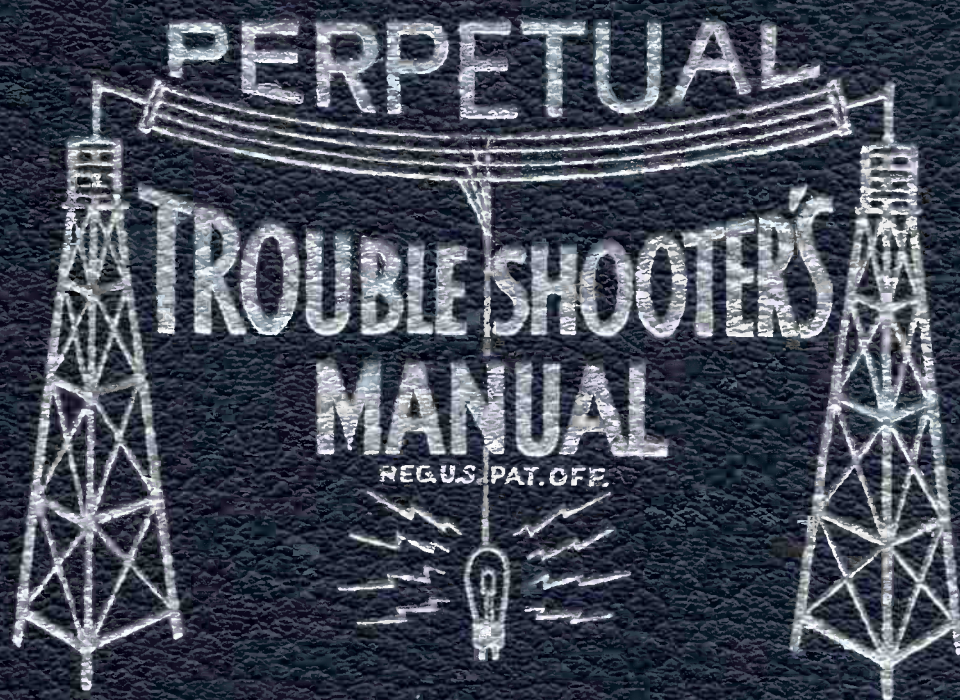


VOLUME X

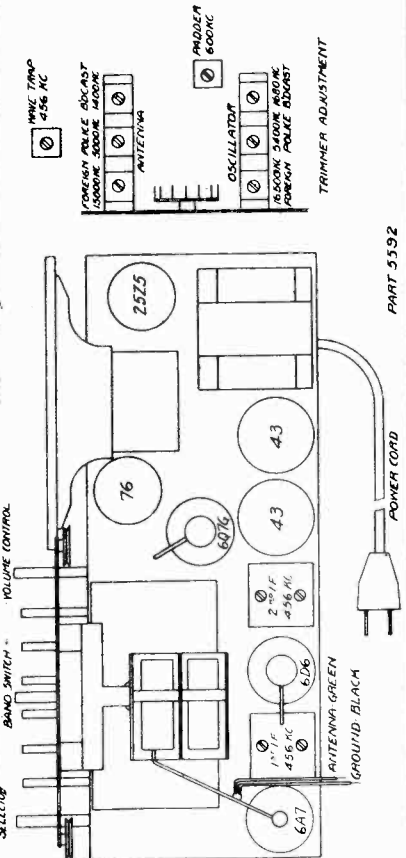
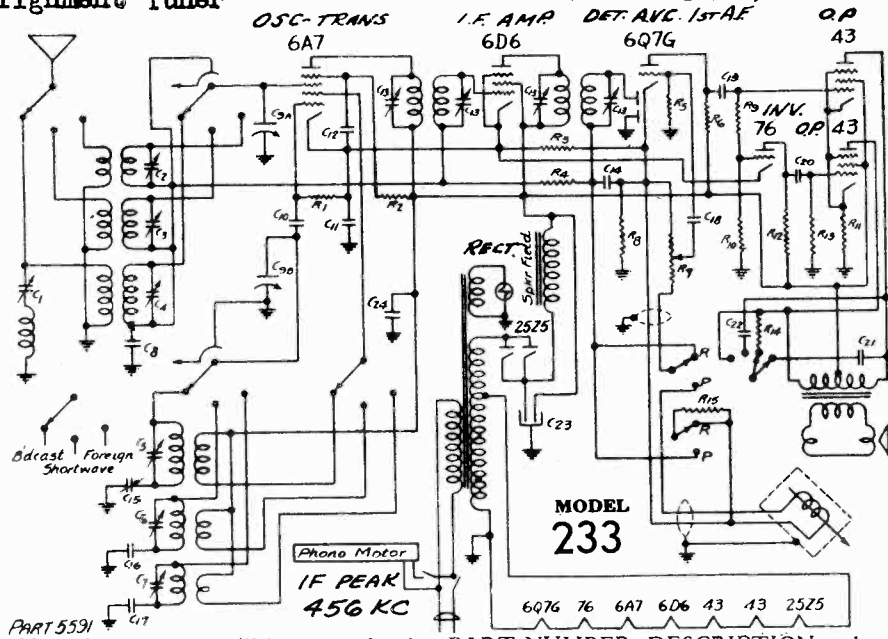


JOHN F. RIDER

MODELS 251, 256
Alignment Tuner

DETROLA CORP.

MODEL 233
Schematic, Socket
Trimmers, Alignment



No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

Symbol	Part No.	Description	5397	5353	5357	5388	3904	5234	5233	5240	5232	530 Pilot Light Bulb	5387 Dial Chart	5396 Escutcheon
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, 23	2600	.02 600 V. Electrolytic												
C-24	5272	8 MF. 150 V. Electrolytic												
C-25	5420	8 MF. 150 V. Electrolytic												
C-26	5419	8/8 MF. 250 V. 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.												
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, 15	603	100M. 1/3 W.												
R-13	615	500M 1/3 W.												
R-14	4529	10M 1/3 W. 10%												
R-15A } B } C }	5421	{ 30 ohm 10 ohm 20 ohm } Wire Wound												
	3463-10	1st IF Transformer												
	3463-4	2nd IF Transformer												
	5096	Oscillator Coil												
	5392	Antenna Coil												
	5390	Band Switch												
	5394	Tone Control Switch												
	5390	Band Switch												
	5394	Tone Control Switch												
	5422	AC-DC Switch												

ALINEMENT PROCEDURE MODELS 233, 251, 256.

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 transformer No. 2. Connect 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.

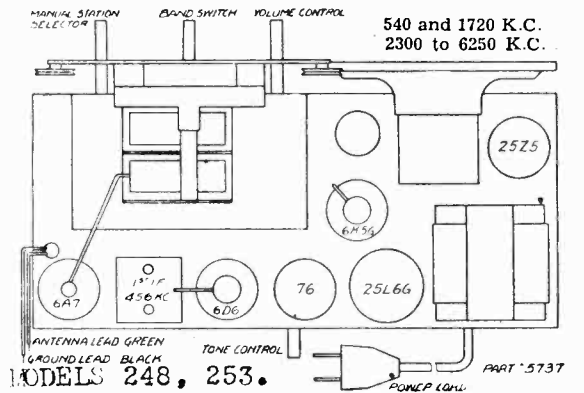
Adjustment of Mechanical Automatic Tuning System

Any of your favorite stations may be set up on any button, but it is recommended that they be set up in the same sequence as they are received on the dial. Loosen one of the buttons 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 the button in this position, tune in the station desired very carefully in the usual manner with the manual tuning knob. While still holding the button if, fix the adjustment by turning the button to the 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.

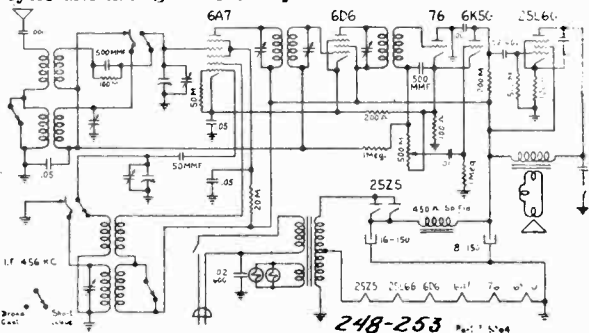
MODELS 248, 253
 MODELS 249, 254
 MODEL 250 MODEL 257

DETROLA CORP.

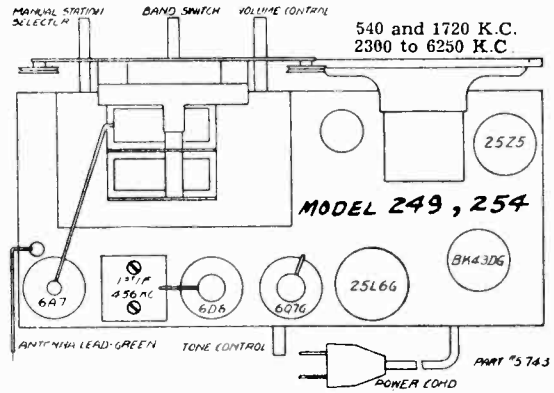
Schematics, Socket Trimmers



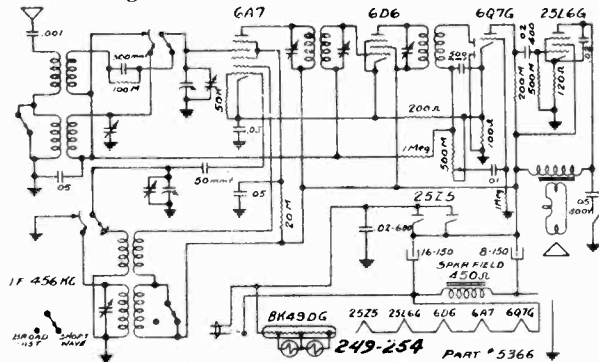
MODELS 248, 253.
 This receiver is designed to operate on 105 to 125 volts, 60 cycle alternating current only.



6A7—Oscillator, Translator, 6K5G—Audio Amplifier
 6D6—I.F. Amplifier 25L6G—Power Output
 76—Detector 25Z5—Rectifier

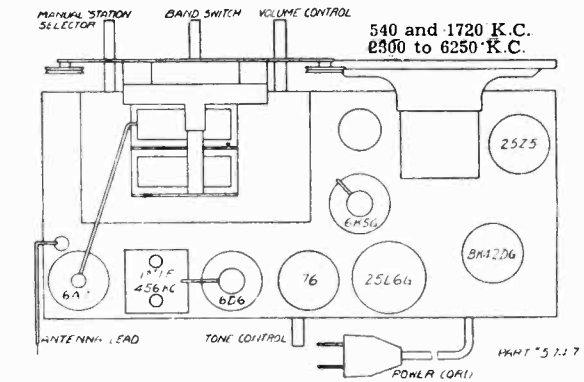


MODEL 249, 254
 This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

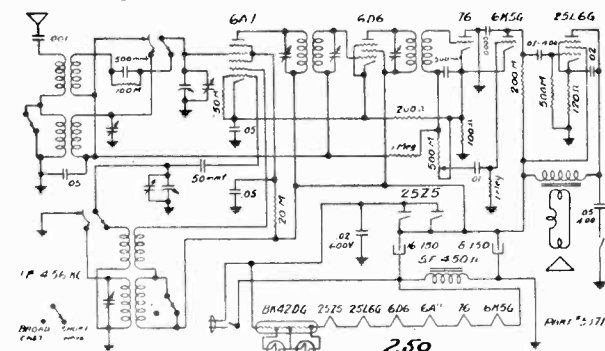


DO NOT CONNECT A GROUND TO THIS RECEIVER.
 6A7—Oscillator, Translator 25L6G—Power Output
 6D6—I.F. Amplifier 25Z5—Rectifier
 6Q7G—Detector, Audio Amplifier BK49DG—Ballast

MODEL 250

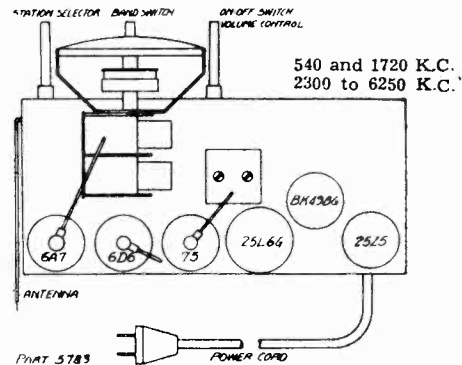


This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

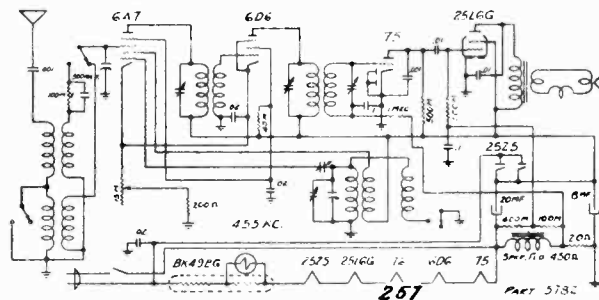


DO NOT CONNECT A GROUND TO THIS RECEIVER.
 6A7—Oscillator, Translator 6K5G—Audio Amplifier
 6D6—I.F. Amplifier 25L6G—Power Output
 76—Detector 25Z5—Rectifier
 BK42DG—Ballast

MODEL 257.



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

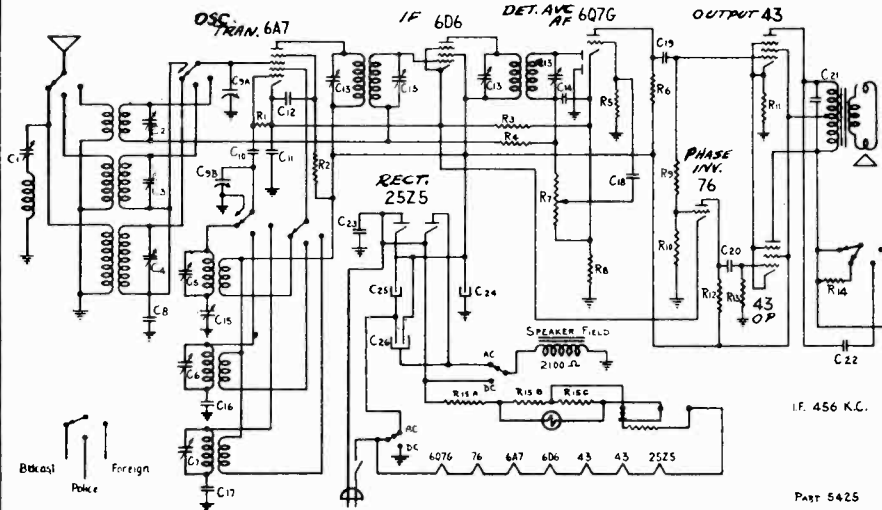


DO NOT CONNECT A GROUND TO THIS RECEIVER.
 25L6G—Power Output 6A7—Oscillator, Translator
 25Z5—Rectifier 6D6—I.F.
 BK49BG—Ballast 75—Detector

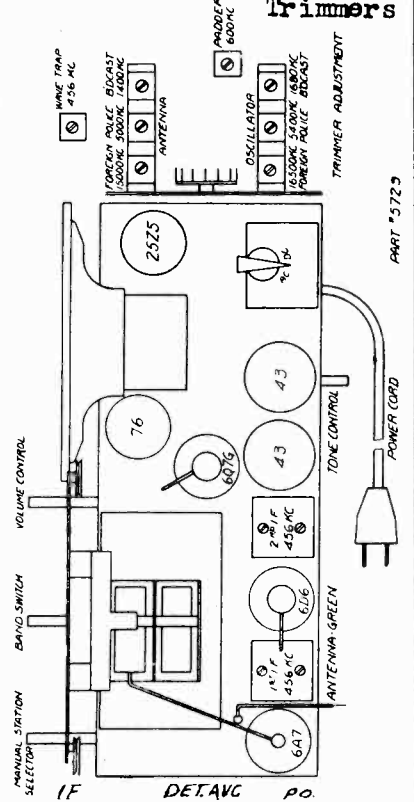
MODEL 262 Schematic, Socket Trimmers, Alignment

DETROLA CORP.

MODELS 251, 256 Schematic, Socket Trimmers



Be sure the AC-DC switch is in the proper position.

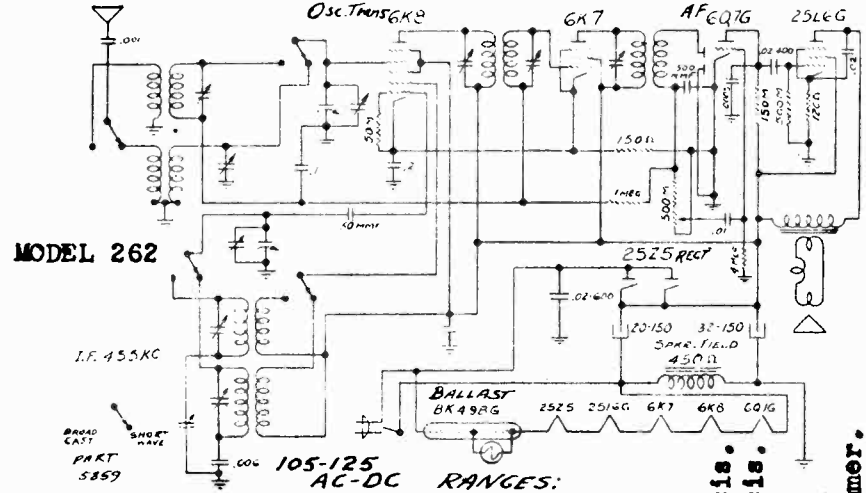


This receiver is designed to operate on 105 to 125 volts AC or DC. No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

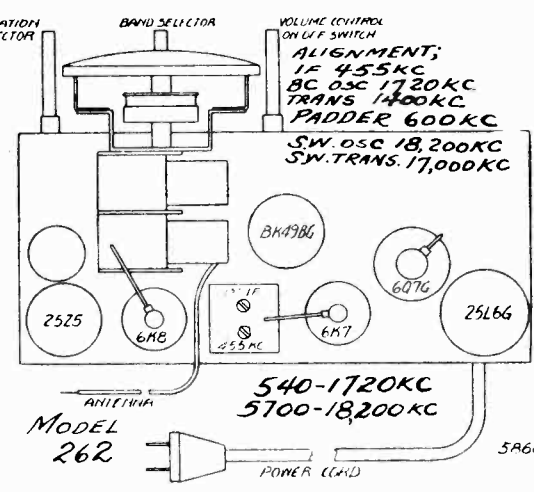
Symbol	Part No.	Description
C-1	3272	30-140 mmf Trimmer
C-2, 5, 7	1611	3-35 mmf Trimmer
C-3, 4, 6	2597	1-10 mmf Trimmer
C-8, 11	572	.1 200 V.
C-9a, b	5724	Tuning Condenser
C-10	2780	50 mmf Mica
C-12	580	.05 200 V.
C-13		IF Trimmer
C-14	4810	.0005 400 V.
C-15	2560	220-500 mmf Padder
C-16	2741	1330 mmf 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, 23	2600	.02 600 V. Electrolytic
C-24	5272	8 MF. 150 V. Electrolytic
C-25	5420	8 MF. 150 V. Electrolytic
C-26	5419	8/8 MF. 250 V. 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.
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%
R-15A, B, C	5421	{ 30 ohm 10 ohm 20 ohm } Wire Wound
	3463-10	1st IF Transformer
	3463-4	2nd IF Transformer
	5096	Oscillator Coil
	5392	Antenna Coil

FOR ALIGNMENT SEE INDEX

Model 251-256



MODEL 262



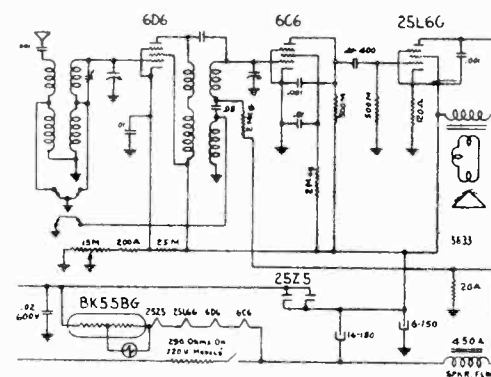
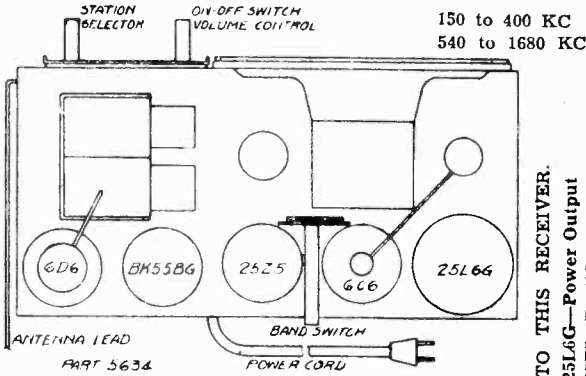
LOCATION OF TRIMMERS MODEL 262.
 2nd. IF Trans. beneath chassis.
 BC osc., osc. coil beneath chassis.
 BC trans., trans coil top chassis.
 BC padder on the chassis.
 SW osc, next to BC osc trimmer.
 SW trans. next to BC trans trimmer.

MODEL 260
 MODEL 266
 MODEL 268
 MODEL 272

DETROLA CORP.

Schematics, Socket Trimmers

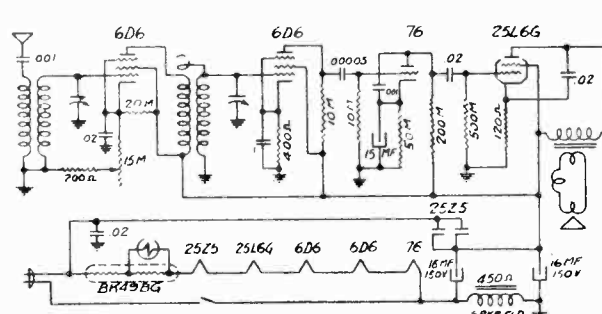
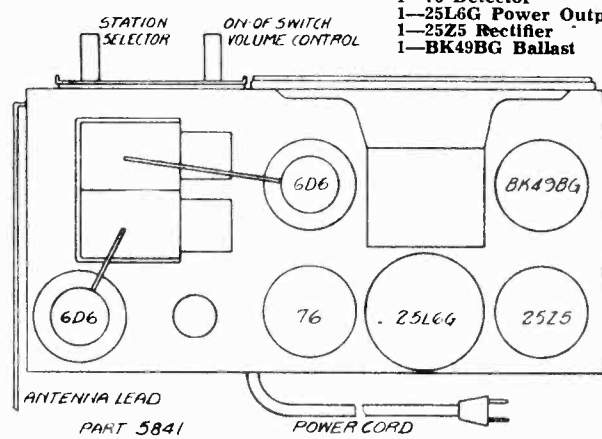
MODEL 260



This receiver is designed to operate on 220 volts, direct or alternating current.

DO NOT CONNECT A GROUND TO THIS RECEIVER.
 25L6G—Power Output
 25Z5—Rectifier
 BK55BG—Ballast

MODEL 266

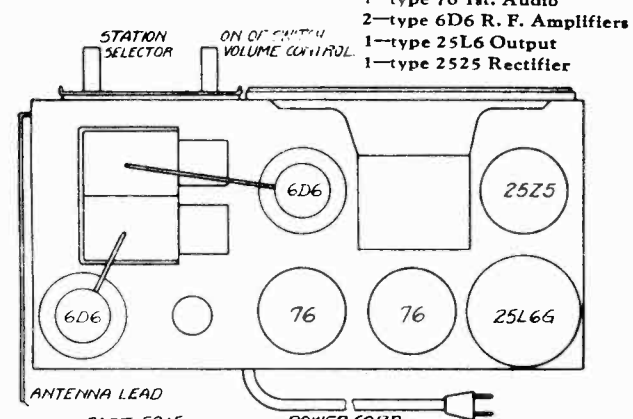


This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

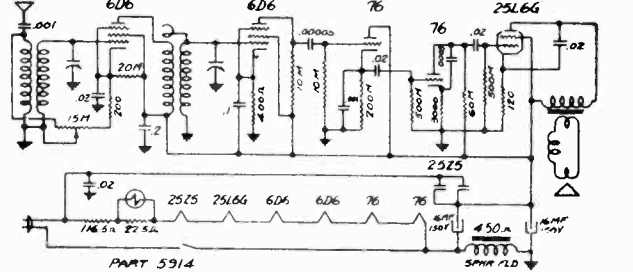
2—6D6 R. F. Amplifiers
 1—76 Detector
 1—25L6G Power Output
 1—25Z5 Rectifier
 1—BK49BG Ballast

540 K.C. and 1600 K.C.
 1600 K.C. and 1712 K.C.

MODEL 268

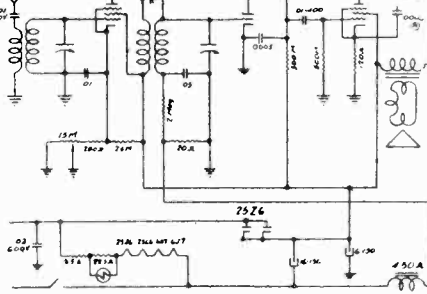
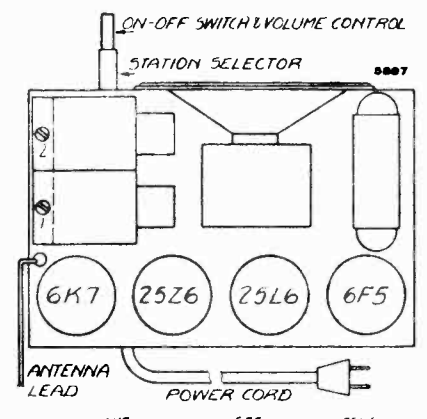


This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



1—type 76 Detector
 1—type 76 1st. Audio
 2—type 6D6 R. F. Amplifiers
 1—type 25L6 Output
 1—type 25Z5 Rectifier

Model 272



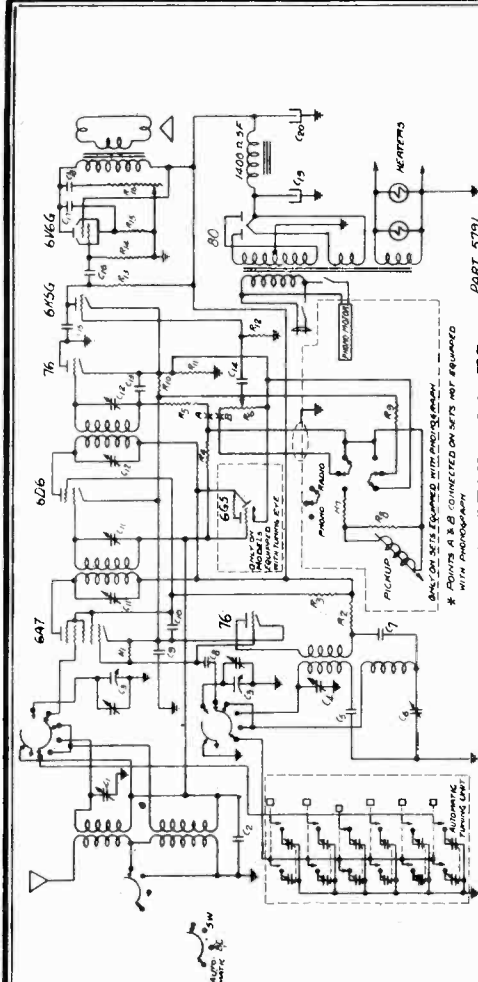
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

1—25Z6 Rectifier
 1—25L6 Output

1—6K7 R. F. Amplifier
 1—6F5 Detector

DETROLA CORP.

MODEL 258
MODEL 259
Schematics



Tubes required are:

- 1-76 Oscillator
- 1-6A7 Translator
- 1-6D6 I.F. Amplifier
- 1-76 Detector, A.V.C.

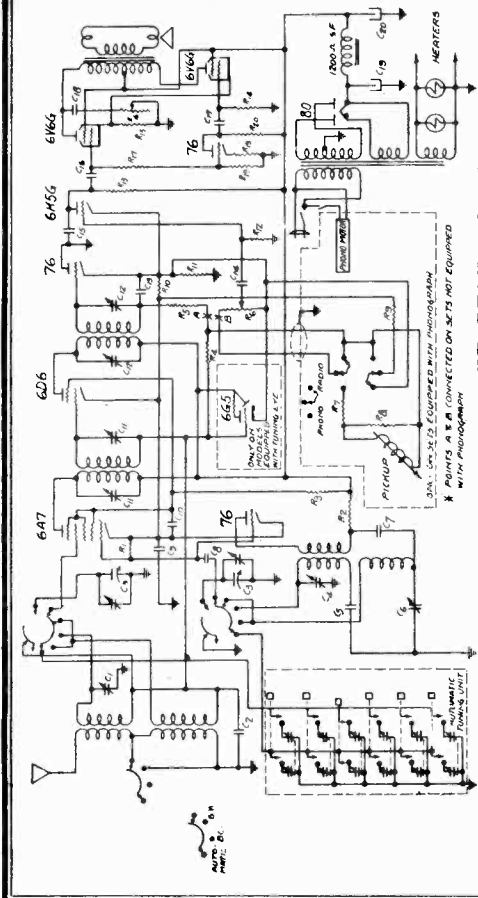
*Only on those sets equipped with tuning eye.

No orders for parts will be accepted unless those shown above.

CHASSIS MODEL NUMBER are given.

Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	1611	5-35 mmf Trimmer	R-15	3353	250 ohm 2W
C-2, 7, 10	580	.05-200V	R-16	5511	100M T. C.
C-3	5654	Tuning Condenser	R-17	2881	400M 10% 1/3W
C-4	2597	1-10 mmf Trimmer	R-18	2880	100M 10% 1/3W
C-5	2741	1330 mmf Mica +5%	R-19	2883	5M 10% 1/3W
C-6	2560	300-500 mmf padder		5802	Power Transformer
C-8	2780	50 mmf mica		5656	Dial Chart
C-9	2792	2-200V		5447	Pointer
C-11, 12	4810	IF Trimmers		5657	1st I.F. Transformer
C-13	.0005-400V			5658	2nd I.F. Transformer
C-14	.01-200V			5659	Antenna Coil
C-15	100 mmf mica			5660	Oscillator Coil
C-16, 17	576	02-400V		5789	Band Switch
C-18	563	05-400V		5790	Automatic Tuning Unit
C-19	3375	16MF 400V		5240	Radio-Phono Switch
C-20	3113	16MF Reg.		5232	Phono Motor
R-1, 5, 20	631	50M 1/3W		5233	Turn Table 10"
R-2, 3	617	20M 1/3W		5234	Phono Pickup
R-4, 12	624	1 Meg 1/3W		5798	Automatic Tuning
R-6	5100	5 meg V.C.			Buttons
R-7	2106	3 Meg 1/3 W		5672	Dial Escutcheon
R-8	615	5 Meg 1/3 W		5797	Button Escutcheon
R-9, 11	2689	100 ohm 10% 1/3W		5800	Tuning Eye Escutcheon
R-10	600	10M 1/3W		5799	Call Letter Sheets
R-13	598	200M 1/3W			Speaker
R-14	615	.5 Meg 1/3W			

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% 1/3W on sets not equipped with phonograph.



Tubes required are:

- 1-76 Oscillator
- 1-6A7 Translator
- 1-6D6 I.F. Amplifier
- 1-76 Detector, A.V.C.

*Only on those sets equipped with tuning eye.

No orders for parts will be accepted unless those shown above.

CHASSIS MODEL NUMBER are given.

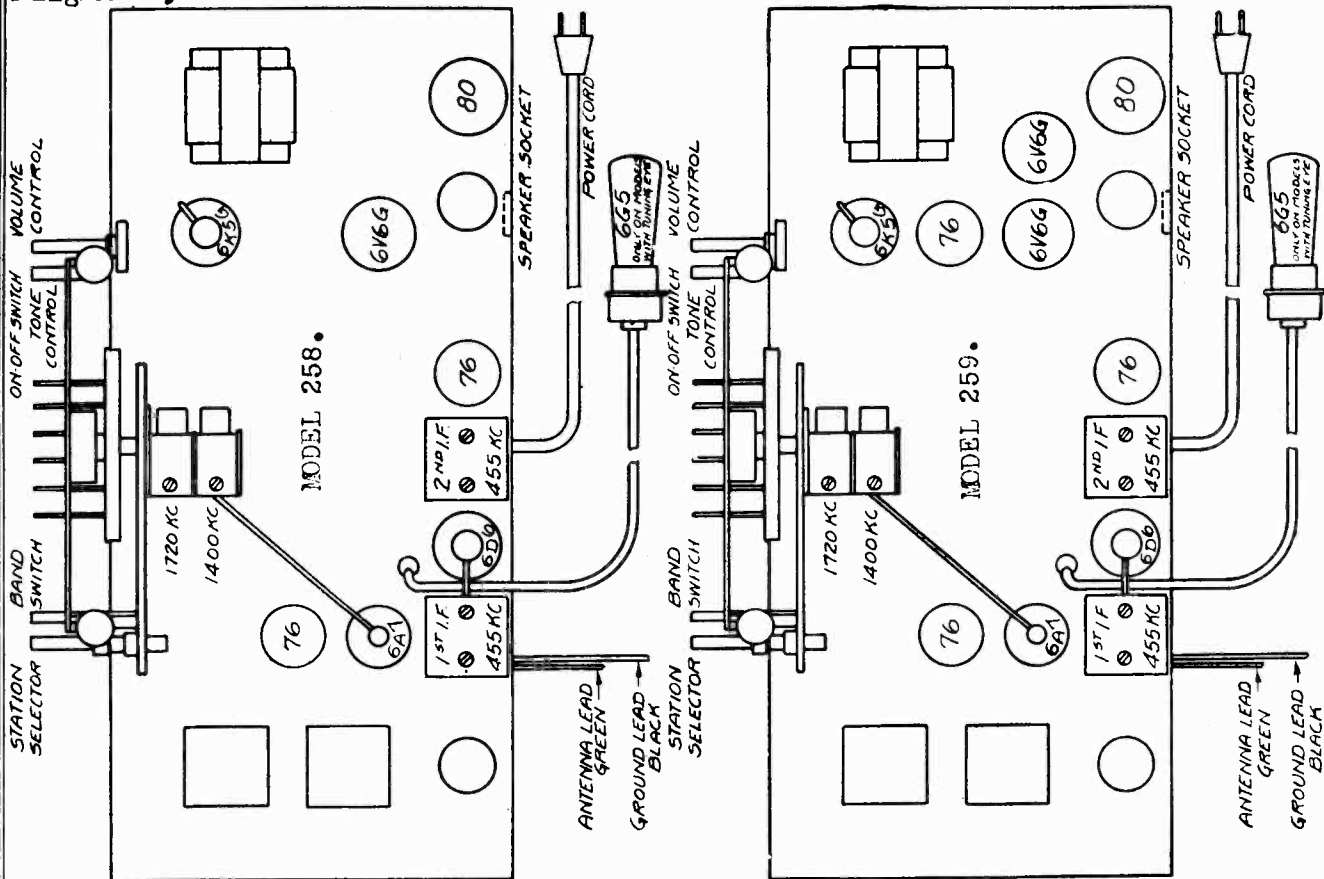
Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	1611	5-35 mmf Trimmer	R-15	3353	250 ohm 2W
C-2, 7, 10	580	.05-200V	R-16	5511	100M T. C.
C-3	5654	Tuning Condenser	R-17	2881	400M 10% 1/3W
C-4	2597	1-10 mmf Trimmer	R-18	2880	100M 10% 1/3W
C-5	2741	1330 mmf Mica +5%	R-19	2883	5M 10% 1/3W
C-6	2560	300-500 mmf padder		5802	Power Transformer
C-8	2780	50 mmf mica		5656	Dial Chart
C-9	2792	2-200V		5447	Pointer
C-11, 12	4810	IF Trimmers		5657	1st I.F. Transformer
C-13	.0005-400V			5658	2nd I.F. Transformer
C-14	.01-200V			5659	Antenna Coil
C-15	100 mmf mica			5660	Oscillator Coil
C-16, 17	576	02-400V		5789	Band Switch
C-18	563	05-400V		5790	Automatic Tuning Unit
C-19	3375	16MF 400V		5240	Radio-Phono Switch
C-20	3113	16MF Reg.		5232	Phono Motor
R-1, 5, 20	631	50M 1/3W		5233	Turn Table 10"
R-2, 3	617	20M 1/3W		5234	Phono Pickup
R-4, 12	624	1 Meg 1/3W		5798	Automatic Tuning
R-6	5100	5 meg V.C.			Buttons
R-7	2106	3 Meg 1/3 W		5672	Dial Escutcheon
R-8	615	5 Meg 1/3 W		5797	Button Escutcheon
R-9, 11	2689	100 ohm 10% 1/3W		5800	Tuning Eye Escutcheon
R-10	600	10M 1/3W		5799	Call Letter Sheets
R-13	598	200M 1/3W			Speaker
R-14	615	.5 Meg 1/3W			

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% 1/3W on sets not equipped with phonograph.

MODEL 258
 MODEL 259
 Socket, Trimmers
 Alignment, Tuner

DETROLA CORP.

MODEL 270
 Alignment, Tuner



MODELS 258, 259, 270.

ALIGNMENT 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 transformer No. 2. Connect 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 center (B) position and the tuning condenser at minimum capacity feed 1720 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 paddler. The tuning condenser should be rocked back and forth through the signal while varying the paddler in order to assure perfect alignment.

Using 400 ohm resistor in series with generator, set band selector in right hand (F) position, set generator to 6300 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc., tune receiver to signal and adjust antenna trimmer.

Setting Up the Push Button Station Selector

First select six favorite local or strong nearby stations, listing them 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 five stations consecutively as they are tuned in on the dial, tuning from left to right. For example assume your selected stations operate on frequencies of 1500 kc., 1300 kc., 1100 kc., 900 kc., 700 kc., and 600 kc. The 1500 kc. station should be listed as No. 1, the 1300 kc. station would be No. 2, and so on through the list with the 600 kc. station becoming No. 6. In setting up the buttons, the 1500 kc. station should be set up on No. 1 button, or the first button from the left, the 1300 kc. station on the second button from the left, and so on until the 600 kc. station is finally set up on the button farthest to the right.

With the band selector set at "B," or the second position from the left, tune in station No. 1. Observe the program in progress, then turn the band selector knob to the extreme left position (A). Push the No. 1 button in as far as it will go; when the proper operating position is reached the button will lock in. Then insert the screw driver through the opening directly above the No. 1 button and turn the larger headed screw until the same program is heard. **Do not force this screw. It should turn very easily and if the station is not heard when the screw is turned all the way in one direction, reverse the direction of rotation until the station is found.** When the station is located, turn the screw back and forth through the station slowly and observe when the station is accurately tuned in, indicated by a minimum of noise or hiss, or by watching the tuning eye on the models so equipped. Inserted in one side of the larger screw head is a smaller screw. This screw is for fine adjustment, and should be turned in and out until position of least hiss is found, or until the tuning eye, on models so equipped, shows the least shadow. It will not be necessary to turn this small screw more than one full turn from the factory adjusted position. As a definite check that the desired station has been tuned in, listen for the station announcement. Set up the remaining buttons in the same manner, and after all stations have been set up, locate the call letters of the stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets and insert them in the escutcheon according to the directions on the envelope.

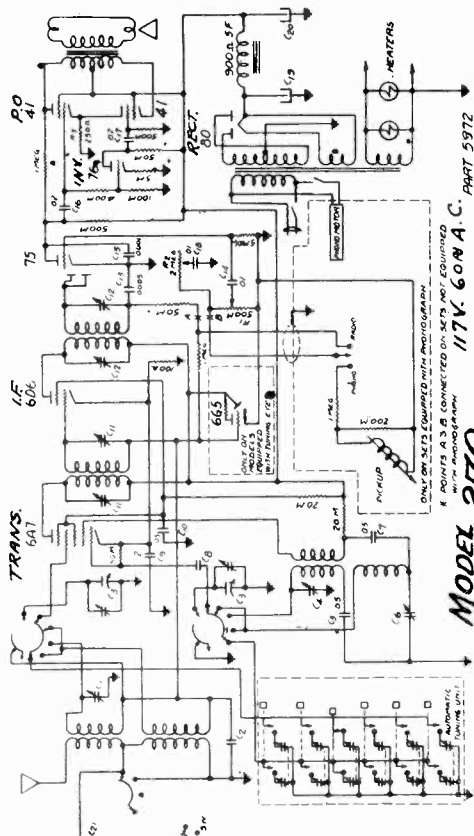
On Sets Equipped with Phonograph

Phono Radio Switch: The Left Hand Position is for Radio Only. The Right Hand Position connects the pick-up and turns on the power for the phonograph motor.

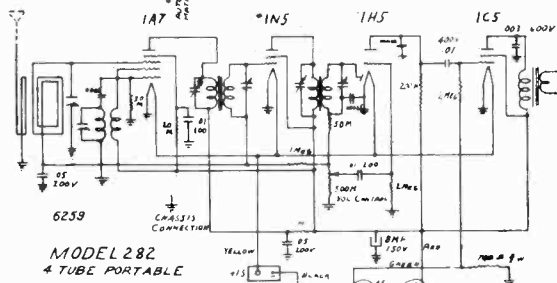
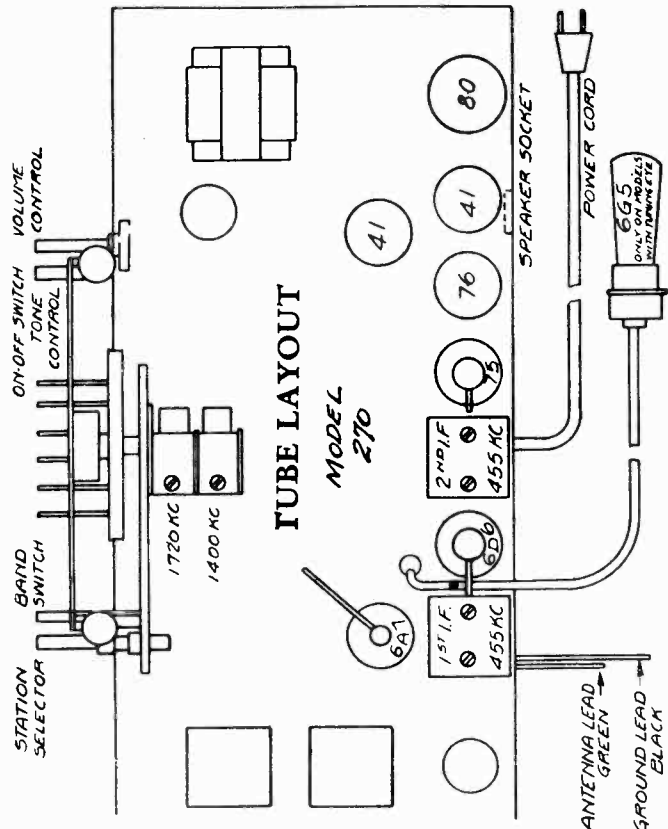
MODEL 270
 MODELS 282, 288
 MODEL 286

DETROLA CORP.

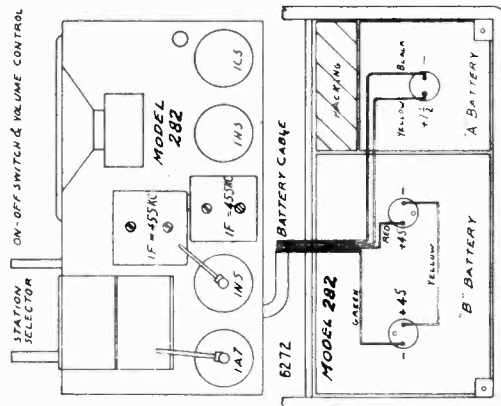
Schematics, Socket
 Trimmers, Alignment



MODEL 270
 FOR ALIGNMENT SEE INDEX
 IF PEAK 456 KC



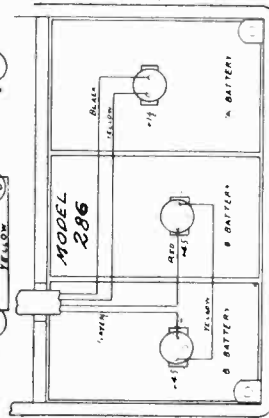
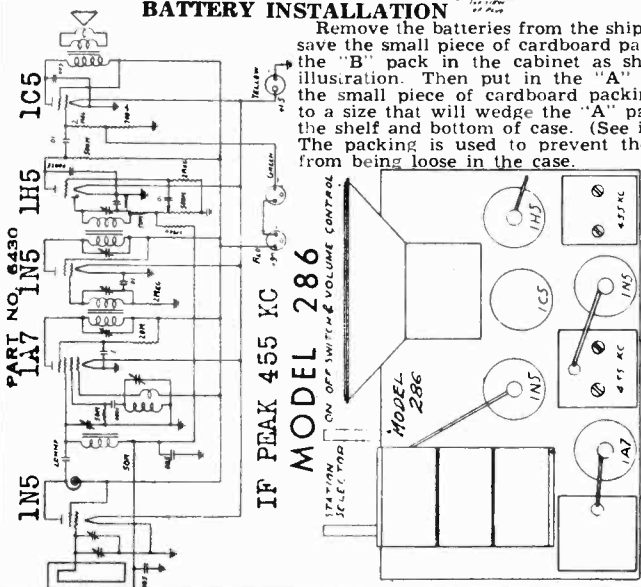
Models 282 — 288
 550 to 1600 kilocycles.



Connect the "A" and "B" plugs as shown in the illustration. It makes no difference which socket on the "B" pack the three prong "B" plugs are inserted.

BATTERY INSTALLATION

Remove the batteries from the shipping carton, save the small piece of cardboard packing. Place the "B" pack in the cabinet as shown in the illustration. Then put in the "A" pack. Take the small piece of cardboard packing and fold to a size that will wedge the "A" pack between the shelf and bottom of case. (See illustration.) The packing is used to prevent the "A" pack from being loose in the case.



MODELS 282, 286, 288
 ALIGNMENT PROCEDURE

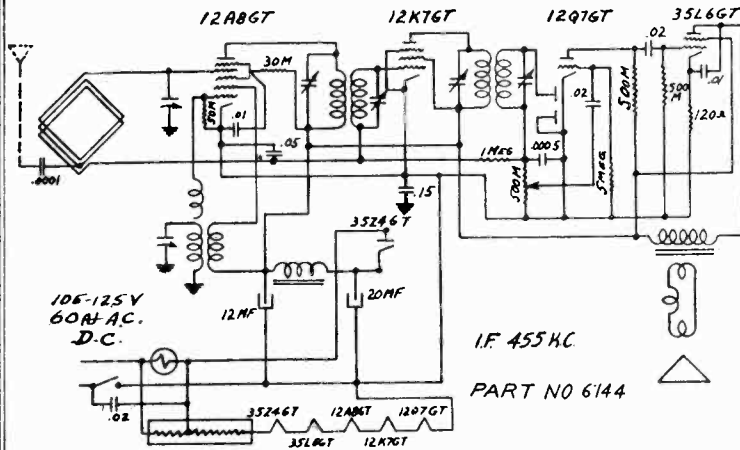
I.F. Frequency 455 KC. Set Range 540-1580 KC. Connect the test oscillator, or signal generator, to the set as follows. Connect the "hot" side of the signal generator to the grid of the 1A7 tube, and the ground side to the terminal on the back of the chassis. An output meter should be connected across the voice coil leads of the speaker to indicate resonance. Align the I.F. trimmers at 455 KC for maximum meter reading. Adjust the trimmer on the back of the variable condenser at or near 1400 KC at full volume on a weak broadcast signal. When aligning the set do not set the receiver on or near a metal work bench or other large metal object, as it will affect the tracking of the receiver.

Schematics, Socket
Trimmers, Alignment

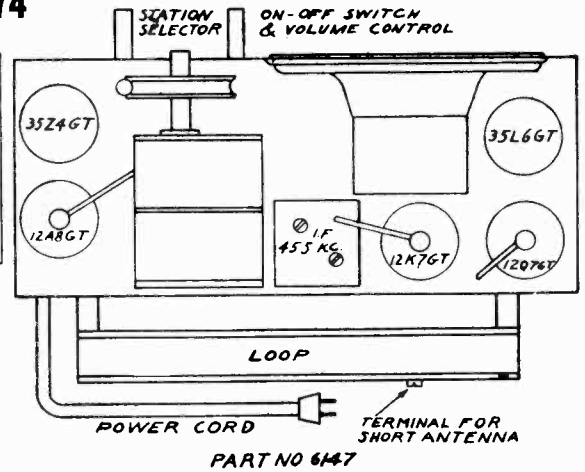
DETROLA CORP.

MODEL 274
MODEL 276U, Super Pee Wee
MODEL 2742

Model 274

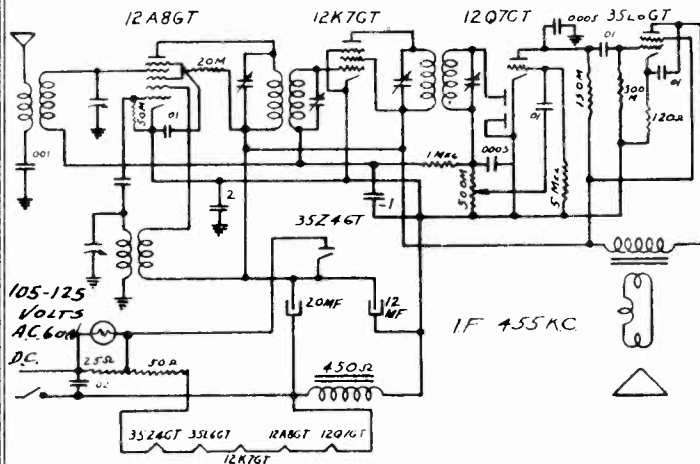


12A8GT Translator 12Q7GT Detector -AVC 35L6GT Output
12K7GT IF Amplifier 35Z4GT Rectifier

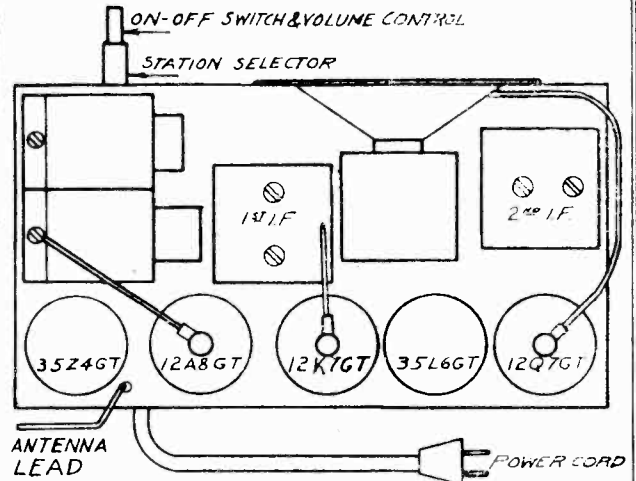


Super Pee-Wee Model 276-U

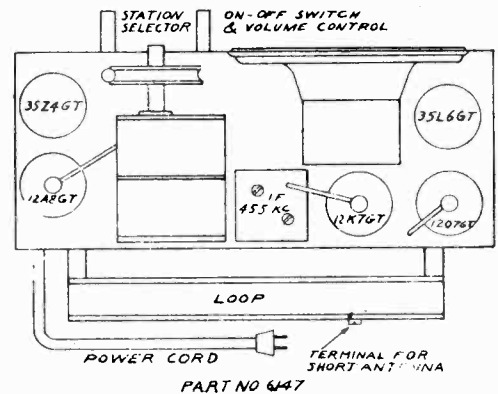
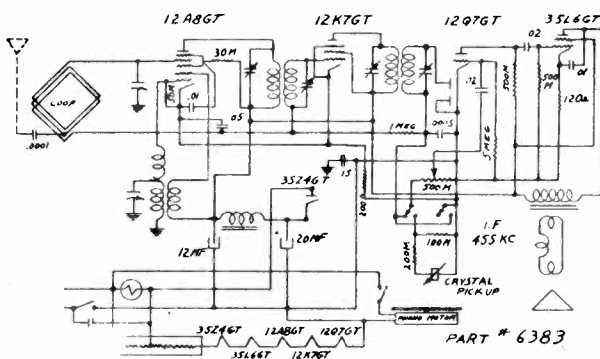
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



12A8GT Translator 35L6GT Output
12K7GT IF Amplifier 35Z4GT Rectifier
12Q7GT Detector AVC



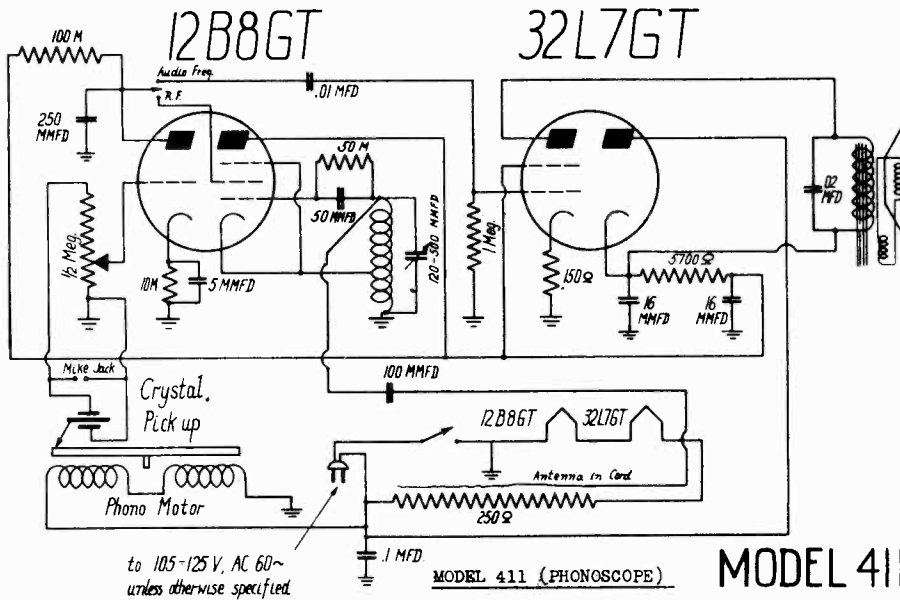
MODEL 2742—A.C.—D.C.—PHONOGRAPH



This receiver is designed to operate on 105 to 125 volts, 60 cycle, alternating or direct current. Do not connect to any other source.

For phonograph operation turn the Radio Phono switch to the Phono position. THE A.C.-D.C. SWITCH MUST BE SET IN THE PROPER POSITION. (This switch is on the phonograph panel.) The radio volume control also serves as the phonograph volume control.

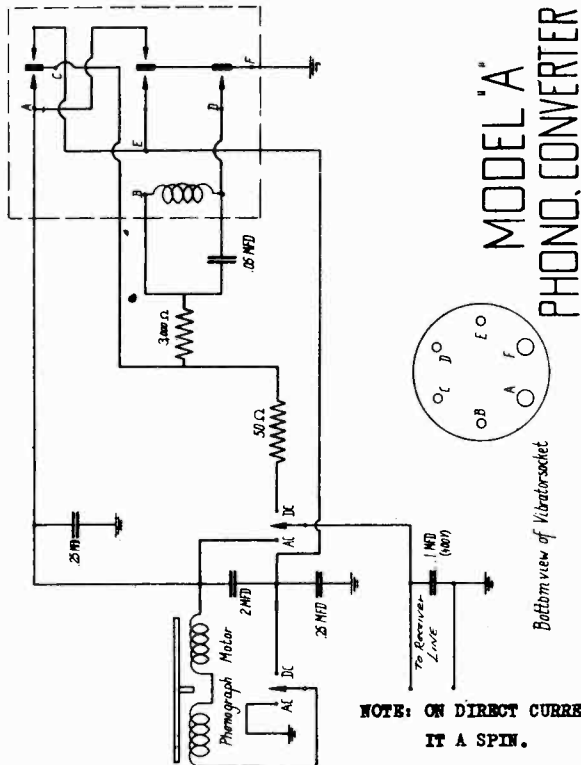
MODEL A Phono Converter
 MODEL 411 Phonoscope DEWALD RADIO MFG. CORP.
 Schematics, Data



The "PHONOSCOPE" is a combination audio and wireless playback. Disc recordings may be played directly through this unit, or may be reproduced through a remote radio receiver. A microphone may also be used instead of disc recordings. The unit has been designed to operate on 105-125 volts 60 cycles A.C. unless otherwise specified.

