 watt carbon resistor	.16
R8	KR-56U	10 megohm 1/4 watt carbon resistor	.16
R9	4CR-261	290 ohm 1/2 watt wire-wound resistor	.16
R10	4CR-260	35 ohm 1/2 watt wire-wound resistor	.16
R11	TTR-231	3,000 ohm 1/4 watt carbon resistor	.20
C2	3PC-385A	0.000035 mf mica condenser	.20
C3	42C-381A	0.000075 mf mica condenser	.20
C4	EC-24A	0.0001 mf mica condenser	.20
C5	4VC-370A	0.00015 mf mica condenser	.20
C6	NC-70A	0.0002 mf mica condenser	.20
C7	4VC-371A	0.0003 mf mica condenser	.20
C8, C9, C10,		Dual trimmer condenser, Range—each section, 10 to 120 mmf	.40
C11, C12, C13	4VC-368		.40
C14	1IC-133A	0.00025 mf mica condenser	.20
C15	AAC-106A	0.00005 mf mica condenser	.20
†C16, C17		Trimmer, part of first i-f transformer.	
†C18, C19		Trimmer, part of second i-f transformer.	
C20, C21	3RC-373	0.0004 mf, 600 volt tubular condenser	.20
C22, C23	BC-12	0.05 mf, 200 volt tubular condenser	.20
C24, C26	HC-34	0.005 mf, 600 volt tubular condenser	.20
C25	KC-58	0.01 mf, 400 volt dry electrolytic condenser	1.00
C27, C28	3RC-318A	5 1/4" dynamic speaker	4.75
	4CS-269A	Dual 5 mf, 300 volt dry electrolytic condenser	1.00
	4BL-94	Pilot light, 6.3 volt, 25 amp., Mazda No. 44	2.55
	4VS-309	6 gang push-button selector switch	.05
	4VZ-732	Push-buttons	.05
	4VZ-733	Carbonoid push-button caps	.05
	4VZ-713	Trimmer buttons	.45
	4VZ-725	Station name-tats (complete set)	.45

* Item number locates the article on the schematic diagram.

† These trimmers are mounted in pairs.

‡ These trimmers are part of coil assemblies and cannot be supplied separately.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for all readings was 117.5 volts, 60 cycles, a.c. All readings, except B plus at rectifier and heaters, were taken on 250 volt scale.

Tube	Pin	Screen	Grid	Plate	Carbide	Osc. Plate	Fil.
6A7	182	70	0	0	0	0	6.3 a.c.
6A7	182	70	0	0	0	0	6.3 a.c.
6A7	182	70	0	0	0	0	6.3 a.c.
6A7	182	70	0	0	0	0	6.3 a.c.
41	165	182	0	0	0	0	6.3 a.c.

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—262.

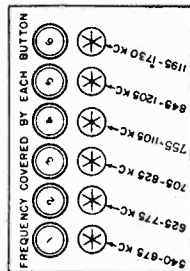
EMERSON RADIO & PHONOGRAPH CORP.

MODEL BE 198
Chassis BE
Tuner Data

ADJUSTMENTS OF MIRACLE TUNING ASSEMBLY

The six push-buttons provide a choice of six favorite stations for Miracle Tuning. Adjustments for any particular station must be made by means of the small cross-slotted button below the chosen push-button. The following procedure must be carefully observed in making these adjustments.

Pre-adjustment of Station Buttons



NOTE: The above illustration will also be found on a label on the bottom of the cabinet.

1. Select six nearby broadcast stations desired for Miracle Tuning and determine their frequencies. Stations are usually listed in newspapers with their frequencies in kilocycles.
2. The frequency range covered by each button is shown in the Fig. 1 at the left. Of the chosen stations select the one with the lowest frequency. The button with a frequency range which includes this station frequency is the one to be adjusted for that particular station. For example, a desired station has a frequency of 600 kilocycles. Button No. 1 covers a range of 840 to 675 kilocycles. This button, therefore, is the one to be used for that station.

Where a station has a frequency which falls within the ranges of two buttons use the button with the lower frequency range, except when this lower button has already been reserved for another station.

3. Locate the station call letters on one of the four cards supplied in an envelope with the receiver. Push out the circular tab bearing the station call letters from the card. Remove the clear celluloid disc from the chosen push-button by prying with a small sharp instrument at the notch on the side of the button. Remove the printed tab from the button and replace it with the proper tab. Replace the celluloid disc over this tab and press it in firmly.

4. Insert the line plug into the electrical outlet and turn the receiver on for at least 10 minutes for the receiver to warm up. The receiver should be in normal operating temperature before making any adjustments.

Press in the push-button to be used for the desired station. Be sure the button is pushed all the way down so that the cross-slotted button which remains depressed. The cross-slotted button which is below the selected push-button is the one to be adjusted, see Fig. 2. Insert a small thin coin in one of the slots in the button and rotate it slowly in either direction until the desired station is heard.

Once the station is heard, rotate the adjusting button back and forth through a very small arc until the station is received at maximum volume and the reception is clear and undistorted. Check the proper station by listening for the station announced above the station announced above. So long as the volume of the station is not adjusted, observe the procedure outlined above. In similar fashion adjust for the remaining stations chosen.

5. Once the six buttons have been adjusted it is necessary that they be rechecked. Starting with the first button repeat the entire adjusting procedure, being very careful to adjust the button to the middle of the stations. When rotating the adjusting button, do not exert any undue pressure on it, since this may disturb the final adjustment.
6. The receiver is adjusted at the factory so that the entire broadcast frequency range is divided and so covered by the six buttons. In rare cases where two or more of the desired stations fall within the frequency range of one button, the internal connections in the automatic unit may be changed so that any of these stations may be selected by the automatic unit. The changes to be made are simple, but, nevertheless, should be done by a competent serviceman.

Turn the receiver on by rotating the volume control knob clockwise until the switch is heard to click and then rotate this knob in the same direction to about half of its full rotation. Tune in the desired station by merely pushing in the button bearing the call letters of that station. Be sure that the button is pushed all the way in until a click is heard and the button remains depressed. Adjust the volume to the desired level.

Operation

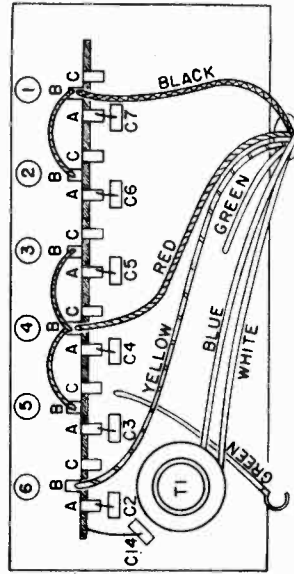


Fig. 3. Rear View of Push-Button Assembly.

The Switching Assembly

Remove the chassis from the cabinet and loosen the switch assembly from the chassis by removing the two screws which pass through slots in the front plate. Do not unsolder any of the leads coming from the switch assembly. Merely tilt the assembly forward so that all of its parts are accessible. Behind each button are switch lugs arranged in groups of three, as in the diagram. Lugs lettered B for each button are connected to one of the oscillator coil taps, which have the following frequency ranges:

Black covered wire: 540-875 kc.
Red covered wire: 705-1205 kc.
Yellow covered wire: 1195-1730 kc.

Lugs lettered A on each button are connected to fixed condensers (C2, C3, C4, C5, C6, C7), which tune the antenna coils properly in each of the following bands:

Button no. 1. 540-875 kc
Button no. 2. 625-775 kc
Button no. 3. 705-825 kc
Button no. 4. 755-1105 kc
Button no. 5. 845-1205 kc
Button no. 6. 1195-1730 kc

Lugs lettered C are connected to adjustable trimming condensers (C8, C9, C10, C11, C12, C13), which tune the oscillator. These trimmers are all of the same capacity range.

Change of Connections

If the button covering a certain frequency band is already in use and it is desired to tune in another station in that same band, the range of any other button may be changed to accommodate that station by observing the following procedure:

1. Place the switch in a position which corresponds to Fig. 3 above. Unsolder the molded mica condenser (C2 or C3 or C4 or C6 or C7) lug A of the station to be changed and, with a sharp knife, cut the lead to the disconnected MOULDED MICA CONDENSER WHICH IS ATTACHED TO THE BUTTON IN USE. To allow for future changes, tape up the end of the disconnected molded condenser.

If lug B of the button to be changed is already connected to the colored coil lead which includes the desired frequency, no further operation is necessary. However, if lug B is not connected to an oscillator tap, the desired frequency range then remove any wires from lug B and reconnect this lug to any other lug B which already is connected to the coil lead of the correct color (frequency band). Refasten the assembly on the chassis and tune in the new station. Remount the chassis in the cabinet, insert proper station name-taps and retune all stations.

Examples

- Button 4 is in use and it is desired to shift button 5 to tune in a station at 830 kc.
1. Unsolder C3 (75 mmf) mica condenser from lug 5A. (Tape end.)
 2. Connect lug 5A to lug 4A. (Button 4 covers the desired frequency.)
 3. Since lug 5B is already connected to lug 4B, the operation has been completed. Retune the new station.
- Button 2 is in use and it is desired to shift button 3 to tune in a station at 700 kc.
1. Unsolder C5 (150 mmf) mica condenser from lug 3A. (Tape end.)
 2. Connect lug 3A to lug 2A. (Button 2 covers the desired frequency.)
 3. Disconnect the wire joining lug 3B to lug 4B and reconnect to lug 2B. Retune the new station.

MODELS BB208, BB209
Chassis BB
Schematic, Alignment
Voltage, Tuner, Parts

EMERSON RADIO & PHONOGRAPH CORP.

Item	Part No.	DESCRIPTION	PRICE
T1	5NT-437	Antenna coil	.50
T2	5NT-438	Detector coil	.50
R1	2VR-219F	Volume control with line switch—75,000 ohms	.90
R2	3CR-294	240 ohm 1/4 watt wire-wound resistor	.16
R3	L-55BG	Plug-in ballast tube. (Interchangeable with L-55B)	.55
R4	OR-73U	25,000 ohm 1/4 watt carbon resistor	.16
R5	HR-42U	2 megohm 1/4 watt carbon resistor	.16
R6, R7	KR-56U	.5 megohm 1/4 watt carbon resistor	.16
R8	3QR-297	110 ohm 1/4 watt wire-wound resistor	.16
C1, C2	5BC-398	Two-gang variable condenser	2.35
C3	NNC-199	0.001 mf, 600 volt tubular condenser	.20
+C4, C5		Trimmers, part of variable condenser.	
C6, C8	AC-6	0.1 mf, 200 volt tubular condenser	.20
C7	5AC-388	0.25 mf, 100 volt tubular condenser	.20
C9, C10	LC-65	0.02 mf, 400 volt tubular condenser	.20
C11	EBC-132	0.1 mf, 400 volt tubular condenser	.20
C12, C13	4DC-345A	Dual 16 mf, 100 volt dry electrolytic condenser	1.20
C14	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
	5BS-383	5" dynamic speaker	3.90
	4BL-94	Pilot light, 6.3 volt, .25 amp. Mazda No. 44	.20
	6BM-372	Four-button mechanical tuning unit (complete with variable condenser)	6.15
	5BD-50A	Dial face	.15
	4MZ-588A	Escutcheon with crystal (for 209 cabinet)	1.25
	6RZ-835	Push-buttons	.05
	4YZ-772	Drive cord	.02
	5YZ-824	Drive cord spring	.05
	4VZ-763B	Celluloid push-button caps (set of 4)	.05
	4VZ-725	Station name-tab cards (per set)	.65

List Price As of July 14, 1938
(Subject to change without notice)

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS

Item number locates the article on schematic diagram.
 †These condensers cannot be supplied separately.
 ‡Note: In replacing the dual 16 mf electrolytic condenser, part no. 4DC-345A, the green lead should be connected to the 25Z5 cathode.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc is required.
 Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.
 Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

VOLTAGE ANALYSIS

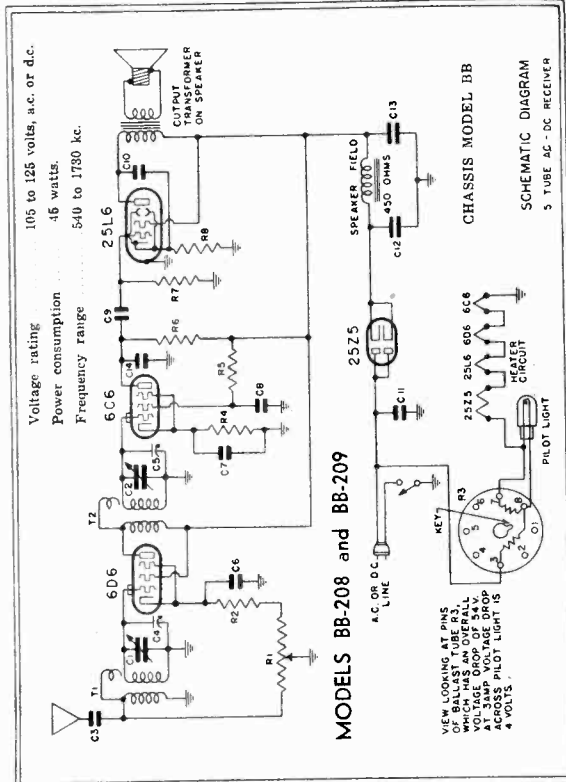
Readings should be taken with a 1000 ohms per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control knob set for full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6D6	100	100	2.3	6.3
6C6	20	16	2.1	6.3
25L6G	93	100	6.0	20.0

Voltages across speaker field—26 volts.
 25Z5 cathode to ground—125 volts.

BH-SI

A.C.-D.C. T.R.F. Receiver



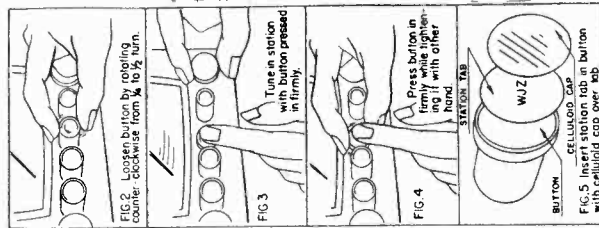
Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

PREADJUSTMENT OF STATION BUTTONS

Insert the line plug in the electric outlet. Turn the receiver on by rotating the volume control knob clockwise until the switch is heard to click and then rotate this knob in the same direction to about half of its full rotation. Wait about a minute for the tubes to warm up. If the power supply is d.c. and the receiver does not operate at first, reverse the line plug to obtain the proper polarity.
 Select four nearby stations desired for automatic tuning. Choose one of these stations and the button to be adjusted for it. Follow the procedure outlined below.

1. Loosen the push-button to be adjusted by rotating it counter-clockwise from 1/4 to 1/2 turn. See Fig. 2.
2. Push the button in as far as it will go and, holding it in firmly, tune in the desired station by means of the selector knob. See Fig. 3.
3. Hold button in with finger of one hand and tighten securely with the other hand. Release the button and tighten it further if possible. See Fig. 4.
4. Remove the celluloid cap and blank station tab from the button by prying at the small notch in the side of the button with a pointed instrument. Remove the tab bearing the station call letters from one of the cards supplied in a separate envelope with the receiver. Insert the tab in the button and replace the celluloid cap over this tab, pressing it in firmly.

Check the adjustment of the button by detuning the station by means of the selector knob and then pressing the push-button in as far as it will go. The station should be received clearly and with maximum volume.

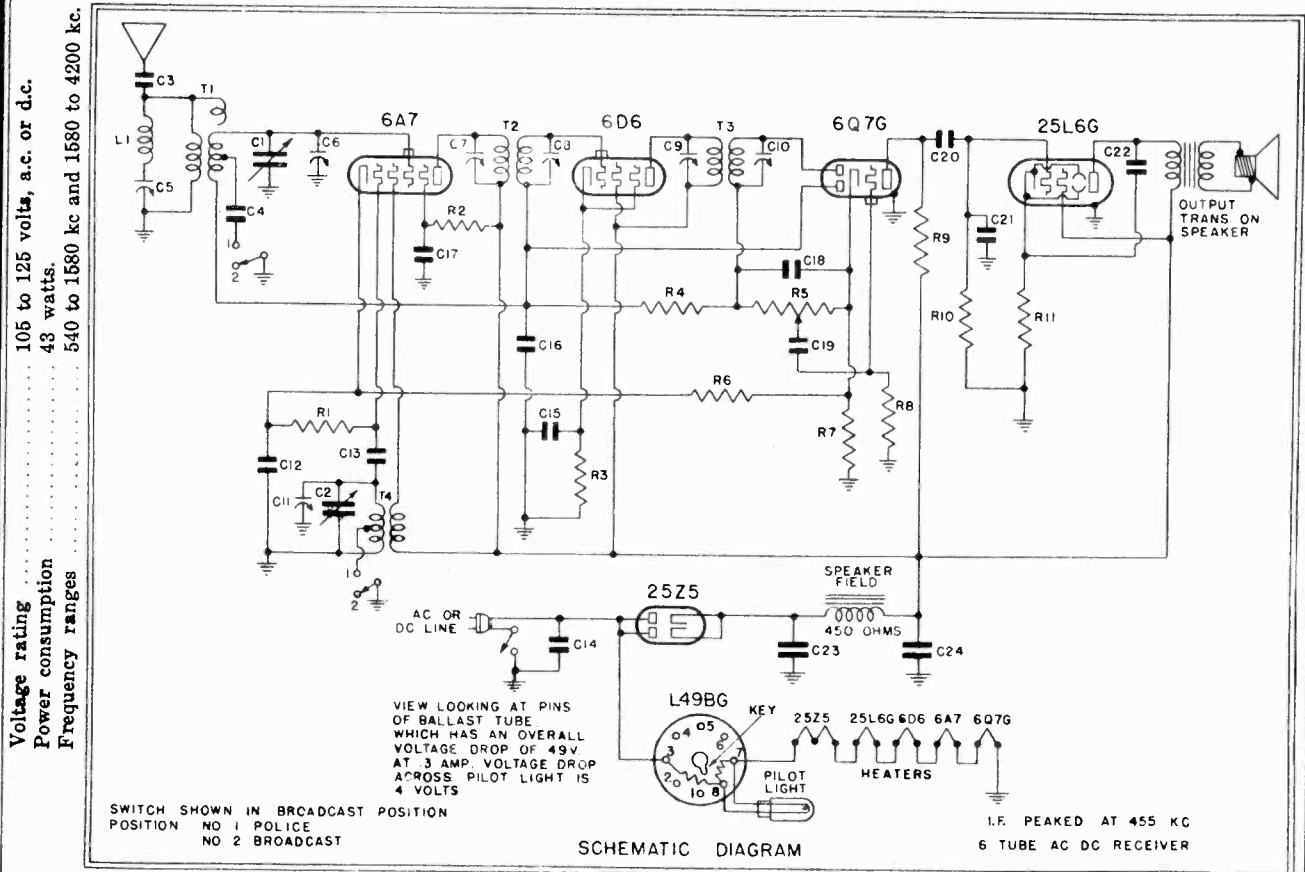


EMERSON RADIO & PHONOGRAPH CORP.

MODELS BJ200, BJ210, 5J214

Chassis BJ

Schematic, Voltage, Notes



CHASSIS MODEL BJ

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale.

VOLTAGE ANALYSIS	Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
	6A7	100	50	2.3	100	6.8
	6D6	100	100	3.5	—	6.3
	6Q7G	48	—	1.2	—	6.3
	25L6G	92	100	6.5	—	25.0

- Voltage at 25Z5 cathode—130 volts.
- Voltage across speaker field—28 volts.
- Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
- Voltage drop across pilot light section of ballast tube (pins Nos. 8 and 7)—4 volts.

GENERAL NOTES

- If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
- One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
- The filament dropping resistor (L-49BG on schematic) is in a special tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
- When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
- The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
- The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red
- The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers, featuring compactness and portability while at the same time retaining a high efficiency from the standpoint of performance. Since it functions as an outside antenna the Flexible Mast will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with each kit.
- The wave-trap has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

MODELS BJ-200, BJ-210, and BJ-214

MODELS BJ200, BJ210, BJ214

Alignment, Parts

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

List Price as Effective as of June 1st, 1938 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	3RT-384A	Two-band antenna coil	.85
T2	3RT-320B	455 kc first i-f transformer	1.10
T3	3RT-321B	455 kc second i-f transformer	1.10
T4	3RT-319A	Two-band oscillator coil	.60
L1	4DT-348	455 kc adjustable wave-trap	.40
R1	KR-58	50,000 ohm 1/4 watt carbon resistor	.16
R2	2CR-193	30,000 ohm 1/2 watt carbon resistor	.16
R3	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	3FR-256B	Volume control with line switch—500,000 ohms	1.00
R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R10	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R11	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
—	L-49BG	Plug-in type ballast resistor. Interchangeable with L-49B	.55
C1, C2	5JC-397	Two-gang variable condenser	2.45
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4	4DC-367	0.0012 mf mica condenser	.30
†C5	—	Trimmer, part of wave-trap assembly.	
†C6, C11	—	Trimmer, part of variable condenser.	
†C7, C8	—	Trimmer part of first i-f transformer assembly.	
†C9, C10	—	Trimmer, part of second i-f transformer assembly.	
C12, C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C14	2VC-242A	0.1 mf, 400 volt molded condenser	.20
C15	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C19	KC-58	0.01 mf, 400 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	3FC-336	0.025 mf, 400 volt tubular condenser	.20
C23, C24	3CC-261	20 mf, 150 volt wet electrolytic condenser	.80
	3RS-281A	Wave-band switch	.35
	3FS-251A	5 1/2" dynamic speaker	5.00
	5JZ-821	Dial face	.70
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	5JZ-822	Dial drive shaft and pulley	.05
	4MZ-588A	Dial pointer	.20
	4XM-367	Drive pulley	.10
	5JZ-824	Drive cord spring	.05
	4YZ-772	Drive cord	.02
	5FZ-758	Pyralin crystal (for BJ-200)	.45
	3CZ-350	Escutcheon with crystal (for BJ-210 and BJ-214)	1.25

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response. (See General Note No. 8.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

The tube complement

- 1—6A7 pentagrid oscillator-modulator.
- 1—6D6 first i-f amplifier.
- 1—6Q7G diode detector, a-f amplifier, a.v.c.
- 1—25L6G beam power output.
- 1—25Z5 dual half-wave rectifier.
- 1—L49B or L49BG ballast tube.

*Item number locates the article on the schematic diagram.
 †These trimmers are part of coil assemblies and cannot be supplied separately.
 ‡These trimmers are part of variable condenser and cannot be supplied separately.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.
 The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.
 The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

Octal-base tubes in this receiver may be replaced with either metal or octal-base glass tubes.

MODELS BL200, BL210, BL214

Chassis BL
Alignment, Parts

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS LIST

List Price as Effective as of July 1st, 1938
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	Price
L1	4DT-343	455 kc wave-trap	\$.40
T1	3RT-384A	Two-band antenna coil	.85
T2	3RT-319A	Two-band oscillator coil	.60
T3	3RT-320B	455 kc first i-f transformer	1.10
T4	3RT-321B	455 kc second i-f transformer	1.10
T5	3RT-322A	Power transformer	3.05
R1	KR-53U	50,000 ohm 1/4 watt carbon resistor	.16
P2	3LR-265U	40,000 ohm 1/2 watt carbon resistor	.16
R3	HR-42U	2 megohm 1/4 watt carbon resistor	.16
R4	3FR-256B	Volume control with switch—500,000 ohms	1.00
R5	3RR-274U	5 megohm 1/4 watt carbon resistor	.16
R6	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R7	KR-56U	500,000 ohm 1/4 watt carbon resistor	.16
R8	3RR-275U	10 megohm 1/4 watt carbon resistor	.16
R9	4CR-321	290 ohm 1/2 watt wire-wound resistor	.16
R10	4CR-320	35 ohm 1/2 watt wire-wound resistor	.16
†C1		Trimmer, part of 455 kc wave-trap assembly.	
†C2, C5		Trimmer, part of variable condenser.	
C3, C4	5JC-397	Two-gang variable condenser	2.45
†C6, C7		Trimmer, part of first i-f transformer.	
†C8, C9		Trimmer, part of second i-f transformer.	
C10	4DC-367	0.0012 mf mica condenser	.30
C11, C13	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	4XC-393A	0.00006 mf mica condenser	.20
C14, C21	3RC-373	0.0004 mf, 600 volt tubular or mica condenser	.20
C15, C17	HC-34	0.006 mf, 600 volt tubular condenser	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C19, C20	3RC-318A	Dual 5 mf, 300 volt dry electrolytic condenser	1.40
	3RS-231A	Wave-band switch	.35
	4CS-269A	5 1/2" dynamic speaker	4.60
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	5LZ-827	Dial face	.70
	4MZ-588A	Dial pointer	.20
	5JZ-822	Drive shaft and pulley for dial assembly	.05
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	4XM-367	Drive pulley	.10
	3CZ-850	Escutcheon with crystal (for BL-210 and BL-214)	1.25
	5FZ-758	Pyralin crystal (for BL-200)	.45

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for a minimum response. (See General Note No. 1.)

The tube complement

- 1—6A7 pentagrid oscillator-modulator
- 1—6D6 i-f amplifier
- 1—6Q7G diode detector, audio amplifier, a.v.c.
- 1—41 pentode power output
- 1—80 full-wave rectifier

Octal-base tubes may be replaced with either metal or equivalent octal-base glass tubes.

R-i Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

NOTE: The Model BL-200 should be aligned with the chassis bottom plate in place.

The police band is self-tracking and does not require any adjustment.

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBER

- *Item number locates the article on the schematic diagram.
- †These trimmers are part of coil assemblies and cannot be supplied separately.
- ‡These trimmers are part of variable condenser and cannot be supplied separately.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans. The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna. The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

MODELS BL-200, BL-210, and BL-214

CHASSIS MODEL BL

Voltage

EMERSON RADIO & PHONOGRAPH CORP.

MODEL AC 202
Chassis AC
Schematic, Coils

Voltage rating 105-125 volts, 60 cycles, a.c.
Power consumption 45 watts for receiver and 20 watts for motor.
Frequency ranges 540 to 1580 kc. and 1580 to 4200 kc.

Tube Data

- 1—6A7 pentagrid oscillator-modulator
- 1—6D6 i-f amplifier
- *1—6Q7-G diode detector, audio amplifier, automatic volume control
- 1—41 pentode power output
- 1—80 full-wave rectifier

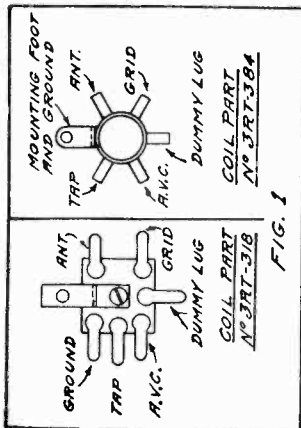
*See production changes on next page.

AC-130, AC-149, AC-168

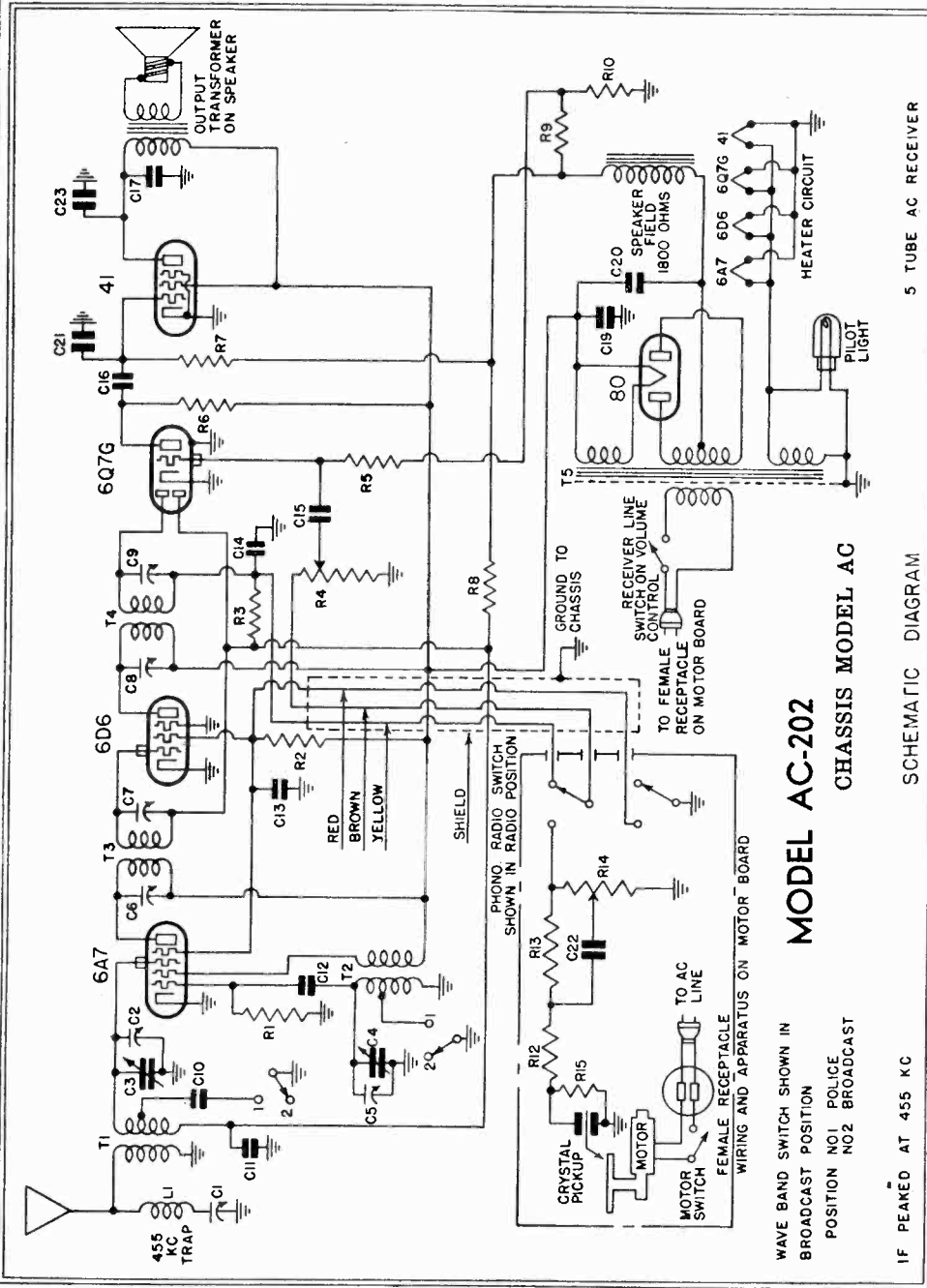
For Models Without Phono

SEE INDEX

Combination Phonograph and Radio



Note: 3RT-384A lug arrangement is the same as 3RT-384. Bottom View of Coils.



Readings should be taken on the 250 volt scale of a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All voltages except heaters were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	180	60	0	180	6.3
6D6	180	60	0	—	6.3
6Q7-G	70	—	0	—	6.3
41	170	180	0	—	6.8

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—182.

