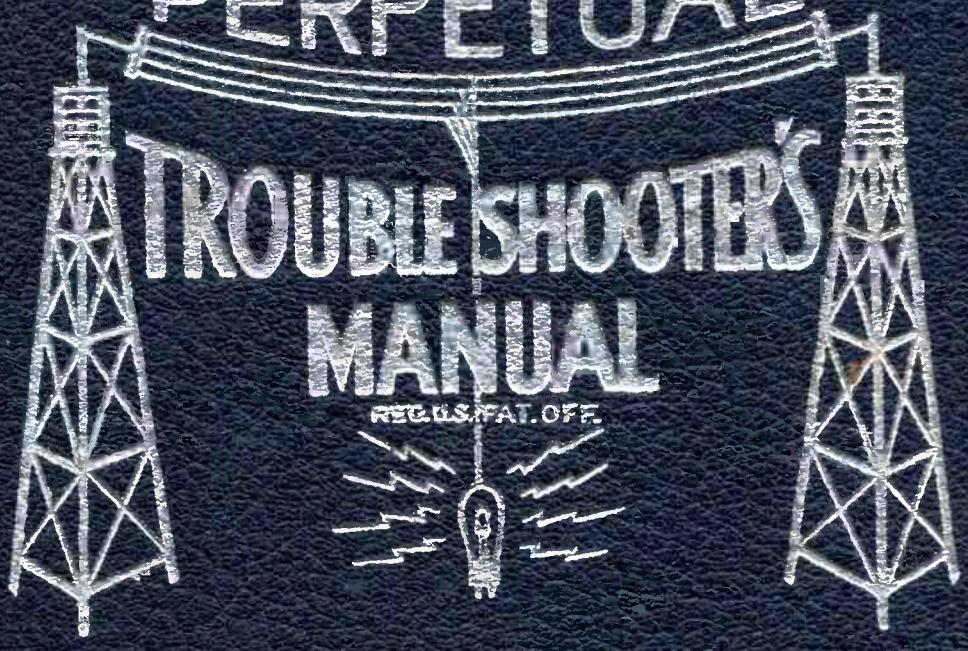
VOLUME XI

PERPETUAL TROUBLESHOOTER'S MANUAL

REG. U.S. PAT. OFF.

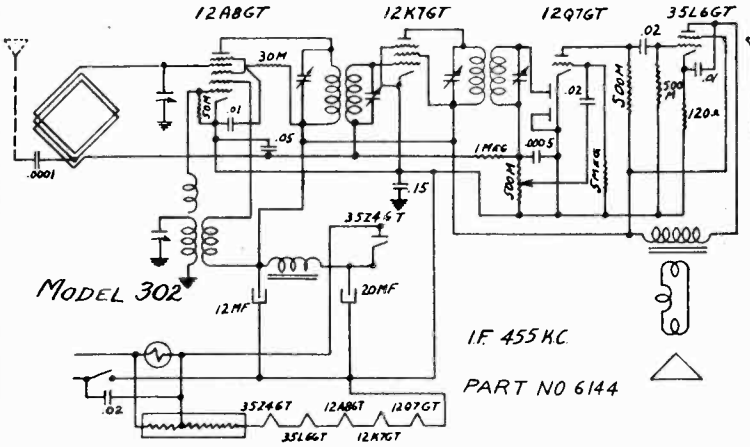


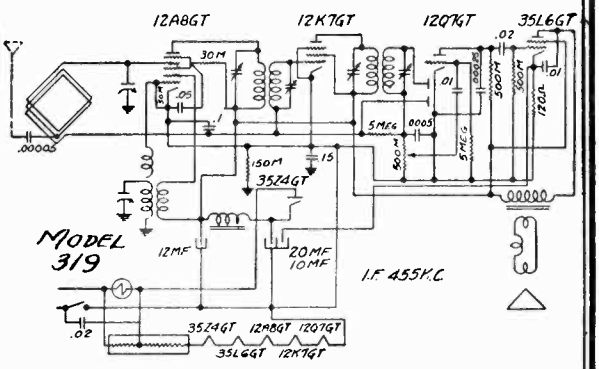
JOHN F. RIDER

Schematics, Socket Alignment, Trimmers

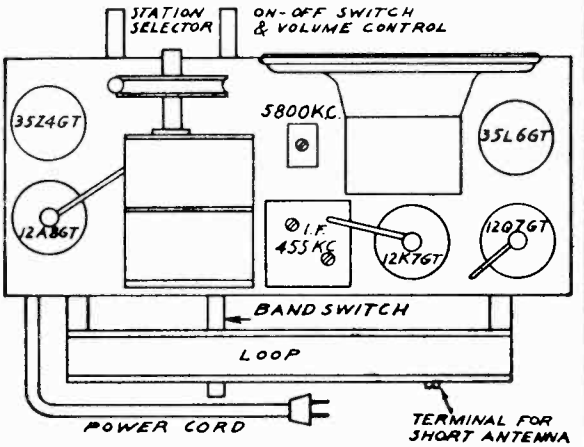
DETROLA CORP.

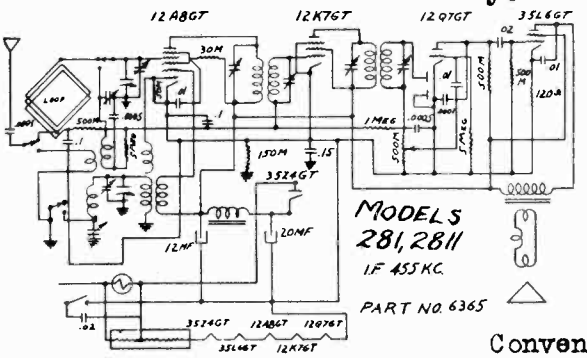
MODELS 281, 2811
MODEL 293
MODEL 302
MODELS 304, 3041
MODEL 319





At right: Chassis layout for Models 302, 319, 281, and 2811. Band switch and 5800-kc trimmer on Models 281 and 2811 only.



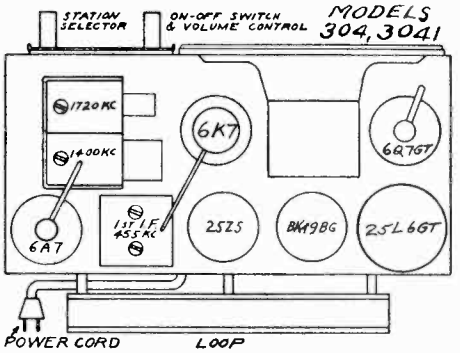


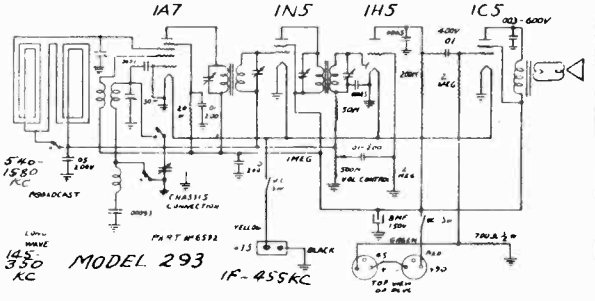
Conventional alignment for all models See Vol. VIII "How It Works"

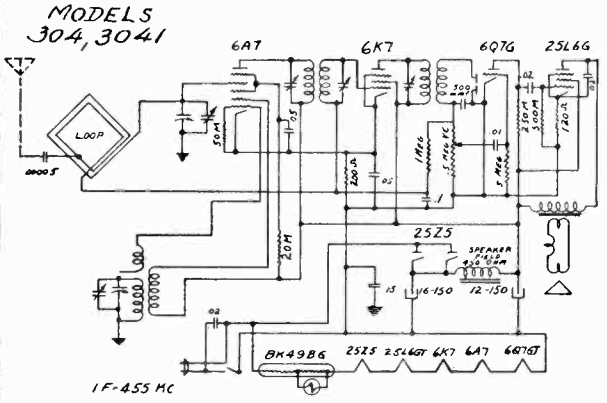
The following tubes are used in this receiver:

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

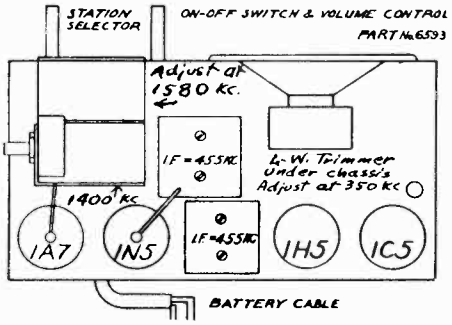
If this receiver should fail to operate when connected to direct current, reverse the attachment plug in the light socket.







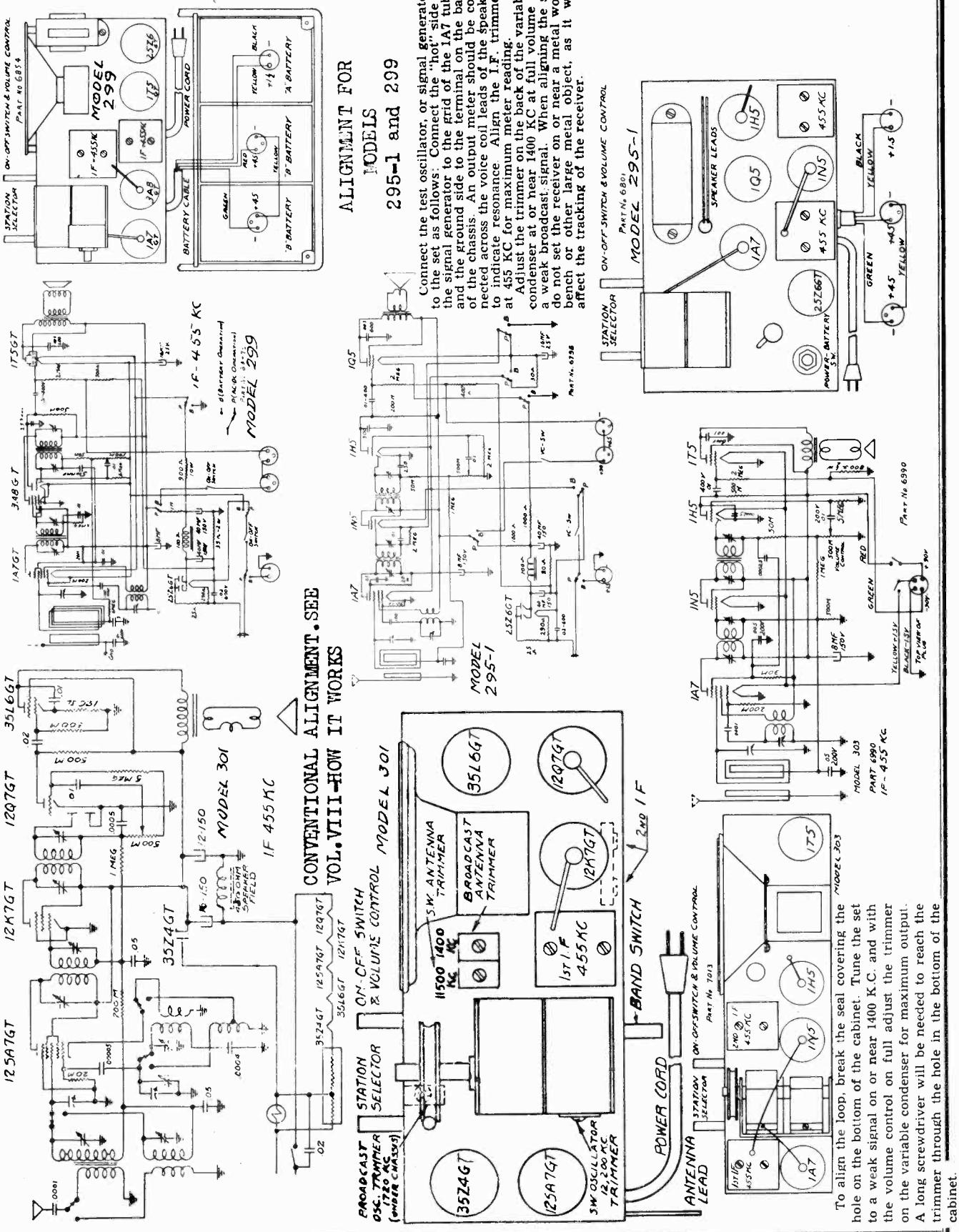
At right: Layout for Model 293



MODEL 295-1
MODEL 299
MODEL 301
MODEL 303

DETROLA CORP.

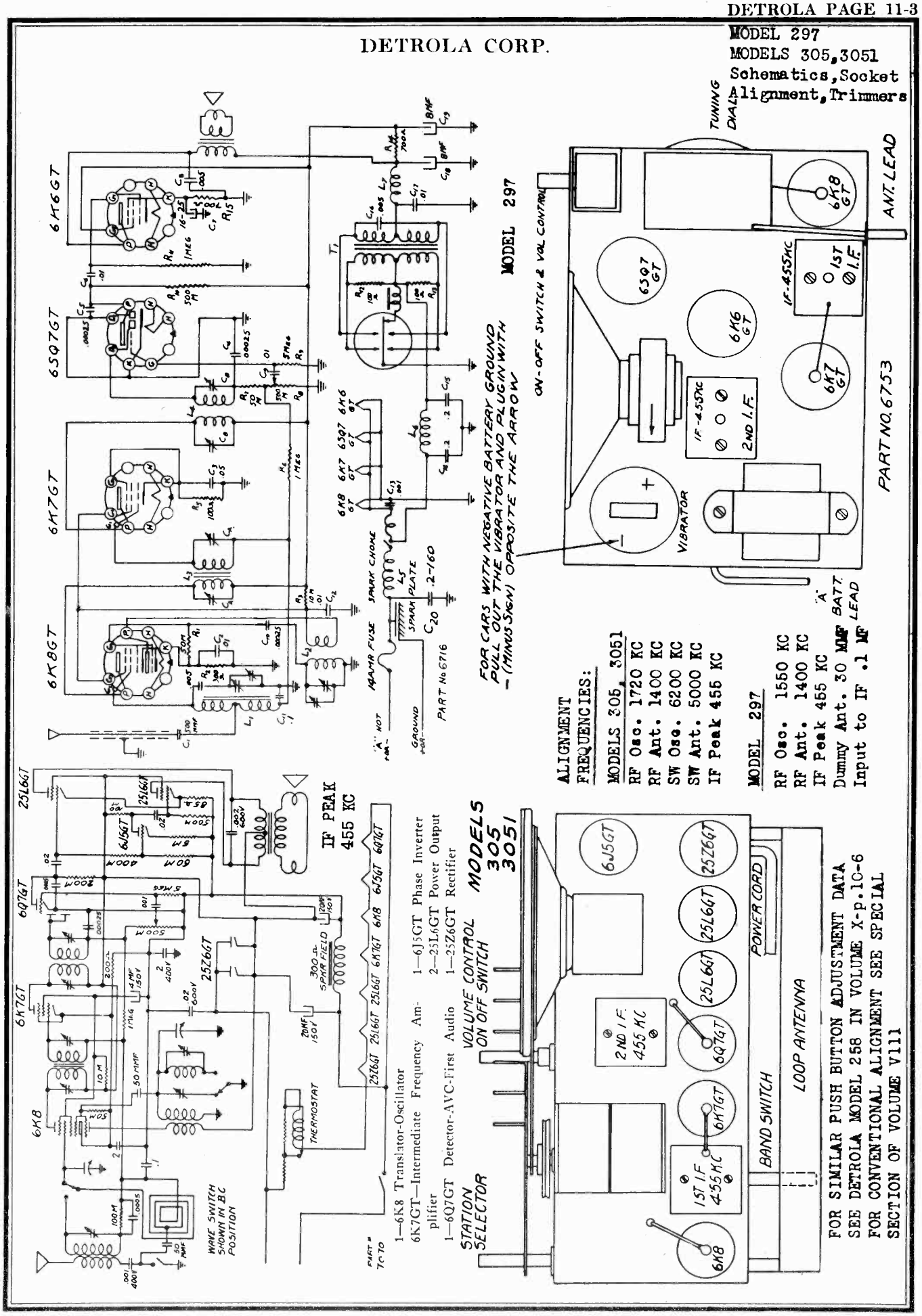
Schematics, Socket Alignment, Trimmers



To align the loop, break the seal covering the hole on the bottom of the cabinet. Tune the set to a weak signal on or near 1400 K.C. and with the volume control on full adjust the trimmer on the variable condenser for maximum output. A long screwdriver will be needed to reach the trimmer through the hole in the bottom of the cabinet.

DETROLA CORP.

MODEL 297
MODELS 305, 3051
Schematics, Socket
Alignment, Trimmers



MODELS 310,3101
MODELS 320,3201,3202
Schematics, Socket, Alignment, Trimmers

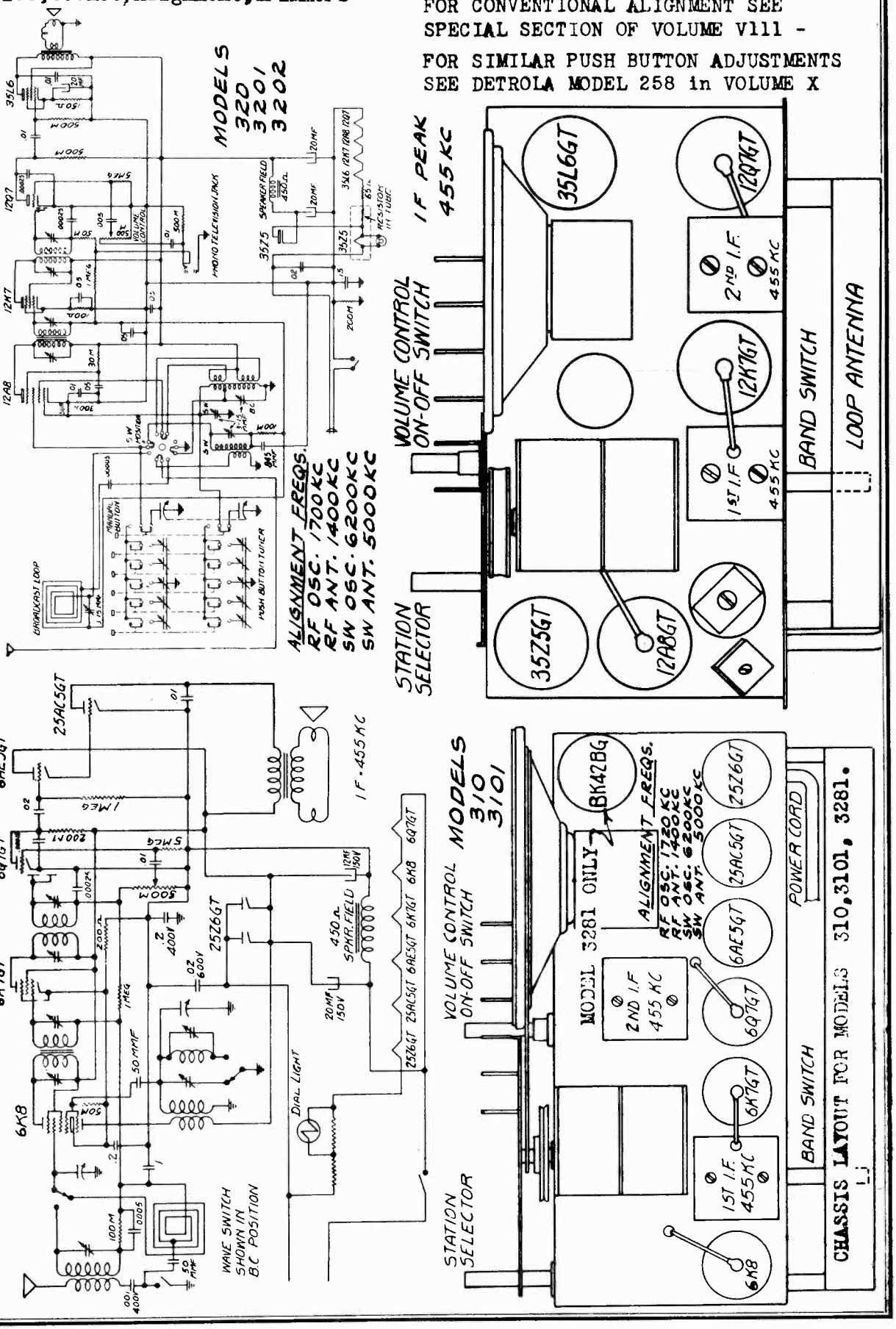
DETROLA CORP.

MODEL 3281
Socket, Trimmers

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION OF VOLUME V111 -

FOR SIMILAR PUSH BUTTON ADJUSTMENTS SEE DETROLA MODEL 258 in VOLUME X

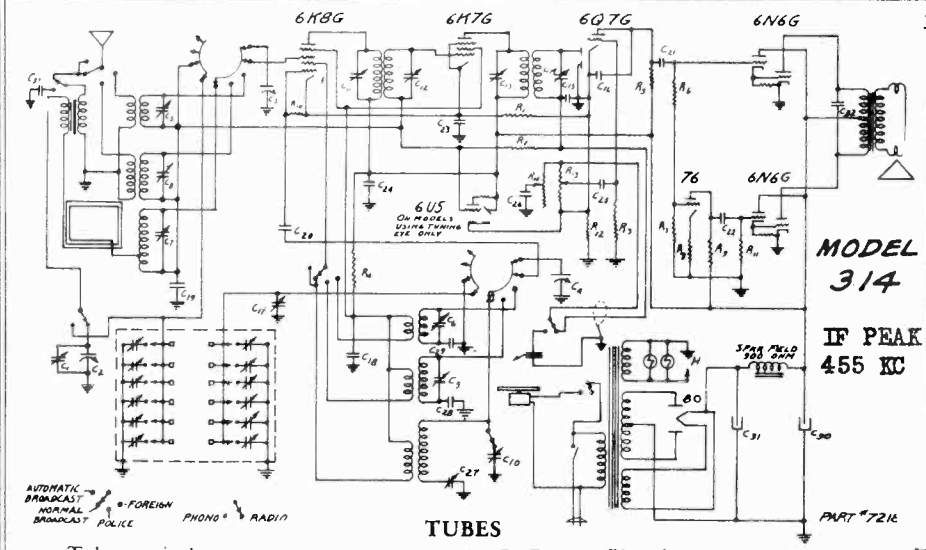
Tubes required are;
1—6K8 Oscillator-Translator
1—6K7GT IF Amplifier
1—6Q7GT Detector-AVC-First Audio
1—6AE5GT Driver
1—25AC5GT Power Output
1—25Z6GT Rectifier
1—12A8GT Translator-Oscillator
1—12K7GT—Intermediate Frequency Amplifier
1—12Q7GT Detector-AVC-First Audio
1—35L6GT Power Output
1—35Z5GT Rectifier



DETROLA CORP.

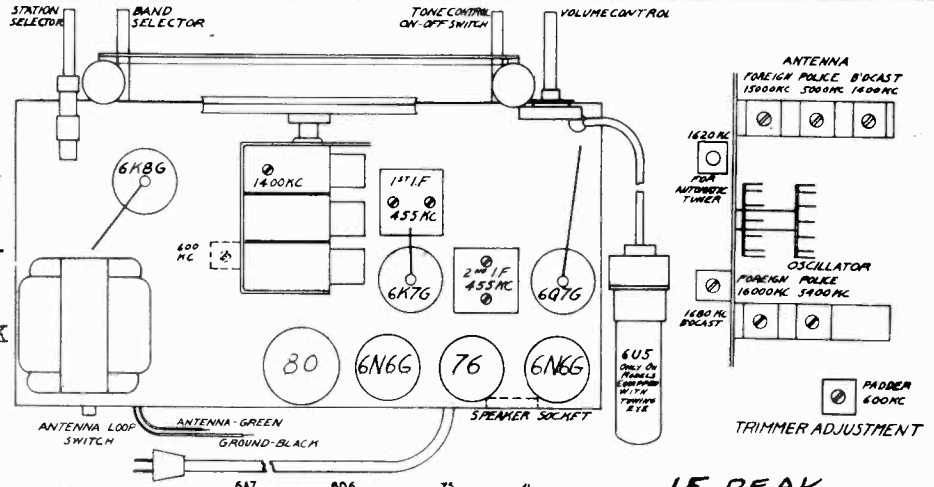
MODEL 314
MODEL 318
Schematics, Socket Alignment, Trimmers

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION OF VOLUME VIII
FOR SIMILAR PUSH BUTTON ADJUSTMENTS SEE DETROLA MODEL 258 VOLUME X p.10-6



MODEL 314

IF PEAK 455 KC



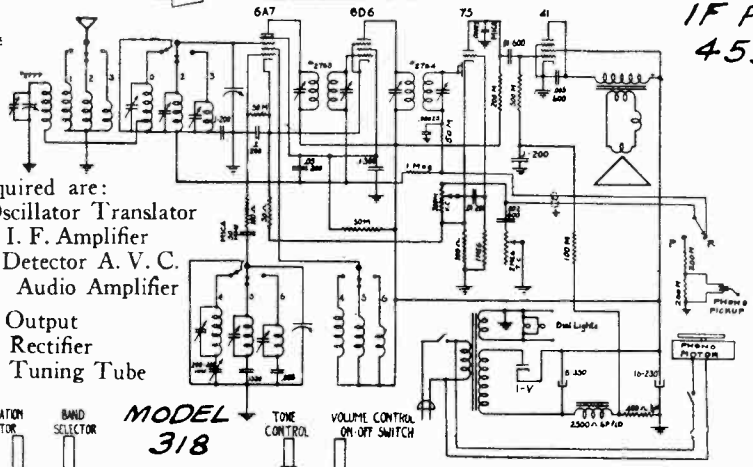
TUBES

Tubes required are:
1—6K8G Oscillator-translator
1—6K7G Intermediate Frequency Amplifier
1—6Q7G Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
2—6N6G Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube

MODEL 314

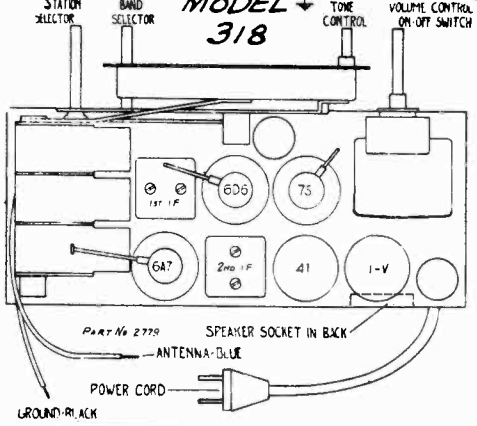
Symbol	Description	Symbol		Description
C1	Trimmer on variable	R1		200 ohm 1/3 W.
C2. 3. 4	3-gang 362 mmdf. variable	R2. 3		1 meg 1/3 W.
		R4		10M ohm 1 W.
C5. 6	3-35 mmfd. trimmer	R5		200M ohm 1/3 W.
C7. 8. 9. 10	1-10 mmfd. trimmer	R6		400M ohm 1/3 W.
C11. 12. 13. 14	I.F. Trimmers	R7		100M ohm 1/3 W.
C15. 16	.0005 mfd. 400 V. paper	R8		5M omh 1/3 W.
C17	1-10 mmfd. isolantite trimmer	R9. 10		50M ohm 1/3 W.
		R11		500M ohm 1/3 W.
C18. 19	.1 mfd. 200 V. paper	R12		(50 ohm 1/3 W. in models equipped with tuning eye)
C20	50 mmfd. Mica			
C21. 22	.02 mfd. 400 V.	R13	5100	500M ohm volume control
C23. 24	.2 mfd. 200 V.	R14	5099	2 meg. tone control
C25	.01 mfd. 400 V.		7226	Power transformer
C26	.003 mfd. 600 V.	T1	3463-5	1st I.F. transformer
C27	350 mmfd. Var. padder	T2	3463-6	2nd I.F. transformer
C28	1330 mmfd. padder		7358	Broadcast antenna coil
C29	.006 mfd. 600 V. padder		7216	Short wave antenna coils
C30	16 mfd. 400 W.V. Dry Elect.		7217	Oscillator coils
			7231	12-inch speaker
C31	16 mfd. 400 W.V. Dry Elect.		6249	Push button trimmer tuner
			2163	Drive cable
C32	.002 mfd. 600 V. paper		5121	Call letter sheet
C33	.00025 mfd. Mica			

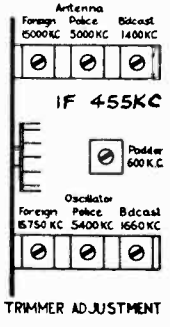
IF PEAK 455KC



Tubes required are:
1—6A7 Oscillator Translator
1—6D6 I. F. Amplifier
1— 75 Detector A. V. C. Audio Amplifier
1— 41 Output
1— 1V Rectifier
1—6U5 Tuning Tube

MODEL 318





MODEL 315
Schematic, Socket,
Alignment, Trimmers, Parts

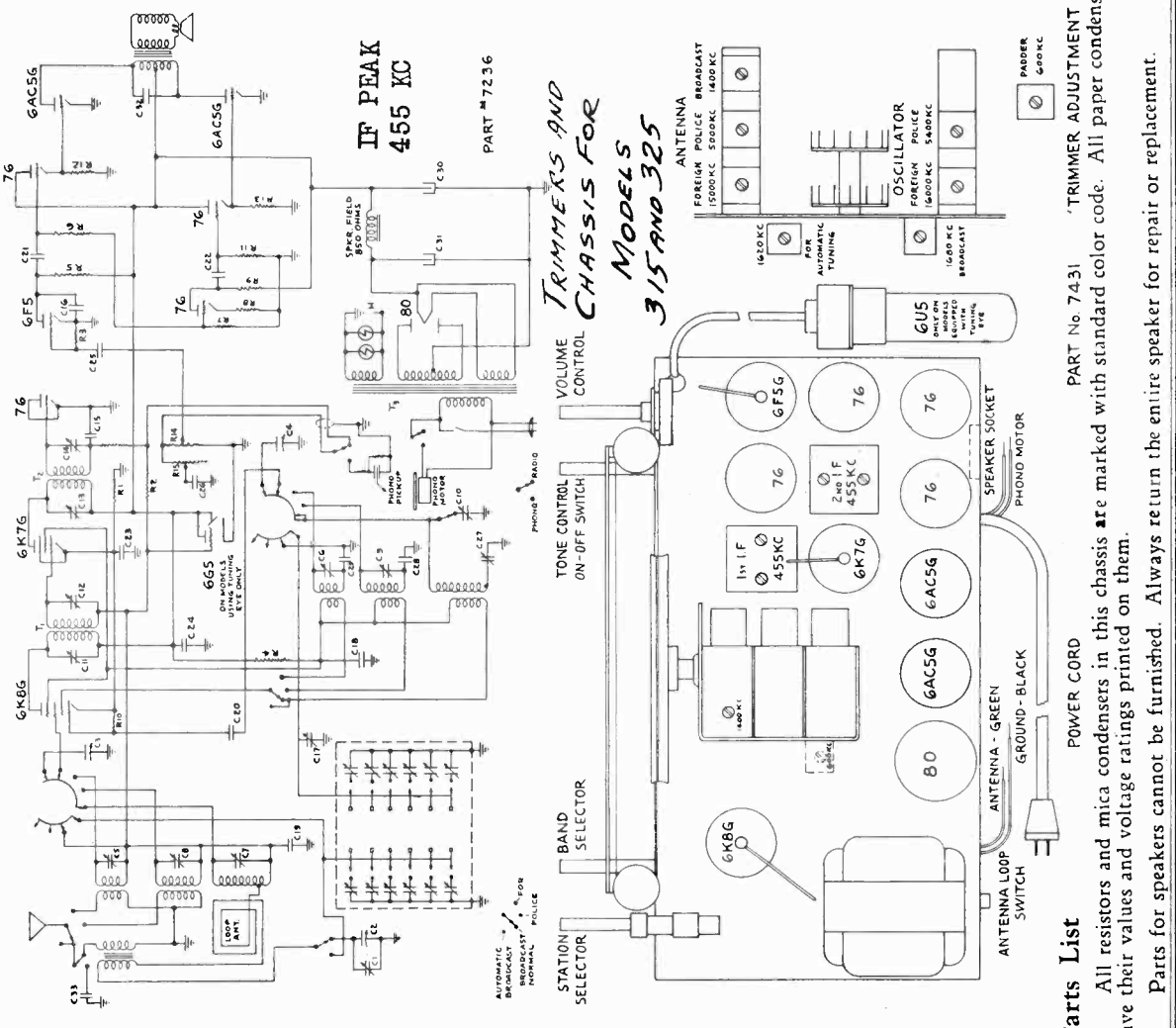
DETROLA CORP.

MODEL 325
Socket, Trimmers

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION, VOL. VIII
FOR SIMILAR PUSHBUTTON ADJUSTMENTS SEE DETROLA PAGE 10-6 IN VOL.X FOR MODEL 258.

Symbol	Part No.	Description
C1		Trimmer on Tuning Condenser
C2, 3, 4	5092	Tuning Condenser
C5, 6	3157	3-35 mmf. Trimmer
C7, 8, 9, 10	5565	1-10 mmf. Trimmer
C11, 12, 13, 14		Trimmers in IF Transformers
C15, 16, 33		250 mmf. Mica
C18, 19		50 mmf. Mica
C21, 22		.02 mf. 400 volt
C23, 24		.2 mf. 200 volt
C25		.01 mf. 400 volt
C26		.003 mf. 600 volt
C27	2560	Oscillator Padding Condenser
C28	2741	1330 mmf. Mica 5%
C29		.006 mf. 600 volt
C30, 31	7113	16 mf. 400 volt electrolytic
C32		.002 mf. 600 volt
R1, 7		200 ohm 1/3 watt
R2, 11		1 meg. 1/3 watt
R4		10M 1 watt
R5		200M 1/3 watt
R6		800M 1/3 watt
R8		5M 1/3 watt
R9, 10		50M 1/3 watt
R3		5 meg. 1/3 watt
R12, 13		25M 1/3 watt
R14	5100	500M volume control
R15	5099	2 meg. tone control and switch
T1	3463-5	1st IF Transformer
T2	7241	2nd IF Transformer
T3	7242	Power Transformer
7358		Antenna Coil
7216		Preselector Coil
7217		Oscillator Coil
7219		Dial Chart
5112		Pointer
4830		Dial Light Socket
6249		Push Button Tuning Unit
2981		Tuning Tube Cable
5129		Push Buttons
7181		Cabinet
7245		Shipping Carton
7247		Escutcheon
7230		Tuning Tube Escutcheon
4732		Tuning Knob
4733		Volume Knob
4735		Tone Knob
4734		Band Switch Knob
3466		Radio-Phono Knob
5241		Phono-Radio Plate
7087		Automatic Record Changer

Tubes required are:
1—6K8G Oscillator Translator
1—6K7G IF Amplifier
1—76 Detector—AVC
1—76 Phase Inverter
2—76 Drivers
2—6AC5G Power Output
1—6F5 First Audio
1—80 Rectifier
1—6U5 Tuning Tube



Parts List

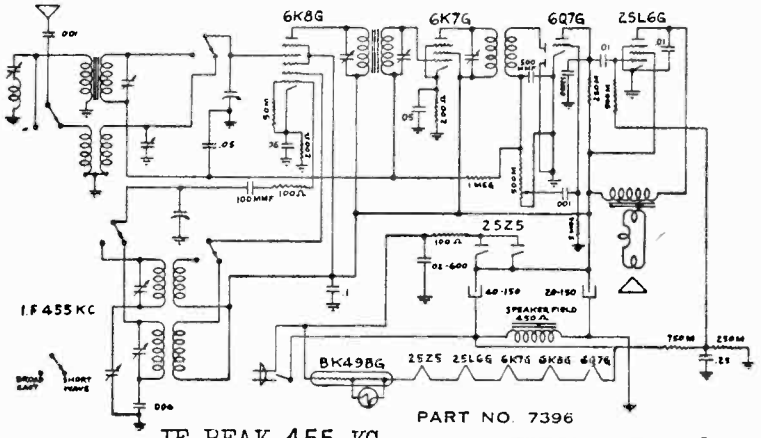
All resistors and mica condensers in this chassis are marked with standard color code. All paper condensers have their values and voltage ratings printed on them.

Parts for speakers cannot be furnished. Always return the entire speaker for repair or replacement.

DETROLA CORP.

MODELS 321, 324
MODEL 325
MODEL 322
Schematics, Socket Alignment, Trimmers Schematic

MODELS 321 and 324



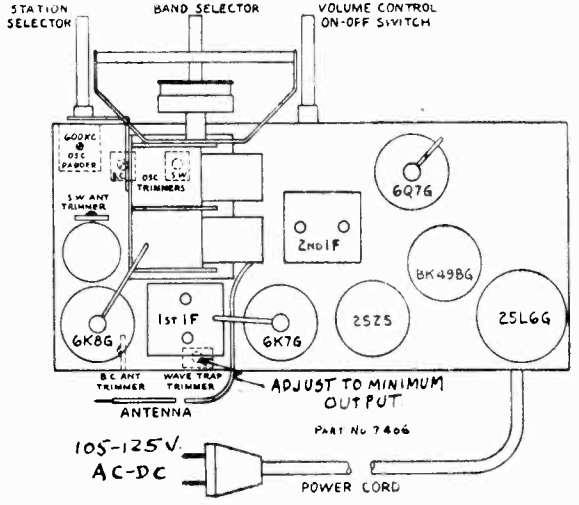
PART NO. 7396

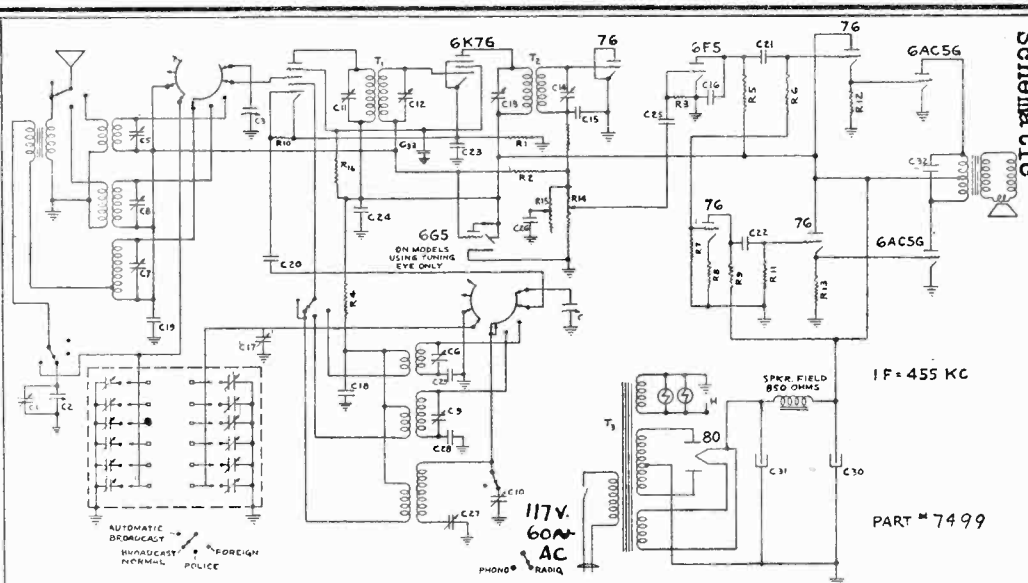
IF PEAK 455 KC

ALIGN. FREQ.
I.F. 455KC
WAVE TRAP 455KC.
B.C. OSC. 1720KC
B.C. ANT. 1400KC
B.C. PAD. 600KC
S.W. OSC. 18200KC
S.W. ANT. 17000KC

The following tubes are used in this receiver:

6K8G—Oscillator, Translator
6K7G—I.F. Amplifier
6Q7G—Detector, Audio Amplifier, AVC.
25L6G—Power Output
25Z5—Rectifier
BK49BG—Ballast



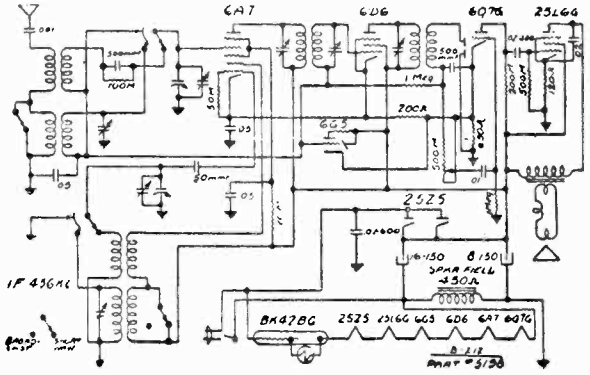


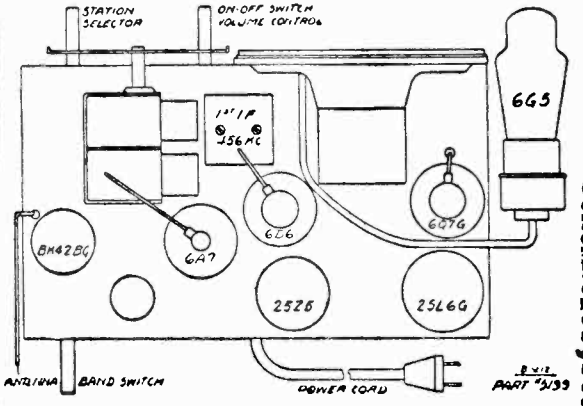
C-1 TRIMMER ON VARIABLE CONDENSER
C-2,3,4 VARIABLE CONDENSER
C-5,6 3-35 MMFD. TRIMMER
C-7,8,9,10 1-10 MMFD TRIMMER
C-11,12,13,14 I.F. TRIMMERS
C-15,16,33 .00025 MICA
C-17 1-10 MMF. TRIMMER, 150 LANTITE
C-18,19 .1 - 200 V.
C-20 50 MMF MICA
C-21,22 .02 - 400 V.
C-23,24 .2 - 200 V.
C-25 .01 - 400 V.
C-26 .003 - 600 V.
C-27 350 MMFD VAR. PADDER
C-28 1330 MMFD PADDER
C-29 .006 - 600 V. PADDER
C-30 16 MFD - 400 V. ELECTROLYTIC
C-31 16 MFD - 400 V. ELECTRLYTIC
C-32 .002 - 600 V.

R-1 200 OHMS
R-2,3,11 1 MEG 1/3 WATT
R-4 10 OHMS 1 W
R-5,7 200 M OHMS 1/3 W
R-6 800 M OHMS 1/3 W
R-8 5000 OHMS 1/4 W
R-9,10 50 M OHMS 1/3 W
R-12,13 2.5 M 1/3 W
R-14 500 M OHMS VOL. CONTROL
R-15 2 MEG TONE CONTROL

SERIES 322

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.





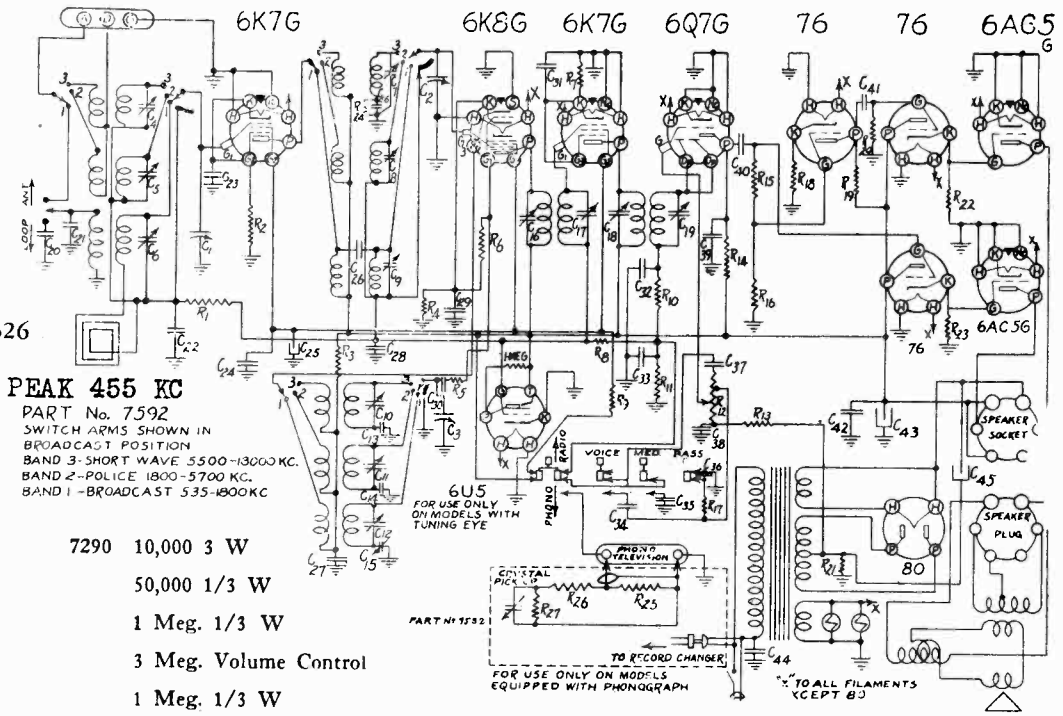
IF PEAK 456 KC

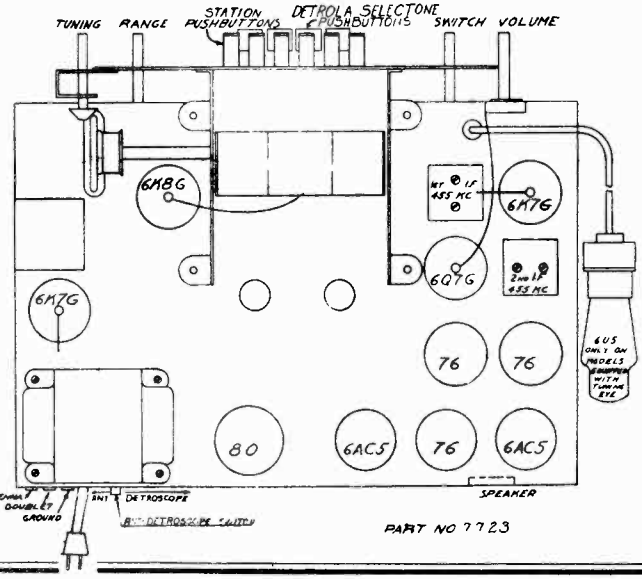
The following tubes are used in this receiver:

6A7—Oscillator, Translator
6D6—I. F. Amplifier
6Q7G—Detector, Audio Amplifier
25L6G—Power Output
25Z5—Rectifier
BK42BG—Ballast
6G5—Tuning Eye

Symbol	*Part No.*	*Description*
C1,2,3	7591	Tuning Condenser
C4 to C12	7197	Trimmer Condensers, 3-20 mmf.
C13	7721	.007 mfd. plus or minus 5%
C14	7312	1440 mmf. plus or minus 3%
C15	7314	Condenser Padder Adj.
C20,34	1286	250 mmf. Mica
C21,30	2780	50 mmf. Mica
C22,23,28,46	580	.05-200
C24	575	.1-400
C25	5780	20 mmfd., 150 V. Electrolytic
C26	7473	2.5 mmf.
C27	2600	02-600V
C29,31,38	572	.1-200V
C32,33	1285	100 mmf.
C35,36,37	824	.002-600V
C39	1285	100 mmf.
C40,41	2782	.005-600
C42	3352	.2-400
C43,45	7400	16 mfd. 400 V Electrolytic
C44		.0012 Mica
R1		10,000 1/3 W
R2,4		300 1/3 W
R3		20,000 1/2 W
R5		200 1/3 W
R6,19		50,000 1/3 W
R7		400 1/3 W
R8		2 Meg. 1/3 W
R9	7290	10,000 3 W
R10		50,000 1/3 W
R11		1 Meg. 1/3 W
R12		3 Meg. Volume Control
R13		1 Meg. 1/3 W
R14,17		200,000 1/3 W
R15		400,000 1/3 W
R16		100,000 1/3 W
R18		5000 1/3 W
R20		500,000 1/3 W
R21	2965	20 1/2 Flexohm
R22,23		25,000 1/3 W
R24		75,000 1/3 W
R25,26		500,000 1/3 W
R27		200,000 1/3 W

SERIES 326





ANTENNA-GROUND CONNECTIONS

The antenna and ground leads to the receiver are attached to a terminal strip at the rear of the chassis. The terminals on this strip are marked "A," "D," and "G," which are the abbreviations for "Antenna," "Doublet" and "Ground" respectively.

The receiver is normally shipped from the factory with a wire connecting terminal "D" to terminal "G." In such a condition the receiver is ready for a normal antenna and a ground wire to be attached to the terminals "A" and "G" respectively. If a doublet is used, the wire connecting terminal "D" to terminal "G" should be removed and the two leads from the doublet antenna connected to terminals "A" and "D." For best operation with the doublet, a normal ground lead should be connected to the "G" terminal.

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. An all W. Signal Generator which will provide an accurately calibrated signal at the frequencies listed.
2. An Output Meter.
3. A non-metallic screwdriver.
4. Dummy Antenna—.1 mfd., 200 mmf., 400 ohms.

Set the volume control near the maximum position, connect the signal generator ground to the receiver chassis, connect the proper value of dummy antenna between the high side of the generator output and the point in the receiver indicated in the table below. Connect the output meter either across the primary of the output transformer or across the speaker voice coil. Allow the signal generator and the chassis to heat for several minutes.

BAND	SIGNAL FREQUENCY SETTING	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH POSITION	VARIABLE CONDENSER SETTING	TRIMMER FUNCTION	ADJUSTMENT
I.F.	455 kc.	Grid of 6K7G(I.F.)	.1 mmfd.	Short wave	Minimum capacity	2nd I.F.	Adjust to maximum output
I.F.	455 kc.	Grid of 6K8G	.1 mmfd.	Short wave	Minimum capacity	1st I.F.	Adjust to maximum output
BROAD-CAST BAND	1400 kc. exact	Antenna terminal	200 mmf.	Broadcast	Set pointer to indicate 1400 kc.	Broadcast oscillator	Adjust to maximum output
BROAD-CAST BAND	1400 kc. exact	Antenna terminal	200 mmf.	Broadcast	As above	Broadcast RF amplifier	Adjust to maximum output
BROAD-CAST BAND	1400 kc.	Antenna terminal	200 mmf.	Broadcast	As above	Broadcast antenna	Adjust to maximum output
BROAD-CAST BAND	600 kc. approx.	Antenna terminal	200 mmf.	Broadcast	Tune in signal	Broadcast padder	Adjust to maximum output while rocking gang condenser

REPEAT ABOVE BROADCAST ALIGNING PROCEDURE AT LEAST ONCE MORE

MIDDLE WAVE BAND	5,000 exact	Antenna Terminal	400 ohms	Middle	Set pointer to indicate 5000 kc.	Middle wave oscillator	Adjust to maximum output.
MIDDLE WAVE BAND	5,000 kc. exact	Antenna Terminal	400 ohms	Middle	As above	Middle wave RF.	Adjust to maximum output.
MIDDLE WAVE BAND	5,000 kc. exact	Ant. Terminal	400 ohms	Middle	As above	Middle wave Ant.	Adjust to maximum output.
SHORT WAVE BAND	16,000 kc. exact	Ant. Terminal	400 ohms	Short wave	Set pointer to indicate 16,000 kc.	Short wave oscillator	Adjust to maximum output. *See note 1
SHORT WAVE BAND	16,000 kc. exact	Ant. Terminal	400 ohms	Short wave	As above	Short wave RF. amplifier	Adjust to maximum output while rocking the tuning-condenser slightly.
SHORT WAVE BAND	16,000 kc. exact	Ant. Terminal	400 ohms	Short wave	As above	Short wave Antenna	Adjust to maximum output while rocking the tuning-condenser slightly.

REPEAT ABOVE PROCEDURE AS FINAL CHECK

NOTE 1.—Exercise care to see that the oscillator is tuned to a frequency higher than the signal since it is very easy to mistakenly set the oscillator on the wrong side of the signal at this high frequency.

TUBES:

1—6K7G RF Amplifier.
1—6K8G Converter (Oscillator and First Detector).
1—6K7G IF Amplifier
1—6Q7G Second Detector and First Audio Amplifier.
2—76 Driver Tubes.
1—76 Phase Inverter.
2—6AC5 Output Tubes.
1—80 Rectifier.
1—6U5 Tuning Indicator.

POWER TRANSFORMERS

Power transformer are available and receivers are sometimes equipped with them for operation on 25 or 40 cycles.

SERVICE SUGGESTIONS

Be *sure* that antenna and ground connections are made according to instructions.

See that all tubes are in the proper sockets, that they are in good operating condition, and that clips are attached to the small caps on tops of those tubes requiring them. Make sure that the tube shields are not shorting the clips to the chassis.

Be sure that the Band Selector Switch and "Ant-Loop" Switch is in the proper position for the type of reception desired.

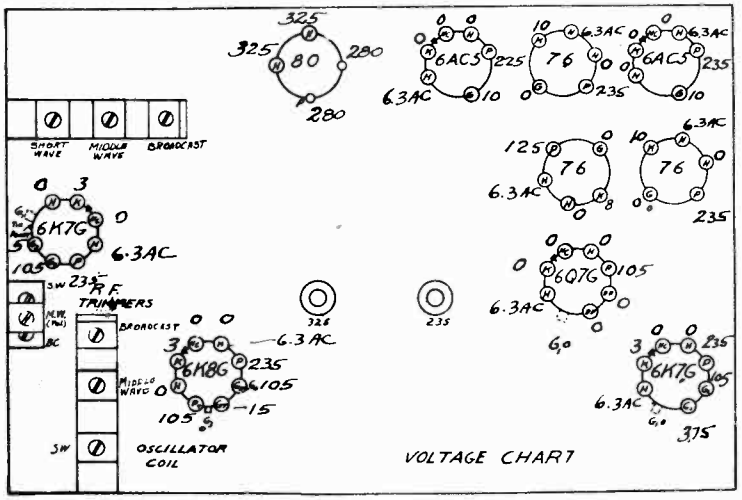
See that all plugs are making proper contact.

If the receiver remains inoperative after the above suggestions have been tried, *turn the Power Switch "Off."* Never leave the switch turned on when signs of abnormal heating are present. A minor circuit trouble may cause an expensive repair bill if the set is allowed to run for any length of time after the trouble develops.

Occasionally a loud hum will be heard as stations are tuned in. Reverse the power supply plug. If the hum persists, remove the cause by properly grounding other sets or appliances in the house.

The receiver is perfectly conventional in all respects, therefore servicing should not present any particular problems to the professional service man. The normal methods of locating trouble applies in this set as in any other.

1. Suspected open condensers may most easily be checked by shunting each suspected unit with another condenser of the same capacity known to be good.
2. Suspected shorted condensers can usually be most easily detected by resistance checks. The condensers usually bypass a resistance of some finite value. A resistance check without disconnecting any wires will show a lower resistance than the color code of the resistance would indicate if the condenser is leaking or shorted. It must be remembered that some resistances vary 25% above or below the value indicated by the color code.
3. Leaky condensers in grid circuits can be checked by voltage measurement across the grid leak at no signal. If a measurable positive voltage exists at the grid end of the grid leak when measured to ground, a leaky coupling condenser probably exists. The condenser should then be disconnected and checked for resistance.



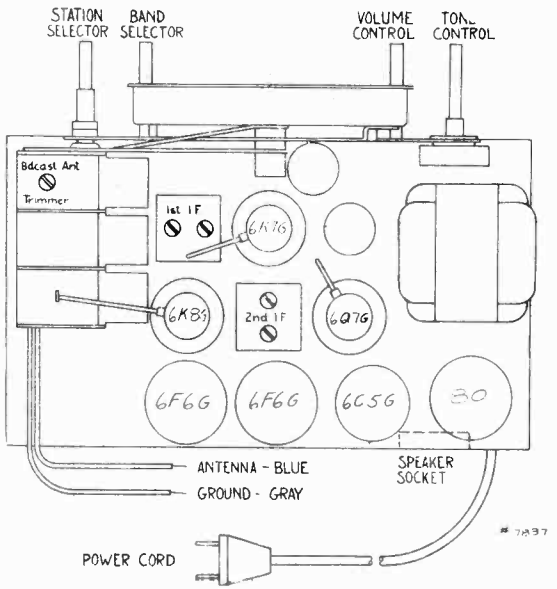
MODEL 3231 ALINEMENT PROCEDURE

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

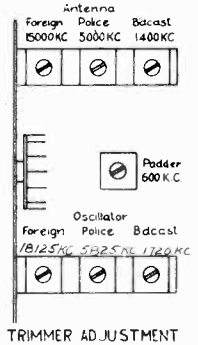
IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 455 kc. signal to the grid of the 6K7G IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6K8G tube.

RF. (See diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch to position "B," tuning condenser to minimum capacity. Feed 1720 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the "P" position. adjust the oscillator top frequency for 5825 kc., then aline the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 18,125 kc., and aline the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the lst band is set properly, it is best to screw the oscillator trimmer tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.



MODEL 3231



TRIMMER ADJUSTMENT

MODELS 333 - 3281 ALINEMENT PROCEDURE

Turn the band switch to the Broadcast position.

Connect an output meter across the speaker voice coil. The volume control should be set a few degrees from the maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

IF alignment: Connect the signal generator ground to the receiver chassis through a .1 mfd. condenser. Using a .1 mfd. condenser in series with the high side of the generator, apply a 455 kc. signal to the grid of the 6K7GT tube and align the 2nd IF transformer. Connect to the grid of the 6K8 tube and align the 1st IF transformer. (See Tube Layout Diagram for location of these adjustments.) From this postion recheck both transformers again.

Broadcast Band Alignment: Turn the band switch to the Broadcast position, turn the tuning condenser all the way to the right, (minimum capacity), apply a 1720 kc. signal to the grid of the 6K8 tube and adjust the broadcast oscillator trimmer. The oscillator coil is under the right hand end of the chassis and this trimmer is the one nearest the front of the chassis. To align the loop antenna, connect a single turn loop across the terminals of the generator, place the receiver about one foot in front of the single turn loop, set the generator at about 1400 kc., tune in the signal and adjust the trimmer on the loop antenna assembly for maximum response.

Short Wave Alignment: Using a 400 ohm resistor between the high side of the generator and the antenna terminal (on the LOOP frame), turn the tuning condenser to minimum capacity, set the generator at 18,500 kc., and adjust the short wave oscillator trimmer. This trimmer is immediately in back of the broadcast oscillator trimmer. Set the generator at about 17,000 kc., tune in the signal and adjust the short wave antenna trimmer for maximum response. This trimmer is mounted on the loop antenna.

NOTE: If considerable hum appears when the generator is connected as described above use smaller condensers between the generator and the receiver. The best way is to use a 1:1 transformer to isolate either the receiver or the generator from the line. The adjustments of this receiver are very stable and no aligning should be attempted unless absolutely necessary.

MODEL 326 PROCEDURE FOR SETTING THE STATION BUTTONS

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next and so on.

Any buton may be used for any station you can receive, although it will be better to set the stations so that the kilocycle numbers increase from left to right.

SETTING A STATION BUTTON

Pull the button at the extreme left off the shaft. When this is done, the locking screw under the shaft will be exposed.

Loosen this screw with a small screwdriver by turning several turns in a counter-clockwise direction. Continue to press in firmly on the screwdriver, thus holding the station button shaft depressed. Select the first station button shaft depressed. Select the first station from the list you have prepared and carefully tune in this station by means of the manual tuning knob.

Continue to press in firmly on the screwdriver and lock the mechanism by turning the locking screw in a clockwise direction until it is tight. The station is now set on this button.

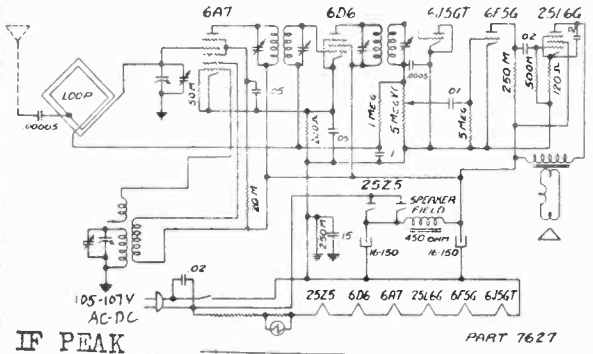
Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

Select the proper station call letter tab from the sheet provided and place it in the recess in the proper push button. Cover the call letter tab with one of the heavy celluloid retainers provided. Replace the button on the shaft. Follow the same procedure for inserting the station call letters in any other buttons.

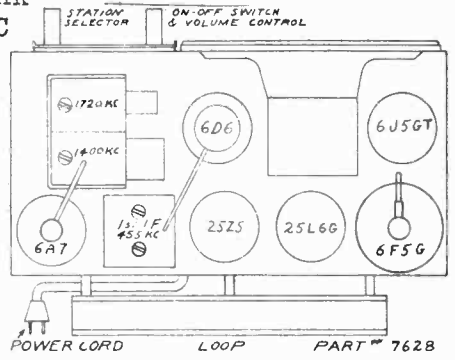
After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure as outlined above. If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of the others.

MODEL 329
MODEL 333
MODEL 342
Schematics, Socket Trimmers

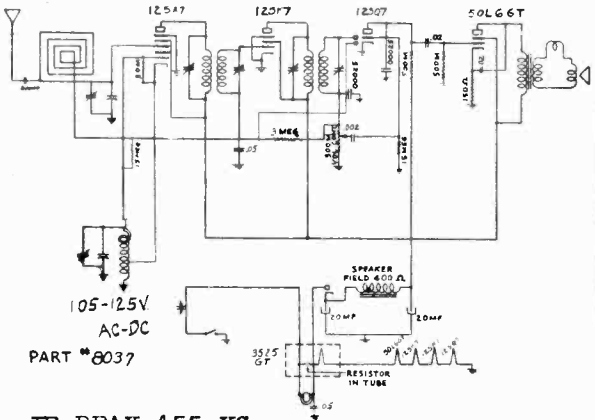
SERIES 329

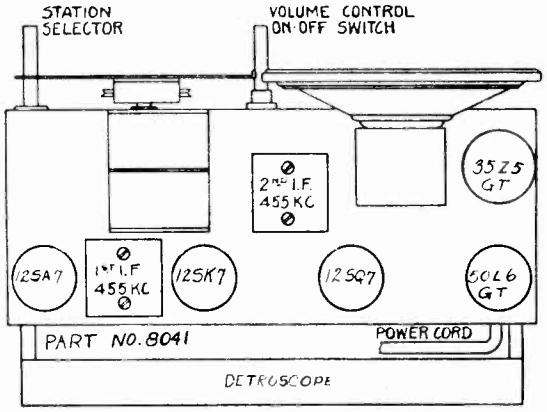


IF PEAK 455 KC



MODEL 342 SERIES





IF PEAK 455 KC

The following tubes are used in this receiver.

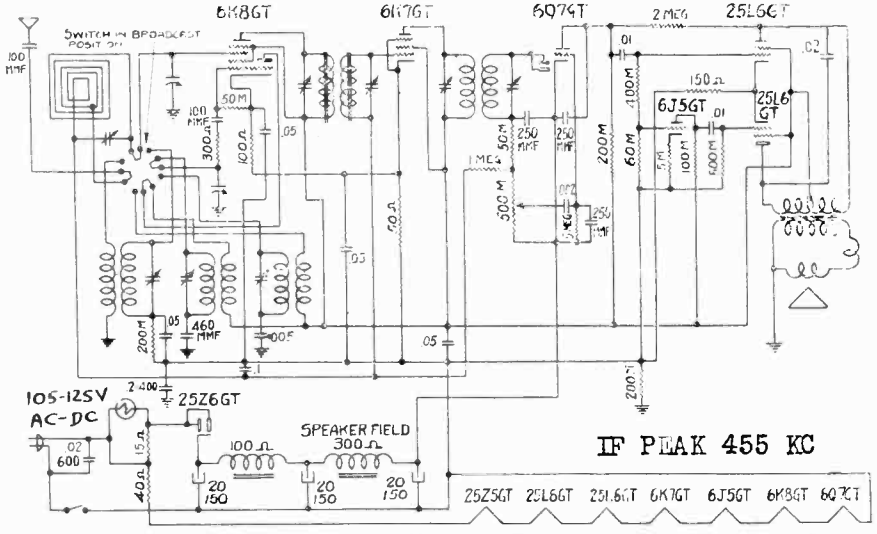
12SA7 Translator — 12SQ7 Detector AVC
12SK7 IF Amplifier — 50L6GT Output
35Z5GT Rectifier

FOR CONVENTIONAL ALIGNMENT FOR THESE MODELS, SEE SPECIAL SECTION VOLUME VIII.

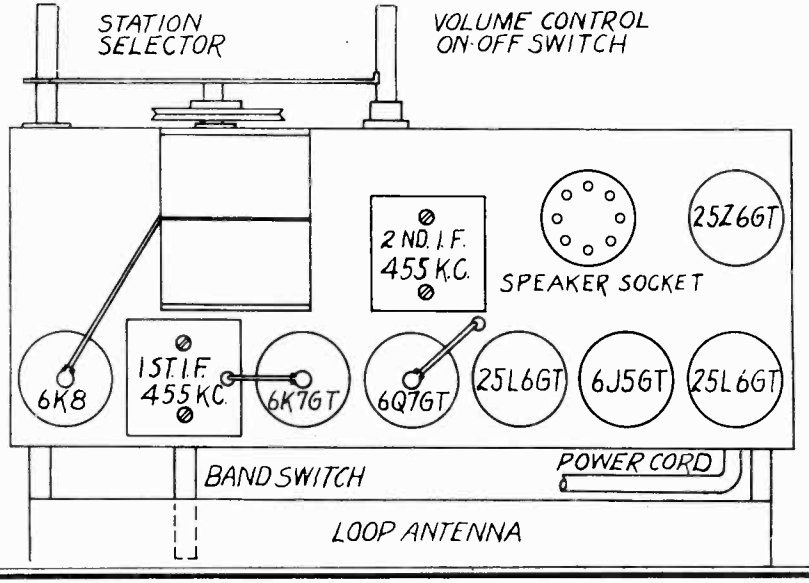
A.C.-D.C. SUPERHETERODYNE SERIES 333

TUBES

1—6K8 Translator-Oscillator
6K7GT—Intermediate Frequency Amplifier
1—6Q7GT Detector-AVC-First Audio
1—6J5GT Phase Inverter
2—25L6GT Power Output
1—25Z6GT Rectifier



IF PEAK 455 KC

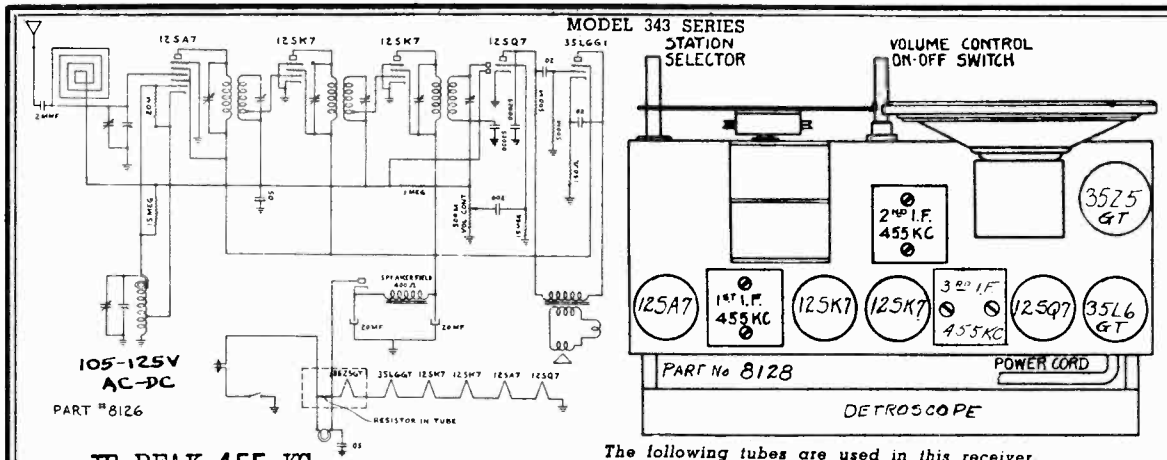


MODEL 343
Schematic, Socket
Trimmers
MODEL 3231
MODEL 3281
Schematics

FOR LAYOUTS
SEE INDEX

DETROLA CORP.

MODEL 343 SERIES



IF PEAK 455 KC
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

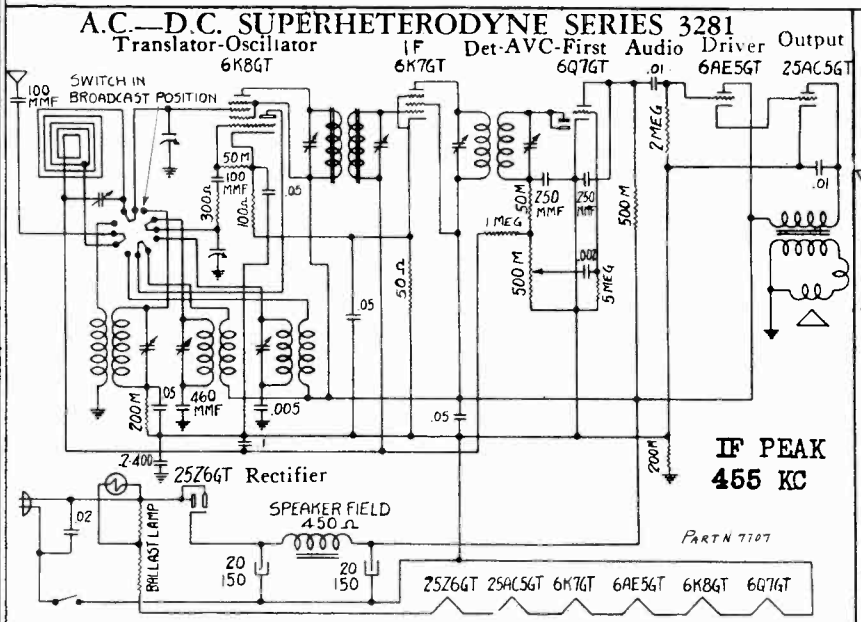
The following tubes are used in this receiver.

12SA7	Translator	12SQ7	Detector AVC
12SK7	1st IF Amplifier	35L6GT	Output
12SK7	2nd IF Amplifier	35Z5GT	Rectifier

SUPERHETERODYNE SERIES 3231

Symbol	Part No.	Description
C1,a,b,c	7483	Variable Condenser
C1,22		.1 mf 200 volt
C2		,2 mf. 200 volt
C3		50 mmf Mica
C4,5,8	2597	1-10 mmf Trimmer
C6,9	1611	3-35 mmf Trimmer
C7	3157	2-25 mmf Trimmer
C10	2560	200-500 mmf B.C. Osc Padder
C11	2471	1330 mmf 5% Mica
C12	2793	.006 600 volt 10%
C13		.1 mf 400 volt
C14		.2 mf 400 volt
C15,17		250 mmf Mica
C16		.01 mf 200 volt
C18,19		,02 mf 400 volt
C20		.002 mf 600 volt
C21		.005 mf 600 volt
C23,24	7113	16 mf 450 volt Electrolytic
R1,6,13		50 M 1/3 watt
R2,3		100 ohm 1/3 watt
R4		10 M 1/3 watt
R5,16,17		1 Meg 1/3 watt
R7	2726	500 M Volume Control & Switch
R8		200 M 1/3 watt
R9		400 M 1/3 watt
R10		250 ohm 2 watt
R11		100 M 1/3 watt
R12		5 M 1/3 watt
R14		500 M 1/3 watt
R15	2737	2 Meg Tone Control
R18		20 M 1/3 watt
R19		15 ohm 1/3 watt

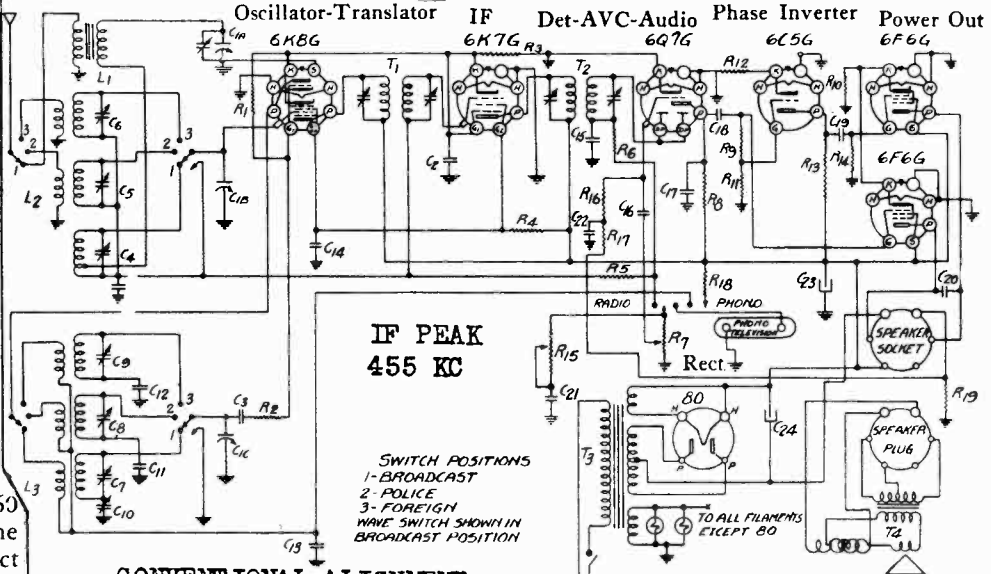
A.C.—D.C. SUPERHETERODYNE SERIES 3281



IF PEAK
455 KC

WARNING !

The clock with which this receiver is equipped will operate on 60 cycle alternating current only. A switch is provided on the back of the cabinet to disconnect the clock when the receiver is operated on direct current. Failure to throw the switch to the proper position as indicated on the back of the cabinet will result in serious damage to the clock.



IF PEAK
455 KC

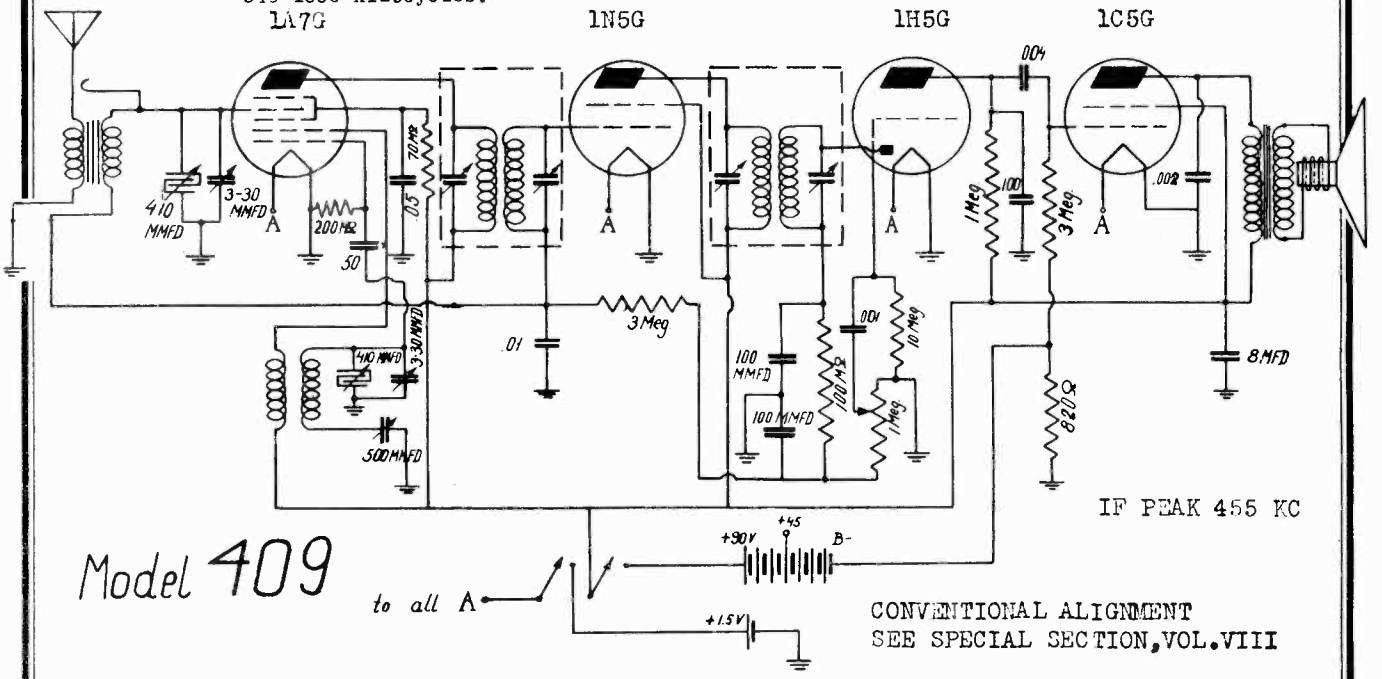
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

117V-AC (50-60~) ONLY

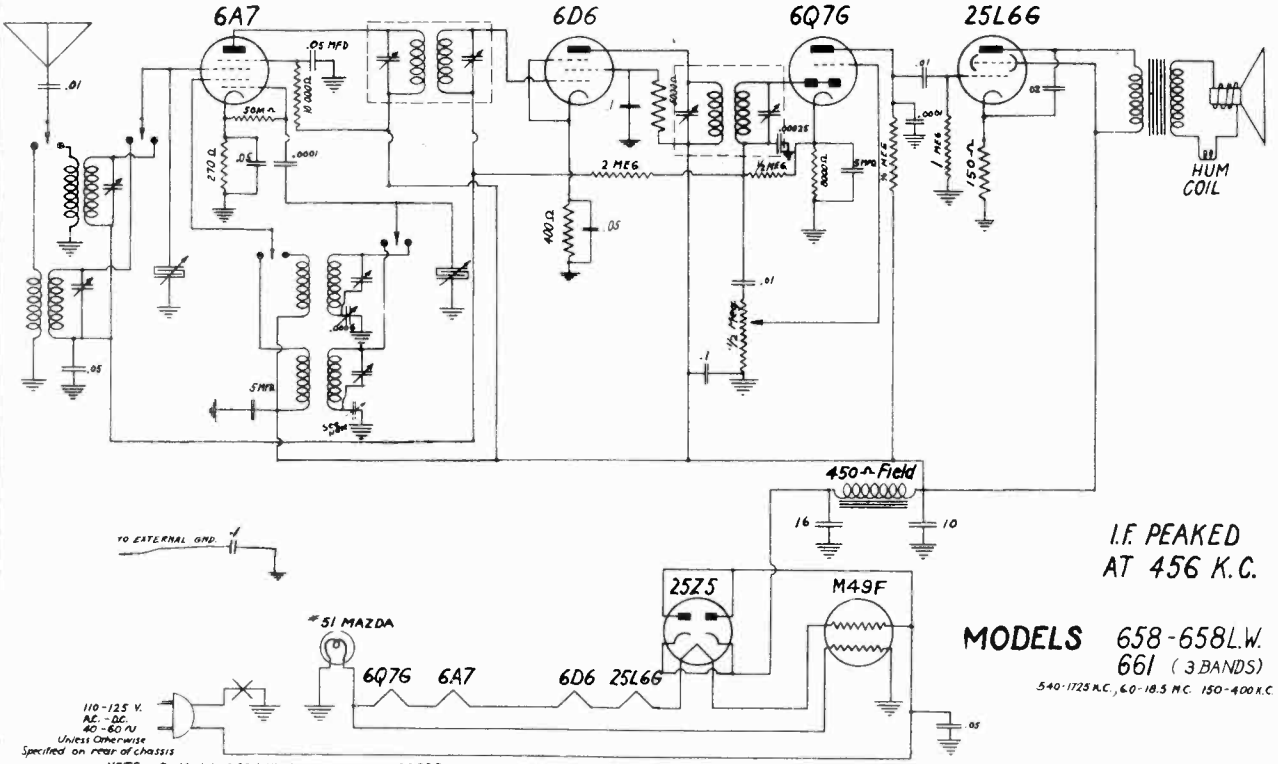
DEWALD RADIO MFG. CORP.

MODEL 409
MODELS 658, 658LW, 661
Schematics, Alignment

This is a battery operated superheterodyne receiver with full automatic volume control. It is designed to funotion with an "A" supply of 1.5 volts and a "B" supply of 90 volts. The broadcast range coverage is 540-1600 kilocycles.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII



I.F. PEAKED AT 456 K.C.

MODELS 658-658L.W. 661 (3 BANDS)
540-1725 K.C., 6.0-18.5 M.C. 150-400 K.C.

NOTE: On Models 658 L.W. this condenser is .00025

MODEL	RANGE COVERAGE		
658	555-174 meters 540-1725 K.C.	50-16 meters 6.0-18.5 M.C.	
658 L.	555-174 meters 540-1725 K.C.	2000-750 meters 150-400 K.C.	
661	555-174 meters 540-1725 K.C.	50-16 meters 6.0-18.5 M.C.	2000-750 meters 150-4000 K.C.

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

TO CALIBRATE RECEIVER

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

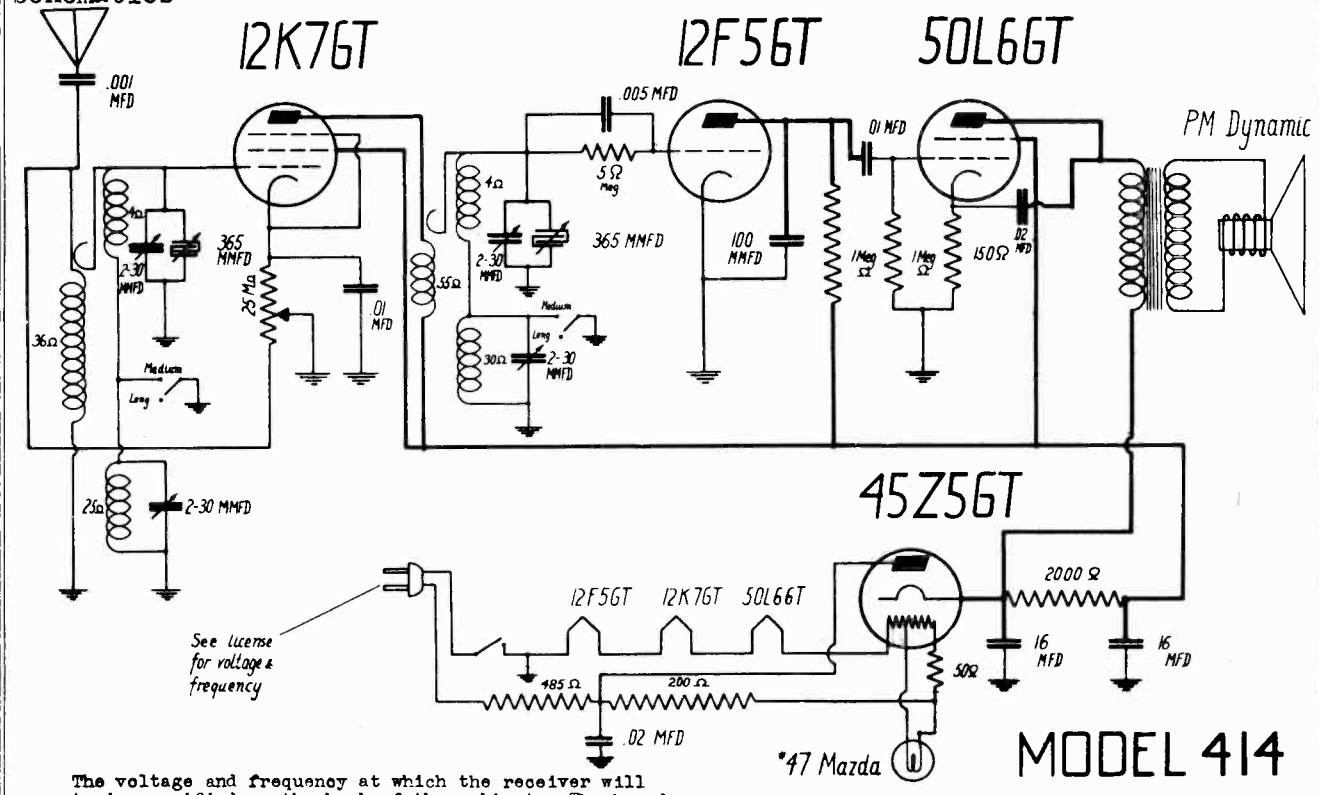
BROADCAST ALIGNMENT Remove short from variable condenser. Wave band switch on broadcast position. Adjust generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C., peak the broadcast padder for maximum signal. The variable condenser should be "rocked"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

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

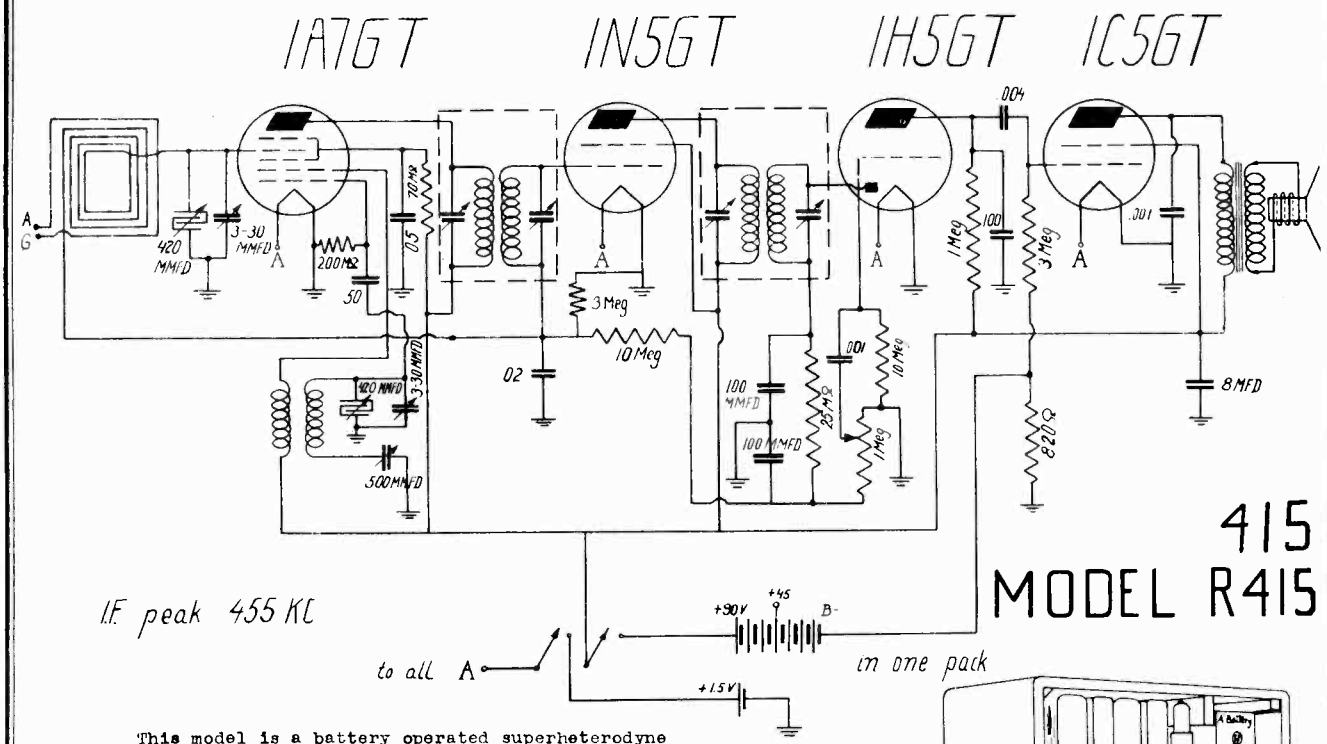
LONG WAVE ALIGNMENT Turn wave band switch to Long Wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave padder for maximum signal. The variable condenser should be "rocked" during this operation. Recheck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

MODEL 414
MODELS 415, R415
Schematics

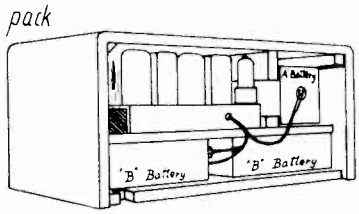
DEWALD RADIO MFG. CORP.