PHONOGRAPH The phonograph motor and unit is turned "on" by rotating the knob **OPERATION** on the right in a clockwise direction. Further rotation in this direction increases the volume. Turn the knob on the left side in the clockwise position. Allow about a minute for the tubes to become sufficiently heated. Disc recordings may now be played through the speaker in the PHONOSCOPE. **MICROPHONE** A high impedance magnetic or crystal microphone may be used in place **OPERATION** of phonograph recordings. The two pin tips should be inserted in the microphone jack in the rear of the cabinet. The microphone may be used as a means of speaking or entertaining through the unit.

WIRELESS REPRODUCTION Wireless reproduction is a method by which signals from the PHONO-REPRODUCTION SCOPE may be picked up in a remote radio receiver. This is accomplished by rotating the knob on the left in the counterclockwise position. The receiver through which the recordings or microphones reproduction is to be heard must be turned "on". The volume control should be turned to nearly maximum position; and the dial should be adjusted for approximately 550 K.C. The tuning trimmer which is located under the motor board of the cabinet of the PHONOSCOPE should be adjusted until the loudest "swish" or "hiss" noise is heard through the remote radio receiver speaker. After this adjustment has been made any form of reproduction in the PHONOSCOPE will be heard in the remote unit. Once the trimmer has been adjusted it is advisable to tune the remote receiver in order to pick-up the signals being reproduced. This unit when reproducing through the radio receiver will operate at a distance of fifty feet.



This converter is used with radio and phonograph combination. The purpose of the unit is to enable the phonograph motor to operate on direct current. Although the radio receiver will operate A.C. or D.C., care must be taken when operating the phonograph, that the converter switch is in the proper position.

ALTERNATING CURRENT OPERATION

Push the slide button switch to the position marked A.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

DIRECT CURRENT OPERATION

Push the slide button switch to the position marked D.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

NOTE

When operating the receiver on D.C. and no signals are heard after it has been "on" for about a minute, reverse the line plug in the outlet.

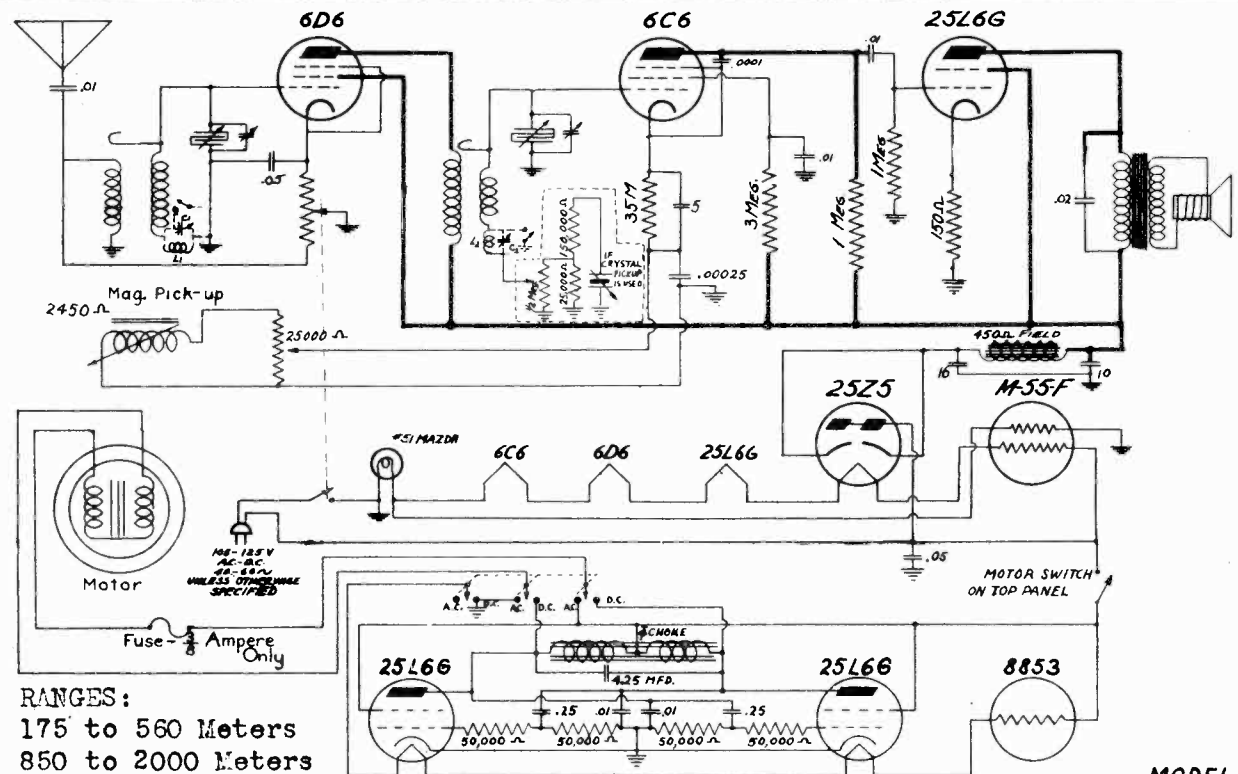
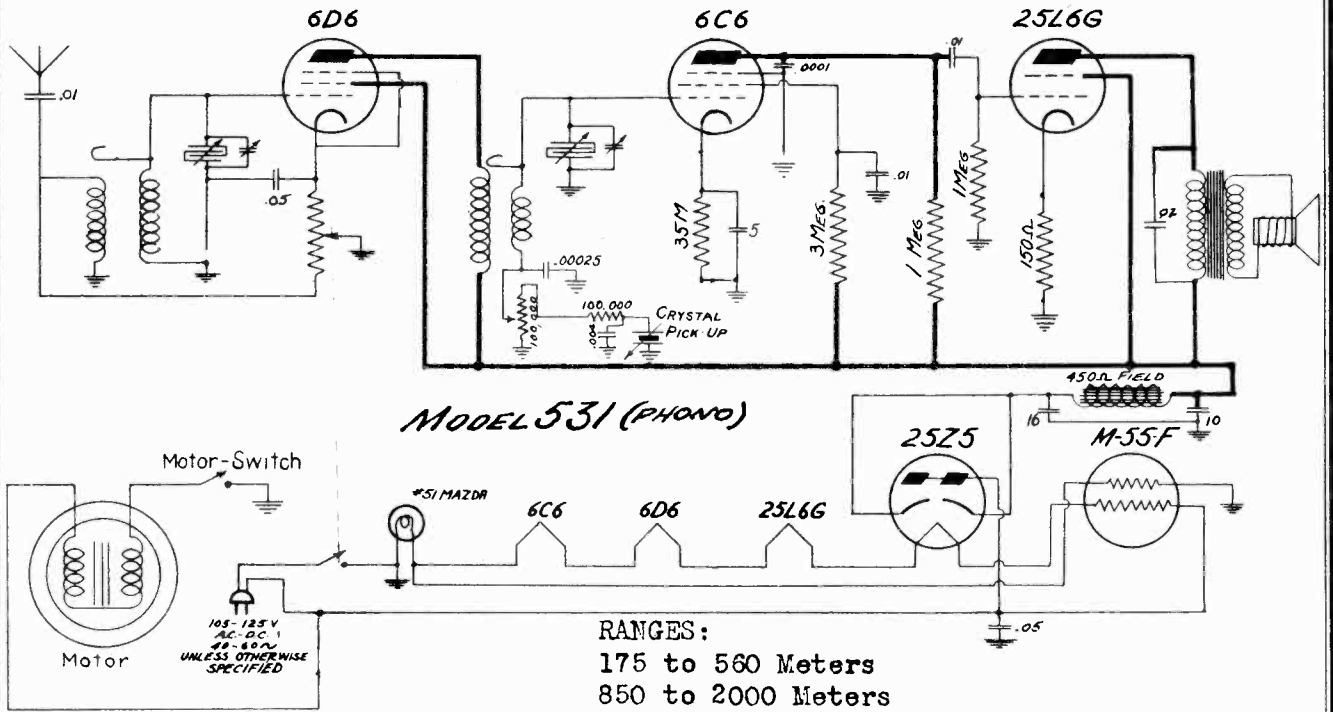
WARNING

ALWAYS BE SURE THAT THE POSITION OF THE CONVERTER SLIDE SWITCH IS IN THE POSITION CORRESPONDING TO THE LINE CURRENT AT THE OUTLET. FOR INSTANCE, IF THE OUTLET IS A.C. THE SLIDE SWITCH MUST BE ON THE A.C. SIDE. FAILURE TO OBSERVE THIS WHILE OPERATING THE PHONOGRAPH MOTOR, MAY RESULT IN DAMAGE TO THE UNIT.

NOTE: ON DIRECT CURRENT IT MAY BE NECESSARY TO START THE MOTOR BY GIVING IT A SPIN.

DEWALD RADIO MFG. CORP.

MODEL 531 Phono.
 MODELS 532, 532LW
 Schematics



MODEL 532-532 L.W. LIST PRICES OF REPLACEMENT PARTS

1481 antenna coil	.50	8542 pilot lamp	.15
1482 detector coil	.50	8777 knob	.10
1488 cent. tap choke	1.50	8852 AC-DC switch	.75
2422 2 gang var. cond.	2.00	8854 pointer knob	.15
2425 comb. electrolytic	1.00	9799 drum	.15
2433 4.25 mfd. cond.	2.00	9914 drive shaft	.10
3420 comb. vol. cont.	1.00	9911 pointer	.10
6079 scale-	.10	cabinet	12.50
6080 crystal	.25	phono. vol. cont.	1.00
7233 speaker	3.50	phono. pickup	11.50
		phono. motor	17.50

MODEL 532 - 532 L.W.
 RADIO-PHONOGRAPH COMBINATION

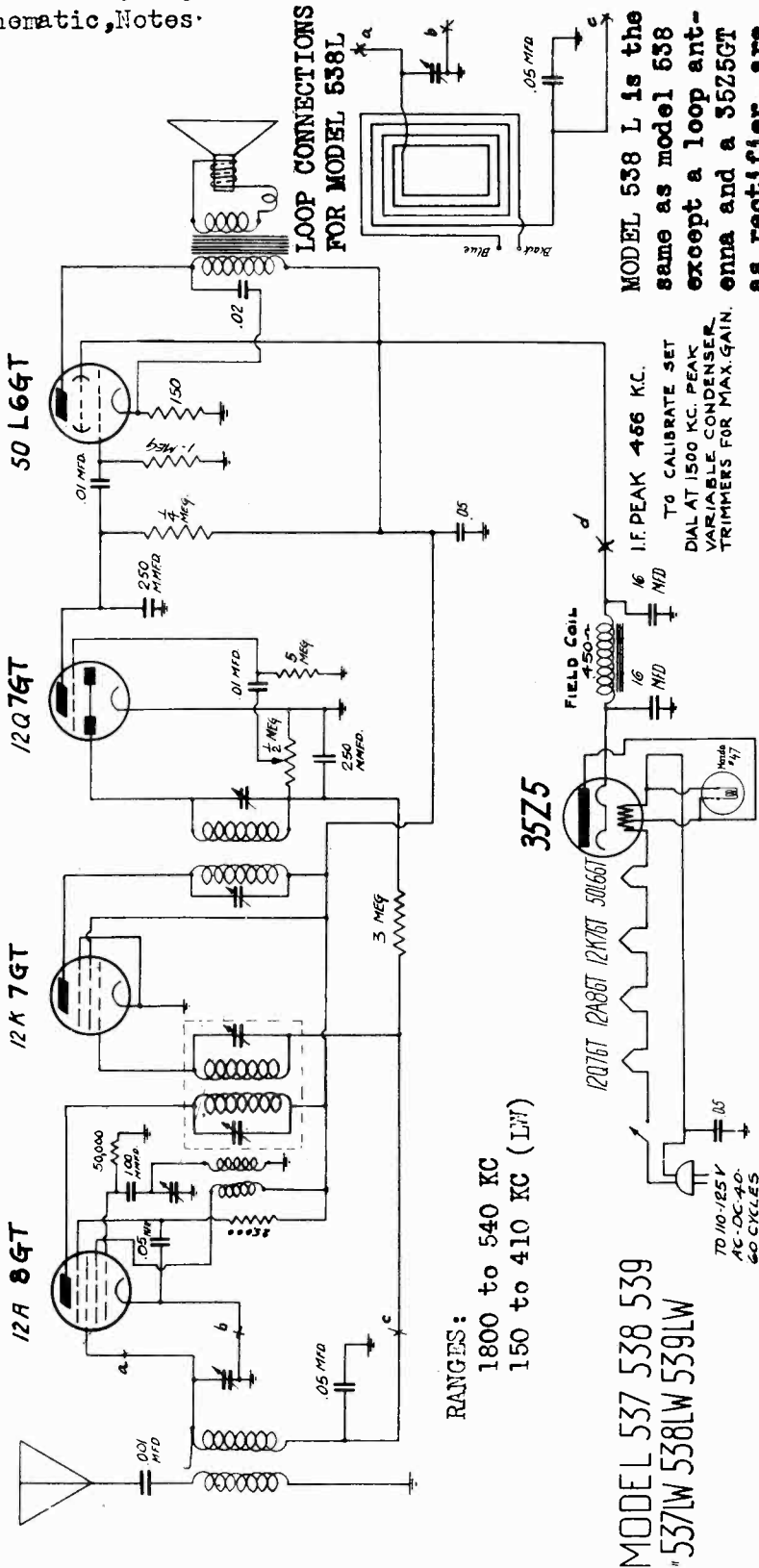
In Model 532 L.W.
 11, 01, L2 & 02 are in circuit.
 In Model 532
 11, L2, 01, & 02 are omitted.

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

MODELS 537, 537LW, 538, 538L, 538LW, 539, 539LW

DEWALD RADIO MFG. CORP.

Schematic, Notes



LOOP CONNECTIONS FOR MODEL 538L

MODEL 538 L is the same as model 538 except a loop antenna and a 5Z5GT as rectifier, are used.

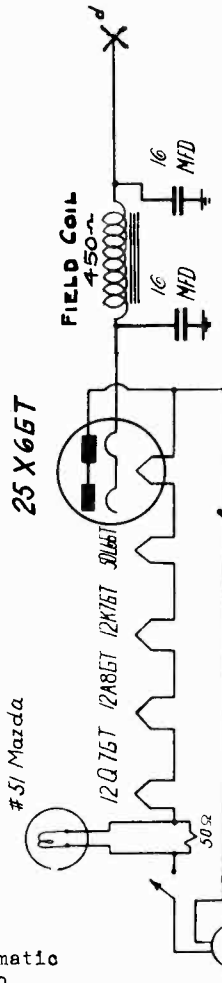
RANGES:
1800 to 540 KC
150 to 410 KC (LW)

MODEL 537 538 539
"537LW 538LW 539LW"

TO CALIBRATE SET DIAL AT 1500 KC. PEAK VARIABLE CONDENSER TRIMMERS FOR MAX. GAIN.

TO 110-125 V AC-DC 40-60 CYCLES UNLESS OTHERWISE SPECIFIED

- 1514 antenna coil .75
- 1515 obtillator coil .45
- 1516 dual tuned i.f. 1.10
- 1517 second detector i.f. .50
- 2460 comb. electrolytic 1.50
- 2453 2 gang var. cond. 2.00
- 3454 comb. vol. cont. 1.00
- 4087 cabinet-walnut 3.50
- 6109 dial scale .50
- 6110 dial crystal .30
- 7243 speaker 4.50
- 8542 pilot lamp .10
- 8876A pilot lamp socket .25
- 8877 knob .15
- 9977 drive drum .30
- 9978 drive spring .15
- 9981 pointer .30



CONNECTIONS FOR ISSUES OF MODELS 538 and 538LW using 25X66T Rectifier.

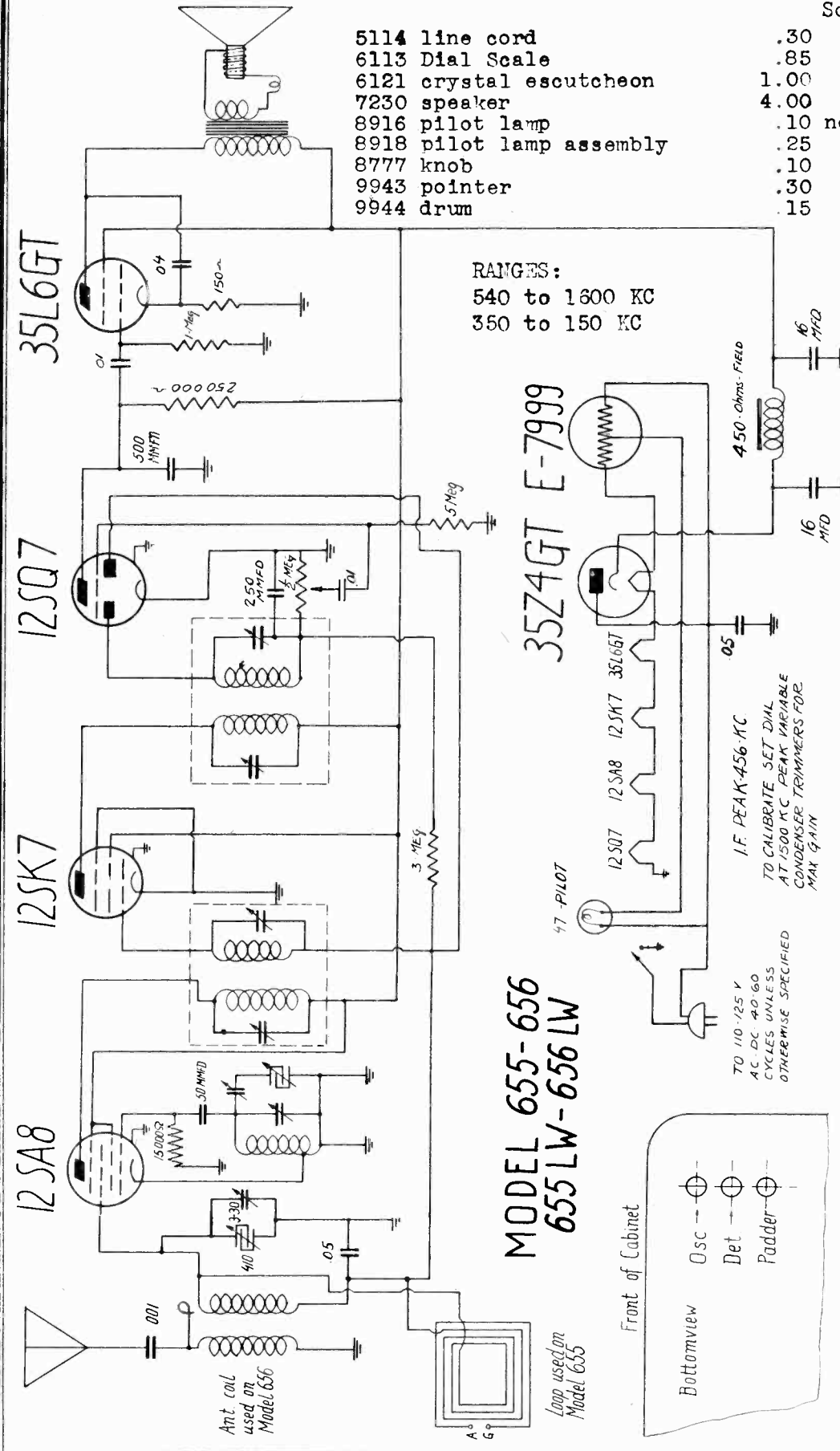
TO 110-125 V AC-DC 40-60 CYCLES UNLESS OTHERWISE SPECIFIED

These models are five tube superheterodyne receivers with full automatic volume control. The range coverage of the model 538 is 1800 l.c. to 540 k.c. The model 538 L.W. has a long wave band added (150 k.c.-410 k.c.) They have been designed to operate on 105-125 volts, 40-60 cycles AC or DC unless otherwise specified.

DEWALD RADIO MFG. CORP.

MODELS 655, 655LW,
656, 656LW
Schematic, Alignment

- 5114 line cord .30
- 6113 Dial Scale .85
- 6121 crystal escutcheon 1.00
- 7230 speaker 4.00
- 8916 pilot lamp .50
- 8918 pilot lamp assembly 1.50
- 8777 knob .65
- 9943 pointer 2.00
- 9944 drum 1.50
- net 1.75
- 5.25

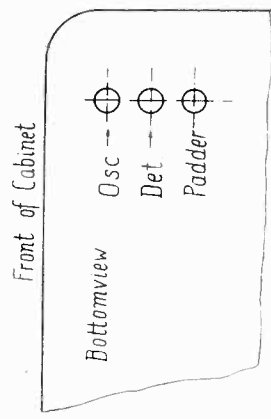


RANGES:
540 to 1600 KC
350 to 150 KC

MODEL 655-656
655 LW-656 LW

TO CALIBRATE RECEIVER

Adjust the signal generator at 456 K.C. and peak the I.F. trimmers for maximum signal. Connect the "hot" lead from the signal generator to antenna of receiver and ground to ground of receiver. Adjust the generator and receiver to 1500 K.C. and peak the trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the padder for maximum signal. The model 655 should have the back attached to the cabinet when peaking 1500 K.C. and 600 K.C. The trimmers and padder on these models are shown in a sketch on the wiring diagram.

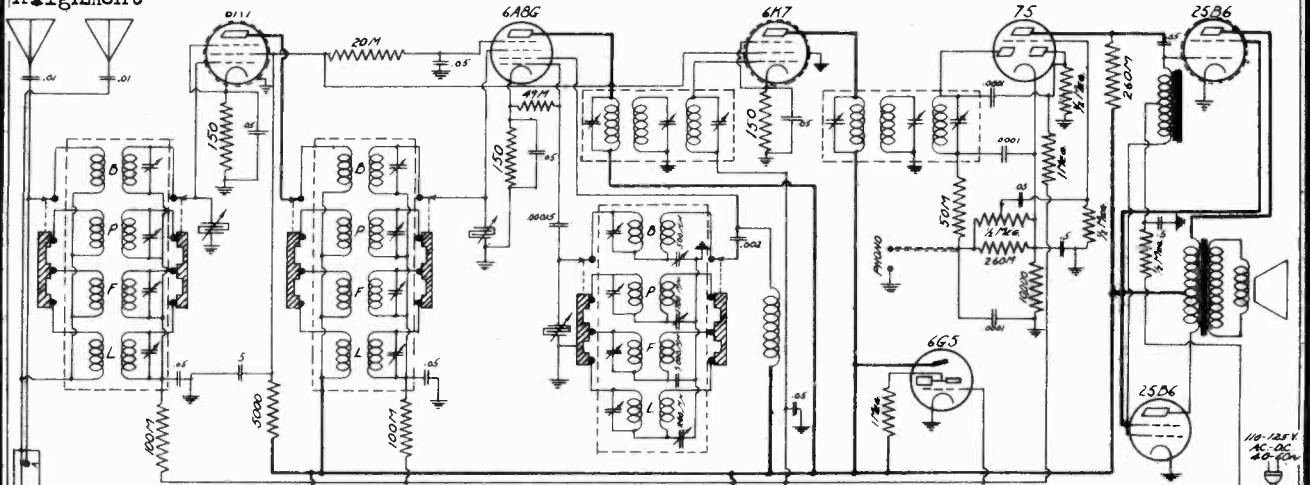


- 1520 osc. coil
- 1521 ant. loop
- 1531 dual tuned I.F.
- 1532 ant. coil
- 2443A 2 gang var. cond.
- 2460 comb. elect
- 2466 trimmer assembly
- 3439 comb. vol cont.
- cabinet

MODEL 1102-3
Schematic, Socket, Trimmers
Alignment

DEWALD RADIO MFG. CORP.

MODEL Radio-Phono Combin.
Schematic, Alignment



PHONO (MODEL 1102 ONLY)
IF PEAK 456 KC

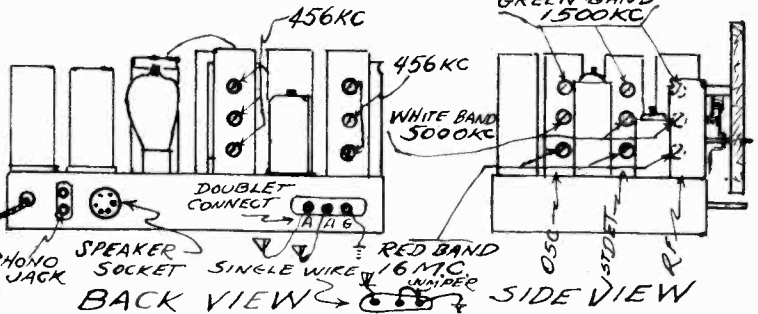
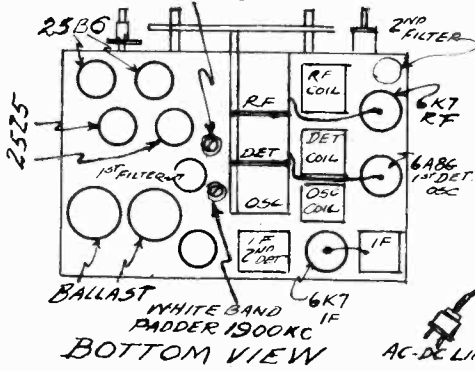
MODEL 1102-3

GREEN BAND PADDER 600KC

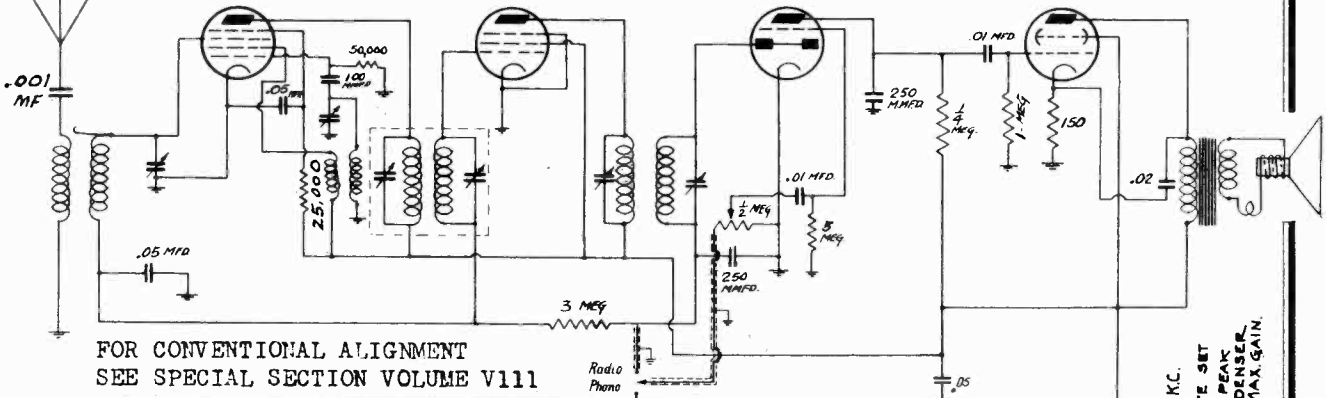
MODEL 1102 "L" BAND OMITTED

GREEN BAND - B.C. - 540-1800KC
WHITE BAND - INT. - 1600-5500KC
RED BAND - S.W. - 5.4-18.8MC
BLUE BAND - L.W. - 140-400KC

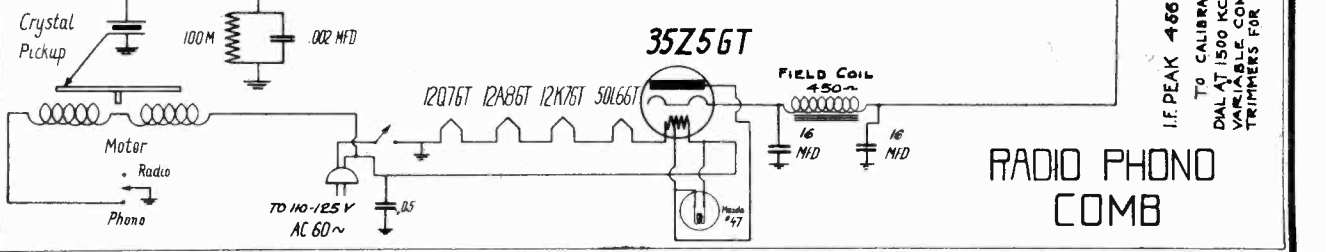
NOTE: BLUE (L.W.) BAND ON MODEL 1103 ONLY AUGN COIL TRIMMERS AT 375KC PADDER AT 160KC



12A 8GT 12K 7GT 12Q 7GT 50 L6GT



FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME V111



RADIO PHONO COMB

IF PEAK 456 KC.
TO CALIBRATE SET DAL AT 1500 KC PEAK VARIABLE CONDENSER TRIMMERS FOR MAX GAIN.

ALLEN B. DUMONT LABS., INC. MODELS 180,181,182,183

Circuit Data, Controls Trouble Chart

GENERAL FEATURES

These receivers are classed as "Electrostatic and Direct Vision." Electrostatic indicates that the entire deflection system is electrostatic and since the picture is viewed direct, without the use of a mirror, lens or other device, it is referred to as Direct Vision. The latter ensures clarity, brilliance and the widest angle of vision. Steady, clear cut, black and white pictures that are large enough for all the family to enjoy at one time are secured by the use of a fourteen inch cathode-ray tube which furnishes a picture eight by ten inches. A separate high fidelity section brings superb reproduction of the sound channel which is associated with the picture. A single control tunes both the sight and the sound channels so the receiver is no more difficult to operate than an ordinary broadcast receiver. To the above features add its compact size, minimum number of controls and simple straight forward layout and you will have an idea of the first commercial television receiver which we believe you will find easy to install and service in spite of the apparent complexity of the subject Television.

CIRCUIT ARRANGEMENT

A simple straight line layout is used in these receivers that should prove extremely helpful to the serviceman. Viewed from the front the video receiver is on the left side of the chassis and the sound receiver is on the right. Fig. No. 1 shows the front controls and the sound receiver while Fig. No. 2 shows the rear adjustments and the video receiver. The top portion of the chassis contains both sweep circuits along with the modulating circuits of the cathode-ray tube. To prevent confusion each side is considered separately, half appearing in Fig. No. 1 and the remainder in Fig. No. 2. The seven auxiliary controls shown in Fig. No. 2 are provided for the use of the installer and serviceman. These controls are necessary to make the final alignment of picture size and positioning when the receiver is installed under the operating conditions imposed by the earth's magnetic field and the power supply line voltages. Once properly set these controls do not need adjustment and since they were not provided for the owner's use we suggest that the dealer or serviceman seal the back of the cabinet as it is not possible to tamper with the controls when the back is in place. The use of the parts and tubes shown in Fig. No. 1 and Fig. No. 2 can be checked by comparing the "V" numbers, etc., with the schematic drawings.

Operating Controls of the Receiver (Front)

First, become familiar with the controls on the front of the receiver. Since the receiver has been tested before shipment, probably only a few minor adjustments will be necessary. Therefore before touching the adjustments in the rear attempt to operate the set according to the instruction sheet supplied the purchaser and make only the adjustments required. These instructions are repeated here to cover the possible loss of this sheet. Figure No. 1 shows the front of the receiver with the controls numbered and the use and the purpose of these controls is as follows.

1. Marked CONTRAST, ON and OFF

This is a power switch for starting and stopping a set. It also is the volume control of the picture signal. It should be adjusted in conjunction with the intensity control (No. 4) to produce a picture of pleasing contrast to the user. If the location is such that the signal received is very small, it may be necessary to use the full gain of this control, while in a good location it may have to be retarded considerably. If the picture is not satisfactory the rear controls must be adjusted as covered in a following section.

2. Marked SELECTOR

This control is a four position switch provided for covering four television channels.

3. Marked TUNING

Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and at this point the picture signal will be correctly tuned.

4. Marked INTENSITY

The intensity or brightness of the picture is controlled by this knob. It should be adjusted in conjunction with Control No. 1 to get the best picture. Note: It is a good plan to retard (turn to the left) this control when starting the set. If about 15 seconds is allowed to elapse before advancing this control it will prevent a small bright spot from appearing on the screen which might eventually darken the screen.

5. Marked FOCUS

This control is used to sharpen the individual lines of the pattern and once set seldom requires further adjustment.

6. Marked VOLUME

This volume control adjusts the audio volume and has no effect whatever upon the picture.

Rear Controls of the Receiver

As previously stated, the adjustment of these controls is necessary for the final alignment of picture size and positioning, as the earth's magnetic field and power supply line voltages vary with locations. The location of these controls is shown in Figure No. 2 and their use will be covered in numerical order. Proceed as follows: remove the wood screws holding in the back of the cabinet and pull out the back. The safety switch will open, turning the set off and since it is necessary to have the set in operation while making these adjustments the switch can be made temporarily inoperative. (A large battery clip is convenient for this purpose.) Do not reach into the set with the voltages on. (See Cautions and Warning.) There is one adjustment that cannot be made by these controls, that

of rotating the Cathode-ray tube to cause the picture to properly line up with the viewing opening. To remedy this, turn the set off, remove the elastic band that grips the rear support and rotate the tube by hand in the correct direction.

The function of the seven rear controls are as follows:

1. Vertical Frequency Control

This controls the frequency of the vertical sweep. If the picture is not steady and slips past at intervals, vertically, this control should be adjusted until a steady picture is secured.

2. Vertical Size Control

If the picture is too narrow and out of proportion vertically this control will remedy the trouble.

3. Vertical Positioning Control

As its name indicates, this control will move the pattern vertically, allowing the picture to be placed directly in the center of the opening.

4. Astigmatic Positioning Control

This is adjusted in conjunction with Control No. 5 to give the best possible focus on the corners of the picture.

5. Horizontal Positioning Control

This control positions the picture horizontally.

6. Horizontal Size Control

The width of the picture is adjusted by this control.

7. Horizontal Frequency Control

If no picture can be secured but modulation (dark and light spaces) can be seen on the screen, the setting of the horizontal frequency control is probably incorrect. Adjust this control until the picture forms.

With the adjustment of these controls the installation should be satisfactory. However, if the signal is weak or if ghosts or noise is present, return to the dipole antenna and make changes as previously suggested until the best position for it is secured.

LOCATION OF TROUBLE

FAULT

POSSIBLE CAUSES

No picture.

1. Power supply trouble in any or all three sources.
2. Too much bias on modulator electrode.
3. Defective cathode-ray tube.

No scanning.

1. Trouble in 1500 volt power source.
2. Poor connections to deflection plates.
3. Defective scanning circuits.
4. Defective cathode-ray tube.

No modulation.

1. Defective or shorted antenna.
2. Defect in video receiver.
3. Too much bias on modulator electrode.
4. Defective cathode-ray tube.

Poor focus.

1. Improper voltages supplied cathode-ray tube. (check entire divider circuit)
2. Defective video receiver.
3. Poor adjustments.
4. Defective cathode-ray tube.

Uneven brilliance.

1. Hum from power source.
2. Defective scanning circuits.
3. Scanning picked up by modulator circuits.
4. Screen burnt or discolored.

Distorted picture.

1. Poor synchronizing (circuit or adjustment).
2. Overloading (contrast control advanced too far)
3. Defective video receiver.
4. A.C. hum.
5. External interference.

Unsteady picture or flickers.

1. Poor synchronizing action.
2. Leakage.
3. Varying voltages to cathode-ray tube or receiver.
4. Unsteady receiver.
5. Antenna loose or shorting.

Double image.

1. Scanning circuits incorrectly adjusted.
2. Ghost images due to reflection of signals.

Cathode-ray tube controls effect the picture and scanning.

1. Cathode-ray tube defective, probably leaking and going soft.

Superimposed pattern on the picture.

1. Oscillation probably in the receiver.

Streaks across picture.

1. Usually local interference such as ignition or diathermy.

MODELS 180, 181, 182, 183

Chassis Views

ALLEN B. DUMONT LABS., INC.

- CONTROLS**
- Operating Controls 6
 - Adjustment Controls 7
- Types 181, 182, 183
These receivers have the same operating controls as the type 180 and therefore will not be covered separately.
- MECHANICAL SPECIFICATIONS**
- Cabinet Dimensions
- Height 24 inches
 - Width 15 3/4 inches
 - Depth 25 inches
- Chassis Dimensions
- Height 20 3/4 inches
 - Width 13 1/4 inches
 - Depth 24 1/4 inches

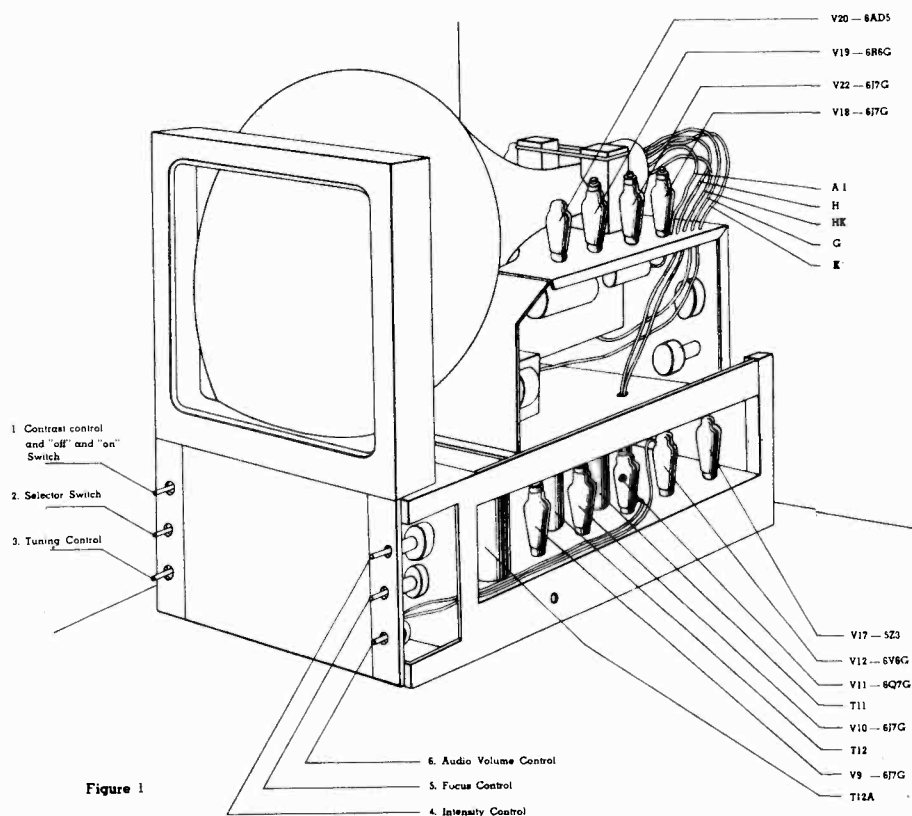


Figure 1

TUBE COMPLEMENT

Type	Purpose
1853	R.F. Amplifier
6J5M	R.F. Oscillator
1852	First Detector
1853	1st Video I.F. Amplifier
1852	2nd Video I.F. Amplifier
6H6M	Video 2nd Detector
1851	1st Video Amplifier
6V6G	Video Power Amplifier
6J7G	1st Sound I.F. Amplifier
6J7G	2nd Sound I.F. Amplifier
6Q7G	Sound 2nd Detector and Amplifier
6V6G	Sound Power Amplifier
6J7G	Horizontal Synch Separator
6AD5G	Horizontal Sweep Oscillator
6R6G	Horizontal Sweep Amplifier
6J7G	Vertical Synch Separator
6AD5G	Vertical Sweep Oscillator
6R6G	Vertical Sweep Amplifier
2Y2	4100 Volt Rectifier
5X3	1600 Volt Rectifier
5Z3	350 Volt Rectifier
114-9-T	Cathode-ray Tube (14")

Frequency Ranges — Four Television Channels provided, present alignment as follows:

STEP	STATION	SIDE BAND	AUDIO CARRIER	VIDEO CARRIER
A	NBC	Single	49.75	45.25
B	CBS	Single	55.75	51.25
C				
D	NBC	Double	49.75	46.5

Twenty-two Tube, A.C. Superhetrodyne, Television Receiver

- Vertical Frequency Control
- Horizontal Frequency Control
- Vertical Position Control
- Horizontal Position Control
- Vertical Size Control
- Asymetric Position Control
- Horizontal Size Control

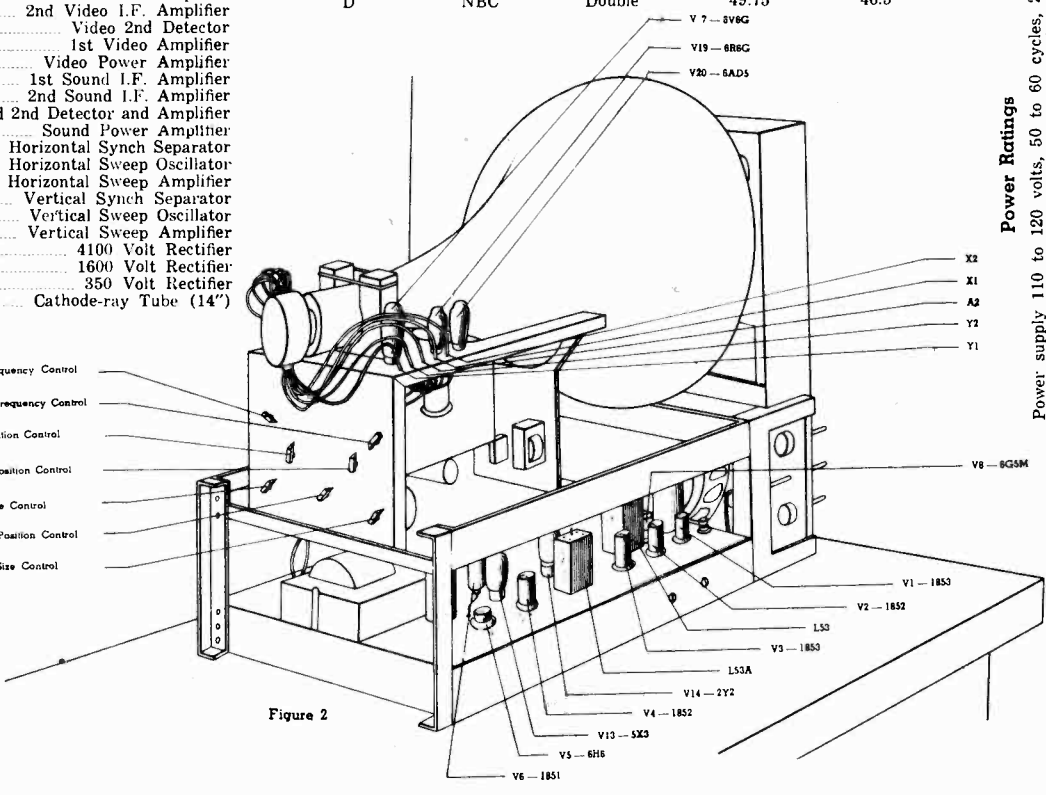


Figure 2

Power Ratings
Power supply 110 to 120 volts, 50 to 60 cycles, 250 watts.
Audio output, maximum 4.25 watts.

ALLEN B. DUMONT LABS., INC.

MODELS 180, 181,
182, 183

Video and A-F
Receivers
Schematic
Early Production

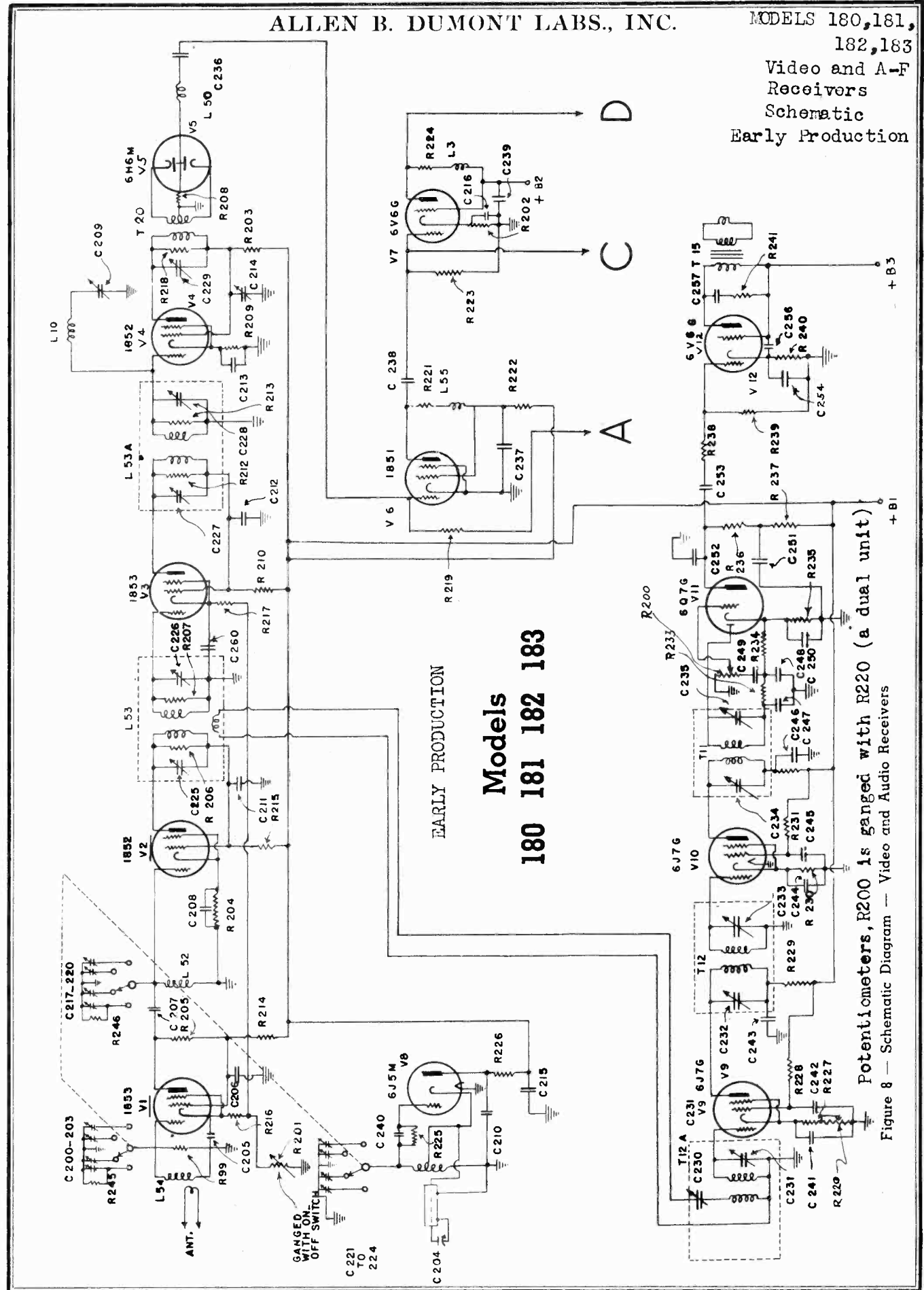


Figure 8 — Schematic Diagram — Video and Audio Receivers

MODELS 180,181,182,183

Separator and Sweep
Voltage Divider

Schematics, Notes

ALLEN B. DUMONT LABS., INC.

Early Production

EARLY PRODUCTION

Models

180 181 182 183

It is better to shut the set completely off between adjustments than to suffer a painful or even a dangerous burn. The set is equipped with a safety switch which automatically opens upon the removal of the back of the cabinet. This protects the operator from dangerous high voltages which would otherwise be exposed.

The high voltages that are necessary in this type of equipment are very dangerous and should not be approached in a careless manner.

The serviceman that is engaged in installing or servicing television receivers is urged to take all precautions and run no unnecessary risks.

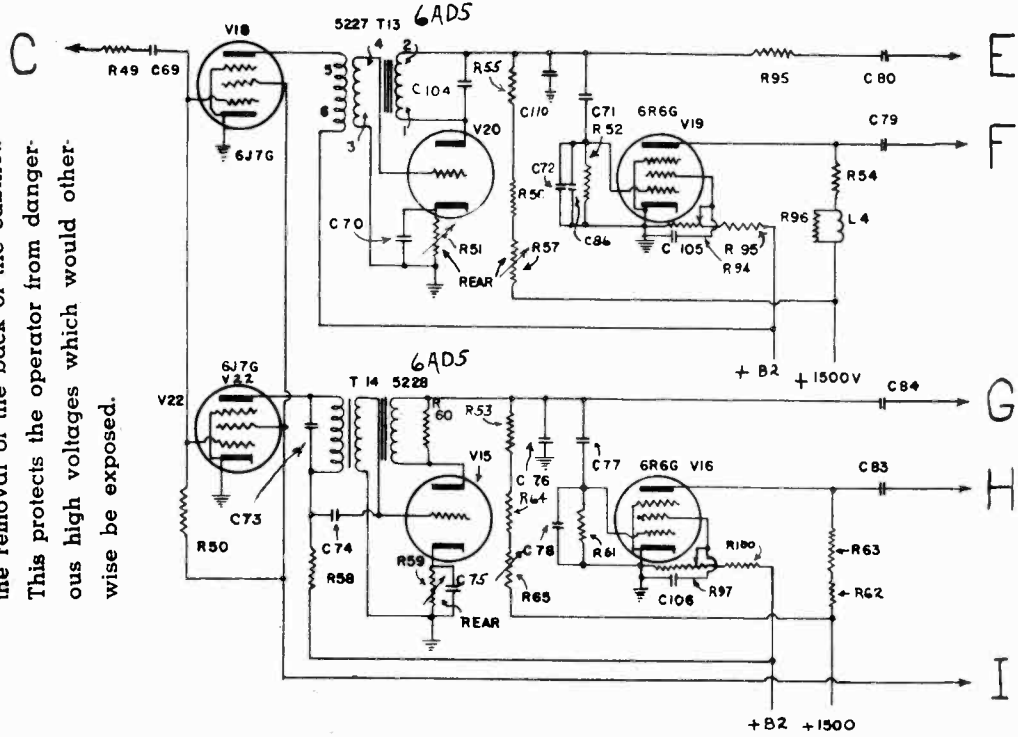


Figure 5 — Schematic Diagram, Separator and Sweep Circuits

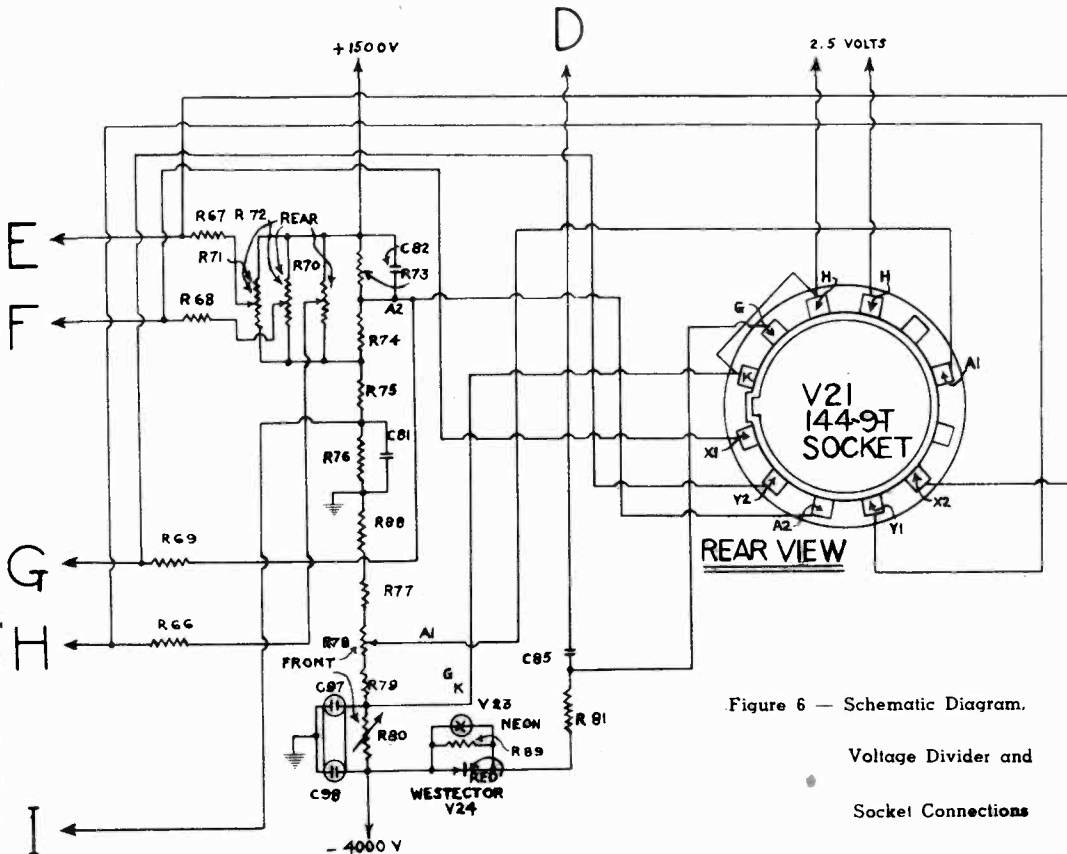


Figure 6 — Schematic Diagram.
Voltage Divider and
Socket Connections

ALLEN B. DUMONT LABS., INC.

MODELS 180,181,182,183
S.P.U. Schematic
Voltage, Notes

CAUTION AND WARNING

Large cathode-ray tubes operate at high voltages and hence are evacuated to a very high degree of vacuum. Therefore the atmospheric pressure on the glass can run into tons depending on the size of the tube. A collapse therefore is as bad as an explosion and all cathode-ray tubes should be handled with care. The Du Mont Laboratories have gone to great expense to provide a cathode-ray tube that is safe for the home and the structural design results in its ability to stand tests nearly twice as severe as usually employed. The serviceman, however, should observe the following rules as he will probably be the only one to handle the average tube.

1. Be careful in handling the tube.
2. Watch the use of tools near the tube.
3. Don't scratch the surface of the glass.
4. Don't stand the tube on a metal surface or in any other way cause certain parts to be quickly heated or cooled.