VOLTAGE ANALYSIS

MODEL AC 202

Chassis AC

Alignment, Changes

Parts, Notes

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS

MODEL AC-202

CHASSIS MODEL AC

*Item	Part No.	DESCRIPTION	Price
L1	4DT-343	455 kc wave-trap. (See production change No. 3.)	\$.40
T1	3RT-384A	Two-band antenna coil. (See production change No. 4.)	.35
T2	3RT-319A	Two-band oscillator coil	.60
T3	3RT-320B	455 kc first i-f transformer	1.10
T4	3RT-321B	455 kc second i-f transformer	1.10
T5	3RT-322A	Power transformer. (Formerly part No. 4CT-372.)	3.05
R1	KR-53U	50,000 ohm 1/4 watt carbon resistor	.16
R2	3LR-265U	40,000 ohm 1/2 watt carbon resistor	.16
R3	11R-42U	2 megohm 1/4 watt carbon resistor	.16
R4	3FR-256B	Volume control with switch—500,000 ohms	1.00
R5	3RR-274U	5 megohm 1/4 watt carbon resistor	.16
R6	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R7	KR-56U	500,000 ohm 1/4 watt carbon resistor	.16
R8	3RR-275U	10 megohm 1/4 watt carbon resistor	.16
R9	4CR-321	290 ohm 1/2 watt wire-wound resistor. (See production change No. 2.)	.16
R10	1CR-320	35 ohm 1/2 watt wire-wound resistor. (See production change No. 2.)	.16
R11	LR-65U	10,000 ohm 1/4 watt carbon resistor. (See production change No. 1.)	.16
†C1		Trimmer, part of 455 kc wave-trap assembly.	
†C2		Trimmer, part of variable condenser.	
†C3, C4	4CC-350A	Two-gang variable condenser	2.60
†C6, C7		Trimmer, part of first i-f transformer.	
†C8, C9		Trimmer, part of second i-f transformer.	
C10	4DC-367	0.0012 mf mica condenser. (See production change No. 4.)	.30
C11, C13,			
C18	BC-12	0.05 mf, 200 volt tubular condenser. (See production change No. 1.)	.20
C12	4XC-393A	0.00006 mf mica condenser	.20
C14, C21	3RC-373	0.0004 mf mica or 600 volt tubular condenser	.20
C15, C17	HC-34	0.006 mf, 600 volt tubular condenser. (See production change No. 1.)	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C19, C20	3RC-318A	Dual 5 mf, 300 volt dry electrolytic condenser	1.40
	3RS-231A	Wave-band switch	.35
	4CS-269	5 1/2" dynamic speaker (for Models 130, 149, and 168)	4.55
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44. (See production change No. 5.)	.20
	4LZ-582	Dial face	.75
	3CZ-336	Drive belt for dial assembly	.15
	3CZ-337B	Drive shaft and pulley for dial assembly	.10
	3CZ-339	Idler pulley for dial assembly	.05
	3CZ-340	Idler spring for dial assembly	.03
	3CZ-341	Condenser shaft pulley	.10
	4MZ-588A	Dial pointer	1.20
	3FZ-351	Esutechon with crystal (for Models AC-130 and AC-168)	1.20
	3FZ-398A	Dial crystal (for Model AC-149)	.40
	3FZ-399	Clip for dial crystal (for Model AC-149)	.01

ADDITIONAL PARTS USED IN MODEL AC-202 COMBINATION

R2	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R12	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R13	4LR-313	1.5 megohm 1/4 watt carbon resistor	.16
R14	4LR-312A	500,000 ohm tone control with motor line switch	1.05
R15	KR-57A	1 megohm 1/4 watt carbon resistor	.16
C22	AC-7A	0.00025 mf mica condenser	.20
C23	LC-65	0.02 mf, 400 volt tubular condenser	21.35
	3LPM-3	110 volt a.c. phonograph motor	.20
	3LM-253	Needle cup	.15
	3LM-255	Needle cup cover	.20
	4CS-334	8" dynamic speaker (for Model 202)	6.95
	TTS-111R	Phono-radio switch	.55
	4RZ-733B	Crystal pick-up	11.35

*Item number locates the article on the schematic diagram.

†These trimmers are part of coil assemblies and cannot be supplied separately.

‡These trimmers are part of variable condenser and cannot be supplied separately.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response. (See General Note No. 1.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

List Price as Effective as of July 1st, 1963 (Subject to change without notice)

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is present from a particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

2. The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.

3. The color coding of the leads of the i-f transformers, is as follows:
Grid—return—black
Grid—green—black
Plate—blue
B plus—red

4. With a few exceptions, the color coding of the general wiring is as follows:
A.v.c. and cathode—white or yellow
Grid—green
Filament and ground—black
B plus—brown
Screen—brown

5. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed of the motor, part No. 3LPM-3, remove the turn-table and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

6. The color coding of the power transformer leads is as follows:
Primary—two black leads
Secondary—two heavy green leads
Tertiary—two heavy yellow leads
High voltage sec.—center tap—yellow and red

GENERAL NOTES

PRODUCTION CHANGES

1. In receivers bearing serial numbers below 1,258,237:
a. C17 was a .001 mf, 600 volt tubular condenser.
b. R11 and C18 were connected from the plate of the 41 tube to B plus as shown by the dotted lines on the schematic diagram.

2. In receivers bearing serial numbers below 1,355,800:
a. The second detector was a type 75 round resistor, part number 3RR-276.
b. It was a 20 ohm 1/4 watt wire-wound resistor, part number 3RR-266.

3. In receivers bearing serial numbers below 1,438,600 the wave-trap was part number MMT-149 (interchangeable with 4DT-343).

4. In receivers bearing serial numbers below 1,385,494 the antenna coil was part number 3RT-318.

5. In receivers bearing serial numbers between 1,335,494 and 1,438,600 the antenna coil was part number 3RT-384. With both of these coils C10 was 0.001 mf.

6. Receivers above serial number 1,438,600 use 3RT-384A which is interchangeable with 3RT-318 and 3RT-384A when C10 is changed to 0.0012 mf. The lug arrangement for these coils is shown in Fig. 1.

7. In receivers bearing serial numbers below 1,355,050 the pilot light was part number XL-9 (screw-type base).

Chassis BM
Schematics, Changes
Voltage, Parts, Alignment

EMERSON RADIO & PHONO. CORP.

MODELS BM206, BM215
Chassis BM BM216
MODELS BM206, BM215

Part No.	Description	Price
6NT-437	Antenna coil	.50
6NT-438	Detector coil	.50
2VR-219E	Volume control, 75,000 ohms, with line switch	.90
3CR-294	Volume control, 75,000 ohms, with line switch	.90
L55-BG	240 ohm, 1/2 watt wire-wound resistor	.16
KR-63U	Plug-in ballast tube	.55
HR-42U	15,000 ohm, 1/4 watt carbon resistor	.16
KR-66U	2 megohm, 1/4 watt carbon resistor	.16
3QR-297	500,000 ohm, 1/4 watt carbon resistor	.16
KR-55	110 ohm, 1/2 watt wire-wound resistor	.16
6MC-399	250,000 ohm, 1/4 watt carbon resistor	.16
NNC-199	Two-gang variable condenser	3.55
AC-6	.001 mf, 600 volt tubular condenser	.20
6AC-388	Trimmers, part of variable condenser	.20
LC-65	.1 mf, 200 volt tubular condenser	.20
LC-64	.25 mf, 100 volt tubular condenser	.20
EFC-132	.02 mf, 400 volt tubular condenser	.20
4DC-345A	.05 mf, 400 volt tubular condenser	.20
6AC-384	1 mf, 400 volt tubular condenser	1.20
BC-12	Dual 16 mf, 100 volt dry electrolytic condenser (See prod. ch.)	.20
BC-13	.0002 mf, 600 volt tubular or mica condenser	.20
6BS-383	.05 mf, 200 volt tubular condenser	.20
6NS-335	.25 mf, 200 volt tubular condenser	.20
4BL-94	5" dynamic speaker (Model BM)	3.90
4XM-367	5" dynamic speaker (Model BN)	4.10
6MZ-829	Pilot light, 6.3 volt, .25 amp, Mazda No. 44	.20
6NE-11	Drive pulley	.10
6MZ-830	Dial crystal (Model BM)	.10
4MZ-588B	Dial crystal (Model BN)	.16
6YZ-772	Drive shaft and pulley	.10
6YZ-824	Dial pointer	.20
6MZ-831	Drive cord	.02
6ND-57	Drive cord spring	.06
	Dial face (Model BM)	.55
	Dial face (Model BN)	.15

ADDITIONAL PARTS USED ON BM-216 COMBINATION

KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
2VR-219H	Phono volume control with motor switch—75,000 ohms	.90
6MS-948	Phono-radio-tone control switch	.60
XXC-307	.005 mf, 400 volt tubular condenser	.20
4XPM-15	Phono motor	12.20
4XZ-850	Crystal pick-up	9.85
3LM-283	Phonograph needle cup	.20

When ordering replacement parts specify part number
*Item number locates the article on the schematic diagram.
†These condensers cannot be supplied separately.

TUBE DATA

- 1-6D6, r-f amplifier.
- 1-6C6, biased detector.
- 1-25L6G, beam power output.
- 1-25Z5, dual half-wave rectifier.
- 1-L55BG, ballast tube.

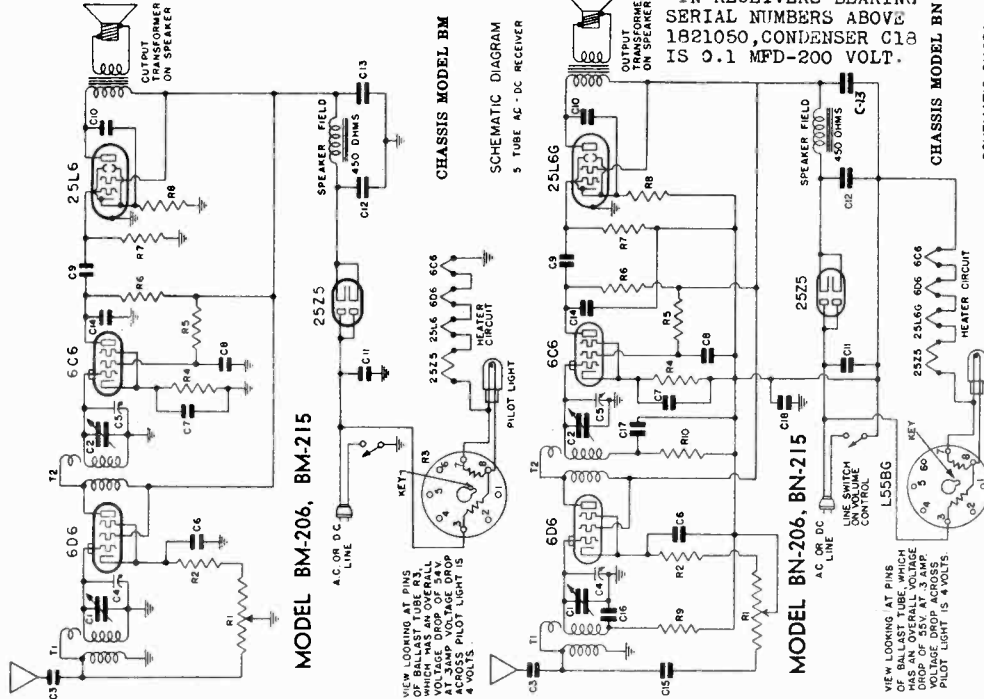
ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc is required. Use as weak a test signal as possible. An output meter should be used across the volume coil or output transformer for observing maximum response. Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 1400 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

PRODUCTION CHANGE

On early BM and BN chassis the red lead from the dual electrolytic condenser is connected to the 25Z5 cathodes and green lead to the 6D6 screen. In later models the green lead is connected to 25Z5 and red to 6D6. Replacements should be connected as in the later models.



IN RECEIVERS BEARING SERIAL NUMBERS ABOVE 1821050, CONDENSER C13 IS 0.1 MFD-200 VOLT.

CHASSIS MODEL BN
SCHEMATIC DIAGRAM
5 TUBE AC-DC RECEIVER
Voltage rating 105 to 125 volts.
Power consumption 45 watts for Receiver.
Frequency range 640 to 1780 kc.

Tube	Plate	Screen	Cathode	File
6D6	300	23	21	63
6C6	100	23	21	63
25L6G	250	23	21	280

BM, BM-214, BN-81

MODEL BM-206, BM-215
MODEL BN-206, BN-215

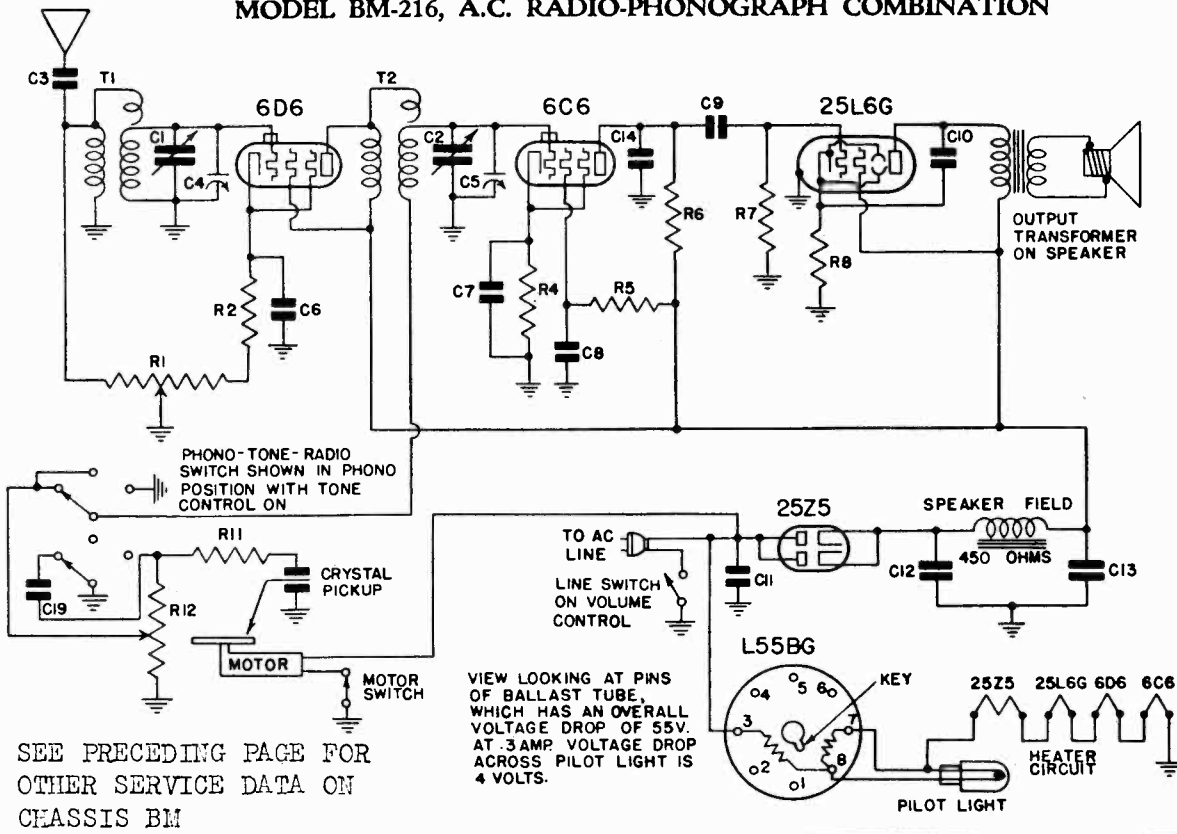
VOLTAGE ANALYSIS
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings, except heaters and cathodes, were taken on 200 volt scale.

Point	Tube	Plate	Screen	Cathode
6D6	300	23	21	21
6C6	100	23	21	21
25L6G	250	23	21	21

Voltage across speaker field—26 volts.
25Z5 cathode to ground—125 volts.

MODEL BM216, Chassis BM
 MODEL BY233, Chassis BY. EMERSON RADIO & PHONOGRAPH CORP.
 Schematics.

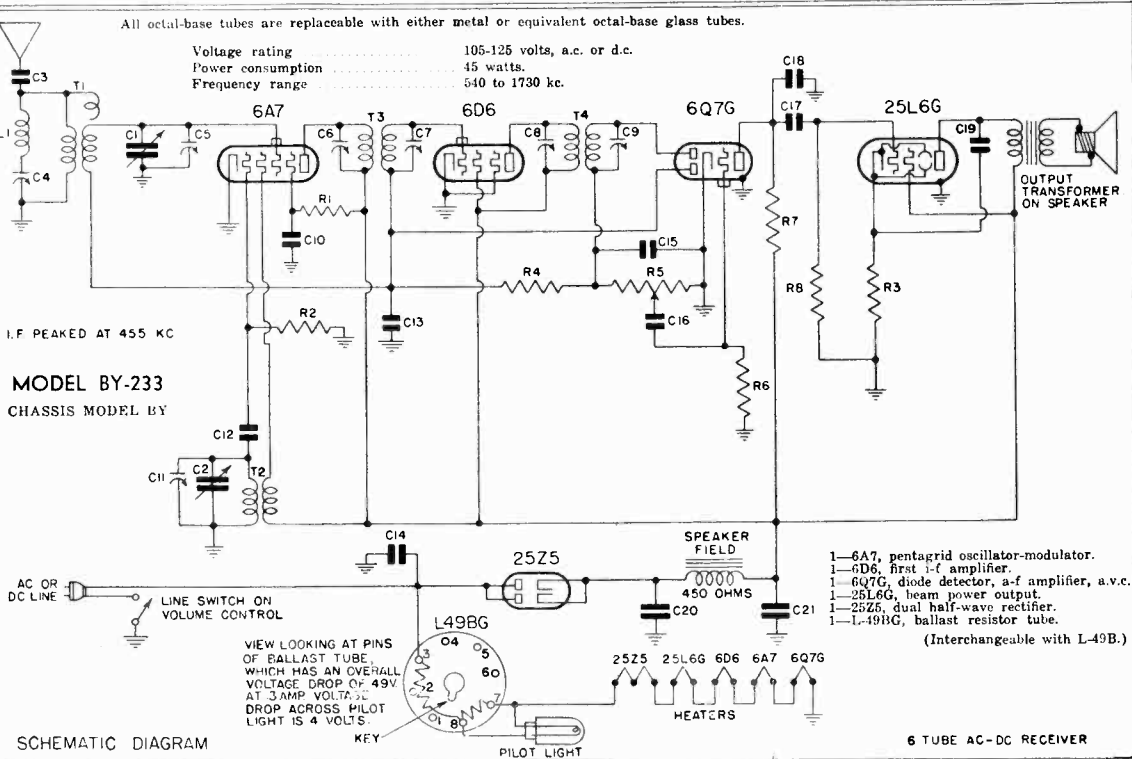
MODEL BM-216, A.C. RADIO-PHONOGRAPH COMBINATION



Caution: The motor used in this combination is of the synchronous type and will operate on ALTERNATING CURRENT ONLY. To avoid damaging the motor, the combination should never be used on direct current.

All octal-base tubes are replaceable with either metal or equivalent octal-base glass tubes.

Voltage rating 105-125 volts, a.c. or d.c.
 Power consumption 45 watts.
 Frequency range 540 to 1730 kc.



EMERSON RADIO & PHONOGRAPH CORP.

MODEL BY 233
Chassis BY
Alignment, Voltage
Parts, Notes

Five-Tube, A.C. - D.C., Superheterodyne

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the i-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (L-49BG on schematic) is in a special tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
Grid—green
Plate—blue
B plus—red.
Grid return—black
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. In replacing the dual 20 mf electrolytic condenser, part no. 4HC-348B, the lead farthest from the mounting bracket should be connected to the rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltages for these readings was 117.5 volts, 60 cycles, a.c. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100	55	0	100	6.3
6D6	100	100	0	—	6.3
6Q7G	43	—	0	—	6.3
25L6G	92	100	5.5	—	25.0

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins 3, 7)—49 volts.
Voltage drop across pilot light section (pins 7, 8)—4 volts.

ADJUSTMENTS

Location of Coils and Trimmer Adjustment.

The first and second i-f transformers are mounted on the left hand inside wall of the chassis. The trimmers for the first i-f transformer are accessible through the lower pair of holes in the side of the chassis. The trimmers for the second i-f transformer are accessible through the upper pair of holes in the chassis.
The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.
The 455 kc wave-trap is mounted on the same form as the antenna coil directly under the 25Z5 and ballast tubes. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible through a hole in the right side of the chassis.

i-f and Wave-trap Alignment

Rotate the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140, feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

Item	Part No.	DESCRIPTION	PRICE
L1, T1	5Y7-444	Antenna coil with adjustable 455 kc wave-trap	.90
T2	4X7-433	Oscillator coil	.35
T3	5Y7-445	Double-tuned 455 kc first i-f transformer	.95
T4	4XT-435A	Double-tuned 455 kc second i-f transformer	.80
R1	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R4	KR-57	1 megohm 1/4 watt carbon resistor	.16
R5	2NR-214E	Volume control .25 megohm with line switch	.90
R6	4XR-327	15 megohm 1/4 watt carbon resistor	.16
R7	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
C1, C2	L-49BG	Ballast tube. (Interchangeable with L-49B)	.55
C3	5Y7-405	Two-gang variable condenser	2.35
	4XC-401	0.00055 mf mica condenser	.20
†C4		Trimmer, part of wave-trap assembly.	
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	4XC-393A	0.00006 mf mica condenser	.20
C13	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	EEC-192	0.1 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	3FC-336	0.025 mf, 400 volt tubular condenser	.20
C20, C21	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser	.90
	3QS-257C	5" dynamic speaker	3.60
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	5YD-56	Dial face	.05
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	2DD-21E	Dial pointer	.10
	5YE-10	Dial crystal	.05
	4XM-367	Dial drive pulley	.10

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†Not supplied separately.

List Price as Effective as of August 1, 1935
(Subject to change without notice)

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response. Always use as weak a test signal as possible when aligning the receiver.

MODEL BN216

Chassis BN

EMERSON RADIO & PHONOGRAPH CORP.

Schematic, Voltage Changes, Alignment, Parts

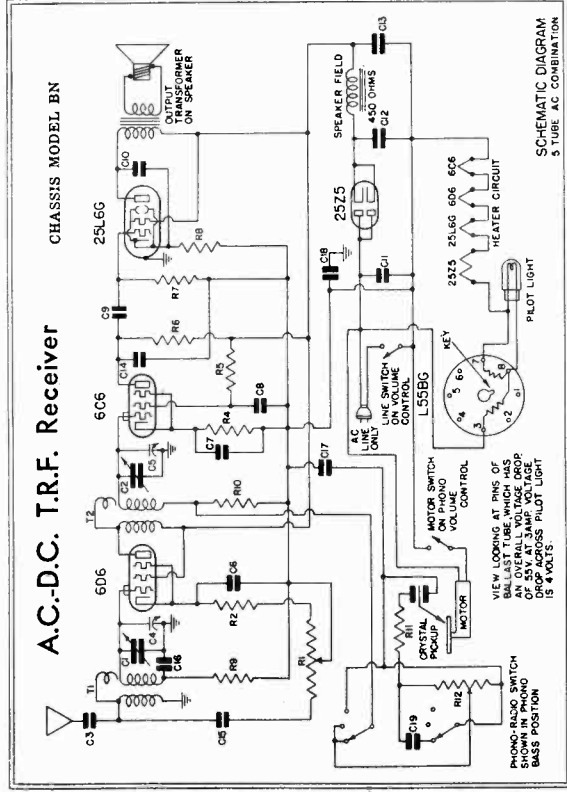
A.C. Radio-Phonograph Combination (See Caution-Phono Motor)

*Item	Part No.	DESCRIPTION	PRICE
T1	5NT-437	Antenna coil	.50
T2	5NT-438	Detector coil	.50
R1	2VR-219G	Volume control, 75,000 ohms, with line switch	.90
R2	3CR-294	240 ohm, 1/2 watt wire-wound resistor	.16
R3	L55-BG	Plug-in ballast tube	.55
R4	KR-63U	15,000 ohm, 1/4 watt carbon resistor	.16
R5	HR-42U	2 megohm, 1/4 watt carbon resistor	.16
R6, R7	KR-58U	500,000 ohm, 1/4 watt carbon resistor	.16
R8	3QR-297	110 ohm, 1/2 watt wire-wound resistor	.16
R9, R10	KR-56U	250,000 ohm, 1/4 watt carbon resistor	.16
C1, C2	5MC-399	Two-gang variable condenser	3.65
C3	NNC-199	.001 mf, 600 volt tubular condenser	.20
C4, C5	AC-6	Trimmers, part of variable condenser	.20
C6, C8, C18	5AC-388	.1 mf, 200 volt tubular condenser	.20
C7	LC-65	.25 mf, 100 volt tubular condenser	.20
C9, C15	LC-65	.02 mf, 400 volt tubular condenser	.20
C10	LC-64	.05, 400 volt tubular condenser	.20
C11	EEC-132	.1 mf, 400 volt tubular condenser	.20
C12, C13	DC-345A	Dual 16 mf, 100 volt dry electrolytic condenser (See production changes)	1.20
C14	3AC-384	.0002 mf, 600 volt tubular or mica condenser	.20
C16, C17	BC-12	.05 mf, 200 volt tubular condenser	.20
	SNS-335	5" dynamic speaker	4.10
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	4XM-367	Drive pulley	.10
	5NE-11	Dial crystal	.15
	6M7-830	Drive shaft and pulley	.10
	4MZ-588B	Dial pointer	.20
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.06
	5ND-87	Dial face	.15

ADDITIONAL PARTS USED ON BN-216 COMBINATION

KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
2VR-219H	Phono volume control with motor switch—75,000 ohms	.90
5MS-348	Phono-radio-tone control switch	.60
XXC-207	.005 mf, 400 volt tubular condenser	.20
4XPM-15	A.C. phonograph motor (synchronous type)	12.20
4XPM-20	A.C. phonograph motor (self-starting type)	12.65
4XZ-850	Crystal pick-up (metal tone-arm)	9.85
4XC-411	Crystal pick-up (wooden tone-arm)	9.30
3LM-283	Phonograph needle cup	.20

*Item number locates the article on the schematic diagram.
 †These trimmer condensers are part of the coil assemblies and cannot be supplied separately.
 Voltage rating 105 to 125 volts.
 Power consumption 45 watts for receiver.
 10 watts for motor in Model BN-216.
 Frequency range 540 to 1780 kc.
 Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.



SCHEMATIC DIAGRAM FOR MODEL BN-216

PRODUCTION CHANGES
 On early BN chassis the red lead from the dual electrolytic condenser is connected to the 25Z5 cathodes and green lead to the 606 cathode. Later models the green lead is connected to 20Z6 and red to 6D6. Replacements should be connected as in the later models.
 In receivers bearing serial numbers below 1,821,050 C18 is .25 mf 200 volt.

MOTOR CAUTION
 The motor used in the combination Model BN-216 is of the synchronous type and will operate on ALTERNATING CURRENT ONLY. To avoid seriously damaging the motor, the combination should never be used on direct current.

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	FUL
6D6	100	100	2.3	R11
6C6	50	15	2.1	R12
25L6G	50	100	6	C19

1—6D6, r-f amplifier.
 1—6C6, biased detector.
 1—25Z5, beam power tube.
 1—L55BG, ballast tube.
 (Interchangeable with L55B.)
 The ballast resistor (L55BG on schematic) is in a special tube at the rear of the chassis. In normal operation this tube will become quite hot. For voltage drop specifications, see "Voltage Analysis" above.

ALIGNMENT PROCEDURE
 An oscillator with a frequency of 1400 kc is required.
 Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.
 Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

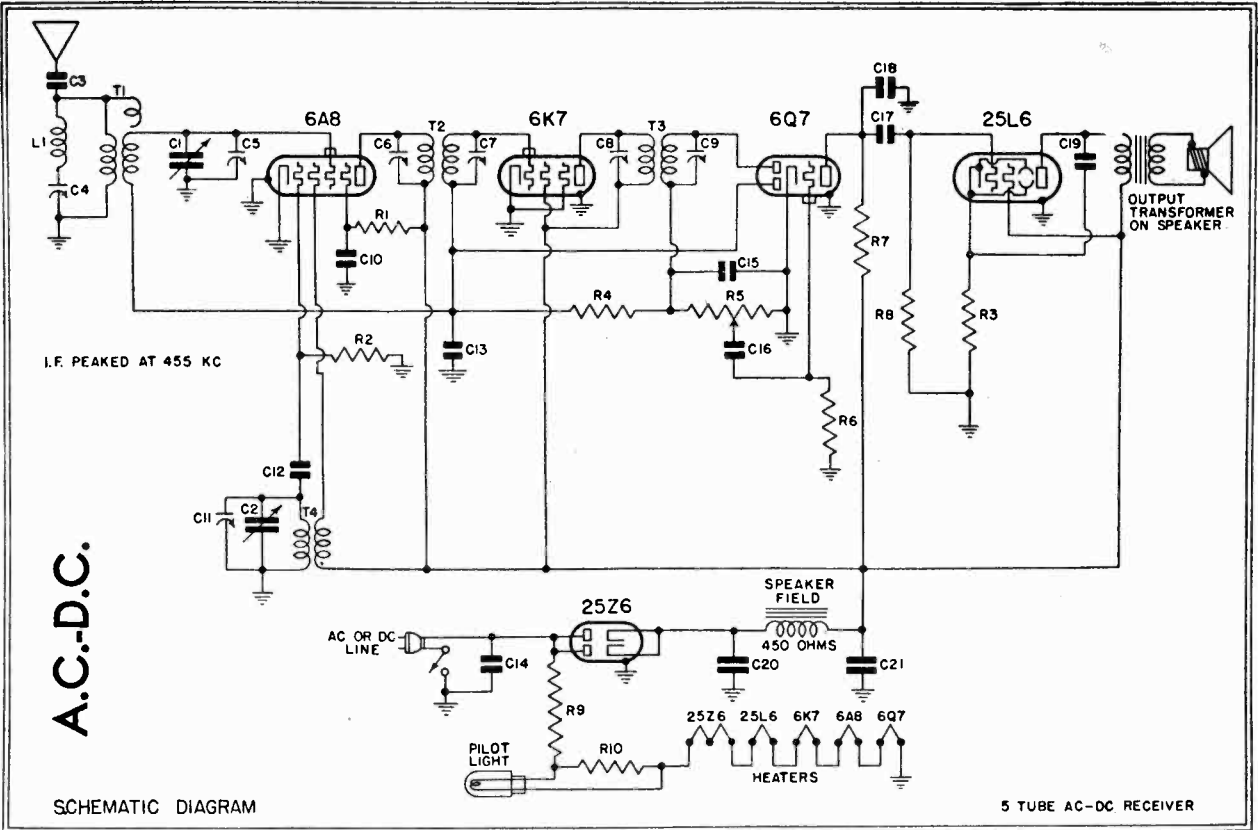
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on. The list is for the 25Z5 tube. For these readings use 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Chassis AX
Schematics, Voltage

EMERSON RADIO & PHONO. CORP.

