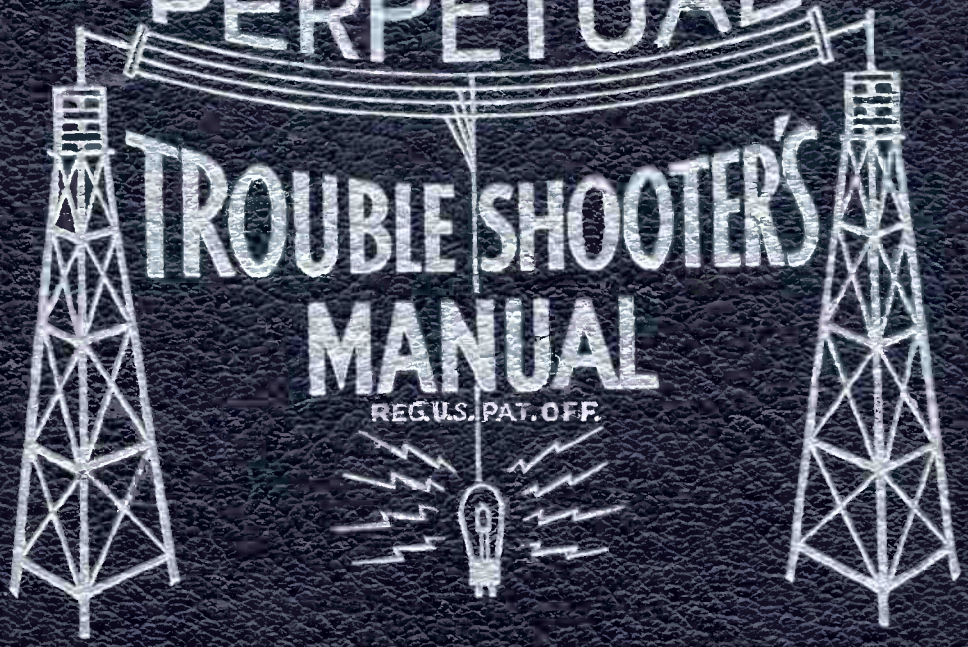
VOLUME VII

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.

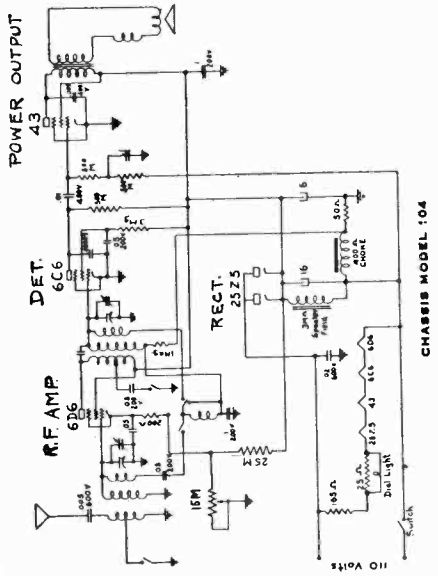


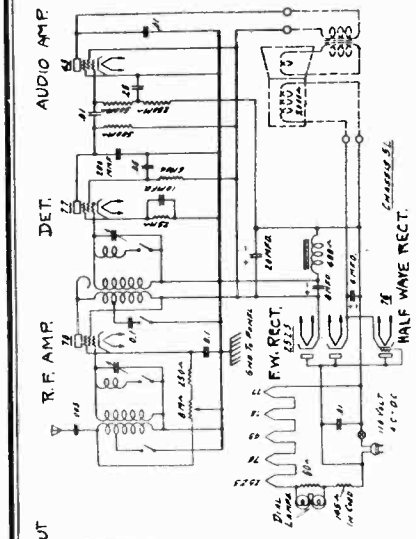
JOHN F. RIDER

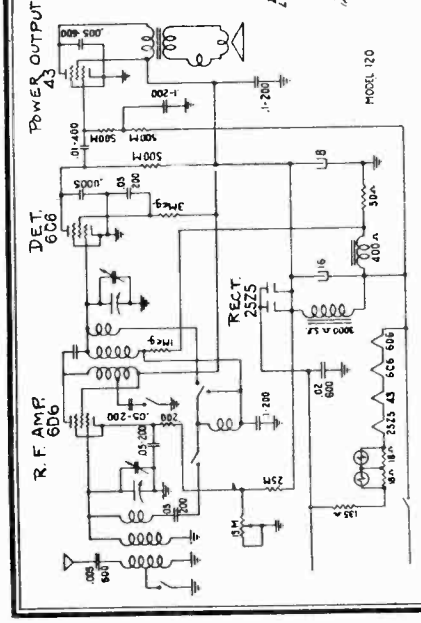
DETROLA RADIO CORP.

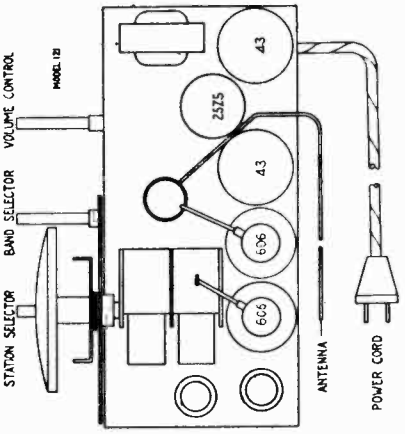
MODEL 5L
MODEL 5Y
MODEL 104
MODEL 120
MODEL 121
Schematics
Sockets

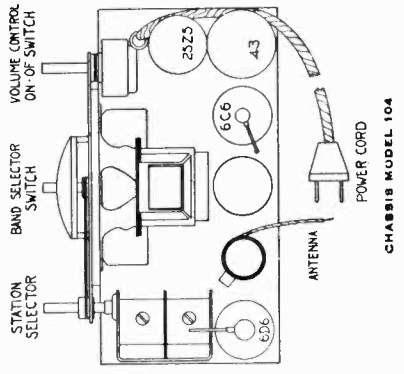
DETROLA

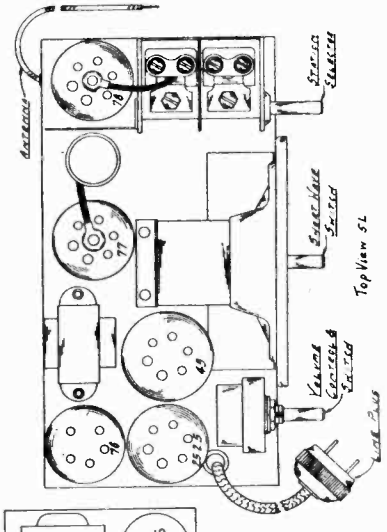


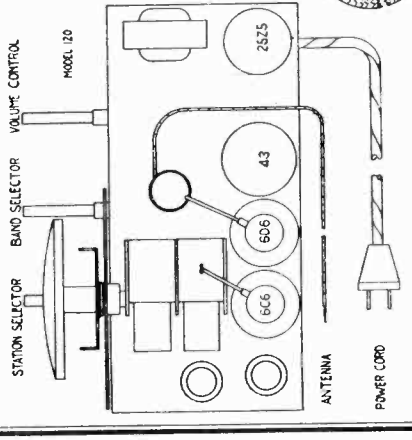


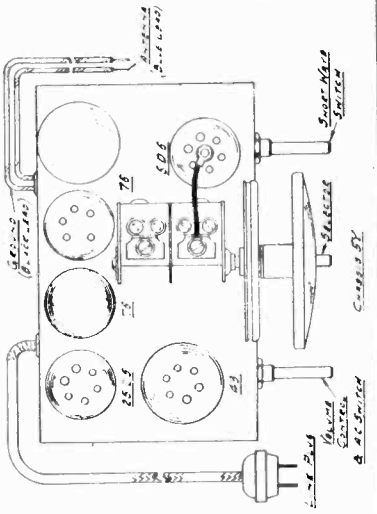


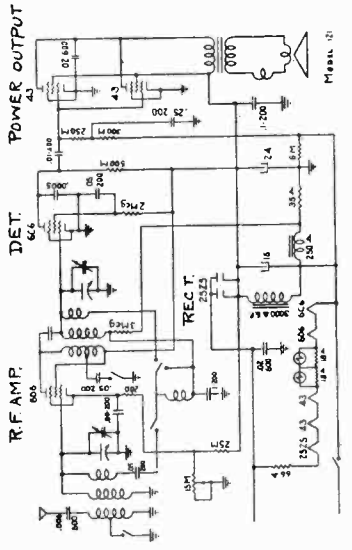


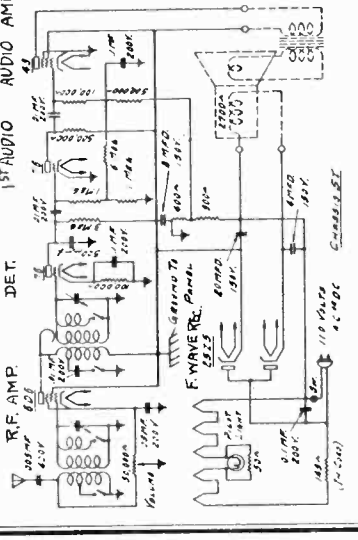






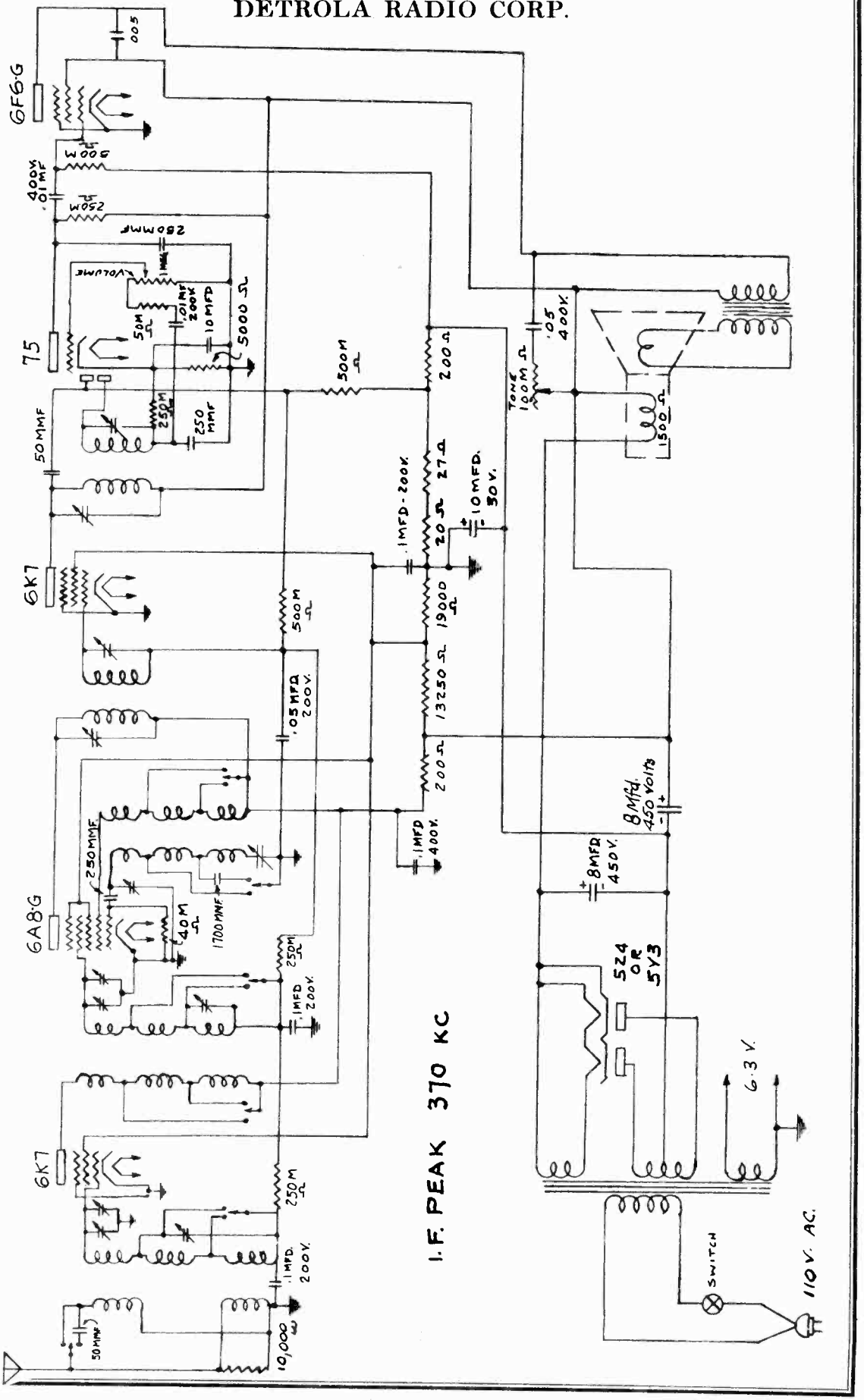






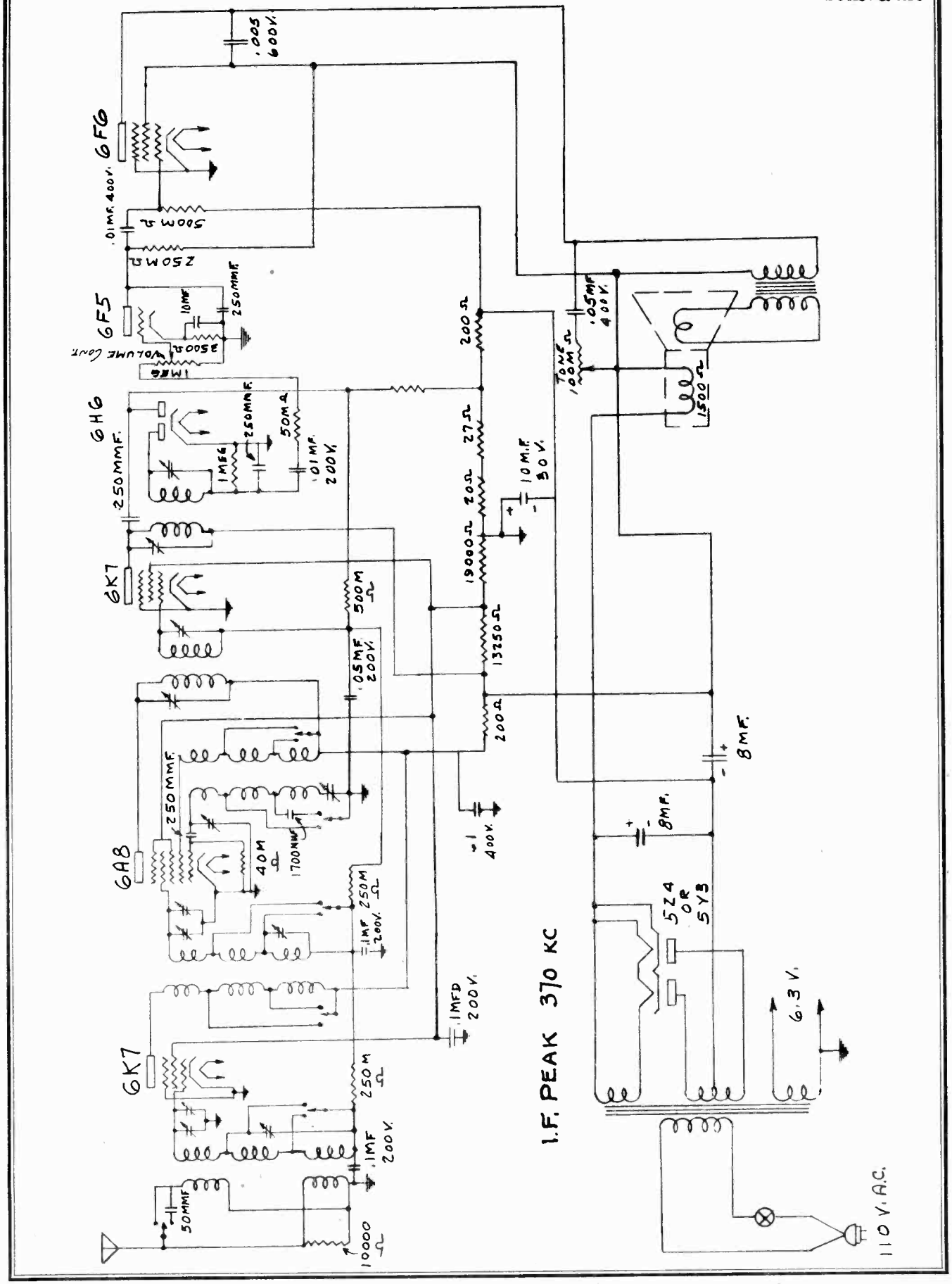
MODEL 6ZM
Schematic

DETROLA RADIO CORP.



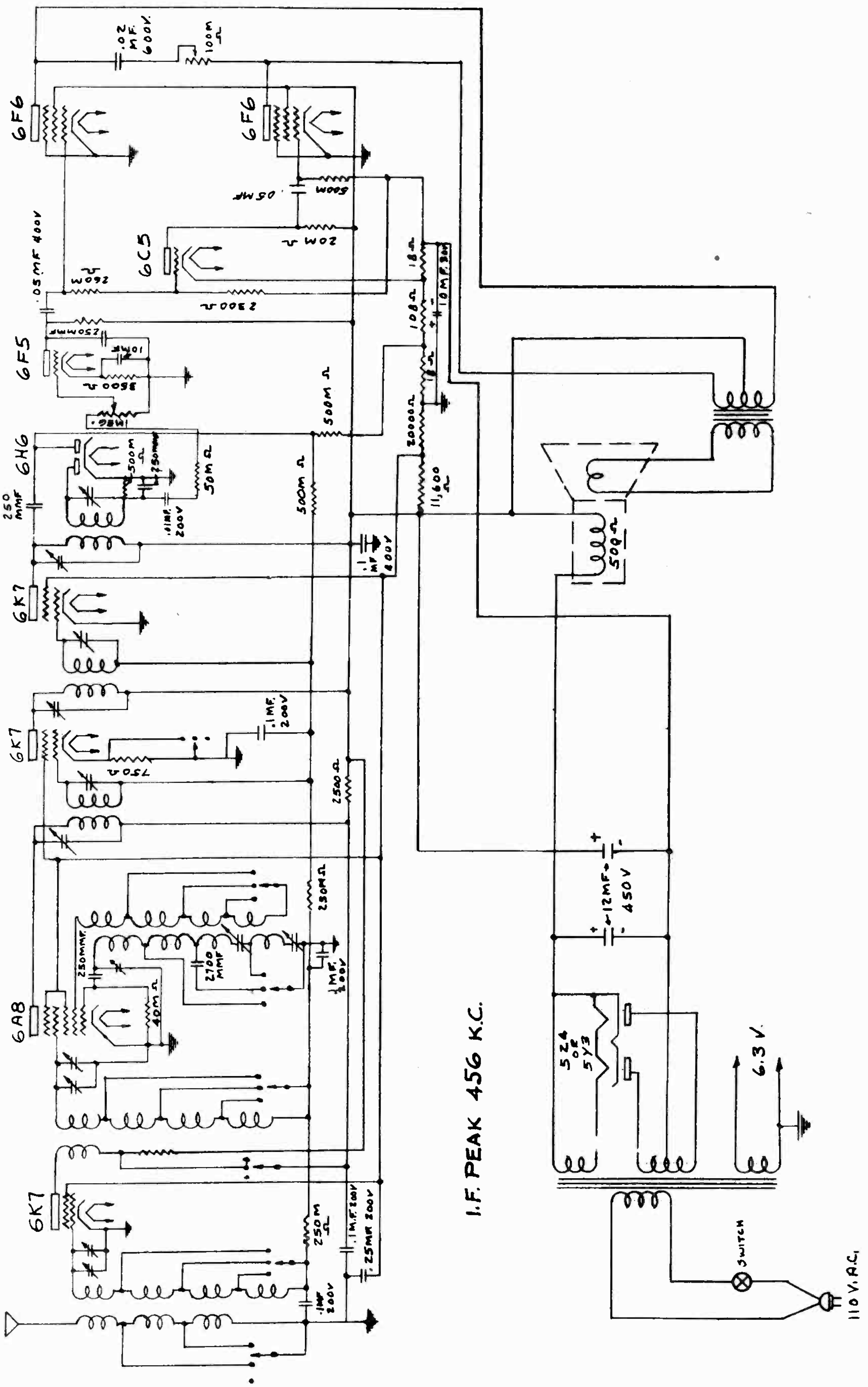
DETROLA RADIO CORP.

MODEL 7ZM
Schematic



MODEL 10ZM
Schematic

DETROLA RADIO CORP.



DETROLA RADIO CORP.

MODEL 6ZM
MODEL 7ZM
MODEL 10ZM
Alignment

INSTRUCTIONS FOR R-F. AND I-F. ALIGNMENT OF 6ZM AND 7ZM RECEIVERS

R-F. and I-F. Alignment

The trimmers on the tuning condensers and the intermediate stages are very accurately adjusted before the receiver leaves the factory, and should need little or no attention. To check adjustments, the following procedure should be followed:

Set wave band switch in broadcast position and turn volume control to extreme right (full on). Adjust test oscillator to 370 kc. and couple to control grid of 6A8G tube. Adjust four trimmers located in top of i-f. units for maximum output.

R-F. Alignment

1. Couple oscillator to antenna terminal, leaving band switch in broadcast position; set dial pointer and test oscillator to 1400 kc.; adjust oscillator trimmer located on top of tuning condenser for maximum output.
2. Turn band switch to "F" band and set dial pointer and test oscillator to 15 mc. Adjust antenna and r-f. trimmers located on top of tuning condenser for maximum output.
3. Reset band switch to broadcast position and set dial pointer and test oscillator to 140 kc.; adjust antenna and r-f. trimmers located on top of antenna and r-f. coils for maximum output.
4. Set dial pointer and test oscillator to 600 kc. Adjust padding condenser located in bottom of chassis, near 6A8G tube socket, for maximum output. Reset dial pointer and test oscillator to 1400 kc. and readjust oscillator trimmer located on top of tuning condenser for maximum output. This completes all adjustments.

INSTRUCTIONS FOR R-F. AND I-F. ALIGNMENT OF 10ZM RECEIVER

R-F. and I-F. Alignment

The trimmers on the tuning condenser and intermediate stages are very accurately adjusted before the receiver leaves the factory, and should need little or no attention. To check and adjust, the following procedure should be followed:

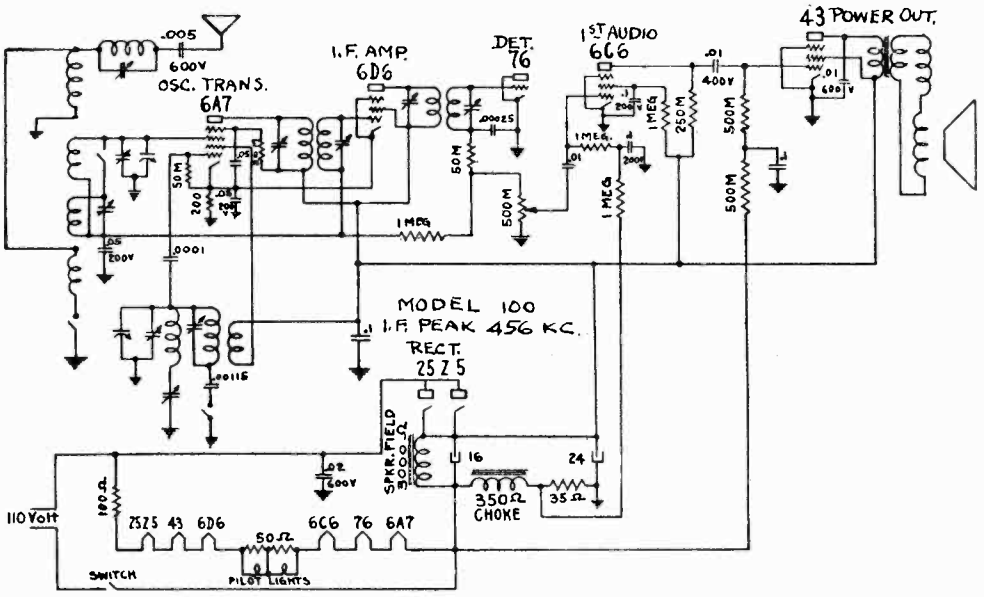
Set wave band switch in broadcast position and turn volume control to extreme right (full on); adjust test oscillator to 456 kc. and couple to control grid of 6A8G tube; adjust six trimmers located in top of i-f. units for maximum output.

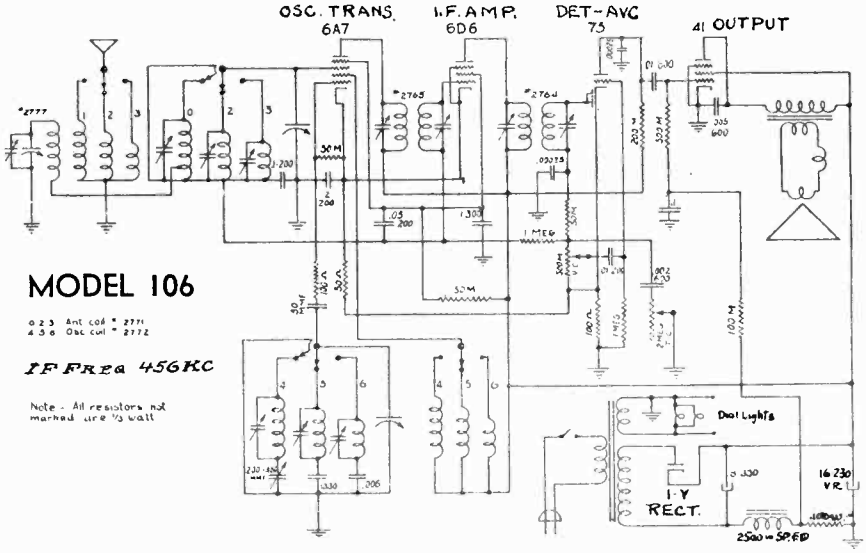
R-F. Alignment

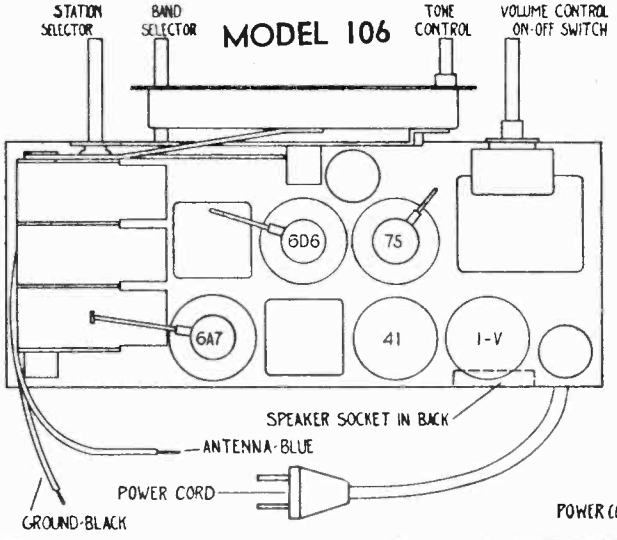
1. Couple oscillator to antenna terminal, leaving band switch in broadcast position. Set dial pointer and test oscillator to 1400 kc.; adjust oscillator trimmer on top of tuning condenser for maximum output.
2. Turn band switch to "F" band and set dial and test oscillator to 15 mc. Adjust antenna on r-f. trimmer located on top of tuning condenser for maximum output.
3. Reset band switch to broadcast position and set dial pointer and test oscillator to 600 kc.; adjust padding condenser located near long wave oscillator coil for maximum output. Rock tuning condenser back and forth slowly when making this adjustment.
4. Reset dial pointer and test oscillator to 1400 kc. and readjust oscillator trimmer on top of tuning condenser for maximum output.
5. Turn band switch to "1" band and set dial pointer and test oscillator to 160 kc. Adjust long wave padding condenser located near oscillator coil shield for maximum output. Rock tuning condenser back and forth slowly when making this adjustment. This completes all necessary adjustments.

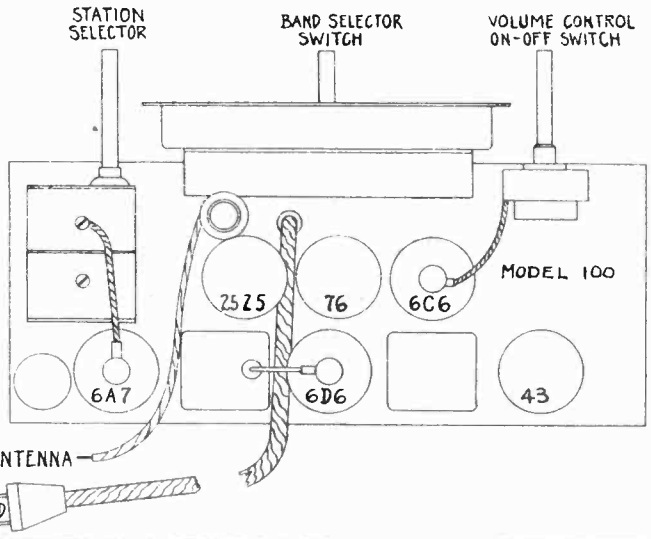
MODEL 100
MODEL 106
Schematics
Sockets

DETROLA RADIO CORP.