TERMINAL VOLTAGES

Using Weston Model 772 20,000 Ohms per Voltmeter
(with Televerter)

Tube	Plate	Screen	Grid (Control)	Notes
V9	240	150	- 4.3	Cathode to ground.
V10	240	155	- 4.3	
V11	190	- 2.2	
V12	275	290	-11.5	
V8	115	Contrast on full.
V1	140	190	- 2.	
V2	190	190	- 3.5	
V3	180	180	- 2.25	
V4	170	170	- 2.25	
V6	170	185	- 2.0	
of V6. Should read -4 volts at center tap of 5Z3 high voltage winding to ground.				
V7	140	225	- 7.5	

V17 5Z3 filament to ground = 310 volts
 V13 5X3 filament to ground = 1600 volts
 (output after L7 = 1550)
 V14 2Y2 output = 3950 to 4200 (ground is positive)
 (output after R83 = 3800 to 4100 volts)
 The above measurements were taken with respect to ground, the following are point to point.
 V21 From cathode to grid -60 to -160
 From cathode to first anode +800 to +1600
 From cathode to second anode +5000

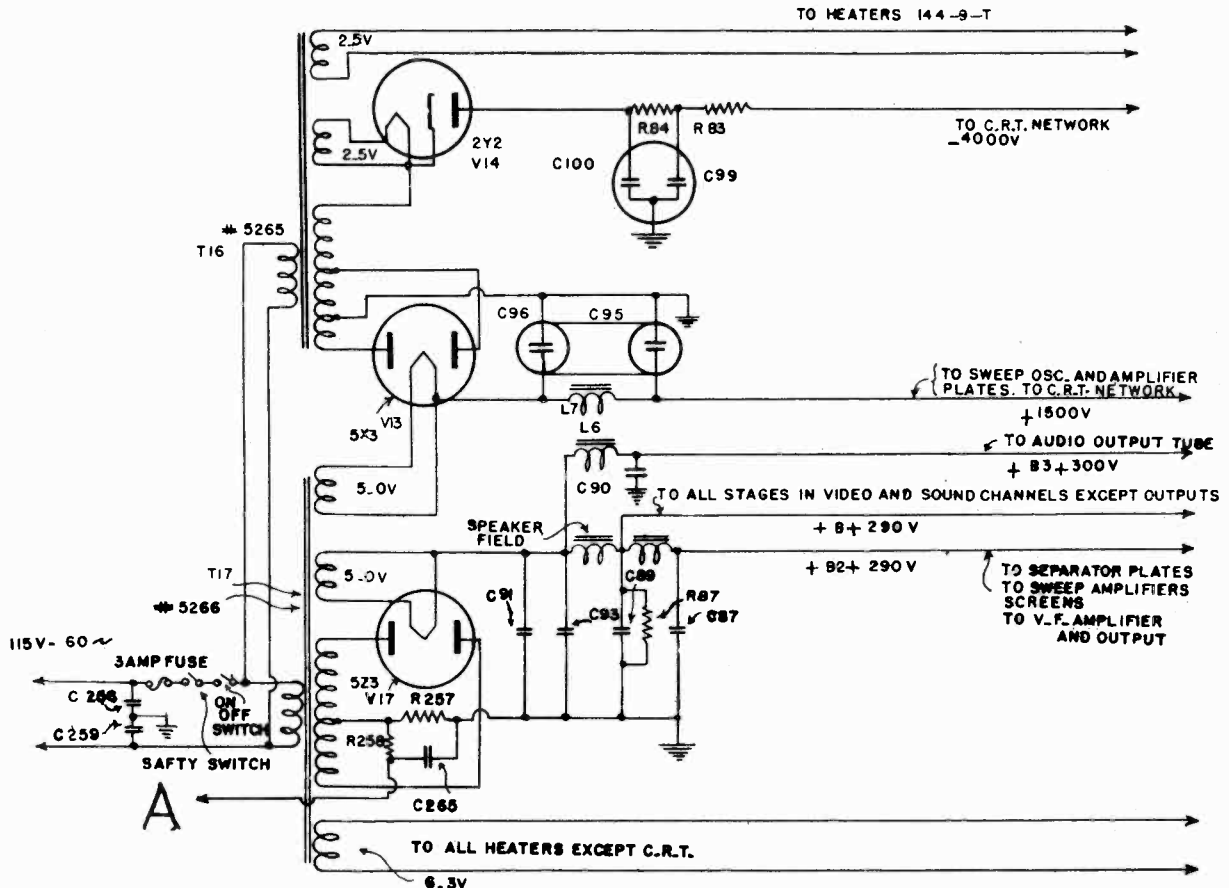


Figure 7 — Schematic Diagram. Power Supplies

RESISTOR VALUES

EARLY PRODUCTION

CONDENSER VALUES

R	Ohms	Watt	RESISTOR VALUES		EARLY PRODUCTION		CONDENSER VALUES		Volts				
			Class	R	Ohms	Watt Class	C.	Mfd.		C.	Mfd.		
49	10,000	1/2	R	200	500,000	pot	S	69	.1	400	214	.01	400
50	10 meg	1/2	R	201	2,000	pot	R	70	.05	400	215	.01	400
51	6,000	pot	W	202	150	1/2	R	71	.000075	1500	216	.001	400
52	1 meg	1/2	R	203	5,000	1	R	72	.0025	400	217	3-30	trimmer
53	200,000	2	S	204	400	1/2	R	73	.0025	400	218	3-30	trimmer
54	80,000	20	W	205	3,000	1/2	R	74	.005	500	219	3-30	trimmer
55	100,000	2	S	206	3,000	1/2	R	75	.25	50	220	3-30	trimmer
56	100,000	2	S	207	3,000	1/2	R	76	.04	1600	221	3-30	trimmer
57	500,000	pot	S	208	3,000	1/2	R	77	.0005	1500	222	3-30	trimmer
58	15,000	1/2	R	209	150	1/2	R	78	.25	400	223	3-30	trimmer
59	6,000	pot	W	210	5,000	1	R	79	.01	1200	224	3-30	trimmer
60	50,000	1/2	R	212	3,000	1/2	R	80	.04	1600	225	L53	
61	25 meg	1	R	213	3,000	1/2	R	81	.1	400	226	L53	
62	1.5 meg	1	R	214	5,000	1	R	82	.25	600	227	L53A	
63	1.5 meg	1	R	215	5,000	1	R	83	.1	1000	228	L53A	
64	200,000	2	S	216	150	1/2	R	84	.1	1000	229	T-20	
65	1 meg	pot	S	217	150	1/2	R	85	.05	4500	230	T12A	
66	5 meg	1/2	R	218	5,000	1/2	R	86	.0005	400	231	T12A	
67	5 meg	1/2	R	219	1 meg	1/2	R	87	16.	450	232	T12	
68	5 meg	1/2	R	220	100,000	pot	S	88	8.	450	233	T12	
69	5 meg	1/2	R	221	1,500	1	R	89	8.	450	234	T11	
70	2 meg	pot	R	222	5,000	1	R	90	16.	450	235	T11	
71	2 meg	pot	R	223	1 meg	1/2	R	91	16.	450	236	.04	400
72	2 meg	pot	R	224	1,000	2	R	92	4.	1500	237	8.	450
73	300,000	1/2	R	225	25,000	1/2	R	93	4.	1500	238	.04	400
74	300,000	1/2	R	226	25,000	1/2	R	94	2.	4000	239	.01	400
75	750,000	2	R	227	400	1/2	R	95	2.	4000	240	.000050	400
76	15,000	1/2	R	228	100,000	1/2	R	96	2.	4000	241	.02	400
77	1 meg	2	S	229	4,000	1/2	R	97	.0003	4000	242	.10	400
78	1 meg	pot	S	230	1,000	1/2	R	98	.02	400	243	.25	400
79	750,000	2	R	231	100,000	1/2	R	99	25.	50	244	.02	400
80	100,000	pot	R	232	4,000	1/2	R	100	.0002	1500	245	.10	400
81	10,000	1/2	R	233	50,000	1/2	R	101	3-30 mmf.	trimmer	246	.25	400
82	35,000	10	W	234	1.5 meg	1/2	R	102	3-30 mmf.	trimmer	247	.0002	400
83	100,000	1	R	235	2,000	1/2	R	103	3-30 mmf.	trimmer	248	.000050	400
84	100,000	2	R	236	50,000	1/2	R	104	3-30 mmf.	trimmer	249	.01	400
87	100,000	1	R	237	10,000	1/2	R	105	3-5	variable	250	25.	25
88	1 meg	2	S	238	50,000	1/2	R	106	.0006	400	251	4.	450
89	1 meg	1/2	R	239	250,000	1/2	R	205	.0006	400	252	.0006	400
90	50,000	1/2	R	240	160	1	R	206	.0006	400	253	.1	400
94	250,000	pot	S	241	10,000	1	R	207	.0006	400	254	50.	25
95	40,000	1/2	R	245	10,000	1/2	R	208	.01	400	255	.0005	400
96	50,000	1/2	R	246	10,000	1/2	R	209	3-30 mmf.	trimmer	256	.01	400
97	50,000	pot	R	257	20	1	R	210	.0006	400	257	.01	400
99	3,000	1/2	R	258	500,000	1/2	R	211	.01	400	258	.0006	400
100	200,000	1/2	R					212	.01	400	259	.01	400
								213	.01	400	265	25	25

SERVICE

While the technique employed in servicing television receivers is similar to ordinary radio practice, there is a greater need for basic knowledge and the time will be well spent that is used to study the fundamental principles of television before attempting actual service work. For obvious reasons it will be impossible to include fundamental theory in this manual, however, since very little data concerning the form of sweeps used in these receivers is available, the following description may be helpful.

Fig. 5 is a schematic diagram showing the sweep generator, the sawtooth generator, and synchronizing circuit. The two 6J7C tubes (V18 & V22) function as the synchronizing signal separators. The outputs of the two plates are fed their respective synchronizing windings of the horizontal and vertical oscillation transformers. Linear sawtooth deflection is effected using a 6AD5G triode as an oscillator and a 6R6G pentode as an amplifier. Oscillations are generated as follows: Let us consider first the low frequency vertical circuit. Condenser C76 is charged from the power supply through the resistor consisting of R64 R65 and R66. R65 functions mainly as an amplitude or size control, although it has some effect upon the frequency of operation. Condenser C76 charges to practically full power supply potential. As a result of previous oscillations, a charge on condenser C75 is held on the cathode which gradually decreases to zero through R59 as C76 is charging. This charge on C75 is high enough to hold the beam at about the grid potential at the D.C. ground potential as the cathode approaches ground potential due to the discharge of C75 the 6AD5G triode becomes conducting. As plate current flows C76 is discharged producing the return trace of the sawtooth. The surge of plate current through the winding of the oscillation transformer induces a voltage in the grid winding, of proper polarity to drive the grid more positive, thereby reducing the plate circuit impedance and therefore the return trace time. At the same time that C76 is discharging, C75 is charging to its initial value to cut off the flow of plate current. As this action takes place, the plate current surge decreases, thereby applying less positive voltage to the grid and increasing its cutoff action. Ultimately, the tube is completely cut off, the charging cycle again begins. Resistance in the charging cycle again begins. Resistance in the frequency control since it determines the breakdown potential and the frequency of recurrence of the oscillations in the plate circuit of the triode. Synchronizing pulses are injected through the grid of the oscillator tube through the winding of the oscillator transformer. These synchronizing pulses are polarized so that they drive the grid in a positive

direction with respect to the cathode and therefore hasten the "breaking down" of the oscillator tube and effect synchronization. Since condenser C76 is charged to nearly full power supply voltage, the signal which is taken from the plate circuit of the triode is extremely non-linear. It is applied, however, to one plate of the deflecting pair in the cathode-ray tube. At the same time it is divided by a capacity-resistance network and is applied to the grid of the 6R6G pentode. This triode section is so operated that its output is distorted in a manner opposite to that distortion introduced by the non-linear operation of the oscillator triode. The output of the 6R6G is applied to the other deflection plate of the pair and the deflection from this signal is such that the resultant deflection is linear.

Since the high frequency or horizontal sweep operates in the same manner, it will be unnecessary to repeat the above description. The horizontal circuit is, however, a little more critical than the vertical and it is absolutely essential to keep the stray circuit capacities of the horizontal oscillator and amplifier at a minimum in order to keep the return trace time at a minimum. Therefore, if repairs are ever necessary on this circuit care must be taken not to increase the capacity of the circuit.

In Fig. 6 the use of a copper oxide rectifier and neon lamp can be explained as follows. The D.C. component necessary for the background level, is introduced by the action of the copper oxide (Westector) V24. The neon lamp V23 is provided to protect the rectifier from high voltage surges when the equipment is first turned on.

Assuming that the controls are properly set and handled, the first step will be to determine the location of the trouble and isolate the defective portion. In this you will be aided by the design of the receiver, for sections are separated by means of the various sections are separately boxed out, while by no means complete, will serve to point out possible causes and location.

While no fast rule can be laid down, once the section failing has been decided on it will generally be found that a systematic check correctly interpreted will locate the fault. A voltage check of the suspected circuit along with the checking of the tubes employed will probably be the next step. Then, if the voltages are correct and a cathode-ray oscillograph is available it can be used to trace the source of the trouble.

It is quite probable that the majority of service problems will fall within this range in spite of this limitation, as the correct adjustment of the regular control knobs along with the replacement of tubes and parts will provide the answer to nearly all troubles.

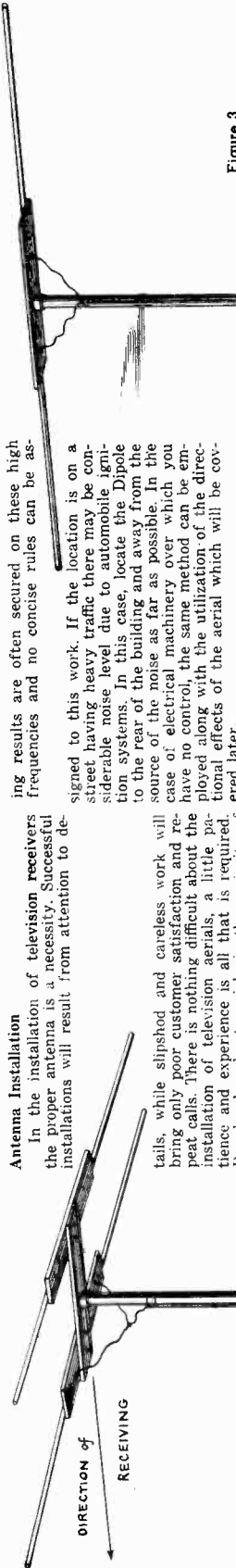


Figure 3
Simple Dipole Antenna

ing results are often secured on these high frequencies and no concise rules can be assigned to this work. If the location is on a street having heavy traffic there may be considerable noise level due to automobile ignition systems. In this case, locate the Dipole to the rear of the building and away from the source of the noise as far as possible. In the case of electrical machinery over which you have no control, the same method can be employed along with the utilization of the directional effects of the aerial which will be covered later.

Room Illumination

Whenever possible the receiver should be so placed in the home that a direct glare from either natural or artificial light does not fall upon the face of the cathode-ray tube. The received pictures may be viewed under a variety of conditions where it is not always convenient to darken the room completely. Adjustments made to meet these conditions will not cause damage to the receiver. Viewing the pictures in a dark room as possible is always at an advantage as it permits the setting of the Intensity and Contrast controls in a manner that will give picture tone values more correctly relating to those actually used in the studio from which the picture is transmitted.

Installation Process

It is a good plan to proceed as follows with the installation.

1. Erect the Dipole antenna in the clear.
- Start by using horizontal polarization (mount the rods horizontally) and turn them until their plane is at right angles with the location of the transmitter.
2. Adjust the receiver to produce a picture.
3. Return to the antenna and make final adjustments for best signal strength and removal of ghosts, etc.

Ghost Effects

Where the picture appears to be duplicated and slightly displaced, the additional picture is referred to as a ghost. This effect is usually due to the reflection of the signals and can be cured by the slanting or rotating of the Dipole or the use of a reflector or reflectors. If, after all possible positions have been tried, the ghost still exists it will be necessary to change the location of the antenna and try again.

Directional Effects

In the simple Dipole, directional effects are not very pronounced, but it does have a rather sharp no-signal radius and it is possible in some instances to materially reduce interference by placing the offending source in this area. If the installation of the receiver is being made at quite a distance from the transmitter or if the signal level is very low due to local conditions, it is well to consider the use of a reflector. This is done by placing a rod, about ten feet long, parallel with the Dipole and about five feet back of it. The directional effect of the Dipole remains the

Antenna Installation

In the installation of television receivers the proper antenna is a necessity. Successful installations will result from attention to details, while slipshod and careless work will bring only poor customer satisfaction and repeat calls. There is nothing difficult about the installation of television aerials, a little patience and experience is all that is required.

Regular broadcast aerials in the majority of cases will be found useless. Impress this upon the owner and make a satisfactory installation regardless of what other equipment he already has. Satisfactory picture reception is what both of you require for the completion of the installation.

The Dipole Antenna

The Dipole form of aerial is generally satisfactory; it consists of two metal rods, each approximately five feet long and placed on a line with each other. Extreme accuracy in the length of these rods is usually not necessary and if the receiver is located very close to the transmitting station it may be found advisable to cut down the length of each rod. The simple dipole aerial is shown in Fig. No. 3.

The Lead-In

The most popular lead-in from the dipole to the television receiver will be a twisted pair as it is inexpensive and generally satisfactory in locations where the signal is strong. The length of this lead is usually not of extreme importance. It is better to get the Dipole located in the clear and as far from electrical interference as possible than to limit its location by using a theoretical, exact length feeder. The twisted pair should be soldered to the lugs on the Dipole as a good connection is essential and necessary since several changes in the position of the antenna may be required for best results.

The other form of lead-in is the coaxial line such as the Amphnol No. 72. This form of feeder should be used in installations where the length of the lead-in is too long for satisfactory work with the twisted pair and where the installation is at an extreme distance and every bit of energy picked up must be delivered to the receiver.

Polarization

If the dipole is mounted horizontally it is said to be horizontally polarized, and if vertically it is vertically polarized. Since the physical location materially affects the aerial no specific form can be advised and we can merely suggest that you start by using horizontal polarization and change if necessary to produce the best results.

Location of the Antenna

Whenever possible the Dipole should be erected so that it is in line of sight with the transmitter. This does not mean that no signals can be secured where a direct view of the transmitter cannot be obtained. Surpris-

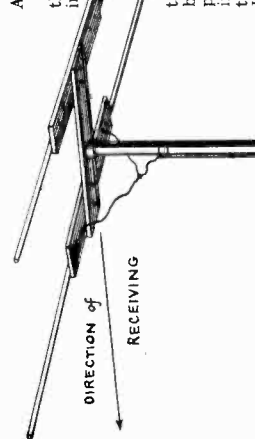
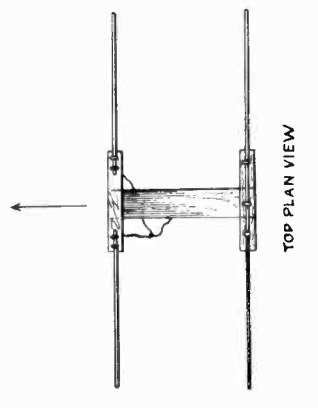
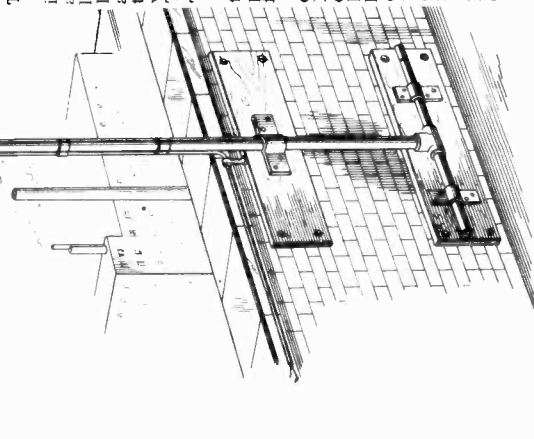


Figure 4
Dipole Antenna with Reflector

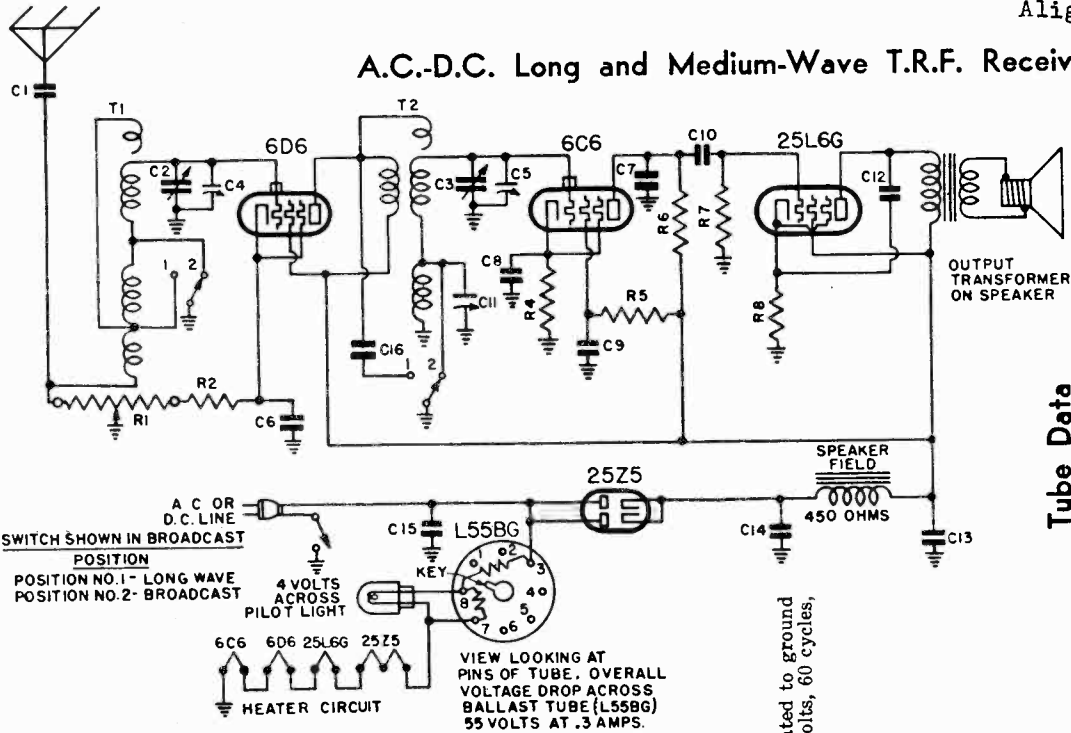


same, namely at right angles to the plane. Signals coming from the front will be greatly increased. In using reflectors it is well to bear in mind, however, that any signal approaching from the rear (where the reflector is located) will be greatly attenuated. Fig. No. 4 shows the reflector added to the simple Dipole.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CD206, CD215
Chassis CD
Schematic, Voltage
Alignment, Parts

A.C.-D.C. Long and Medium-Wave T.R.F. Receiver



Voltage rating 105 to 125 volts
Power consumption .. 45 watts
Frequency range 535 to 1650 kc
366 to 143 kc

MODEL CD-206
CD-215
CHASSIS MODEL CD

*Item	Part No.	DESCRIPTION	PRICE
T1	3TT-409	Two-band antenna coil	.65
T2	3TT-410	Two-band detector coil	.65
R1	3VR-219E	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	KR-56U	500,000 ohm, 1/4 watt carbon resistor	.16
R7	3QR-297	110 ohm, 1/2 watt wire-wound resistor	.16
C1	KC-58	0.01 mf. 400 volt tubular condenser	.20
C2	5MC-399	Two-gang variable condenser	3.55
C3		Trimmers, part of variable condenser, not supplied separately.	
C4	AC-6	0.1 mf, 200 volt tubular condenser	.20
C5	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C6	5AC-388	0.25 mf, 100 volt tubular condenser	.20
C7	LC-65	0.02 mf, 400 volt tubular condenser	.15
C8	3AC-278	Trimmer for long-wave interstage coil	.20
C9	LC-64	0.05 mf, 400 volt tubular condenser	.20
C10	4DC-345A	Dual 16 mf, 150 volt dry electrolytic condenser	1.20
C11	ECC-132	0.1 mf, 400 volt tubular condenser	.20
C12	NC-70A	0.0002 mf mica condenser	3.90
C13	5BS-338	5" dynamic speaker	.55
C14	3TS-223A	Wave-band switch	.20
C15	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.10
C16	4XM-367	Drive pulley	.10
	5MZ-829	Dial crystal	.10
	5MZ-830	Drive shaft and pulley	.10
	4MZ-588B	Dial pointer	.20
	4VZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	6DD-63	Dial face	.15

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 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6D6	100	100	2.3	6.3
6C6	20	15	2.1	6.3
25L6G	93	100	6	25.0

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

ALIGNMENT PROCEDURE

An oscillator with frequencies of 1500 kc and 350 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 550. Rotate band-switch clockwise to broadcast (medium-wave) position. Then rotate the variable condenser until the pointer is at 200 and feed 1500 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

Turn wave-band switch counter-clockwise to long-wave position. Rotate variable condenser until pointer is at 350 and feed 350 kc to antenna. Adjust the long-wave interstage coil trimmer for maximum output. Return to broadcast and repeat entire procedure. The long-wave trimmer is located beneath the chassis and is reached from the right end of the chassis.

Tube Data

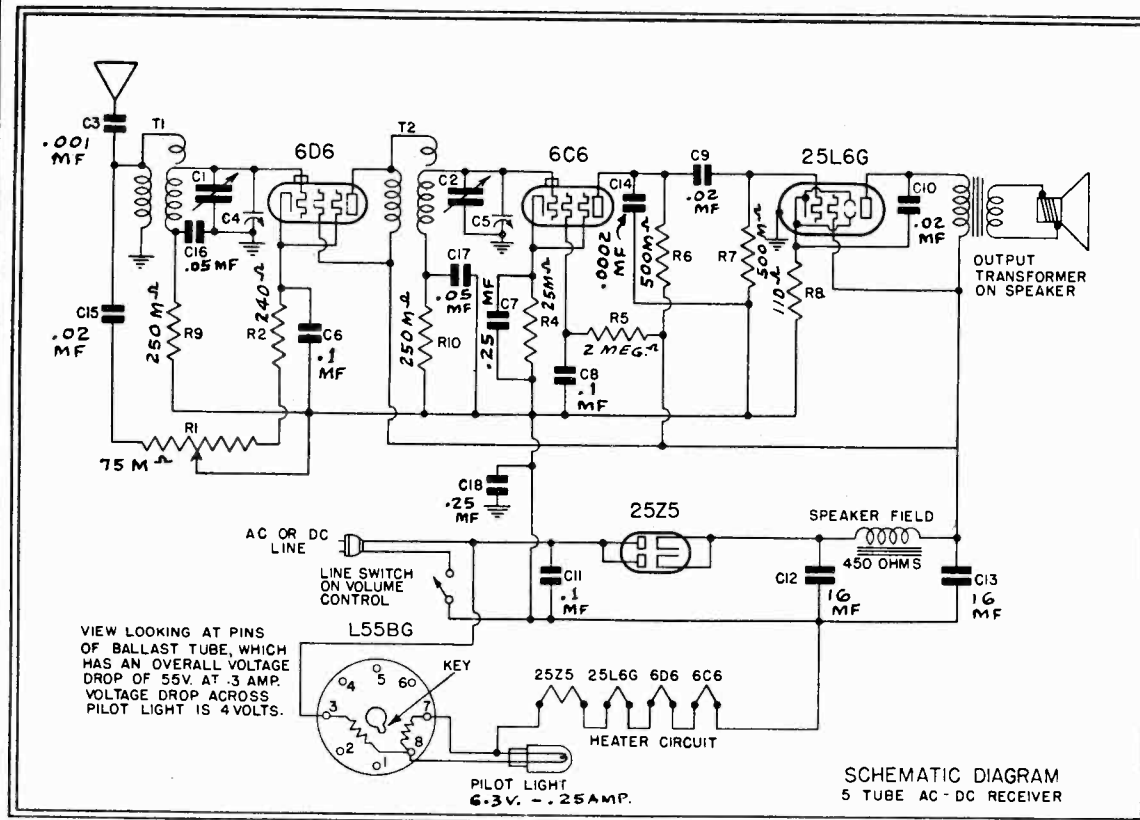
The tube complement is as follows:
1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G beam power output.
1—25Z5, dual half-wave rectifier.
1—L55BG, ballast tube.
Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

When ordering replacement parts specify part number

*Item number locates the article on the schematic diagram. (Subject to change without notice.)

MODELS BX208, BX209
 Chassis BX
 Schematic, Voltage
 Alignment

EMERSON RADIO & PHONOGRAPH CORP.



SCHMATIC DIAGRAM FOR MODELS BX-208 and BX-209

PREADJUSTMENT OF STATION BUTTONS

For complete instruction for "Preadjustment of Station Buttons" see MODEL CA-208

TUBE DATA

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 1730 kc.

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

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 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6D6	100	100	2.3	6.3
6C6	20	15	2.1	6.3
25L6G	93	100	6.0	25.0

Voltage across speaker field—26 volts.

25Z5 cathode to ground—126 volts.

Voltage across ballast tube (pins 3, 7)—55 volts.

Voltage across pilot light section (pins 7, 8)—4 volts.

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

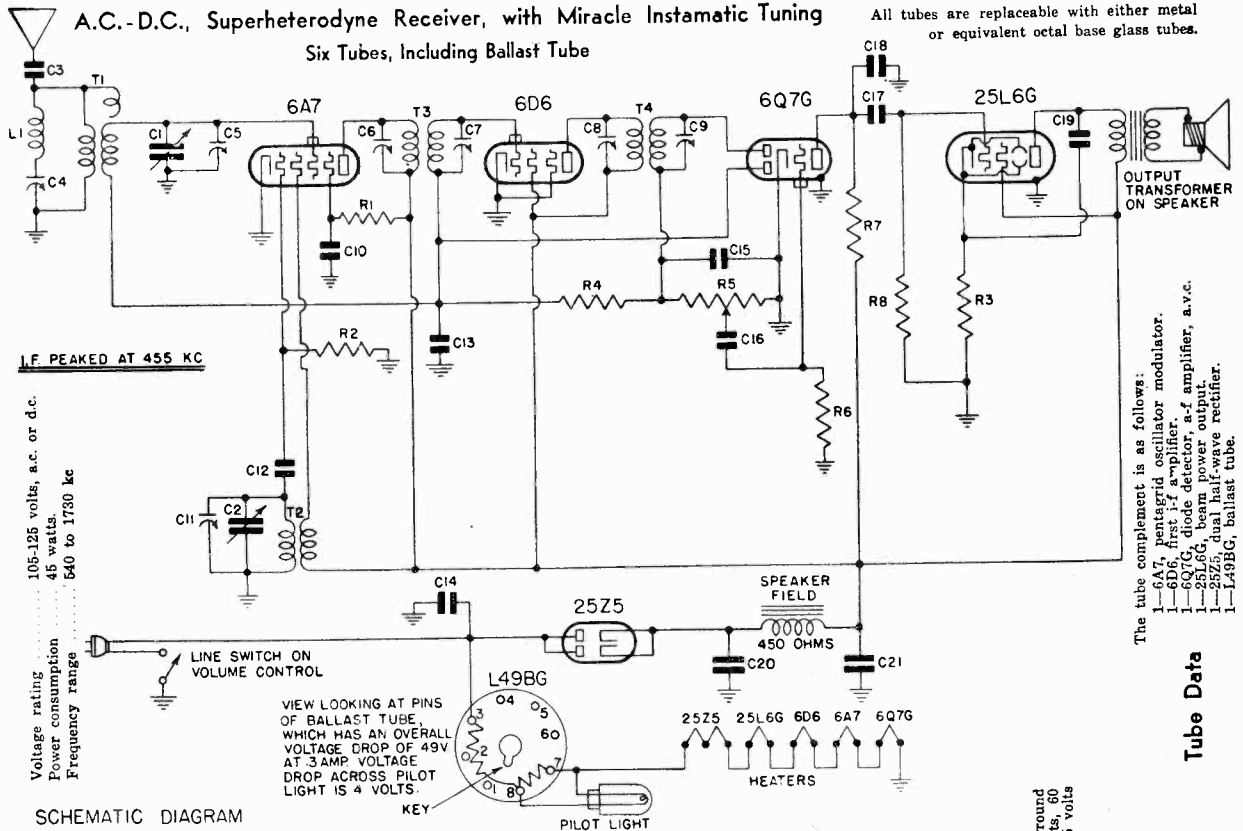
An oscillator with a frequency of 1400 kc is required.

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.

Schematic, Voltage Alignment, Notes EMERSON RADIO & PHONOGRAPH CORP.

MODELS CA208
CA209, CA234
Chassis CA



SCHEMATIC DIAGRAM

MODELS CA-208, CA-209 and CA-234

CHASSIS MODEL CA

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. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
B plus—red.
5. 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.
6. 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.

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 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 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 on the top of the chassis beside the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the side 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 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 for minimum response. (See General Notes, paragraph No. 6.)

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.

Tube Data

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. All readings except cathode and heaters were taken on 250 volt scale. Measurements made with 117.0 volts d.c. will be lower than those given below.

Tube	Screen	Plate	Cathode	Osc. Plate	Fil.
6A7	65	100	0	100	6.3
6D6	100	100	0	100	6.3
6Q7G	43	100	0	100	6.3
25L6G	100	92	5.5	100	28.0

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube L49BG (pins 3, 7)—49 volts.
Voltage drop across pilot light section of ballast tube (pins 7, 8)—4 volts.

MODELS CA208, CA209
CA234 Chassis CA
Tuner Data, Parts

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS

List Price as of
Sept. 15th, 1938
(Subject to change without notice)

When ordering
replacement parts
specify part number

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	5YT-444	Antenna coil with adjustable 455 kc wave-trap	.90
T2	4XT-433	Oscillator coil	.35
T3	3RT-320C	Double-tuned 455 kc first i-f transformer	1.10
T4	3RT-321C	Double-tuned 455 kc second i-f transformer	1.10
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-214F	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
	L49-BG	Ballast resistor tube. (Interchangeable with L-49B)	.55
C1, C2	6AC-407	Two-gang variable condenser	2.35
C3	NNC-199	0.001 mf, 600 volt tubular 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	5AC-384	0.0002 mf, 600 volt tubular or 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-348A	Dual 20 mf, 150 volt dry electrolytic condenser	1.00
	5BS-333	5" dynamic speaker	3.90

.20	Pilot light, 6.3 volt, .25 amp., Mazda No. 44
.70	Dial face
.02	Drive cord
.05	Drive cord spring
.20	Dial pointer
1.25	Escutcheon with crystal
6.15	Four-button mechanical tuning unit (complete with variable condenser)
.05	Push-buttons
.05	Celluloid push-button caps (set of 4)
.65	Station name-tab cards (complete set)

- 4BL-94
- 6AD-59
- 4YZ-772
- 5JZ-824
- 4MZ-588A
- 3CZ-350B
- 6AM-414
- 5BZ-835
- 4VZ-763B
- 4VZ-725

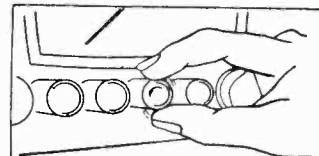


FIG 2 Loosen button by rotating counter-clockwise from 1/4 to 1/2 turn.

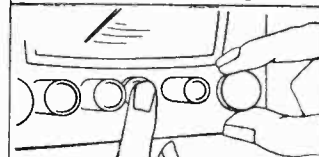


FIG 3 Tune in station with button pressed in firmly.

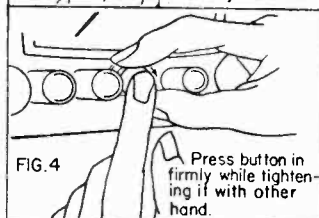


FIG 4 Press button in firmly while tightening it with other hand.

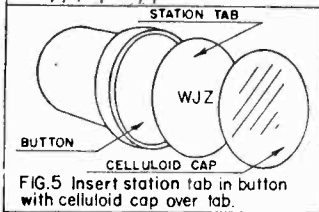


FIG 5 Insert station tab in button with celluloid cap over tab.

*Item number locates the article on the schematic diagram.

†These condensers cannot be supplied separately.

PREADJUSTMENT OF STATION BUTTONS

Select four nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

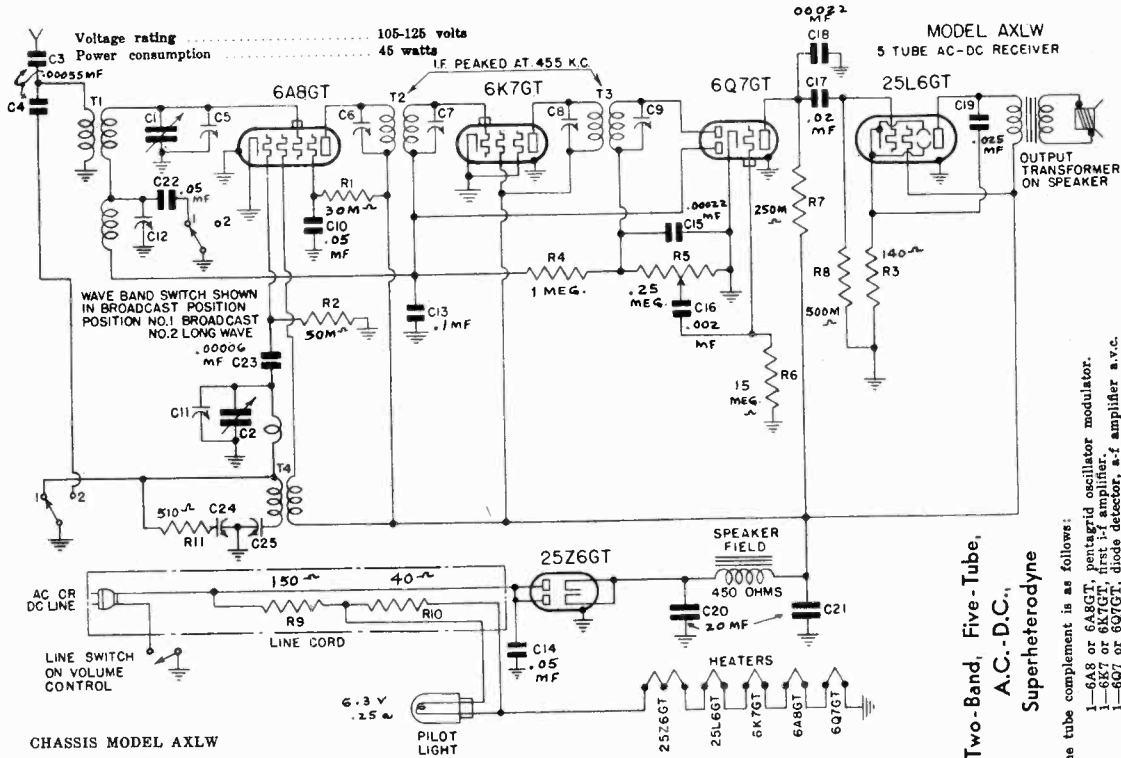
1. Loosen the push-button to be adjusted by rotating it counter-clockwise from 1/4 to 1/2 turn. See Fig. 2.
2. Push the button in as far as it will go and, holding it in firmly, tune in the desired station by means of the selector knob. See Fig. 3.
3. Hold button in with finger of one hand and tighten securely with the other hand. Release the button and tighten it further if possible. See Fig. 4.
4. Remove the 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, pressing it in firmly. Four celluloid caps are supplied in a separate envelope with the receiver. Snap one of these caps into the button over the station tab.

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 come back in clearly and with maximum volume.

Schematic, Voltage Alignment, Notes

EMERSON RADIO & PHONOGRAPH CORP

MODELS AXLW211
-212, -217, -235
-237, -238, -239
-257, Chas. AXLW



Models AXLW-211, AXLW-212, AXLW-217, AXLW-235, AXLW-237, AXLW-238, AXLW-239 and AXLW-257

Frequency range
540 to 1650 kc (555 to 182 meters)
157 to 370 kc (1910 to 810 meters)

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

The tube complement is as follows:
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.

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 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 (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:
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. To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.

TUBE DATA

All tubes are replaceable with either metal or equivalent bentam glass tubes. The letters "GT" at the end of the tube number indicates that the tube has a bentam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohm-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on and the receiver in broadcast position. For these readings was 117.5 volts, 60 cycles, a.c. All readings and cathode voltages 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	Fil
6A8	100	65	0	6.3
6K7	100	100	0	6.3
6Q7	100	100	0	6.3
25L6	82	100	5.5	25.0

Voltage at 25Z6 cathode—125 volts.
Voltage across speaker field—28 volts.

ADJUSTMENTS

An oscillator with frequencies of 455, 1500, 350 and 172 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 can.

The two-band antenna coil is located directly behind the speaker. The trimmer for the broadcast antenna coil is located on the front section of the antenna coil form. The trimmer for the long wave antenna coil is mounted on the top of the antenna coil form. The two-band oscillator coil is located underneath the chassis below the first trimmer. The trimmer for the broadcast oscillator coil is located on the bottom of the chassis beneath the trimmer and series padding condenser C25. The trimmer for the long wave oscillator coil is located beneath the series padding condenser C24 on the bottom only. The section toward the rear of the chassis is C24, the shunt trimmer. The section toward the front of the chassis is C25, the series padding condenser.

i-f Alignment

Turn the band switch clockwise to broadcast position and swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cup of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Broadcast Alignment

With the band switch in broadcast position set the dial pointer at 200. Feed 1500 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.

Long Wave Alignment

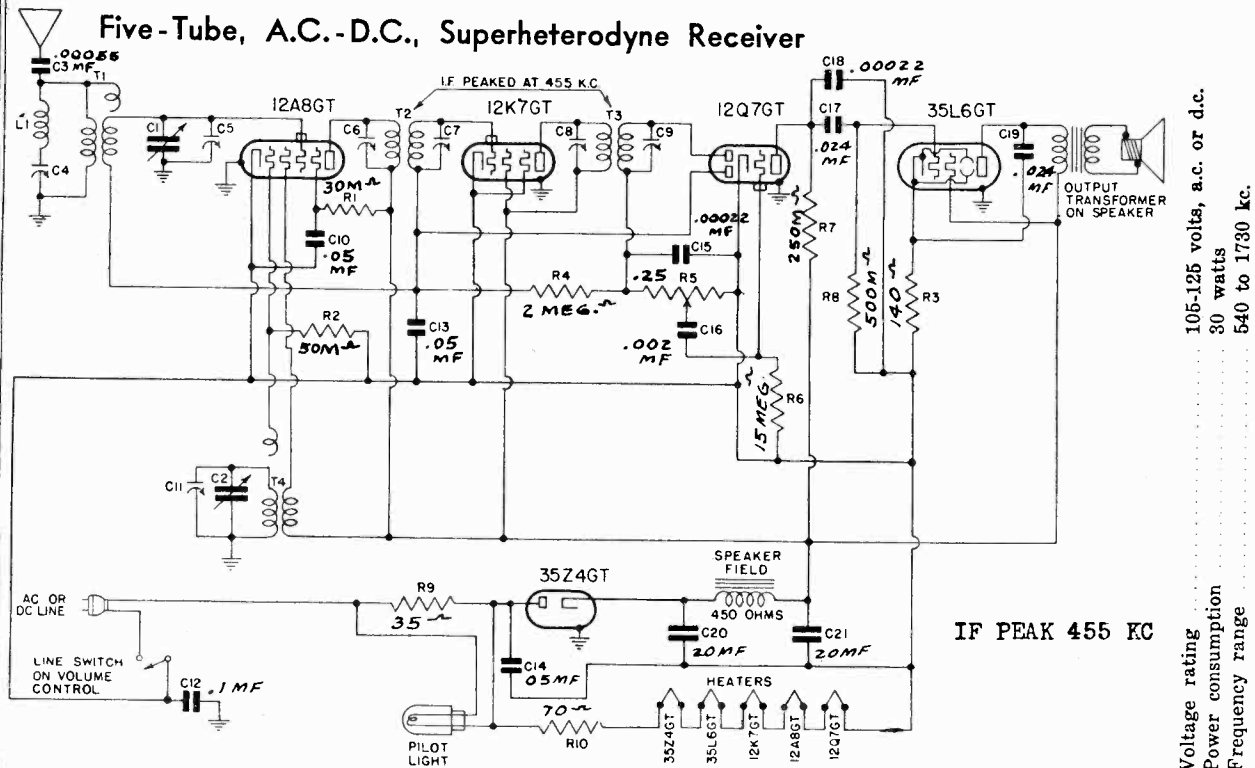
Turn the band switch counter-clockwise to the long wave position. With the dial pointer set at 350, feed 350 kc through a .0001 mf condenser to the antenna and adjust first the oscillator trimmer (rear trimmer) for maximum response, then the antenna trimmer (on antenna coil) for maximum response. Return the dial pointer to 1750, feed 172 kc, and adjust the series padding (front trimmer) for maximum response. Return to 350 kc and repeat alignment for maximum response. Return to 350 kc and repeat alignment.

MODELS CJ211, CJ217, CJ235

CJ257 Chassis CJ EMERSON RADIO & PHONOGRAPH CORP.

Alignment.
Schematic, Voltage

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



105-125 volts, a.c. or d.c.
30 watts
540 to 1730 kc.

SCHEMATIC DIAGRAM FOR MODELS CJ-211, CJ-217, CJ-235 AND CJ-257 CHASSIS MODEL CJ

- The tube complement is as follows:
- 1—12A8 or 12A8GT, pentagrid oscillator modulator.
 - 1—12K7 or 12K7GT, first i-f amplifier.
 - 1—12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
 - 1—35L6 or 35L6GT, beam power output.
 - 1—35Z4 or 35Z4GT, half-wave rectifier.

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

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red.

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 form 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 12A8 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)

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.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus 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.
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
35L6	87	94	5.2	—	35

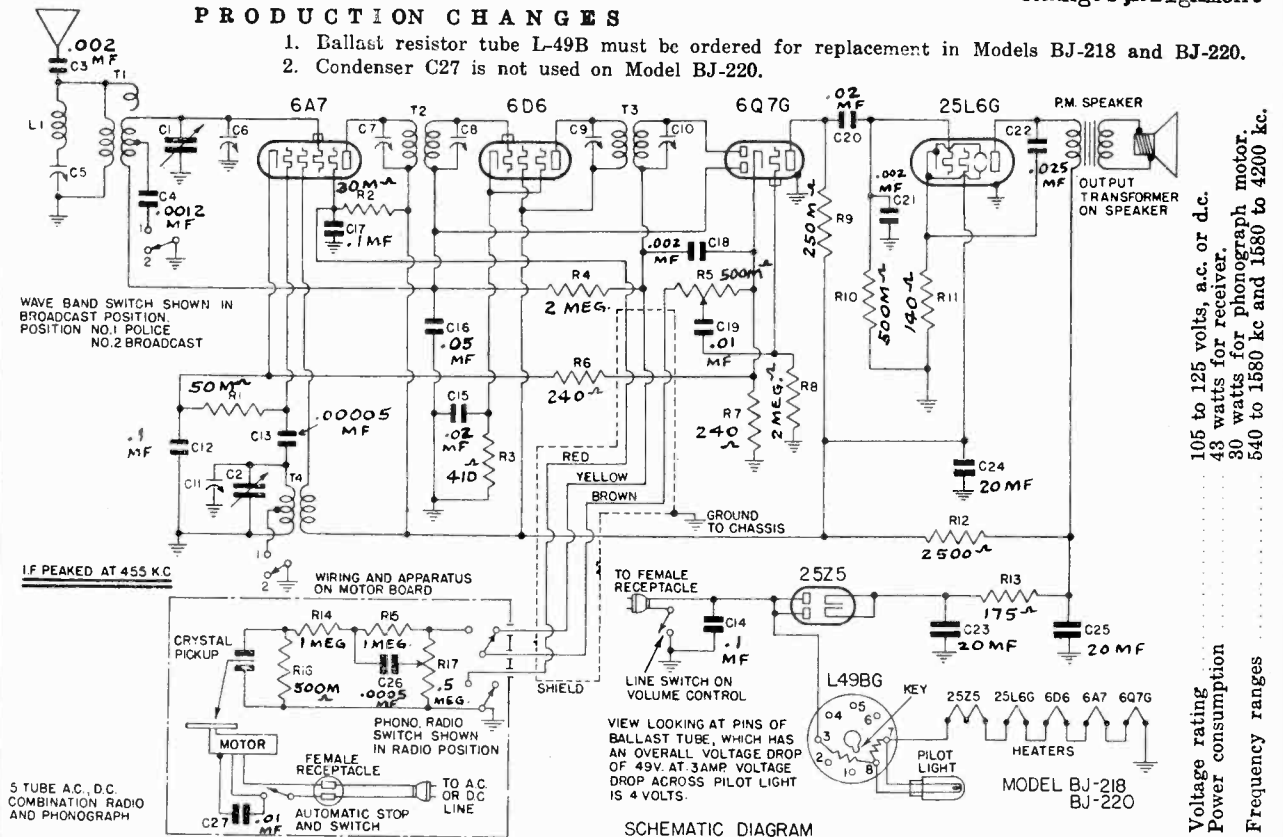
Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS BJ218, BJ220
Chassis BJ
Schematic, Voltage
Changes, Alignment

PRODUCTION CHANGES

1. Ballast resistor tube L-49B must be ordered for replacement in Models BJ-218 and BJ-220.
2. Condenser C27 is not used on Model BJ-220.



105 to 125 volts, a.c. or d.c.
43 watts for receiver.
30 watts for phonograph motor.
540 to 1580 kc and 1580 to 4200 kc.

Voltage rating
Power consumption
Frequency ranges

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.

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

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

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. 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 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.

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

The tube complement is as follows:

- 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—L-49B

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. All readings except cathodes and heaters were taken on 250 volt scale.

MODELS BJ-218 and 220

Plate	Screen	Cathode	Osc. Plate	Heaters	
84	46	2.0	84	6.3	Voltage at 25Z5 cathode—130 volts.
84	84	2.8	—	6.3	Voltage across speaker field (Models BJ-200, 210 and 214)—23 volts.
35	—	1.0	—	6.3	Voltage drop across ballast tube L-49BG (pins nos. 3, 7)—49 volts.
115	84	5.5	—	25	Voltage drop across pilot light section (pins nos. 7, 8)—4 volts.

MODELS BL218, BL220

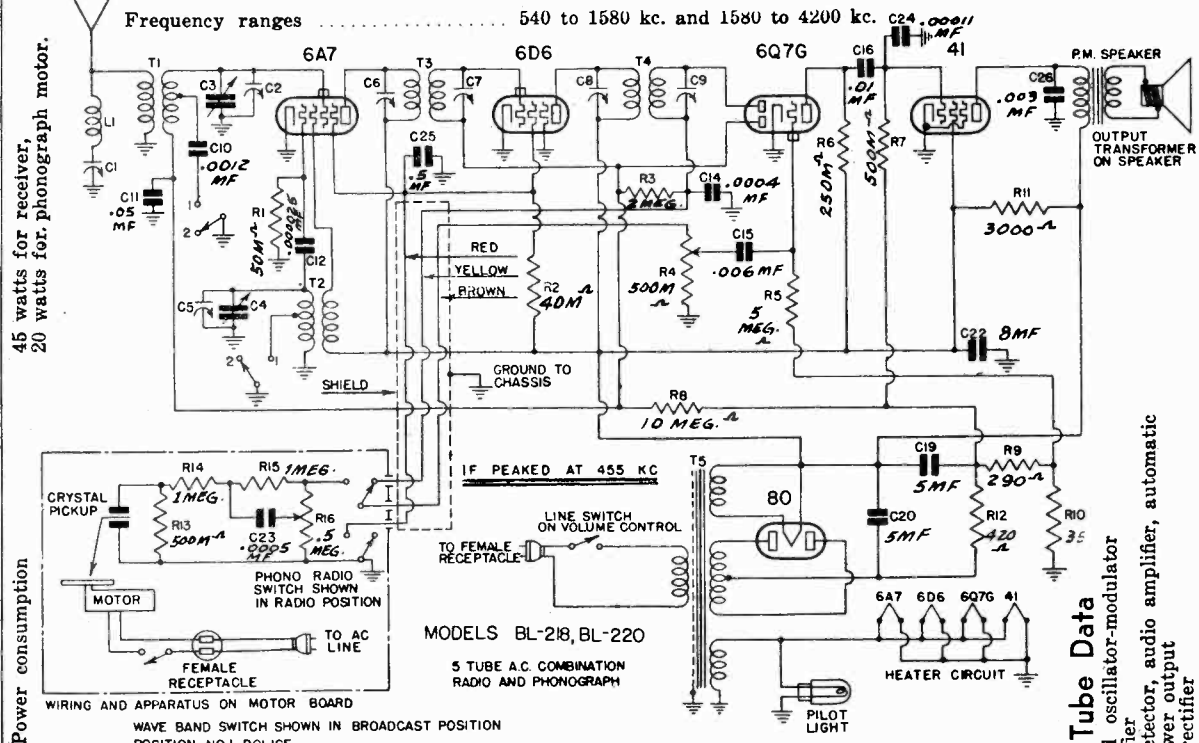
Chassis BL

EMERSON RADIO & PHONOGRAPH CORP. Changes, Alignment

Schematic, Voltage

PRODUCTION CHANGES

- In receivers used in phonograph combinations:
R2 is 40,000 ohms 1 watt, part No. 2NR-217
- Receivers bearing serial numbers below 1,802,875 used a 0.00006 mf mica condenser, part No. 4XC-393A, at C12.
- Receivers bearing serial numbers below 1,800,200 used dial drive shaft and pulley, part No. 5JZ-822.



Power consumption
45 watts for receiver,
20 watts for phonograph motor.

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

Tube Data

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

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. To readjust the speed 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 stroboscope method will work only when the neon lamp is connected to a 60 cycle, a.c. supply.

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

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

The color coding of the power transformer leads is as follows:

- Primary—two black leads
- High voltage sec.—two red leads
- High voltage sec. center tap—red and yellow lead
- 6.3 v. sec.—two heavy green leads
- 5 v. sec.—two heavy yellow leads

With a few exceptions, the color coding of the general wiring is as follows:

- Plate—blue
- B plus—red
- Screen—brown
- A.v.c. and cathode—white or yellow
- Grid—green
- Filament and ground—black

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.

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. All readings except heaters were taken on 250 volt scale.

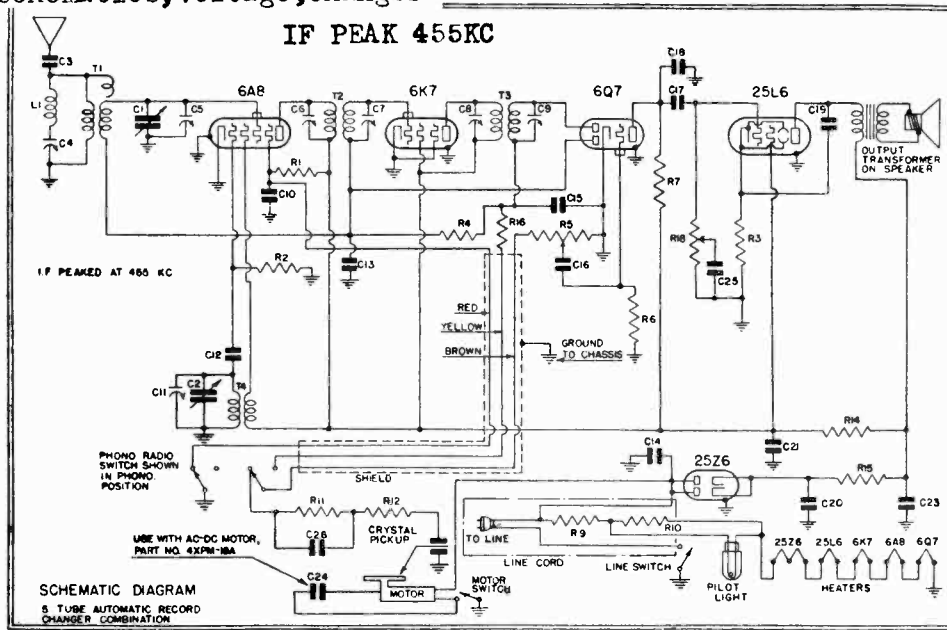
Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	182	70	0	182	6.3 a.c.
6D6	182	70	0	—	6.3 a.c.
6Q7	87	—	0	—	6.3 a.c.
41	*165	182	0	—	6.3 a.c.

Voltage across speaker field (Models 200, 210 and 214)—70 volts.
Voltage from B minus to chassis (Models 200, 210 and 214)—80 v
Voltage from B minus to chassis (Models 218 and 220)—54 volts.
B plus at 80 tube filament (Models 200, 210 and 214)—182 v
B plus at 80 tube filament (Models 218 and 220)—232 volts.
*Voltage at 41 tube plate in Models 218 and 220 is 220 volts

Chassis AX
Schematics, Voltage, Changes

EMERSON RADIO & PHONOGRAPH CORP.