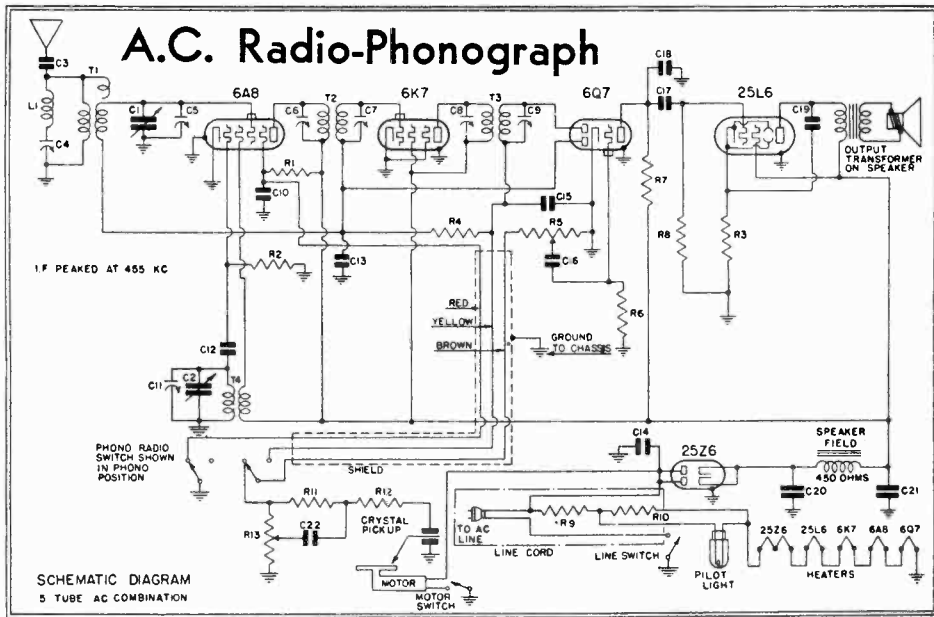
MODELS AX211, AX212
AX217, AX219

MODELS AX-211, AX-212 and AX-217



SCHMATIC DIAGRAM No. 1

MODEL AX-219 (See Note No. 8)



SCHMATIC DIAGRAM No. 2

Tube Data CHASSIS MODEL AX

- 1—6A8 or 6A8GT, pentagrid oscillator modulator.
 - 1—6K7 or 6K7GT, first i-f amplifier.
 - 1—6Q7 or 6Q7GT, diode detector, a-f amplifier, a.v.c.
 - 1—25L6 or 25L6GT, beam power output.
 - 1—25Z6 or 25Z6GT, dual half-wave rectifier.
- All tubes are replaceable with either metal or equivalent bantam glass tubes.
- Voltage rating 105-125 volts.
Power consumption 45 watts for receiver.
Frequency ranges 10 watts for motor on Model AX-219.
..... 540 to 1730 kc.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8	100	55	0	100	6.3
6K7	100	100	0	—	6.3
6Q7	43	—	0	—	6.3
25L6	92	100	5.5	—	25.0

Voltage at 25Z6 cathode—128 volts.
Voltage across speaker field—28 volts.

VOLTAGE ANALYSIS

MODELS AX211, -212, -217, -219

Chassis AX

Alignment, Notes, Parts

EMERSON RADIO & PHONOGRAPH CORP.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-9—see schematic) is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
Grid—green
Plate—blue
Grid return—black
B plus—red.
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-52. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. The phonograph motor of Model AX-219 is of the a.c. synchronous type. To avoid damaging the motor, the combination should be used on ALTERNATING CURRENT ONLY.
9. To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.
(Subject to change without notice)

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same from as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	4XT-432	Antenna coil with adjustable 455 kc wave-trap	\$.90
T4	4XT-433	Oscillator coil	.35
T2	4XT-434	Double-tuned 455 kc first i-f transformer	1.10
T3	4XT-435	Double-tuned 455 kc second i-f transformer	.85
R1	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R4	KR-57	1 megohm 1/4 watt carbon resistor	.16
R5	4XR-328A	Volume control .25 megohm with line switch	.95
R6	4XR-327	15 megohm 1/4 watt carbon resistor	.16
R7	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R9, R10	4XW-112	Resistance line cord with pilot light ballast section R9—150 ohms; R10—40 ohms	.85
C1, C2	4XC-391	Two-gang variable condenser	2.40
C3	4XC-401	0.00065 mf mica condenser	.20
+C4		Trimmer, part of wave-trap assembly.	
+C5, C11		Trimmers, part of variable condenser.	
+C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	4XC-393A	0.00006 mf mica condenser	.20
C13	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	3FC-356	0.025 mf, 400 volt tubular condenser	.20
C20, C21	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C22	4XS-324	4" dynamic speaker (for 211, 212, and 217 cabinets)	3.70
.55	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
9.85	4XZ-810A	Dial face	.20
12.20	4YZ-772	Drive cord	.02
.20	51Z-824	Drive cord spring	.05
3.70	4XZ-811A	Drive shaft	.05
	4XZ-812A	Dial pointer	.02
	4XZ-815	Dial crystal (for 211 and 212 cabinets)	.10
	4XE-1	Dial crystal (for 217 and 219 cabinets)	.10
	4XZ-816	Dial face fasteners	.01

ADDITIONAL PARTS USED ON AX-219
(Schematic Diagram No. 2)

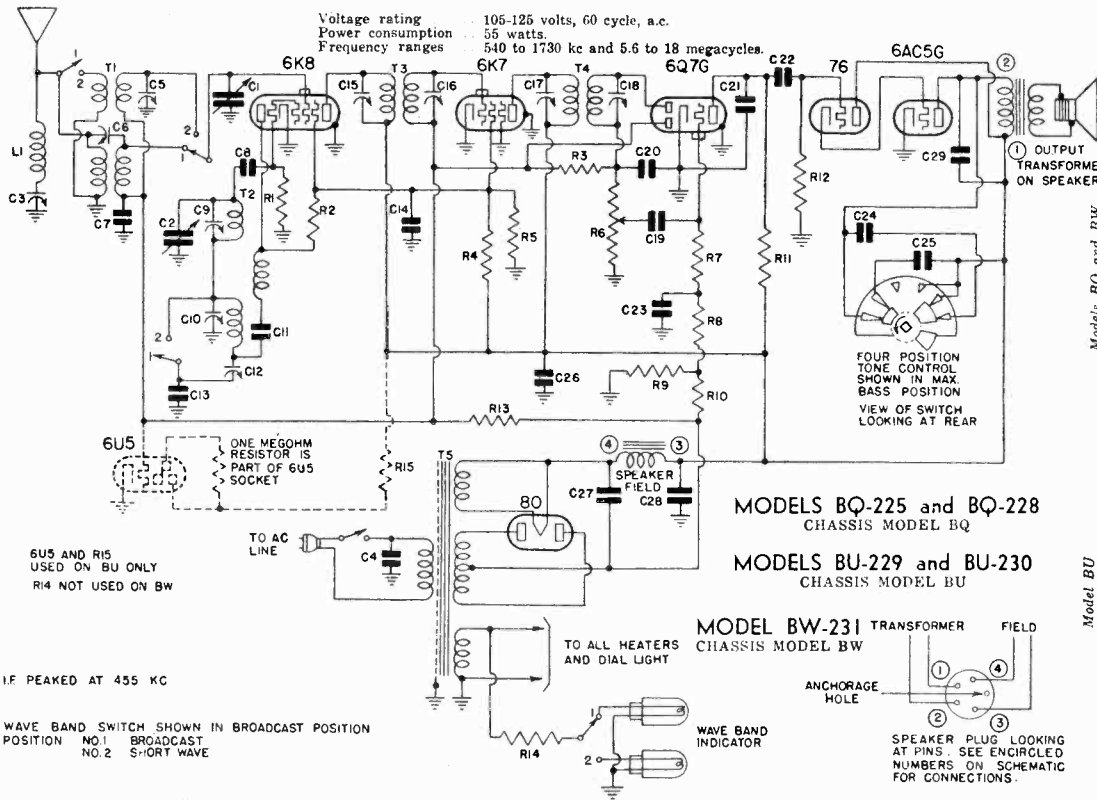
KR-56	500,000 ohm 1/4 watt carbon resistor	.16
4LR-312B	500,000 ohm tone control with motor line switch	1.05
IC-47A	0.0005 mf mica condenser	.20
TTS-111S	Phono-radio switch	.55
4XZ-850	Crystal pick-up	9.85
4XPM-15	Phonograph motor	12.20
3LM-253	Needle cup	.20
4XS-324A	4" dynamic speaker (for 219 cabinet)	3.70

*Item number locates the article on schematic diagram.
†Not supplied separately.

MODELS BQ225, BQ228, Chassis BQ
MODELS BU229, BU230, Chassis BU

EMERSON RADIO

MODEL BW231, Chassis BW
Schematic, Voltage, Parts



6U5 AND R15 USED ON BU ONLY
R14 NOT USED ON BW

IF PEAKED AT 455 KC

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO. 1 BROADCAST
POSITION NO. 2 SHORT WAVE

TO AC LINE

TO ALL HEATERS AND DIAL LIGHT

ANCHORAGE HOLE

WAVE BAND INDICATOR

MODEL BW-231 TRANSFORMER
CHASSIS MODEL BW

MODEL BU-229 and BU-230
CHASSIS MODEL BU

MODEL BQ-225 and BQ-228
CHASSIS MODEL BQ

FOUR POSITION TONE CONTROL SHOWN IN MAX. BASS POSITION
VIEW OF SWITCH LOOKING AT REAR

OUTPUT TRANSFORMER ON SPEAKER

- Model BQ and BW
- 1-6K8, triode-hexode oscillator-modulator.
 - 1-6K7, i-f amplifier.
 - 1-6Q7G, diode detector, audio amplifier and a.v.c.
 - 1-6AUG5, power output.
 - 1-6U5, electron-ray tuning indicator.
 - 1-80, full-wave rectifier.
- Model BU
- 1-6K8, triode-hexode oscillator-modulator.
 - 1-6K7, i-f amplifier.
 - 1-6Q7G, diode detector, audio amplifier and a.v.c.
 - 1-6AUG5, power output.
 - 1-6U5, electron-ray tuning indicator.
 - 1-80, full-wave rectifier.

Part No.	DESCRIPTION	PRICE
4RT-418	Two-band antenna coil with 455 kc wave-trap	\$1.85
5QT-446	Two-band oscillator coil	1.10
4ZT-426A	455 kc first i-f transformer	1.20
3RT-321C	455 kc second i-f transformer	1.10
4ZT-426A	Power transformer	3.95
L1-65	10,000 ohm 1/4 watt carbon resistor	.16
R2	2 megohm 1/2 watt carbon resistor	.16
R3	10,000 ohm 1/2 watt carbon resistor	.16
R4	40,000 ohm 1/2 watt carbon resistor	.28
R5	40,000 ohm 1/2 watt carbon resistor	.16
R6	Volume control, .5 megohm with line switch	1.00
R7	.25 megohm 1/4 watt carbon resistor	.16
R8	175 ohm 1/2 watt wire-wound resistor	.16
R9	15 ohm 1/2 watt wire-wound resistor	.16
R10	1 megohm 1/2 watt carbon resistor	.16
R11	10 megohm 1/2 watt carbon resistor	.16
R12	3 ohm 1/2 watt wire-wound resistor (not used on BW)	.16
R13	20,000 ohm 1 watt carbon resistor (not used on BQ or BU)	.16
R14	Two-gang variable condenser (used on BQ and BU)	3.55
R15	Two-gang variable condenser (used on BW)	3.50
C1	Trimmer, .001 mf, 400 volt molded condenser	.20
C2	Trimmers, part of antenna coil assembly	.20
C3	Trimmers, part of oscillator coil assembly	.20
C4	0.05 mf, 200 volt tubular condenser	.20
C5	0.00006 mf mica condenser	.20
C6	Trimmers, part of oscillator coil assembly	.20
C7	Trimmers, part of oscillator coil assembly	.20
C8	Trimmers, part of oscillator coil assembly	.20
C9	Trimmers, part of oscillator coil assembly	.20
C10	Trimmers, part of oscillator coil assembly	.20
C11	Trimmers, part of oscillator coil assembly	.20
C12	Trimmers, part of oscillator coil assembly	.20
C13	Trimmers, part of oscillator coil assembly	.20
C14	Trimmers, part of oscillator coil assembly	.20
C15	Trimmers, part of oscillator coil assembly	.20
C16	Trimmers, part of oscillator coil assembly	.20
C17	Trimmers, part of oscillator coil assembly	.20
C18	Trimmers, part of oscillator coil assembly	.20
C19	Trimmers, part of oscillator coil assembly	.20
C20	Trimmers, part of oscillator coil assembly	.20
C21	Trimmers, part of oscillator coil assembly	.20
C22	Trimmers, part of oscillator coil assembly	.20
C23	Trimmers, part of oscillator coil assembly	.20
C24	Trimmers, part of oscillator coil assembly	.20
C25	Trimmers, part of oscillator coil assembly	.20
C26	Trimmers, part of oscillator coil assembly	.20
C27	Trimmers, part of oscillator coil assembly	.20
C28	Trimmers, part of oscillator coil assembly	.20
C29	Trimmers, part of oscillator coil assembly	.20
C30	Trimmers, part of oscillator coil assembly	.20
C31	Trimmers, part of oscillator coil assembly	.20
C32	Trimmers, part of oscillator coil assembly	.20
C33	Trimmers, part of oscillator coil assembly	.20
C34	Trimmers, part of oscillator coil assembly	.20
C35	Trimmers, part of oscillator coil assembly	.20
C36	Trimmers, part of oscillator coil assembly	.20
C37	Trimmers, part of oscillator coil assembly	.20
C38	Trimmers, part of oscillator coil assembly	.20
C39	Trimmers, part of oscillator coil assembly	.20
C40	Trimmers, part of oscillator coil assembly	.20
C41	Trimmers, part of oscillator coil assembly	.20
C42	Trimmers, part of oscillator coil assembly	.20
C43	Trimmers, part of oscillator coil assembly	.20
C44	Trimmers, part of oscillator coil assembly	.20
C45	Trimmers, part of oscillator coil assembly	.20
C46	Trimmers, part of oscillator coil assembly	.20
C47	Trimmers, part of oscillator coil assembly	.20
C48	Trimmers, part of oscillator coil assembly	.20
C49	Trimmers, part of oscillator coil assembly	.20
C50	Trimmers, part of oscillator coil assembly	.20
C51	Trimmers, part of oscillator coil assembly	.20
C52	Trimmers, part of oscillator coil assembly	.20
C53	Trimmers, part of oscillator coil assembly	.20
C54	Trimmers, part of oscillator coil assembly	.20
C55	Trimmers, part of oscillator coil assembly	.20
C56	Trimmers, part of oscillator coil assembly	.20
C57	Trimmers, part of oscillator coil assembly	.20
C58	Trimmers, part of oscillator coil assembly	.20
C59	Trimmers, part of oscillator coil assembly	.20
C60	Trimmers, part of oscillator coil assembly	.20
C61	Trimmers, part of oscillator coil assembly	.20
C62	Trimmers, part of oscillator coil assembly	.20
C63	Trimmers, part of oscillator coil assembly	.20
C64	Trimmers, part of oscillator coil assembly	.20
C65	Trimmers, part of oscillator coil assembly	.20
C66	Trimmers, part of oscillator coil assembly	.20
C67	Trimmers, part of oscillator coil assembly	.20
C68	Trimmers, part of oscillator coil assembly	.20
C69	Trimmers, part of oscillator coil assembly	.20
C70	Trimmers, part of oscillator coil assembly	.20
C71	Trimmers, part of oscillator coil assembly	.20
C72	Trimmers, part of oscillator coil assembly	.20
C73	Trimmers, part of oscillator coil assembly	.20
C74	Trimmers, part of oscillator coil assembly	.20
C75	Trimmers, part of oscillator coil assembly	.20
C76	Trimmers, part of oscillator coil assembly	.20
C77	Trimmers, part of oscillator coil assembly	.20
C78	Trimmers, part of oscillator coil assembly	.20
C79	Trimmers, part of oscillator coil assembly	.20
C80	Trimmers, part of oscillator coil assembly	.20
C81	Trimmers, part of oscillator coil assembly	.20
C82	Trimmers, part of oscillator coil assembly	.20
C83	Trimmers, part of oscillator coil assembly	.20
C84	Trimmers, part of oscillator coil assembly	.20
C85	Trimmers, part of oscillator coil assembly	.20
C86	Trimmers, part of oscillator coil assembly	.20
C87	Trimmers, part of oscillator coil assembly	.20
C88	Trimmers, part of oscillator coil assembly	.20
C89	Trimmers, part of oscillator coil assembly	.20
C90	Trimmers, part of oscillator coil assembly	.20
C91	Trimmers, part of oscillator coil assembly	.20
C92	Trimmers, part of oscillator coil assembly	.20
C93	Trimmers, part of oscillator coil assembly	.20
C94	Trimmers, part of oscillator coil assembly	.20
C95	Trimmers, part of oscillator coil assembly	.20
C96	Trimmers, part of oscillator coil assembly	.20
C97	Trimmers, part of oscillator coil assembly	.20
C98	Trimmers, part of oscillator coil assembly	.20
C99	Trimmers, part of oscillator coil assembly	.20
C100	Trimmers, part of oscillator coil assembly	.20

- 6U5 AND R15 USED ON BU ONLY
R14 NOT USED ON BW
- IF PEAKED AT 455 KC
- WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO. 1 BROADCAST
POSITION NO. 2 SHORT WAVE
- TO AC LINE
- TO ALL HEATERS AND DIAL LIGHT
- ANCHORAGE HOLE
- WAVE BAND INDICATOR
- MODEL BW-231 TRANSFORMER
CHASSIS MODEL BW
- MODEL BU-229 and BU-230
CHASSIS MODEL BU
- MODEL BQ-225 and BQ-228
CHASSIS MODEL BQ
- FOUR POSITION TONE CONTROL SHOWN IN MAX. BASS POSITION
VIEW OF SWITCH LOOKING AT REAR
- OUTPUT TRANSFORMER ON SPEAKER

THE FOLLOWING PARTS ARE USED ON MODELS BQ AND BU ONLY:

50M-300	Six-button mechanical tuning unit (including variable condenser)	11.40
50M-301	Background plate	.30
50F-2	Conical dial face	1.10
50F-2	Escutcheon for push-buttons	1.15
4VZ-743A	Celluloid push-button caps (set of 6)	.05
5RZ-535	Push-buttons	.05
50P-13	Adjusting buttons	.05
51E-25	Wiring manual cards (complete set)	.65
51E-25	Wiring manual cards (for BU-230)	.25
5SE-4	Escutcheon for electron-ray tuning indicator	.30

THE FOLLOWING PARTS ARE USED ON MODEL BW ONLY:

4VM-97	Dial drive pulley	.10
4VZ-752	Conical dial face	.06
51Z-924	Drive cord spring	.06
4VZ-739	Conical dial face	1.70

VOLTAGE ANALYSIS

Plate	Grid	Screen	Control	Diode	Rectifier	Plate
6K8	215	100	0	75	6.3 a.c.	6.3 a.c.
6K7	215	100	0	75	6.3 a.c.	6.3 a.c.
6Q7G	100	0	0	—	6.3 a.c.	6.3 a.c.
6U5	215	100	0	—	6.3 a.c.	6.3 a.c.
80	100	0	0	—	6.3 a.c.	6.3 a.c.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except B plate rectifier, screen and control voltages were taken on 250-volt scale.

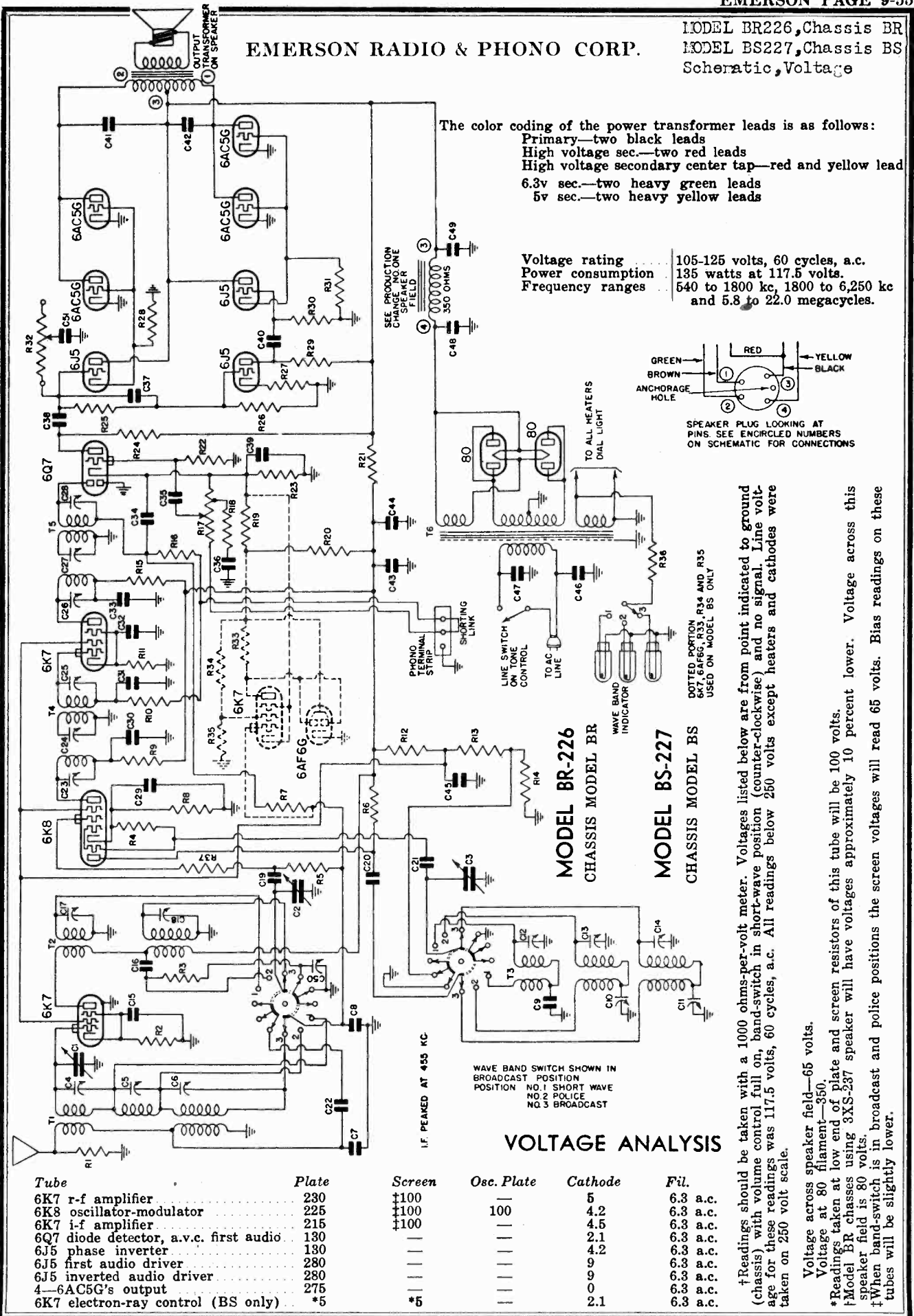
Voltage at B plate to B min. (center tap of high voltage winding on power transformer)—300 volts.

Voltage across speaker field—70 volts.

The grid bias for all tubes is developed across resistors R-9 and R-10 (see schematic). The total voltage measured across R-9 and R-10 should be 12 volts.

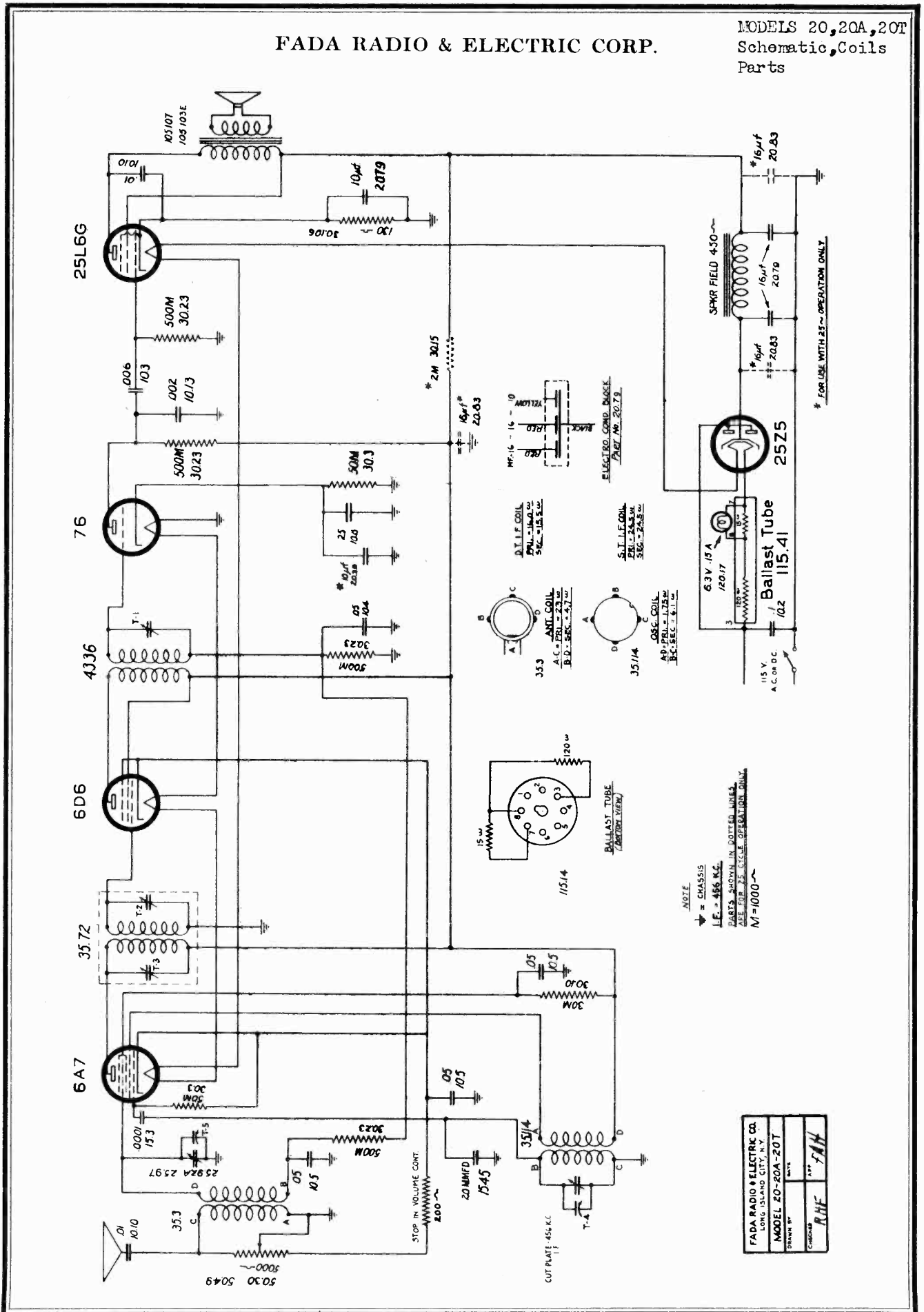
EMERSON RADIO & PHONO CORP.

MODEL BR226, Chassis BR
 MODEL BS227, Chassis BS
 Schematic, Voltage



FADA RADIO & ELECTRIC CORP.

MODELS 20, 20A, 20T
Schematic, Coils
Parts



MODEL 250 Series
MODEL 262 Series
Socket, Trimmers
Voltage, Alignment

FADA RADIO & ELECTRIC CO

CONTINUITY AND VOLTAGE READINGS ON

MODEL 262 SERIES

Line Voltage 117 A.C. - Input Current .45 Amp.
No signal input Volume Control Max.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE CURRENT MA	CATHODE VOLTS	SCREEN GRID VOLTS
6AR	1st Detector	103	1.2	2.2	52
	Oscillator	93	2.2	---	---
6K7	Int. Freq.	104	7.0	5.5	104
6C5	2nd Detector	37	.05	5.5	---
43	Pwr. Pentode	86	22.0	14.5	90
25Z5	Rectifier	---	75.0 TOTAL	---	---

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (PART #20.49)

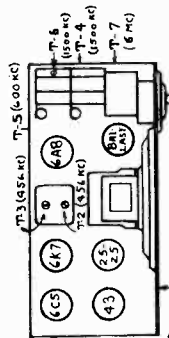
1st section - 119 2nd section - 104

Voltage across 3,000 ohm speaker field 119 volts
" 3,000 " filter choke 15 "

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.21	3,000*	340*	.5	3

*These are cold D.C. resistance values.



ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8 tube	T-1, T-2, T-3
B.C.	1500 KC	1500 KC	---	200 mmfd. condenser	Antenna lead	T-4, T-6
B.C.	600 KC	600 KC	---	200 mmfd. condenser	Antenna lead	T-5
S.W.	6 MC	16 MC	5.1 MC	400 ohm resistor	Antenna lead	T-7

Note: Set the dial pointer directly to the last, long line at the right hand side of the dial with the ganged condenser fully meshed.

* To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 250 SERIES

Line Voltage 117 A.C. - Input Current .52 Amp.
No signal input Volume control - Max.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE CURRENT MA	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Detector	214	3.8	2.5	92
	Oscillator	176	3.4	---	---
6D6	Int. Freq.	214	6.6	3.1	92
76	2nd Detector	98	0.2	9.1	---
6B5	Pwr. Input	214	6.3	---	---
	Pwr. Output	202	27.0	---	---
80	Rectifier	---	52.0 TOTAL	---	---

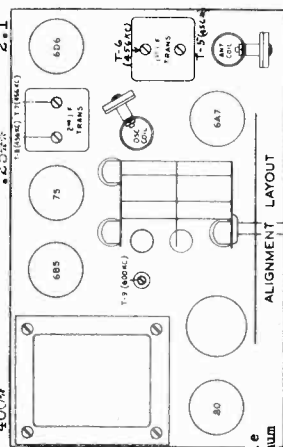
VOLTAGES ACROSS ELECTROLYTIC CONDENSERS 1st - 305 2nd - 214
These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

Above readings taken with a 105.37 speaker in circuit.

Voltage across speaker field 91 volts

Voltage across speaker field 91 volts

Voltage across speaker field 91 volts



ALIGNMENT TABLE

*To insure perfect alignment, it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	control grid of 6D6 tube	T-7
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	control grid of 6A7 tube	T-6, T-5
S.W.	4.5 MC	4.5 MC	3.6 MC	400 ohm resistor	Yellow antenna lead	T-3, T-1
S.W.	1.9 MC	1.8 MC	---	400 ohm resistor	Yellow antenna lead	Check Sensitivity
B.C.	1500 KC	1500 KC	---	200 mmfd. condenser	Yellow antenna lead	T-4, T-2
B.C.	600 KC	600 KC	---	200 mmfd. condenser	Yellow antenna lead	T-8*

Socket, Trimmers
Voltage, Alignment

FADA RADIO & ELECTRIC CO

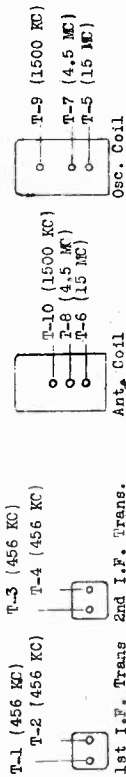
MODEL 272
MODEL 273
MODEL 280
MODEL 281

on Band "C" and note the accuracy of calibration. If a discrepancy of more than 5 KC is noted, shift the dial pointer to the station's frequency.