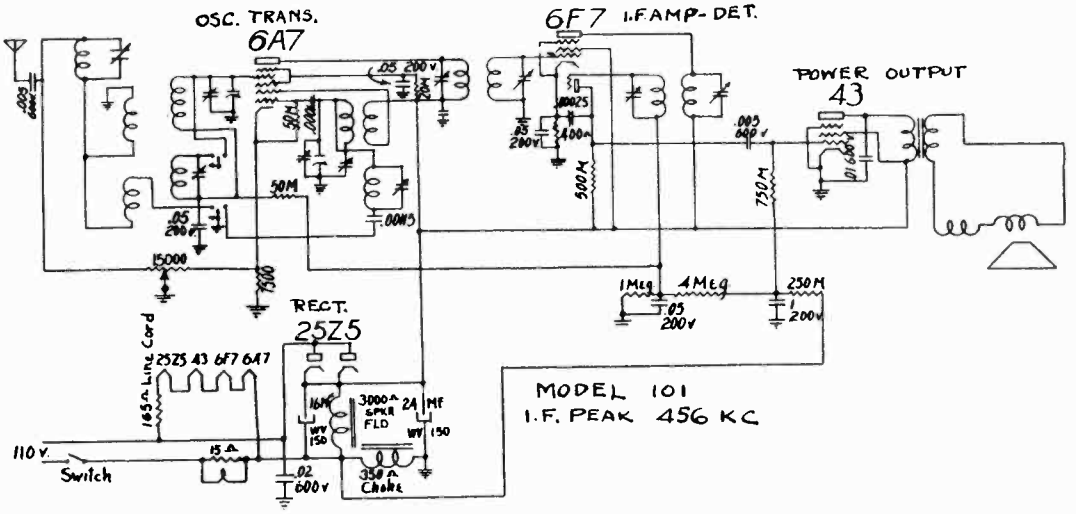


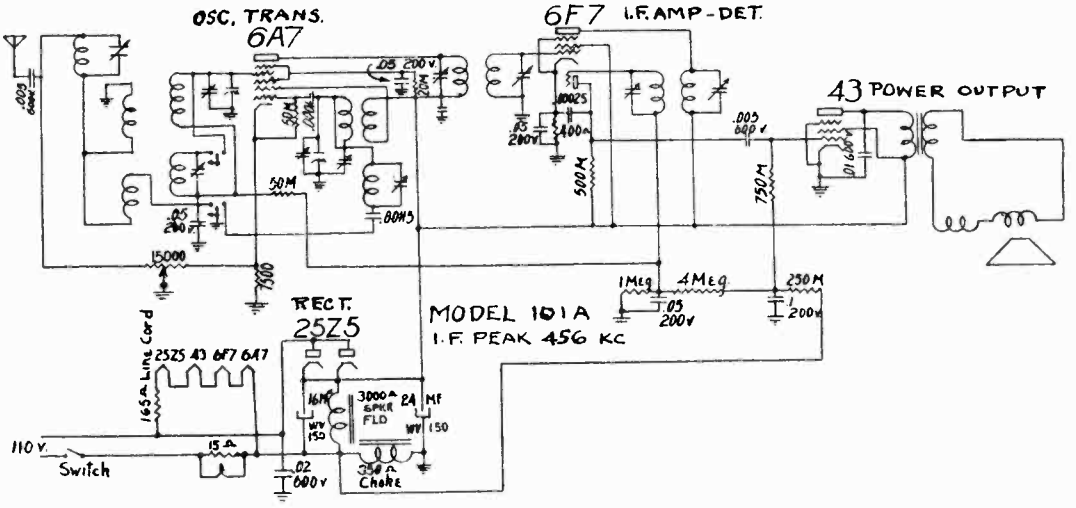


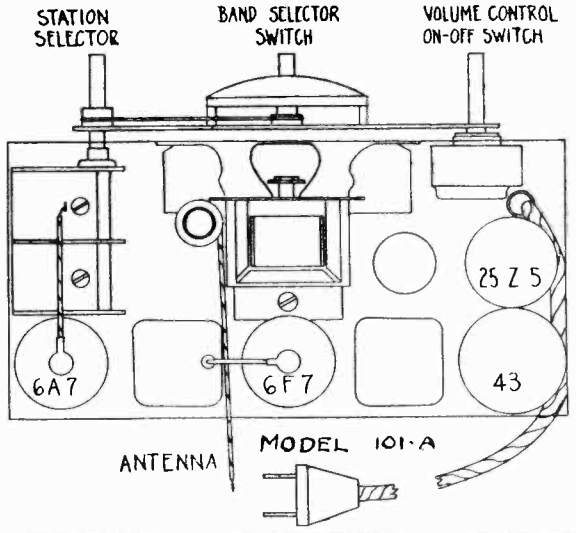


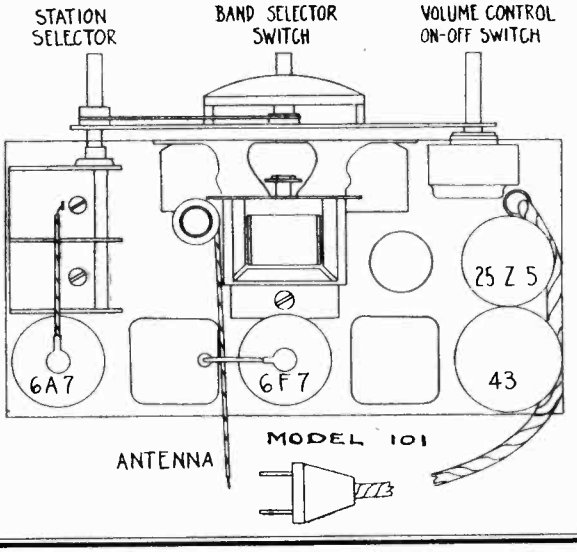
DETROLA RADIO CORP.

MODEL 101
MODEL 101-A
Schematics
Sockets



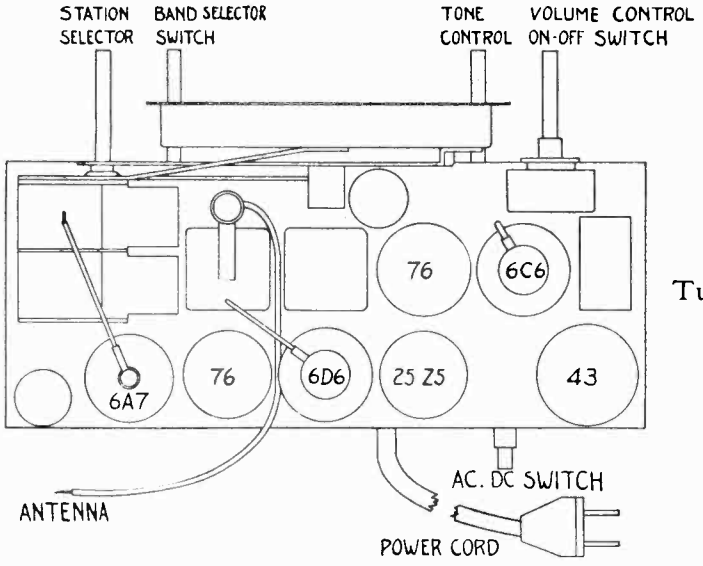






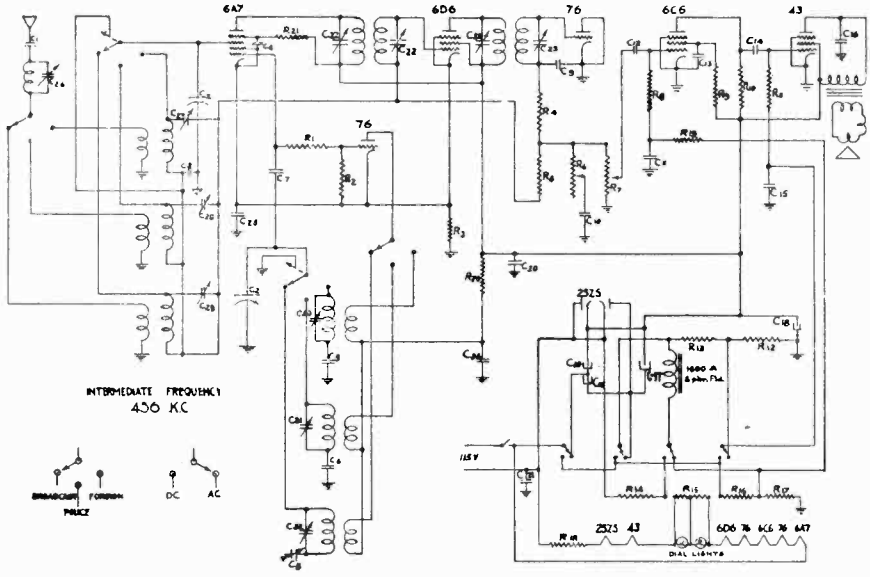
MODEL 102
Schematic
Socket

DETROLA RADIO CORP.



Tubes required are:

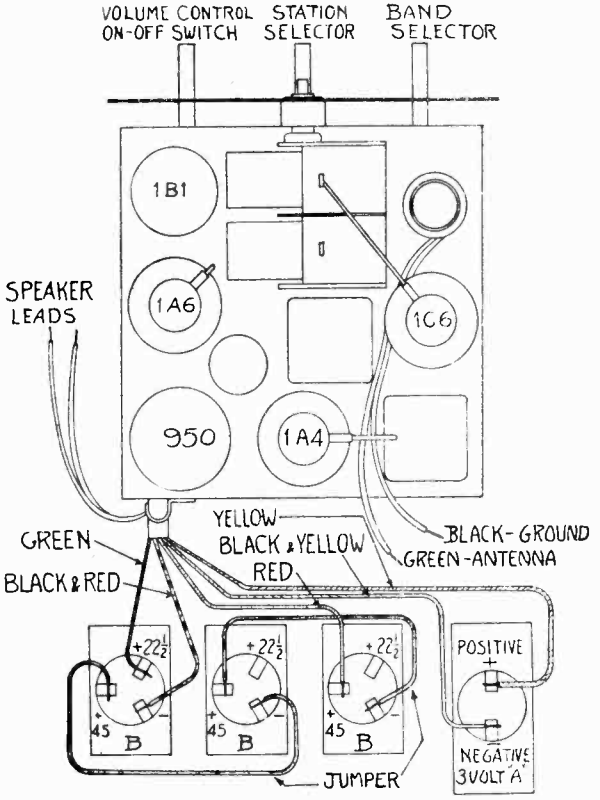
1—76	Oscillator.
1—6A7	Translator.
1—6D6	Intermediate frequency amplifier.
1—76	Detector-Automatic volume control.
1—6C6	First audio.
1—43	Power output.
1—25Z5	Rectifier. Voltage Doubler.

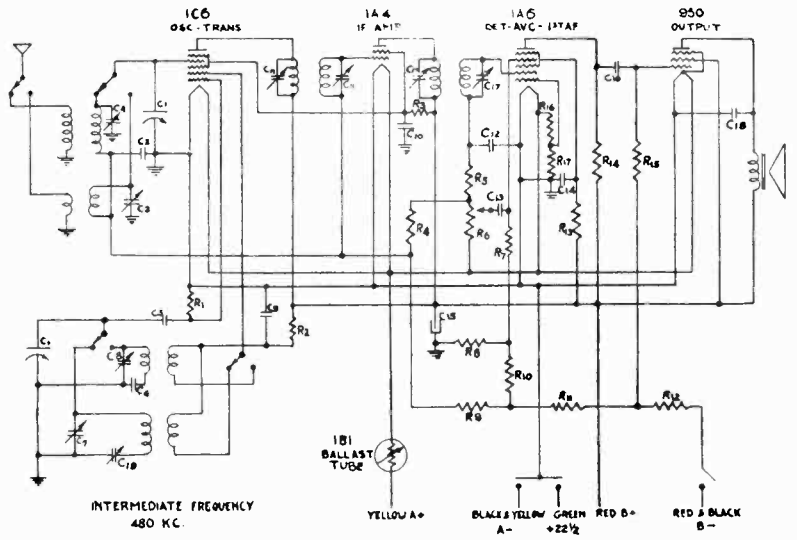


SCHEMATIC CIRCUIT DIAGRAM — MODEL 102

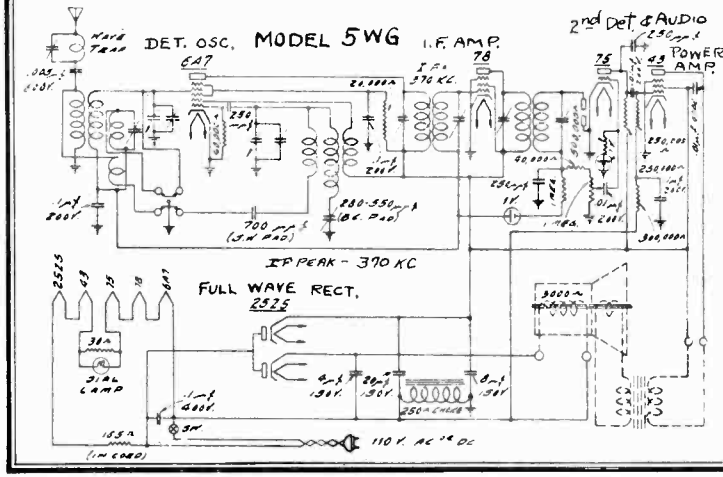
C1	.005 600 v.	C18	24 mfd. 150 w.v. wet el.	R6	2 meg. tone control
C2	.00035 variable air	C19	8/8 mfd. 175 p.v. dry	R7	500M ohms, vol. con. and line switch
C3	.05 200 v.	C20	.1 200 v.		
C4	.05 200 v.	C21	.02 600 v.	R8	1 meg., 1/3 watt
C5	350 mmf. variable mica	C22	120 mmf. trimmer	R9	1 meg., 1/3 watt
C6	1330 mmf.	C23	120 mmf. trimmer	R10	250M ohms, 1/3 watt
C7	50 mmf. mica	C24	.02 200 v.	R11	500M ohms, 1/3 watt
C8	3850 mmf.	C25	.05 200 v.	R12	200M ohms, 1/3 watt
C9	250 mmf. mica	C26	180 mmf. trimmer	R13	500M ohms, 1/3 watt
C10	.01 200 v.	C27	5 to 35 mmf. trimmer	R14	1200 ohms, 3 watt
C11	.1 200 v.	C28, C29, C30, C31, C32,		R15	45 ohms, center tapped
C12	.01 400 v.		1 to 10 mmf. trimmer	R16	370 ohms, 1 watt
C13	.1 200 v.	R1	200 ohms, 1/3 watt	R17	35 ohms, 1/3 watt
C14	.01 400 v.	R2	50M ohms, 1/3 watt	R18	82 ohms, line cord
C15	.25 200 v.	R3	200 ohms, 1/3 watt	R19	1 meg., 1/3 watt
C16	.005 600 v.	R4	50M ohms, 1/3 watt	R20	5M ohms, 1/3 watt
C17	8 mfd. 250 w.v. wet el.	R5	1 meg., 1/3 watt	R21	20M ohms, 1/3 watt

MODEL 103
MODEL 5-WG
Schematics
Socket





MODEL 103



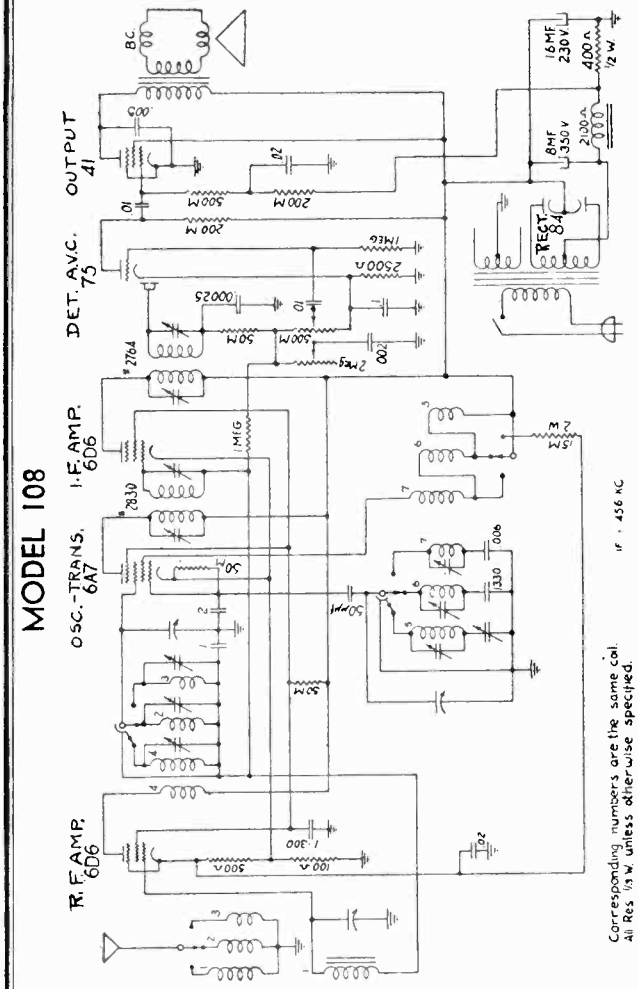
PARTS LIST

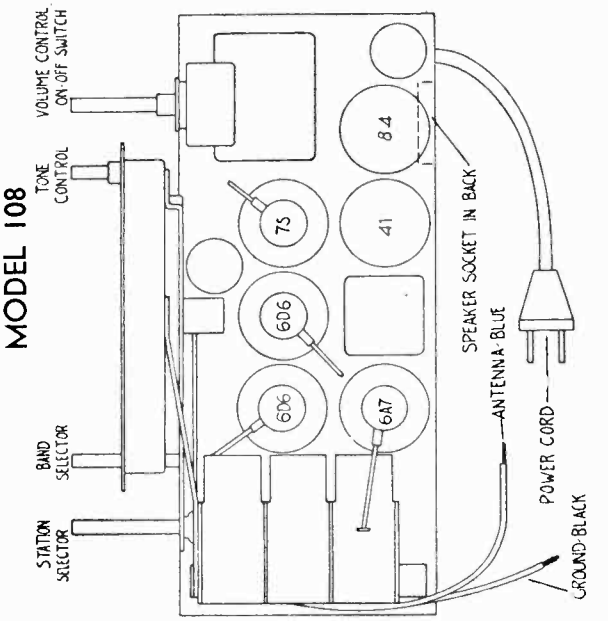
MODEL 103

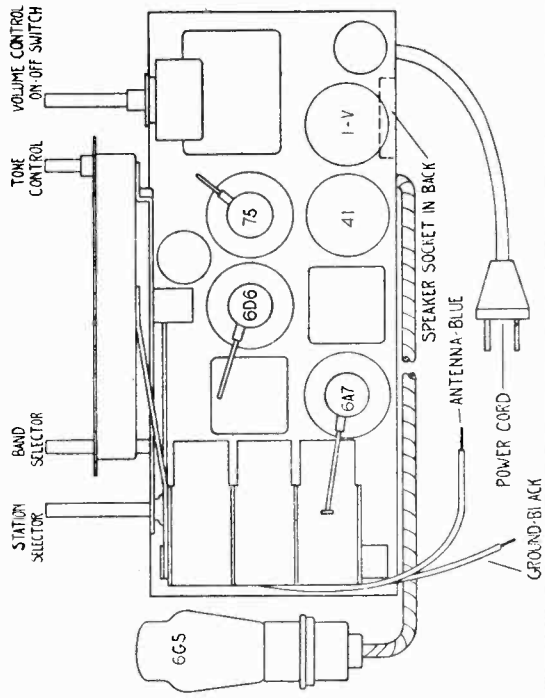
C1	350 mmf. var. air	C13	.01 200 v.	R6	5 meg v. c.
C2	1 200 v.	C14	.01 400	R7	1 meg.
C3	3-35 mmf.	C15	16 mf. 150 v.	R8	200 ohms
C4	1-10 mmf.	C16	.005 600 v.	R9	2 meg.
C5	50 mmf. mica	C17	80 mmf. trim	R10	300 ohms
C6	005	C18	.003 600v.	R11	500 ohms
C7	3-35 mmf.	C19	350 mmf. var. mica	R12	800 ohms
C8	1-10 mmf.	R1	50 M.	R13	60 M.
C9	.02 200 v.	R2	5 M.	R14	250 M.
C10	.1 200 v.	R3	25 M.	R15	1 meg.
C11	80 mmf. trim	R4	2 meg.	R16	100 ohms
C12	250 mmf. mica	R5	50 M.	R17	100 ohms

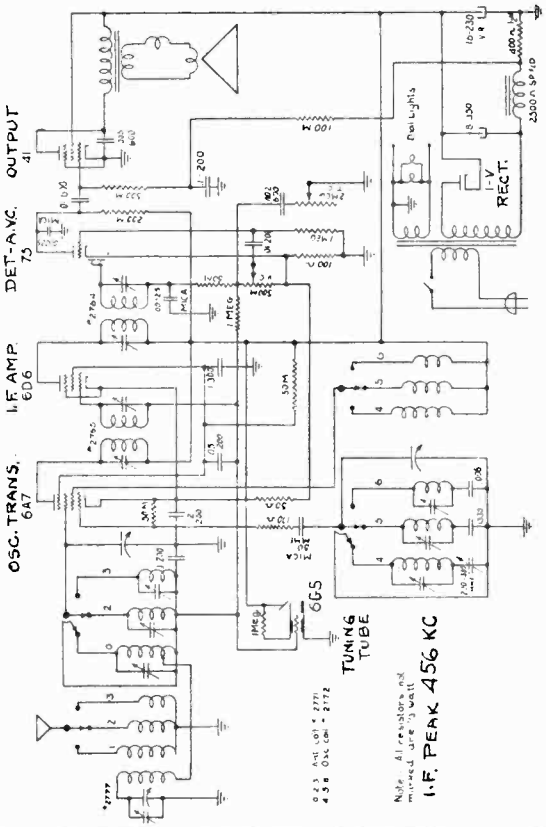
MODEL 106-E
MODEL 108
Schematics
Socket

DETROLA RADIO CORP.



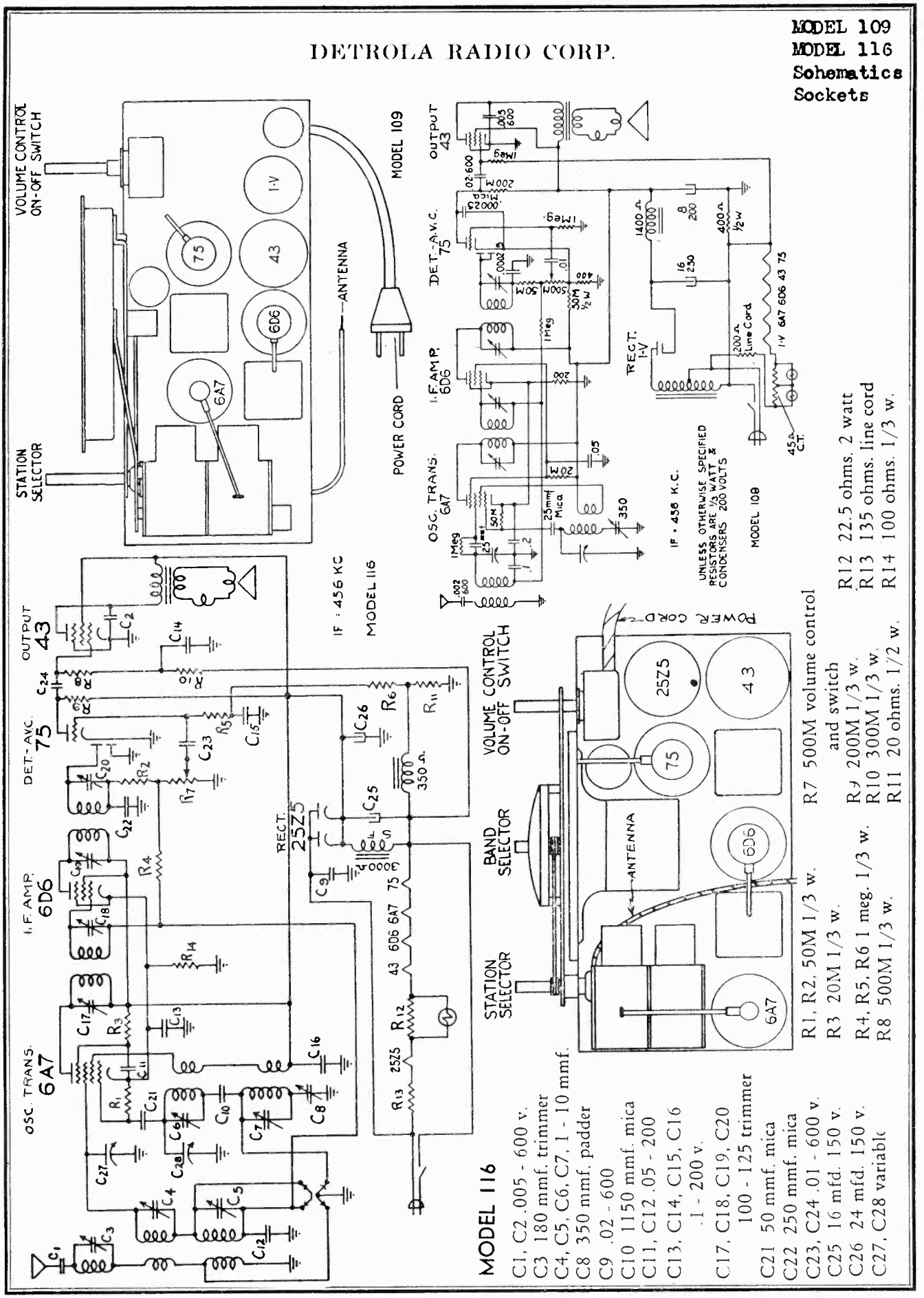






DETROLA RADIO CORP.

MODEL 109
MODEL 116
Schematics
Sockets



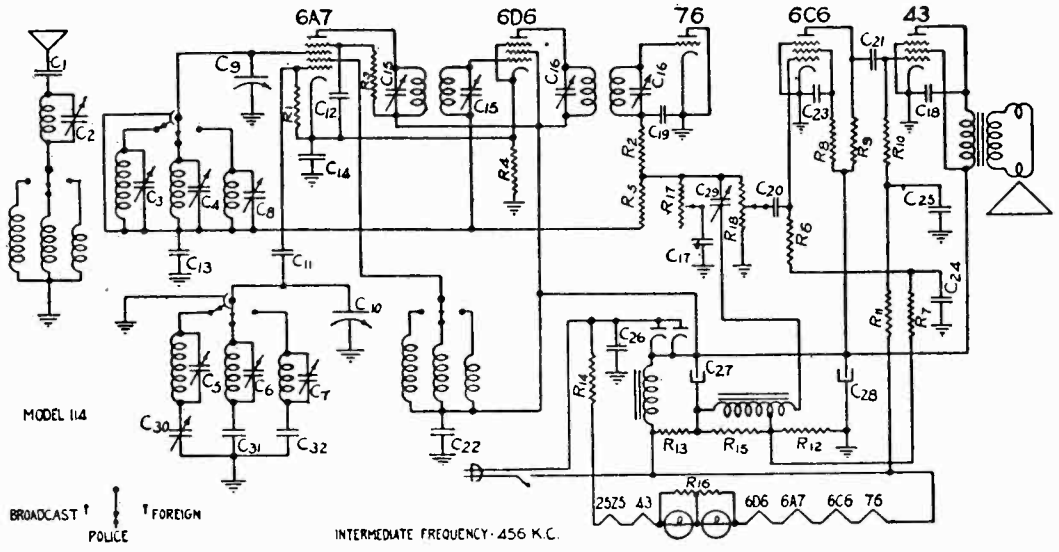
MODEL 116

C1, C2 .005 - 600 v.
C3 180 mmf. trimmer
C4, C5, C6, C7, 1 - 10 mmf.
C8 350 mmf. padder
C9 .02 - 600
C10 1150 mmf. mica
C11, C12 .05 - 200
C13, C14, C15, C16 .1 - 200 v.
C17, C18, C19, C20 100 - 125 trimmer
C21 50 mmf. mica
C22 250 mmf. mica
C23, C24 .01 - 600 v.
C25 16 mfd. 150 v.
C26 24 mfd. 150 v.
C27, C28 variable

R1, R2, 50M 1/3 w.
R3 20M 1/3 w.
R4, R5, R6 1 meg. 1/3 w.
R8 500M 1/3 w.
R7 500M volume control and switch
R9 200M 1/3 w.
R10 300M 1/3 w.
R11 20 ohms. 1/2 w.
R12 22.5 ohms. 2 watt
R13 135 ohms. line cord
R14 100 ohms. 1/3 w.