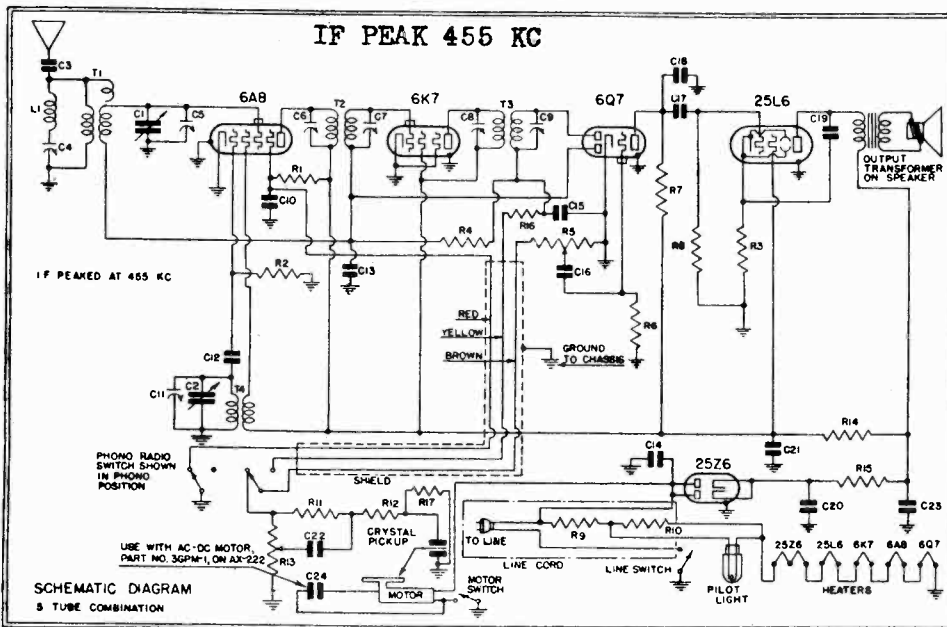
MODELS AX221 AC
AX221 AC-DC
AX222, AX232 AC
AX232 AC-DC



MODELS AX-232 AC and AC-232 AC-DC

FOR RECORD CHANGER DATA SEE INDEX

CHASSIS MODEL AX



MODELS AX-221 AC, AX221 AC-DC and AX-222

CHASSIS MODEL AX

Tube Data

The tube complement is as follows:

- 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.

PRODUCTION CHANGES

AX-221 and AX-222 chassis bearing serial numbers below 1,890,976 do not have R16, 100,000 ohm resistor, connected in series with the yellow lead to phono-radio switch.
 AX-221 and AX-222 chassis bearing serial numbers below 1,914,451 do not contain resistor R17.
 On model AX-222 a 0.01 mf, 400 volt condenser is connected from B plus to the speaker frame. Another 0.01 mf condenser is connected from the motor mounting plate to ground.
 AX-221 and AX-222 chassis below serial number 1,921,165 have a 210 ohm, 1/2 watt wire-wound resistor at R15.

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. Measurements made with 117.5 volts d.c. will be lower than those given below.

VOLTAGE ANALYSIS

Models	Plate	Screen	Osc.	Cathode	Heaters	Voltage rating	Power consumption	Frequency range
AX-221, AX-222, and AX-232	82	44	82	0	6.3	105-125 volts	45 watts for receiver	
	82	82	—	0	6.3		10 watts for 219 motor	
	35	35	—	0	6.3		20 watts for 221 a.c. or 232 a.c. motors	
	115	82	—	5.5	25		30 watts for 221 a.c.-d.c., 222, and 232 a.c.-d.c. motors	
	Voltage at 25Z6 cathode—135.							

MODELS AX221 AC
AX221 AC-DC
AX222, AX232 AC
AX232 AC-DC

EMERSON RADIO & PHONOGRAPH CORP. Chassis AX
Alignment, Notes
Parts

REPLACEMENT PARTS

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

Combination Phonograph and Five-Tube Superheterodyne

MODEL AX-221AC (For Operation on AC Only)
MODEL AX-221AC-DC (For Operation on Either AC or DC)
MODEL AX-222 (AC-DC Portable)
MODEL AX-232AC (Automatic Record Changer—For AC Only)
MODEL AX-232AC-DC (Automatic Record Changer—For AC or DC)

When ordering replacement parts specify part numbers.
*Item number locates the article on the schematic diagram.
†Not supplied separately.

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	4XT-432	Antenna coil with adjustable 455 kc wave-trap	\$.90
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
T4	4XT-433	Oscillator coil	.35
R1	2CR-193	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, R17	KR-57	1 megohm 1/4 watt carbon resistor	.16
R5	4XR-335	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
R9, R10	4XW-112	Resistance line cord with pilot light ballast section. R9—150 ohms; R10—40 ohms	.85
R13	4LR-312B	Tone control .5 megohm with motor line switch	1.05
R14	4XR-334	2,500 ohm 1 watt carbon resistor	.16
R15	4ZR-325	175 ohm 1 watt realized resistor. (See prod. change No. 4.)	.16
R16	KR-54	100,000 ohm 1/4 watt carbon resistor. (See prod. change No. 1.)	.16
R18	4XR-342	Tone control .5 megohm	.70
C1, C2	4XC-391A	Two-gang variable condenser (for 219 and 221)	2.40
C1, C2	4XC-412	Two-gang variable condenser (for 222 and 232)	2.75
C3	4XC-401	0.00055 mf mica condenser	.20
+C4		Trimmer, part of wave-trap assembly.	
+C5, C11		Trimmmers, part of variable condenser.	
+C6, C7, C8, C9		Trimmmers, 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-5	0.1 mf, 200 volt tubular condenser	.20
C14	EFC-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-336	0.025 mf, 400 volt tubular condenser	.20
C20, C21	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C22	IC-47A	0.0005 mf mica condenser	.65
C23	4XC-404	20 mf, 135 volt dry electrolytic condenser	.20
C24	3LC-297A	0.01 mf, 400 volt molded condenser (used only with ac-dc motors)	.20
C25	HC-54	0.006 mf, 600 volt tubular condenser	.20
C26	4VC-371A	0.0003 mf mica condenser	.20
	TTS-111S	Phono-radio switch	.55
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	4XZ-811A	Drive shaft	.01
	4XZ-816	Dial face fasteners	.20
	3LM-253	Needle cup (for 219 and 221)	.20
	3CM-251	Needle cup (for 222)	.75
	4M2-588B	Dial pointer (for 221, 222 and 232)	.20
	4XF-3	Dial crystal (for 221, 222 and 232)	.20
	4XD-51	Dial face (for 221, 222 and 232)	.55
	4PS-303A	6 1/2" permanent magnet dynamic speaker (used on 221, 222 and 232)	6.70

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-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.
- In operating the a.c.-d.c. combinations 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
Grid return—black
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-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.
- 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.
- The receivers in these combinations are of the a.c.-d.c. type. The motors, however, in models 219, 221AC and 232AC are of the AC ONLY type and will be damaged if the combination is used on direct current.
- To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.

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.)

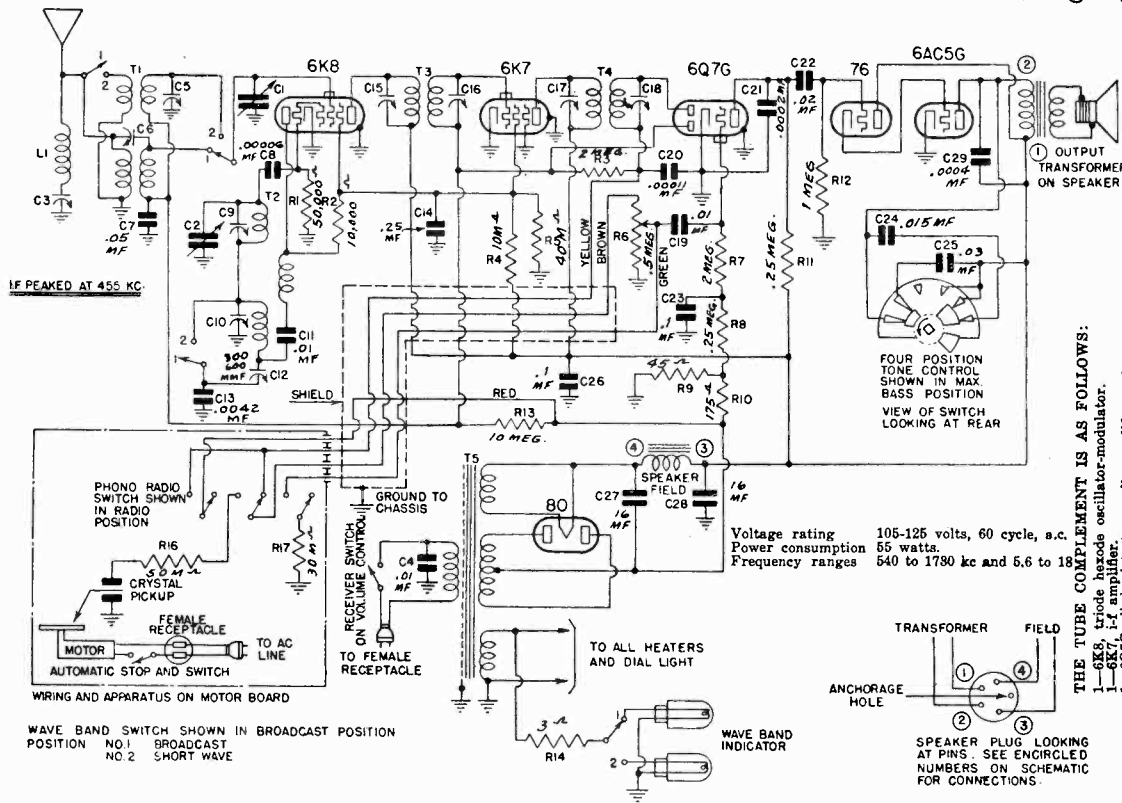
R-f Alignment

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.

Item	Part No.	DESCRIPTION	PRICE
R11, R12	KR-56	600,000 ohm 1/4 watt carbon resistor	.16
	4XPM-15 or	A.C. synchronous motor	12.20
	4XPM-20	A.C. self-starting motor	12.65
	4XZ-850 or	Crystal pick-up (metal tone arm)	8.90
	4XC-411	Crystal pick-up (wooden tone arm)	8.70
	4XZ-354A	Diaphragm speaker	1.10
	4XE	Dial dynamo	.20
	4XZ-810B	Dial face	.02
	4XZ-812B	Dial pointer	.16
R11, R12	KR-57	1 megohm 1/4 watt carbon resistor	.16
	3LPM-3	110 volt, a.c. motor (for 221-AC)	21.35
	3GPM-1	AC-DC motor (for 221AC-DC and 222)	43.20
	4RZ-733A	Crystal pick-up	11.85
R11, R12	KR-56	.5 megohm 1/4 watt carbon resistor	.16
	4XPM-19A	117 volt, ac-dc phonograph motor (for AX-232 AC-DC)	66.00
	4XPM-19	117 volt, ac phonograph motor (for AX-232 AC)	42.60
	4XW-180	Record holder block	.80

EMERSON RADIO & PHONOGRAPH CORP. MODEL BQ223 Chassis BQ

Schematic, Voltage Changes, Alignment



THE TUBE COMPLEMENT IS AS FOLLOWS:
 1-6K8, triode, base oscillator-modulator.
 1-6K7, i-f amplifier.
 1-6Q7G, diode detector, audio amplifier and a.v.c.
 1-76, audio amplifier.
 1-8AG5G, power rectifier.
 1-80, full-wave rectifier.

FOR PREADJUSTMENT OF STATION PUSHBUTTONS SEE MODEL BR 224.

PRODUCTION CHANGE

The colors of leads in the cable to the phono-radio switch on chassis bearing serial numbers below 1876210 are as follows:
 blue to diode; red to high side of volume control; green to arm of volume control; black to B minus. These changes are easily distinguished by the presence of a blue lead in the cable.
 The color coding of the i-f transformers is as follows:
 Grid—green
 Grid return—black
 B plus—red
 Plate—blue
 The color coding of the power 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 yellow leads
 5 volt secondary—two yellow leads
 The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padner, C13 on schematic. When replacing this fixed padner be careful to use a condenser which has a capacity within 2% of the specified value. Otherwise the short-wave coils may not track.
 The trimmer potentiometer is mounted on the chassis near the antenna trimmer. The trimmer potentiometer should be checked by turning the motor on the factory to turn at a speed of 78 r.p.m. The speed may be checked by turning the motor on a test disc and neon light. To readjust the speed remove the turn-coupling thumb screw (located near the top of the chassis) and rotate the disc clockwise until the speed of the motor increases the speed. The speed should be checked with the pick-up and record in playing position.

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. All readings except B minus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Point	Cathode	Grid	Plate
6K8	215	0	75	—
6K7	215	0	—	—
6Q7G	215	0	—	—
76	215	0	11	—
80	215	0	—	—

Voltage at 80 AG5G to R minus 196 volts (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.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is one directly behind the variable capacitor. 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 front of the 76 tube) with the screw adjustment accessible through a hole in the top of the chassis. The trimmer potentiometer is mounted underneath the chassis deck near the 76 tube socket. 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 are mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear of the chassis. The trimmer farthest from the end of the chassis is for short-wave and trimmer closest to the end of the chassis is for broadcast.

I-f and Wave-Trip Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable capacitor at the minimum capacity position and feed 455 kc through a 0.02 mf paper condenser to the grid case of the 6K8 (diode detector, antenna lead) standard dummy antenna (a 0.0002 mica condenser may be substituted). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on right side of the chassis) for minimum response. (See General Note No. 6.)

Short-wave Alignment

(Alignment of the short-wave band should precede broadcast alignment.) Since the dial indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial assembly plate and bent over to form a dial pointer when the chassis is removed from the cabinet. Set pointer at extreme low-frequency end of dial in condenser closed position. (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 exactly at 16 megacycles. Rotate the antenna and adjust the short-wave oscillator trimmer (farthest from end on rear chassis wall) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the right side of the 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. standard dummy antenna in aligning the broadcast coils. (A 0.002 mica condenser may be substituted). Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 76 tube) for maximum response. Move the dial to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (trimmer to end on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at right side of chassis). Return dial to 60, 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.

MODELS BR224
BR224A, Ch. BR
Voltage
Alignment

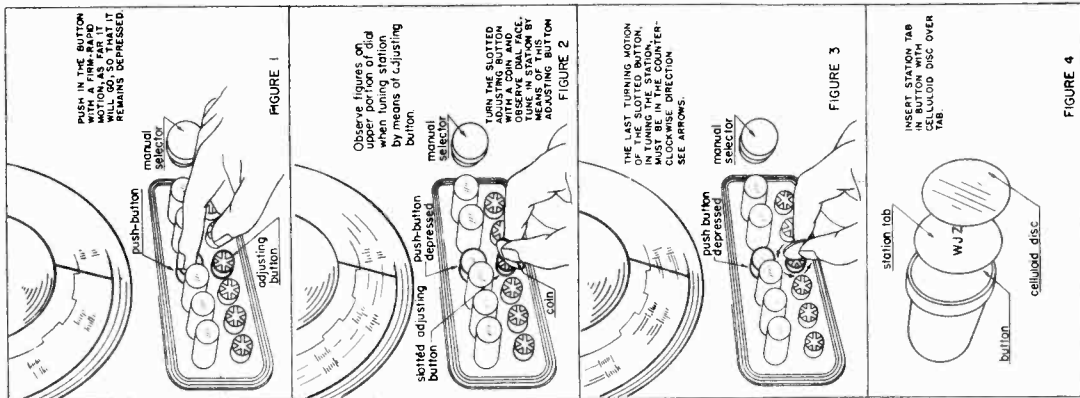
EMERSON RADIO & PHONOGRAPH CORP.

MODEL BQ223
Chassis BQ
Tuner Data

MIRACLE INSTAMATIC TUNING
Preadjustment of Station Push-buttons
FOR CHASSIS BQ

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

1. Insert the line plug in the electrical outlet. Turn the receiver on by rotating the zone control knob clockwise until the switch is heard to click and then rotate this knob to the extreme clockwise position. Wait about a minute for the tubes to warm up. Turn the wave-band switch to the broadcast position, clockwise. Turn the volume control clockwise to about half of its full rotation.
2. Select six nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Find 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 and press it in the depression in the front face of the push-button. Insert one of the clear celluloid discs, which are supplied in a separate envelope, over the dial window in a separate envelope, over the dial window in a separate envelope. Press this disc in firmly. See Fig. 1.
3. Push in the manual selector knob (second from right). When pushing in the selector knob or one of the push-buttons best results are obtained by using a firm rapid action.
4. With the selector knob depressed tune in the desired station. Rotate the selector knob until the mark on the dial face corresponding approximately to the frequency of the station appears at the black indicator line on the conical escutcheon window. Identify the station and note the approximate position of the dial face.
5. Push in the button to be adjusted for this station. See Fig. 2.
6. Insert a small thin coin in one of the slots of the adjusting button immediately below the push-button. Turn the adjusting button until the mark on the dial face corresponding approximately to the frequency of the station again appears at the black indicator line on the conical escutcheon window. Once the station is heard, tune it in carefully by turning the adjusting button back and forth slowly. From the standpoint of performance the station should be tuned to tune in the station accurately. See Fig. 2.
7. It is very important, when tuning in a station by means of the adjusting button, that the last turning motion of the adjusting button be in the counter-clockwise direction, as indicated in Fig. 3.
8. Check the results by moving the dial face, using the selector knob, to a different position and then pushing in the button. The station should be received clearly and with maximum volume.
9. Adjust the remaining buttons, one at a time, following the procedure outlined above.



VOLTAGE ANALYSIS

CHASSIS BR
†Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) counter-clockwise, and no signal. Line voltages for these readings was 117.5 volts, 60 cycles, a.c. All readings below 250 volts, except heaters and cathodes, were taken on 250 volt scale.

Tube	Plate	Screen	Osc. Plate	Cathode	F.V.
6K7 r-f amplifier	230	1100	5	5	6.3 a.c.
6K8 oscillator-modulator	225	1100	100	4.2	6.3 a.c.
6K7 I-f amplifier	215	1100	—	4.5	6.3 a.c.
6Q7 diode detector, a.v.c. first audio	170	—	—	2.1	6.3 a.c.
6J5 phase inverter	180	—	—	4.2	6.3 a.c.
6J5 first audio driver	250	—	—	9	6.3 a.c.
4-6AC5G output driver	275	—	—	0	6.3 a.c.

Voltage across speaker field—65 volts.
Voltage at 80 filament—350.
†Model BR chassis using 3XS-237 speaker will have voltages approximately 10 percent lower. Voltage across this speaker field is 80 volts.
†When band-switch is in broadcast and police positions the screen voltages will read 65 volts. Bias readings on these tubes may be slightly lower.

Location of Coils and Trimmer Adjustments

The I-f transformers are located at the back of the chassis. The first I-f transformer is the one near the electrolytic condenser. The six trimmers for I-f alignment 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 right-hand trimmer is for the broadcast band, the left-hand trimmer is for the short-wave band and the central trimmer is for the police band. The trimmer closest to the front of the chassis is for the intermediate band. The trimmer next to the antenna coils is for the broadcast band. The trimmer farthest from the front is for the short-wave band. The central 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 wave-band switch. The trimmers are accessible through holes in the top of the chassis. The trimmer closest to the band-switch is for the broadcast band, the trimmer farthest from the band-switch 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 front stage coils. The adjusting screws are available through holes in the top of the chassis. The padder nearest the front of chassis is for the police band. The padder for the short-wave band is a silver mica condenser. The padder 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 minimum capacity. Feed 455 kc to the grid of the 6K7 I-f amplifier tube through a .02 mf condenser. (Do not remove the grid clip from the tube.) Examine the trimmer screws and locate the screw which is painted red. Screw this trimmer down as far as it will go. Adjust the other two trimmers for maximum response and then adjust the red trimmer for maximum response. Do not readjust the other two trimmers. Now feed 455 kc to the grid of the 6K8 tube and repeat same procedure on the first I-f transformer. Do not touch the adjustment of the second I-f transformer. Failure to follow this procedure may result in impairment of the fidelity of the receiver.

Broadcast Alignment

Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial drive assembly-plate and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed. Set the wave-band switch at the broadcast (clockwise) position, and the dial 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 dial to 601, feed 1600 kc and adjust the series padder for maximum response. Repeat the dial 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 at 1.8. Feed 1800 kc to the antenna (using a 400 ohm dummy antenna) and adjust the oscillator trimmer for maximum response. Move the dial to 601, 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 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.

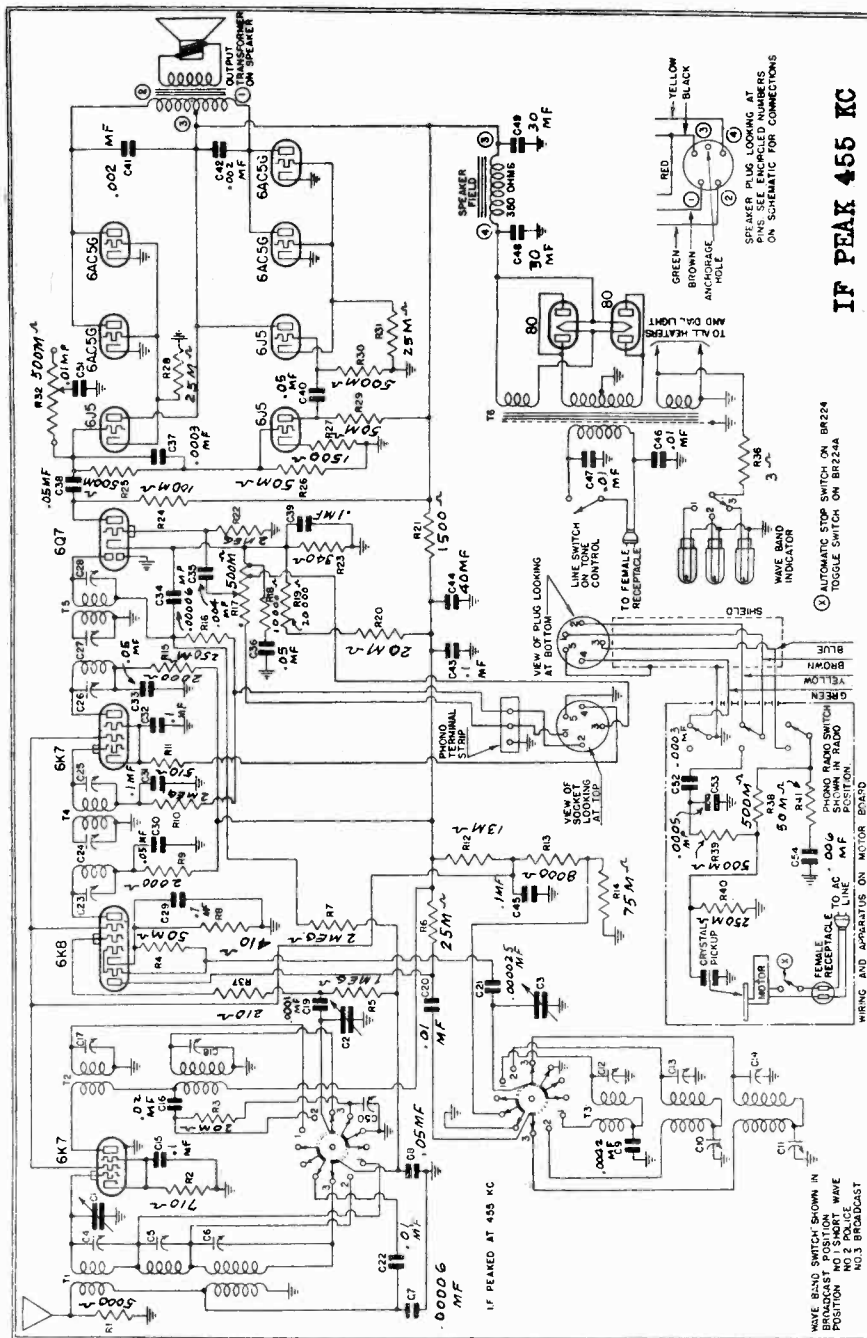
Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial 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 dial to 6 mc, feed 6000 kc to the antenna and adjust the I-f interstage trimmer (central trimmer at left of band-switch) for maximum response.

EMERSON RADIO & PHONOGRAPH CORP. BR224A

MODELS BR224

Chassis BR
Schematic, Notes



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
- 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 work only when the neon bulb is lighted from a 60 cycle a.c. supply. To readjust the speed on Model BR-224, remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.
To readjust the speed on Model BR-224A, remove the record and set the turntable by turning it slowly to give access to the speed regulator screw through a hole in the turntable. Adjust in same manner as BR-224.

TUBE DATA

Voltage rating	105-125 volts, 60 cycles, a.c.
Power consumption	135 watts at 117.5 volts. 20 watts for phonograph motor.
Frequency ranges	540 to 1800 kc, 1800 to 6,250 kc and 5.8 to 22.0 megacycles.

- 1—6K7, R-f amplifier (behind right-hand section of variable condenser).
- 1—6K8, Triode-hexode, oscillator-modulator (behind left-hand section of variable condenser).
- 1—6K7, I-f amplifier (between the two i-f transformers).
- 1—6Q7, Diode detector, audio amplifier, a.v.c. (left rear corner of chassis).
- 1—6J5, Phase inverter (left side of chassis, third from rear).
- 2—6J5, Second audio amplifiers (left side of chassis, second from rear, and right side of chassis beside electrolytic condensers).
- 4—6AC5G, Dynamic coupled, power output (two are in front of power transformer; other two are alongside power transformer near variable condenser).
- 2—80, Rectifiers (beside power transformer, at rear of chassis).

MODEL BR224A
 MODELS AX232 AC, AX232 AC-DC
 Record Changer Data

EMERSON RADIO & PHONOGRAPH CORP.

Part No. 4XPM-18A used with
MODEL AX-232, A.C.-D.C.
 Five-tube A.C.-D.C. Portable Combination

MODEL AX-232, A.C.
 Five-tube A.C. Portable Combination

Part No. 4XPM-18 used with
MODEL BR-224A
 Thirteen-tube A.C. Radio-Phonograph Combination

AUTOMATIC OPERATION

1. Turn the receiver "on" in the usual way.
2. Rotate the phono-radio switch knob counter-clockwise to the phonograph position. Wait about a half-minute for the tubes in the receiver to warm up.
3. See that the pick-up is over the needle gauge plate with needle properly in place. If not, complete a *cycle* as follows: Throw the turntable switch "on." The turntable will start to revolve and the cycle of motion on the pick-up arm will follow through. When the pick-up arm comes down (and it can be moved by hand) the cycle is completed. Turn off the turntable switch.
4. The Index and Record Reject Lever are located near the right front corner of the motor board. With this lever at "Manual" position place the records on the record holder shelves. The records should be arranged in the desired order with the desired selection face up and the last selection on top. The first record to be played will rest directly on the shelves. The turntable should be empty.
5. Throw the turntable switch to the "on" position. The turntable should start to revolve.
6. While the turntable is revolving, push the Index and Record Reject Lever to the "Reject" position and let go. When the lever is released, after it has been pushed to "Reject," it will return automatically to the "10" position. If all the records to be played are 12 inch, return the lever to the "12" position. The changer will then begin to go through its cycle and the first record will drop on the turntable. The entire series of records will then be played automatically in sequence.
7. Adjust to the desired volume by means of the regular receiver volume control.
8. Close the cabinet lid to eliminate normal mechanical noises due to needle vibration.

The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pick-up, swing the arm to the right beyond the edge of the record and lower it onto the pick-up rest with pick-up over needle gauge plate. The record player is then ready for reloading, or for manual operation.

MANUAL OPERATION

1. Proceed as in steps 1, 2 and 3 under Automatic Operation.
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "Manual" position. The lever should be kept in this position when not actually playing records automatically.
4. Throw the turntable switch on and when turntable has attained speed, lift pick-up and gently lower onto the record, so that the needle point enters the outside groove.
5. Proceed as in steps 7 and 8 under Automatic Operation.

SPECIAL PRECAUTIONS

1. This instrument is not recommended for playing 10 inch and 12 inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pick-up will come down in position for a 10 inch record and repeat the playing of the record on a 10 inch diameter unless the turntable switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.
2. Do not handle or move manually the pick-up or any part of the mechanism while it is going through the record-changing operation.
3. Do not use force in handling the mechanism at any time.
4. Warped or thick records should not be used for automatic operation.
5. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.
6. During automatic operation, the needle is fed automatically into the starting groove of the next record. If the needle fails to enter the starting groove, this is an indication that the cabinet is not level. Raise the right hand side of the cabinet, by inserting several thin spacers beneath it on that side. If the needle slides over a few grooves, raise the left hand side of the cabinet in a similar manner.
7. Never leave pick-up with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pick-up is in the rest position over needle gauge plate.

Replacements should be made with genuine Emerson parts for best results.

Record Changer
AdjustmentsEMERSON RADIO & PHONOGRAPH CORP. MODELS AX232 AC,
AX232 AC-DC

MODEL BR224A

Automatic Record Changer**GENERAL INFORMATION**

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum

vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

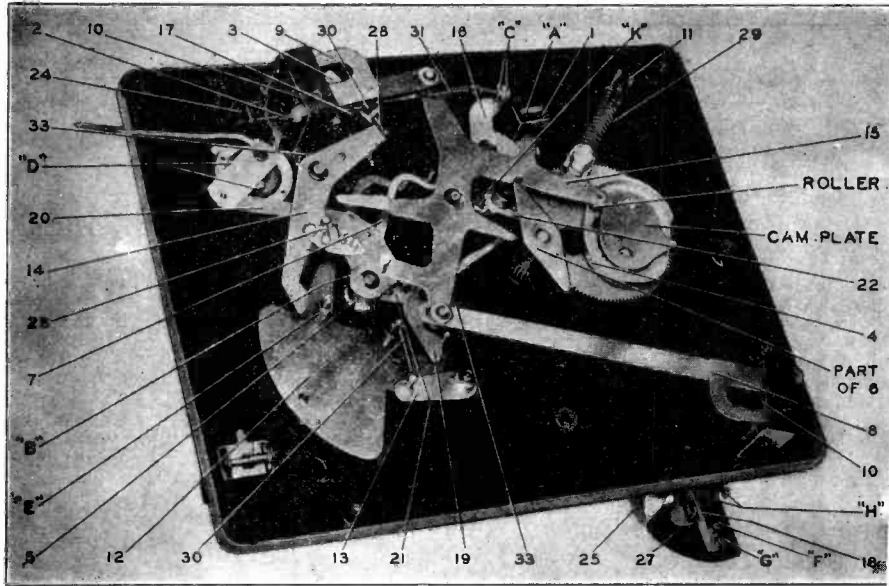
Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

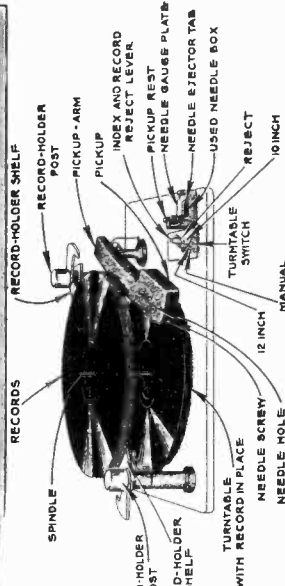
Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F)
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30".

MODEL BR224A EMERSON RADIO & PHONOGRAPH CORP.
 MODELS AX232 AC, AX232 AC-DC
 Record Changer, Diagrams, Notes



Bottom View of Automatic Record Changer



Top View of Automatic Record Changer

AUTOMATIC RECORD CHANGER

GENERAL NOTES

1. The pick-up must be over the needle gauge plate to insert or change needles. To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at the top so that it drops down against the needle gauge plate and then tighten up the needle screw.
2. 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 lift off the record and set the turntable by turning it slowly to give access to the speed regulator screw through one of the three holes in the turntable. Insert a screw-driver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counter-clockwise) to increase speed. Replace and replay record and adjust until speed is checked at 78 r.p.m.
3. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months. The three holes in the top of the turntable give access to the oil holes in the motor mechanism beneath. Revolve the turntable slowly until the oil holes can be seen through the turntable, then apply the oil.
4. Model AX-232, AC-DC portable automatic combination carries an a.c.-d.c. switch at the left of the turntable to switch the motor for a.c. or d.c. supply. It is important that this switch be in the proper position for the power-supply available.

CONTROLS AND MOVING MECHANISM

INDEX and RECORD REJECT LEVER.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"Manual," "12," "10," and "Reject." When you desire to change record selections manually, this lever should be set in the "Manual" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "Reject" position and let go. The pick-up will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "Manual" position when not actually playing records automatically.

TURNTABLE SWITCH.—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

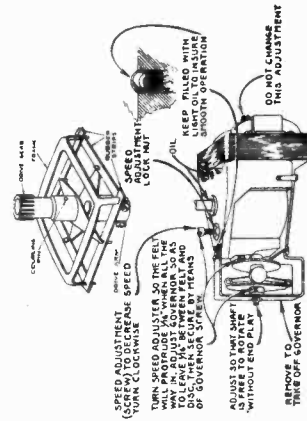
PICK-UP and TOP-LOADING NEEDLE SOCKET.—The pick-up is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pick-up arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pick-up arm in the groove and the pick-up over the needle gauge plate. The pick-up must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

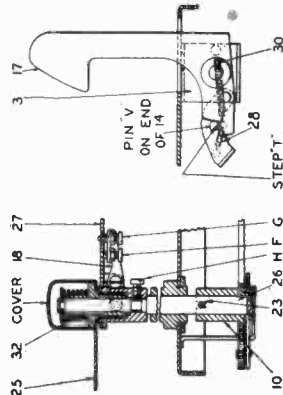
NEEDLE EJECTOR.—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pick-up in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pick-up as described above.

RECORD HOLDER SHELVES.—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves into position.

Note: Numbers refer to parts—letters refer to adjustments.



Motor Data and Coupling



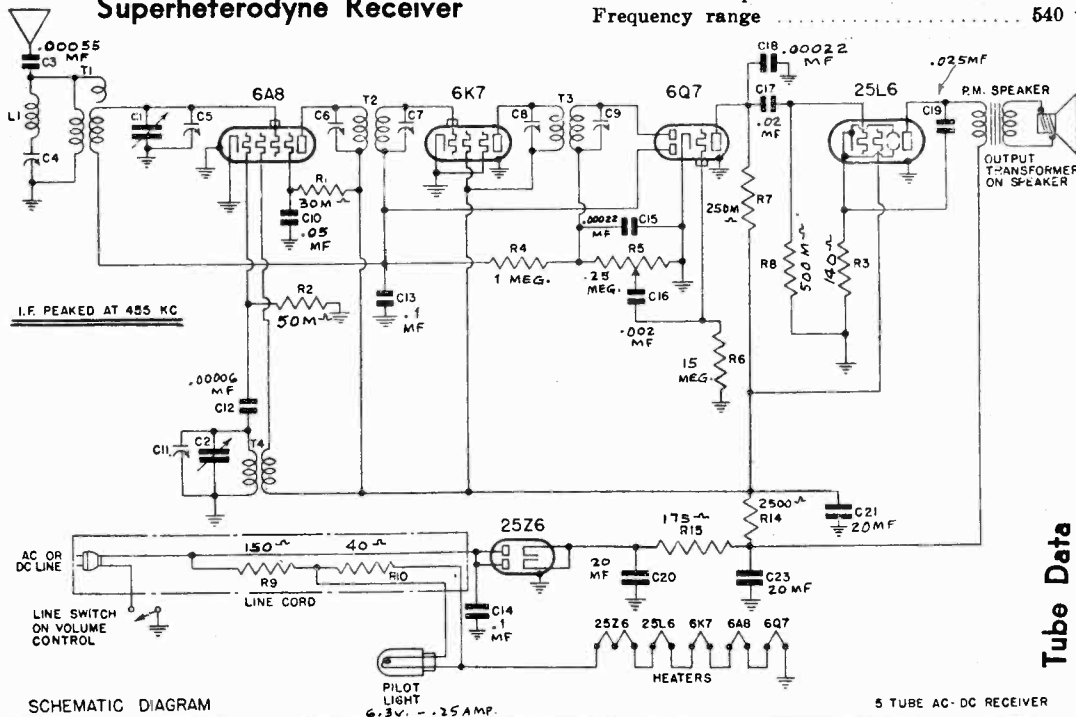
Details of Record Shelf Posts, and Locating Lever Assemblies

EMERSON RADIO & PHONOGRAPH CORP.

MODEL AX240
Chassis AX
Schematic, Voltage
Alignment, Changes

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

Voltage rating 105-125 volts
Power consumption 45 watts
Frequency range 540 to 1730 kc.



Tube Data

The tube complement is as follows:

- 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. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "GT."

SCHEMATIC DIAGRAM FOR MODEL AX-240

(See Production Change, No. 1)

PRODUCTION CHANGE

1. A resistor 100,000 ohms, part no. KR-54, (not shown in schematic for AX-240) is connected in series with the high side of the volume control.

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. 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.

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

Grid—green
Grid return—black
Plate—blue
B plus—red.

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 form 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.

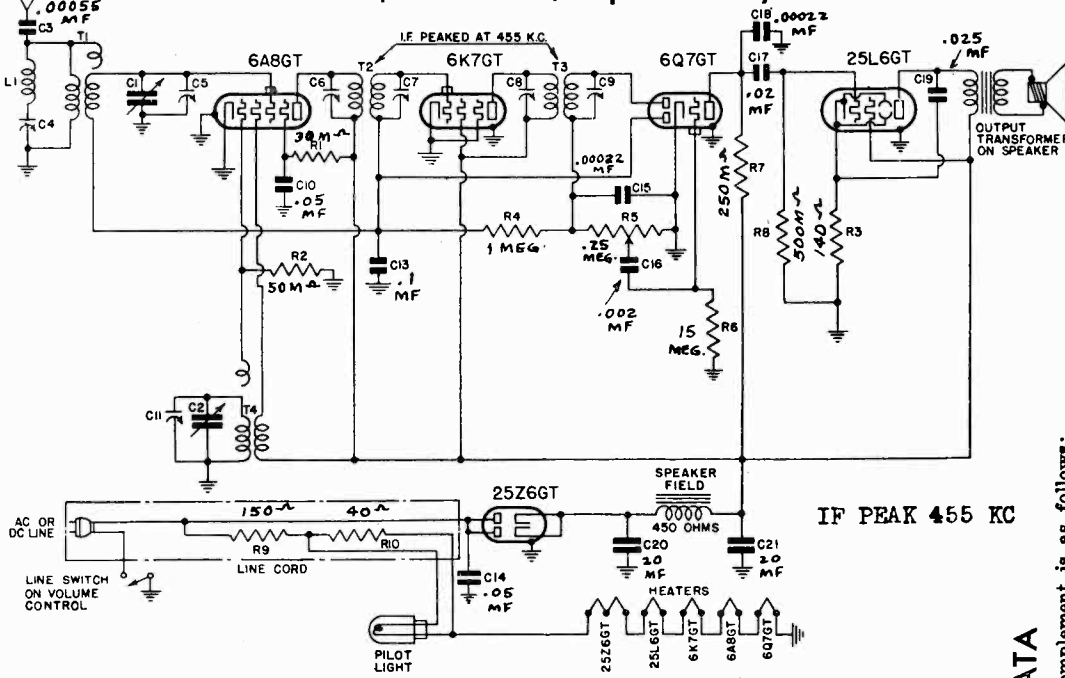
MODELS CH243, CH246, CH256

Chassis CH

EMERSON RADIO & PHONOGRAPH CORP.

Schematic, Voltage Alignment

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



MODELS CH-243, CH-246 and CH-256

CHASSIS MODEL CH

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

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. 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—125 volts.

Voltage across speaker field—28 volts.

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 form 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.

TUBE DATA

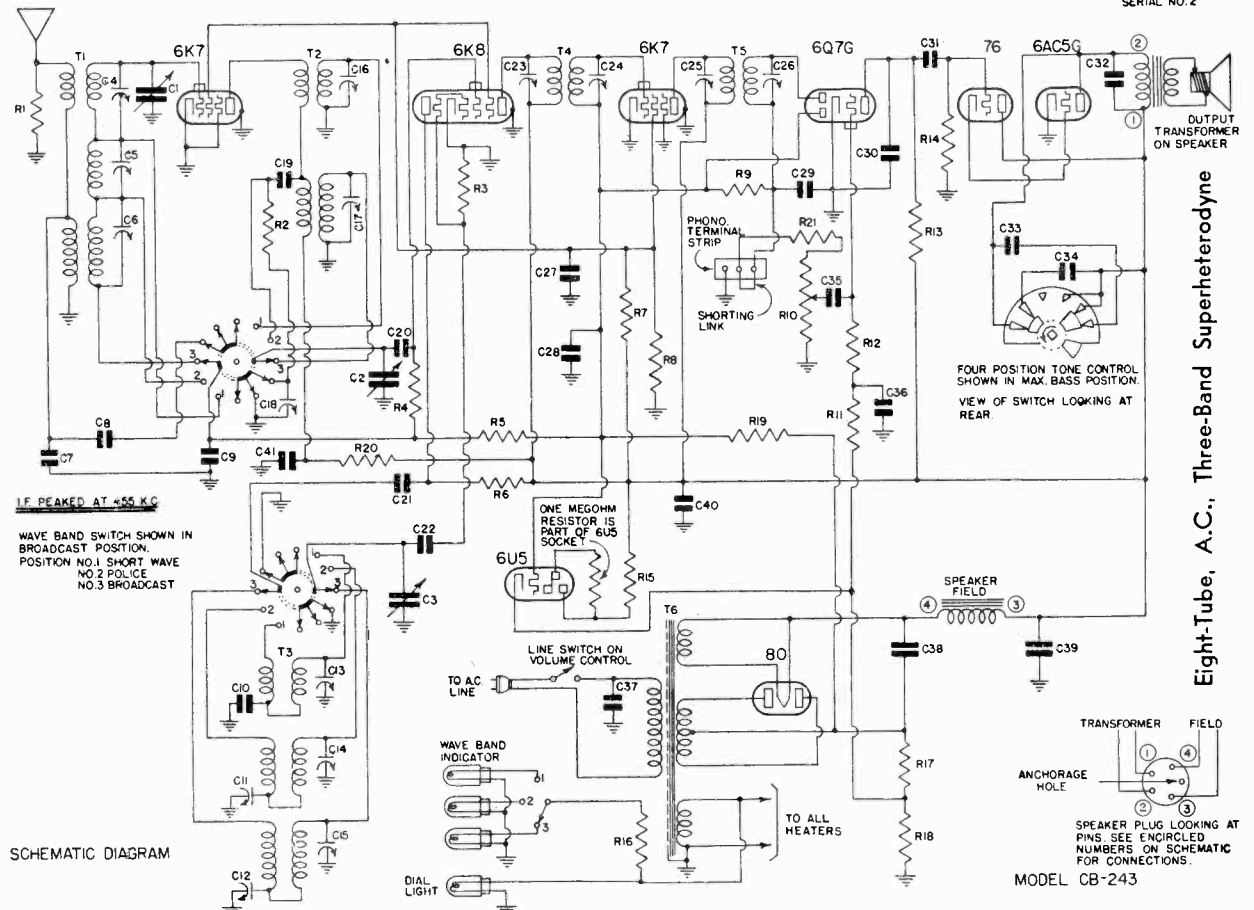
The tube complement is as follows:

- 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. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

MODEL CB243
EMERSON RADIO & PHONOGRAPH CORP Chassis CB
 Schematic, Voltage
 Notes

SERIAL NO. 2



SCHEMATIC DIAGRAM

Eight-Tube, A.C., Three-Band Superheterodyne

Voltage rating 105-125 volts, 60 cycle, a.c. (unless otherwise specified)
 Power consumption 60 watts
 Frequency ranges 540 to 1800 kc, 1800 to 6250 kc and 5.8 to 22 megacycles

GENERAL NOTES

- The receiver should never be turned on with either the speaker plug or the 6AC5G tube 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
 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.
- The adjustable padding condensers for the broadcast and police bands are mounted on the rear chassis wall with the screw adjustment accessible through holes in the rear of the chassis. The short-wave band has a fixed padder, C10 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.
- 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.

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 110 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6K7 (r-f)	170	85	0	—	6.3 a.c.
6K8	206	85	0	77	6.3 a.c.
6K7 (i-f)	206	85	0	—	6.3 a.c.
6Q7G	100	—	0	—	6.3 a.c.
76	206	—	10.3	—	6.3 a.c.
6AC5G	195	—	0	—	6.3 a.c.

Voltage at 8# filament to B minus (center tap on high voltage winding)—300 volts.
 Voltage across speaker field—86 volts.
 The grid bias for all tubes is developed across resistors R17 and R18. This voltage should measure 10.8 volts.

Tube Data

- The tube complement is as follows:
- 1-6K7, r-f amplifier (to left of variable condenser)
 - 1-6K8, triode-hexode oscillator-modulator
 - 1-6K7, i-f amplifier (behind variable condenser)
 - 1-6Q7G, diode detector, audio amplifier and a.v.c.
 - 1-6, audio amplifier
 - 1-6U5, power transformer
 - 1-6U5, detector and tuning indicator
 - 1-80, full-wave rectifier.

Note: The following special voltage transformers are also available:
 6BT-455 Universal power transformer: 110, 180, 210 and 225 volts, 40-60 cycles.
 6BT-456 Power transformer: 110 and 127 volts, 60 cycles.

MODEL CB243

Alignment, Socket Trimmers, Parts EMERSON RADIO & PHONOGRAPH CORP.

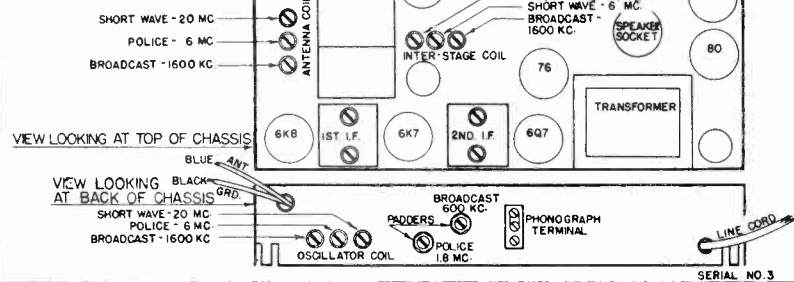
* Item	Part No.	DESCRIPTION	PRICE
T1	4BT-396	Three-band antenna coil	\$2.05
T2	4BT-397	Three-band interstage coil	1.80
T3	5RT-447	Three-band oscillator coil	1.75
T4	4ZT-425A	455 kc first i-f transformer	1.20
T5	3RT-321C	455 kc second i-f transformer	1.10
T6	6BT-451	Power transformer, 117.5 V, 50-60 cycle (See note below)	4.50
R1	LR-64	5000 ohm 1/4 watt carbon resistor	.16
R2	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R3, R5, R21	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R4, R14	KR-57	1 megohm 1/4 watt carbon resistor	.16
R6, R8	3LR-265	40,000 ohm 1/2 watt carbon resistor	.16
R7	3BR-246	10,000 ohm 2 watt carbon resistor	.38
R9, R12	HR-42	2 megohm 1/4 watt carbon resistor	1.00
R10	3XR-277	Volume control 500,000 ohm, with line switch	1.00
R11, R13	KR-55	250,000 ohm 1 watt carbon resistor	1.66
R15	GR-31	20,000 ohm 1 watt carbon resistor	1.66
R16	4ZR-326	3 ohm 1/2 watt wire wound resistor	1.66
R17	6BR-344	145 ohm 1 watt metallized resistor	1.66
R18	4CR-320	35 ohm 1/2 watt wire wound resistor	1.66
R19	3RR-275	10 megohm 1/4 watt carbon resistor	1.66
R20	6BR-345	5000 ohm 1/2 watt carbon resistor	1.66

List Price Ea.
Effective as of
Oct. 15th, 1936

PRICE

7.50
1.95
.80
20
1.70
1.60
.06
.06
.02
.06
10

LOCATION OF TRIMMERS
FIGURES SHOW FREQUENCIES AT WHICH EACH BAND IS ALIGNED READ "ALIGNMENT PROCEDURE"



REPLACEMENT PARTS LIST
MODEL CB-243
CHASSIS MODEL CB

- 8" dynamic speaker
- Wave-band switch
- Tone-control switch
- Pilot light 6.3 volt .25 amp Mazda No. 44
- Conical dial face
- Conical crystal and escutcheon for electron ray indicator tube
- Molded escutcheon for electron ray tube socket and cable assembly
- Dial drive cord
- Dial drive coil
- Dial drive pulley

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600, 1800, 6000 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 poor response.

In aligning antenna trimmers on the high frequency bands, the variable condenser of the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

I-f Alignment
Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 495 kc through a .002 mf paper condenser, to the grid cap of the 6K8 tube (do not remove the grid clip from the tube). Adjust the four I-f trimmers for maximum response.

Broadcast Alignment
Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the variable condenser and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed. The broadcast (clockwise) position, and the dial 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 dial 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 dial 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 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 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 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
Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial 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 dial to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer for maximum response.

Replacements should be made with genuine Emerson parts for best results.

C1, C2, C3	Three-gang variable condenser	5.56
+C4, C5, C6	Trimmers, part of antenna coil assembly	
C7, C20	0.00006 mf mica condenser	.20
C8, C21, C36	0.01 mf, 400 volt tubular condenser	.20
5C-12	0.05 mf, 200 volt tubular condenser	.20
C9	0.0042 mf mica condenser	.40
C10	Single adjustable padding condenser, range: 750-1500 mmf	.40
C11	Single adjustable padding condenser, range: 300-600 mmf	.30
C12	Single (if dual padding condenser is used, order 5SC-409)	
+C13, C14, C15	Dual adjustable padding condenser	.95
+C16, C17, C18	Trimmers, part of oscillator coil assembly	
C19, C31	Trimmers, part of interstage coil assembly	
C22	0.000026 mf mica condenser	
+C23, C24	Trimmers, part of second i-f transformer	
C27	0.02 mf, 200 volt tubular condenser	.20
C28	0.025 mf, 200 volt tubular condenser	.20
C29	0.00011 mf mica condenser	.20
C30	0.0002 mf, 600 volt tubular or mica condenser	.20
C32	0.015 mf, 400 volt tubular condenser	.20
C33	0.015 mf, 400 volt tubular condenser	.20
C34	0.03 mf, 400 volt tubular condenser	.20
C35	0.1 mf, 200 volt tubular condenser	.20
C36	0.01 mf, 400 volt molded condenser	.20
C37	16 mf, 375 volt wet electrolytic condenser	.95
C38	16 mf, 285 volt wet (regulating type) electrolytic condenser	.80
C39	0.1 mf, 400 volt tubular condenser	.20
C40, C41	EFC-132	

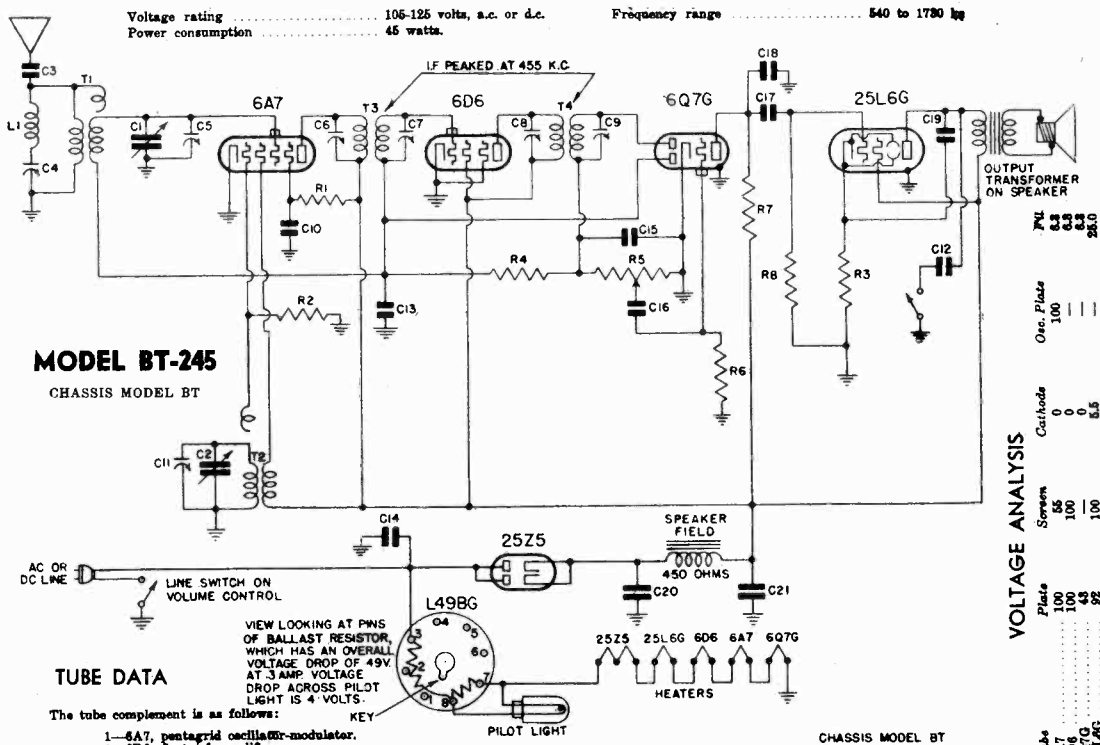
*Item number locates the article on the schematic diagram.

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

EMERSON RADIO & PHONOGRAPH CORP

MODEL BT245 Chassis BT

Schematic, Voltage Alignment, Parts



MODEL BT-245
CHASSIS MODEL BT

TUBE DATA

- The tube complement is as follows:
- 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.

All octal-base tubes are replaceable with either metal or equivalent octal-base glass tubes. The letter "G" at the end of the tube number indicates that the tube has a glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "G."

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Grid
6A7	100	55	0	0
6D6	100	100	0	0
6Q7G	100	100	0	0
25L6G	100	100	5.5	0
25Z5	92	92	0	0

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast resistor L49BG (pins 3, 7)—48 volts.
Voltage drop across pilot light section of ballast resistor (pins 7, 9)—4 volts.
Readings should be taken with a 1000 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. Measurements made with 117.5 volts d.c. will be lower than those given below.

REPLACEMENT PARTS LIST

Item	Part No.	DESCRIPTION	Price
L1, T1	5YT-444	Antenna coil with adjustable 455 kc wave-trap	.90
T2	4XT-458	Oscillator coil	.35
T3	5TT-463	Double-tuned 455 kc first i-f transformer	.90
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	SFR-298	140 ohm 1/4 watt wire-wound resistor	.16
R4	KR-57	1 megohm 1/4 watt carbon resistor	.16
R5	2NR-214	Volume control .25 megohm with line switch	1.20
R6	4XR-327	16 megohm 1/4 watt carbon resistor	.16
R7	KR-56	250,000 ohm 1/4 watt carbon resistor	.16
R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
	L-49BG	Plug-in ballast resistor. (Interchangeable with L-49B)	.55
C1, C2	5TC-423	Two-gang variable condenser	2.40
C3	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
C13	AC-6	0.1 mf, 200 volt tubular condenser	.20
C12, C14	LC-64	0.05 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-348D	Dual 20 mf, 150 volt dry electrolytic condenser	.90
	3QS-257B	5" dynamic speaker	4.45
	4DS-264A	Tone control switch	.25
	4BL-94	Pilot light, 6.8 volt, 25 amp, Mazda No. 44	.20
	5TD-68	Dial face	.20
	3RZ-484	Drive cord	.02
	3RZ-519	Drive cord spring	.02
	4UZ-700A	Dial pointer	.15
	4UZ-842	Dial crystal	.10

GENERAL NOTES

1. If replacements are made or the wiring distributed 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. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
Plate—blue
B plus—red
Grid return—black

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 and second i-f transformers are mounted on the left hand inside wall of the chassis. The trimmer for the first i-f transformer is accessible through the upper pair of holes in the chassis. The trimmer for the second i-f transformer is accessible through the lower 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. 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. 6.)