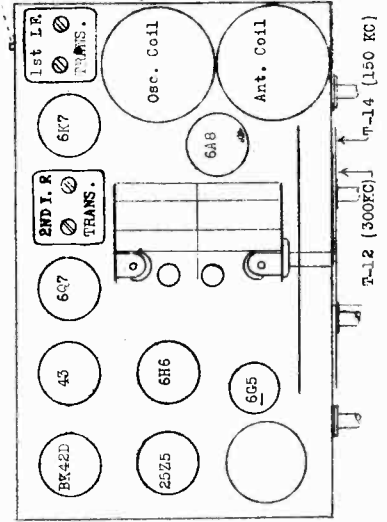
ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
C	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6K7 tube	T-1, T-2
C	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8 tube	T-3, T-4
A	15 MC	15 MC	15.9 MC	400 ohm resistor	Yellow antenna lead	T-5, T-6
A	6 MC	6 MC	---	400 ohm resistor	Yellow antenna lead	Check Sensitivity
B	4.5 MC	4.5 MC	3.6 MC	400 ohm resistor	Yellow antenna lead	T-7, T-8
B	1.8 MC	1.8 MC	---	400 ohm resistor	Yellow antenna lead	Check Sensitivity
C	1500 KC	1500 KC	---	200 mmfd. condenser	Yellow antenna lead	T-9, T-10
C	600 KC	600 KC	---	200 mmfd. condenser	Yellow antenna lead	T-11*
D	300 KC	300 KC	---	200 mmfd. condenser	Yellow antenna lead	T-12, T-13
D	150 KC	150 KC	---	200 mmfd. condenser	Yellow antenna lead	T-14*

*To insure perfect alignment it is necessary to "rock" the gauged variable condenser in order to follow the maximum signal output.



CHASSIS LAYOUT FOR MODELS 272, 273, 280 and 281 SERIES



MODELS 272, 273, and 280 SERIES
LINE VOLTAGE 117 AC, 0.49 AMPERE
NO SIGNAL INPUT

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	FLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Detector	111	1.8	1.6	71
6K7	Oscillator	98	2.9	---	---
	Int. Freq.	111	6.6	2.8	111
	2nd Detector	---	---	---	---
6Q7	A.V.C	---	---	---	---
	1st Audio	45	.3	.8	---
6H6	A.V.C.	---	---	---	---
43	Par. Pentode	90	21.0	15.5	98
6C5	Flash-o-graph	111	4.8	---	---
25A6	Rectifier	---	98.0 TOTAL	---	---

RECEIVER CURRENT-----45 ma. SPEAKER FIELD CURRENT 53 ma.

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

665 used only on 280 SERIES

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS
1st - 125V 2nd - 111V

Voltage across speaker field ----- 110 Volts
" " filter choke ----- 15 "

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.47	2000*	260*	.3**	2.3
106.48	2000*	250*	.2**	1.8

* These are cold D.C. resistance values.

** This reading includes resistance of hum bucking coil.

ALIGNMENT FOR MODELS 272, 273, 280, and 281 SERIES

It is important that the proper dummy antenna value, as specified under "DUMMY ANTENNA" in the following table, be connected in series with the high potential side of the signal generator. The .001 mfd. condenser may be a paper tubular (400 volt) type and the 200 mmfd. condenser of mica construction. The 400 ohm and 50,000 ohm resistors should be carbon type (1/3 watt). The receiver ground should remain connected to the low potential side of the signal generator throughout the following adjustments.

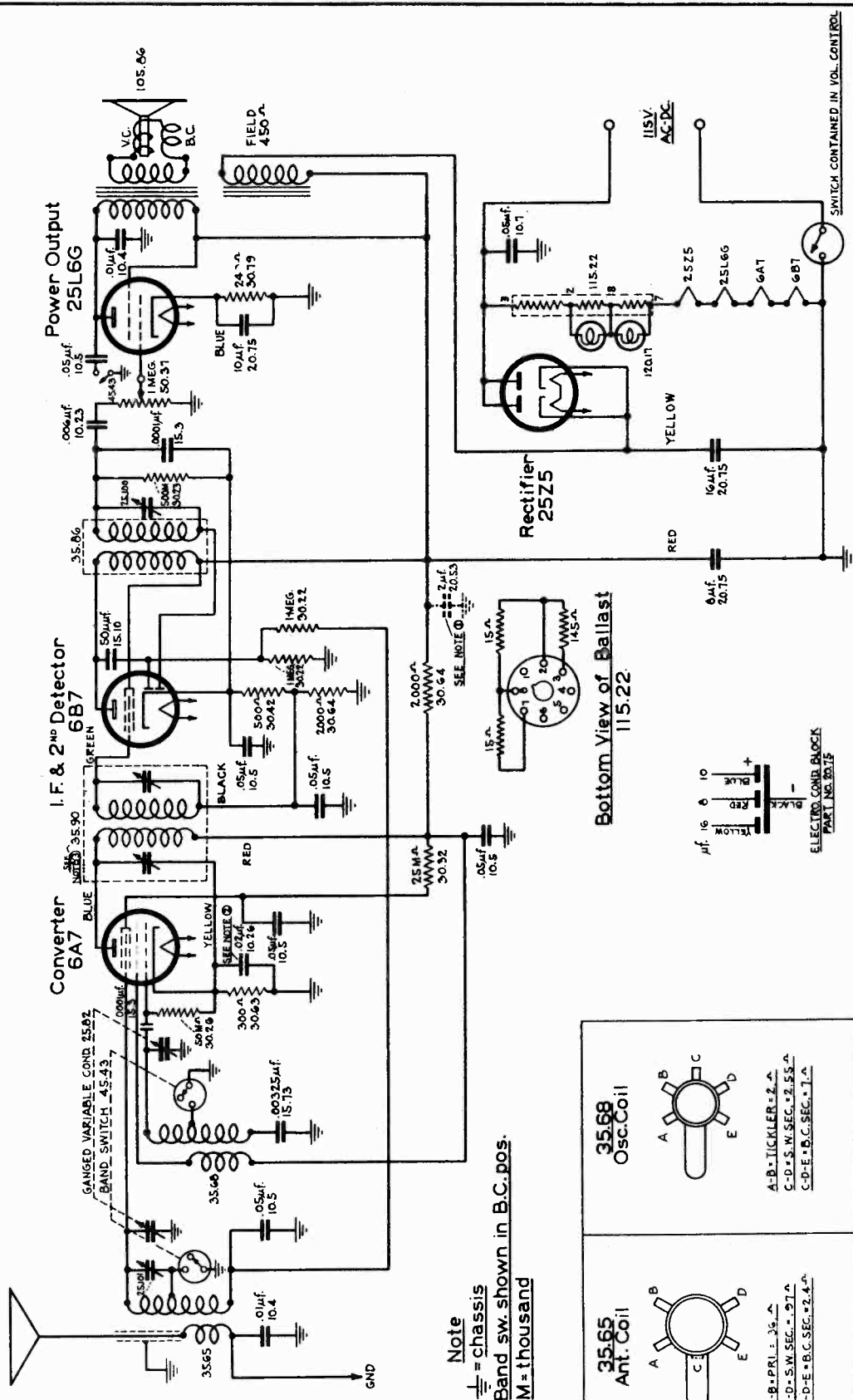
For adjusting the I.F. trimmer condensers, the control grid lead should be removed and a 50,000 ohm resistor inserted in series with same. Then connect the high potential lead of the signal generator through the .001 mfd. condenser, directly to the control grid cap of the tube. Alignment adjustments should be repeated because of possible interaction between circuits.

To determine that the short wave band shunt trimmer condensers have not been adjusted to the image frequency turn the receiver dial to the frequency listed under "IMAGE FREQUENCY", where a signal weaker than the fundamental should be noted, however, if no signal can be heard at this setting even with a greater signal generator output, the trimmer has been improperly adjusted and it will be necessary to re-adjust to the proper peak.

Having completed the alignment, tune in a signal at approximately 800 to 900 KC.

MODEL 352
Schematic, Coils
Parts

FADA RADIO & ELECTRIC CO



FADA RADIO & ELECTRIC CO	DATE 8-31-37
MODEL 352	DESIGNED BY J.P.
CHANGED BY J.H.F.	DATE 1937

I. F. Peak = 456 Kc.

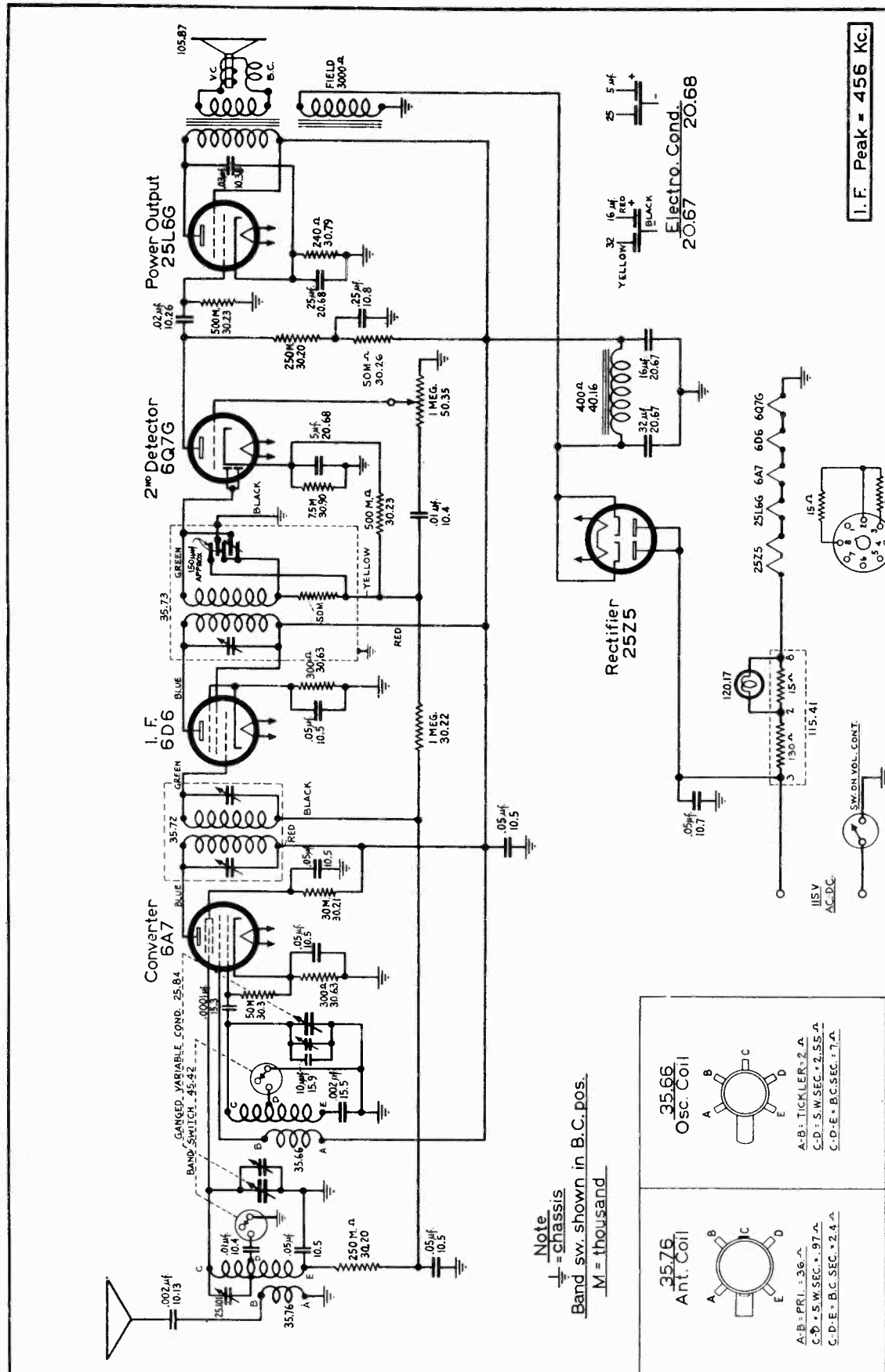
Note
 — = chassis
 Band sw. shown in B.C. pos.
 M = thousand

35.65 Ant. Coil	<p>A-B = P.R.I. = 3g C-D = S.W. SEC. = .2T C-D-E = B.C. SEC. = 2.4</p>
35.68 Osc. Coil	<p>A-B = TICKLER = 2 C-D = S.W. SEC. = 2.55 C-D-E = B.C. SEC. = 1</p>
35.44 1st I.F.	PRI. SEC. = 11.0
35.86 2nd I.F.	PRI. SEC. = 10.0

NOTE: 2uf ELECTROLYTIC PART NO. 20.53 IS USED ON EARLY MODELS IN CONJUNCTION WITH PART NO. 20.63
 NOTE: ON SOME MODELS 0.001uf CONDENSER PART NO. 10.42 IS USED IN PLACE OF 0.01uf PART NO. 10.18
 NOTE: 1st I.F. PART NO. 35.44 IS USED ON SOME EARLY MODELS.

FADA RADIO & ELECTRIC CORP.

MODEL 360
Schematic, Coils
Parts



I. F. Peak = 456 Kc.

FADA RADIO & ELECTRIC CO. ONE BRIDGE CITY, N.Y.
MODEL 360
DATE 8-31-37
DESIGNED BY
APPROVED BY

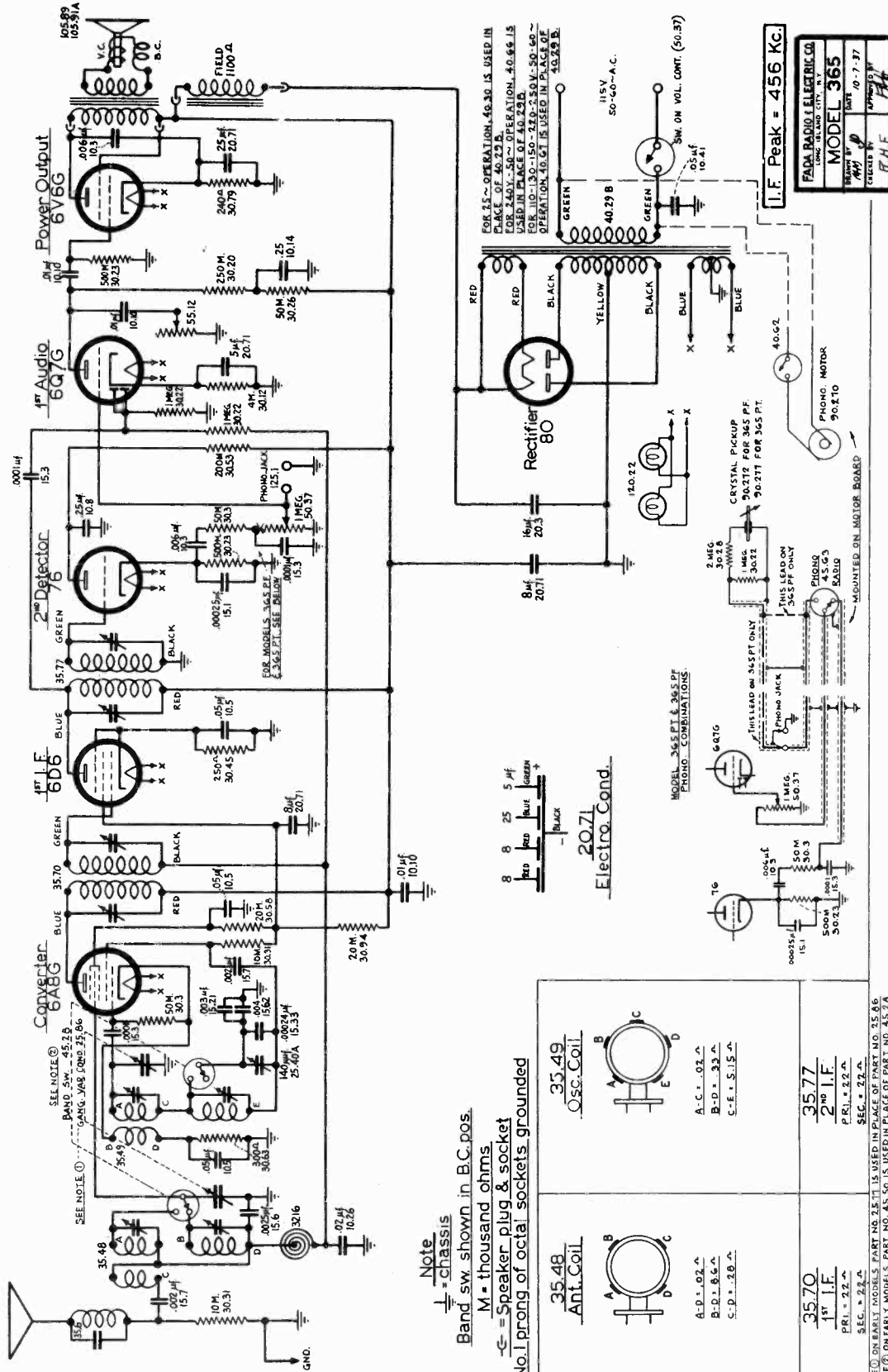
Note
= chassis
Band sw. shown in B.C. pos.
M = thousand

<p>35.76 Ant. Coil</p> <p>A-B = PRI. = 3.6-[^] C-D = S.W. SEC. = .97-[^] C-D-E = B.C. SEC. = 2.4-[^]</p>	<p>35.66 Osc. Coil</p> <p>A-B = TUCKLER = 2-[^] C-D = S.W. SEC. = 2.55-[^] C-D-E = B.C. SEC. = 7-[^]</p>
<p>35.72 1st I. F.</p> <p>PRI. & SEC. = 2.0-[^]</p>	<p>35.73 2nd I. F.</p> <p>PRI. & SEC. = 2.0-[^]</p>

Bottom View of Ballast
115.41

MODEL 365
Schematic, Coils
Parts

FADA RADIO & ELECTRIC CORP.



FOR 15-~ OPERATION, 40.30 IS USED IN PLACE OF 40.25 B.
FOR 250V.~50~ OPERATION, 40.66 IS USED IN PLACE OF 40.29 B.
FOR 110-130-150-220-250V.~50-60~ OPERATION, 40.67 IS USED IN PLACE OF 40.29 B.

I.F. Peak = 456 Kc.

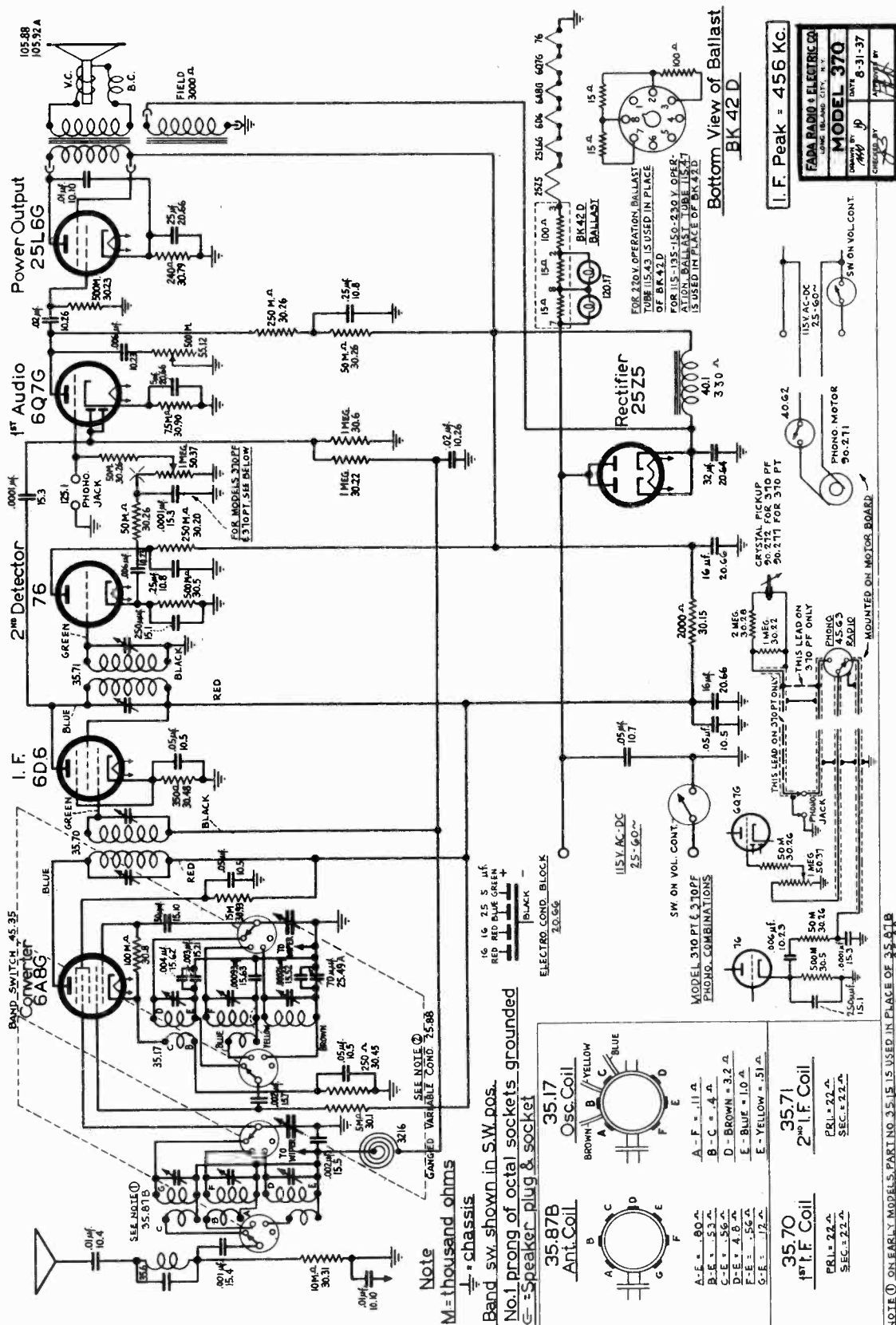
FADA RADIO & ELECTRIC CORP. LONG BEACH, CALIF., U.S.A.	
MODEL 365	
DESIGNED BY A.M.F.	DATE 10-7-37
CHECKED BY R.H.F.	APPROVED BY R.H.F.

35.48 Ant. Coil	35.49 Osc. Coil
A-D = .02 μ B-D = .33 μ C-D = .70 μ	A-C = .02 μ B-D = .33 μ C-E = 5.15 μ
35.70 1st I.F.	35.77 2nd I.F.
SEC. = 2.2 μ PRI. = 2.2 μ	SEC. = 2.2 μ PRI. = 2.2 μ

NOTE: ON EARLY MODELS, PART NO. 25.11 IS USED IN PLACE OF PART NO. 25.16
NOTE: ON EARLY MODELS, PART NO. 45.50 IS USED IN PLACE OF PART NO. 45.26

FADA RADIO & ELECTRIC CORP.

MODEL 370
Schematic, Coils
Parts



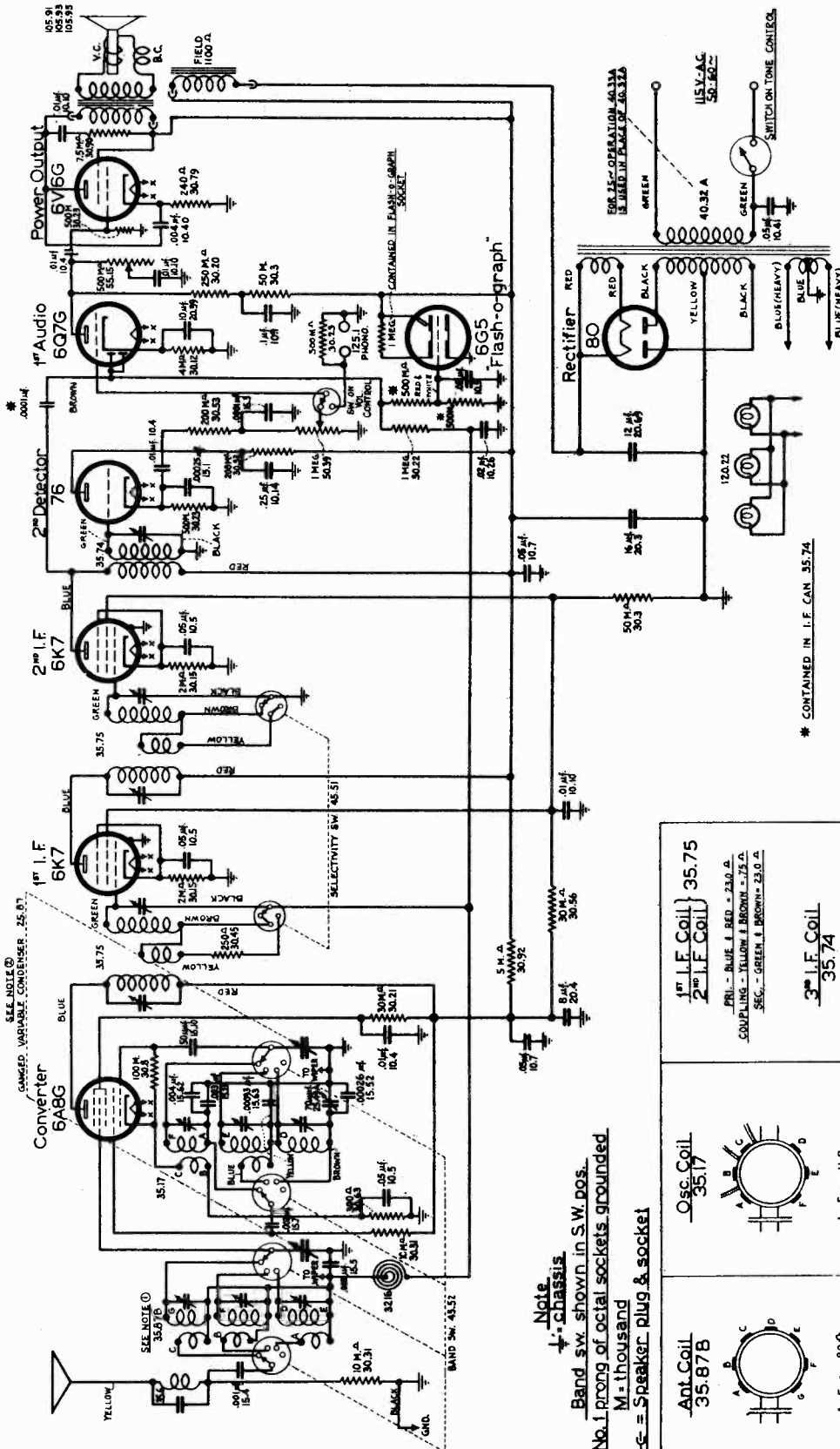
FADA RADIO & ELECTRIC CORP.
NEW BRIDGE CITY, TENN.
MODEL 370
PART NO. 9-31-37
CHECKED BY: [Signature]

I. F. Peak = 456 Kc.

NOTE (1) ON EARLY MODELS PART NO. 35 IS USED IN PLACE OF 35.87B
NOTE (2) ... 25.80 ...

MODEL 380
Schematic, Coils
Parts

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CO.
CHICAGO, ILL.
MODEL 380
DESIGNED BY
PART NO. 35.17, 35.74
CHECKED BY
C.F.F.

I.F. Peak 456 KC.

* CONTAINED IN I.F. CAN 35.74

Note
+ = chassis

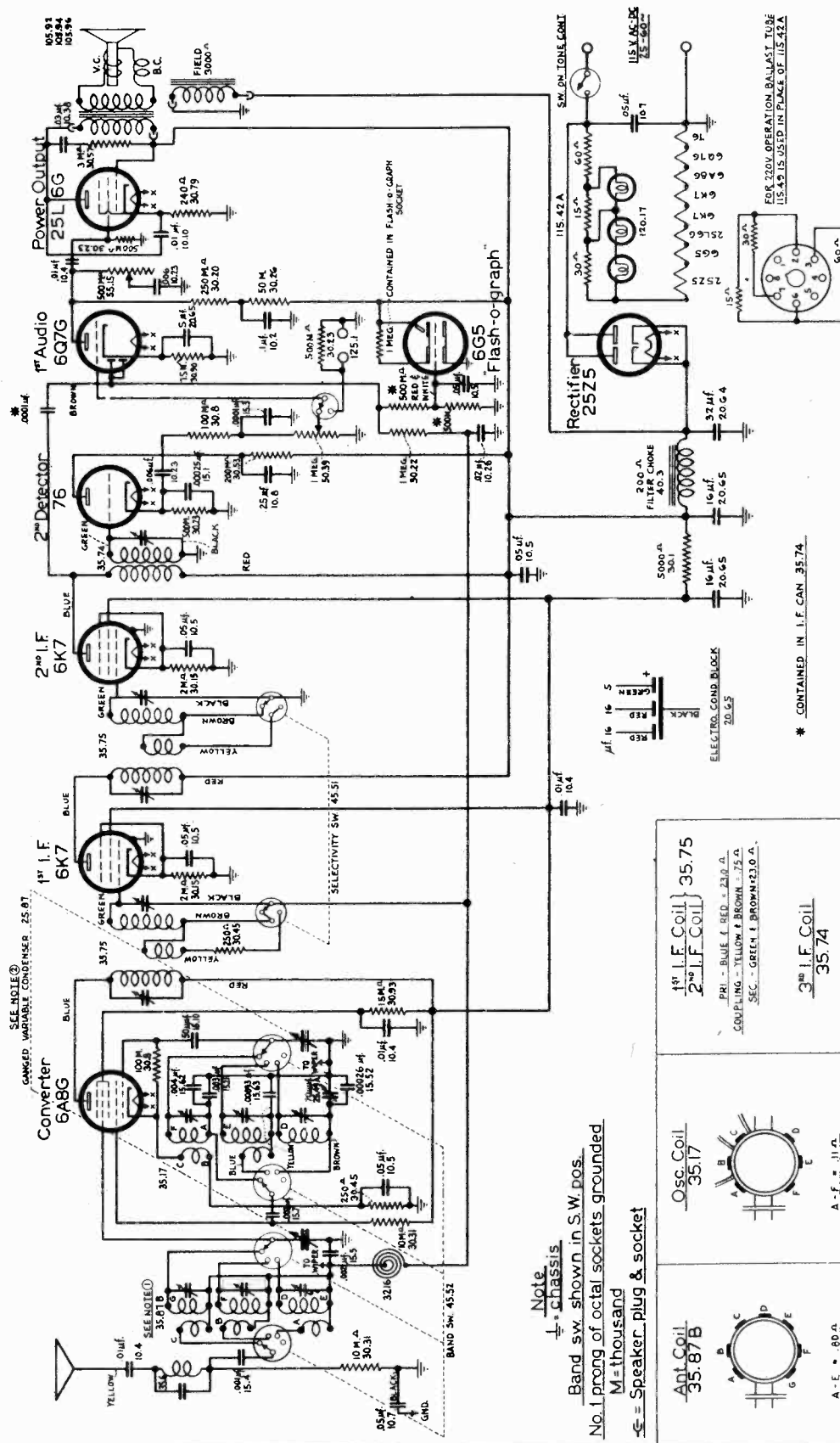
Band sw. shown in S.W. pos.
No. 1 prong of octal sockets grounded
M = thousand
-S = Speaker plug & socket

<p>Ant. Coil 35.87B</p> <p>A-E = 80 Ω B-E = 55 Ω C-E = 38 Ω D-E = 4.0 Ω E-F = .56 Ω G-E = .12 Ω</p>	<p>Osc. Coil 35.17</p> <p>A-F = 11 Ω B-C = 4 Ω D-BROWN = 3.2 Ω E-BLUE = 1.0 Ω F-YELLOW = .51 Ω</p>	<p>1st I.F. Coil } 35.75 2nd I.F. Coil } PRI. - BLUE & RED = 23.0 Ω COUPLING - YELLOW & BROWN = 7.5 Ω SEC. - GREEN & BROWN = 23.0 Ω</p> <p>3rd I.F. Coil 35.74</p> <p>PRI. - BLUE & RED = 18.5 Ω SEC. - GREEN & BLACK = 18.5 Ω</p>
---	--	--

NOTE: ON EARLY MODELS, PART NO. 35.15 IS USED IN PLACE OF PART NO. 35.17
NOTE: ON EARLY MODELS, PART NO. 25.1B IS USED IN PLACE OF PART NO. 25.1A

FADA RADIO & ELECTRIC CO

MODEL 390
Schematic, Coils
Parts



FADA RADIO & ELECTRIC CO
CINCINNATI, OHIO, U.S.A.
MODEL 390
DRAWN BY J.P. DATE 10-7-37
CHECKED BY R.H.P.