The voltage and frequency at which the receiver will operate is specified on the back of the cabinet. The broadcast range coverage is 180-560 meters. The long wave range coverage is 850-2040 meters.



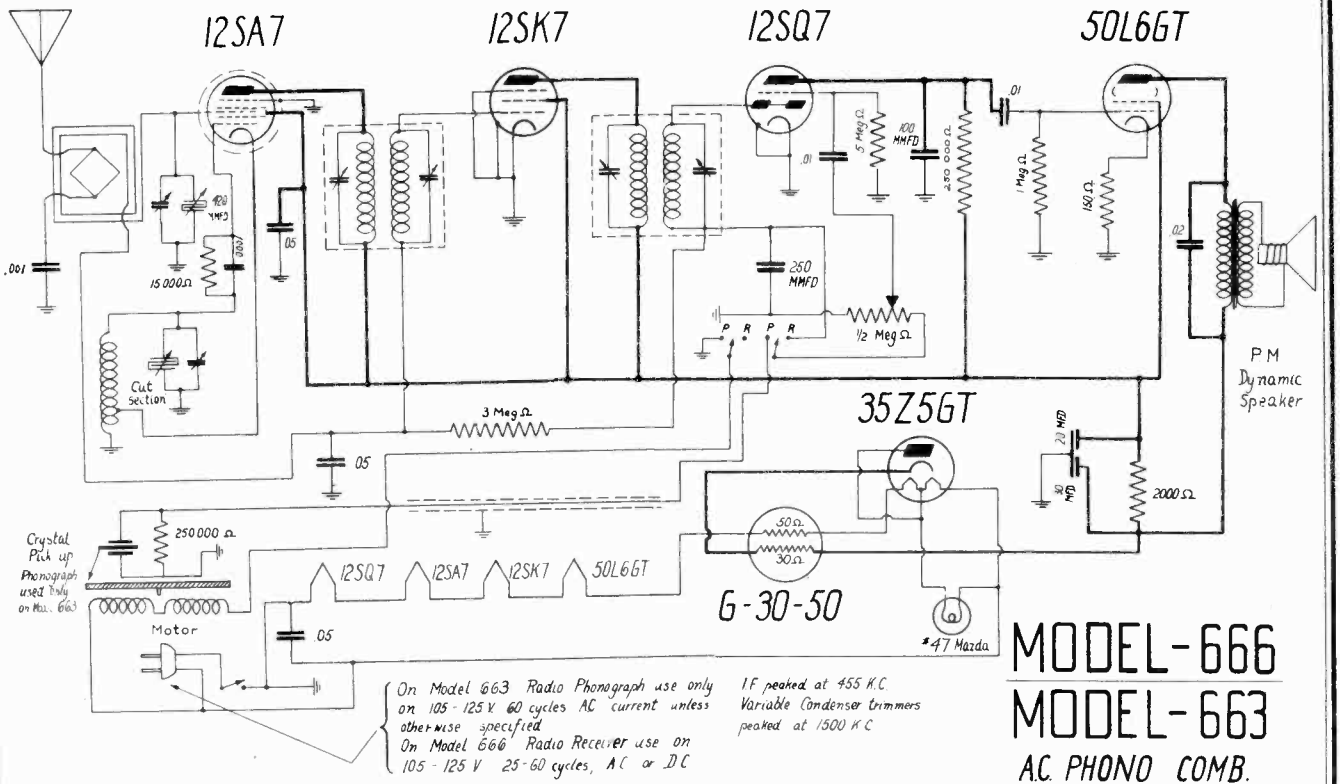
This model is a battery operated superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. It is designed to operate with an "A" supply of 1.5 volts and a "B" supply of 90 volts. The broadcast range coverage is 540 - 1600 kilocycles. For the "A" supply one Eveready #743, Burgess #6F or the equivalent may be used. For the "B" supply two Eveready #727, Burgess #A30X or the equivalent batteries may be used.



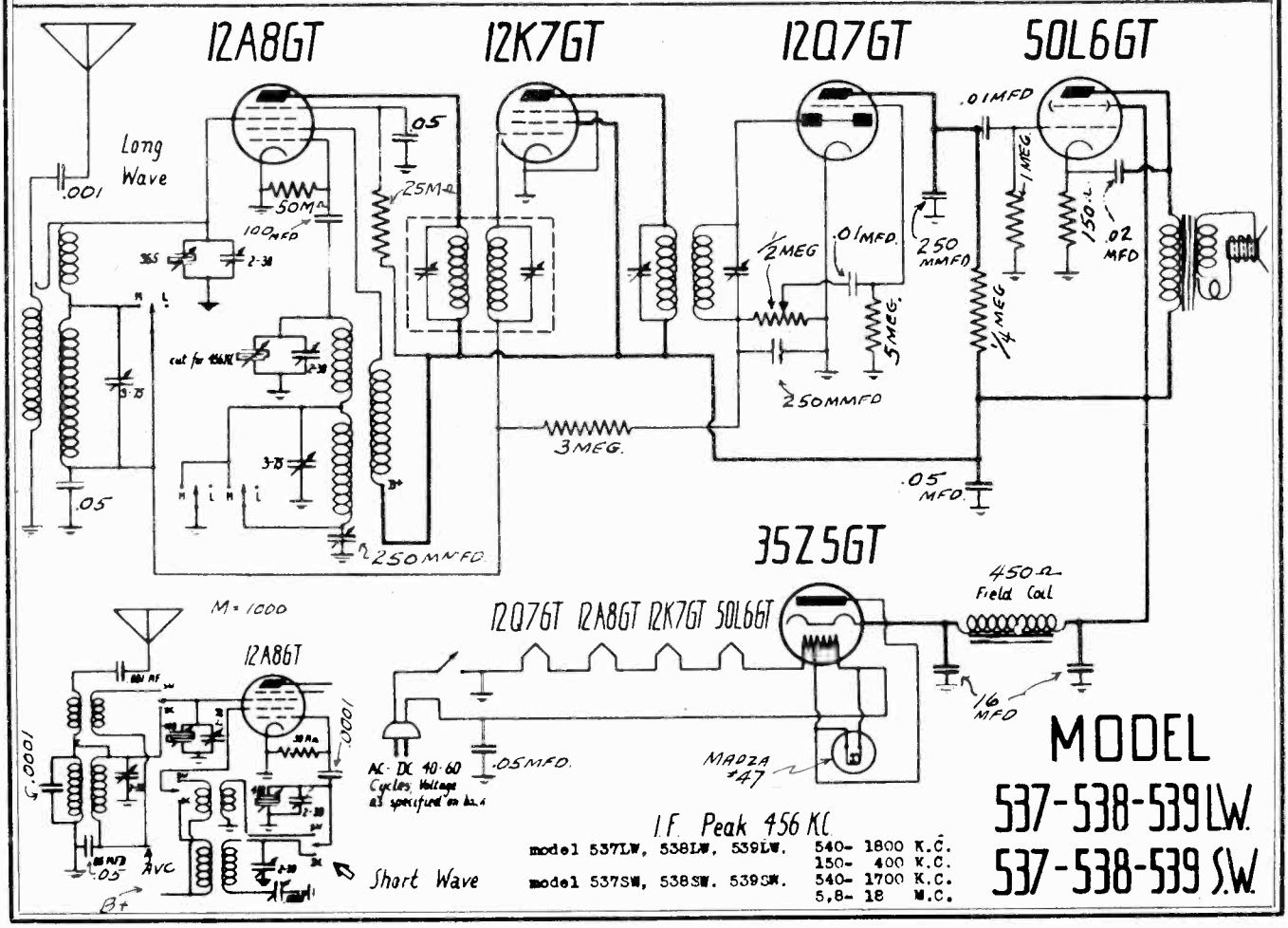
R415 BACKVIEW

DEWALD RADIO MFG. CORP.

MODELS 537,538,539
LW and SW
MODELS 663,666
Schematics



MODEL-666
MODEL-663
A.C. PHONO COMB.



I.F. Peak 456 KC

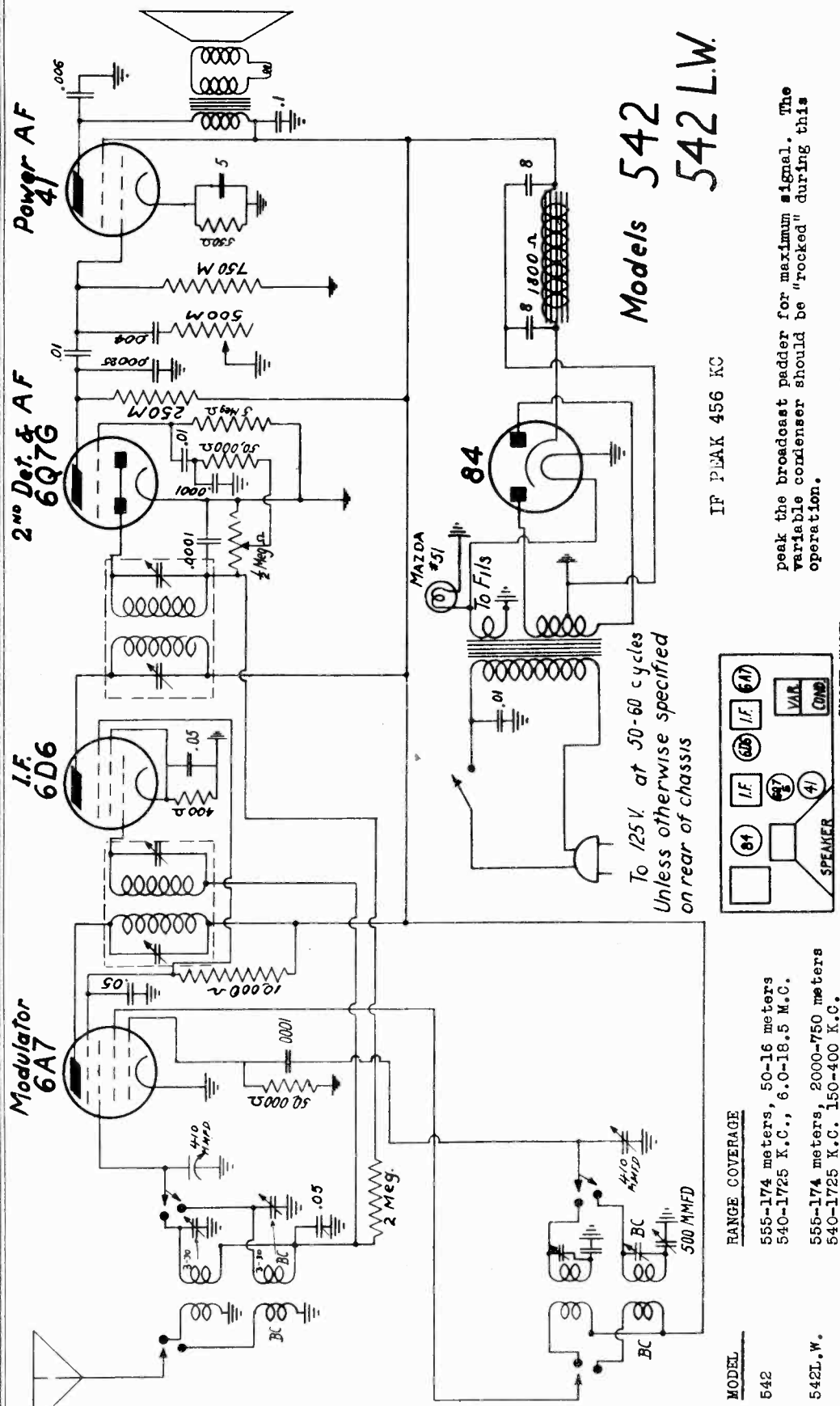
model 537LW, 538LW, 539LW.	540-1800 K.C.	
	150-400 K.C.	
model 537SW, 538SW. 539SW.	540-1700 K.C.	
	5.8-18 M.C.	

MODEL
537-538-539 LW.
537-538-539 S.W.

MODELS 542, 542LW
Schematic, Socket
Alignment

DEWALD RADIO MFG. CORP.

Models 542 542 L.W.



MODEL	RANGE COVERAGE
542	555-174 meters, 50-16 meters 540-1725 K.C., 6.0-18.5 M.C.
542L.W.	555-174 meters, 2000-750 meters 540-1725 K.C. 150-400 K.C.

I.F. ALIGNMENT:

TO CALIBRATE RECEIVER

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

BROADCAST ALIGNMENT:

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

For 6.0-18.5 M.C. (Model 542) Turn wave band switch to this band. Adjust the generator and receiver to 16.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

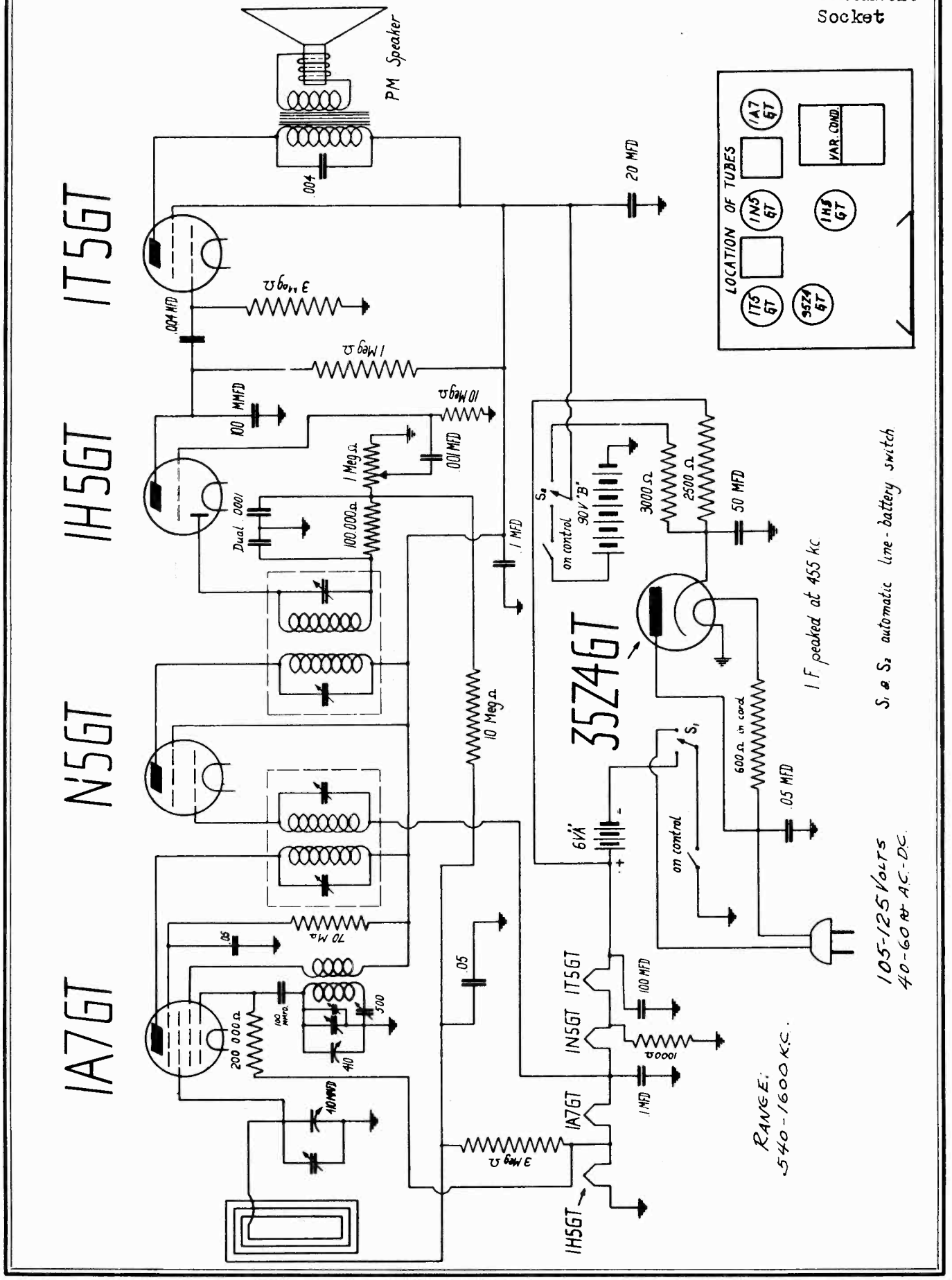
(Model 542 L.W.) Turn wave band switch to long wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for Maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave padder for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

SHORT WAVE ALIGNMENT:

LONG WAVE ALIGNMENT:

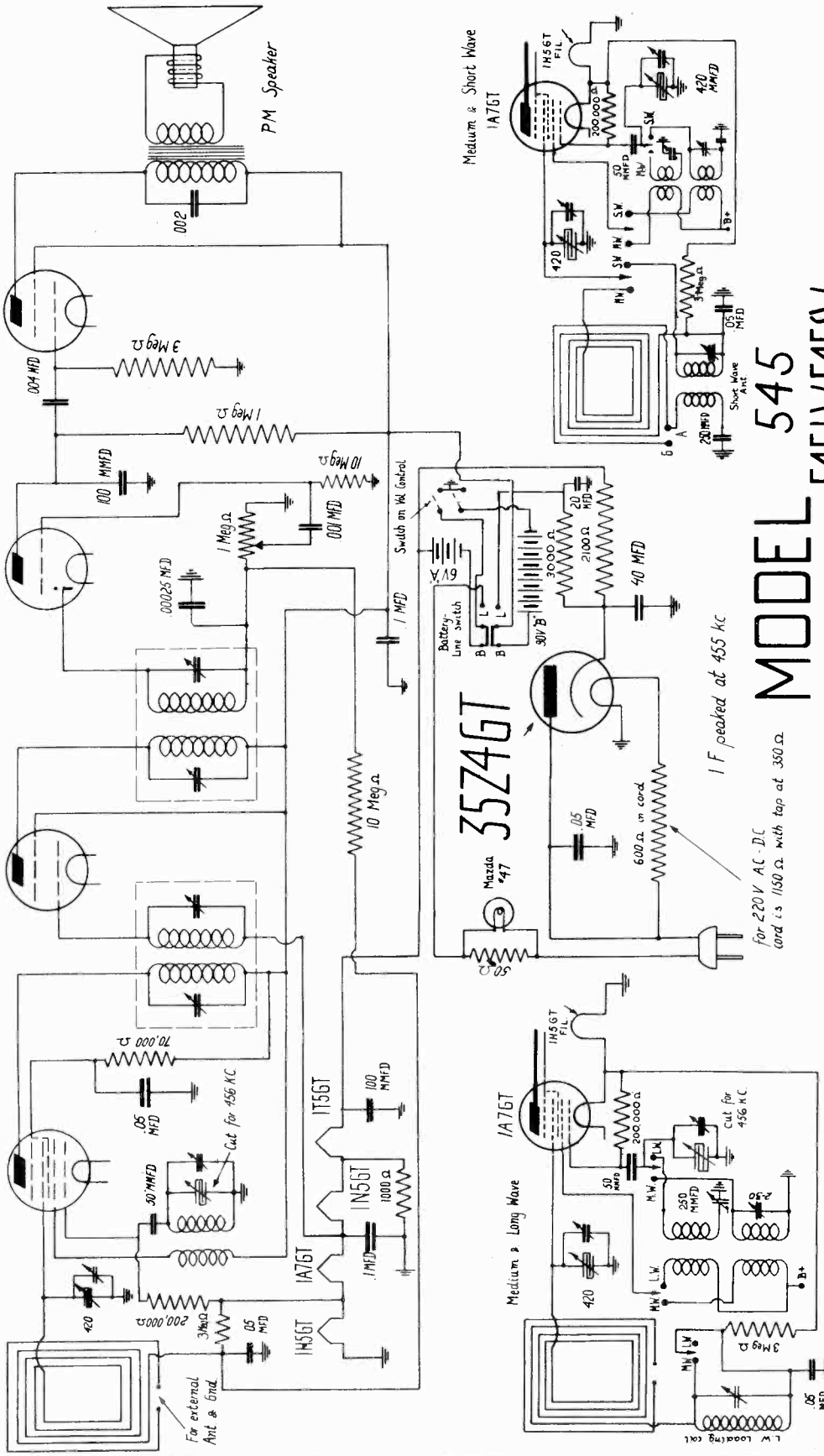
DEWALD RADIO MFG. CORP.

MODEL 544
Schematic
Socket



MODELS 545, 545LW, 545SW
Schematics, Notes

DEWALD RADIO MFG. CORP.



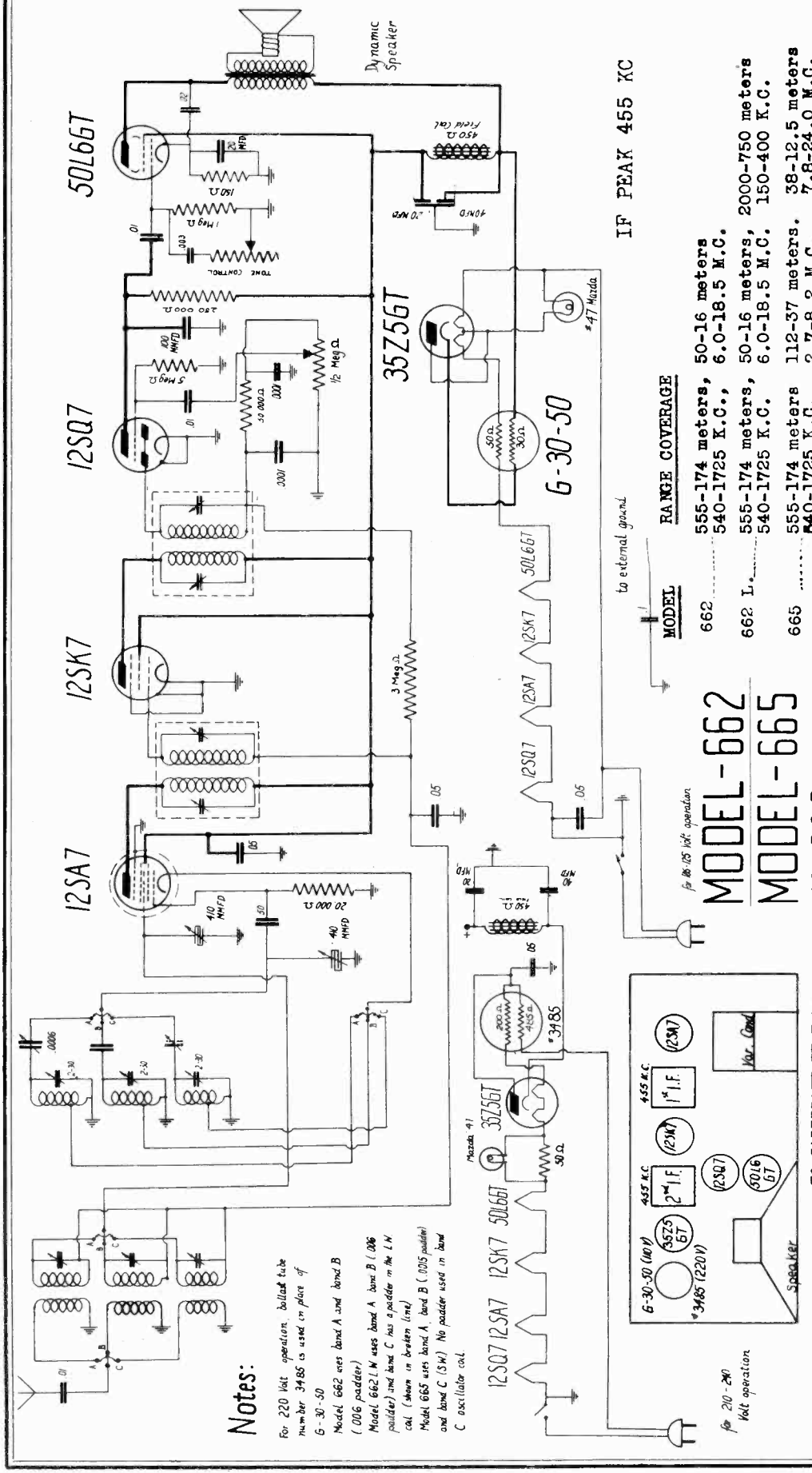
These models are portable combination battery and electric operated superheterodyne receivers with full automatic volume control. A self-contained loop is incorporated which makes the use of an outside aerial unnecessary for broadcast reception. The receivers will operate with an "A" supply of 6 volts and a "B" supply of 90 volts. They will also operate on 105-125 volts, 40-60 cycles A.C. or D.C. unless otherwise specified.

The range coverage is as follows:

MODEL 545	1700 - 540 KC.
MODEL 545 L.W.	1700 - 540 KC. & 350 - 145 KC.
MODEL 545 S.W.	1700 - 540 KC. & 17 - 5.5 MC.

DEWALD RADIO MFG. CORP.

MODELS 662,662L,665
Schematic,Socket
Alignment,Notes



MODEL	RANGE COVERAGE
662	555-174 meters, 50-16 meters 540-1725 K.C., 6.0-18.5 M.C.
662 L	555-174 meters, 50-16 meters, 2000-750 meters 540-1725 K.C. 6.0-18.5 M.C. 150-400 K.C.
665	555-174 meters 112-37 meters. 38-12.5 meters 540-1725 K.C. 2.7-8.2 M.C. 7.8-24.0 M.C.

I.F. ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 455 K.C. and peak I.F. trimmers for maximum signal.

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

SHORT WAVE ALIGNMENT For 2.7-8.2 M.C. (Model 665). Turn wave band switch to this band. Adjust the generator and receiver to 7.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

For 7.8-24.0 M.C. (Model 665) Turn wave band switch to this band. Adjust the generator and receiver to 22.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

For 6.0-18.5 M.C. (Model 662). Turn wave band switch to this band. Adjust the generator and receiver to 16.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

LONG WAVE ALIGNMENT (Model 662 L.W.) Turn wave band switch to Long Wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave padder for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

Notes:

For 220 Volt operation, ballast tube number 3485 is used in place of 6-30-50

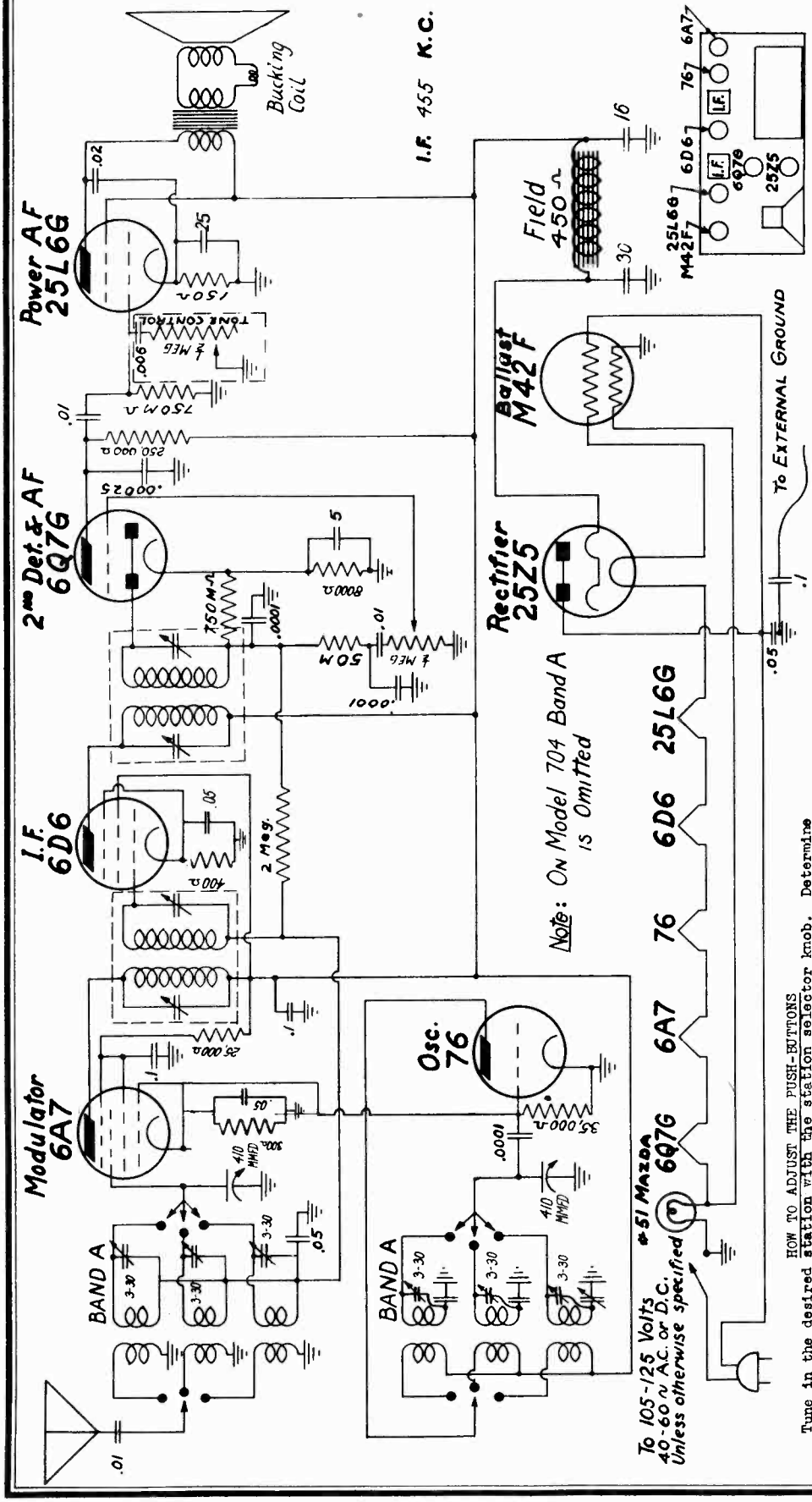
Model 662 uses band A and band B (.006 padder)

Model 662 L W uses band A, band B (.006 padder) and band C has a padder in the L W coil (shown in broken line)

Model 665 uses band A, band B (.015 padder) and band C (SW) No padder used in band C oscillator coil.

MODELS 704, 704LW, 705
Schematic, Socket
Tuner, Alignment

DEWALD RADIO MFG. CORP.



HOW TO ADJUST THE PUSH-BUTTONS

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

TO CALIBRATE RECEIVER

I.F. ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 455 K.C. and peak I.F. trimmers for maximum signal.

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

SHORT WAVE ALIGNMENT For 2.7-8.2 M.C. (Model 705). Turn wave band switch to this band. Adjust the generator and receiver to 7.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

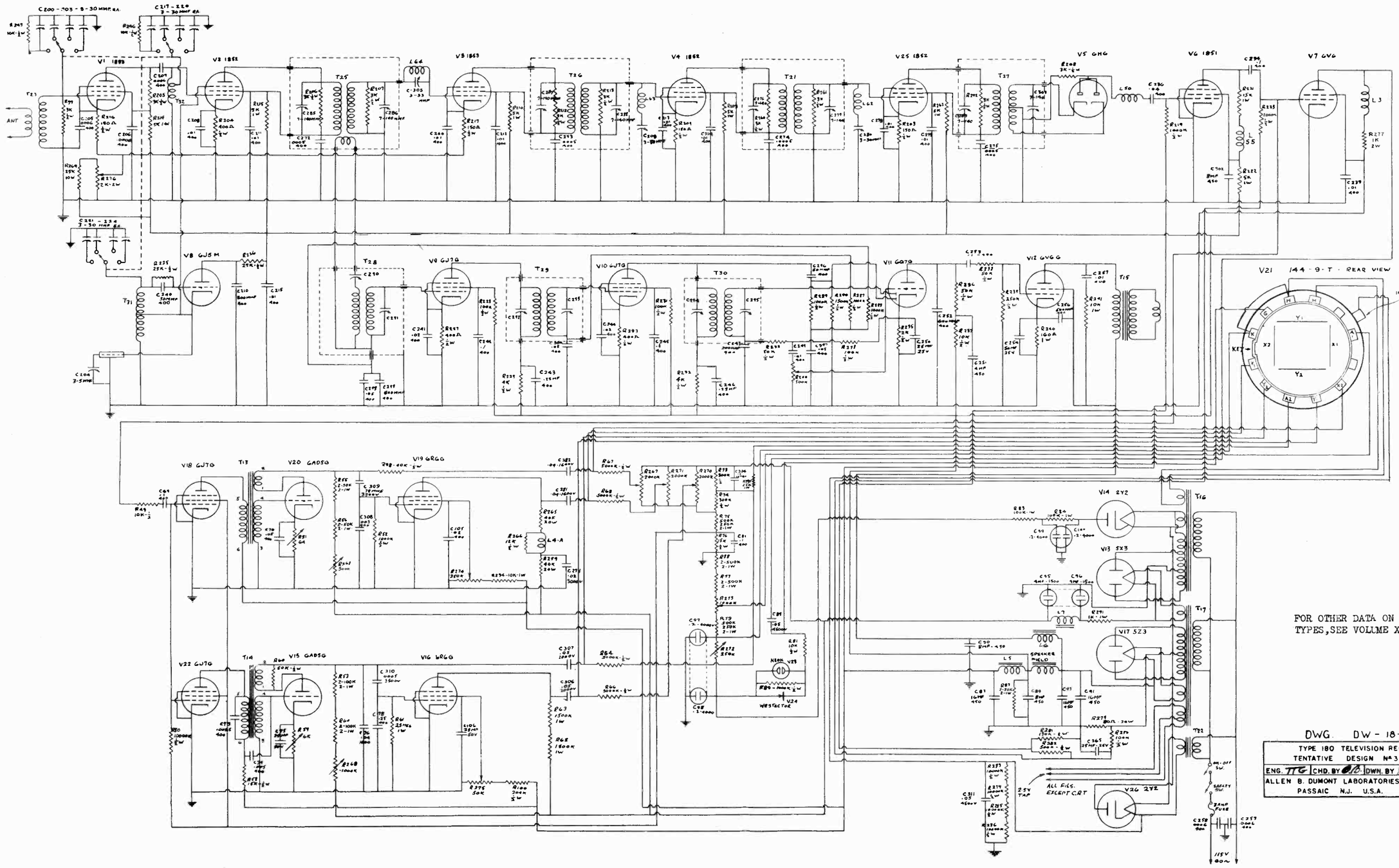
For 7.8-24.0 M.C. (Model 705) Turn wave band switch to this band. Adjust the generator and receiver to 22.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

For 6.0-18.5 M.C. (Model 704). Turn wave band switch to this band. Adjust the generator and receiver to 16.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

LONG WAVE ALIGNMENT (Model 704L,W.) Turn wave band switch to Long Wave band. Adjust the generator and receiver to 300 K.C. and peak trimmers for maximum signal. Adjust generator and receiver to 175 K.C. and peak Long Wave padder for maximum signal. The variable condenser should be "rocked" during this operation. Recheck 300 K.C.

MODEL 180, Type 3
Schematic

ALLEN B. DUMONT LABS., INC.



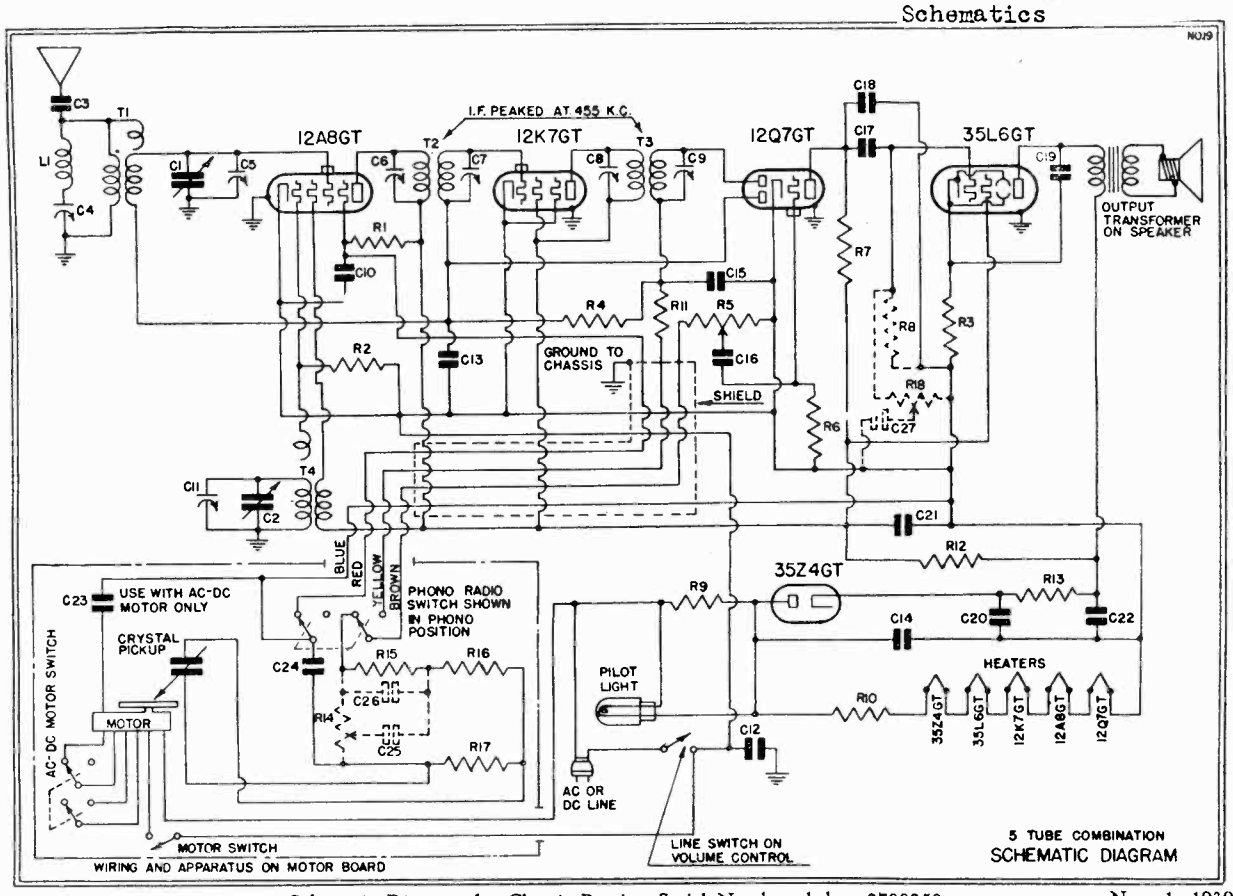
FOR OTHER DATA ON EARLY TYPES, SEE VOLUME X

DWG. DW - 18 - D - 2

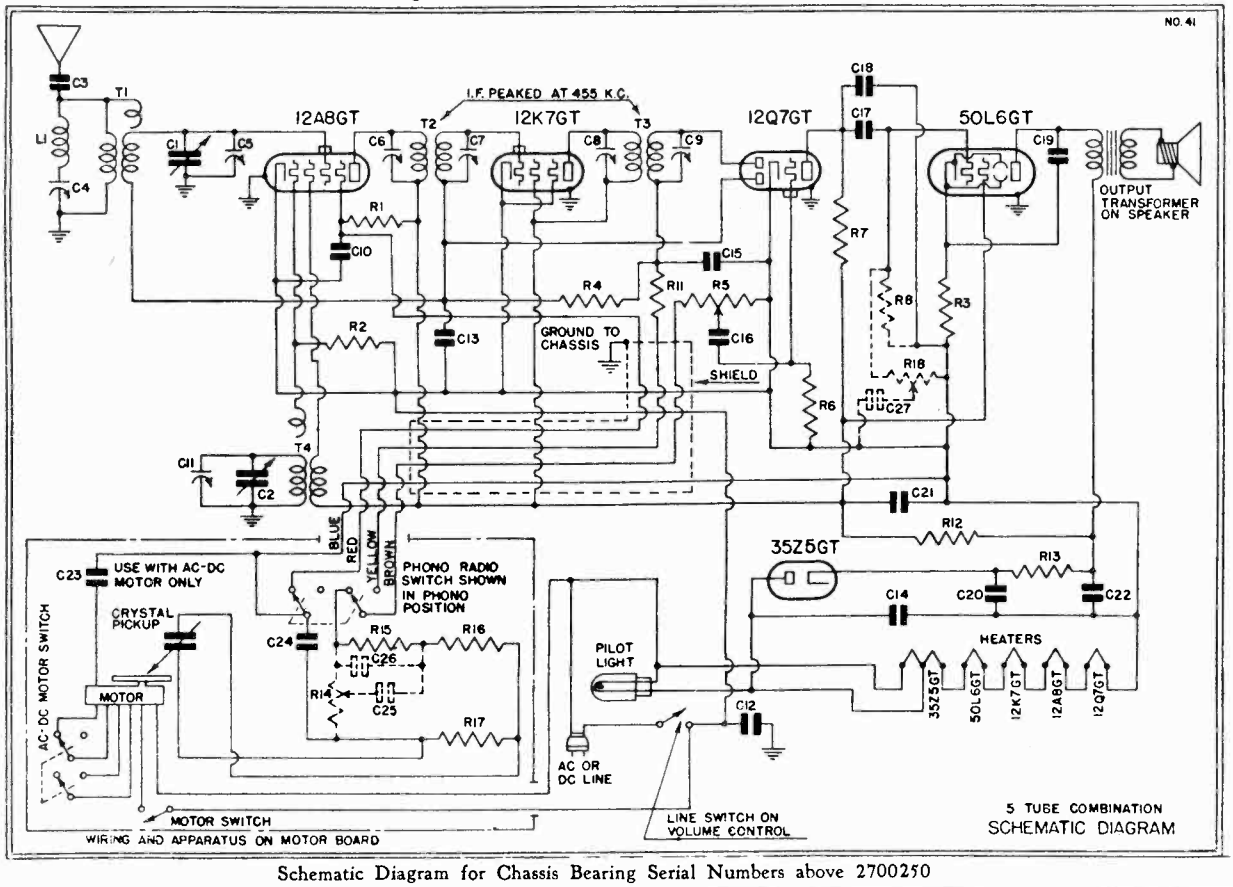
TYPE 180 TELEVISION RECEIVER	
TENTATIVE DESIGN No 3	
ENG. TTG	CHD. BY [illegible] DWN. BY [illegible] JUNE 1 1939
ALLEN B. DUMONT LABORATORIES INC.	
PASSAIC N.J. U.S.A.	

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CJ221,CJ232 AC,
CJ1-221,CJ1-232 AC-DC
Chassis CJ,CJ1,Early,Late
Schematics



Schematic Diagram for Chassis Bearing Serial Numbers below 2700250 Nov. 1, 1939



Schematic Diagram for Chassis Bearing Serial Numbers above 2700250

MODELS CJ221, CJ232 AC
CJ1-221, CJ1-232 AC-DC EMERSON RADIO & PHONOGRAPH CORP.
Chassis CJ, CJ1
Voltage, Alignment, Parts
Changes, Coil Data

REPLACEMENT PARTS

List Price ea. Effective as of July 1, 1939 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	4XT-432	Antenna coil with adjustable 455 kc wave-trap	$ .90
T4	6JT-467A	Oscillator coil. (See production change no. 2)	.35
T2	6JT-466U or 6JT-466AU	Double-tuned 455 kc first i-f transformer	1.10
T3	4XT-435CU	Double-tuned 455 kc second i-f transformer	.85
R1	2CR-193	30,000 ohm ½ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4	HR-42	2 megohm ¼ watt carbon resistor	.90
R5	4XR-335	Volume control .25 megohm with line switch	.16
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7, R8, R17	KR-56	500,000 ohm ¼ watt carbon resistor. (See production change no. 1)	.25
R9, R10	6JR-353	Tapped metal-clad wire-wound resistor. (See production change no. 3) R9—35 ohms; R10—70 ohms; (Each section—2watts)	.16
R11	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R12	4XR-334	2,500 ohm 1 watt carbon resistor	.16
R13	4ZR-325	175 ohm 1 watt wire-wound resistor	2.40
C1, C2	4XC-391C	Two-gang variable condenser (for CJ-221)	2.75
C1,C2	4XC-412	Two-gang variable condenser (for CJ-232)	.20
C3	4XC-401	0.00055 mf mica condenser	
†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, C13, C24	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	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17, C19	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C20, C21	6JC-426U or 6JC-426AU	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C22	4XC-404	20 mf, 135 volt dry electrolytic condenser	.65
C23	KC-58	0.01 mf, 400 volt tubular condenser (for AC-DC motors only)	.20
	6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47	.20
	6JD-74	Dial face	.35
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	6JH-24	Drive shaft	.05
	4MZ-588B	Dial pointer	.20
	4XM-367	Drive pulley	.10
		ADDITIONAL PARTS USED ON CJ-221	
R14	4LR-312B	Tone control .5 megohm with line switch	1.05
R15, R16	KR-57	1 megohm ¼ watt carbon resistor	.16
C25	IC-47A	0.0001 mf mica condenser	.20
	3LM-253	Phonograph needle cup	.20
	4XPM-20A	117 volt a.c. phonograph motor (for 221 a.c.)	12.00
	3GPM-1	117 volt a.c.-d.c. phonograph motor (for 221 a.c.-d.c.)	43.20
	4XC-418A	Crystal pick up	8.10
	6JS-386	6" permanent magnet dynamic speaker	6.20
	6JS-385	Phono-radio switch	.65
	4XE-3A	Dial crystal	.20
		ADDITIONAL PARTS USED ON CJ-232	
R15, R16	KR-56	.5 megohm ¼ watt carbon resistor	.16
R18	4XR-342	Tone control .5 megohm	.70
C26	4UC-371A	0.0003 mf mica condenser	.20
C27	HC-34	0.006 mf 600 volt tubular condenser	.20
	4XPM-19A	117 volt, a.c.-d.c. phonograph motor (for 232 a.c.-d.c.)	66.00
	4XPM-19	117 volt a.c. phonograph motor (for 232 a.c.)	42.60
	4XC-406	Crystal pick up	9.85
	4PS-303A	6" permanent magnet dynamic speaker	6.70
	TTS-111S	Phono-radio switch	.55
	4XE-3	Dial crystal	.20
	4XW-130	Record holder block	.60

When ordering replacement parts specify part number.

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

PRODUCTION CHANGES

1. In CJ chassis bearing serial numbers below 2,700,250; R7, the 12Q7G plate resistor, is 250,000 ohms.
2. CJ chassis also use oscillator coil 4XT-458 or 6JT-467. For correct lug connections to any of these coils see illustration.
3. R9, R10 is not used on CJ chassis above serial number 2,700,250.
4. CJ-221 chassis uses dotted portion R8, R14, and C25.
   CJ-232 chassis uses dotted portion R18, C26, and C27.

Tube Data

For serial numbers below 2,700,250:		*For serial numbers above 2,700,250*
1—12A8 or 12A8GT	pentagrid oscillator modulator	1—12A8 or 12A8GT
1—12K7 or 12K7GT	first i-f amplifier	1—12K7 or 12K7GT
1—12Q7 or 12Q7GT	diode detector, a-f amplifier, a.v.c.	1—12SQ7 or 12SQ7GT
1—35L6 or 35L6GT	beam power output	1—50L6 or 50L6GT
1—35Z4 or 35Z4GT	half-wave rectifier	1—35Z5 or 35Z5GT

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."

VOLTAGE ANALYSIS

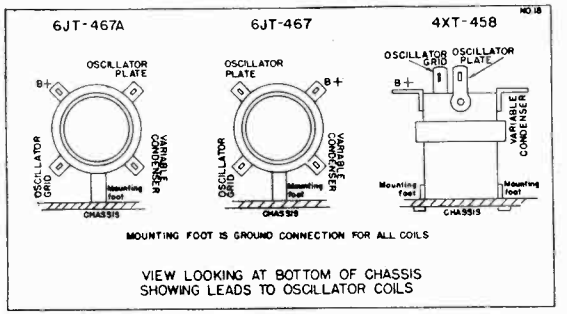
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 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	65	40	0	65	12
12K7GT	65	65	0	—	12
12SQ7GT	40	—	0	—	12
50L6GT	100	65	5.7	—	50

Voltage at 35Z5 cathode—110 volts.

Voltage across pilot light—4.5 volts.

† In chassis using 35Z4GT and 35L6GT plate and screen voltage readings will be slightly higher.



CHASSIS MODEL CJ

Voltage rating ..... 105-125 volts
Power consumption ..... 30 watts for receiver
20 watts for 221 a.c. or 232 a.c. motor
30 watts for 221 and 232 a.c.-d.c. motors
Frequency range ..... 540-1730 kc.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left of the variable condenser. 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 between the 12K7 and 35Z5 tubes. 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

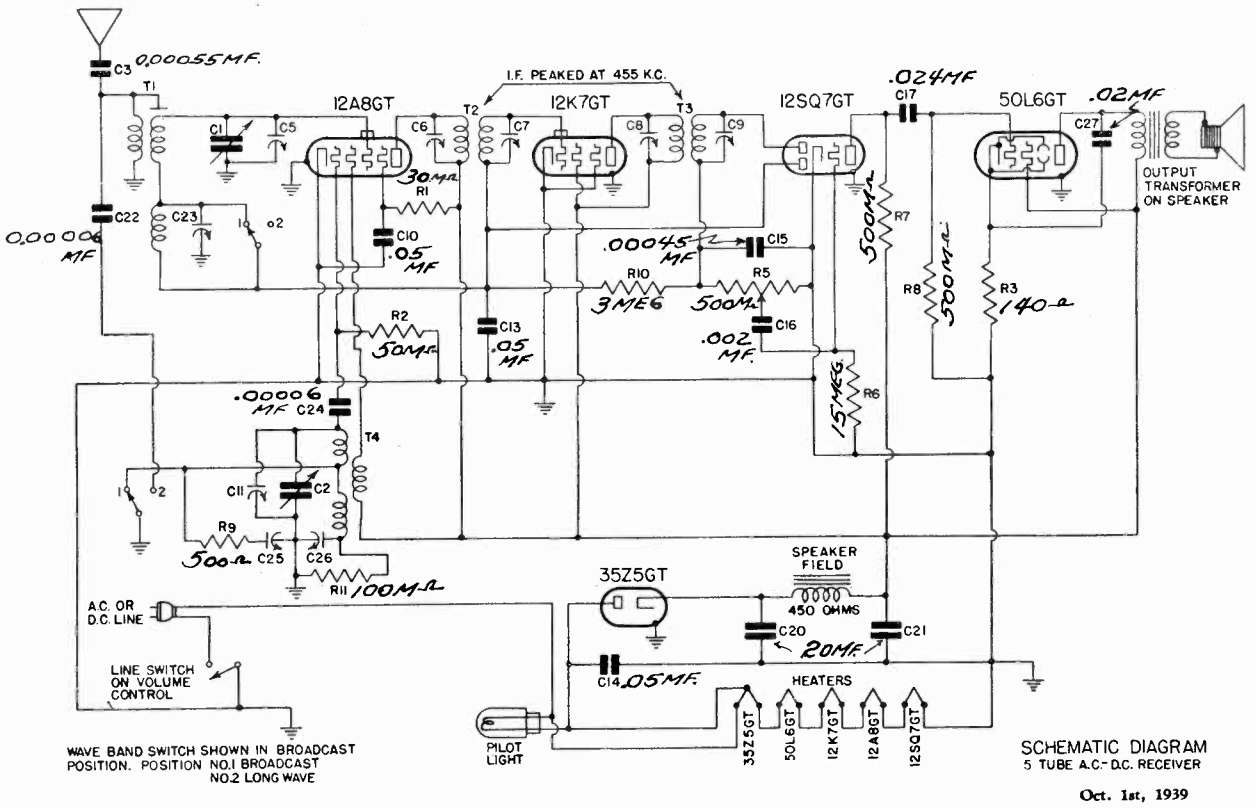
Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 4.)

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 CRLW261, CRLW262
CRLW274, Chassis CRLW
Schematic, Voltage
Alignment, Trimmers

EMERSON RADIO & PHONOGRAPH CORP



Pilot light, 6.3 volt, .15 amp., Mazda No. 47

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

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—pentagrid oscillator modulator	88	45	0	88	12
12K7GT—first i-f amplifier	88	88	0	—	12
12SQ7GT—diode detector, a-f amplifier, a.v.c.	40	—	0	—	12
50L6GT—beam power output	82	88	5.7	—	50

Voltage at 35Z5 cathode—115 volts.

Voltage across speaker field—.27 volts.

Voltage across pilot light—4.5 volts.

Voltage rating	105 to 125 volts, a.c. or d.c.
Power consumption	30 watts
Frequency ranges	538 to 1650 kc (558 to 182 meters) 157 to 375 kc (1905 to 804 meters)

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 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 two-band antenna coil is located to the left of the speaker. The trimmer for the broadcast antenna coil is located on the front section of the variable condenser. 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 antenna coil. The trimmer for the broadcast oscillator coil is located on the rear section of the variable condenser. The trimmer and series padder (condensers C25 and C26 resp.) for the long-wave oscillator coil are located beneath the chassis and can be reached from the bottom only. The section toward the rear of the chassis is C25, the shunt trimmer. The section toward the front of the chassis is C26, the series padding condenser.

Alignment

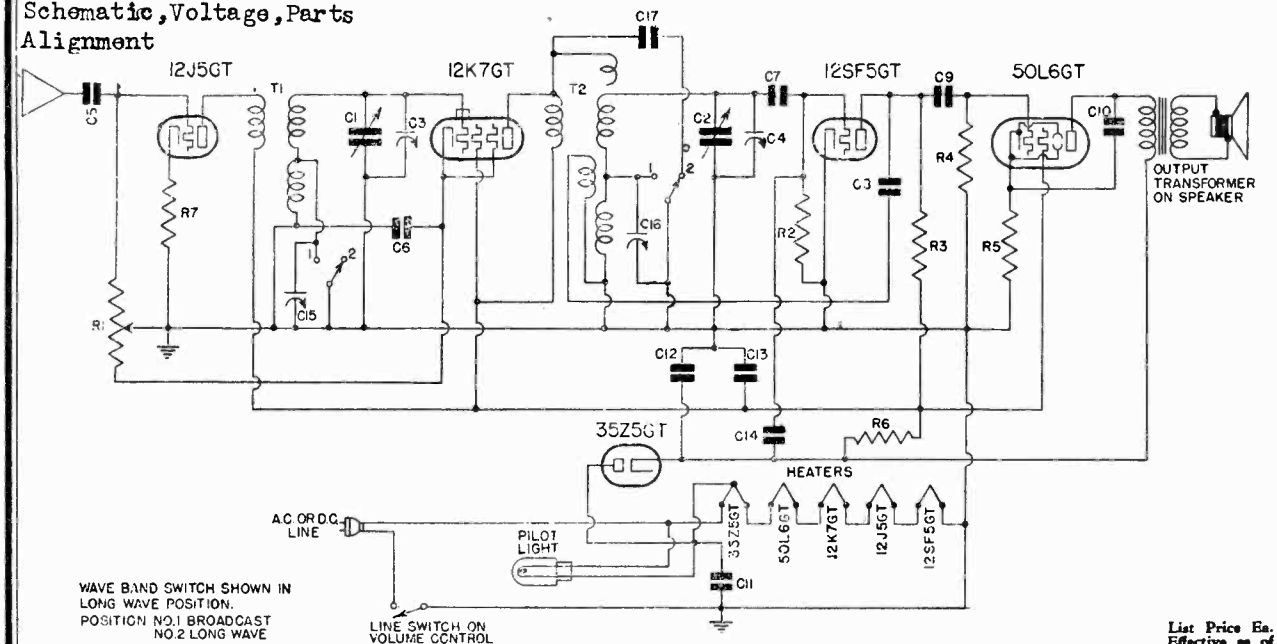
I.F. Turn the band switch clockwise to broadcast position and swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

B.C.-With the band switch in broadcast position set the dial pointer at 200 meters. 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.

L.W. Turn the band switch counter-clockwise to the long-wave position. With the dial pointer set at 850 meters, feed 350 kc through a .0001 mf condenser to the antenna and adjust first the oscillator trimmer (rear trimmer beneath the chassis), then the antenna trimmer (on antenna coil) for maximum response. Move the pointer to 1750 meters, feed 172 kc, and adjust the series padder (front trimmer beneath the chassis), rocking the variable condenser back and forth while adjusting for maximum response. Return to 350 kc and repeat alignment.

MODELS CULW261, CULW262
CULW265, CULW274
Chassis CULW
Schematic, Voltage, Parts
Alignment

EMERSON RADIO & PHONOGRAPH CORP.



List Price Ea. Effective as of Oct. 1st, 1939
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	6UT-517	Two-band r-f coil	$ .65
T2	6UT-518	Two-band detector coil	1.10
R1	6UR-360	Volume control 75,000 ohms with 200 ohm bias stop and line switch	.85
R2	3RR-275	10 megohm ¼ watt carbon resistor	.16
R3, R4	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R5	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R6	6FR-348	2,400 ohm ½ watt carbon resistor	.16
R7	KR-50	500 ohm ¼ watt carbon resistor	.16
C1, C2	6UC-439	Two-gang variable condenser	2.30
†C3, C4		Trimmers, part of variable condenser.	
C5, C8	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C6	BC-12	0.05 mf, 200 volt tubular condenser	.20
C7	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	LC-65	0.02 mf, 400 volt tubular condenser	.20
C10	5JC-417	0.035 mf, 400 volt tubular condenser	.20
C11	LC-64	0.05 mf, 400 volt tubular condenser	.20
C12, C13	6UC-447	Multiple 30 and 10 mf, 150 volt dry electrolytic condenser	.90
C14	6UC-440A	0.000002 mf mica condenser	.20
C15, C16	3AC-278	Trimmer	.15
C17	4VC-371A	0.0003 mf mica condenser	.20
	6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47	

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*	*Cathode*	*Heater*
12J5GT, first r-f amplifier	85	—	2.3	12
12K7GT, second r-f amplifier	85	85	1.6	12
12SF5GT, grid leak detector	25	—	0	12
50L6GT, beam power output	110	85	6	50

Voltage at rectifier cathode—120 volts. Power consumption ..... 30 watts.

ALIGNMENT PROCEDURE

An oscillator with frequencies of 1500 kc and 350 kc is required.

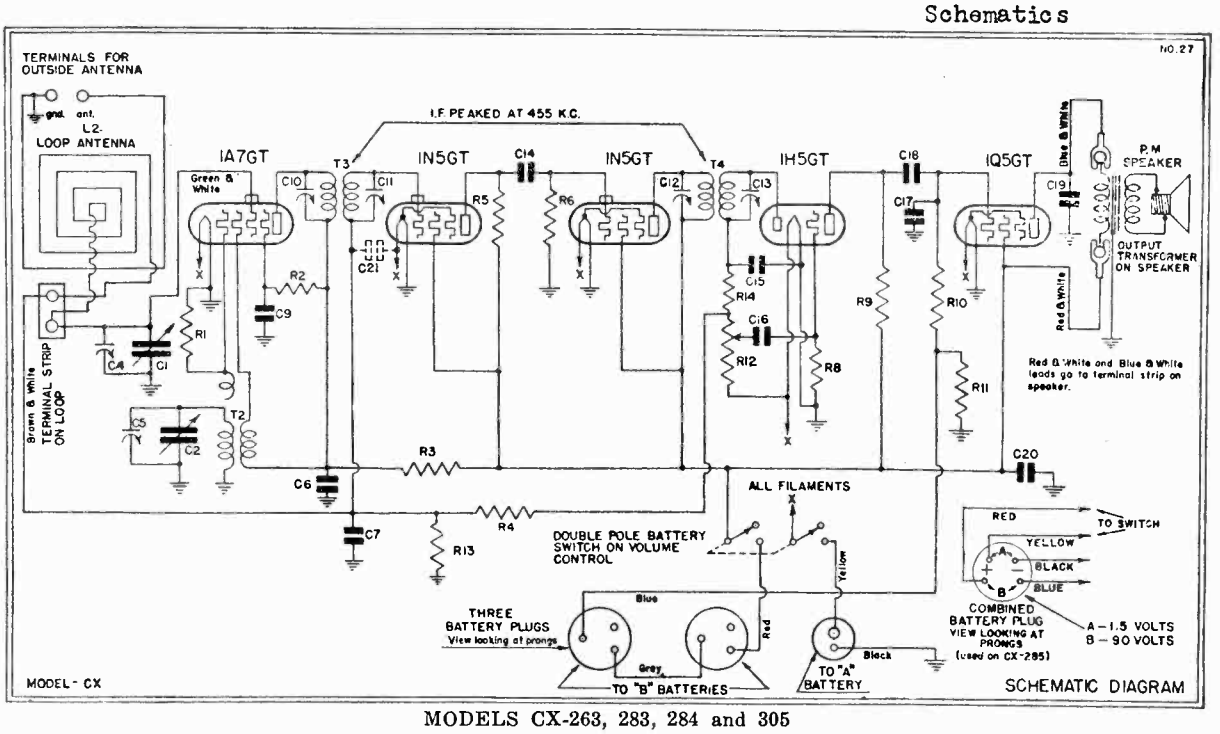
Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

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 meters, 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 850 meters and feed 350 kc to antenna. Adjust the two long-wave interstage coil trimmers for maximum output. The first long-wave interstage coil trimmer is located on the speaker frame. The second (detector coil) long-wave trimmer is located beneath the chassis and is reached from the right end of the chassis.

EMERSON RADIO & PHONOGRAPH CORP.

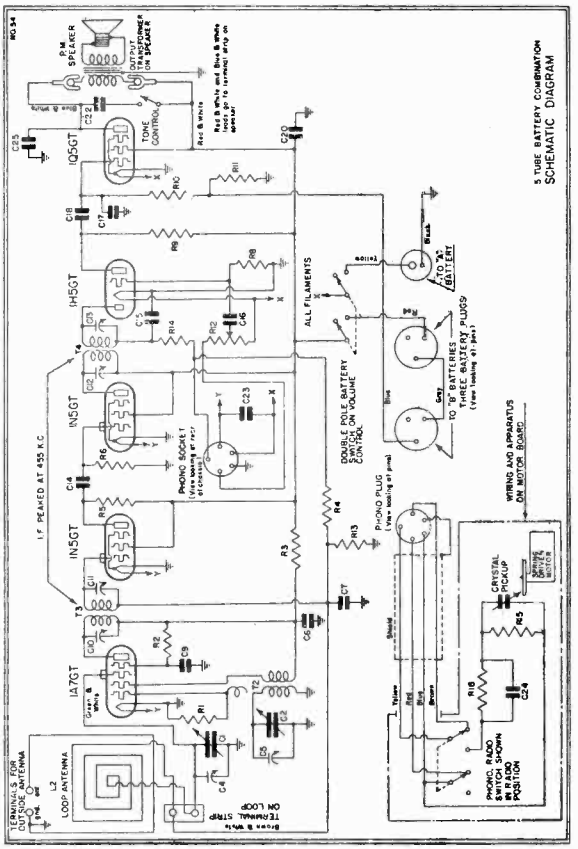
MODELS CX263, CX283, CX284
CX285, CX305, CX292
Chassis CX (3 Types)
Schematics

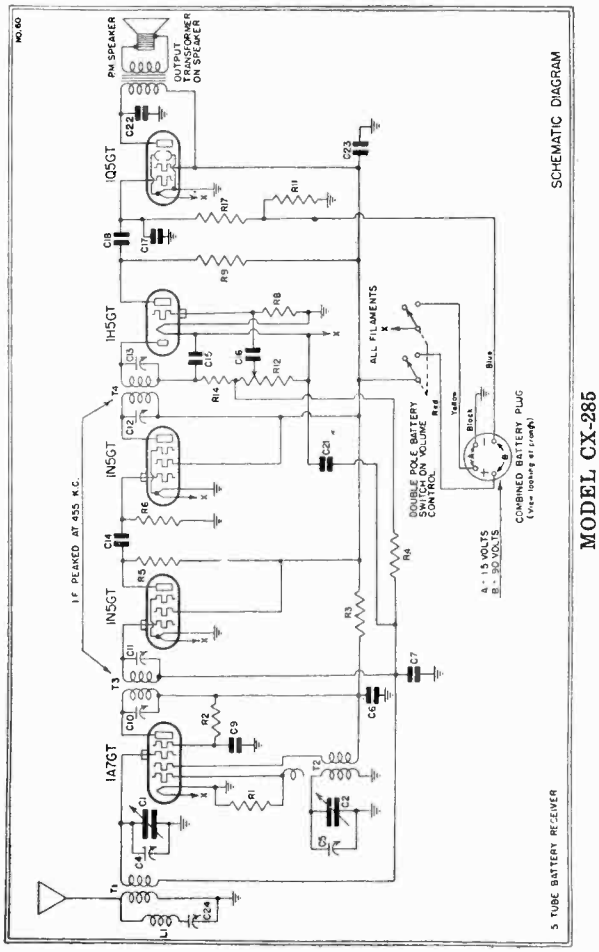


MODELS CX-263, 283, 284 and 305

Current drain .... "A" battery—0.3 amps.
"B" battery—0.10 amps. with no signal

Frequency range .. All Models except CX-285—540 to 1600 kc
Model CX-285—540 to 1730 kc





July 15th, 1939

GENERAL NOTES

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

FOR MODELS CX-263, CX-283, CX284, CX-292 AND CX-305

Type Battery	*No. Req.*	*Eveready Part No.*	*Rayovac Part No.*	*Burgess Part No.*
1½ volt "A"	1	741 (plug-in type)	P-96A (plug-in type)	8F (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)	B30-P1 (plug-in type)

FOR MODEL CX-285

"A" and "B" Pack	1	748 (plug-in type)	AB82 (plug-in type)	17G-D60 (plug-in type)

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

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*	*Osc. Plate*	*Fil.*
1A7GT oscillator-modulator	82	52	82	1.5
1N5GT 1st i-f amplifier	70	82	—	1.5
1N5GT 2nd i-f amplifier	82	82	—	1.5
1H5GT 2nd detector, a.v.c., a-f amplifier	25	—	—	1.5
1Q5GT beam power output	77	82	—	1.5

Bias for the 1Q5GT tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.0 volts.

*Item	Part No.	DESCRIPTION
T1, L1	4XT-432B	Antenna coil with 455 kc adjustable wave trap (for CX-285 only)
L2	7BW-179A	Loop antenna assembly (for CX-292)
L2	6XW-175	Loop antenna assembly (for CX-283)
L2	6XW-174	Loop antenna assembly (for CX-263, 284 and 305)
T2	6RT-476	Oscillator coil
T3	6JT-466DU	Double-tuned 455 kc first i-f transformer
T4	6XT-514	Double-tuned 455 kc diode i-f transformer
R1, R14	KR-53	50,000 ohm ¼ watt carbon resistor
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor
R3	KR-50	500 ohm ¼ watt carbon resistor
R6	KR-54	100,000 ohm ¼ watt carbon resistor
R4, R8, R10, R13, R17	HR-42	2 megohm ¼ watt carbon resistor. (See production change No. 3)
R5	OR-73	25,000 ohm ¼ watt carbon resistor
R9	KR-56	0.5 megohm ¼ watt carbon resistor
R11	6ER-368	680 ohm ½ watt wire-wound resistor
R12	3HR-240C	Volume control—500,000 ohms with double pole battery switch
C1, C2	6RC-436A	Two-gang variable condenser (for CX-263, 284, 285 and 305)
C1, C2	6RC-436B	Two-gang variable condenser (for CX-283 and 292)
†C4, C5		Trimmers, part of variable condenser. (See production change No. 2.)
C6, C7, C21	BC-12	0.05 mf, 200 volt tubular condenser
C9, C18	LC-65	0.02 mf, 400 volt tubular condenser
†C10, C11, C12, C13		Trimmers, part of i-f transformer.
C14	5AC-384	0.0002 mf, 600 volt tubular or mica condenser
C15, C17	4XC-394A	0.00022 mf mica condenser
C16	KC-58	0.01 mf, 400 volt tubular condenser
C19	NNC-199	0.001 mf, 600 volt tubular condenser (for CX-283, 292 and 305) (See production change No. 1)
C20	6EC-432	8 mf, 100 volt dry electrolytic condenser
	6XS-402	4" permanent magnet dynamic speaker (for CX-283)
	6ES-367A	5" permanent magnet dynamic speaker (for CX-263)
	6XS-424	6½" permanent magnet dynamic speaker (for CX-263, 284, 285, 292 and 305)
	6XD-87	Dial face (not used on CX-285)
	6XD-94	Dial face (for CX-285 only)
	6ED-69A	Indicator dial
	6RF-52	Dial pointer
	6XE-26	Dial crystal (for CX-285 and 305)
	6XE-26A	Dial crystal (for CX-263, 283, 284 and 292)
	6RW-162	Drive cord spring
	4YZ-772	Dial drive cord
	6EW-148	Battery cable (for CX-285)
	6EW-135A	Battery cable (for CX-283, 284, 263, 292 and 305)
	6JH-24D	Dial drive shaft

PRODUCTION CHANGES

1. On CX-263, 284 and 285 condenser C19 is part no. 3VC-324 0.003 mf, 600 volt tubular condenser.
2. On CX-263, 284 and 305 trimmer C4 is mounted on the loop antenna frame.
3. Chassis bearing serial numbers below 2,921,400 use .5 megohm at R10.

ADDITIONAL PARTS USED ON CX-292

R15	KR-55	0.25 megohm ¼ watt resistor
R16	HR-42	2 megohm ¼ watt carbon resistor
C22	HC-34	0.006 mf, 600 volt tubular condenser
C23	BC-12	0.05 mf, 200 volt tubular condenser
C24	6XC-458A	0.00014 mf mica condenser
C25	3VC-324	0.003 mf, 600 volt tubular condenser
	3GM-251	Phonograph needle cup
	6XPM-48	Spring-driven phonograph motor
	4XS-432	Phono-radio switch
	3GS-202B	Tone control switch

* Item number locates the article on the schematic diagram.

† Not supplied separately.

ADJUSTMENTS

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

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

On Model CX-285 the antenna coil is located between the two i-f transformers. On all other CX Models the loop antenna acts as the antenna coil. The trimmer for the loop C4 is on the loop frame for Models CX-263, 284 and 305. On Models CX-283, 285 and 292, C4 is on the front section of the variable condenser.

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is at the extreme left end of the chassis. The diode i-f transformer is just to the left of the variable condenser. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

I-f Alignment

Swing variable condenser to minimum capacity position. Feed 455 kc to the grid of the 1A7GT 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 for maximum response.

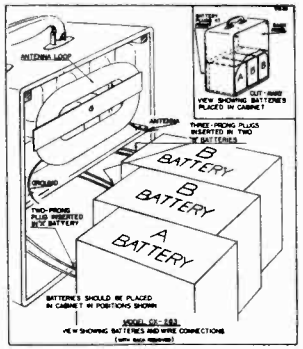
If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may then be swung to either side of the center to give maximum response. Realign at 140.

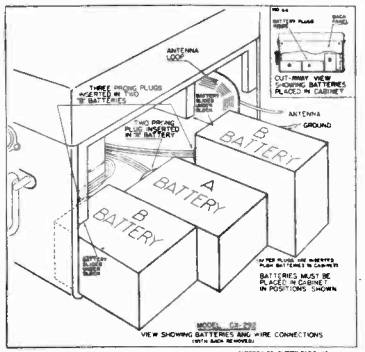
Battery Installation for Models CX-263, CX-283, CX-284, CX-292 and CX-305

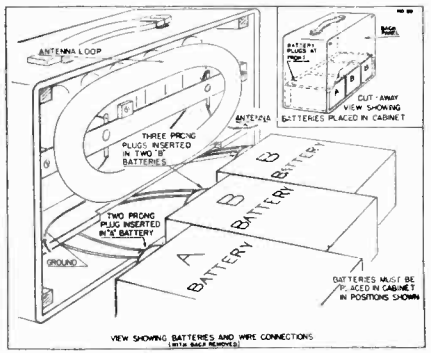
The portable cabinets contain a shelf under the receiver for housing the batteries. To install and connect the batteries observe the following procedure:

1. Remove the back panel of the cabinet by taking out the wood screws.
2. Locate the battery cable on the bottom shelf of the cabinet.
3. With the batteries out of the cabinet insert the three-prong plug on the battery cable into the two "B" batteries and the small two prong plug into the "A" battery.
4. Place the batteries in the cabinet as indicated in the illustration Note that the plug end of the battery is up against the front panel of the cabinet.
5. Replace the back panel of the cabinet and fasten it in place with the wood screws.

Battery Installation for Model CX-285: 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.



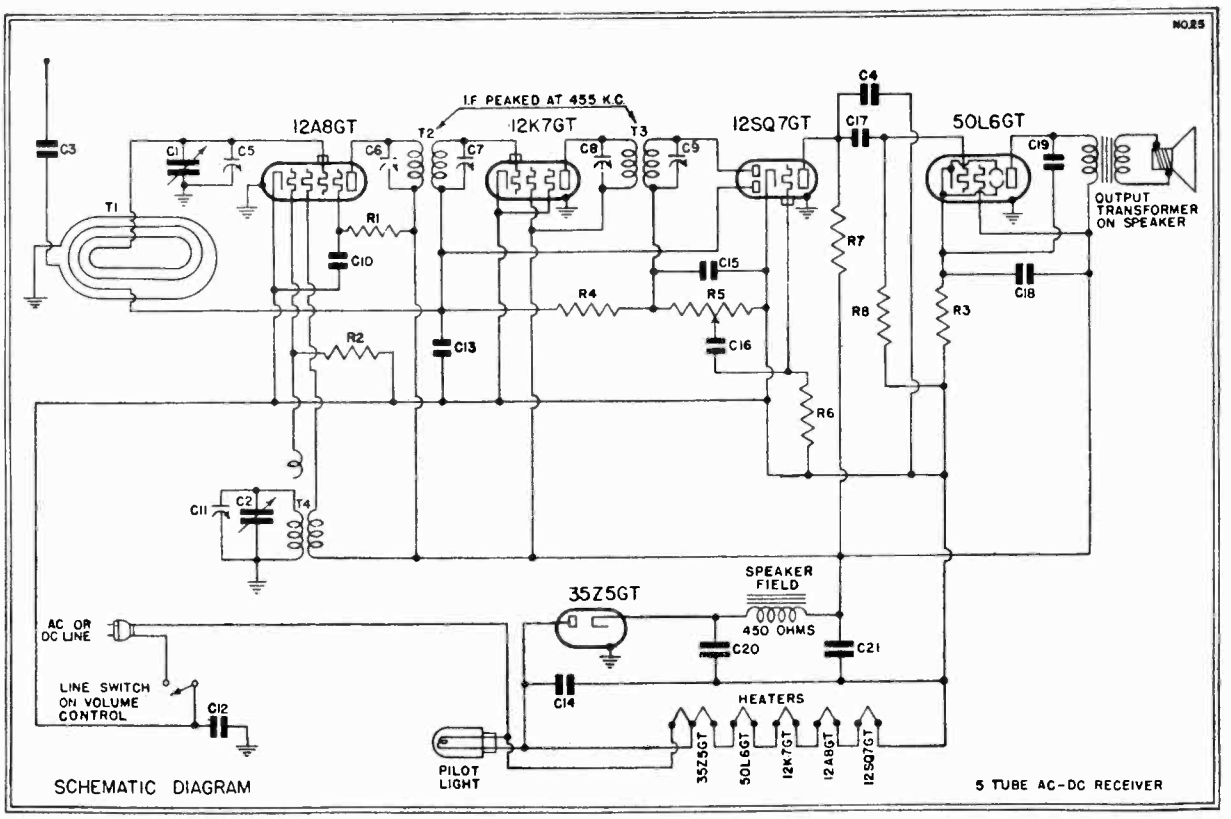




MODELS CX-263, 284 and 305

MODELS CV264,CV280,CV295
CV298,CV313,CV314,CV316
Chassis CV (2 Types)
Schematics

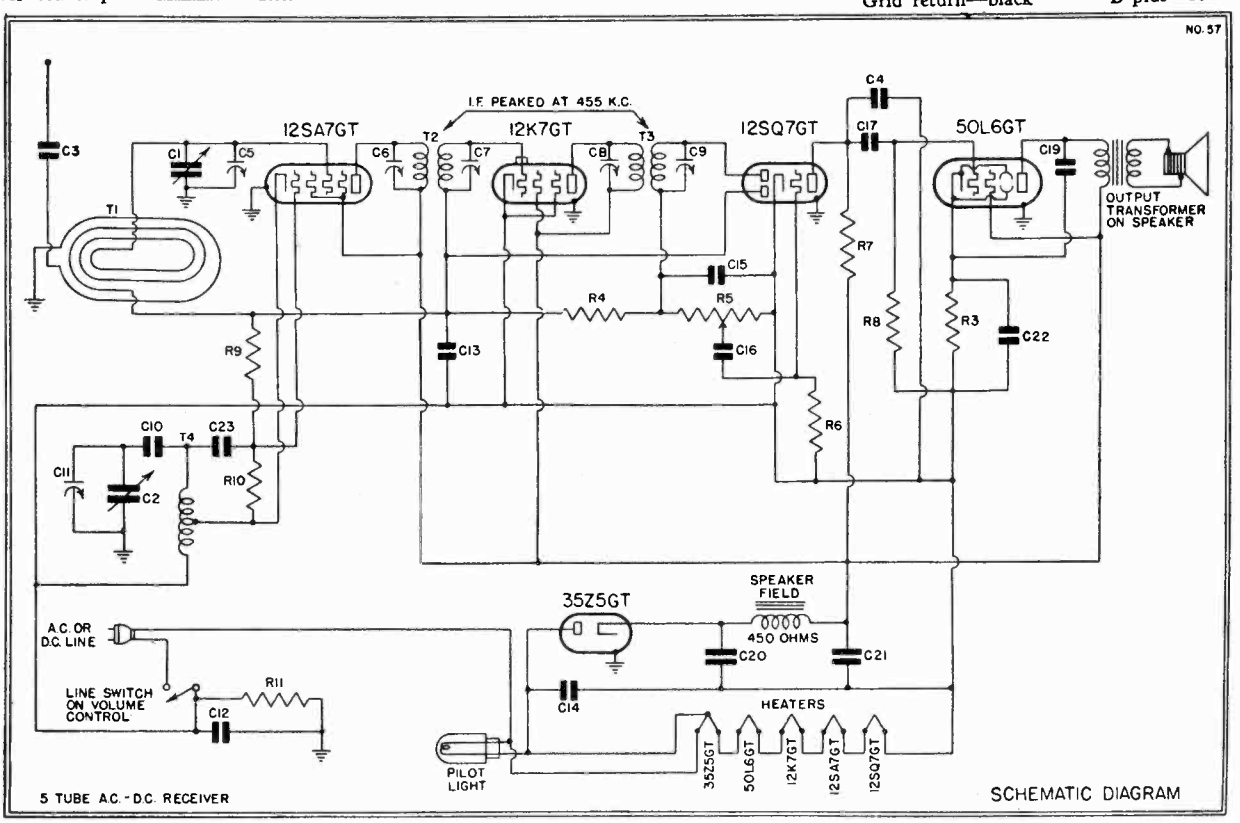
EMERSON RADIO & PHONOGRAPH CORP.



SCHEMATIC FOR CHASSIS USING 12A8GT TUBE

Voltage rating .....105-125 volts, a.c. or d.c.
Power consumption .....30 watts.

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



SCHEMATIC FOR CHASSIS USING 12SA7GT TUBE

Oct. 15, 1939

MODELS CV264,CV280,CV295
CV298,CV313,CV314,CV316 EMERSON RADIO & PHONOGRAPH CORP.
Chassis CV
Voltage,Parts,Changes
Alignment,Trimmers

TUBE DATA

THE TUBE COMPLEMENT IS AS FOLLOWS:

One 12SA7GT—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

(NOTE: Chassis bearing serial numbers below 2920685 use 12A8GT instead of 12SA7GT)

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*	*Fil.*
†12SA7GT	88	88	0	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.
†Chassis using 12A8GT measures 88 volts at oscillator plate and 45 volts at screen.

*Item	Part No.	
T1	6VW-172A	Loop antenna assembly (see production change no. 4b)
T4	7BT-486A	Oscillator coil (see production change no. 2)
T2	7BT-488C	Double-tuned 455 kc first i-f transformer (see production change no. 3a)
T3	7FT-513D	Double-tuned 455 kc second i-f transformer (see production change no. 3b)
R1	2CR-193	30,000 ohm ½ watt carbon resistor (see production change no. 1a)
R2	KR-53	50,000 ohm ¼ watt carbon resistor (see production change no. 1a)
R3	3FR-293	140 ohm ½ watt wire-wound resistor
R4	NNR-220	3 megohm ¼ watt carbon resistor.
R5	6VR-364	Volume control .25 megohm with line switch
R6	4XR-327	15 megohm ¼ watt carbon resistor.
R7, R8	KR-56	500,000 ohm ¼ watt carbon resistor
R10	LR-60	20,000 ohm ¼ watt carbon resistor (see production change no. 1b)
R11	LR-61	200,000 ohm ¼ watt carbon resistor (see production change no. 1b)
C1, C2	6RC-436	Two-gang variable condenser
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser
C4, C15, C23	4XC-394A	0.00022 mf mica condenser
†C5, C11		Trimmers, part of variable condenser.
†C6, C7, C8, C9		Trimmers, part of i-f transformers.
C10, C13	BC-12	0.05 mf, 200 volt tubular condenser
C12	3CC-302	0.15 mf, 200 volt tubular condenser
C14	LC-64	0.05 mf, 400 volt tubular condenser
C17	6JC-425	0.024 mf, 400 volt tubular condenser
C18	6VC-446	20 mf, 150 watt dry electrolytic condenser (see change no. 1a)
C19	LC-65	0.02 mf, 400 volt tubular condenser (see change no. 3c)
C20, C21	6JC-426B	Dual 20 mf, 150 volt dry electrolytic condenser
C22	6ZC-460	20 mf, 25 volt dry electrolytic condenser (see change no. 1b)
	6JS-368U	4" dynamic speaker

*Item number locates the article on the schematic diagram.

†Not supplied separately.

DIAL PARTS

6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47		
6VD-82A	Dial face (see production change no. 4a)		
4YZ-772	Drive cord	6JH-24B	Drive shaft
6RW-162	Drive cord spring	6RF-52	Dial pointer
		6RE-20	Dial crystal

PRODUCTION CHANGES

1. (a) Used only in chassis using 12A8GT.
   (b) Used only in chassis using 12SA7GT.
2. (a) Chassis bearing serial numbers below 2764502 use oscillator coil 6RT-476
   (b) Chassis bearing serial numbers between 2764502 and 2920685 use oscillator coil 7CT-511
3. Chassis bearing serial numbers below 2920685 use
   (a) First i-f transformer 6RT-479A.
   (b) Second i-f transformer 7BT-489A.
   (c) Condenser C19—.03 mf—400 volt.
4. Chassis bearing serial numbers below 2764502 use
   (a) Dial face 6VD-82.
   (b) Loop antenna 6VW-172.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left 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 to the right of 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 (loop). The oscillator coil is located directly beneath the speaker.