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 front section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

MODELS CL246, CL253

CL256 Chassis CL

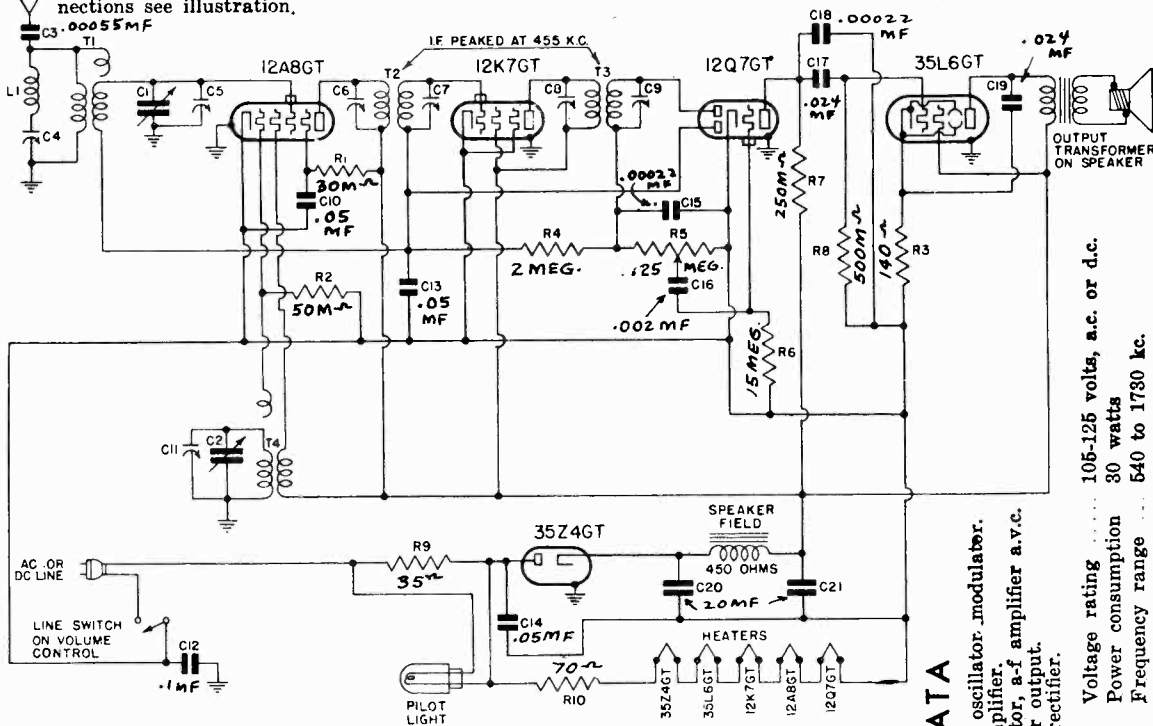
Schematic, Voltage

Alignment, Data

PRODUCTION CHANGE

CL chassis which use oscillator coil 6JT-466 or 4XT-458 may use 6JT-466A for replacement. For correct lug connections see illustration.

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



Plate—blue
B plus—red
Grid—green
Grid return—black

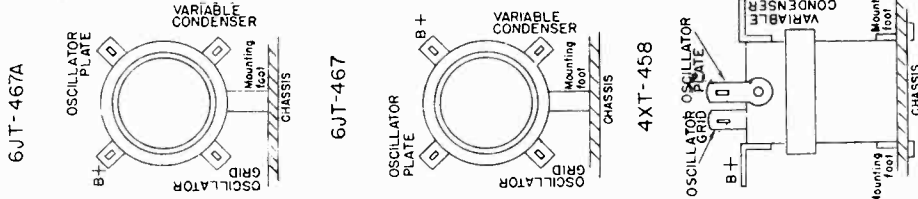
Output Transformer on Speaker
Voltage rating 105-125 volts, a.c. or d.c.
Power consumption 30 watts
Frequency range 540 to 1730 kc.

TUBE DATA

12A8 or 12A8GT, pentagrid oscillator-modulator.
12K7 or 12K7GT, first i-f amplifier.
12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
35L6 or 35L6GT, beam power output.
35Z4 or 35Z4GT, half-wave rectifier.

VIEW LOOKING AT BOTTOM OF CHASSIS SHOWING LEADS TO OSCILLATOR COILS

MOUNTING FOOT IS GROUND CONNECTION FOR ALL COILS



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 form 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 12A8 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. 5.)

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.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus 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.
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
35L6	87	94	5.2	—	35

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.

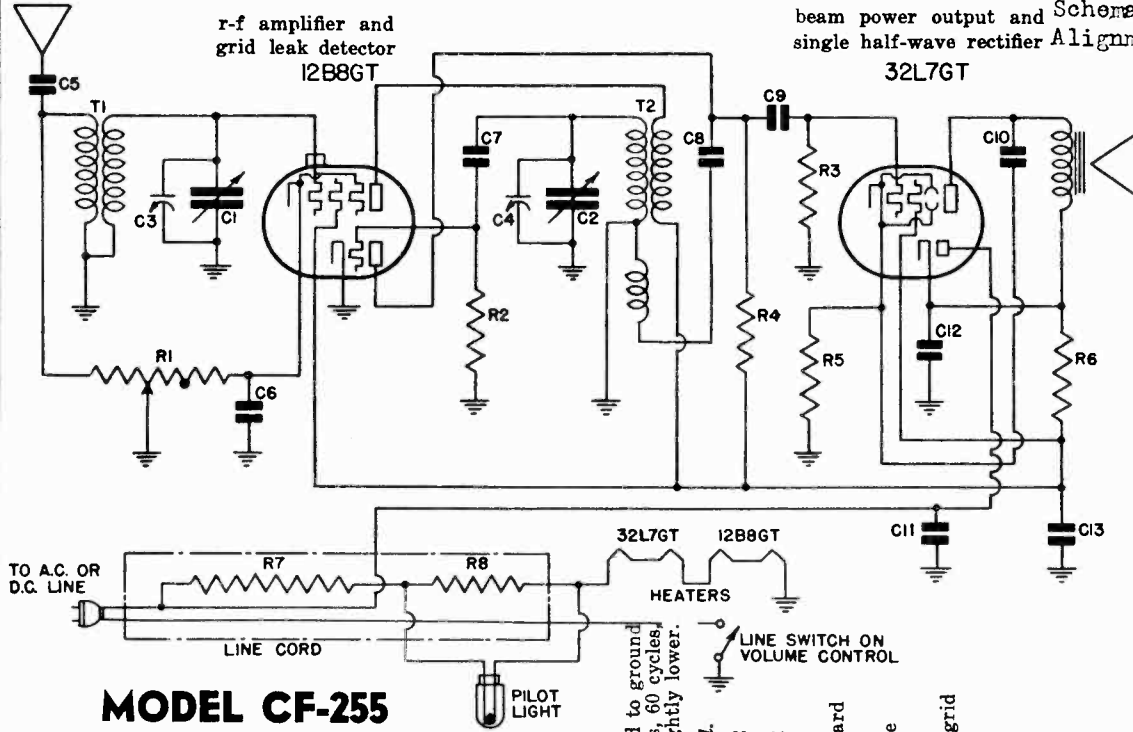
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL CF255

Chassis CF

beam power output and Schematic, Voltage Alignment, Parts
single half-wave rectifier



MODEL CF-255

CHASSIS MODEL CF

*Item	Part No.	DESCRIPTION	Effective as of March 1st, 1939	Price
T1	6FT-461	Broadcast antenna coil		.50
T2	6ET-462	Broadcast detector coil		.50
R1	6FR-346	Volume control 75,000 ohms with 200 ohm bias stop and line switch		.90
R2	3RR-275	10 megohm 1/4 watt resistor		.16
R3, R4	KR-56	500,000 ohm 1/4 watt carbon resistor		.16
R5	3FR-293	140 ohm 1/2 watt wire-wound resistor		.16
R6	6FR-348	2,400 ohm 1/2 watt carbon resistor		.16
R7, R8	6FW-142	Resistance line cord with pilot light section		.80
C1, C2	6FC-422	Two-gang variable condenser		2.30
C3, C4		Trimmers, part of variable condenser.		
C5	4XC-401	0.00055 mf mica condenser		.20
C6	BC-12	0.06 mf, 200 volt tubular condenser		.20
C7	CCC-127	0.01 mf, 200 volt tubular condenser		.20
C8	4XC-394A	0.00022 mf mica condenser		.20
C9	LC-65	0.02 mf, 400 volt tubular condenser		.20
C10	XXC-207	0.005 mf, 400 volt tubular condenser		.20
C11	LC-64	0.05 mf, 400 volt tubular condenser		.20
C12, C13	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser		.90
	6FS-364	4" magnetic speaker		2.80
	6FD-67	Dial pointer		.05
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44		.20
	3RZ-519	Drive cord spring		.02
	4YZ-772	Dial drive cord		.02

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram. †These condensers 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 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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	Plate	Screen	Fil.	Cathode
12B8GT { Pentode	95 (pin no. 3)	95 (pin no. 4)	12	2.1 (pin no. 1)
{ Triode	40 (pin no. 5)			0.0 (pin no. 6)
32L7GT Output	125 (pin no. 3)	95 (pin no. 4)	32	4.5 (pin no. 8)

Voltage at rectifier cathode—130 (pin no. 1)

The socket connections of the tubes used in the CF chassis are as follows, the numbering following standard designation R.M.A.

Tube 12B8GT: pin 1—r-f amplifier cathode
pin 2—heater
pin 3—r-f amplifier plate
pin 4—r-f amplifier screen grid
pin 5—detector plate
pin 6—detector cathode
pin 7—heater
pin 8—detector grid

R-f amplifier grid connection is made to grid cap.

Tube 32L7GT: pin 1—rectifier cathode
pin 2—heater
pin 3—output plate
pin 4—output screen grid
pin 5—output grid
pin 6—rectifier plate
pin 7—heater
pin 8—output cathode

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1600 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.

Examine the condenser drive assembly bracket and locate five dots embossed along the front. Rotate the variable condenser to maximum capacity and set the pointer just below the bottom dot. Then rotate the condenser until the pointer is just below the second dot from the top. Feed 1600 kc to the antenna through a .0001 mf condenser and adjust both trimming condensers for maximum response.

A.C.—D.C. T.R.F. Receiver—Two Tubes

Voltage rating 105 to 125 volts, a.c. or d.c.
Power consumption 40 watts.
Frequency range 540 to 1730 kc.

MODELS CM260, CM266
 CM267 Early, Late EMERSON RADIO & PHONOGRAPH CORP.
 Chassis CM.
 Above and Below Serial 2690200

Schematics
 Voltage
 Alignment, Changes
 Parts list

GENERAL NOTES

- If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
- 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:
 B plus—blue
 B minus—black
 Grid return—black
- Models CM-260, 266 and 267 have self-contained antennas and do not require additional antenna connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal screw is provided in the cabinet for antenna connection. A hole in the bottom of the cabinet from the antenna to make this connection. The screw is easily reached through a hole in the bottom of the cabinet.
- The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcast quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.
- On some models the bottom of the chassis is covered with a metal bottom plate. To reach the internal chassis parts, this plate must be unscrewed and removed.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.
 An output heterodyne 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 to the right of the speaker. The trimmers are accessible through holes in the top of the can.

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

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 oscillator coil is located underneath the chassis, beneath the speaker. The loop antenna acts as the antenna coil.

I-f and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

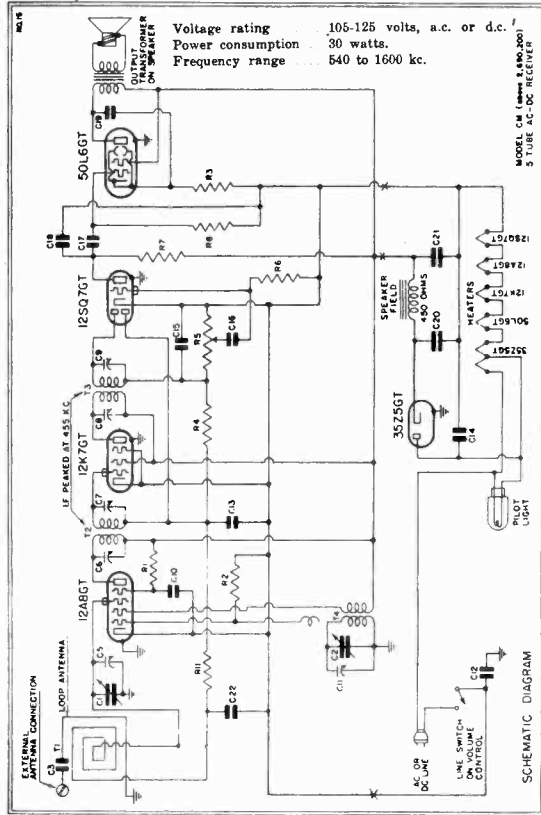
Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

Item	Part No.	DESCRIPTION	PRICE
T1	6MW-155	Loop antenna assembly	(Subject to change without notice)
T4	GJT-467A	Oscillator coil	\$1.45
T2	GJT-466U	Double-tuned 455 kc first i-f transformer	.35
T3	6MT-472U	Double-tuned 455 kc second i-f transformer	1.10
R1	2CR-193	30,000 ohm 1/4 watt carbon resistor	1.05
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	3FR-293	140 ohm 1/4 watt wire-wound resistor	.16
R4	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	4XR-385	Volume control .25 megohm with line switch (for CM-266)	.90
R6	4XR-355A	Volume control .25 megohm with line switch (for CM-260 and CM-267)	.85
R7, R8	4XR-327	150 megohm 1/4 watt carbon resistor	.16
R9, R10	KR-56	500,000 ohm 1/4 watt carbon resistor (see production change no. 1)	.25
		Tapped metal-clad wire-wound resistor (see production change no. 2)	.16
		R9—35 ohms; R10—70 ohms (Each section—2 watts)	
R11	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
C1, C2	4XC-391C	Two-gang variable condenser	2.40
+C5, C11		Trimmers, part of variable condenser	
+C6, C7, C8, C9		Trimmers, part of i-f transformers	
C10, C13, C22	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16, C3	3HC-274	0.0022 mf, 600 volt tubular condenser	.20
C17, C21	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C20, C21	6JC-425	Dual 20 mf, 150 volt dry electrolytic condenser	.90
		5/2-924 Drive cord spring	.05
		6JH-24 Drive shaft (for CM-266)	.05
		6JH-24A Drive shaft (for CM-260 and CM-267)	.05
		6JH-24B Drive shaft (for CM-266)	.05
		4XZ-512B Dial pointer (for CM-266 and CM-267)	.22
		4MZ-588B Dial pointer (for CM-260 and CM-267)	.20
		4XZ-515A Dial crystal (for CM-266)	.40
		4XE-3 Dial crystal (for CM-260 and CM-267)	.40
		4XM-367 Drive pulley	.10

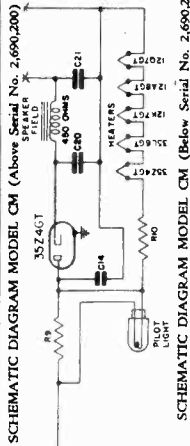
* Item number locates the article on the schematic diagram.
 † Not supplied separately.

PRODUCTION CHANGES

- Chassis bearing serial numbers below 2,690,200 use R7—250,000 ohm 1/4 watt carbon resistor
- Resistor R9—R10, part no. 6JR-353, is not used on chassis bearing serial numbers above 2,690,200.



NOTE: A 35L6GT output tube is used for sets of lower serial numbers.



THE TUBE COMPLEMENT IS AS FOLLOWS:

- For serial numbers below 2,690,200:
- 1—12A8 or 12A8GT pentagrid oscillator/modulator
 - 1—12K7 or 12K7GT diode detector, a-f amplifier, a.v.c.
 - 1—12X7 or 12X7GT beam power output
 - 1—35L6 or 35L6GT half-wave rectifier
- For serial numbers above 2,690,200:
- 1—12A8 or 12A8GT pentagrid oscillator/modulator
 - 1—12K7 or 12K7GT diode detector, a-f amplifier, a.v.c.
 - 1—12X7 or 12X7GT beam power output
 - 1—35Z5 or 35Z5GT diode detector and beam power output half-wave rectifier
- All tubes are replaceable with either metal or equivalent barium glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a barium size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

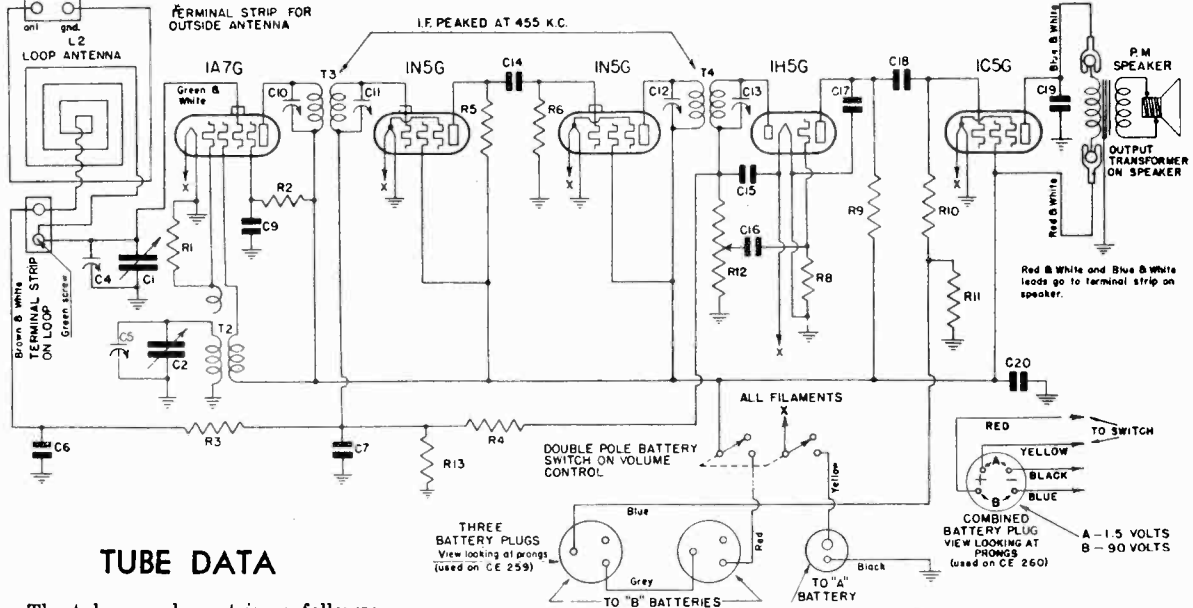
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus a.c. All readings except heaters and cathodes were taken on 280 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	For serial numbers below 2,690,200:		For serial numbers above 2,690,200:	
	Plate	Cathode	Plate	Cathode
12A8	50	0	88	0
12K7	94	0	88	0
12X7	94	0	88	0
35L6	40	0	88	5.7
35L6	87	5.2	88	5.7

Voltage at 35Z4 cathode—121 volts.
 Voltage across speaker field—27 volts.
 Voltage across pilot light section of ballast resistor (R9)—3.5.
 Voltage drop across entire ballast resistor (R9 and R10)—13.5.

Schematic, Voltage Batt. Wiring, Changes EMERSON RADIO & PHONOGRAPH CORP. MODELS CE259, CE260 Chassis CE



TUBE DATA

The tube complement is as follows:

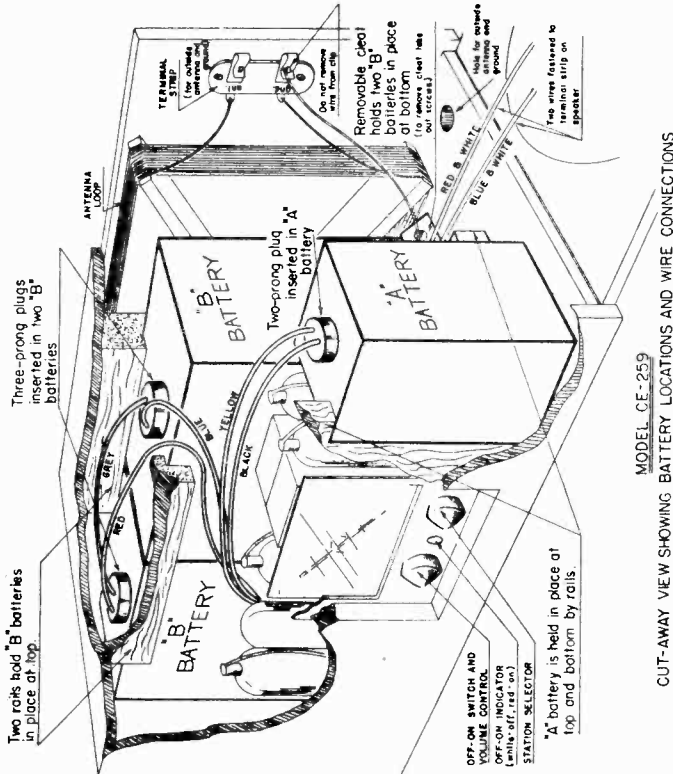
- 1—1A7G, oscillator-modulator
- 1—1N5G, 1st i-f amplifier
- 1—1N5G, 2nd i-f amplifier
- 1—1H5G, 2nd detector, a.v.c., a-f amplifier
- 1—1C5G, pentode output

Five-Tube Battery-Operated Superheterodyne

MODELS CE-259 and CE-260

CHASSIS MODEL CE

Current drain "A" battery—0.3 amps.
 "B" battery—0.010 amps. with no signal
 Frequency range 540 to 1730 kc on early Model CE-259
 530 to 1600 kc on all Model CE-260
 and later Model CE-259



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	Plate	Osc. Plate	Fil.
1A7G	82	82	1.5
1N5G 1st i-f	70	—	1.5
1N5G 2nd i-f	82	—	1.5
1H5G	25	—	1.5
1C5G	77	—	1.5

Bias for the 1C5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.8 volts.

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,319,650 use:
 - (a) Double-tuned 455 kc first i-f transformer, part no. 4XT-434A
 - (b) Double-tuned 455 kc diode i-f transformer, part no. 4XT-435B
 - (c) Oscillator coil, Part No. 4XT-433
 - (d) The low side of the volume control (R12) is connected to A minus (chassis) as shown in the schematic.
 - (e) Condenser C19 is connected from plate to B plus instead of from plate to ground as shown in the schematic.
 - (f) Resistor R2 is 50,000 ohms, Part No. KR53, instead of 30,000 ohms.
2. Chassis bearing serial numbers below 2,408,049 use dial face, part no. 4XD-51
3. On Model CE-260 the antenna trimming condenser (C4) is mounted on the loop antenna frame instead of on the variable condenser.
4. In chassis bearing serial numbers above 2,319,650 condenser C15 is connected from the high side of the volume control to ground instead of to A plus as shown in the schematic.

MODELS CE259, CE260

Chassis CE EMERSON RADIO & PHONOGRAPH CORP.
Socket, Trimmers
Alignment, Parts

MODELS CE-259 AND CE-260

GENERAL NOTES

1. Batteries: The Models CE-259 and CE-260 are designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

FOR MODEL CE-259 (Portable)

Type Battery	No. Req.	Eveready Part No.	Ray-o-vac Part No.
1 1/2 volt "A"	1	742 (plug-in type)	P-94A (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)

FOR MODEL CE-260

Combined "A" and "B" Pack	1	748 (plug-in type)	AB82 (plug-in type)	(Also Burgess No. 17G-D60)
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2. The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

3. The color coding of the battery cable is as follows:

Red—B plus, 90 volts	Yellow—A plus, 1.5 volts
Blue—B minus	Black—A minus

4. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

5. Models CE-259 and CE-260 have self-contained antennas and do not require additional antenna or ground connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal strip is provided in the cabinet for antenna and ground connections. (See diagram on next page.)

6. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume. This procedure is not necessary for receivers with outside antennas.

ADJUSTMENTS

An oscillator with frequencies of 465 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 oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

The loop antenna acts as the antenna coil. The trimmer for the loop, when provided, is on the front section of the variable condenser. (See Production Change No. 3)

I-f Alignment

Model CE-259 (below serial number 2,319,650). Swing variable condenser to maximum capacity position.

Model CE-259 (above serial number 2,319,650) and CE-260. Swing variable condenser to minimum capacity position.

Feed 465 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection 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.

Battery Installation for Model CE-259 (See diagram on inside page)

To install and connect the batteries in the portable cabinet observe the following procedure:

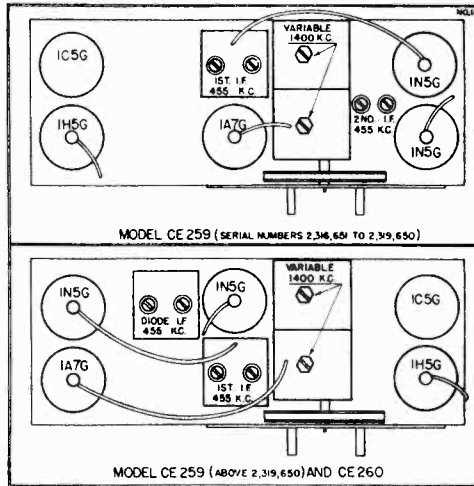
1. Open the end side of the cabinet (side with speaker grille) by removing the two wood screws in the top corners of the panel. The panel is hinged at the bottom. Open the panel by pulling the small leather tab at the top edge.
2. A small wood cleat is fastened to the bottom of the cabinet directly below the two large wood rails. Remove this cleat by taking out the small wood screws.
3. The three-prong plugs on the battery cable from the receiver should be plugged into the two "B" batteries.
4. Slide the "B" batteries, one at a time, in an upright position between the two wood rails in the cabinet, as indicated in the diagram.
5. Replace the small wood cleat in front of the second battery and fasten it securely with the wood screws.
6. The small two-prong plug in the battery cable should be plugged into the "A" battery. Place the "A" battery in the front corner of the cabinet, as shown in the diagram.
7. Be sure that all of the cable wires are free and clear of the receiver. Care should be taken also to keep the wires from jamming between the wood rails and the batteries.
8. Close the end panel and replace the wood screws, fastening them securely.

Battery Installation for Model CE-260

The cabinet for this model is designed to house completely the combined "A" and "B" pack. Place the battery pack in the cabinet at the rear of the receiver and insert the four-prong plug of the battery cable into the socket on the top of the battery.

If it is desired to use separate "A" and "B" plug-in type batteries, a special cable harness is available for connecting the batteries together. The receiver battery cable then may be plugged into the socket on the special cable harness.

When ordering replacement parts specify part numbers.



LOCATION OF TUBES AND TRIMMER CONDENSERS
MODELS CE-259 AND CE-260
(See Production Change No. 3)

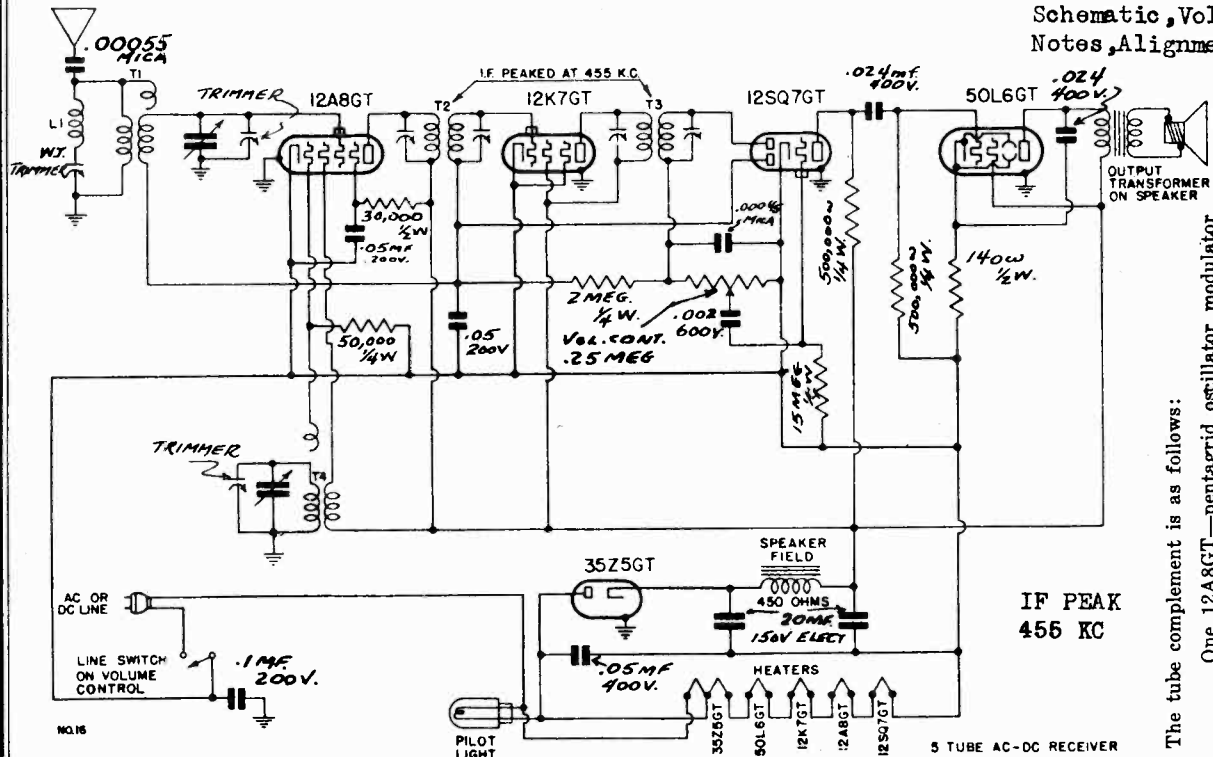
Part No.	Description	Price List Feb. 1939 (1939)	Price to change without notice
L2	Loop antenna assembly (for CE-259 only)	.145	.145
L3	Loop antenna assembly (for CE-260 only)	1.60	1.60
T2	Oscillator coil (see Production Change No. 1c)	.35	.35
T3	Double-tuned 465 kc first i-f transformer (see production change no. 1a)	1.10	1.10
T4	Double tuned 465 kc diode i-f transformer (see production change no. 1b)	1.10	1.10
R1	200,000 ohm 1/4 watt carbon resistor	.16	.16
R2	30,000 ohm 1/4 watt carbon resistor (see Production Change No. 1f)	.16	.16
R3	100,000 ohm 1/4 watt carbon resistor	.16	.16
R4	2 megohm 1/4 watt carbon resistor	.16	.16
R5	10,000 ohm 1/4 watt carbon resistor	.16	.16
R9	.5 megohm 1/4 watt carbon resistor	.16	.16
R10	740 ohm 1/2 watt wire wound resistor	.16	.16
R11	Volume control 500,000 ohms with double pole line switch (for CE-259)	1.05	1.05
R12	Volume control 500,000 ohms with double pole line switch (for CE-260)	1.05	1.05
C1, C2	Two-gang variable condenser	2.50	2.50
C4, C5	Trimmer, part of variable condenser (see Production Change No. 3)	.20	.20
C6, C7	0.05 mf, 200 volt tubular condenser	.20	.20
C9, C18	0.02 mf, 400 volt tubular condenser	.20	.20
C10, C11, C12, C13	Trimmer, part of i-f transformer	.20	.20
C14	0.0002 mf, 600 volt tubular or mica condenser	.20	.20
C15, C17	0.00022 mf mica condenser (see Production Change No. 4)	.20	.20
C16	0.01 mf, 400 volt tubular condenser	.20	.20
C19	0.001 mf, 600 volt tubular condenser	.20	.20
C20	8 mf, 100 volt dry electrolytic condenser	.60	.60
6ES-367	5" permanent magnet dynamic speaker	6.25	6.25
6ED-73	Dial face (see production change no. 2)	.25	.25
6ED-69	Indicator dial	.10	.10
4MZ-588B	Dial pointer	.20	.20
4XE-3	Dial crystal	.20	.20
5Z-324	Drive cord spring	.02	.02
4YZ-772	Dial drive cord	.02	.02
6EW-136	Battery cable (for CE-259)	.65	.65
6EW-148	Battery cable (for CE-260)	.75	.75

† Not supplied separately.

* Item number locates the article on the schematic diagram.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CR261, CR262
CR274 Chassis CR
Schematic, Voltage
Notes, Alignment



The tube complement is as follows:
 One 12A8GT—pentagrid oscillator modulator
 One 12K7GT—first i-f amplifier
 One 12SQ7GT—diode detector, a-f amplifier, a.v.c.
 One 50L6GT—beam power output
 One 35Z5GT—half-wave rectifier

MODELS CR-261, CR-262 and CR-274

CHASSIS MODEL CR
ALIGNMENT AND LOCATION OF TRIMMERS

IF. 455kc through .01 mf. cond. to grid of 12A8G
 1st IF, top of chassis right of speaker; 2nd IF
 under chassis beneath variable, holes provided in
 top of chassis.—Variable max. oap. Adjust trimmers
 to max. response.
 Wave Trap (see GENERAL NOTES) Feed 455kc through
 .0001 mf. cond. to ant. lead. Adjust for minimum
 response.
 RF. Dial at 140. Feed 1400kc through .0001 mf. cond.
 to ant. lead. Adjust osc. trimmer (rear section of
 variable), then ant. trimmer (front section of var-
 iable) for maximum response.

Voltage rating 105-125 volts, a.c. or d.c.
 Power consumption 30 watts.
 Frequency range 540 to 1730 kc.

GENERAL NOTES

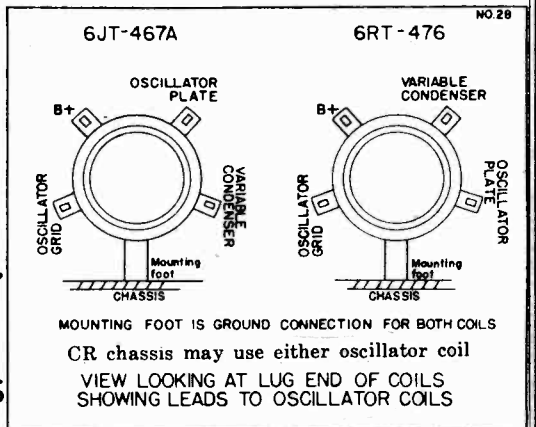
1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:
 Grid—green
 Grid return—black
 Plate—blue
 B plus—red
4. 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.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) 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.
12A8GT	88	45	0	88	12
12K7GT	88	88	0	—	12
12SQ7GT	40	—	0	—	12
50L6GT	82	88	5.7	—	50

Voltage at 35Z5 cathode—115 volts. Voltage across speaker field—27 volts. Voltage across pilot light—4.5 volts.



MOUNTING FOOT IS GROUND CONNECTION FOR BOTH COILS
 CR chassis may use either oscillator coil
 VIEW LOOKING AT LUG END OF COILS
 SHOWING LEADS TO OSCILLATOR COILS

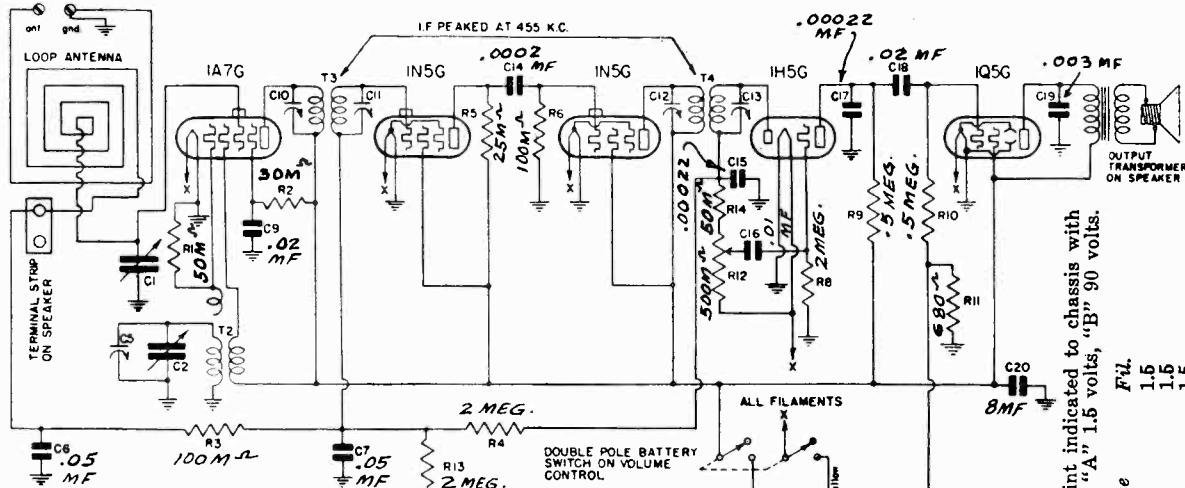
MODEL CT275

Chassis CT
Schematic, Voltage
Alignment

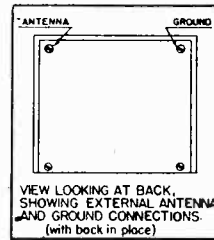
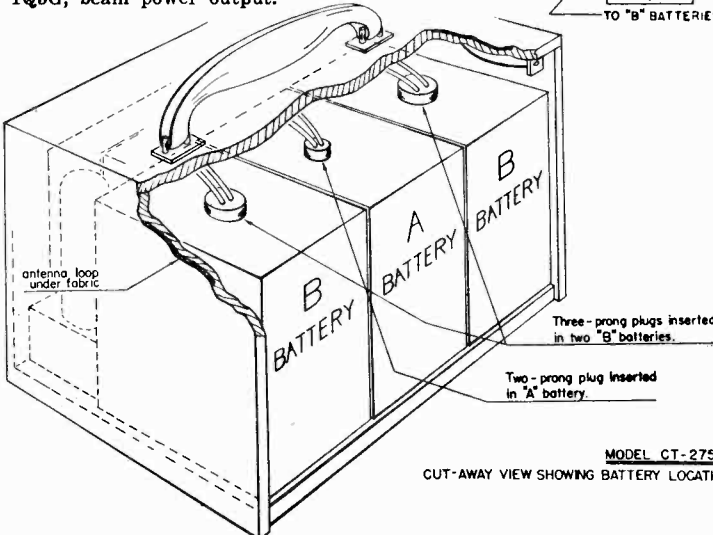
EMERSON RADIO & PHONOGRAPH CORP.

Current drain "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal
Frequency range .. 530 to 1600 kc

TERMINALS FOR
OUTSIDE ANTENNA



- 1A7G, oscillator-modulator.
- 1N5G, 1st i-f amplifier.
- 1N5G, 2nd i-f amplifier.
- 1H5G, 2nd detector, a.v.c., a-f amplifier
- 1Q5G, beam power output.



MODEL CT-275
CUT-AWAY VIEW SHOWING BATTERY LOCATIONS AND WIRE CONNECTIONS

Batteries: The Model CT-275 is designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

Type Battery	No. Req.	Eveready Part No.	Rayovac Part No.	Burgess Part No.
1½ volt "A"	1	741		
45 volt "B"	2	(plug-in type) 762	P-5303 (plug-in type)	8F (plug-in type) B30-P1 (plug-in type)

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

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

The color coding of the battery cable is as follows:

- Red—B plus, 90 volts
- Blue—B minus
- Yellow—A plus, 1.5 volts
- Black—A minus

Location of Coils and Trimmer Adjustments

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is the one between the speaker and the variable condenser. The diode i-f transformer is the one behind the speaker. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

I-f Alignment

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust the oscillator trimmer (on rear section of variable condenser) for maximum response. No alignment necessary on antenna circuit.

VOLTAGE ANALYSIS

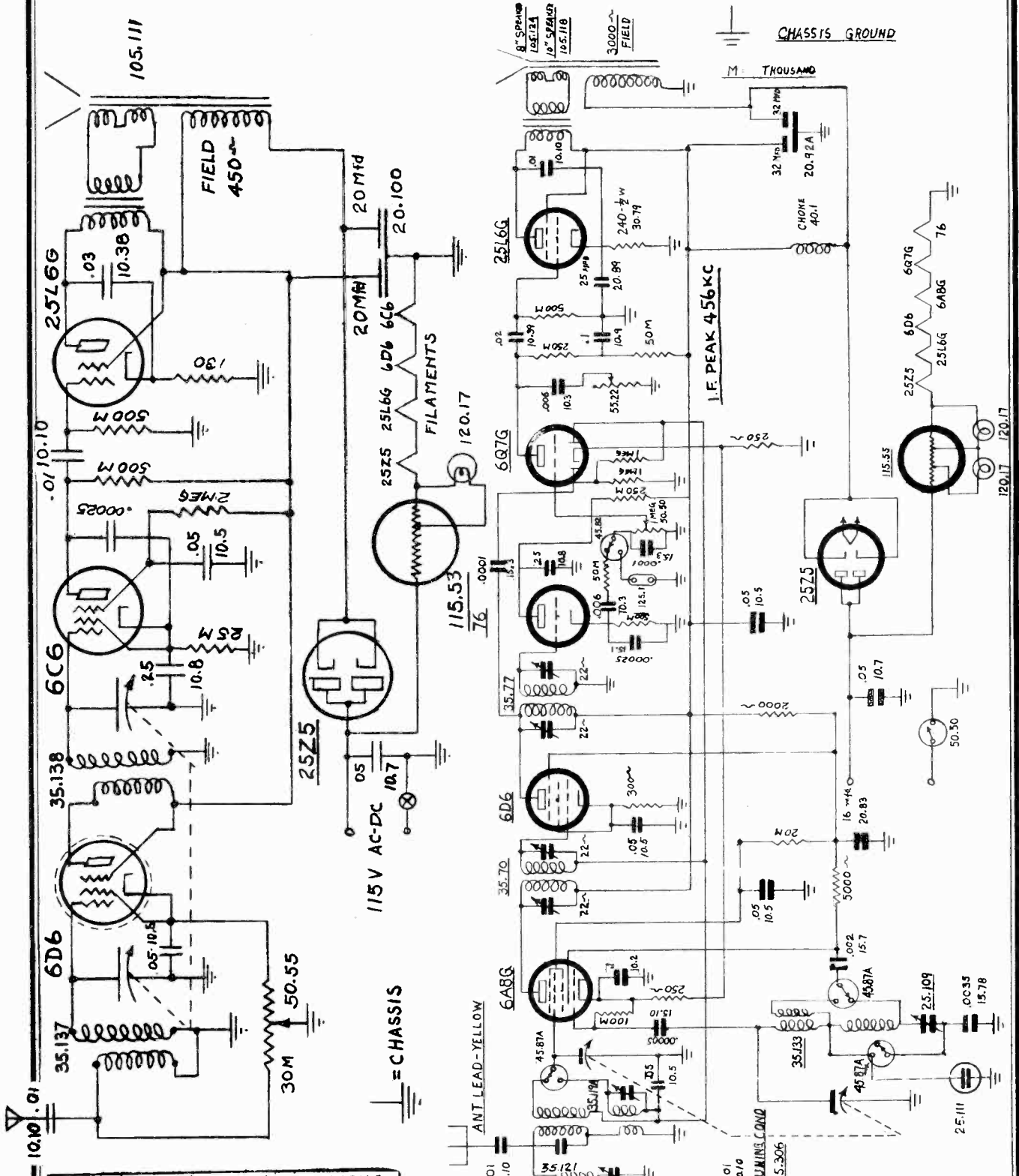
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	Plate	Screen	Fil.
1A7G	82	52	1.5
1N5G	48	82	1.5
1N5G	82	82	1.5
1H5G	25	82	1.5
1Q5G	77	82	1.5

Bias for the 1Q5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.0 volts.

FADA RADIO & ELECTRIC CO

MODEL 5F50
 MODEL 6A70
 Schematics



DRAWN	CHECKED	APPROVED	DATE	SCALE
<i>A.H.</i>	<i>A.H.</i>		9-26-38	

DRAWING NO. **MODEL 5F50**

FADA RADIO & ELECTRIC CO.				
TITLE MODEL 6A70				
DESCRIPTION				
DRAWN	CHECKED	APPROVED	DATE	SCALE
<i>A.H.</i>	<i>A.H.</i>		9-26-38	

MODEL 5F60
 MODEL 460
 MODEL 461

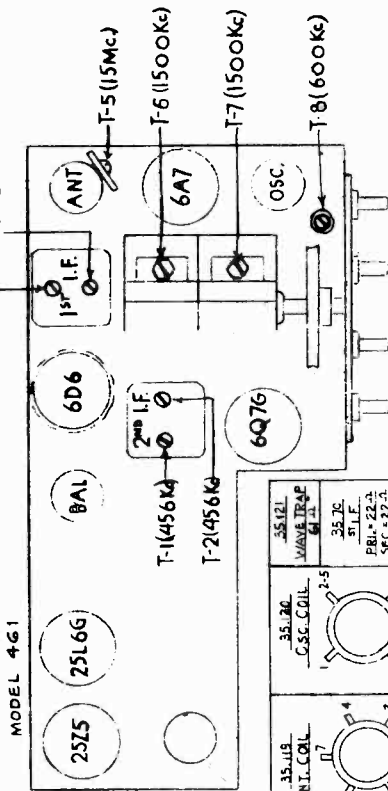
FADA RADIO & ELECTRIC CO

Alignment, Socket
 Trimmers, Voltage

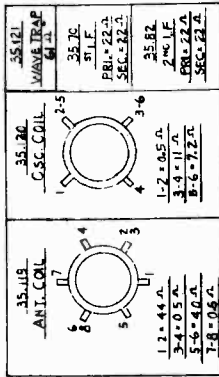
FOR OTHER DATA SEE INDEX

MODEL 5F60 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A80T	105	80	0	105
6K7GT	102	104	0	-
6Q7GT	45	-	0	-
25L6GT	95	104	7	-
25Z6GT	120	-	135	-



ALIGNMENT LAYOUT



MODEL 461

FADA RADIO MODEL 461 - 115 VOLTS - AC-DC - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles-6 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-25L6G-25Z5-115.41. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

MODEL 461 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

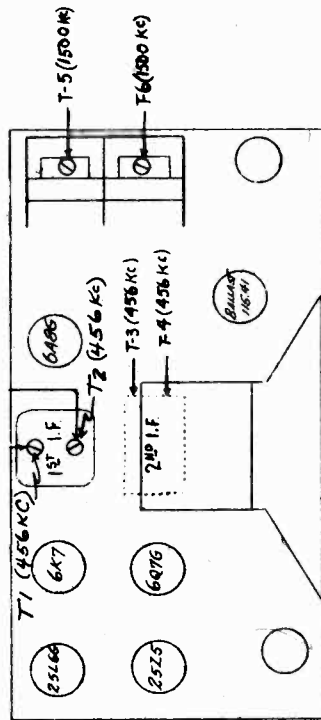
	Plate	Screen	Cathode	Anode
6A7	104	52	2.1	75
6D6	104	104	3.0	-
6Q7G	45	-	1.1	-
25L6	98	104	6.7	-
25Z5	120 A.C.	-	133	-

MODEL 5F60 MODEL 460 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:--Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

MODEL 460 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

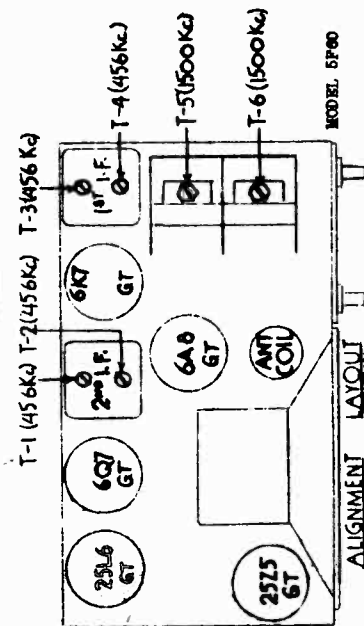
	Plate	Screen	Cathode	Anode
6A8G	110	50	2.5	105
6K7	110	110	2.5	-
6Q7G	45	-	1.1	-
25L6G	110	110	7.	-
25Z5	120 AC	-	133	-



ALIGNMENT LAYOUT

ALIGNMENT LAYOUT

ALIGNMENT LAYOUT

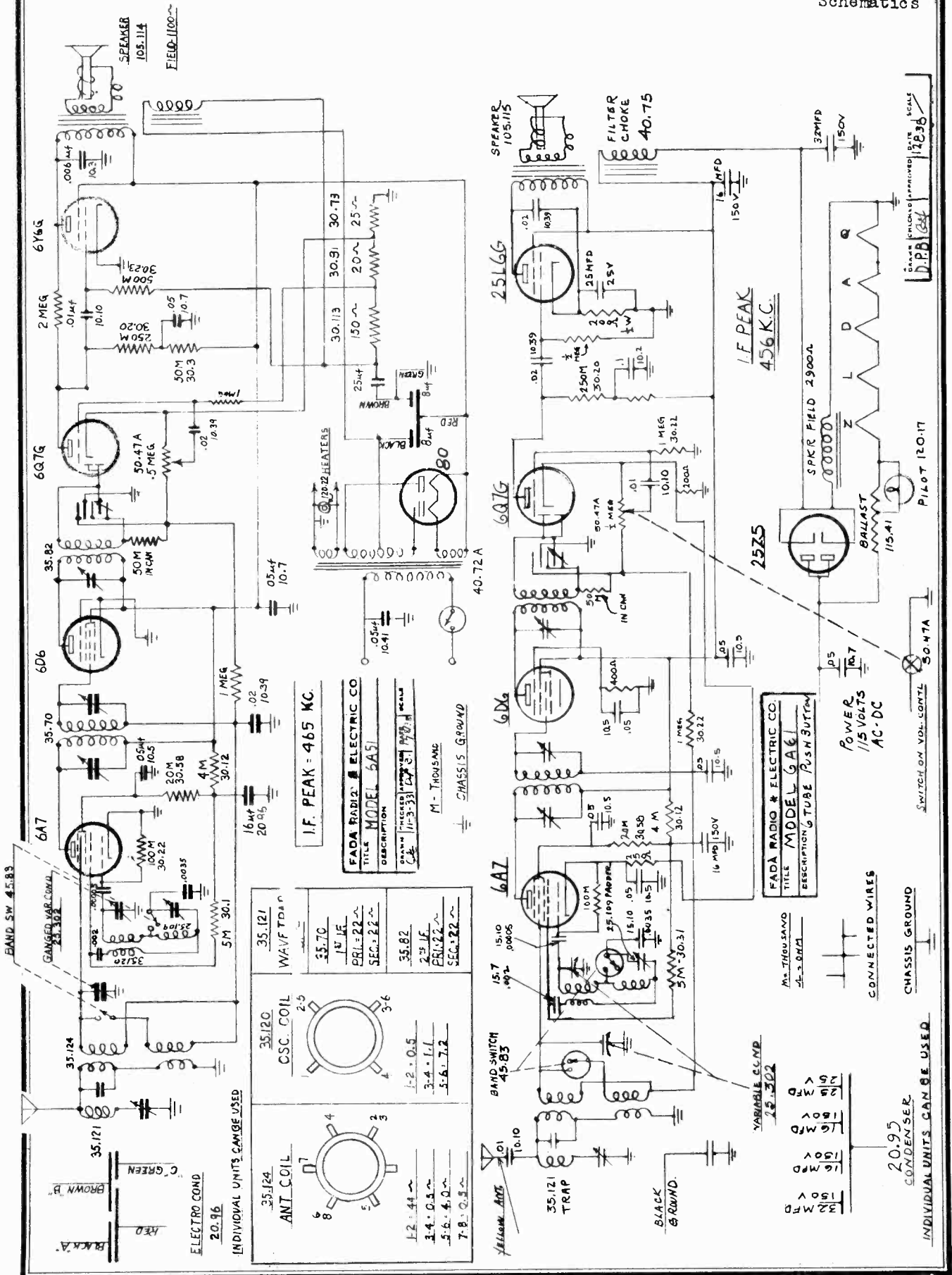


MODEL 5F60

ALIGNMENT LAYOUT

FADA RADIO & ELECTRIC CO

MODEL 6A51
MODEL 6A61
Schematics



I.F. PEAK = 465 KC.

FADA RADIO & ELECTRIC CO
TITLE MODEL 6A51
DESCRIPTION TUNING INDICATOR
PARTS LIST 11-3-33
M. THOMAS

35.124	ANT. COIL	1-2: 44~ 3-4: 0.5~ 5-6: 4.0~ 7-8: 0.5~
35.120	CSC. COIL	
35.121	WAVF. TRAP	
35.70	1 st I.F.	PRI: 22~ SEC: 22~
35.82	2 nd I.F.	PRI: 22~ SEC: 22~

FADA RADIO & ELECTRIC CO.
TITLE MODEL 6A61
DESCRIPTION 6-TUBE PUSH BUTTN

POWER 115 VOLTS AC-DC
SWITCH ON VOL. CONTRL 50.47A

DATE ENCLD APPROVED DATE SCALE
D.P.B. 1236

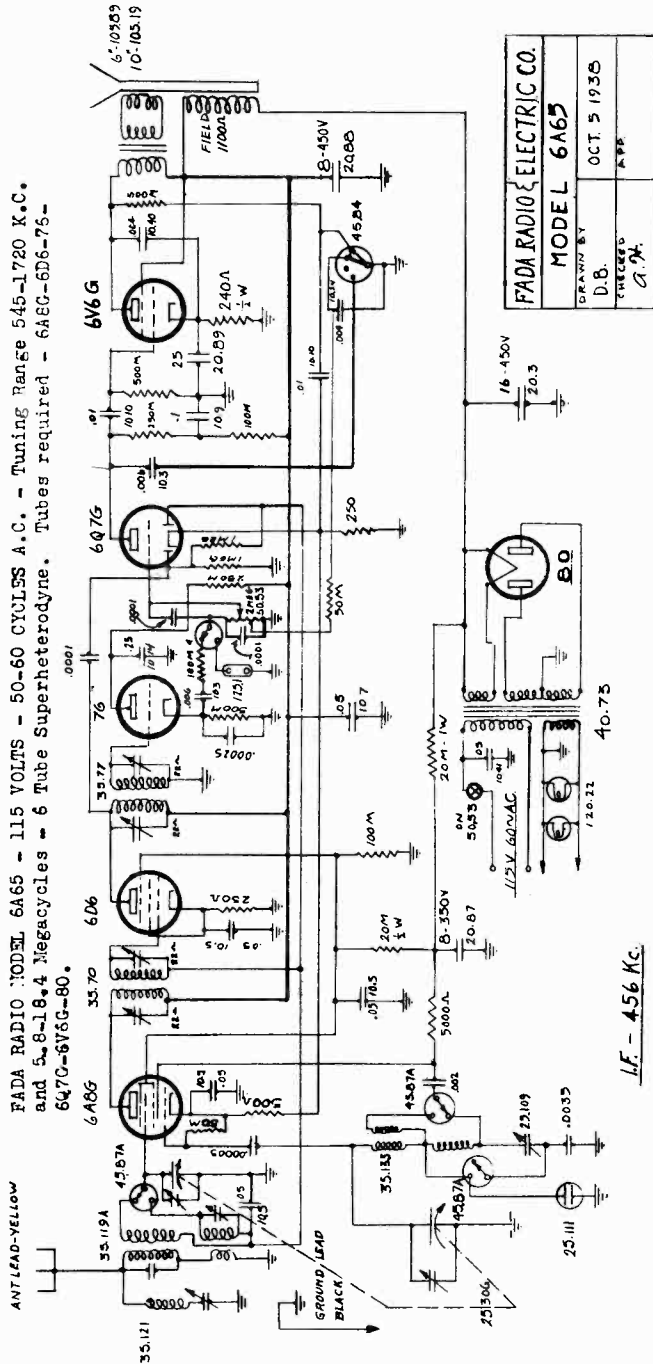
MODEL 6A65

Schematic, Voltage Alignment, Socket Trimmers

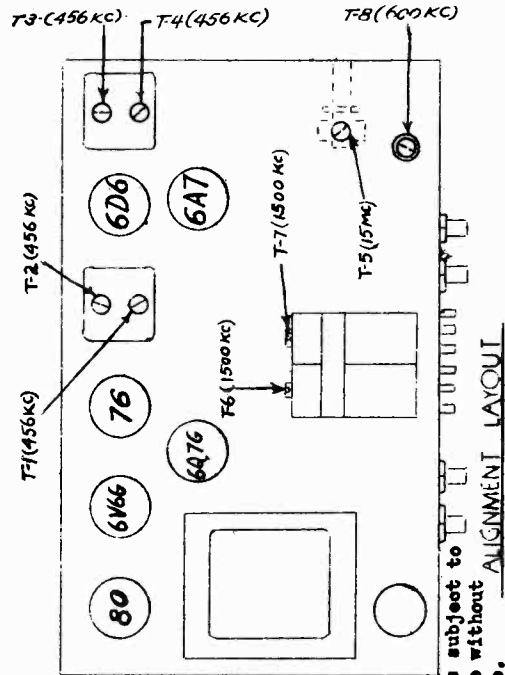
FADA RADIO & ELECTRIC CO

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A. C.