BOTTOM VIEW
BALLAST TUBE IIS-42A

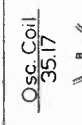
I.F. Peak 456 KC.

FOR 220V OPERATION BALLAST TUBE
IIS-43 IS USED IN PLACE OF IIS-42A

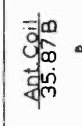
* CONTAINED IN I.F. CAN 35.74

1st I.F. Coil 35.75
2nd I.F. Coil 35.75
PRI - BLUE & RED - 23.0 Ω
COUPLING - YELLOW & BROWN - 72 Ω
SEC - GREEN & BROWN - 23.0 Ω

3rd I.F. Coil 35.74
PRI - BLUE & RED - 18.5 Ω
SEC - GREEN & BLACK - 18.5 Ω



A - F = .80 Ω
B - E = .53 Ω
C - E = .56 Ω
D - E = 4.8 Ω
E - F = .56 Ω
G - E = .12 Ω



A - E = .80 Ω
B - E = .53 Ω
C - E = .56 Ω
D - E = 4.8 Ω
E - F = .56 Ω
G - E = .12 Ω

Note
⊥ = Chassis

Band sw. shown in S.W. pos.
No. 1 prong of octal sockets grounded
M = thousand
Ω = Speaker, plug & socket

NOTE: ON EARLY MODELS PART NO. 35.17 IS USED IN PLACE OF PART NO. 35.87B. NOTE FOR EARLY MODELS: PART NO. 25.18 IS USED IN PLACE OF PART NO. 25.21.

FADA RADIO & ELECTRIC CORP

MODEL 410
MODEL 413
Alignment, Voltage

CONTINUITY AND VOLTAGE READINGS ON MODEL 413 SERIES

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE CURRENT MA	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F. Amp.	220	5.8	2.5	87.
6A8G	{ Converter Oscillator	220 162	4.1 5.2	2.6	84.
6K7	1st I.F.	205	2.0	5.8	87.
76	2nd I.F.	205	2.3	5.2	87.
6J7	2nd Detector	113	.1	15.0	--
6J7	AF Control	191	.9	3.5	87.
6A7G	1st Audio, AVC	77	.4	1.3	--
76	Phase Inverter	88	2.0	50.0	--
6G5	Flash-o-graph	220	7.5	---	--
6V6G	P. P. Output	221	36.0	14.0	250.
5Z3	Rectifier	---	110.0 TOTAL	---	---

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS Line voltage 115 A.C. - Input watts - 96

PART NO.	1ST SECTION	2ND SECTION
20,3	350	200
20,4	246	220

Voltage across speaker field - - - - - 84 volts (No signal input)

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105,98	800*	275* TOTAL	.20**	2.0

*These are cold D.C. resistance values
** This reading includes resistance of hum bucking coil

CONTINUITY AND VOLTAGE READINGS ON MODEL 410 SERIES

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE CURRENT MA	CATHODE VOLTS	SCREEN GRID VOLTS
6A8G	{ Converter Oscillator	175 141	3.8 4.0	2.8	97
6K7	1st I.F.	250	3.1	5.9	80
6K7	2nd I.F.	250	3.1	5.9	80
76	2nd Detector	125	.1	13.0	--
6J7	AF Control	150	.6	3.25	80
6Q7G	1st Audio, AVC	75	.5	1.4	--
6G5	Flash-o-graph	175	3.9	---	--
6V6G	Audio Output	230	44.0	12.1	243
80	Rectifier	---	75.0 TOTAL	---	---

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS

PART NO.	1ST SECTION	2ND SECTION	3RD SECTION
348	255	175	---

Line voltage 115 A.C. - Input watts - 79

ALIGNING INSTRUCTIONS MODEL 413 SERIES MODEL 410 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1,500 KC, 1.8 MC, 4.5 MC, 6 MC and 15 MC. Besides the standard rectifier-type Output Meter, it will be necessary to use a 50 Microammeter Galvanometer, in aligning the Automatic Frequency Control (AFC) Circuit.

The aligning table, shown below, indicates the sequence of steps necessary to correctly align this receiver. Care should be taken to have the controls in their proper positions.

For adjusting the I.F. trimmer condensers, the control grid lead should be removed and a 50,000 ohm resistor inserted in series with same. Then connect the high potential lead of the signal generator through the .001 mfd. condenser, directly to the control grid cap of the tube.

It is important that the proper dummy antenna value, as specified under "DUMMY ANTENNA", be connected in series with the high potential side of the signal generator. The .001 mfd. condenser may be a paper tubular (400 volt) type and the 200 mfd. condenser of mica construction. The 400 ohm and 50,000 ohm resistors should be carbon type (1/3 watt). The receiver ground should remain connected to the low potential side of the signal generator throughout the following adjustments.

When adjusting the AFC circuit, the Galvanometer is connected across the two cathode terminals of the 6HS Discriminator Tube. Adjust the trimmer for Zero Current thru meter. It may be necessary to increase the output of the signal generator considerably to obtain an indication on this meter. The volume control may be retarded to reduce the speaker volume level. Retrimming of the plate circuit of the 2nd I.F. tube is necessary to correct effect of AFC adjustment. NOTE: - If a Galvanometer is not available, the following method may be used to align the AFC trimmer: - (1) Align complete receiver, omitting AFC adjustment. (2) Loosely couple 456 KC to 6A8G grid, set selectivity switch to "AFC OFF", and manually "tune in" a w.c.k carrier on the BC Band, noting heterodyne beat. (3) Adjust manual control for zero beat. (4) Return selectivity switch to "Sharp" position and adjust trimmer (T-1) for zero beat.

To determine that the short wave band shunt trimmer condensers have not been adjusted to the image frequency turn the receiver dial to the frequency listed under "IMAGE FREQUENCY" where a signal weaker than the fundamental should be noted, however, if no signal can be heard at this setting, even with a greater signal generator output, the trimmer has been improperly adjusted and it will be necessary to re-adjust to the proper peak.

The complete alignment adjustments should be repeated because of possible interaction between circuits.

Voltage across speaker field - (1100 ohms) - - - - - 85 volts
" " 5,000 ohm resistor - (#30.92) - - - - - 80 "

SPEAKER D.C. RESISTANCE VALUES

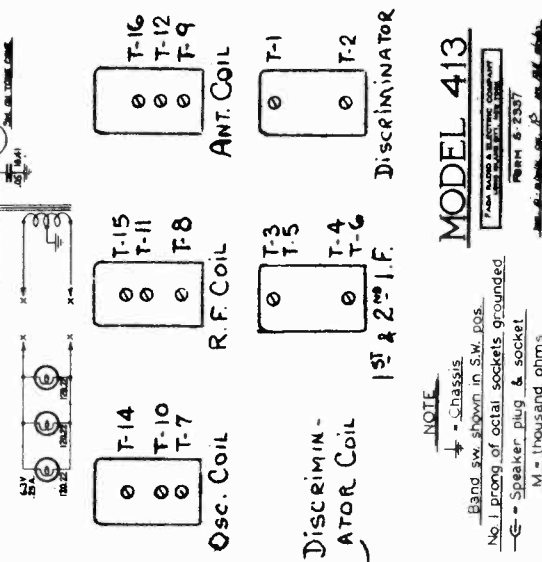
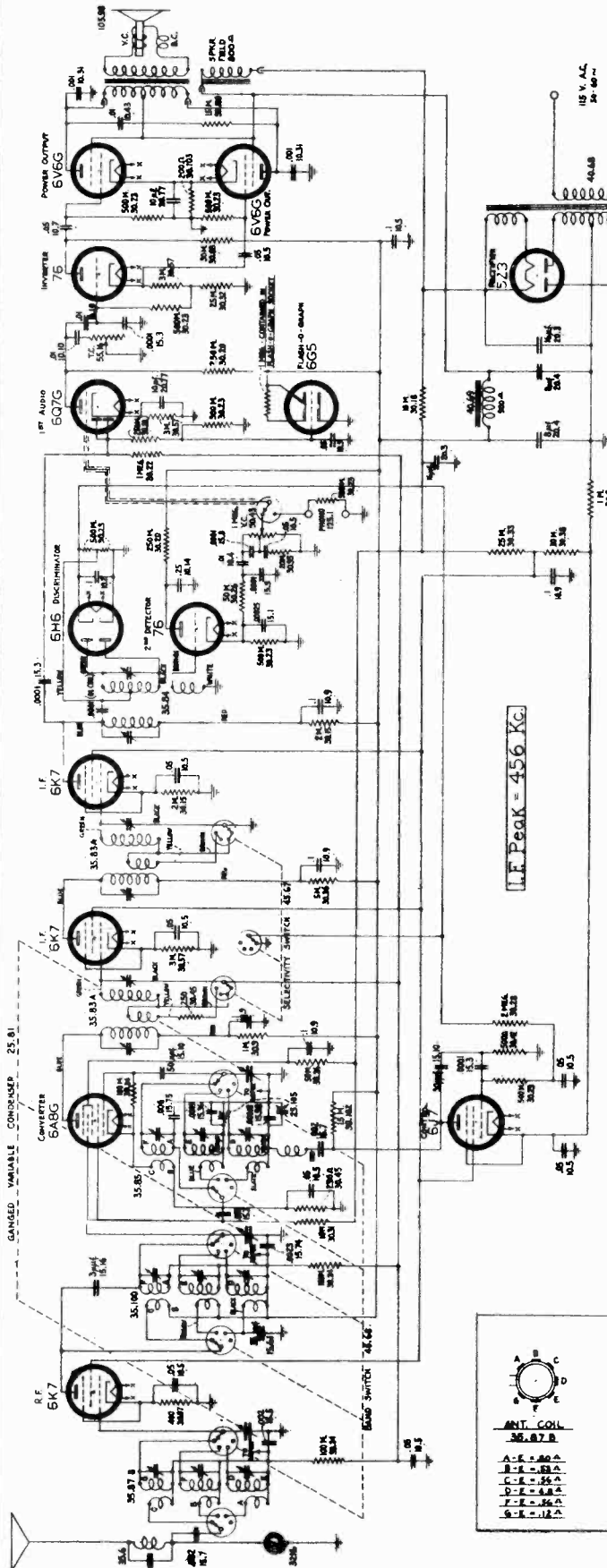
PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105,93	1100*	250*	.8**	2.2

*These are cold D.C. resistance values

**This reading includes resistance of hum bucking coil

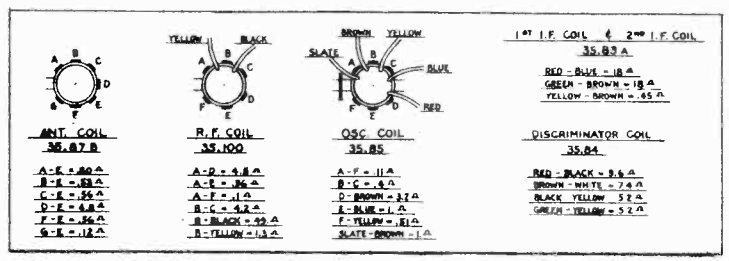
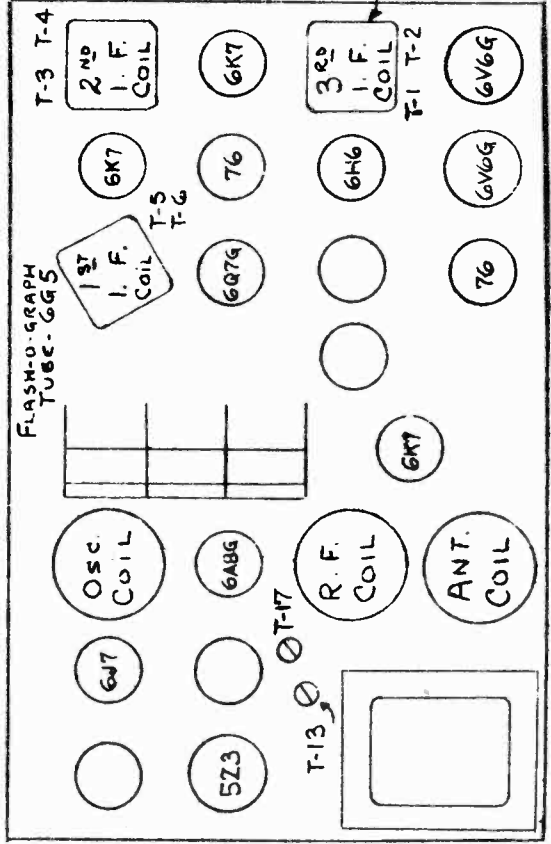
MODEL 413
Schematic, Socket
Trimmers, Coils, Parts

FADA RADIO & ELECTRIC CORP.



MODEL 413
FADA RADIO & ELECTRIC CORP.
PHOENIX 6 2337
M = thousand ohms

NOTE
+ = Chassis
Band sw. shown in S.W. pos.
No. 1 proxy of octal sockets grounded
-G = Speaker plug & socket



FADA RADIO & ELECTRIC CORP.

MODEL 410
MODEL 413
Alignment Tables

MODEL 410 SERIES ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
A.F.C. OFF	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid 1st 6K7 tube	T-1,T-2, T-3,T-4
A.F.C. OFF	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-5,T-6
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-1*
A.F.C. OFF	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-2
S.W.	15 MC	15 MC	15.9 MC	400 ohm resistor	Yellow ant. lead	T-7,T-8
S.W.	6 MC	6 MC	---	400 ohm resistor	Yellow ant. lead	Check Tracking
POL	4.5 MC	4.5 MC	3.6 MC	400 ohm resistor	Yellow ant. lead	T-9,T-10
POL	1.8 MC	1.8 MC	---	400 ohm resistor	Yellow ant. lead	Check Tracking
B.C.	1500 KC	1500 KC	---	200 mmfd. condenser	Yellow ant. lead	T-11, T-12
B.C.	600 KC	600 KC	---	200 mmfd. condenser	Yellow ant. lead	T-13*

MODEL 413 SERIES ALIGNMENT TABLE

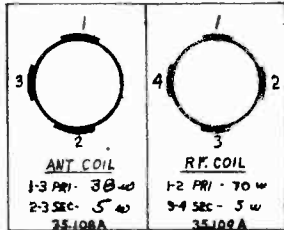
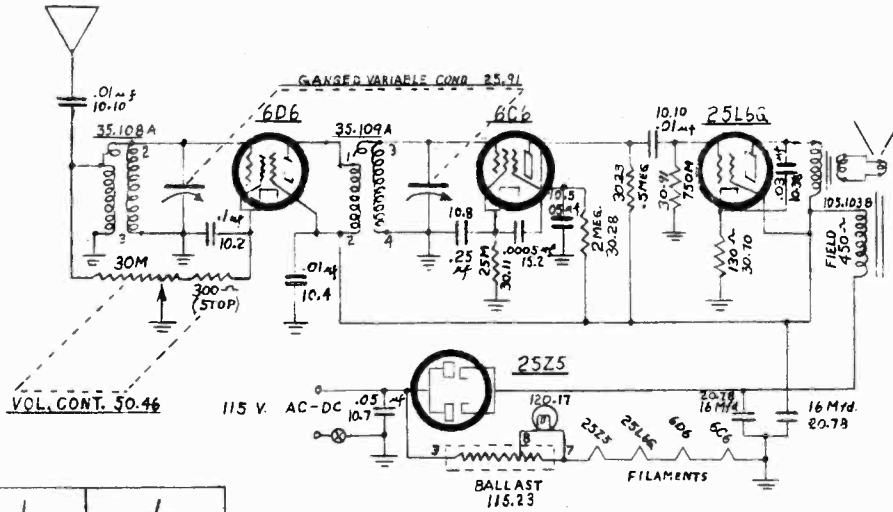
WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	SELECT. SWITCH	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	AFC off	---	.001 mfd. 50,000 ohms	Control grid 1st 6K7 tube	T-1,T-2, T-3,T-4
B.C.	1000 KC	456 KC	AFC OFF	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-5,T-6
B.C.	1000 KC	456 KC	SHARP	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-1*
B.C.	1000 KC	456 KC	AFC OFF	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-2
S.W.	15 MC	15 MC	SHARP	15.9 MC	400 ohm resistor	Yellow ant. lead	T-7,T-8 T-9
S.W.	6 MC	6 MC	SHARP	---	400 ohm resistor	Yellow ant. lead	Check Tracking
POL	4.5 MC	4.5 MC	SHARP	3.6 MC	400 ohm resistor	Yellow ant. lead	T-10, T-11,T-12
POL	1.8 MC	1.8 MC	SHARP	---	400 ohm resistor	Yellow ant. lead	T-13**
B.C.	1500 KC	1500 KC	SHARP	---	200 mmfd. condenser	Yellow ant. lead	T-14,T-15 T-16
B.C.	600 KC	600 KC	SHARP	---	200 mmfd. condenser	Yellow ant. lead	T-17**

*Automatic Frequency Control Adjustment.

** To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

MODEL 450
 MODEL 5F60
 Schematics, Coils
 Parts

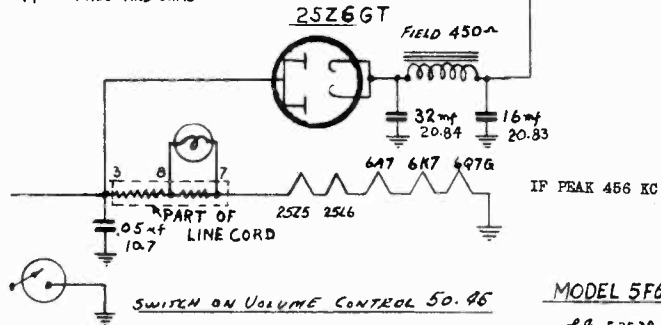
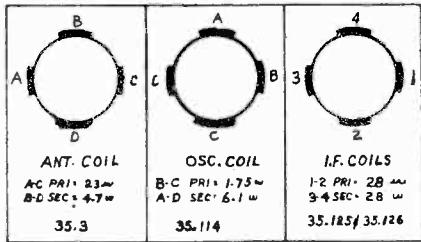
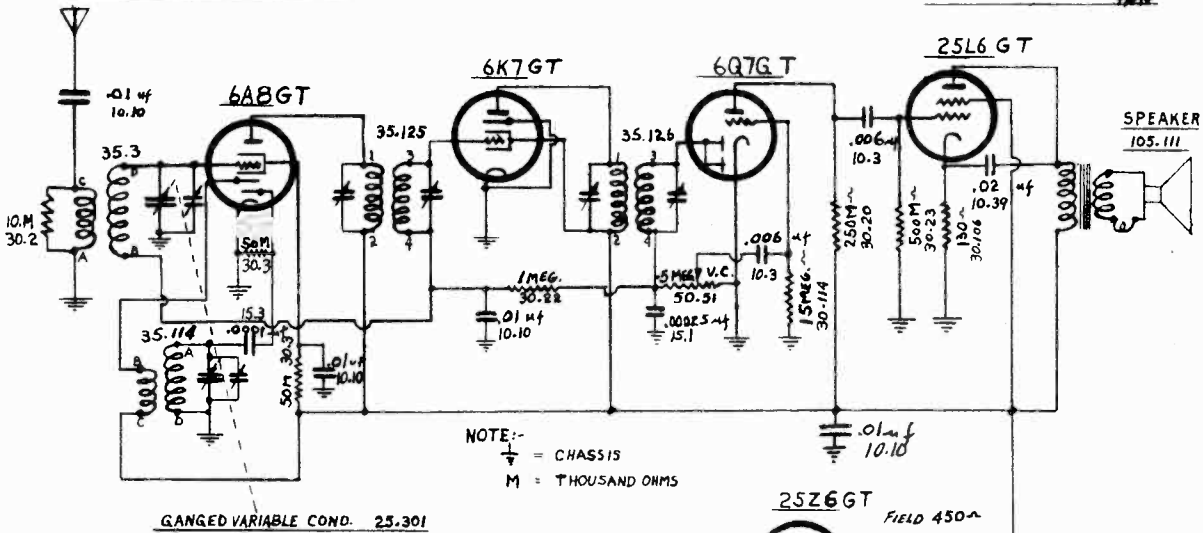
FADA RADIO & ELECTRIC CORP.



NOTE:-
 CHASSIS
 M - THOUSAND OHMS

FADA RADIO & ELECTRIC CO.
 LONG ISLAND CITY, N. Y.

MODEL 450
 107-730-38 (CHECKED) RNT

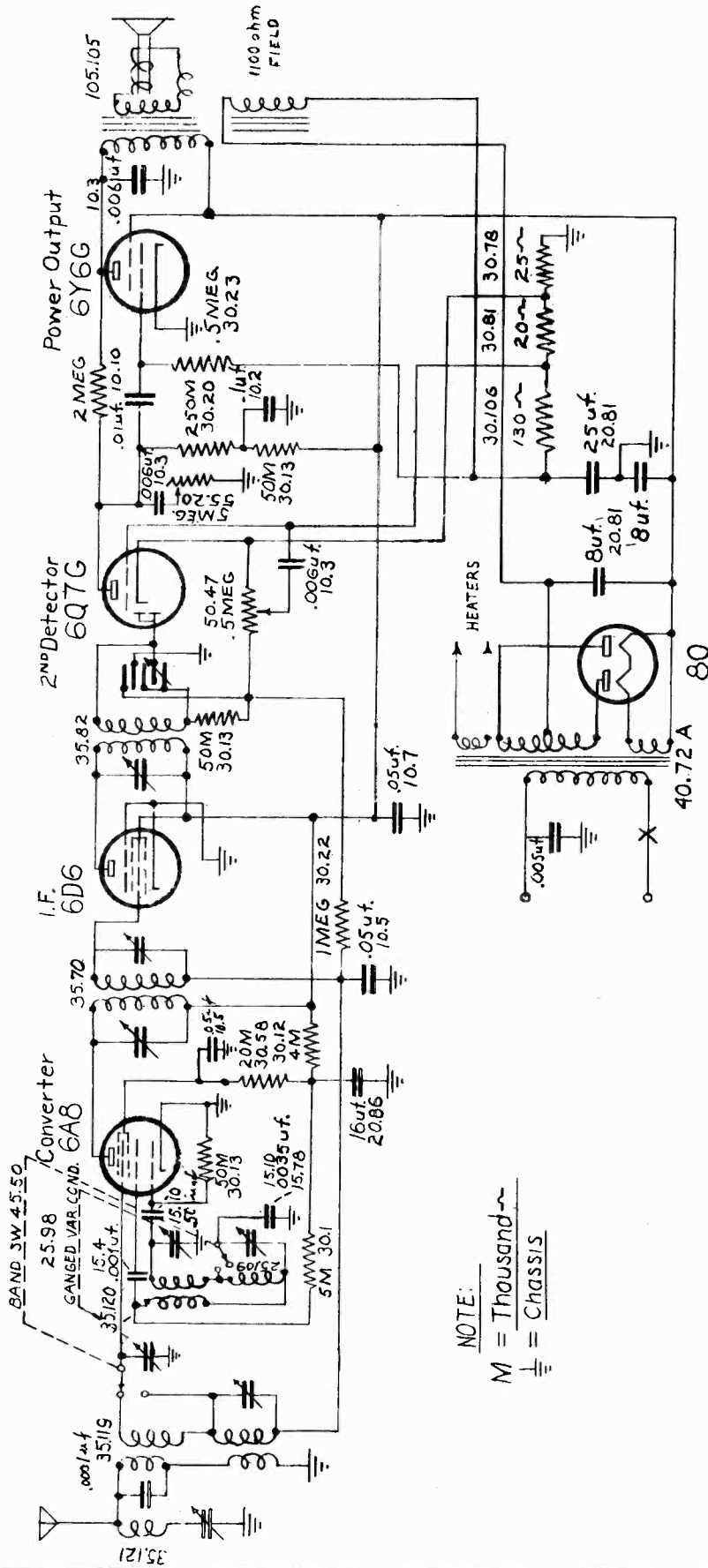


MODEL 5F60

107E-34 5-25-38 RNT

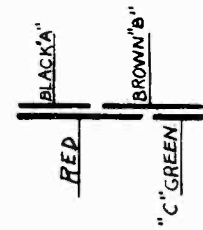
FADA RADIO & ELECTRIC CORP.

MODEL 451
Schematic, Coils
Parts



I.F. PEAK = 456 KC.

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY	
DRAWN BY	MODEL 451
CHECKED BY	DATE 4-31-36
APPROVED BY	



ELECTRO. COND. 20-81

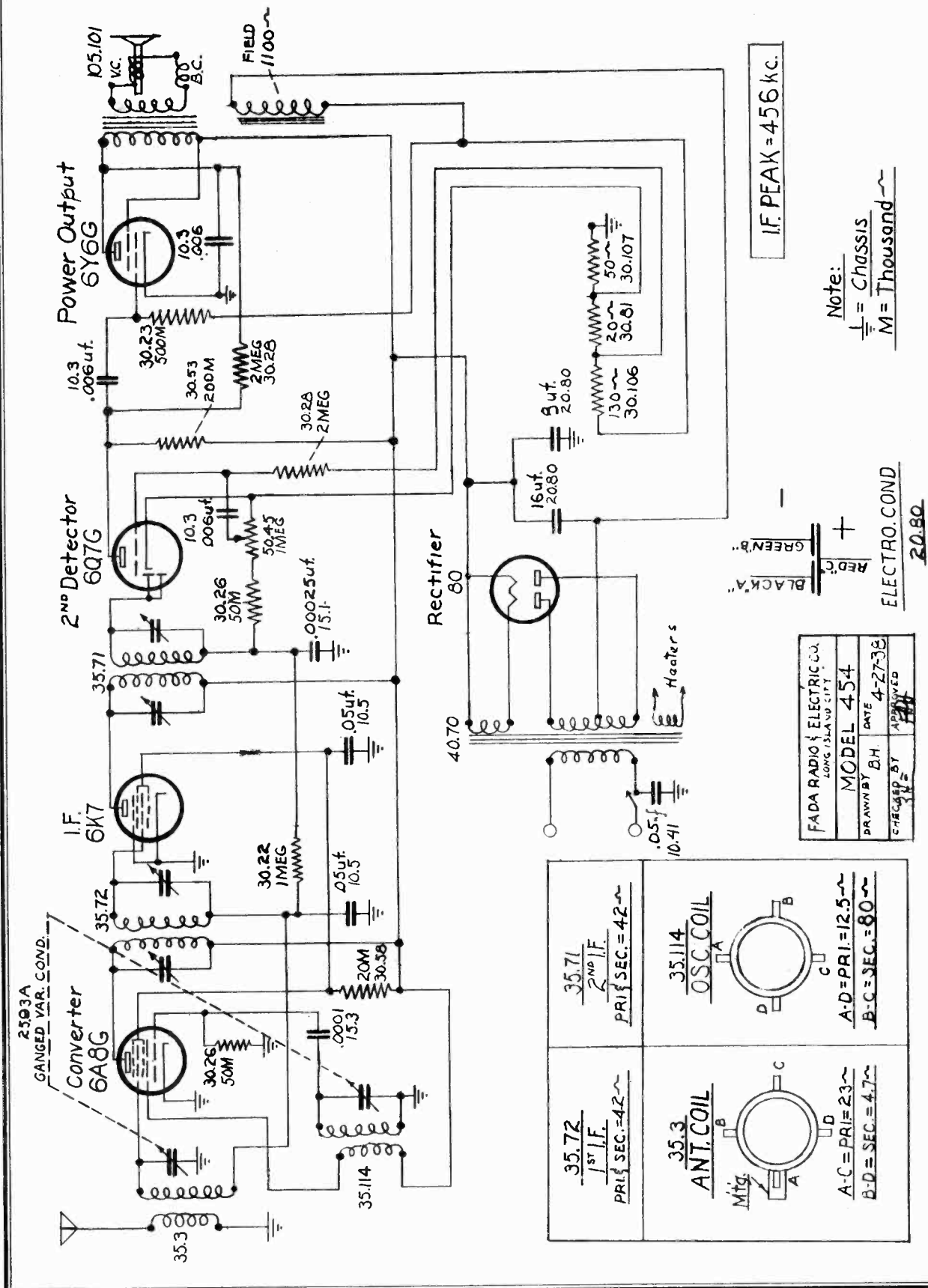
NOTE:
M = Thousand
1/2 = Chassis

35.119 ANT. COIL	35.121 WAVETRAP
<p>1-2 = 4.4 3-4 = 0.5 5-6 = 4.0 7-8 = 0.5</p>	<p>1-2 = 0.5 3-4 = 1.1 5-6 = 7.2</p>

MODEL 454

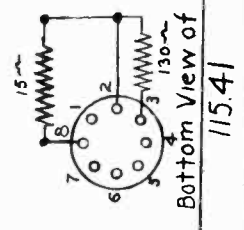
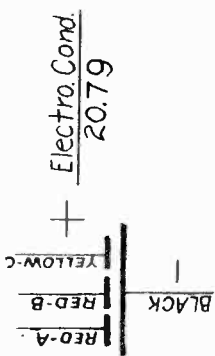
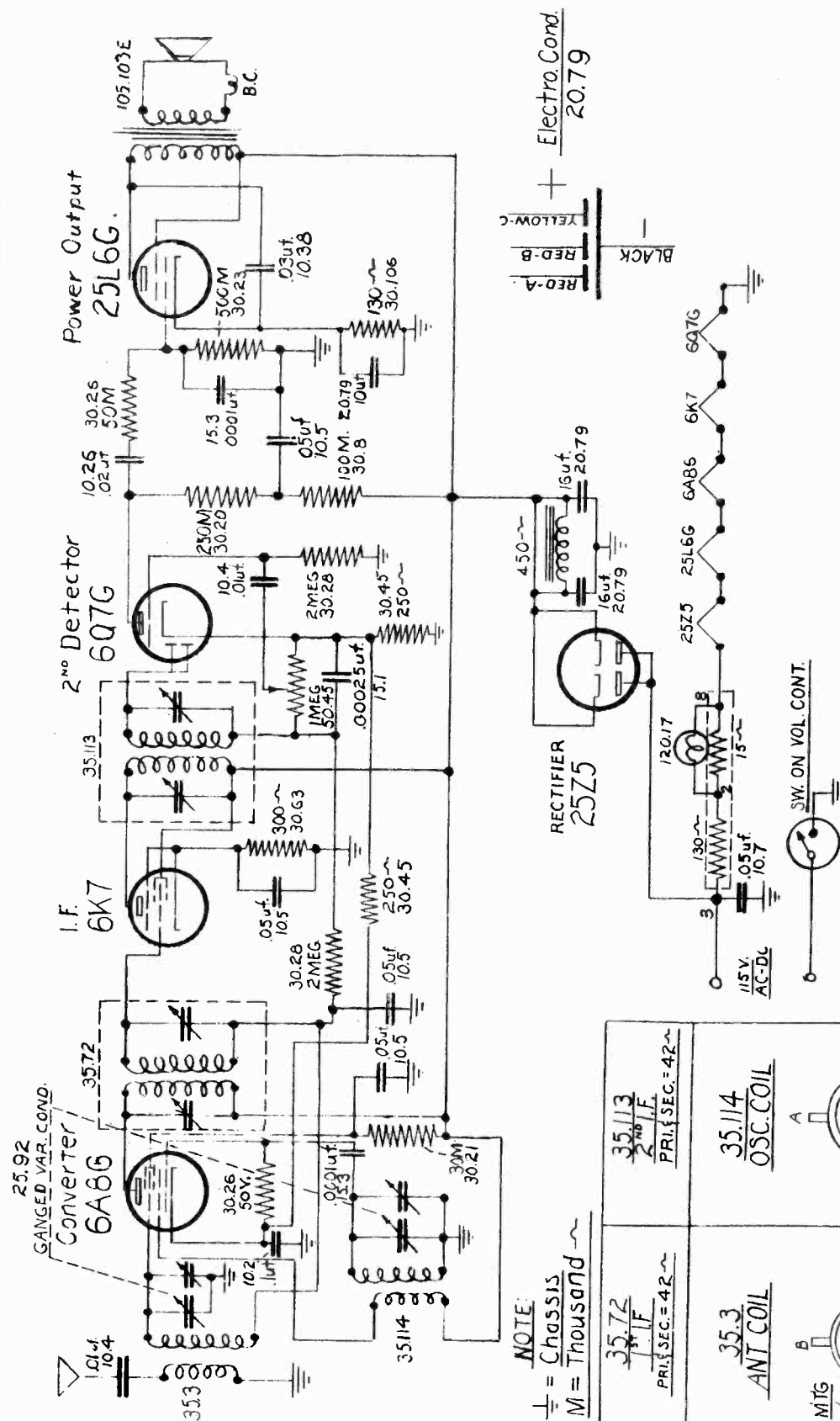
Schematic, Coils
Parts