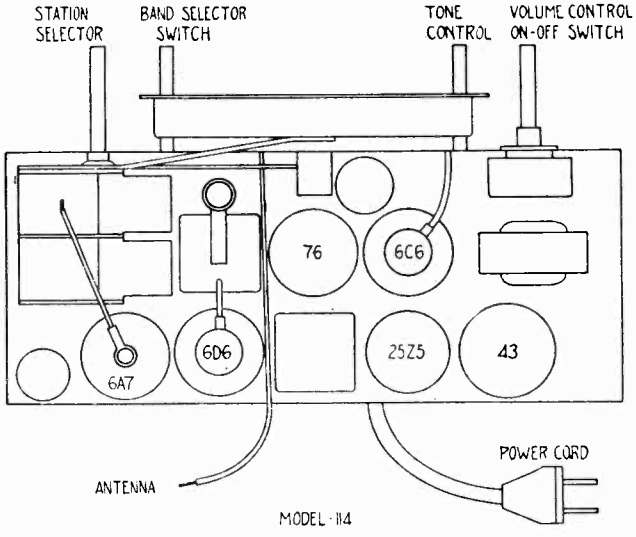
MODEL 114
Schematic
Socket

DETROLA RADIO CORP.



Tubes required are:

1-6A7 Oscillator-translator.
1-6D6 Intermediate frequency amplifier.
1-76 Detector-Automatic volume control.
1-6C6 First audio.
1 43 Power output.
1-25Z5 Rectifier.



MODEL 114

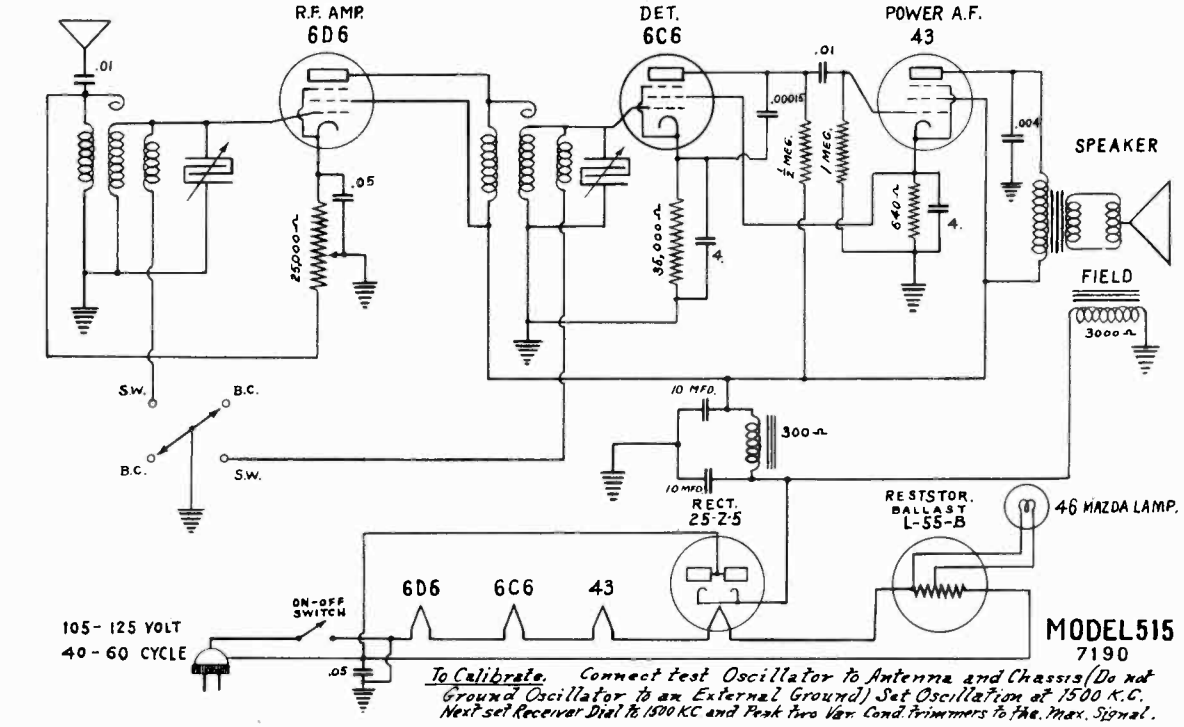
PARTS LIST

C-1 .005 600 v.
C2 180 mmf. trimmer
C3, C4, C5, C6, C7, 1 to 10 mmf. trimmer
C8 3 to 35 mmf. trimmer
C9, C-10 350 mmf. air variable
C11 50 mmf. mica
C12, C13, .05-200 v.
C14 .2 200
C15, C16 120 mmf. trimmer
C17, C18 .003 600 v.
C19 250 mmf. mica
C20 .01 200 v.
C21 .01 400 v.
C22, C23, C24 .1 200 v.
C25 .2 200 v.
C26 .02 600 v.
C27 16 mfd. 150 v. wet electrolytic
C28 24 mfd. 150 v. wet electrolytic
C29 3 to 35 mmf. trimmer
C30 220 to 550 mmf. padder
C31 1330 mmf. padder
C32 3850 mmf. padder
R1, R2 50M ohms
R3 20M ohms
R4 200 ohms
R5, R6, R7, R8 I megohm
R9 250M ohms
R10 500M ohms
R11 300M ohms
R12, R13 35 ohms
R14 100 ohms line cord
R15 10M ohms
R16 45 ohms center tapped
R17 2 megohms tone control
R18 500M ohms vol. control

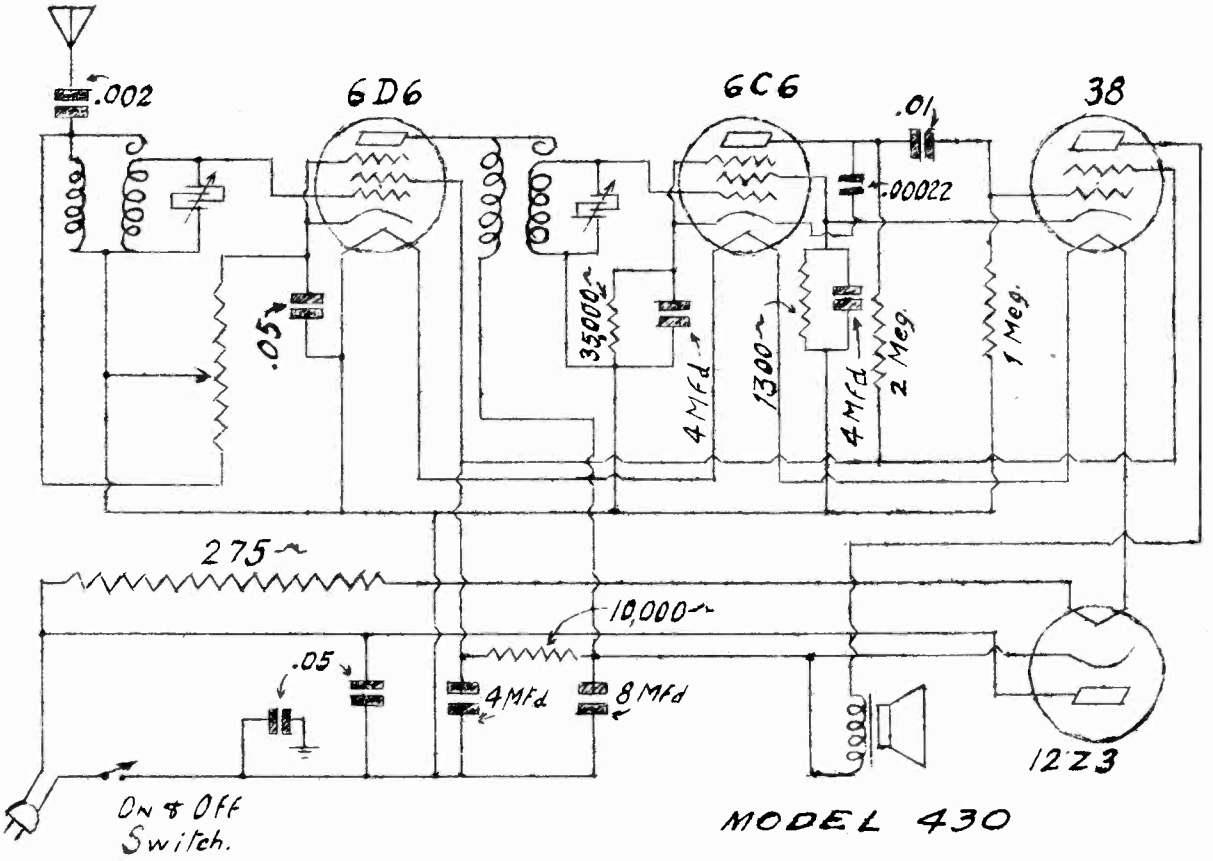
TUBE LAYOUT CHART — MODEL 114

DEWALD RADIO

MODEL 430
MODEL 515
Schematics



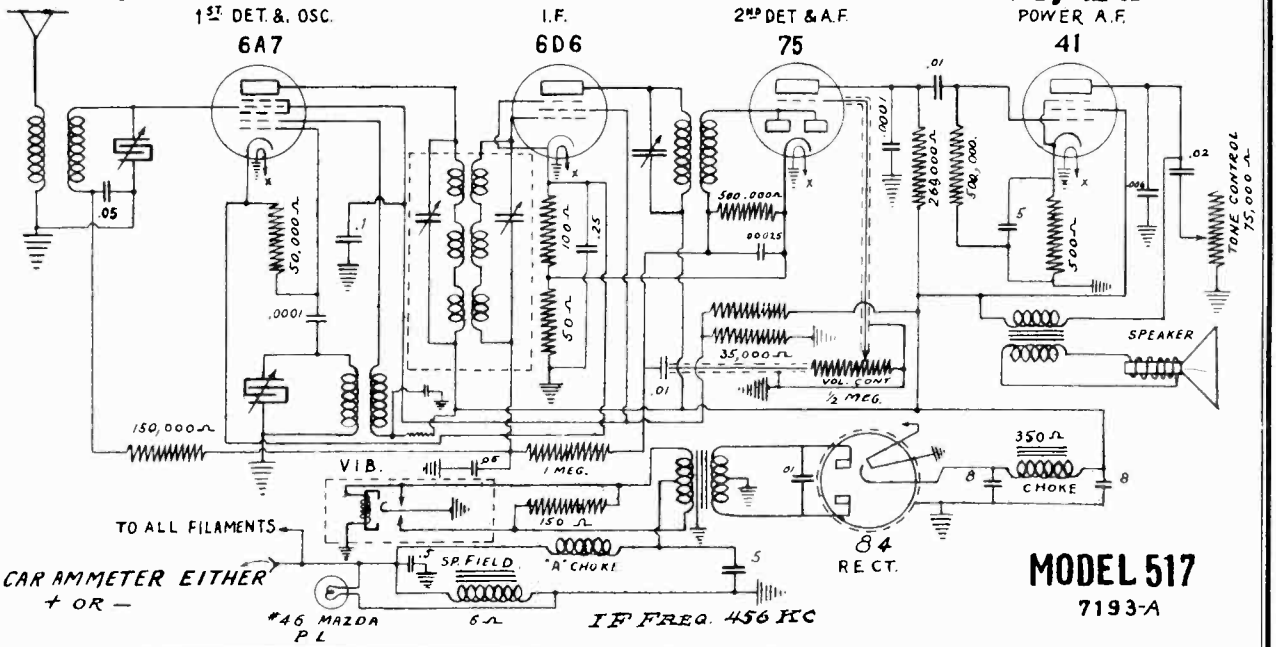
To Calibrate. Connect test Oscillator to Antenna and Chassis (Do not Ground Oscillator to an External Ground) Set Oscillation at 1500 K.C. Next set Receiver Dial to 1500 K.C. and Peak two Var. Cond. Trimmers to the Max. Signal.



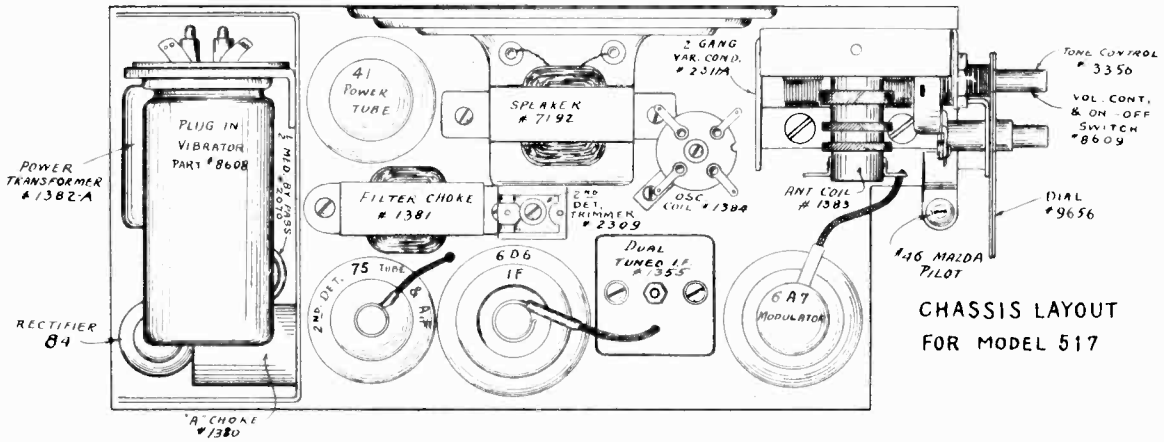
MODEL 517
Schematic, Socket

DEWALD RADIO

Trimmers, Alignment Notes, Parts



MODEL 517
7193-A



CHASSIS LAYOUT FOR MODEL 517

CALIBRATION INSTRUCTIONS Connect test Oscillator, "Hot lead" to the grid of the 6-A-7 Tube and the "Cold" lead to the receiver chassis, short circuit the Receiver's variable condenser cut Oscillator section. Peak - I.F. two trimmers in the top of the aluminum shield and trimmer in rear of speaker to 456-K.C. - After the I.F. has been Peaked, remove short from the variable condenser stator and connect test Oscillator "Hot lead" to the antenna Lead-in of the Receiver. Set test Oscillator and Receiver to 1500 K.C. and adjust variable condenser trimmers for max. signal.

Antenna Lead: A Shielded Antenna lead is connected to the set. If any connections, extensions or alterations are made to this lead care should be taken to see that the lead is well shielded to a point without the field of interference. It is also necessary to ground the "far" end of the Antenna lead-in shield.

Battery: The battery should be kept in a well charged condition and the terminals cleaned of corrosion. Check generator charging rate to keep battery in charged condition.

Ignition Coil: In cases where noise is originating from the ignition coil, it may be overcome by placing a copper shield around the coil and grounding same.

Battery Cables: May be corroded at the battery and are making imperfect contact. Keep all battery cables and wires away from the high tension system. It may also be of advantage to place a choke coil of about 50 turns of #16 wire in series with the main battery lead to the set.

Wires under Car: Where wires run along chassis or other metal parts below the car they should be inspected for quality of insulation and general condition. It may be well to place a condenser at the stop light switch and at the tail light.

Distributor: Points may be burned or improperly adjusted. Rotor arm may be making poor contact with cap.

Distributor Cables: Cables may be "leaking" due to poor or burned insulation. In some installations it may be necessary to shield the high tension leads with copper braid. If ignition cables are insulated with plain rubber insulation it is not advisable to place shielding directly over the wire. In this case the wire should be first covered with a varnished composition covering or loom. The battery lead from the ammeter to the distributor coil and the battery lead to the generator should be shielded.

Dome Light Wire: If dome light wire is radiating, it may be necessary to shield this wire. A .5 Mfd. condenser or a choke in series with this lead by-passed at either side of choke to chassis may help considerably. These connections should be made at the point where the dome light enters the upright post.

Bonding: Although metal joints on the car, such as dash panel to side of car etc., may appear to be sold they may not be making good electrical contact and are causing noise. Paint and other material may get into seams and cause poor or intermittant contacts and for this reason it may be necessary to bond certain parts of the car. The brake rods, drive shaft tubes and parts around the motor should be bonded.

For Realigning Receiver See Circuit Diagram.

NUMBERS AND LIST PRICE OF REPLACEMENT PARTS

PART NO.		PART NO.	LIST
1382	Power Transformer	2047	2.65
1380	"A" Choke	2123	.30
1383	Antenna Coil	2070	.70
1381	"B" Choke	2214	.75
1356	Dual tuned IF Coil	2152	.40
1379	2nd Det. Coil	5107	.65
1384	Osc. Coil	5108	.50
2311	2 gang Var. Con.	7192	2.25
2310	8 x 8 Elec. Cond. "350V	8690	1.20
2312	5 Mfd. " "	3556	.40
2309	Single Trimmer Con.	8611	.20
2302	.01 Cub Cond (1000V)	8608	.35
2056	.01 " "	9560	.35
2022	.1 " "	8016	.35
2191	.02 " "		.35
2046	.05 " "		.35
2033	.25 " "		.40

PART NO.		LIST
2047	.00025 Mica Cond.	.35
2123	.0001 " "	.35
2070	.5 Mfd Cub " "	.45
2214	Ammeter " "	.40
2152	Generator " "	.50
5107	Antenna Cable	.25
5108	Battery Cable	.20
7192	Speaker	4.45
8690	Comb. Vol. Control	1.25
3556	Tone Control	.85
8611	Knob	.20
8608	Vibrator	3.50
9560	Mounting Stud	.10
8016	Pilot Lamps	.10
	7/16 Hexagon Nut	.02

F1401M

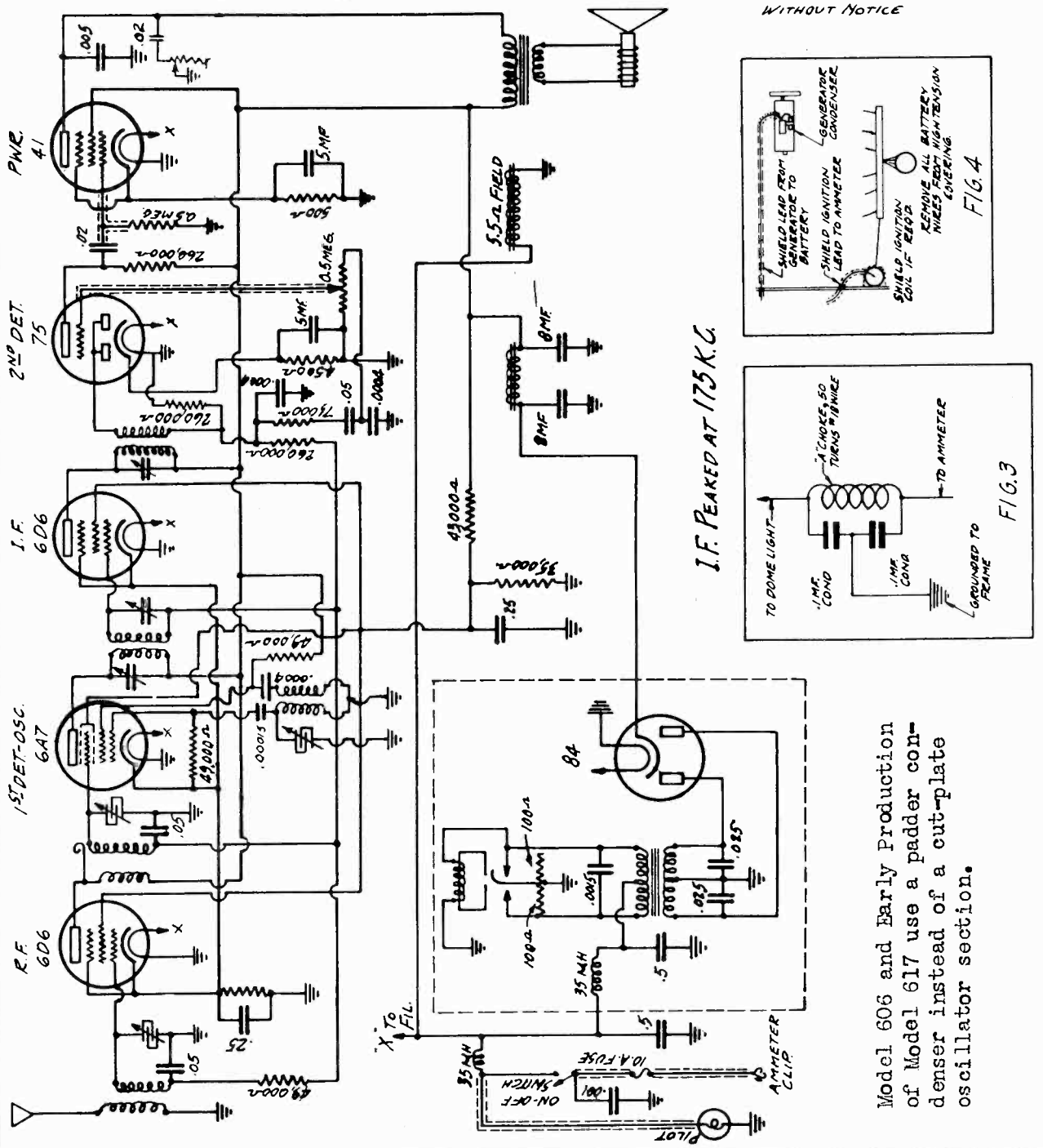
DEWALD RADIO

MODELS 606, 617 (Early and Late) Schematic, Parts, Notes

NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

1311	Power Transformer	$ 3.00
1163	A Choke	.30
1312	Suppressor Choke	.35
1381	B Choke	.95
1307	Antenna Coil	.90
1308	1st Detector Coil	.95
1309	Dual I.F. Transformer	1.50
1310	2nd Detector Coil	1.30
1401	Oscillator Coil	.75
2325	3 Gang Variable Condenser	4.50
2269	Dual 8 Electrolytic Condenser	2.05
2270	Dual 5 Electrolytic Condenser	1.15
2094	.001 Mica Condenser	.40
2241	.0004 Mica Condenser	.35
2267	.0015 Mica Condenser	.40
2046	.05 Cub Condenser	.35
2191	.02 Cub Condenser	.35
2215	.005 Cub Condenser	.35
2219	.5 Cub Condenser	.40
2220	Dual .025 Cub Condenser	.60
2244	.015 Cub Condenser	.40
2152	.25 Generator Condenser	.50
2214	.5 Ammeter Condenser	.40
5077	Antenna Cable	.85
5094	Combination A Cable	.50
7194	Speaker	5.30
8463	Vibrator	5.00
8399	Fuse Retainer	.20
8400	15 Ampere Fuse	.05 (net)
3368	Tone Control	.55
8462	Switch and Volume Control	1.10
8405	Knob	.20
	Remote Control	4.25
	Cable and Sheath	1.50
9517	Mounting Stud	.05 (net)
	7/16 Hexagon Nut	.05 (net)
	Wing Nuts	.05
	Pilot Lamps	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



Model 606 and Early Production of Model 617 use a padder condenser instead of a cut-plate oscillator section.

MODELS 606, 617 (Early and Late) Socket, Trimmers, Alignment

DEWALD RADIO

Is a six tube superheterodyne receiver with full automatic volume control operating on all three radio frequency tubes. The speaker and eliminator are assembled in the same case as the receiver, permitting simple installation. Tone modulation is obtained by turning knob on right side of receiver cover.

BATTERY VOLTAGE — The set operates on a 6 to 8 volt battery with either POSITIVE or NEGATIVE ground.

TUBES — 6D6, 6A7, 6D6, 75, 41 and 84 (6Z4)

ANTENNA — The Antenna may be either the copper mesh or built in type furnished as standard equipment on some cars, or in the case of the new metal roof, or "Turret Top" cars it may be a plate type or balanced Hairpin type Antenna mounted under the running board.

INSTALLATION (See fig. #1) — Connect ammeter condenser to spring clip at end of wire in which the fuse holder is located. Use the self tapping screw provided. Compress the clip and slide it on battery side of ammeter. Ground other terminal of ammeter condenser to any convenient point. Plug antenna lead into connection on right side of set by pushing in and turning to the right. Attach "lead-in" to car antenna. Install the generator condenser by connecting the lead to the generator terminal and grounding the case of the condenser.

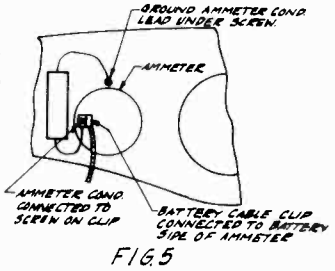


FIG. 5

FUSE — The fuse is located in a metal retainer in the wire that connects to the ammeter. A standard automobile type 15 ampere fuse should be used for replacement, being sure to use fibre cover. Do not use anything else in place of fuse as guarantee will be invalidated.

REMOTE CONTROL — The remote control unit is furnished with drive cables attached. It may be well to examine the set screws holding the cables in place to see that they have not become loosened in shipping. Locate the unit on the steering column and fasten same by means of control clamp.

After the unit has been mounted, looking at the front of unit, the larger knob is the tuning control and the smaller one is the key, switch and volume control.

The remote control cables should now be connected to the receiver by inserting them into cable bushings located on the left side of the set. The drive cable (tongue end) should be inserted into the bushing at the rear of the set and the volume control cable (slotted end) into the one nearer the front. After the cables have been inserted the knobs on the remote control unit should be turned back and forth several times to be sure that the cables are engaged. The cable bushing set screws should now be tightened to hold them firmly in place.

To adjust pointer on remote control dial, turn larger knob as far to right as it will go, then with a small screw driver turn the adjusting screw in the rear of the remote control unit until the pointer is on the first dial mark on the right side of the dial. (below 150) The tuning of the set will then agree with the dial calibration.

LIST OF ACCESSORY PARTS

- 1 Mounting Stud
- 1 Mounting Washer
- 1 Mounting Nut
- 1 Lock Nut
- 1 Remote Control Unit
- 1 Drive Sheath and Cable
- 1 Volume Control Sheath and Cable
- 1 Mazda Pilot Lamp #55, 6-8 Volts
- 1 Antenna Plug and Lead-In
- 1 Generator Condenser
- 1 Ammeter Condenser
- 1 Key Knob

NOISE SUPPRESSION

This receiver has been designed to operate without the use of either spark plug or distributor suppressors. If the ignition system is faulty, or if the set is installed in an old model car where the ignition system radiates badly, it may be necessary to place a suppressor at the distributor in series with the main high tension lead. If spark plug interference is still noticed it may also be necessary to place a suppressor on each plug.

It is important that all items and connections in the electrical system of the car be in good condition. If excessive noises are present it may be well to examine the following points.

1. Antenna Lead: A Shielded Antenna lead is furnished with the set. If any connections, extensions or alterations are made to this lead care should be taken to see that the lead is well shielded to a point without the field of interferance. It is also necessary to ground the "far" end of the Antenna lead-in shield.

2. Battery: The battery should be kept in a well charged condition and the terminals cleaned of corosion. Check generator charging rate to keep battery in charged condition.

3. Ignition Coil: In cases where noise is originating from the ignition coil, it may be overcome by placing a copper shield around the coil and grounding same (See fig. #4).

4. Battery Cables: May be corroded at the battery and are making imperfect contact. Keep all battery cables and wires away from the high tension system. It may also be of advantage to place a choke coil of about 50 turns of #16 wire in series with the main battery lead to the set.

5. Wires under Car: Where wires run along chassis or other metal parts below the car they should be inspected for quality of insulation and general condition. It may be well to place a condenser at the stop light switch and at the tail light.

6. Distributor: Points may be burned or improperly adjusted. Rotor arm may be making poor contact with cap.

7. Distributor Cables: Cables may be "leaking" due to poor or burned insulation. In some installations it may be necessary to shield the high tension leads with copper braid. If ignition cables are insulated with plain rubber insulation it is not advisable to place shielding directly over the wire. In this case the wire should be first covered with a varnished composition covering or loom. The battery lead from the ammeter to the distributor coil and the battery lead to the generator should be shielded. (See fig. #4)

8. Dome Light Wire: If dome light wire is radiating it may be necessary to shield this wire. A single .5 mfd. condenser or a double condenser and choke as shown in fig. #5 connected at the point where the dome light wire enters the upright post will clear up this trouble.

9. Bonding: Although metal joints on the car, such as dash panel to side of car etc., may appear to be solid they may not be making good electrical contact and are causing noise. Paint and other material may get into seams and cause poor or intermittant contacts and for this reason it may be necessary to bond certain parts of the car. The brake rods, drive shaft tubes and parts around the motor should be bonded.

SERVICE NOTES

INT. FREQ. ALIGNMENT — Intermediate frequency peaked at 175 K.C. Connect test oscillator to grid of 6A7 and ground. (Ground stator of oscillator condenser during this operation)

R.F. ALIGNMENT — Connect test oscillator to antenna and ground. Set dial to 1500 K.C. and align trimmer condensers on variable condensers for maximum signal. All other frequencies will automatically be aligned because of cut section oscillator condenser.