	Plate	Screen	Cathode	Anode
6A8G	258	70	4.	150
6D6	258	70	2.	
6Q7G	150	-	1.9	
6Y6G	250	258	11.4	
80	630 A.C. PLATE TO PLATE-330 D.C. F11. to Ground		19.	
76	250	-		



FADA RADIO & ELECTRIC CO.
 MODEL 6A65
 DRAWN BY D.B. OCT 5 1935
 CHECKED G.M.

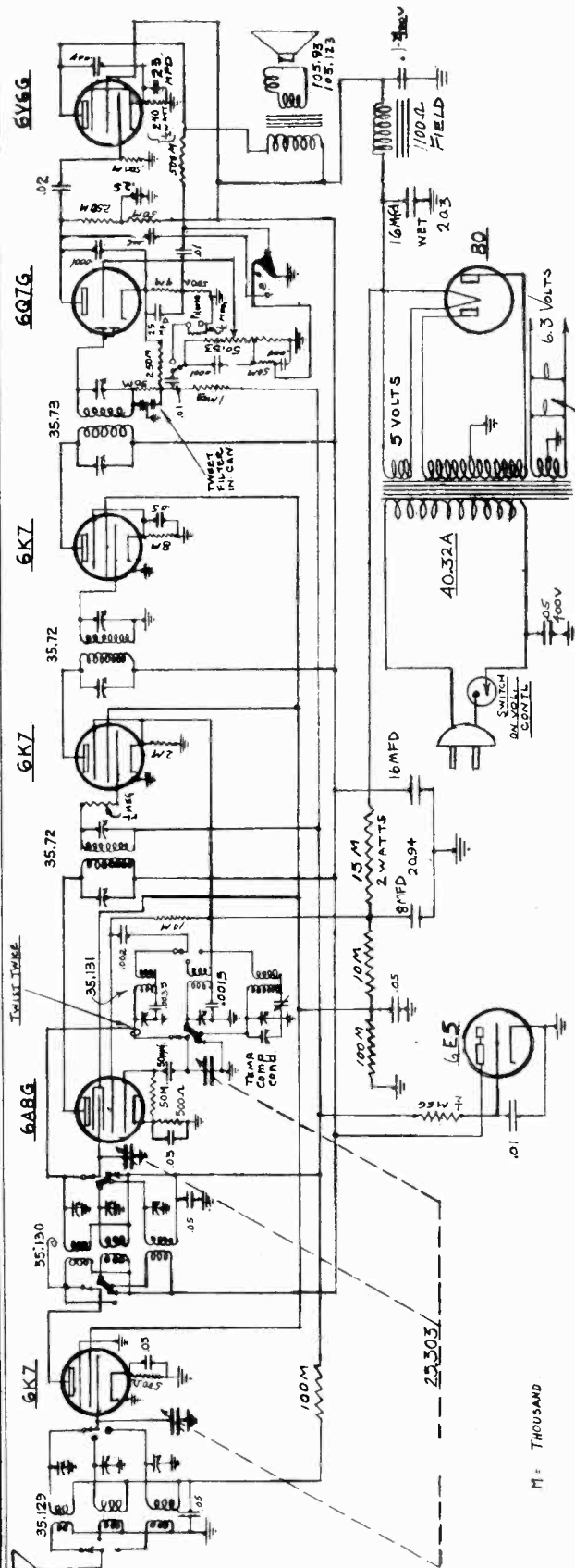


Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

- | | | |
|---------|-------------------|------|
| 50.53 | Volume Control | .85 |
| 45.84 | Tone Switch | .65 |
| 45.87A | Band Switch | .70 |
| 40.75 | Power Transformer | 3.60 |
| 35.119A | Antenna Coil | 1.35 |
| 35.133 | Oscillator Coil | .60 |
| 35.70 | I.F. Input | 1.20 |
| 35.77 | I.F. Output | 1.20 |
| 35.121 | I.F. Trap | .45 |
| 25.506 | Variable Cond. | 2.60 |
| 105.123 | Speaker (8") | 6.30 |
| 105.119 | " (10") | 7.75 |

FADA RADIO & ELECTRIC CO

MODEL 6A80
Schematic, Socket, Voltage
Trimmers,



I.F. PEAK 456 K.C.
Blue Beam Pilot Lights

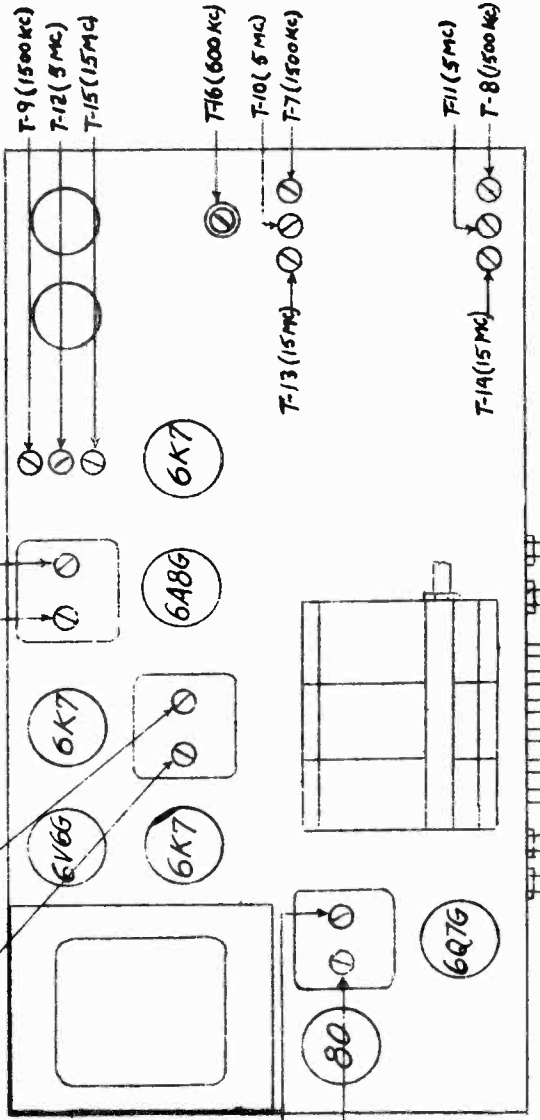
MODEL 6A80
FADA RADIO & ELEC. CITY
DRAWN BY - H.F. - 9-1-38
CHECKED BY D.P.B. - 11/2/38

CHASSIS GROUND

6K7G	6A8G	6K7G	6K7G
265	265	265	265
95	95	95	95
Cathode	3.8	5.2	7.2
Anode	-	136	-

6Q7	6V6G	80	F11(5Mc)
83	255	77	F10(5Mc)
Screen	265	to plate	F7(1500Kc)
Cathode	1.9	(355DC Fil. to	F6(600Kc)
Anode	-	Ground	F5(456Kc)

THESE READINGS TAKEN WITH LINE
VOLTAGE 120 A.C. 1000 OHM PER
VOLT METER.



ALIGNMENT LAYOUT

MODEL 6A80

Alignment

MODELS 366,366PT

Flash-O-Matic Data

FADA RADIO & ELECTRIC CO

FADA FLASH-O-MATIC SIX

INTRODUCTION: FADA Flash-o-Matic Six is an electrical type automatic tuning system that, once adjusted, will automatically "tune in" any one of six local broadcast stations operating between 540 and 1500 kilocycles (K. C.). While the Flash-o-Matic is not confined to local reception, it should be adjusted for stations affording the best reception and most frequently "tuned in."

ALIGNING PROCEDURE: It is advisable that the receiver remain in operation for fifteen minutes or more before attempting any adjustments. Now that the receiver has reached constant temperature the following adjustments are to be made to the trimmer condenser set screws located on the Flash-o-Matic tuning panel at the rear of the receiver.

- (a) Select six local broadcast stations whose programs are preferred; then, detach the station call letters from the station call letter tab sheets, which are supplied with each receiver.
- (b) The six Flash-o-Matic positions are numbered and arranged according to frequency limits.

There are number tabs (1 to 6) in the Flash-o-Matic escutcheon as shipped from the factory. These tabs show the relation between the Flash-o-Matic escutcheon and the Flash-o-Matic tuning panel positions and are to be removed, one at a time (with the aid of a pin) when inserting the station call letters.

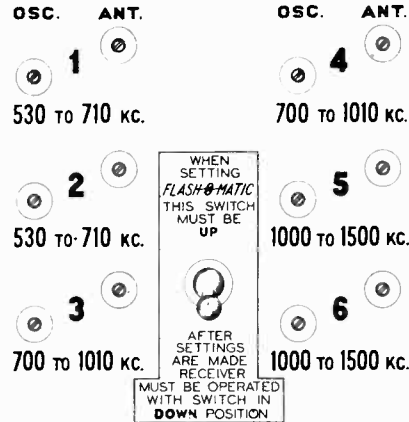
The six call letter tabs corresponding to the six broadcast stations which have been chosen, must be arranged in the Flash-o-Matic escutcheon so that the frequency in kilocycles of each station will fall within the frequency limits of the proper group.

If one of the chosen stations has an operating frequency of 550 K.C., it should be placed in the No. 1 (530 to 710 K.C.) group, a station of 600 K.C. should be placed in the No. 2 group, etc.

Each group has considerable overlap to allow for the selection of six stations which may have frequency assignments comparatively close together.

Having inserted the call letter tabs, cover each tab with a celluloid disc furnished with your receiver.

- (c) Two trimmer condenser set screws are provided for each one of the six station positions and are accessible at the rear of the receiver. All trimmer condenser set screw adjustments are marked as to their group number and frequency range coverage.
- (d) Tune in the station in the usual manner, using manual tuning, and determine the program.
- (e) Turn the wave band switch completely to the right (clockwise).
- (f) Turn the Flash-o-Matic selector switch to the position that corresponds to the group in which the desired station falls. This can be readily determined, for as the Flash-o-Matic selector switch is turned the various call letters will light up.
- (g) The toggle switch (SEE ILLUSTRATION) near the center of the Flash-o-Matic tuning panel should be thrown to the "UP" position during the following adjustments.
- (h) With the aid of a screwdriver adjust (by turning clockwise or counter-clockwise) the OSC. trimmer condenser set screw (SEE ILLUSTRATION) corresponding to the proper station, until the same station that was tuned in manually is heard. Turn the volume control down so that any variation in sound output can be noted and readjust set screw for maximum sound output. **TAKE PARTICULAR CARE WHILE MAKING THIS ADJUSTMENT THAT THE SAME STATION IS HEARD AND NOT A NETWORK STATION BROADCASTING THE SAME PROGRAM.**
- (i) Now adjust the ANT. trimmer condenser set screw (SEE ILLUSTRATION) having the same position number, for maximum sound output.
- (j) Repeat the same procedure as outlined above for each of the remaining five stations.
- (k) To insure accurate adjustment, it may be found advisable to repeat the operations outlined in paragraphs (h), (i) and (j).



- (l) Having completed the adjustments for the desired stations throw the toggle switch (SEE ILLUSTRATION) to "DOWN" position. The receiver is now ready for Flash-o-Matic operation and any one of the six stations to which the Flash-o-Matic has been adjusted, may be instantly "tuned in" by merely rotating the Flash-o-Matic selector knob to the desired station position.
- (m) In order to reset one or more positions of the Flash-o-Matic tuning to other stations, it is merely necessary to follow the instructions outlined above; additional celluloid discs are supplied for this purpose.

OPERATING PROCEDURE: For Flash-o-Matic tuning turn the wave band switch completely to the right (clockwise); this will reduce the illumination of the station selector dial. Then, turn the Flash-o-Matic selector switch until the call letters of the desired station are illuminated. To return to standard or manual tuning simply turn the wave band selector switch toward the left (counter-clockwise) to the desired wave band.

ALIGNMENT MODEL 6A80

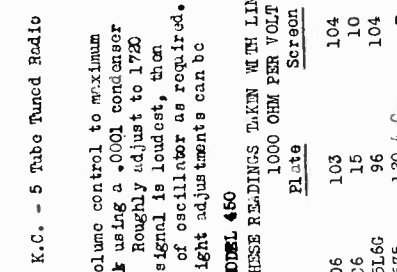
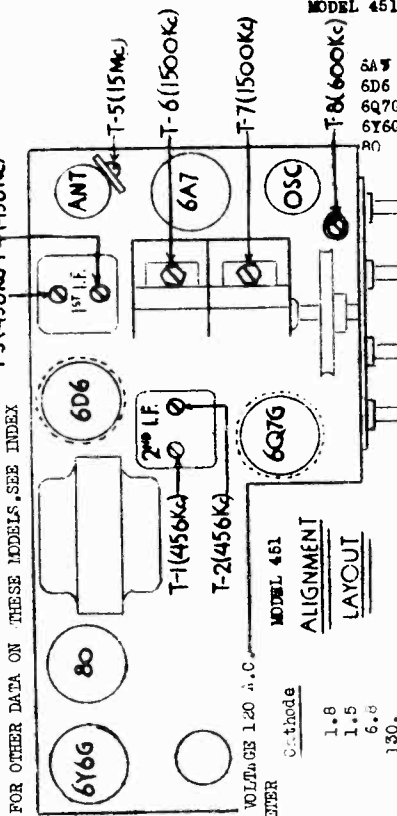
Tuning ranges 533-1730 K.C., 1.71-5.7 M.C. and 5.67 and 18.1 M.C. Tubes 3-6K7G-6A8G-6E5-6V6G-80.

Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. Turn volume control to maximum. Tone switch to high end. Band switch to broadcast. Connect modulated oscillator to grid of 6A8G in series with a .1 condenser and adjust trimmers 1-2-3-4-5-6 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 signal adjust trimmers 7-8-9 for maximum output, reducing input signal as required. Turn pointer to 600 K.C. Shift oscillator to 600 K.C. and adjust padder 16 for maximum while rocking gang condenser. Check alignment at 1000 K.C. Turn band switch to position 2 - turn pointer to 5 M.C. Use a 400 ohm carbon resistor for dummy antenna. Adjust trimmers 10-11-12 for maximum output. Check output at .8 and 2.4. Make sure 5 M.C. was aligned on fundamental and not image. Turn band switch to position 3 - turn pointer to 18 M.C. Adjust trimmers 13-14-15 for maximum. Check image at 14.1. Check sensitivity at 6 M.C.

Alignment, Voltage
Socket, Trimmers

FADA RADIO & ELECTRIC CO

MODELS 20, 20A,
20B, 20T (Late)
MODEL 450
MODEL 451
MODELS 454, 454T



MODEL 451 (TAKEN WITH LINE VOLTAGE 120 A.C.)

	Plate	Screen	Cathode	Anode
6A7	107	52	1.4	78
6D6	107	107	1.4	
6Q7G	55		1.2	
6Y6G	100	107	11	
607	414 A.C. Plate to Plate			

MODELS 20, 20A, 20B, 20T. VOLTAGE DATA

	PLATE	SCREEN	CATHODE	ANODE
6A7	110	50	2.5	105
6D6	110	110	2.5	
6Q7G	45	-	1.1	
25L6G	110	110	7	
25Z5	120 AC	-	133	

FOR OTHER DATA ON THESE MODELS, SEE INDEX

NOTE: MODEL 20T DIFFERS FROM MODEL 20A IN THAT IT HAS A SEPARATE SPEAKER AND A LONGER VOLUME CONTROL SHAFT. MODEL 20B DIFFERS IN THAT A 76 TUBE IS SUBSTITUTED FOR THE 6Q7G TO ACCOMMODATE AUTOMATIC VOLUME CONTROL.

MODEL 454, 454T. READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A8G	112	62	2.7	112
6K7	112	62	2.7	
6Q7G	50		1.1	
6Y6G	105	112	11.5	
80	414 AC Plate to Plate			

MODEL 450

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode
6D6	103	104	1.8
6C6	15	10	1.5
25L6G	96	104	6.6
25Z5	120 A.C.		130.

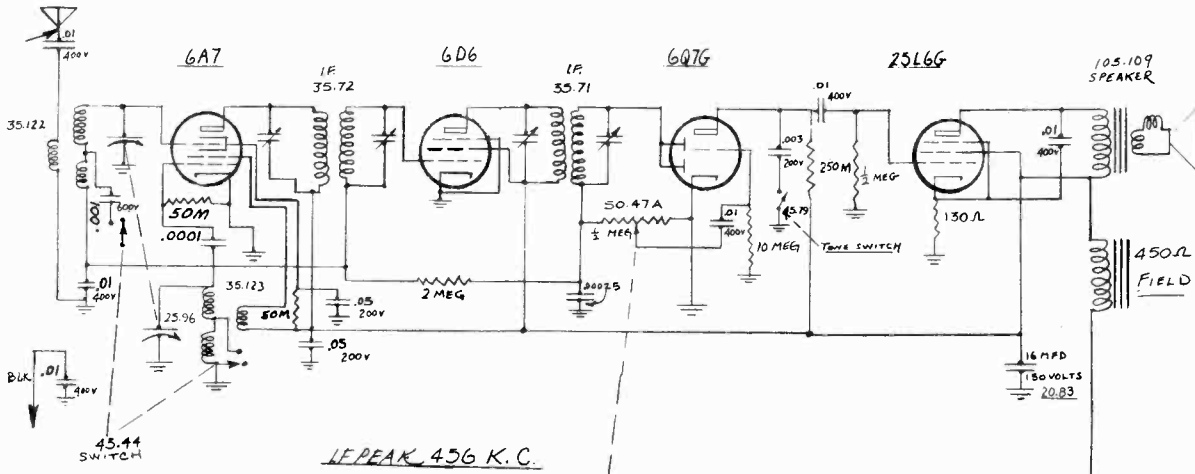
FADA RADIO MODEL 451 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 545-1720 K.C. - 6 and 5.8-16.4 Megacycles - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:—Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tune control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padding tube rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

FADA RADIO MODELS 454, 454T

FADA MODELS 20, 20A, 20B, 20T. - 115 VOLTS AD-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. —Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 K.C. with magic wand.

MODEL 30 Late
MODEL 31 Late
Schematics

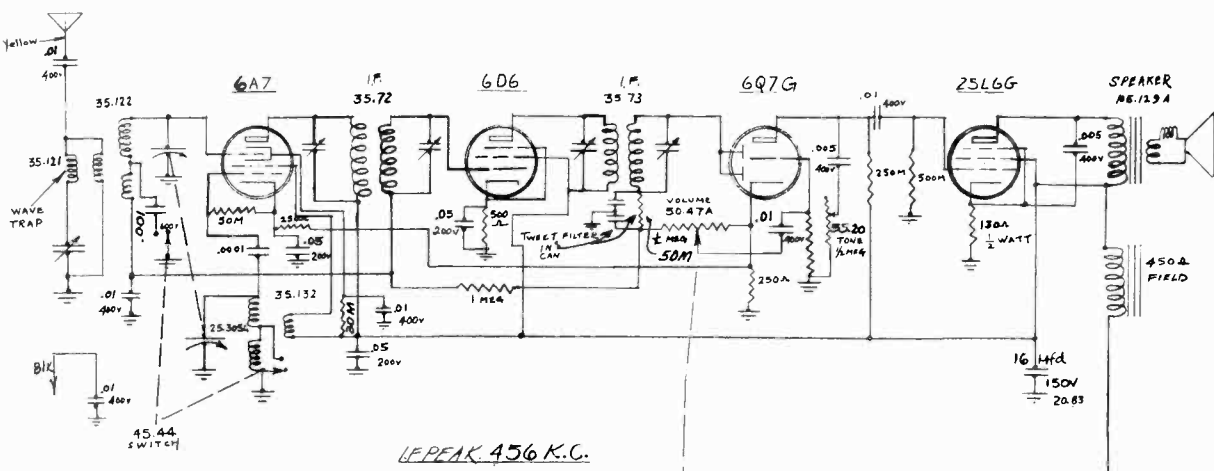
FADA RADIO & ELECTRIC CORP.



16 PEAK 456 K.C.

CONNECTED WIRES
CHASSIS GROUND
M: THOUSAND

FADA RADIO & ELEC CO
MODEL 30
DRAWN BY D.P.B. 11-17-38
CHECKED BY CH 12/8/38



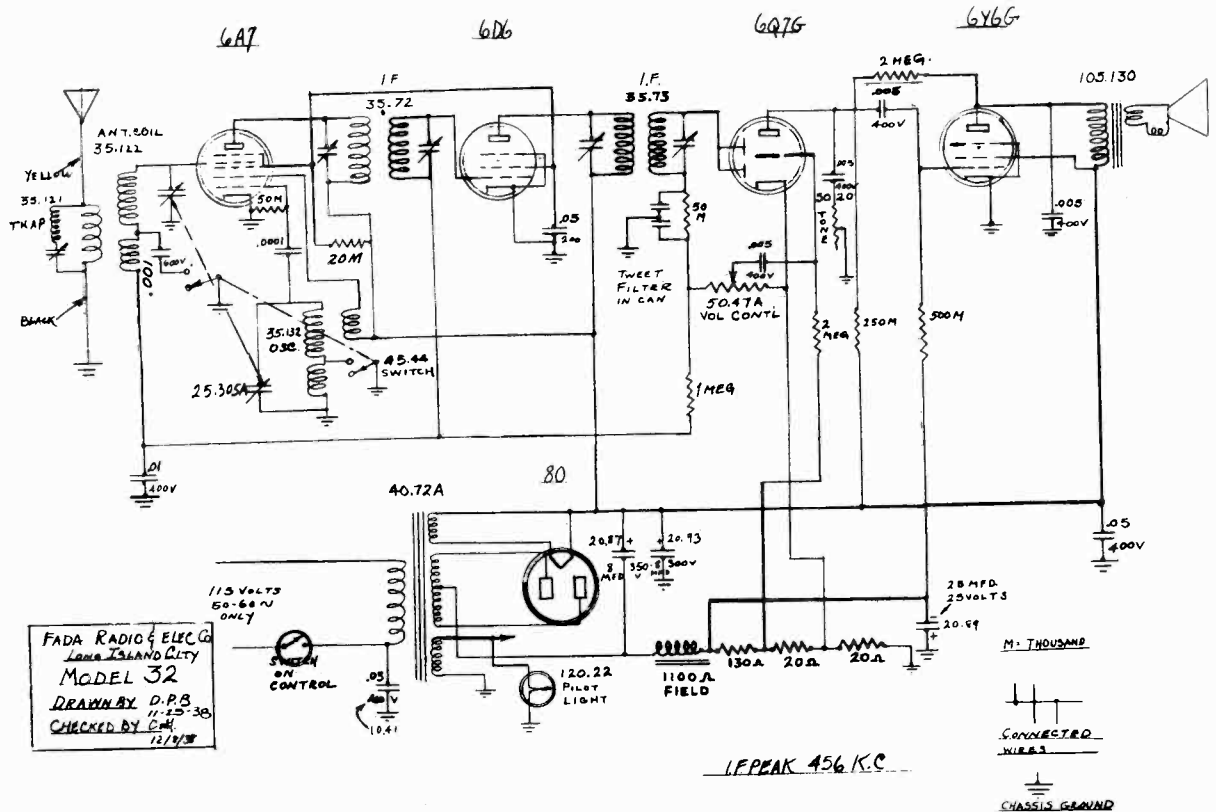
16 PEAK 456 K.C.

M: THOUSAND
CONNECTED WIRES
CHASSIS GROUND

FADA RADIO & ELEC CO
MODEL 31
DRAWN BY D.P.B. 11-17-38
CHECKED BY CH 12-8-38

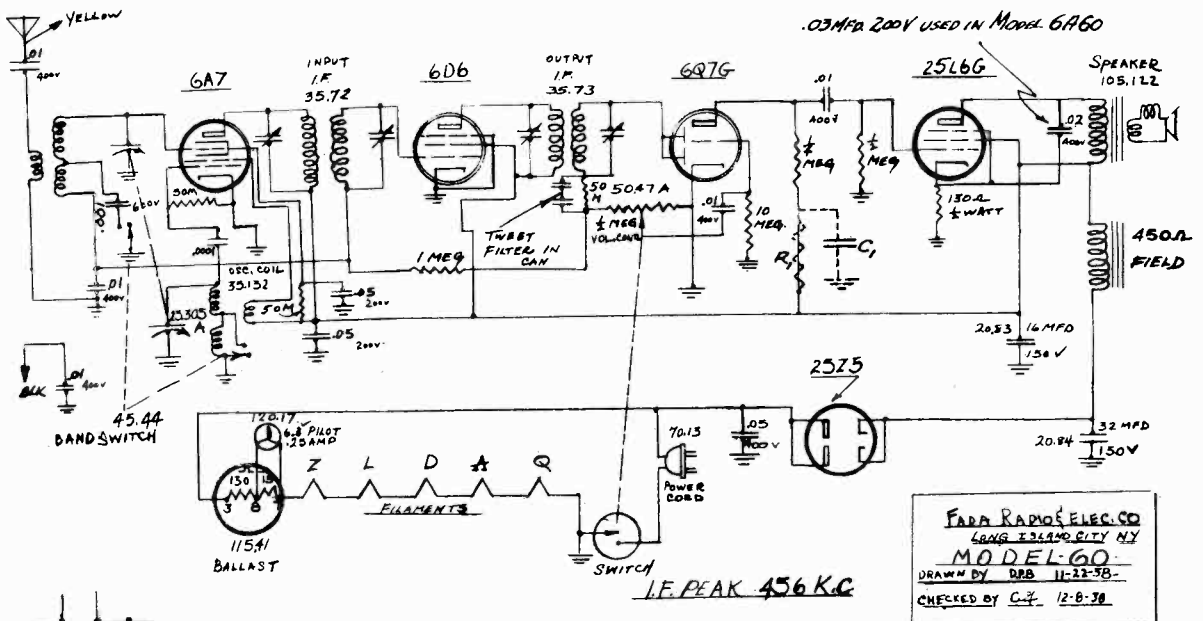
FADA RADIO & ELECTRIC CORP.

MODEL 32 Late
MODEL 6A60
MODEL 60
Schematics



FADA RADIO & ELEC. CO.
LONG ISLAND CITY
MODEL 32
DRAWN BY D.P.B.
11-25-38
CHECKED BY C.F.
12/1/38

M. THOUSAND
CONNECTED WIRES
CHASSIS GROUND



FADA RADIO & ELEC. CO.
LONG ISLAND CITY NY
MODEL 60
DRAWN BY D.P.B.
11-22-38
CHECKED BY C.F.
12-8-38

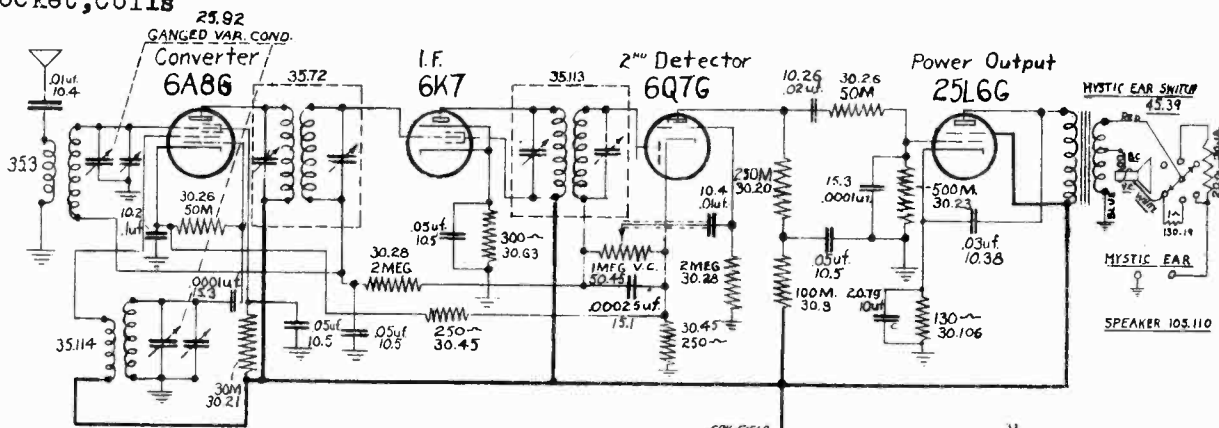
FADA RADIO & ELEC. CO.
LONG ISLAND CITY NY
MODEL 6A60
DRAWN BY D.P.B.
11-22-38
CHECKED BY C.F.
12-8-38

CONNECTED WIRES
CHASSIS GROUND
MID-POINT

USED ONLY IN MODEL 6A60
R₁ 50M.
C₁ .1MFD 200V.
BAND SWITCH *25.304 (REPLACES *25.305A SHOWN ABOVE).
BAND SWITCH *45.83 (REPLACES *45.44 SHOWN ABOVE).

MODEL S46
Schematic, Voltage
Alignment, Trimmers
Socket, Coils

FADA RADIO & ELECTRIC CO

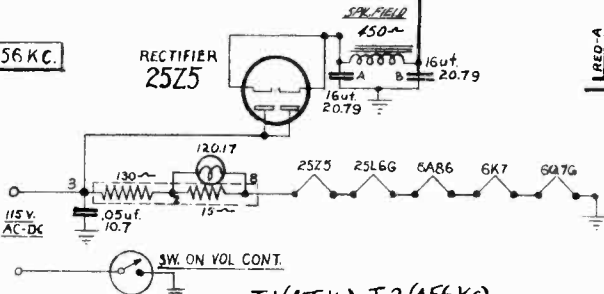
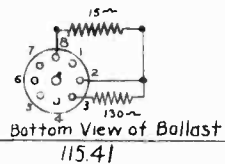


NOTE:
⊥ = Chassis
M = Thousand ~

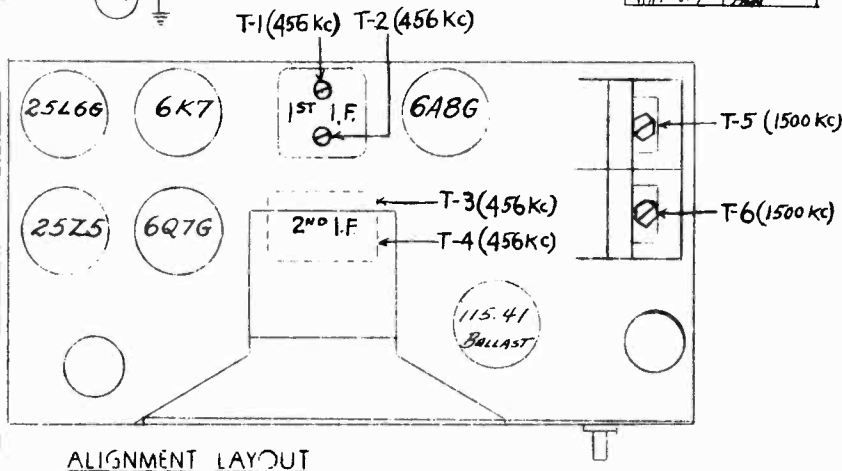
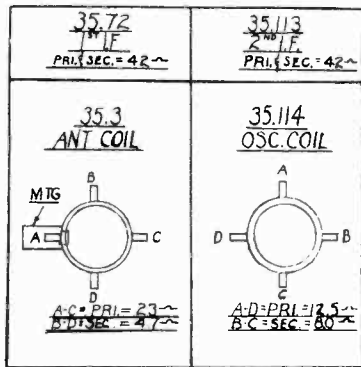
I.F. PEAK = 456 K.C.

RECTIFIER
25Z5

Electro Cond.
20.79



FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL S46 - SILENT RADIO	
DRAWN BY BH	DATE 4-27-38
CHECKED BY RHF E-7	APPROVED BY



FADA RADIO MODEL S46 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Super-heterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:--Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

*** USE ONLY GENUINE FACTORY REPLACEMENT PARTS ***

List		List	
75.207	Dial Assembly	1.75	20.79 Electrolytic Condenser
50.45	Volume Control	.80	105.110 Speaker
35.3	Antenna Coil	.60	120.27 Pilot Light Socket
35.114	Oscillator Coil	.45	140.37 Knobs (walnut)
35.72	Input I.F.	1.00	(ivory)
35.113	Output I.F.	.90	75.245 Crystal
25.92A	Variable Condenser	2.15	

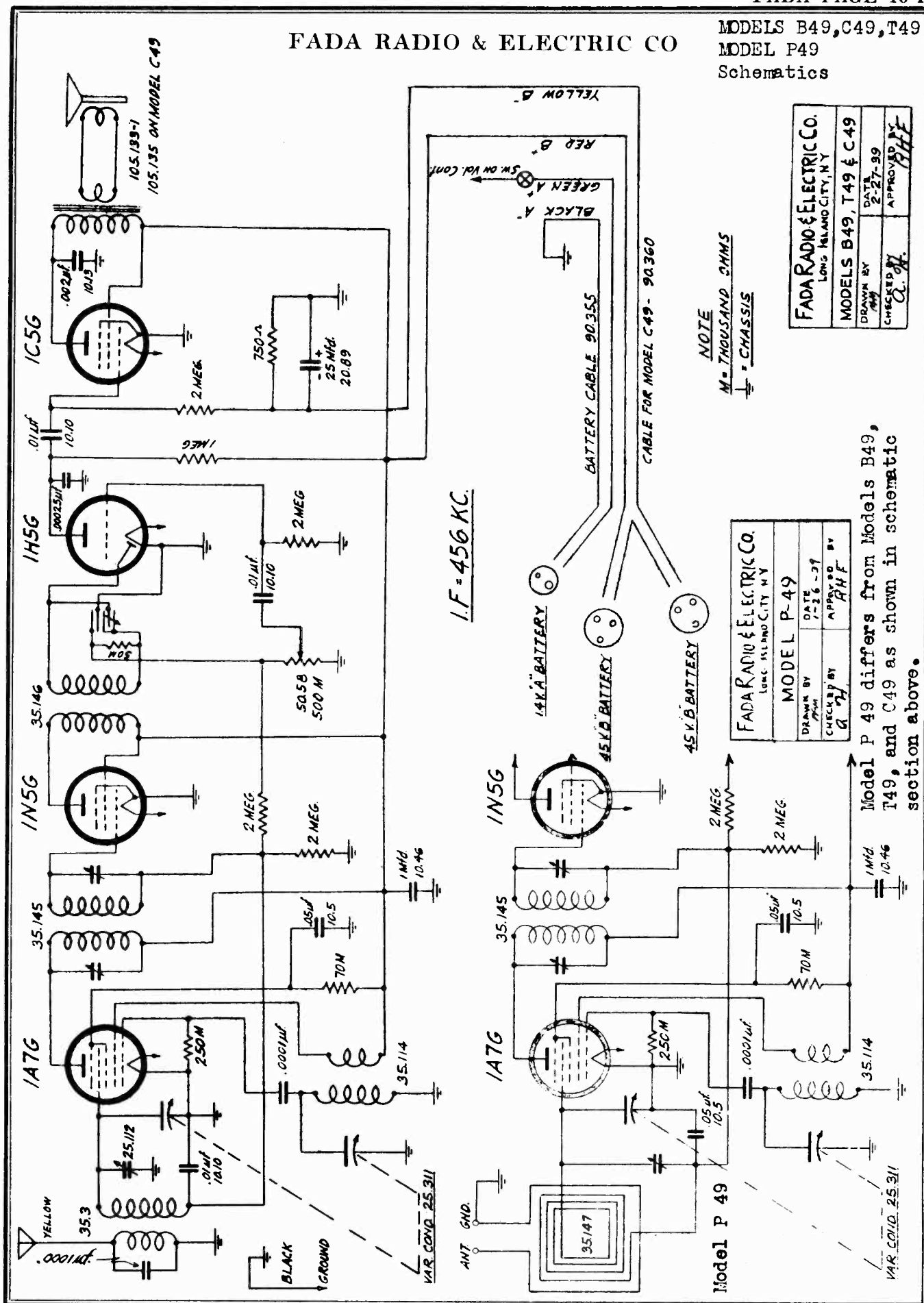
Prices subject to change without notice.

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plato	Screen	Cathode	Anode
6A8G	110	50	2.5	105
6K7	110	110	2.5	-
6Q7G	45	-	1.1	-
25L6G	110	110	7.	133
25Z5	120 AC	-	-	-

FADA RADIO & ELECTRIC CO

MODELS B49, C49, T49
 MODEL P49
 Schematics



FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODELS B49, T49 & C49	DATE 2-27-39
DRAWN BY [Signature]	CHECKED BY [Signature]
	APPROVED BY [Signature]

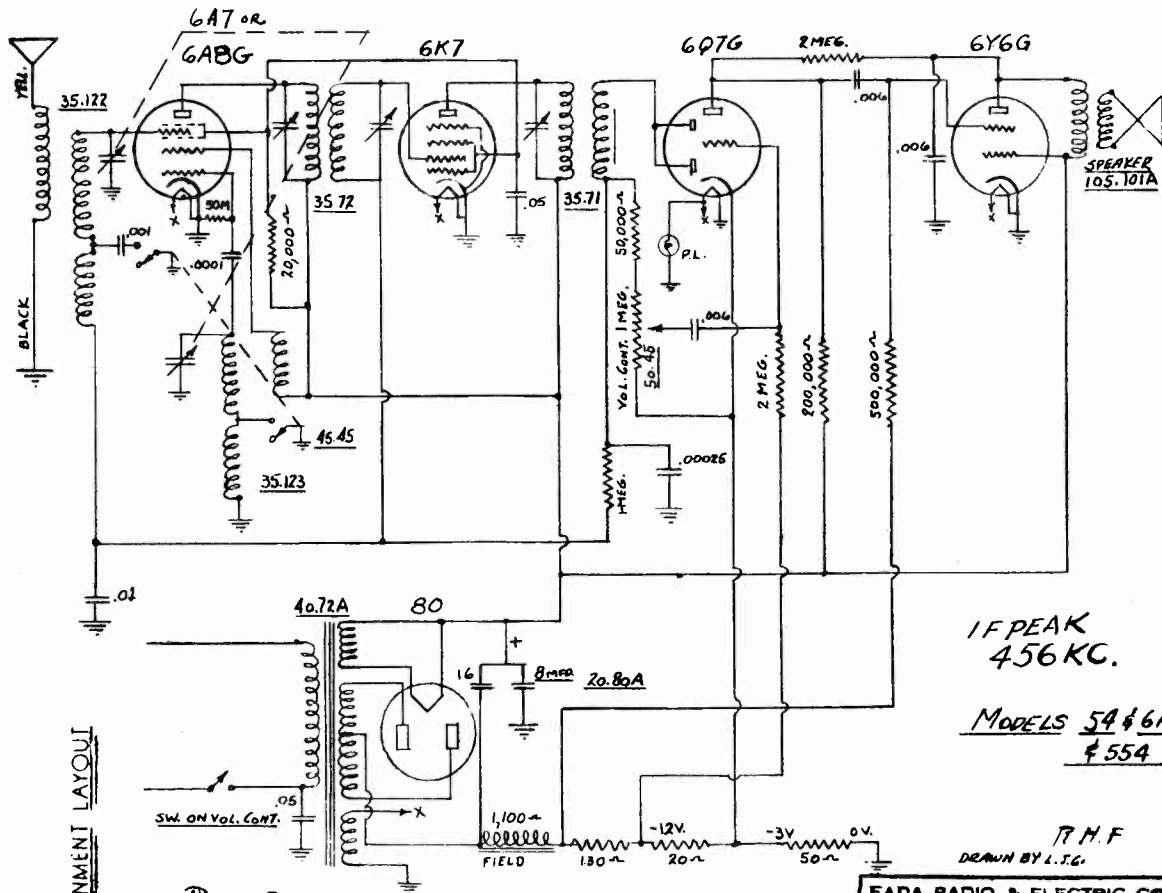
NOTE
 M = THOUSAND OHMS
 CHASSIS

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL P-49	
DRAWN BY [Signature]	DATE 7-26-37
CHECKED BY [Signature]	APPROVED BY [Signature]

Model P 49 differs from Models B49, T49, and C49 as shown in schematic section above.

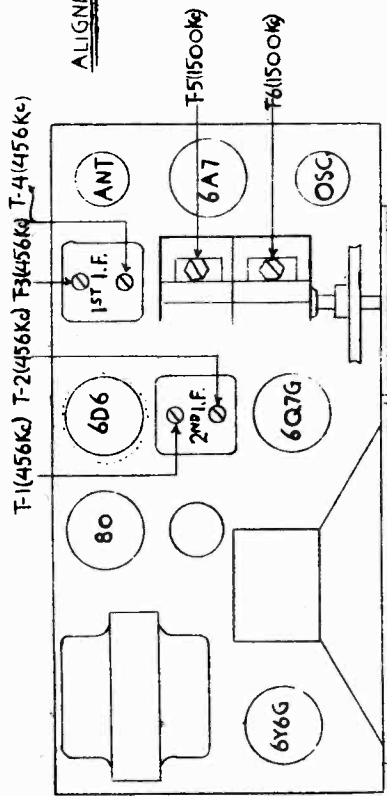
MODELS 54, 6A54, 554
Schematic, Voltage
Alignment, Trimmers
Socket

FADA RADIO & ELECTRIC CO



IF PEAK
456 KC.
MODELS 54 & 6A54
554
T.H.F.
DRAWN BY I.J.G.

FADA RADIO & ELECTRIC CO.



FADA RADIO MODEL 54 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 540-1720 and 1550-4000 K.C. - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Band switch in broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna load using a .0002 condenser as dummy antenna. With a 150Q K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. using magic wand. Set band switch in police band position and check sensitivity at 2800 K.C. Do not disturb trimmers for this operation.

Prices subject to change without notice.

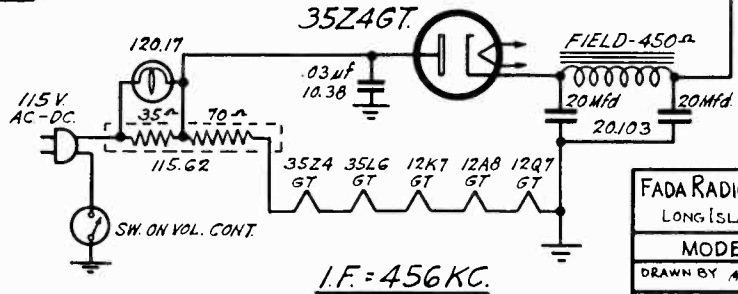
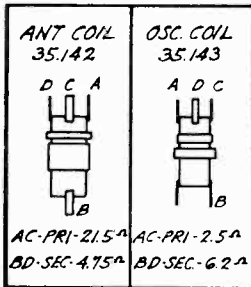
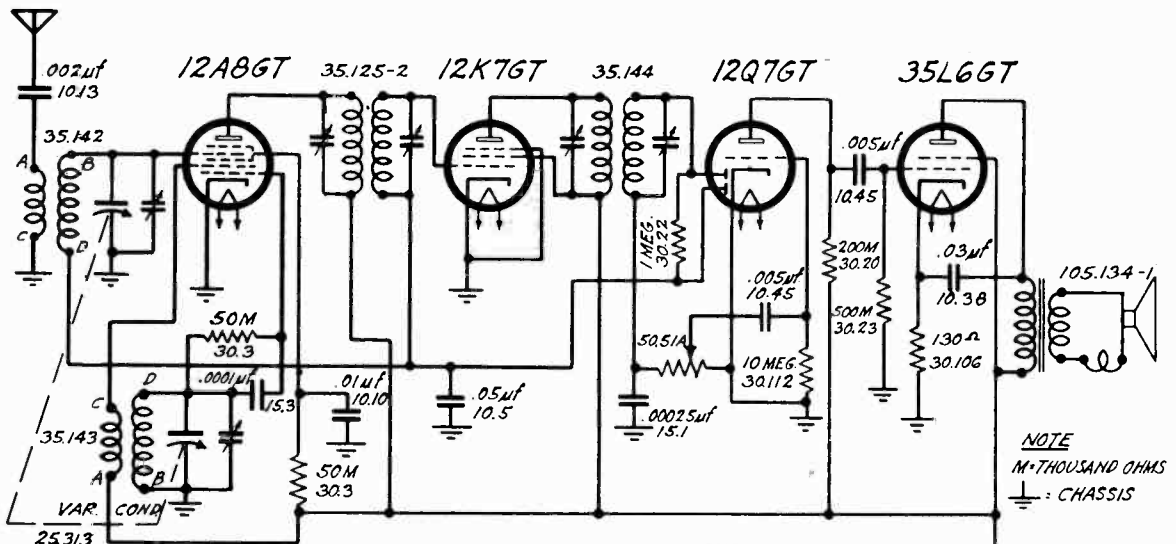
	List		List		
50.47A	Volume Control	.85	25.306A	Variable Condenser	2.10
45.44	Band Switch	.50	20.81A	Electrolytic "	1.35
75.229	Vornier Drive	.25	75.267	Pulley	.20
35.122	Antenna Coil	.75	75.290	Dial Plate	.20
35.132	Oscillator Coil	.60	75.223	Dial Pointer	.15
35.72	Input I.F.	1.00	75.291	Dial Scale	.15
35.73	Output I.F.	1.25	105.114	Speaker	4.25
40.72A	Power Transformer	3.25	75.230	Crystal	.40

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

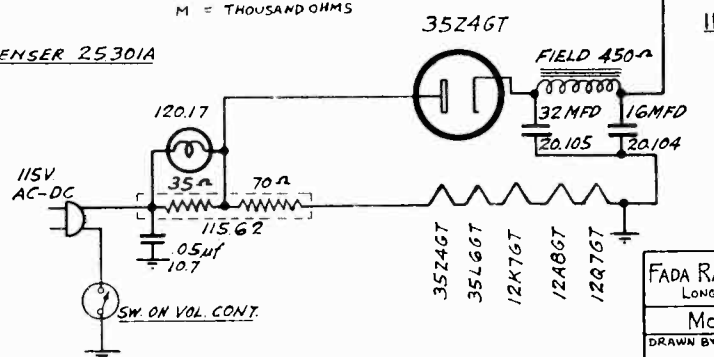
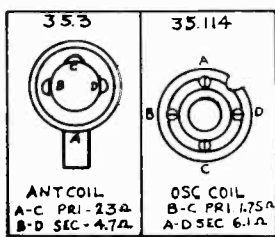
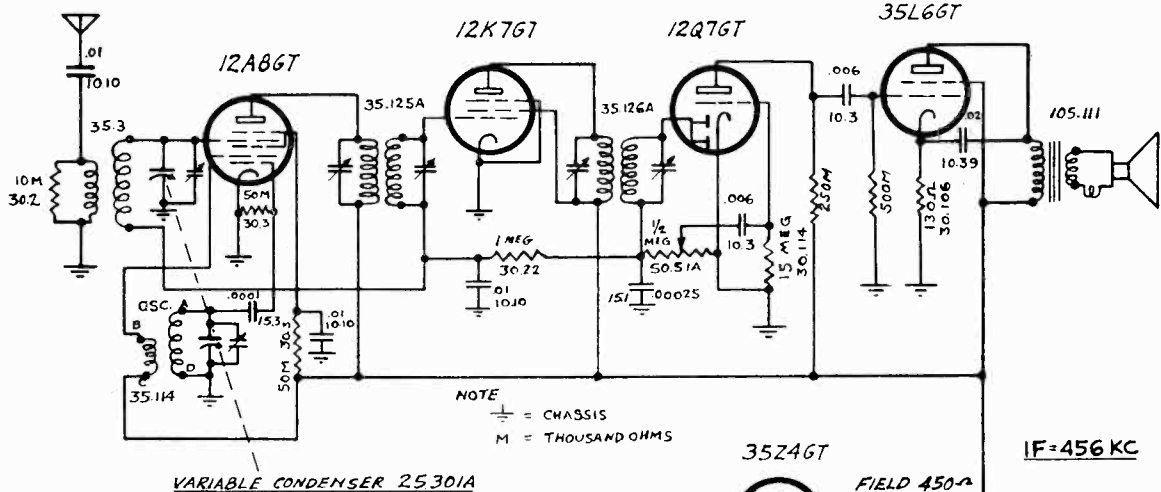
	Plate	Screen	Cathode	Anode
6A7	112	62	2.7	112
6D6	112	62	2.7	-
6Q7G	50	-	1.1	-
6Y6G	105	112	11.5	-
80	414 A.C. Plate to Plate			

FADA RADIO & ELECTRIC CO

MODEL F55
MODEL 59
Schematics



FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL F55
DRAWN BY MM DATE 1-30-39
CHECKED DRB APPROVED P.H.F.



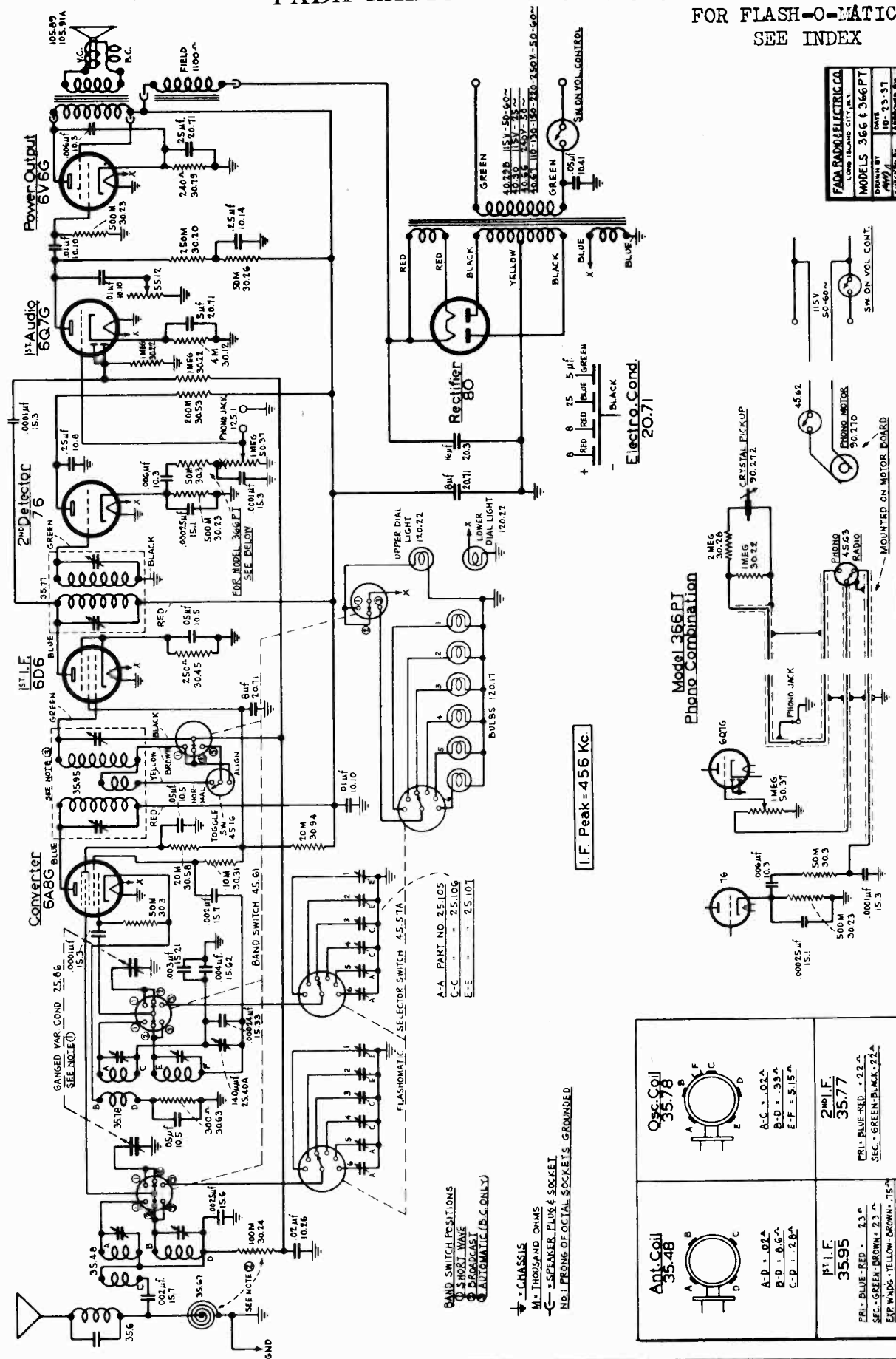
FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 59
DRAWN BY MM DATE 2-25-39
CHECKED R.H.F. APPROVED P.H.F.

MODELS 366, 366PT

FADA RADIO & ELECTRIC CO

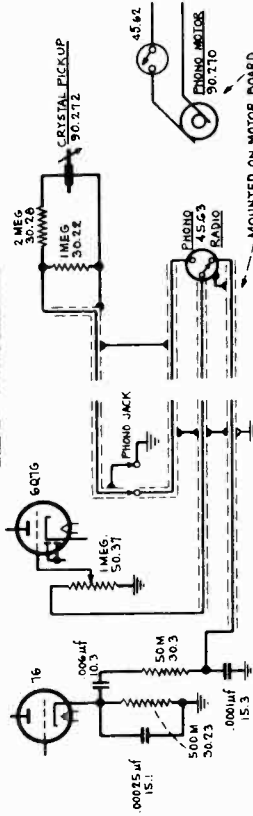
Schematic, Coils
FOR FLASH-O-MATIC DATA
SEE INDEX

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.
MODELS 366 & 366PT
DRAWN BY
CHECKED BY
DATE
10-23-37



I.F. Peak = 456 Kc.

Model 366 PT
Phono Combination



NOTE ON EARLY MODELS I.F. PART NO. 35.69 IS USED IN PLACE OF 35.95.