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

MODEL 460
Schematic, Coils
Parts



FADA RADIO & ELECTRIC CO. LONG ISLAND CITY N.Y.	
MODEL 460	DATE 4-27-38
DRAWN BY BH	CHECKED BY RHF 6-7
APPROVED BY	

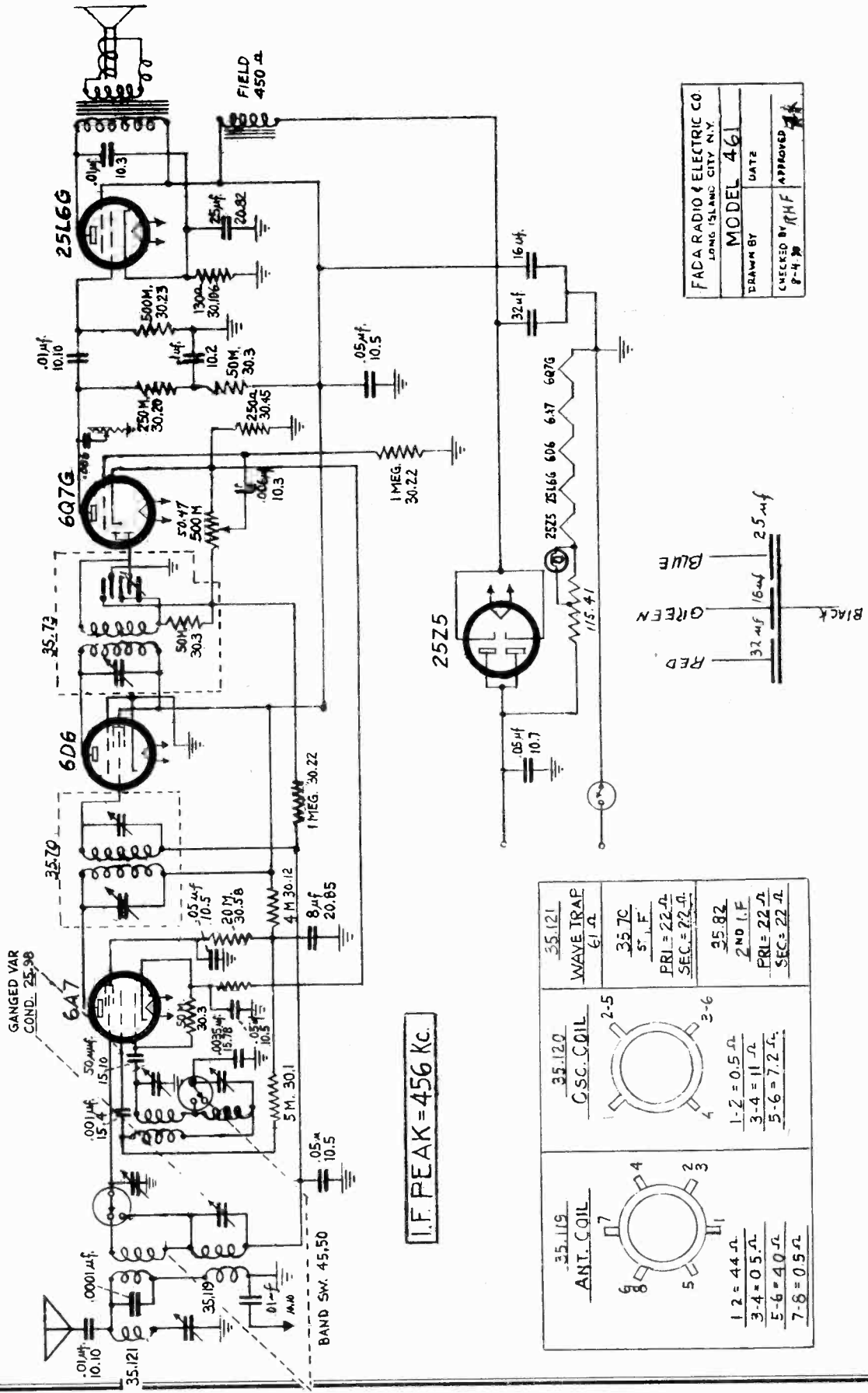
I.F. PEAK = 456 KC.

NOTE:
K = Thousand
M = Million

35.72 I.F. PRI. SEC. = 42~	35.113 I.F. PRI. SEC. = 42~
35.3 ANT. COIL A-C = PRI. = 23~ B-D = SEC. = 47~	35.114 OSC. COIL A-D = PRI. = 12.5~ B-C = SEC. = 80~

MODEL 461
Schematic, Coils
Parts

FADA RADIO & ELECTRIC CORP.



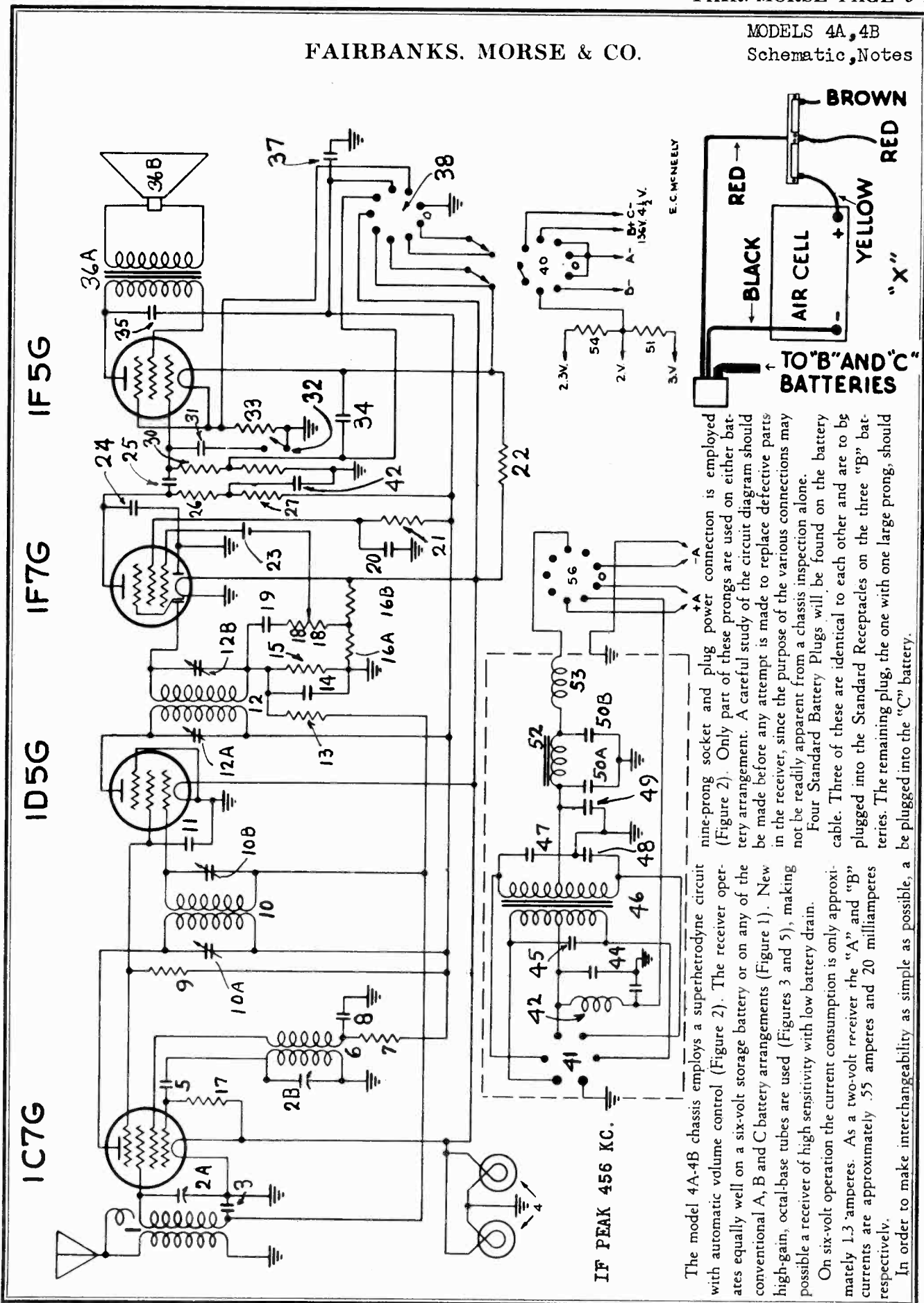
FADA RADIO & ELECTRIC CO. LONG ISLAND CITY N.Y.	
MODEL 461	DATE
DRAWN BY	CHECKED BY RHF
	APPROVED

I.F. PEAK = 456 Kc.

35.119 ANT. COIL	35.120 CSC. COIL	35.121 WAVE TRAP
1-2 = 44 Ω 3-4 = 0.5 Ω 5-6 = 40 Ω 7-8 = 0.5 Ω	1-2 = 0.5 Ω 3-4 = 11 Ω 5-6 = 7.2 Ω	61 Ω 5" I.F. PRI = 22 Ω SEC = 72 Ω
		95.82 2ND I.F. PRI = 22 Ω SEC = 22 Ω

FAIRBANKS, MORSE & CO.

MODELS 4A, 4B
Schematic, Notes



The model 4A-4B chassis employs a superheterodyne circuit with automatic volume control (Figure 2). The receiver operates equally well on a six-volt storage battery or on any of the conventional A, B and C battery arrangements (Figure 1). New high-gain, octal-base tubes are used (Figures 3 and 5), making possible a receiver of high sensitivity with low battery drain.

On six-volt operation the current consumption is only approximately 1.3 amperes. As a two-volt receiver the "A" and "B" currents are approximately .55 amperes and 20 milliamperes respectively.

In order to make interchangeability as simple as possible, a nine-prong socket and plug power connection is employed (Figure 2). Only part of these prongs are used on either battery arrangement. A careful study of the circuit diagram should be made before any attempt is made to replace defective parts in the receiver, since the purpose of the various connections may not be readily apparent from a chassis inspection alone.

Four Standard Battery Plugs will be found on the battery cable. Three of these are identical to each other and are to be plugged into the Standard Receptacles on the three "B" batteries. The remaining plug, the one with one large prong, should be plugged into the "C" battery.

MODELS 4A, 4B
 Socket, Trimmers
 Alignment, Voltage
 Resistance

FAIRBANKS, MORSE & CO.

ALIGNMENT

Alignment procedure is given below in chart form (Figure 4). Make adjustments in the order given. Any low range AC voltmeter, preferably about 0-15 volts, may be used for an output meter. It should be connected from the plate of the 1F5G tube to ground with a .1 mfd. condenser in series with one of the leads. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter hand tends to go off scale. If too strong a signal is used and the volume control is used to keep the hand on scale, the A.V.C. will operate and inaccurate alignment will result.

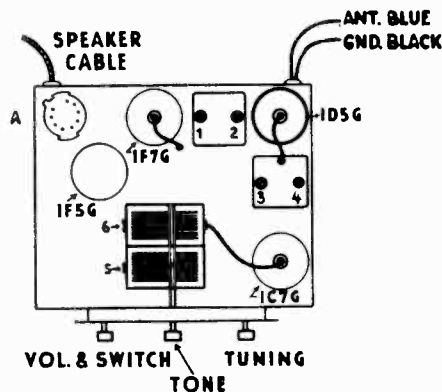


FIGURE 3
 TOP VIEW OF 4A AND 4B CHASSIS

No.	Connect Generator To	Dummy	Generator Frequency	Band Switch Setting	Dial Setting	Stage	Trimmer No.	AFC Switch	Adjust For	Special Instrs.
1	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	2nd IF	1		Max.	
2	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	2nd IF	2		Max.	
3	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	1st IF	3		Max.	
4	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	1st IF	4		Max.	
5	Antenna Lead	200 mmfd. Cond. Mica	1500 KC		1500 KC	Osc.	5		Max.	
6	Antenna Lead	200 mmfd. Cond. Mica	1500 KC		1500 KC	Det.	6		Max.	

FIGURE 4
 ALIGNMENT PROCEDURE CHART

OHMS	VOLTS	1C7G	VOLTS	OHMS	OHMS	VOLTS	1D5G	VOLTS	OHMS	OHMS	VOLTS	1F7G	VOLTS	OHMS
1MEG	50		5.5	55M	1 MEG	50		0	0	0	0		.35	500M
1MEG	135		75	1MEG	1 MEG	140		0	1 MEG	1MEG	8		20	2MEG
.6	2		0	1MEG	.6	2		0	0	.6	2		0	1MEG
			0	0									0	0
OHMS	VOLTS	1F5G	VOLTS	OHMS										
1MEG	140		0	500M										
1MEG	135		4	10										
7	6													
OHMS	VOLTS	POWER PLUG	VOLTS	OHMS										
0	0		6	7										
10	4		6	7										
1MEG	140		6	7										
20M	0		6	7										
			2	1.5										

FIGURE 5
 VOLTAGE AND RESISTANCE ANALYSIS CHART MODEL 4B

FAIRBANKS, MORSE & CO.

MODELS 4A, 4B
Parts

PARTS AND PRICE LIST MODELS 4A AND 4B

Part Number	Reference Figure 2	Description	List Price	Part Number	Reference Figure 2	Description	List Price
800-1	23	Bias Cell	\$.20	335-1	33	Resistor—.33 ohm ½ watt	\$.15
40-2		Cabinet—Console (C1B)		336-1	16 A & B	Resistor—50-100 ohms Tapped .....	.25
41-1		Cabinet—Table (T5-B)		335-2	54	Resistor—.53 ohms ½ watt .....	.25
480-1	40	Cable—Battery (4A) with plugs	2.00	335-3	51	Resistor—1.65 ohms ½ watt .....	.25
480-2	56	Cable Assembly—Battery (4B)	1.50	338-1	22	Resistor—11 ohms 2 watt .....	.25
501-1	1	Coil Assembly—Antenna	1.20	301-21	29, 7	Resistor—22,000 ohms ½ watt .....	.15
503-1	6	Coil Assembly—Oscillator .....	.90	301-22	9	Resistor—33,000 ohms ½ watt .....	.15
202-1	2 A & B	Condenser—Tuning (2 gang)	2.50	301-23	17	Resistor—47,000 ohms ½ watt .....	.15
250-8	35	Condenser—.003-600 Paper .....	.18	301-25	27	Resistor—100,000 ohms ½ watt .....	.15
250-11	31	Condenser—.006-600 Paper .....	.18	301-27	26	Resistor—220,000 ohms ½ watt .....	.15
250-12	19, 25	Condenser—.01-400 Paper .....	.18	301-29	15, 30	Resistor—470,000 ohms ½ watt .....	.15
250-39	28, 20	Condenser—.05-200 Paper .....	.18	301-31	13, 21	Resistor—1 megohm ½ watt .....	.15
250-21	11, 8, 3	Condenser—.1-200 Paper .....	.18	7129-1		Screw—Speaker Mounting	Doz. .18
250-27	37	Condenser—.25-200 Paper .....	.20	7245-40		Screw—Chassis Mtg., 8-32x¼	Doz. .20
250-40	34	Condenser—.5-150 Paper .....	.25	7245-31		Screw—Chassis Assembly	Doz. .08
260-10	24, 14	Condenser—.00025 Mica .....	.18	111-2		Shield Assembly—Tube .....	.15
260-18	5	Condenser—.001 Mica .....	.18	455-1		Sockets—Octal Base Tube .....	.15
340-1	18	Control—Volume and Switch	1.00	22-2	36 A & B	Speaker—8" P. M. Dynamic	6.50
381-1	32	Control—Switch—Tone .....	.35	22-1	36 A & B	Speaker—6" P. M. Dynamic	5.50
64-1		Crystal—Pyralin .....	.50	470-3		Terminal Strip—3 lug .....	.06
150-1		Dial Drive Bushing—Brass .....	.15	470-11		Terminal Strip—Bias Cell .....	.15
151-1		Dial Drive Shaft—Steel .....	.15	550-1	10	Transformer—Input I. F.	1.50
7476-1		Dial Drive Spring Washer .....	.02	550-2	12	Transformer—Output I. F.	1.50
7475-1		Dial Drive "C" Washer .....	.01	7471-4		Washer—Chassis Mounting	Doz. .08
611-1		Dial Reflector .....	.60	7477-1		Washer (Felt) for Knob	Doz. .05
465-1		Dial Light Socket (Screw Type) .....	.10	POWER PACK PARTS MODEL 4B			
805-1	4	Dial Light—2V—60 Ma. .....	.25	420-1	52	Choke—Iron Core	1.50
125-1		Dial Drive Pulley .....	.30	425-1	42	Choke Assembly "A" .....	.30
8036-1		Dial Drive Cord .....	.05	425-2	53	Choke Assembly "B" .....	.40
127-1		Dial Cord Spring .....	.03	803-1		Clips for Cable "A" .....	.15
601-1		Dial Scale—Celluloid .....	.60	231-1	50 A & B	Cond.—Elec., 8-8 200 V.....	1.50
7381-1		Dial Scale Split Rivets	Doz. .05	250-40	43, 44, 45	Condenser—.5-150 Paper .....	.25
602-1		Dial Pointer (Push on) .....	.10	250-22	49	Condenser—.1-400 Paper .....	.20
801-3		Grid Clips—Tube .....	.02	250-41	47, 48	Condenser—.01-1200 Paper .....	.20
700-2		Grommets—½" Rubber .....	.01	7530-3		Rivets for Socket	Doz. .05
700-1		Grommets—Rubber .....	.02	451-3		Socket—6-prong (Vibrator) .....	.15
70-1		Knob—Bakelite .....	.15	470-2		Terminal Strip—2 lug .....	.05
460-1	38	Receptacle for Battery Cable.....	.25	405-1	46	Transformer	3.00
				806-1	41	Vibrator—6-prong Sync.	4.00

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 5A

Parts

FAIRBANKS, MORSE & CO.

PARTS AND PRICE LIST MODEL 5A

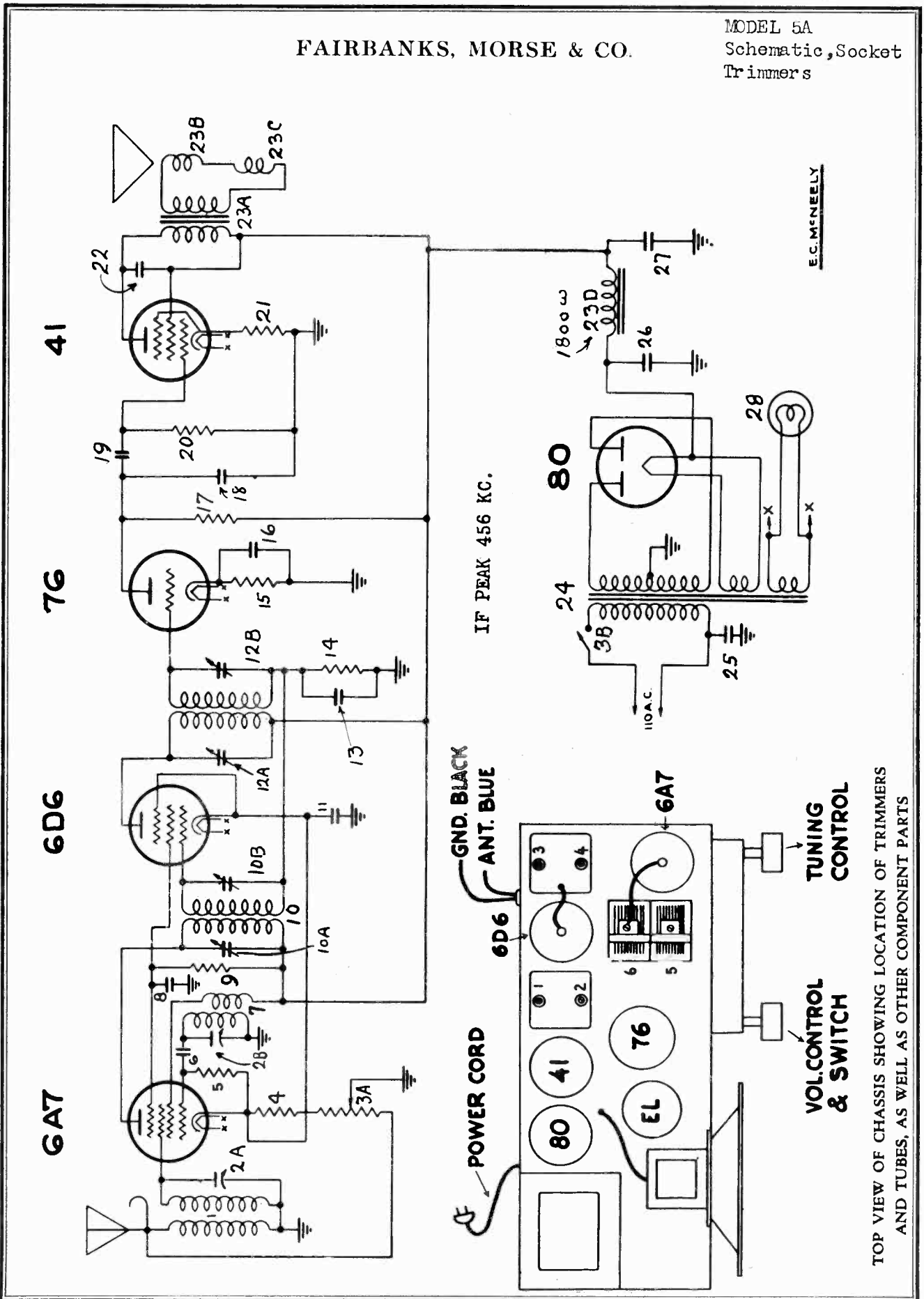
Part Number	Reference Schematic Diagram	Description	List Price
42-3		Cabinet (T1)	
42-4		Cabinet (T1-V) Ivory	
42-5		Cabinet (T1-K) Black	
801-8		Clips—Grid	\$.02
501-1	1	Coil Assembly—Antenna	1.20
503-1	7	Coil Assembly—Oscillator	1.00
202-3	2 A & B	Condenser—2-Gang Variable	2.50
231-2	26 27	Condenser—Electrolytic (8-8 mfd.)	1.50
250-18	8	Condenser—Tubular .05-400	.18
250-27	11 13	Condenser—Tubular .25-200	.20
250-21	16	Condenser—Tubular .1-200	.18
250-12	19	Condenser—Tubular .01-400	.18
250-11	22	Condenser—Tubular .006-600	.18
251-1	25	Condenser—Moulded .01-600	.18
260-7	6	Condenser—Mica 100 mmfd.	.18
260-18	18	Condenser—Mica 1000 mmfd.	.20
340-3	3 A & B	Control—Volume and Switch	1.20
875-1		Cord and Plug (AC Line)	.50
64-4		Crystal—Pyralin	.40
625-2		Dial Mounting Plate Assembly	.70
601-3		Dial Scale	.60
7382-1		Dial Scale Mounting Rivets	.02
602-3		Dial Pointer	.10
805-3	28	Dial Pilot Bulb	.15
465-3		Dial Pilot Bulb Socket	.10
125-1		Dial Drive Pulley	.40
8036-1		Dial Drive Cord	.20
127-1		Dial Cord Spring	.03
150-1		Dial Shaft Bushing	.15

Part Number	Reference Schematic Diagram	Description	List Price
151-1		Dial Drive Shaft	\$.15
700-1		Grommets—Rubber Black	.03
700-2		Grommets—Rubber (Condenser Mounting)	.04
70-1		Knobs—Walnut	.15
70-4		Knobs—Ivory	.25
70-5		Knobs—Black	.15
302-21	9	Resistor—Carbon 22,000 ohms (1 watt)	.18
306-21	21	Resistor—Carbon 470 ohms (½ watt)	.15
301-8	4	Resistor—Carbon 150 ohms (½ watt)	.15
301-23	5	Resistor—Carbon 47,000 ohms (½ watt)	.15
301-25	15	Resistor—Carbon 100,000 ohms (½ watt)	.15
301-29	20, 17, 14	Resistor—Carbon 470,000 ohms (½ watt)	.15
451-4		Socket—7-Prong	.10
451-3		Socket—6-Prong	.10
451-2		Socket—5-Prong	.10
451-1		Socket—4-Prong	.10
20-2	23	Speaker—5-inch Dynamic	4.50
470-7		Terminal Strip—1-Lug	.05
470-8		Terminal Strip—2-Lug	.06
400-1	24	Transformer—Power 110-volt 50-cycle	3.50
400-7		Transformer—Power, Universal	5.00
550-5	10	Transformer Assembly—I. F. Input	1.50
550-6	12	Transformer Assembly—I. F. Output	1.50
111-3		Tube Shield	.15
123-1		Washer—Cup Type	.04
7476-1		Washer—Spring Type	.02
7475-1		Washer "C"	Dozen .05
8021-1		Washer—Fibre Black	Dozen .05

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FAIRBANKS, MORSE & CO.

MODEL 5A
Schematic, Socket
Trimmers



ECM'NEELY

IF PEAK 456 KC.

TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS AND TUBES, AS WELL AS OTHER COMPONENT PARTS

MODEL 5A
Alignment, Voltage
Resistance

FAIRBANKS, MORSE & CO.

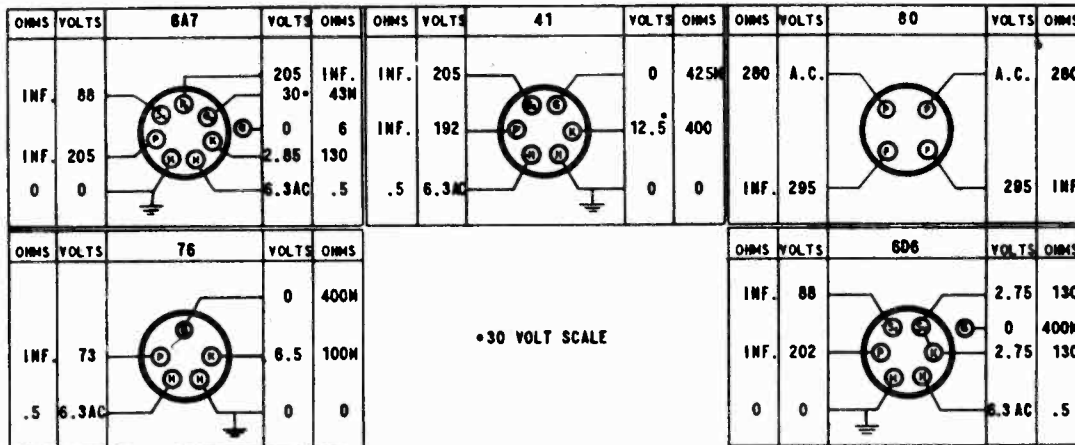
ALIGNMENT

The model 5A is a five-tube AC operated, superhetrodyne. Alignment is given below in chart form. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. Inaccurate alignment is likely to result if too strong a signal is used.

No.	Connect Generator To	Generator Frequency	Dummy	Dial Setting	Stage	Trimmer No.	Peak For	Range Switch	AFC Switch	Special Instrs.
1	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	2nd IF	1	Max.			
2	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	2nd IF	2	Max.			
3	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	1st IF	3	Max.			
4	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	1st IF	4	Max.			
5	Antenna Lead	1500 KC	200 mmfd. Condenser	1500 KC	Osc.	5	Max.			
6	Antenna Lead	1500 KC	200 mmfd. Condenser	1500 KC	Det.	6	Max.			

Check calibration and sensitivity at 600 KC. No adjustment necessary.

ALIGNMENT PROCEDURE CHART



VOLTAGE AND RESISTANCE ANALYSIS CHART

MODEL 5B
Alignment, Voltage
Resistance

FAIRBANKS. MORSE & CO.