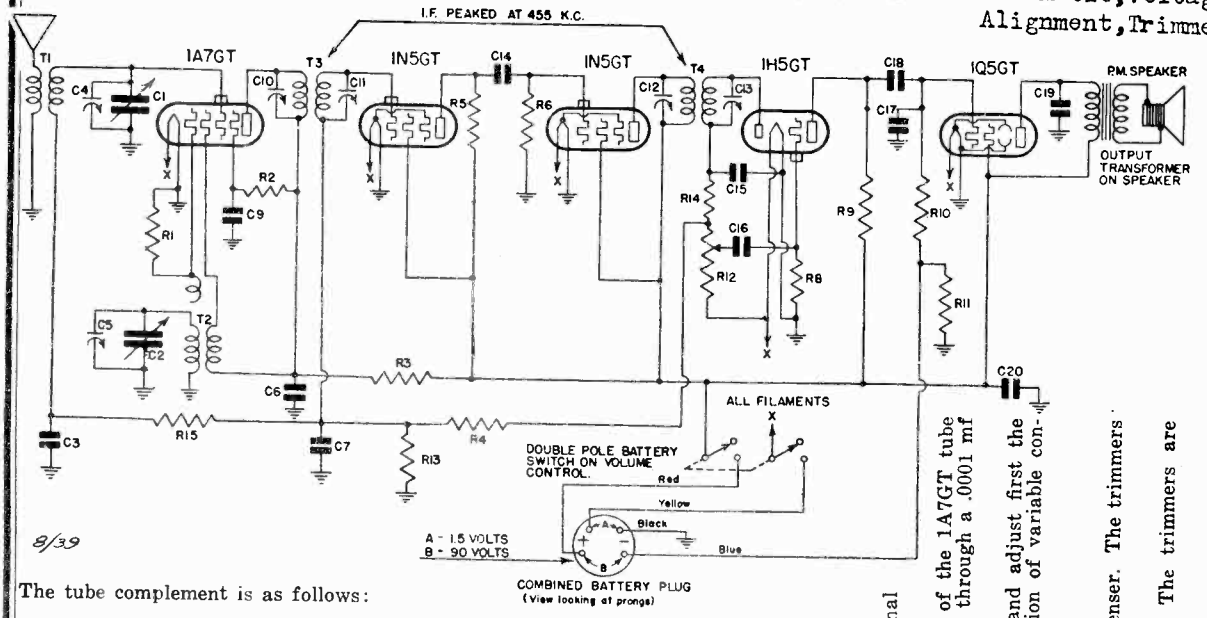
Alignment

I.F.—Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. The grid of the 12SA7GT tube may be reached by clipping the input lead to the stator loop of the antenna (front) section.

R.F.—Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop about 12 inches away from and parallel to the receiver loop antenna. Advance the input to the loop until a satisfactory deflection is obtained on the output meter. Adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. If the loop antenna has been replaced it may be necessary to retrack the loop inductance. With the dial set at 60 feed 600 kc to the antenna lead. A portion of the outside may be swung to either side of the center to give maximum response. Repeat the trimmer alignment at 140.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL DH264, Chassis DH
Schematic, Voltage, Parts
Alignment, Trimmers



The tube complement is as follows:

1—1A7GT oscillator-modulator.
1—1N5GT 1st i-f amplifier.
1—1N5GT 2nd i-f amplifier.
1—1H5GT 2nd detector, a.v.c., a-f amplifier.
1—1Q5GT beam power output.

*Item	Part No.	DESCRIPTION
T1	4XT-432A	Antenna coil with 455 kc adjustable wave-trap
T2	6RT-476	Oscillator coil
T3	6RT-479B	Double-tuned 455 kc first i-f transformer
T4	4XT-435D	Double-tuned 455 kc diode i-f transformer
R1, R14	KR-53	50,000 ohm ¼ watt carbon resistor
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor
R6, R15	KR-54	100,000 ohm ¼ watt carbon resistor
R3	KR-50	500 ohm ¼ watt carbon resistor
R4, R8, R13	HR-42	2 megohm ¼ watt carbon resistor
R5	LR-65	10,000 ohm ¼ watt carbon resistor
R9, R10	KR-56	0.5 megohm ¼ watt carbon resistor
R11	6ER-358	680 ohm ½ watt wire-wound resistor
R12	7HR-373	Volume control—500,000 ohms with double pole battery
C1, C2	6RC-436	Two-gang variable condenser
C3	AC-6	0.1 mf, 200 volt tubular condenser
†C4, C5		Trimmers, part of variable condenser.
C6, C7	BC-12	0.05 mf, 200 volt tubular condenser
C9, C18	LC-65	0.02 mf, 400 volt tubular condenser
†C10, C11, C12, C13		Trimmers, part of i-f transformer.
C14	5AC-384	0.0002 mf, 600 volt tubular or mica condenser
C15, C17	4XC-394A	0.00022 mf mica condenser
C16, C19	KC-58	0.01 mf, 400 volt tubular condenser
C20	6EC-432	8 mf, 100 volt dry electrolytic condenser

Current drain "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal
Frequency range 530 to 1730 kc

Alignment

IF-Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 1A7GT 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.

RF-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.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left of the variable condenser. 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 to the left of the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the left side of the chassis. The oscillator coil is located underneath the chassis, beneath the antenna coil.

VOLTAGE ANALYSIS

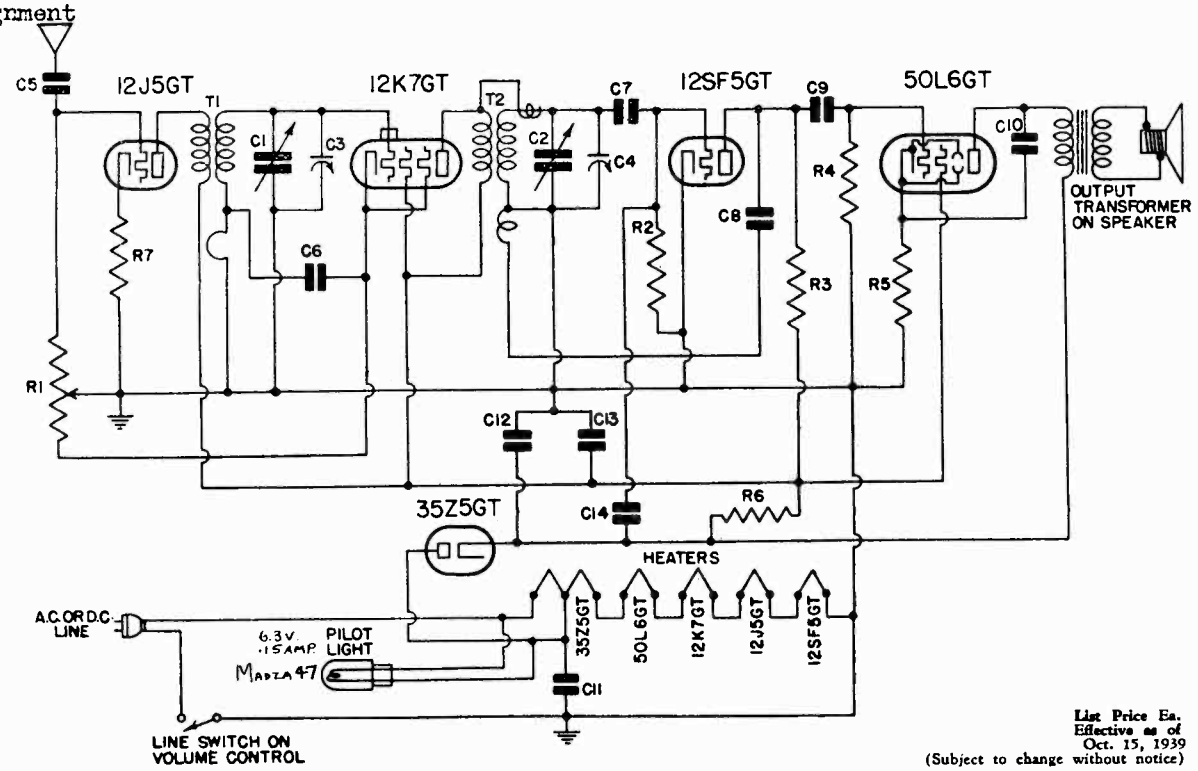
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
1A7GT	82	52	82	1.5
1N5GT 1st i-f	48	82	—	1.5
1N5GT 2nd i-f	82	82	—	1.5
1H5GT	25	—	—	1.5
1Q5GT	77	82	—	1.5

Bias for the 1Q5GT tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.0 volts.

MODEL CU265
Chassis CU
Schematic, Voltage, Parts
Alignment

EMERSON RADIO & PHONOGRAPH CORP.



List Price Ea. Effective as of Oct. 15, 1939
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	6UT-478	Broadcast r-f coil	$ .45
T2	6FT-462B	Broadcast detector coil	.50
R1	6UR-360	Volume control 75,000 ohms with 200 ohm bias stop and line switch	.85
R2	3RR-275	10 megohm ¼ watt carbon resistor	.16
R3, R4	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R5	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R6	6FR-348	2,400 ohm ½ watt carbon resistor	.16
R7	PR-79	1000 ohm ¼ watt carbon resistor	.16
C1, C2	6UC-439	Two-gang variable condenser	2.30
C3, C4		Trimmers, part of variable condenser.	
C5, C8	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C6	BC-12	0.05 mf, 200 volt tubular condenser	.20
C7	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	LC-65	0.02 mf, 400 volt tubular condenser	.20
C10	5JC-417	0.035 mf, 400 volt tubular condenser	.20
C11	LC-64	0.05 mf, 400 volt tubular condenser	.20
C12, C13	6UC-447	Multiple 30 and 10 mf, 150 volt dry electrolytic condenser	.90
C14	6UC-440A	0.000002 mf mica condenser	.20

The tube complement is as follows:

1—12J5GT, first r-f amplifier
1—12K7GT, second r-f amplifier
1—12SF5GT, grid leak detector
1—50L6GT, beam power output
1—35Z5GT, single half-wave rectifier

Voltage rating ..... 105 to 125 volts, a.c. or d.c.
Power consumption ..... 30 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 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*	*Cathode*	*Heater*
12J5GT	85	—	2.8	12
12K7GT	85	85	1.6	12
12SF5GT	25	—	0	12
50L6GT	110	85	6	50

Voltage at rectifier cathode—120 volts.

ALIGNMENT PROCEDURE

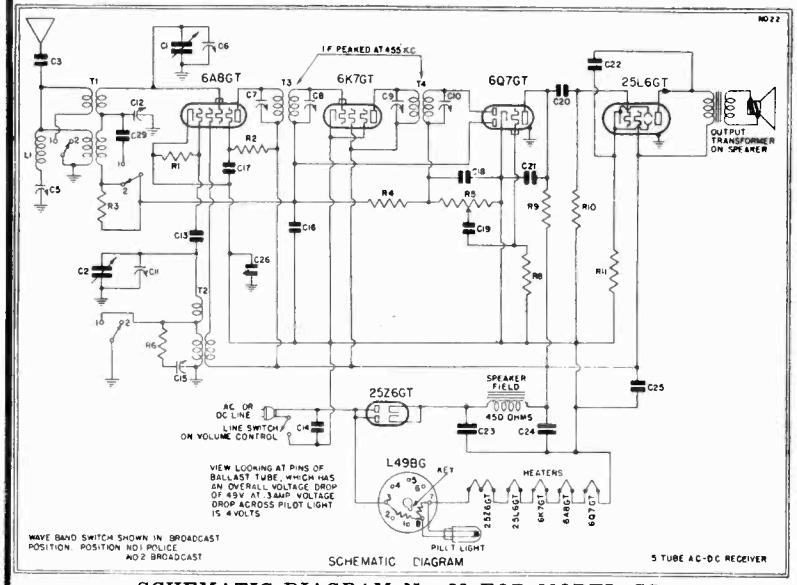
Use as weak a test signal as possible. An output meter should be connected across the voice coil or output transformer for observing maximum output.

With the pointer set at 150 feed 1500 kc to the antenna lead through a .0001 mf condenser, and adjust the trimmers, located on the variable condenser, for maximum response.

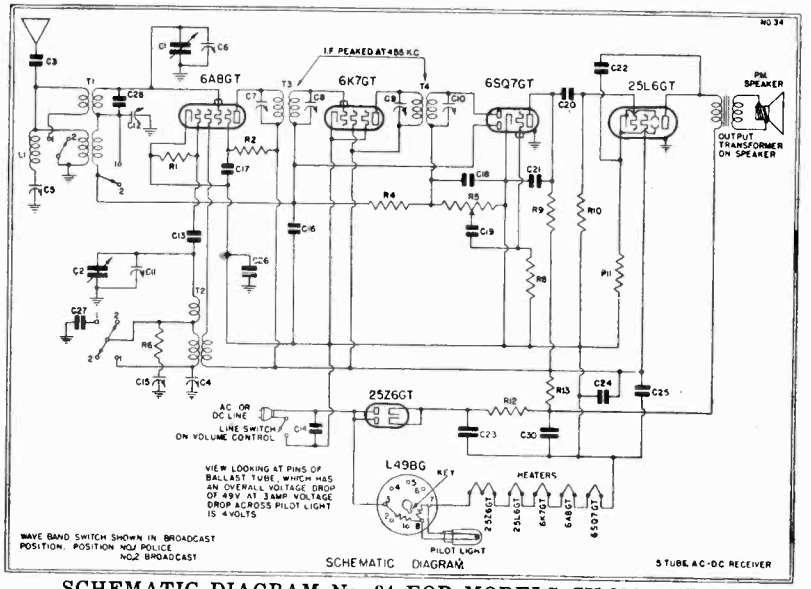
Octal-base tubes in this receiver may be replaced with either metal or bantam-type octal-base glass tubes. The letters "GT" at the end of the tube number indicates that the tube has a bantam glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

1—6A8GT pentagrid oscillator-modulator.
1—6K7GT first i-f amplifier.
†1—6SQ7GT diode detector, a-f amplifier, a.v.c. (*see note*).
1—25L6GT beam power output.
1—25Z6GT dual half-wave rectifier.

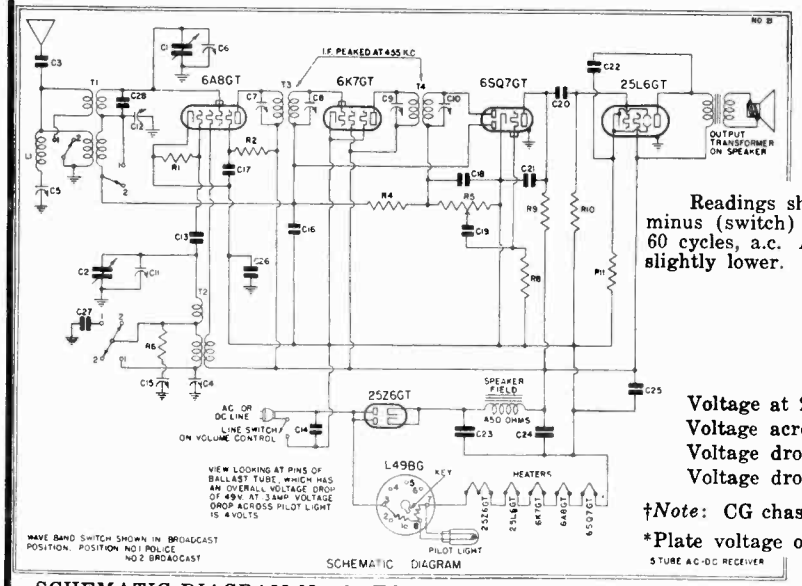
Voltage rating . . . . 105 to 125 volts, a.c. or d.c.
Power consumption . 43 watts.
Frequency ranges . . 540 to 1700 kc and 2300 to 6600 kc. (Model CG)
540 to 1700 kc and 2250 to 7500 kc. (Model CY)



SCHEMATIC DIAGRAM No. 22 FOR MODEL CG



SCHEMATIC DIAGRAM No. 34 FOR MODELS CY-286 AND 288



SCHEMATIC DIAGRAM No. 21 FOR MODELS CY-269, 271 AND 273 AND 319

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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8GT	95	45	0	95	6.3
6K7GT	95	95	0	—	6.3
†6SQ7GT	38	—	0	—	6.3
*25L6GT	90	95	6.5	—	25.0

Voltage at 25Z6 cathode—125 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast resistor (pins nos. 3, 7)—49 volts.
Voltage drop across pilot light section of ballast resistor (pins nos. 8 and 7)—4 volts.

†*Note*: CG chassis bearing serial numbers below 2,616,849 use 6Q7GT.

*Plate voltage of 25L6 tube in CY-286 and 288 measures 112 volts.

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

6/39

REPLACEMENT PARTS LIST

List Price ea. Effective as of June 1st, 1939 (Subject to change without notice)

* Item	Part No.	DESCRIPTION	PRICE
T1, L1	6GT-468	Two-band antenna coil with 455 kc wave-trap (CG only)	$1.10
T1, L1	6YT-483	Two-band antenna coil with 455 kc wave-trap (CY only)	1.10
T2	6GT-469	Two-band oscilator coil (CG only)	.55
T2	6YT-484	Two-band oscillator coil (CY only)	.55
T3	4XT-434DU	455 kc first i-f transformer	1.00
T4	4XT-435U	455 kc second i-f transformer	.80
R1, R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3, R6	PR-79	1000 ohm ¼ watt carbon resistor	.16
R4	NNR-220	3 megohm ¼ watt carbon resistor	.16
R5	6SR-362	Volume control with line switch—500,000 ohms	.90
R8	4XR-327	15 megohm ¼ watt carbon resistor	.16
R9, R10	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	3FR-293	140 ohm ½ watt wire-wound resistor	.16
——	L-49BG	Plug-in type ballast resistor. Interchangeable with L-49B	.55
C1, C2	6GC-428	Two-gang variable condenser (CG only)	2.35
C1, C2	6YM-518	Two-gang variable condenser (complete with 4 gang push-button assembly) (for CY only)	5.45
C3	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C4	2NC-231A	Single adjustable padding condenser (CY only)	.30
†C5	——	Trimmer, part of wave-trap assembly.	
†C6, C11	——	Trimmers, part of variable condenser.	
†C7, C8	——	Trimmers, part of first i-f transformer assembly.	
†C9, C10	——	Trimmers, part of second i-f transformer assembly.	
C12, C15	6GC-430	Dual trimmer assembly	.35
C18	IIC-133A	0.000025 mf mica condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C16, C17, C25	HC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C19	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	3XC-331	0.015 mf, 400 volt tubular condenser	.20
C23, C24	6JC-426U or 6JC-426AU	20 mf, 150 volt dry electrolytic condenser	.90
C26	3CC-302	0.15 mf, 200 volt tubular condenser	.20
C27	6YC-448	0.00083 mf mica condenser	.20
C28	IC-51A	0.00001 mf mica condenser	.20
C29	6GC-429	0.00064 mf mica condenser	.20
	6GS-375	Wave-band switch (CG only)	.60
	6GS-375A	Wave-band switch (CY only)	.60
	6GS-379	5" dynamic speaker (not used on CY-286 or CY-288)	4.20
	6GD-72	Dial face (CG only)	.45
	6YD-83	Dial face (CY only)	.40
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	4XZ-811C	Dial drive shaft (CG only)	.05
	6QH-31	Dial drive shaft (CY only)	.05
	1MZ-588A	Dial pointer	.20
	5JZ-824	Drive cord spring (CG only)	.05
	6QW-169	Drive cord spring (CY only)	.02
	'YZ-772	Drive cord (CG only)	.02
	6QZ-863	Drive cord (CY only)	.04
	5FZ-758A	Dial crystal (for CG-268 and CY-269)	.25
	6GE-22A	Dial crystal (not used on CG-268 and CY-269)	.25
	6QF-50	Molded push-buttons (CY only)	.10
	6WP-135	Station name tabs (complete set) (CY only)	.25
R12	4ZR-325	175 ohm 1 watt metallized resistor	.16
R13	6YR-369	1000 ohm 1 watt carbon resistor	.16
C30	6YC-450	40 mf, 135 volt dry electrolytic condenser	.80
	6YS-418	8" permanent magnet dynamic speaker	7.30
	5LW-125	Speaker cable	.25

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

The filament dropping resistor (L-49B on schematic) is located at the rear of the chassis. This resistor will become quite hot under normal operating conditions. For voltage drop specifications, see below.

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

The first i-f transformer is held to the chassis by snap-on fasteners. To remove it, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.

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

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1500 kc and 6000 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 located on top of the chassis deck. The trimmers are available through holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear.

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

The 455 kc wave-trap is part of the antenna coil assembly directly behind the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear 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 6A8 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. 6.)

Short-Wave Alignment

With the wave-band switch in the short-wave position, counter-clockwise, set the dial pointer at 6 mc. and feed 6000 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead.

MODEL CG: Adjust first the oscillator trimmer (on front section of the variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

MODEL CY: Adjust first the oscillator trimmer (on left-hand section of variable condenser) then the antenna trimmer (on right-hand section of variable condenser) for maximum response.

Broadcast Alignment

MODEL CG: Rotate the wave-band switch clockwise to the broadcast position, set the pointer at 150 and feed 1500 kc through a standard dummy antenna to the antenna lead. Adjust first the broadcast oscillator trimmer (lower of dual trimmer assembly located underneath the variable condenser) and then the antenna trimmer (upper trimmer of dual assembly) for maximum response.

MODEL CY: Follow identical procedure as outlined above for CG. Then feed 600 kc and adjust the variable padding condenser (reached through hole in rear wall) while rocking the variable condenser for maximum response. Return to 1500 and retrim if necessary.

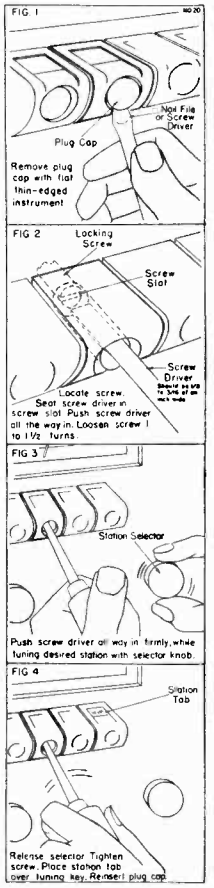
PREADJUSTMENT OF AUTOMATIC TUNING KEYS

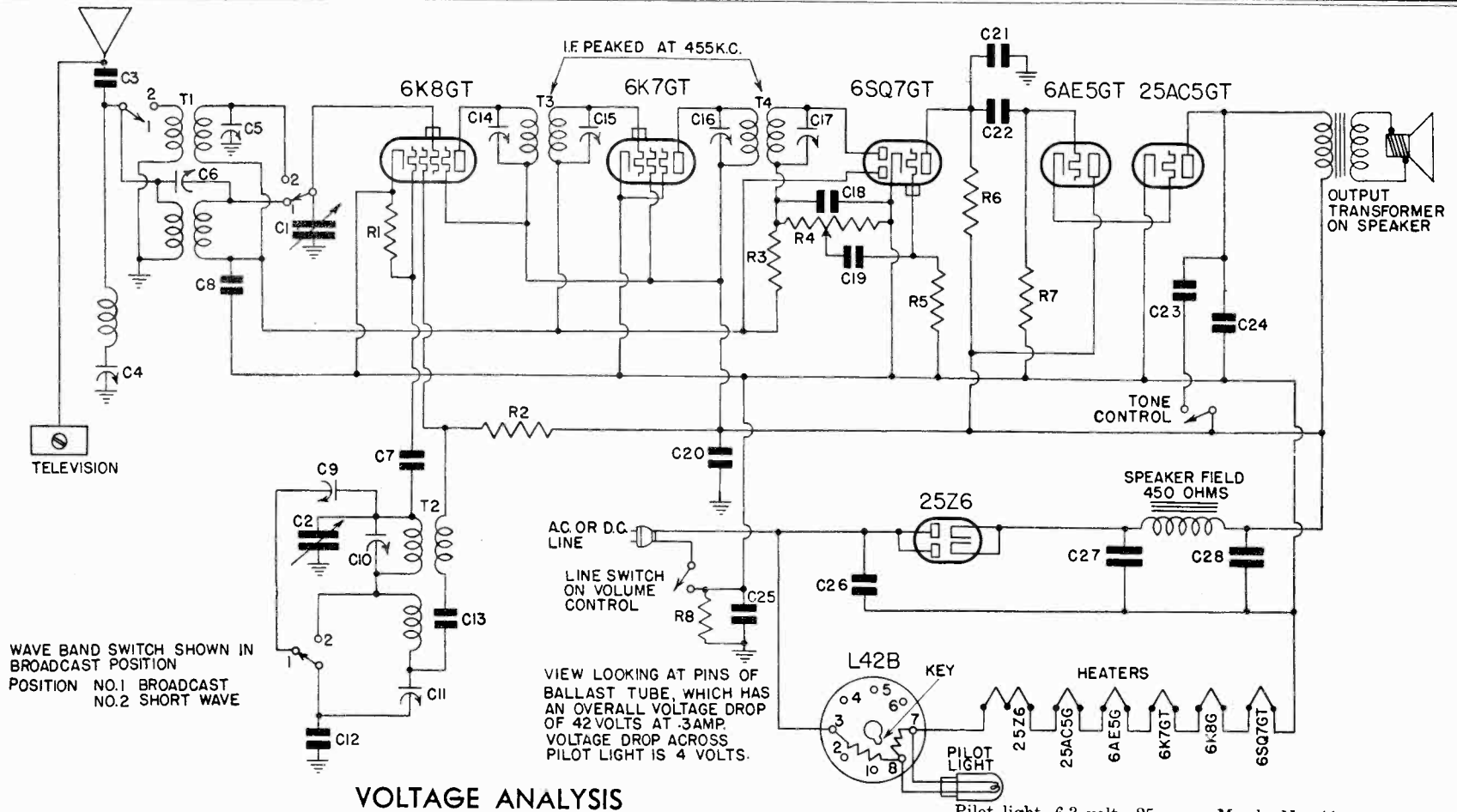
Select four nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below:

1. Remove the small plug cap in the front of the tuning key by prying at its lower edge with a flat thin-edged tool such as a nail file or screw-driver. *See Fig. 1 at right.*
2. Insert a screw-driver into the hole in the tuning key. The locking screw is accessible through the tuning key hole. Seat the screw-driver in the slot of the locking screw and push in the screw-driver as far as it will go. Loosen the screw about 1 to 1½ turns. *See Fig. 2.*

   It is important to use a screw-driver in which the flat portion is not wider than ⅛". *A larger screw-driver cannot be inserted.*
3. With the screw-driver seated in the screw slot, press the screw in as far as possible and holding it in firmly with one hand, tune in the desired station with the other hand, using the selector knob. *See Fig. 3.*
4. Release the selector knob and tighten screw firmly.
5. Check the adjustment by turning well past the station, using the selector knob, and then pushing down the key. The station should come back in again clearly and with maximum volume.

   After the adjustment is tested, check to see that the locking screw is tightened firmly.
6. Replace the plug cap in the front of the key. Remove the tab bearing the station call letters from one of the cards supplied in a separate envelope with the receiver. Moisten the tab and place it on the top of the tuning key as indicated in Fig. 4.





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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K8GT	95	95	0	70	6.3
6K7GT	95	95	0	—	6.3
6SQ7GT	30	—	0	—	6.3
6AE5GT	95	—	14	—	6.3
25AC5GT	90	—	0	—	25.0

Voltage at 25Z6—128 volts.

Voltage across speaker field—33 volts.

Voltage drop across ballast resistor (pins nos. 3, 7)—42 volts.

Voltage drop across pilot light section of ballast resistor (pins nos. 8 and 7)—4 volts.

Pilot light, 6.3 volt, .25 amp., Mazda No. 44

Voltage rating ..... 105 to 125 volts, a.c. or d.c.
Power consumption 43 watts.
Frequency ranges 540 to 1730 kc and 5.6 to 18 m

Tube Data

1—6K8GT pentagrid oscillator-modulator.
1—6K7GT first i-f amplifier.
1—6SQ7GT diode detector, a-f amplifier, a.v.c.
1—6AE5GT audio amplifier.
1—25AC5GT dynamic coupled output.
1—25Z6GT dual half-wave rectifier.

Oct. 15, 1939

MODELS CQ269, CQ 271, CQ 273
MODELS CS268, CS 270, CS 272 & CS 276

List Prices Effective as of June 1st, 1939 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	{6QT-474 or 4RT-418 or 6QT-475}	Two-band antenna coil with 455 kc wave-trap	$1.85
T2	{6QT-481}	Two-band oscillator coil	1.10
T3	6QT-480	455 kc first i-f transformer	1.30
T4	4XT-435D	455 kc second i-f transformer	.80
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R3	NNR-220	3 megohm ¼ watt carbon resistor	.16
R4	6SR-362	Volume control with line switch—500,000 ohms	.90
R5	4XR-327	15 megohm ¼ watt carbon resistor	.16
R6	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R7	KR-57	1 megohm ¼ watt carbon resistor	.16
R8	LR-61	200,000 ohm ¼ watt carbon resistor	.16
	L-42BG	Plug-in type ballast resistor. Interchangeable with L-42B	.55
C1, C2	6QM-492	Two-gang variable condenser. Complete with 4 button tuning unit (CQ only)	5.45
C1, C2	6SC-438	Two-gang variable condenser (CS only)	2.80
C3	NNC-199	0.001 mf, 600 volt tubular condenser	.20
†C4		Trimmer, part of wave-trap assembly.	
†C5, C6		Trimmers, part of antenna coil assembly.	
C7	4XC-393A	0.00006 mf mica condenser	.20
C8, C20, C23	BC-12	0.05 mf, 200 volt tubular condenser	.20
C9, C10, C11		Trimmers, part of oscillator coil assembly.	
C12	3EC-267	0.0042 mf mica condenser	.20
C13	KC-58	0.01 mf, 400 volt tubular condenser	.20
†C14, C15		Trimmers, part of first i-f transformer.	
†C16, C17		Trimmers, part of second i-f transformer.	
C18, C21	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C19	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C22	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	3XC-331	0.015 mf, 400 volt tubular condenser	.20
C25	AC-6	0.1 mf, 200 volt tubular condenser	.20
C26	LC-64	0.05 mf, 400 volt tubular condenser	.20
C27, C28	6QC-437	Dual dry electrolytic condenser, 150 volt C27—20 mf; C28—40 mf	1.10

Location of Coils and Trimmer Adjustments

The first i-f transformer is located on top of the chassis deck. The trimmers are available through-holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear.

The trimmers for the antenna coil are mounted on the antenna coil assembly behind and to the right of the variable condenser. The trimmer in the center is for the broadcast band and the trimmer at the bottom for the short-wave band.

The trimmers for the oscillator coil are mounted on the oscillator coil assembly, located on the rear wall underneath the chassis. The trimmer farthest from the end is for the broadcast band. The center trimmer is the broadcast series padding condenser, and the trimmer closest to the end is for the short-wave band.

The 455 kc wave-trap is part of the antenna coil assembly. The trimmer for the trap is the uppermost trimmer of the assembly.

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 6K8 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. 6.)

Short-Wave Alignment

With the wave-band switch in the short-wave position, counter-clockwise, set the dial pointer at 16 mc. Feed 16,000 kc through a standard short-wave dummy antenna (a 400 ohm resistor may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer, then the antenna trimmer for maximum response.

Broadcast Alignment

Rotate the wave-band switch clockwise and set the pointer at 160. Feed 1600 kc through a standard broadcast dummy antenna to the antenna lead (a .0002 mf condenser may be used as a substitute) and adjust first the broadcast oscillator trimmer and then the antenna trimmer for maximum response.

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

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

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

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

MODEL DA-287

CHASSIS MODEL DA

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.

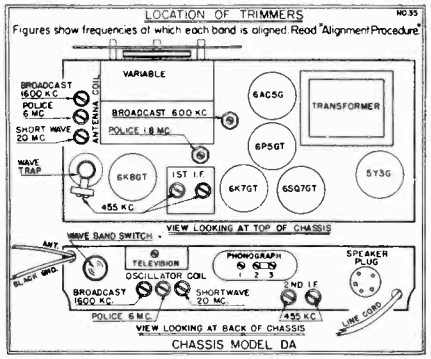
Always use as weak a test signal as possible during alignment.

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 the trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

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



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 6K8 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 (using a standard dummy antenna) and adjust the 455 kc wave trap for minimum response. (See General Notes No. 6.)

Broadcast Alignment

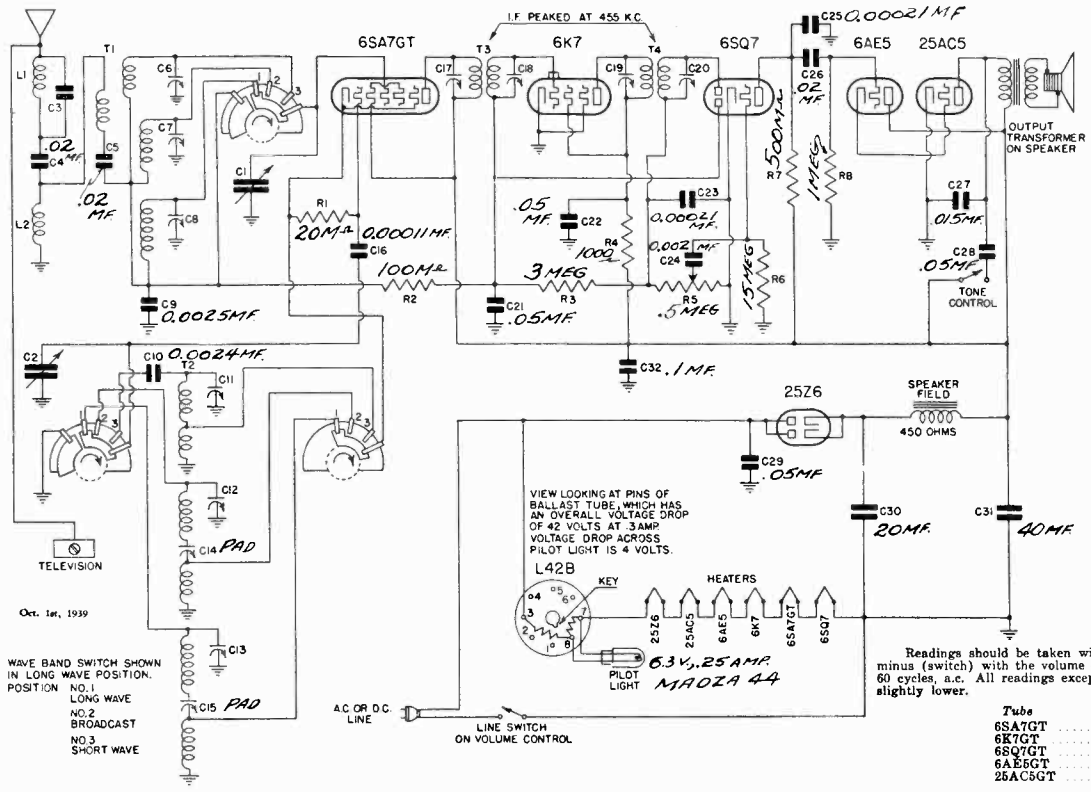
Set the wave-band switch at the broadcast (clockwise) position, and the pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum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

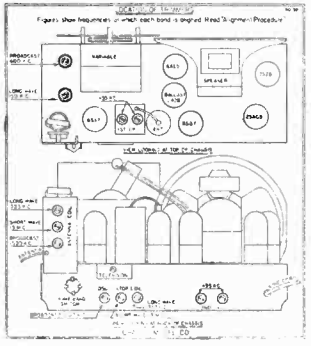
Police Alignment

Set the wave-band switch at the police-band (central) position and the pointer at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the pointer to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condensers 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. (The police-band padder is located beneath the chassis behind the variable condenser.)

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.





Three-Band, Six-Tube Superheterodyne Receiver

MODELS DD-268, DD-270, DD-272 and DD-276

CHASSIS MODEL DD

Voltage rating	105 to 125 volts, a.c. or d.c.
Power consumption	43 watts
Frequency ranges	141 to 353 kc (2130 to 850 meters) 535 to 1600 kc (560 to 187 meters) 5.6 to 18.3 mc (53.5 to 16.4 meters)

Tube Data

The tube complement is as follows:

1—6SA7GT pentagrid oscillator-modulator.
1—6K7GT first i-f amplifier.
1—6SQ7GT diode detector, a-f amplifier, a.v.c.
1—6AE5GT audio amplifier.
1—25AC5GT dynamic coupled output.
1—25Z6GT dual half-wave rectifier.

GENERAL NOTE

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

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

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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6SA7GT	95	95	0	6.3
6K7GT	95	95	0	6.3
6SQ7GT	35	—	0	6.3
6AE5GT	95	—	14	6.3
25AC5GT	90	—	0	25.0

Voltage at 25Z6—130 volts.

Voltage across speaker field—35 volts.

Voltage drop across ballast resistor (pins nos. 3, 7)—42 volts.

Voltage drop across pilot light section of ballast resistor (pins nos. 8 and 7) —4 volts.

Television

The outlet marked "Television" at the rear of the chassis may be used in conjunction with "Television Attachments" which are designed to feed *sound intermediate frequency* to an additional receiver for amplification. This outlet is not suitable for use with Television Attachments which feed *audio* to a separate amplifier.

I-f Alignment

Rotate the wave-band switch to the broadcast (central) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 6SA7GT tube (clip signal input to stator of front variable condenser section). Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

Set the wave-band switch at the long-wave (clockwise) position and the pointer at 2000 (meters). Feed 150 kc to the antenna (using standard dummy antenna or .0002 mf condenser) and adjust the long-wave series padder for maximum response. Move the pointer to 900 (meters), feed 333 kc to the antenna, and adjust first the oscillator trimmer then the antenna trimmer for maximum response. Return to 2000 meters, feed 150 kc, and rock the variable condenser while adjusting the series padder for maximum response. Return to 900 (meters) and check alignment.

ADJUSTMENTS

Broadcast Alignment

Set the wave-band switch at the broadcast (central) position, and the pointer at 500 (meters). Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 200 (meters), feed 1500 kc and adjust the oscillator coil trimmer for maximum response, then adjust the antenna coil trimmer for maximum response. Reset the pointer at 500, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 200 meters and check alignment. If readjustment is necessary return to 500 meters and repeat entire procedure.

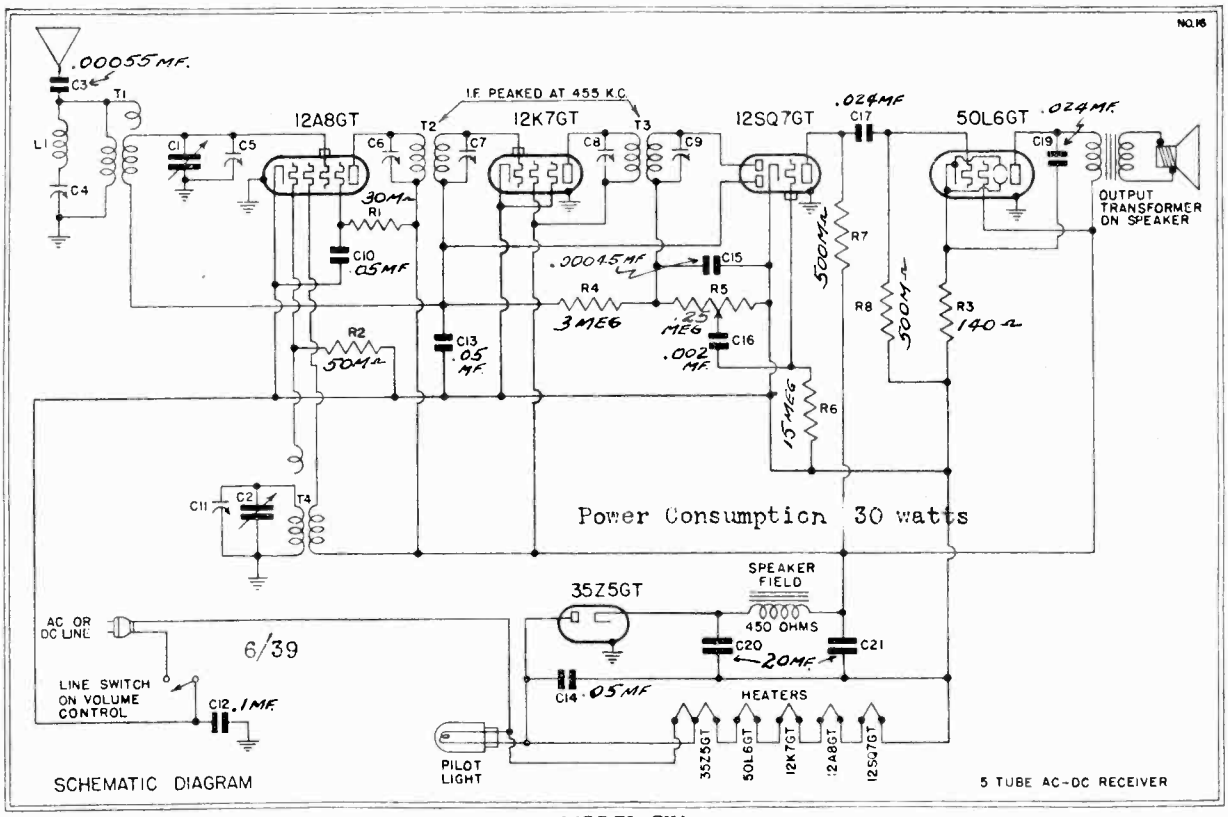
Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 (meters) and feed 15,000 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 antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

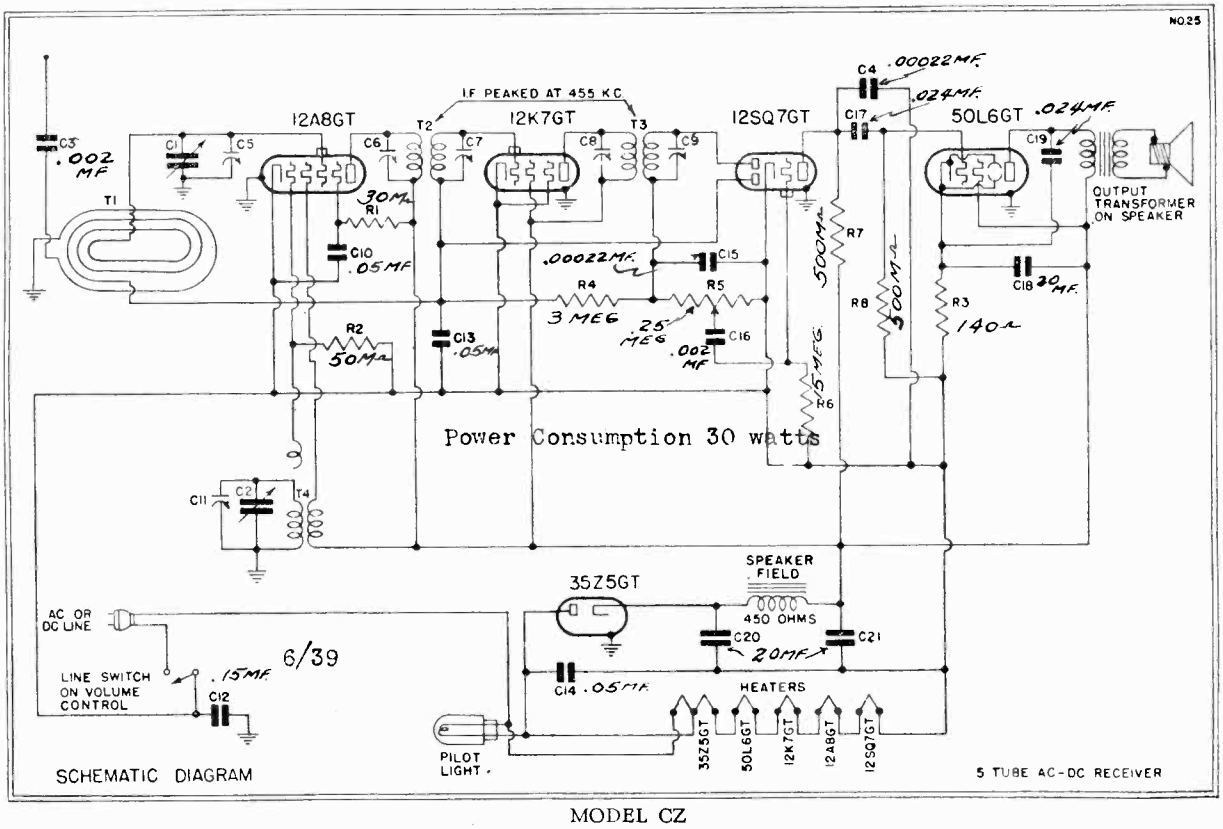
MODELS CW279, Chassis CW
CZ282, Chassis CZ

EMERSON RADIO & PHONOGRAPH CORP.

Schematics



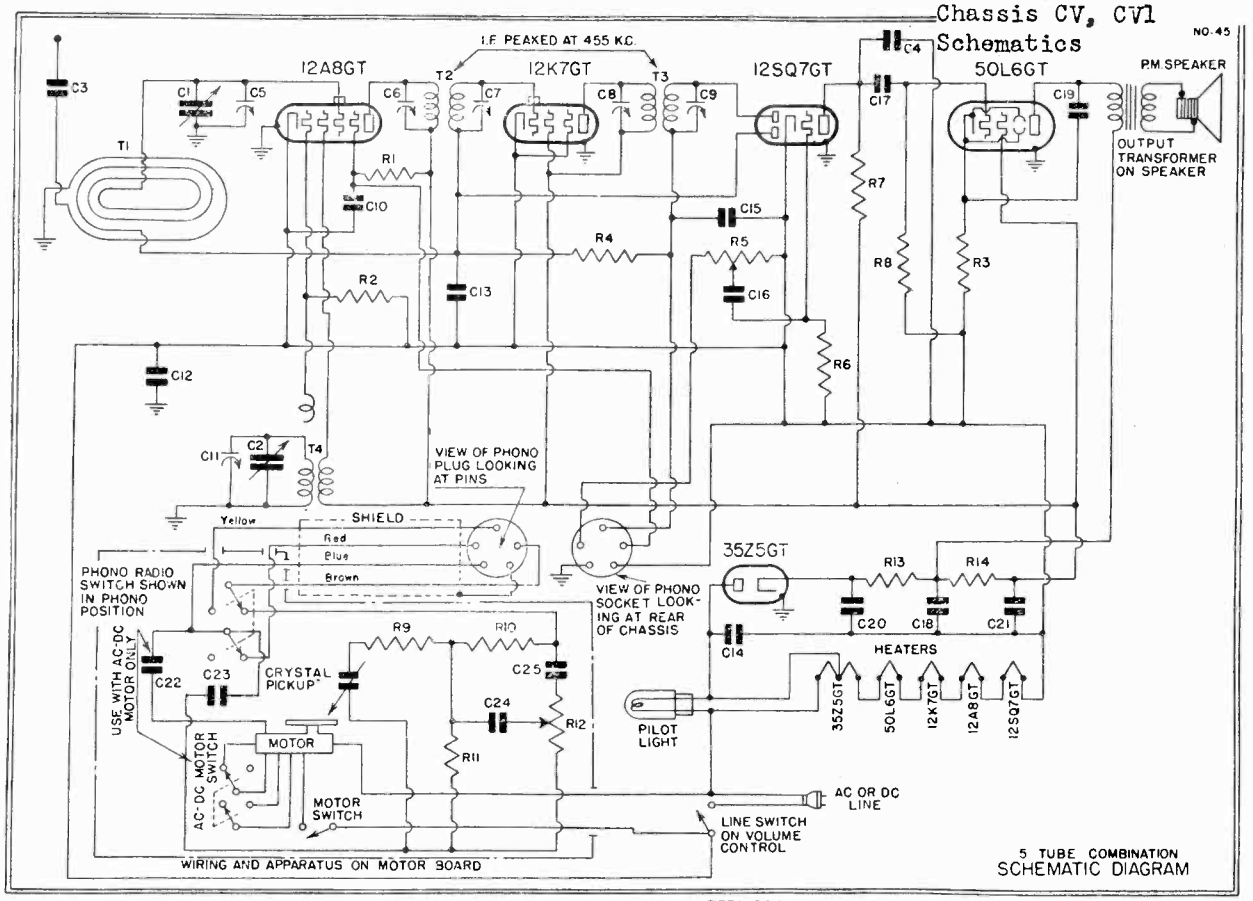
MODEL CW



MODEL CZ

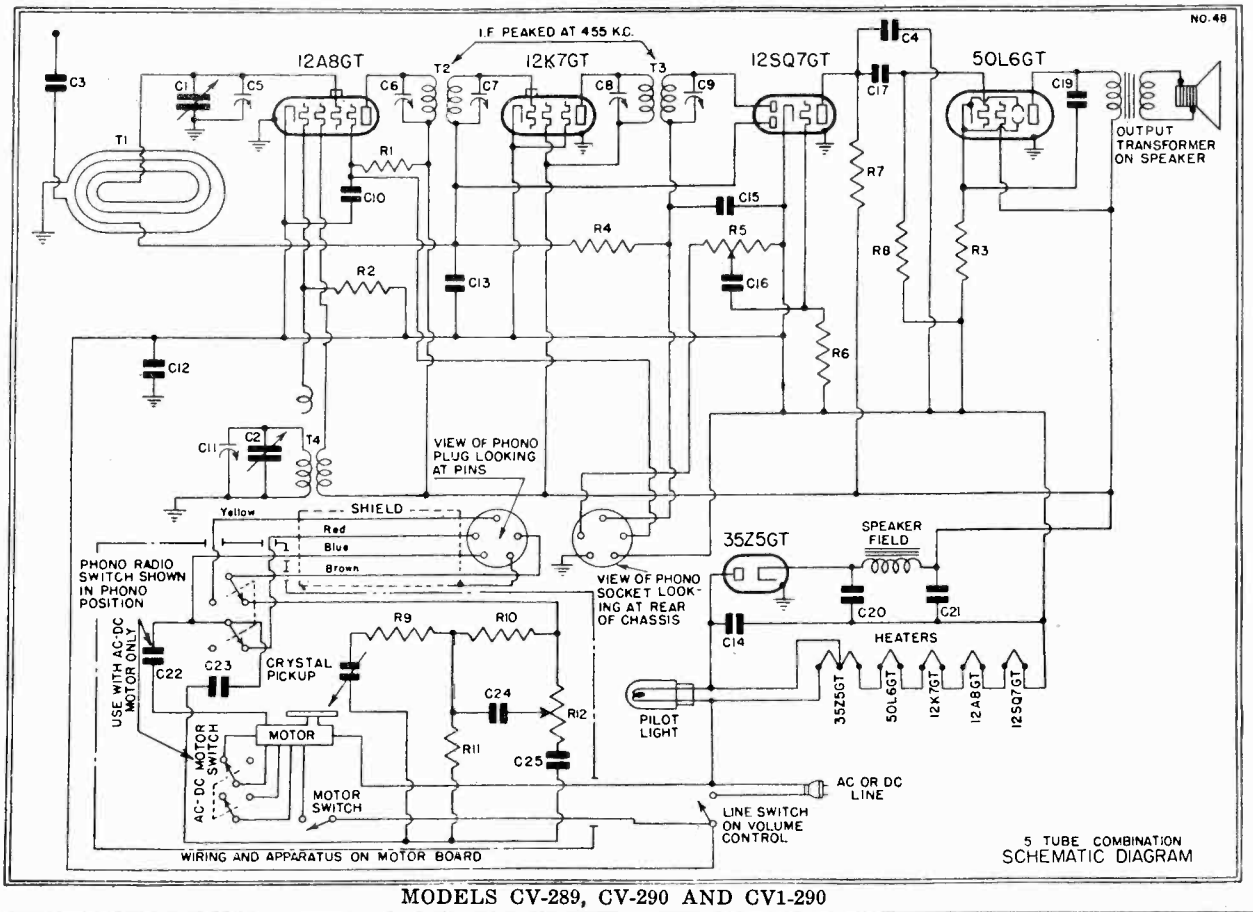
EMERSON RADIO & PHONOGRAPH CORP.

MODELS CV289,CV290,CV291
CV1-290,CV1-291
Chassis CV, CV1
Schematics



9-39

MODELS CV-291 AND CV1-291



MODELS CV-289, CV-290 AND CV1-290

REPLACEMENT PARTS LIST

*ITEM	PART NO.	DESCRIPTION	LIST PRICE EA. EFFECTIVE AS OF SEPT. 1ST, 1939 (SUBJECT TO CHANGE WITHOUT NOTICE) PRICE
T1	6MW-171B	Loop antenna assembly (for CV-289, CV-291 and CV1-291) (see prod. ch. No. 3)	$ .90
T1	6VW-188A	Loop antenna assembly (for CV-290 and CV1-290) (see production change No. 3)	.85
T4	7CT-511	Oscillator coil (see production change No. 3)	.40
T2	6RT-479A	Double-tuned 455 kc first i-f transformer	.95
T3	7BT-489A	Double-tuned 455 kc second i-f transformer	.95
	or		
	7FT-513D	Double-tuned 455 kc second i-f transformer	.95
R1	2CR-193	30,000 ohm ½ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4	NNR-220	3 megohm ¼ watt carbon resistor	.16
R5	6VR-364	Volume control .5 megohm with line switch	.85
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7, R8, R11	KR-56	500,000 ohm ¼ watt carbon resistor (see production change No. 2)	.16
R9, R10	KR-57	1 megohm ¼ watt carbon resistor (see production change No. 1)	.16
R12	6VR-366	Tone control, 75,000 ohm, with motor line switch	.95
R13	4ZR-325	175 ohm 1 watt metallized resistor	.16
R14	4XR-334	2,500 ohm 1 watt carbon resistor	.16
C1, C2	6RC-436	Two-gang variable condenser	2.30
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4, C15	4XC-394A	0.00022 mf mica condenser	.20
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10, C13, C23	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	3CC-302	0.15 mf, 200 volt tubular condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C17	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C18	4XC-404	20 mf, 150 volt dry electrolytic condenser	.60
C19	LC-65	0.02 mf, 400 volt tubular condenser	.20
C20, C21	6JC-426B	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C22	KC-58	0.01 mf, 400 volt tubular condenser (used only with a.c.-d.c. motors)	.20
C24	JC-47A	0.0005 mf mica condenser	.20
C25	KC-59	0.006 mf, 400 volt tubular condenser	.20
	6JS-368U	4" dynamic speaker (not used on CV-291 or CV1-191)	3.85
	6JS-386	6½" permanent magnet dynamic speaker (for CV-291 and CV1-291)	6.20
	6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47	.20
	6VD-82A	Dial face (see production change No. 3)	.30
	4YZ-772	Drive cord	.02
	6RW-162	Drive cord spring	.02
	6JH-24B	Drive shaft	.05
	6RF-52	Dial pointer	.05
	6RE-20	Dial crystal	.10
	3LM-253	Phonograph needle cup (CV-289 and CV-291)	.20
	3GM-251	Phonograph needle cup (CV-290)	.75
	6JPM-46A	117 volt a.c. rim-drive phono motor	8.70
	or		
	4XPM-20A	117 volt a.c. phono motor	12.00
	or		
	3GPM-1	117 volt a.c.-d.c. phono motor (not used on CV-289)	43.20
	6VS-414	Phono-radio switch	.75
	4XC-418A	Crystal pick-up	8.10

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 a.c.-d.c. combinations 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 . Plate—blue
   Grid return—black B plus—red
4. The receiver has a self-contained antenna and normally does not require additional antenna connection. For permanent home installations of this model, however, in a location far removed from broadcasting stations, an additional outside antenna should be used. The outside antenna connection should be made to the flexible wire lead at the rear of the cabinet.
5. 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, to 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.*
6. The receivers in these combinations are of the a.c.-d.c. type. The motors, however, in models CV-289, CV-290 and CV-291 are of the A.C. *only* type and will be damaged if the combination is used on direct current.

PRODUCTION CHANGES

1. On CV-289 resistor R9 is .5 megohm.
2. On CV-291 and CV1-291 resistor R11 is .2 megohm.
3. CV chassis bearing serial numbers below 2,764,502 use:

T4	6RT-476	Oscillator coil	.35
	6VD-82	Dial face	.30
T1	6MW-171A	Loop antenna (for CV-289, CV-291 and CV1-291)	.90
T1	6VW-188	Loop antenna (for CV-290 and CV1-290)	.85

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

Voltage rating 105-125 volts
Power consumption {30 watts for receiver / 20 watts for A.C. motor / 30 watts for A.C.-D.C. motor
Frequency range 540 to 1600 kc

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.

* These readings are approximately 10% lower on CV-291 and CV1-291.
† This reading is approximately 20% higher on CV-291 and CV1-291.

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 located at the extreme left end of the chassis. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is located just to the left of the variable condenser. 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 (loop). The oscillator coil is located beneath the first i-f transformer.

I-f Alignment

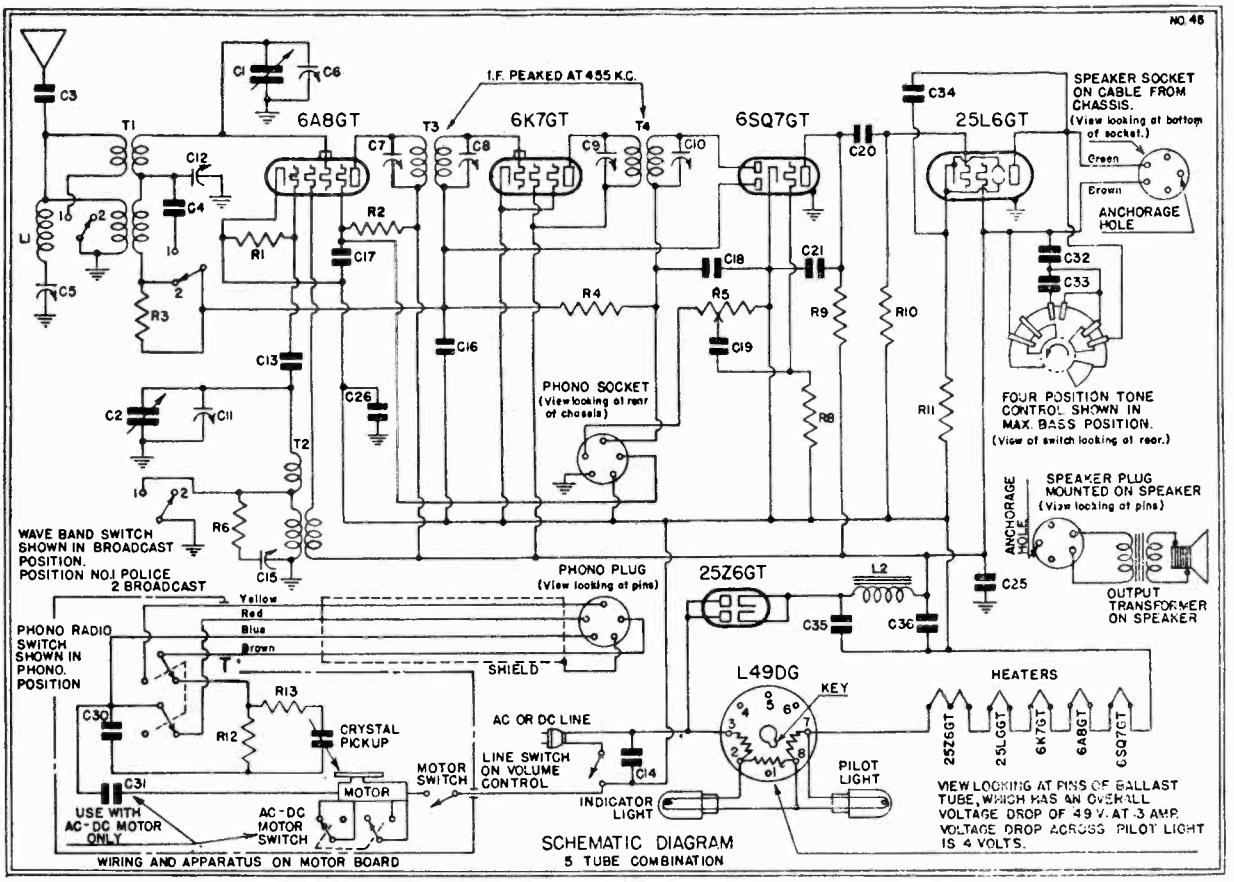
Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 12A8GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna 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 antenna trimmer should be adjusted when the chassis is in place in the cabinet. It can be reached through a hole near the front of the motor board.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may then be swung to either side of the center to give maximum response. Realign at 140.

CHASSIS CR,CR1 EMERSON RADIO & PHONOGRAPH CORP. MODELS CG293,CG294,CG1-293
CG1-294,Chassis CG,CG1
Record Changer Data Schematic,Record Changer



AUTOMATIC RECORD CHANGER

(A)—Record Removing Lever.

A locknut provides adjustment for raising or lowering the record finger to engage the next to last record on the turntable. No adjustment is required unless the motor mounting screws should loosen and allow motor and turntable to shift upward or downward, or should record finger become bent.

Raising the record removing lever to the vertical position will repeat the top record on the turntable, either 10-inch or 12-inch for as long as desired.

(B)—Latch Mechanism.

The latch should engage one-half the depth of the notch. This may be adjusted by turning the eccentric washer.

(C)—Speed Regulator.

The motor speed can be regulated for "fast" or "slow" by moving lever to either side.

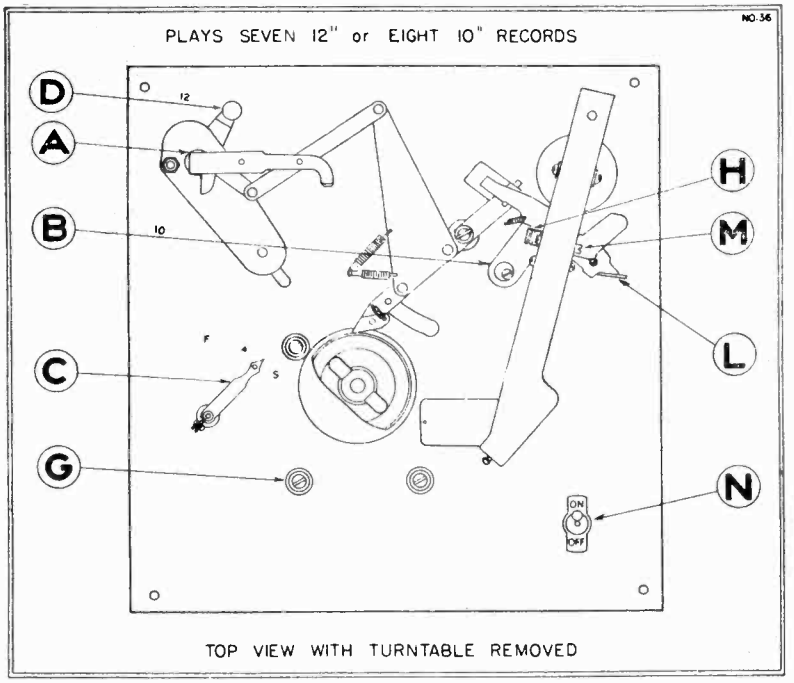
(D)—Adjustment for 10-inch and 12-inch Records.

The motor panel is stamped "10" and "12." Set the change lever opposite the size of record to be played.

(G)—Motor Mounting Screws.

(H)—Trip Mechanism.

All records having either the spiral or oscillating type trip groove are handled automatically by this trip mechanism. No adjustment required.



(L)—Record Reject Lever.

Pull the reject lever forward if removal of a record is desired before it is completely played.

(M)—Pick-up and Tone Arm.

Turn screw in or out to place the needle properly on the edge of the record.

(N)—On-off Switch.

On-off switch for motor.

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List Prices as Effective as of Sept. 1, 1939 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	6GT-468	Two-band antenna coil with 455 kc wave-trap	$1.10
T2	6GT-469	Two-band oscillator coil	.55
T3	4XT-434CU	455 kc first i-f transformer	1.00
T4	4XT-435CU	455 kc second i-f transformer	.80
R1, R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3, R6	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R4	NNR-220	3 megohm ¼ watt carbon resistor	.16
R5	6SR-362	Volume control—250,000 ohms with line switch	.90
R8	4XR-327	15 megohm ¼ watt carbon resistor	.16
R9, R10	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R12	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R13	KR-57	1 megohm ¼ watt carbon resistor	.16
——	L-49DG	Plug-in type ballast resistor. Interchangeable with L-49D	.55
C1, C2	6GC-428	Two-gang variable condenser	2.35
C3	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C4	6GC-429	0.00064 mf mica condenser	.20
†C5	——	Trimmer, part of wave-trap assembly.	
†C6, C11	——	Trimmers, part of variable condenser.	
†C7, C8	——	Trimmers, part of first i-f transformer assembly.	
†C9, C10	——	Trimmers, part of second i-f transformer assembly.	
C12, C15	6GC-430	Dual trimmer assembly	.35
C13	IIC-133A	0.000025 mf mica condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C16, C17 C25, C30	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C19	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C26	3CC-302	0.15 mf, 200 volt tubular condenser	.20
C31	KC-58	0.01 mf, 400 volt tubular condenser (for a.c.-d.c. motors only)	.20
C32, C33	ZZC-211	0.03 mf, 200 volt tubular condenser	.20
C34	XXC-207	0.005 mf, 400 volt tubular condenser	.20
C35, C36	6QC-437	Multiple 20 and 40 mf, 150 volt dry electrolytic condenser C35—20 mf C36—40 mf	1.10
	6GS-375	Wave-band switch	.60
	6GD-72	Dial face	.45
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	4XZ-811C	Dial drive shaft	.05
	4MZ-588A	Dial pointer	.20
	5JZ-824	Drive cord spring	.05
	4YZ-772	Drive cord	.02
	6GE-22A	Dial crystal	.25
	3LM-253	Phonograph needle cup	.20
	3LM-255	Needle cup cover	.15
L2	4PT-404	Iron core filter choke	1.80
	6GS-422	12" permanent magnet dynamic speaker	12.25
	6VS-414A	Phono-radio switch	.75
	6GS-406A	Tone control switch	.80

ADDITIONAL PARTS USED IN CG-294 AND CG1-294

6GPM-50 or 6GPM-50A	A.C. phonograph motor (for CG-294)	34.20
	A.C.-D.C. phonograph motor (for CG1-294)	51.00
6GC-452	Crystal phono pick-up	14.35

ADDITIONAL PARTS USED IN CG-293 AND CG1-293

6JPM-46 or 4XPM-20B or 3GPM-1	117 volt a.c. rim-drive phonograph motor (for CG-293)	9.00
	117 volt a.c. phonograph motor (for CG-293)	12.25
	117 volt a.c.-d.c. phonograph motor (for CG1-293)	43.20
4XC-418A	Crystal pick-up	8.10
4RS-301	Automatic stop switch	2.50

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1500 kc and 6000 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 located on top of the chassis deck. The trimmers are available through holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear.

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

The 455 kc wave-trap is part of the antenna coil assembly directly behind the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear 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 6A8 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. 6.)

Short-Wave Alignment

With the wave-band switch in the short-wave position, counter-clockwise, set the dial pointer at 6 mc. and feed 6000 kc through a 400 ohm resistor to the antenna lead.

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

Broadcast Alignment

Rotate the wave-band switch clockwise to the broadcast position, set the pointer at 150 and feed 1500 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead. Adjust first the broadcast oscillator trimmer (lower of dual trimmer assembly located underneath the variable condenser) and then the antenna trimmer (upper trimmer of dual assembly) for maximum response.

Voltage rating	105 to 125 volts, a.c. or d.c.
Power consumption	43 watts for radio 20 watts for a.c. motor 30 watts for a.c.-d.c. motor
Frequency ranges	540 to 1700 kc and 2300 to 6600 kc

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. The filament dropping resistor (L49DG on schematic) is located at the rear of the chassis. This resistor will become quite hot under normal operating conditions. For voltage drop specifications, see below.
3. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
4. The first i-f transformer is held to the chassis by snap-on fasteners. To remove it, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red
6. The wave-trap has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
7. The receivers in these combinations are of the a.c.-d.c. type. The motors, however, used in Models CG-293 and 294 are of the *a.c. only* type and will be damaged if operated on direct current.
8. Any series of records to be played automatically should be of one size. The changer will not play intermixed sizes. Select seven 12-inch records or eight 10-inch records and place them on the turntable with the selection to be played facing upwards.
9. Adjust the lever "D" for the size of records to be played. (See illustration.) Lower the pick-up carefully so that the needle rides on the smooth surface on the outside edge of the record.
10. *On the Model* CG1-293 *and* CG1-294 *only, before turning the motor on check the a.c.-d.c. switch underneath the turntable on the motor board, making sure that it is in a position corresponding to the power supply.* To reach this switch simply remove the turntable by pulling it directly upward. If the power supply is d.c. the switch should be thrown to d.c. position and for an a.c. supply to the a.c. position. When replacing the turntable be sure it is seated all the way down over its shaft.

Tube Data

The tube complement is as follows:

1—6A8GT pentagrid oscillator-modulator.
1—6K7GT first i-f amplifier.
†1—6SQ7GT diode detector, a-f amplifier, a.v.c. (*see note*).
1—25L6GT beam power output.
1—25Z6GT dual half-wave rectifier.

Octal-base tubes in this receiver may be replaced with either metal or bantam-type octal-base glass tubes. The letters "GT" at the end of the tube number indicates that the tube has a bantam 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 (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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8GT	113	45	0	113	6.3
6K7GT	113	113	0	—	6.3
†6SQ7GT	38	—	0	—	6.3
25L6GT	125	113	6.5	—	25.0

Voltage at 25Z6 cathode—125 volts.
Voltage across filter choke—12 volts.
Voltage drop across ballast resistor (pins nos. 3, 7)—49 volts.
Voltage drop across pilot light sections of ballast resistor (pins nos. 8 and 7, 2 and 8)—4 volts.

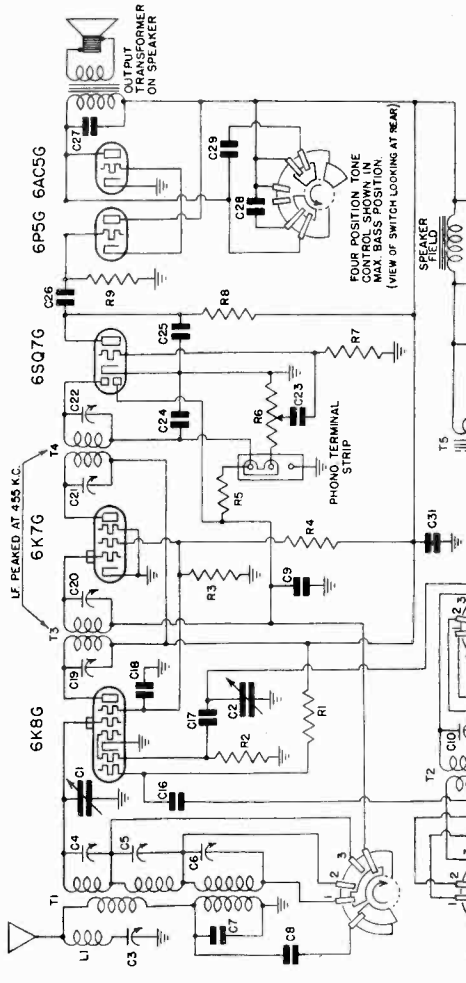
†*Note*: CG chassis bearing serial numbers below 2,616,849 use 6Q7GT.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL DA 287
Chassis DA
Schematic, Voltage, Parts
Notes

REPLACEMENT PARTS LIST

* Item	Part No.	DESCRIPTION
L1	4DT-343A	Adjustable 455 kc wave trap
T1	7AT-485	Three-band antenna coil
T2	5RT-447A	Three-band oscillator coil
T3	7AT-490	Double tuned 455 kc first i-f transformer
T4	7AT-491	Double tuned 455 kc second i-f transformer
T5	4ZT-426B	Power transformer 117 volts, 60 cycles
R1, R3	3BR-247	40,000 ohm ½ watt carbon resistor
R2	KR-53	50,000 ohm ½ watt carbon resistor
R4	7AR-365	16,000 ohm 2 watt carbon resistor
R5	HR-42	2 megohm ¼ watt carbon resistor
R6	6GR-352	Volume control .25 megohm with line switch
R7	4XR-327	15 megohm ½ watt carbon resistor
R8	KR-56	5 megohm ½ watt carbon resistor
R9	KR-57	1 megohm ½ watt carbon resistor
C1, C2	7AC-442	Two gang variable condenser
†C3		Trimmer, part of wave trap assembly
†C4, C5, C6		Trimmers, part of antenna coil assembly
C7	4XC-393A	0.00006 mf, with condenser
C8, C16	KC-58	0.01 mf, 400 volt tubular condenser
C9	BC-12	0.05 mf, 200 volt tubular condenser
C10, C11, C12		Trimmers, part of oscillator coil assembly
C13	3EC-267	0.0042 mf mica condenser
C14	2NC-231B	Single adjustable padding condenser. (range 750-1500 mmf.)
C15	2NC-231A	Single adjustable padding condenser. (range 300- 600 mmf.)
C17	4HC-395A	0.000026 mf mica condenser
C18, C31	EEC-132	0.1 mf, 400 volt tubular condenser
†C19, C20, C21, C22		Trimmers, part of first i-f transformer
C23	3HC-274	Trimmer, part of second i-f transformer
C24, C25	4XC-394A	0.002 mf, 600 volt tubular condenser
C26	LC-65	0.00022 mf mica condenser
C27	NNC-199	0.02 mf, 400 volt tubular condenser
C28	EC-23	0.001 mf, 600 volt tubular condenser
C29	3XC-331	0.03 mf, 400 volt tubular condenser
C30	3LC-297A	0.15 mf, 400 volt tubular condenser
C32	7AC-443	0.01 mf, 400 volt molded condenser
C33	7AC-444	16 mf, 450 volt dry electrolytic condenser
		16 mf, 400 volt dry electrolytic condenser



GENERAL NOTES

1. 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.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green
   B plus—red
   Plate—blue.
   Grid return—black
4. 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.
5. The adjustable padding condensers for the broadcast and police bands are mounted on the top of the chassis with the screw adjustment accessible through holes in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. The wave trap in the receiver has been adjusted for maximum signal rejection at 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.
7. The outlet marked "Television" at rear of the chassis may be used with any "Television Attachment" which is designed to feed the sound intermediate or audio frequency to a separate amplifier.
   Detailed instruction for such a connection is given with any "Television Attachment."

FOR ALIGNMENT
SEE INDEX

VOLTAGE ANALYSIS

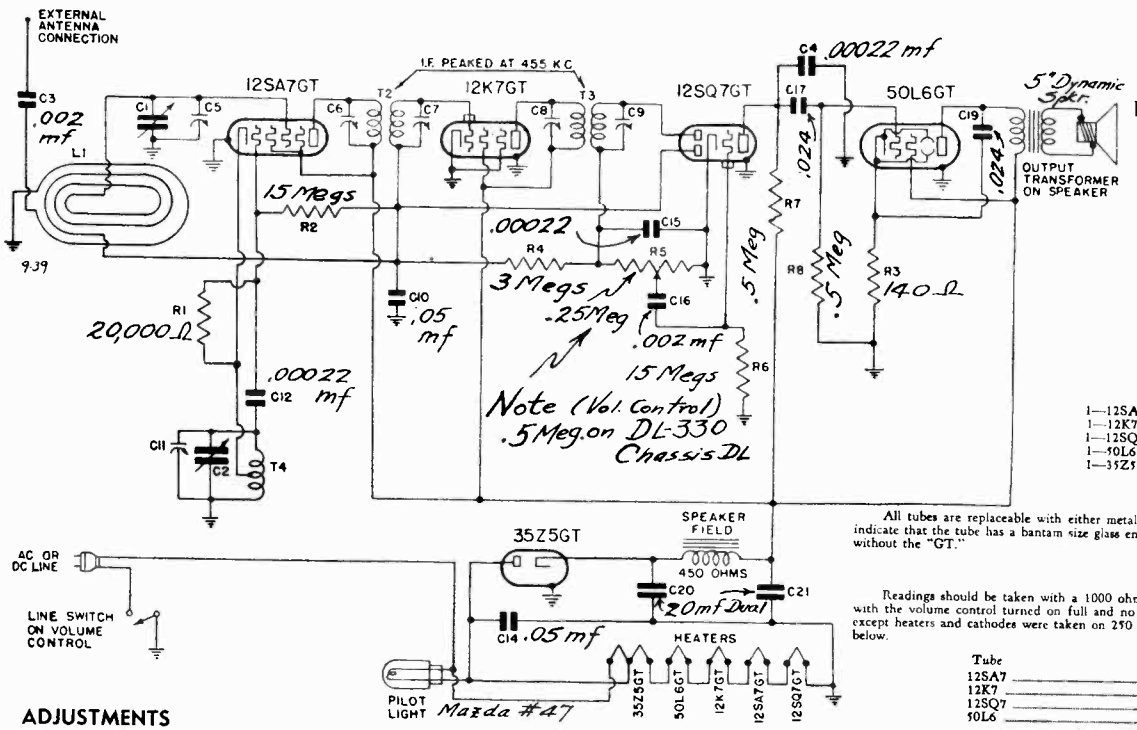
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 110 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6K8G	220	95	0	100	6.3 a.c.
6K7GT	220	95	0	—	6.3 a.c.
6SQ7GT	65	—	0	—	6.3 a.c.
6P5GT	220	—	12	—	6.3 a.c.
6AC5G	205	—	0	—	6.3 a.c.

Voltage at 5Y3G filament to ground—300 volts.
Voltage across speaker field—80 volts.

The tube complement is as follows:
1—6K8G, triode-hexode oscillator-modulator
1—6K7GT, i-f amplifier
1—6SQ7GT, diode detector, audio amplifier and a.v.c.
1—6P5GT, audio amplifier
1—6AC5G, power output
1—5Y3G, full-wave rectifier.

Voltage rating	105-125 volts, 60 cycle, a.c. (unless otherwise specified)
Power consumption	55 watts
Frequency ranges	540 to 1800 kc, 1800 to 6200 kc and 5.8 to 22 megacycles



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.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug. This lug is easily indentified by the connection of the green lead to the loop.

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

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

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

MODELS DB-296 and DB-301

CHASSIS MODEL DB

MODEL: DL-330

CHASSIS MODEL: DL

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption ..... 30 watts.
Frequency range ..... 540 to 1600 kc.

TUBE DATA

THE TUBE COMPLEMENT IS AS FOLLOWS:

1—12SA7 or 12SA7GT ..... pentagrid oscillator modulator
1—12K7 or 12K7GT ..... first i-f amplifier
1—12SQ7 or 12SQ7GT ..... diode detector, a-f amplifier, a.v.c.
1—50L6 or 50L6GT ..... beam power output
1—35Z5 or 35Z5GT ..... 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."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (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	Fil.
12SA7	88	88	0	12
12K7	88	88	0	12
12SQ7	30	—	0	12
50L6	82	88	5.6	90

Voltage at 35Z5 cathode—120 volts.

Voltage across speaker field—32 volts.

Voltage across pilot light—4.5 volts.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and 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 oscillator coil.

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

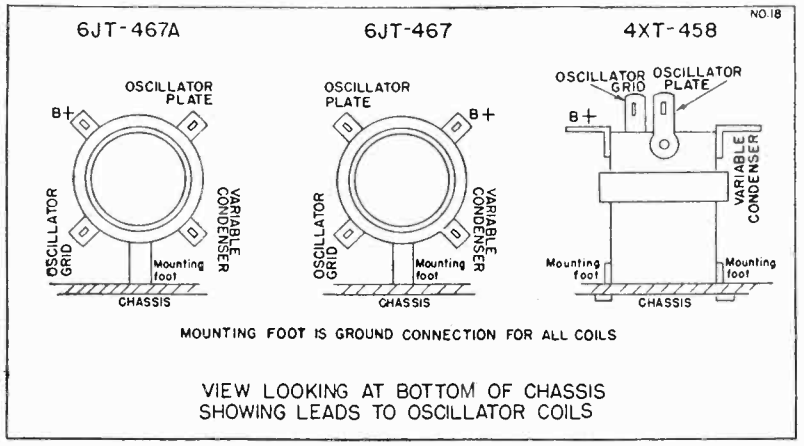
1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:

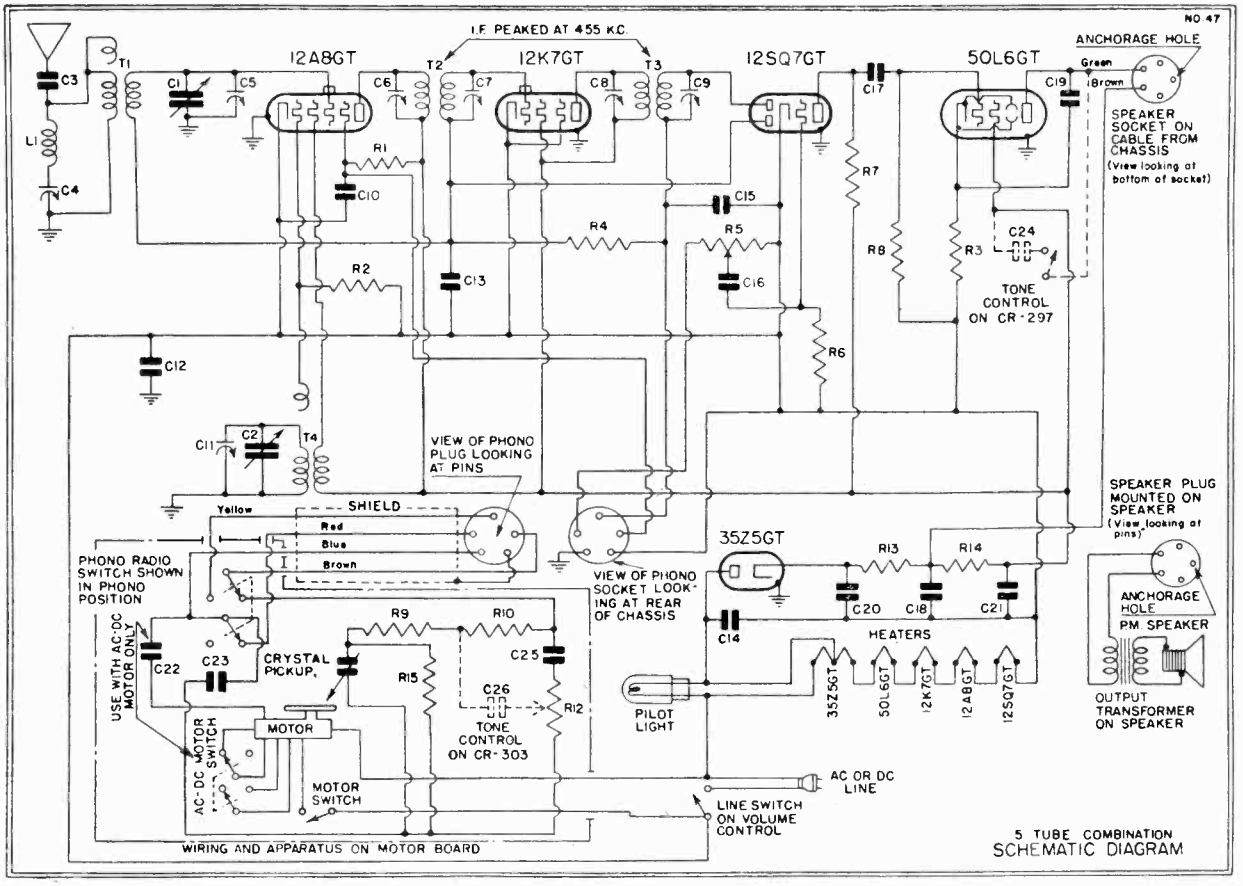
Grid—green	Plate—blue
Grid return—black	B plus—red

4. Models DB-296 and 301 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 lead has been brought out of the rear near the line cord.
5. 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, to 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.*

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CR297, CR303, CR1-297
CR1-303 Chassis CR, CR1
Schematic, Voltage





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	65	40	0	65	12
12K7GT	65	65	0	—	12
12SQ7GT	40	—	0	—	12
50L6GT	100	65	5.7	—	50

Voltage at 35Z5 cathode—110 volts.

Voltage across pilot light—4.5 volts.

Voltage rating	105-125 volts
Power consumption	30 watts for receiver 20 watts for a.c. motor 30 watts for a.c.-d.c. motor
Frequency range	540 to 1730 kc

10-39

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

MODEL CR-297 (AC) MODEL CR1-297 (AC-DC)
MODEL CR-303 (AC Portable Automatic Record Changer)
MODEL CR1-303 (AC-DC Portable Automatic Record Changer)

List Prices as of Effective as of Sept. 15, 1939
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	4XT-432A	Antenna coil with 455 kc wave-trap	$ .90
T4	6RT-476	Oscillator coil (see production change no. 1)	.35
T2	6RT-479	Double-tuned 455 kc first i-f transformer	1.10
T3	4XT-435E	Double-tuned 455 kc second i-f transformer	.80
R1	2CR-193	30,000 ohm ½ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4	HR-42	2 megohm ½ watt carbon resistor	.16
R5	6VR-364	Volume control .5 megohm with line switch	.85
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7, R8, R9	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R10, R15	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R13	4ZR-325	175 ohm 1 watt metallized resistor	.16
R14	4XR-334	2500 ohm 1 watt carbon resistor	.16
C1, C2	6RC-436	Two-gang variable condenser	2.30
C3	4XC-401	0.00055 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, C13, C23	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	6RC-441	0.00045 mf mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C19	LC-65	0.02 mf, 400 volt tubular condenser	.90
C20, C21	6JC-426B	Dual 20 mf, 150 volt tubular dry electrolytic condenser	.65
C18	4XC-404	20 mf, 135 volt dry electrolytic condenser	.20
C22	3LC-297A	0.01 mf, 400 volt molded condenser (*used with a.c.-d.c. motors only*)	.20
C25	3HC-274	0.002 mf, 600 volt tubular condenser	
		ADDITIONAL PARTS USED ON CR-297 AND CR1-297	
R12	LLR-154	75,000 ohm ¼ watt carbon resistor	.16
C24	BC-12	0.05 mf, 200 volt tubular condenser	.20
	3LM-253	Phonograph needle cup	.20
	3LM-255	Needle cup cover	.15
	6JPM-46	117 volt a.c. phonograph motor (rim drive)	9.00
	or		
	4XPM-20B	117 volt a.c. phonograph motor	12.25
	or		
	3GPM-1	117 volt a.c.-d.c. phonograph motor	43.20
	4XC-418A	Crystal phono pick-up	8.10
	6YS-418	8" permanent magnet dynamic speaker	7.30
	6VS-414	Phono-radio switch	.75
	4RS-301	Automatic stop switch	2.50
	3ES-256L	Tone control switch	.50
		ADDITIONAL PARTS USED ON CR-303 AND CR1-303	
R12	6RR-372	Potentiometer for tone control	.95
C26	1C-47A	0.0005 mf mica condenser	.20
	3GM-251	Phonograph needle cup	.75
	6RPM-52	A.C. phonograph motor	34.20
	or		
	6RPM-52A	A.C.-D.C. phonograph motor	51.00
	6JS-386	6½" permanent magnet dynamic speaker	6.20
	6VS-414B	Phono-radio switch	.70
	6RC-453	Crystal pick-up	14.35

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left of the variable condenser. The trimmers are accessible through holes in the top of the can.