A-A PART NO. 25.105
C-C " 25.106
E-E " 25.101

BAND SWITCH POSITIONS
S SHORT WAVE
P PARADISE
A AUTOMATIC (B.C. ONLY)

* CHASSIS
M = THOUSAND OHMS
-C = SPEAKER PLUG & SOCKET
NO. 1 FRONT OF OCTAL SOCKETS GROUNDED

Ant. Coil 35.48	 A-D .02 μ B-D .06 μ C-D .28 μ
1st I.F. 35.95	 PRI. - BLUE - RED . 2.2 μ SEC. - GREEN - BROWN . 2.3 μ EXP. WIND. - YELLOW - BROWN . 15 μ
2nd I.F. 35.77	 PRI. - BLUE - RED . 2.2 μ SEC. - GREEN - BLACK . 2.4 μ EXP. WIND. - YELLOW - BROWN . 15 μ

NOTE ON EARLY MODELS PART NO. 25.11 IS USED IN PLACE OF PART NO. 25.86
NOTE ON EARLY MODELS 10M RESISTOR - PART NO. 30.31 IS USED IN PLACE OF 35.67 & RESISTOR 35.81 IS USED IN PLACE OF 30.24

MODEL 365
 MODELS 366, 366PT
 Alignment, Voltage
 Socket, Trimmers

ALIGNMENT

- VOLUME CONTROL MAXIMUM.
- ATTENUATE SIGNAL TO CONTROL SIGNAL OUTPUT.
- CONNECT PROPER DUMMY ANTENNA, FOR EACH ADJUSTMENT, IN SERIES WITH HIGH POTENTIAL SIDE OF SIGNAL GENERATOR. FOR .001 MFD. CONDENSER, USE PAPER TUBULAR TYPE (400V); FOR 300 MFD., MICA; 400 and 50,000 ohm resistors, CARBON 1/3 WATT.
- GROUND LOW POTENTIAL SIDE OF SIGNAL GENERATOR.
- FOR ADJUSTING THE I.F. TRIMMER CONDENSERS, THE CONTROL GRID 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.
- REPEAT ALL ADJUSTMENTS.
- TO DETERMINE THAT THE SHORT WAVE BAND SHUNT TRIMMER HAS NOT BEEN ADJUSTED TO THE IMAGE FREQUENCY, TURN THE 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 GREATER SIGNAL GENERATOR OUTPUT, THE TRIMMER HAS BEEN IMPROPERLY ADJUSTED AND IT WILL BE NECESSARY TO READJUST TO THE PROPER PEAK.

ALIGNMENT TABLES

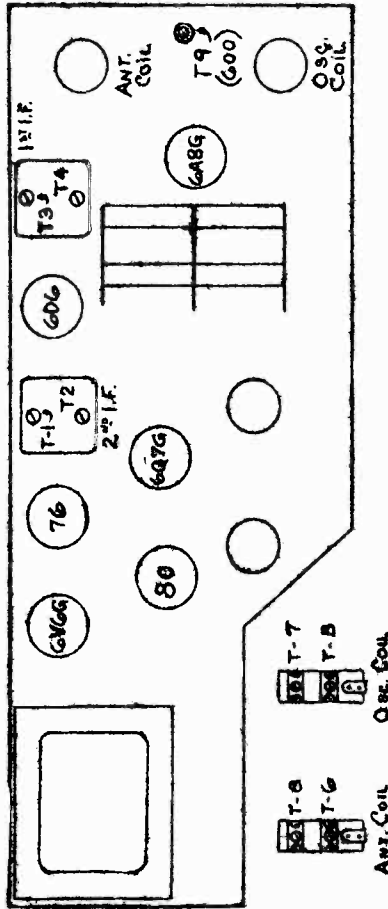
WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1,000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6D6 tube	T-1, T-2
B.C.	1,000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-3, T-4
S.W.	15.0 MC	15.0 MC	15.9 MC	400 ohm resistor	Yellow antenna lead	T-5, T-6
S.W.	6.0 MC	6.0 MC	---	400 ohm resistor	Yellow antenna lead	Check Tracker
B.O.	1,500 KC	1,500 KC	---	200 mmfd. condenser	Yellow antenna lead	T-7, T-8
B.G.	600 KC	600 KC	---	200 mmfd. condenser	Yellow antenna lead	T-9*

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

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS

1st Section	2nd Section	3rd Section
312	240	105

Voltage across speaker field 73 volts



ALIGNMENT LAYOUT

CONTINUITY AND VOLTAGE READINGS ON

SEE INDEX FOR MODEL 365 SCHEMATIC

Line voltage 115 A.C. - Input watts - 58

TYPE OF TUBE	POSITION OF TUBE	PLATE MA	CATHODE	SCREEN	VOLTS	GRID VOLTS
6A8G	1st Detector	235	1.9	1.3	65	---
6D6	Oscillator	86	2.2	---	---	---
76	Int. Freq.	235	9.4	3.0	105	---
6Q7G	2nd Detector	127	.1	13.0	---	---
6V6G	A.V.C.	---	---	---	---	---
80	1st Audio	67	.1	1.3	229	---
	Pwr. Pentode	220	41.0	10.5	---	---
	Rectifier	---	---	---	---	---
		---	66.0 TOTAL	---	---	---

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages. Above readings taken with a 105.89 speaker in circuit.

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.89	1,100*	210*	.5**	3.0
105.91A	1,100*	220*	.8**	3.0

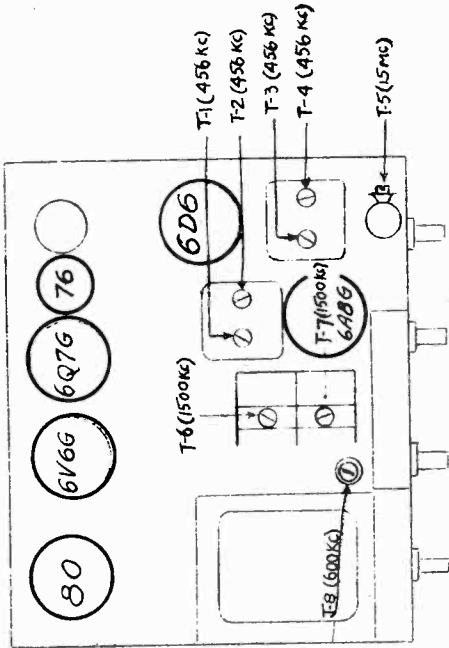
* These are cold D.C. resistance values.

** This reading includes resistance of hum bucking coil.

MODEL 465
Schematic, Voltage
Alignment, Trimmers
Socket

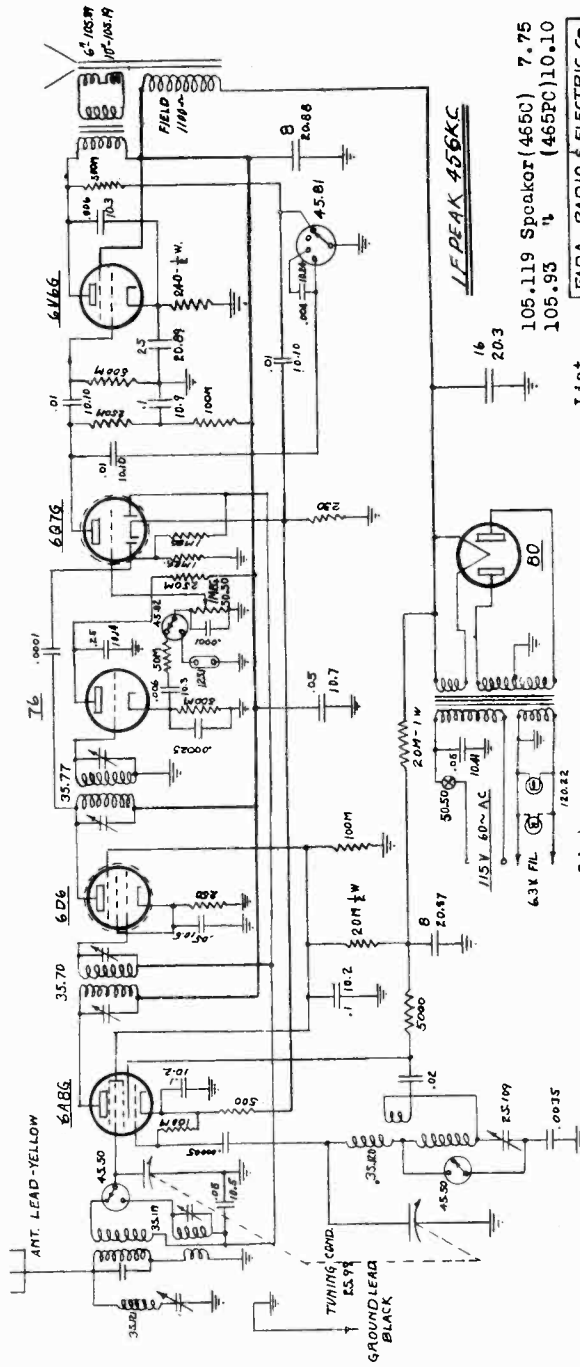
FADA RADIO & ELECTRIC CO

ALIGNMENT LAYOUT



FADA RADIO MODEL 465 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range - 545-1720 K.C. and 5.8-18.4 Megacycles - 6 Tube Superheterodyne. Tubes required-6A8C-6D6-76-6Q7C-6V6C-80.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tune control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8C tube in series with a 1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust paddler T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M. C.



THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode
6A8C	258	70	4
6D6	258	70	2
6Q7C	150	-	2
6V6C	250	258	11.4
80	630 A.C. Plate to Plate	-	19
76	250	-	19

FADA RADIO & ELECTRIC CO LONG ISLAND CITY, N.Y.	
MODEL 465	
DRAWN BY	C. W.
CHECKED	A. W.
SEPT 29, 1938	

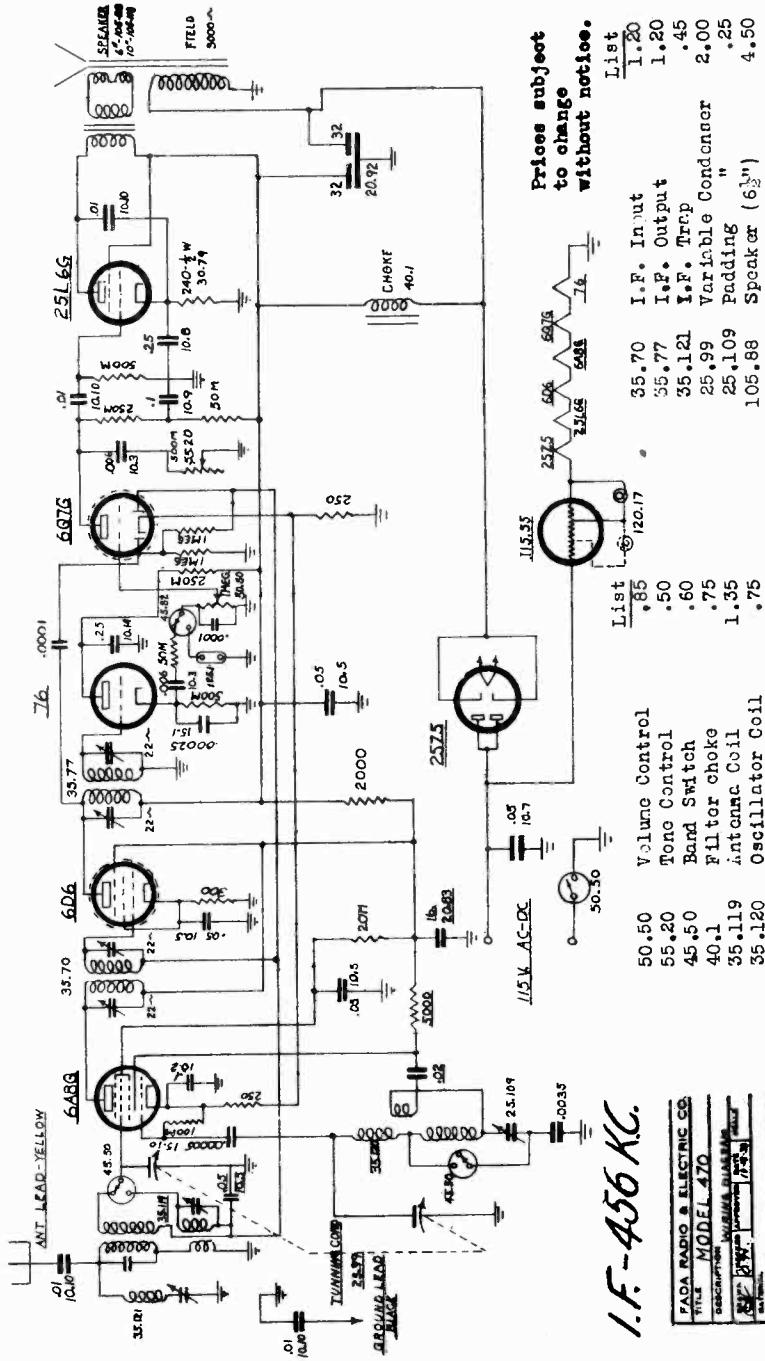
List		List	
1.20	I.F. Input	35.70	I.F. Output
1.20	I.F. Output	35.77	I.F. Trap
.45	Variable Cond.	35.121	Padding Cond.
2.00	Speaker (465T)	25.99	
.25		25.109	
4.25		105.89	

List		List	
.85	Volume Control	50.50	Tuning Capd.
.65	Tono Switch	45.81	Ant. Lead-Yellow
.60	Band Switch	45.50	Ground Lead-Black
3.60	Power Transformer	40.73	
1.35	Antenna Coil	35.119	
.75	Oscillator Coil	35.120	

Prices subject to change without notice.

FADA RADIO & ELECTRIC CO

MODEL 470
Schematic, Voltage
Alignment, Trimmers
Socket



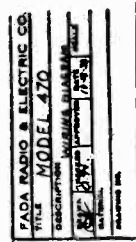
Prices subject to change without notice.

50.50	Volume Control	List	.85
55.20	Tone Control	115.55	120.17
45.50	Band Switch	25Z5	50K
40.1	Filter choke	25Z5	50K
35.119	Antenna Coil	25Z5	50K
35.120	Oscillator Coil	25Z5	50K
35.70	I.F. Input	25Z5	50K
35.77	I.F. Output	25Z5	50K
35.121	I.F. Trap	25Z5	50K
25.99	Variable Condenser	25Z5	50K
25.109	Padding "	25Z5	50K
105.88	Speaker (6 1/2")	25Z5	50K

FADA RADIO MODEL 470 - 115 VOLTS A.C.-D.C. - Tuning Range 545-1730 K.C. and 5.8-18.4 Megacycles - 7 Tube Superheterodyne. Tubes required -6A8G-6D6-76-6Q7G-25L6G-25Z5-115.55.

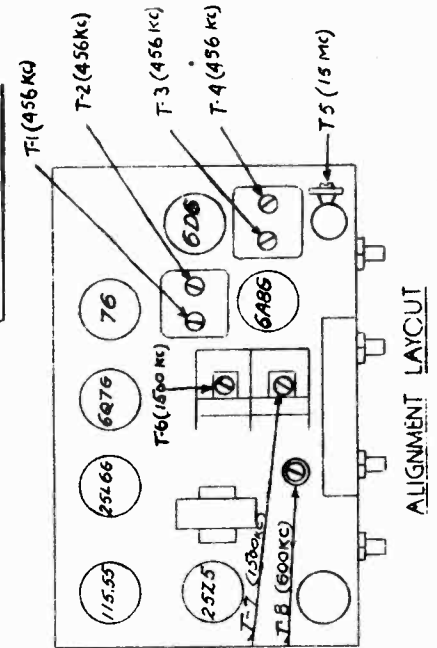
Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tune control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a 1000 p.f. condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padding T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

I.F.-456 Kc.



THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

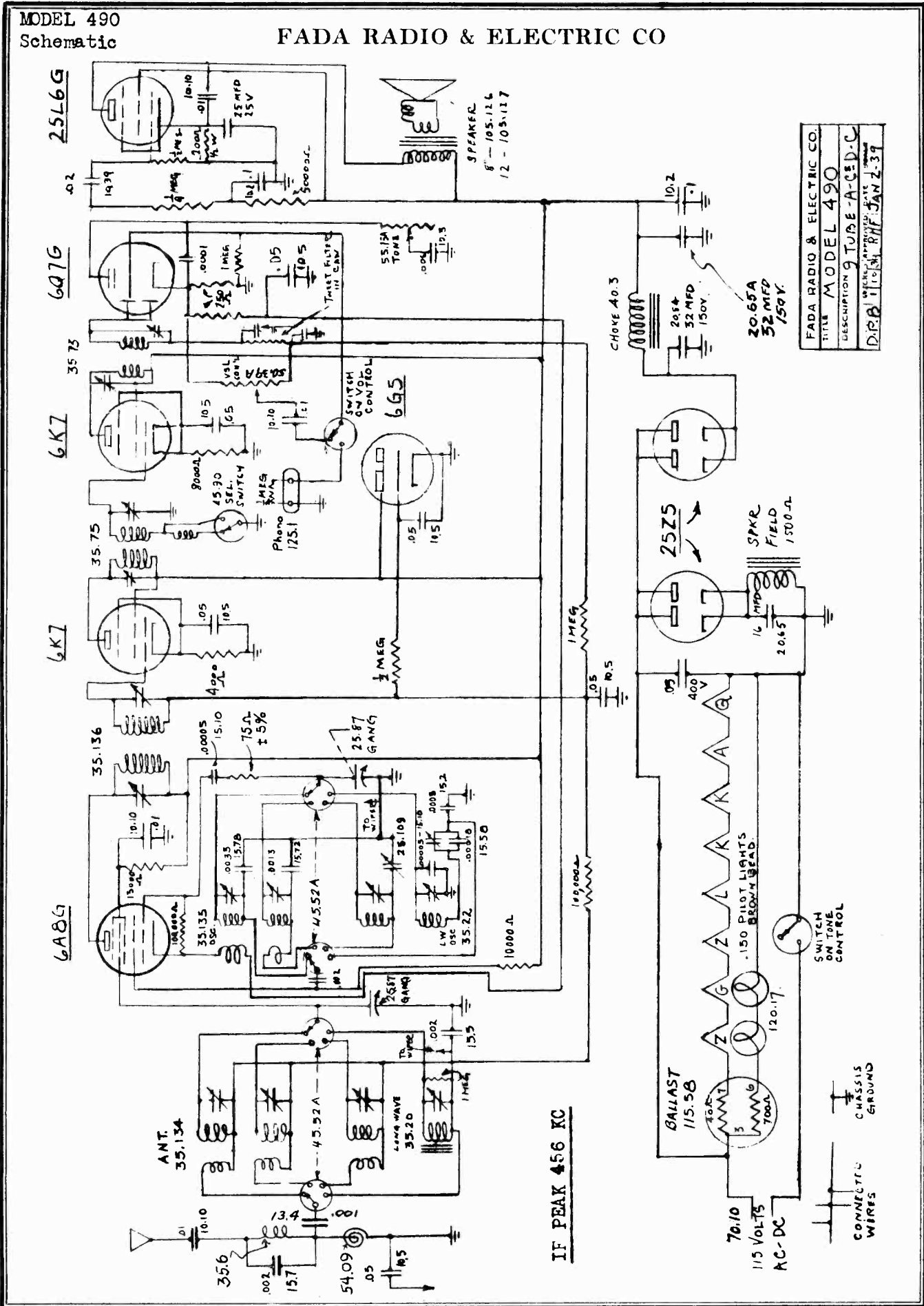
	Plate	Screen	Cathode	Anode
6A8G	92	54	2.4	75
6D6	107	96	2.4	
76	101	"	8.6	
6Q7G	75	"	1.2	
25L6G	105	109	8.4	
25Z5	120 A.C.		120 D.C.	



ALIGNMENT LAYOUT

MODEL 490
Schematic

FADA RADIO & ELECTRIC CO



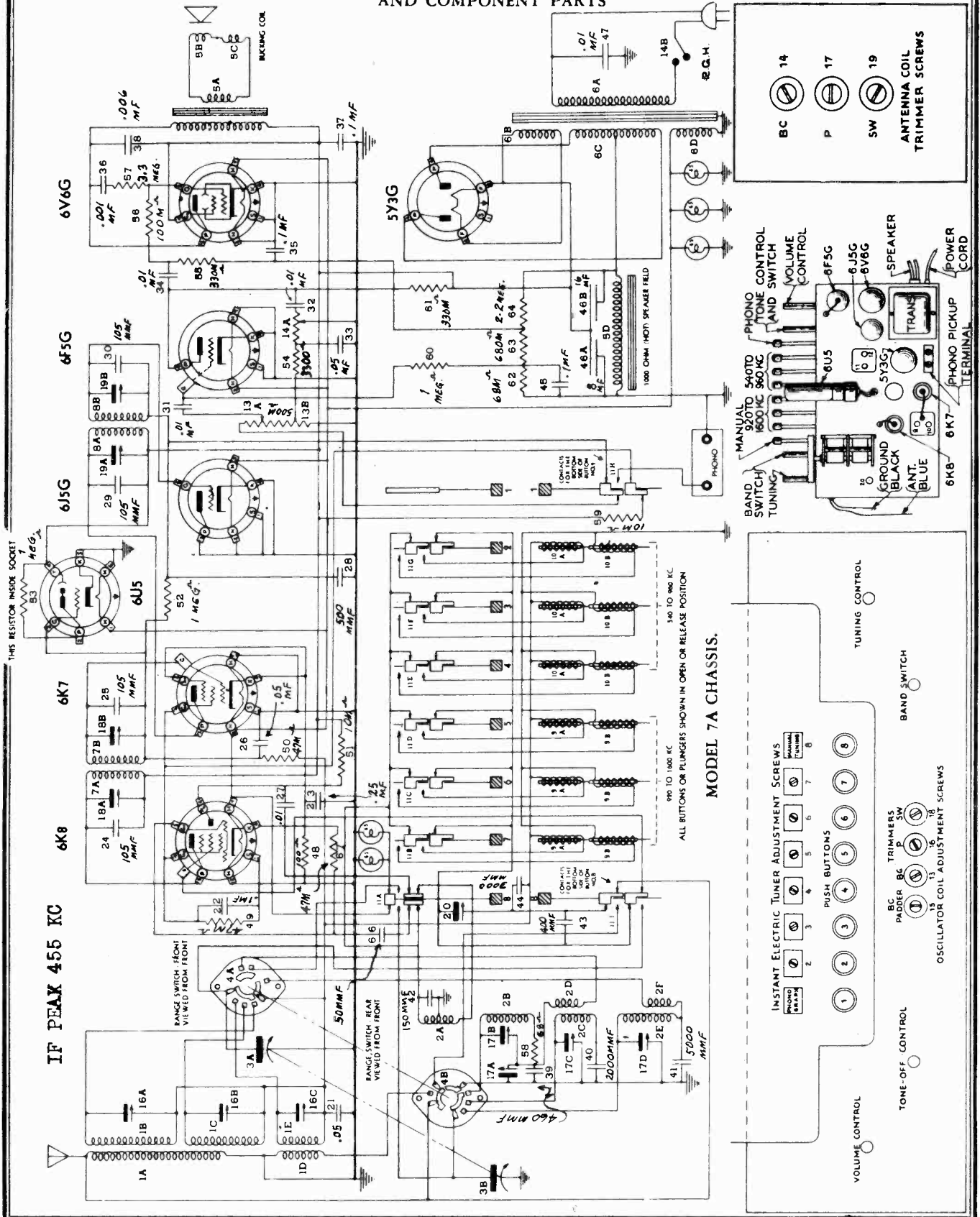
FADA RADIO & ELECTRIC CO.
TITLE MODEL 490
DESCRIPTION 9 TUBE A-C-E-D-C
DRAWN BY [Signature] DATE JAN 2-39

IF PEAK 456 KC

FAIRBANKS, MORSE & CO.

MODEL 7A
Schematic, Socket
Trimmers

SCHMATIC WIRING DIAGRAM OF THE MODEL 7A CHASSIS.
FRONT, SIDE, AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS
AND COMPONENT PARTS



MODEL 7A

Alignment, Voltage Tuner, Phono

FAIRBANKS, MORSE & CO.

The model 7A chassis is an AC operated superheterodyne with automatic volume control, audio inverse feedback, permeability push button tuning and tuning eye. It incorporates three wave bands, broadcast, police-amateur and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 42 on the schematic diagram and has a value of 150 micro-microfarads. The capacitance in the antenna circuit consists of two condensers, number 20 and number 43. Condenser number 20 must be adjusted when the initial alignment is made, but does not have to be touched at the time the buttons are "set" for their individual stations. Its use is covered in the alignment instructions. Instructions for "setting-up" the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 56 and number 57 and condenser number 36. By means of this network a certain amount of the voltage present at the plate of the 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the line when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form. Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for the best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is set to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear a signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the antenna trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the antenna trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

OHMS VOLTS	6K8	VOLTS OHMS	6K7	VOLTS OHMS	6J5E	VOLTS OHMS	6K8	VOLTS OHMS	6V6G	VOLTS OHMS	5Y36
30M 110	*1.1 43M	30M 110	*3.2 100	500M *3.4	*.4 500M	32M 245	32M 245	32M 245	32M 245	*.1 115MEG	75 1200
32M 245	162 43M	32M 245	*.5 15MEG	0	0	235 0	235 0	235 0	235 0	90 MEG	245
0 0	*.2 15MEG	0 0	0 0	0 0	6.3 0	0 0	0 0	0 0	0 0	6.3 0	
0 0	3.2 100	0 0	*3.2 100	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
OHMS VOLTS	6V6G	VOLTS OHMS	6V6G	VOLTS OHMS	6V6G	VOLTS OHMS	6V6G	VOLTS OHMS	6V6G	VOLTS OHMS	6V6G
370M 115	32M 245	32M 245	*12.5 1 MEG	35M 245	35M 245	32M 245	32M 245	32M 245	32M 245	32M 245	32M 245
6.3 0	0 0	0 0	6.3 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
<p>MEASURED ON TRIPLETT VOLT-OHM METER MODEL 1200A—2000 OHMS VOLT—LINE VOLTAGE = 117 VOLTS—*10 VOLT SCALE</p> <p>**OPERATING VOLTAGE AS MEASURED WHEN USING CONVENTIONAL TYPE OF VOLTMETER VALUE OF READING WILL VARY ACCORDING TO SENSITIVITY OF INSTRUMENT.</p>											

VOLTAGE AND RESISTANCE DATA

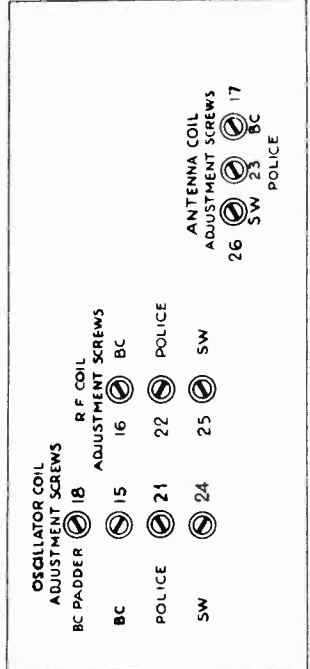
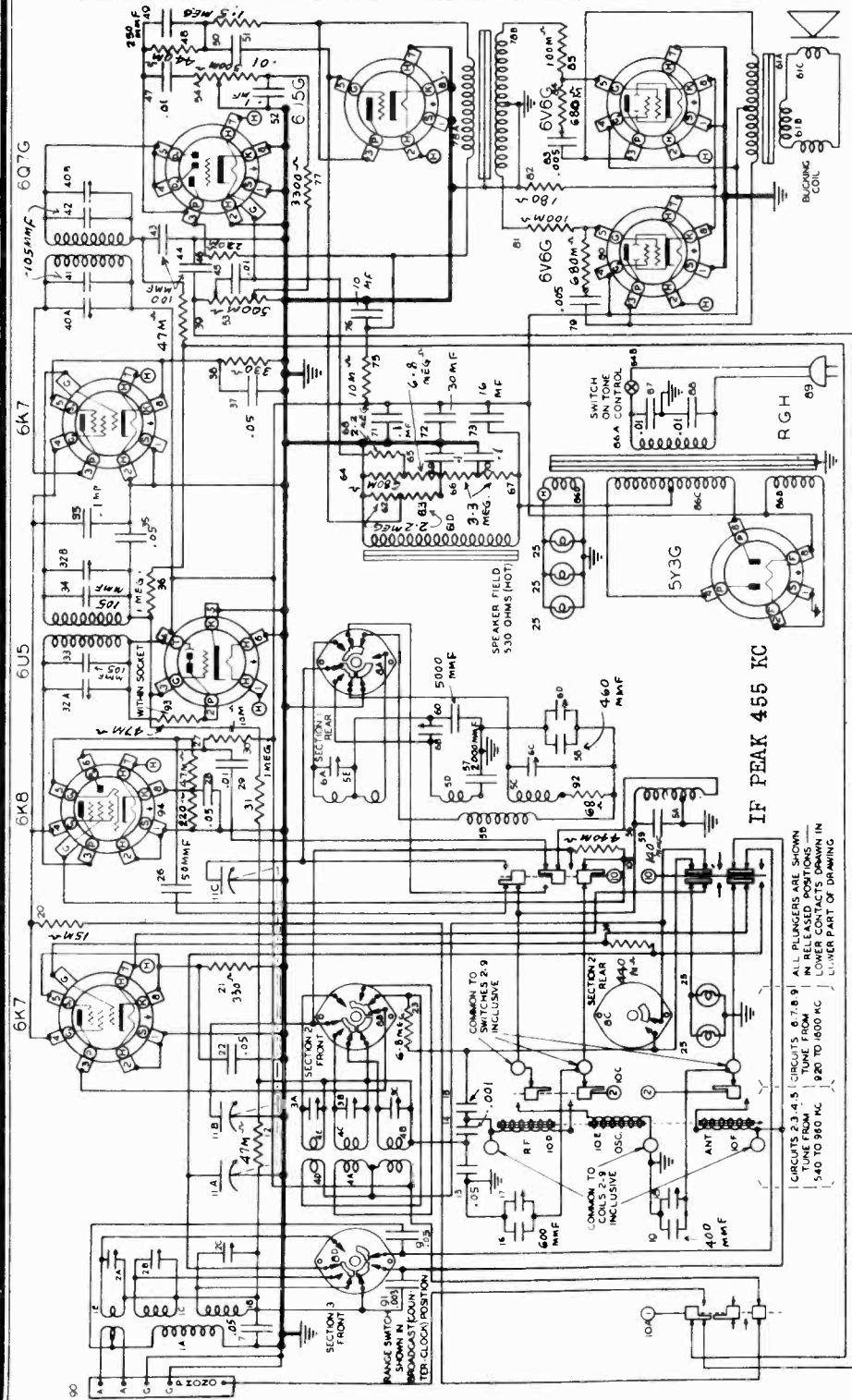
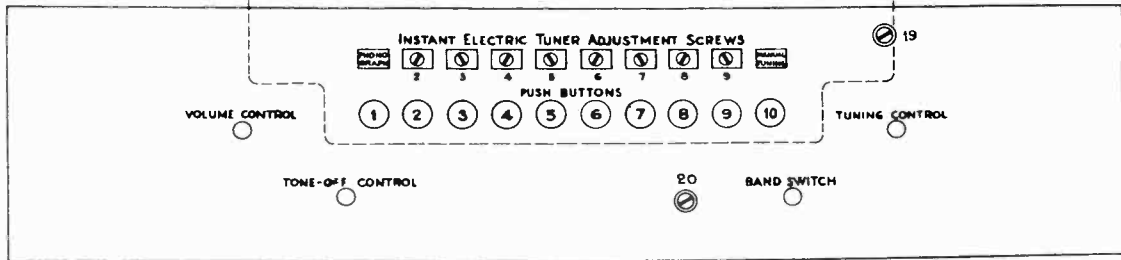
Step No.	Connect Signal Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch Position	Dial Setting	Section	Adjusting Screw No.	Peak For
1	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	9	Maximum
2	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	10	Maximum
3	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	11	Maximum
4	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	12	Maximum
5	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Osc.	13	Maximum
6	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Det.	14	Maximum
7	Antenna	600 KC	200 Mmfd. Condenser	Broadcast (A)	600 KC	B.C. Padder	15	Max. (1)
8	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #7 Button	Instant Electric Tuner	7	Maximum
9	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress Electric Tuner	Instant Electric Tuner	20	Maximum (2)
10	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Oscillator	16	Maximum
11	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Detector	17	Maximum
12	Antenna	2.5 MC	400 Ohm Resistor	Police-Amateur (B)	2.5 MC	Police Padder	(3)	Maximum
13	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Oscillator	18	Maximum (4)
14	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Detector	19	Maximum (5)
15	Antenna	8.0 MC	400 Ohm Resistor	Short Wave (C)	8.0 MC	Short Wave Padder	(6)	Maximum

ALIGNMENT PROCEDURE CHART

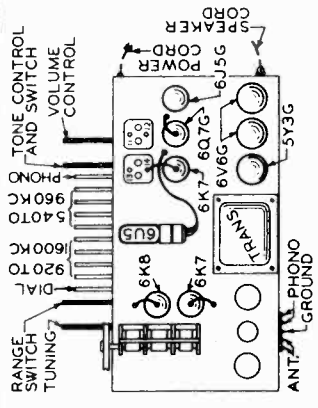
- While locking, repeat 13, 14 and 15 until no change is noticed.
- The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae may necessitate a minor change in this adjustment for best results.
- Check calibration at 2.5 MC. Padder is fixed.
- Check for image at 19.1 MC approximately.
- Check for image response.
- Check calibration at 8.0 MC. Padder is fixed.

FAIRBANKS, MORSE & CO.

MODEL 9C
Schematic, Socket
Trimmers, Tuner Layout

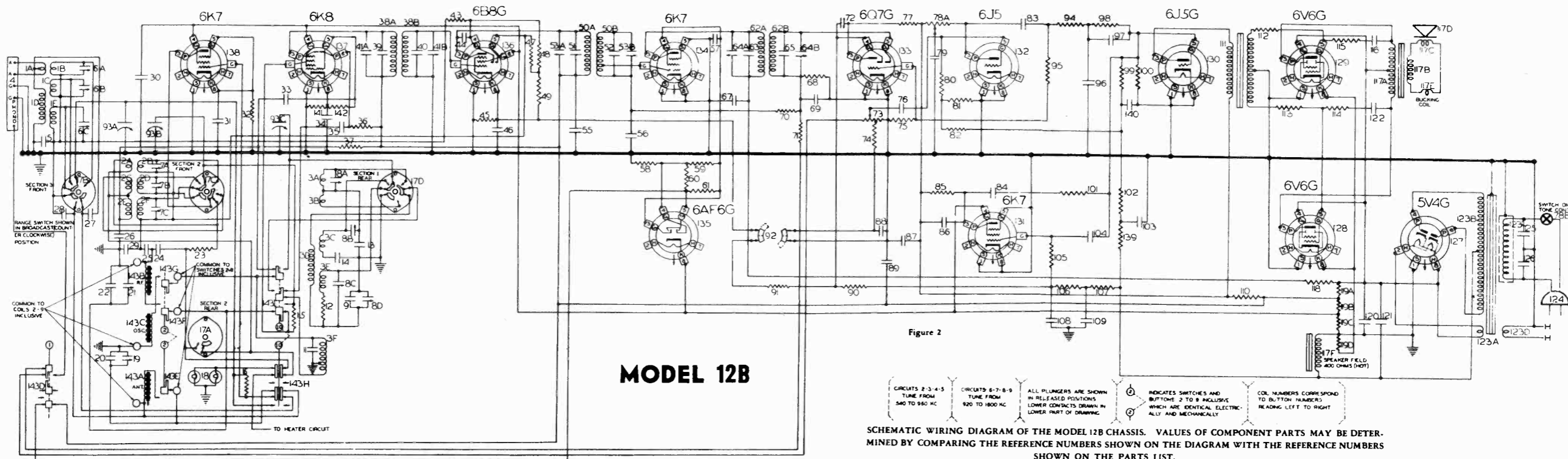


SCHEMATIC MODEL 9C CHASSIS.



FAIRBANKS, MORSE & CO.

MODEL 12B
Schematic, Socket, Tuner
Trimmers, Voltage, Phono.

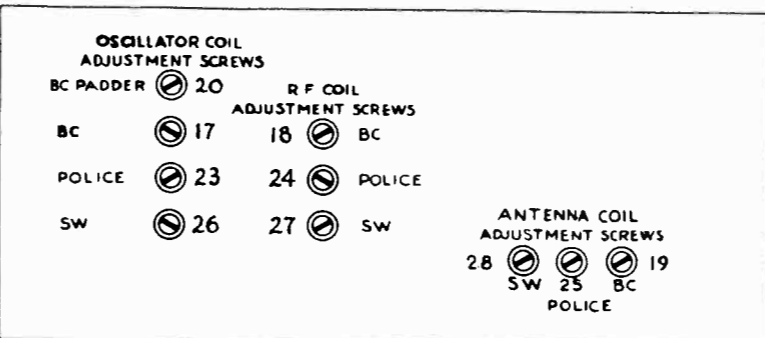
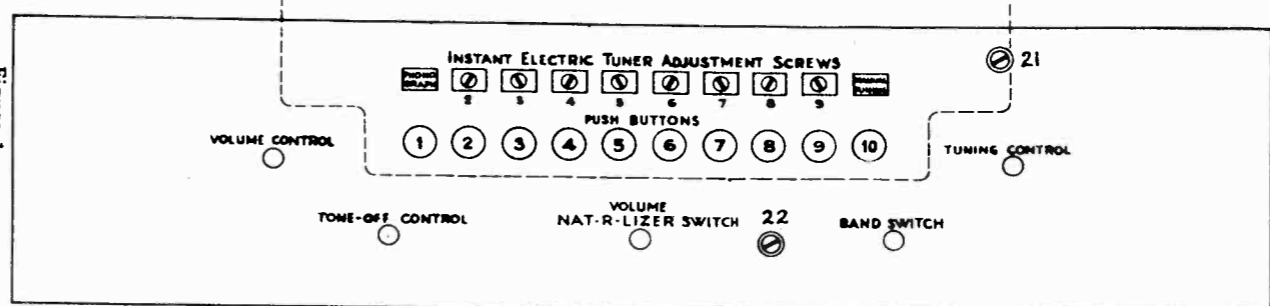


6K7		6K8		6B8G		6Q7G		6J5		6J5G		6V6G		5V4G		6AF6G	
OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS	OHMS	VOLTS
7M	120	7M	120	7M	120	7M	120	7M	120	7M	120	7M	120	7M	120	7M	120
11500	250	11500	250	11500	250	11500	250	11500	250	11500	250	11500	250	11500	250	11500	250
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55M	110	55M	110	55M	110	55M	110	55M	110	55M	110	55M	110	55M	110	55M	110
16500	260	16500	260	16500	260	16500	260	16500	260	16500	260	16500	260	16500	260	16500	260
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16500	190	16500	190	16500	190	16500	190	16500	190	16500	190	16500	190	16500	190	16500	190
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	350AC	440	350AC	440	350AC	440	350AC	440	350AC	440	350AC	440	350AC	440	350AC	440	350AC
11500	320	11500	320	11500	320	11500	320	11500	320	11500	320	11500	320	11500	320	11500	320
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ALL READINGS MEASURED ON MODEL 1200A, 2000 OHMS PER VOLT, TRIPLETT VOLT OHMMETER, AS NEAR HALF SCALE AS POSSIBLE AND WITH 117 VOLTS, LINE VOLTAGE.

ALL READINGS FROM SPECIFIED POINT TO GROUND (CHASSIS FAN) WITH VOLUME AND TONE CONTROL ADVANCED TO MAXIMUM, VOLUME NATURALIZER "IN", RANGE SWITCH ON BC POSITION, GANG CONDENSOR IN FULL MESH, NO ANTENNA AND CHASSIS GROUND.

VOLTAGE AND RESISTANCE DATA



FRONT, SIDE, AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

IF PEAK 455 KC

The model 12B chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, volume naturalizer, and tuning eye. It incorporates three wave bands, broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

FAIRBANKS, MORSE & CO.

ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form (see figure 3 and 4). Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal on the dial, so at 20 megacycles the image

MODEL 12B Alignment

should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.

Table with 10 columns: Step No., Connect Signal Generator To, Signal Generator Frequency, Dummy Antenna, Range Switch Position, Dial Setting, Section, Adjusting Screw No., Peak For, Volume Nat.-R-L Switch. Rows 1-21 describe alignment steps for various frequencies and components.

- (1) While rocking. Repeat 7, 8, 9 and 10 until no change is noted.
(2) To check volume naturalizer operation, turn to "On" or "In" position. If functioning normally, volume level will drop quite noticeably, under normal output volume.
(3) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment per best results.
(4) Check calibration at 2.5 MC. Padder is fixed.
(5) Check for image at 19.1 MC on dial approximately.
(6) Check for image response.
(7) Check calibration at 8.0 M.C. Padder is fixed.

Figure 4

ALIGNMENT PROCEDURE CHART

MODEL 12B Tuner Data, Parts Naturalizer Notes

FAIRBANKS, MORSE & CO.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 11 on the schematic diagram and has a value of 140 micro-microfarads. The capacitance in the antenna and RF circuits consists in each case of two condensers, number 19 and 20 for the antenna, and number 21 and 22 for the RF. Condensers 19 and 21 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are "set" for their individual stations. Their use is covered in the alignment instructions in Figure 4. Instructions for setting-up the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 114 and 115, and condensers 116 and 122. By means of this network a certain amount of the voltage present at the plate of each 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

PURPOSE AND OPERATION OF VOLUME NATURALIZER

In most transmitting stations, the operators attempt to keep the modulation percentage high at all times in order to increase the area in which acceptable reception of their programs is possible. In so doing, a considerable portion of the volume range present in the studio program may be lost due to the fact that the lower volume portions of the program are raised to maintain coverage and thus require that the higher volume portions be relatively attenuated to prevent over-modulation of the transmitter.

The volume naturalizer is designed to compensate, in part, for this evil that often exists under present broadcasting conditions but should not be used indiscriminately. In general, its use is not justified on oral programs although occasionally a listener may prefer it. On some popular musical selections, the volume range is so restricted that no appreciable difference will be noticed except as the frequency response is influenced by the naturalizer circuit. Of course the volume control should be reset, each time the naturalizer is switched in and out, to keep the reference volume approximately the same for more accurate comparison. This will not be necessary at relatively high volume, because the volume will not change appreciably as the naturalizer is switched in or out, under these conditions.

On modern phonograph records, its use is not often desirable as the volume range is generally acceptable. On older records, no definite recommendation can be made because great variations will be found, especially between recordings by different manufacturers.

The method by which the volume naturalizer operates, can be simply described as controlled degeneration, whereby a portion of the audio signal from the plate circuit of the 6V6 first audio tube, is used to vary the bias voltage of preceding and interconnected tubes, in such a manner as to increase the volume level on signals that were originally suppressed at the transmitting station, and to decrease the volume level on signals that were increased in intensity at the transmitter, thus restoring in part, the original volume range present, for example, during a symphonic orchestra broadcast.

PARTS AND PRICE LIST MODEL 12B

Table with 4 columns: Part Number, Description, Quantity, and Price. Lists various components like resistors, capacitors, and tubes with their respective prices.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Table with 4 columns: Part Number, Description, Quantity, and Price. Continuation of the parts list from the previous table, including various assemblies and specialized components.

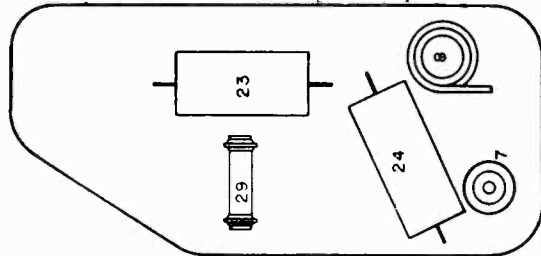
Schematic, Voltage
Socket, Trimmers
Chassis, Alignment

FIRESTONE TIRE & RUBBER CO.

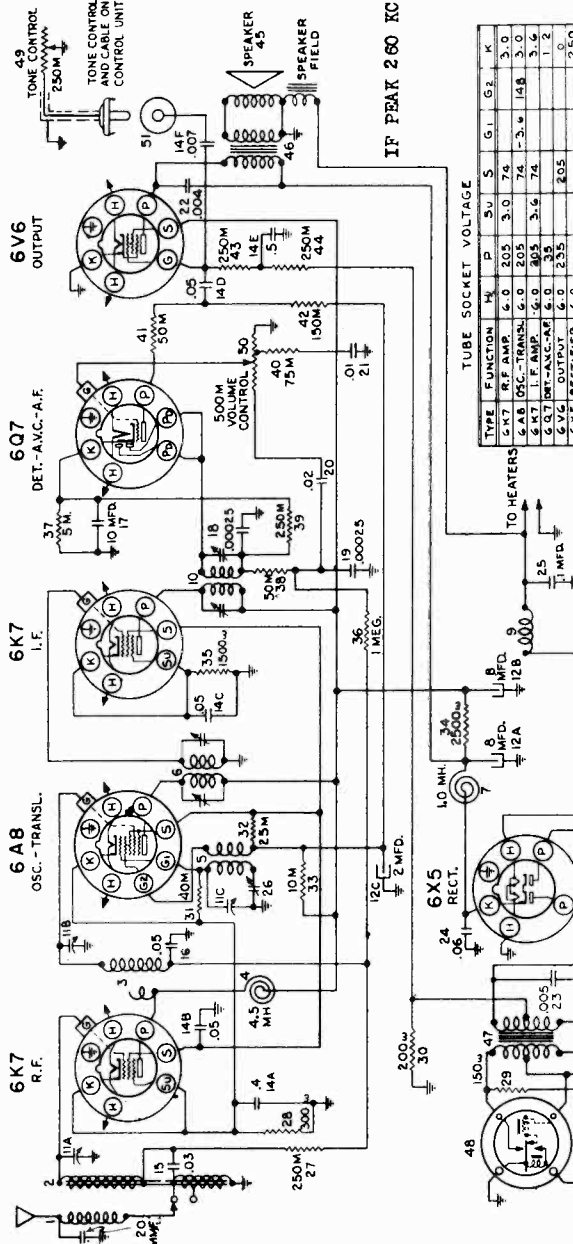
MODEL 7407-3
Chassis 536

NOTE: VOLTAGE READING TAKEN FROM *
TUBE SOCKET CONTACTS TO GROUND
WITH A D.C. VOLTMETER HAVING A
RESISTANCE OF 1000 OHMS PER VOLT.
*A BATTERY: 6 VOLTS.
CURRENT DRAIN: 7.4 AMPERES

ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Firestone auto receivers. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end, as with the capacity coupled sets. There are two taps provided on the antenna coil. One for use with whip or low capacity type antenna, and the other for running board or high capacity type antenna. The antenna coil is set at the low capacity tap at the factory and must be changed (by means of the small tip jack located in the receiver at the antenna coil) if a high capacity antenna is used. This is done by merely removing the small tip jack from its present tap on the antenna coil and inserting the jack in the other receptacle provided.

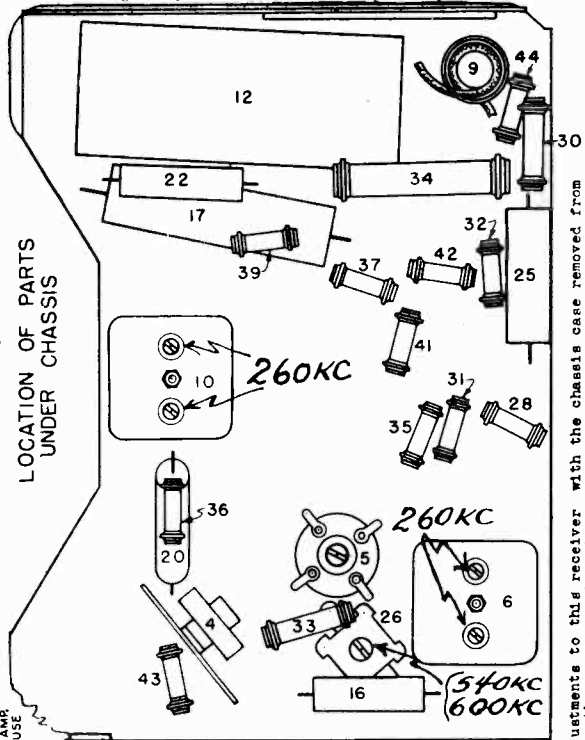


LOCATIONS OF PARTS UNDER POWER SUPPLY

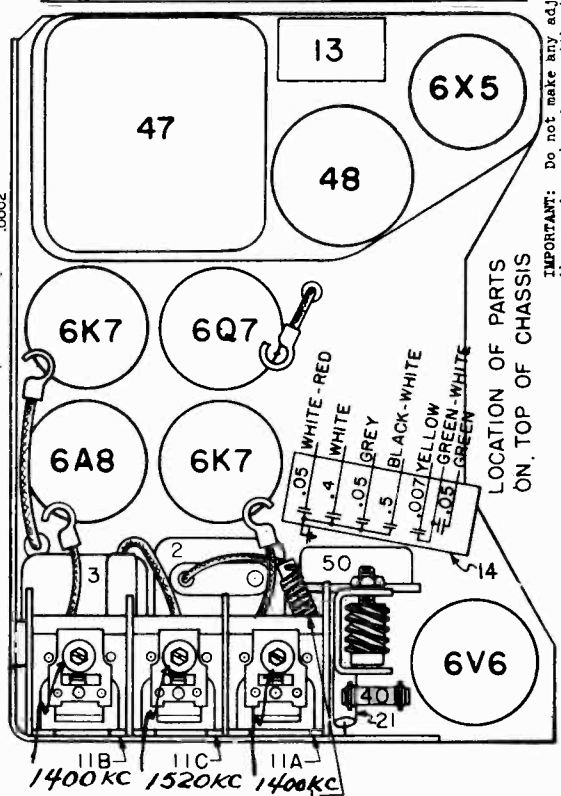


TUBE	FUNCTION	W	P	S	G	K
6A8	OSC. - TRANS.	6.0	20.2	7.4	3.0	3.0
6K7	R.F. AMP.	6.0	80.5	3.6	14.8	3.6
6Q7	DET. - A.V.C. - A.F.	6.0	35	2.5	1.2	1.2
6V6	OUTPUT	6.0	235	2.5	0	0
6X5	RECTIFIER	6.0	2.5	0	0	2.50

(TO AMMETER CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.)



LOCATION OF PARTS UNDER CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS

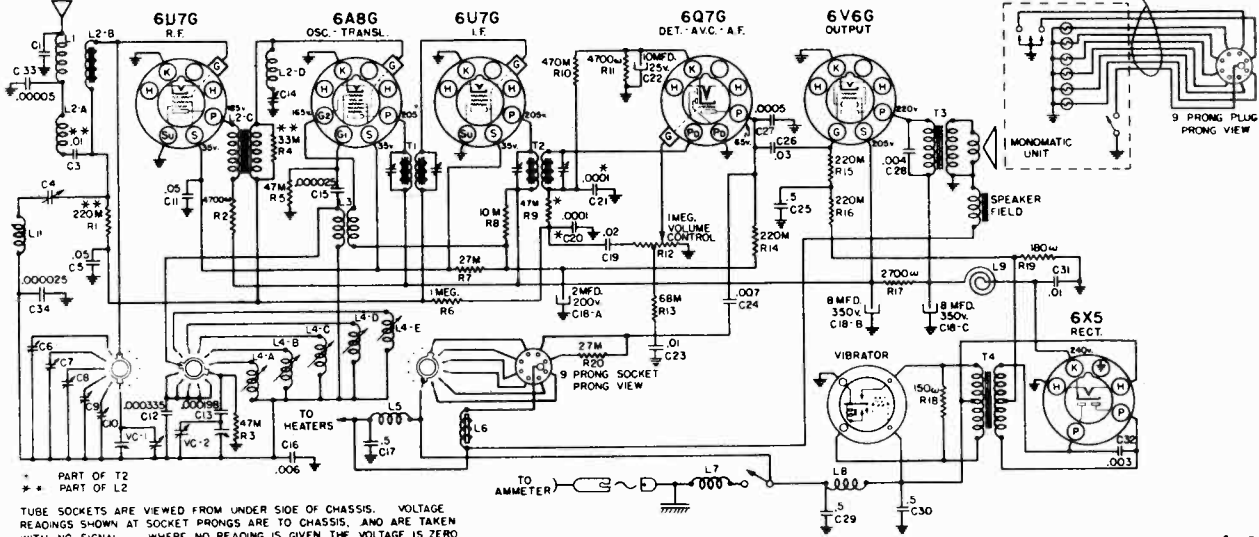
IMPORTANT: Do not make any adjustments to this receiver with the chassis case removed from the receiver chassis or without the proper equipment.

MODEL S7407-5

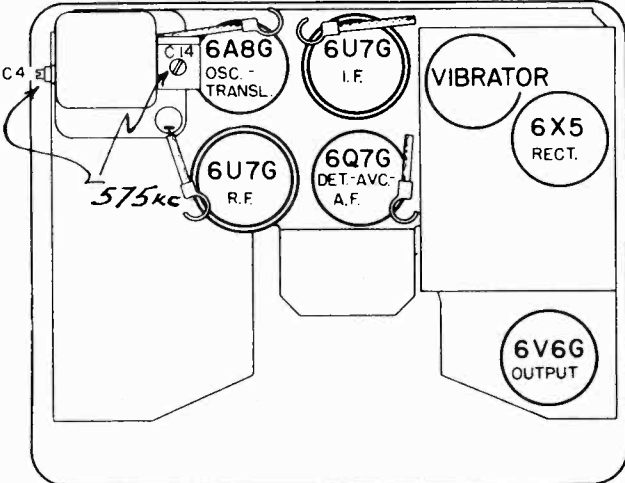
Schematic, Voltage,
Socket, Trimmers,

FIRESTONE TIRE & RUBBER CO.

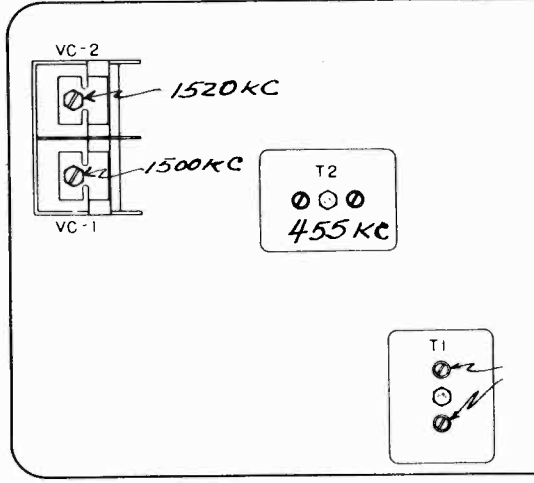
Alignment, Tuner



* PART OF T2
** PART OF L2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ
"A" BATTERY - 6 VOLTS CURRENT DRAIN - 7.1 AMPERES



LOCATIONS OF TUBES & TRIMMERS - BOTTOM COVER REMOVED



LOCATIONS OF TRIMMERS - TOP COVER REMOVED

SETTING UP THE MONOMATIC TUNING MECHANISM:

Remove the plate that covers the Monomatic tuning adjustments on the receiver case.

Operate the Monomatic button (marked "Push") until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune in your #1 station, using the Station Selector knob.

Operate the Monomatic button until the #1 station indicator (furthest left of the five indicators) becomes illuminated.

Turn the #1 station screw marked "OSC" (see Fig. 3) until your #1 station is tuned in. Other stations may be heard during this operation. If in doubt whether you have your desired #1 station, compare it with the original station by operating the Monomatic button until the Dial Tuning position is reached.

After adjusting the "OSC" screw as carefully as possible, adjust the "ANT" screw for maximum volume and best reproduction. After having done so, it is advisable to re-check the adjustment of the "OSC" screw and then the "ANT" one again to insure greatest accuracy.

Tune in your #2 station and operate the Monomatic button until the #2 indicator becomes illuminated. Then proceed to adjust the two screws for this station in the same manner as was just done for the #1 station. Always adjust the "OSC" screw before adjusting the "ANT" one, and then repeat the adjustments for greater accuracy.

Proceed in the same manner for the remaining stations on your list. Then replace the cover in the receiver case. Insert the proper call letters, cut from the sheets supplied, in the indicator button slots.