(Model 606 and Early Model 617 use a padding condenser)

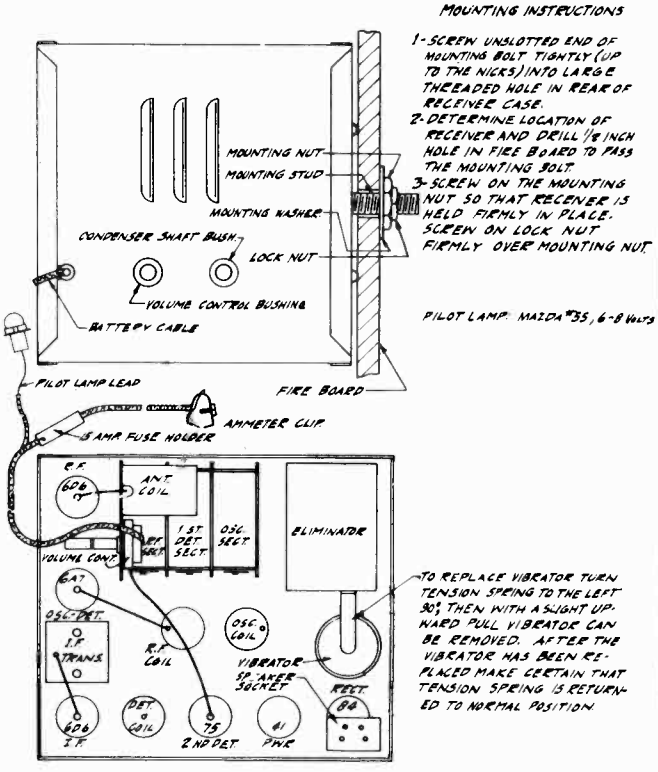


FIG. 1

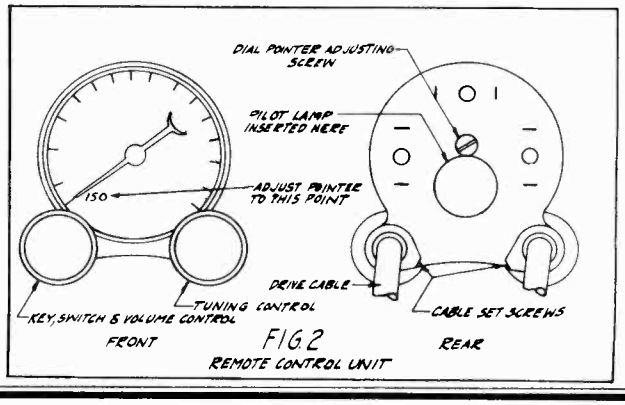
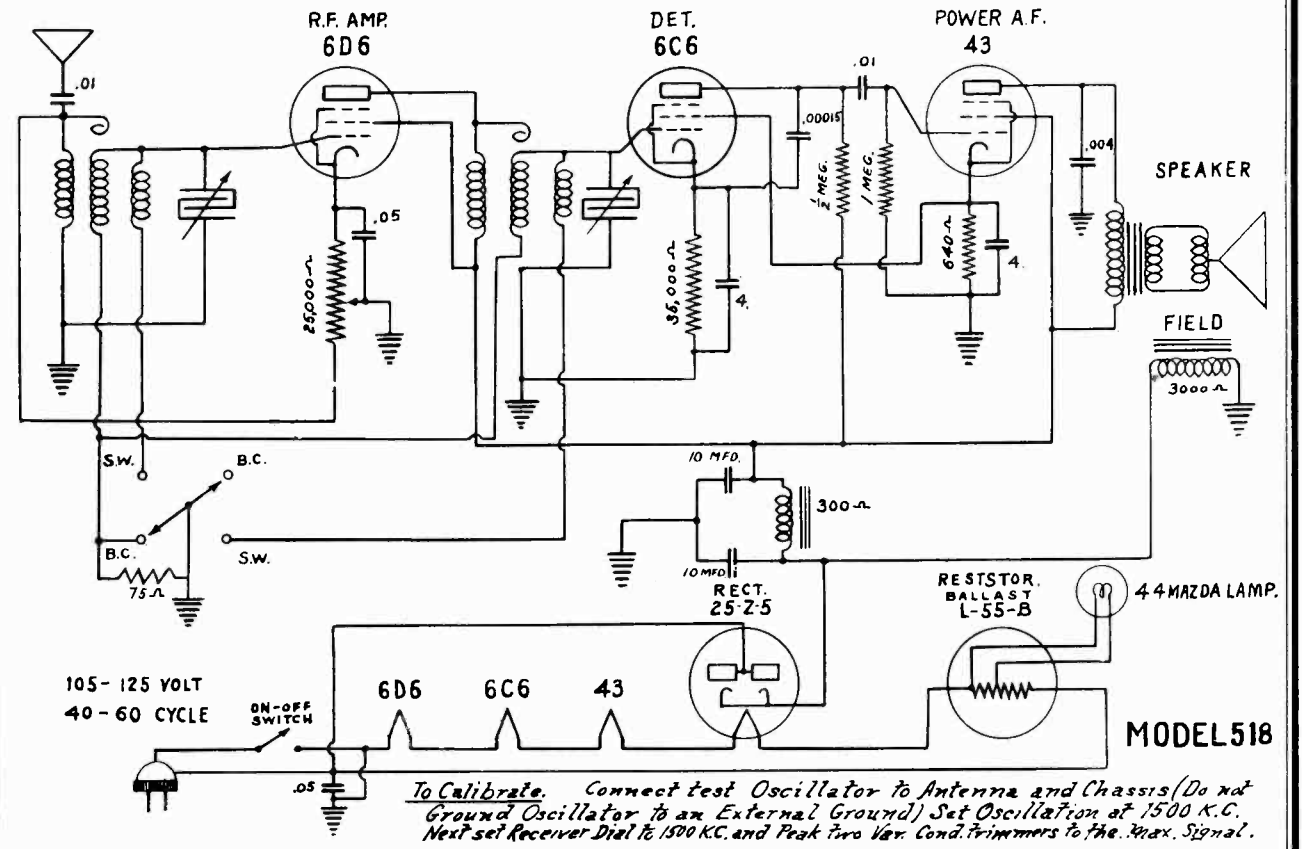


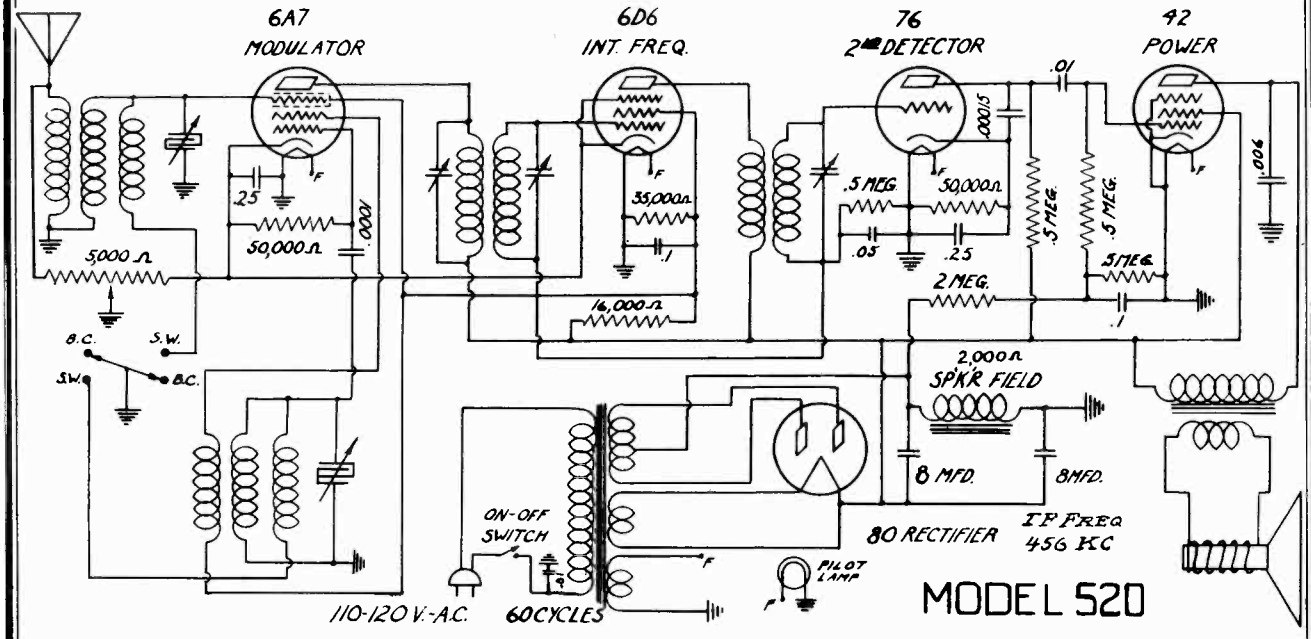
FIG. 2
REMOTE CONTROL UNIT

DEWALD RADIO

MODEL 518
MODEL 520
Schematics
Alignment



To Calibrate. Connect test Oscillator to Antenna and Chassis (Do not Ground Oscillator to an External Ground) Set Oscillation at 1500 K.C. Next set Receiver Dial to 1500 K.C. and Peak two Var. Cond. Trimmers to the Max. Signal.

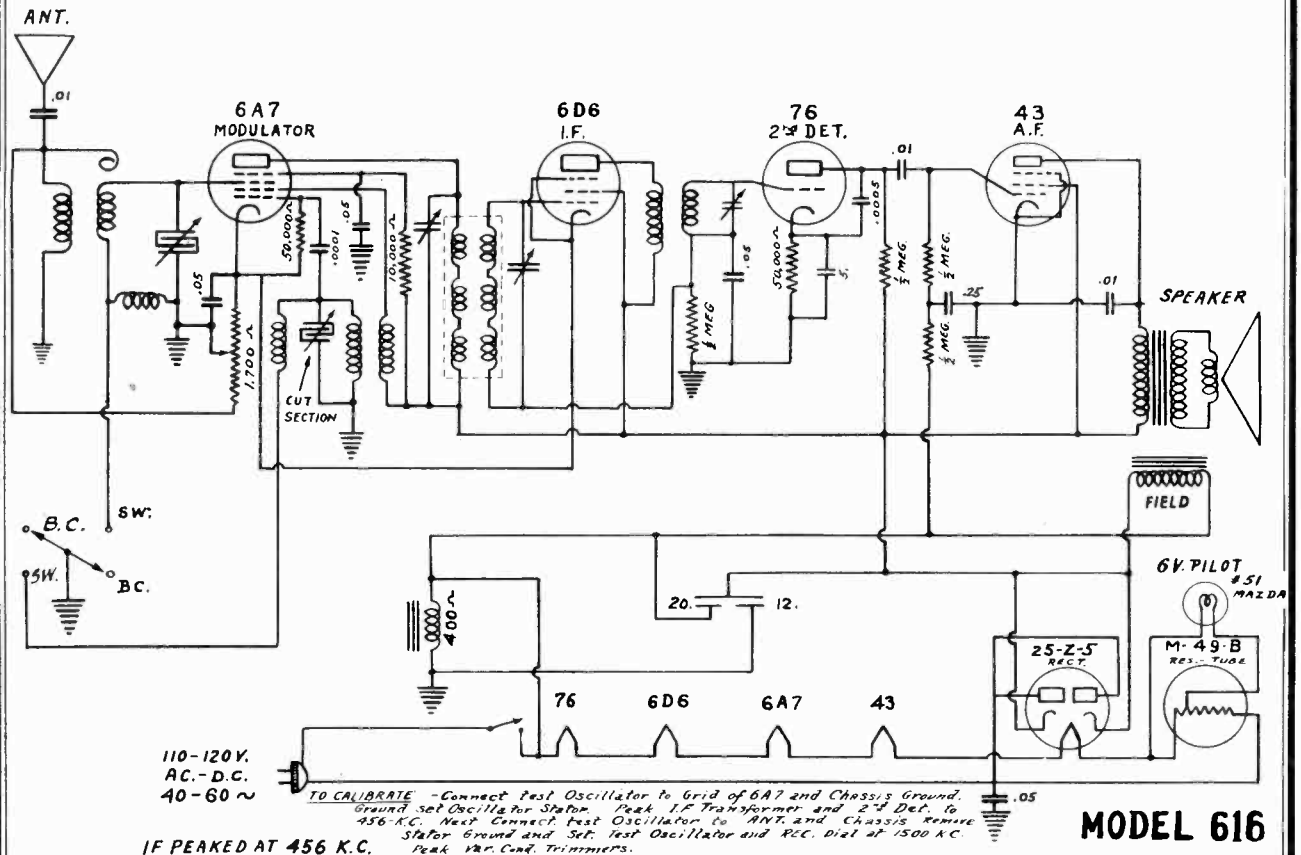


TO CALIBRATE- SET SERVICE OSCILLATOR TO 456 K.C. AND CONNECT 'HOT' LEAD TO GRID OF 6A7 TUBE GROUND STATOR OF REAR (OSCILLATOR) SECTION OF VARIABLE CONDENSER. TURN VOLUME CONTROL FOR MAXIMUM OUTPUT AND PEAK INTERMEDIATE FREQUENCY TRIMMERS FOR MAXIMUM GAIN

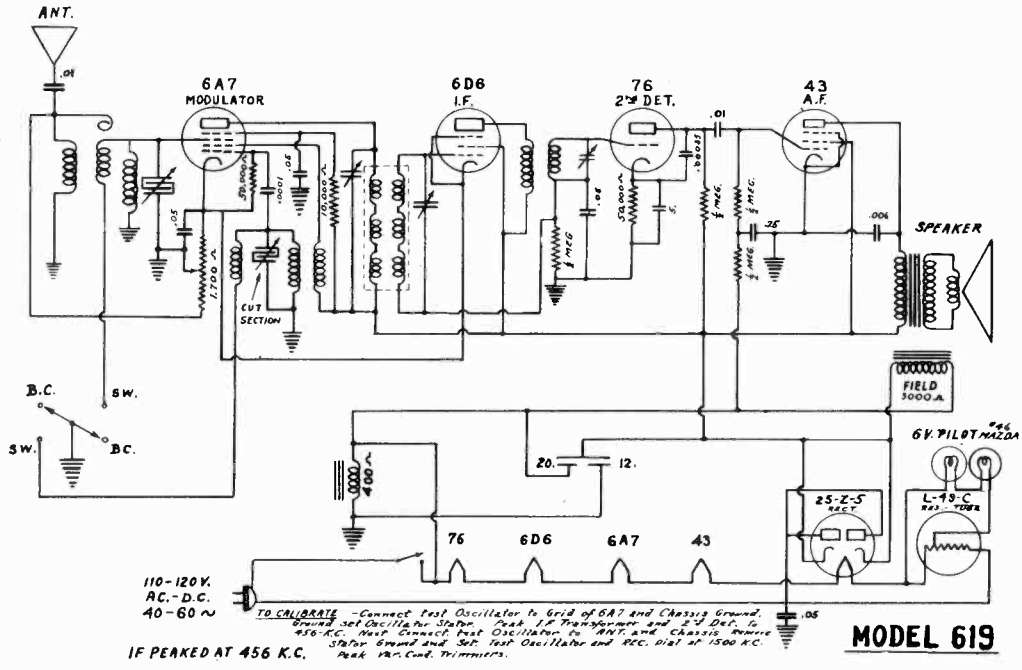
REMOVE SHORT FROM VARIABLE CONDENSER. REMOVE SERVICE OSCILLATOR LEAD FROM GRID OF 6A7 TUBE AND CONNECT SAME TO RED LEAD ON REAR OF SET. ADJUST SERVICE OSCILLATOR AND THE RECEIVER TO 1500 K.C. AND PEAK TRIMMERS ON VARIABLE CONDENSER FOR MAXIMUM GAIN. ALL THE OTHER FREQUENCIES ARE AUTOMATICALLY CALIBRATED WHEN RECEIVER IS PEAKED AT 1500 K.C. DUE TO THE CONSTRUCTION OF THE CUT SECTION OF VARIABLE CONDENSER.

MODEL 616
MODEL 619
Schematics
Alignment

DEWALD RADIO



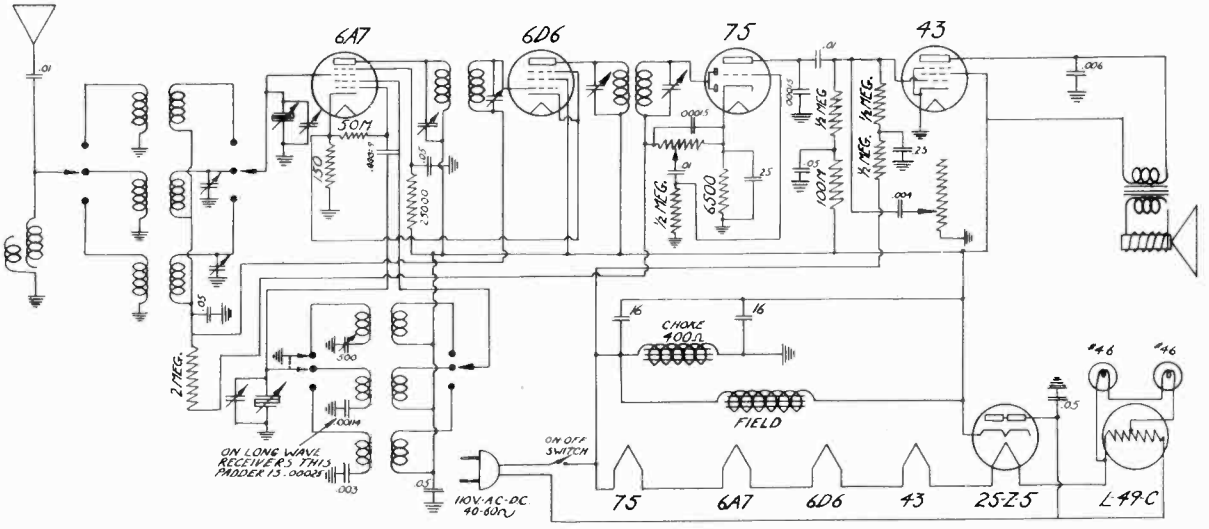
MODEL 616



MODEL 619

DEWALD RADIO

MODELS 618, 618LW
MODELS 620, 620LW
Schematics
Alignment



SERVICE NOTES

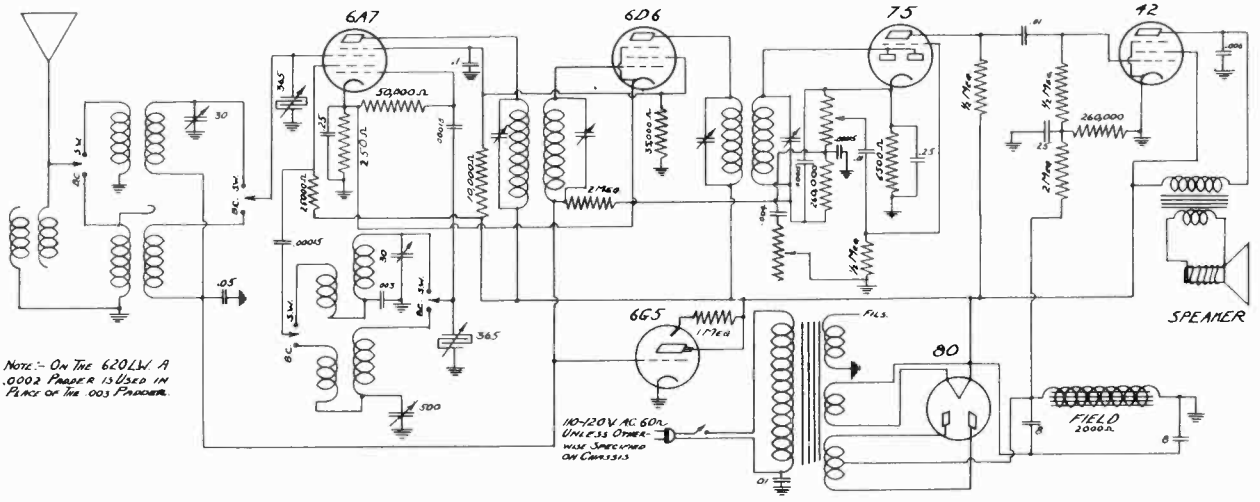
I.F. ALIGNMENT - Intermediate Frequency Peaked At 456 K.C. Connect Test Oscillator To Grid of 6A7 And Chassis. Short Circuit Stator of Front Section of Variable Condenser During This Operation. Then Peak I.F. Trimmers For Maximum Signal.

R.F. ALIGNMENT - Remove Short From Stator of Variable Condenser. Turn Wave Band Switch To Broadcast. Connect Test Oscillator To Antenna And Chassis. Set Test Oscillator And Radio Dial To 1500 K.C. And Peak Var. Cond. Trimmers For Maximum Signal. Set Test Oscil. At 600 K.C. And Adjust Padder Condenser in Front of Chassis For Max. Signal. During This Operation The Var. Cond. Must Be Rocked Reading 1500 K.C.

POLICE BAND ALIGNMENT - Turn Wave Band Switch To Police Band Set Test Osc. And Radio Dial To 4000 K.C. And Peak 2 Trimmers Near Front Of Chassis For Max. Sig. The Low Freq. Setting Is Automatically Adjusted By A Fixed Calibrated Padder. If Receiver Has Long Waves Instead of Police Band Calibrate Same Trimming Cond. As on Police Band But Set Oscillator And Receiver At 300 K.C. For Alignment.

SHORT WAVE ALIGNMENT - Turn W.B. Switch To Short Wave. Set Test Osc. And Radio Dial To 15 Megacycles And Peak Trimmers Near Center Of Chassis For Max. Sig. Low Freq. Setting Is Automatically Taken Care Of By Short Wave Coils Which Are Carefully Matched For This Setting By A Fixed Calibrated Padder.

MODEL - 618



SERVICE NOTES

I.F. ALIGNMENT - Intermediate Frequency Peaked At 456 K.C. Connect Test Osc. To Grid of 6A7 And Chassis. Short Circuit Stator of Front Section of Var. Cond. During This Operation. Then Peak I.F. Trimmers For Maximum Signal.

R.F. ALIGNMENT - Remove Short From Stator of Var. Cond. Turn Wave Band Switch To Broadcast. Connect Test Osc. To Antenna And Chassis. Set Test Oscil. And Radio Dial To 1500 K.C. And Peak Var. Cond. Trimmers For Max. Signal. Set Test Oscil. At 600 K.C. And Adjust Padder Cond. on Top of Chassis For Max. Signal. During This Operation The Var. Cond. Must Be Rocked Readjust 1500 K.C.

SHORT WAVE ALIGNMENT - Turn W. B. Switch To Short Wave Set Test Oscil. And Radio Dial To 15 Megacycles And Peak Trimmers Near Center of Chassis For Max. Signal. Low Frequency Setting Is Automatically Taken Care of By Short Wave Coils Which Are Carefully Matched For This Setting By A Fixed Calibrated Padder.

L.W. ALIGNMENT - Turn W.B. Switch To L.W. Set Osc. And Radio at 300 KC And Peak The L.W. Trimmers Then Set Osc. And Radio To 175 KC And Adjust Padder Cond. Recheck 300 K.C.

MODEL 620 620-L.W.

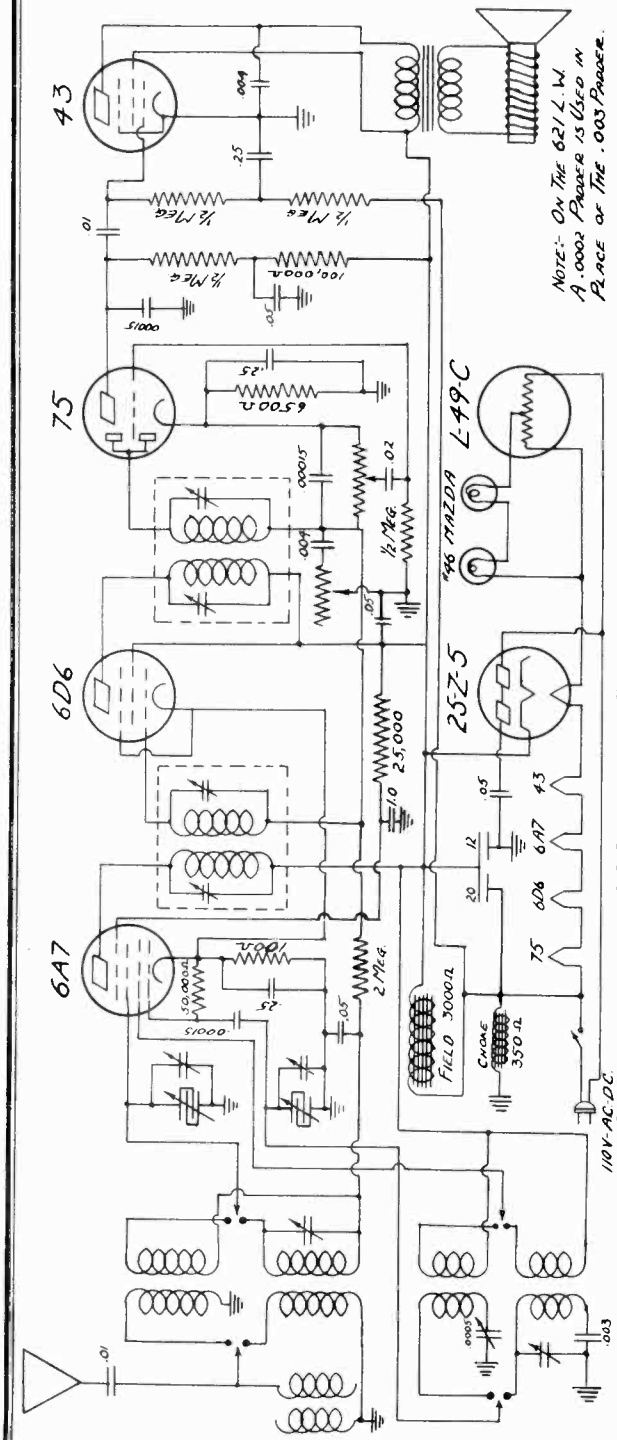
PART # 7207

MODELS 621, 621LW
Schematic
Alignment, Notes

DEWALD RADIO

SHORT WAVE TUNING

In tuning stations on the short waves, great care must be exercised in tuning as the receiver acts very selectively. A station may be tuned in and out within a fraction of a degree on the dial and for this reason it is necessary that the receiver be tuned carefully. An example of the care required may be obtained when one considers that in one dial division there may be as many as five stations.



These receivers are six tube dual wave superheterodyne with full automatic volume control on both wave bands. They are designed to operate on 110-120 volts 40-60 cycles alternating current or direct current, unless otherwise specified on rear of chassis.

RANGES:

The Model 621 has the following ranges:
550-1700 K.C. (550-178 meters) and
17 - 55 M.C. (18-55 meters)
The Model 621 L.W. has the following ranges:
550-1700 K.C. (550-178 meters and 140-350 K.C.)

ANTENNA

An Antenna of 50 to 100 feet should be connected to the red lead extending from rear of chassis. The antenna should be kept as far away as possible from obstructions, such as electric power lines, telephone lines, or other antenna. For best results it is necessary to have a secure ground connection made to a water or other grounded pipe.

BROADCAST OPERATION

Turn the radio on by rotating the left hand knob toward the right. The volume of the radio is adjusted by this same knob. Turn the lower center knob to the right and tune the receiver by manipulating the top knob and making use of the outer figures on the dial scale.

SHORT WAVE OPERATION

Turn the lower center knob to the left. On this band, the center figures on the dial scale should be noticed. Due to the sharpness of tuning on short wave it is necessary to tune slowly and have the volume control turned on "full" to avoid passing over stations.

LONG WAVE RECEPTION

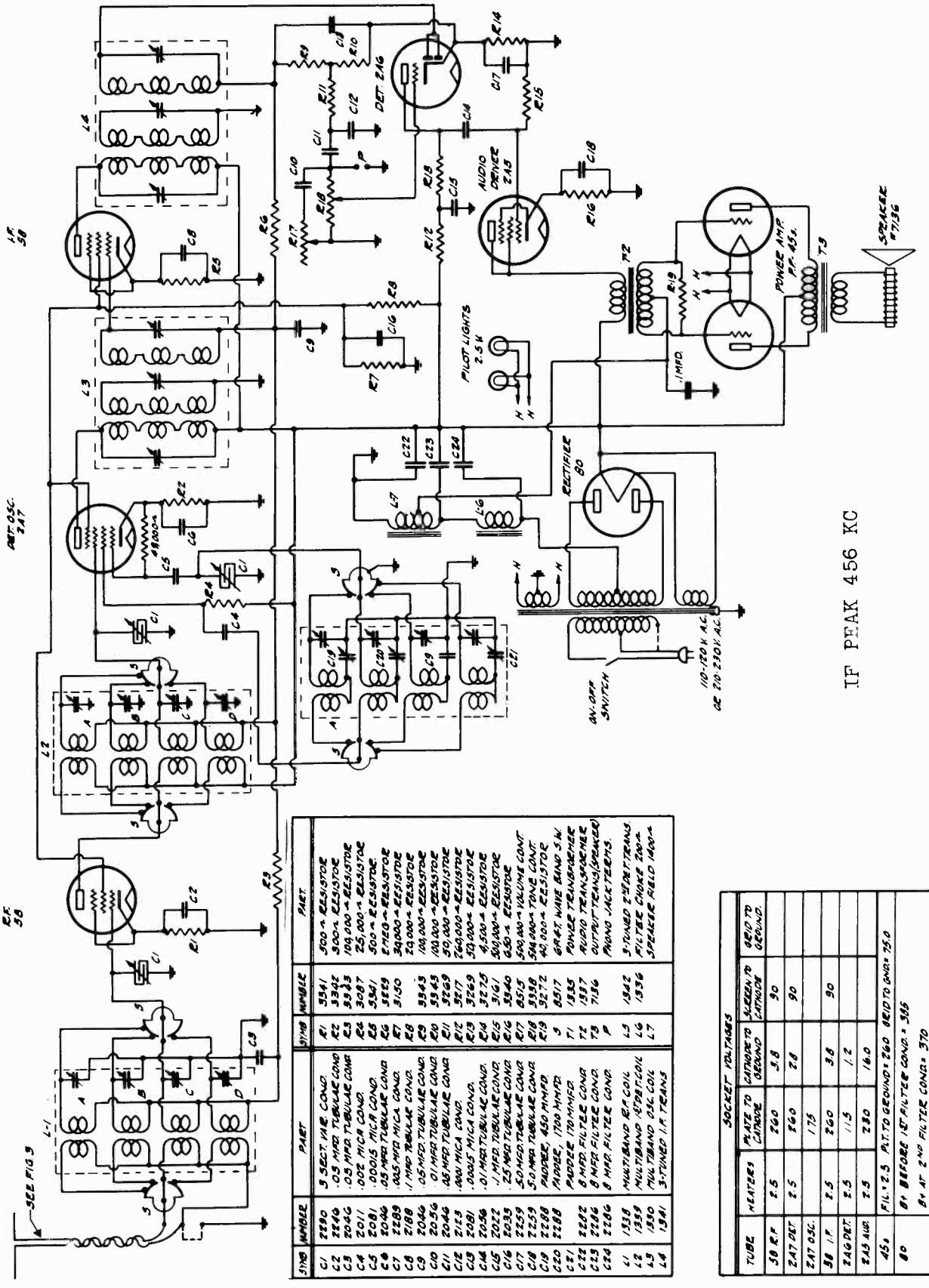
The 621 L.W. has Long Wave in place of Short Wave band. Follow the same instructions as for Short Wave reception but use inner row of Figures.