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

The trimmers for the antenna and ostillator 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 and the antenna coil and wave-trap assembly is mounted at the left side of the chassis.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8GT 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. 4.)

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.

PRODUCTION CHANGES

1. CR chassis also uses oscillator coil 6JT-467A or 6RT-476. For correct lug connections to either of these coils see illustration on previous page.

MODEL CW-279 and MODEL CZ-282

CHASSIS MODEL CW — CHASSIS MODEL CZ

Location of Coils and Trimmer Adjustments

MODEL CW

The first i-f transformer is located between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are accessible through holes in the rear of the chassis.

The antenna coil is located to the left of the speaker and the oscillator coil underneath the chassis below the speaker.

Trimmers for the antenna and oscillator coils are located on the variable condenser, the trimmer on the section adjacent to the 50L6GT tube being for the oscillator.

The 455 kc wave trap is wound on the same form as the antenna coil and may be adjusted from the left side of the chassis.

MODEL CZ

The first i-f transformer is located to the left of the speaker and the second i-f transformer, to the right of the speaker. Trimmers for both coils are accessible through holes in the tops of the cans.

The oscillator coil is located directly beneath the speaker. The loop antenna acts as the antenna coil. Trimmers for both oscillator and antenna coil are located on the variable condenser, the trimmer on the section adjacent to the 50L6GT tube being for the oscillator.

I-f and Wave-Trap Alignment

MODEL CW

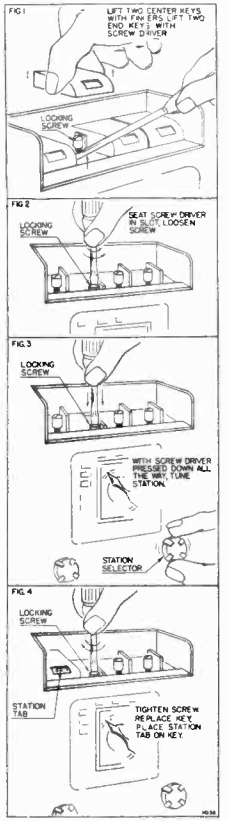
Rotate the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 12A8GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes, paragraph No. 4.)

MODEL CZ

Repeat the same procedure as for Model CW except for trap alignment. Model CZ does not use a wave trap.

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 section of variable condenser near 50L6) then the antenna trimmer (on section of variable condenser near 12K7) for maximum response.



Preadjustment of Automatic Tuning Keys

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

1. Remove all four keys. The two center keys should be taken out first. Grasp the key firmly on each side with the fingers and pull directly up. Remove the two end keys by prying them up with a screw-driver; the screw-driver should be inserted in the slot at the side of the key. See Fig. 1.
2. Seat the screw-driver in the slot of the locking screw to be adjusted. Press down the screw-driver firmly and loosen the screw about 1 to 1½ turns. See Fig. 2.
3. With the screw-driver seated in the locking-screw, press it down firmly with the left hand while tuning in the desired station with the right hand, using the station selector. See Fig. 3.
4. Release the station selector knob and tighten the locking screw as much as possible. See Fig. 4.
5. Replace the key on its shaft. The vertical piece of metal alongside the locking screw slides into the slot in the key which contains a flat spring. Remove the tab bearing the station call letters from one of the cards supplied in a seperate envelope with the receiver. Moisten the tab and place it in the depression provided for it in the key. See Fig. 4.
6. Check the adjustment by turning well past the station, using the selector knob, and then pushing down the key. The station should come back in again clearly and with maximum volume.

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 —pentagrid oscillator modulator	88	50	0	88	12
12K7GT —first i-f amplifier	88	88	0	—	12
12SQ7GT —diode detector, a-f amplifier, a.v.c.	40	—	0	—	12
50L6GT —beam power output	82	88	5.7	—	50

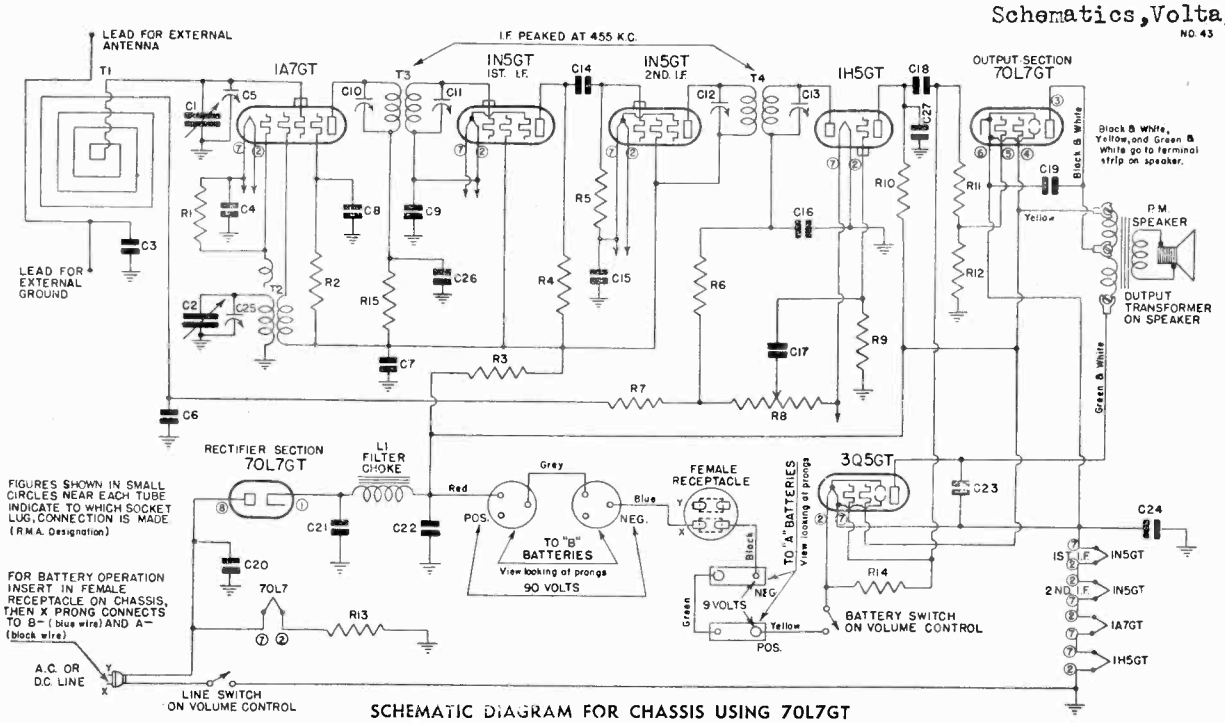
Voltage at 35Z5 cathode—115 volts.

Voltage across speaker field—27 volts.

Voltage across pilot light—4.5 volts.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS DF302, DF306
Chassis DF(2 Types)
Schematics, Voltage
NO. 43

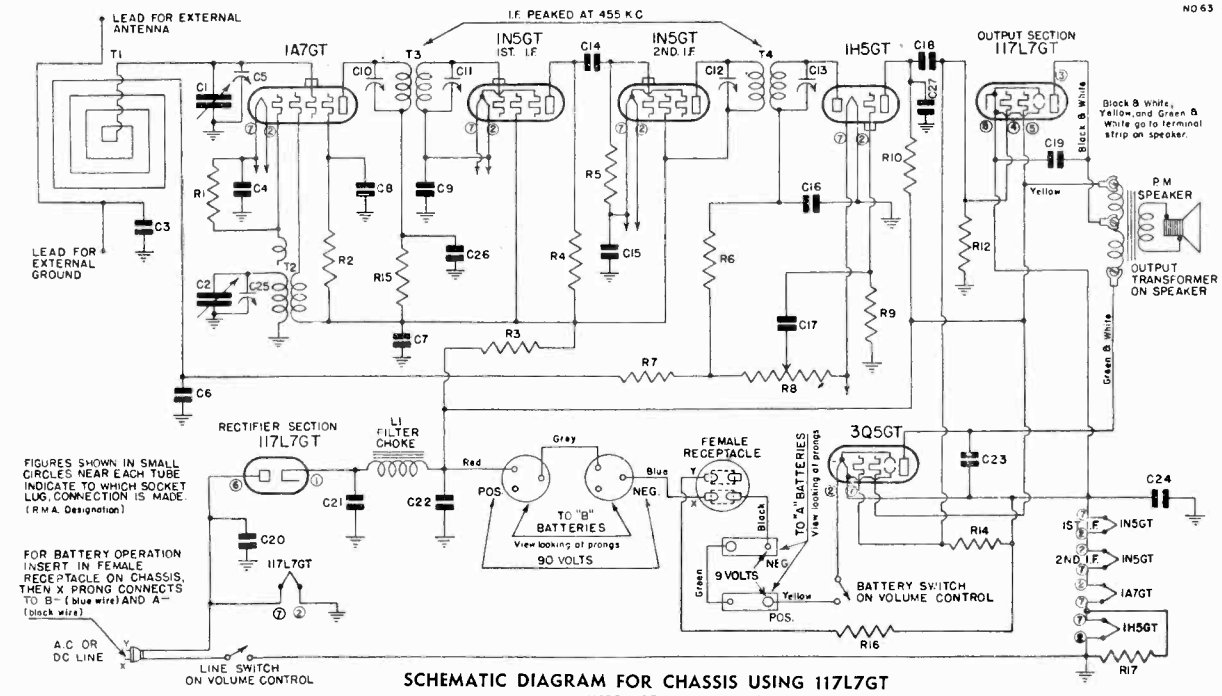


SCHEMATIC DIAGRAM FOR CHASSIS USING 70L7GT
MODEL DF

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" 9.0 volts, "B" 90 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7GT	88	50	82	1.5
1N5GT 1st i-f	50	88	—	1.5
1N5GT 2nd i-f	88	88	—	1.5
1H5GT	27	—	—	1.5
3Q5GT	85	88	—	3.0
70L7GT (line operation only)	86	95	—	70.0
70L7GT rectifier cathode (Pin no. 1) (line operation only)—125 volts.				
or 117L7GT (line operation only)	86	95	—	117
117L7GT rectifier cathode (Pin no. 1) (line operation only)—125 volts.				



SCHEMATIC DIAGRAM FOR CHASSIS USING 117L7GT
MODEL DF

10-39

MODELS DF302, DF306
Chassis DF
Alignment, Trimmers
Changes, Parts

EMERSON RADIO & PHONOGRAPH CORP.

Item	Part No.	DESCRIPTION	PRICE (Subject to change without notice)
†Not supplied separately.			
T1	6XW-174	Loop antenna assembly	$1.15
L1	7FT-512	Iron core filter choke	.90
T2	6RT-476	Oscillator Coil	.35
T3	7BT-488A	Double-tuned 455 kc first i-f transformer	1.00
T4	7FT-513	Double-tuned 455 kc diode i-f transformer	.95
R1, R6	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R3	KR-50	500 ohm ¼ watt carbon resistor	.16
R4	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R5	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R7, R14	NNR-220	3 megohm ¼ watt carbon resistor	.16
R8	3HR-240C	Volume control with line and battery switch	1.05
R9	3RR-274	5 megohm ¼ watt carbon resistor	.16
R10, R12	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	LR-61	200,000 ohm ¼ watt carbon resistor	.16
R13	7FR-370	315 ohm metal clad resistor (see Production Change No. 2)	.35
R15, R16	PR-79	1,000 ohm ¼ watt carbon resistor (see General Note No. 9 and Production Change No. 3)	.16
R17	7JR-376	330 ohm ¼ watt carbon resistor (see General Note No. 9 and Production Change No. 3)	.16
C1, C2	6RC-436B	Two gang variable condenser	2.35
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4, C6, C9, C26	BC-12	0.05 mf, 200 volt tubular condenser	.20
†C5		Trimmer part of loop assembly	
C7	BC-13	0.25 mf, 200 volt tubular condenser	.20
C8, C18	LC-65	0.02 mf, 400 volt tubular condenser	.20
†C10, C11, C12, C13		Trimmers, part of i-f transformers	
C14, C27	4XC-394A	0.00022 mf, mica condenser	.20
C15	5AC-388	0.25 mf, 100 volt tubular condenser	.20
C16	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C17	HC-34	0.006 mf, 600 volt tubular condenser	.20
C19	3VC-324	0.003 mf, 600 volt tubular condenser	.20
C20	LC-64	0.05 mf, 400 volt tubular condenser	.20
C21, C22	6JC-426E	Dual 20 mf, 150 volt dry electrolytic condenser	.85
C23	NNC-199	0.001 mf, 600 volt tubular condenser (see Production Change No. 1)	.20
C24	7FC-451	40 mf, 25 volt dry electrolytic condenser	.80
C25		Trimmer, part of variable condenser	

List Price Ea. Effective as of Oct. 1st, 1939

PRODUCTION CHANGES

1. Chassis using certain speakers use output condenser C23 part no. KC-58—.01 mf.—400 volt.
2. Chassis bearing serial numbers between 3000651 and 3001051 and between 3325600 and 3326599 use 117L7GT in place of 70L7GT and do not use resistor R13.
3. The schematic diagram of chassis using 70L7GT does not show resistors R16 and R17. These resistors occupy the same position in this chassis as they are shown in the schematic of chassis using 117L7GT.

Some chassis do not contain resistors R16 and R17. These resistors should be added to increase tube life.

On chassis bearing serial numbers between 2,888,350 and 2,963,000 use only bakelite base tubes when replacing the 1N5GT's.

To permit the use of *metal base* 1N5GT's in the above chassis, the following change must be made in the chassis:

1. Unsolder and remove the three leads from the #1 pin soldering lug of the 1N5GT socket at the rear of the chassis. (Three leads are condenser C26, resistor R15, and one wire.)
2. Solder these three leads to the #8 pin soldering lug of the 1A7GT socket. (This lug is a blank.)

The tube complement is as follows:

1—1A7GT oscillator-modulator.
1—1N5GT 1st i-f amplifier.
1—1N5GT 2nd i-f amplifier.
1—1H5GT 2nd detector, a.v.c., a-f amplifier.
1—3Q5GT beam power output (battery operation only).
1—70L7GT beam power output and half wave rectifier (line operation only).
or
1—117L7GT beam power output and half wave rectifier (see Production Change No. 2)

See Note above.

Range	540—1600 kc.
Voltage Rating (Line Operation)	105-125 volts a.c. or d.c.
Power Consumption (Line Operation)	30 watts
Current Drain (Battery Operation)	"A" Battery 0.05 amps. "B" Battery 0.01 amps.

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 is on the loop frame.

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is the one at the left end of the chassis. The diode i-f transformer is located between the 1N5GT first i-f tube and the variable condenser. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

Alignment

IF-Swing variable condenser to minimum capacity position.

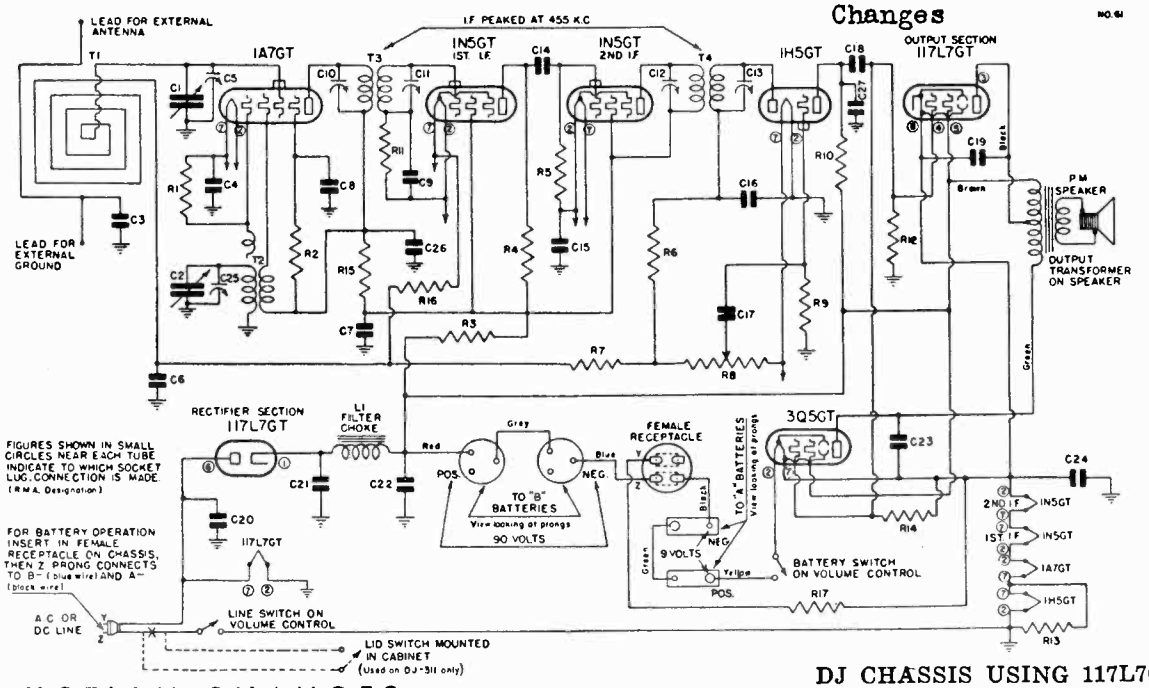
Feed 455 kc to the grid of the 1A7GT tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

RF-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 loop frame) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop, may then be swung to either side of the center to give maximum response. Realign at 140.

EMERSON RADIO & PHONOGRAPH CORP.

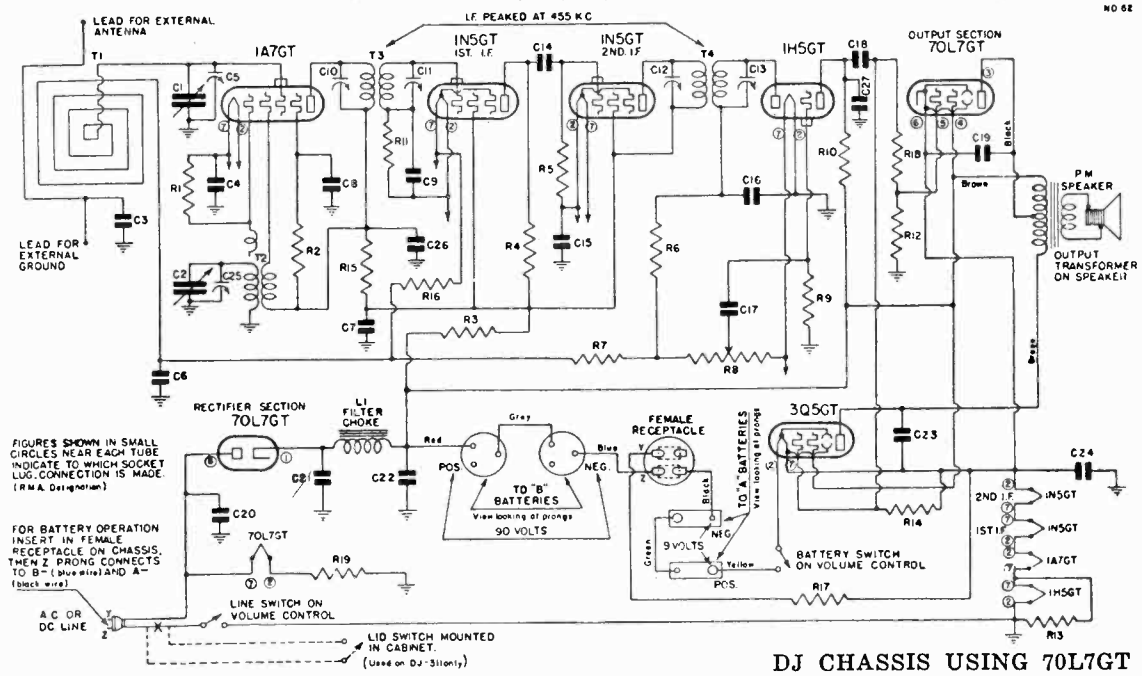
MODELS DJ310, DJ311, DJ312
Chassis DJ (2 Types)
Schematics, Voltage Changes



DJ CHASSIS USING 117L7GT

PRODUCTION CHANGES

1. DJ chassis bearing serial numbers below 3,017,129 use 70L7GT rectifier-output tube. See lower schematic.
2. In Model DJ-311 receivers after serial number 3,021,529, the door switch, part No. 7JS-444, has been omitted.



DJ CHASSIS USING 70L7GT

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" 9.0 volts, "B" 90 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
1A7GT	88	50	82	1.5
1N5GT 1st i-f	50	88	—	1.5
1N5GT 2nd i-f	88	88	—	1.5
1H5GT	27	—	—	1.5
3Q5GT	85	88	—	3.0
117L7GT (line operation only)	86	95	—	117

117L7GT rectifier cathode (Pin no. 1) (line operation only)—125 volts. (See production change no. 1.)

MODELS DJ310,DJ311,DJ312
Chassis DJ
Alignment,Batt.Data,Parts
Trimmers

EMERSON RADIO & PHONOGRAPH CORP.

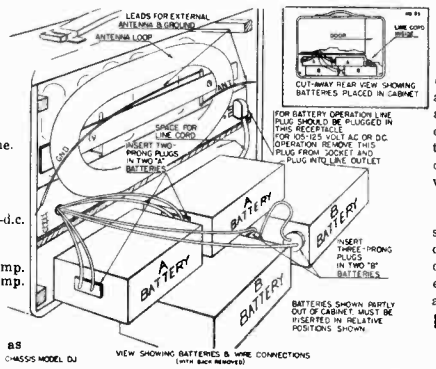
MODELS: DJ-310, DJ-311 and DJ-312

CHASSIS MODEL: DJ

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Type Battery	*No. Req.*	*Eveready Part No.*	*Rayovac Part No.*	*Burgess Part No.*
4½ volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	——	——



DESCRIPTION

Type: Universal (Battery, A.C.-D.C.) Superheterodyne.

Frequency Range: 540-1600 kc.

Power Supply: Battery, A.C. or D.C.

Voltage Rating: (Line operation) 105-125 volts, a.c.-d.c.

Power Consumption: (Line operation) 30 watts.

Current Drain: (Battery operation) "A" battery 0.05 amp. "B" battery 0.01 amp.

GENERAL NOTES

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

2. The color coding of the battery cable is as follows:
   Red—B plus, 90 volts — Yellow—A plus, 9 volts
   Blue—B minus — Black—A minus

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

4. A.C.-D.C. Operation: Open the small door at the back of the cabinet. *It is important that this small door be left open while operating the receiver on either a.c. or d.c. power.* Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet. If the power supply is d.c. and the receiver does not operate at first, remove the plug from the wall outlet, turn it half way around and re-insert it in the outlet, thus obtaining the proper polarity.

5. Battery Operation: Important: Remove the line plug from the electrical outlet. Insert the plug into the receptacle at the rear of the receiver. This is important since the receiver will not operate from batteries with the plug out of the receptacle. The loose portion of the cord can then be coiled and placed in the cabinet underneath the shelf.

6. The receiver has a self-contained antenna and normally does not require additional antenna or ground connection. For permanent home installations of this model, however, in a location far removed from broadcasting stations, an additional outside antenna should be used. The outside antenna and ground connections should be made to the two leads at the rear of the cabinet. See the illustration

7. The self-contained loop antenna has directional properties. *It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.*

ADJUSTMENTS

Location of Coils and Trimmer Adjustments

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

The loop antenna acts as the antenna coil. The trimmer for the loop is on the rear section of the variable condenser.

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

I-f Alignment

Swing variable condenser to minimum capacity position. Feed 455 kc to the grid of the 1A7GT 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 from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the radiating loop. A portion of the outside turn of the loop may then be swung to either side of the center to give maximum response. Realign at 140.

Battery Installation

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

1. Remove the back panel of the cabinet by taking out the screws.

2. Locate the battery cable coming from the receiver and identify the plugs on the cable ends.

3. Insert the three-prong plug on the battery cable into the two "B" batteries. Place the two batteries in the bottom of the cabinet with the plug-ends of the batteries facing each other. Push the batteries up against the front of the cabinet. The wood blocks at the rear corners and rear center of the cabinet serve to hold the "B" batteries in place.

4. Insert the two-prong plug on the battery cable into the two "A" batteries. Place the "A" batteries, one at a time, above the "B" batteries in the cabinet. The plug-ends of the "A" batteries should be facing to the left, as indicated in the illustration. Push the "A" batteries to the left, when placing them in the cabinet, in order to clear the small wood block in the front right-hand corner of the cabinet.

5. Replace the back panel of the cabinet and fasten it in place with the screws.

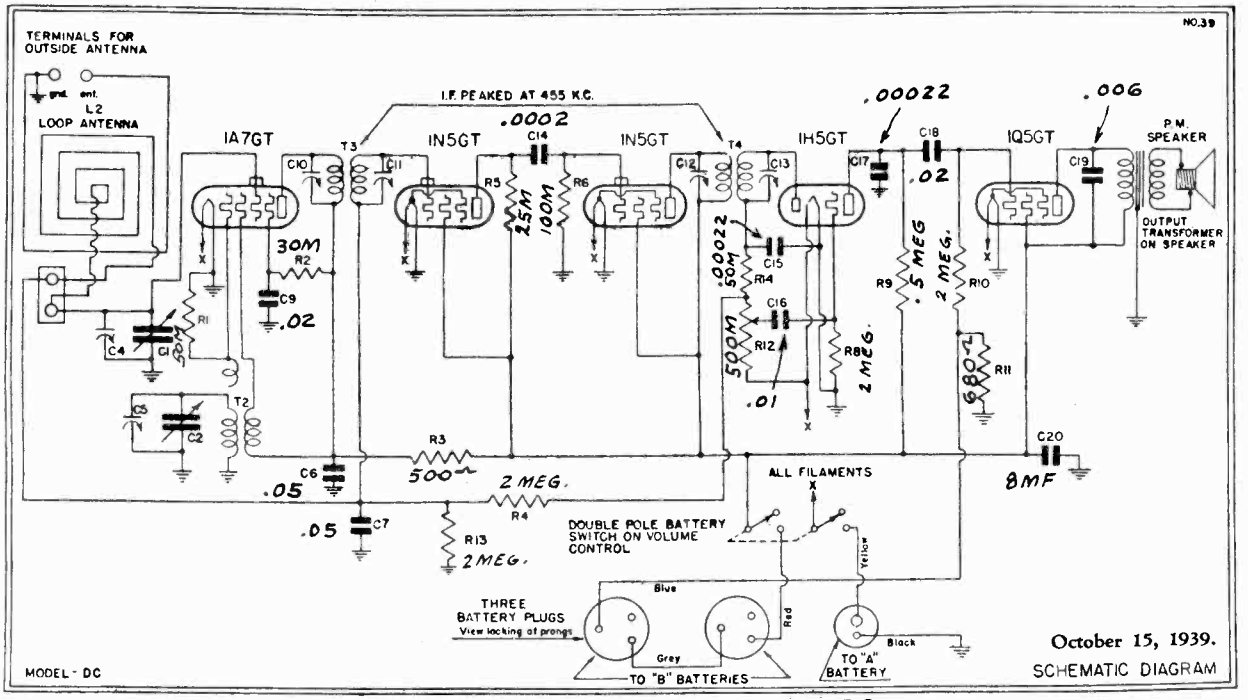
*Item	Part No.	DESCRIPTION	PRICE
T1	7JW-206	Loop antenna assembly	$ .95
L1	7JT-524	Iron core filter choke	.85
T2	7CT-511	Oscillator coil	.40
T3	7BT-488E	Double-tuned 455 kc first i-f transformer	.95
T4	7JT-544A	Double-tuned 455 kc diode i-f transformer	.95
R1, R6	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R3	KR-50	500 ohm ¼ watt carbon resistor	.16
R4	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R5	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R7, R14	NNR-220	3 megohm ¼ watt carbon resistor	.16
R8	3HR-240E	Volume control with line and battery switch (500,000 ohms)	.95
R9, R11	3RR-274	5 megohm ¼ watt carbon resistor	.16
R10, R12	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R18	LR-61	200,000 ohm ¼ watt carbon resistor (see production change no. 1)	
R13	7JR-376	330 ohm ¼ watt carbon resistor (see production change no. 1)	.16
R15, R17	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R16	4XR-327	15 megohm ¼ watt carbon resistor	.16
C1, C2	7BC-445	Two-gang variable condenser	2.30
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C6, C7, C9, C26, C28	BC-12	0.05 mf, 200 volt tubular condenser	.20
C8, C18	LC-65	0.02 mf, 400 volt tubular condenser	.20
†C10, C11, C12, C13		Trimmers, part of i-f transformers.	
C14, C27	4XC-394A	0.00022 mf, mica condenser	.20
C15	5AC-388	0.25 mf, 100 volt tubular condenser	.20
C16	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C17	HC-34	0.006 mf, 600 volt tubular condenser	.20
C19	3VC-324	0.003 mf, 600 volt tubular condenser	.20
C20	LC-64	0.05 mf, 400 volt tubular condenser	.20
C21, C22	6JC-426E	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C23	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C24	7FC-451	40 mf, 25 volt dry electrolytic condenser	.80
†C25, C5 C29	AC-6	Trimmer, part of variable condenser. 0.1 mf, 200 volt tubular condenser	.20
	7JS-444	Door switch (for DJ-311)	.50
	7JS-440	5½" permanent magnet dynamic speaker (for DJ-310 and DJ-326)	5.10
	7JS-443	6½" permanent magnet dynamic speaker (for DJ-311 and 312)	5.75
		DIAL PARTS	
	7JD-93	Dial face	.10
	4MZ-588A	Dial pointer	.20
	7BH-40B	Dial drive shaft	.10
	6RW-162	Drive cord spring	.02
	7JW-217	Battery cable (DJ)	.60
	7BZ-867A	Dial drive cord	.02
	7JE-30A	Dial crystal (for 310, 311)	.25
	7JE-30	Dial crystal (for 312)	.20

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

Specify part numbers when ordering—List price each effective as of October 15, 1939. (Subject to change without notice.)

EMERSON RADIO & PHONOGRAPH CORP.

MODEL DC308
Chassis DC
Schematic, Voltage, Changes
Alignment, Trimmers



PRODUCTION CHANGES

1. **Chassis bearing serial numbers below 2,936,285 use .5 megohm at R10.**
2. **Chassis bearing serial numbers below 2,939,151 use diode i-f transformer**

The tube complement is as follows:

1—1A7GT oscillator-modulator
1—1N5GT 1st i-f amplifier
1—1N5GT 2nd i-f amplifier
1—1H5GT 2nd detector, a.v.c., a-f amplifier
1—1Q5GT pentode output

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

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*	*Osc. Plate*	*Fil.*
1A7GT	82	52	82	1.5
1N5GT 1st i-f	70	82	—	1.5
1N5GT 2nd i-f	82	82	—	1.5
1H5GT	25	—	—	1.5
1Q5GT	77	82	—	1.5

Bias for the 1Q5GT tube is obtained across the resistor R11. The voltage drop across this resistor should be 6.8 volts.

Location of Coils and Trimmer Adjustments

The first i f transformer is located to the right of the variable condenser and the diode i-f transformer to the left of the variable condenser. Trimmers for both transformers are accessible through holes in the tops of the cans.

The oscillator coil is located under the chassis, beneath the variable condenser. Trimmer for the oscillator is located on the front section of the variable condenser.

The loop antenna acts as the antenna coil. Trimmer for the loop is located on the rear section of the variable condenser.

I-f Alignment

Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7GT tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

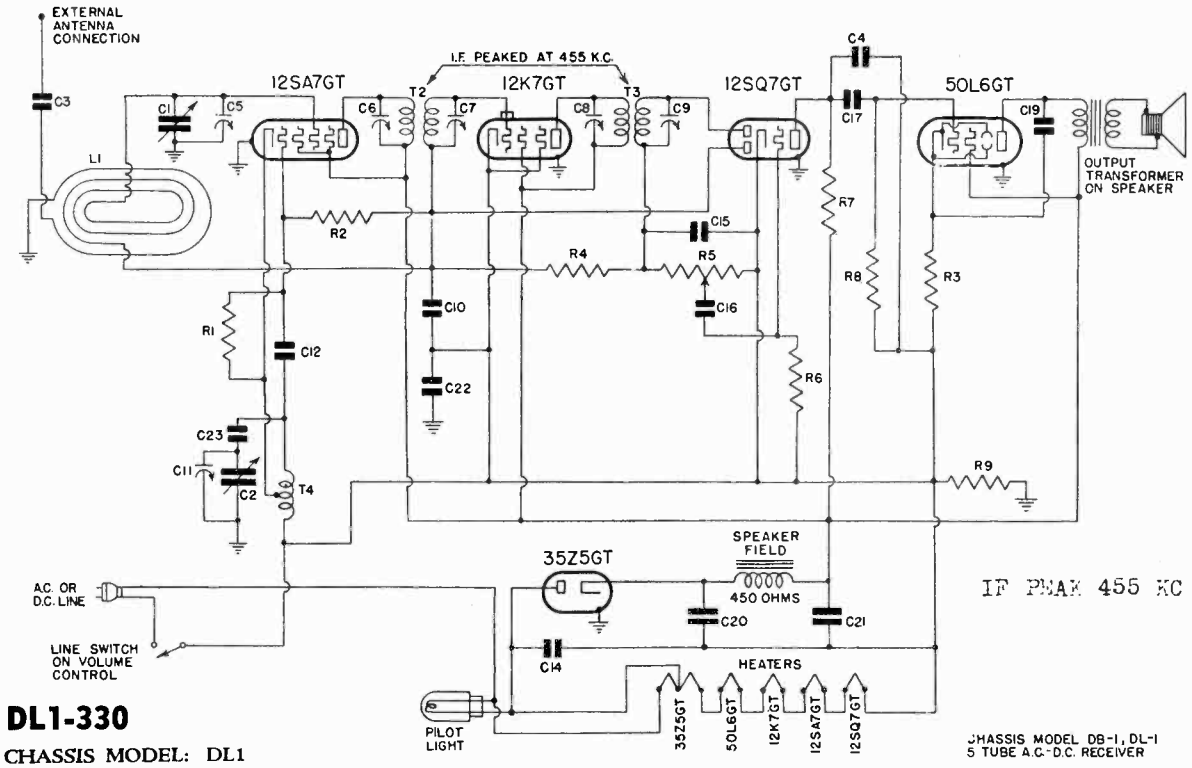
Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance, align at 140. With the pointer set at 60 feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Repeat the alignment at 140.

MODEL DL1-330
Chassis DL1
Schematic, Parts

EMERSON RADIO & PHONOGRAPH CORP.

NO. 73



DL1-330

CHASSIS MODEL: DL1

FOR ALIGNMENT, VOLTAGE, AND TRIMMERS SEE DL-330 CHASSIS DL.

When ordering, specify part numbers. List price each, effective as of Jan. 1, 1940. Subject to change without notice.

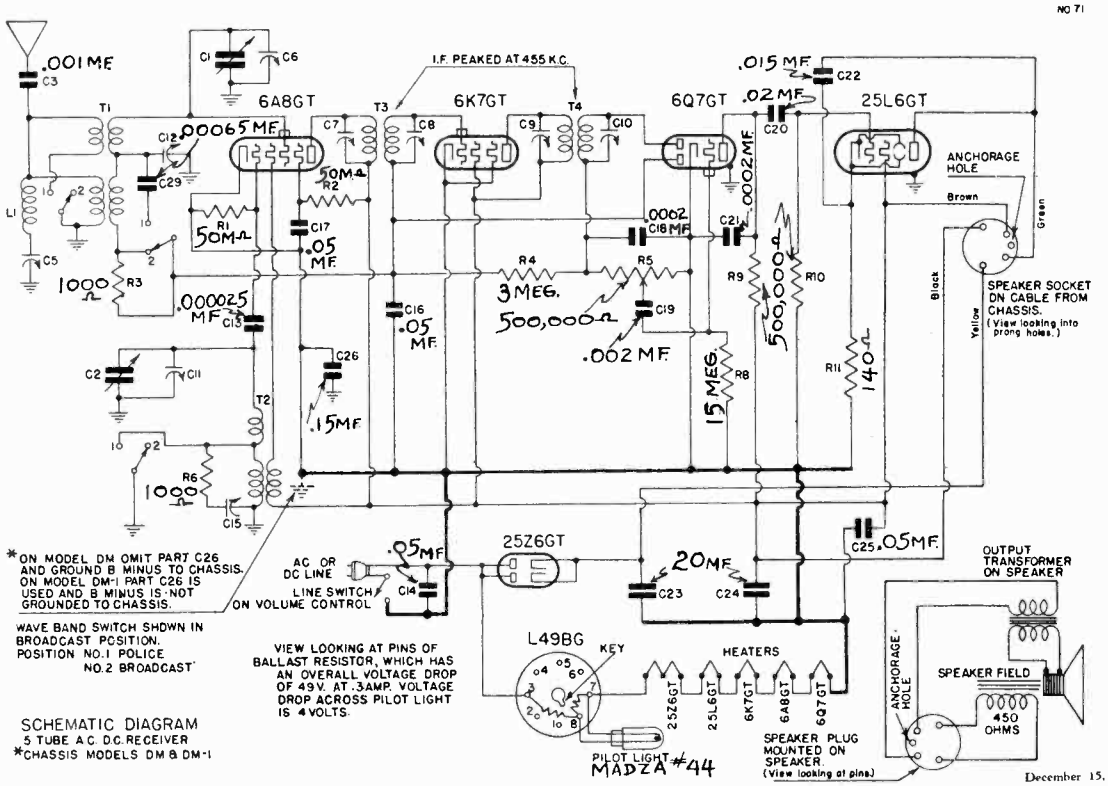
*Item	Part No.	DESCRIPTION	PRICE
L1	7BW-179	Loop antenna assembly	$ .90
T4	7BT-486	Oscillator coil (DL)	.40
T4	7BT-486A	Oscillator coil (DL1)	.40
T2	7BT-488	Double-tuned 455 kc first i-f transformer	1.00
T3	7BT-550B	Double-tuned 455 kc second i-f transformer	.95
R1	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ wattwire-wound resistor	.16
R4	NNR-220	3 megohm ¼ watt carbon resistor	.16
R5	7LR-378	Volume control 0.5 megohm with line switch	.85
R6, R2	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7, R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R9	LR-61	200,000 ohm ¼ watt carbon resistor (DL1)	.16
C1, C2	7BC-445A	Two-gang variable condenser	2.25
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10, C23	BC-12	0.05 mf, 200 volt tubular condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C12, C15, C4	4XC-394A	0.00022 mf mica condenser	.20
C16, C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17, C19	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C20, C21	6JC-426C	Dual 20 mf, 150 volt dry electrolytic condenser	.90
C22	3CC-302	0.15 mf, 200 volt tubular condenser (DL1 only)	.20
	7BS-409	5" dynamic speaker (DL)	3.80
	7BS-435	5" dynamic speaker (DL1)	3.85
	6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47	.20
	7BB-77	Pilot light socket	.15
	7LD-96	Dial face	.25
	7BZ-867A	Drive cord	.02
	6RW-162	Drive cord spring	.02
	7BH-40C	Drive shaft and pulley	.10
	7QD-103	Dial pointer	.15
	5FZ-758	Dial crystal (DL)	.25
	5FZ-758A	Dial crystal (DL1)	.25

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

EMERSON RADIO & PHONOGRAPH CORP.

MODELS DM331,DM1-331
Chassis DM,DM1
Schematic,Voltage
Alignment,Trimmers

NO 71



SCHEMATIC DIAGRAM
5 TUBE A.C. D.C. RECEIVER
*CHASSIS MODELS DM & DM-1

December 15, 1939.

MODEL: DM-331 MODEL: DM1-331

CHASSIS MODEL: DM CHASSIS MODEL: DM1

DESCRIPTION

Type: Two-band superheterodyne.

Frequency ranges: 540 -1700 kc
2300-6600 kc

Number of Tubes: Five.

Type of tubes:

1—6A8GT, pentagrid oscillator-modulator
1—6K7GT, first i-f amplifier
1—6SQ7GT, diode detector, a-f amplifier, a.v.c.
1—25L6GT, beam power output
1—25Z6GT, dual half-wave rectifier.

Octal-base tubes in this receiver may be replaced with either metal or bantam-type octal-base glass tubes. The letters "GT" at the end of the tube number indicates that the tube has a bantam glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

Power supply: A.C. or D.C.

Voltage rating: 105-125 volts.

Power consumption: 45 watts.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. The filament dropping resistor (L49BG on schematic) is located at the rear of the chassis. This resistor will become quite hot under normal operating conditions. For voltage drop specifications, see below.
3. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
4. The first i-f transformer is held to the chassis by snap-on fasteners. To remove it, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
6. The wave-trap has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

ADJUSTMENTS

An oscillator with frequencies of 455, 1500 and 6000 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 located on top of the chassis deck. The trimmers are available through holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear.

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

The trimmers for the broadcast oscillator and antenna coil are mounted on a dual assembly just below the variable condenser underneath the chassis.

The 455 kc wave-trap is part of the antenna coil assembly directly behind the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear 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 6A8 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. 6.)

Short-Wave Alignment

(Short-wave alignment should precede broadcast alignment.)

With the wave-band switch in the short-wave position, counter-clockwise, set the dial pointer at 6 mc. and feed 6000 kc through a standard dummy antenna to the antenna lead. If an I.R.E. standard dummy antenna is not available, a 0.0002 mf mica condenser in series with 400 ohm non-inductive resistor may be used as a substitute.

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

Broadcast Alignment

Rotate the wave-band switch clockwise to the broadcast position, set the pointer at 150 and feed 1500 kc through a standard dummy antenna to the antenna lead. A .0002 mf mica condenser may be used as a substitute. Adjust first the broadcast oscillator trimmer (lower of dual trimmer assembly located underneath the variable condenser) and then the antenna trimmer (upper trimmer of dual assembly) for maximum response.

VOLTAGE ANALYSIS

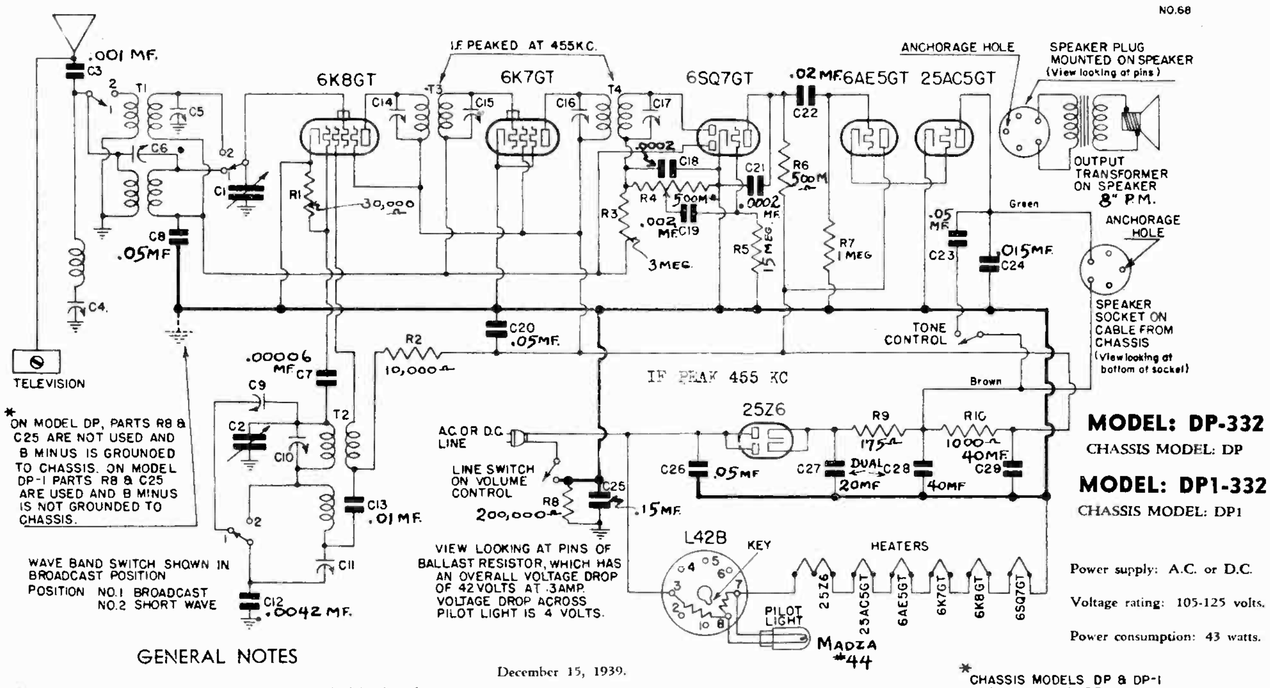
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250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

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8GT	95	45	0	95	6.3
6K7GT	95	95	0	—	6.3
†6SQ7GT	38	—	0	—	6.3
*25L6GT	90	95	6.5	—	25.0

Voltage at 25Z6 cathode—125 volts. Voltage drop across ballast resistor (pins nos. 3, 7)—49 volts.
Voltage across speaker field—28 volts. Voltage drop across pilot light section of ballast resistor (pins nos. 8 and 7)—4 volts.

MODELS DP332,DP1-332
Chassis DP,DP1
Schematic,Voltage
Alignment,Trimmers

EMERSON RADIO & PHONOGRAPH CORP.



MODEL: DP-332
CHASSIS MODEL: DP

MODEL: DP1-332
CHASSIS MODEL: DP1

Power supply: A.C. or D.C.

Voltage rating: 105-125 volts.

Power consumption: 43 watts.

December 15, 1939.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. The filament dropping resistor (L42B on schematic) is located at the rear of the chassis. This resistor will become quite hot under normal operating conditions. For voltage drop specifications, see below.
3. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
4. The first i-f transformer is held to the chassis by snap-on fasteners. To remove it, unsolder all its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green, Plate—blue
   Grid return—black, B plus—red
6. The wave-trap has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

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 cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6K8GT	90	90	0	70	6.3
6K7GT	90	90	0	—	6.3
6SQ7GT	30	—	0	—	6.3
6AE5GT	90	—	14	—	6.3
25AC5GT	110	—	0	—	25.0

Voltage at 25Z6—125 volts.

Voltage drop across ballast resistor (pins nos. 3, 7)—42 volts.

Voltage drop across pilot light section of ballast resistor (pins nos. 8 and 7)—4 volts.

DESCRIPTION

Type: Two-band superheterodyne.

Frequency ranges: 540-1730 kc
5.6-18 mc.

Number of tubes: Six.

Type of tubes:
1—6K8GT, pentagrid oscillator-modulator
1—6K7GT, first i-f amplifier
1—6SQ7GT, diode detector, a-f amplifier, a.v.c.
1—6AE5GT, audio amplifier
1—25AC5GT, dynamic coupled output
1—25Z6GT, dual half-wave rectifier.

ADJUSTMENTS

An oscillator with frequencies of 455, 1600 and 16,000 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 located on top of the chassis deck. The trimmers are available through holes in the top of the can. The second i-f transformer is located on the rear wall underneath the chassis. The trimmers are available through holes in the rear.

The trimmers for the antenna coil are mounted on the antenna coil assembly behind and to the right of the variable condenser. The trimmer in the center is for the broadcast band and the trimmer at the bottom for the short-wave band.

The trimmers for the oscillator coil are mounted on the oscillator coil assembly, located on the rear wall underneath the chassis. The trimmer farthest from the end is for the broadcast band. The center trimmer is the broadcast series padding condenser, and the trimmer closest to the end is for the short-wave band.

The 455 kc wave-trap is part of the antenna coil assembly. The trimmer for the trap is the uppermost trimmer of the assembly.

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 6A8 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. 6.)

Short-Wave Alignment

With the wave-band switch in the short-wave position, counter-clockwise, set the dial pointer at 16 mc. Feed 16,000 kc through a standard short-wave dummy antenna (a 400 ohm resistor may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer, then the antenna trimmer for maximum response.

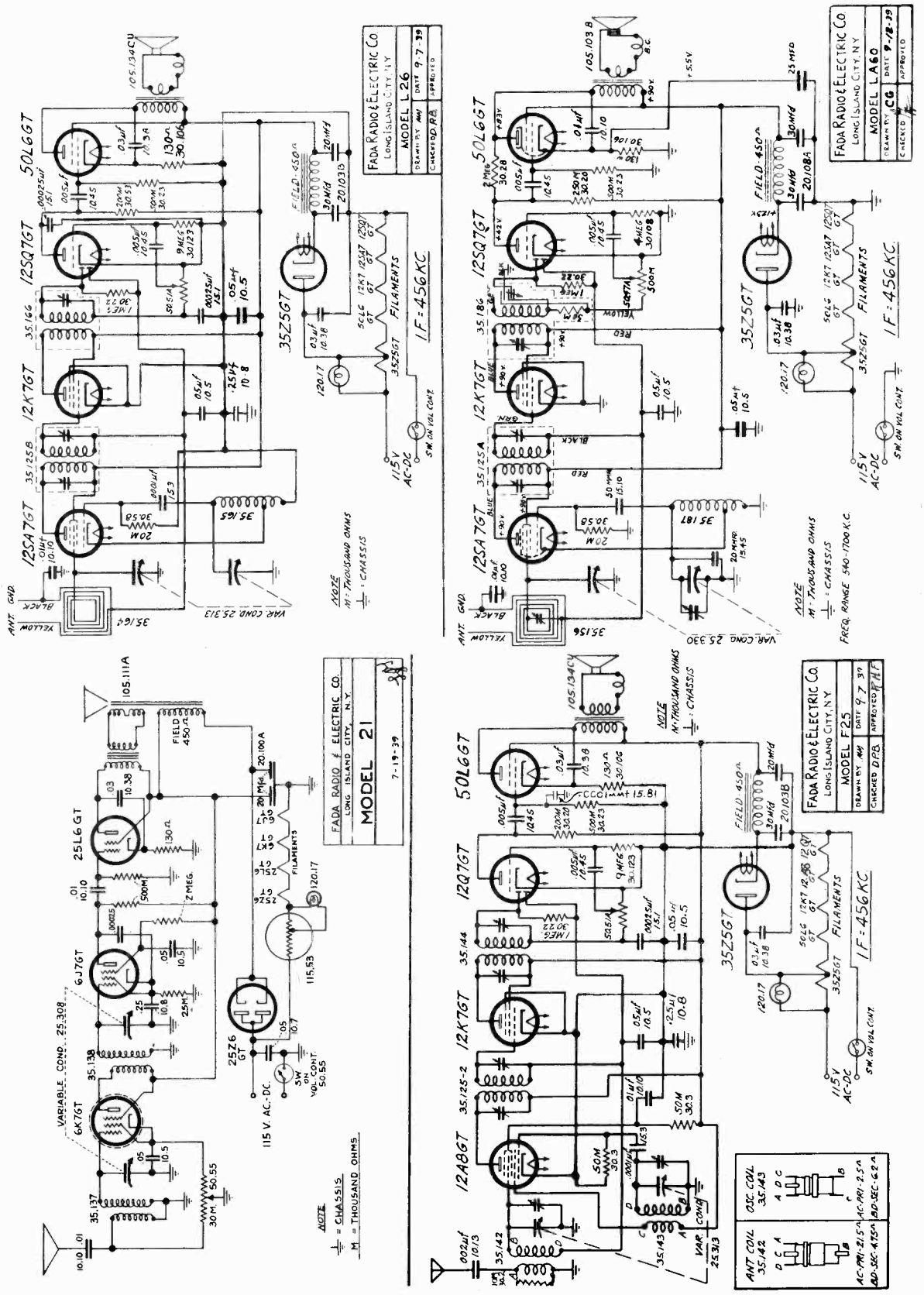
Broadcast Alignment

Rotate the wave-band switch clockwise and set the pointer at 160. Feed 1600 kc through a standard broadcast dummy antenna to the antenna lead (a .0002 mf condenser may be used as a substitute) and adjust first the broadcast oscillator trimmer and then the antenna trimmer for maximum response. Move pointer to 60, feed 600 kc and adjust series padder (while rocking the variable) for maximum response.

MODEL LA60
Schematics

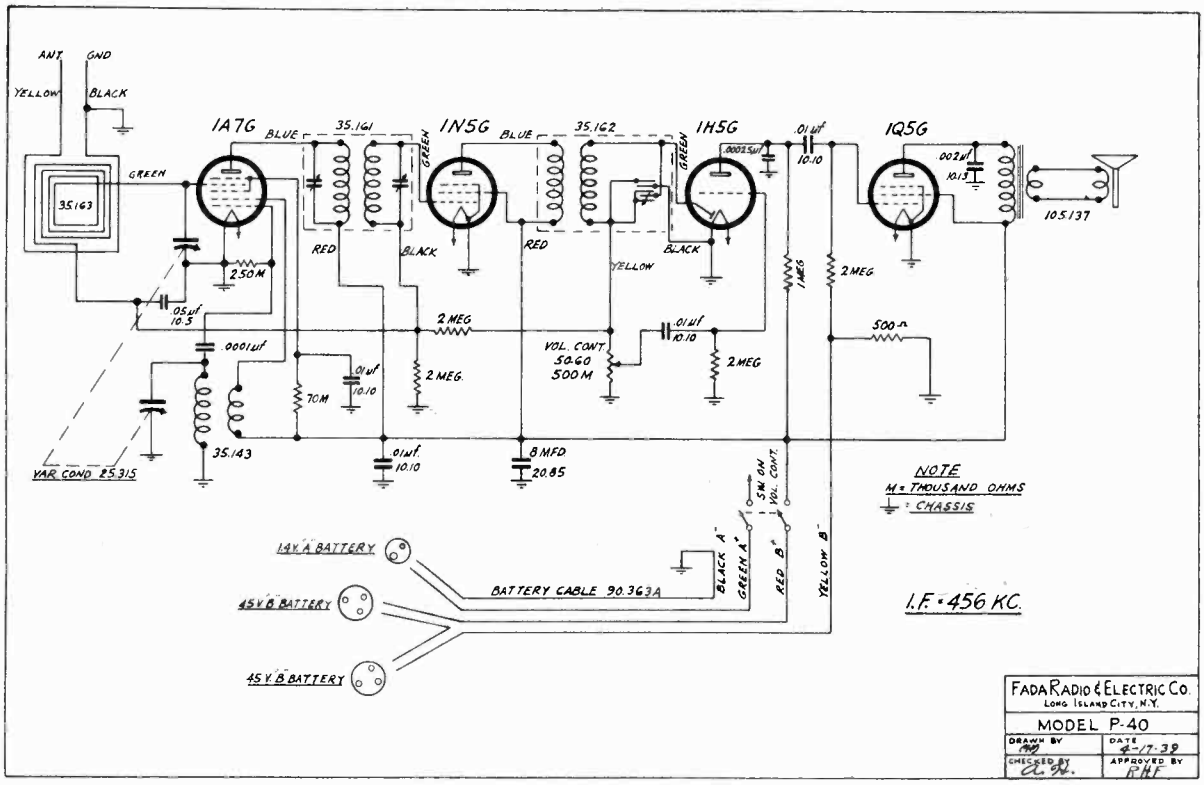
FADA RADIO & ELECTRIC CO

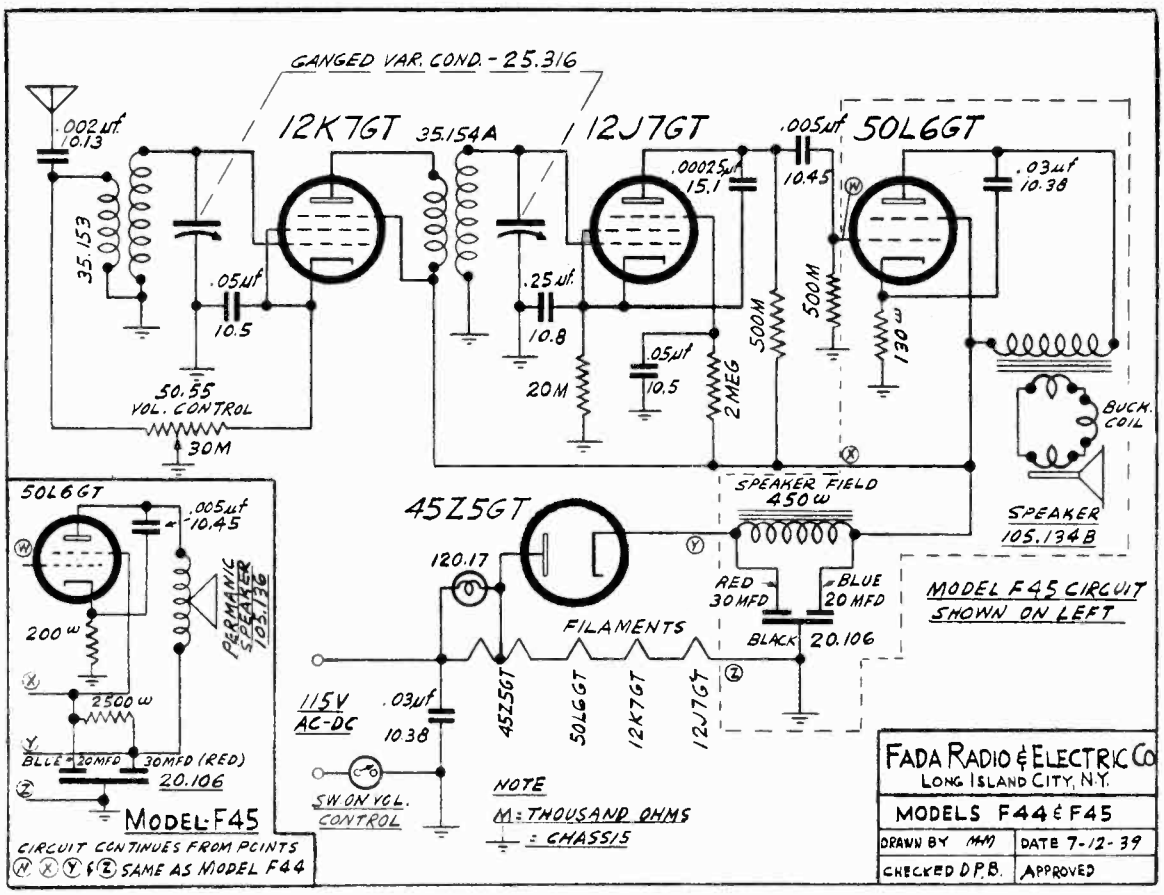
MODEL 21
MODEL F25
MODEL L26



MODEL P40
MODELS F44, F45
Schematics

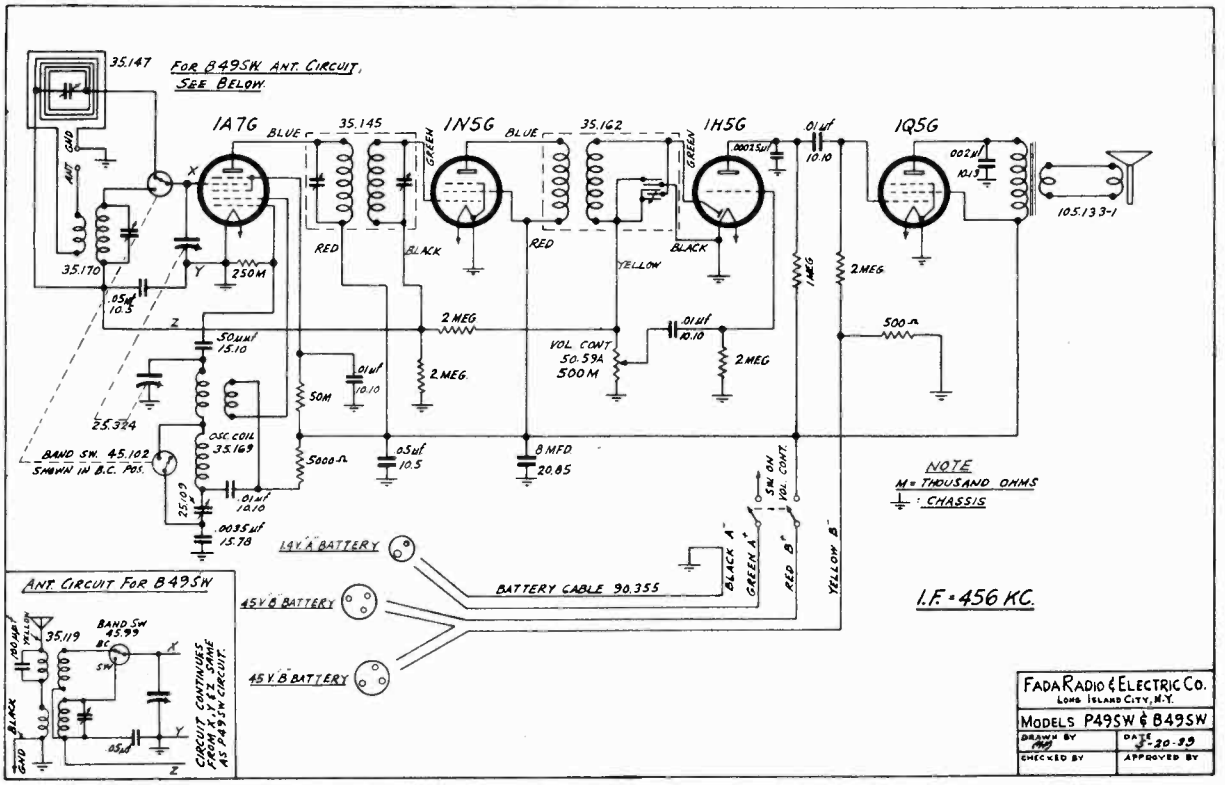
FADA RADIO & ELECTRIC CO

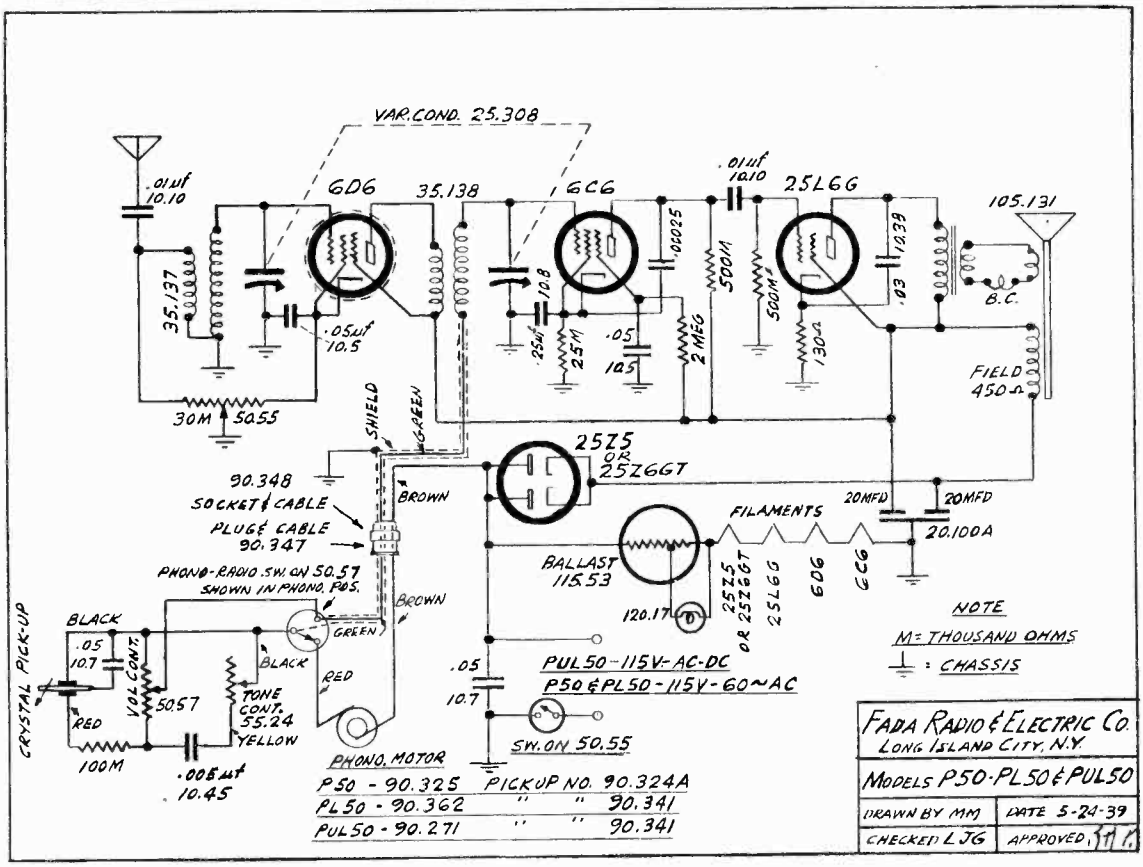




FADA RADIO & ELECTRIC CO

MODELS P49SW, B49SW
MODELS P50, PL50, PUL50
Schematics

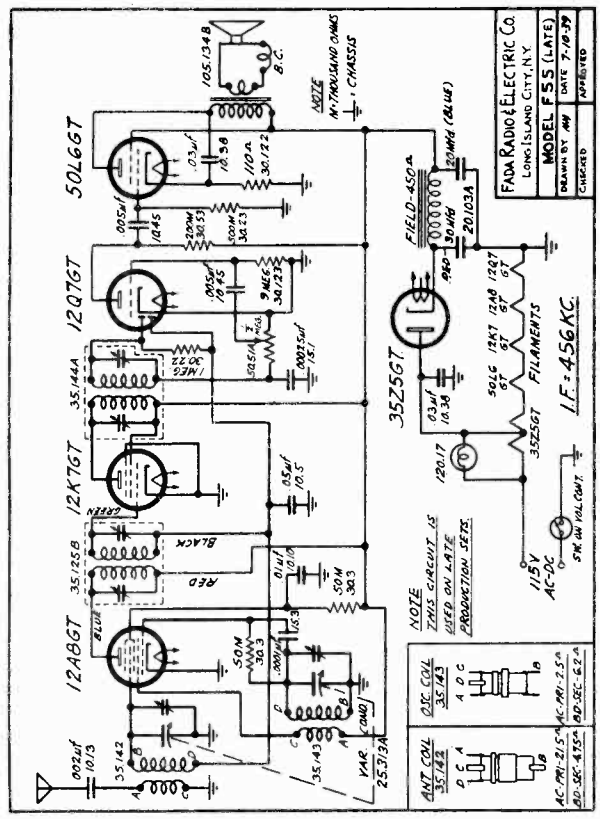


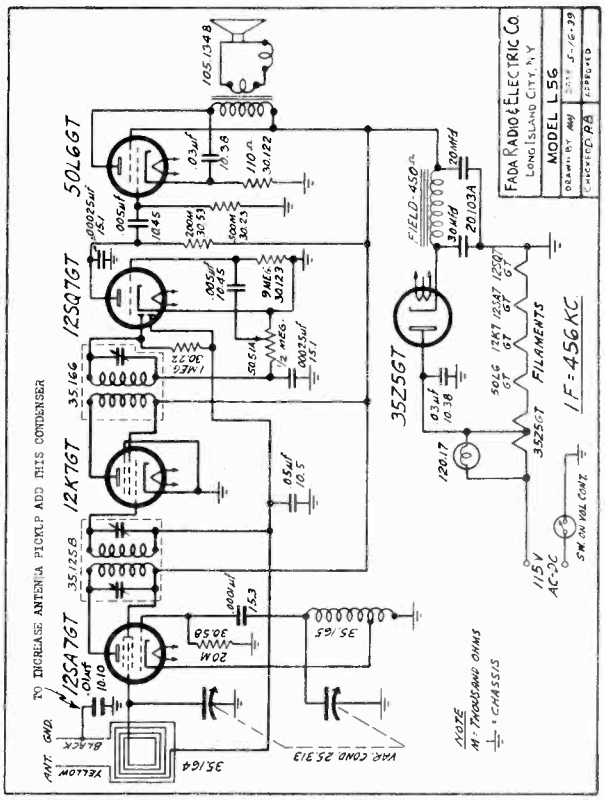


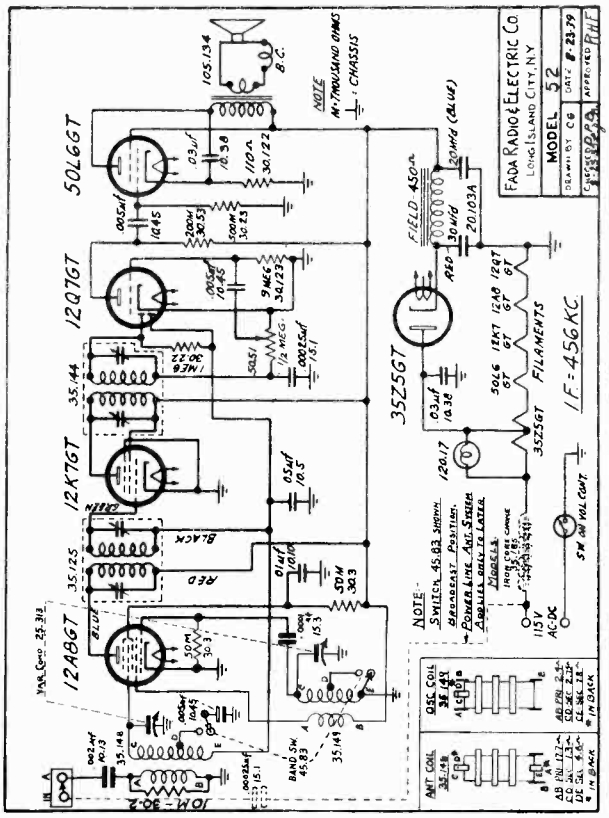
MODELS 52,F52
MODEL 53
MODEL F55 Late

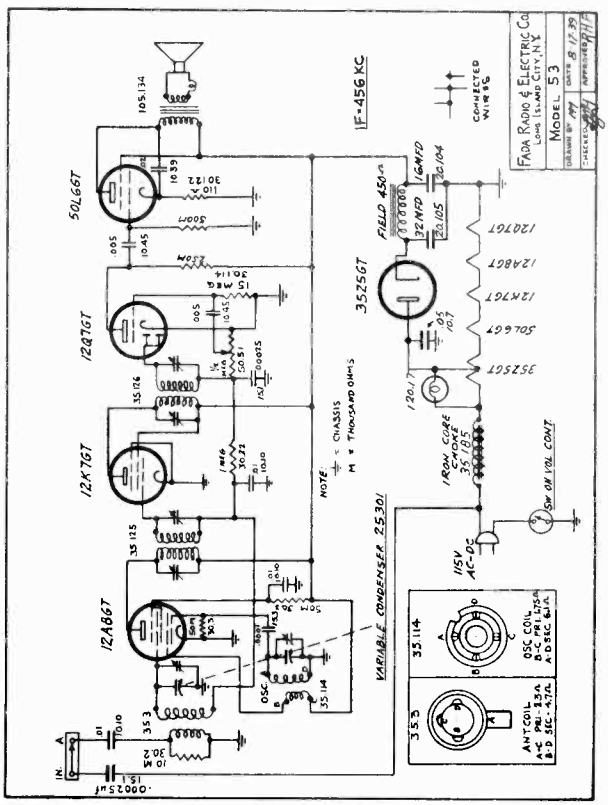
FADA RADIO & ELECTRIC CO

MODEL L56
Schematics



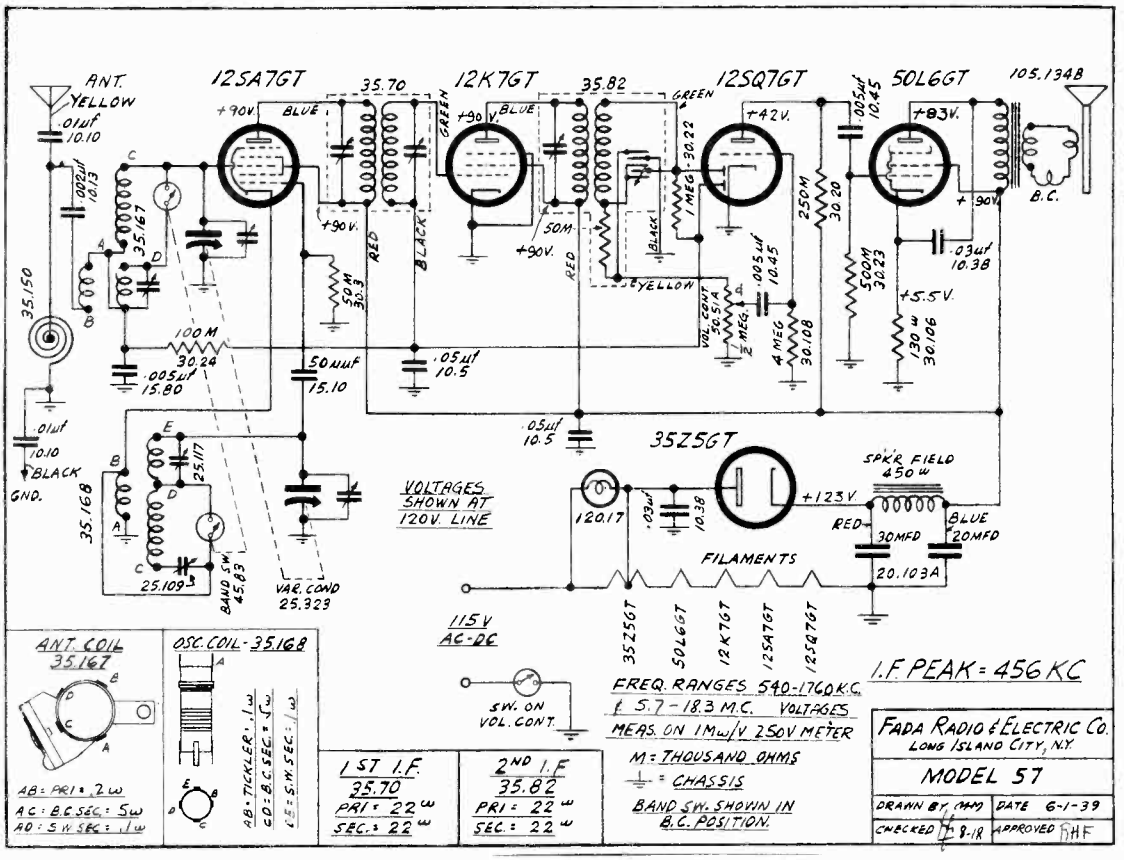


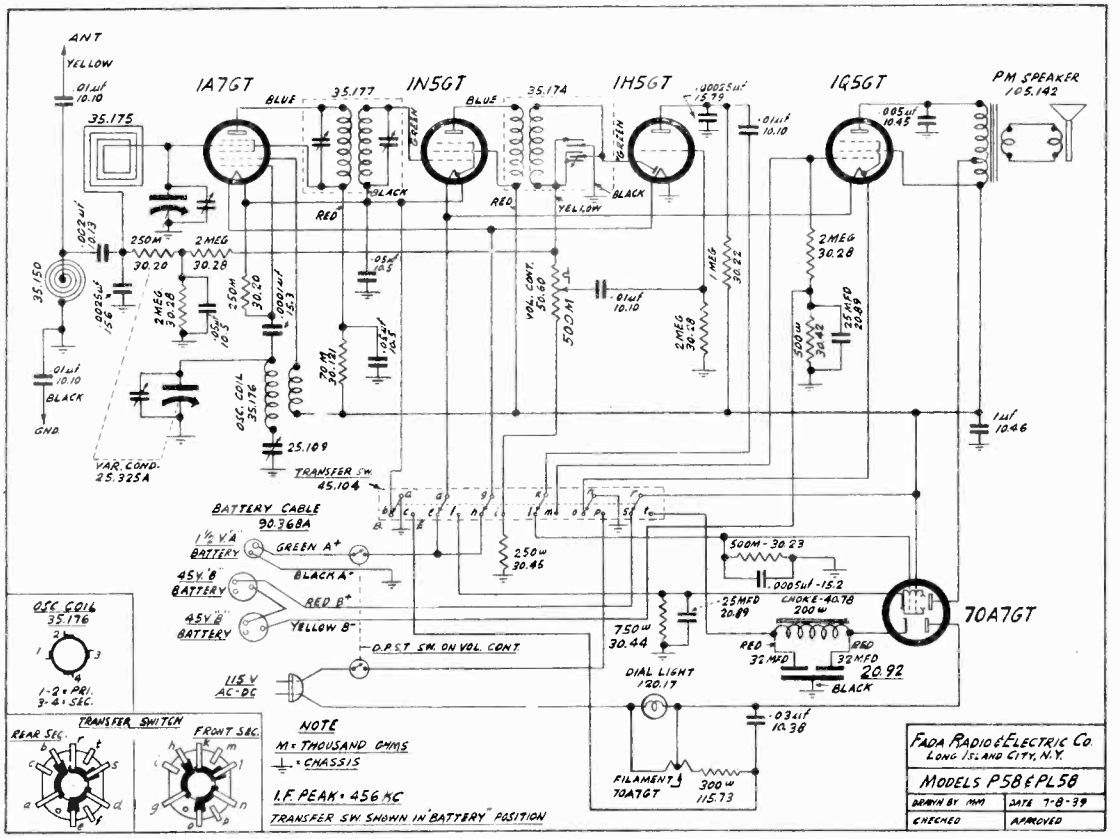




FADA RADIO & ELECTRIC CO

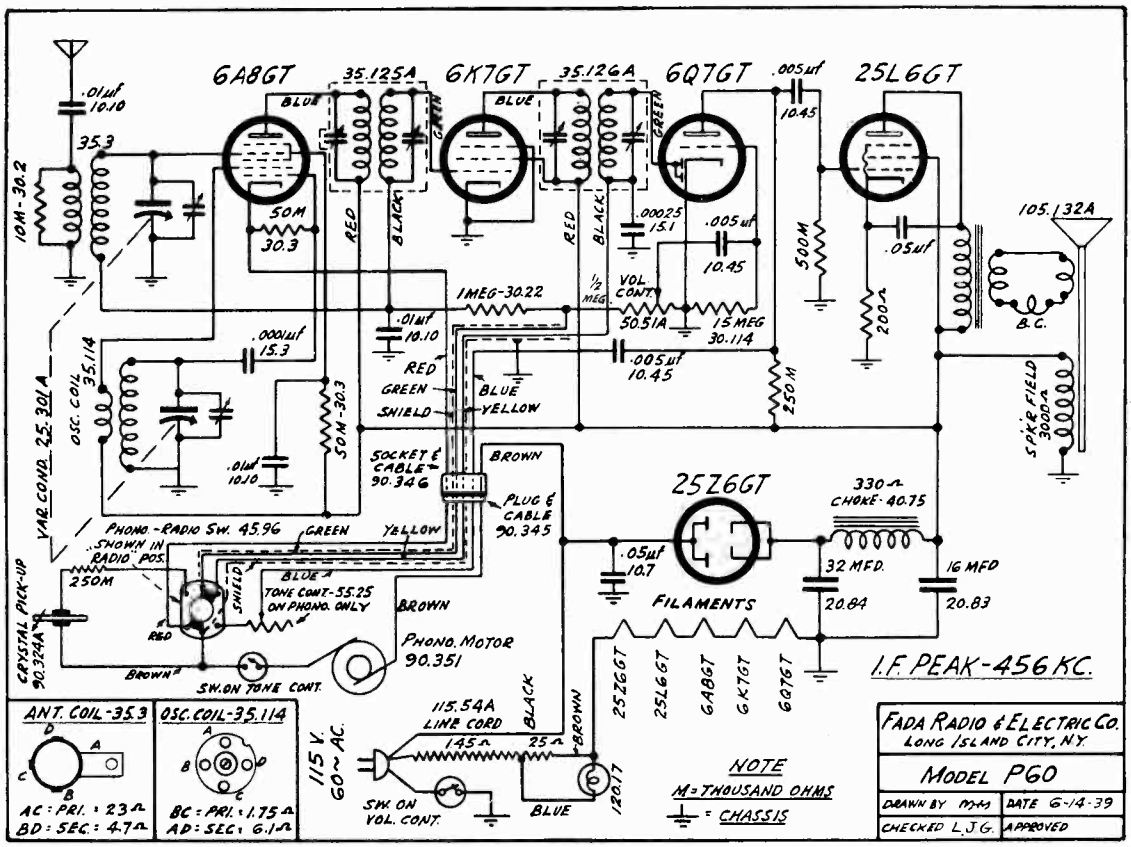
MODEL 57
MODELS P58, PL58
Schematics



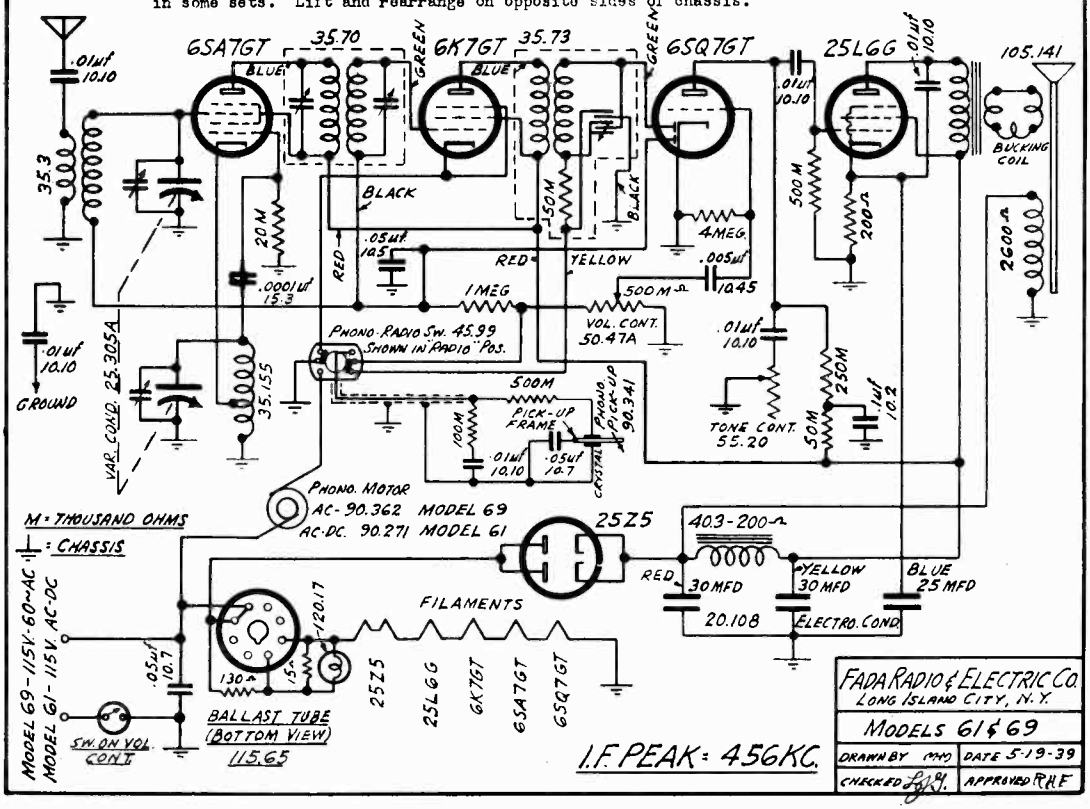


MODEL P60
MODELS 61,69
Schematics

FADA RADIO & ELECTRIC CO

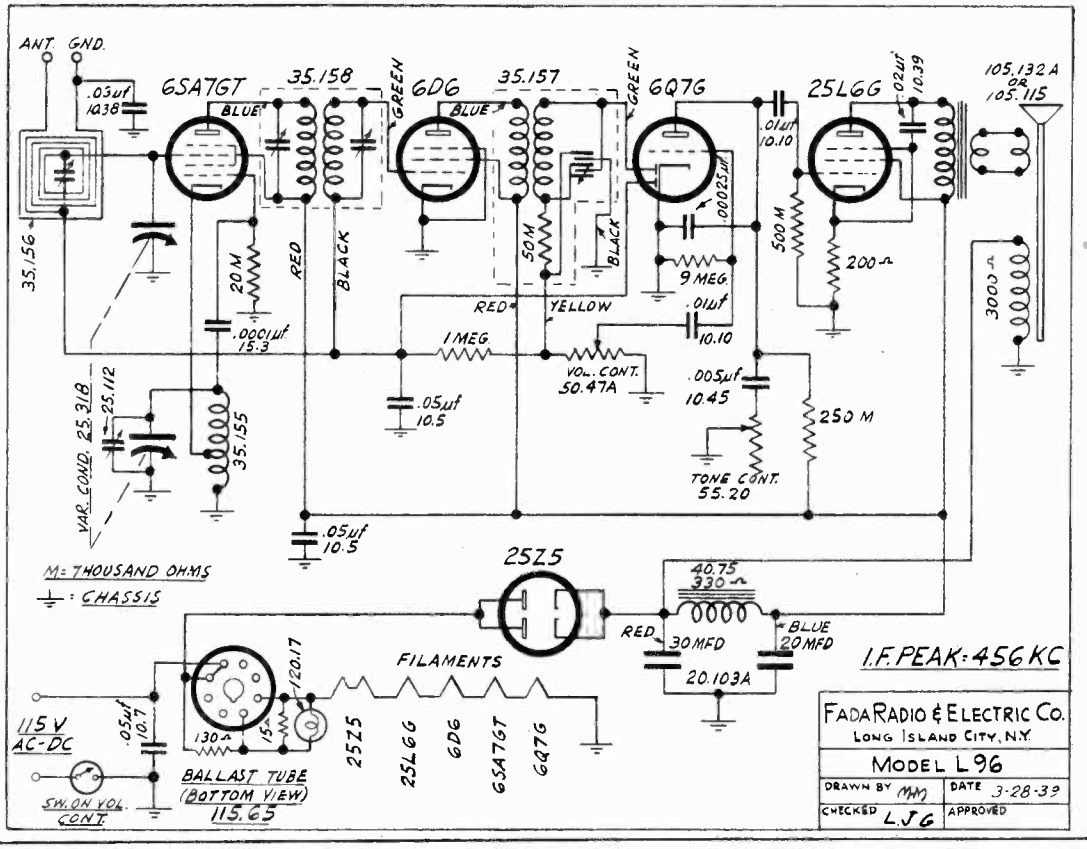


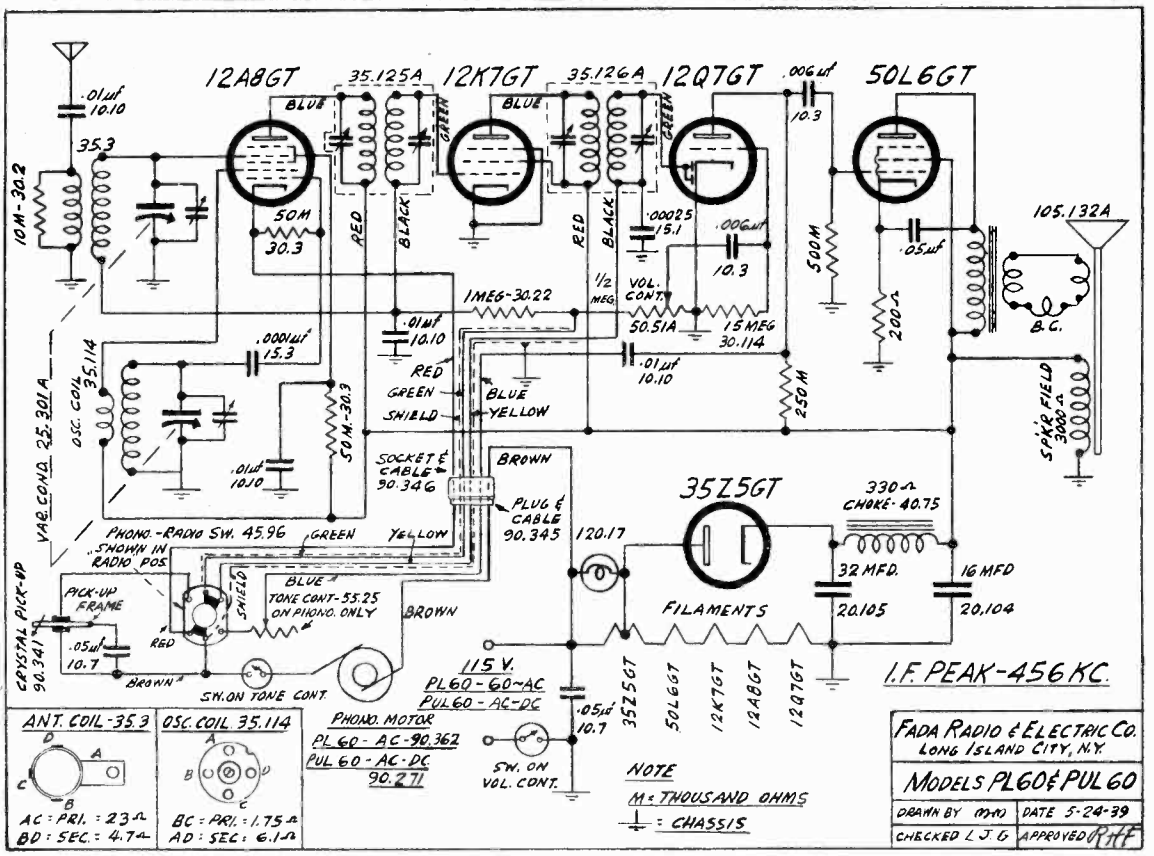
HUM - A.C. leads from ballast to rectifier (Blue and Brown) are too close to the grid of the 6SQ7GT in some sets. Lift and rearrange on opposite sides of chassis.