ALIGNMENT

The model 5B is a five-tube AC operated, superhetrodyne. It is capable of receiving signals on the standard broadcast band, 540 to 1750 kilocycles, and on the police-amateur band, 2.35 to 7.8 megacycles.

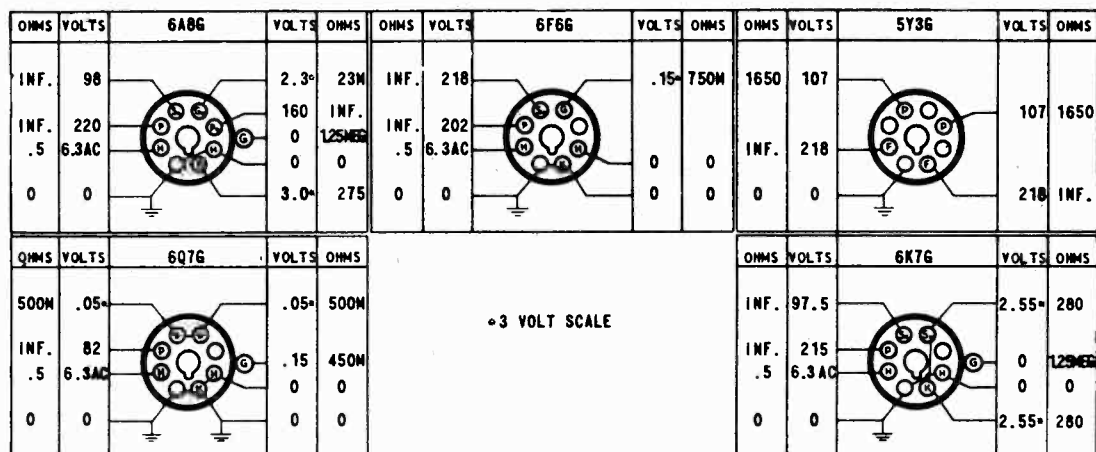
Alignment procedure is given below in chart form. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should

be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the A.V.C. will operate and inaccurate alignment will result.

No.	Connect Generator To	Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instrs.
1	6A8G Grid	456 KC	Condenser .1 mfd.	BC	550 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	1st IF	4		Max.	
5	Antenna Lead	1500 KC	200 mmfd.	BC	1500 KC	Osc.	5		Max.	
6	Antenna Lead	1500 KC	200 mmfd.	BC	1500 KC	Det.	6		Max.	
7	Antenna Lead	600 KC	200 mmfd.	BC	600 KC	Osc.	7		Max.	Rock Gang Condenser

Check Short Wave Calibration at 2.5 and 6 megacycles. No adjustment is necessary.

ALIGNMENT CHART



VOLTAGE AND RESISTANCE ANALYSIS CHART

FAIRBANKS, MORSE & CO.

MODEL 5B
Parts

PARTS AND PRICE LIST MODEL 5B

Part Number	Reference Schematic Diagram	Description	List Price
42-1		Cabinet (TZ)	.02
801-5		Clip—Grid	1.20
501-2	1	Coil Assembly—Antenna	1.20
503-2	10	Coil Assembly—Oscillator	2.50
202-2	4 A & B	Condenser—2-Gang Variable	.40
271-1	13	Condenser—Padder	1.60
232-1	43 A & B	Condenser—Electrolytic (8-8-350)	.18
250-11	38, 34	Condenser—Tubular .006-600	.18
250-15	25, 33	Condenser—Tubular .02-600	.18
250-39	5	Condenser—Tubular .05-200	.18
250-22	11, 37	Condenser—Tubular .1-400	.18
250-21	16, 17	Condenser—Tubular .1-200	.20
250-27	36	Condenser—Tubular .25-200	.18
251-1	41	Condenser—Moulded .01-600	.18
260-7	21, 23, 2	Condenser—Mica 100 mmfd.	.18
260-10	32	Condenser—Mica 250 mmfd.	.20
260-18	8	Condenser—Mica 1000 mmfd.	.25
261-22	14	Condenser—Mica 3000 mmfd.	1.20
340-2	24 A & B	Control—Volume and Switch	.50
875-1		Cord and Plug (AC Line)	.40
64-2		Crystal—Pyralin	.80
625-1		Dial Mounting Plate Assembly	.80
601-2		Dial Scale	.05
635-1		Dial Scale Clips	.15
805-2	42	Dial Light Bulb (6.3 volt)	.10
465-2		Dial Light Socket	.15
150-1		Dial Drive Shaft Bushing	.40
151-1		Dial Drive Shaft	.20
125-1		Dial Drive Pulley	.03
8036-1		Dial Drive Cord	.04
127-1		Dial Cord Spring	.15
602-3		Dial Pointer	.03
700-1		Grommet—Black Rubber	.04
700-2		Grommet—Gum Rubber	.15
70-1		Knobs—Bakelite	.03

Part Number	Reference Schematic Diagram	Description	List Price
302-21	19	Resistor—Carbon 22,000 ohms (1 watt)	.18
301-10	6, 18	Resistor—Carbon 330 ohms (½ watt)	.15
301-19	9	Resistor—Carbon 10,000 ohms (½ watt)	.15
301-21	7	Resistor—Carbon 22,000 ohms (½ watt)	.15
301-23	22, 28	Resistor—Carbon 47,000 ohms (½ watt)	.15
301-28	27	Resistor—Carbon 330,000 ohms (½ watt)	.15
301-29	29, 30, 31	Resistor—Carbon 470,000 ohms (½ watt)	.15
301-31	15	Resistor—Carbon 1,000,000 ohms (½ watt)	.15
301-33	26	Resistor—Carbon 2,200,000 ohms (½ watt)	.15
455-1		Socket—Octal 8	.15
455-2		Sockets—Octal 5 (Rectifier)	.15
20-4	39 ABCDE	Speaker—5½-inch Dynamic	4.50
381-2	3 A & B	Switch—Band	.60
380-1	35	Switch—Tone Control	.25
7245-31		Screw—Chassis Assembly	.01
470-1		Terminal Strip (1 Lug)	.04
470-2		Terminal Strip (2 Lug)	.05
470-10		Terminal Strip (4 Lug)	.10
550-1	12	Transformer—Input I. F.	1.50
550-2	20	Transformer—Output I. F.	1.50
400-2	40	Transformer—Power 110-volt 50-60 cycle	3.50
400-7	40	Transformer—Power Universal	5.00
111-2		Tube Shield	.15
123-1		Washer—Cup Type	.04
7476-1		Washer—Spring	.02
7475-1		Washer "C"	Doz. .05
7477-1		Washer—Felt	Doz. .05

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 65 Export
Schematic

FAIRBANKS, MORSE & CO.

MODEL NO. 65

AC-DC RECEIVER 456 KC. I.F.
18-52 METERS - 5.8-16.5 MEGACYCLES.
197-555 METERS - 540-1600 KILOCYCLES.
810-2000 METERS - 150-370 KILOCYCLES.

EXPORT MODEL

110 to 220 Volts
With Adapter
(Not Shown)

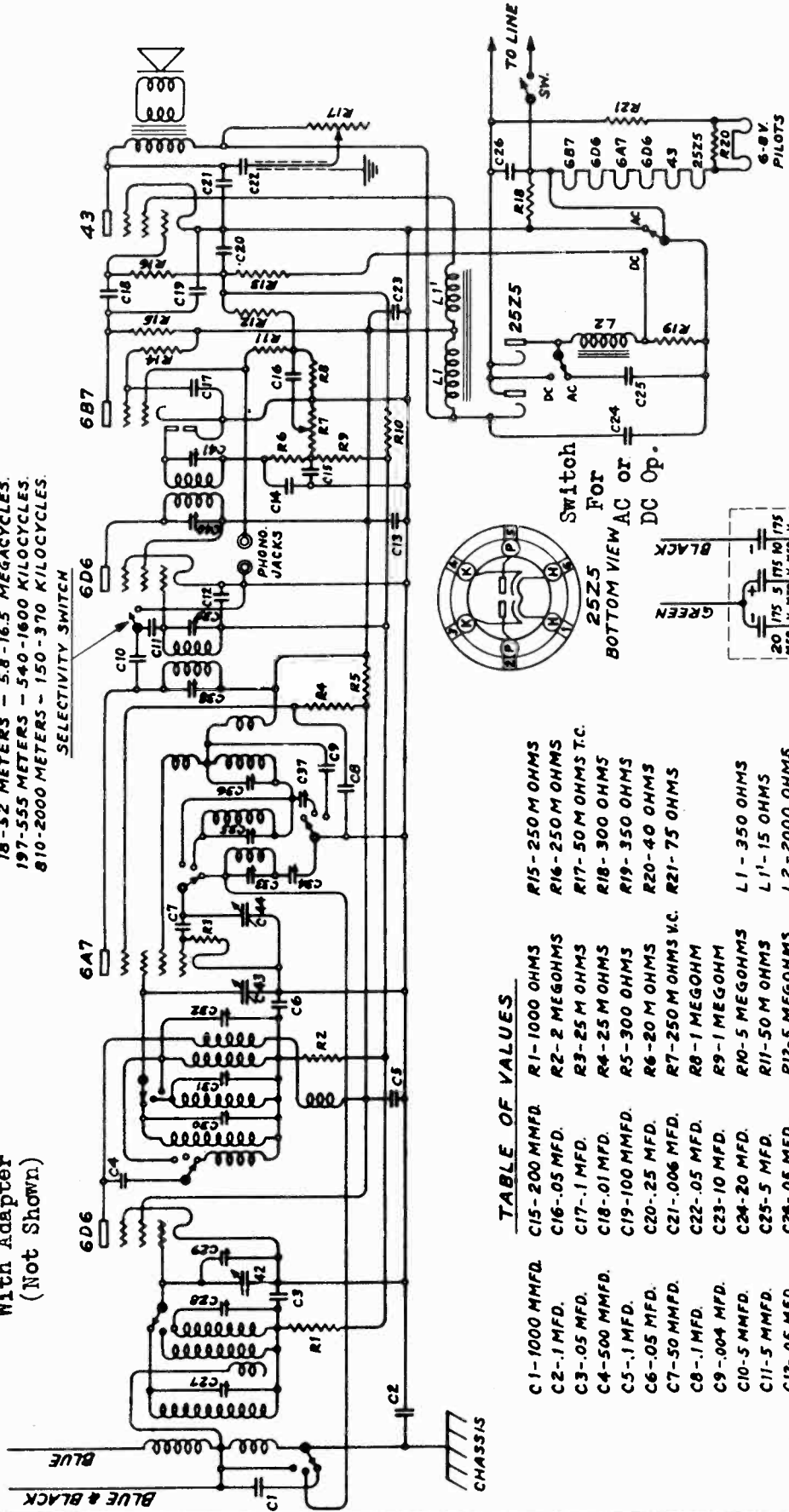
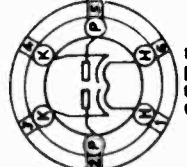
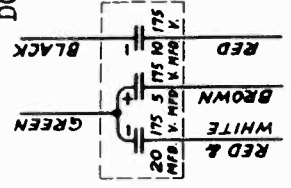


TABLE OF VALUES

C1-1000 MMFD.	C15-200 MMFD.	R1-1000 OHMS	R15-250 M OHMS
C2-1 MFD.	C16-.05 MFD.	R2-2 MEGOHMS	R16-250 M OHMS
C3-.05 MFD.	C17-.1 MFD.	R3-25 M OHMS	R17-50 M OHMS T.C.
C4-500 MMFD.	C18-.01 MFD.	R4-25 M OHMS	R18-300 OHMS
C5-1 MFD.	C19-100 MMFD.	R5-300 OHMS	R19-350 OHMS
C6-.05 MFD.	C20-.25 MFD.	R6-20 M OHMS	R20-40 OHMS
C7-50 MMFD.	C21-.006 MFD.	R7-250 M OHMS V.C.	R21-75 OHMS
C8-1 MFD.	C22-.05 MFD.	R8-1 MEGOHM	
C9-.004 MFD.	C23-10 MFD.	R9-1 MEGOHM	L1-350 OHMS
C10-5 MMFD.	C24-20 MFD.	R10-5 MEGOHMS	L1'-15 OHMS
C11-5 MMFD.	C25-5 MFD.	R11-50 M OHMS	L2-2000 OHMS
C12-.05 MFD.	C26-.05 MFD.	R12-5 MEGOHMS	
C13-1 MFD.		R13-100 M OHMS	
C14-100 MMFD.		R14-1 MEGOHM	



Switch
FOR
AC OR
DC Op.



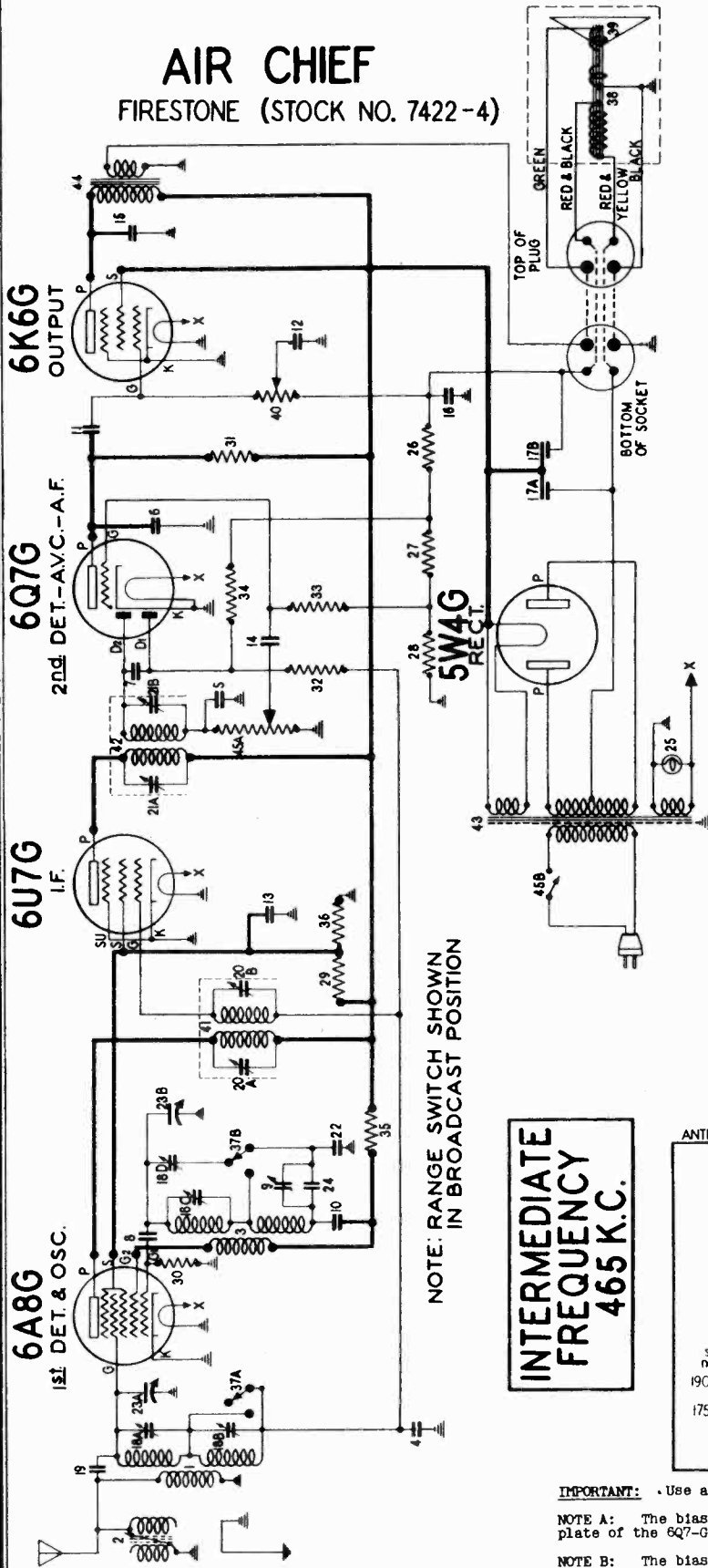
ELECTROLYTIC
CONDENSER

FAIRBANKS - MORSE
HOME APPLIANCES, INC.
SD-11835

FIRESTONE TIRE & RUBBER CO.

MODEL R-3051
Chassis R-305
Schematic, Socket
Voltage, Parts

AIR CHIEF
FIRESTONE (STOCK NO. 7422-4)



NOTE: RANGE SWITCH SHOWN
IN BROADCAST POSITION

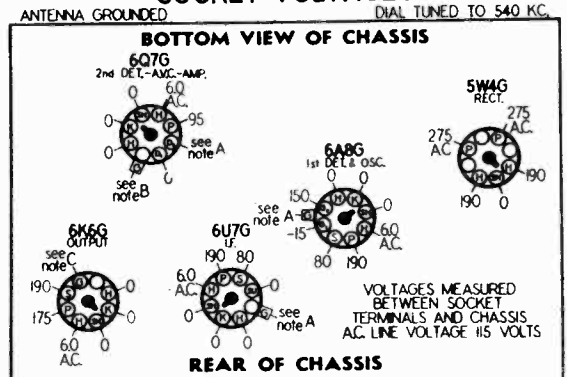
**INTERMEDIATE
FREQUENCY
465 K.C.**

R-305 CHASSIS (RECEIVER MODEL R-3051)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	110508	Coil - Antenna trap	\$1.15
2	110538	Coil - Antenna trap	1.02
3	110512	Coil - Oscillator	.85
4	88534	Condenser - paper .05 mfd. 150 volt	.25
5	88534	Condenser - paper .05 mfd. 150 volt	.25
6	88534	Condenser - paper .05 mfd. 150 volt	.25
7	88534	Condenser - paper .05 mfd. 150 volt	.25
8	88534	Condenser - paper .05 mfd. 150 volt	.25
9	88534	Condenser - paper .05 mfd. 150 volt	.25
10-11-12	88534	Condenser - paper .05 mfd. 150 volt	.25
13	88534	Condenser - paper .05 mfd. 150 volt	.25
14	88534	Condenser - paper .05 mfd. 150 volt	.25
15	88534	Condenser - paper .05 mfd. 150 volt	.25
16	110377	Condenser - Electrolytic 10 mfd. 25 volt	.80
17A-17B	110487	Condenser - Electrolytic (sect. B-B mfd.)	1.50
18A to 18D	110488	Condenser - trimmer strip	.12
19	110510	Condenser - wire 3 mfd.	.58
20A-20B	110510	Condenser - trimmer strip for I.F.	.58
21A-21B	110510	Condenser - trimmer strip for I.F.	.58
23A-23B	110503	Condenser - variable gang (39)	3.50
24	111127	Condenser - mica 520 mfd. (39)	.24
25	110628	Lamp - pilot, 6.3 volt .25 amp.	.15
26	88583	Resistor - wire wound 240 ohms 1 watt	.15
27	89118	Resistor - wire wound 20 ohm 1 watt	.12
28	110534	Resistor - wire wound 40 ohm 1 watt	.12
29	110534	Resistor - carbon 15,000 ohms 1 watt (10%)	.12
30	110534	Resistor - carbon 15,000 ohms 1 watt	.12
31	110534	Resistor - carbon 20,000 ohms 1 watt	.12
32-33	110554	Resistor - carbon 1 megohm 1 watt	.12
34	110559	Resistor - carbon 470,000 ohms 1 watt	.12
35	110578	Resistor - carbon 10,000 ohms 1 watt (20%)	.12
36	110582	Resistor - carbon 12,000 ohms 1 watt	.12
37A-37B	110505	Switch - range	.90
38	R-275-A	Speaker - dynamic (5 inch)	6.50
39	110532	Cone and voice coil assembly (for R-275-A)	1.70
40	110504	Transformer - first I.F.	2.00
41	110514	Transformer - second I.F.	2.00
42	110520	Transformer - power 115 volt 60 cycle	4.20
43	111862	Transformer - power 115 volt 25 cycle	7.50
44	110537	Transformer - output	1.50
45A-45B	110503	10 Lugs Control - switch	1.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6U7-G and the diode plate of the 6Q7-G is -3 volts measured across resistors 27 and 28.

NOTE B: The bias for the control grid of the 6Q7-G triode section is -2 volts measured across resistor 28.

NOTE C: The bias for the control grid of the 6K6-G tube is -14 volts measured across resistors 26, 27, and 28.

MODEL R-3051

Chassis R-305

Trimmers, Alignment

Dial Data

FIRESTONE TIRE & RUBBER CO.

SERVICE DATA FOR AIR CHIEF MODEL R-3051 RECEIVER

STOCK NO.-7422-4

The Model R-3051 is a five tube, two band superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning ranges of 525 to 1750 KC. and 2200 to 7000 KC.

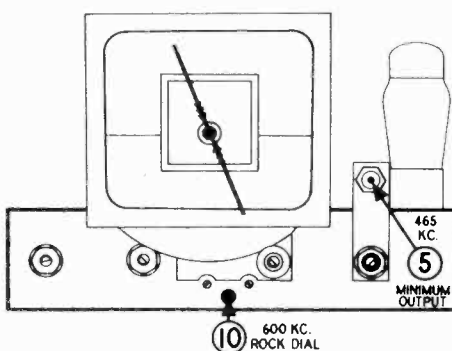
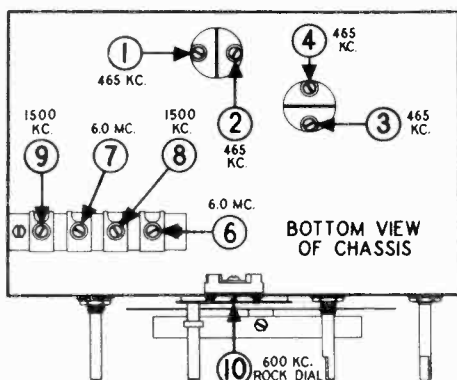
ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 6.0 MC. are required.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

- ① Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh set the pointer on the horizontal black line below 530 KC. on the dial.
- ⑤ Using a bakelite screw driver proceed to align in exactly the same order as shown in the table below.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE (Do not remove grid clip)	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	6.0 MC.	SHORT-WAVE Counter-clockwise	6.0 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6.0 MC. WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	6.0 MC.	SHORT-WAVE Counter-clockwise	TUNE TO 6.0 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST Clockwise	1500 KC.	8	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN. SIG.	9	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	10	BROADCAST OSCILLATOR Series Pad	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



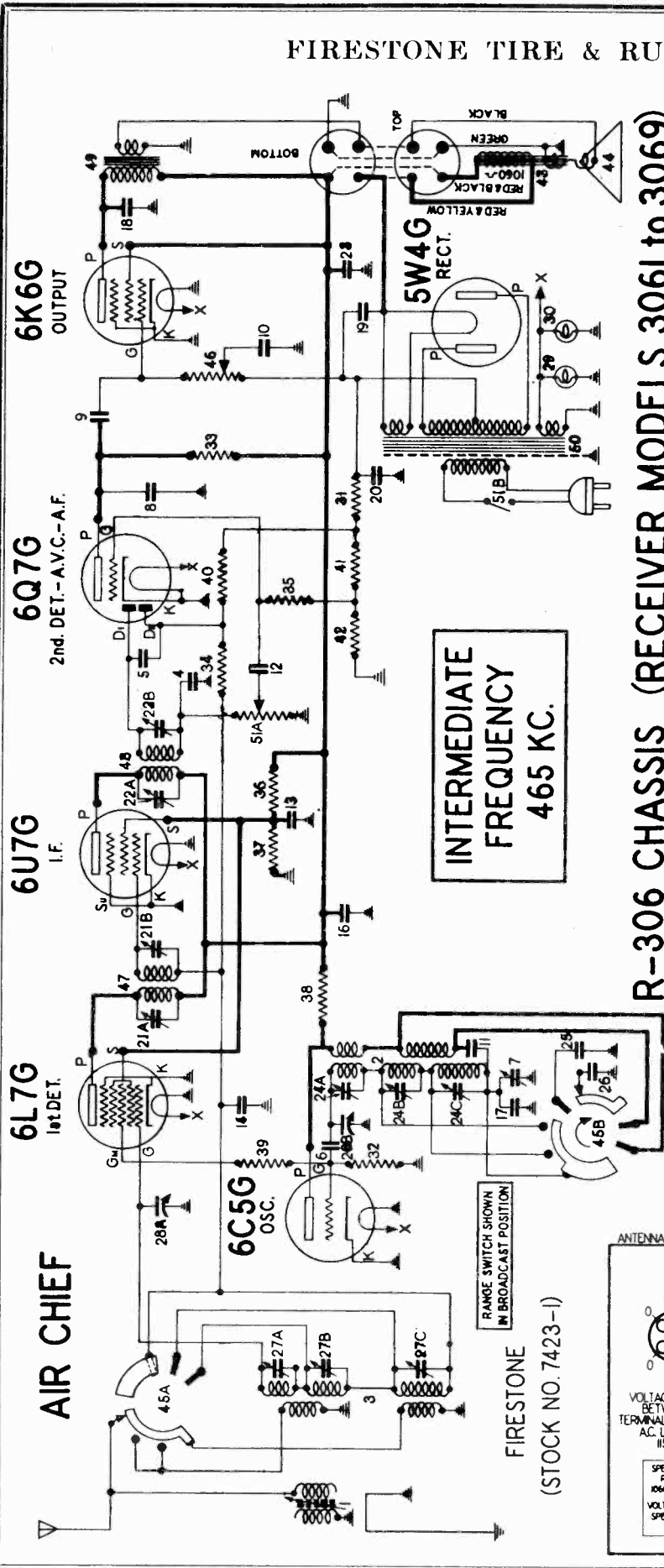
DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE	PART NUMBER	DESCRIPTION	LIST PRICE
83552	Bolt - chassis mounting (#10x7/8")	\$.03	85040	Screw - self tapping 6 x 1/4	Per C \$.35
110507	Bracket - for mtg. electrolytic condenser	.05	88822	Screw - ornamental head B-32 (speaker mtg.)	.02
110501	Bracket - for dial & pilot light mtg.	.07	110506	Shaft - drive and disc assembly	.16
110486	Clamp - for mounting 5 inch speaker	.05	88161	Shield - tube	.08
89912	Clip - grounding, for tube base	.02	88164	Shield - tube cap (slotted)	.06
110612	Dial drive - disc	.09	89911	Shield - tube base	.04
112167	Escutcheon - dial	1.45	F5427	Socket - octal base	.15
112475	Knob - control	.18	110501	Socket - 4 prong (for spkr.)	.16
12349	Nut - 8-32 for speaker mtg.	Per C	110627	Socket - dial lamp	.12
110496	Plug - speaker (4 prong)	.12	67950	Washer - steel (chassis mtg.)	.01
112432	Pointer - dial	.24	77223	Washer - for spkr. mtg.	.01
112147	Reflector - dial	.25	84015	Washer - felt, for back of knobs	.01
34214	Retaining ring - for drive shaft (rear)	.02	110610	Washer - spring for drive shaft	.02
110611	Retaining ring - for drive shaft (front)	.02	110613	Washer - flat for dial drive	.01
112148	Scale - dial	.80	110614	Washer - spring, dial drive disc retaining	.03

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FIRESTONE TIRE & RUBBER CO.

MODELS 3061 to 3069 incl.
Chassis R-306
Schematic, Socket
Voltage, Parts



R-306 CHASSIS (RECEIVER MODELS 3061 to 3069)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	110526	Coil - antenna trap	\$1.02
2	110560	Coil - sec. (without trimmer)	1.40
3	111300	Coil - antenna trimmer	.26
4	83539	Condenser - mica 280	.50
5-6	85081	Condenser - mica 51 mfd.	.10
7	85285	Condenser - padding	.10
8	85394	Condenser - mica 510 mfd.	.25
9	88026	Condenser - paper .02 mfd. 400 V.	.25
10-11	88030	Condenser - paper .01 mfd. 400 V.	.25
12	88189	Condenser - paper .05 mfd. 200 V.	.25
13	88191	Condenser - paper .1 mfd. 300 V.	.25
14	88534	Condenser - paper .05 mfd. 150 V.	.25
18	88882	Condenser - mica 345 mfd. (.3%)	.40
17	88826	Condenser - paper .004 mfd. 750 V.	.24
19	89937	Condenser - elect. 15 mfd. 450 V.	1.60
	112515	Condenser - elect. 15 mfd. 450 V. volt (arm-chair model only)	1.55
20	110377	Condenser - elect. 10 mfd. 25 volt	.80
	111669	Condenser - elect. 20 mfd. 25	1.20
21A-21B	110516	Condenser - trimmer, strip (for I.F. transformer)	.58
22A-22B	110768	Condenser - elect. 12 mfd. 450 volt (arm-chair model only)	1.25
23	112710	Condenser - trimmer (3 section) for oscillator coil	.85
24A to C	110659	Condenser - trimmer (3 section) for oscillator coil	.85
	110906	Condenser - mica .00332 mfd. (.3%)	.40
25	110907	Condenser - mica .960 mfd. (.3%)	.30
26	110922	Condenser - mica 1000 mfd. (.3%)	.85
27A to C	11322	Condenser - trimmer (3 section) for antenna coil	4.00
28A	28B-112238	Condenser - variable gang	.15
29-30	110629	Lamp - dial 6.3 volt .25 amp	.18
31	88770	Resistor - carbon 200 ohm 2 W.	.12
32	110552	Resistor - carbon 47,000 ohm 1/4 W.	.12
33	110553	Resistor - carbon 220,000 ohm 1/4 W.	.12
34	110554	Resistor - carbon 470,000 ohm 1/4 W.	.12
35	110659	Resistor - carbon 1 meg. 1/4 watt	.12
36	110659	Resistor - carbon 15,000 ohm 2 W.	.50
37	110659	Resistor - carbon 27,000 ohm 2 W.	.50
38	110659	Resistor - carbon 47,000 ohm 2 W.	.50
39	110659	Resistor - carbon 180,000 ohm 2 W.	.50
40	110591	Resistor - carbon 680,000 ohm 2 W.	.50
41-42	112182	Resistor - wire wd. 27 ohm 1/2 W.	.12
43	R-277-A	Speaker - dynamic 8 inch	7.50
44	110943	R-277-A Spkr. (do not place gasket between cone and frame)	1.70
45A	45B-112173	Switch - range	1.20
46	112174	Tone control - 500,000 ohms	.95
47	110651	Transformer - 1st I.F.	1.80
48	112168	Transformer - 2nd I.F.	1.80
49	112326	Transformer - output	1.75
50	112621	Transformer - power 115 V.-50 C.	5.00
	112621	Transformer - power 115 V.-25 C.	8.50
51A	51B-112175	Volume control - 1 meg. (with off-on switch)	1.25

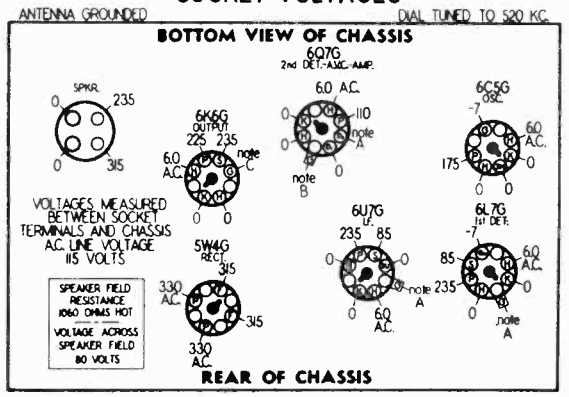
IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7G, 6U7G, and the diode plate of the 6Q7G is -3.5 volts measured across resistors number 41 and 42.