TONE CONTROL

The tone control is the knob to the right. Various degrees of tone can be obtained by merely adjusting this control.

DEWALD RADIO

MODELS 804,804S
806A,806C
Schematic,Parts
Voltage



SYM	NUMBER	PART
C1	2190	3 SECT. VAR. COND.
C2	2240	.05 MFD. TUBULAR COND
C3	2046	.05 MFD. TUBULAR COND
C4	2011	.002 MICA COND.
C5	2081	.0005 MICA COND.
C6	2046	.05 MFD. TUBULAR COND.
C7	2289	.005 MFD MICA COND.
C8	2188	.1 MFD TUBULAR COND.
C9	2046	.05 MFD. TUBULAR COND.
C10	2036	.01 MFD. TUBULAR COND.
C11	2046	.05 MFD. TUBULAR COND.
C12	2113	.006 MICA COND.
C13	2081	.0005 MICA COND.
C14	2056	.01 MFD. TUBULAR COND.
C15	2022	.1 MFD. TUBULAR COND.
C16	2033	.25 MFD. TUBULAR COND.
C17	2259	.50 MFD. TUBULAR COND.
C18	2259	5.0 MFD. TUBULAR COND.
C19	2288	PADDER, 450 MMFD.
C20	2288	PADDER, 1700 MMFD.
C21		PADDER 170 MMFD.
C22	2242	8 MFD. FILTER COND.
C23	2242	8 MFD. FILTER COND.
C24	2246	8 MFD. FILTER COND.
L1	1335	MULTIBAND R.F. COIL
L2	1355	MULTIBAND DET. COIL
L3	1350	MULTIBAND OSC. COIL
L4	1341	3-TUNED I.F. TRANS.

SYM	NUMBER	PART
R1	3541	300 Ω RESISTOR
R2	3342	9300 Ω RESISTOR
R3	3333	100,000 Ω RESISTOR
R4	3287	25,000 Ω RESISTOR
R5	3341	500 Ω RESISTOR
R6	3329	1120 Ω RESISTOR
R7	3130	34000 Ω RESISTOR
R8		20,000 Ω RESISTOR
R9	3343	100,000 Ω RESISTOR
R10	3343	100,000 Ω RESISTOR
R11	3269	50,000 Ω RESISTOR
R12	3277	250,000 Ω RESISTOR
R13	3269	50,000 Ω RESISTOR
R14	3275	4,500 Ω RESISTOR
R15	3161	350,000 Ω RESISTOR
R16	3340	650 Ω RESISTOR
R17	3515	500,000 Ω VOLUME CONT.
R18	3338	500,000 Ω TONE CONT.
R19	3272	40,000 Ω RESISTOR
S	3517	GR&T WAVE BAND S.W.
T1	1335	POWER TRANSFORMER
T2	1337	AUDIO TRANSFORMER
T3	7136	OUTPUT TRANS.(SPEAKER)
P		PHONO JACKETTES.
L5	1342	3-TUNED I.F. TRANS.
L6	1336	FILTER CHOKE 200Ω
L7		SPEAKER FIELD 1400Ω

SOCKET VOLTAGES					
TUBE	HEATERS	PLATE TO CATHODE	CATHODE TO GROUND	SCREEN TO CATHODE	GRID TO GROUND
58 R.F.	2.5	260	5.8	90	
2A7 DET.	2.5	260	2.8	90	
2A7 OSC.		175			
58 I.F.	2.5	260	3.8	90	
2A6 DET.	2.5	115	1.2		
2A5 AUD.	2.5	230	16.0		
45's	FIL. 2.5	PLT. TO GROUND = 260		GRID TO GROUND = 75.0	
80	#1 BEFORE 1ST FILTER COND. = 385 #2 AT 2ND FILTER COND. = 370 #3 AT OUTPUT OF FILTER 260				

MODELS 804, 804S 805A, 805C Alignment, Socket Trimmers, Data

The Models 804 and 805 are all wave superheterodyne receivers designed to operate on 110-120 or 210-230 volts, alternating current, 50-60 cycles only. The primary tap on top of the power transformer must be connected properly for the voltage to be used.

Before plugging into the power line, make sure that the line voltage and current frequency agree with the above. If doubt exists regarding the exact power line conditions, consult your local power Company.

Check the tubes to be certain that they are securely pushed into their respective sockets, and that the grid clips on top of the tubes are firmly in place. Also check the speaker plug to see that it is securely pushed into its socket at the rear of the Chassis.

TUBES 2-58s, 1-2A7, 1-2A6, 1-2A5, 2-45s, 1-80

INSTALLATION This receiver is arranged for a "Doublet" Antenna system, or an ordinary single wire system. For connections of either type see Fig. #3a & 3B. A good Antenna is essential for the correct operation of this receiver, especially where distant reception is expected. The flat top portion of the Antenna should be placed as high as possible above the ground and surrounding objects. No. 14 solid or stranded wire may be used for the flat top portion and well insulated semi-flexible wire for the lead-in section. The Antenna should be equipped with good insulators wherever they are required. Material such as pyrex, glass, Bakelite, and high grade porcelain are well suited for radio installations. The lead-in wire should be kept away from all nearby wires and should be run at right angles to power or trolley lines wherever possible. It should be brought into the house at the nearest point convenient to the receiver in order to avoid picking up noise from home electrical devices. The ground wire should be as short as possible and must be a good connection to water or other grounded pipe.

BAND SWITCH This switch is located on the left side of front panel and its position is indicated by the letters engraved into the knob. (A-B-C-D)

BAND "A" Standard Domestic Broadcast band. Frequency range from 540 to 1800 K.C.

BAND "B" Intermediate Short wave Band. Broadcast Frequency range from 1600 K.C. to 5500 K.C. Services operating on this band are: Police, Aeroplane, Television, and Amateur. Reception on this band is reliable for moderate distances during both day and night, but for distances greater then 1000 miles the area must be in darkness.

BAND "C" Short Wave Band. Frequency range 5.4 to 18 megacycles. Services operating on this band include: Domestic and Foreign Short wave Broadcasting, Aeroplane, Amateur, Commercial Code and Telephone, and Experimental. Stations in the vicinity of 18 to 12 Megacycles are best received when the distance between transmitter and receiver is greater than 1500 miles and the area between is in Daylight. This same holds true for stations about 10 to 12 Megacycles except that signals are often heard in the early hours of darkness. Stations operating on frequencies between 10 and 7 megacycles offer reliable reception both day and night, especially when the distance is greater then 700 miles. Reliable reception on frequencies below 7 megacycles, when the distance exceeds 1500 miles, may be expected when the area between receiver and transmitter is in darkness.

BAND "D" Long wave Band. Frequency range 140 K.C. to 400 K. C. (Model 805 only) This band includes the European long wave Broadcast band, (Heard in Europe only) Domestic Aviation Beacons, weather Reports and Commercial Code.

BAND SPREAD DIAL This receiver is provided with a dual station selector drive, to permit micrometer tuning which is especially valuable on the short waves where band spreading or its equivalent, high ratio tuning, becomes necessary for easy and rapid registering of foreign programs.
The large knob of the main selector drive is the low ratio control with a normal ratio of 24 to 1 in 3600. The small knob on the same shaft controls the high ratio control with a tuning ratio of 125 to 1 in 3600. Bands "A" and "B" are calibrated in kilocycles and Band "C" in megacycles. The Small Band Spread Indicator may be used to make fine adjustments not obtainable from the larger scale.

PHONOGRAPH PICKUP It is also possible to use this receiver with an electric phono pickup attachment for the reproduction of disc. recordings. For this purpose, a Phono Jack is located at the rear of the Chassis. The volume Control will control the strength of signals for phonograph reproduction (any high impedance pickup of high quality may be used with this receiver.)

SERVICE NOTES

REALIGNMENT The procedure outlined below should be followed should the receiver require realignment. For location aligning trimmers and padders, see Fig. 2.

I. F. ALIGNMENT To align the Intermediate Frequency stages, first place the wave Band Switch in Pos. "A" and Short Circuit the Oscillator Section of the Variable Condenser. Set the test Oscillator to 456 K.C. and connect its output through A .00025 MFD fixed Condenser to the grid cap of the 2A7 Tube and chassis ground. Adjust the six I. F. Compensators (Three on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least possible input to the receiver to prevent broadening of the resonance peaks.)

BAND "A" (BROADCAST) ALIGNMENT After the Intermediate Frequency stages have been completely aligned, connect external test oscillator to the Antenna and Ground binding posts of the set. See Fig. 3-A. Set the band switch to "A" position. Set test Oscillator to 1500 K.C. and adjust the three band A Compensators for maximum gain. Next, set dial at 600 K.C. and adjust Band "A" Paddler for maximum signal, rocking Variable Condenser at the same time. Now repeat repeaking operation at 1500 K. C.

BAND "B" ALIGNMENT Turn wave Band Switch to "B" Position and set Variable Condenser to 5000 K. C. Adjust test oscillator to this frequency and adjust 3 Band "B" Trimmers for maximum gain. Next set dial at 1900 K. C. and adjust band "B" Paddler for maximum signal. Now repeat repeaking operation at 5000 K. C.

BAND "C" (SHORT WAVE) ALIGNMENT Turn wave Band Switch to "C" position and set Variable Condenser to 16 megacycles. Adjust test oscillator to this frequency and adjust three band "C" Trimmers.

BAND "D" (LONG WAVE) ALIGNMENT Turn wave Band Switch to "D" position and align Trimmers on long wave coils at 375 K.C. Adjust Band "D" Padder at 160 K. C.

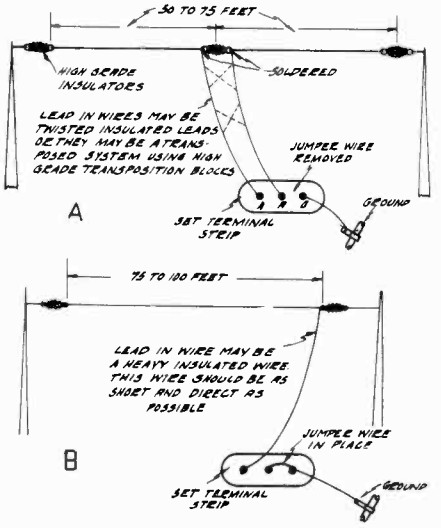


FIG. 3

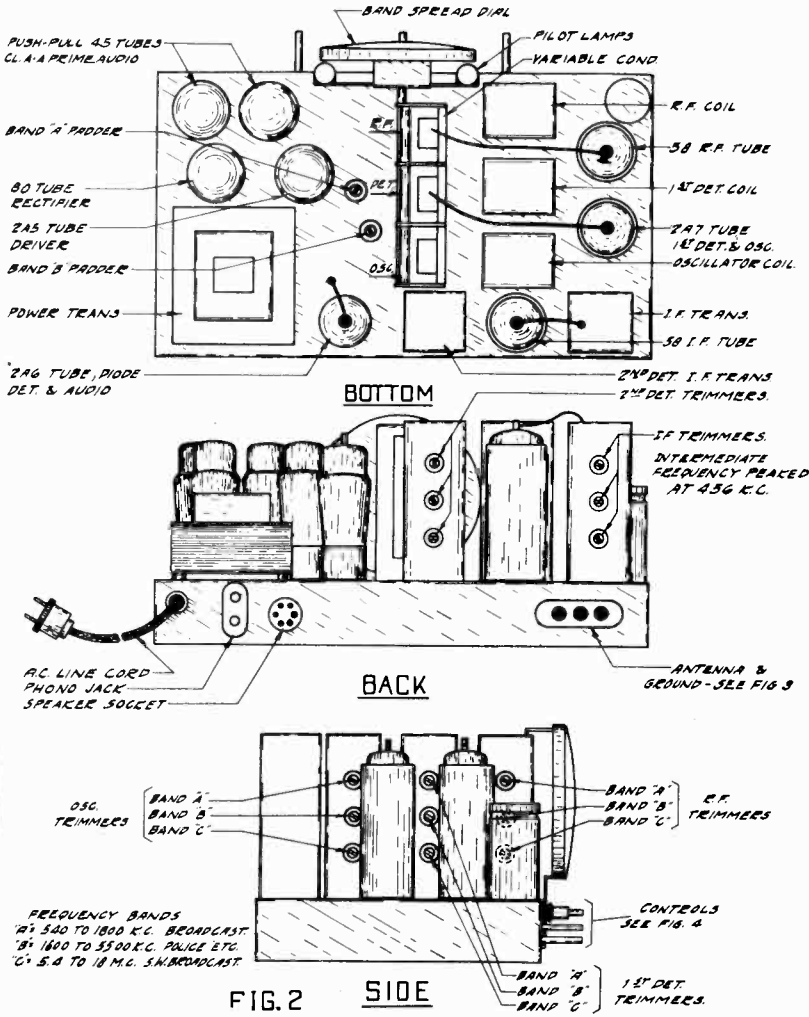


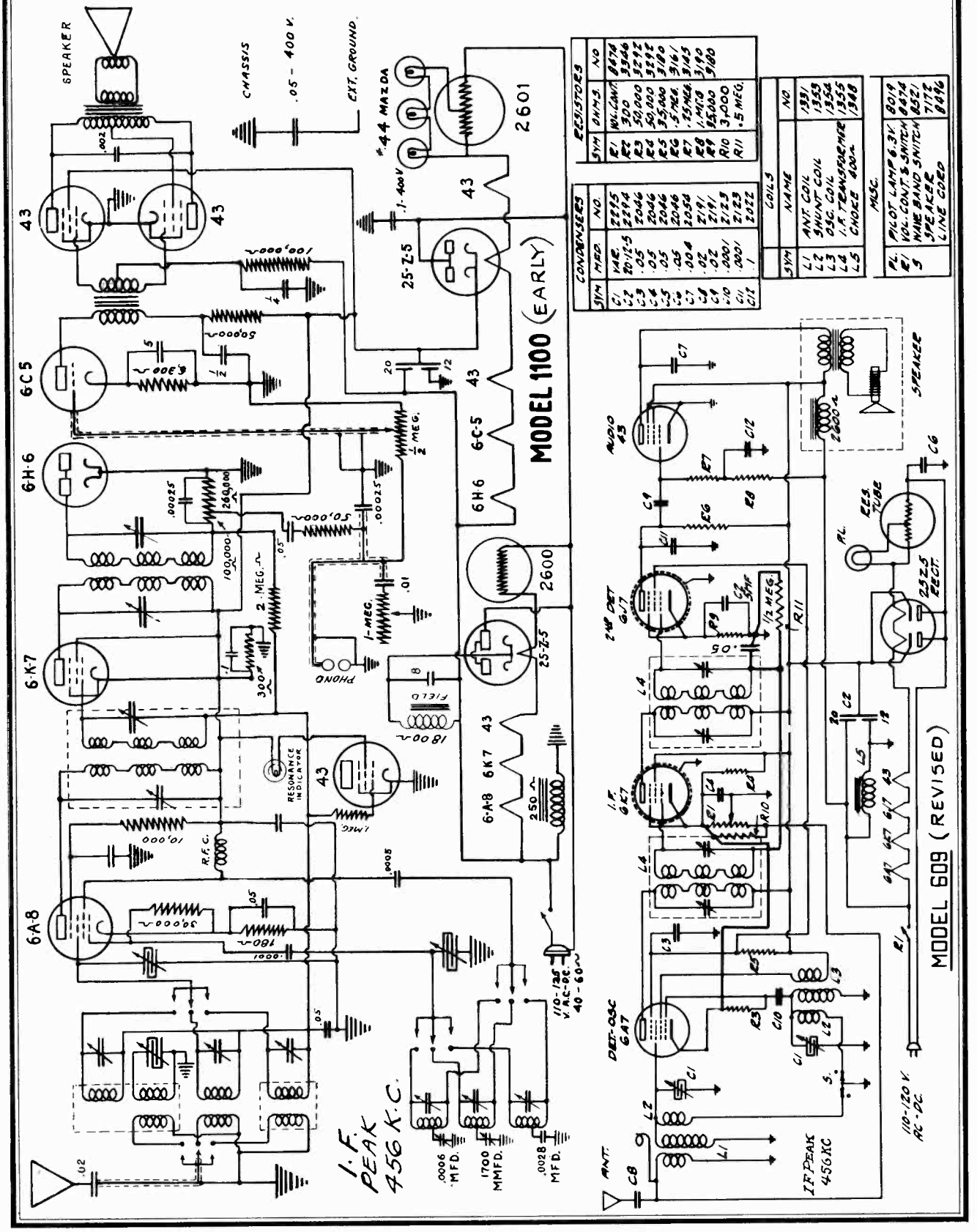
FIG. 2

TONE CONTROL The Tone Control Knob is located directly below the main Tuning Knob. By adjusting this knob the user may select any tone shading desired from mellow to brilliant. The Tone Control may also be used to reduce background noise on signals that are accompanied by excessive disturbances such as static and local electrical noise.

VOLUME CONTROL AND ON-OFF SWITCH To place receiver in operation turn the "Volume Control Knob" to the right. To increase volume rotate to the right; to decrease rotate to the left. The receiver is also equipped with an automatic volume control feature which tends to maintain all reception at a constant level, thereby reducing fading effects and blasting of strong signals.

DEWALD RADIO

MODEL 609, Late
MODEL 1100, Early
Schematics



CONDENSERS		
SYM	MFD.	NO.
C1	MAT.	2215
C2	10-15-5	2214
C3	.05	2046
C4	.05	2046
C5	.05	2046
C6	.004	2058
C7	.02	2191
C8	.02	2191
C10	.0001	2123
C11	.0001	2123
C12	1	2022

RESISTORS		
SYM	OHMS	NO
R1	VOLUME	8474
R2	300	3546
R3	50,000	3212
R4	50,000	3212
R5	35,000	3180
R6	.5 MEG.	3161
R7	.15 MEG.	3145
R8	1 MEG.	3170
R9	15,000	3180
R10	3,000	
R11	.5 MEG.	

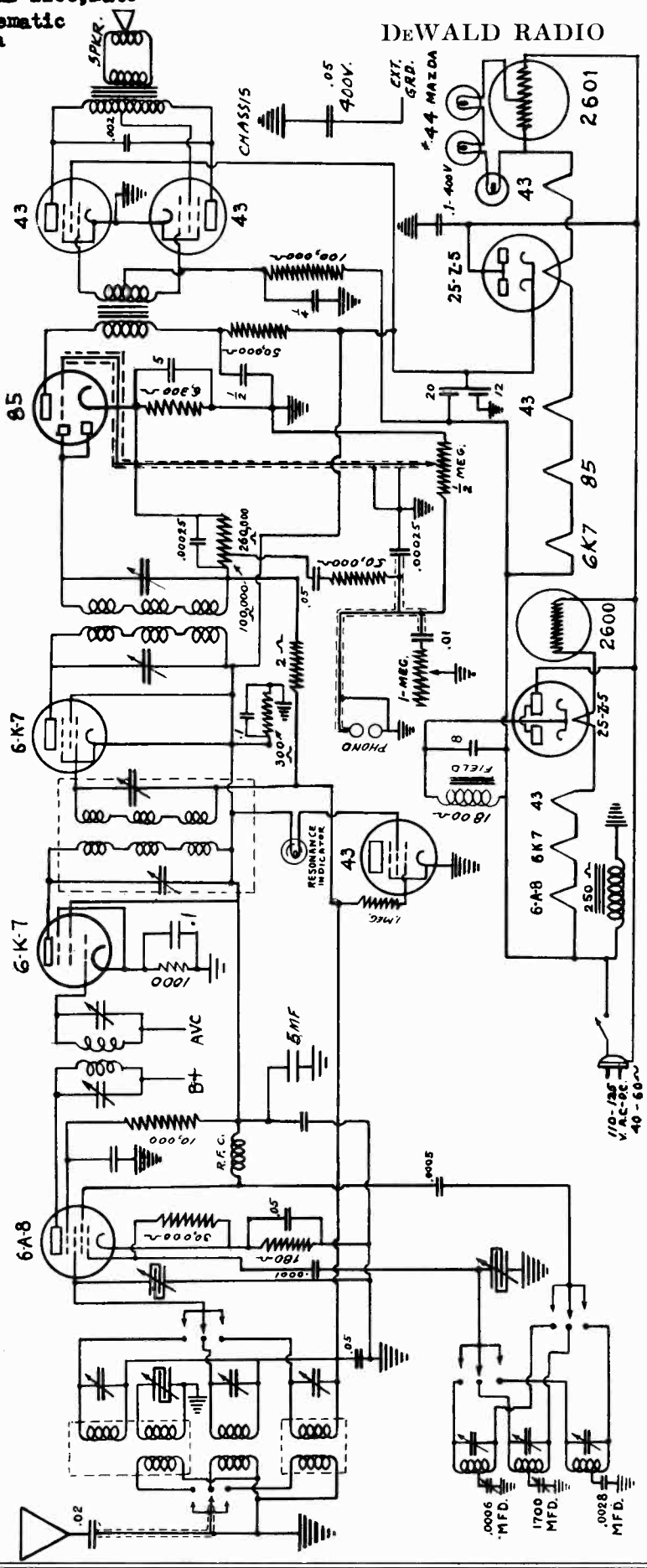
COILS		
SYM	NAME	NO.
L1	ANT. COIL	1351
L2	SHUNT COIL	1353
L3	OSC. COIL	1354
L4	I.F. TRANSFORMER	1355
L5	CHOKE 400 A.	1348

MISC.		
PL.	PILOT LAMP 6.3V.	8019
R1	VOL. CONT. & SWITCH	8474
S	WAVE BAND SWITCH	8521
	SPEAKER	7172
	LINE CORD	8496

MODEL 1100, Late

Schematic Data

DEWALD RADIO



ANTENNA AND GROUND CONNECTIONS An Antenna from 50 to 100 feet long should be connected to the post in rear of chassis. It should be as far as possible from obstructions, such as electric light, telephone lines, or other buildings. For quiet and stable service it is necessary to have a secure ground connection made to a water pipe or radiator with a good ground clamp. Connect ground to black wire in rear of chassis.

GREEN BROADCASTING OPERATION To receive stations on the broadcasting band, turn wave band-switch knob (located on the lower left side of front panel) to the right (Green position) hand position. Turn set on by rotating combination switch and volume control knob on the lower right hand side of control panel to the right. Tune in the desired station which may be located on the top dial scale (green figures) and adjust volume control for desired volume.

WHITE SHORT WAVE OPERATION For reception of stations on the short wave band, (5.5 to 16.8 megacycles) turn wave band switch to the left, (White position), and tune carefully noting the white scale. Due to the sharpness of the tuning on the short wave it is usually necessary to turn up the volume control in order to avoid passing over stations.

WHITE SHORT WAVE TUNING NOTE In tuning stations on the short wave, great care must be exercised in tuning as the receiver acts very selectively. A station may be tuned in and out within a fraction of a degree on the dial and for this reason it is necessary that the receiver be tuned carefully. An example of the care required may be obtained when one considers that in one dial division there may be as many as five stations.

RED BAND OPERATION This band covers the frequency range between 1600 to 4600 K.C., in the Model 1100, or 180 to 410 K.C. in the Model 1100 LW. When tuning on these ranges, the wave band switch is in the center position and the red scale is in use.

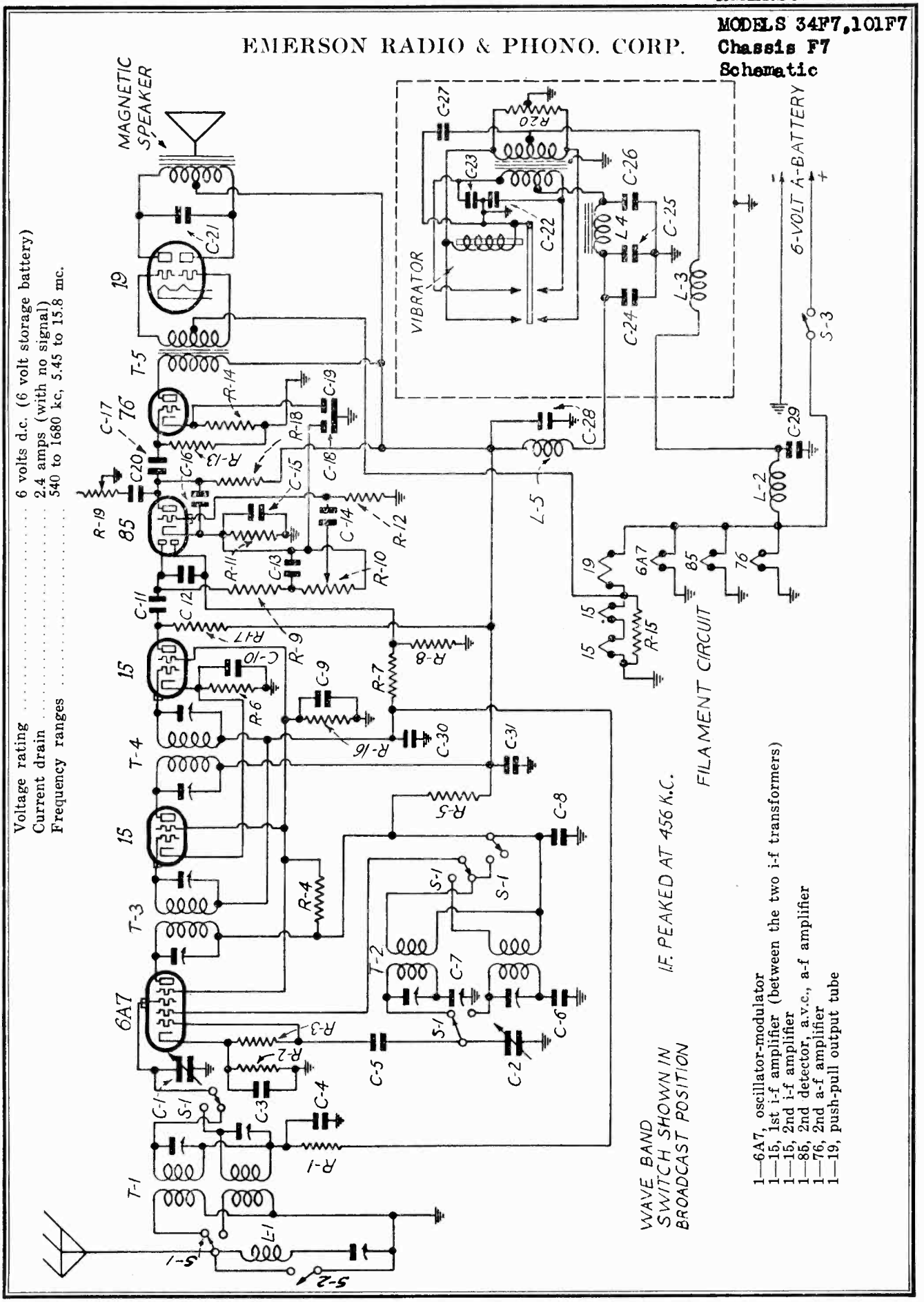
RESONANCE INDICATOR Green spot in the lower right hand side of dial is the Resonance Indicator. When tuning receiver watch this spot until the glow is at a minimum. At this point the receiver is tuned exactly on the station desired.

TONE CONTROL The Tone Control Knob is located in the upper left hand side of the receiver. By adjusting this knob the user may select any tone shading desired from mellow to brilliant. The Tone Control may also be used to reduce background noise on signals that are accompanied by excessive disturbances such as static and local electrical noise.