FADA RADIO & ELECTRIC CO

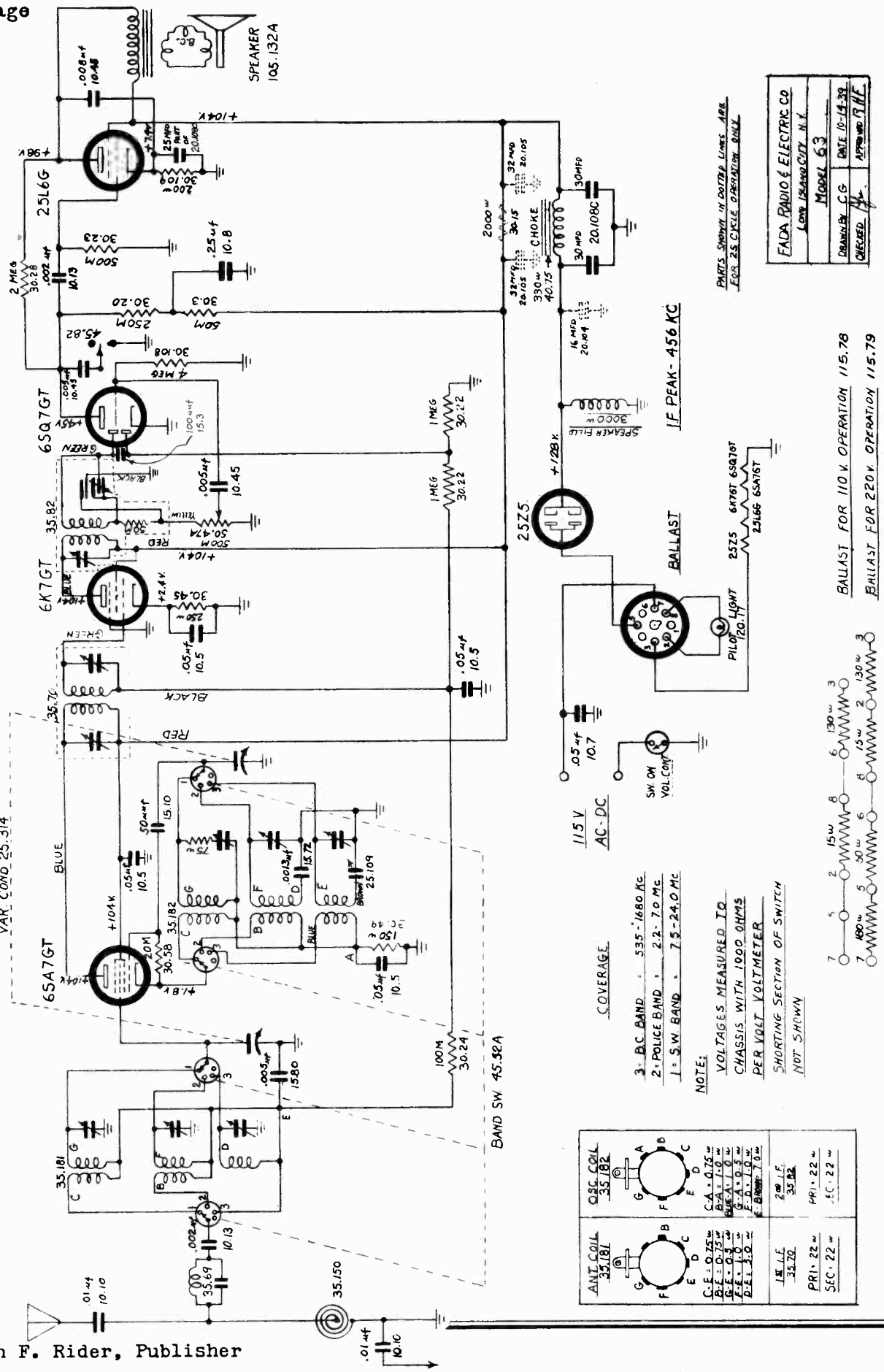
MODELS PL60, PUL60
MODEL L96
Schematics

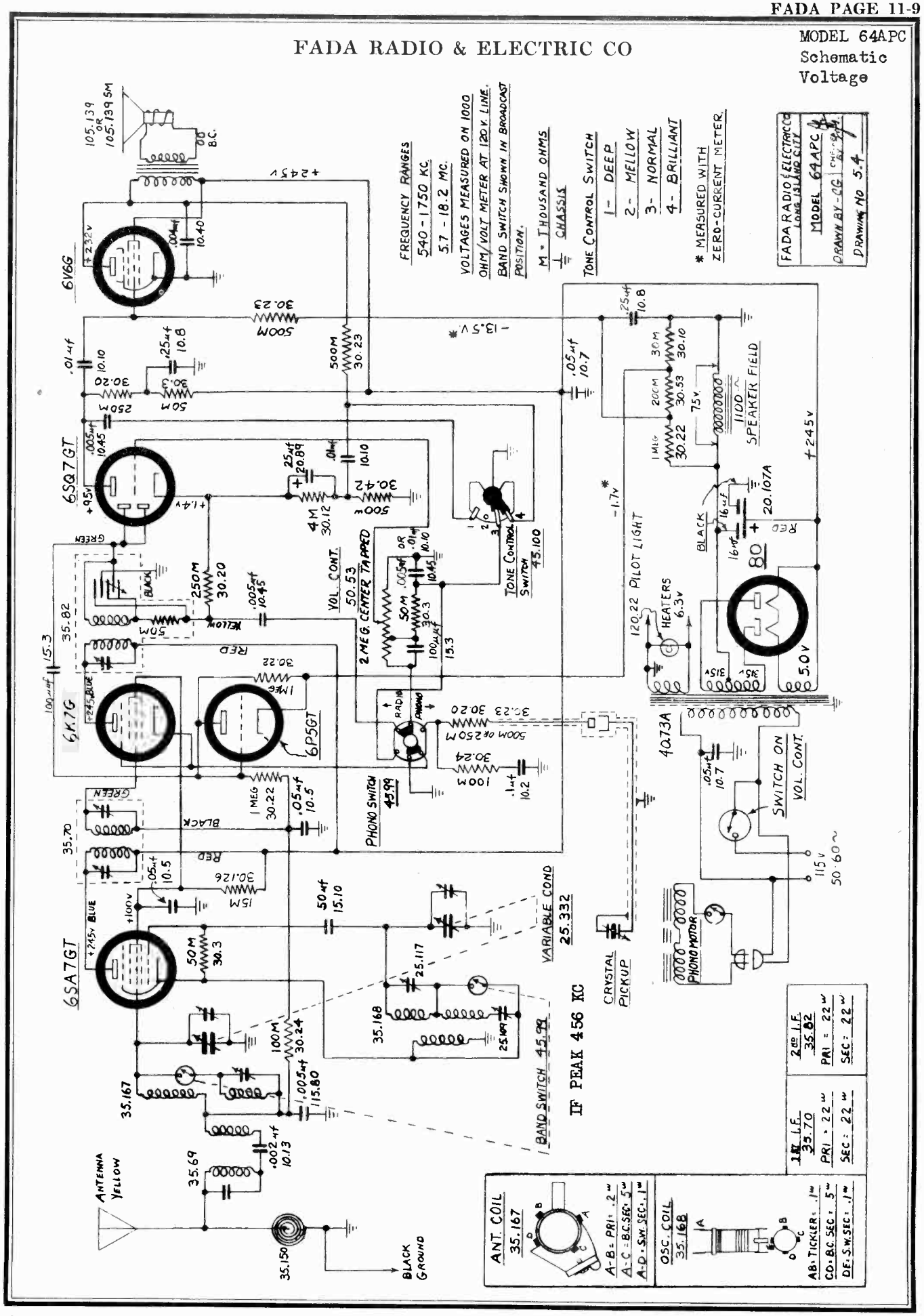




MODEL 63
Schematic
Voltage

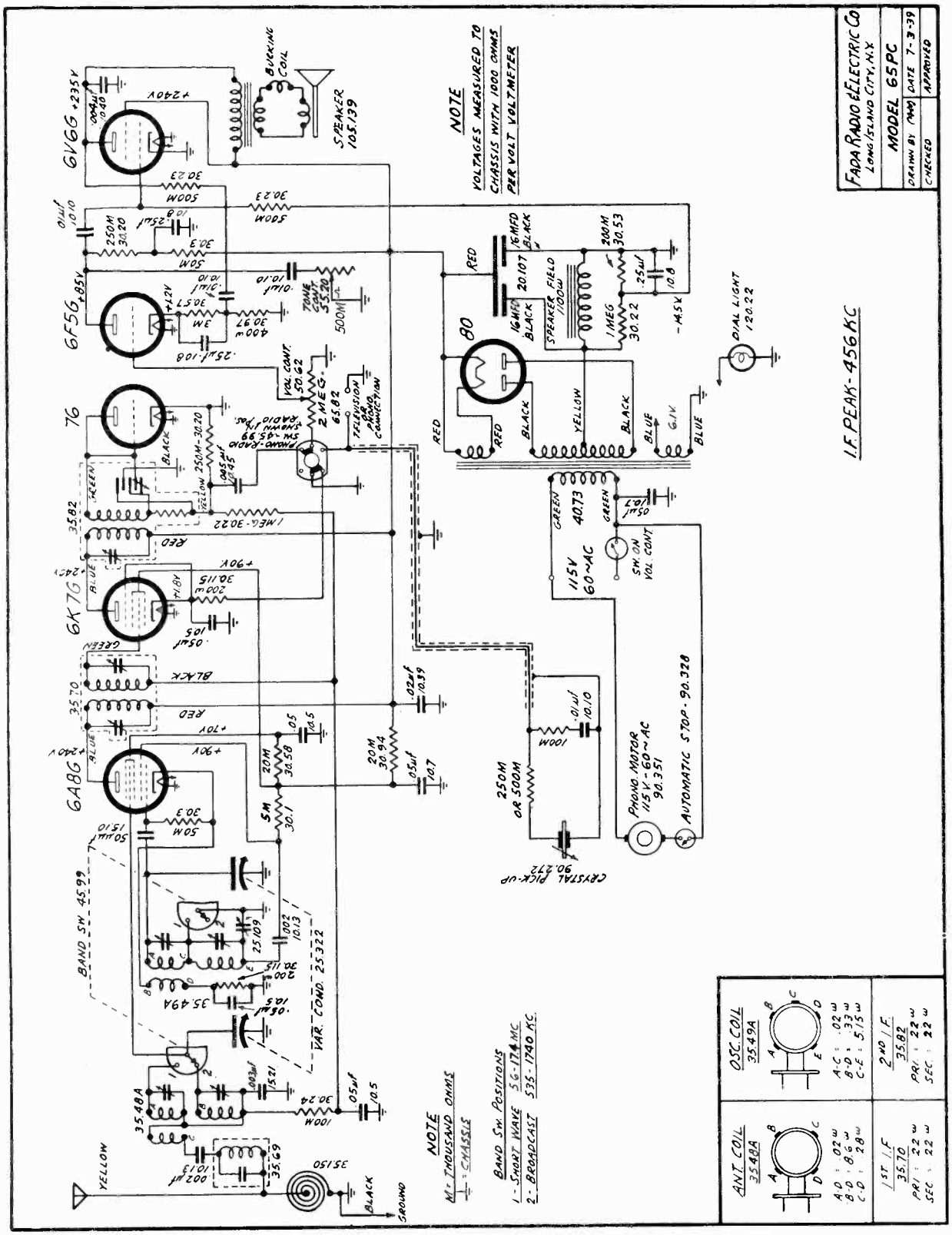
FADA RADIO & ELECTRIC CO





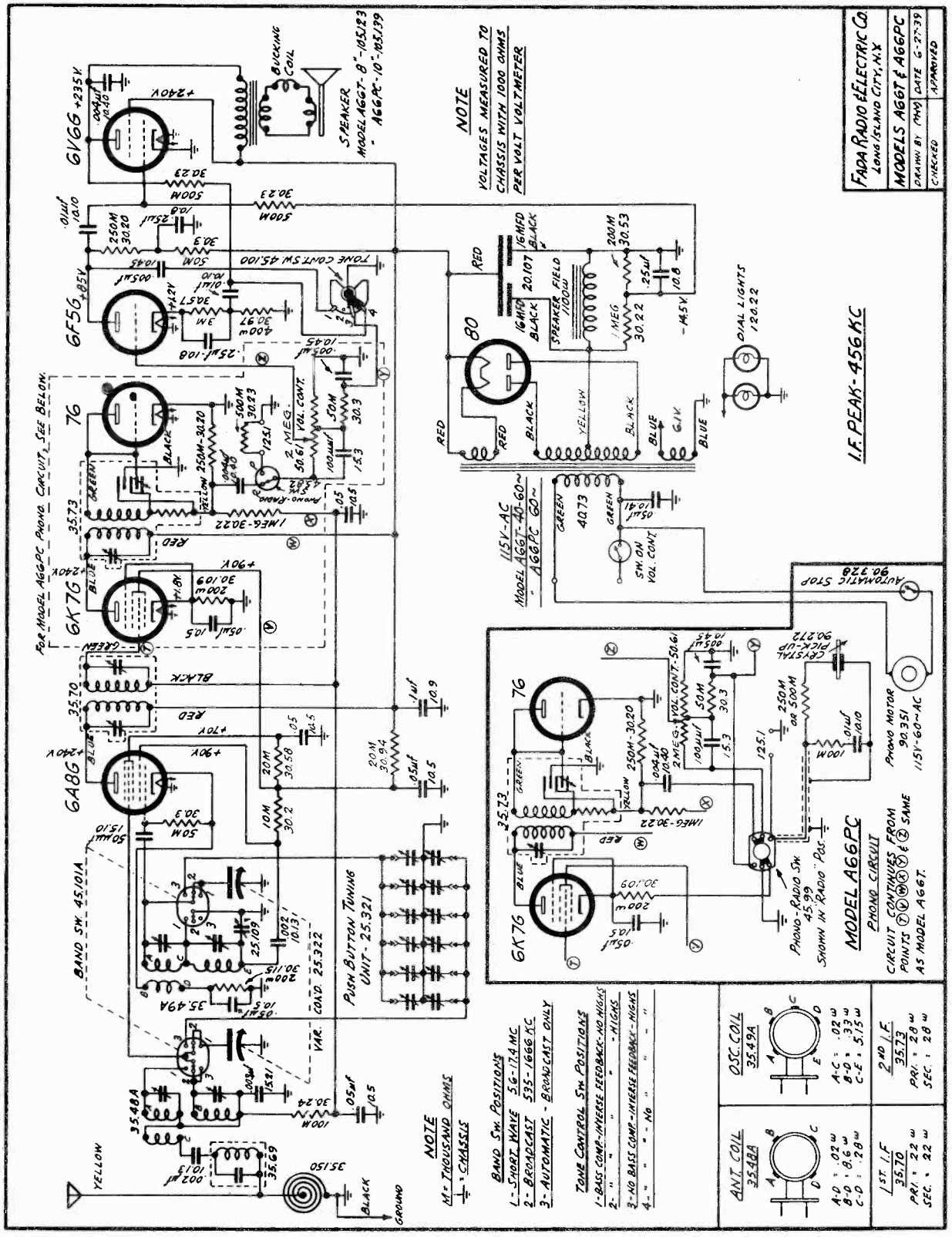
MODEL 65PC
Schematic
Voltage

FADA RADIO & ELECTRIC CO



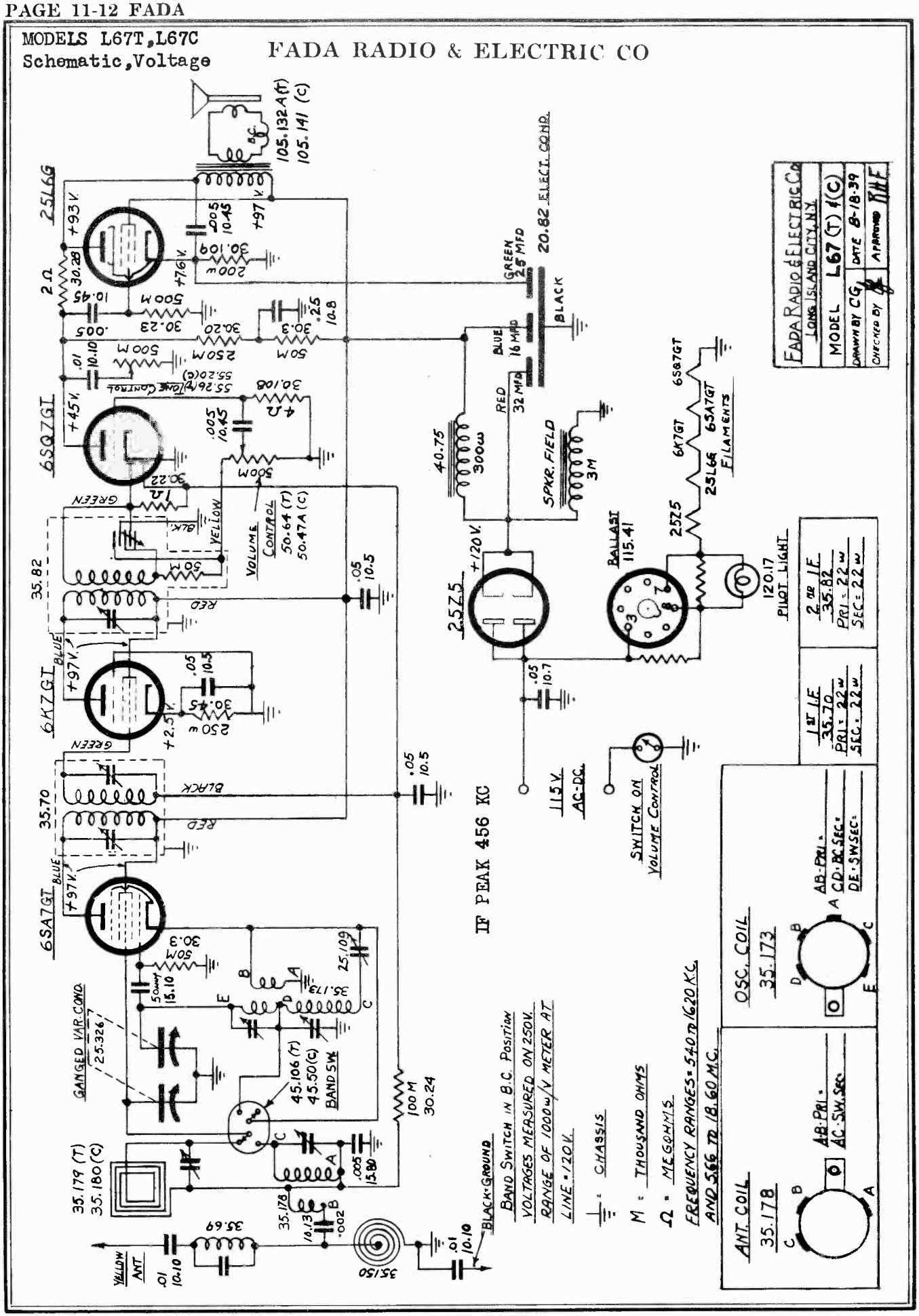
FADA RADIO & ELECTRIC CO

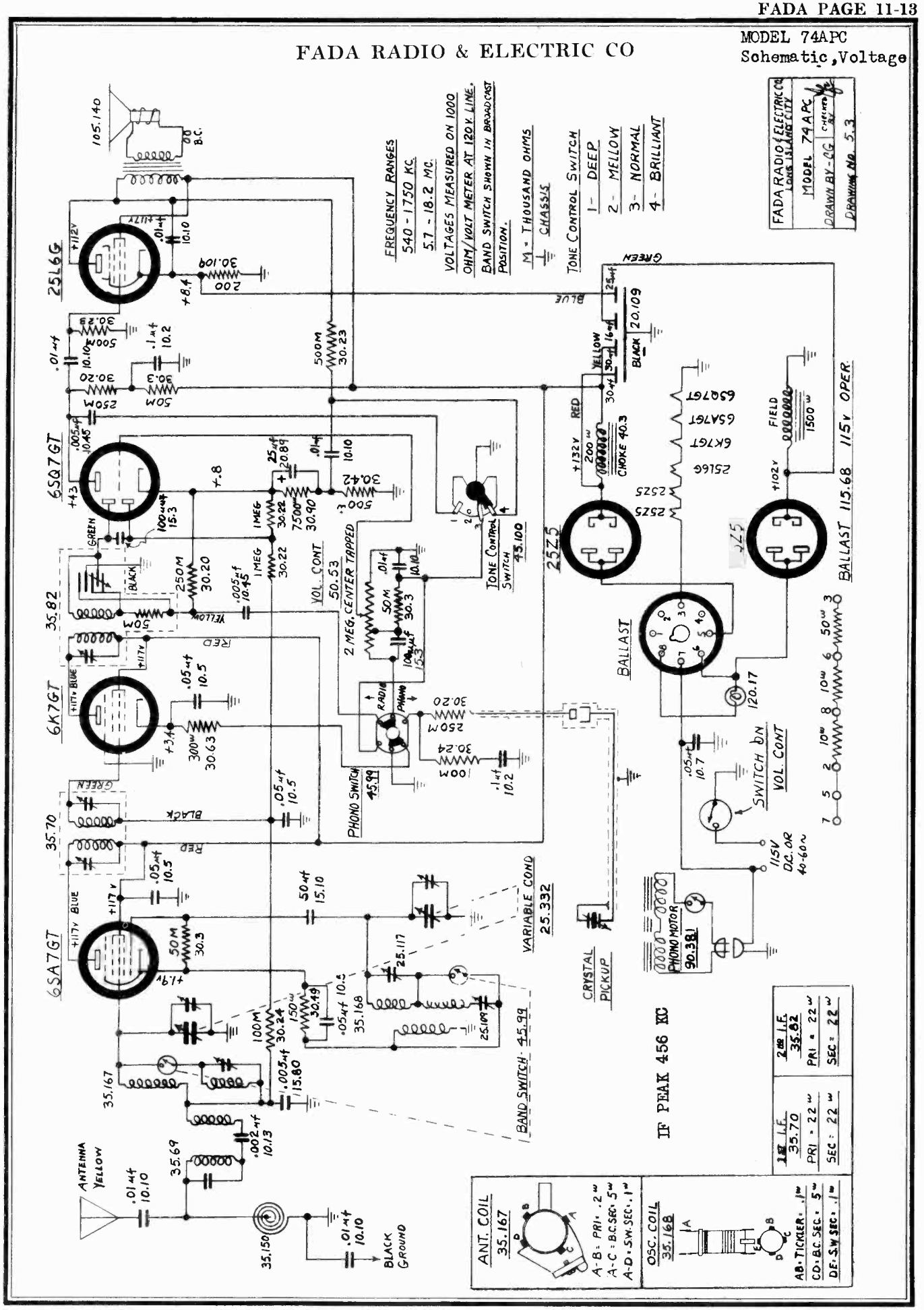
MODELS A66T, A66PC
Schematic, Voltage



MODELS L67T, L67C
Schematic, Voltage

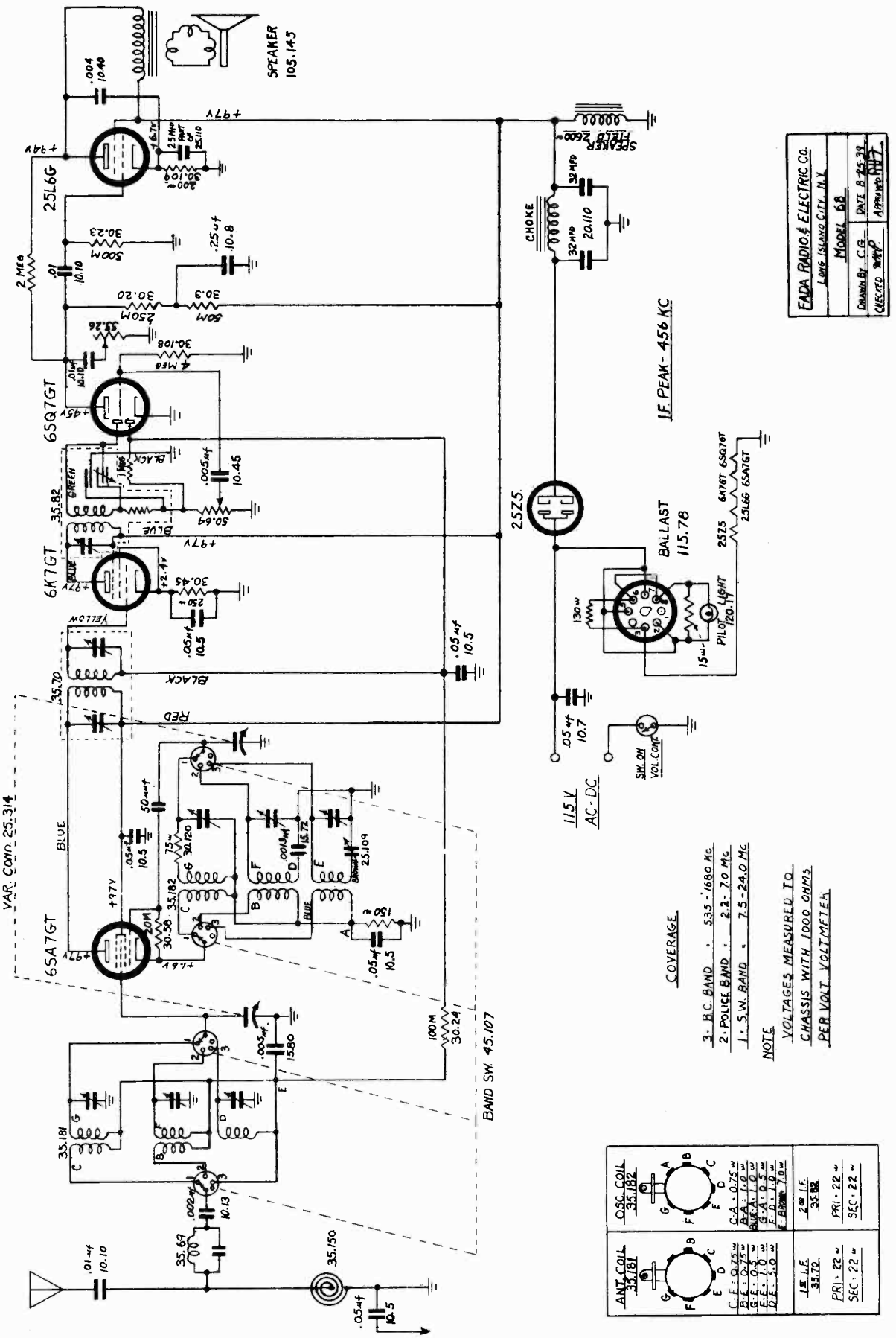
FADA RADIO & ELECTRIC CO





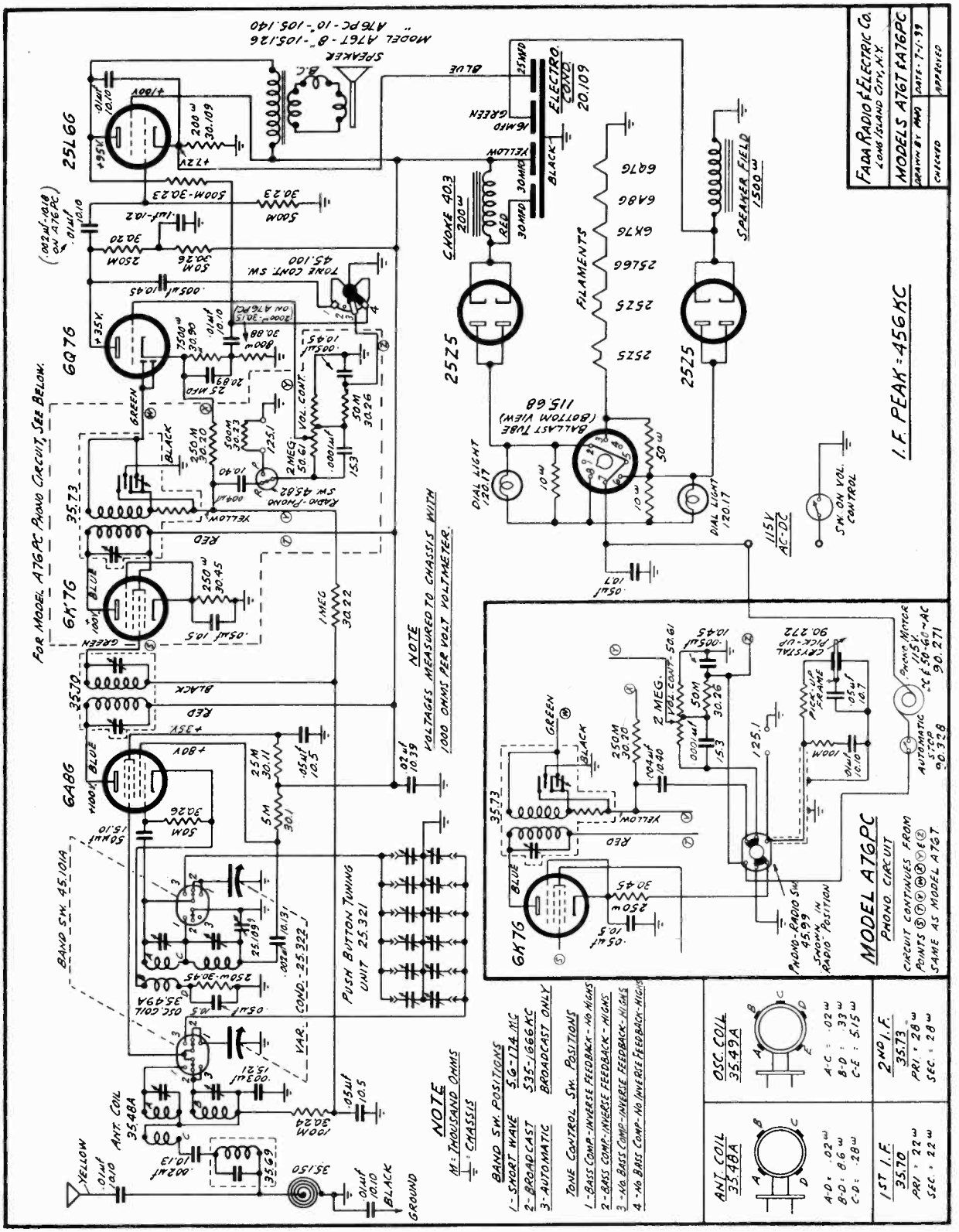
MODEL 68
Schematic, Voltage

FADA RADIO & ELECTRIC CO



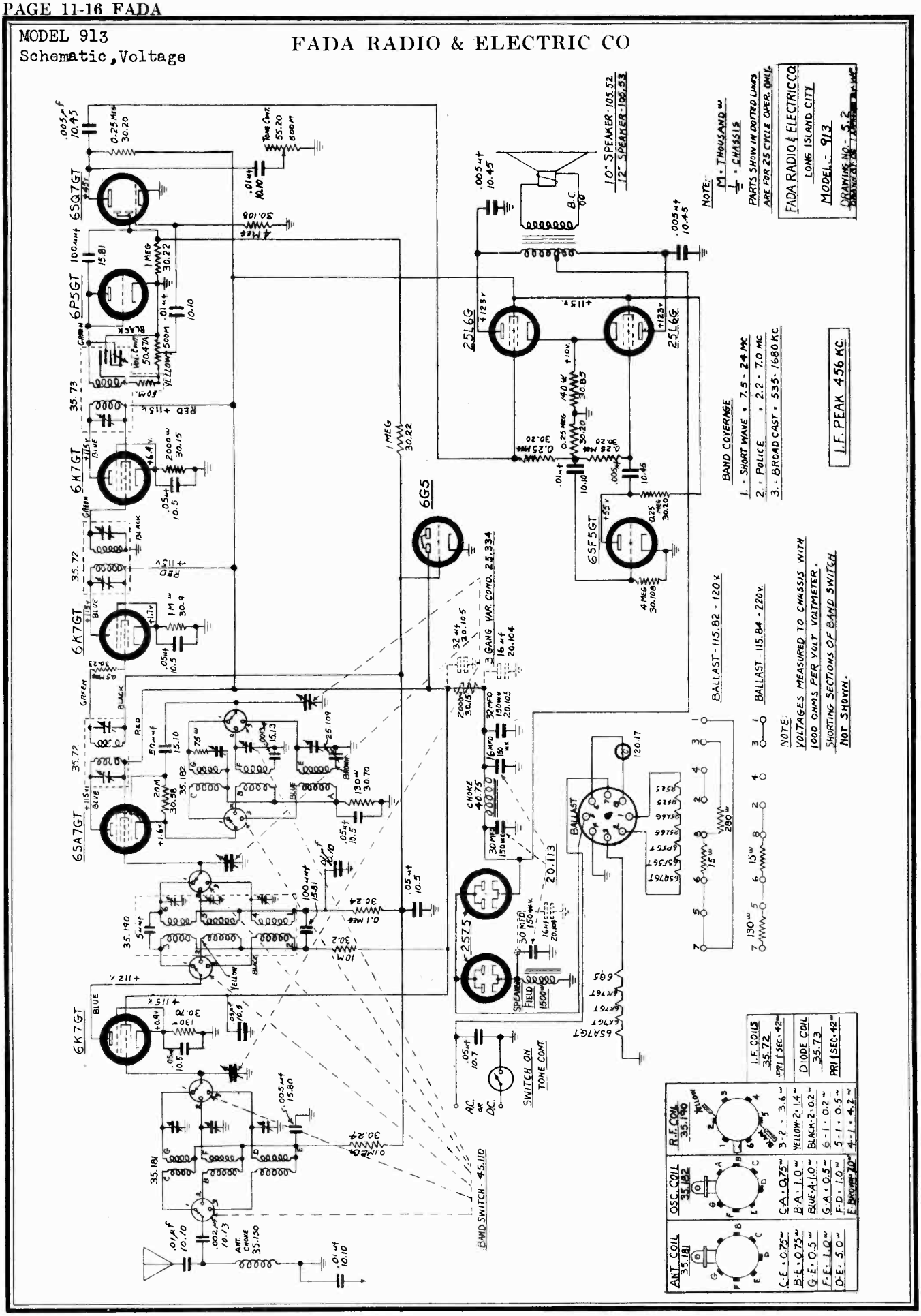
FADA RADIO & ELECTRIC CO

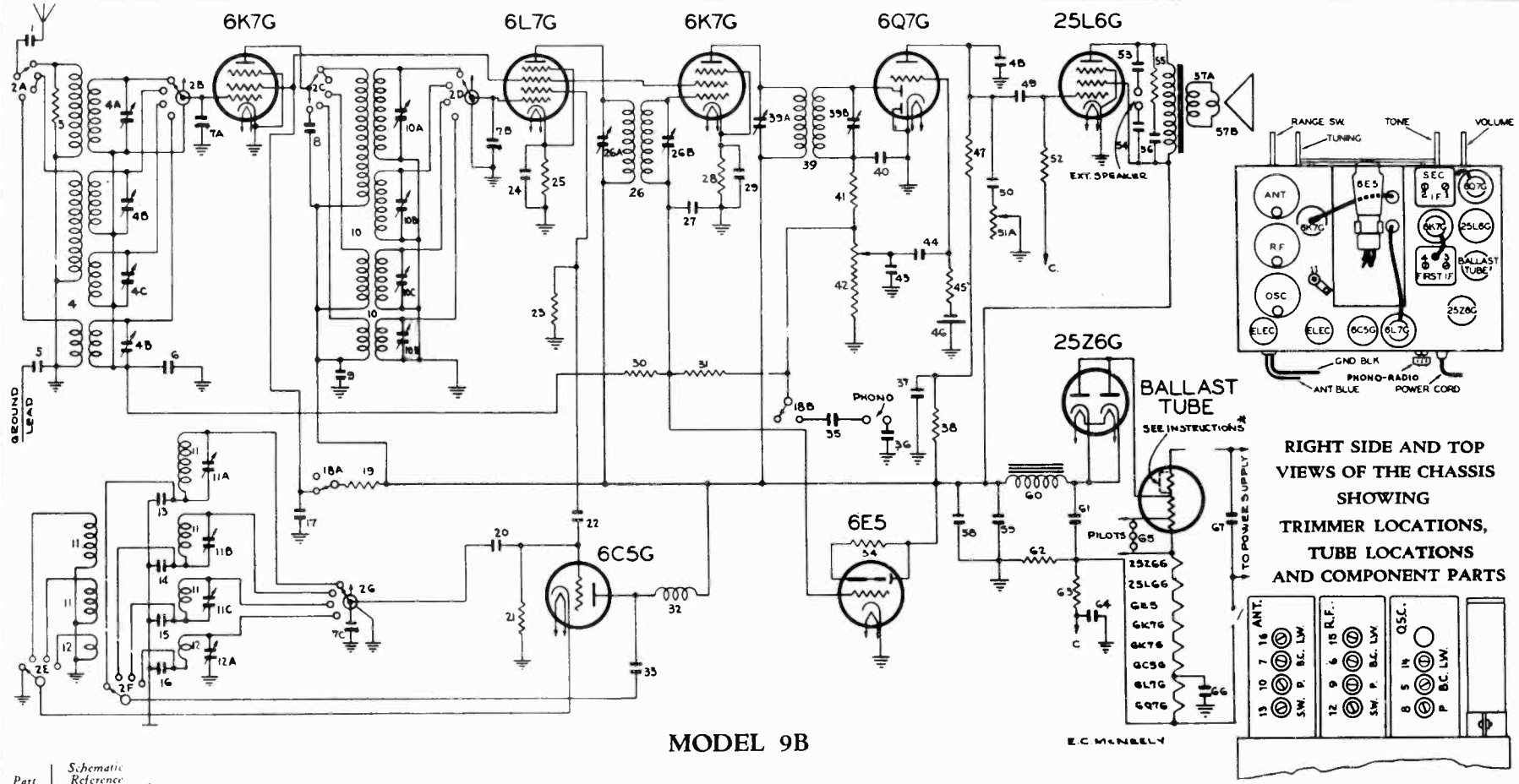
MODELS A76T, A76PC
Schematic, Voltage



MODEL 913
Schematic, Voltage

FADA RADIO & ELECTRIC CO





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

MODEL 9B

IF PEAK 456 KC

Part Number	Schematic Reference Number	Description
503-8	12	Coil Assembly—HF Oscillator
280-1	12A	Condenser—Air Trimmer
420-3	60	Choke—Iron Core Filter, 200 oh...
425-4	32	Choke—Oscillator Plate
211-4	61	Condenser—Electrolytic 30 mfd., 150 volt
210-3	59	Condenser—Electrolytic 20 mfd., 150 volt
261-25	16	Condenser—Mica 5700 mmfd., HF. Pad.
260-5	22	Condenser—Mica 50 mmfd.
260-7	20, 40, 43, 48	Condenser—Mica 100 mmfd.
260-13	8	Condenser—Mica 500 mmfd.
260-18	33	Condenser—Mica 1000 mmfd
285-3	15	Condenser—Semi Fixed Padder 1535 mmfd.
285-4	14	Condenser—Semi Fixed Padder 503 mmfd.
285-5	13	Condenser—Semi Fixed Padder 296 mmfd.
251-1	67	Condenser—Moulded Paper .01-600 volt
250-12	1	Condenser—Tubular Paper .01-400 volt
250-15	44, 49, 56, 64	Condenser—Tubular Paper .02-600 volt
250-16	50	Condenser—Tubular Paper .03-600 volt
250-39	6, 24, 27, 29, 66	Condenser—Tubular Paper .05-200 volt
250-21	5, 9, 17, 35, 36, 53, 54	Condenser—Tubular Paper .1-200 volt
250-27	37, 58	Condenser—Tubular Paper .25-200 volt
203-1	7—A, B, C	Condenser—Variable Tuning, 3-Gang
340-5	51—A, B	Control—Tone and Power Switch 500,000 ohm
340-9	42	Control—Volume 500,000 ohm
337-2	62	Resistor—Wire Wound 100 ohm, 1 watt
302-17	55	Resistor—Fixed Carbon 4700 ohm, 1 watt
301-9	28	Resistor—Fixed Carbon 220 ohm, ½ watt
301-10	25	Resistor—Fixed Carbon 330 ohm, ½ watt
301-15	19	Resistor—Fixed Carbon 2200 ohm, ½ watt
301-17	3	Resistor—Fixed Carbon 4700 ohm, ½ watt
301-23	21, 23, 30 38, 41	Resistor—Fixed Carbon 47,000 ohm, ½ watt
301-26	47	Resistor—Fixed Carbon 150,000 ohm, ½ watt
301-27	63, 52	Resistor—Fixed Carbon 220,000 ohm, ½ watt
301-29	45	Resistor—Fixed Carbon 470,000 ohm, ½ watt
301-31	31	Resistor—Fixed Carbon 1 megohm, ½ watt
805-2	65	Dial Light .25 Amp., 6.3 volt
22-7	57—A, B	Speaker—PM, Dyn. (12")
22-6	57—A, B	Speaker—PM, Dyn. (8")
*	808-1	Tube—Ballast (100-125 volt)
	802-2	Tube—Ballast (125-150 volt)
	808-4	Tube—Ballast 200-255 volt)

ELECTROLYTIC CONDENSER COLOR CODE

(All Other Color Codes Standard R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR		SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR	
Black	0 to 9 mfd.	Black	0 to 99 volts
Brown	9 to 19 mfd.	Brown	99 to 199 volts
Red	19 to 29 mfd.	Red	199 to 299 volts
Orange	29 to 39 mfd.	Orange	299 to 399 volts
Yellow	39 to 49 mfd.	Yellow	399 to 499 volts
		Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.

MODEL 9B
Voltage, Alignment
Resistance

FAIRBANKS, MORSE & CO.

OHMS	VOLTS	6K7G R.F.	VOLTS	OHMS
4 MEG	85V.DC		0	0
4MEG	105V.DC		N.C.	N.C.
102	21V.AC		-.4	1MEG
			25V.AC	104
0	0		0	0

OHMS	VOLTS	6C5G OSCILLATOR	VOLTS	OHMS
INF	0		-12V.DC	40M
			-12V.DC	40M
4MEG	105V.DC			
100	17V. AC		21V.AC	101
0	0		↓	0

OHMS	VOLTS	6L7G	VOLTS	OHMS
4MEG	85		-3	43M
			N.C.	N.C.
4MEG	105		0	6.5
99	8.2AC		19AC	100
0	0		2.4	330

OHMS	VOLTS	6K7G I.F.	VOLTS	OHMS
4MEG	85		1.6	220
			N.C	N.C
4MEG	105		-.6	1↓MEG
108	23AC		29AC	110
0	0		1.6	220

OHMS	VOLTS	607G	VOLTS	OHMS
0	0		4	↓MEG
			105	4MEG
4MEG	55		-.6	500000
95	6.5 AC		8AC	98
0	0		0	0

OHMS	VOLTS	25L6G	VOLTS	OHMS
4MEG	110		-7	440M
			105	4MEG
4MEG	105			
125	60AC		34 AC	117
0	0		0	0

OHMS	VOLTS	808-1 BALLAST	VOLTS	OHMS
190	115AC		N.C.	N.C.
			N.C.	N.C.
190	115AC			
N.C.	N.C.		85AC	137
N.C.	N.C.		80AC	140

OHMS	VOLTS	25Z6G	VOLTS	OHMS
4MEG	125		120AC	190
			110	4MEG
189	120AC			
136	87AC		60AC	121
0	0		125	4MEG

OHMS	VOLTS	6E5	VOLTS	OHMS
1↓MEG	-.6	Green, Red, No External, 1MEG, K Black, Yellow, Yellow	110	4 MEG
N.C.	N.C.		0	0
110	34AC		29AC	113

VOLTAGE AND RESISTANCE DATA

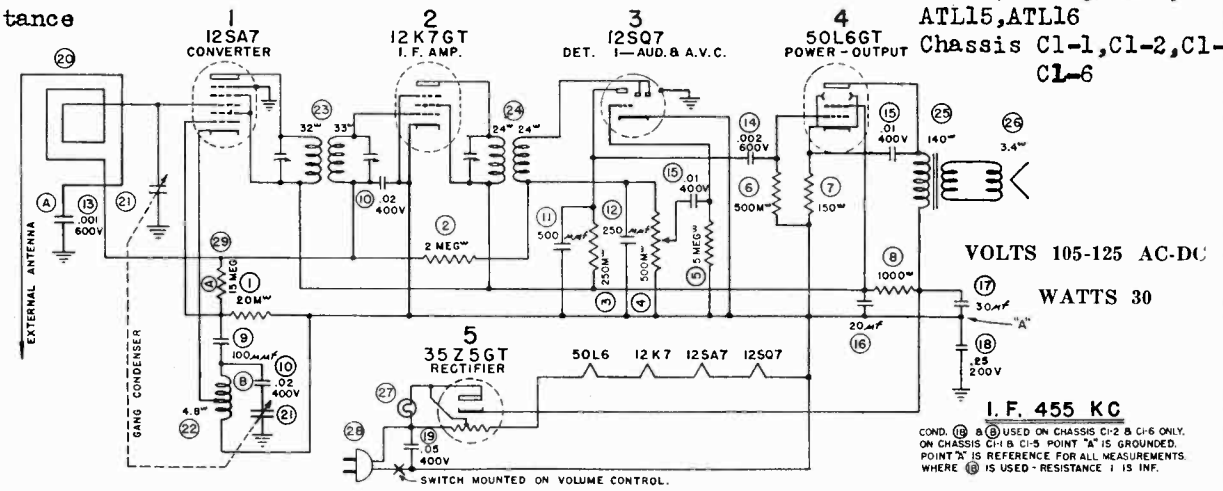
No.	Connect Generator To	Signal Generator Setting Freq.	Meters	Dummy	Range Switch	Dial Setting Freq.	Meters	Stage	Trimmer No.	Peak For	Special Instructions
1	6L7G Grid	456 KC	658	.1 mfd. Condenser	Broadcast	550 KC	550	2nd IF	1	Max.	Note: On all bands—Do not connect low side of signal generator to chassis pan. Connect to black ground lead.
2	6L7G Grid	456 KC	658	.1 mfd. Condenser	Broadcast	550 KC	550	2nd IF	2	Max.	
3	6L7G Grid	456 KC	658	.1 mfd. Condenser	Broadcast	550 KC	550	1st IF	3	Max.	
4	6L7G Grid	456 KC	658	.1 mfd. Condenser	Broadcast	550 KC	550	1st IF	4	Max.	
5	Antenna Lead	350 KC	850	.1 mfd. Condenser	LW-A	350 KC	850	LW Osc.	14	* Max.	*On LW Band—Keep Antenna and speaker leads separated when aligning, to avoid regeneration.
6	Antenna Lead	350 KC	850	.1 mfd. Condenser	LW-A	350 KC	850	LW R.F.	15	* Max.	
7	Antenna Lead	350 KC	850	.1 mfd. Condenser	LW-A	350 KC	850	LW Ant.	16	* Max.	Check Calibration at 175 KC., 1700 Meters.
8	Antenna Lead	1500 KC	200	200 mmfd. Condenser	BC-B	1500 KC	200	BC Osc.	5	Max.	
9	Antenna Lead	1500 KC	200	200 mmfd. Condenser	BC-B	1500 KC	200	BC R.F.	6	Max.	
10	Antenna Lead	1500 KC	200	200 mmfd. Condenser	BC-B	1500 KC	200	BC Ant.	7	Max.	Check Calibration at 600 KC., 500 Meters.
11	Antenna Lead	6.0 MC	50	400 ohm Resistor	Pol.-C	6.0 MC.	50	Police Osc.	8	Max.	
12	Antenna Lead	6.0 Mc.	50	400 ohm Resistor	Pol.-C	6.0 MC.	50	Police R.F.	9	Max.	
13	Antenna Lead	6.0 MC	50	400 ohm Resistor	Pol.-C	6.0 MC.	50	Police Ant.	10	Max.	Check Calibration at 2.5 MC., 120 Meters.
14	Antenna Lead	18 MC	17	400 ohm Resistor	SW-D	18 MC.	17	SW Osc.	11	** Max.	**Check for image at 17.1 MC., or 17.5 meters approx. If not received, oscillator is not aligned on fundamental.
15	Antenna Lead	18 MC	17	400 ohm Resistor	SW-D	18 MC.	17	SW R.F.	12	Max.	
16	Antenna Lead	18 MC	17	400 ohm Resistor	SW-D	18 MC.	17	SW Ant.	13	Max.	Check Calibration at 7.5 MC., 40 meters.

ALIGNMENT PROCEDURE CHART

Schematic
Voltage
Alignment
Resistance
Parts

FARNESWORTH TELEV. & RADIO CORP.

MODELS AT10, AT11, AT12
AT14, AT15, AT16, AT110,
AT111, AT112, AT114,
AT115, AT116
Chassis C1-1, C1-2, C1-5
C1-6



	1		2		3		4		5	
	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE
1	NONE	NONE	NONE	NONE	NONE	NONE	NONE	INF	NONE	120
2	22 AC	24	33 AC	36	NONE	5 MEG	33 AC	36	115 AC	100
3	80+	INF *	80+	INF *	NONE	500M	120+	INF *	110 AC	100
4	82+	INF *	82+	INF *	NONE	500M	82+	INF *	NONE	NONE
5	6-	20M	NONE	NONE	NONE	500M	NONE	500M	110AC	100
6	NONE	NONE	NONE	2.5MEG	55 + †	INF *	----	OPEN	82 +	INF *
7	11AC	12	24	CAP 2.5MEG	11AC	12	78AC	77	78AC	77
8	NONE	2.5 MEG	NONE		NONE	NONE	6+	150	130+	INF *
		CAP. NONE								

† – THIS VALUE WILL VARY WITH VOLTMETER DUE TO SERIES RESISTOR.
* – RESISTANCE WILL DEPEND ON CONDITION OF ELECTROLYTIC CONDENSER.

BOTTOM VIEW OF SOCKETS

VOLTMETER RESISTANCE 1000 PER VOLT.
LINE VOLTAGE 117 VOLTS.

With the low side (G) of the signal generator connected to the chassis through a .01 mfd. 200 Volt condenser, the following procedure should be used when aligning the receiver:

TABULATION FOR ALIGNMENT

STEPS	Connect High Side of Generator to	Set Generator at	Set Gang at	Adjust the following	Located	To obtain
1.	SET VOLUME CONTROL AT MAXIMUM					MAXIMUM OUTPUT
2.	12K7GT I.F. Grid Cap in Series with .01 Mfd.*	455 Kc.	A Quiet Point	2nd I .F. Trimmer Only one	Top of Chassis	
3.	High Side of Loop in Series with .01 Mfd.			1st I. F. Trimmers 2 used	End of Chassis	
4.	Antenna in Series with 1000 mmf.	1730 Kc.	Minimum Capacity	Oscillator Trimmer	Side of Gang Condenser	
5.		1400 Kc.	1400 Kc.	Antenna Trimmer		
6.		600 Kc.	600 Kc.	End Plates of Gang		
7.	RECHECK ALL ABOVE ADJUSTMENTS					

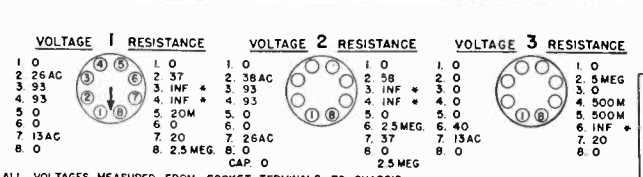
*Do not remove grid cap.

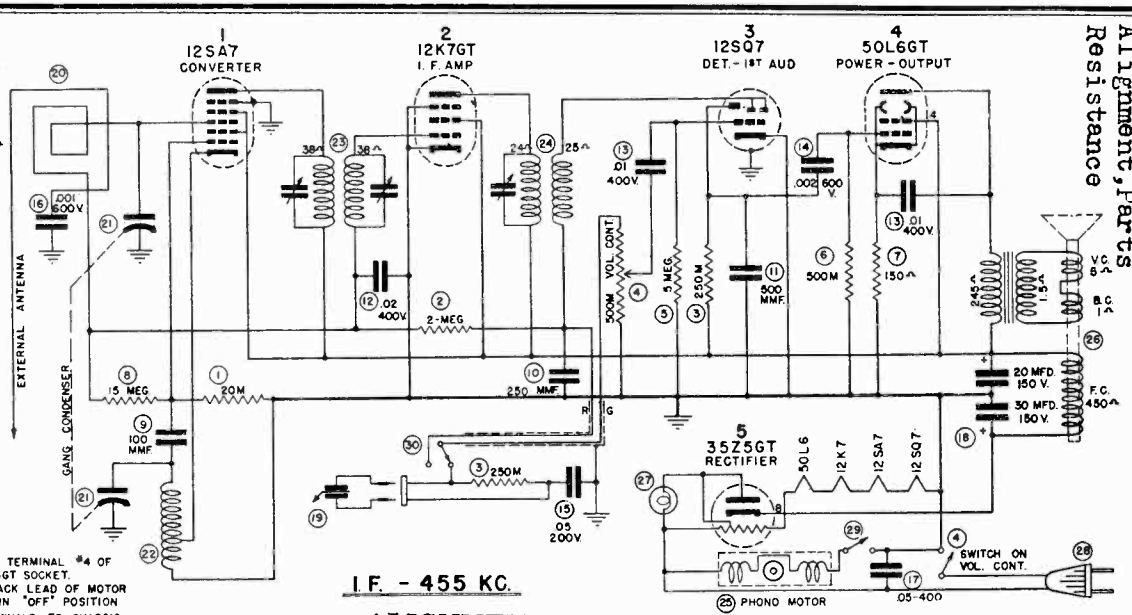
Ref. No.	Part No.	DESCRIPTION
1	773-16	20 M ohms—½ W.
2	773-25	2 Meg.—½ W.
3	773-21	250 M ohms—½ W.
4	782-1	500 M ohms Var. Vol. Cont.
5	773-27	5 Meg.—½ W.
6	773-23	500 M ohms—½ W.
7	773-35	150 ohms—½ W.-10%
8	775-9	1000 ohms—1 W.
9	253-1	100 mmf.—Mica
10	255-3	.02 mfd. 400 V.
11	253-3	500 mmf.—Mica
12	253-2	250 mmf.—Mica
13	255-1	.01 mfd. 400 V.
14	254-5	.002 mfd. 600 V.
15	255-1	.01 mfd. 400 V.
16 & 17	259-1	20 mfd. - 30 mfd.—150 V.
18	256-3	.25 mfd. 200 V.
19	255-2	.05 mfd. 400 V.
20	388-1	Loop & Shield Assembly
21	266-1	Gang Condenser
21	265-1	Gang Cond.—For Button Tuning
22	389-1	Osc. Coil
22	3811-1	Osc. Coil—Underwriters
23	387-1	1st I. F. Trans. Assembly
24	3810-1	2nd I. F. Trans. Assembly
26	814-1	Speaker Complete (C1-1, C1-5)
26	814-2	Speaker Complete—Underwriters
27	421	Pilot Light
28	2710-1	Line Cord
28	2713-1	Line Cord—Underwriters
	318-1	Dial Scale
	317-1	Dial Cover (Pyralyn)
	111-1	Dial Pointer
	595-1	Knob Walnut
	595-2	Knob Ivory
	596-1	Handle Walnut
	596-2	Handle Ivory
	601-1	Cardboard Back
	801-1	Tube Socket
	594-1	Push Button (Walnut)
	594-2	Push Button (Ivory)

MODEL AK-17

Chassis Cl-3 FARNESWORTH TELEV. & RADIO CORP.

Schematic, Voltage Alignment, Parts Resistance





Ref. No.	Part No.	DESCRIPTION
1	773-16	20 M ohm
2	773-25	2 meg.
3	773-21	250 M ohm
4	782-1	500 M ohm
5	773-27	5 meg.
6	773-23	500 M ohm
7	773-35	150 ohm
8	773-30	15 meg.
9	253-1	100 mmfd. mica
10	253-2	250 mmfd.
11	253-3	500 mmfd.
12	255-3	.02 mfd. 400 V.
13	255-1	.01 mfd. 400 V.
14	254-5	.002 mfd. 600 V.
15	256-1	.05 mfd. 200 V.
16	254-9	.001 mfd. 600 V.
17	255-2	.05 mfd. 400 V.
18	259-1	20 mfd.—30 mfd. 150 V.
19	712-1	Replacement Cartridge
20	388-1	Loop & Shield assy.
21	266-1	Gang Condenser
22	389-1	Oscillator Coil
23	387-1	1st I. F. Transformer
24	3810-1	2nd I. F. Transformer
25	442-1	Phono Motor
26	8113-1	Speaker Complete
27	421-1	Pilot Lamp
28	2710-1	Line Cord
29	134-2	Automatic Stop Assembly
30	909-1	Phono-radio Switch
	6024-1	Cardboard back
	713-1	Tone Arm
	135-1	Tone Arm Rest
	318-1	Dial Scale
	317-1	Dial Cover
	111-1	Dial Pointer
	595-1	Knob Walnut
	3658-1	Idler Retaining Spring
	1318-1	Phono Idler Pulley
	3657-1	Snap Buttons (for back)
	5658-1	Needle Cup
	3655-1	Needle Screw

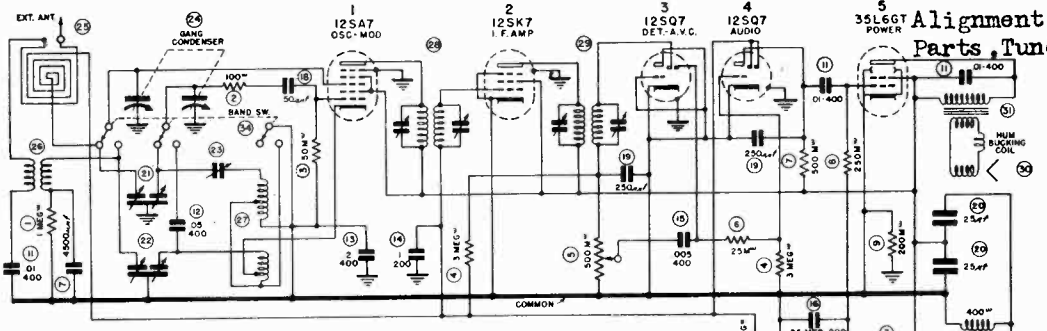
With the low side of the signal generator connected to the chassis through a .01 mfd. 200 volt condenser, the following procedure should be used when aligning the receiver:

STEPS	Use in Series With Generator	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	SET VOLUME CONTROL AT MAXIMUM					
2.	.01 mfd. to grid cap of 12K7GT I. F.*	455 Kc.	Minimum	2nd I. F. trimmer (1)	Top of Chassis	MAXIMUM OUTPUT
3.	.01 to high side of loop			1st I. F. trimmers (2)	End of Chassis	
4.	1000 mmf. to antenna	1730 Kc.		Oscillator Trimmer	Side of Gang Condenser	
5.		1400 Kc.	1400 Kc.	Antenna Trimmer		
6.		600 Kc.	600 Kc.	End Plates of Gang		
7.	RECHECK ALL ABOVE ADJUSTMENTS					

*Do not remove grid cap.

MODELS AT-20 to AT23
Chassis C5-1
Schematic, Voltage
Alignment, Resistance
Parts, Tuner

FARNESWORTH TELEV. & RADIO CORP.

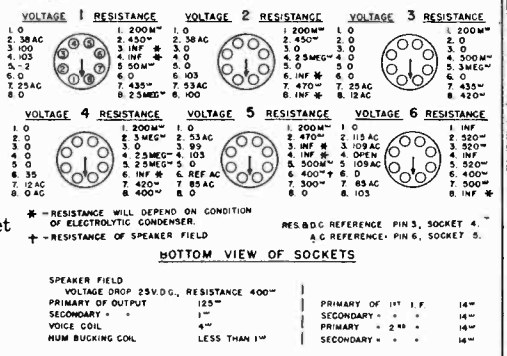


VOLTS
105-125
AC-DC

WATTS 30

INTERMEDIATE FREQUENCY 455 KC

Ref. No.	Part No.		Ref. No.	Part No.	
1	771-24	1 meg. ohm	26	3828-1	S.W. Antenna Coil
2	771-34	100 ohm	27	3829-1	Oscillator Coil
3	771-48	50 M ohm	28	3826-1	1st I. F. Transformer
4	771-26	3 meg. ohm	29	3827-1	2nd I. F. Transformer
5	785-1	500 M ohms Volume	30	816-1	Complete Speaker
6	771-16	25 M ohms Control	32	421-1	Dial Light Mazda No. 47
7	771-23	500 M ohms	34	906-1	Wave Changes Switch
8	771-21	250 M ohms		413-1	Call Letter Kit
9	771-21	200 M ohms		3116-1	Dial Scale
10	771-29	10 meg ohms		921-2	Dial Cord
11	255-1	.01 mfd. 400 V.		1311-1	Dial Pointer
12	255-2	.05 mfd. 400 V.		3117-1	Dial Crystal
13	255-6	.2 mfd. 400 V.		0710-1	Dial Escutcheon
14	256-2	.1 mfd. 200 V.		5647-1	Button Escutcheon
15	255-5	.005 mfd. 400 V.		5914-3	Tuning Knob Beetle W-23
16	256-3	.25 mfd. 200 V.		5914-1	Tuning Knob Red
17	2513-4	4500 mmfd. ± 3%		5914-2	Tuning Knob for Wood Cabinet
18	253-3	50 mmfd.		5915-1	Tuning Button Beetle W-23
19	253-2	250 mmfd.		5915-2	Tuning Button Red
20	2515-1	25 mfd. 200 V.		5916-1	Tuning Button for Wood Cabinet
21	2613-1	Dual Antenna Trimmer		5646-1	Dial Shaft
22	2612-1	Dual Oscillator Trimmer			
23	2614-1	600 Kc. Pac 200—600 mmfd.			
24	2611-1	Gang Condenser			
25	3830-1	Loop Antenna			



PUSH BUTTON SET UP

At the right hand end of the top of the cabinet four buttons project. These buttons are set for stations by—

1. Loosen button to be set by unscrewing it about one full turn.
2. Depress button which is to be set up.
3. While holding button down, carefully tune in the station to be set up.
4. Tighten button—detune set and check button by depressing it.

The other three buttons are set up in the same manner.

ALIGNMENT PROCEDURE

To properly align this set an output meter and a signal generator are required. The generator must be calibrated at the following points: 455 Kc., 600 Kc., 1400 Kc., 1600 Kc., 6 Mc., 10 Mc., 15 Mc., and 18.3 Mc.

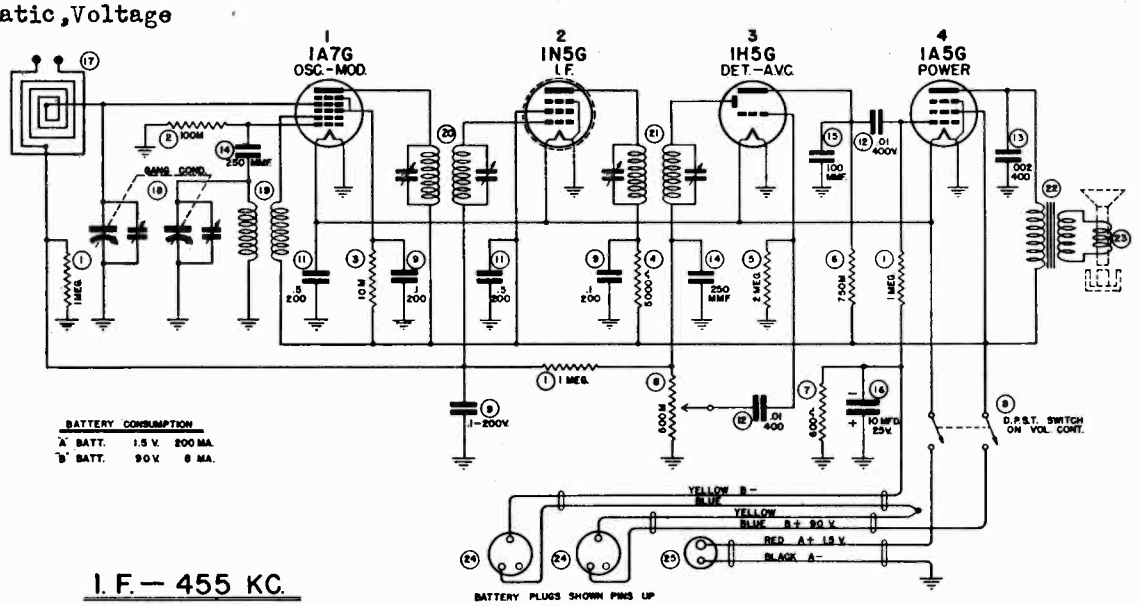
Always run the output of the signal generator as low as possible and still have accurate readings of the output meter. Connect high side of generator to antenna lead and low side to chassis through .01 condenser.

STEPS	In Series With Antenna	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	SET VOLUME CONTROL AT MAXIMUM					MAXIMUM OUTPUT
2.	250 mmfd.	455 Kc.	Minimum	2nd I. F. Trimmers	Front Top of Chassis	
3.				1st I. F. Trimmers	Rear Top of Chassis	
4.		1600 Kc.		B. C. Osc. Trimmer	Rear Side	
5.		1400 Kc.	Strongest Sig. & Rock Gang While Adjust. Is Made	B.C. R.F. Trimmer	Osc. is Right hand. R.F. Left Hand Screw	
6.		600 Kc.		B.C. Pad	Top of Chassis	
7.	Recheck	1400 Kc.				
8.	400 ohms No Condenser	18.3 Mc.	Minimum	S.W. Osc. Trimmer	Bottom of Osc. Coil. Osc. Trimmer Is Nearest Rear of Chassis	
9.		15.0 Mc.	Strongest Sig. & Rock Gang	S.W. R.F. Trimmer		
10.	CHECK SIGNAL AT 6 Mc. and 10 Mc.					

MODEL AT-30
Chassis C6-1
Schematic, Voltage

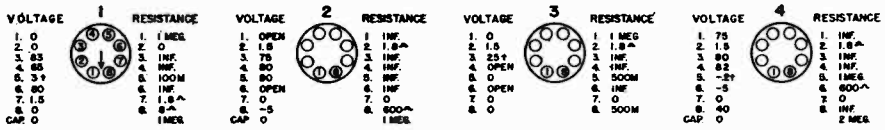
FARNESWORTH TELEV. & RADIO CORP.

Alignment, Parts
Resistance



I. F. — 455 KC.

Any combination of one 1½ volt "A" battery and two 45 volt "B" batteries that will fit in the receiver case will be satisfactory. Battery drain is .2 amp., at 1½ volts and 9 ma., at 90 volts.



BOTTOM VIEW OF SOCKETS

†DEPENDS ON SENSITIVITY OF METER.
RESISTANCE MEASUREMENTS MADE WITH BATTERIES DISCONNECTED.
VOLTAGE & RESISTANCE MEASURED TO GROUND WITH A 1000Ω PER VOLT VOLTMETER.

Ref. No.	Part No.		Ref. No.	Part No.	
		Resistors			**Electrolytic Condensers**
1	771-24	1 meg.	16	2518-1	10 mfd. 25 V.
2	771-19	100 M			**Miscellaneous**
3	771-44	10 M	17	3839-1	Loop Antenna
4	771-13	5 M	18	2617-1	Gang Condensers
5	771-25	2 meg.	19	3840-1	Oscillator Coil
6	771-91	750 M	20	3841-1	1st I. F. Transformer
7	771-38	600 ohms	21	3842-1	2nd I. F. Transformer
8	788-1	500 M Volume Control	22	9412-1	Output Transformer
		Tubular Condensers & Switch	23	817-1	Speaker
9	256-2	.1 mfd. 200 V.	24	8016-1	3 Prong Battery Plug
11	256-5	.5 mfd. 200 V.	25	8019-1	2 Prong Battery Plug
12	255-1	.01 mfd. 400 V.		3130-1	Dial Crystal
13	255-4	.002 mfd. 400 V.		3129-1	Dial Scale
		Mica Condensers		5657-1	Dial Pointer
14	253-2	250 mmfd.		9210-1	Dial Drive Cable
15	253-1	100 mmfd.		5917-2	Knob Marked "Tuning"
				5920-1	Knob Marked "Off-Volume"
				644-1	Dial Cord Spring

ALIGNMENT

To properly align this receiver, a signal generator calibrated at 455 Kc., 1400 Kc., and 1730 Kc., is required. After aligning the I. F. stages, replace receiver in cabinet and FASTEN LOOP IN NORMAL POSITION before aligning the R. F. end through the openings in the end of the cabinet. These openings are closed by snap fasteners. The oscillator trimmer is nearest the front panel and the loop trimmer is directly behind it.

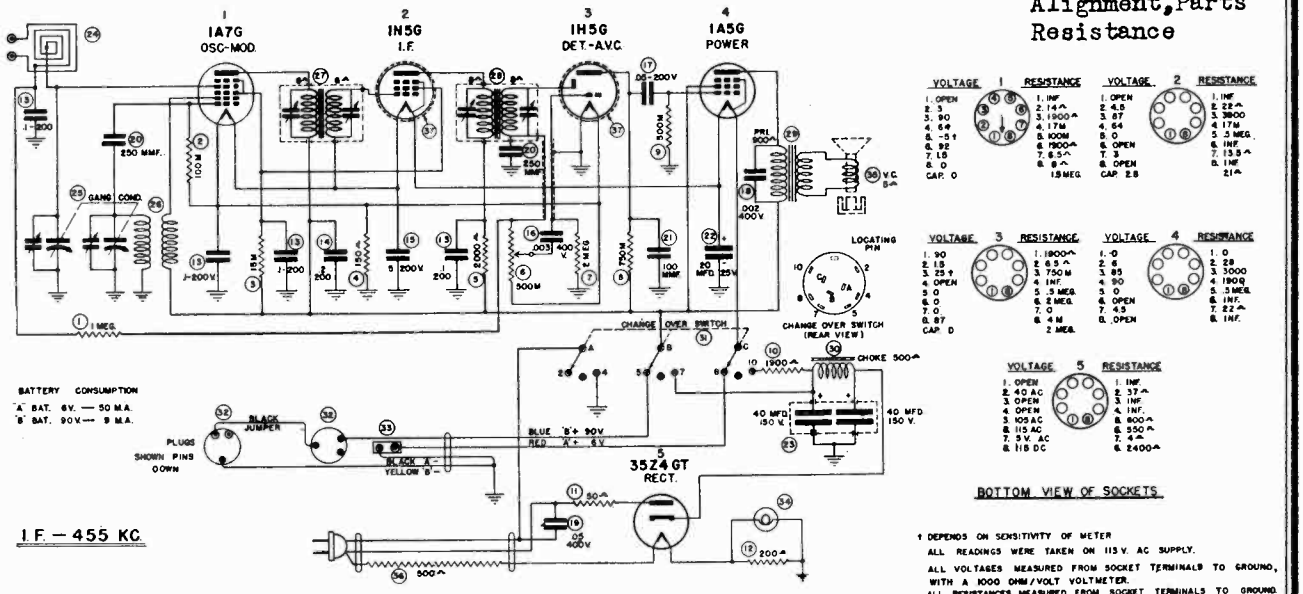
STEPS	Use in Series With Generator	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	.02 mfd. to Chassis Connect high side of Generator to grid cap of 1A7G tube.	455 Kc.	Quiet Point	2nd I. F. Trimmers	Top of I. F. Trans.	MAXIMUM OUTPUT
				1st I. F. Trimmers		
2.	Loop**	1730 Kc.	1730 Kc.	Oscillator Trimmer*	See Note Below	
3.	Loop**	1400 Kc.	1400 Kc. and Rock Gang	Loop Trimmer*		

*See preceding paragraph for location of trimmers.

**Loop to consist of five to ten turns of insulated wire wound on a three to four inch form to be closely coupled to the loop antenna in the receiver.

FARNESWORTH TELEV. & RADIO CORP.

MODEL AT-31
Chassis C7-1
Schematic, Voltage
Alignment, Parts
Resistance



† DEPENDS ON SENSITIVITY OF METER
ALL READINGS WERE TAKEN ON 115 V. AC SUPPLY.
ALL VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND, WITH A 1000 OHM/VOLT VOLTMETER.
ALL RESISTANCES MEASURED FROM SOCKET TERMINALS TO GROUND.

WATTS 30 VOLTS 105-125 AC-DC

Ref. No.	Part No.		Ref. No.	Part No.	
1	771-24	1 meg.	23	2516-1	40 mfd. 150 V.—40 mfd. 150 V. dual
2	773-19	100 M ohm	24	3833-1	Loop Assembly
3	771-45	15 M ohm	25	2615-1	Gang Condenser
4	771-50	150 ohm	26	3834-1	Osc. Coil
5	771-41	2 M ohm	27	3831-1	1st I. F. Transformer
6	786-1	500 M ohm volume control	28	3832-1	2nd I. F. Transformer
7	771-25	2 meg.	29	9410-1	Output Transformer
8	771-91	750 M ohm	30	9411-1	Filter choke
9	771-23	500 M ohm	31	908-1	Change Over Switch
10	779-1	1900 ohm candohm	32	8016-1	Battery plug (3 prong)
11	771-32	50 ohm	33	8017-1	Battery plug (2 prong)
12	778-1	200 ohm flexible	34	422-1	Dial bulb
13	256-2	.1 200 V.	35	818-1	Speaker less transformer
14	256-4	.2 200 V.	36	222-1	Line Cord
15	256-5	.5 200 V.		3118-1	Dial Scale
16	254-3	.003 400		5651-1	Dial Pointer
17	256-1	.05 200		0712-1	Dial escutcheon and crystal
18	255-4	.002 400		5917-1	Knob marked Volume
19	255-2	.05 400		5917-2	Knob marked Tuning
20	253-2	250 mmfd. Mica		5918-1	Knob for AC battery switch
21	253-1	100 mmfd. Mica		926-1	Dial Cord
22	2517-1	20 mfd. 25 V.		5652-1	Dial shaft

WHEN INSTALLING BATTERIES

1. Remove corner brackets. These lift out readily.
2. Put "B" battery against left wall of cabinet. Push against front panel, then slide as far to right as possible against wooden block. Insert other "B" battery in space just vacated.
3. If batteries stick, opening bottom door will facilitate installation.

ALIGNMENT

A signal generator calibrated at 455 Kc., 1400 Kc., and 1730 Kc., is necessary to properly align this receiver. After aligning the I. F. stages, replace receiver in cabinet and fasten loop in normal position before aligning the R. F. end through the openings in the end of the cabinet. These openings are closed by snap fasteners. The oscillator trimmer is nearest the front panel and the loop trimmer is directly behind it.

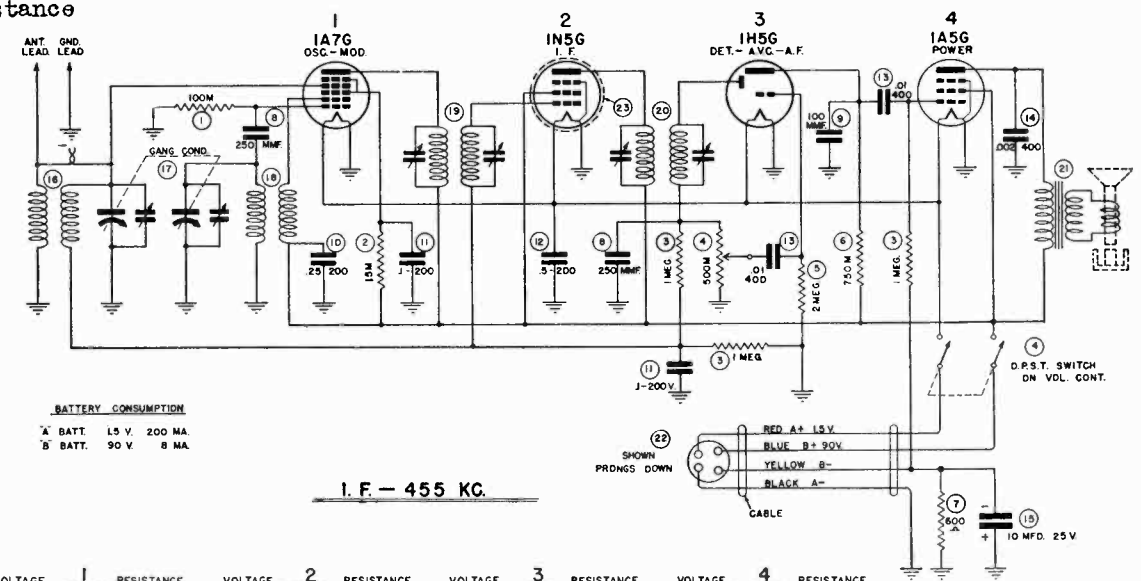
STEPS	Use in Series with Generator	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	.02MFD in each lead Connect high side of generator to grid cap of 1A7G tube	455 Kc.	Quiet Point	2nd I. F. Trimmers 1st I. F. Trimmers	Top of I. F. Trans.	MAXIMUM OUTPUT
2.	Loop**	1730 Kc.	Minimum	Oscillator Trimmer*	See Note Below	
3.	Loop**	1400 Kc.	1400 Kc. & Rock Gang	Loop Trimmer*		

*See preceeding paragraph for location of trimmers.

**Loop to consist of five to ten turns of insulated wire wound on a three to four inch form to be closely coupled to the loop antenna in the receiver.

MODEL AT-40
Chassis C8-1
Schematic, Voltage
Alignment, Parts
Resistance

FARNESWORTH TELEV. & RADIO CORP.



VOLTAGE	1	RESISTANCE
1. OPEN		1. INF.
2. 0		2. 0
3. 85		3. INF.
4. 57		4. INF.
5. -5†		5. 100M
6. 85		6. 1 MEG.
7. 1.5		7. 2.4^
8. 85		8. INF.

VOLTAGE	2	RESISTANCE
1. OPEN		1. INF.
2. 0		2. 0^
3. 85		3. INF.
4. 85		4. INF.
5. 85		5. INF.
6. OPEN		6. INF.
7. 1.5		7. 2.4^
8. OPEN		8. INF.

VOLTAGE	3	RESISTANCE
1. OPEN		1. INF.
2. 1.5		2. 2.4^
3. 25†		3. INF.
4. 0		4. INF.
5. 0		5. INF.
6. 0		6. INF.
7. 0		7. 0
8. 0		8. INF.

VOLTAGE	4	RESISTANCE
1. OPEN		1. INF.
2. 1.5		2. 2.4^
3. 83		3. INF.
4. 85		4. INF.
5. -0.2†		5. INF.
6. -9		6. 600^
7. 0		7. 0
8. OPEN		8. INF.

BOTTOM VIEW OF SOCKETS

† DEPENDS ON SENSITIVITY OF METER.
ALL VOLTAGES AND RESISTANCE MEASURED TO GROUND.
MEASURE RESISTANCE WITH BATTERY DISCONNECTED.

Ref. No.	Part No.		Ref. No.	Part No.	
		Resistors			**Electrolytic Condensers**
1	771-19	100 M ohm	15	2518-1	10 mfd. 25 V.
2	771-45	15 M ohm			**Miscellaneous**
3	771-24	1 meg.	16	3837-1	Antenna Coil
4	787-1	500 M ohm Volume Control & Switch	17	2616-1	Gang Condenser
5	771-25	2 meg.	18	3838-1	Oscillator Coil
6	771-91	750 M ohm	19	3835-1	1st I. F. Transformer
7	771-8	600 ohm	20	3836-1	2nd I. F. Transformer
		Mica Condensers	21	819-1	Speaker Complete
8	253-2	250 mmfd. Mica	22	8018-1	Battery Plug 4 Prong
9	253-1	100 mmfd. Mica	23		Tube Shield
		Tubular Condensers		5655-1	Dial Pointer
10	256-3	.25 mfd. 200 V.		5656-1	Dial Escutcheon
11	256-2	.1 mfd. 200 V.		3120-1	Dial Scale
12	256-5	.5 mfd. 200 V.		5919-1	Knobs
13	255-1	.01 mfd. 400 V.		926-2	Dial Cord
14	255-4	.002 mfd. 400 V.		5653-1	Dial Shaft
				5654-1	Dial Indicator
				3121-1	Dial Crystal

This set is designed to be used with an outdoor antenna which should be placed as high as possible and as far as possible from sources of interference. A good ground connection should be used.

ALIGNMENT

To properly align this receiver, an output meter and a signal generator are required. The generator must be calibrated at the following frequencies: 455 Kc., 600 Kc., 1400 Kc., and 1700 Kc. The volume control must bet set at maximum and the signal generator at the lowest value that will give an accurate reading on the output meter. The high side of the generator is connected to the blue antenna lead and the low side is connected to the black lead.