NOTE B: The bias for the control grid of the 6Q7G is -1.5 volts measured across resistor number 42.

NOTE C: The bias for the control grid of the 6K6G output tube is -17 volts measured across resistors 31, 41, and 42.

SOCKET VOLTAGES



MODELS 3061 to 3069 incl.
Chassis R-306
Trimmers, Alignment
Dial Data

FIRESTONE TIRE & RUBBER CO.

SERVICE DATA FOR AIR CHIEF MODEL R-306 - RECEIVER

STOCK NO. 7423-1

The model R-306 Air Chief is a three band superheterodyne receiver having a tuning range of 525 KC. to 18,100 KC.

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18. MC. are required.

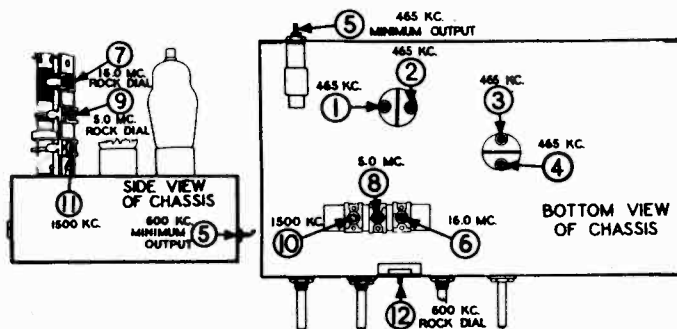
- ① Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh set the pointer on the horizontal black line below 530 KC. on the dial.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6AG6 TUBE (Do not remove grid clip)	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2 3-4	1ST I.F. 2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT
400 OHM CARBON RESISTOR	ANTENNA LEAD	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	16.0 MC.	POLICE (Center)	16.0 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16.0 MC. WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	16.0 MC.	POLICE (Center)	TUNE TO 16.0 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD	5.0 MC.	SHORT-WAVE Counter-clockwise	5.0 MC	8	POLICE OSCILLATOR	ADJUST TO SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	5.0 MC.	SHORT-WAVE Counter-clockwise	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST (Clockwise)	1500 KC.	10	BROADCAST OSCILLATOR (shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN. SIG.	11	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	12	BROADCAST OSCILLATOR Series Pad	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
110830	Bolt - chassis mtg. #10 x 1	.03
112236	Bracket - dial mtg.	.12
112321	Bracket - support (arm-chair model)	.30
88810	Bushing - rubber, for chassis mtg.	.03
110487	Clamp - for speaker mtg.	.06
89912	Clip - grounding, for tube base	.02
111302	Cord - dial drive (6 ft. lengths)	.30
112233	Drum - and bushing (dial drive)	.35
112265	Escutcheon - for dial (celluloid window)	2.10
112424	Knob - tone, tuning & volume	.18
112425	Knob - range switch	.22
112231	Mounting plate - for dial	.35
12349	Nut - 8-32 for speaker mtg.	per C
110022	Pin - for escutcheon mtg.	.01
110496	Plug - speaker	.12
112277	Pointer - assembly	.20
81145	Retaining ring - for drive shaft	per C
112282	Scale - dial	.85
112714	Screw - chassis mtg. (arm-chair model)	.08
88822	Screw - ornamental hd. 8-32 (spkr. mtg.)	.02
112237	Shaft - dial drive	.10
86161	Shield - tube	.08
86162	Shield - tube - long section	.08
86164	Shield cap - tube, grid type	.06
89111	Shield - tube, base	.04
85427	Socket - octal base	.15

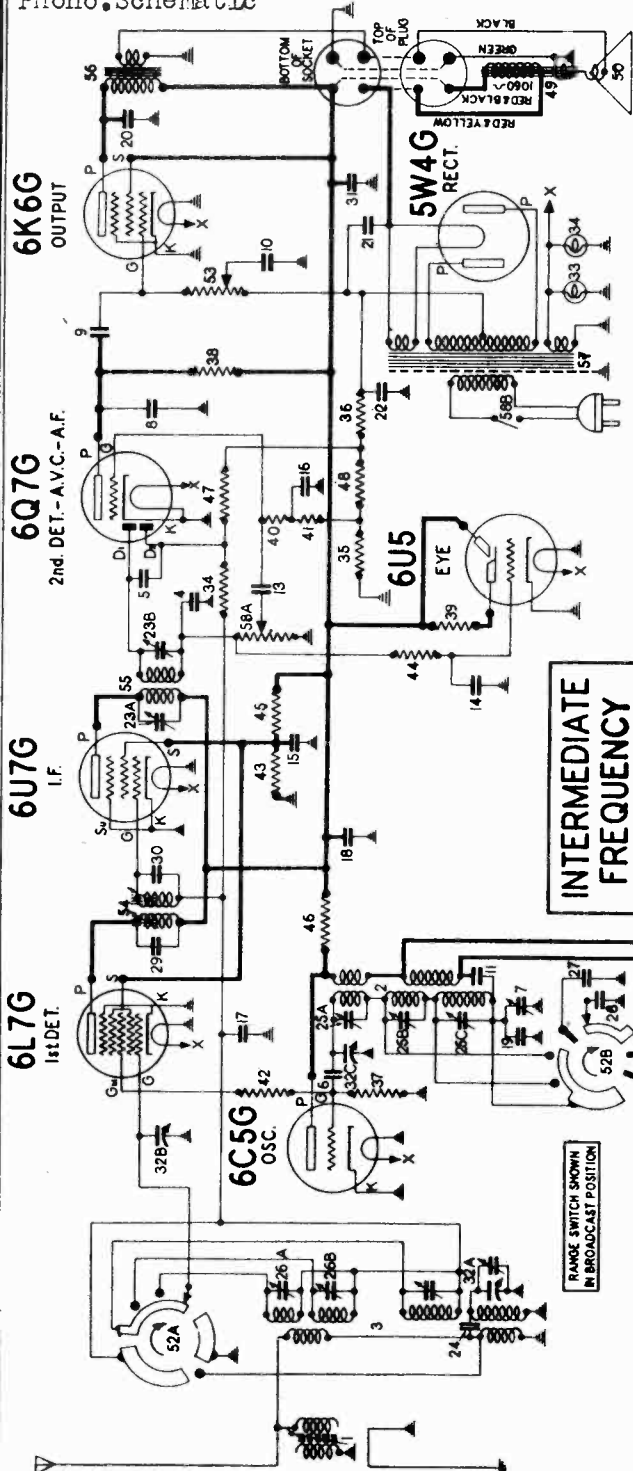


PART NUMBER	DESCRIPTION	LIST PRICE
110501	Socket - speaker (4 prong)	.16
110627	Socket - dial lamp	.12
111357	Spring - drive cord tension	.03
85785	Terminal strip - 0-A	.15
87568	Washer - embossed (for 89537 elec. cond.)	.05
77223	Washer - for speaker mounting	.01
89746	Washer - behind knobs	.005
110829	Washer - flat steel mtg.	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Chassis R-307-X FIRESTONE TIRE & RUBBER CO. Models 3071 to 3079 incl.
Phono. Schematic

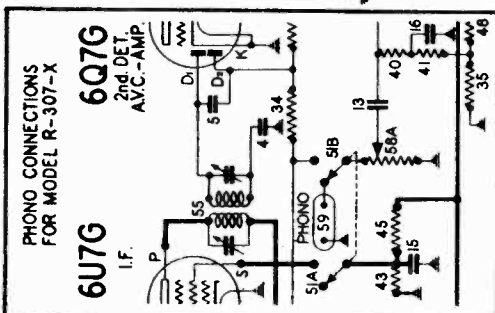
Chassis R-307
Schematic, Socket, Voltage
Parts



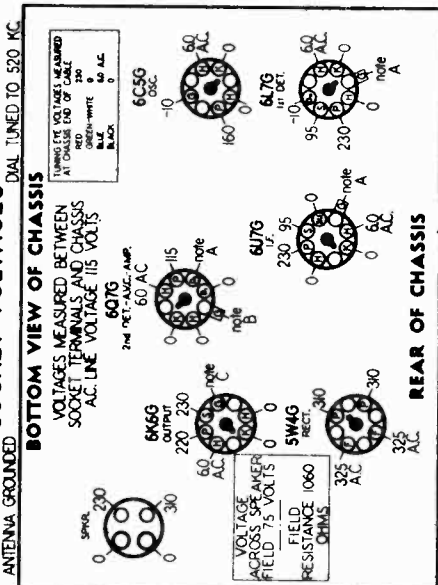
FIRESTONE (STOCK NOS. 7406-2, 7423-2 & 7423-3)

R-307 CHASSIS (RECEIVER MODELS 3071 to 3079)

AIR CHIEF



SOCKET VOLTAGES



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The bias for the control grids of the 6L7-G, 6U7-G and the diode plate of the 6Q7-G is -3 volts measured across resistors 35 and 48.
NOTE B: The bias for the control grid of the 6K6-G triode section is -1.5 volts measured across resistor 36.
NOTE C: The bias for the control grid of the 6U5-G tube is -18 volts measured across resistors 35, 48, and 56.

DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
1	110536-Coil - wave trap	1.02
2	110660-Coil - osc. (less trimmers)	1.40
3	110681-Coil - antenna & preselector (with	3.00
4	89539-Con. dual trimmers) 260 mfd.	.20
5	65061-Condenser - mica 51 mfd.	.15
6	65285-Condenser - paper	.10
7	85394-Condenser - mica 510 mfd.	.25
8	86028-Condenser - paper .02 mfd. 400 volt	.25
9	88030-Condenser - paper .01 mfd. 400 volt	.25
10-11	88189-Condenser - paper .05 mfd. 200 volt	.25
12	88191-Condenser - paper .25 mfd. 300 volt	.35
13	88524-Condenser - paper .15 mfd. 150 volt	.25
14	88982-Condenser - paper .1 mfd. 400 volt	.25
15	89554-Condenser - mica 345 mfd.	.40
16	89825-Condenser - paper .004 mfd. 750 volt	.24
17	89825-Condenser - elec. 30 mfd. 450 volt	1.60
18	89825-Condenser - elec. 10 mfd. 25 volt	.80
19	110377-Condenser - elec. 10 mfd. 50 volt	.85
20	112113-Condenser - trimmer, for i.f. trans.	.56
21	110516-Condenser - mica 510 mfd.	.25
22	110681-Condenser - trim. (3 sect. for osc. coil)	.40
23	250-250-Condenser - trim. (2 sect. for ant. coil)	.40
24	110907-Condenser - mica 930 mfd.	.30
25	110907-Condenser - mica 930 mfd.	.30
26	110907-Condenser - mica 100 mfd. (.5%)	.18
27	111352-Condenser - elec. 8 mfd. 450 volt (for	1.25
28	112284-Condenser - model 307-X)	.25
29	112284-Condenser - elec. 8 mfd. 450 volt	5.50
30	112284-Condenser - variable gang	5.50
31	32A to 32C	1.15
32	32A to 32C	1.15
33	33	1.15
34	34	1.15
35	35	1.15
36	36	1.15
37	37	1.15
38	38	1.15
39	39	1.15
40	40	1.15
41	41	1.15
42	42	1.15
43	43	1.15
44	44	1.15
45	45	1.15
46	46	1.15
47	47	1.15
48	48	1.15
49	49	1.15
50	50	1.15
51	51	1.15
52	52	1.15
53	53	1.15
54	54	1.15
55	55	1.15
56	56	1.15
57	57	1.15
58	58	1.15
59	59	1.15

MODELS 3071 to 3079 incl.

Chassis R-307

FIRESTONE TIRE & RUBBER CO.

Trimmers, Alignment, Parts

Dial Data

SERVICE DATA FOR AIR CHIEF MODELS 3071 to 3079

STOCK NOS. 7423-2, 7423-3, 7406-2

The model R-307 chassis, is a seven tube, three band superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning range 525 KC. to 18,100 KC.

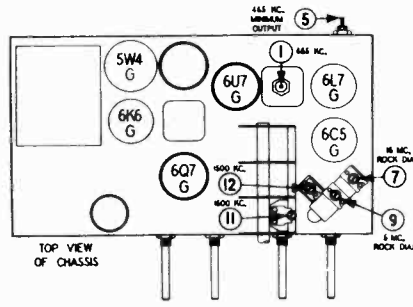
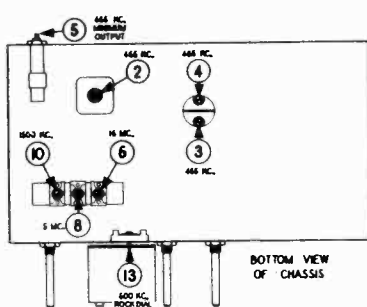
ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

- ① Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh set the pointer on the black horizontal line across the dial face.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND AND POLICE BAND.

DUPPLY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	16 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	8	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	1500 KC.	10	BROADCAST OSCILLATOR (shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN. SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE	PART NUMBER	DESCRIPTION	LIST PRICE
112304	Band indicator - assembly	\$.28	110496	Plug - speaker	.12
110830	Bolt - chassis mtg. #10 x 1	.03	112392	Pointer - dial	.22
112298	Bracket - dial mounting	.16	112200	Scale - dial	1.50
88810	Bushing - rubber mounting	.03	88161	Shield - tube, section (short)	.08
112309	Cable & Plug - for tuning eye	.65	88162	Shield - tube, section (long)	.08
110487	Clamp - spir. mtg. (for 277 spkr.)	.06	88164	Shield - tube cap	.06
89912	Clip - tube grounding	.02	89911	Shield - tube base	.04
110808	Clip - for tuning eye support	.14	111085	Sleeve - felt (for tuning eye)	.03
111302	Cord - dial drive (6 ft. lengths)	.30	85427	Socket - octal base	.15
111274	Drum & Bushing - for dial drive	.10	110501	Socket - speaker	.16
112265	Escutcheon - with celluloid window	2.10	111008	Socket - dial lamp	.12
112474	Escutcheon - for tuning eye	.35	111357	Spring - dial cord tension	.03
112424	Knob - for any control	.18	85785	Terminal Strip - G.A.	.15
112295	Mounting plate - for drive mechanism	.70	67588	Washer - embossed (for mtg. 89937 elec. cond.)	.05
12349	Nut - spkr. mtg. (#8-32)	.45	77223	Washer - spkr. mtg. (277 spkr.)	.01
112297	Planetary drive - on tuning shaft	2.00	89746	Washer - for back of knobs	.005
			110829	Washer - flat steel mounting	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FIRESTONE TIRE & RUBBER CO.

MODEL 3085
Chassis R-308
Schematic, Socket
Voltage, Parts

AIR CHIEF

6K7
R.F.

6L7
1st. DET.

6K7
1st. I.F.

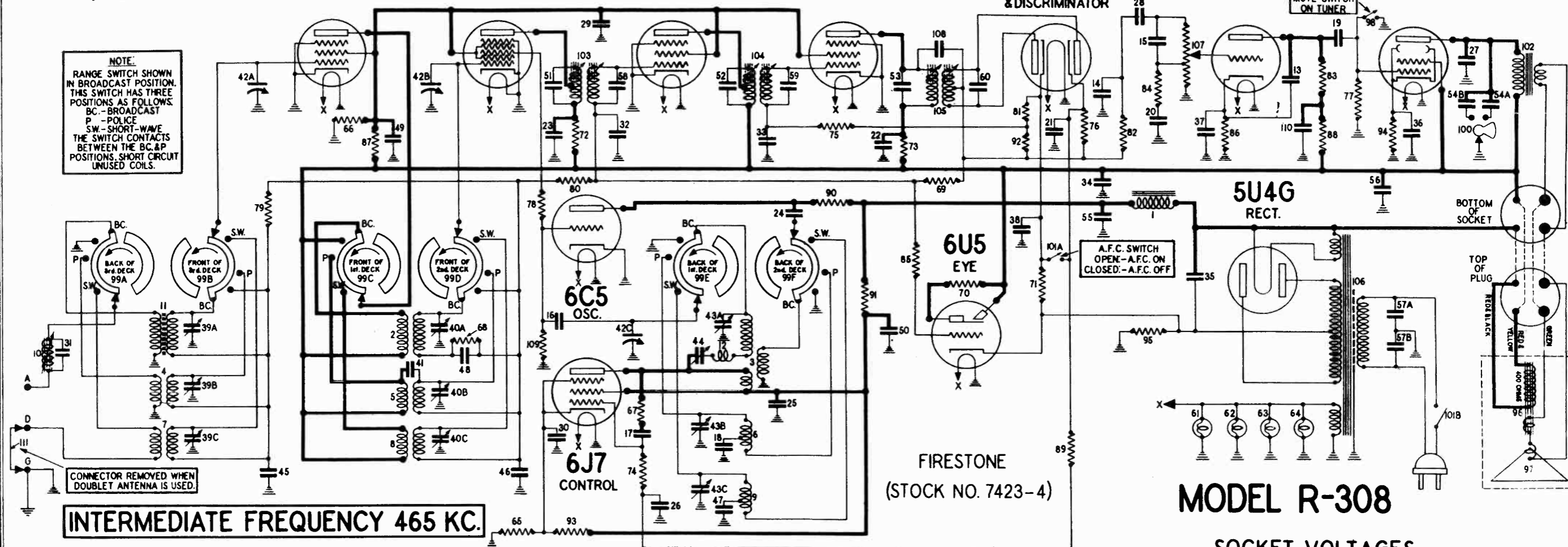
6K7
2nd. I.F.

6H6
2nd. DET.-A.V.C.
& DISCRIMINATOR

6F5
AUDIO

6L6
OUTPUT

NOTE:
RANGE SWITCH SHOWN
IN BROADCAST POSITION.
THIS SWITCH HAS THREE
POSITIONS AS FOLLOWS:
BC - BROADCAST
P - POLICE
S.W. - SHORT-WAVE
THE SWITCH CONTACTS
BETWEEN THE BC & P
POSITIONS, SHORT CIRCUIT
UNUSED COILS.



INTERMEDIATE FREQUENCY 465 KC.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	112097	Choke - filter	1.40
2	111056	Coil - R.F. (broadcast)	1.25
3	111057	Coil - oscillator (broadcast)	1.05
4	111058	Coil - antenna (police)	.80
5	111059	Coil - R.F. (police)	1.05
6	111060	Coil - oscillator (police)	1.00
7	111062	Coil - antenna (short-wave)	.90
8	111063	Coil - R.F. (short-wave)	.90
9	111064	Coil - oscillator (short-wave)	.85
10	111079	Coil - antenna trap	1.20
11	111103	Coil - antenna (broadcast)	1.82
12	111488	Coil - compensating inductance	.38
13-14	83539	Condenser - mica 250 mmfd.	.20
15-108	83785	Condenser - mica 110 mmfd.	.20
16	85061	Condenser - mica 51 mmfd.	.25
17	85394	Condenser - mica 510 mmfd.	.25
18	85487	Condenser - mica 1370 mmfd. (3%)	.30
19	88026	Condenser - paper .02 mfd. 400 volt	.25
20-21-22	86030	Condenser - paper .01 mfd. 400 volt	.25
23-24-25	88046	Condenser - paper .1 mfd. 150 volt	.25
26	88185	Condenser - paper .006 mfd. 600 volt	.25
27	88189	Condenser - paper .05 mfd. 200 volt	.25
28	88191	Condenser - paper .1 mfd. 300 volt	.25
29	88193	Condenser - paper .25 mfd. 150 volt	.35
30	88205	Condenser - mica 2100 mmfd.	.35
31	88534	Condenser - paper .05 mfd. 150 volt	.25
32-33	88682	Condenser - paper .1 mfd. 400 volt	.25
34-110	89937	Condenser - elect. 30 mfd. 450 volt	1.60
35	110377	Condenser - elect. 10 mfd. 25 volt	.80
36-37-38	111078	Condenser - trimmer (3 section)	.75
39A to C	111080	Condenser - 3 mmfd. (wire)	.10
40A to C	112464	Condenser - variable gang	6.25
41	111089	Condenser - trimmer (3 section) for oscillator (all bands)	.75
42	111115	Condenser - pad (single section)	.63
43	111117	Condenser - low loss .05 mfd. 150 volt	.35
44	111122	Condenser - mica 3580 mmfd. (3%)	.48
45	111123	Condenser - mica 7750 mmfd. (5%)	.85
46	111298	Condenser - elect. 4 mfd. 200 volt	.75
47-50	111542	Condenser - mica 200 mmfd. (5%)	.18
51-52-53	111384	Condenser - shielded (Section A-.02 mfd. 600 volt) (Section B-.03 mfd. 900 volt)	.85
54A-54B	111469	Condenser - elect. 16 mfd. 450 volt	1.30

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
54	111501	Condenser - dual shielded (Section A-.012 mfd. 1000 volt) (Section B-.012 mfd. 1000 volt)	.70
58-59-60	111575	Condenser - mica 220 mmfd. (5%)	.20
61-62-63-64	112636	Lamp dial (frosted) 8-8 volt .25 amp.	.25
65	88460	Resistor - wire wound 150 ohm 1/2 watt	.12
66	110551	Resistor - carbon 15,000 ohm 1 watt (10%)	.15
109	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
67	110599	Resistor - carbon 56,000 ohm 1/4 watt (10%)	.12
68	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
69-70	110554	Resistor - carbon 1 meg. 1/4 watt	.12
71-72-73	110557	Resistor - carbon 4700 ohm 1/4 watt	.12
74-75-76-77	110559	Resistor - carbon 470,000 ohms 1/4 watt	.12
78	110560	Resistor - carbon 100 ohm 1/4 watt	.12
79-80-81	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
82-83	110566	Resistor - carbon 33,000 ohms 1/4 watt	.12
84	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
85	110572	Resistor - carbon 4700 ohm 1/4 watt (10%)	.12
86	110575	Resistor - carbon 12,000 ohm 2 watt	.30
87	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
88	110580	Resistor - carbon 3.3 meg. 1/4 watt	.12
89	110592	Resistor - carbon 22,000 ohm 1 watt	.12
90	110593	Resistor - carbon 18,000 ohm 3 watt	.20
91	110594	Resistor - carbon 350,000 ohm 1/4 watt	.12
92	110595	Resistor - carbon 12,000 ohm 3 watt	.15
93	111514	Resistor - wire wound 170 ohm 2 watt	.15
94	111515	Resistor - wire wound 27 ohm 1/2 W. (5%)	.12
95	112447	R.F. unit complete (with gang and range switch)	30.00
96	115005	Speaker - dynamic 12 inch	9.50
97	11490	Cone - voice coil assembly for 12" spkr.	2.30
98	112887	Switch - mute contact on dial mechanism	.15
99A to F	11077	Switch - range and bracket	3.30
100	112442	Switch - tone control	.45
101A-101B	112443	Switch - off-on A.F.C. manual	1.00
102	111074	Transformer - output	1.85
103-104	111336	Transformer - 1st I.F. or 2nd	2.70
105	111340	Transformer - I.F. discriminator	2.70
106	112365	Transformer - power (115 volt-60 cycle)	8.40
107	112540	Transformer - power (115 volt-25 cycle)	12.00
108	112441	Volume control (1 megohm)	.95
109	83783	Condenser - mica 110 mmfd.	.20
110	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
111	88682	Condenser - paper .1 mfd. 400 volt	.25
112	85321	Connector - ground	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FIRESTONE
(STOCK NO. 7423-4)

MODEL R-308

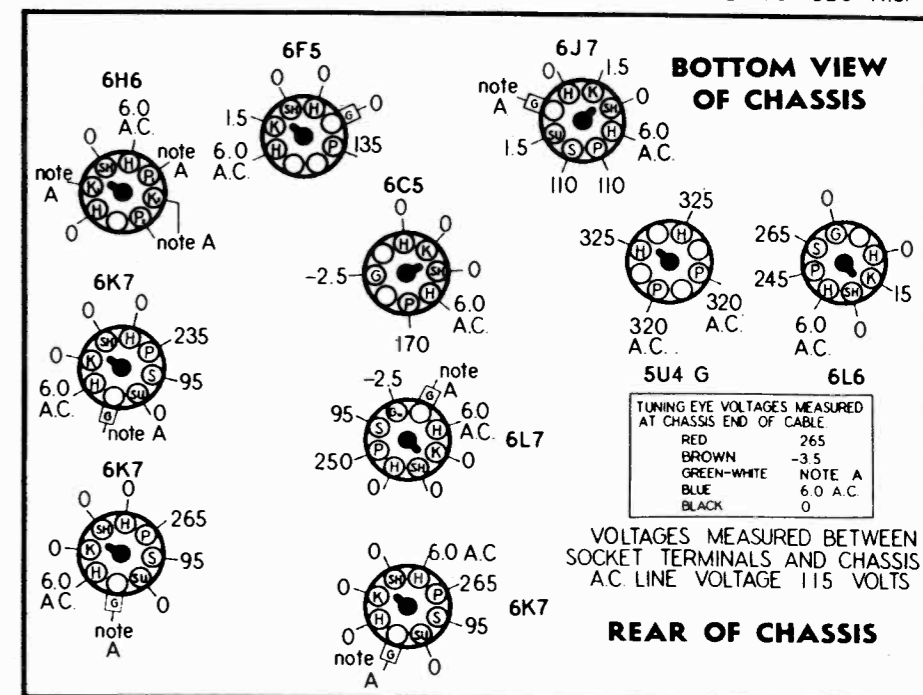
SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 520 K.C.

VOLTAGE CHART NOTES

IMPORTANT:- Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6L7, 6K7 R.F., 6K7 first I.F., 6K7 second I.F., and the diode plates of the 6H6 2nd detector and discriminator is -3.5 volts measured across resistor 95.

RECEIVER
MODEL 3085



BOTTOM VIEW OF CHASSIS

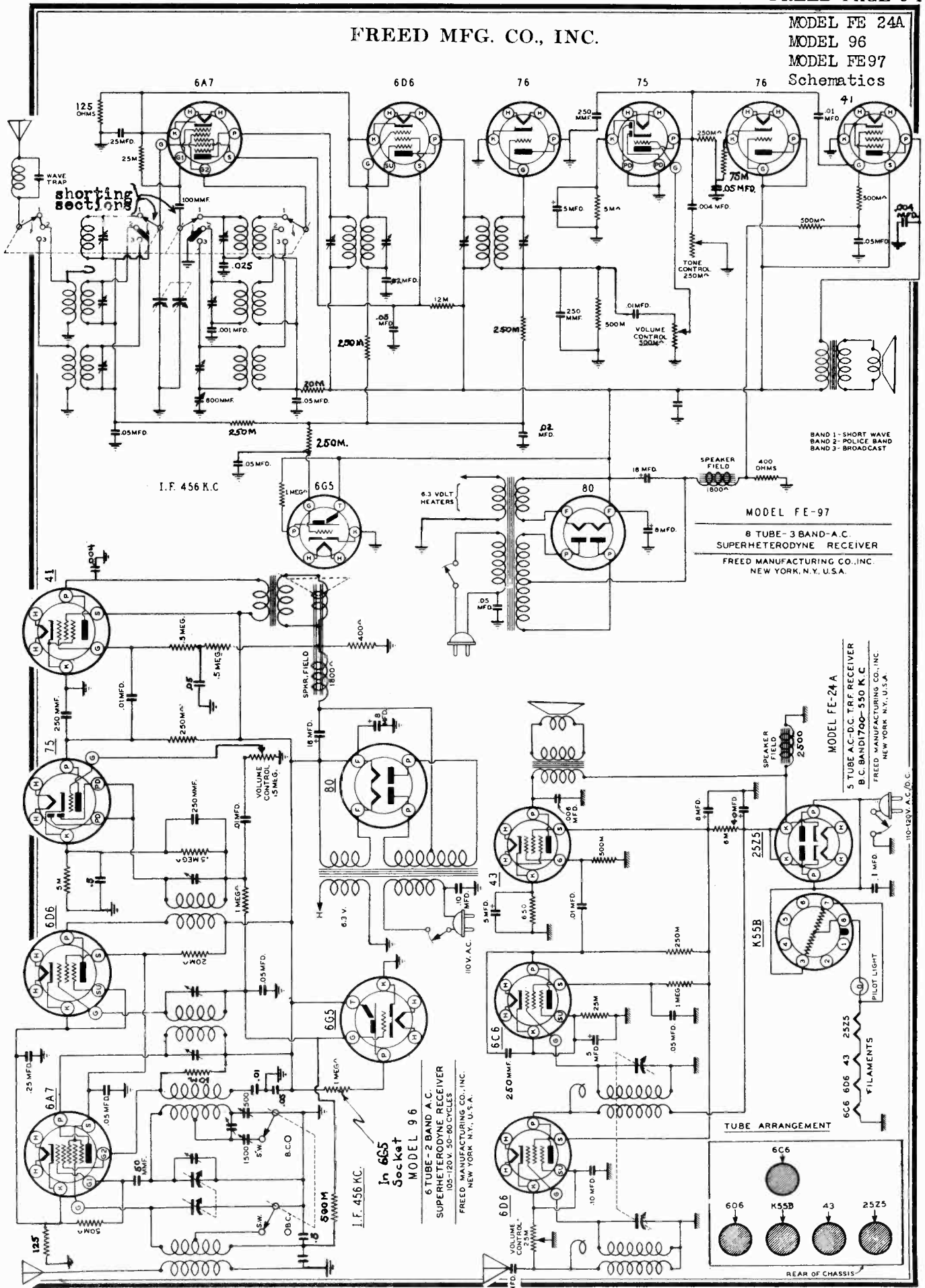
TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE
RED 265
BROWN -3.5
GREEN-WHITE NOTE A
BLUE 6.0 A.C.
BLACK 0

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS A.C. LINE VOLTAGE 115 VOLTS

REAR OF CHASSIS

FREED MFG. CO., INC.

MODEL FE 24A
MODEL 96
MODEL FE97
Schematics



I.F. 456 K.C.

MODEL FE-97

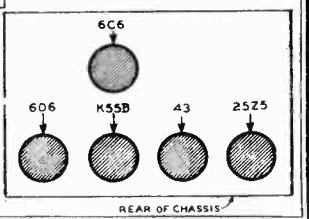
8 TUBE - 3 BAND - A.C.
SUPERHETERODYNE RECEIVER
FREED MANUFACTURING CO., INC.
NEW YORK, N.Y., U.S.A.

MODEL FE-24A

5 TUBE A.C.-D.C. TRF RECEIVER
B.C. BAND 1700-550 K.C.
FREED MANUFACTURING CO., INC.
NEW YORK, N.Y., U.S.A.

In 6G5
Socket
MODEL 96
6 TUBE - 2 BAND A.C.
SUPERHETERODYNE RECEIVER
100-120 V. 50-60 CYCLES
FREED MANUFACTURING CO., INC.
NEW YORK, N.Y., U.S.A.

TUBE ARRANGEMENT



MODEL 27-D
MODEL 30-D
Schematics

FREED MFG. CO., INC.