PHONOGRAPH PICKUP It is also possible to use this receiver with an electric Phono pickup attachment for the reproduction of disc recordings. For this purpose, a Phono Jack is located at the rear of the chassis. The Tone Control will control the strength of signals for phonograph reproduction (any high impedance pickup of high quality may be used with this receiver.)

EMERSON RADIO & PHONO. CORP.

MODELS 34F7,101F7
Chassis F7
Schematic



Voltage rating ..... 6 volts d.c. (6 volt storage battery)
Current drain ..... 2.4 amps (with no signal)
Frequency ranges ..... 540 to 1680 kc, 5.45 to 15.8 mc.

1—6A7, oscillator-modulator
1—15, 1st i-f amplifier (between the two i-f transformers)
1—15, 2nd i-f amplifier
1—85, 2nd detector, a.v.c., a-f amplifier
1—76, 2nd a-f amplifier
1—19, push-pull output tube

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 15,000 kc is required.

In aligning the broadcast coils use, as a dummy antenna, a .0002 condenser in series with the test oscillator antenna lead. In aligning the short-wave coils a non-inductive 400 ohm resistor should be used as a dummy antenna.

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

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f is the one closer to the front.

The broadcast and short-wave antenna coils are wound on one form and mounted vertically on top of the chassis deck, directly in front of the first i-f transformer. The trimmers for these two coils are mounted on a strip which is attached to the coil tubing. The lower trimmer is for the short-wave antenna coil and the upper trimmer is for the broadcast antenna coil.

The broadcast and short-wave oscillator coils are wound on one form and mounted with the trimmer assembly against the inside of the right-hand chassis wall. The trimmer screws are accessible through two holes in the chassis. The trimmer closer to the front is for the short-wave oscillator coil. The trimmer closer to the rear is for the broadcast oscillator coil.

The adjustable 456 kc wave trap is also mounted on the inside of the right-hand chassis wall. The trimmer for this wave trap is accessible through a hole in the rear wall of the chassis.

The broadcast series padder is mounted on the inside of the front chassis wall with the adjusting screw accessible through a hole in the chassis. There is no adjustable padder for the short-wave band.

I-f and Wave-trap Alignment

Rotate the wave-band switch (extreme right-hand control) to the broadcast position, clockwise. Rotate the variable condenser to the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers (at the tops of the cans) for maximum response. Feed 456 kc through the antenna and adjust the wave trap (through hole in rear of chassis) for *minimum response.*

Broadcast Alignment

With the wave-band switch in the broadcast position, set the dial pointer to 600, feed 600 kc to the antenna through a dummy antenna and adjust the broadcast series padder (on front wall) for maximum response. Move the pointer to 1600, feed 1600 kc to the antenna and adjust the broadcast oscillator trimmer (on right wall, closer to rear) for maximum response and then adjust the broadcast antenna trimmer (top trimmer on antenna coil) for maximum response. Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate condenser shaft back and forth through small arc) for maximum response. Return to 1600 kc again and check the alignment.

Short-wave Alignment

Rotate the wave-band switch to the short-wave position, counter-clockwise. Set the dial pointer a little below 15 and feed 15,000 kc to the antenna, using a 400 ohm dummy antenna. Adjust the short-wave oscillator trimmer (closer to front on right wall) for maximum response, choosing the *minimum capacity* peak, and then adjust the short-wave antenna trimmer (lower trimmer on antenna coil) for maximum response, choosing the *maximum capacity* peak. (See General Instructions below.)

GENERAL INSTRUCTIONS

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

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

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

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 you adjust the trimmers.

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

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 battery voltage for these readings was 6.1 volts.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	95	63	3.0	95	6
15	157	63	1.8	—	2
15	114	63	1.8	—	2
85	53	—	5.5	—	6
76	150	—	5.7	—	6
19	153	—	—	—	2

Voltage from each control grid of the 19 tube to ground—4 volts.

With an input of 6.0 volts and 1.6 amperes the output of the power pack should be approximately 140 volts at .040 amperes.

GENERAL NOTES

The large, oblong metal box on the top of the chassis deck contains the power pack. The function of this power pack is to convert the 6 volt direct current from the storage battery into 140 volt direct current. The vibrator used is of the synchronous type.

REPLACEMENT PARTS

*Item No.	Part No.	DESCRIPTION	List Price Ea. Effective as of Sept. 1st, 1935 PRICE
L1	MMT-149	Adjustable 456 kc wave trap	$ .35
L2	OOT-167	R-f "A" choke	.20
L3	2KT-240	R-f "A" choke	.45
L4	2KT-239	Iron-core filter choke—500 ohms	.80
L5	OOT-166A	R-f "B" choke (1 millihenry)	.30
T1	2KT-234	Two-band antenna coil	1.30
T2	2KT-235	Two-band oscillator coil	1.20
T3	2KT-236	456 kc first i-f transformer	1.15
T4	2KT-237	456 kc second i-f transformer	1.15
T5	2KT-232	Audio transformer	1.00
T6	2KT-238	Power transformer	2.75
R1, R18	KR-55	250,000 ohm ½ watt carbon resistor	.16
R2	FFR-133	650 ohm ½ watt wire-wound resistor	.16
R3	KR-53	50,000 ohm ½ watt carbon resistor	.16
R4, R5	LR-65	10,000 ohm ½ watt carbon resistor	.16
R6	FFR-126	500 ohm ½ watt wire-wound resistor	.16
R7, R12	KR-57	1 megohm ½ watt carbon resistor	.16
R8	KR-56	500,000 ohm ½ watt carbon resistor	.16
R9, R13	KR-54	100,000 ohm ½ watt carbon resistor	.16
R10, S3	2KR-209	Volume control with line switch—0.5 megohms	.80
R11	LR-60	20,000 ohm ½ watt carbon resistor	.16
R14	PR-79	1,000 ohm ½ watt carbon resistor	.16
R15	LLR-147	100 ohm ½ watt wire-wound resistor	.16
R16	LLR-154	75,000 ohm ½ watt carbon resistor	.16
R17	OR-73	25,000 ohm ½ watt carbon resistor	.16
R19	2KR-210	Tone control—250,000 ohms	.55
R20	ZR-105	200 ohm wire-wound center tapped resistor	.16
C1, C2	XXC-187	Two-gang variable condenser	2.15
C3, C4, C9, C10, C30, C31	AC-6	0.1 mf, 200 volt tubular condenser	.16
C5	EC-24A	0.0001 mf mica condenser	.16
C6	AAC-111	0.003 mf mica condenser	.16
C7	2KC-198	Single adjustable padding condenser Range—200 to 400 mmf	.30
C8	BC-13	0.25 mf, 200 volt tubular condenser	.16
C11, C12, C13, C16	AC-7A	0.00025 mf mica condenser	.16
C14	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C15	BC-12	0.05 mf, 200 volt tubular condenser	.16
C17	FC-29	0.02 mf, 200 volt tubular condenser	.16
C18, C19	2KC-234	Dual 5 mf, 25 volt dry electrolytic condenser block	.75
C20, C21	HC-34	0.006 mf, 600 volt tubular condenser	.16
C22, C23	2TC-189	0.015 mf, 1000 volt tubular condenser	.16
C24	EEC-132	0.1 mf, 400 volt tubular condenser	.16
C25, C26	2KC-237	Multiple 6 and 10 mf, 200 volt dry electrolytic condenser C25—10 mf, 200 volt C26— 6 mf, 200 volt	2.00
C27	2KC-236	0.5 mf, 120 volt tubular condenser	.40
C28	2KC-249	Tubular 8 mf, 200 volt dry electrolytic condenser	.85
C29	EC-19	0.5 mf, 200 volt tubular condenser	.25
	2KS-151	6" magnetic speaker	4.50
	2KS-155	10" magnetic speaker for console	5.75
S1	2KS-152	Wave-band switch	.90
S2	OOS-108A	Local-distance switch	.12
	2KD-36	Airplane dial	1.75
	2NZ-306	Escutcheon with crystal	.50
	2KV-6	Synchronous vibrator	3.80
	2TM-211	Escutcheon reflector ring	.10

*Item number locates article on schematic diagram.

It is important to observe the proper polarity in connecting the battery to the receiver. The heavy red lead should be attached to the positive side of the battery. If the connections are reversed the vibrator and electrolytic condenser in the power pack will be seriously damaged.

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

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

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

Plate—blue
B plus—red
Screen—brown
Cathode—white or yellow
Grid—green
Filament and ground—black

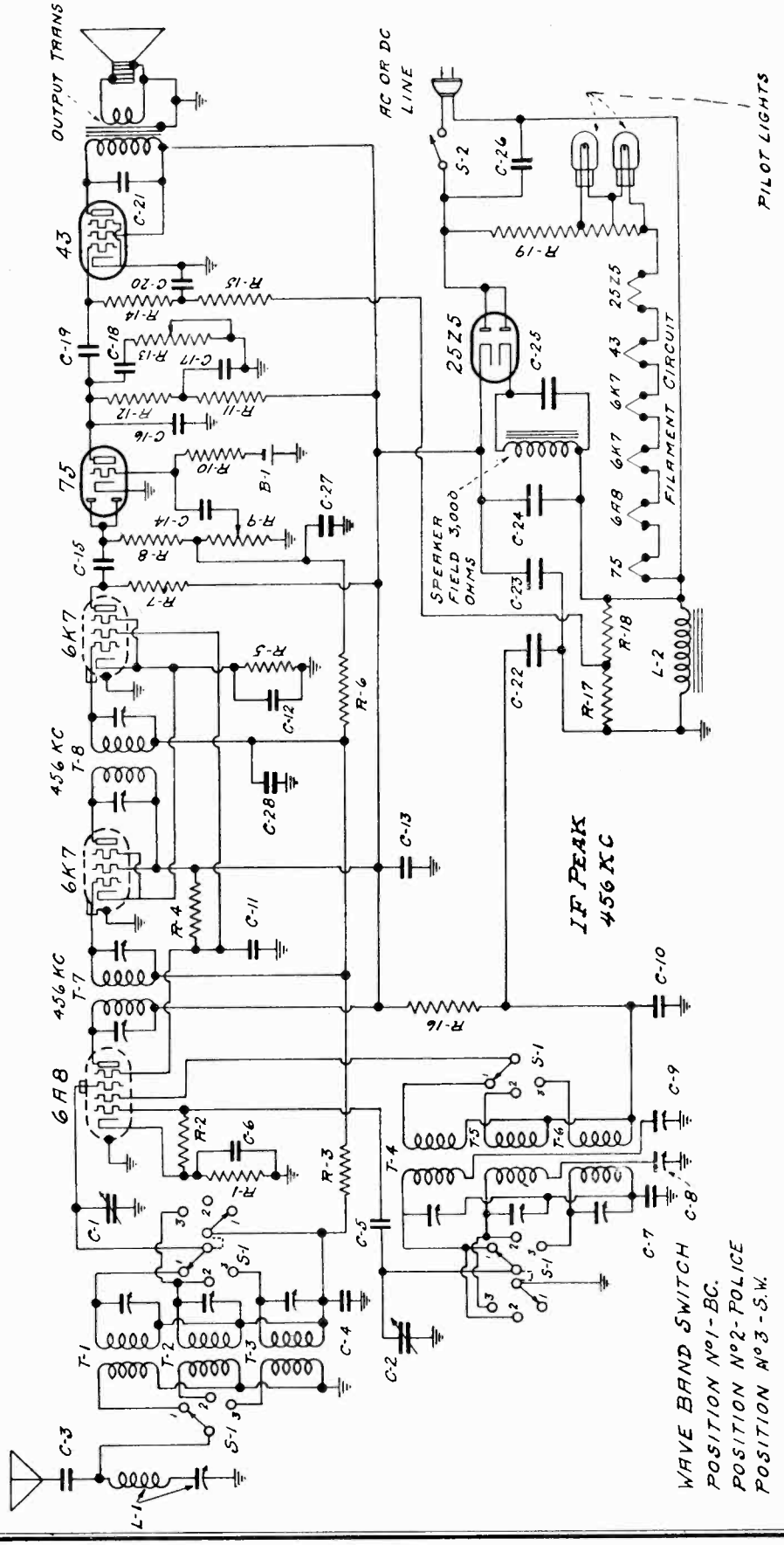
The color coding of the leads of the power pack is as follows:

A plus—yellow
B plus—red

The chassis is common negative for both the A and B supply.

EMERSON RADIO & PHONO. CORP.

MODEL 101U
Chassis U68
Schematic



Voltage rating ..... 105-130 volts.
Current drain ..... 0.43 amps.
Frequency ranges ..... 540 to 1660 kc, 1580 to 4750 kc, 5.5 to 16 mc.

The tube complement is as follows:
1—6A8 (metal) Pentagrid oscillator-moduator
1—6K7 (metal) 1st i-f amplifier
1—6K7 (metal) 2nd i-f amplifier (adjacent to 75)
1—75 (glass) 2nd detector—a-f amplifier, a.v.c.
1—43 (glass) Power output pentode
1—25Z5 (glass) Half-wave rectifier

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1700, 4500 and 15,000 kc should be used. In addition, an output meter should be used across the voice coil or output transformer for observing maximum response.

I-f Alignment

The i-f transformers XXT-188A and XXT-189A are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for *maximum response*. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response*. The trimmer is on the wave-trap, which is located on top of the chassis behind the antenna coil.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis to the right of the variable condenser. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer nearest the front of the chassis is for the broadcast antenna coil. The central trimmer is for the police antenna coil and the trimmer furthest from the front of the chassis is for the short-wave antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the tone control. The three trimmers for these coils are mounted on a bakelite strip between the coil tubing and the chassis. The trimmers are accessible through three holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil. The central trimmer is for the police oscillator coil and the trimmer furthest from the front of the chassis is for the broadcast oscillator coil.

The dual adjustable padder is mounted underneath the chassis between the oscillator coil and the variable condenser with the adjusting screws accessible through two holes in the top of the chassis. The screw closer to the front is for the police band and the other screw is for the broadcast band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (on dual padder, closer to back of chassis) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (to left of variable, furthest from front of chassis) for maximum response, and then the broadcast antenna trimmer (on antenna coil, nearest front of chassis). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (on dual padder, closer to front) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (to left of variable, central trimmer) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust police band antenna trimmer (central one on antenna coil) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (to left of variable, closest to front) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect alignment.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, 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.

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

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

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8	105	50	1.25	90	6
6K7 1st i-f	105	105	3.5	—	6
6K7 2nd i-f	62	50	3.5	—	6
75	57	—	0	—	6
43	92	105	0	—	24

Voltage across speaker field—114.

Voltage across filter choke—22

REPLACEMENT PARTS

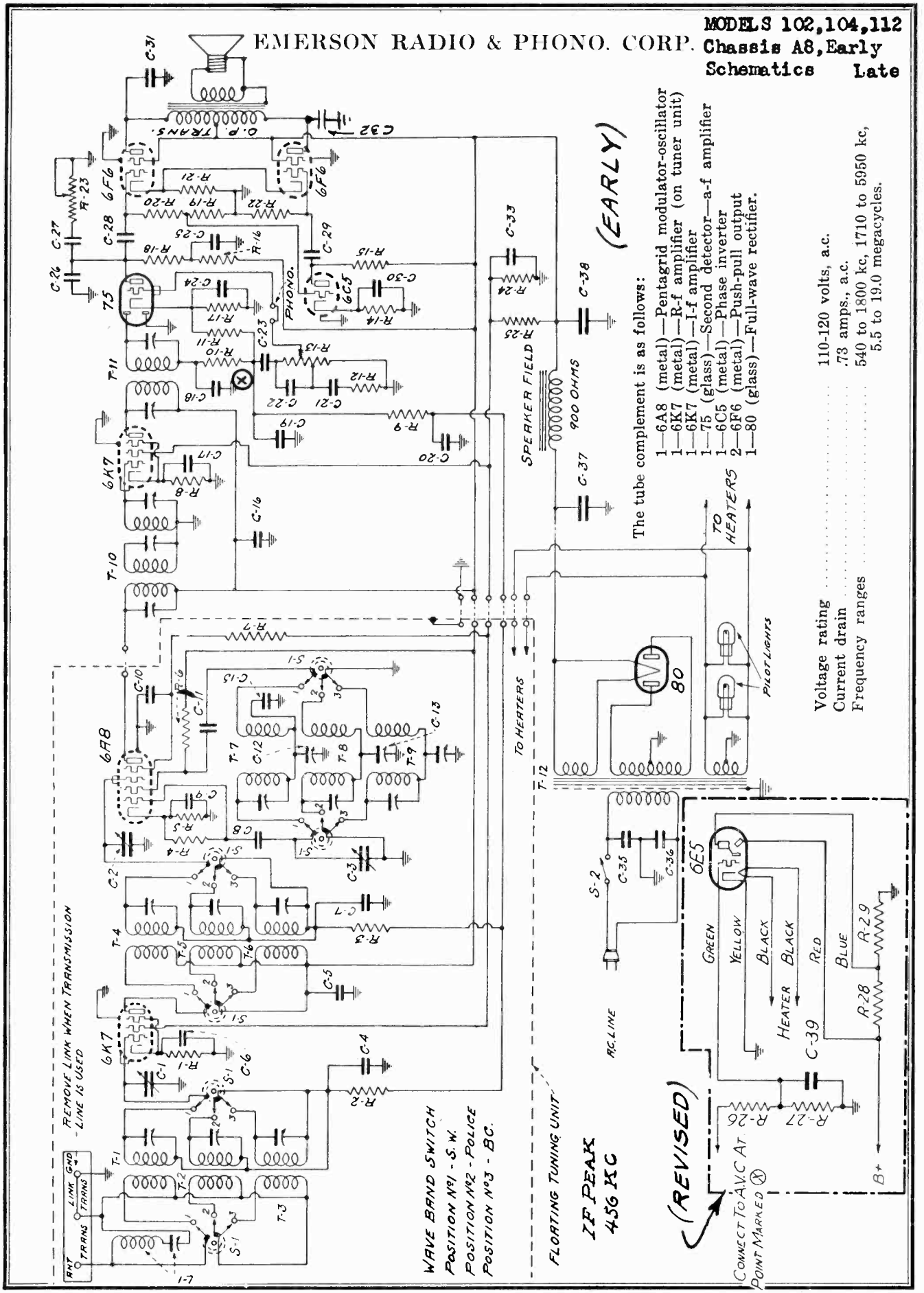
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

*Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L1	MMT-149	Adjustable 456 kc wave trap	$ .35
L2	ZZT-196	Filter choke—500 ohms	.60
T1, T2, T3	ZZT-192A	Three-band antenna coil assembly	1.80
T4, T5, T6	ZZT-193	Three-band oscillator coil assembly	1.80
T7	XXT-188A	456 kc first i-f transformer	1.15
T8	XXT-189A	456 kc second i-f transformer	1.15
R1	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R2, R7, R11	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	HR-42	2 megohm ¼ watt carbon resistor	.16
R4	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R5	LLR-149	400 ohm ½ watt wire-wound resistor	.16
R6, R10	KR-57	1 megohm ¼ watt carbon resistor	.16
R8	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R9	2FR-205A	Volume control—0.5 megohms	.60
R12	LR-61	200,000 ohm ¼ watt carbon resistor	.16
R13	XXR-186A	Tone control with line switch—250,000 ohms	.80
R14, R15	KR-56	0.5 megohms ¼ watt carbon resistor	.16
R16, R17	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R18	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R19	ZZR-192A	Wire-wound ballast resistor—130 ohms	.40
C1, C2	XXC-187	Two-gang variable condenser	2.15
C3, C21	AAC-114	0.001 mf mica condenser	.16
C4, C10, C26	AC-6	0.1 mf, 200 volt tubular condenser	.16
C5	EC-24A	0.0001 mf mica condenser	.16
C6, C11, C12	ZZC-191B	Seven-section condenser block	1.05
C13, C17, C20		C6 —0.2 mf, 200 v. C17—0.1 mf, 200 v.	
C28		C11—0.1 mf, 200 v. C20—0.1 mf, 200 v.	
		C12—0.1 mf, 200 v. C28—0.05 mf, 200 v.	
		C13—0.1 mf, 200 v.	
C7	ZZC-206	0.005 mf mica condenser	.16
C8, C9	JJC-144C	Dual adjustable padding condenser	.60
		C8—800 to 1400 mmf	
		C9—250 to 550 mmf	
C14, C19	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C15, C16, C27	AC-7A	0.00025 mf mica condenser	.16
C18	BC-11	0.005 mf, 200 volt tubular condenser	.16
C22, C23, C24	ZZC-192A	Multiple 4, 8 and 16 mf electrolytic condenser	2.25
		C22—4 mf, 150 volts	
		C23—8 mf, 150 volts	
		C24—16 mf, 150 volts	
C25	YC-98	Tubular 4 mf, 150 volt electrolytic condenser	.70
S1	XXS-117A	Wave-band switch	1.10
	2FS-141	10" dynamic speaker	7.00
	KL-6	Pilot light, 6.3 volt, .15 amp. Mazda No. 40	.15
B1	XXZ-213	Bias cell, one volt	.15
	XXD-25B	Airplane dial	2.10
	XXZ-195	Escutcheon with crystal	.50

GENERAL NOTES

1. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip on the inside of the right-hand chassis wall. Do not put a voltmeter across this bias cell. If the set distorts, check the cell by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. On replacing it be sure the clip makes good contact.
2. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
3. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of this receiver.
4. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
5. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
6. The color coding of the i-f transformer leads is as follows:

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



MODELS 102,104,112 Chassis A8, Early and Late
Alignment, Voltage Changes, Parts

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 5500, 6000 and 17000 kc should be used.

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

I-f Alignment

The i-f transformers NNT-153 and NNT-154 are located on extreme left side of chassis. Set wave-band switch at position A (clockwise) and condenser at minimum. Feed 456 kc to grid of 6A8 tube. Adjust the five i-f trimmers carefully for maximum response. Feed 456 kc through antenna and adjust 456 kc wave-trap for *minimum response.* This wave-trap is located at bottom rear of set, directly under the antenna binding post.

Broadcast Alignment

The three broadcast coils are in separate cans on top of tuner unit. (The tuner unit is the separate chassis section floated on rubber in center of chassis base). All trimmers for these coils are located at bottoms of cans and are available from bottom of chassis. NNT-150 is antenna coil, NNT-151 is detector coil and NNT-152 is oscillator coil. The oscillator coil has two adjusting screws; the one painted red is the series padder and the other is the trimmer. The antenna and detector coils have one trimmer each.

Set switch at A and pointer to 600 on dial. Feed 600 kc to antenna and adjust broadcast oscillator padder (red screw at bottom front of tuner unit, left-hand corner) for maximum response. Set pointer at 1600, feed 1600 kc to antenna and adjust oscillator trimmer beside red padder for maximum response, and then adjust r-f trimmer (through hole at about center of tuner unit), and antenna trimmer (through hole at rear of unit). Reset the pointer to 600, feed 600 kc to antenna and rock the variable condenser while resetting the oscillator padder for maximum response. Return to 1600, and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

The three police-band coils are the smaller ones located on the bottom side of the tuner unit, in row at left of wave-band switch (same side of switch as antenna binding post). The antenna coil is the one furthest from front of chassis, detector coil in center, and oscillator coil nearest front of chassis. The dual padder mounted on bottom, right-hand side of tuner unit has one padder for police-band oscillator coil and one for short-wave oscillator coil. The padder nearest wave-band switch is for the police band. Each of the three trimmers for the police-band coils is located on top of its respective coil.

Set switch at B (central position) and pointer to 1800 (2 divisions below 200 mark). Feed 1800 kc to antenna. Adjust oscillator series padder nearest to switch in right-hand corner for maximum response. Set pointer to 5500 and feed 5500 kc to antenna. First adjust oscillator trimmer (front one on row of smaller coils) for maximum response. If two peaks are obtained, select the *minimum capacity* peak. (See General Instructions below). Then adjust the antenna (rear) and detector (center) trimmers for maximum response. If two peaks are obtained, select the *maximum capacity* peak. Re ... pointer to 1800, feed 1800 kc to antenna, and rock variable condenser while adjusting police band oscillator padder for maximum response. Return to 5500 and check alignment. If a readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

The three short-wave coils are the larger ones located on bottom side of tuner unit in row at right of wave-band switch. The antenna coil is the one furthest from front of chassis, detector coil in center and oscillator coil nearest front of chassis. On dual padding condenser the padder furthest from wave-band switch is for short-wave oscillator coil. Each of the three trimmers for the short-wave coils is located on top of its respective coil.

Set switch at C (counter-clockwise) and pointer at 6 megacycles. Feed 6000 kc to antenna. Adjust short-wave oscillator padder (furthest from switch on dual unit) for maximum response. Set pointer to 17 megacycles and feed 17000 kc to antenna. First adjust oscillator trimmer (front) for maximum response. If two peaks are obtained, select the *minimum capacity* peak. Then adjust the antenna (rear) and detector (center) trimmers for maximum response. If two peaks are obtained, select the *maximum capacity* peak. Return pointer to 6 mc, feed 6000 kc to antenna and rock variable condenser while adjusting the oscillator padder for maximum response. Return to 17 mc. Feed 17000 kc to antenna and check alignment.

Check the receiver on all three bands for dead spots which indicate incorrect alignment.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, 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 and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

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

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

A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the center of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.

In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.

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

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

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	250	107	4.0	—	6.3 a.c.
6A8	250	100	3.5	190	6.3 a.c.
6K7 (i-f)	250	107	5.5	—	6.3 a.c.
75	100	—	0.9	—	6.3 a.c.
6C5	135	—	4.7	—	6.3 a.c.
6F6	245	250	15.5	—	6.3 a.c.
6F6	245	250	15.5	—	6.3 a.c.

Voltage across speaker field—100 volts.
B plus at 80 filament—350 volts.

(EARLY) REPLACEMENT PARTS

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

* Item	Part No.	DESCRIPTION	List Price Ea. Effective as of Sept. 1st, 1935 Price
T3	NNT-150	Broadcast antenna coil	$ .90
T6	NNT-151	Broadcast detector coil	.90
T9	NNT-152	Broadcast oscillator coil	.90
T2	NNT-155	Intermediate band antenna coil	.50
T5	NNT-156	Intermediate band detector coil	.50
T8	NNT-157	Intermediate band oscillator coil	.50
T1	NNT-158	Short-wave antenna coil	.55
T4	NNT-159	Short-wave detector coil	.60
T7	NNT-160	Short-wave oscillator coil	.55
T10	NNT-153	456 kc first i-f transformer	1.75
T11	NNT-154	456 kc second i-f transformer	1.35
T12	NNT-191	Power transformer	3.90
L1	MMT-149	456 kc tunable wave-trap	.35
R13	NNR-156	Volume control—1.2 megohms	.70
R23	NNR-157A	Tone control—.5 megohms	.60
R24, R25	NNR-158	25,000 ohm metal clad wire-wound tapped resistor	.40
		~~R-25 R24~~—10,000 ohms, 2.5 watts	
		~~R-24 R25~~—15,000 ohms, 2 watts	
R21	AAR-107	250 ohm, 2 watt wire-wound resistor	.16
R1, R5	CCR-140	350 ohm, ½ watt wire-wound resistor	.16
R8	IIR-131	1000 ohm, ½ watt wire-wound resistor	.16
R7, R14	GR-85	2000 ohm, ¼ watt carbon resistor	.16
R17	ZR-101	3,300 ohm, ¼ watt carbon resistor	.16
R19	LR-64	5,000 ohm, ½ watt carbon resistor	.16
R12	KR-63 (5000 ~~15,000~~)	ohm, ¼ watt carbon resistor	.16
R4, R15	KR-53	50,000 ohm, ½ watt carbon resistor	.16
R16	LLR-154	75,000 ohm, ¼ watt carbon resistor	.16
R2, R3 R10, R22	KR-54	100,000 ohm, ¼ watt carbon resistor	.16
R18	KR-55	250,000 ohm, ¼ watt carbon resistor	.16
R9, R11	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
R6	YR-97	15,000 ohm, ½ watt carbon resistor	.16
R20	NNR-204	95,000 ohm, ½ watt carbon resistor	.16
C1, C2, C3	NNC-153	3 gang variable condenser	3.25
C12, C13	NNC-154A	Dual padding condenser C12, C13—800 to 1400 mmf	.75
C37, C38	NNC-155	Dual 8 mf, 450 w. v., dry electrolytic condenser	1.65
C34, C30	IC-43	5 mf, 25 volt tubular dry electrolytic condenser	.60
C16, C17	NNC-157	Seven-section condenser block	1.30
C20, C25		C16—.1 mf, 400 v. C27—.01 mf, 400 v.	
C27, C28		C17—.1 mf, 200 v. C28—.01 mf, 400 v.	
C33		C20—.05 mf, 200 v. C33—.9 mf, 400 v.	
		C25, C21—.25 mf, 400 v.	
C8	EC-24A	.0001 mf mica condenser	.16
C18, C19, C7	AC-7A	.00025 mf mica condenser	.16
C11	AAC-114	.001 mf mica condenser	.16
C15	NNC-181	.0015 mf mica condenser	.16
C22	IC-47	.0005 mf mica condenser	.16
C31, C32	NNC-214	.002 mf, 1000 v. tubular condenser	.16
C23	CCC-127	.01 mf, 200 v. tubular condenser	.16
C29	KC-58	.01 mf, 400 v. tubular condenser	.16
C6, C9	AC-6	.1 mf, 200 v. tubular condenser	.16
C5, C10	EEC-132	.1 mf, 400 v. tubular condenser	.16
C21	RC-12	.05 mf, 200 v. tubular condenser	.16
C4, C7	NNC-158	.05 mf, 200 v. tubular condenser, with mounting strap	.16
C35, C36	XXC-220	Dual .01 mf, 250 v. condenser	.30
S1	NNS-95	Wave-band switch, with shields	2.40
S2	NNS-109	On-off switch	.50
	NNS-118	8" dynamic speaker (for Model 104)	6.50
	NNS-121	10" dynamic speaker (for Model 102)	7.50
	NND-23	Airplane dial	5.25
	NNZ-205	Escutcheon with crystal	.50
	KL-6	Pilot light, 6.3 volt, .15 amp. Mazda No. 40	.15

(Revised Model) - PRODUCTION CHANGES

To facilitate production of later receivers, tubular condensers were substituted for the seven-section condenser block, part no. NNC-157. Relative to these condensers, the revised parts list should read as follows:

Item No.	Part No.	Description	Price
C16	EEC-132	0.1 mf, 400 volt tubular condenser	$.16
C17	AC-6	0.1 mf, 200 volt tubular condenser	.16
C20	BC-12	0.05 mf, 200 volt tubular condenser	.16
C25	AAC-112	0.25 mf, 400 volt tubular condenser	.16
C27,C28	KC-58	0.01 mf, 400 volt tubular condenser	.16
C33	NNC-243	0.9 mf, 400 volt tubular condenser	.60

The dial was changed from part no. NND-23 to part no. NND-23A.