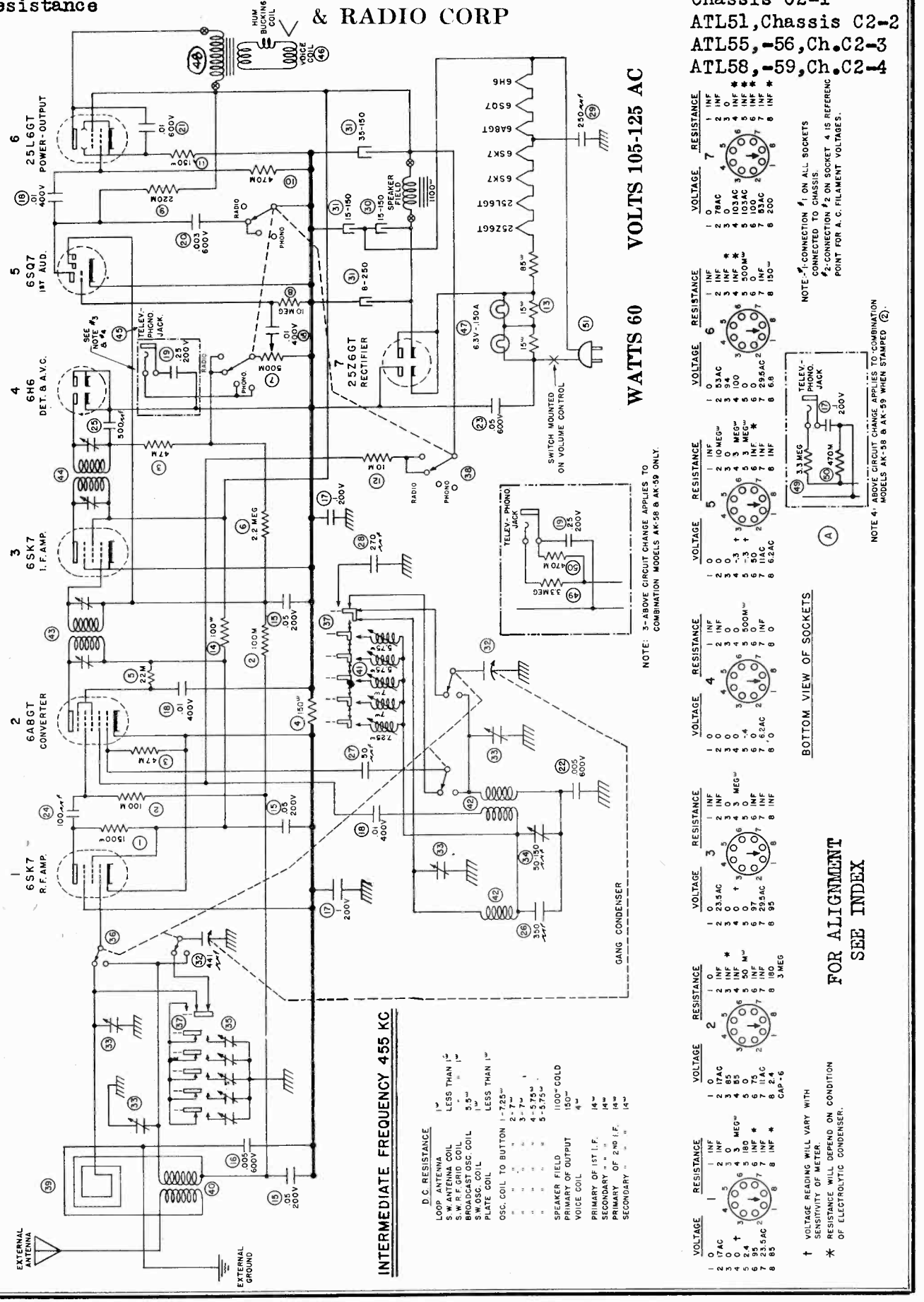
STEPS	In Series With Antenna	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	SET VOLUME CONTROL AT MAXIMUM.					
2.	250 mmf.	455 Kc.	Minimum	2nd I. F. Trimmers	Top of I. F.	MAXIMUM OUTPUT
3.				1st I. F. Trimmers		
4.		1700 Kc.	1700 Kc.	Oscillating Trimmer	Top Front of Gang	
5.		1400 Kc.	Strongest Signal and Rock Gang While Adjustment is Made	Antenna Trimmer	Top Rear of Gang	

Schematic, Voltage Resistance

FARNESWORTH TELEV. & RADIO CORP

MODELS ATL50, -52
Chassis C2-1
ATL51, Chassis C2-2
ATL55, -56, Ch. C2-3
ATL58, -59, Ch. C2-4

WATTS 60 VOLTS 105-125 AC



INTERMEDIATE FREQUENCY 455 KC

D.C. RESISTANCE

LOOP ANTENNA	1Ω
S.W. ANTENNA COIL	LESS THAN 1Ω
S.W. R.F. GRID COIL	" " 1Ω
BROADCAST OSC. COIL	3.5Ω
S.W. OSC. COIL	1Ω
PLATE COIL	LESS THAN 1Ω
OSC. COIL TO BUTTON 1 - 7.25Ω	
" " " " 2 - 7Ω	
" " " " 3 - 7Ω	
" " " " 4 - 5.75Ω	
" " " " 5 - 5.75Ω	
SPEAKER FIELD	1100Ω COLD
PRIMARY OF OUTPUT	150Ω
VOICE COIL	4Ω
PRIMARY OF 1ST I.F.	14Ω
SECONDARY " " "	14Ω
PRIMARY OF 2ND I.F.	14Ω
SECONDARY " " "	14Ω

BOTTOM VIEW OF SOCKETS

	1	2	3	4	5	6	7
1	0	0	0	0	0	0	0
2	17AC	INF	23.5AC	0	0	53AC	78AC
3	0	INF	0	0	0	94	0
4	85	INF *	85	0	-3 +	100	103AC
5	0 +	3 MEG**	0	5 500**	-3 +	0	103AC
6	95	INF *	75	INF	50	0	100
7	23.5AC	INF *	11AC	INF	11AC	295AC	83AC
8	85	INF *	180	3 MEG	6.2AC	6.8	200

† VOLTAGE READING WILL VARY WITH SENSITIVITY OF METER.

* RESISTANCE WILL DEPEND ON CONDITION OF ELECTROLYTIC CONDENSER.

NOTE-1-CONNECTION #1 ON ALL SOCKETS CONNECTED TO CHASSIS.
#2-CONNECTION #2 ON SOCKET 4 IS REFERENC POINT FOR A.C. FILAMENT VOLTAGES.

NOTE 4- ABOVE CIRCUIT CHANGE APPLIES TO COMBINATION MODELS AK-58 & AK-59 WHEN STAMPED (2).

FOR ALIGNMENT SEE INDEX

Chassis C4-1,C4-2
Tuner Data

FARNESWORTH TELEV. & RADIO CORP.

MODELS AC70,AC71
Chassis C3-1
AK76,Chassis C3-2
Schematic,Voltage
Tuner,Resistance

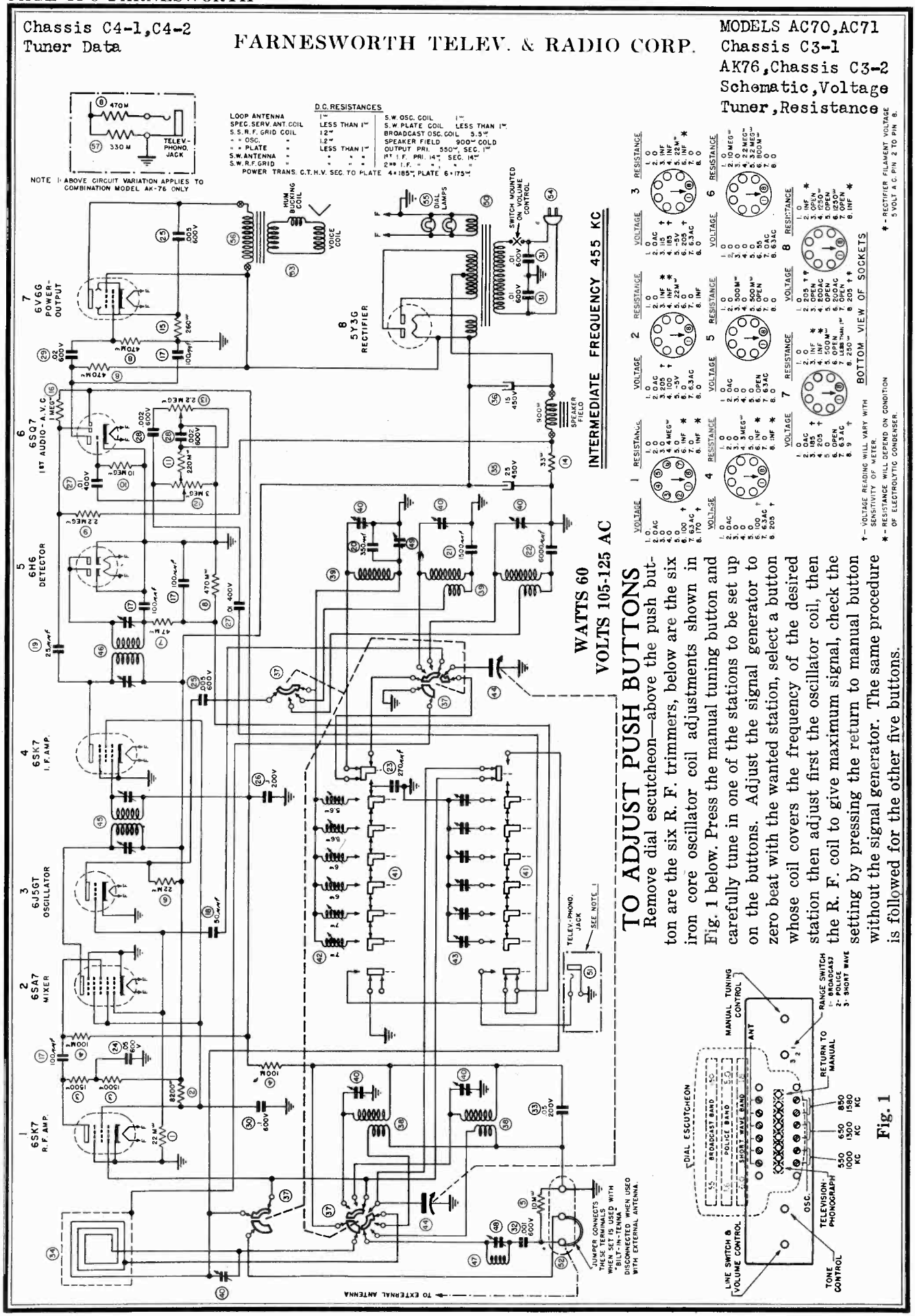
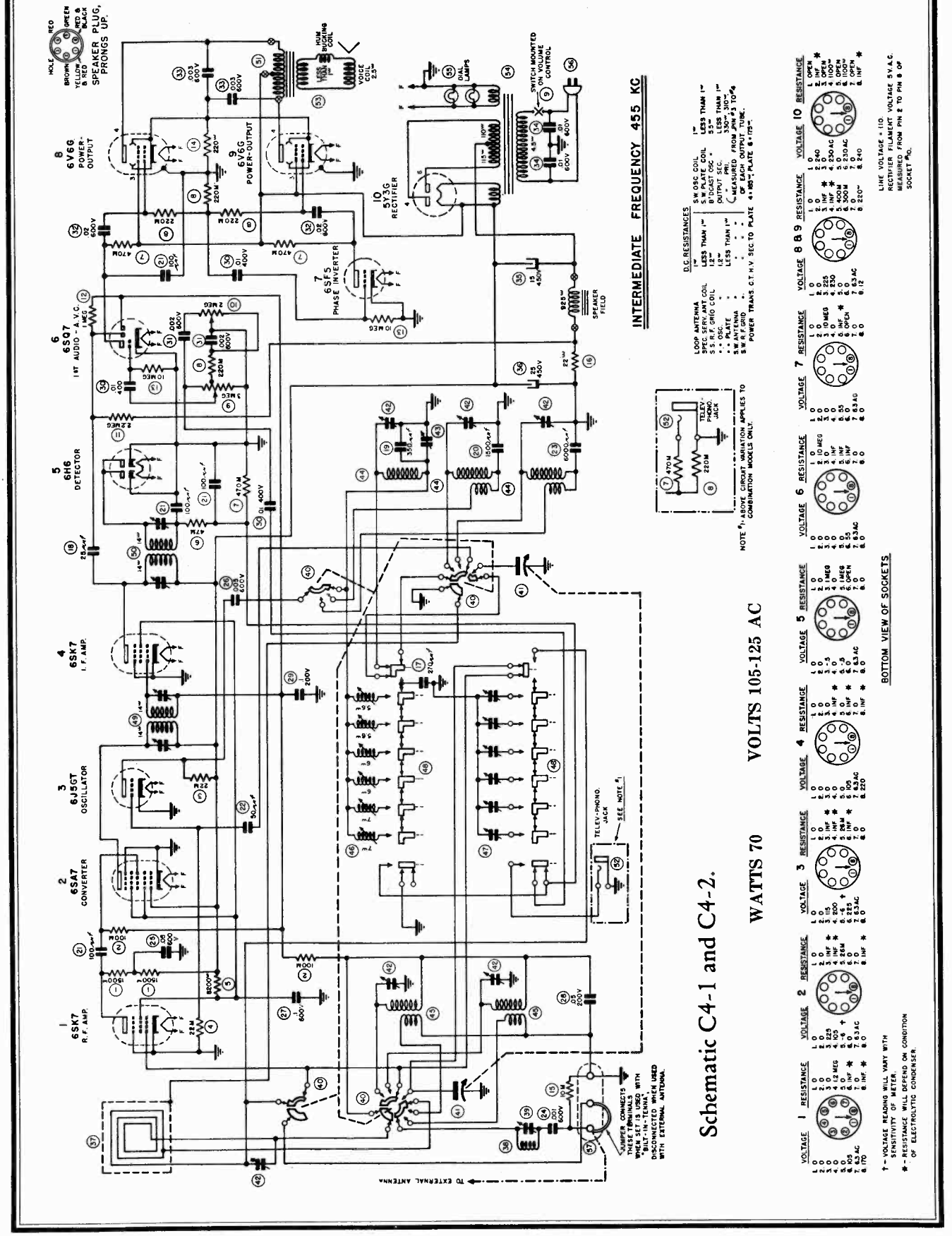


Fig. 1

FARNESWORTH TELEV. & RADIO CORP.

MODELS AC90,AC91
Chassis C4-1
AK95,AK96,Ch.C4-2
Schematic,Voltage
Resistance



Schematic C4-1 and C4-2.

CHASSIS C2-1,C2-2,
C2-3,C2-4
CHASSIS C3-1,C3-2
CHASSIS C4-1,C4-2
Alignment,Tuner

FARNESWORTH TELEV. & RADIO CORP.

MODELS ATL-50,ATL-52 (Ch.C2-1),ATL-51 (Ch.C2-2),ATL-55,ATL-56 (Ch.C2-3),ATL-58, ATL-59 (Ch.C2-4).

CHASSIS REMOVAL

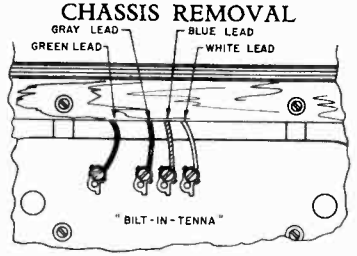


Fig. 2

When removing the chassis from the cabinet for service, first remove the loop antenna in table models. Second—disconnect the pointer from the drive cable by bending tongue toward the rear of the chassis to release drive cord, before loosening chassis hold down bolts. In consoles the loop is mounted below the chassis shelf, so it is not necessary to remove the loop assembly. However, the four leads from the chassis to the four screw type terminals on the loop shield should be removed by loosening the screws. See Fig. 2 for color code, when replacing chassis.

ALIGNMENT

Before re-aligning the set be sure all adjusting screws for the iron core oscillator coils are flush with or inside the chassis base.

Connect the low side of the signal generator to the black (ground) lead of the set and the high side of the generator to the green (antenna) lead.

PUSH BUTTON SET UP

At the rear of the chassis between the television jack and the antenna and ground leads are five pairs of holes. The lower hole is for the adjustment of the iron cores for the oscillator coils. The upper hole is for the R.F. stage adjustment. It is suggested that a signal generator be used for alignment. Tune in by means of the tuning knob, one of the stations that is to be set up. Select the button in the range covering the station selected, as shown by the label on the back of the chassis and Fig. 1 below. Before pushing the button adjust the signal generator to zero beat with the desired station, then push button. Adjust the oscillator (lower screw) first, then the R.F. stage (upper screw) turn off the signal generator, check against manual tuning by the manual tuning button. When the screws are turned to the right (clockwise) the frequency of the associated circuit is lowered.

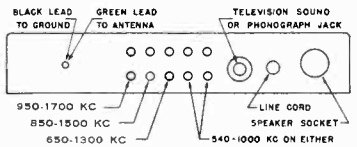


Fig. 1

CAUTION—Often two peaks are found at 18Mc. Use the one found at the minimum setting of the oscillator trimmer.

STEPS	Use in series with antenna	Set Generator at	Set Gang at	Adjust	Located	To obtain
1.	SET VOLUME CONTROL AT MAXIMUM					MAXIMUM OUTPUT
2.	250 mmfd.	455 Kc.	Minimum	2nd I. F. Trimmers	Top 2nd I. F. Tran.	
3.				1st I. F. Trimmers	Top 1st I. F. Tran.	
4.		1600 Kc.		B.C. Osc. Trimmer	Top of Chassis	
5.		1500 Kc.	Strongest Signal and Rock Gang	B.C.R.F. Trimmer		
6.		600 Kc.		B.C. Pad		
7.	Recheck 1600 Kc.					
8.	400 Ohms	18.1 Mc.	Minimum	S.W. Osc. Trimmer		
9.		16 Mc.	Strongest Signal and Rock Gang	S.W.R.F. Trimmer		
10.	Check Signal at 6 Mc. and 10 Mc.					

MODELS AC-70,AC-71 (Ch.C3-1),AK-76 (Ch.C3-2) AC-90,AC-91 (Ch.C4-1),and AK-95, AK-96 (Ch.C4-2).

TO REMOVE CHASSIS

Before removing the chassis it is necessary to remove the loop antenna, this is done as follows: First remove the 3 prong plug from top of loop frame. Loosen the bolt which goes through the wooden member at the bottom of the speaker enclosure. This will allow the bottom pivot (wood) to drop—allowing the top pivot of the loop to be removed from its bearing. Caution should be used so that the heavy rubber washer is not lost, also when the loop is removed from the top bearing, a lead which plugs into the top of the loop axis, must be disconnected, if the loop is dropped this lead may break. After the loop is free the set should be manually tuned to 900 K. C. and the pointer disconnected from the drive cord by bending the center tab toward the back of the cabinet and releasing the cord.

The chassis bolts may be removed and the chassis lifted out taking care that the two sets of leads to the loop do not catch on the chassis shelf.

When replacing the loop after the chassis, chassis pointer and the single lead to the center of the loop have been reinstated, before replacing the loop make sure the lower bearing support has the dowel pointing away from the loud speaker so that an angle of approximately 10° or 15° is made with a line parallel with the front panel. When the loop is installed be sure the label faces the back of the cabinet and that the loop is raised by the lower support so the rubber washer is slightly compressed so the loop will not rotate by itself. Then plug in the three prong plug making certain the leads are dressed so no strain is on them when the loop is rotated.

When replacing chassis adjust signal generator to 900 Kc—then manually tune in the signal, set the pointer so its center line coincides with the center line of the 900 Kc marker, then clamp pointer to drive cord. If set is correctly aligned the calibration will check at 600 Kc and 1500 Kc within the pointer's width.

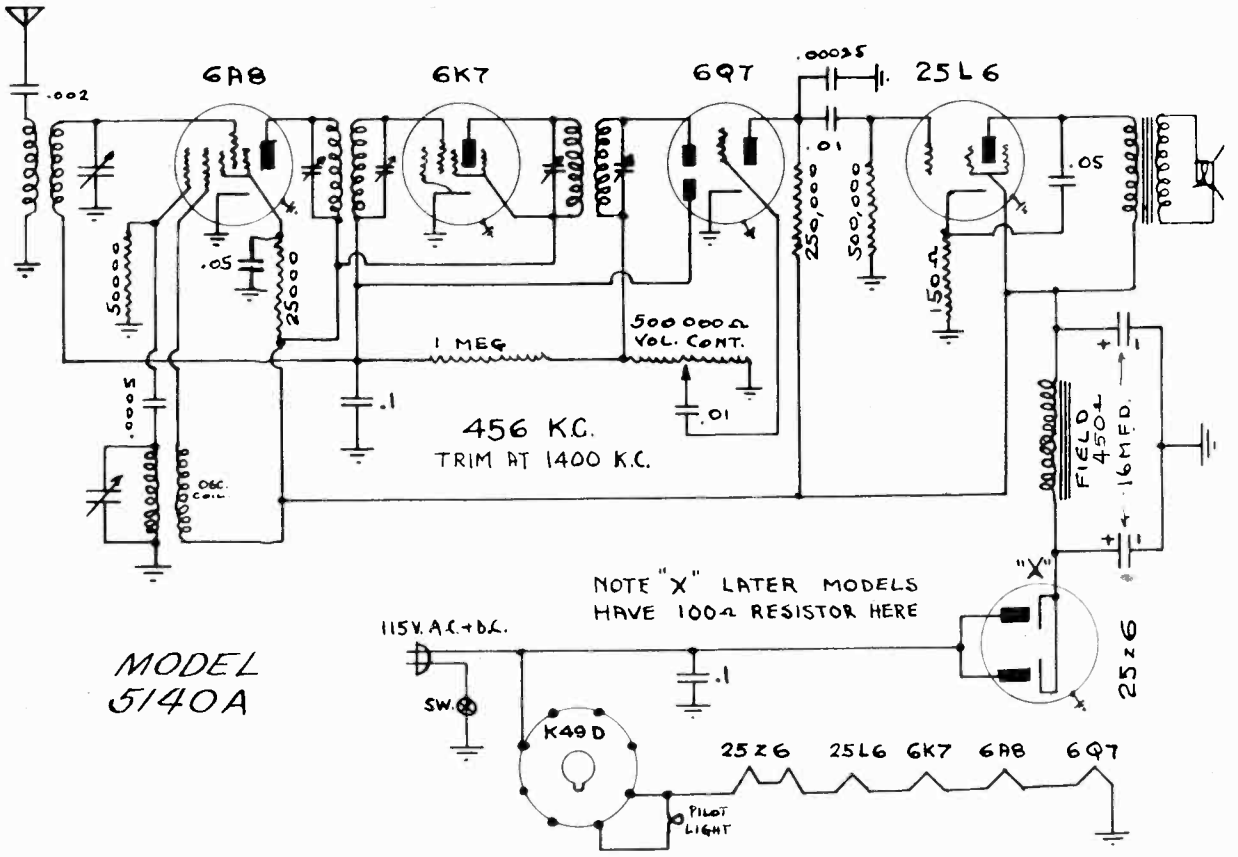
ALIGNMENT Connect the high side of the generator to the antenna terminal and the low side of it to the ground terminal making certain jumper on terminal strip is disconnected. Before aligning tighten wave trap trimmer screw.

STEPS	In Series With Antenna	Set Generator at	Set Gang at	Adjust	Located	To Obtain
1	SET VOLUME AND TONE CONTROLS AT MAXIMUM					
2	250 mmfd.	455 Kc.	Minimum	2nd I. F. Trimmers	Top of I. F. Trans.	Maximum Output
3				1st I. F. Trimmers		
4				Wave Trap Trimmer	Rear of Chassis	Minimum Output
5		1600 Kc.		Osc. B. C. Trimmer	Top of Chassis	Maximum Output
6		1500 Kc.	Strongest Signal and Rock Gang	R. F. B. C. Trimmer		
7		600 Kc.		600 Kc. Pad		
8	Recheck 1500 Kc.					
9	400 Ohms.	5.6	Minimum	Osc. Police Trimmer*		
10		5 Mc.	Strongest Sig. & Rock Gang	R. F. Police Trimmer**		
11	Check 1.8 Mc.					
12	400 Ohms.	18.1 Mc.	Minimum	Osc. S. W. Trimmer*		
13		16 Mc.	Strongest Sig. & Rock Gang	R. F. S. W. Trimmer**		
14	Check 6 and 10 Mc.					

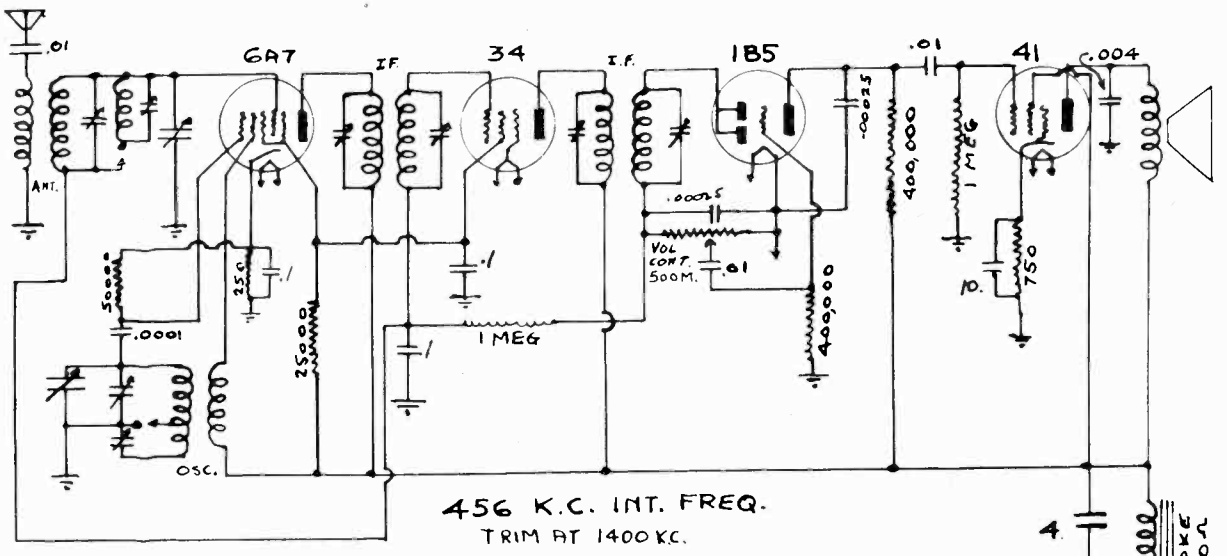
*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.
**Tighten R. F. trimmer screw for maximum capacity, then unscrew until first peak is secured.

FERGUSON RADIO, INC.

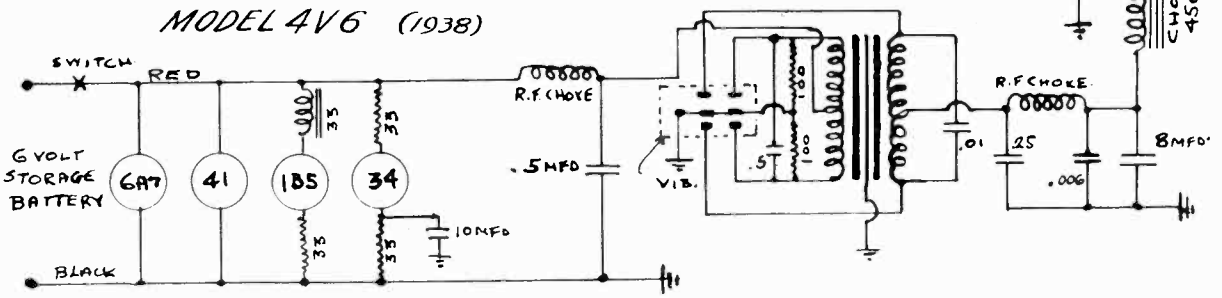
MODEL 4V6(1938)
MODEL 5140A
Schematics



MODEL 5140A

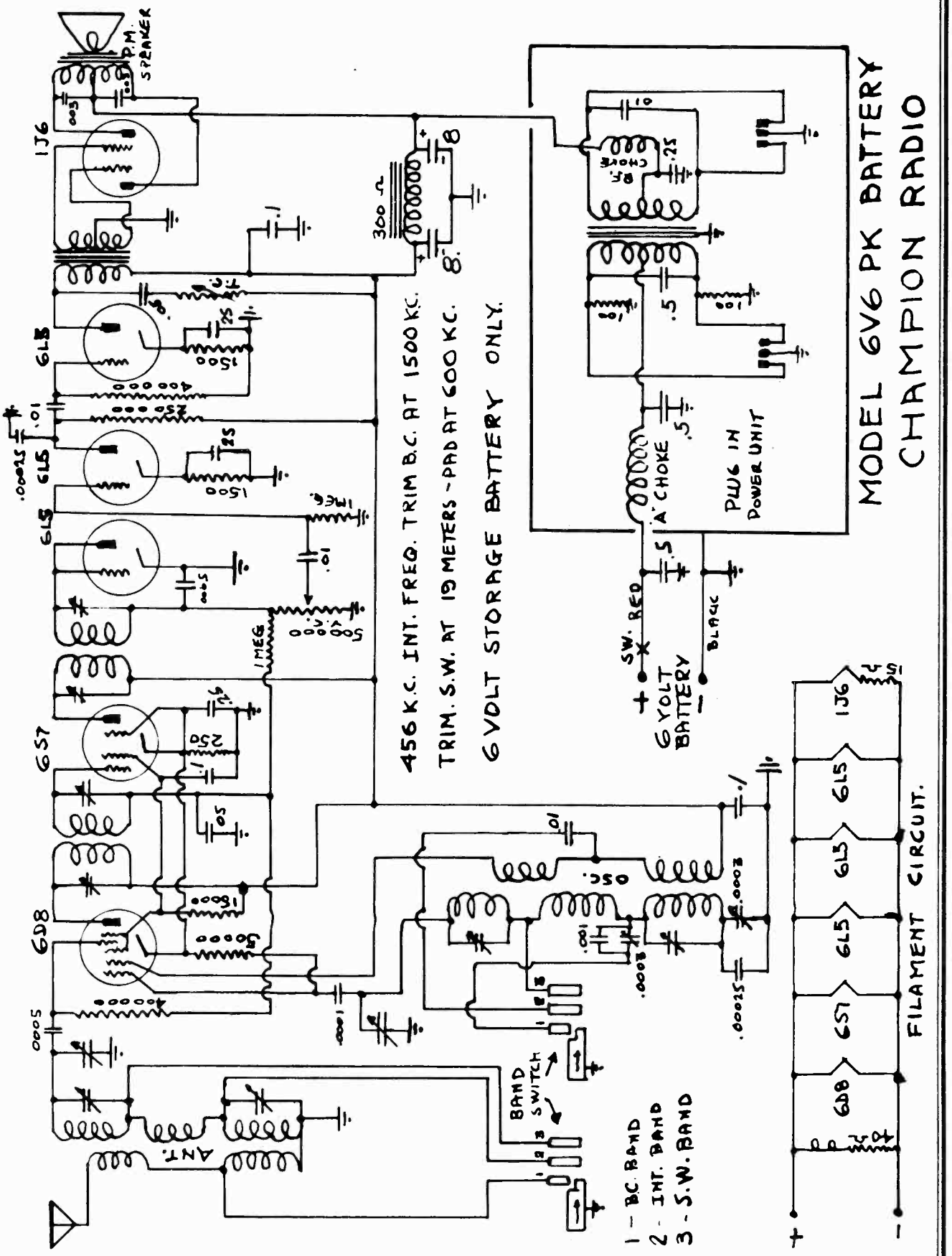


MODEL 4V6 (1938)



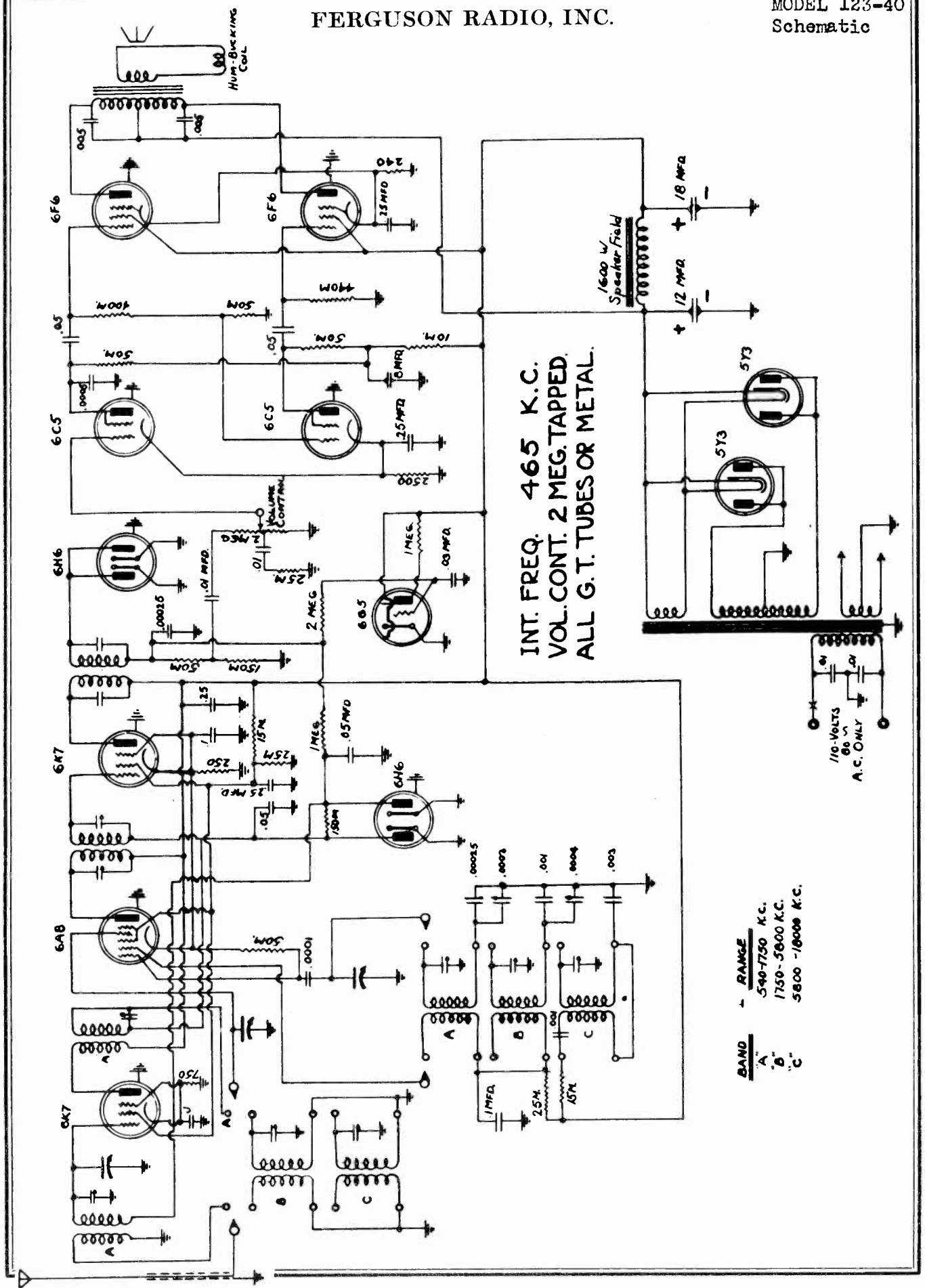
MODEL 6V6PK Batt.
Schematic, Alignment

FERGUSON RADIO, INC.



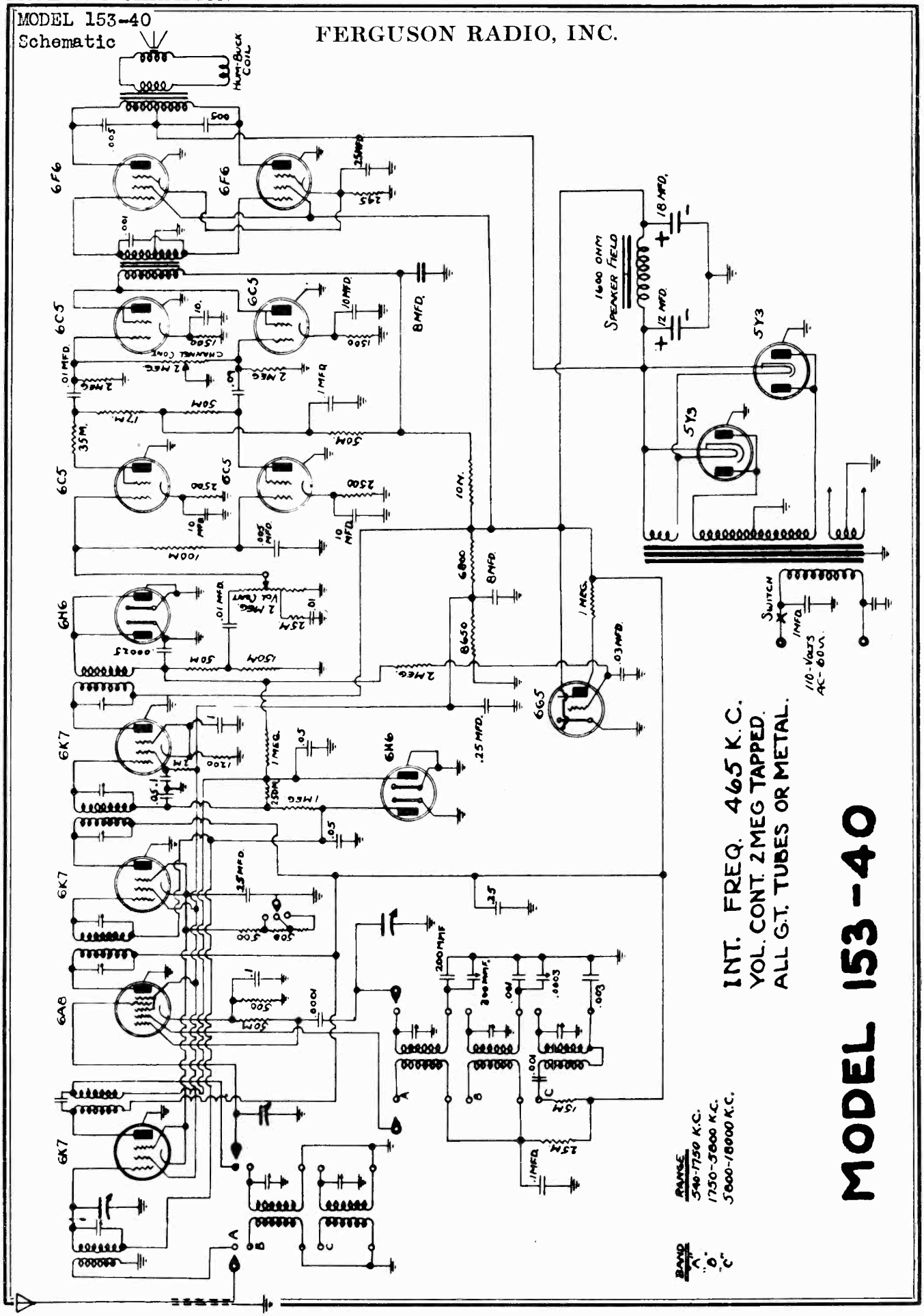
FERGUSON RADIO, INC.

MODEL 123-40
Schematic



MODEL 153-40
Schematic

FERGUSON RADIO, INC.

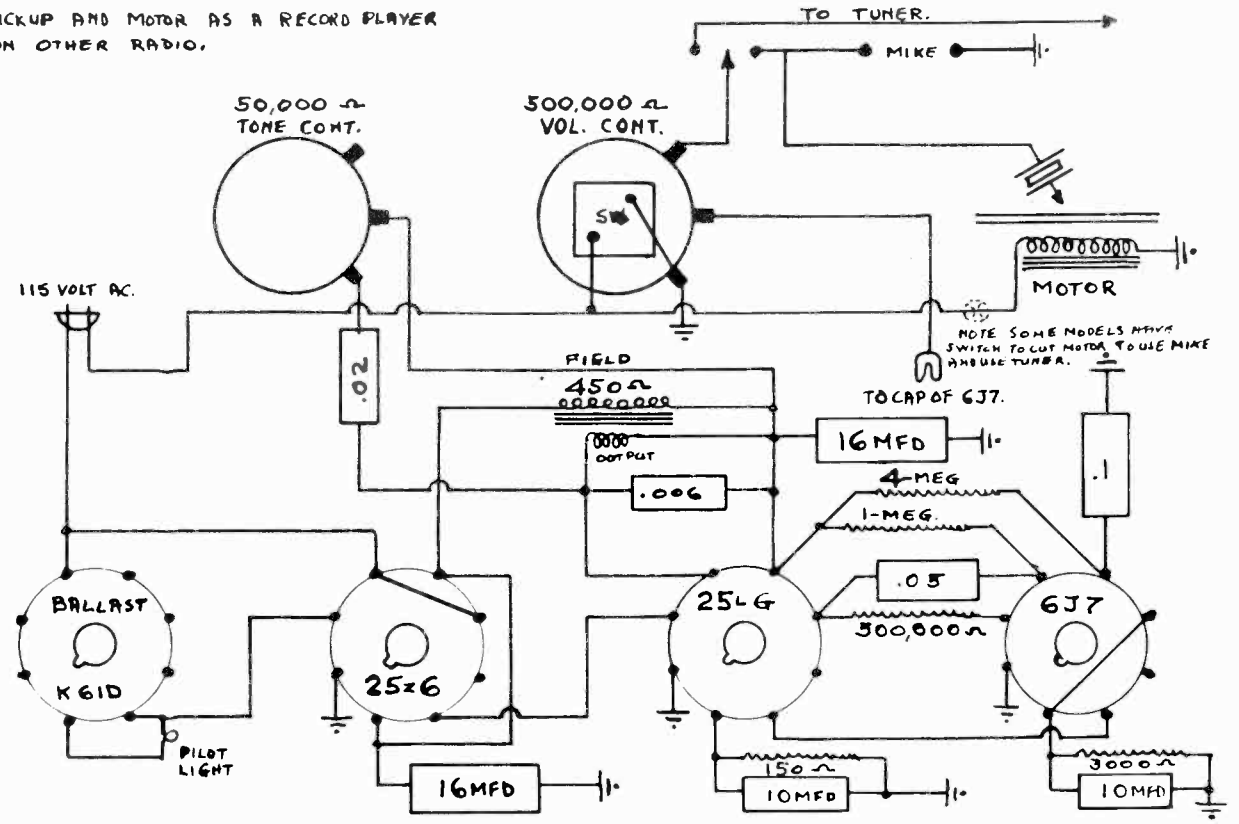


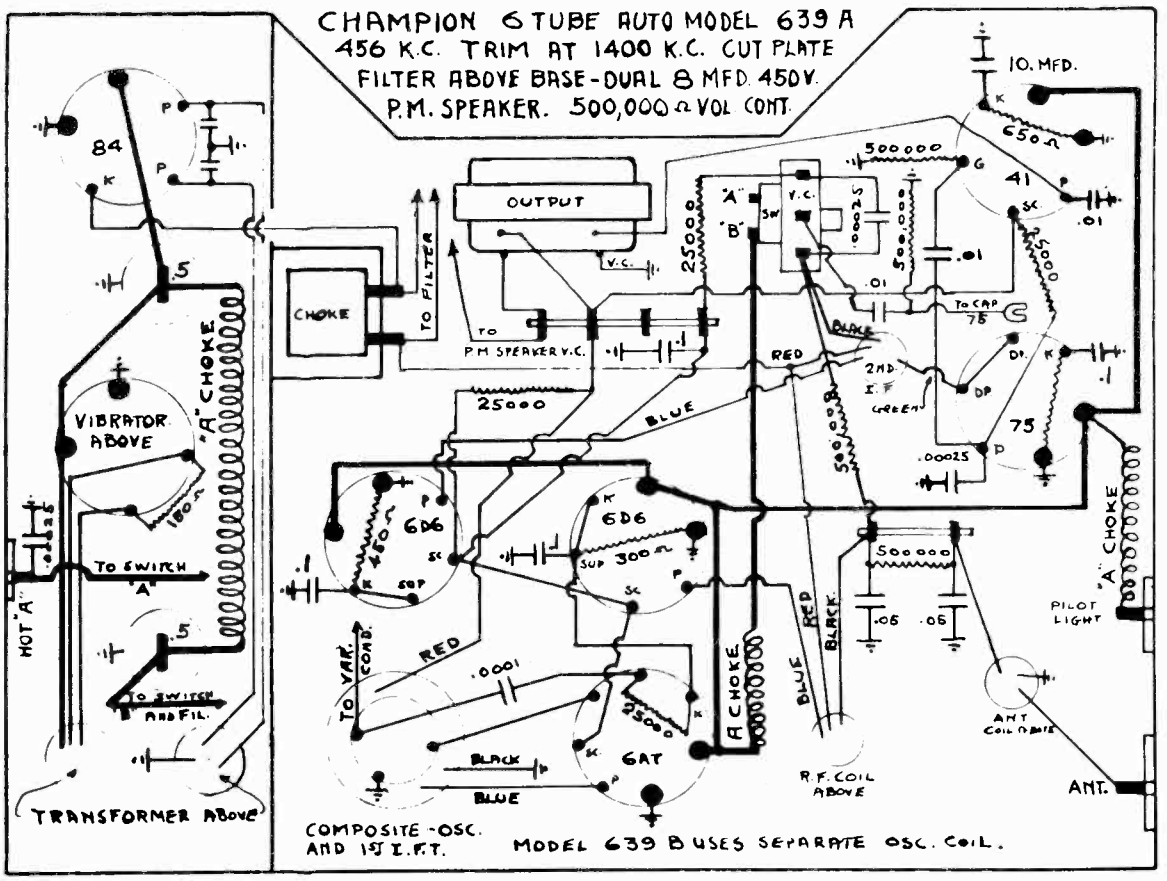
FERGUSON RADIO, INC.

3 TUBE ELECTRIC PHONOGRAPH

MODEL 3-Tube Phono.
MODELS 639A, 639B
Schematics

NOTE: SOME MODELS HAVE JACK TO USE PICKUP AND MOTOR AS A RECORD PLAYER ON OTHER RADIO.





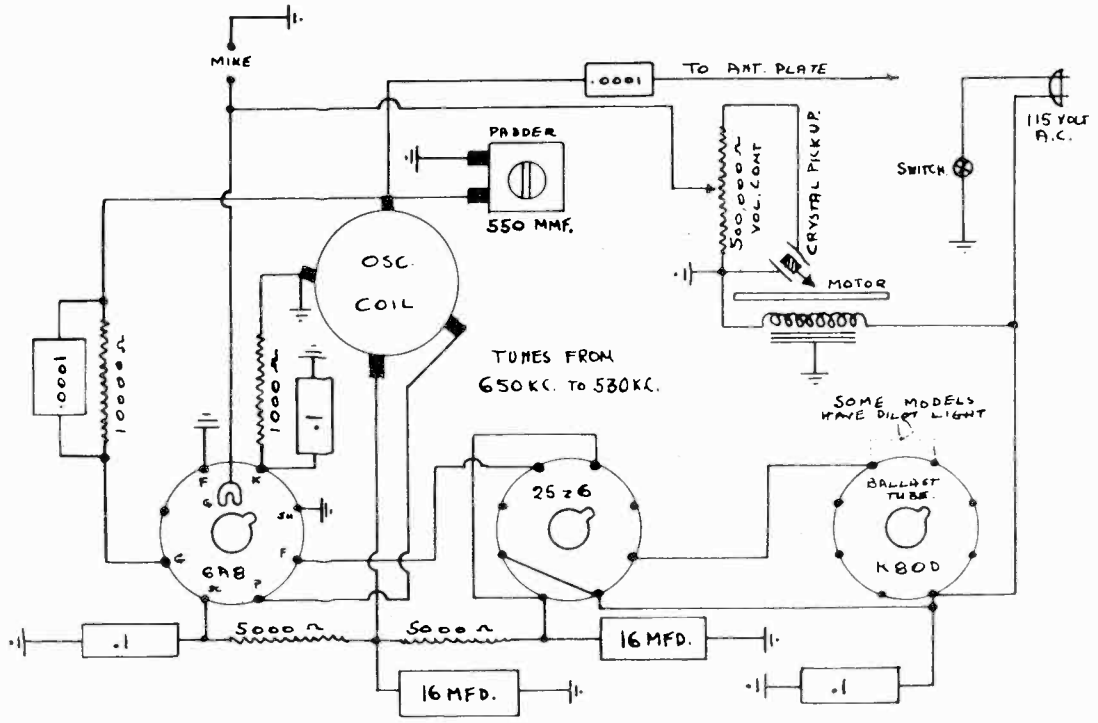
NOTE: MODEL 639-B USES: 6K7 - 6A8 - 6K7 - 6Q7 - 6K6 - 6X5 BANTAM TUBES

MODEL Wireless Record Player
MODEL 6140AK
Serial 9293 up
Schematics

FERGUSON RADIO, INC.

CHAMPION RADIO – WIRELESS RECORD PLAYER

NOTE MIKE CONNECTION AND VOL CONTROL ON DE LUXE MODEL ONLY
NOT ON JUNIOR MODEL – RADIATOR EITHER IN LINE CORD OR BOTTOM

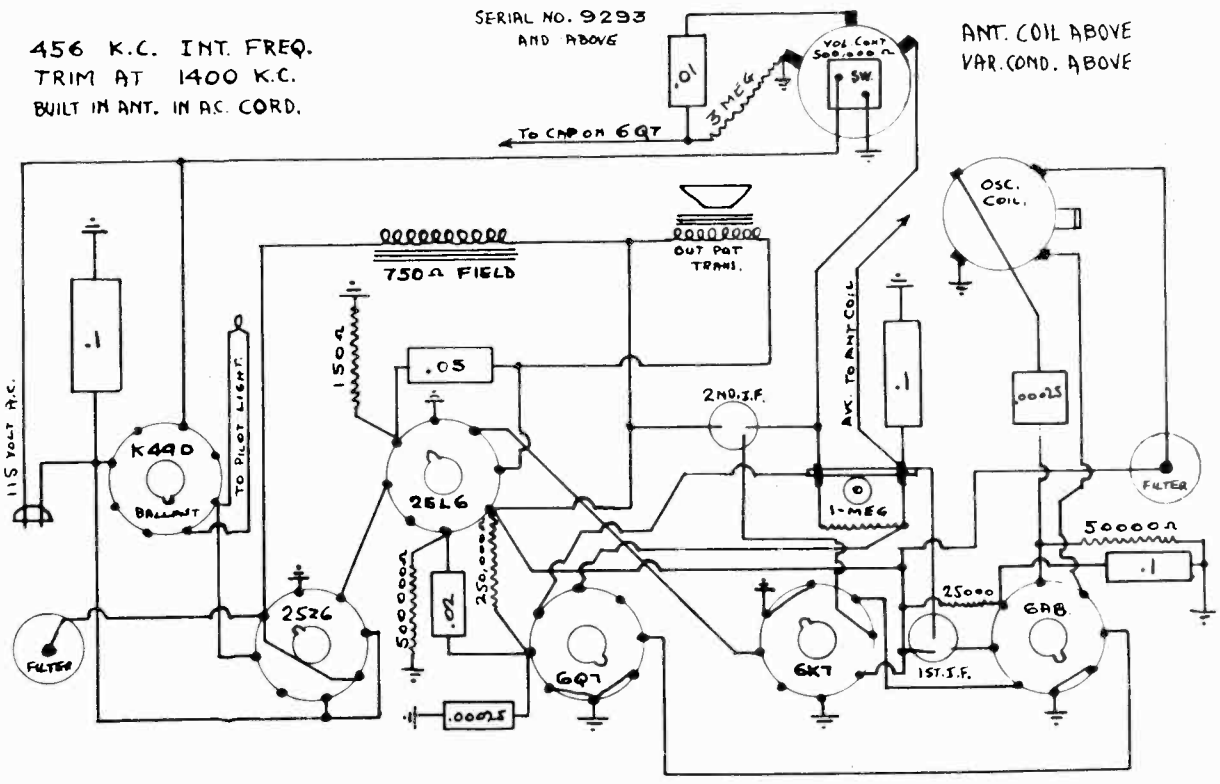


MODEL 6140 AK

SERIAL NO. 9293 AND ABOVE

456 K.C. INT. FREQ.
TRIM AT 1400 K.C.
BUILT IN ANT. IN A.C. CORD.

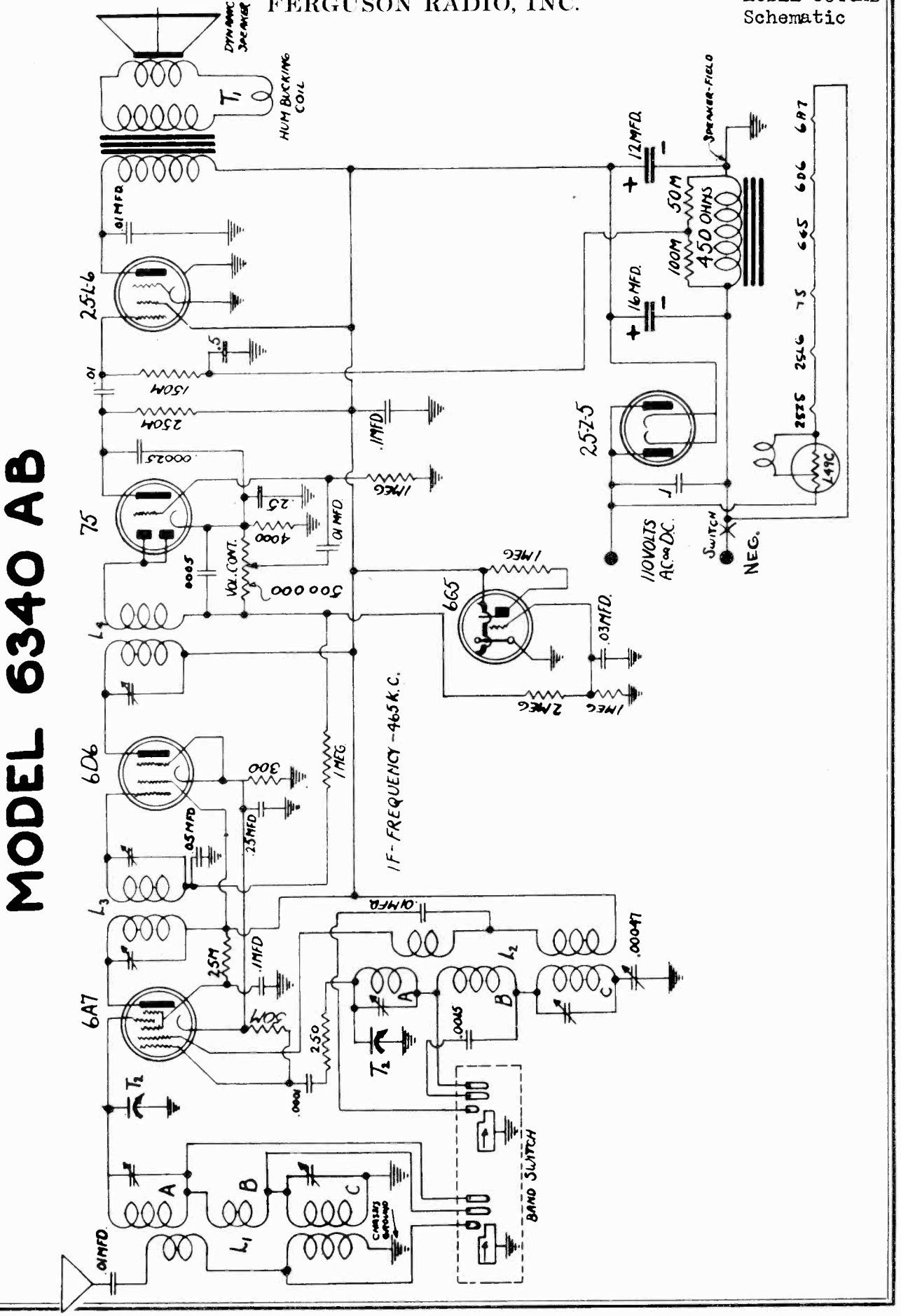
ANT. COIL ABOVE
VAR. COND. ABOVE



FERGUSON RADIO, INC.

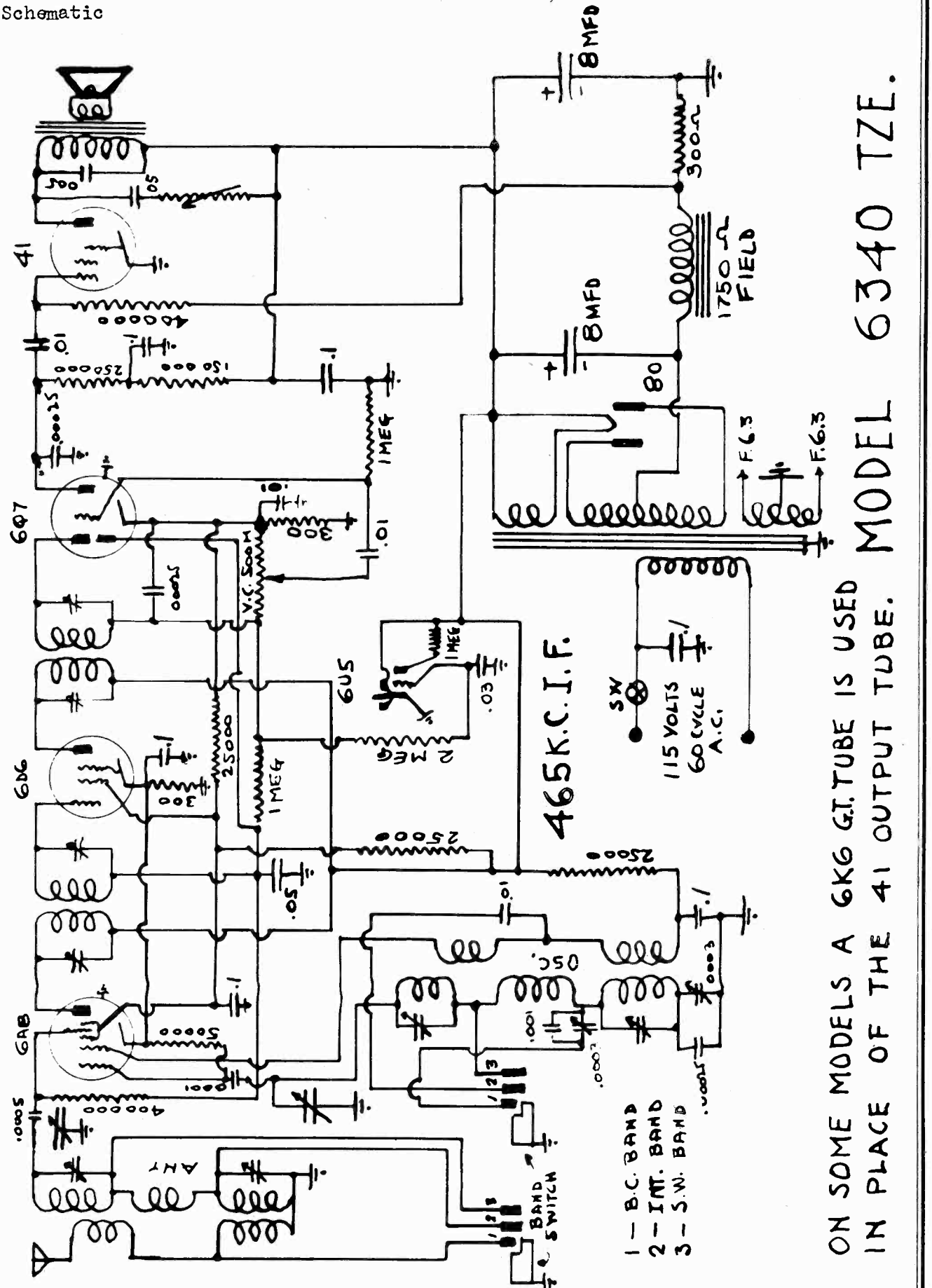
MODEL 6340AB
Schematic

MODEL 6340 AB



MODEL 6340TZE
Schematic

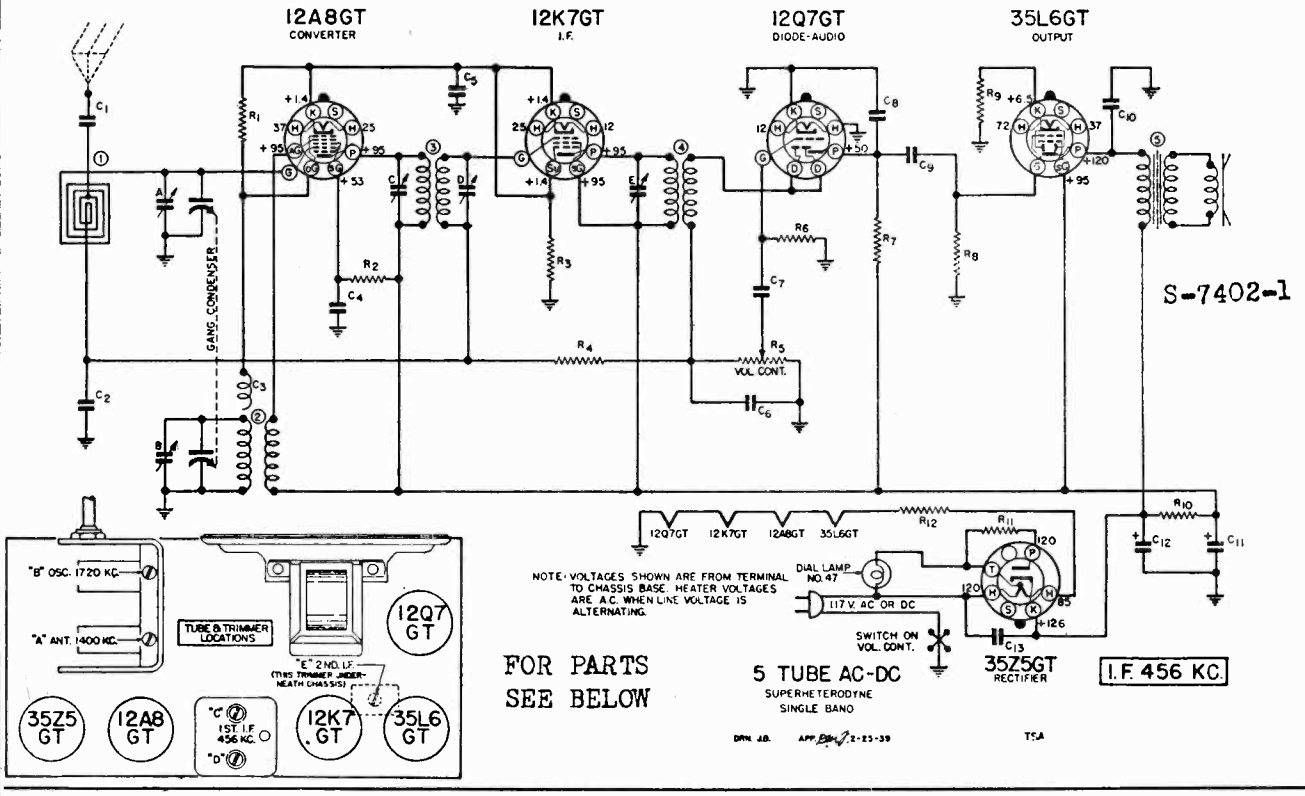
FERGUSON RADIO, INC.

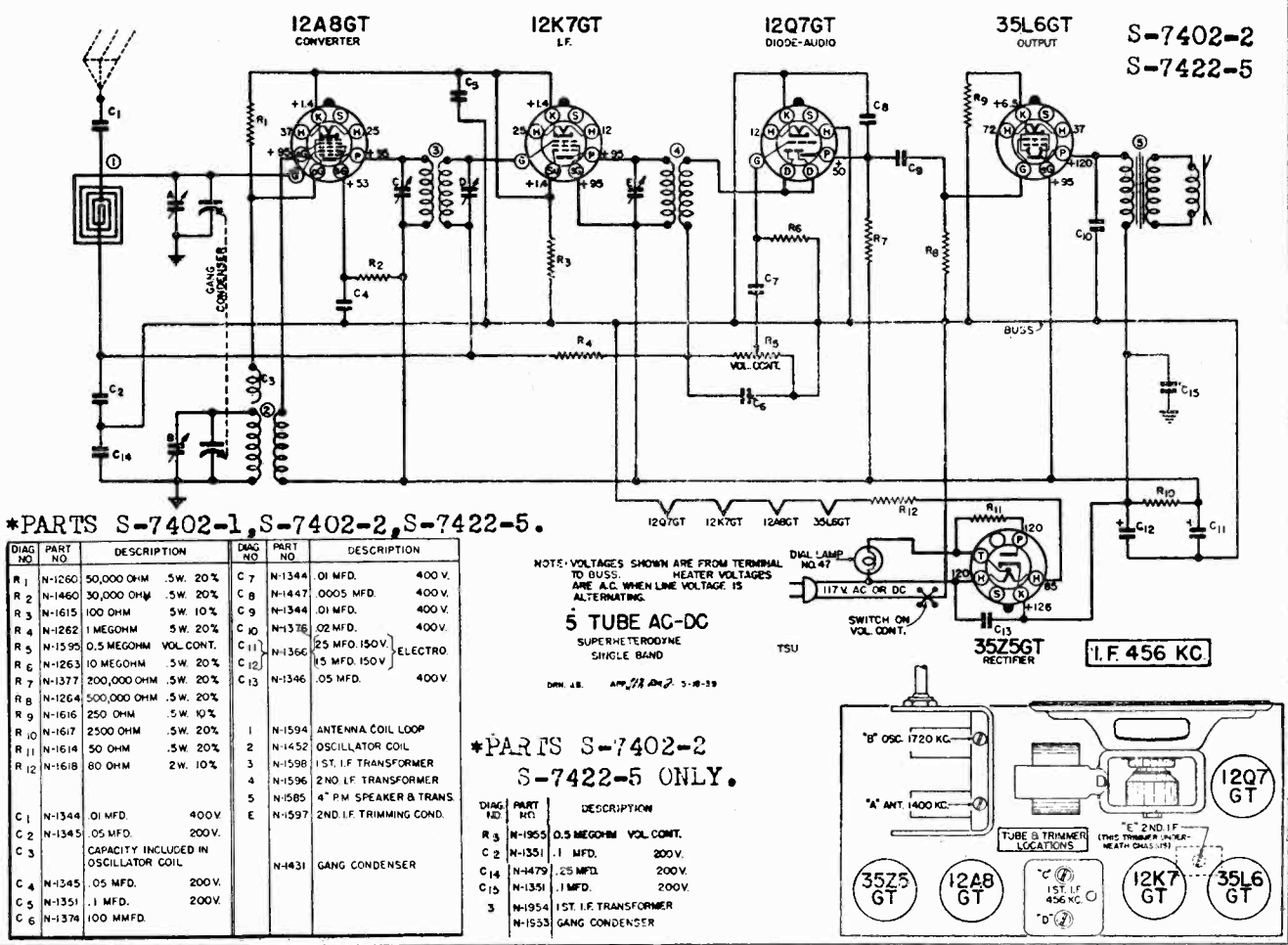


Socket, Trimmers, Parts
Alignment

MODEL S7402-1
MODELS S7402-2, S7422-5
Schematics, Voltage

FIRESTONE TIRE & RUBBER CO.





*PARTS S-7402-1, S-7402-2, S-7422-5.

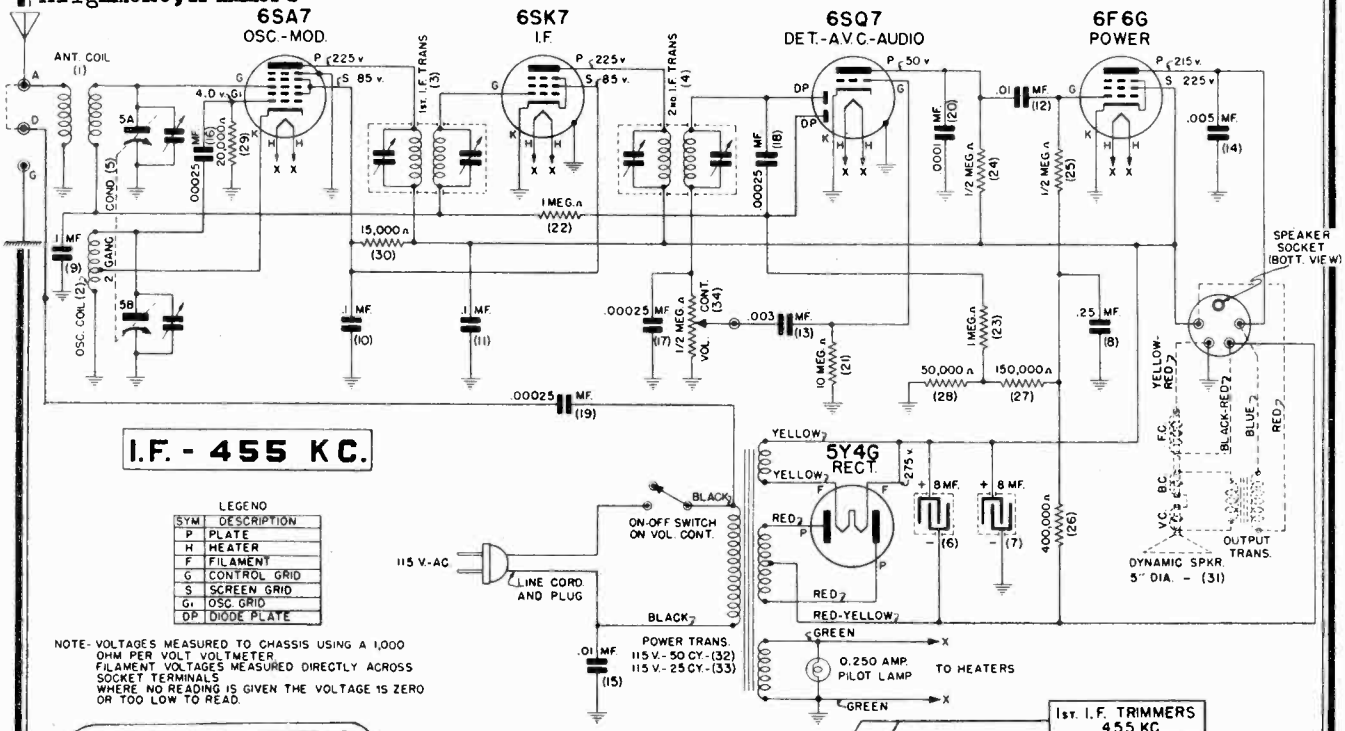
DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION	
R 1	N-1260	50,000 OHM	.5W. 20%	C 7	N-1344	.01 MFD.	400 V.
R 2	N-1460	30,000 OHM	.5W. 20%	C 8	N-1447	.0005 MFD.	400 V.
R 3	N-1615	100 OHM	5W. 10%	C 9	N-1344	.01 MFD.	400 V.
R 4	N-1262	1 MEGOHM	5 W. 20%	C 10	N-1376	.02 MFD.	400 V.
R 5	N-1595	0.5 MEGOHM	VOL. CONT.	C 11	N-1366	25 MFD. 150 V.	ELECTRO.
R 6	N-1263	10 MEGOHM	.5W. 20%	C 12		15 MFD. 150 V.	
R 7	N-1377	200,000 OHM	.5W. 20%	C 13	N-1346	.05 MFD.	400 V.
R 8	N-1264	500,000 OHM	.5W. 20%				
R 9	N-1616	250 OHM	.5W. 10%				
R 10	N-1617	2500 OHM	.5W. 20%	1	N-1594	ANTENNA COIL LOOP	
R 11	N-1614	50 OHM	.5W. 20%	2	N-1452	OSCILLATOR COIL	
R 12	N-1618	80 OHM	2W. 10%	3	N-1598	1 ST. I.F. TRANSFORMER	
				4	N-1596	2 NO. I.F. TRANSFORMER	
				5	N-1585	4" P.M. SPEAKER & TRANS.	
C 1	N-1344	.01 MFD.	400 V.	E	N-1597	2ND. I.F. TRIMMING COND.	
C 2	N-1345	.05 MFD.	200 V.				
C 3		CAPACITY INCLUDED IN OSCILLATOR COIL			N-1431	GANG CONDENSER	
C 4	N-1345	.05 MFD.	200 V.				
C 5	N-1351	.1 MFD.	200 V.				
C 6	N-1374	100 MMFD.					

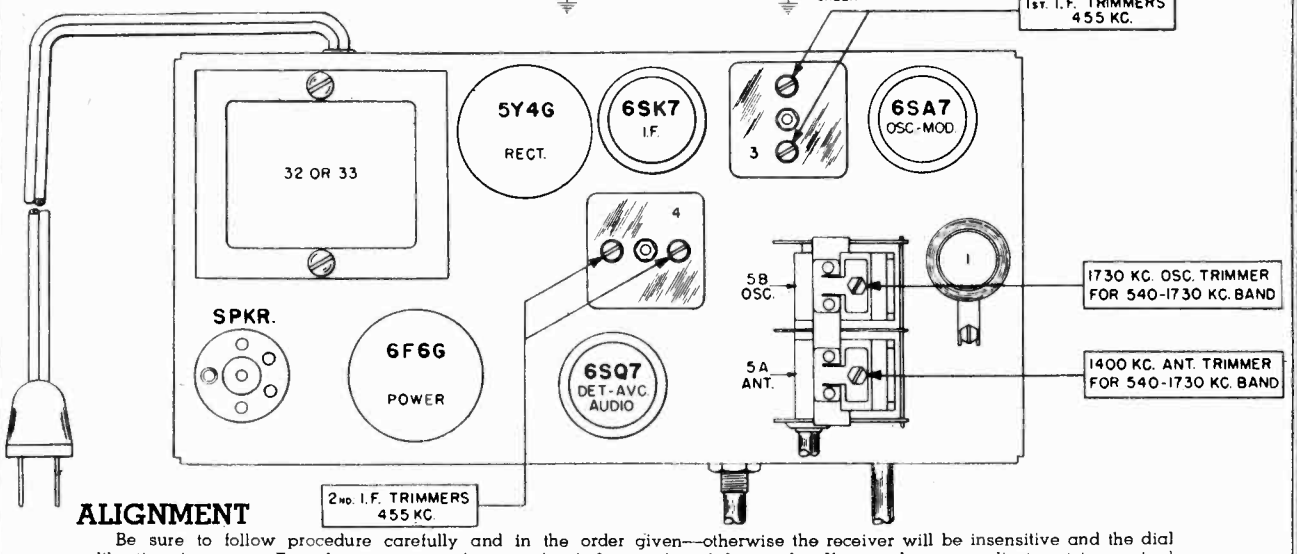
*PARTS S-7402-2
S-7422-5 ONLY.

DIAG NO.	PART NO.	DESCRIPTION	
R 3	N-1955	0.5 MEGOHM	VOL. CONT.
C 2	N-1351	.1 MFD.	200 V.
C 14	N-1479	.25 MFD.	200 V.
C 15	N-1351	.1 MFD.	200 V.
3	N-1954	1 ST. I.F. TRANSFORMER	
	N-1533	GANG CONDENSER	

MODEL S7403-3
Schematic, Voltage, Socket Alignment, Trimmers

FIRESTONE TIRE & RUBBER CO.





ALIGNMENT

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to the last line move to correct position.

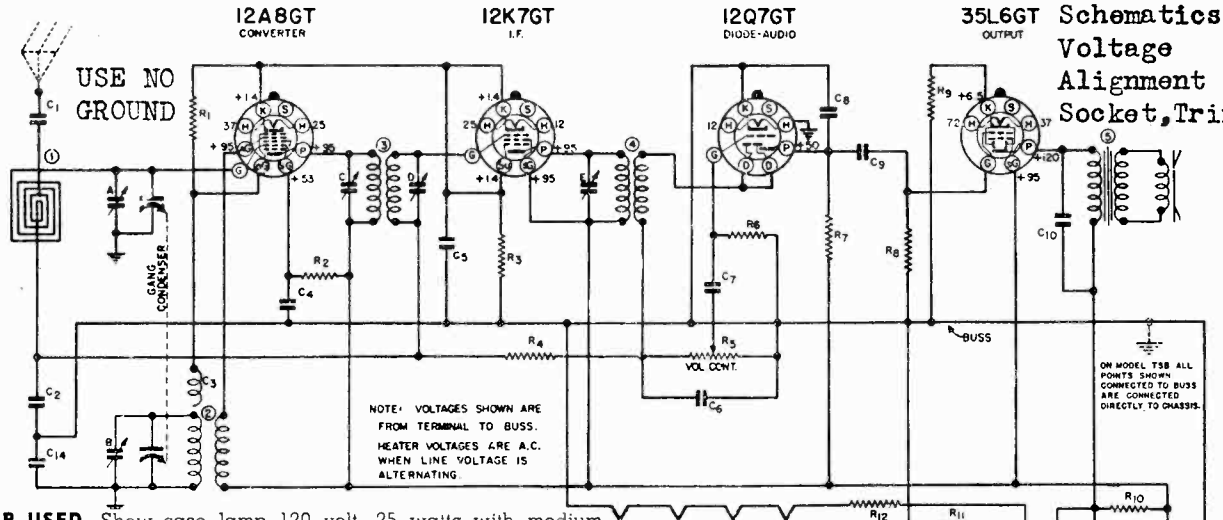
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

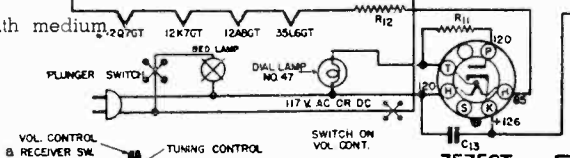
Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 6SA7 tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
(1) Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver "A" antenna post.	Adjust 1730 K. C. oscillator trimmer for maximum output.
(2) Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD condenser	Receiver "A" antenna post.	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.

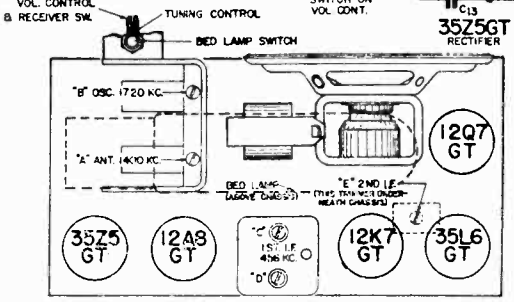
MODEL S7402-3
MODEL S7403-4
Schematics
Voltage
Alignment
Socket, Trimmers

FIRESTONE TIRE & RUBBER CO.



LAMP USED. Show case lamp 120 volt, 25 watts with medium screw base. (Never use a lamp larger than 25 watts.)





I.F. 456 KC.

TUNING RANGE
535 to 1720 KC

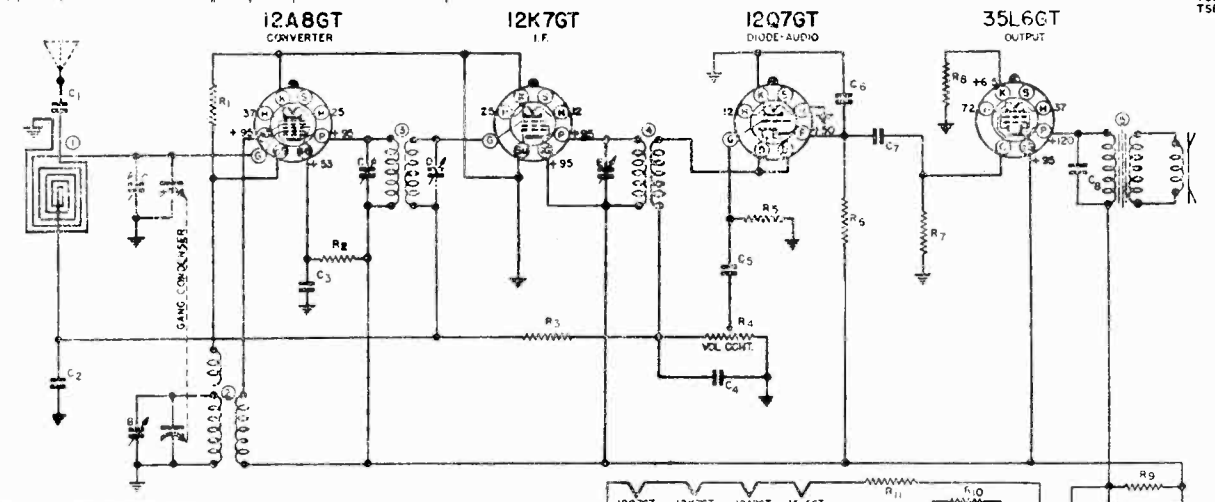
5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

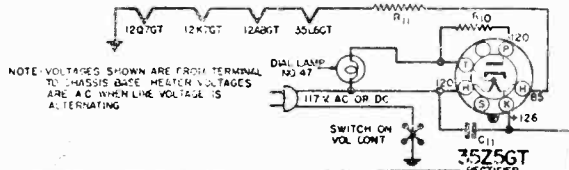
DRN. H.B. APP. 10/2/39

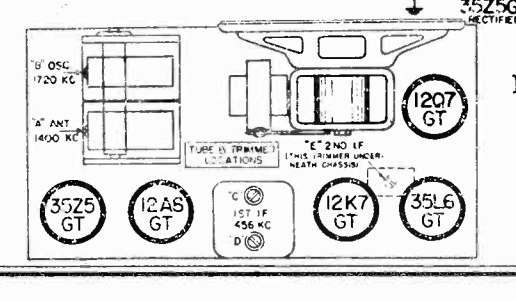
MODEL S-7402-3

TSB
TSBU

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R_1	N-1260	50,000 OHM .5W 20%	C_7	N-1344	.01 MFD. 400 V.
R_2	N-1627	20,000 OHM .5W 20%	C_8	N-1447	.0005 MFD 400 V.
R_3	N-1742	25 OHM .5W 20%	C_9	N-1344	.01 MFD 400 V.
R_4	N-1282	1 MEGOHM .5W 20%	C_{10}	N-1376	.02 MFD. 400 V.
R_5	N-1335 / N-1351	.5 MEGOHM VOL CONT. (TSB) / .5 MEGOHM VOL CONT. (TSBU)	C_{11}	N-1366 (TSB)	30 MFD. 150 V. ELECTRO.
R_6	N-1263	10 MEGOHM .5W 20%	C_{12}	N-2593 (TSBU)	15 MFD. 150 V. ELECTRO.
R_7	N-1377	200,000 OHM .5W 20%	C_{13}	N-1346	.05 MFD. 400 V.
R_8	N-1264	500,000 OHM .5W 20%	C_{14}	N-1479	.25 MFD. 400 V.
R_9	N-1616	250 OHM .5W 10%	1	N-2146	ANTENNA COIL LOOP
R_{10}	N-1617	2500 OHM .5W 20%	2	N-1452	OSCILLATOR COIL
R_{11}	N-1614	50 OHM .5W 20%	3	N-1598 / N-1954	1ST. I.F. TRANS. (TSB) / 1ST. I.F. TRANS. (TSBU)
R_{12}	N-1618	80 OHM 2W 10%	4	N-1598	2ND I.F. TRANSFORMER
			5	N-2074 / N-2428	4" P.M. SPKR & TRANS. (TSB) / 4" P.M. SPKR & TRANS (TSBU)
C_1	N-1344	.01 MFD. 400V.	E	N-1597	2ND. I.F. TRIMMING COND.
C_2	N-1345 / N-1351	.05 MFD. 200 V. (TSB) / .1 MFD. 200 V. (TSBU)			
C_3		CAPACITY INCLUDED IN OSCILLATOR COIL		N-2088	GANG CONDENSER
C_4	N-1345	.05 MFD. 200V.		N-2595	BED LAMP
C_5	N-1351	.1 MFD. 200V.		N-2094	BED LAMP SWITCH
C_6	N-1370	100 MMFD.			







I.F. 456 KC.

MODEL S-7403-4

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

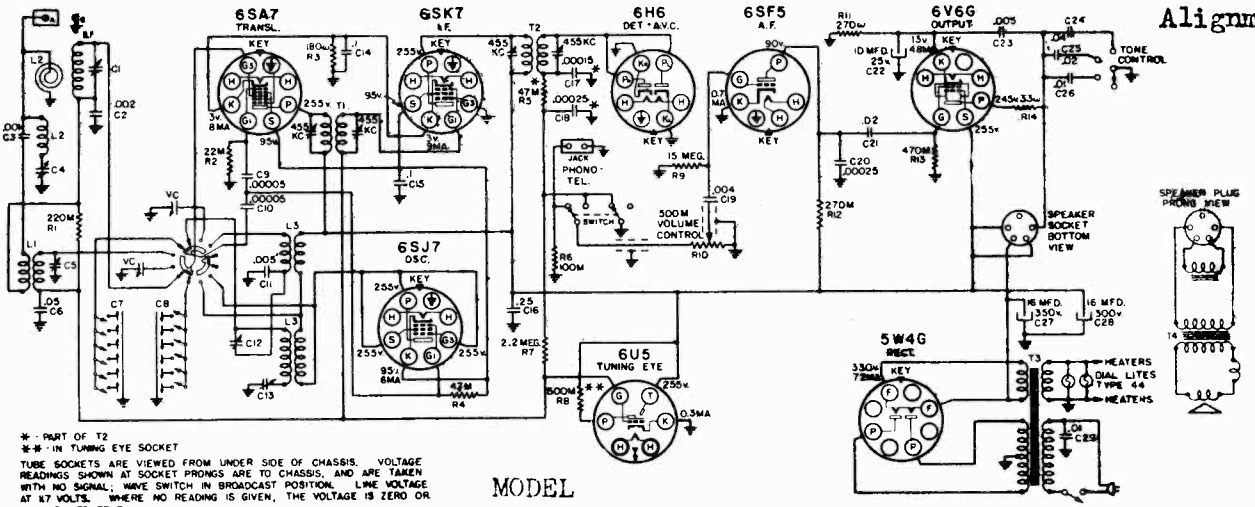
DRWN. L.T.C. APP.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W 20%	1	N-2902	ANTENNA COIL LOOP
R2	N-1259	15,000 OHM .5W 20%	2	N-1452	OSCILLATOR COIL
R3	N-1262	1 MEGOHM .5W 20%	3	N-1598	1ST I.F. TRANSFORMER
R4	N-2889	.5 MEGOHM VOL CONT.	4	N-2890	2ND I.F. TRANSFORMER
R5	N-1263	10 MEGOHM .5W 20%	5	N-2889	4-1/2" SPEAKER & TRANS.
R6	N-1377	200,000 OHM .5W 20%			
R7	N-1264	500,000 OHM .5W 20%	E	N-1597	2ND I.F. TRIMMING COND.
R8	N-1616	250 OHM .5W 10%			
R9	N-1257	2,000 OHM .5W 20%			
R10	N-1742	25 OHM .5W 20%			
R11	N-1618	80 OHM 2W 10%			
				N-2901	2 GANG CONDENSER
C1	N-1344	.01 MFD. 400 V.			
C2	N-1345	.05 MFD. 200 V.			
C3	N-1345	.05 MFD. 200 V.			
C4	N-1374	100 MMFD.			
C5	N-1344	.01 MFD. 400 V.			
C6	N-1447	.0005 MFD. 400 V.			
C7	N-1344	.01 MFD. 400 V.			
C8	N-1376	.02 MFD. 400 V.			
C9	N-1365	30 MFD. 6 V. ELECTRO.			
C10		15 MFD. 150 V.			
C11	N-1346	.05 MFD. 400 V.			