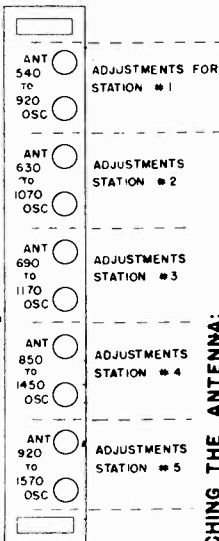


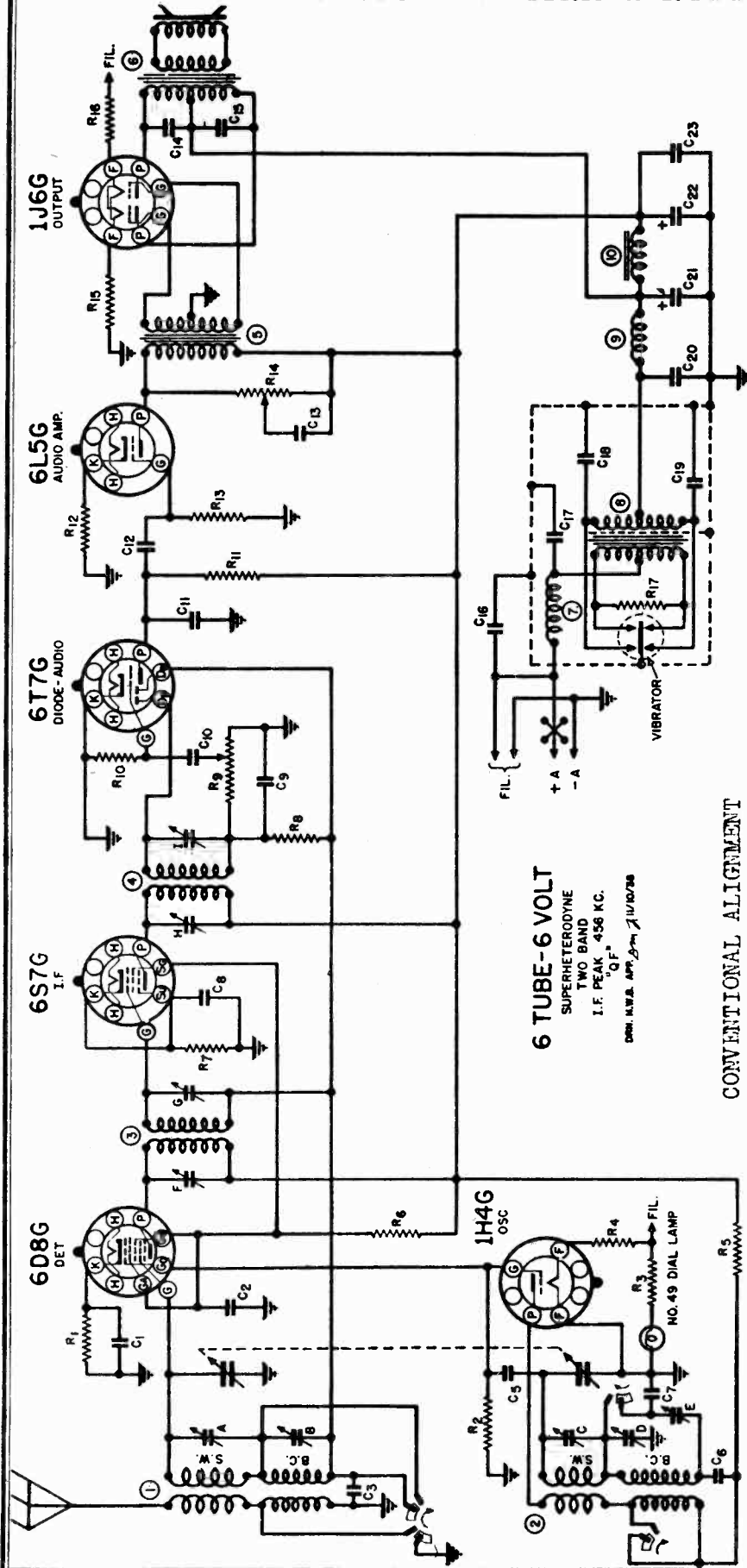
Fig. 3

MATCHING THE ANTENNA:

An adjusting screw, accessible to a screw-driver through a hole in the side of the case is provided to match the receiver to the car antenna. Using the Station Selector knob, tune in a very weak station at about 600 kilocycles. Then turn the adjusting screw to the point affording maximum volume.

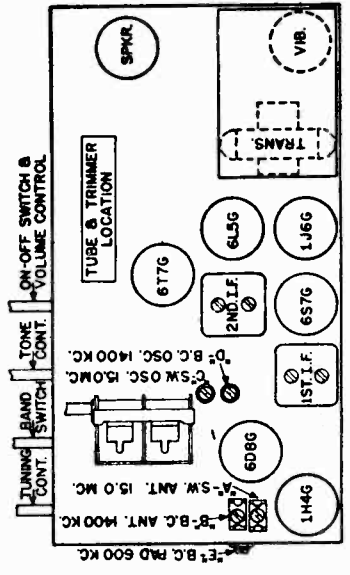
FIRESTONE TIRE & RUBBER CO.

MODEL S7424-3
Schematic, Socket
Alignment
Trimmers



6 TUBE-6 VOLT
SUPERHETERODYNE
TWO BAND
I.F. PEAK 456 KC.
Q.F.
DR. N.W. APR. 27 11/10/78

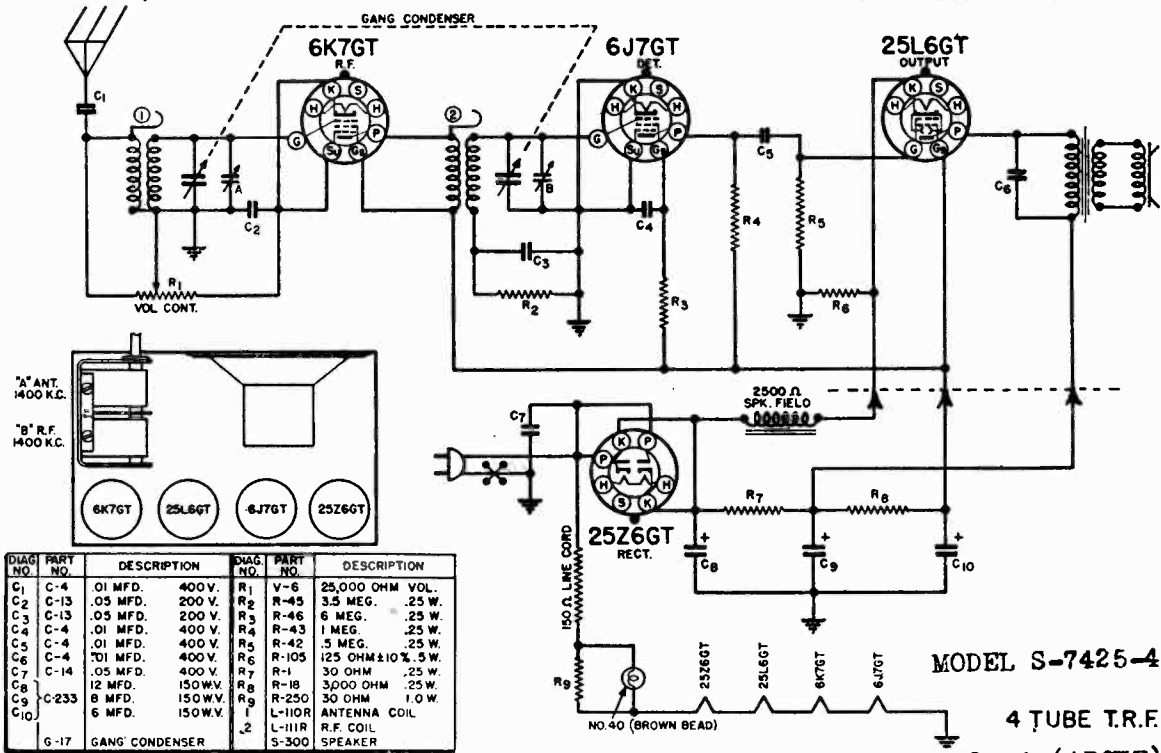
CONVENTIONAL ALIGNMENT VOL. VIII.
SEE SPECIAL SECTION VOL. VII.



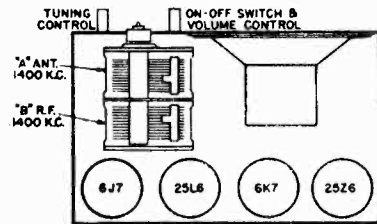
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	C-13	.05 MFD.	R9	V-20	1 MEG. VOLUME CONT.	1	L-72	ANTENNA COIL
C2	C-1	.1 MFD.	R10	R-35	5 W.	2	L-63	OSCILLATOR COIL
C3	C-13	.05 MFD.	R11	R-41	.25 MEGOHM	3	I-38	1ST I.F. TRANS.
C4	C-13	.05 MFD.	R12	R-16	2000 OHM	4	I-39	2ND I.F. "
C5	C-15	50 MMFD.	R13	R-42	.5 MEGOHM	5	T-103	AUDIO "
C6	C-4	.01 MFD.	R14	V-112	75,000 OHM TONE CONT.	6	S-26	SPKR.
C7	C-10	100 MMFD.	R15	R-510	8.3 OHM 5% .5 W.	7	H-208	"A" CHOKE
C8	C-13	.05 MFD.	R16	R-510	8.3 OHM 5% .5 W.	8	T-26	POWER TRANS.
C9	C-10	100 MMFD.	R17	R-107	200 OHM	9	H-207	R.F. CHOKE
C10	C-27	.008 MFD.				10	H-9	AUDIO CHOKE
C11	C-4	.01 MFD.				A		2-35 MMFD.
C12	C-4	.01 MFD.				B		
C13	C-5	.01 MFD.				C		
C14	C-4	.01 MFD.				D		
C15	C-4	.01 MFD.				E		
C16	C-22	.5 MFD.	X-17	BAND SWITCH				
C17	C-22	.5 MFD.	G-20	GANG CONDENSER				
C18	C-17	.01 MFD.(OIL) 1000V.	F-4	SYN VIBRATOR				
			W-207	BATTERY CABLE				

MODELS S7425-4, S7425-5, S7426-5
Schematics, Socket, Trimmers FIRESTONE TIRE & RUBBER CO.

Alignment

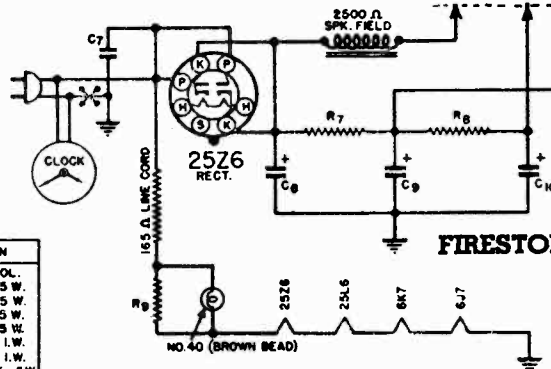


DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	C-4	.01 MFD. 400 V.	R1	V-6	25,000 OHM VOL.
C2	C-13	.05 MFD. 200 V.	R2	R-45	3.5 MEG. .25 W.
C3	C-13	.05 MFD. 200 V.	R3	R-46	6 MEG. .25 W.
C4	C-4	.01 MFD. 400 V.	R4	R-43	1 MEG. .25 W.
C5	C-4	.01 MFD. 400 V.	R5	R-42	5 MEG. .25 W.
C6	C-4	.01 MFD. 400 V.	R6	R-105	125 OHM ±10% .5 W.
C7	C-14	.05 MFD. 400 V.	R7	R-1	30 OHM .25 W.
C8	C-14	.05 MFD. 400 V.	R8	R-18	3,000 OHM .25 W.
C9	C-233	8 MFD. 150 W.V.	R9	R-250	30 OHM 1.0 W.
C10	C-233	6 MFD. 150 W.V.	L-110	L-110	ANTENNA COIL
			L-111	L-111	R.F. COIL
	G-17	GANG CONDENSER	S-300	S-300	SPEAKER



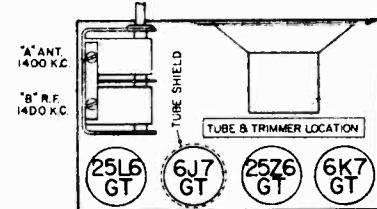
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	C-4	.01 MFD. 400 V.	R1	V-24	25,000 OHM VOL.
C2	C-13	.05 MFD. 200 V.	R2	R-45	3.5 MEG. .5 W.
C3	C-13	.05 MFD. 200 V.	R3	R-46	6 MEG. .5 W.
C4	C-4	.01 MFD. 400 V.	R4	R-43	1 MEG. .5 W.
C5	C-4	.01 MFD. 400 V.	R5	R-42	5 MEG. .5 W.
C6	C-4	.01 MFD. 400 V.	R6	R-105X	125 OHM ±10% 1 W.
C7	C-14	.05 MFD. 400 V.	R7	R-105X	125 OHM ±10% 1 W.
C8	C-14	.05 MFD. 400 V.	R8	R-18X	3,000 OHM ±10% .5 W.
C9	C-233	8 MFD. 150 W.V.	R9	R-100	30 OHM 1 W.
C10	C-233	6 MFD. 150 W.V.	L-110	L-110	ANTENNA COIL
	W-3	POWER CORD	L-111	L-111	R.F. COIL
	G-26	GANG CONDENSER	S-300A	S-300A	SPEAKER & TRANS.

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)



4 Tube AC Tuned Radio Frequency Receiver With Electric Clock

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD. 400 V.	R1	V-23	25,000 OHM VOL.
C2	N-1345	.05 MFD. 200 V.	R2	N-1418	3.5 MEG. .5 W.
C3	N-1345	.05 MFD. 200 V.	R3	N-1419	6 MEG. .5 W.
C4	N-1344	.01 MFD. 400 V.	R4	N-262	1 MEG. .5 W.
C5	N-1344	.01 MFD. 400 V.	R5	N-264	5 MEG. .5 W.
C6	N-1344	.01 MFD. 400 V.	R6	N-1416	125 OHM ±10% .5 W.
C7	N-1346	.05 MFD. 400 V.	R7	N-1420	125 OHM 1 W.
C8	C-235	16 MFD. 150 W.V.	R8	N-1417	3,000 OHM .5 W.
C9	C-235	6 MFD. 150 W.V.	R9	N-1415	30 OHM 1.0 W.
C10	C-235	6 MFD. 150 W.V.	R9	N-1251	25 OHM 1 W.
	S-300	SPEAKER	L-110	L-110	ANTENNA COIL
	G-25	GANG CONDENSER	L-111	L-111	R.F. COIL

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.

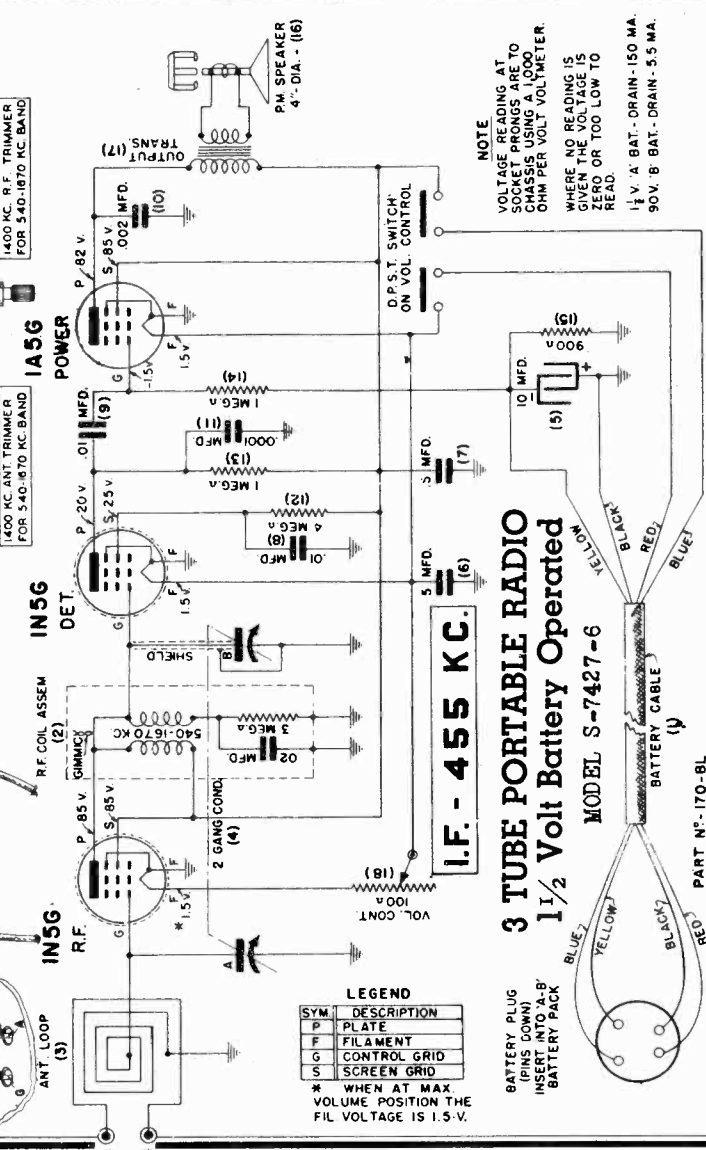
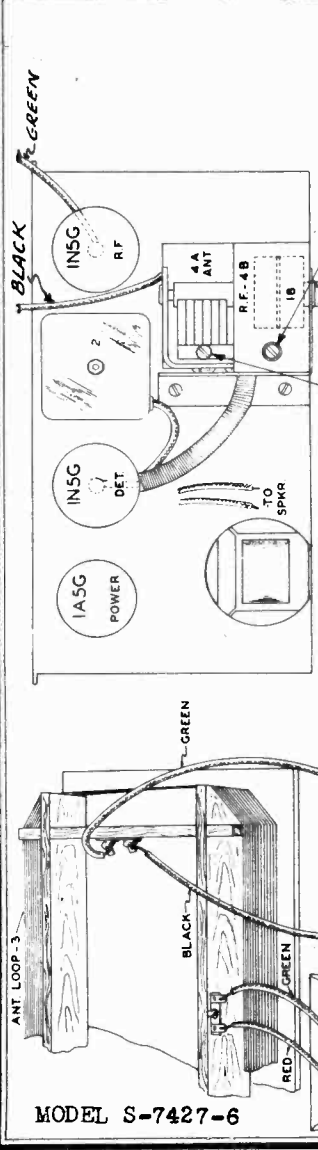
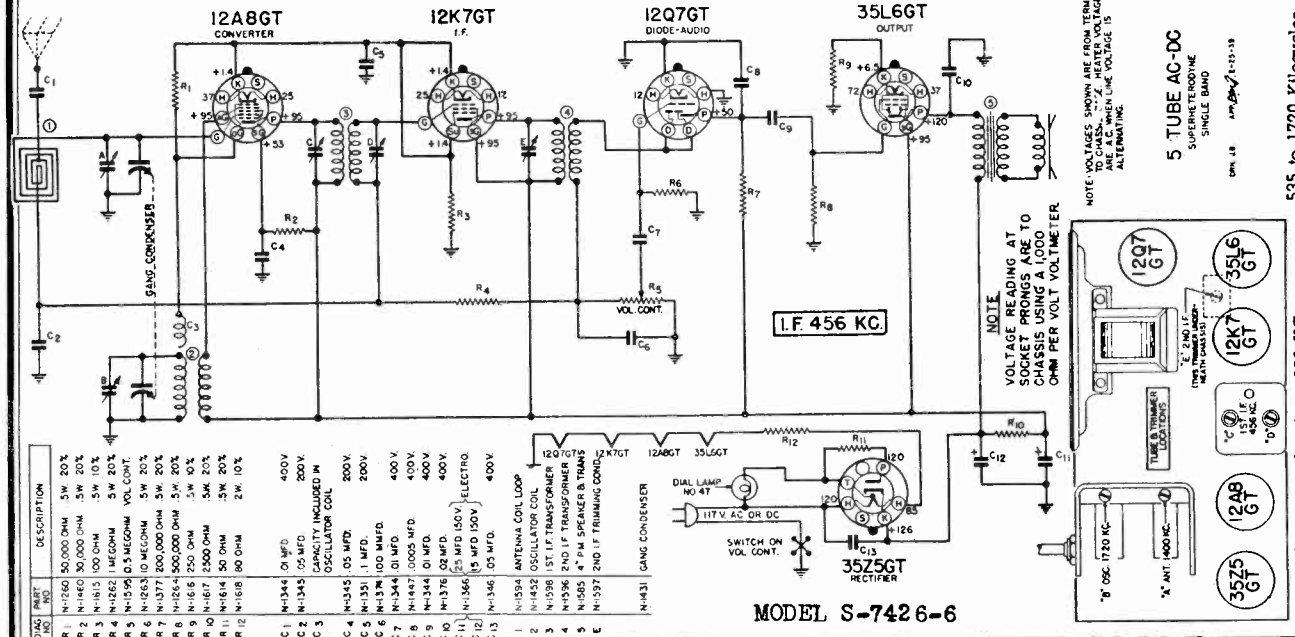
POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.

Schematics, Socket Trimmers, Alignment Voltage

FIRESTONE TIRE & RUBBER CO.

MODEL S7426-6

MODEL S7427-6



3 TUBE PORTABLE RADIO
1 1/2 Volt Battery Operated
MODEL S-7427-6

NOTE: VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

1 1/2 V. 'A' BAT. - DRAIN - 150 MA.
 90V. 'B' BAT. - DRAIN - 5.5 MA.

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1400 kilocycle antenna and R. F. trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

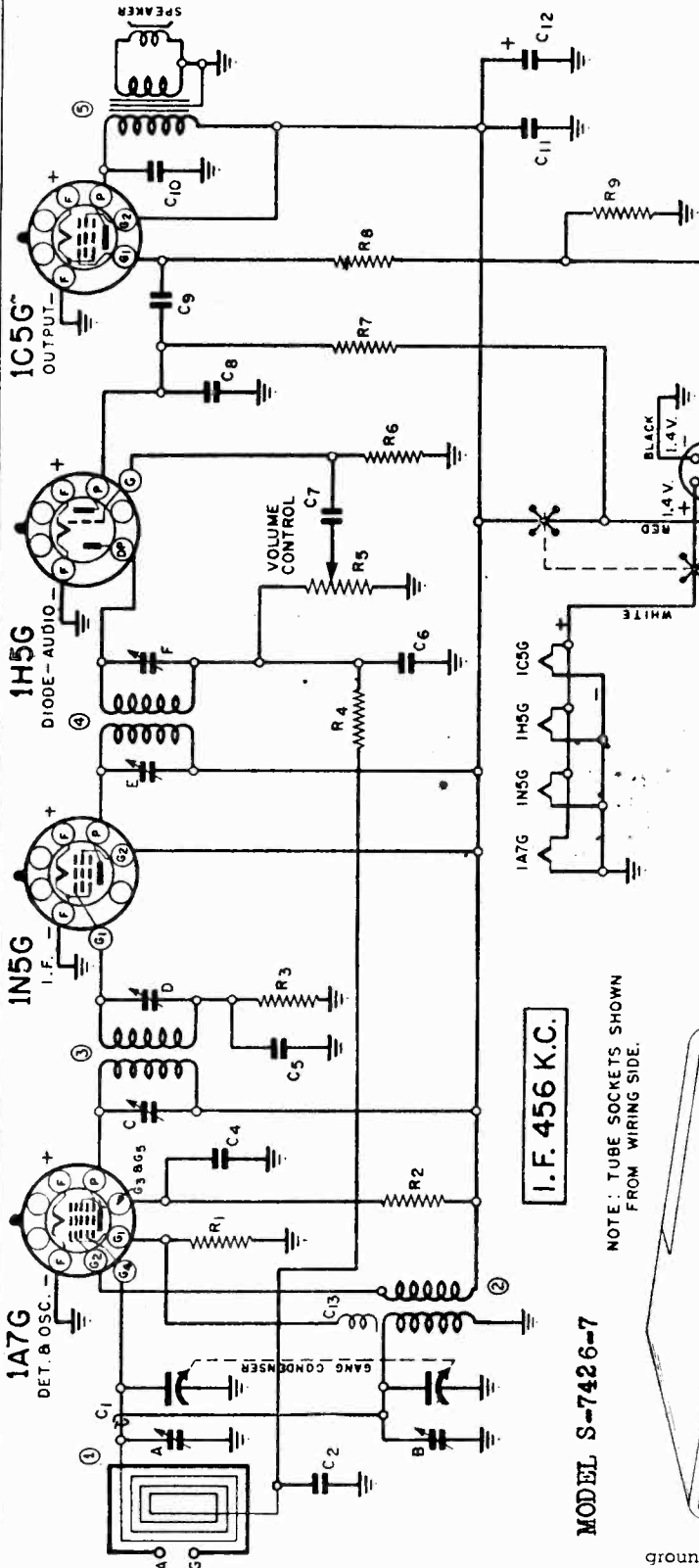
Couple test oscillator to receiver loop by:

- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.
- Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

MODEL S7426-7, Roamer
(Jan. 1939)

FIRESTONE TIRE & RUBBER CO.

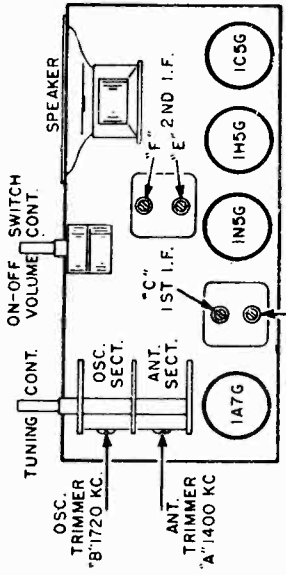
Schematic, Socket
Alignment
Trimmers



I.F. 456 K.C.

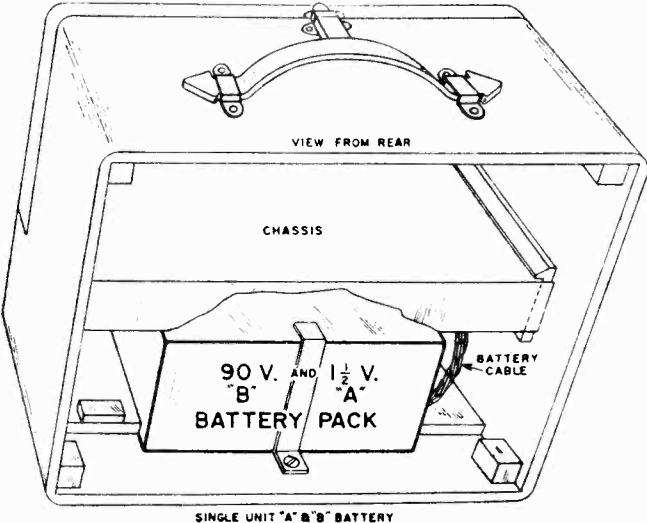
NOTE: TUBE SOCKETS SHOWN FROM WIRING SIDE.

MODEL S-7426-7



PORTABLE
4 TUBE - 1 1/2 VOLT
SUPERHETERODYNE
SINGLE BAND
"D" 1ST I.F. - 456 KC.

DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1377	.2 MEGOHM 20% .5W.
R2	N-1353	50,000 OHM 10% "
R3	N-1378	2 MEGOHM 20% "
R4	N-1262	1 MEGOHM "
R5	N-1504	.5 MEG. VOLUME CONT.
R6	N-1378	2 MEGOHM 20% .5W.
R7	N-1262	1 MEGOHM "
R8	N-1379	550 OHM 10% "
R9	N-1345	GIMMICK
C1	N-1345	.05 MFD. 200V.
C2	N-1345	.05 MFD. 200V.
C3	N-1376	.02 MFD. 400V.
C4	N-1343	250 MMFD. 20% 400V.
C5	N-1344	.01 MFD. 400V.
C6	N-1374	100 MMFD. 20% "
C7	N-1344	.01 MFD. 400V.
C8	N-1347	.006 MFD. 600V.
C9	N-1351	.10 MFD. 200V.
C10	N-1367	6 MFD. ELECTROLYTIC CAPACITY INCLUDED
C11	N-1367	6 MFD. ELECTROLYTIC CAPACITY INCLUDED
C12	N-1367	6 MFD. ELECTROLYTIC CAPACITY INCLUDED
C13	N-1367	6 MFD. ELECTROLYTIC CAPACITY INCLUDED
1	N-1508	LOOP ANTENNA
2	N-1532	OSCILLATOR COIL
3	N-1391	1ST I.F. TRANS.
4	N-1509	2ND I.F. TRANS.
5	N-1507	5" P.M. SPKR. & TRANS.
	N-1499	GANG CONDENSER
	N-1510	BATTERY CABLE



SINGLE UNIT "A" & "B" BATTERY

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis

ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna terminal to the generator through a 200 MMF dummy and the ground terminal to the generator ground. Set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output. Check the sensitivity at 600 to determine if the gang or the coils have been damaged.

DRWN. F.L.C. APP. G.M.G. 1-24-39 XL

Schematics, Socket, Trimmers
Alignment, Voltage

FIRESTONE TIRE & RUBBER CO.

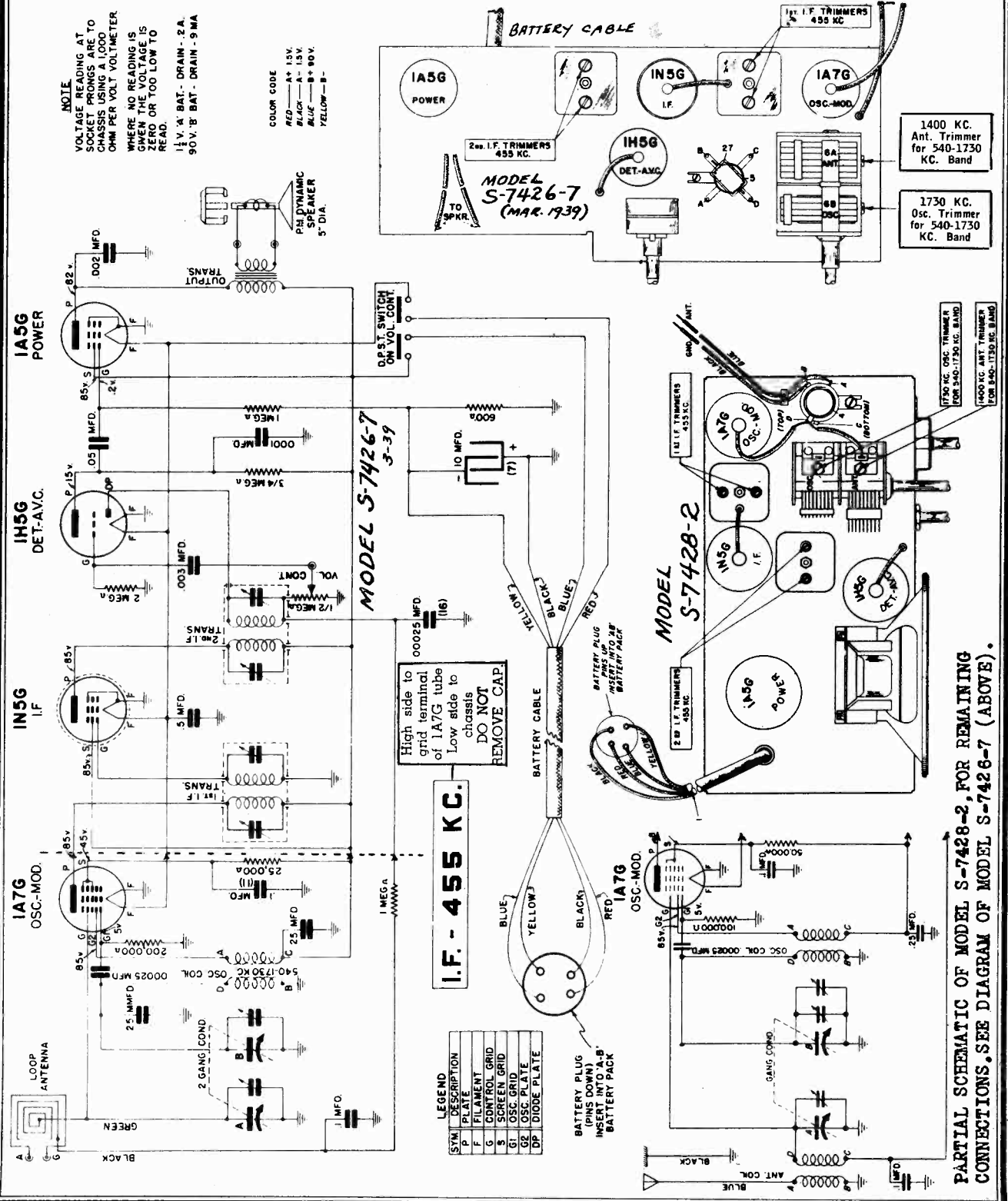
MODEL S7426-7 (Mar. 1939)
MODEL S7428-2

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

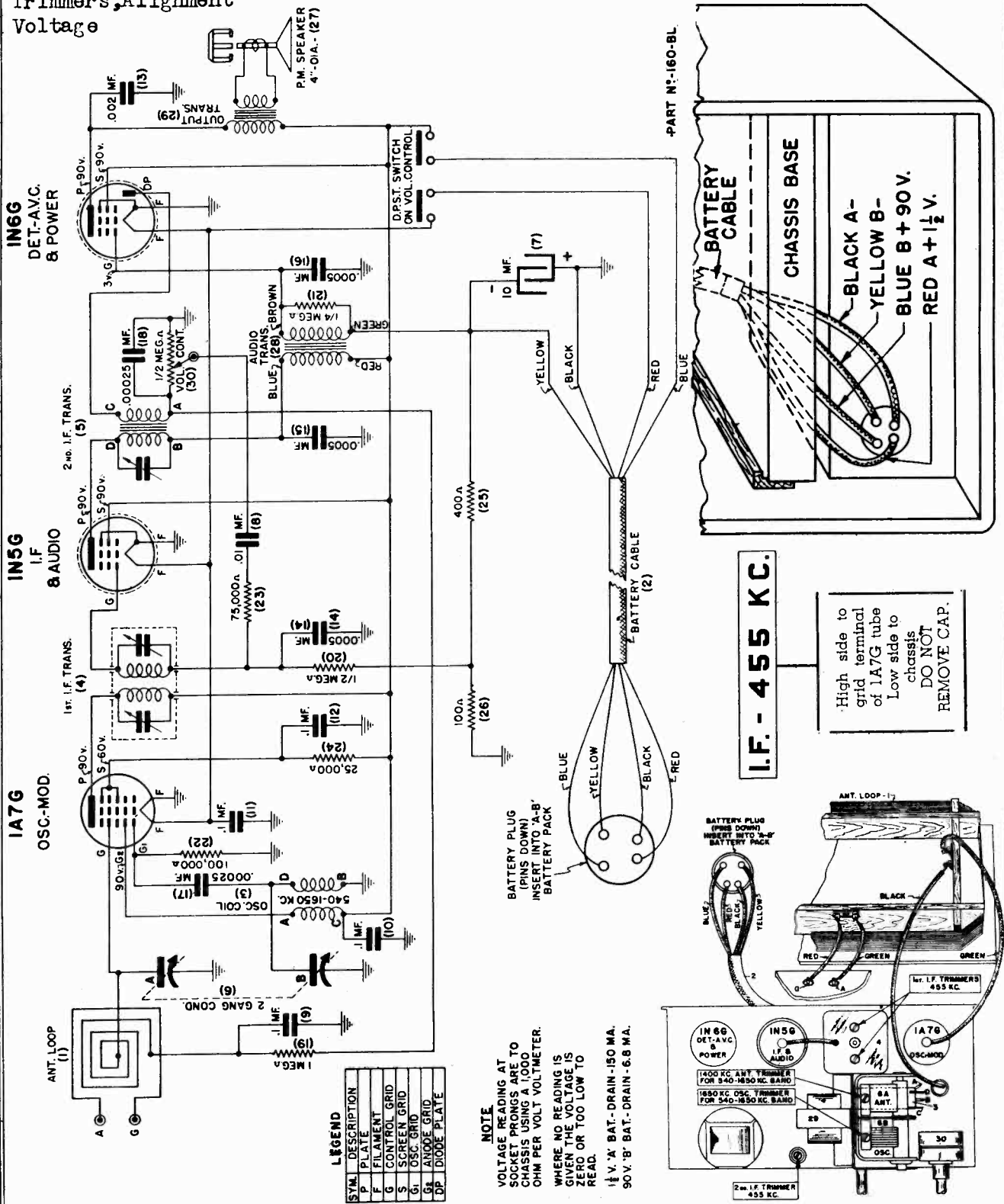
- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.
- Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.



MODEL S7426-9

Schematic, Socket
Trimmers, Alignment
Voltage

FIRESTONE TIRE & RUBBER CO.



BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERY-PACK IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.
- Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

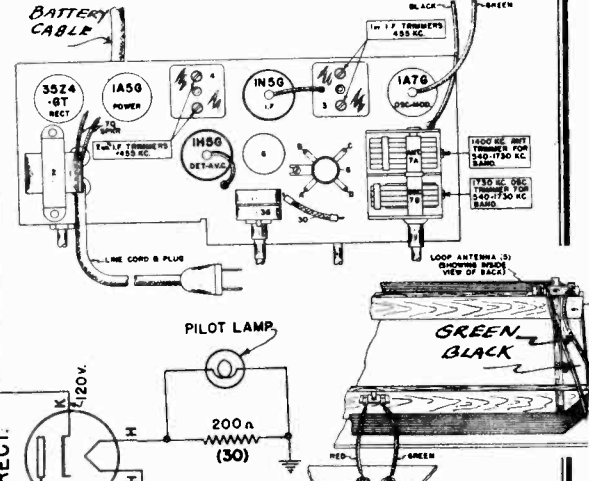
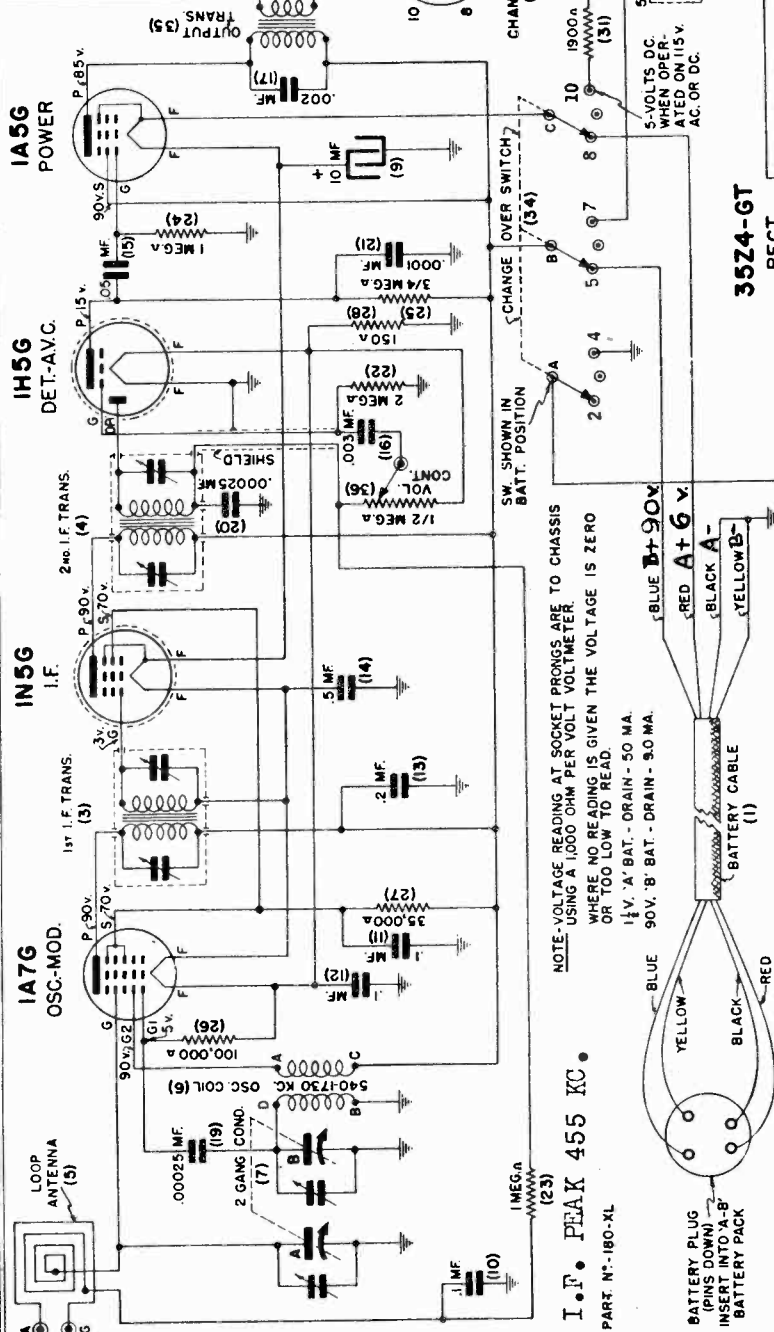
Alignment, Voltage Trimmers

FIRESTONE TIRE & RUBBER CO.

MODEL S7427-5 Schematic, Socket

LEGEND

SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
C	CONTROL GRID
S	SCREEN GRID
O	OSC. GRID
D	OSC. PLATE
D.P.	DIODE PLATE
H	HEATER



NOTE: VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1000 OHM PER VOLT VOLTMETER. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ. 1 1/2 V. 'A' BAT. - DRAIN - 50 MA. 90 V. 'B' BAT. - DRAIN - 30 MA.

I. F. PEAK 455 KC. PART. N° - 180-XL

Place all line cord when not in use in compartment under battery. Always keep the door closed. TEST OSCILLATOR

Refer to parts layout diagram for location of trimmers mentioned below—and: Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.

Adjust 1730 K. C. oscillator trimmer for maximum output.

Adjust 1400 K. C. antenna trimmer for maximum output.

Set receiver dial to:	I. F. Any point where no interfering signal is received	Exactly 1730 K. C.	Approx. 1400 K. C.
Adjust test oscillator frequency to:	455 K. C.	Exactly 1730 K. C.	Exactly 1400 K. C.
Use dummy antenna in series with output of test oscillator consisting of:	.02 MFD condenser	None	None
Attach output of test oscillator to:	High side to grid terminal of IA7G tube Low side to chassis DO NOT REMOVE CAP. Use small loop to couple test oscillator to receiver loop	Use small loop to couple test oscillator to receiver loop	Use small loop to couple test oscillator to receiver loop

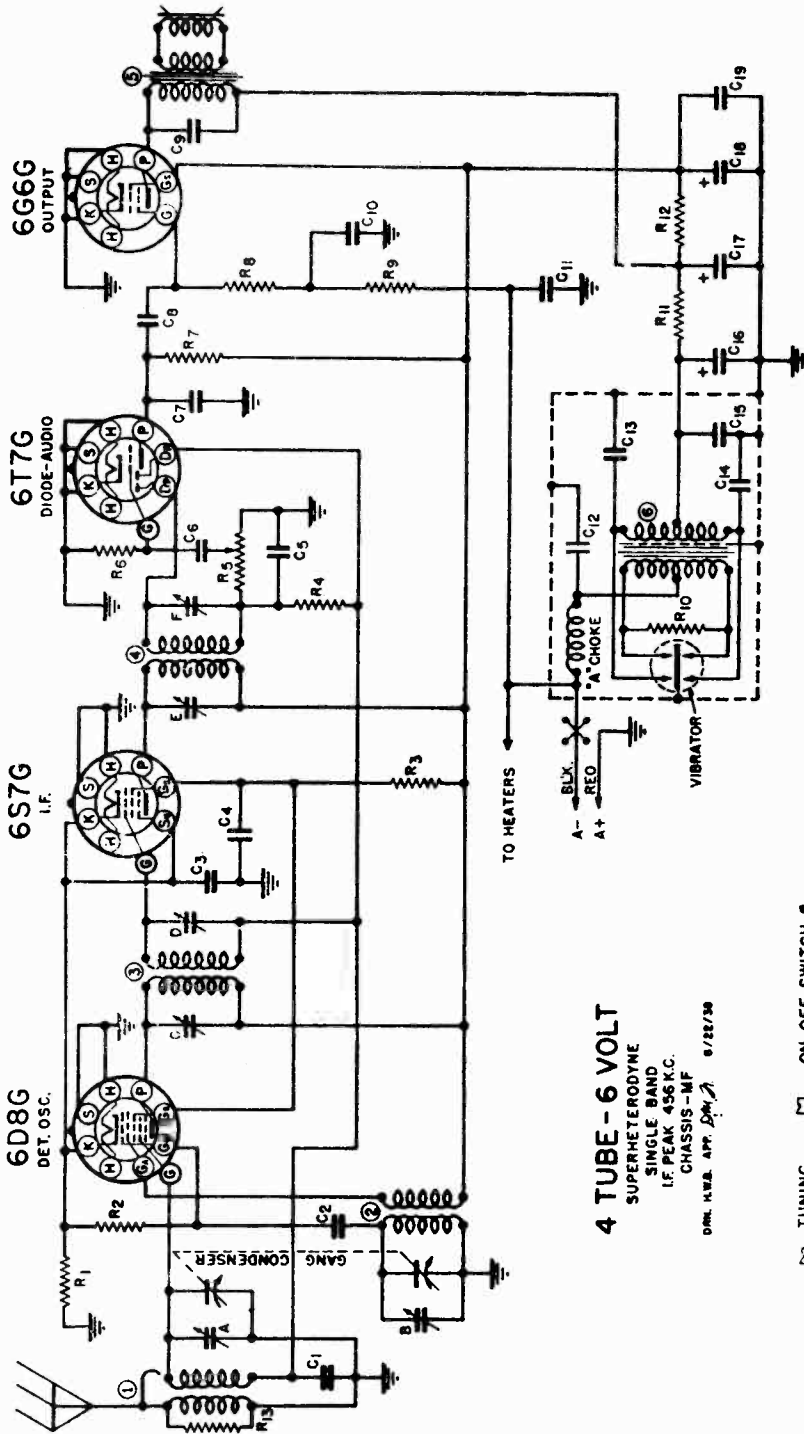
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

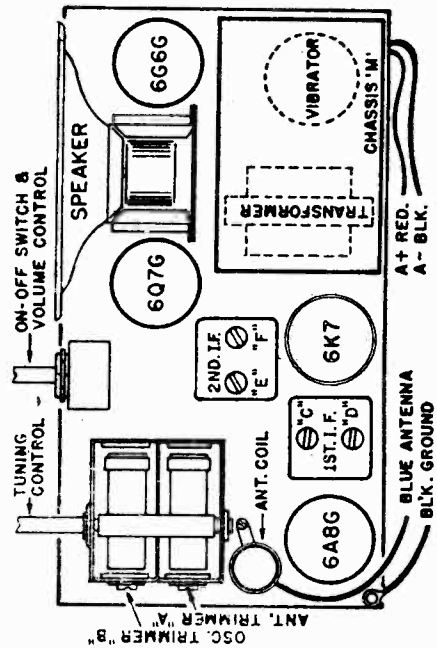
- Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.
- Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

MODEL S7428-1 FIRESTONE TIRE & RUBBER CO.
Schematic, Socket, Trimmers
Alignment



4 TUBE - 6 VOLT
SUPERHETERODYNE
SINGLE BAND
I.F. PEAK 456 KC.
CHASSIS - MF
DIAL N.W.B. APP. D.M.V. 9/22/39

DIAG. PART NO.	DESCRIPTION	DIAG. PART NO.	DESCRIPTION
C-1	.5 MFD. 50 V.	R-1	200 OHM
C-2	.5 MFD. 50 V.	R-2	50,000 OHM
C-3	.01 MFD. (OIL) 1000 V.	R-3	50,000 OHM
C-4	.01 MFD. (OIL) 1000 V.	R-4	2 MEGOHM
C-5	.01 MFD. (OIL) 1000 V.	R-5	2 MEGOHM
C-6	.01 MFD. (OIL) 1000 V.	R-6	2 MEGOHM
C-7	.01 MFD. (OIL) 1000 V.	R-7	2 MEGOHM
C-8	.01 MFD. (OIL) 1000 V.	R-8	2 MEGOHM
C-9	.01 MFD. (OIL) 1000 V.	R-9	2 MEGOHM
C-10	.01 MFD. (OIL) 1000 V.	R-10	2 MEGOHM
C-11	.01 MFD. (OIL) 1000 V.	R-11	2 MEGOHM
C-12	.01 MFD. (OIL) 1000 V.	R-12	2 MEGOHM
C-13	.01 MFD. (OIL) 1000 V.	R-13	2 MEGOHM
C-14	.01 MFD. (OIL) 1000 V.	R-14	2 MEGOHM
C-15	.01 MFD. (OIL) 1000 V.	R-15	2 MEGOHM
C-16	.01 MFD. (OIL) 1000 V.	R-16	2 MEGOHM
C-17	.01 MFD. (OIL) 1000 V.	R-17	2 MEGOHM
C-18	.01 MFD. (OIL) 1000 V.	R-18	2 MEGOHM
C-19	.01 MFD. (OIL) 1000 V.	R-19	2 MEGOHM
C-20	.01 MFD. (OIL) 1000 V.	R-20	2 MEGOHM
C-21	.01 MFD. (OIL) 1000 V.	R-21	2 MEGOHM
C-22	.01 MFD. (OIL) 1000 V.	R-22	2 MEGOHM
C-23	.01 MFD. (OIL) 1000 V.	R-23	2 MEGOHM
C-24	.01 MFD. (OIL) 1000 V.	R-24	2 MEGOHM
C-25	.01 MFD. (OIL) 1000 V.	R-25	2 MEGOHM
C-26	.01 MFD. (OIL) 1000 V.	R-26	2 MEGOHM
C-27	.01 MFD. (OIL) 1000 V.	R-27	2 MEGOHM
C-28	.01 MFD. (OIL) 1000 V.	R-28	2 MEGOHM
C-29	.01 MFD. (OIL) 1000 V.	R-29	2 MEGOHM
C-30	.01 MFD. (OIL) 1000 V.	R-30	2 MEGOHM
C-31	.01 MFD. (OIL) 1000 V.	R-31	2 MEGOHM
C-32	.01 MFD. (OIL) 1000 V.	R-32	2 MEGOHM
C-33	.01 MFD. (OIL) 1000 V.	R-33	2 MEGOHM
C-34	.01 MFD. (OIL) 1000 V.	R-34	2 MEGOHM
C-35	.01 MFD. (OIL) 1000 V.	R-35	2 MEGOHM
C-36	.01 MFD. (OIL) 1000 V.	R-36	2 MEGOHM
C-37	.01 MFD. (OIL) 1000 V.	R-37	2 MEGOHM
C-38	.01 MFD. (OIL) 1000 V.	R-38	2 MEGOHM
C-39	.01 MFD. (OIL) 1000 V.	R-39	2 MEGOHM
C-40	.01 MFD. (OIL) 1000 V.	R-40	2 MEGOHM
C-41	.01 MFD. (OIL) 1000 V.	R-41	2 MEGOHM
C-42	.01 MFD. (OIL) 1000 V.	R-42	2 MEGOHM
C-43	.01 MFD. (OIL) 1000 V.	R-43	2 MEGOHM
C-44	.01 MFD. (OIL) 1000 V.	R-44	2 MEGOHM
C-45	.01 MFD. (OIL) 1000 V.	R-45	2 MEGOHM
C-46	.01 MFD. (OIL) 1000 V.	R-46	2 MEGOHM
C-47	.01 MFD. (OIL) 1000 V.	R-47	2 MEGOHM
C-48	.01 MFD. (OIL) 1000 V.	R-48	2 MEGOHM
C-49	.01 MFD. (OIL) 1000 V.	R-49	2 MEGOHM
C-50	.01 MFD. (OIL) 1000 V.	R-50	2 MEGOHM
C-51	.01 MFD. (OIL) 1000 V.	R-51	2 MEGOHM
C-52	.01 MFD. (OIL) 1000 V.	R-52	2 MEGOHM
C-53	.01 MFD. (OIL) 1000 V.	R-53	2 MEGOHM
C-54	.01 MFD. (OIL) 1000 V.	R-54	2 MEGOHM
C-55	.01 MFD. (OIL) 1000 V.	R-55	2 MEGOHM
C-56	.01 MFD. (OIL) 1000 V.	R-56	2 MEGOHM
C-57	.01 MFD. (OIL) 1000 V.	R-57	2 MEGOHM
C-58	.01 MFD. (OIL) 1000 V.	R-58	2 MEGOHM
C-59	.01 MFD. (OIL) 1000 V.	R-59	2 MEGOHM
C-60	.01 MFD. (OIL) 1000 V.	R-60	2 MEGOHM
C-61	.01 MFD. (OIL) 1000 V.	R-61	2 MEGOHM
C-62	.01 MFD. (OIL) 1000 V.	R-62	2 MEGOHM
C-63	.01 MFD. (OIL) 1000 V.	R-63	2 MEGOHM
C-64	.01 MFD. (OIL) 1000 V.	R-64	2 MEGOHM
C-65	.01 MFD. (OIL) 1000 V.	R-65	2 MEGOHM
C-66	.01 MFD. (OIL) 1000 V.	R-66	2 MEGOHM
C-67	.01 MFD. (OIL) 1000 V.	R-67	2 MEGOHM
C-68	.01 MFD. (OIL) 1000 V.	R-68	2 MEGOHM
C-69	.01 MFD. (OIL) 1000 V.	R-69	2 MEGOHM
C-70	.01 MFD. (OIL) 1000 V.	R-70	2 MEGOHM
C-71	.01 MFD. (OIL) 1000 V.	R-71	2 MEGOHM
C-72	.01 MFD. (OIL) 1000 V.	R-72	2 MEGOHM
C-73	.01 MFD. (OIL) 1000 V.	R-73	2 MEGOHM
C-74	.01 MFD. (OIL) 1000 V.	R-74	2 MEGOHM
C-75	.01 MFD. (OIL) 1000 V.	R-75	2 MEGOHM
C-76	.01 MFD. (OIL) 1000 V.	R-76	2 MEGOHM
C-77	.01 MFD. (OIL) 1000 V.	R-77	2 MEGOHM
C-78	.01 MFD. (OIL) 1000 V.	R-78	2 MEGOHM
C-79	.01 MFD. (OIL) 1000 V.	R-79	2 MEGOHM
C-80	.01 MFD. (OIL) 1000 V.	R-80	2 MEGOHM
C-81	.01 MFD. (OIL) 1000 V.	R-81	2 MEGOHM
C-82	.01 MFD. (OIL) 1000 V.	R-82	2 MEGOHM
C-83	.01 MFD. (OIL) 1000 V.	R-83	2 MEGOHM
C-84	.01 MFD. (OIL) 1000 V.	R-84	2 MEGOHM
C-85	.01 MFD. (OIL) 1000 V.	R-85	2 MEGOHM
C-86	.01 MFD. (OIL) 1000 V.	R-86	2 MEGOHM
C-87	.01 MFD. (OIL) 1000 V.	R-87	2 MEGOHM
C-88	.01 MFD. (OIL) 1000 V.	R-88	2 MEGOHM
C-89	.01 MFD. (OIL) 1000 V.	R-89	2 MEGOHM
C-90	.01 MFD. (OIL) 1000 V.	R-90	2 MEGOHM
C-91	.01 MFD. (OIL) 1000 V.	R-91	2 MEGOHM
C-92	.01 MFD. (OIL) 1000 V.	R-92	2 MEGOHM
C-93	.01 MFD. (OIL) 1000 V.	R-93	2 MEGOHM
C-94	.01 MFD. (OIL) 1000 V.	R-94	2 MEGOHM
C-95	.01 MFD. (OIL) 1000 V.	R-95	2 MEGOHM
C-96	.01 MFD. (OIL) 1000 V.	R-96	2 MEGOHM
C-97	.01 MFD. (OIL) 1000 V.	R-97	2 MEGOHM
C-98	.01 MFD. (OIL) 1000 V.	R-98	2 MEGOHM
C-99	.01 MFD. (OIL) 1000 V.	R-99	2 MEGOHM
C-100	.01 MFD. (OIL) 1000 V.	R-100	2 MEGOHM



TUBE AND TRIMMER LOCATIONS

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600 and 1400 KC. and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should be aligned.

I.F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.