Previous to the above changes, C41, 8 mf-450 volt tubular electrolytic condenser (part no. NNC-226), was added.

(Revised Model) - REPLACEMENT PARTS

Item No.	Part No.	Description	List Price Ea. Sept. 1st, 1935
R28	KR-57	1 megohm 1/4 watt carbon resistor	$.16
R26, R27	HR-42	2 megohm 1/4 watt carbon resistor	.16
R29	NNR-226	4 megohm 1/4 watt carbon resistor	.16
C39	CCC-127	0.01 mf, 200 volt tubular condenser	.16
	NNZ-297	6E5 tube socket and cable assembly	.40
	NNM-203	Metal strap for 6E5 tube	.10
	NNZ-298	Wood cleat for 6E5 tube (for Model 112 only)	.30
	NNZ-328	Wood cleat for 6E5 tube (for Model 102 only)	.30
	NNZ-329	Wood cleat for 6E5 tube (for Model 113 only)	.30
	NNZ-301	Escutcheon for 6E5 tube	.20

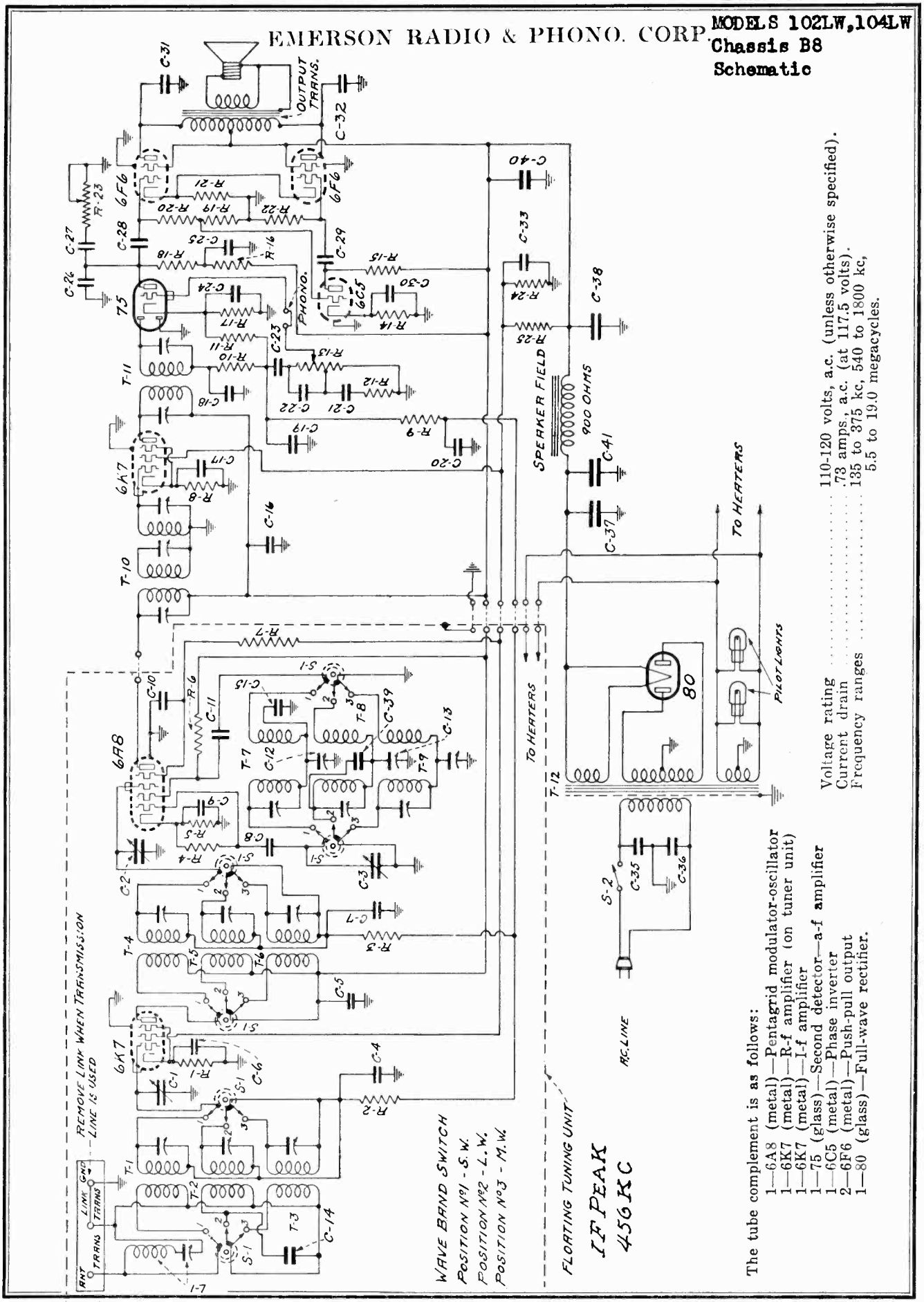
NOTES ON REVISED MODEL

In later production receivers a 6E5 cathode ray tube was added to the chassis to be used as a tuning indicator. The circuit revision is indicated in the schematic diagram. The entire 6E5 circuit is blocked off in the lower left hand corner of the diagram. It should be noted that the original circuit is not changed. The revision of these models involves only the addition of the 6E5 circuit.

The extra parts required for the addition of the 6E5 tube are listed under Replacement Parts below. Revisions in the main circuit and parts list are indicated under Production Changes.

EMERSON RADIO & PHONO. CORP.

MODELS 102LW, 104LW
Chassis B8
Schematic



Voltage rating ..... 110-120 volts, a.c. (unless otherwise specified).
Current drain ..... .73 amps., a.c. (at 117.5 volts).
Frequency ranges ..... 135 to 375 kc, 540 to 1800 kc, 5.5 to 19.0 megacycles.

The tube complement is as follows:
1—6A8 (metal)—Pentagrid modulator-oscillator
1—6K7 (metal)—R-f amplifier (on tuner unit)
1—6K7 (metal)—I-f amplifier
1—75 (glass)—Second detector—a-f amplifier
1—6C5 (metal)—Phase inverter
2—6F6 (metal)—Push-pull output
1—80 (glass)—Full-wave rectifier.

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600, 1600, 6000 and 17000 kc should be used.

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

I-f Alignment

The i-f transformers NNT-153 and NNT-154 are located on extreme left side of chassis. Set wave-band switch at position A (clockwise) and condenser at minimum. Feed 456 kc to grid of 6A8 tube. Adjust the five i-f trimmers carefully for maximum response. Feed 456 kc through antenna and adjust 456 kc wave-trap for *minimum response*. This wave-trap is located at bottom rear of set, directly under the antenna binding post.

Medium-Wave Alignment

The three medium-wave coils are in separate cans on top of tuner unit. (The tuner unit is the separate chassis section floated on rubber in center of chassis base). All trimmers for these coils are located at bottoms of cans and are available from bottom of chassis. NNT-150 is antenna coil, NNT-151 is detector coil and NNT-152 is oscillator coil. The oscillator coil has two adjusting screws; the one painted red is the series padder and the other is the trimmer. The antenna and detector coils have one trimmer each.

Set switch at A and pointer to 600 on dial. Feed 600 kc to antenna and adjust medium-wave oscillator padder (red screw at bottom front of tuner unit, left-hand corner) for maximum response. Set pointer at 1600, feed 1600 kc to antenna and adjust oscillator trimmer beside red padder for maximum response, and then adjust r-f trimmer (through hole at about center of tuner unit), and antenna trimmer (through hole at rear of unit) Reset the pointer to 600, feed 600 kc to antenna and rock the variable condenser while resetting the oscillator padder for maximum response. Return to 1600, and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

The three long-wave coils are the coils with the large number of turns located on the bottom side of the tuner unit, in row at left of wave-band switch (same side of switch as antenna binding post). The antenna coil is the one furthest from front of chassis, detector coil in center, and oscillator coil nearest front of chassis. The dual padder mounted on bottom, right-hand side of tuner unit has one padder for the long-wave oscillator coil and one for the short-wave oscillator coil. The padder nearest the wave-band switch is for the long-wave band. Each of the three trimmers for the long-wave coils is located on top of its respective coil.

Set switch at **B** (central position) and pointer to 150. Feed 150 kc to antenna. Adjust oscillator series padder (nearest to switch in right-hand corner) for maximum response. Set pointer to 345 and feed 345 kc to antenna. First adjust oscillator trimmer (front one on row of long-wave coils) for maximum response. Then adjust the antenna (rear) and detector (center) trimmers for maximum response. Return pointer to 150, feed 150 kc to antenna, and rock variable condenser while adjusting long-wave oscillator padder for maximum response. Return to 345 and check alignment. If a readjustment is necessary return to 150 and repeat entire procedure.

Short-Wave Alignment

The three short-wave coils are the ones with the heavy wire turns located on bottom side of tuner unit, in row at right of wave-band switch. The antenna coil is the one furthest from front of chassis, detector coil in center and oscillator coil nearest front of chassis. On dual padding condenser the padder furthest from wave-band switch is for short-wave oscillator coil. Each of the three trimmers for the short-wave coils is located on top of its respective coil.

Set switch at **C** (counter-clockwise) and pointer at 6 megacycles. Feed 6000 kc to antenna. Adjust short-wave oscillator padder (furthest from switch on dual unit) for maximum response. Set pointer to 17 megacycles and feed 17000 kc to antenna. First adjust oscillator trimmer (front) for maximum response. If two peaks are obtained, select the *minimum capacity* peak. Then adjust the antenna (rear) and detector (center) trimmers for maximum response. If two peaks are obtained, select the *maximum capacity* peak. Return pointer to 6 mc, feed 6000 kc to antenna and rock variable condenser while adjusting the oscillator padder for maximum response. Return to 17 mc. Feed 17000 kc to antenna and check alignment.

Check the receiver on all three bands for dead spots which indicate incorrect alignment.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, 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 and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

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

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

GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the center of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. The pickup leads should be removed before attempting to receive broadcast stations.
2. The receiver should never be turned on with the speaker plug or the 6F6 tubes out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:

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

6. If the dial is of the type which has four small screws spaced circularly about the main knob shaft it may be adjusted to prevent slipping by carefully tightening up on these screws. Extreme care should be exercised to tighten the screws only enough to cure the slipping; excessive pressure will damage the interral mechanism.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	250	107	4.0	—	6.3 a.c.
6A8	250	100	3.5	190	6.3 a.c.
6K7 (i-f)	250	107	5.5	—	6.3 a.c.
75	100	—	0.9	—	6.3 a.c.
6C5	135	—	4.7	—	6.3 a.c.
6F6	245	250	15.5	—	6.3 a.c.
6F6	245	250	15.5	—	6.3 a.c.

Voltage across speaker field—100 volts.
B plus at 80 filament—350 volts.,

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

REPLACEMENT PARTS

* Item	Part No.	DESCRIPTION	List Price Ea. Effective as of Sept. 1st, 1935 Price
T3	NNT-150	Broadcast antenna coil	$ .90
T6	NNT-151	Broadcast detector coil	.90
T9	NNT-152	Broadcast oscillator coil	.90
T2	2HT-212	Long-wave antenna coil	.70
T5	2HT-213	Long-wave detector coil	.70
T8	2HT-214	Long-wave oscillator coil	.65
T1	NNT-158	Short-wave antenna coil	.55
T4	NNT-159	Short-wave detector coil	.60
T7	NNT-160	Short-wave oscillator coil	.55
T10	NNT-153	456 kc first i-f transformer	1.75
T11	NNT-154	456 kc second i-f transformer	1.36
T12	NNT-191	Power transformer	3.90
L1	MMT-149	456 kc tunable wave-trap	.35
R13	NNR-156	Volume control—1.2 megohms	.70
R23	NNR-157A	Tone control—.5 megohms	.60
R24, R25	NNR-158	25,000 ohm metal clad wire-wound tapped resistor R24—10,000 ohms, 2.5 watts R25—15,000 ohms, 2 watts	.40
R21	AAR-107	250 ohm, 2 watt wire-wound resistor	.16
R1, R5	CCR-140	350 ohm, ½ watt wire-wound resistor	.16
R8	HR-131	1000 ohm, ½ watt wire-wound resistor	.16
R7, R14	GR-85	2000 ohm, ½ watt carbon resistor	.16
R17	ZR-101	3,300 ohm, ¼ watt carbon resistor	.16
R19	LR-64	5,000 ohm, ¼ watt carbon resistor	.16
R12	KR-63	15,000 ohm, ¼ watt carbon resistor	.16
R4, R15	KR-53	50,000 ohm, ¼ watt carbon resistor	.16
R16	LLR-154	75,000 ohm, ¼ watt carbon resistor	.16
R2, R3 R10, R22	KR-54	100,000 ohm, ¼ watt carbon resistor	.16
R18	KR-55	250,000 ohm, ¼ watt carbon resistor	.16
R9, R11	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
R6	YR-97	15,000 ohm, ½ watt carbon resistor	.16
R20	NNR-204	95,000 ohm, ½ watt carbon resistor	.16
C1, C2, C3	NNC-153	3 gang variable condenser	3.25
C12, C13	2HC-219	Dual padding condenser C12—800 to 1400 mmf C13—150 to 800 mmf	.60
C37, C38	2HC-217	Dual 8 mf, 450 w. v., dry electrolytic condenser	1.65
C41	NNC-226	Tubular 8 mf, 450 v. electrolytic condenser	1.00
C24, C30	IC-43	5 mf, 25 volt tubular dry electrolytic condenser	.60
C16, C17	NNC-157	Seven-section condenser block	1.30
C20, C25		C16—.1 mf, 400 v. C27—.01 mf, 400 v.	
C27, C28		C17—.1 mf, 200 v. C28—.01 mf, 400 v.	
C33		C20—.05 mf, 200 v. C33— .9 mf, 400 v.	
		C25—.25 mf, 400 v.	
C8, C14	EC-24A	.0001 mf mica condenser	.16
C18, C19, C26	AC-7A	.00025 mf mica condenser	.16
C11	AAC-114	.001 mf mica condenser	.16
C15	NNC-181	.0015 mf mica condenser	.16
C22	IC-47	.0005 mf mica condenser	.16
C39	IIC-133A	.000025 mf mica condenser	.16
C31, C32	NNC-214	.002 mf, 1000 v. tubular condenser	.16
C23	CCC-127	.01 mf, 200 v. tubular condenser	.16
C29	KC-58	.01 mf, 400 v. tubular condenser	.16
C6, C9	AC-6	.1 mf, 200 v. tubular condenser	.16
C5, C10	EEC-132	.1 mf, 400 v. tubular condenser	.16
C21	BC-12	.05 mf, 200 v. tubular condenser	.16
C4, C7	NNC-158	.05 mf, 200 v. tubular condenser, with mounting strap	.16
C40	IC-46	.5 mf, 400 v. tubular condenser	.25
C35, C36	XXC-220	Dual .01 mf, 250 v. condenser	.30
S1	NNS-95	Wave-band switch, with shields	2.40
S2	NNS-109	On-off switch	.50
	NNS-118	8" dynamic speaker (for Model 104LW)	6.50
	NNS-121	10" dynamic speaker (for Model 102LW)	7.50
	2HD-32	Airplane dial	5.25
	NNZ-205	Escutcheon with crystal	.50
	KL-6	Pilot light, 6.3 volt, .15 amp. Mazda No. 40	.15

EMERSON RADIO & PHONO. CORP.

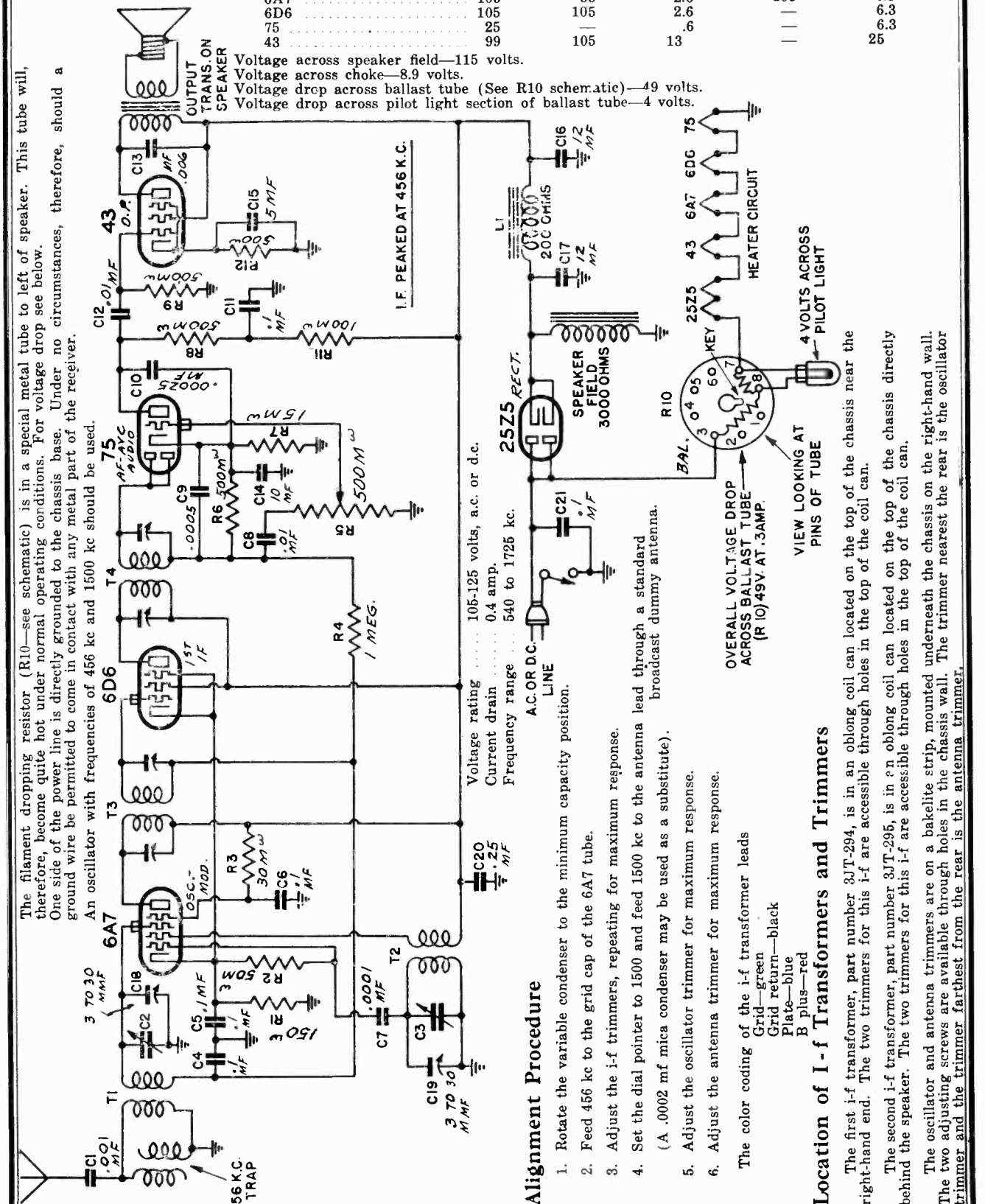
MODEL J106
Chassis J
Schematic, Voltage
Alignment, Data

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

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	55	2.6	105	6.3
6D6	105	105	2.6	—	6.3
75	25	—	.6	—	6.3
43	99	105	13	—	25

Voltage across speaker field—115 volts.
Voltage across choke—8.9 volts.
Voltage drop across ballast tube (See R10 schematic)—49 volts.
Voltage drop across pilot light section of ballast tube—4 volts.

The filament dropping resistor (R10—see schematic) is in a special metal tube to left of speaker. This tube will, therefore, become quite hot under normal operating conditions. For voltage drop see below.
One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
An oscillator with frequencies of 456 kc and 1500 kc should be used.



Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 6A7 tube.
3. Adjust the i-f trimmers, repeating for maximum response.
4. Set the dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard broadcast dummy antenna. (A .0002 mf mica condenser may be used as a substitute).
5. Adjust the oscillator trimmer for maximum response.
6. Adjust the antenna trimmer for maximum response.

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

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3JT-294, is in an oblong coil can located on the top of the chassis near the right-hand end. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 3JT-295, is in an oblong coil can located on the top of the chassis directly behind the speaker. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The oscillator and antenna trimmers are on a bakelite strip, mounted underneath the chassis on the right-hand wall. The two adjusting screws are available through holes in the chassis wall. The trimmer nearest the rear is the oscillator trimmer and the trimmer farthest from the rear is the antenna trimmer.

MODELS 107,111
Chassis U6F
Schematic,Voltage,Notes

EMERSON RADIO & PHONO. CORP.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to cathode of the 43 tube (B minus). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	99	43	1.1	80	6.3
6K7	99	80	1.8	—	6.3
6H6	—	—	0		6.3
6F5	50	—	0		6.3
43	87	99	0	—	24

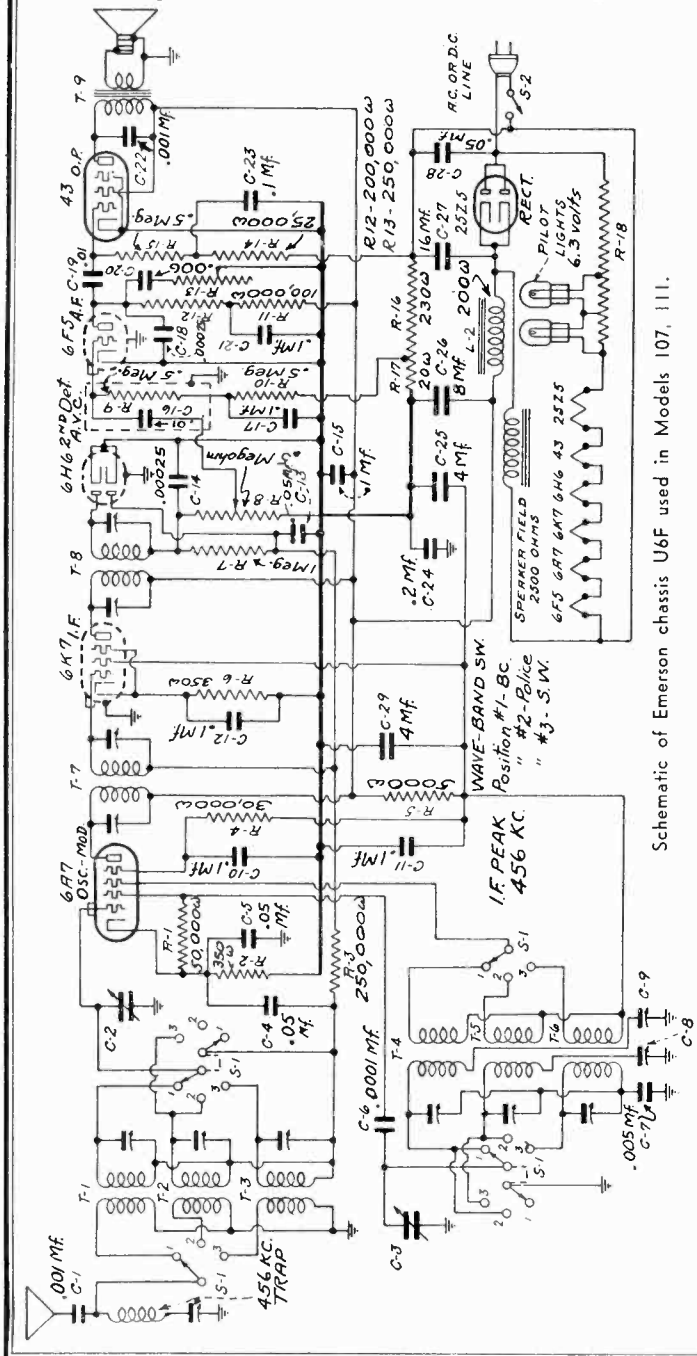
Voltage across speaker field (black and yellow leads)—120

Voltage across filter choke—9.5

The 250 ohm bias resistor, R16 and R17 on schematic diagram, is located underneath the chassis deck near volume control.

Voltage across the two outside terminals of this resistor—11.5

Voltage from cathode of 43 tube to central terminal of resistor—1.0



Schematic of Emerson chassis U6F used in Models 107, 111.

The schematic diagram of the receiver bearing these model numbers, shown on *Emerson page 6-15 of Rider's Volume VI.* is for Chassis U6A. A note on that page makes reference to chassis U6F that carries the same model numbers, 107 and 111. This chassis is different and its schematic is shown in the accompanying illustration.

The filament dropping resistor (Part No. 2LR-212) is of the cylindrical plug-in type and is located on top of the chassis between the 6H6 and 25Z5 tubes. The output transformer (Part No. 2LT-221 and T-9 on the diagram) and the filter choke (Part No. 2CT-207A and L-2 on the diagram) are located in the square can on top of the chassis to the left of the speaker.

The voltage across the speaker field (black and yellow leads)—120, and the voltage across the filter choke—9.5. Voltage across two outside terminals of the 250-ohm bias resistor (R-16 and R-17, located underneath the chassis deck near the volume control)—11.5 and the voltage from the cathode of the 43 tube to central terminal of resistor—1.0.

The various paragraphs under the heading "Adjustments" on Emerson page 6-16 applies to this chassis also, with the exception of the locations of the trimmers for the antenna coils. These are as follows: Short-wave coil, upper trimmer; police band, central trimmer, and that for the broadcast band is the lower trimmer. While adjusting the short-wave antenna trimmer (the upper one) for maximum response, rock the variable condenser.

Voltage rating .... 105-130 volts ac-dc
Current drain ..... 0.43 amps.

The filament dropping resistor, part number 2LR-212, is of the cylindrical plug-in type and is located on top of the chassis between the 6H6 and 25Z5 tubes.

The output transformer, part no. 2LT-221 (T9 on schematic diagram) and the filter choke, part no. 2CT-207A (L2 on schematic diagram) are located in the square can on top of the chassis to the left of the speaker.

EMERSON RADIO & PHONO. CORP.

MODELS 107AC,114
Chassis E5
Schematic,Voltage
Alignment,Changes

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 6000 and 7500 should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments:

The two i-f transformers are located on the top of the chassis deck. The second i-f is the one directly behind the 6A7 tube. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck beside the antenna coil.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis deck (in the corner near the antenna coil) with the screw adjustment accessible through a hole in the front of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted on bracket on top of chassis deck. The trimmers for these coils are accessible through holes in the bracket. The trimmer nearest the chassis is the short-wave antenna trimmer. The trimmer nearest the top of the bracket is the broadcast antenna trimmer.

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

Short-Wave Alignment:

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the variable condenser at minimum capacity. Feed 7500 kc and adjust the short-wave oscillator trimmer (closest to front on right-hand chassis wall) for maximum response. Then feed 6000 kc and rotate the variable condenser until the signal is picked up, and adjust the short-wave antenna trimmer (lower one on upright bracket on right side of chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below).

Broadcast Alignment:

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute). Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in front under antenna coil) for maximum response. Move pointer to 1600 and feed 1600 kc and adjust the broadcast oscillator trimmer (farthest from front on right-hand chassis wall) for maximum response. Then adjust the antenna trimmer (nearest top on upright bracket) for maximum response. Return to 600, feed 600 ks and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

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

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

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

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

1. The receiver should never be turned on with the 41 tube out of its socket, since the rapid rise in rectifier voltage may damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color-coding of the i-f transformers is as follows:
   Grid—green — Grid return—black
   B plus—red — Plate—blue
4. The color-coding of the power transformer is as follows:
   Primary—two black leads — 6.3 volt secondary—two green leads
   High-voltage secondary—two red leads — Electrostatic shield—bare stranded wire
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the front of the chassis. The short-wave band has a fixed padder which is a 1360 mmf molded mica condenser. (Note that this condenser is coded 1300 mmf). When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1360 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color-coding of the general wiring is as follows:
   Cathode—white or yellow
   Plate—blue
   Grid—green
   B plus—red
   Filament and ground—black
   Screen—brown

Voltage rating ..... 105 to 125 volts
Current drain ..... 0.4 amps
Frequency range ..... 540 to 1750 kc, 2200 to 7500 kc.