MODEL S7404-2
(Serials Prefixed with C)

FIRESTONE TIRE & RUBBER CO

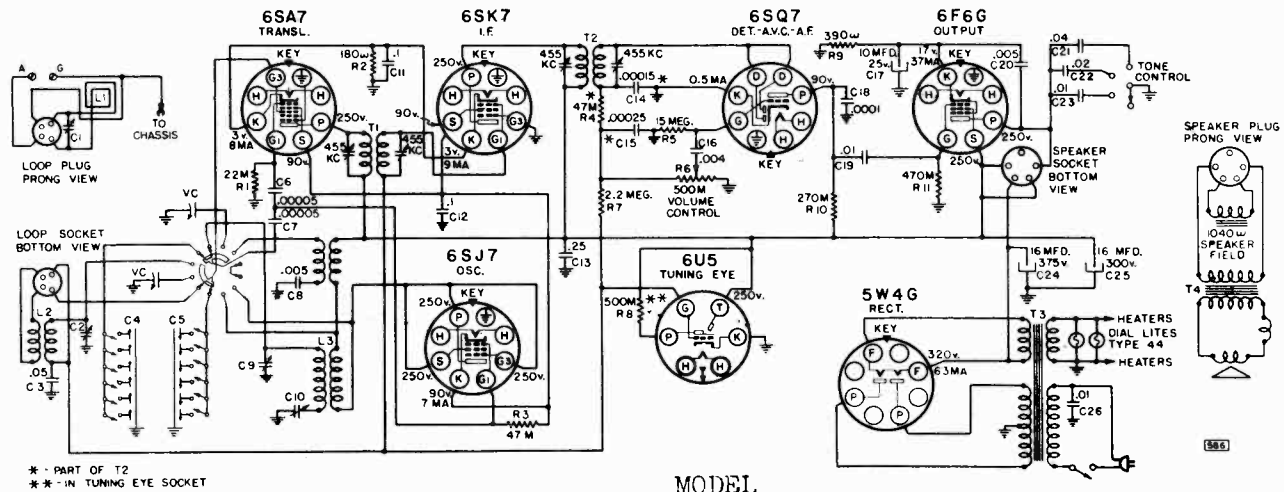
MODEL S7427-8
Schematics, Voltage
MODELS S-7402-3, S-7403-4
Alignment



* - PART OF T2
** - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MODEL
S-7404-2 (With serial numbers prefixed with "C").



* - PART OF T2
** - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MODEL
S-7427-8

ALIGNMENT PROCEDURE

MODEL S-7402-3

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 (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis from cabinet and set it up on the bench. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODEL S-7403-4

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 (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis, shield, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set up on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODEL S7403-8
Schematic, Voltage

FIRESTONE TIRE & RUBBER CO.

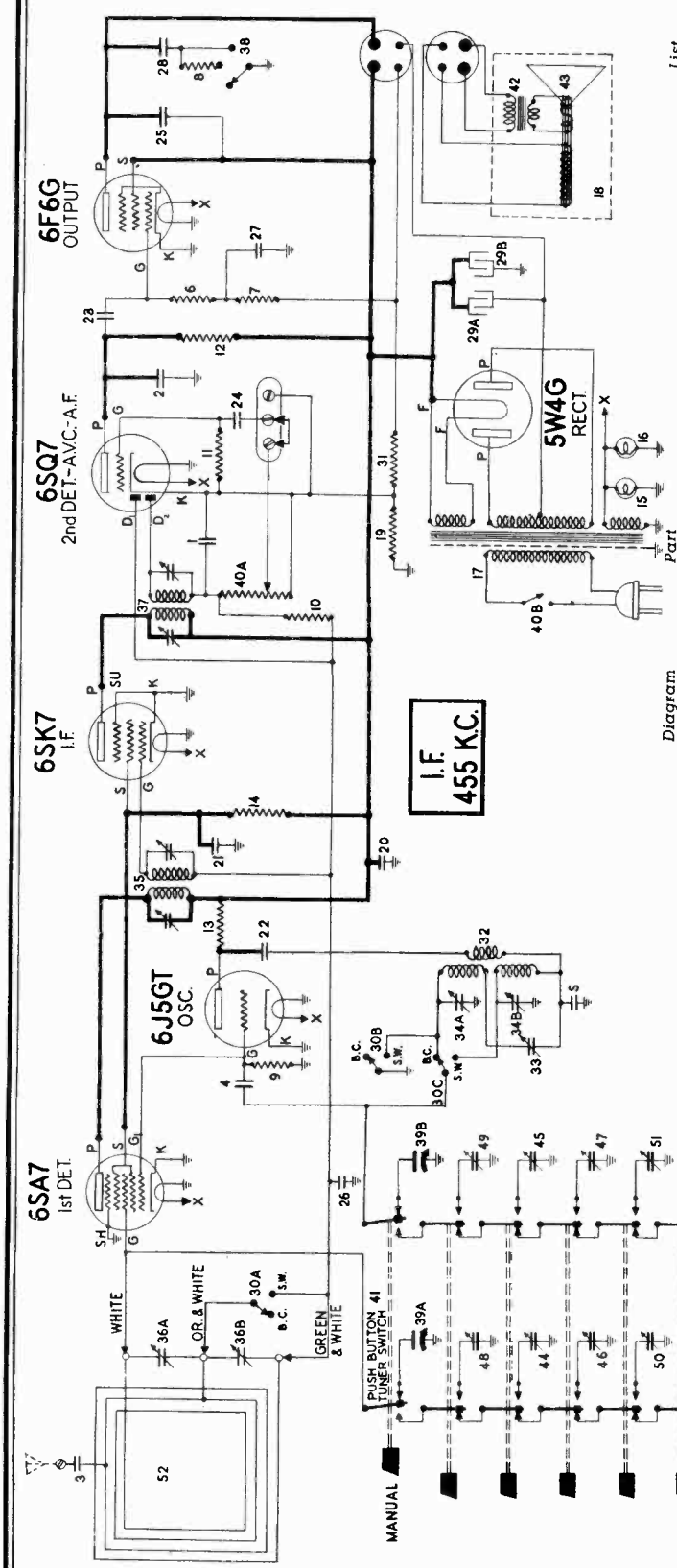


Diagram Number	Part Number	DESCRIPTION	List Price
1-2	83539	Condenser—Mica, 260 mmfd.	$0.20
3	83783	Condenser—Mica, 110 mmfd.	.20
4	85061	Condenser—Mica, 51 mmfd.	.15
5	89275	Condenser—Mica, .002 mfd.	.40
6	110559	Resistor—Carbon 470,000 ohms, ¼ watt	.12
8	110557	Resistor—carbon, 4,700 ohms, ¼ watt	.12
9	110578	Resistor—carbon, 68,000 ohms, ¼ watt	.12
10-11	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
12	110591	Resistor—680,000 ohms, ¼ watt	.12
13-14	110592	Resistor—carbon 22,000 ohms, 1 watt	.12
15-16	110629	Lamp—6.3 volt, .25 amps.	.15
17	114530	Power transformer, 117 volt—60 cycle	3.50
	119890	Power transformer, 117 volt—25 cycle	
18	U-115097	Speaker—dynamic 6"	5.20
19	116275	Resistor—Carbon 470,000 ohms, ¼ watt	.12
20-21	116625	Condenser—.1 mfd. 600 volt	.25
22-23	116640	Condenser—.01 mfd. 600 volt	.15
24-25	116647	Condenser—.004 mfd. 600 volt	.15
26	116819	Condenser—.05 mfd. 600 volt	.15
27	110377	Condenser—Electrolytic 10 mfd., 35 volt	.20
28	116984	Condenser—.04 mfd. 600 volts	.80
29A-29B	117034	Condenser—multiple electrolytic 15 mfd.—450 volt 10 mfd.—450 volt	.20 1.45
30A-30B-30C	117532	Range switch	.76
31	118812	Resistor—180 ohms—1 W. WW.	.12
32	118916	Coil—oscillator	.52
33	118919	Condenser—padding	.40
34A-34B	118920	Trimmer condensers (2 section)	.30
35	119042	Transformer—1st I.F.	1.10
36A-36B	119126	Trimmer Condensers (2 section)	.35

Diagram Number	Part Number	DESCRIPTION	List Price
37	119221	Transformer—2nd I.F.	$1.15
38	119289	Switch—tone	.60
39A-39B	119291	Condenser—variable tuning	2.75
40A-40B	119602	Volume control—1 meg. (with switch)	1.25
41	119603	P. B. Switch	2.30
42	U-119646	Transformer—output for U-115097 speaker	1.65
43	U-119647	Cone & Voice coil for U-115097 speaker	1.65
44 to 47	119663	Condenser—P.B. trimmer (750-1375 KC.)	.24
48-49	119664	Condenser—P.B. trimmer (980-1600 KC.)	.24
50 to 53	119753	Condenser—P.B. trimmer (540-1000KC.)	.24
	119732	Loop Antenna and Cabinet back assembly	2.00

(Prices subject to change without notice)

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SA7	1st DET.	6.0 A.C.	O	Note A	—8	90		240		
6J5GT	OSC.	6.0 A.C.	O	—8				145		
6SK7	I.F. AMP.	6.0 A.C.	O	Note A		90	O	240		
6SQ7	2nd. DET.-A.V.C.-A.F.	6.0 A.C.	—3	Note A				50	Note A	Note A
6F6G	Output	6.0 A.C.	O	Note B		240		220		
5W4G	Rectifier	5.0 A.C.						Plates—340 A.C. to C.T.		

NOTE A: The voltage at these elements is —3 volts measured across resistor 19.
NOTE B: The voltage at this grid is —14 volts measured across resistors 19 and 31.
Use a high resistance voltmeter of at least 1000 ohms per volt.

MODEL S7403-8
Alignment, Socket Trimmers

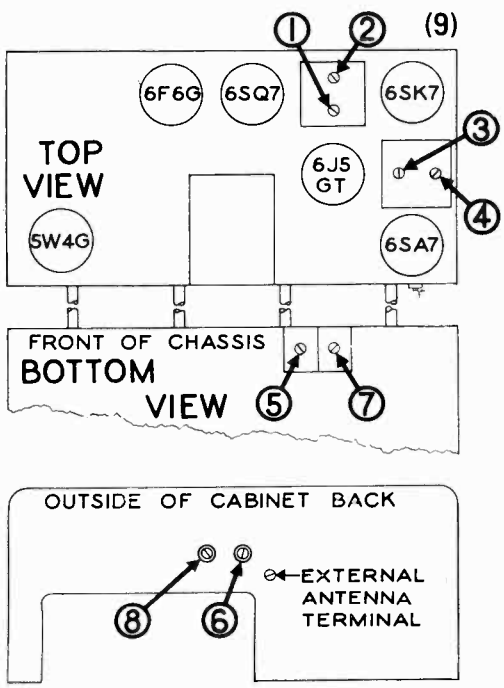
FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator are required.
Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
Connect the ground lead of the signal generator to the chassis.
Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
Be sure the loop is properly connected and in the same relative position it occupies when in the cabinet.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Rear Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
400 OHM Carbon Resistor	External Antenna Terminal	6 MC	Foreign	6 MC	5	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 5.1 MC. If image does not appear realign at 6 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Terminal	6 MC	Foreign	Tune to 6 MC. Generator Signal.	6*	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	External Antenna Terminal	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	8*	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal	600 KC	Broadcast	Tune To 600 KC Generator Signal	9	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

*NOTE: Trimmers must be aligned in order shown. After set is in cabinet realign No. 6 at 6MC. Then No. 8 at 1500 KC. on weak signals. Signal generator should be disconnected.



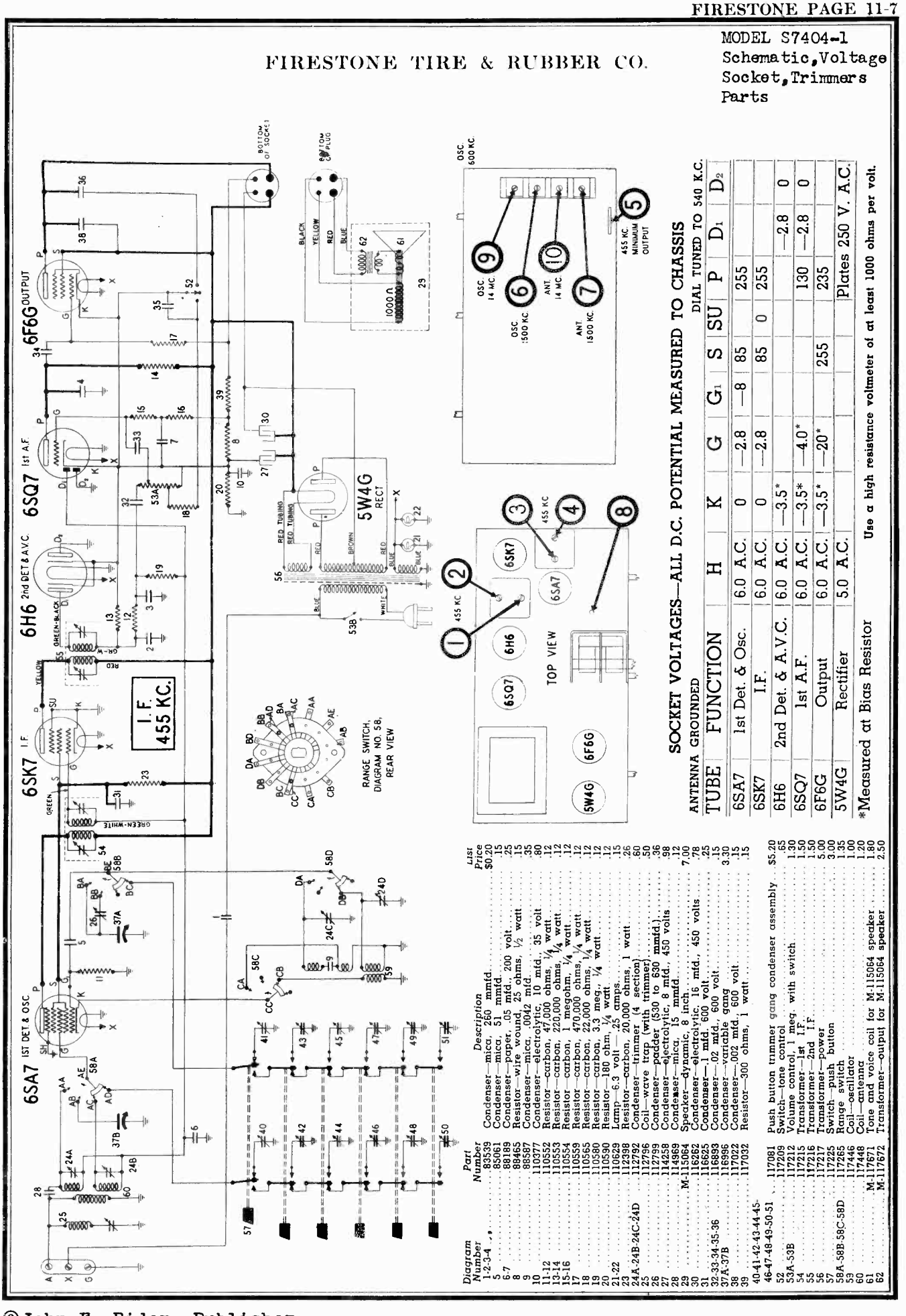
DIAL AND MISCELLANEOUS PARTS

Part Number	Description	List Price
114955	Clamp for dial cord	$0.01
119559	Clamp—dial scale retaining	.08
112745	Clip—coil mounting	.01
117057	Cord—drive (supplied in 2 foot lengths)	.15
119655	Dial escutcheon	.85
119694	Dial background	.06
119777	Dial scale	.55
117029	Drive drum and bushing	.50
88348	Eyelet for dial cord	Per doz. .05
119644	Knob	.18
119577	Pointer	.12
119654	Push button	.85
81145	Retaining ring—for drive shaft	Per C .50
83624	Screw—self tapping 8x¼	.01
119218	Screw—Escutcheon mounting	.02
85040	Screw—No. 6 Hex. Hd.	Per C .35
112874	Screw—No. 10x1⅛ Chassis mtg.	.01
85827	Set Screw—8-32 Square Head	.02
113191	Screw—No. 8-32x1⅛	.01
110501	Socket—4 prong (for speaker)	.16
116690	Socket—small octal base	.12
117078	Socket—octal with special grounding lug	.12
111090	Spacer—steel mtg.	.02
113177	Spring—dial cord tension	.09
119739	Station call letter tabs	.48
119824	Terminal strip—phono	.05
118606	Tuning shaft	.18
110829	Washer—chassis mounting	.01
111456	Washer—spring washer	Per C .50
116530	Washer—for back of knobs	.005

(Prices Subject to Change without Notice)

FIRESTONE TIRE & RUBBER CO.

MODEL S7404-1
Schematic, Voltage
Socket, Trimmers
Parts



SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SA7	1st Det. & Osc.	6.0 A.C.	0	—2.8	—8	85		255		
6SK7	I.F.	6.0 A.C.	0	—2.8		85	0	255		
6H6	2nd Det. & A.V.C.	6.0 A.C.	—3.5*						—2.8	0
6SQ7	1st A.F.	6.0 A.C.	—3.5*	—4.0*				130	—2.8	0
6F6G	Output	6.0 A.C.	—3.5*	—20*		255		235		
5W4G	Rectifier	5.0 A.C.						Plates 250 V. A.C.		

*Measured at Bias Resistor — Use a high resistance voltmeter of at least 1000 ohms per volt.

Diagram Number	Part Number	Description	List Price
1-2-3-4	83539	Condenser—mica, 260 mmfd.	$0.20
5	85061	Condenser—mica, 51 mmfd.	.15
6-7	88189	Condenser—paper, .05 mfd., 200 volt	.25
8	88465	Resistor—wire wound, 25 ohms, ½ watt	.15
9	88587	Condenser—mica, .0042 mfd.	.35
10	110377	Condenser—electrolytic, 10 mfd., 35 volt	.80
11-12	110552	Resistor—carbon, 47,000 ohms, ¼ watt	.12
13-14	110553	Resistor—carbon, 220,000 ohms, ¼ watt	.12
15-16	110554	Resistor—carbon, 1 megohm, ¼ watt	.12
17	110559	Resistor—carbon, 470,000 ohms, ¼ watt	.12
18	110565	Resistor—carbon, 22,000 ohms, ¼ watt	.12
19	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
20	110590	Resistor—180 ohm, ¼ watt	.12
21-22	110629	Lamp—6.3 volt—.25 amps.	.15
23	112398	Resistor—carbon, 20,000 ohms, 1 watt	.26
24A-24B-24C-24D	112792	Condenser—trimmer (4 section)	.60
25	112796	Coil—wave trap (with trimmer)	.50
26	112799	Condenser—padder (530 to 630 mmfd.)	.36
27	114258	Condenser—electrolytic, 8 mfd., 450 volts	.98
28	114969	Condenser—mica, 15 mmfd.	.12
29	M-115064	Speaker—dynamic, 8 inch	7.00
30	116262	Condenser—electrolytic, 16 mfd., 450 volts	.78
31	116625	Condenser—.1 mfd. 600 volt	.25
32-33-34-35-36	116893	Condenser—.02 mfd., 600 volt	.15
37A-37B	116986	Condenser—variable gang	3.30
38	117022	Condenser—.002 mfd. 600 volt	.15
39	117032	Resistor—300 ohms, 1 watt	.15
40-41-42-43-44-45-46-47-48-49-50-51	117081	Push button trimmer gang condenser assembly	$5.20
52	117209	Switch—tone control	.65
53A-53B	117212	Volume control, 1 meg. with switch	1.30
54	117215	Transformer—1st I.F.	1.50
55	117216	Transformer—2nd I.F.	1.50
56	117217	Transformer—power	1.50
57	117225	Switch—push button	5.00
58A-58B-58C-58D	117265	Range switch	3.00
59	117446	Coil—oscillator	1.35
60	117448	Coil—antenna	1.00
61	M-117671	Tone and voice coil for M-115064 speaker	1.20
62	M-117672	Transformer—output for M-115064 speaker	1.80
			2.50

MODEL S7404-1
Alignment, Tuner
MODEL S7404-2
MODEL S7404-3

FIRESTONE TIRE & RUBBER CO.

MODEL S7426-8
MODEL S7427-1, Late
Tuner Data

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the "G" terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector from between the "A" and "X" terminals. Check the pointer to see that it is correctly set.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Front Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	"A" Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for minimum output using a strong generator signal.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	"A" Terminal	600 KC	Broadcast	Tune To 600 KC Generator Signal	8	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	"A" Terminal	14 MC	Foreign	14 MC	9	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" Terminal	14 MC	Foreign	14 MC	10	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results. Also be sure to select stations that fall within the frequency range of the buttons.
3. Be sure the antenna is connected before proceeding further.
   It will be impossible to set up buttons properly without an antenna.
4. With the range switch in the Broadcast (Manual) position (position B) tune in the station to be set up. Then turn the range switch to Automatic Position (Position A) and push in the button to be set up, being sure to select a button with the proper frequency range (see Fig. 1). ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.
5. At the back of the chassis will be found 6 holes numbered to correspond to the numbers of the buttons. See Fig. 1. Adjust the large screw with the number corresponding to the number of the button you have pushed in, until the same station is again heard. Tune accurately, adjusting for deepest tone.

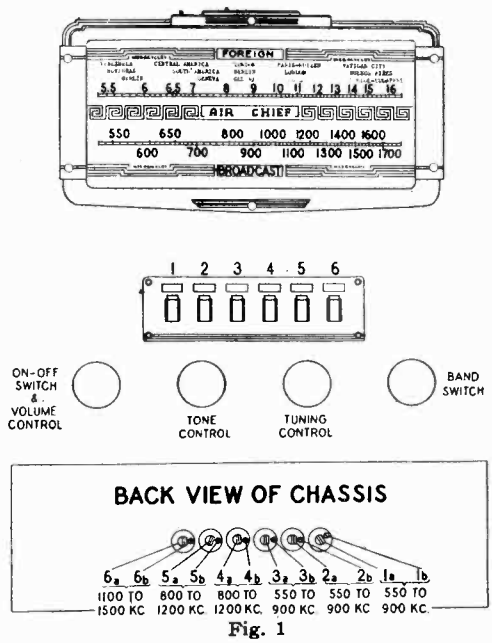


Fig. 1

6. Now adjust the small screw (located adjacent to the large screw just adjusted) until maximum output is obtained. Make a final adjustment on the large screw, always tuning for deepest tone.
7. The set-up is now complete for this button. The remaining buttons may be set up in the same way.
8. Call letter tabs which may be used to label the buttons are supplied with this radio.

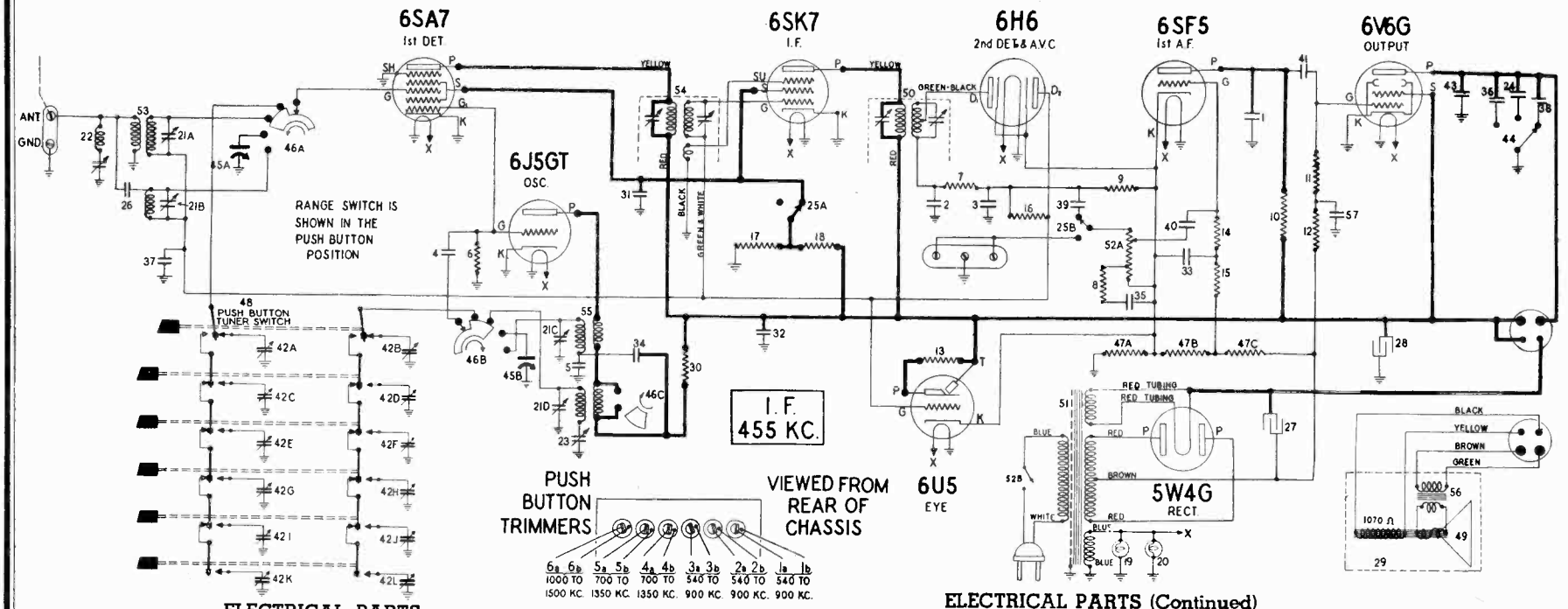


Fig. 1

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2-3	83783	Condenser—mica, 110 mmfd.	.20
4	85061	Condenser—mica, 51 mmfd.	.15
5	88587	Condenser—mica, .0042 mfd.	.35
6-7-8	110552	Resistor—carbon, 47,000 ohms, ¼ watt	.12
9-10-11-12	110553	Resistor—carbon, 220,000 ohms, ¼ watt	.12
13-14-15	110554	Resistor—carbon, 1 megohm, ¼ watt	.12
16	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
17	110581	Resistor—carbon, 18,000 ohms, 2 watts	.30
18	110595	Resistor—carbon, 12,000 ohms, 3 watts	.20
19-20	110629	Lamp—6.3 volts — .25 amps.	.15
21A to 21D	112792	Condenser—trimmer (4 section)	.60
22	112796	Coil—wave trap (with trimmer)	.50
23	113346	Condenser—padding	.38
24	114108	Condenser—.03 mfd., 750 volt	.25
25A-25B	114141	Switch—D.P.D.T.	.44
26	114969	Condenser—mica, 15 mmfd.	.12
27-28	114972	Condenser—electrolytic, 16 mfd., 450 volt	.78
29	U-115078	Speaker—dynamic, 10"	9.00
30	116055	Resistor—carbon, 22,000 ohms, ½ watt	.12
31-32-33	116625	Condenser—.1 mfd., 600 volt	.25
34-35-36	116640	Condenser—.01 mfd., 600 volt	.15
37-38	116819	Condenser—.05 mfd., 600 volt	.20
39-40-41	116893	Condenser—.02 mfd., 600 volt	.15
42A to 42L	117081	Push button trimmer gang condenser assembly	5.20
43	118194	Condenser—.006 mfd., 600 volts	.15
44	118616	Switch—tone	.80
45A-45B	118619	Condenser—variable tuning	3.00
46A-46B-46C	118622	Range switch	1.20
47A-47B-47C	118628	Resistor—bias (candohm type)	.35
48	118631	Push button switch	2.65

FOR PUSH BUTTON DATA, SEE INDEX

ELECTRICAL PARTS (Continued)

Diagram Number	Part Number	Description	List Price
49	U-118659	Cone & Voice coil for U-115078 speaker	$2.35
50	118664	Transformer—2nd I.F.	1.30
51	118665	Transformer—power	6.00
52A-52B	118669	Volume control (1 Meg.) with switch	1.40
53	118671	Coil—antenna	.80
54	118672	Transformer—1st I.F.	1.30
55	118675	Coil—oscillator	1.00
56	U-118678	Transformer—output for U-115078 speaker	1.80
57	116893	Condenser—.02 mfd., 600 volt	.15

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SA7	1st Det.	6.0 A.C.	0	—3*	—10	90		255		
6J5GT	Osc.	6.0 A.C.	0	—10				145		
6SK7	I.F. Amp.	6.0 A.C.	0	—3*		90	0	255		
6H6	2nd Det. & A.V.C.	6.0 A.C.	—3						—3*	—3*
6SF5	1st A.F.	6.0 A.C.	—3	—4.5*				155		
6V6G	Output	6.0 A.C.	0	—14.5*		255		230		
6U5	Tuning Eye	6.0 A.C.	—3	—3*				T=255 Volts		
5W4G	Rectifier	5.0 A.C.						Plates=300 V.A.C.		

*Measured at Bias Resistor.

Use a high resistance voltmeter of at least 1000 ohms per volt.

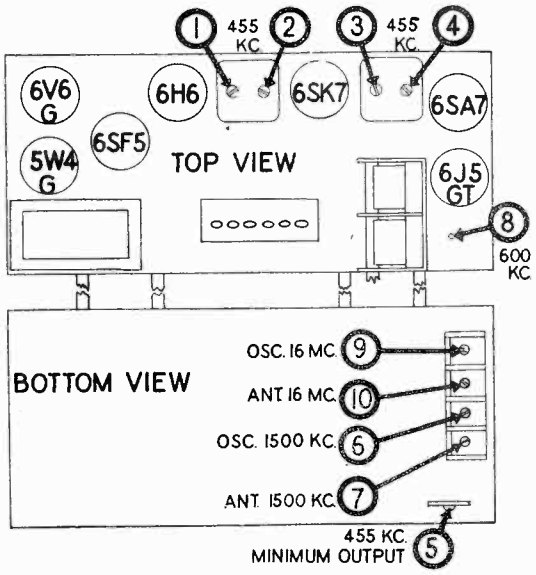
MODEL S7404-2
(Serials Prefixed with A)
Alignment, Socket, Trimmers

FIRESTONE TIRE & RUBBER CO.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6V6G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the "GND" terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Check the pointer to see that it is correctly set.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Front Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	"Ant." Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for minimum output using a strong generator signal.
200 MMFD. Mica Condenser	"Ant." Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"Ant." Terminal	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	"Ant." Terminal	600 KC	Broadcast	Tune To 600 KC Generator Signal	8	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	"Ant." Terminal	16 MC	Foreign	16 MC	9	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear realign at 16 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"Ant." Terminal	16 MC	Foreign	16 MC	10	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



DIAL AND MISCELLANEOUS PARTS

Part Number	Description	List Price
118749	Back—cabinet complete with antenna and terminal	$1.65
118648	Band indicator	.22
118601	Band indicator lever	.03
113442	Bracket—for tuning eye	.16
114001	Clamp for dial scale retaining	.08
114955	Clamp—for dial cord	.01
110808	Clip—for tuning eye support	.14
112745	Clip—coil mounting	.01
112798	Clip—for mtg. wave trap coil	.01
113178	Cord—dial—for tone indicator (supplied in 4 ft. lengths)	.30
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive (supplied in 2 ft. lengths)	.15
118663	Dial Gasket	.42
118547	Dial mounting plate & brackets	1.10
118700	Dial Scale	1.00
113402	Drum—dial cord drive	.56
114052	Escutcheon—dial	2.00
113890	Escutcheon—eye	.10
118626	Escutcheon for push buttons	.45
117087	Knob—for tuning or volume	.12
118605	Pointer	.14
118625	Push button	.12
81145	Retaining ring—for drive shaft	Per C .50
83624	Screw—self tapping 8 x ¼	.01
85040	Screw—No. 6 Hex. Hd.	Per C .35
113191	Screw—special No. 8-32 x 1⅛	.01
114914	Screw—special head for mtg. escutcheon	Per Dz. .15
85827	Set Screw—8-32 Square Head	.02
111085	Sleeve—felt for tuning eye	.03
85427	Socket—octal base (standard)	.15
110501	Socket—4 prong (for speaker)	.16
113025	Socket—octal base (with special ground)	.15
114117	Socket—dial lamp	.18
111090	Spacer—steel, mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
114046	Spring—for band indicator drive	.05
117315	Tabs—station call letters	.55
85785	Terminal strip—antenna—ground	.15
117703	Tuning eye cable and socket	1.00
118606	Tuning shaft	.18
67590	Washer—steel; chassis mtg.	.01
111456	Washer—spring washer	Per C .50
111972	Washer—extension and tap (for mtg.)	.05
116530	Washer—(paper) for back of knobs	.005

PHONOGRAPH CONNECTIONS: Connect the wires from a phonograph record player to the left hand and middle terminals on the terminal strip nearest the middle of the chassis on the back of the chassis. Push the black sliding button on the back of the chassis to the right for phonograph or television reception. This switch must be pushed to the left for radio reception. Turn the volume knob on the record player to the maximum volume position and control volume by means of the volume control on the radio.

TELEVISION CONNECTIONS: Connect the wires from a television picture receiver to the right hand and middle terminals on the terminal strip. Operation will now be the same as for phonograph operation.

FIRESTONE TIRE & RUBBER CO.

MODEL S7404-2 (Serials Prefixed with C)
MODEL S7427-8
Alignment, Trimmers Socket

MODEL S-7404-2 (With "C" prefixed to Serial Number)

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across loud speaker voice coil
Generator ground lead connection . . . . . Receiver chassis
Dummy antenne value to be in series with generator output . . . . . See chart below
Connection of output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Brilliant
Position of Dial Pointer with variable fully closed . . . . . On mark to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
Manual B.C.	Closed	455 kc	.1 mfd.	G3 of 6SA7	T2,T1	IF
Manual B.C.	600 kc	600 kc	.0002 mfd.	Ant. Term.	C4*	Wave Trap
Manual B.C.	Fully open	1720 kc	.0002 mfd.	Ant. Term.	C12**	Oscillator
Manual B.C.	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1	Translator
Manual B.C.	600 kc	600 kc	.0002 mfd.	Ant. Term.	C13	Padder
Manual S.W.	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator

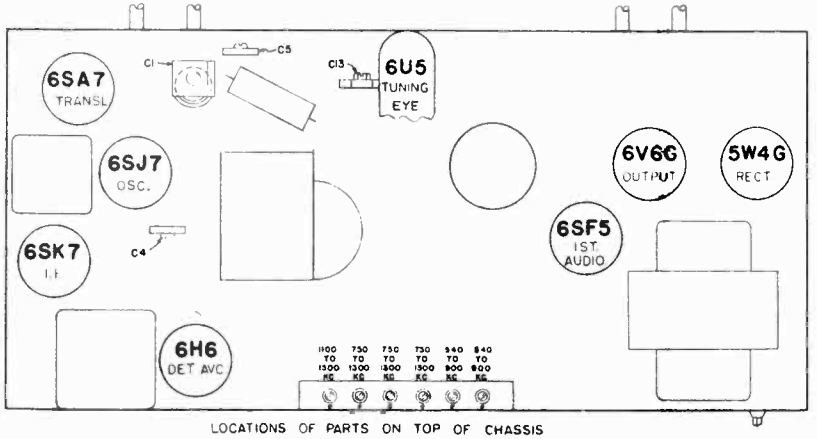
IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

** Mounted under the chassis.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF PARTS ON TOP OF CHASSIS

MODEL S-7427-8

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across loud speaker voice coil
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Brilliant
Position of Dial Pointer with variable fully closed . . . . . On mark to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
Manual B.C.	Closed	455 kc	.1 mfd.	G3 of 6SA7	T2,T1	IF
Manual B.C.	Fully open	1620 kc	.0002 mfd.	Ant. Term.	C9	Oscillator
Manual B.C.	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1*	Translator
Manual B.C.	600 kc	600 kc	.0002 mfd.	Ant. Term.	C10	Padder
Manual S.W.	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C3	Translator

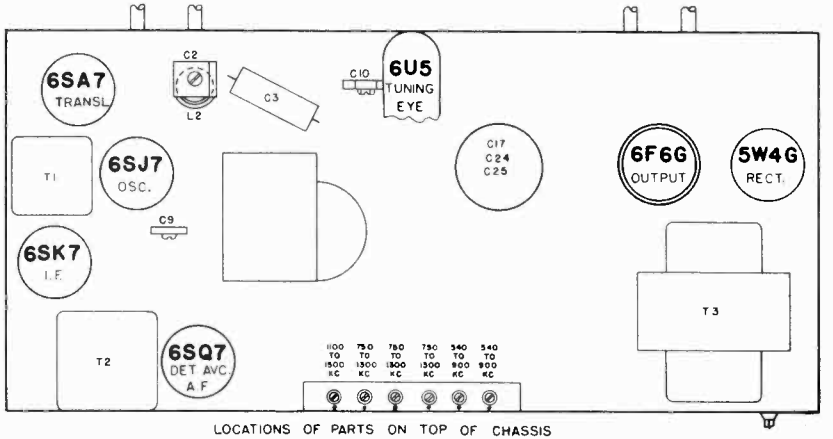
IMPORTANT ALIGNMENT NOTES

* Mounted on loop.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

With the signal generator disconnected, tune in a weak broadcast station at about 1400 kc and readjust C1 for the final adjustment.

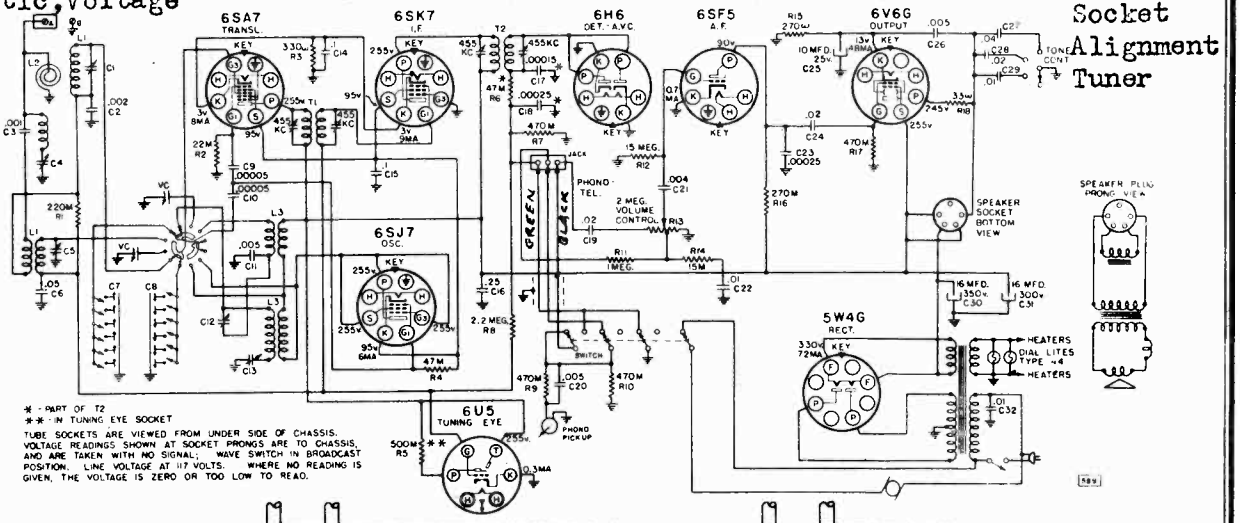


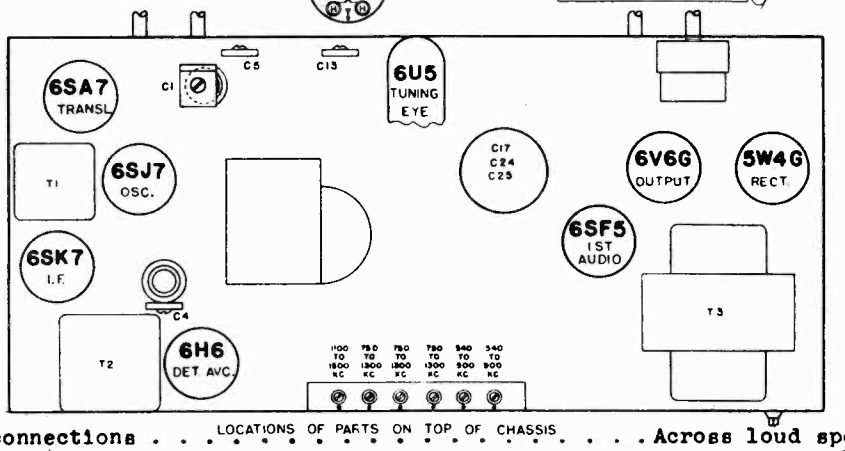
LOCATIONS OF PARTS ON TOP OF CHASSIS

MODEL S7404-4
Schematic, Voltage

FIRESTONE TIRE & RUBBER CO.

Trimmers
Socket
Alignment
Tuner





LOCATIONS OF PARTS ON TOP OF CHASSIS

PRELIMINARY:

Output meter connections . . . . . Across loud speaker voice coil
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Brilliant
Position of Dial Pointer with variable fully closed . . . . . On mark to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
Manual B.C.	Closed	455 kc	.1 mfd.	G3 of 6SA7	T2,T1	IF
Manual B.C.	600 kc	600 kc	.0002 mfd.	Ant. Term.	C4*	Wave Trap
Manual B.C.	Fully open	1730 kc	.0002 mfd.	Ant. Term.	C12**	Oscillator
Manual B.C.	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1	Translator
Manual B.C.	600 kc	600 kc	.0002 mfd.	Ant. Term.	C13	Padder
Manual S.W.	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

** Mounted under the chassis.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

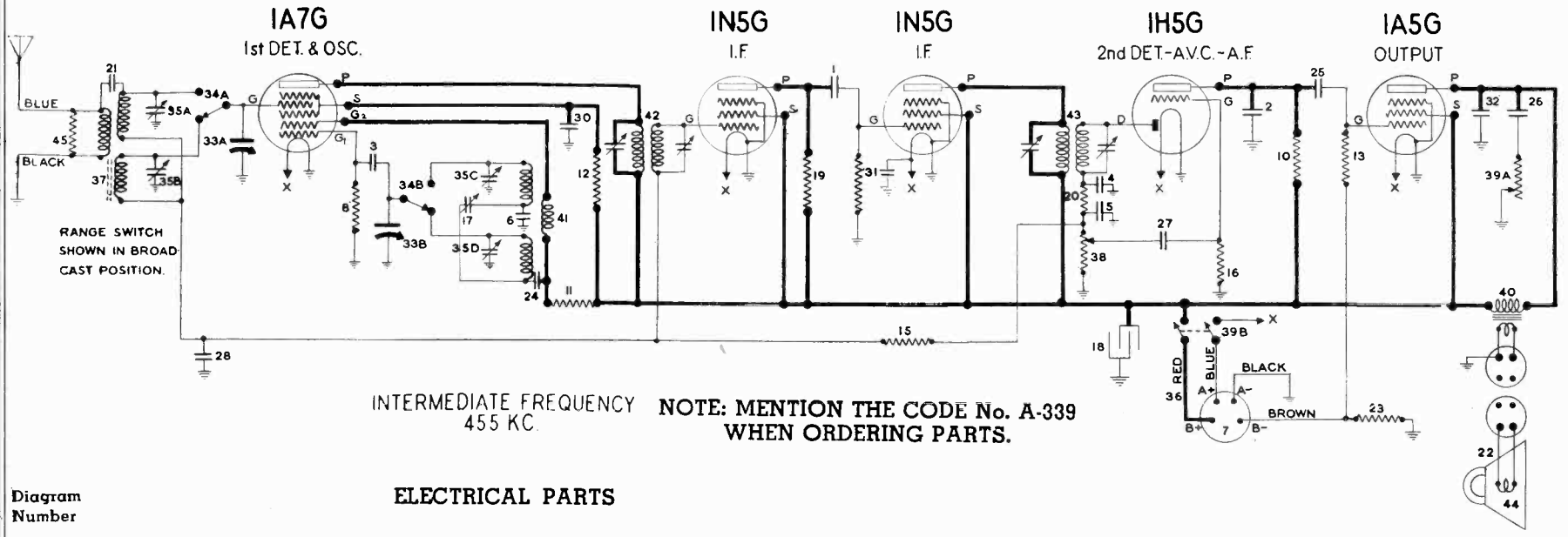
The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

PUSH BUTTON TUNING

Each of the buttons will be set up in the following manner:

1. Turn the BAND knob to the MANUAL BROADCAST position and tune in the desired station.
2. Turn the BAND knob to PUSH BUTTON. Push in the button that is to be set to the desired station.
3. Turn the large screw of the corresponding adjustment until the station is tuned in; then the small screw for finer tuning. Repeat with the large screw for final adjustment. Use the Tuning Eye to secure exact tuning. The BAND knob can be turned back to MANUAL BROADCAST in order to check if the station is the desired one.
4. Fasten the proper call letters in the escutcheon.

Proceed in the same manner for the remaining buttons.



INTERMEDIATE FREQUENCY 455 KC.

NOTE: MENTION THE CODE No. A-339 WHEN ORDERING PARTS.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2	83783	Condenser—mica, 110 mmf.	.20
3-4-5	85061	Condenser—mica, 51 mmfd.	.15
6	88587	Condenser—mica, .0042 mfd.	.35
7	88631	Plug—4 prong, male	.06
8	110553	Resistor—carbon, 220,000 ohms, ¼ watt	.12
9	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
10	110554	Resistor—carbon 1 megohm, ¼ watt	.12
11	110557	Resistor—carbon, 4,700 ohms, ¼ watt	.12
12	110566	Resistor—carbon, 33,000 ohms, ¼ watt	.12
13	110570	Resistor—carbon, 2.2 meg., ¼ watt	.15
15-16	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
17	112799	Condenser—padder	.36
18	112898	Condenser—electrolytic 16 mfd., 150 volt	.50
19	118816	Resistor—carbon, 6,700 ohms, ¼ watt	.12
20	110565	Resistor—carbon, 22,000 ohms, ¼ watt	.12
21	114969	Condenser—mica, 15 mmfd.	.12
22	M-115093	Speaker—P.M. (8")	7.50
23	116078	Resistor—560 ohms, ¼ watt	$0.12
24-25-26	116640	Condenser—.01 mfd., 600 volt	.15
27	116647	Condenser—.004 mfd., 600 volt	.15
28 to 31	116819	Condenser—.05 mfd., 600 volt	.20
32	117022	Condenser—.002 mfd., 600 volt	.15
33A-33B	119533	Condenser—tuning (with drum)	3.30
34A-34B	119534	Range switch	.80
35A-35D	119536	Condenser—trimmer (4 sections)	.60
36	119537	Battery cable	.40
37	119541	Coil—antenna	1.25
38	119551	Volume control—1 meg.	.95
39A-39B	119552	Tone control—100,000 ohms, with switch	.95
40	119651	Transformer—output	1.50
41	119669	Coil—oscillator	.75
42	119720	Transformer—1st I.F.	1.25
43	119673	Transformer—2nd I.F.	1.25
44	M-119750	Cone & voice coil for M-115093 speaker	1.60
45	118805	Resistor—carbon, 10,000 ohms, 1 watt	.12

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.

Tube	Function	G	G_1	G_2	P	D	S	F(x)
1A7G	1st Det. & Osc.	0	—1	74	85	—	49	1.4
1N5G	I. F.	0	—	—	60	—	85	1.4
1N5G	I. F.	0	—	—	85	—	85	1.4
1H5G	2nd Det. A.V.C.—A.F	0	—	—	Note A	0	—	1.4
1A5G	Output	Note B	—	—	83	—	85	1.4

Note A: Only a small voltage will be measured at the plate of the 1H5G when using a voltmeter having a resistance of 1000 ohms per volt.

Note B: The bias on the 1A5G grid is —5 volts measured across resistor No. 23.

MODEL S7405-5
Alignment, Trimmers
Socket

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

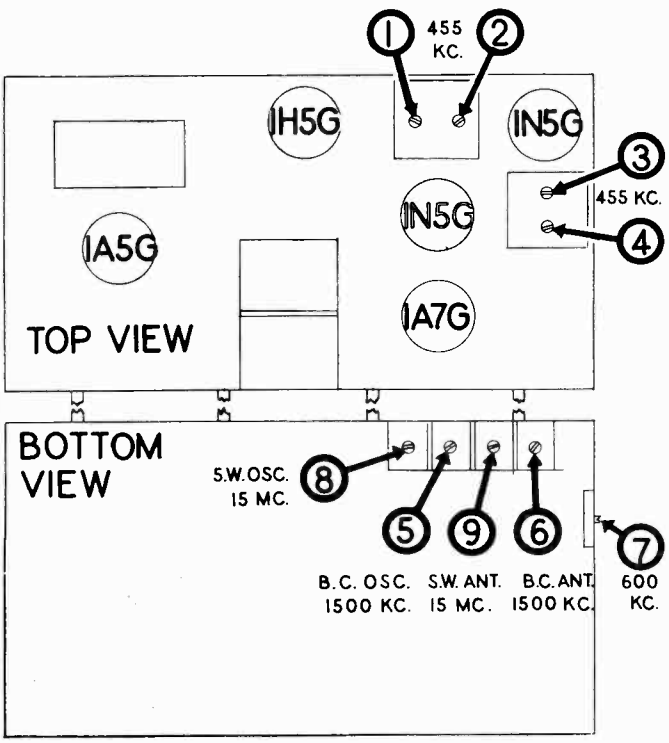
Connect the output meter across the voice coil or between the plate of the 1A5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

Connect the ground lead of the signal generator to the black ground wire or the chassis.

Turn the volume control to the maximum volume position and keep it in this position while aligning.

With the gang condenser in full mesh, set the dial pointer to the low frequency edge of the dial scale.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7G	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	600 KC	Broadcast	Tune To 600 KC Generator Signal	7	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	15 MC	8	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	15 MC	9	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

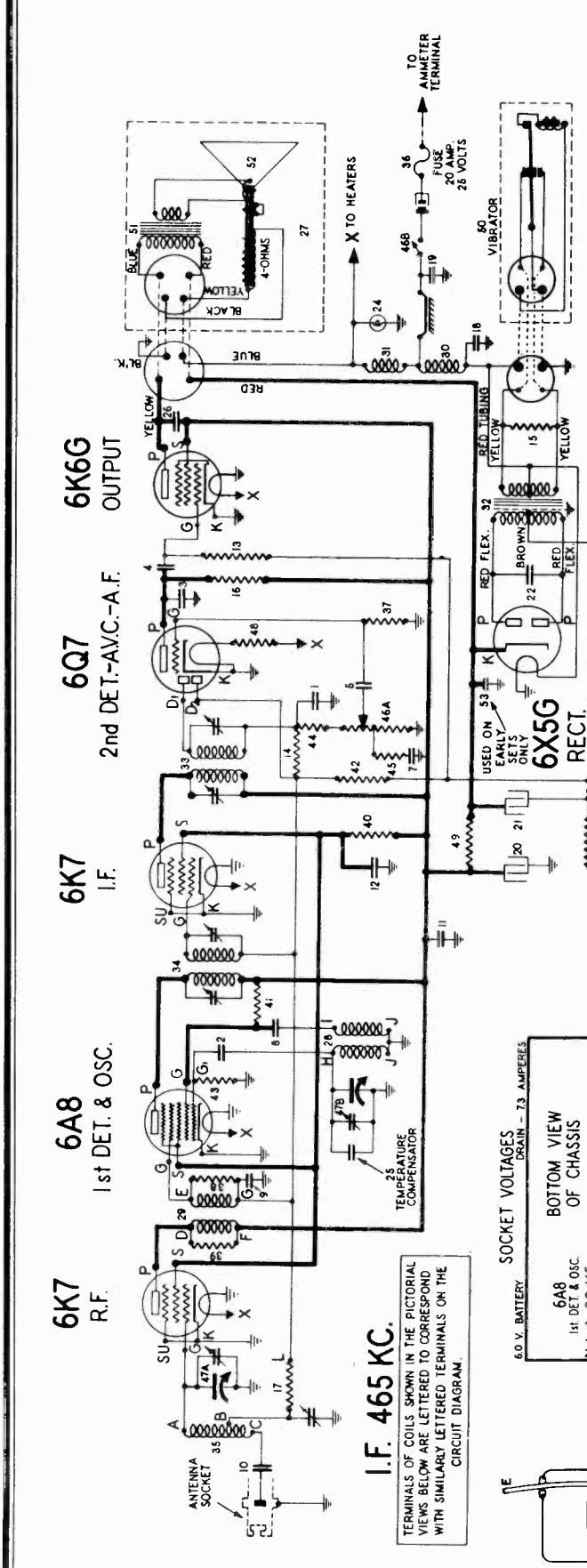


MISCELLANEOUS PARTS

Part Number	Description	List Price
119538	Cabinet Back	$ .45
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
117057	Cord—drive (supplied in 2 ft. lengths)	.15
119523	Dial Scale	.40
112265	Escutcheon—with celluloid window	2.10
116411	Indicator lever assembly	.09
119644	Knob—push on	.18
119588	Pointer	.25
81145	Retaining ring for drive shaft	Per C .50
83624	Screw self tapping 8 x 1/4	.01
113191	Screw—special No. 8-32 x 1 1/8	.01
119587	Screw—No. 2 x 3/8 Phillips Round Head	.02
85827	Set Screw 8-32 Square Head	.02
119549	Shaft—extension for volume control	.25
116392	Shield base—tube	.03
116395	Shield—tube	.08
85427	Socket—octal base (standard)	.15
110501	Socket—4 prong (for speaker)	.16
111090	Spacer—steel mounting	.02
113169	Spring—for indicator lever	.01
114968	Spring—dial cord tension	.03
111972	Washer—extension and top (for mounting)	.05
111456	Washer—spring washer	Per C .50

FIRESTONE TIRE & RUBBER CO.

MODEL S7407-6
Schematic, Voltage
Socket, Coils, Parts



USE A HIGH RESISTANCE VOLTMETER OR A 1000 OHMS PER VOLT.
NOTE A:- THE ACTUAL BIAS ON THESE GRIDS AND DIODE PLATE (Dp) IS -3 VOLTS. DUE TO THE HIGH RESISTANCE IN THIS BIAS SUPPLY CIRCUIT IT IS NOT POSSIBLE TO MEASURE THE ACTUAL VOLTAGE UNLESS A VACUUM TUBE VOLTMETER IS AVAILABLE.
NOTE B:- THE BIAS ON THIS GRID IS -18 VOLTS MEASURED ACROSS RESISTOR NO. 23.

PARTS LIST

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmf.(10%)	.20
3	83764	Condenser - mica .0011 mfd.	.25
4	PE026	Condenser-paper .02 mfd. 400 V.	.25
5-6	88029	Condenser-paper .004 mfd.400 V.	.25
7-8-55	88030	Condenser-paper .01 mfd. 400 V.	.25
9	88189	Condenser-paper .05 mfd. 200 V.	.25
10	88205	Condenser - mica 2100 mmfd.	.35
11	88682	Condenser - paper .1 mfd.400 V.	.25
12	89421	Condenser - paper .1 mfd.200 V.	.25
13	112971	Resistor - insulated 470,000 ohms 1/4 watt	.15
14	112973	Resistor - insulated 1.5 meg. 1/4 watt	.15
15	112976	Resistor - wire wound 220 ohms 1/2 watt (10%)	.15
16	112987	Resistor - insulated 220,000 ohms 1/4 watt	.15
17	112993	Resistor - carbon 470,000 ohms 1/10 watt	.12
18-19	113561	Condenser-paper .5 mf. 150 volt	.38
20-21	114258	Condenser-elect. 8 mfd.450 volt	.98
22	114277	Condenser-oil filled .01 mfd. 2000 volts	.24
23	114334	Resistor - wire wound 360 ohms 2 watts (10%)	.20
24	114401	Dial Lamp - 6 volt	.18
25	114499	Condenser-temp. comp. for osc.	.48
26	114528	Condenser-paper .005 mfd. 600V.	.15
27	U-115046	Speaker - dynamic 8"	5.95
28	116025	Oscillator coil	.40
29	116026	R.F. Coil & Shield Assembly	1.40
30	116032	Choke coil in "A" supply (long)	.35
31	116035	Choke coil in "A" supply (short)	.25
32	116038	Transformer - power (6 volt)	3.50
33	116040	Transformer - 2nd I.F.	1.00
34	116043	Transformer - 1st I.F.	1.25
35	116045	Ant. Coil - with shield & brkt.	1.25
36	116049	Fuse - 20 amp. 25 volt	.05
37	116050	Resistor-insul. 10 meg. 1/4 W.	.12
38	116052	Resistor-carb. 33,000 ohm 1/10W	.12
39	116053	Resistor-carb. 68,000 ohm 1/10W	.12
40	116054	Resistor-carb. 27,000 ohm 1 W.	.12
41	116055	Resistor-carb. 22,000 ohm ½ W.	.12
42	116057	Resistor-carb. 10 meg. ½ W.(10%)	.12
43-44-45	116058	Resistor-carb. 47,000 ohm ½ W.	.12
46A - 46B	116125	Volume control - 500,000 ohms with off-on switch	1.00
47A - 47B	116127	Condenser - variable gang	2.75
48	116166	Resistor-W.W. 3 ohms 1 watt	.15
49	116167	Resistor-W.W. 1,500 ohms 1 watt	.15
50	116202	Vibrator	3.00
51	U-116207	Output transformer for U-115046 speaker	1.70
52	U-116208	Cone & Voice coil assembly for U-115046 speaker	1.50
53	88030	Condenser-paper .01 mfd. 400 V.	.25

MODEL S7407-6
Alignment, Trimmers
Parts

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

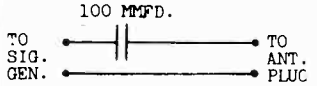
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1400 KC. are required.

1- Connect the output meter across the speaker voice coil or between the plate of the 6K6G output tube and ground through a .1 mfd. condenser. The more sensitive type meter should be connected across the voice coil.

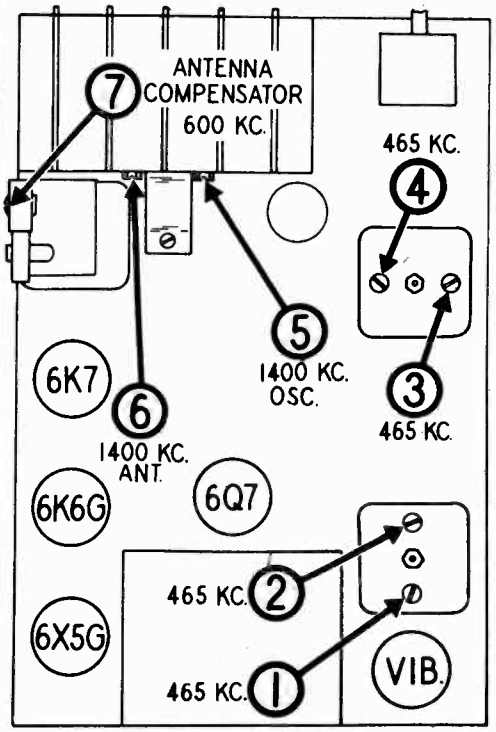
2- Connect the ground lead of the signal generator to the receiver chassis and leave it connected in this manner throughout the entire alignment procedure.

3- Turn the volume control to the maximum volume position.

4- With the gang condenser in full mesh, set the pointer to the last division on the low frequency end of the dial scale. This can be done by releasing the clip holding the pointer to the dial cord and slide the pointer to the correct position. Then retighten the pointer clip on the dial cord.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GEN. OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	1ST I. F.	
WHEN ALIGNING TRIMMERS NO. 5, 6 AND 7 CONNECT THE SIGNAL GENERATOR OUTPUT TO THE ANTENNA LEAD-IN PLUG ON THE LEFT SIDE OF THE RECEIVER CASE WITH A 100 MMFD. (APPROX.) MICA CONDENSER IN SERIES WITH GENERATOR OUTPUT.  IMPORTANT:- IF THIS CONDENSER IS OMITTED THE ALIGNMENT WILL BE INCORRECT.		1400 KC.	TUNE TO 1400 KC GENERATOR SIGNAL	5	OSCILLATOR (Shunt) CONDENSER	ADJUST FOR MAXIMUM OUTPUT.
				6	ANTENNA (Shunt) CONDENSER	ADJUST FOR MAXIMUM OUTPUT.
		600 KC	TUNE TO 600 KC GENERATOR SIGNAL	7	ANTENNA COMPENSATOR (Series Condenser)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RE-TUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

AFTER THE SET IS INSTALLED IN THE CAR. TUNE IN A FAIRLY WEAK STATION NEAR 600 KC. AND ADJUST TRIMMER 7 FOR MAXIMUM OUTPUT.



FORM NO. 8958 PRINTED IN U.S.A.

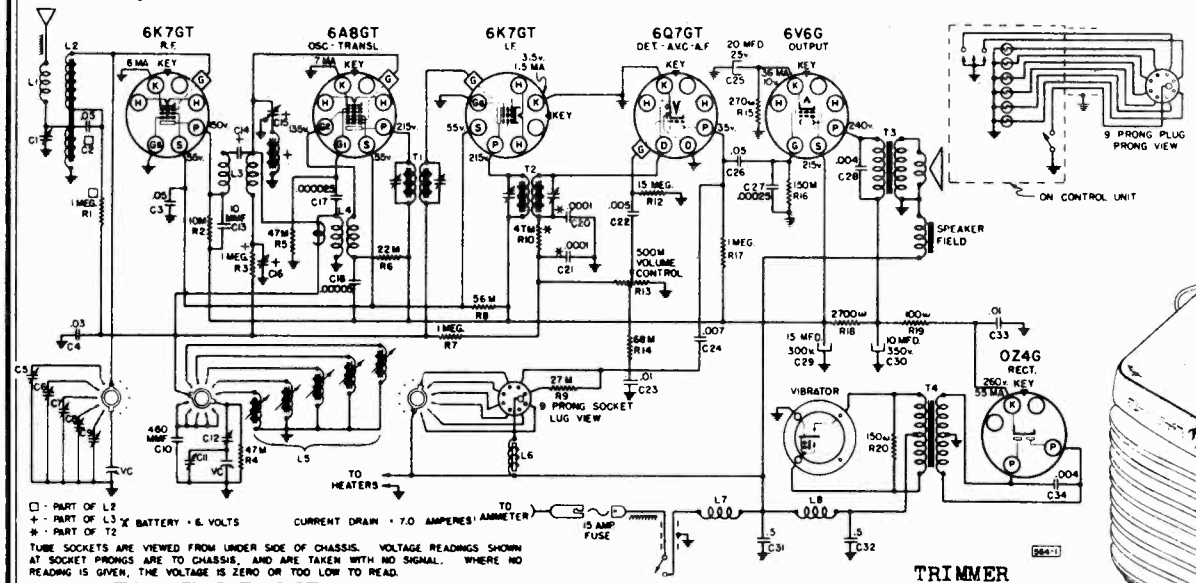
PARTS LIST

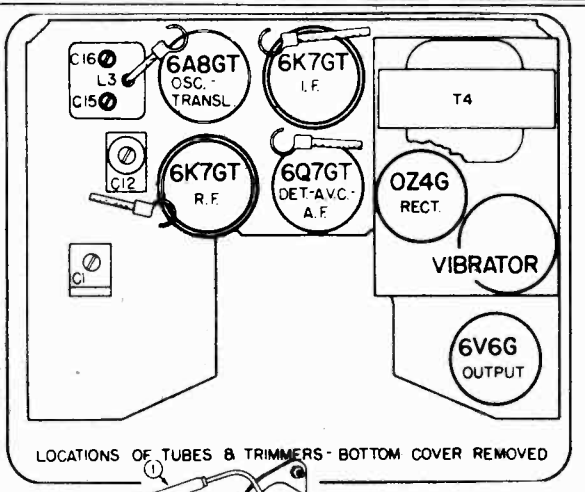
PART NUMBER	DESCRIPTION	LIST PRICE
INSTALLATION PARTS		
116155	"A" Cable with fuse hous.	.30
116158	"A" Cable (chassis end)-	.28
83319	Fuse insulator tube-----	.02
77650	Nut for mtg. back of rec.	.02
61086	Lockwasher-for mtg. front bracket---Per C	.25
79056	Lockwasher-1/4" for mtg. back of rece.ver- doz.	.08
116269	Lockwasher - double edge for rear brkt. mtg.--	.01
116225	Mtg. Bracket - for rear-	.35
116285	Mtg. Brkt.R.H.for front-	.10
116286	Mtg. Brkt.L.H. for front	.10
116264	Mtg. Bolt (1/4-20 X 1⅛)-	.02
45569	Nut-#10-32 for front brkt	.01
77854	Screw-10-32 for frt.brkt.	.08 dz
NOISE SUPPRESSION PARTS		
110236	Anti Rattle Clips------	.05
110402	Braided Ground Bond (10")	.22
110403	Braided Ground Bond (6")	.18
110410	Cond.-.5 mfd. 100 volt--	.35
88429	Distributor suppressors-	.35
88430	Dome light filter------	1.00
88422	Ford distributor cond.--	.75
88350	Gen.cond.-.5 mfd. 150 V.	.75
CASE SECTIONS AND ASSOCIATED PARTS		
116121	Bottom cover-(spkr.case)	1.50
116214	Escutcheon - for nose---	.65
116169	Grill - for speaker-----	.30
116213	Nose for receiver case--	.60
110430	Nose Mounting screws----	.01
116120	Receiver case - less bottom cover---------	2.00
116217	Screw for mtg. nose esc.	.06
116218	Speed Nut - for nose esc.	.01
114339	Trunk clamp-upper sect.-	.16
114341	Trunk clamp-lower sect.-	.08
DIAL AND MISCELLANEOUS PARTS		
113170	Adjusting lug-for shafts-	.01
110087	Antenna lead receptacle--	.03
116171	Cable & Plug for spkr.---	.30
114253	Clamp - for vibrator----	.12
112745	Clip - coil mounting----	.01
113178	Cord - dial------(4 ft.)	.30
116148	Dial Drive Drum & Pinion-	1.00
116153	Dial Frame & Pulley-----	.50
116150	Dial Scale - glass------	.28
116200	Knob-for tun. or vol.---	.10
116346	Mechanical Tuner Assem.--	2.50
12349	Nut for spkr. mtg.--Per C	.45
116109	Pointer - for dial------	.06
116201	Push button----------	.10
116117	Retainer-for dial (large)	.02
116118	Retainer-for dial (small)	.01
81145	Retaining ring------Per C	.50
114327	Spring-push button key---	.04
111403	Set Screw - fluted head--	.12
116243	Shaft - for push buttons-	.08
116124	Socket -for dial lamp----	.15
116168	Speaker plug - male end--	.20
113177	Spring - for dial cord---	.09
114356	Tab - cellulod-----Per Dz.	.08
116266	Tabs - call letters---Set	.50
110237	Tube shield cap--------	.06
114611	Tube socket - octal type-	.15
114612	Tube socket (spec. grd.)-	.15
116154	Tuning shaft----------	.08
88262	Vibrator socket(4 prong)-	.14

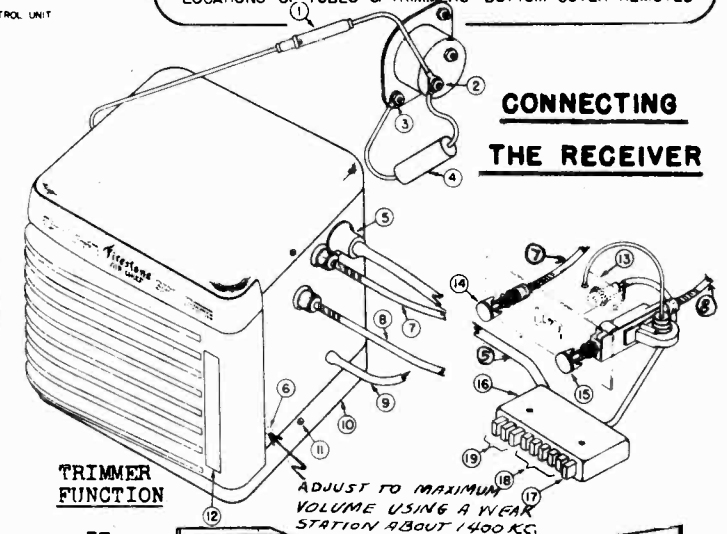
MODEL S7407-8 FIRESTONE TIRE & RUBBER CO. MODEL S7407-5, Late

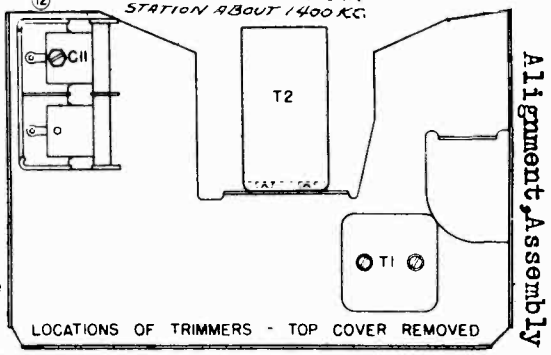
Alignment Schematic, Voltage Socket, Trimmers Alignment, Assembly

1. Fuse Container.
2. Connection to Ammeter.
3. Grounding of Ammeter Condenser.
4. Ammeter Condenser.
5. Push Button and Tone Control cable.
6. Hole for Antenna Matching Adjustment.
7. Volume Control Cable.
8. Station Selector Cable.
9. Antenna Leadin Cable.
10. Bottom Cover, Removable for Tube Replacement.
11. Screw Holding Bottom Cover.
12. Cover Over MONOMATIC TUNING Adjustments. (SEE INDEX FOR SETTING TUNER)
13. Manual Tuning Control.
14. On-Off Switch and Volume Control Knob.
15. Station Selector Knob.
16. Push Button Tuning Control
17. MONOMATIC TUNING Button.
18. Station Call Letter Indicators.
19. TRIMATIC Tone Control Buttons.









FOR TUNER SEE PAGE 10-2, VOL. X

ALIGNMENT PROCEDURE

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN) S-7407-5	S-7407-8	TRIMMER FUNCTION
Closed	455 kc	.1 mfd.	RF Grid	T2, T1	T_2 T_1	IF
Closed	455 kc	.1 mfd.	RF Grid	C16*	C8*	IF Wave Trap
Open	1530 kc	.00008 mfd.	Ant. Conn.	C11	C7	Oscillator
Open	3430 kc	.00008 mfd.	Ant. Conn.	C15*	C6*	Image Rejector
Closed	540 kc	.00008 mfd.	Ant. Conn.	C12	C9	Padder
Open	1530 kc	.00008 mfd.	Ant. Conn.	C11	C7	Oscillator
1400 kc	1400 kc	.00008 mfd.	Ant. Conn.	C1	C1	Antenna
600 kc(rock)	600 kc	.00008 mfd.	Ant. Conn.	C12	C9	Padder

The receiver must be in its case during alignment.

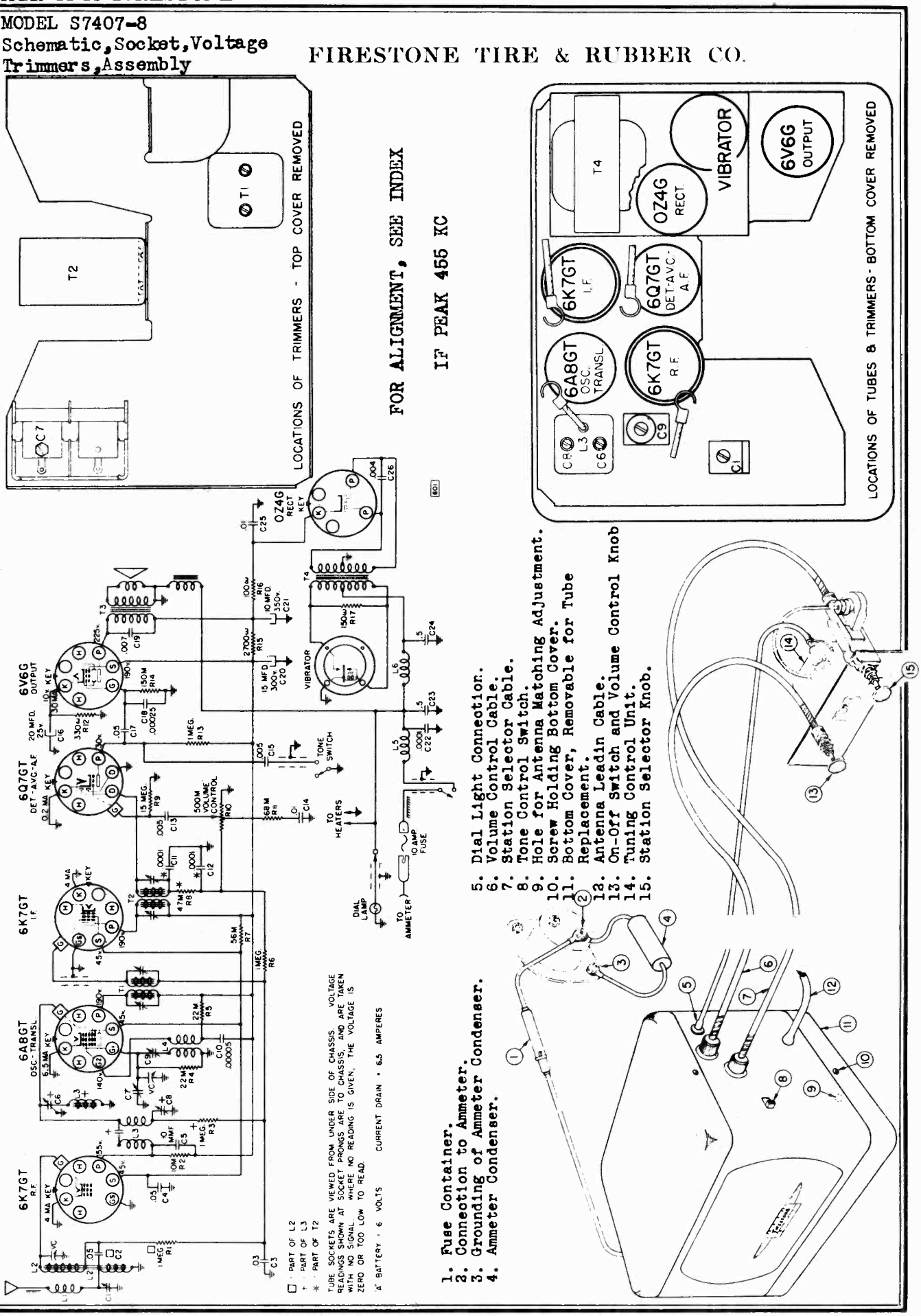
* The signal generator should be adjusted for high output and the trimmer should be adjusted for minimum response.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment, except as noted by (*) above.

MODEL S7407-8
Schematic, Socket, Voltage
Trimmers, Assembly

FIRESTONE TIRE & RUBBER CO.



1. Fuse Container.
2. Connection to Ammeter.
3. Grounding of Ammeter Condenser.
4. Ammeter Condenser.
5. Dial Light Connection.
6. Volume Control Cable.
7. Station Selector Cable.
8. Tone Control Switch.
9. Hole for Antenna Matching Adjustment.
10. Screw Holding Bottom Cover.
11. Bottom Cover, Removable for Tube Replacement.
12. Antenna Leadin Cable.
13. On-Off Switch and Volume Control Knob
14. Tuning Control Unit.
15. Station Selector Knob.

FIRESTONE TIRE & RUBBER CO.

MODEL S7425-3
Schematic, Voltage
Chassis, Socket
Trimmers

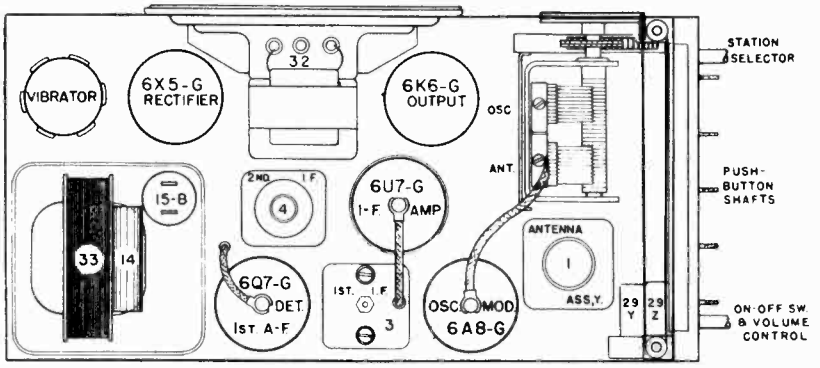


Fig. 2. Top View

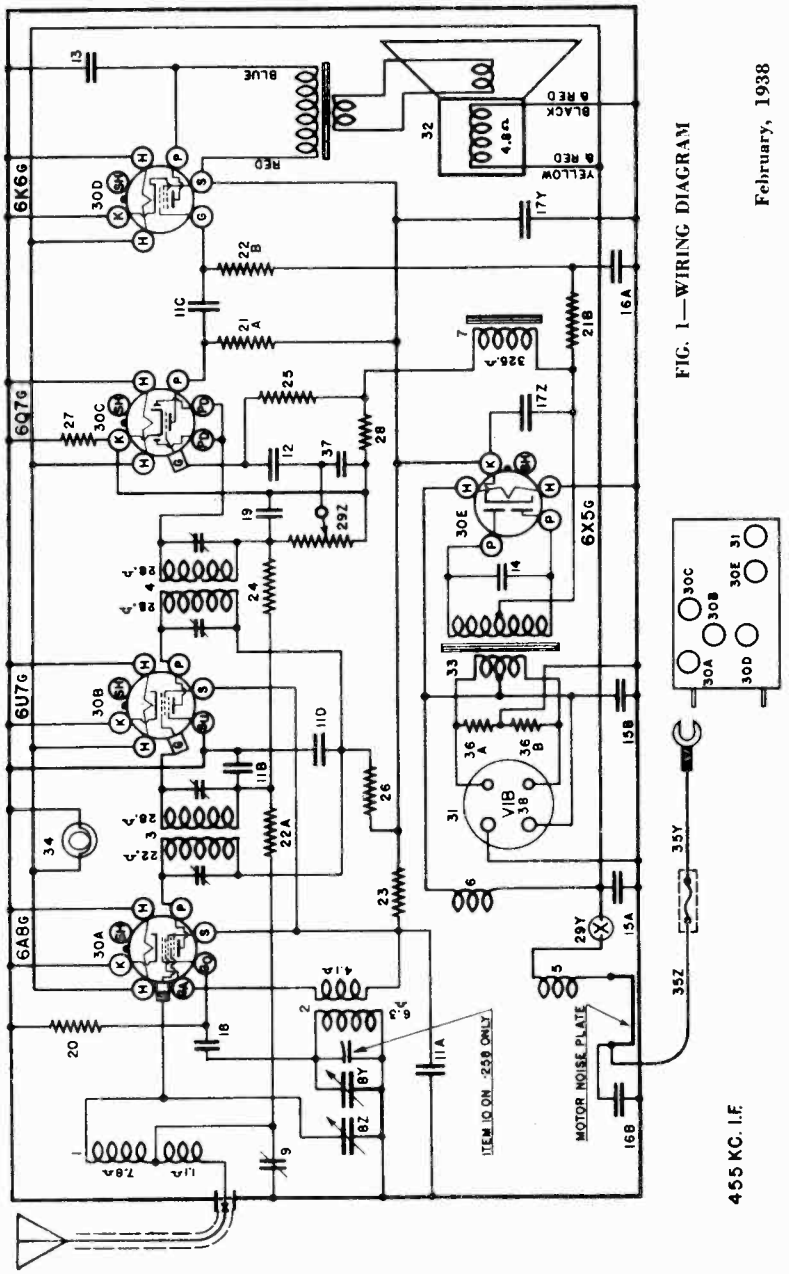


FIG. 1—WIRING DIAGRAM

February, 1938

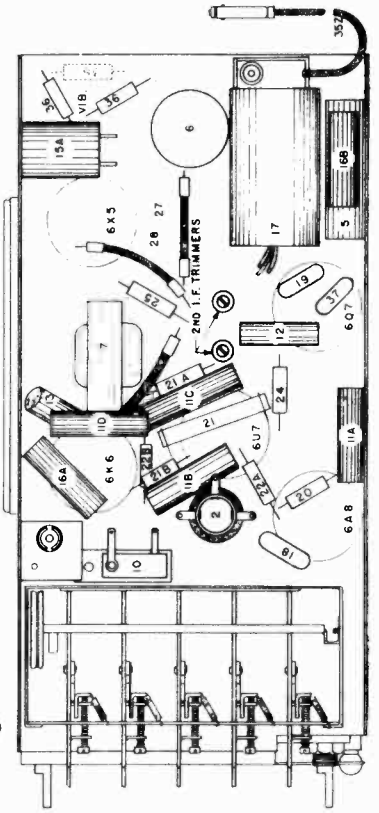


Fig. 3 Bottom View

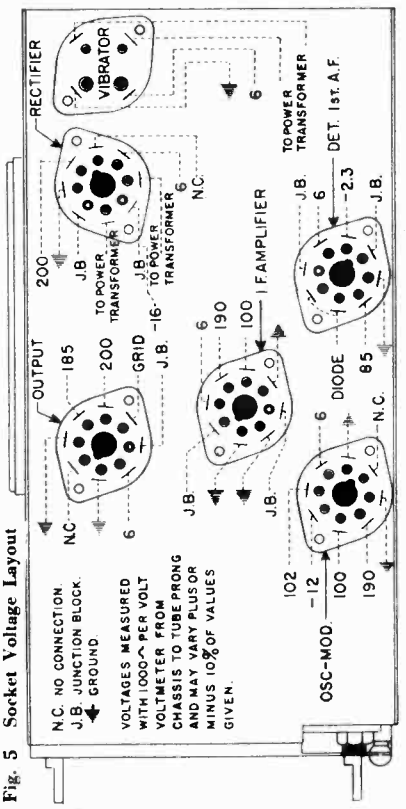


Fig. 5 Socket Voltage Layout

SPECIFICATIONS

This model is a single unit five-tube superheterodyne receiver. It incorporates an unusual push button tuning system of rugged mechanical design that is positive, accurate, and easy to adjust and operate. A highly efficient superheterodyne circuit employs five tubes to the utmost advantage as follows: one 6A8G as an oscillator and mixer or modulator, one 6U7G as an intermediate frequency amplifier, one 6Q7G as detector, A. V. C. and 1st A. F. amplifier, one 6K6G as power output amplifier and a 6X5G as a rectifier. A full wave vibrator is used. Bias for the 6A8G and 6U7G tubes is obtained across item 27 (60 ohm resistor), for the 6Q7G tube across item 28 (40 ohm resistor) and for the 6K6G across the "B" Filter choke, item 7, and items 27 and 28.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

SOCKET VOLTAGE LAYOUT

The socket layout in the illustration Fig. 5, shows the voltage readings taken between the tube prongs and receiver chassis. It will be noted that certain unused terminals are used as junction blocks while others are not used at all. All readings are taken with the receiver in operating condition and no signal input.

SETTING PUSH BUTTONS

Should it become necessary to realign the circuits of the receiver, it may also be necessary to reset the push buttons. The push buttons may be quickly and accurately set, either with the receiver in the case or with the case removed.

Insert a small screw driver in the hole through each push button and loosen (do not remove) the set screw in the bottom of the hole. By means of the conventional tuning knob, tune-in AS ACCURATELY AS POSSIBLE the favorite station having the highest frequency —that is, the station nearest the left-hand end of the dial. Completely depress and hold the No. 1 push button on the left and tighten the set screw SECURELY.

The push button tuning system is now correctly set for the 1st station. Follow through with this same procedure, setting the other four stations in the order of their frequency (kilocycles).

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6U7G I. F. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn Vol. Cont. to maximum position (RIGHT).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both 2nd I. F. trimmer condensers for maximum output. Fig. 3.

(e) Transfer generator lead to top of 6A8G Osc.-Mod. tube, leaving the tube's grid clip in place.

(f) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(g) Repeat operations (d) and (f) for more accurate adjustments.

IN ORDER TO PREVENT A. V. C. ACTION ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

To obtain the greatest gain from the R. F. amplifier, the capacity of the dummy antenna should be equal to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. (.000065 mf.) to 250 mmf. (.00025 mf.), depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna havinig a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity and vice versa.

(a) If the receiver is to be used with a whip or streamlined antenna, the output lead from the signal generator should be connected through a .0001 mf. condenser to the "Ant" connection of the receiver. If a large antenna such as a running board type or built-in top antenna is to be used, a .0002 mf. condenser should be used in place of the .0001 mf. condenser.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(g) Repeat operation (e) for more accurate adjustment.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, located between the control knobs on the front of the chassis, for maxiumum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "Ant" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

REPLACING DIAL DRIVE CORDS

Two dial drive cords are used and should the innermost cord break, it will be necessary to remove the outer cord and large pulley before the inner cord can be replaced.

To replace the inner cord:

(1) After removing the broken cord, place the chassis on end with the push buttons "up" and the speaker toward you.

(2) Thread an 18" length of drive cord through the hook on one end of the tension spring which was removed from the pulley on the end of the push button rocker plate.

(3) Insert both ends of this cord through the eyelet in the rocker plate pulley from the inside. Pull the cord through until the tension spring is pulled into the pulley, then hook the free end of the spring over the catch in the pulley in the side opposite the eyelet.

(4) Open the condenser gang all the way.

(5) Pull all but approximately 4½" of the cord through the eyelet. Loop the 4½" end of the cord around the lower half of the pulley.

(6) Loop the long end of the cord over the top of the pulley and back over the brass idler pulley to the drive shaft. Continue the cord around the drive shaft, threading from the inside and over the top. Wrap four complete turns of the cord around the drive shaft and continue the cord over the top of the rocker plate pulley.

(7) Pull on the short end of the cord until the tension spring in the pulley is stretched to within ⅛" of the eyelet. Maintain this tension and tie a knot in the two ends of the cord over the catch which holds the spring. Loop the cord over the spring catch so that the knot is turned in. (A drop of bees' wax on the knot would be an added protection against coming untied.)

To replace the outer cord:

(1) Place the chassis in a horizontal position with the push buttons to the left and the speaker toward you.

(2) Close the condenser gang and mount the large drive pulley on the shaft. Place the pulley on the condenser shaft so that the shaft is flush with the outside of the pulley bushing and the eyelet in the pulley is horizontal with the shaft and toward the dial.

(3) Cut a 22" length of drive cord and tie a knot ½" from the two ends.

(4) Hook one end of the tension spring over the catch provided in the pulley and hook the other end over the drive cord at the knot.

5) Thread the cord through the eyelet in the pulley and extend one side up and over the vertical brass pulley. Loop this lead around the horizontal idler pulley at the left-hand side of the dial and then around the idler pulley at the right-hand side of the dial and then over the top of the large drive pulley. The tension on the spring should be sufficient to stretch it to within approximately ½" of the eyelet.

(6) With the gang closed, move the pointer to the extreme right-hand end of the dial. Press the cord into the slots in the back of the pointer and check to see that the pointer travels from one end of the dial to the other as the gang is opened and closed. It may be advisable to place some Aratex or other liquid adhesive on the cord where it fits into the pointer.

REPLACING THE DRIVE CORD

1.—Remove the broken cord and the cord tension spring.

2.—Cut a 30 inch length of drive cord and tie the tension spring approximately 4 inches from one end. Thread both ends through the eyelet in the large pulley from the inside. Hook the other end of the spring to the catch in the pulley and bend catch to secure spring.

3.—Close the condenser gang and see that the eyelet in pulley is on top and that the end of the condenser shaft is flush with the inside of the pulley.

4.—Take the long end of cord and place on small brass idler pulley on the right side of the dial bracket. Loop around pulley in a clockwise direction and then around idler pulley on the left side of the dial bracket, continue on over the top of the large pulley and down to the drive shaft. From the under side of drive shaft wrap 2 turns around shaft in a counter-clockwise direction, bringing cord up on the left side of large pulley. Be sure the cord is on all the pulleys then tie a knot, pulling with sufficient force to stretch the tension spring to within ½ inch of the edge of pulley.

5.—Close gang and place the pointer on the cord at the extreme left end of the dial. Check to see that pointer travels full length of the dial. It may be advisable to place some "ARATEX" or other liquid adhesive on cord where it fits into the pointer.

When referring to manually tuned model disregard all parts listed between Items 7 and 11 and all parts listed under the heading Miscellaneous Mechanical Parts.

PARTS — The following are parts to fill the deletions to complete Parts List

Item No.	*Part No.*	*Description*
8	G49—33001	2 Section Gang Condenser
	C —50455B	Glass Dial Face
	MG23—50500	Dial Support Bracket (Riveted to chassis)
	W —43549	Retaining Washer (Drive Shaft)
	W —50512	Drive Shaft
	G9 —43564	Pulley & Hub assembly
	—41582	Drive Cord (30 in.)
9	W —50054B	Ant. Comp. Condensor
16B	W —50105	Condensor 0.1 Mf. 160 V.
	W —50589	Felt (Dial window)
	D —50503B	Case (Rear section)
	C —50504B	Case (Front section)
	—50505	Knob (2 Required)

FIRESTONE TIRE & RUBBER CO.

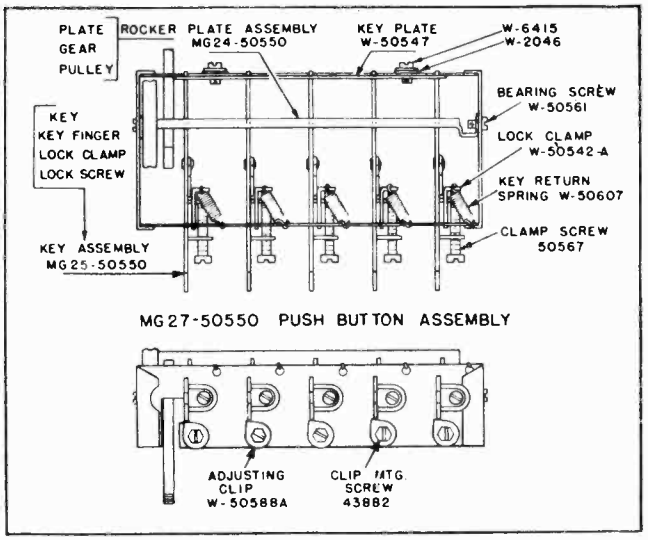
MODEL S7425-3
Voltage, Parts
Tuner Assembly

PARTS LIST

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	G167—32000	Ant. Coil
2	G167—32002	Osc. Coil
3	G185—32004	1st I-F Assy., 455 Kc.
4	G186—32004	2nd I-F Assy., 455 Kc.
5	G19 —32977	Motor Noise Check
6	G27 —28067	"A" Filter Choke
7	G16 —29535	"B" Filter Choke
8	G50 —33001	2 Section Gang Cond.
9	—50054B	Ant. Compensating Cond.
	C —50623	Glass Dial Face
	W —50545	L. H. Dial Mtg. Clip
	W —50560	R. H. Dial Mtg. Clip
	W —50517B	Dial Mask (Maroon)
	W —50518	Pointer
	B —78	Screw—Dial Clip Mtg.
	MG23—50550	Dial Mtg. Bracket Assy. (Riveted to Chassis)
	MG28—50550	Manual Drive Shaft Brkt. Assy.
	G8 —43564	Pulley and Hub Assy.
	W —23877	Set Screw—Hub
	—41582	Drive Cord—40 Inches
	W —50590	Spring—Cord Tension—Large Pulley
	W —43561	Spring—Cord Tension—Small Pulley
	W —50524B	Manual Drive Shaft
10	G3 —50369	Temp. Compensating Cond.
11A	W —32380	Condenser, .05 Mf. 200 V.
11B	W —32380	Condenser, .05 Mf. 200 V.
11C	W —32380	Condenser, .05 Mf. 200 V.
11D	W —32380	Condenser, .05 Mf. 200 V.
12	W —37226	Condenser, .02 Mf. 160 V.
13	W —23191A	Condenser, .01 Mf. 400 V.
14	W —50203	Condenser, .0065 Mf. 1,000 V.
15A	W —50161	Condenser, .5 Mf. 120 V.
15B	W —50161	Condenser, .5 Mf. 120 V.
16A	W —50105	Condenser, .1 Mf. 160 V.
16B	W —50105	Condenser, .1 Mf. 160 V.
17Z	W —50528	Condenser, 4. Mf. 350 V.
17Y		Condenser, 4. Mf. 350 V.
	W —50224	Cond. Clamp
18	G1 —34002	Condenser, .00025 Mf. Molded
19	G3 —34002	Condenser, .0005 Mf. Molded
20	—35600	Resistor, 100,000 Ohm ¼W.
21A	—35601	Resistor, 300,000 Ohm ¼W.
21B	—35601	Resistor, 300,000 Ohm ¼W.
22A	—36322	Resistor, 500,000 Ohm ¼W.
22B	—36322	Resistor, 500,000 Ohm ¼W.
23	—23616	Resistor, 15,000 Ohm 1W.
24	—35602	Resistor, 1. Megohm ¼W.
25	—35927	Resistor, 2. Megohm ¼W.
26	—50641	Resistor, 750 Ohm ½W.
27	—50643	Resistor, 60 Ohm ½W.
28	—50642	Resistor, 40 Ohm ½W.
	Mounting Parts	
	W —38038D	Distributor Suppressor
	W —29754C	Generator Condenser
	—25846	¾" No. 10 P. K. Screw (Set Mtg.)
	—6213	¼"—20 Hex. Nut (Brkt. Mtg.)
	—35065	¼"—20 Screw (Brkt. Mtg.)
	W —38205	¼" Lock Washer (Brkt. Mtg.)
	—32783	Ant. Cable (Accessory)
	W —50167	Mtg. Bracket (Set)
	W —50395	Ammeter Cond. (Accessory)
	W —38935	Case Ground Clip

Fig. 4 Push Button Assembly



29Z	—50526	Volume Control, 1. Meg.
29Y		On-Off Switch
30	G178—36400	8 Prong Socket
	W —50176	Tube Shield Half (2 Req.)
	W —31210	Tube Shield Ring
31	G105—28807	Vib. Socket
	W —50123A	Vib. Gnd. Clip
32	278-BL-7"U"	Speaker, Mfg. Spec. 5B-122
	—45889	Output Trans.
33	B —50641	Power Trans.
	W —50130	Power Trans. Can
34	G1 —50631	Dial Light Bulb—6-8 V.
35Z	G29 —32750	"A" Lead—Set to Fuse
35Y	G27 —32750	"A" Lead—Fuse to Ammeter
36A	—38915	Resistor, 100 Ohm ½W. W. W.
36B	—38915	Resistor, 100 Ohm ½W. W. W.
37	G2 —34002	Condenser, .0001 Mf. Molded
38	G10 —38000	Vibrator, Interchangeable
	G13 —38000	Vibrator
	W —32757	Fuse (12 Amp.)
	W —32776	Fuse Insulator
	Miscellaneous Mechanical Parts	
	MG27—50550	Push Button Unit Assy.
	MG25—50550	Key Assy.
	W —50542A	Key Clip (Lock Clamp)
	—50567	⅞"—6x32 Screw (Clamp)
	W —50607	Spring—(Key Return)
	W —50588A	Adjusting Clip (Heart Shaped)
	—43882	¼" No. 8 P. K. Screw (Clip Mtg.)
	W —50547	Key Plate (Rear Guide)
	MG24—50550	Rocker Plate Assy.
	W —50561	⅛"—6x40—Fil. H. Screw (Rocker Plate Bearing)
	W —45553B	Push Button
	W —50551A	Celluloid Cover
	—50549	Call Letter Sheet
	D —50503B	Case (Rear Half) FS49
	C —50554A	Case (Front Half) FS49
	W —50589	Felt (Dial Window)
	—50505	Knob (2 Req.)

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6A8-G	Oscillator-Modulator	6.0	190	100	—	0	102	0
6U7-G	I-F Amplifier	6.0	190	100	0	0	—	—
6Q7-G	Diode Detector & A-F Amp.	6.0	85	—	—	-2.3	—	—
6K6-G	Output	6.0	185	200	—	0	—	—
6X5-G	Rectifier	6.0	—	—	—	200	—	—

Power Output approximately 4 Watts.
Battery Drain approximately 5.7 Amperes at 6 Volts.

MODEL S7425-6
Chassis R-320
Schematic, Voltage
Socket, Coils

FIRESTONE TIRE & RUBBER CO.

ANTENNA COIL

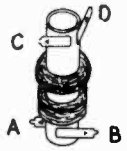


DIAGRAM NO. 23
PART NO. 113449

OSCILLATOR COIL

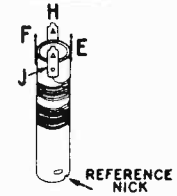
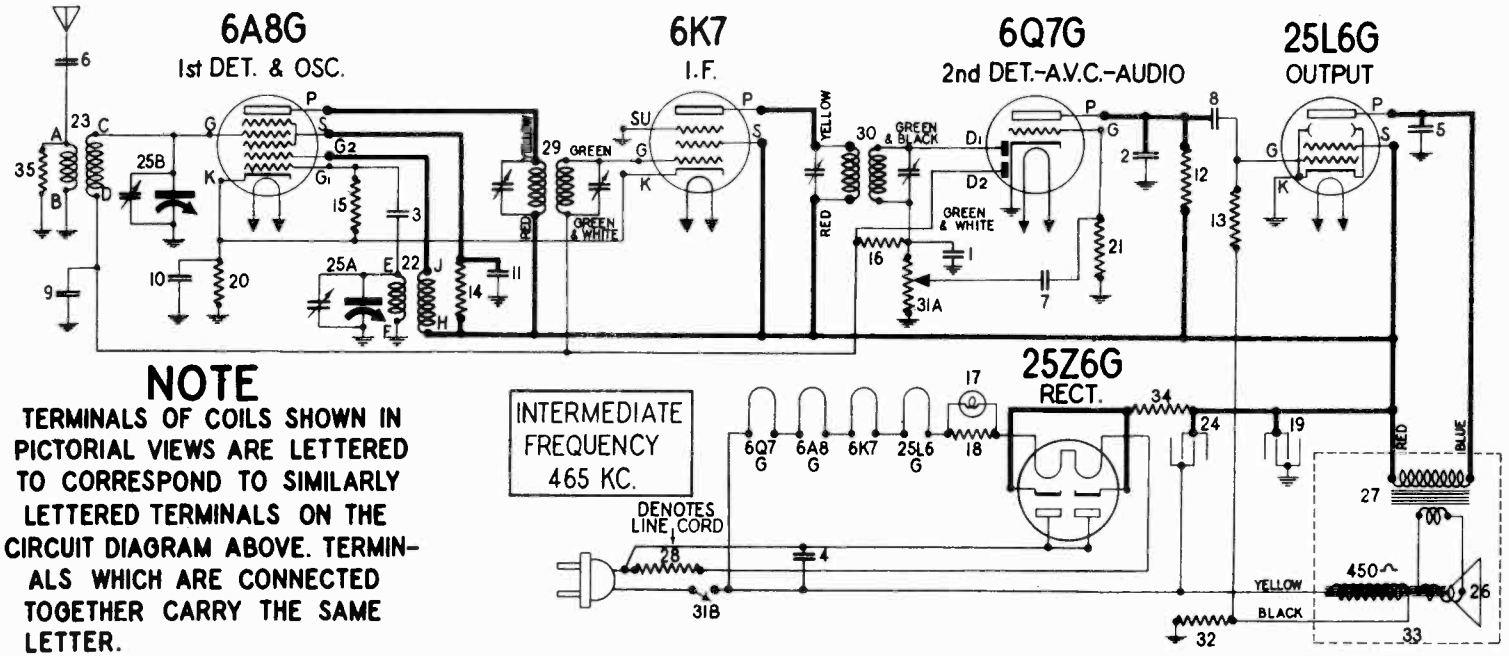


DIAGRAM NO. 22
PART NO. 113042



NOTE

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.

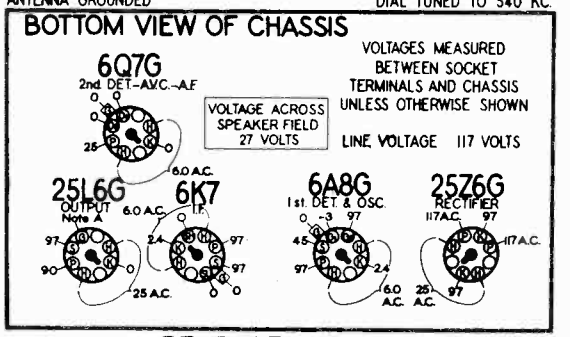
PARTS LIST

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	83783	Condenser - mica, 110 mmf.	.20
4-5	88026	Condenser - paper .02 mfd. 400 V.	.25
6	88029	Condenser - paper .004 mfd. 400 V.	.25
7-8	88030	Condenser - paper .01 mfd. 400 V.	.25
9-10	88189	Condenser - paper .05 mfd. 200 V.	.25
11	69421	Condenser - paper .1 mfd. 200 V.	.25
12	110553	Resistor - carb. 220000 ohms ½ W.	.12
13	110559	Resistor - carb. 470000 ohms ½ W.	.12
14	110566	Resistor - carb. 33000 ohms ½ W.	.12
15	110578	Resistor - carb. 68000 ohms ½ W.	.12
16	110580	Resistor - carb. 3.3 meg. 1/4 watt	.12
17	110629	Lamp - 6.3 volt - .25 amps.	.15
18	110975	Resistor - W.W. 33 ohms ½ W.(10%)	.12
19	112898	Condenser - elect. 16 mfd. 150 V.	.50
20	112974	Resistor - carb. 220 ohm ½ W.(10%)	.15
21	112975	Resistor - carbon 10 meg. 1/4 watt	.12
22	113042	Coil - oscillator	.45
23	113449	Coil - antenna	.78
24	113472	Condenser - elect. 40 mfd. 150 V.	.56
25A - 25B	113478	Condenser - variable gang	3.20
26	R-114061	Cone - voice coil assembly (for R-115039 speaker)	1.50
27	R-114062	Transformer - output	1.20
28	114951	Power cord - (dropping resistance 143 ohms 10%)	.98
29	114802	Transformer - 1st I.F.	1.10
30	114804	Transformer - 2nd I.F.	.85
31A - 31B	114814	Volume control 1 megohm with off-on switch	.96
32	114815	Resistor - W.W. 110 ohms ½ W.(10%)	.14
33	R-115039	Speaker - dynamic 5 inch	3.95
34	116013	Resistor - W.W. 50 ohms 1 watt	.18
35	110569	Resistor - carb. 10,000 ohms ½ W.	.12

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A:- The bias for the control grid of the 25L6-G tube is -6.7 volts, measured across resistor number 32.

FIRESTONE TIRE & RUBBER CO.

MODEL S7425-6
Chassis R-320
Alignment, Tuner
Socket, Trimmers
MODEL S7425-1, Late
MODEL S7426-1
Tuner Data

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1—Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

2—Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

3—Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4—TO CALIBRATE THE DIAL:- Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

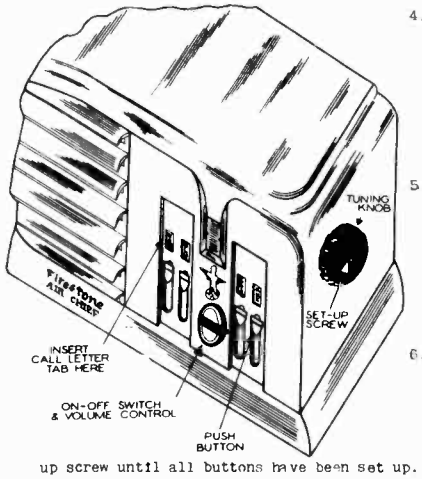
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. MICA CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I. F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT
				3-4	2ND I. F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	6	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

HOW TO SET UP THE PUSH BUTTONS.

1. Be sure that the antenna wire furnished with the set is extended to its full length and placed under the carpet or around the floor molding. In most instances the 20 feet of brown insulated wire included with the radio will make a satisfactory antenna. However in localities remote from powerful broadcast stations, it may be found necessary to use an outside antenna.

2. Turn the set on and allow it to operate at least one quarter hour before setting up the push buttons.

3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals generally give poor results.



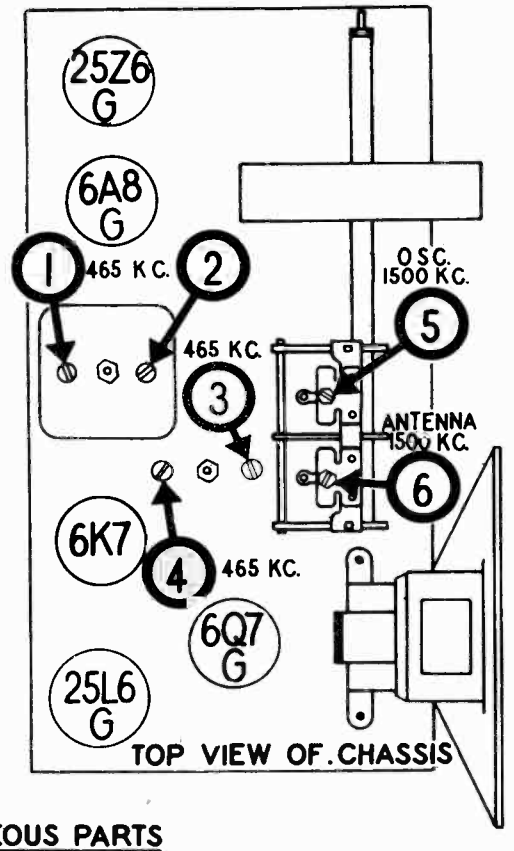
4. The large tuning knob at the side of your set has a set screw located in the center. Grasp this tuning knob firmly and then using a screw driver or a coin, turn the screw counter-clockwise not more than two whole turns.

5. Push down any one of the four buttons and holding it down tune in the desired station using the tuning knob. The push button must be held down firmly while the station is being tuned in otherwise the setting will be incorrect.

6. Release the button that you have just set up. WARNING:- Do not attempt to use any button until you have completed the set-up of all four buttons. Do not retighten the set-up screw until all buttons have been set up.

7. Proceed to set up the next button by pushing down on the button firmly and tuning in the desired station, using the tuning knob. The rest of the buttons should be set-up in a similar manner.

8. After all of the buttons have been set-up YOU MUST RE-TIGHTEN THE SCREW IN THE TUNING KNOB: OTHERWISE ALL SETTINGS OF THE BUTTONS WILL BE DESTROYED. GRASP THE KNOB FIRMLY AND USE A SMALL SCREW DRIVER OR A COIN TO TIGHTEN THE SCREW SECURELY.

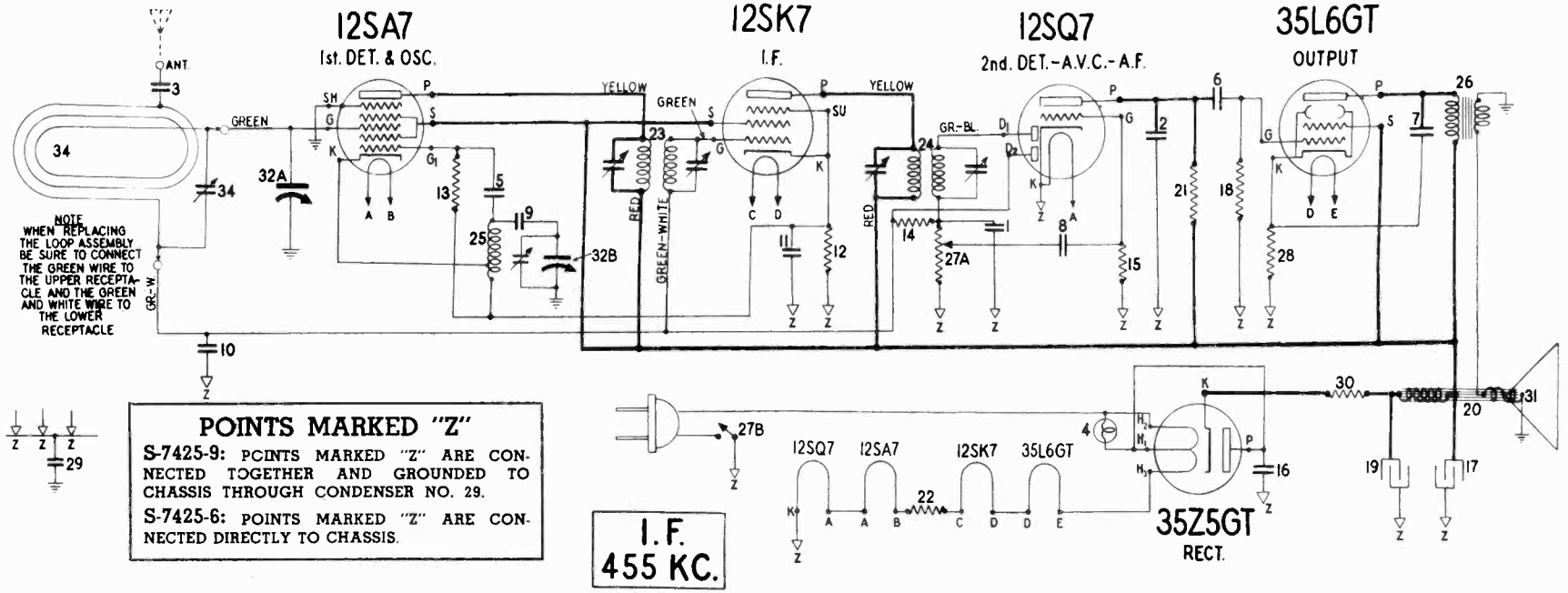


DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting (osc. & ant.)	.01
113558	Clutch Spring - for tuner (on cam shaft)	.04
113504	Collar - Coupling (between tuner unit and gang condenser shaft)	.08
113560	Dial Scale - celluloid strip	.22
113753	Dial Window - celluloid	.16
113557	Key - for push button tuner (left hand)	.24
113572	Key - for push button tuner (right hand)	.24
113531	Knob - tuning (ivory)	.30
113574	Knob - volume (ivory)	.18
113500	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113699	Screw - #8 X 1" for chassis mtg.	.01
113538	Screw - for tuning knob (chrome head)	.14
85427	Socket - octal base (standard)	.15
113543	Socket - dial lamp	.18
113559	Spring - for key return	.02
113550	Tabs - station call letters	.28
113529	Tip - for push button (ivory)	.05

MODELS S7425-6, Late
S7425-9, Loop
Schematic, Voltage
Socket

FIRESTONE TIRE & RUBBER CO.



POINTS MARKED "Z"

S-7425-9: POINTS MARKED "Z" ARE CONNECTED TOGETHER AND GROUNDED TO CHASSIS THROUGH CONDENSER NO. 29.

S-7425-6: POINTS MARKED "Z" ARE CONNECTED DIRECTLY TO CHASSIS.

I.F. 455 KC.

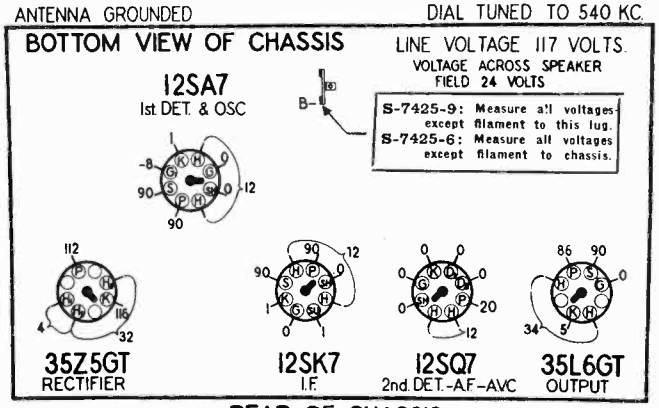
ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica, 260 mmfd.	$0.20
3	83783	Condenser—mica, 110 mmfd.	.20
4	85296	Lamp—dial, 6 to 8 volt (mazda #51)	.16
5	85394	Condenser—mica, 510 mmfd.	.25
6-7	88026	Condenser—paper, .02 mfd., 400 volt	.25
8	88030	Condenser—paper, .01 mfd., 400 v.	.25
9	88030	Condenser—paper, .01 mfd., 400 volt (S-7425-9 only)	.25
10	88189	Condenser—paper, .05 mfd., 200 volt	.25
11	88193	Condenser—paper, .25 mfd., 150 volt	.35
12	110560	Resistor—carbon, 100 ohms, ¼ watt	.12
13	110565	Resistor—22,000 ohms, ¼ watt	.12
14-15	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
16	111252	Condenser—paper, .05 mfd., 400 volt	.13
17	112898	Condenser—electrolytic, 16 mfd., 150 volt	.50
18	112971	Resistor—insulated 470,000 ohms, ¼ watt	.15
19	113472	Condenser — electrolytic 40 mfd., 150 volt	.56
20	U-115055	Speaker—electro dynamic	3.60
21	116067	680,000 ohm, ¼ watt—20% insulated	.12
22	116527	Resistor—100 ohms—10% 3 watt W.W.	.26
23	116667	Transformer—1st I.F.	1.00
24	116672	Transformer—2nd I.F.	1.00
25	116674	Coil—oscillator	.35
26	U-116676	Transformer—output for U-115055 speaker	1.00
27A-27B	116691	Volume control with switch	1.00
28	116702	Resistor—140 ohms—10% ½ watt W.W.	.12
29	116706	Condenser — 0.2 mfd., 600 volt (S-7425-9 only)	.35
30	116752	Resistor—33 ohms, 1 watt W.W.	.15
31	U-116727	Cone & Voice Coil Assem. for U-115055 speaker	1.20
32A-32B	116755	Condenser—2 gang	3.50
33	116775	Loop antenna	1.00
34	116781	Condenser—trimmer for loop ant. assembly	.22

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



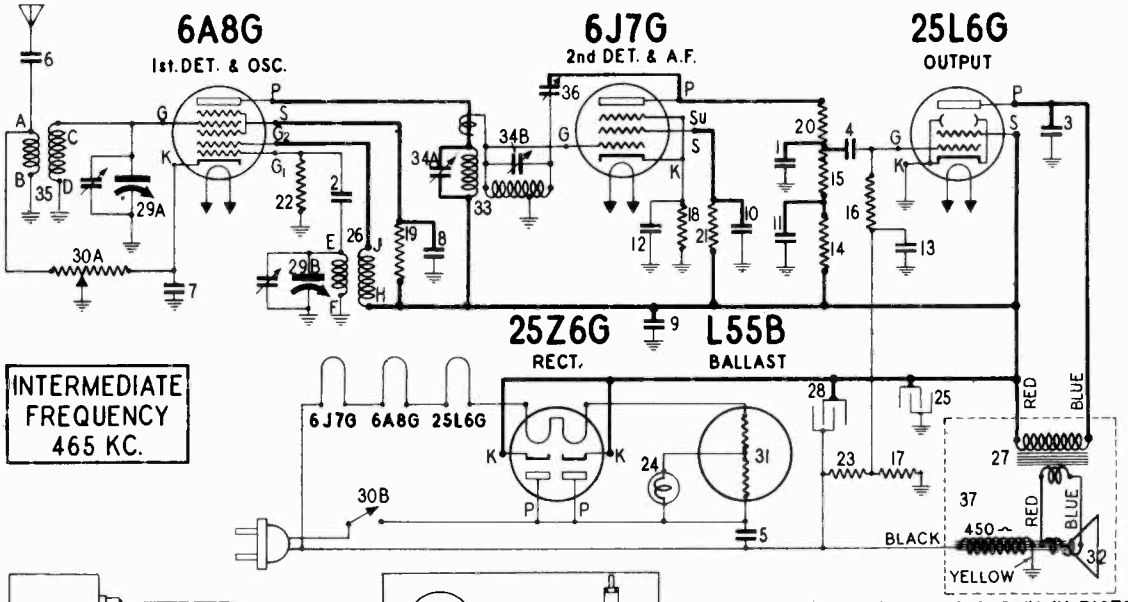
REAR OF CHASSIS

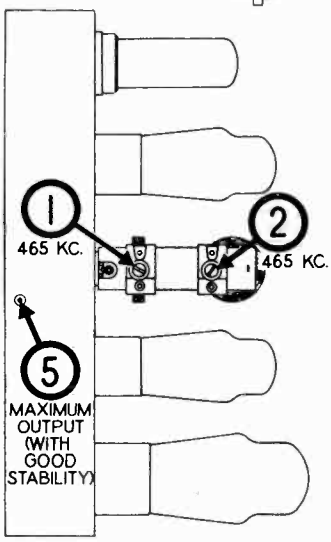
Use a high resistance voltmeter of at least 1000 ohms per volt.

Schematics, Socket Trimmers, Coils

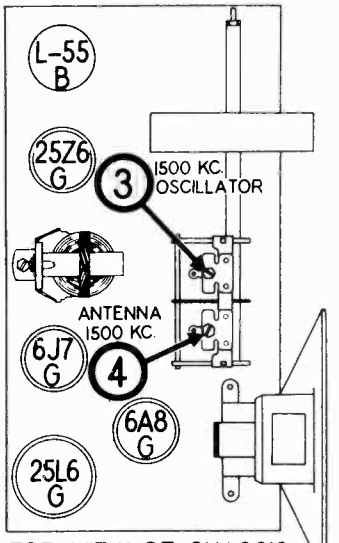
FIRESTONE TIRE & RUBBER CO.

MODELS S7425-8UA, S7425-9, Ch. R317
MODEL S7426-1
Chassis R311





REAR VIEW OF CHASSIS



TOP VIEW OF CHASSIS

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.

ANTENNA COIL

DIAGRAM NO. 35
PART NO. 113744

OSCILLATOR COIL

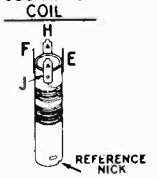
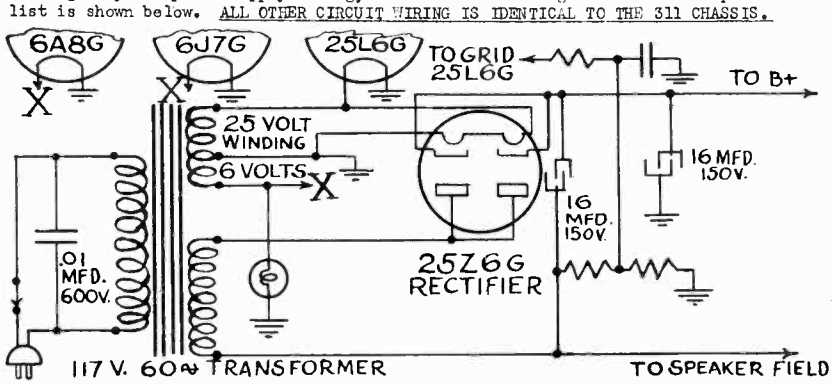


DIAGRAM NO. 27
PART NO. 113042

The Firestone Air Chief Stock No. 7425-8UA and 7425-9 (317 chassis) are identical in operation, performance and circuit wiring to the Firestone Air Chief Stock No. 7426-1 (311 chassis) except for the following differences:

The 317 chassis is designed for operation from a 117 volt 60 cycle power supply while the 311 chassis will operate on either 117 volt A.C. or D.C. power system. The only difference between the two models is that a one-to-one power transformer which also has a 25 volt and a 6 volt filament winding, has been substituted for the ballast resistor tube. A partial schematic diagram for the 317 chassis, showing only the power supply wiring, tube filament wiring and associated parts list is shown below. ALL OTHER CIRCUIT WIRING IS IDENTICAL TO THE 311 CHASSIS.



ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmf.-	.20
3-4-5	88028	Condenser - paper .02 mfd. 400 volt	.25
6	88029	Condenser - paper .004 mfd. 400 volt	.25
7-8-9 10-11	89421	Condenser - paper .1 mfd. 200 volt	.25
12-13	89532	Condenser - paper .25 mfd. 200 volt	.32
14	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
15-16	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
17	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
18	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
20	110569	Resistor - carbon 10,000 ohm 1/4 watt	.12
21	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
22	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
23	110584	Resistor - carbon 330,000 ohm 1/4 watt	.12
24	110629	Lamp - 6.3 volt - .25 amps.	.15
25	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
26	113042	Coil - oscillator	.45
27	R-113343	Transformer - output for R-115013 spkr.	1.00
28	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
29A-29B	113478	Condenser - variable gang	3.20
30A-30B	113501	Volume Control-20,000 ohms with on-off switch	.92
31	113506	Ballast Resistor - L55B	.65
32	R-113737	Cone - voice coil Assem. for R-115025 spkr.	1.90
33	113738	Transformer - I.F. (with trimmer)	1.26
34A-34B	113743	Condenser - trimmer (2 section for I.F.)	.30
35	113744	Coil - antenna	.72
36	113745	Condenser - trimmer (regen control)	.28
37	R-115025	Speaker - dynamic - 5" (sub. R-115013)	4.80

Chassis Model	Voltage
R-311	117 volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to back off (turn clockwise) the regeneration control trimmer (#5) slightly. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. IF OSCILLATION OCCURS "BACK-OFF" (ONE QUARTER TURN CLOCKWISE) THE REGENERATION CONTROL TRIMMER # 5.
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1500 KC	1500 KC	3	FROM RIGHT OSCILLATOR (GRID)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1600 KC	TUNE TO 1500 KC GEN. SIG.	4	FROM LEFT ANTEN. & (GRID)	ADJUST FOR MAXIMUM OUTPUT.
CONNECT RECEIVER TO CUSTOMERS ANTENNA OR TO A 50 MMFD. MICA CONDENSER IN SERIES WITH THE SIGNAL GENERATOR.		TUNE IN A WEAK SIGNAL ON THE LOW FREQUENCY END OF THE DIAL. A WEAK SIGNAL IS REQUIRED SO THAT VOLUME CONTROL MAY BE SET TO MAXIMUM VOLUME POSITION.		5	REGENERATION CONTROL	ADJUST TRIMMER TO GIVE MAXIMUM OUTPUT, CONSISTENT WITH GOOD STABILITY AND TONE QUALITY.
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.

THIS ADJUSTMENT MUST AGAIN BE MADE AFTER THE REGENERATION CONTROL TRIMMER HAS BEEN SET.

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83624---	Screw - Self Tapping 8 X 1/4 for mounting I.F. transformer	$ .01
85427----	Socket - tube, 8 prong	.15
85827----	Set Screw - 8/32 square head	.02
88161----	Shield Tube - (short section)	.08
88162----	Shield Tube - (long section)	.08
88164----	Shield Cap - tube, grid type	.06
89911----	Shield - Tube, base	.04
89912----	Clip - grounding, for tube base	.02
112745---	Clip - coil mounting (osc. & ant.)	.01
113500---	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113504--	Collar - Coupling (between tuner unit and gang cond. shaft)	.08
113510---	Tip - for push button (walnut)	.05
113530---	Knob - tuning (walnut)	.25
113537---	Screw for tuning knob & set-up	.18
113543---	Socket - dial lamp	.18
113548---	Felt Pad - behind push buttons	.01
113550---	Tabs - station call letters	.28
113557---	Key - for push button tuner(left hand)	.24
113558--	Clutch spring - for tuner (on cam shaft)	.04
113559---	Spring - for key return	.02
113560---	Dial Scale - Celluloid Strip	.22
113572---	Key - for push button (right hand)	.24
113573---	Knob - Volume (walnut)	.18
113636---	Screw - #8 X 3/4" For chassis mtg.	.01
113638---	Screw - Back cover retaining	.01
113699---	Screw - #8 X 1" For chassis mtg.	.01
113753---	Dial Window - celluloid	.16

I.F. TRANSFORMER & REGENERATION CONTROL.

This R-311 chassis employs only one intermediate frequency transformer, the windings of which are capacitively coupled. The two trimmers used to tune the primary and secondary of this transformer are mounted on the transformer assembly, and are accessible from the rear of the chassis. Also associated with this intermediate frequency transformer is an additional trimmer condenser, which is accessible through a hole in the rear of the chassis. This condenser is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. The regeneration obtained increases the amplification and selectivity obtainable from the intermediate frequency transformer, and makes the performance of this set comparable to that which is obtained from a set employing an intermediate frequency stage.

When aligning the intermediate frequency transformer the output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube in the customary manner. The primary and secondary windings are tuned by adjusting Trimmer Screws No. 1 and No. 2 until a maximum deflection is obtained on the output meter. If the set has a tendency to oscillate when adjusting these trimmer screws, turn Trimmer Screw No. 5 to the right (clockwise) until the oscillation ceases. The signal generator is next coupled to the antenna lead, and Trimmers No. 3 and No. 4 are aligned for maximum output, using a generator frequency of 1500 KC. Now connect the set to the CUSTOMER'S antenna and tune in a station on the low frequency end of the dial. The regeneration control, Trimmer No. 5 is now adjusted to give maximum output of the set, consistent with good stability and tone quality. After changing the setting of Trimmer No. 5 it is necessary to re-adjust Trimmers No. 1 and No. 2, as their setting will be found to have changed slightly. The output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube through a .1 mfd. condenser and Trimmers No. 1 and No. 2 adjusted, as was done previously.

A-C OPERATION

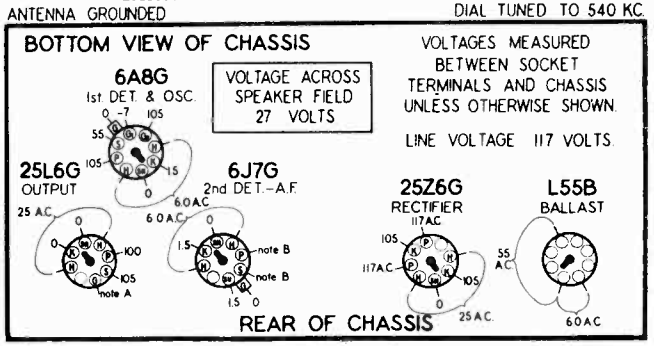
When the set is used on alternating current, all D-C potentials are supplied by a 25Z6G rectifier tube and its associated filter circuit. The tube is connected for half-wave rectification of the A-C supply.

If any hum is noticed when the set is used on A-C, reversing the power plug in the receptacle will sometimes reduce the hum level. When the set has not been used for some time, or the filter condensers have been replaced, a slight hum may be audible when the set is first turned on. This hum may not clear up immediately upon reversal of the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors in the filter system will have reformed.

D-C OPERATION

If the set fails to operate after allowing time for the tubes to reach their normal operating temperatures, reverse the power plug in the receptacle. When the set is used on direct current, the 25Z6G rectifier tube and the filter system remains in the circuit and serve two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6G tube protects the filter condensers from damage. On correct D-C polarity the 25Z6G tube passes the D-C and the filter circuit aids in smoothing the supply voltage, thus minimizing line noises.

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of a least 1000 ohms per volt.

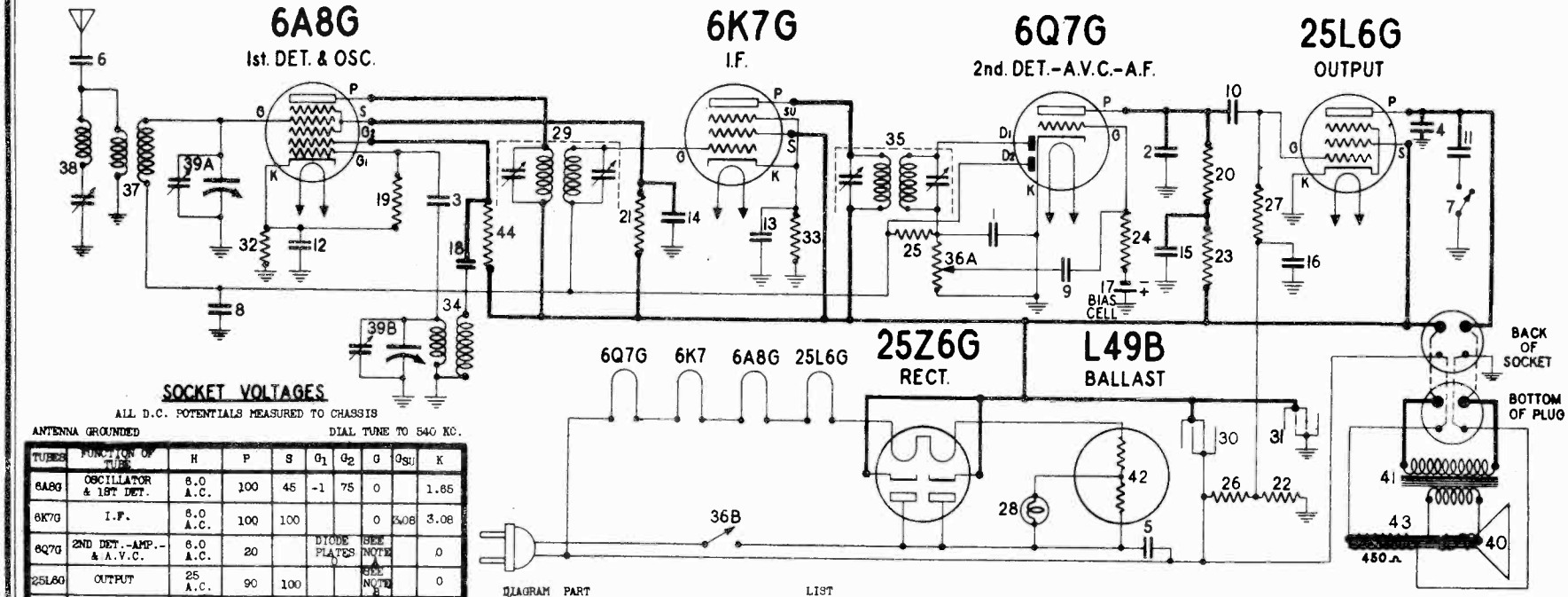
NOTE A: The bias for the control grid of the 25L6G output tube is -6.0 volts. Due to the high resistance in this grid circuit the voltage measured will be extremely small.

NOTE B: Due to the high resistance in the plate and screen grid circuits, the voltages measured at these terminals will be very small.

FIRESTONE TIRE & RUBBER CO.

MODEL S7426-2

Schematic, Voltage
Socket, Trimmers
Alignment



SOCKET VOLTAGES

ALL D.C. POTENTIALS MEASURED TO CHASSIS

ANTENNA GROUNDED — DIAL TUNE TO 540 KC.

TUBES	FUNCTION OF TUBE	H	P	S	G_1	G_2	G	G_{SU}	K
6A8G	OSCILLATOR & 1ST DET.	6.0 A.C.	100	45	-1	75	0		1.65
6K7G	I.F.	6.0 A.C.	100	100			0	3.08	3.08
6Q7G	2ND DET.-AMP.- & A.V.C.	6.0 A.C.	20		DIODE PLATES 0		SEE NOTE A		0
25L6G	OUTPUT	25 A.C.	90	100			SEE NOTE B		0
25Z6G	RECTIFIER	25 A.C.	110 A.C 110 A.C						130

DROP ACROSS SPEAKER FIELD 26 VOLTS.

Use a high resistance voltmeter of at least 1000 ohms per volt.

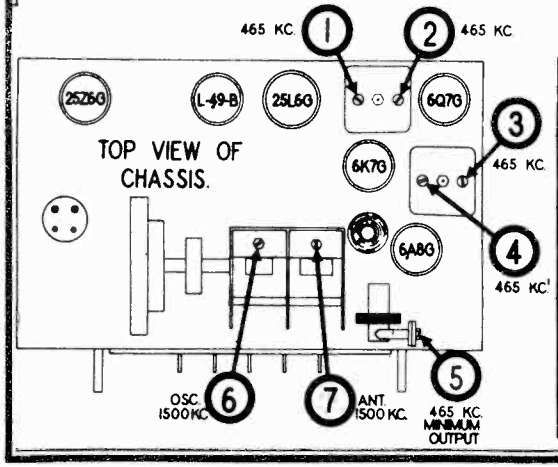
NOTE B:- The bias for the control grid of the 25L6G output tube is -8.7 volts measured across resistor 22.

NOTE A:- The bias for the control grid of the triode section of the 6Q7G tube is -1.0 volt is supplied by a bias cell. Due to the high resistance of the cell the voltmeter will indicate only a fraction of a volt.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	85061	Condenser - mica 51 mmfd.	.15
4-5	88026	Condenser - .02 mfd. 400 V.	.25
6-18	88029	Condenser - .004 mfd. 400 V.	.25
7	88054	Switch - tone control	.30
8-9-10	88189	Condenser - .05 mfd. 200 V.	.25
11	88682	Condenser - .1 mfd. 400 volt	.25
12-13-14-15	89421	Condenser - .1 mfd. 200 volt	.25
16	89532	Condenser - .25 mfd. 200 V.	.32
19	110552	Resistor 47,000 ohm 1/4 watt	.12
20	110553	Resistor 220000 ohm 1/4 watt	.12
24	110554	Resistor - carb. 1 meg. ½ W.	.12
22-23	110564	Resistor 100000 ohm 1/4 watt	.12
21	110566	Resistor 33,000 ohm 1/4 watt	.12
44	110569	Resistor 10,000 ohm 1/4 watt	.12
25	110580	Resistor-carb. 3.3 meg. ½ W.	.12
26-27	110584	Resistor 330000 ohm 1/4 watt	.12
28	110629	Lamp - dial 6.3 volt .25 amp	.15
31	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
32-33	112951	Resistor-carb. 400 ohms ½ W.	.12
17	113117	Bias cell - 1.25 volts	.26
38	113119	Coil-wave trap(with trimmer)	.50

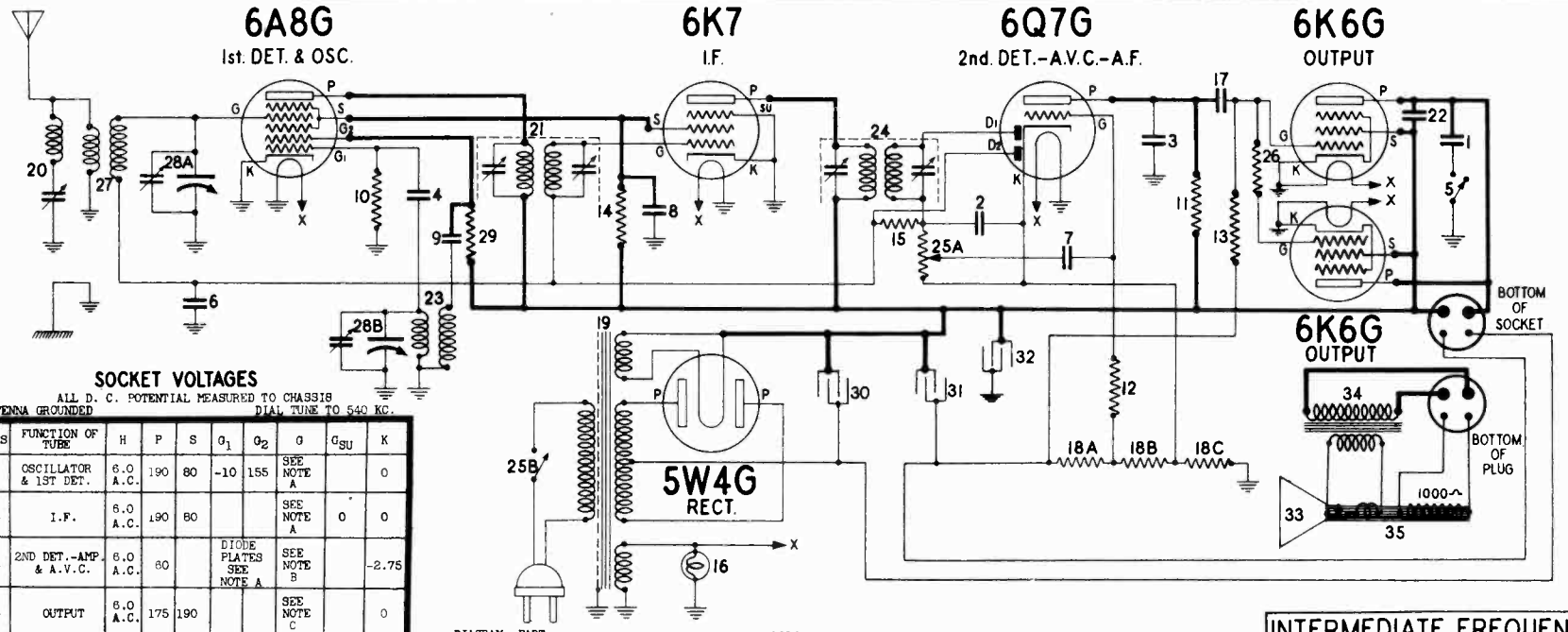
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
42	113365	Ballast tube L-49-B	.50
37	113449	Coil - antenna	.78
30	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
36A-36B	113852	Volume control - 500,000 ohms (with switch)	.96
29	113853	Transformer - 1st I.F.	1.25
35	113854	Transformer - 2nd I.F.	1.20
34	113855	Coil - oscillator	.48
39A-39B	113869	Condenser - gang	3.30

INTERMEDIATE FREQUENCY 465 KC.



DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE (Do not remove grid clip)	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	1ST I.F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	6	BROADCAST OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

MODELS S7426-3, S7426-4
Chassis R313
Schematic, Voltage
Socket, Trimmers
Alignment



SOCKET VOLTAGES

ALL D. C. POTENTIAL MEASURED TO CHASSIS
ANTENNA GROUNDED — DIAL TUNE TO 540 KC.

TUBES	FUNCTION OF TUBE	H	P	S	G_1	G_2	G	G_{SU}	K
6A8G	OSCILLATOR & 1ST DET.	6.0 A.C.	190	80	-10	155	SEE NOTE A		0
6K7G	I.F.	6.0 A.C.	190	80			SEE NOTE A	0	0
6Q7G	2ND DET.-AMP. & A.V.C.	6.0 A.C.	80		DIODE PLATES SEE NOTE A		SEE NOTE B		-2.75
6K6G	OUTPUT	6.0 A.C.	175	190			SEE NOTE C		0
6K6G	OUTPUT	6.0 A.C.	175	190			SEE NOTE C		0
5W4G	RECTIFIER	5.0 A.C.	335 A.C.	335 A.C.					

DROP ACROSS SPEAKER FIELD 55 VOLTS

Use a high resistance voltmeter of at least 1,000 ohms per volt.

NOTE A: The control grid bias for the 6A8G, 6K7G and the diode plates of the 6Q7G tubes is -2.75 volts measured across resistor 18C.

NOTE B: The control grid bias for the 6Q7G tube is -4.2 volts measured across resistors 18B and 18C.

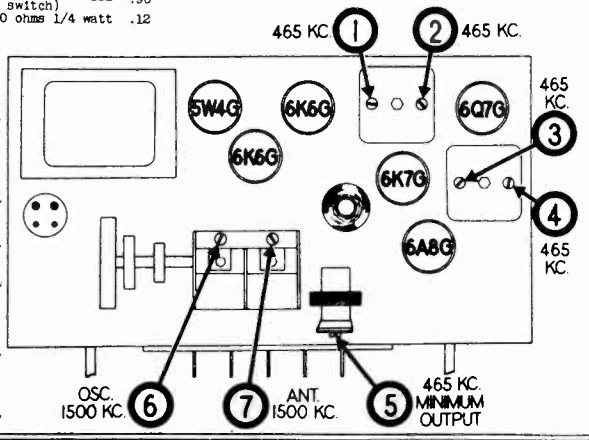
NOTE C: The control grid bias for the 6K6G tubes is -15 volts measured across resistors 18A, 18B and 18C.

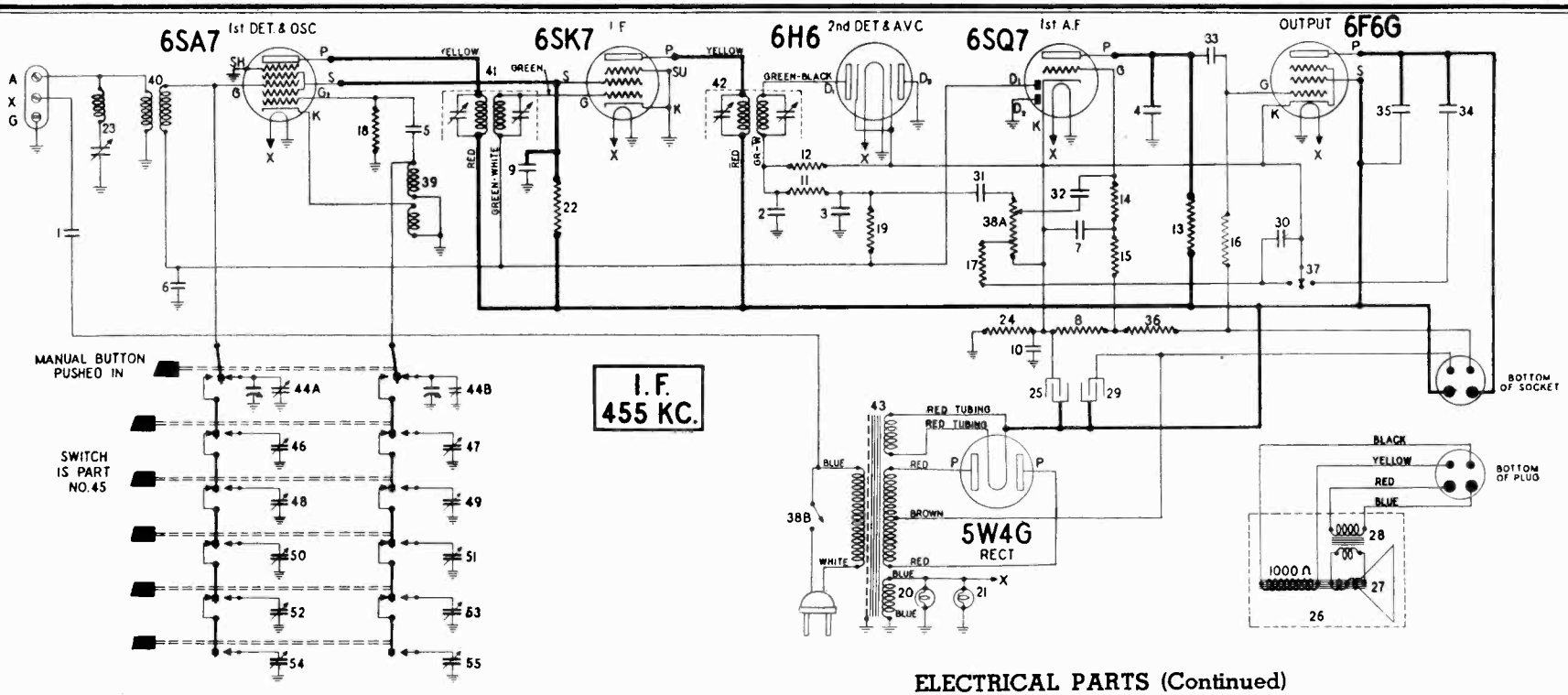
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83217	Condenser - .04 mfd. 600 V.	.35
2-3	83539	Condenser - mica 260 mmfd.	.20
4	85061	Condenser - mica 51 mmfd.	.15
5	88054	Switch - tone control (Model 313)	.30
5	114192	Switch - tone control (Model 313AT)	
6-7	88189	Condenser - .05 mfd. 200 V.	.25
8	88191	Condenser - .1 mfd. 300 volt	.25
9	88030	Condenser - .01 mfd. 400 V.	.25
10	110552	Resistor - 47,000 ohms ± W.	.12
11	110553	Resistor - 220,000 ohms ± W.	.12
12	110554	Resistor - 1 meg. 1/4 watt	.12
13	110559	Resistor - 470,000 ohms ± W.	.12
14	110566	Resistor - 33,000 ohms ± W.	.12
15	110580	Resistor - 3.3 meg. 1/4 watt	.12
16	110629	Lamp-dial - 6.3 volt-.25 amp	.15
17	111252	Condenser - .05 mfd. 400 V.	.13
18A to C	113810	Resistor - Bleeder Section A - 180 ohms; Section B - 25 ohms; Section C - 45 ohms	.40
19	113813	Transformer - 117 V. 60 Cy.	5.00
20	113869	Coil - wave trap	.54
21	113853	Transformer - 1st I.F.	1.25
22	88030	Condenser - .01 mfd. 400 V.	.25
23	113855	Coil - oscillator	.48
24	113854	Transformer - 2nd I.F.	1.20
25A - B	113852	Volume control - 500,000 ohms (with switch)	.96
26	110560	Resistor - 100 ohms 1/4 watt	.12

INTERMEDIATE FREQUENCY 465 KC.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
27	113449	Coil - antenna	.78
28A - B	113869	Condenser - variable gang	3.30
29	110569	Resistor - 10,000 ohms ± W.	.12
30-31	113808	Cond.-elect. 8 mfd. 300 V.	.66
32	114009	Cond.-elect. 4 mfd. 300 W.V.	.72

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE (Do not remove grid clip)	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1—2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3—4	1ST I.F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD.	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	6	BROADCAST OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.





ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3-4	83539	Condenser—mica 260 mmfd.	$0.20
5	85061	Condenser—mica 51 mmfd.	.15
6-7	88189	Condenser—paper .05 mfd. 200 volt	.25
8	88465	Resistor—wire wound 25 ohms ½ watt	.15
9	89421	Condenser—paper .1 mfd. 200 volt	.25
10	110377	Condenser—electrolytic 10 mfd. 35 volt	.80
11	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
12-13	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
14-15	110554	Resistor—carbon 1 megohm ¼ watt	.12
16	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
17-18	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
19	110580	Resistor—carbon 3.3. meg. ¼ watt	.12
20-21	110629	Lamp—6.3 volt—.25 amps.	.15
22	112398	Resistor—carbon 20,000 ohms 1 watt	.26
23	112796	Coil—wave trap (with trimmer)	.50
24	112974	Resistor—carbon 220 ohms ¼ watt 10%	.15
25	114258	Condenser—electrolytic 8 mfd. 450 volts	.98
26	U-115063	Speaker—dynamic—6 inch	5.50
27	U-116211	Cone—voice coil assembly (for U-115063 speaker)	1.65
28	U-116212	Transformer—output (for U-115063 speaker)	1.50
29	116262	Condenser—electrolytic 16 mfd. 450 volt	.78
30	116640	Condenser—.01 mfd. 600 volt	.15
31-32-33-34	116893	Condenser—.02 mfd. 600 volt	.15
35	117022	Condenser—.002 mfd. 600 volt	.15
36	117032	Resistor—300 ohms, W.W., 1 W.	.15
37	117209	Switch—tone control	.65
38A-38B	117212	Volume control 1 meg. with switch	1.30
39	117213	Coil—oscillator	.50
40	117214	Coil—antenna	.80

ELECTRICAL PARTS (Continued)

Diagram Number	Part Number	Description	List Price
41	117215	Transformer—1st I.F.	1.50
42	117216	Transformer—2nd I.F.	1.50
43	117217	Transformer—power	5.00
44A-44B	117219	Condenser—2 gang	3.50
45	117225	Switch—push button	3.00
46-47-48-49-50-51-52-53-54-55	117236	Condenser—push button trimmer gang	4.10

SOCKET VOLTAGES

ALL D.C. POTENTIAL MEASURED TO CHASSIS

ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SA7	1st Det. & Osc.	6.0 A.C.	0	—3.5*	—8	85		255		
6SK7	I.F.	6.0 A.C.	0	—3.5*		85	0	255		
6H6	2nd Det. & A.V.C.	6.0 A.C.	—3.5*						3.5*	0
6SQ7	1st A.F.	6.0 A.C.	—3.5*	—4.5				130	3.5*	0
6F6G	Output	6.0 A.C.	—3.5*	—20		255		235		
5W4G	Rectifier	5.0 A.C.						Plates 210 V. A.C.		

*Measured across Resistor No. 24.

Use a high resistance voltmeter of at least 1000 ohms per volt.

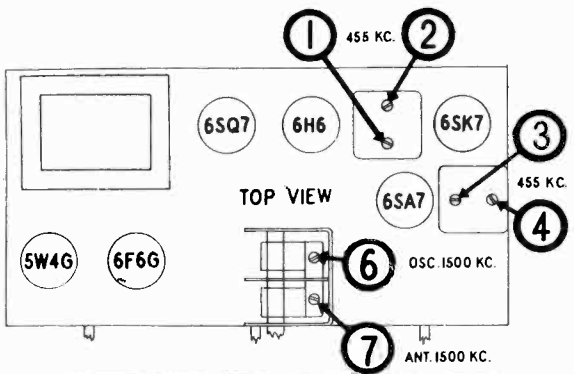
MODEL S7426-8
Alignment, Socket Trimmers

FIRESTONE TIRE & RUBBER CO.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and chassis, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the "G" terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector from between the "A" and "X" terminals.
5. Push in the "MANUAL" button, and keep it depressed during the entire alignment procedure.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD CONDENSER	FRONT LUG ON GANG CONDENSER	455 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	1st I.F.	
200 MMFD. MICA CONDENSER	"A" TERMINAL	455 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



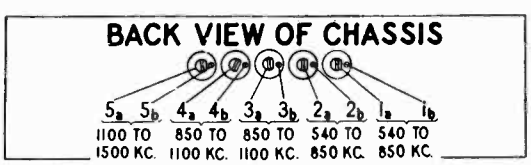


Fig. 1

MISCELLANEOUS PARTS

Part Number	Description	List Price
117208	Background for dial	$0.05
83552	Bolt—chassis mtg. (No. 10 x 7/8)	.03
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
112798	Clip—for mtg. wave trap coil	.01
116009	Clip—for antenna coil mtg.	.01
85321	Connector—for internal antenna	.01
116948	Cord—dial—6 ft. lengths	.18
117057	Cord—drive—3 ft. lengths	.15
117222	Dial scale	.60
117029	Drive drum and bushing	.50
117232	Escutcheon for dial—with glass	.75
117233	Escutcheon for push buttons	.35
117087	Knob for volume	.12
117245	Pin—push buttons	.03
117227	Pointer	.25
117234	Push button	.08
117192	Retainer for dial scale	.01
81145	Retaining ring—for drive shaft	Per C .50
83624	Screw—self tapping 8 x 1/4	.01
85040	Screw—No. 6 Hex. Hd.	Per C .35
85827	Set Screw—8-32 Square Head	.02
114914	Screw—special head for mtg. escutcheon	Per Doz. .15
114117	Socket—dial lamp	.18
110501	Socket—4 prong (for spkr.)	.16
116690	Socket—(octal base) (small)	.12
111090	Spacer—steel mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
116536	Terminal strip (G.X.A.)	.15
116530	Washer (paper) for back of knobs	.005
111456	Washer—spring washer	Per C .50

FOR
SETTING UP PUSH BUTTONS
SEE INDEX

FIRESTONE TIRE & RUBBER CO.

MODEL S7427-1, Early
Chassis R314
Schematic, Voltage

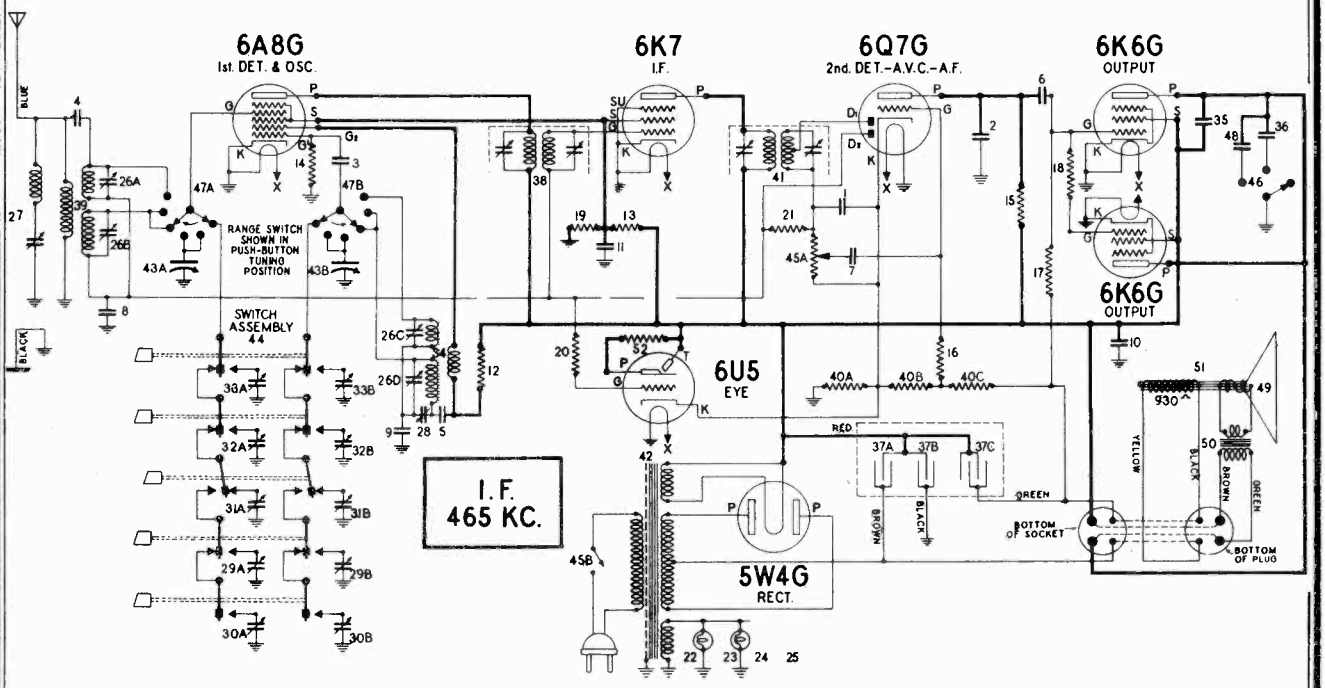


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	85061	Condenser - mica 51 mmfd.	.15
4	85454	Condenser - mica 11 mmf.	.15
5-6	88030	Condenser - .01 mfd. 400 V.	.25
7-8	88189	Condenser - .05 mfd. 200 V.	.25
9	88587	Condenser - mica .0042 mfd.	.35
10	88682	Condenser - .1 mfd. 400 volt	.25
11	89421	Condenser - .1 mfd. 200 volt	.25
12	110550	Resistor - 10,000 ohms ½ W.	.15
13	110551	Resistor - 15,000 ohms 1 W.	.15
14	110552	Resistor - 47,000 ohms ½ W.	.12
15	110553	Resistor - 220000 ohms ½ W.	.12
16	110554	Resistor - 1 meg. 1/4 watt	.12
17	110559	Resistor - 470000 ohms ½ W.	.12
18	110560	Resistor - 100 ohms 1/4 watt	.12
19	110562	Resistor - 22,000 ohms ½ W.	.12
20	110570	Resistor - 2.2 meg. 1/4 watt	.15
21	110580	Resistor - 3.3 meg. 1/4 watt	.12
22-23-24-25	110629	Lamp - 6.3 volt .25 amps	.15
26A to D	112792	Condenser - trimmer (4 sec.)	.60
27	112796	Coil-wave trap(with trimmer)	.50
28	112799	Cond.-padder (530 - 630 mmfd)	.36
29A to B 30A to B	112942	Condenser - dual push button trimmer (1100 KC-1700 KC)	.36
31A to B	112943	Condenser - dual push button trimmer (770 KC -1350 KC)	.45
32A to B 33A to B	112944	Condenser - dual push button trimmer (550 KC -1000 KC)	.50
34	113015	Coil Assembly - oscillator	1.00
35	113035	Condenser - ceramic tube .006 mfd. 600 volt	.14
36	113202	Condenser - .02 mfd. 600 V.	.15
37A to C	112802	Condenser - electrolytic(dry) Sect.A-Brown-8 mfd.400 V. Sect.B-Black-4 mfd.400 V. Sect.C-Green-4 mfd.400 V.	1.80
38	112803	Transformer - 1st I.F.	1.20
39	113011	Coil - ant. broadcast & short wave	1.20
40A to C	113974	Resistor - bleeder Section A - 33 ohms Section B - 18 ohms Section C - 133 ohms	.45
41	113975	Transformer - 2nd I.F.	1.20
42	113978	Transformer - power 117 volt 50 cycle	4.80
43A to B	113979	Condenser - variable gang	3.00
44	113981	Push button switch assembly	2.70
45A to B	113982	Volume control - 500,000 ohms (with switch	.98
46	113983	Switch for tone control	.42
47A to B	113984	Switch - range	1.05
48	114058	Condenser - .08 mfd. 600 V.	.26
49	R-114134	Cone & Voice coil assembly (for R-115028 speaker)	2.75
50	R-114135	Transformer - output	2.35
51	R-115028	Speaker - dynamic (10 in.)	7.50
52	110554	Resistor - 1 meg. 1/4 watt	.12

SOCKET VOLTAGES

ALL D. C. POTENTIAL MEASURED TO CHASSIS
ANTENNA GROUNDED — DIAL TUNE TO 540 KC.

TUBES	FUNCTION OF TUBE	H	P	S	G_1	G_2	G	G_{SU}	K
6A8G	OSCILLATOR & 1ST DET.	6.0 A.C.	200	85	-10	150	SEE NOTE A		0
6K7G	I.F.	6.0 A.C.	200	85			SEE NOTE A	0	0
6Q7G	2ND DET.-AMP. & A.V.C.	6.0 A.C.	95		DIODE PLATES SEE NOTE A		SEE NOTE B		-2.8
6K6G	OUTPUT	6.0 A.C.	185	200			SEE NOTE C		0
6K6G	OUTPUT	6.0 A.C.	185	200			SEE NOTE C		0
5W4G	RECTIFIER	5.0 A.C.	340 A.C. 340 A.C.						

DROP ACROSS SPEAKER FIELD 65 VOLTS

Use a high resistance voltmeter of at least 1,000 ohms per volt.

NOTE A: The control grid bias for the 6A8G, 6K7G and the diode plates of the 6Q7G tubes is -2.8 volts measured across resistor 40A.

NOTE B. The control grid bias for the 6Q7G tube is -4.3 volts measured across resistors 40A and 40B.

NOTE C. The control grid bias for the 6K6G tubes is -14.5 volts measured across resistors 40A, 40B and 40C.

MODEL S7427-1, Early
Chassis R314
Alignment, Trimmers
Socket

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 14 MC. are required.

1- Connect the output meter across the voice coil or between the plate of either of the 6K6G tubes and ground through a .1 mfd. condenser, (these tubes are connected in parallel, not push-pull). The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)

2- Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

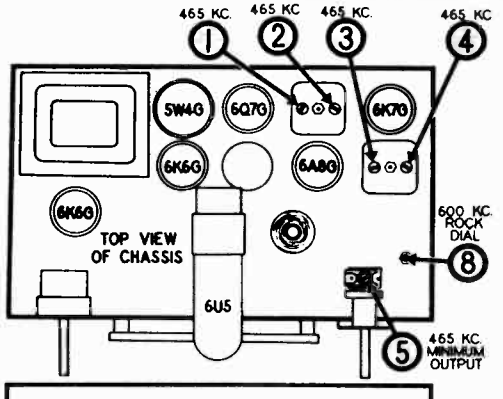
3- Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.

4- With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is only slightly off calibration, loosen the set screw in the pointer cord drive drum, and with the gang condenser in full mesh turn the drum until the pointer is in the correct position. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last division on the left end of the dial scale. Hold the pointer in place and check to see if the gang condenser is still fully meshed, then tighten the pointer clip being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC	AMERICAN (CENTER)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	AMERICAN (CENTER)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN (CENTER)	1500 KC	6	AMERICAN OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN (CENTER)	TUNE TO 1500 KC GENERATOR SIGNAL	7	AMERICAN ANTENNA	ADJUST FOR MAXIMUM OUTPUT
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	AMERICAN (CENTER)	TUNE TO 600 KC GENERATOR SIGNAL	8	AMERICAN OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	20 MC	FORIEGN (COUNTER-CLOCKWISE)	14 MC	9	FOREIGN OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	20 MC	FOREIGN (COUNTER-CLOCKWISE)	14 MC	10	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
81145	Retaining Ring-for drive shaft--Per C	.50
85427	Socket - octal base (standard)	.15
85827	Set Screw - 8/32 square head for tone or band indicator	.02
88348	Eyelet - for dial cord--Per dz.	.05
89746	Washer - (paper) for back of knobs	.005
110496	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for spkr.)	.16
110829	Washer - chassis mtg.	.01
111085	Sleeve - felt for tuning eye	.03
111302	Cord - dial drive 6 or 50 ft. lengths--Per ft.	.05
111357	Spring - drive cord tension	.03
112745	Clip - coil mtg. (osc. & ant.)	.01
112865	Shield - base, for tubes	.03
112874	Bolt - chassis mtg.	.01
112879	Screw - escutcheon mtg.	.03
113025	Socket-octal base(with special ground)	.15
113077	Shield - tube	.15
113093	Socket - for dial lamp	.18
113442	Bracket - for tuning eye	.16
113710	Washer - ceramic for push button trimmer	.015
113722	Knobs - tone and band switch	.08
113723	Knob - tuning and volume	.08
113800	Escutcheon - dial	1.00
113815	Escutcheon - push button	.60
113887	Push button	.04
113890	Escutcheon - eye	.10
113973	Dial drum and bushing assembly	.45
113987	Shaft - tuning	.10
113990	Band indicator & link assembly	.30
113994	Spring - for tone indicator	.015
113996	Tone indicator & link assembly	.30
113998	Cable & plug for tuning eye	.60
114000	Dial scale	.85
114001	Clamp - for dial scale retaining	.08
114002	Pointer - for dial	.12
114007	Dial mtg. plate & bracket	.60
114041	Tabs - station call letters	.35



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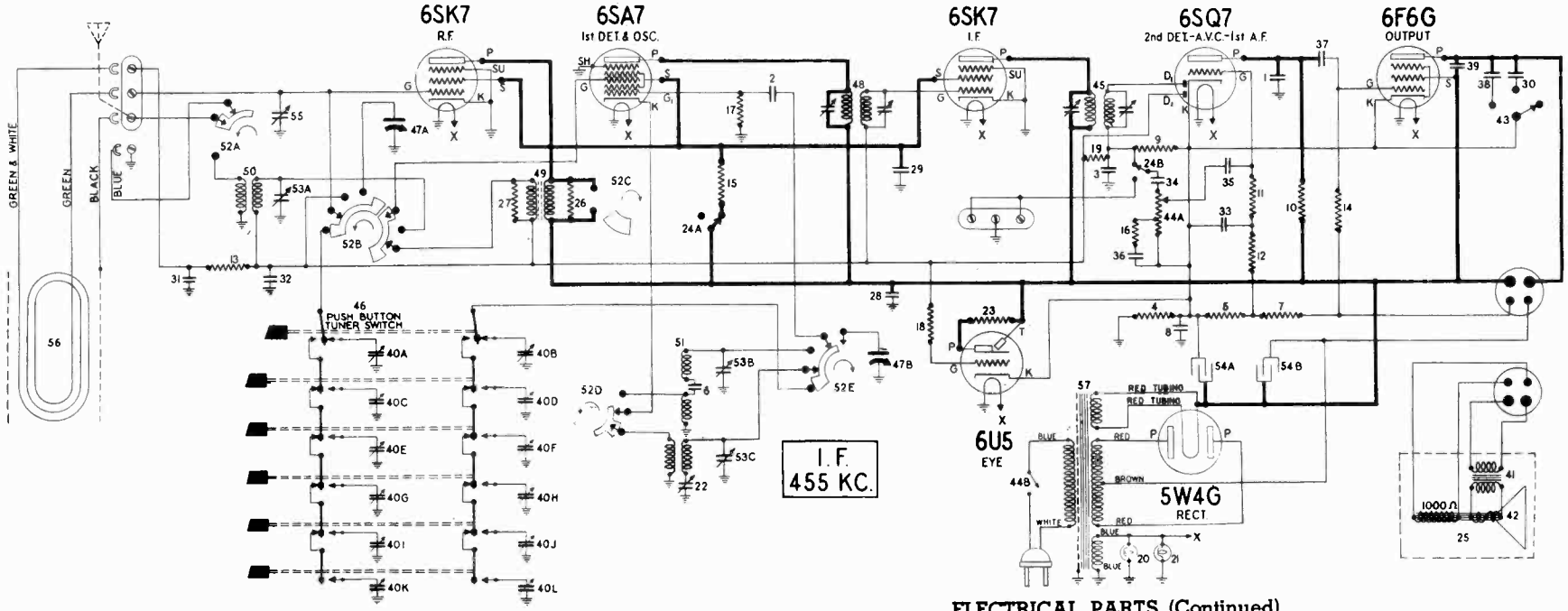
MODEL S7427-1, Late
Schematic, Voltage



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2	85061	Condenser—mica, 51 mmfd.	.15
3	85394	Condenser—mica, 510 mmfd.	.25
4	88461	Resistor—carbon—150 ohms, ¼ W.	.12
5	88465	Wire wound resistor, 25 ohms, ½ watt	.15
6	88587	Condenser—mica, .0042 mfd.	.35
7	89762	Resistor—220 ohms, wire wound, 1 watt	.16
8	110377	Condenser—electrolytic, 10 mfd., 35 volt	.80
9-10	110553	Resistor—carbon, 220,000 ohms, ¼ watt	.12
11-12	110554	Resistor—carbon, 1 megohm, ¼ watt	.12
13-14	110559	Resistor—carbon, 470,000 ohms, ¼ watt	.12
15	110561	Resistor—carbon, 15,000 ohms, 2 watt	.30
16	110565	Resistor—carbon, 22,000 ohms, ¼ watt	.12
17	110566	Resistor—carbon, 33,000 ohms, ¼ watt	.12
18-19	110580	Resistor—carbon, 3.3 meg., ¼ watt	.12
20-21	110629	Lamp—6.3 volt—.25 amps.	.15
22	112799	Condenser—Padder (530 to 630 mmfd.)	.36
23	112972	Resistor—Insulated—1 megohm—¼ watt	.15
24A-24B	114141	Switch—D.P.D.T.	.44
25	M-115059	Speaker—electro dynamic, 10"	7.60
26	116053	Resistor—carbon, 68,000 ohms, 1/10 watt	.12
27	116096	Resistor—22,000 ohms, 1/10 watt	.10
28-29	116625	Condenser—.1 mfd. 600 volt	.25
30	116640	Condenser—.01 mfd. 600 volt	.15
31-32-33	116819	Condenser—.05 mfd. 600 volt	.20
34-35-36-37	116893	Condenser—.02 mfd. 600 volt	.15
38	116984	Condenser—.04 mfd. 600 volt	.20
39	117022	Condenser—0.002 mfd.—600 volt	.15
40A to 40L	117081	Push Button Trimmer Gang Cond. Assembly	5.20
41	M-117091	Transformer—output for M-115059 speaker	1.50
42	M-117092	Cone and voice coil for M-115059 speaker	2.20
43	117209	Switch—tone control	.65
44A-44B	117212	Volume control—1 meg., with switch	1.30
45	117216	Transformer—2nd I.F.	1.50

ELECTRICAL PARTS (Continued)

Diagram Number	Part Number	Description	List Price
46	117225	Switch—push button	3.00
47A-47B	117527	Condenser—variable tuning	3.25
48	118337	Transformer—1st I.F.	1.20
49	118338	Transformer—R.F.	1.00
50	118342	Coil—short wave antenna	.80
51	118343	Coil—oscillator	.70
52A to 52E	118414	Range switch	1.50
53A-53B-53C	118417	Condenser—3 section trimmer	.70
54A-54B	118421	Condenser—electrolytic, 10 mfd.—15 mfd., 450 v.	1.50
55	118431	Condenser—trimmer	.22
56	118482	Loop antenna	1.00
57	118498	Power transformer	5.00

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F. Amp.	6.0 A.C.	0	—3.2*		80	0	240		
6SA7	1st Det. & Osc.	6.0 A.C.	0	—3.2*	—8	80		240		
6SK7	I.F. Amp.	6.0 A.C.	0	—3.2*		80	0	240		
6SQ7	2nd DET.—A. V. C. & 1st A. F.	6.0 A.C.	—3.2	—4.5*				135	—3.2*	—3.2*
6F6G	Output	6.0 A.C.	—3.2	—19*		240		220		
6U5	Eye	6.0 A.C.	—3.2	—3.2*				T=240 Volts		
5W4G	Rectifier	5.0 A.C.						Plates 250 A.C.		

*Measured at Bias Resistor

Use a high resistance voltmeter of at least 1000 ohms per volt.

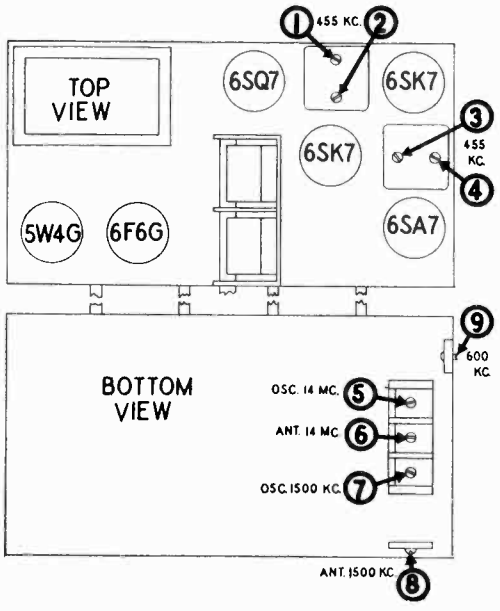
MODEL S7427-1, Late
Alignment, Trimmers
Socket, Notes

FIRESTONE TIRE & RUBBER CO.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the blue wire from the extreme left hand screw at the rear of the chassis and allow it to float free.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Front Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
400 OHM Carbon Resistor	Black Wire on Antenna Terminal Strip	14 MC	Foreign	14 MC	5	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Black Wire on Antenna Terminal Strip	14 MC	Foreign	14 MC	6	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	Black Wire on Antenna Terminal Strip	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Black Wire on Antenna Terminal Strip	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Black Wire on Antenna Terminal Strip	600 KC	Broadcast	Tune To 600 KC Generator Signal	9	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



DIAL AND MISCELLANEOUS PARTS

Part Number	Description	List Price
116280	Back—cabinet	$0.36
83552	Bolt—chassis mounting No. 10 x 7/8	.03
113442	Bracket—for tuning eye	.16
114955	Clamp—for dial cord	.01
114001	Clamp—for dial scale retaining	.08
112745	Clip—coil mounting	.01
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive	.15
118450	Dial scale	1.00
118480	Disc—for end of loop mounting	.05
117029	Drive drum and bushing	.50
113800	Escutcheon—for dial	1.00
113890	Escutcheon—for tuning eye	.10
117233	Escutcheon—for push buttons	.35
117087	Knob—for tuning or volume	.12
118483	Mounting board for loop antenna	2.50
118484	Mounting block for loop antenna	.60
117245	Pin for push buttons	.03
114002	Pointer—for dial	.12
117234	Push button	.08
81145	Retaining ring—for drive shaft	Per C .50
83624	Screw—self tapping 8 x 1/4	.01
85040	Screw—No. 6 Hex. Hd.	Per C .35
113191	Screw—special No. 8—32 x 1 1/8	.01
114914	Screw—special head for mounting escutcheon	.15
85827	Set screw—8-32 square head	.02
118475	Shield—for loop antenna	1.00
110501	Socket—4 prong (for speaker)	.16
114117	Socket—dial lamp	.18
116690	Socket—small octal base	.12
113177	Spring—dial cord tension	.09
117315	Station call letter tabs	.55
118416	Tuning eye cable and socket	.70
116530	Washer (paper) for back of knobs	.005
111456	Washer—spring washer	Per C .50

PHONOGRAPH & TELEVISION CONNECTIONS

PHONOGRAPH CONNECTIONS: Connect the wires from a phonograph record player to the left hand and middle terminals on the terminal strip nearest the middle of the chassis on the back of the chassis. Push the black sliding button on the back of the chassis to the right ("TELE. PHONO" position) for phonograph or television operation. This switch must be in the "RADIO" position for radio reception.

Turn the volume knob on the record player to the maximum volume position and control volume by means of the volume control on the radio.

TELEVISION CONNECTIONS: Connect the wires from a television attachment unit to the right hand and middle terminals on the terminal strip. Operation will now be the same as for phonograph operation.