The tube complement is as follows:
1—6A7, oscillator-modulator
1—78, i.f. amplifier
1—75, diode detector, a.v.c. a-f amplifier
1—41, power output pentode
1—1-V, half-wave rectifier

VOLTAGE ANALYSIS

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

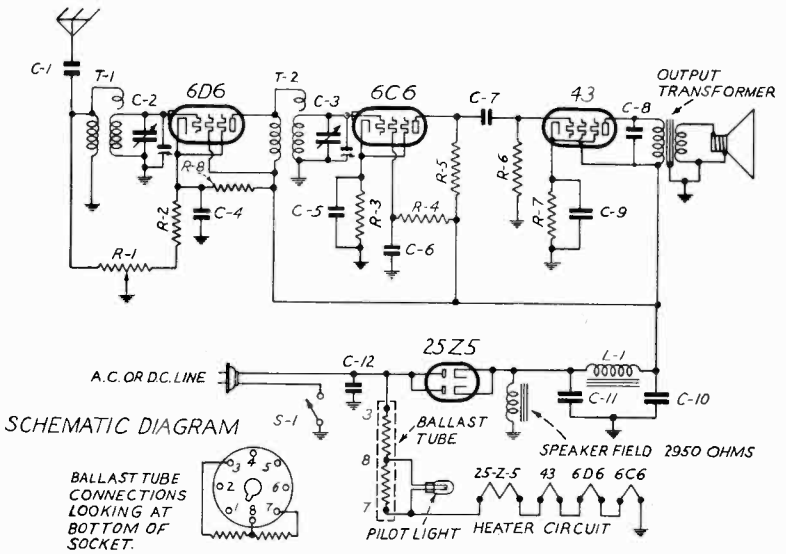
Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	219	74	2.3	150	6.3 a.c.
78	219	74	2.3	—	6.3 a.c.
75	75	—	3.2	—	6.3 a.c.
41	206	219	13.6	—	6.3 a.c.

B plus at cathode of 1-V tube—271 volts.
Voltage across the speaker field—50 volts.

PRODUCTION CHANGES

On early production:

a. Trimmer across secondary of broadcast antenna coil had rotor returned to ground.
b. Trimmer across secondary of short-wave oscillator coil had rotor returned to ground.
c. In very early sets 85 tube was used in place of 75, and .02 mf coupling condenser went directly to plate. One 100,000 ohm plate resistor was used in place of two resistors R-10 and R-15 shown in plate circuit. The control grid of the 85 in these receivers was connected directly to movable arm on the volume control, and R-14 and C-24 were not in the circuit.
d. Model 114 had 6D6, first i-f tube in place of 78. All production changes above also apply to model 114.
e. The second electrolytic condenser C19 was of the regulating type, part no. 2NC-247A.
f. The 456 kc wave-trap was originally part no. MMT-149.



VOLTAGE ANALYSIS

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

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6	100	102	3	6.3
6C6	30	21	2	6.3
43	95	101	13	25.0

Voltage across speaker field (25Z5 cathode to chassis)—118 volts.

Voltage across choke (25Z5 cathode to 43 screen)—16.5 volts.

The line voltage dropping resistor, part no. 2VR-215, is of the plug-in type and resembles a metal tube. The overall voltage drop of this resistor is 55 volts.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1425 kc is required.

The dial pointer should be at the extreme low-frequency end of the dial calibration when the variable condenser is at the maximum capacity position.

Set the dial pointer at 1425, feed 1425 kc to the antenna and adjust both trimmers on the variable condenser for maximum response. Use as weak a test signal as possible.

Range: The receiver is designed to operate over the broadcast range from 540 to 1650 kilocycles. This range covers all of the standard American broadcast stations and some of the low-frequency police transmitters.

The tubes used are as follows:
1—6D6, r-f amplifier.
1—6C6, biased detector.
1—43, power output pentode.
1—25Z5, dual half-wave rectifier.

Voltage rating	105 to 130 volts a-c or d-c
Current drain	0.38 amps.
Frequency range	540 to 1650 kc.

REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION	PRICE List Price ea. Effective as of Sept. 1st, 1935
		PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE	
L1	ZZT-196A	Iron-core filter choke—500 ohms	$ .60
T1	2VT-241	Antenna coil	.55
T2	2VT-242	Detector coil	.55
R1, S1	2VR-219A	Volume control with line switch—75,000 ohms	.75
R2	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R3	OR-73	25,000 ohm ¼ watt carbon resistor	.16
†R4	HR-42	2 megohm ¼ watt carbon resistor	.16
R5, R6	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R7	KKR-135A	650 ohm 1 watt wire-wound resistor	.16
†R8	KR-55	250,000 ohm ¼ watt carbon resistor	.16
	2VR-215	Ballast resistor tube (voltage dropping resistor—overall voltage drop is 55 volts)	
C1	AAC-114	0.001 mf mica condenser	.60
†C2, C3	2VC-244	Two-gang variable condenser	.16
C4, C6	AC-6	0.1 mf, 200 volt tubular condenser	1.90
C5, C9	GGC-137A	Combination by-pass and filter condenser block	.16
C10, C11		C5—5 mf, 25 volts. C10— 8 mf, 150 volts. C9—5 mf, 25 volts. C11—16 mf, 150 volts.	2.25
C7	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C8	KC-58	0.01 mf, 400 volt tubular condenser	.16
C12	2VC-242	0.1 mf, 250 volt a-c tubular condenser	.16
	2VS-157	5" dynamic speaker	3.25
	XL-9	Pilot light, 6.3 volts, .25 amps, Mazda No. 46	.15
	2SD-35	Airplane dial	1.20

† See Production Changes below.
* Item number locates the article on the schematic diagram.

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS

PRODUCTION CHANGES

Receivers bearing serial numbers up to about 708,040 did not have a resistor connected from the cathode of the 6D6 tube to B plus. (This resistor is R8 on schematic diagram.)

In receivers bearing serial numbers up to 712,500 the variable condenser was part no. 2VC-238. The variable condenser now indicated in the parts listed above was used in receivers bearing serial numbers above 712,500. (The part no. is stamped on the end plate of the condenser.)

In receivers bearing serial numbers up to 720,250, R4 was a 500,000 ohm ¼ watt carbon resistor.

EMERSON PRODUCTION CHANGES AS OF 4/29/36,
NOT ALREADY NOTED IN SERVICE NOTES.

Chassis Model U4B; Cabinet Models 118 and 126

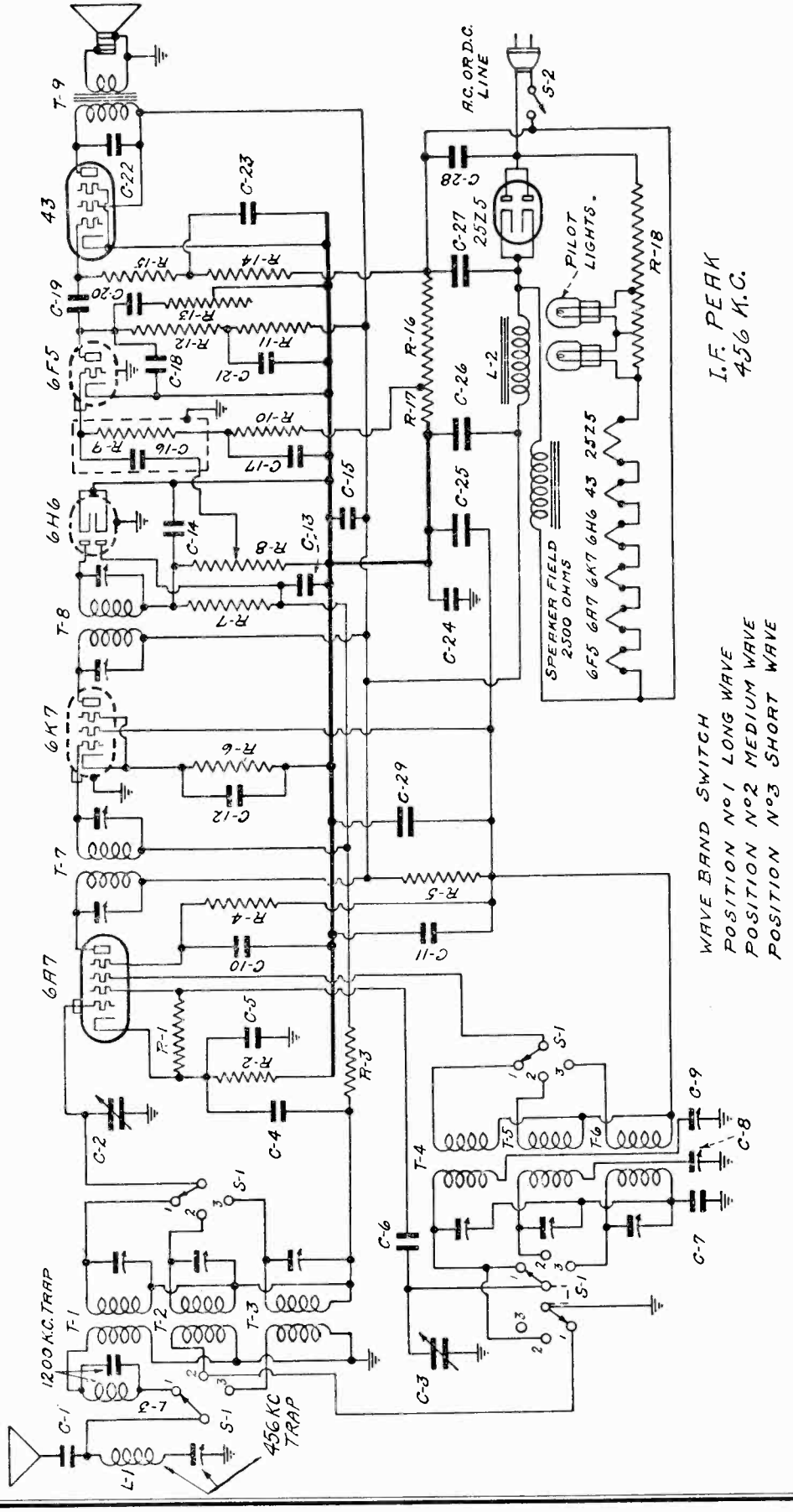
Receivers bearing serial numbers lower than 740,750:
C-8, .01 output condenser, was originally across 43 plate and ground, instead of to screen.

THE RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THE RECEIVER.

Power Supply: The power supply for this receiver should be either a. c. 50 to 60 cycles, or d. c., of any voltage between 105 and 130 volts. With special external line cord ballast resistors this receiver may be operated on higher voltages.

EMERSON RADIO & PHONO. CORP.

MODELS 107LW, 111LW
Chassis U6C
Schematic



The tube complement is as follows:

1—6A7 (glass) Pentagrid oscillator-modulator
1—6K7 (metal) I-f amplifier
1—6H6 (metal) Diode-detector and a.v.c.
1—6F5 (metal) Audio amplifier
1—43 (glass) Power output pentode
1—25Z5 (glass) Dual half-wave rectifier

Voltage rating ..... 105 to 130 volts
Current drain ..... 0.43 amps.
Frequency range ..... 135 to 359 kc, 540 to 1660 kc, 5.5 to 16 megacycles.

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600 and 1600 and 15,000 kc should be used. An output meter should be used across the voice coil or output transformer for observing maximum response.

I-f and Wave-Trap Alignment

The two i-f transformers are located in cans on the top of the chassis. The first i-f is in the right hand rear corner and the second i-f is behind the speaker. The four trimmers, two for each transformer, are located at the tops of the cans.

Rotate the variable condenser to minimum and set the wave-band switch to medium-wave (central position). Feed 456 kc to the grid of the 6A7 tube and align the four i-f trimmers for maximum response. Feed 456 kc through the antenna and adjust the 456 kc wave-trap for *minimum response*. The wave-trap trimmer is mounted on the wave trap located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis in the front right-hand corner. The three trimmers for these coils are mounted on a bakelite strip to the side of the coil form. The lowest trimmer is for the long-wave antenna coil. The central trimmer is for the medium-wave antenna coil and the top trimmer for the short-wave antenna coil.

The oscillator coils for the three bands are wound on one form and mounted on the inside of the right-hand chassis wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the long-wave oscillator coil, the central trimmer is for the medium-wave oscillator coil and the trimmer furthest from the front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the long-wave band and the other is for the medium-wave band. The short-wave band has no padder.

Long-Wave Alignment

Rotate the wave-band switch (clockwise) to the long-wave position and set dial to 150. Feed 150 kc through antenna and adjust the long-wave series padder (closest to front on lower row, right wall), for maximum response. Move dial pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer (closest to front on top row, right wall) and then the long-wave antenna trimmer (lower trimmer on upright coil). Return to 150 kc and readjust the series padder, rocking the variable condenser for maximum response. Return to 345 kc and check.

Medium-Wave Alignment

Rotate switch to medium-wave position (central). With dial at 600 feed 600 kc through the antenna and adjust the medium-wave band series padder (furthest from front on lower row, right wall), for maximum response. Move dial pointer to 1600, feed 1600 kc and adjust the medium-wave oscillator trimmer (on right wall, top row, center) for maximum response and then the medium-wave antenna trimmer (on top of chassis, central trimmer). Return to 600 kc and readjust the medium-wave series padder for maximum response. Return to 1600 kc and check.

Short-Wave Alignment

Rotate switch to the short-wave position (counter-clockwise) and set dial pointer to 15 megacycles. Feed 15 megacycles and adjust the short-wave oscillator trimmer (furthest from front on right wall) for maximum response, *choosing the minimum capacity peak*, and then the short-wave antenna trimmer (top trimmer on upright coil) *choosing the maximum capacity peak*. (See General Instructions below.)

Check all three bands for dead spots or incorrect image responses.

General Instructions

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

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

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

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

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to the cathode of the 43 tube (B minus). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	99	43	1.1	80	6.3
6K7	99	80	1.8	—	6.3
6H6	—	—	0	—	6.3
6F5	50	—	0	—	6.3
43	87	99	0	—	24

Voltage across speaker field (black and yellow leads)—120

Voltage across filter choke—9.5

The 250 ohm bias resistor, R16 and R17 on schematic diagram, is located underneath the chassis deck near the volume control.

Voltage across the two outside terminals of this resistor—11.5

Voltage from cathode of 43 tube to central terminal of resistor—1.0 volt.

GENERAL NOTES

1. To take the chassis out of the Model 107 cabinet first remove the knobs (knobs are of push-on type) and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
3. The filament dropping resistor, part number 2LR-212, is of the cylindrical plug-in type and is located on top of the chassis between the 6H6 and 25Z5 tubes.
4. The output transformer, part number 2LT-221 (T9 on schematic diagram), and the filter choke, part number 2CT-207A (L2 on schematic diagram), are located in the square can on top of the chassis to the left of the speaker.

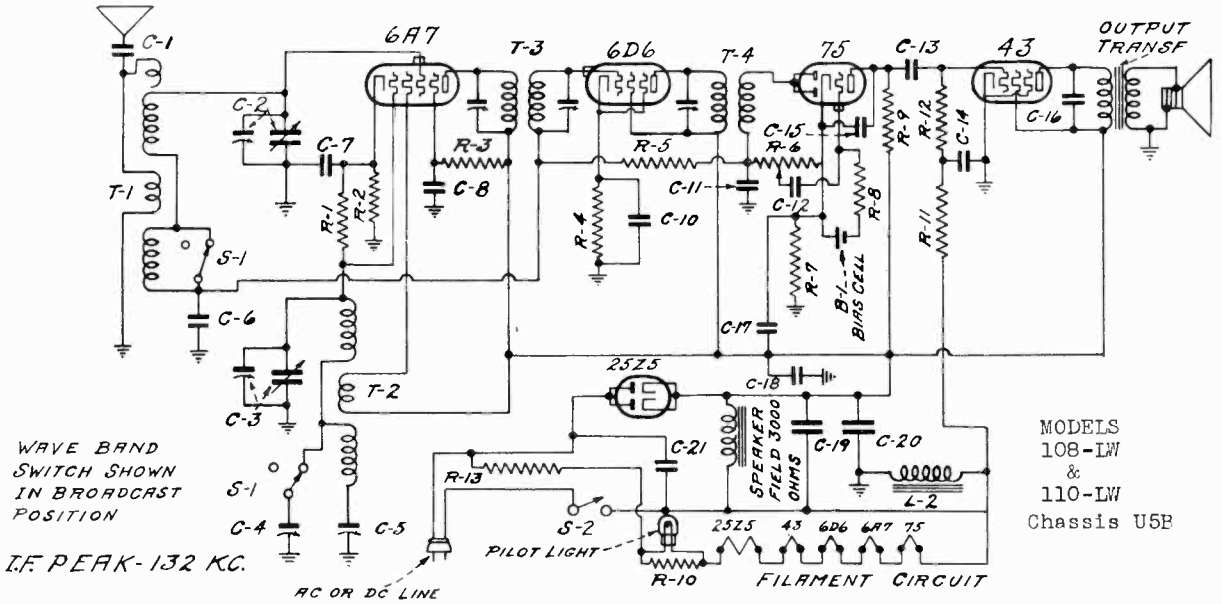
REPLACEMENT PARTS LIST

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Item	Part No.	DESCRIPTION	Price
L1	MMT-149	456 kc adjustable wave trap	$ .35
L2	2CT-207A	Filter choke—200 ohms	.60
L3	FFT-128	1200 kc image trap	.30
T1, T2, T3	2MT-222	Three-band antenna coil	2.30
T4, T5, T6	2MT-223	Three-band oscillator coil	1.85
T7	2LT-224	456 kc first i-f transformer	1.15
T8	2LT-225	456 kc second i-f transformer	1.15
T9	2LT-221	Speaker output transformer	1.00
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2, R6	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R3	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R4	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R5	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R7	KR-57	1 megohm ¼ watt carbon resistor	.16
R8, S2	ZZR-190A	Volume control with line switch—0.5 megohm	.75
R9, R10, R15	KR-56	0.5 megohm ¼ watt carbon resistor	.16
R11	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R12	LR-61	200,000 ohm ¼ watt carbon resistor	.16
R13	ZZR-191A	Tone control—250,000 ohms	.55
R14	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R16, R17	2CR-211	250 ohm, one watt, wire-wound tapped resistor R16—230 ohms R17—20 ohms	.25
R18	2LR-212	Plug-in type ballast resistor	.85
C1, C22	AAC-114	0.001 mf mica condenser	.16
C2, C3	ZZC-184	Two-gang variable condenser	1.80
C4, C5	2LC-225	0.05 mf, 200 volt tubular high-frequency condenser	.16
C6	EC-24A	0.0001 mf mica condenser	.16
C7	ZZC-206	0.005 mf mica condenser	.16
C8, C9	FFC-135A	Dual adjustable padding condenser C8—150 to 300 mmf C9—250 to 550 mmf	.50
C10, C11, C12 C13, C15, C24	2LC-223	Six-section condenser block C10—0.1 mf, 200 v. C13—0.05 mf, 200 v. C11—0.1 mf, 200 v. C15—0.1 mf, 200 v. C12—0.1 mf, 200 v. C24—0.2 mf, 200 v.	1.10
C14, C18	AC-7A	0.00025 mf mica condenser	.16
C16, C19	CCC-127A	0.01 mf, 200 volt tubular condenser	.16
C17, C21, C23	AC-6	0.1 mf, 200 volt tubular condenser	.16
C20	HC-34	0.006 mf, 600 volt tubular condenser	.16
C25, C26, C27	2LC-224	Multiple 4, 8 and 16 mf electrolytic condenser C25—4 mf, 150 volts C26—8 mf, 150 volts C27—16 mf, 150 volts	2.10
C28	LC-64	0.05 mf, 400 volt tubular condenser	.16
C29	YC-98A	Tubular 4 mf, 150 volt electrolytic condenser	.70
	2LS-142	Dynamic speaker (without output transformer)	3.75
S1	ZZS-129A	Wave-band switch	1.05
	XL-9	Pilot light, 6.3 volts, .25 amp. Mazda No. 46	.15
	2MD-33	Airplane dial	1.85
	ZZZ-209	Escutcheon	.20

EMERSON RADIO & PHONO. CORP.

MODELS 108LW, 110LW
Chassis U5B
MODEL 109
Chassis U4A
Schematics



MODELS 108-LW & 110-LW Chassis U5B

The tube complement is as follows:

1—6A7—Pentagrid oscillator-modulator.
1—6D6—I-f amplifier.
1—75—Diode detector, audio amplifier, automatic volume control.
1—43—Pentode power output.
1—25Z5—Dual half-wave rectifier.

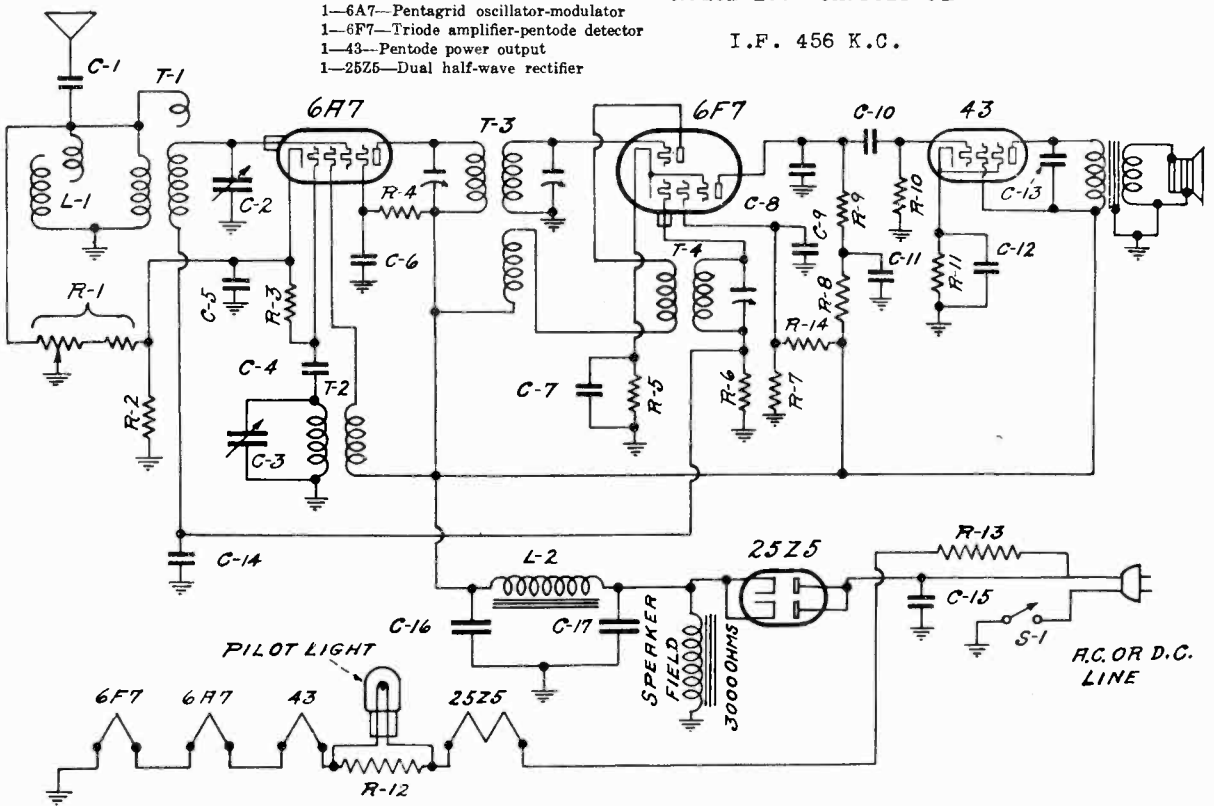
Voltage rating	105-130 volts
Current drain	0.4 amp.
Frequency ranges	145 to 475 kc, 530 to 1550 kc.

The tube complement is as follows:

1—6A7—Pentagrid oscillator-modulator
1—6F7—Triode amplifier-pentode detector
1—43—Pentode power output
1—25Z5—Dual half-wave rectifier

Model 109 Chassis U4A

I.F. 456 K.C.



MODEL 108-LW & 110-LW
Chassis U5B

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	55	1.6	105	6
6D6	105	105	3.0	—	6
75	45	—	0	—	6
43	100	105	0	—	24

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.

Voltage across choke (chassis to line switch)—20 volts.

Location of Coils and Trimmer Adjustments:

The first i-f transformer, our part 2JT-217, is located on the top of the chassis. The two trimmers for this transformer may be adjusted through two holes in the top of the can. The second i-f transformer is mounted on the inside of the right-hand wall of the chassis, and has one trimmer accessible through a hole in the chassis.

The antenna trimmer is on the front section (antenna) of the variable condenser. The oscillator trimmer is on the rear section (oscillator) of the variable condenser. The dual padding condenser unit mounted on the metal strap at the rear of the chassis has two series padders, one for the long-wave band and one for the medium-wave band. The long-wave series padder is the one closest to the wave-band switch. The one farthest from the switch is the medium-wave series padder.

Alignment Procedure:

1. Rotate wave-band switch (at rear of chassis) to the medium-wave position, clockwise.
2. Rotate the variable condenser to the minimum capacity position and feed 132 kc to the grid cap of the 6A7 tube.
3. Adjust the three i-f trimmers (two on first i-f and one on the second i-f) for maximum response.
4. Rotate the wave-band switch to the long-wave position, counter-clockwise, and set dial pointer to 172.5.
5. Feed 172.5 kc to antenna lead and adjust the long-wave series padder (on dual unit, nearest to switch) for maximum response.
6. Rotate the wave-band switch to the medium-wave position, clockwise, and set the dial pointer at 600.
7. Feed 600 kc to antenna and adjust the medium-wave series padder (one on dual unit, furthest from switch) for maximum response.
8. Set dial pointer to 1425, feed 1425 kc to antenna and adjust the oscillator trimmer, on the rear section of the variable condenser, for maximum response and then adjust the antenna trimmer, on the front section of the variable condenser, for maximum response.
9. Return pointer to 600 kc, feed 600 kc and readjust the medium-wave series padder while rocking the variable condenser (rotate variable condenser shaft back and forth through a small arc) for maximum response.
10. Return pointer to 1425, feed 1425 kc and check the medium-wave adjustments.
11. Rotate wave-band switch to the long-wave position, counter-clockwise. Set pointer at 172.5, feed 172.5 kc and readjust the long-wave series padder while rocking the variable condenser 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.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L2	ZZT-196	Filter choke—500 ohms	$ .60
T1	2JT-215	Two-band antenna coil	.70
T2	2JT-216	Two-band oscillator coil	.65
T3	2JT-217	132 kc first i-f transformer	1.05
T4	2JT-218	132 kc second i-f transformer	.80
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R3	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R4	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R5, R8	KR-57	1 megohm ¼ watt carbon resistor	.16
R6, S2	2DR-169	Volume control with line switch—0.5 megohm	.80
R7	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R9, R11, R12	KR-56	0.5 megohm ¼ watt carbon resistor	.16
R10	2DR-200	25 ohm wire-wound metal clad resistor	.16
R13		146 ohm, 15 watt resistor wire in line cord (see part no. 2DW-62, below)	
C1, C11	IC-47A	0.0005 mf mica condenser	.16
C2, C3	2JC-218	Two gang variable condenser	2.20
C4, C5	JJC-144C	Dual adjustable padding condenser C4—800 to 1400 mmf. C5—250 to 550 mmf.	.60
C6, C14, C21 C7, C8, C10	AC-6	0.1 mf, 200 volt tubular condenser	.16
C12, C13	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C15	AC-7A	0.00025 mf mica condenser	.16
C16	BC-34	0.006 mf, 600 volt tubular condenser	.16
C17	EC-19	0.5 mf, 200 volt tubular condenser	.25
C18	BC-13	0.25 mf, 200 volt tubular condenser	.16
C19, C20	2DC-203	Multiple 8 and 16 mf electrolytic filter condenser C19—16 mf, 150 volts. C20—8 mf, 150 volts.	1.50

MODEL 109
Chassis Model U4A

VOLTAGE ANALYSIS

Voltage readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis).

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	60	1.35	105	5.5
6F7 { Pentode	55	15	2.25	—	5.5
6F7 { Triode	105				
43	98	105	14.5	—	23.0

Voltage across speaker field—115

Voltage across choke—10.5

Location of I-f's and Trimmers:

The first i-f transformer, part No. KKT-136, is in an oblong coil can, located on top of the chassis directly behind the speaker. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part No. KKT-137B, is in a round coil can located on top of the chassis to the left of the speaker. The single trimmer for this i-f is accessible through a hole in the top of the coil can.

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

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

FIRST I-F TRANSFORMER (Part No. KKT-136)
Plate—blue
B plus—red
Grid return—black
Tertiary—black, red tracer
Grid—green

SECOND I-F TRANSFORMER (Part No. KKT-137B)
Plate—blue
B plus—red
Grid return—black
Grid—green

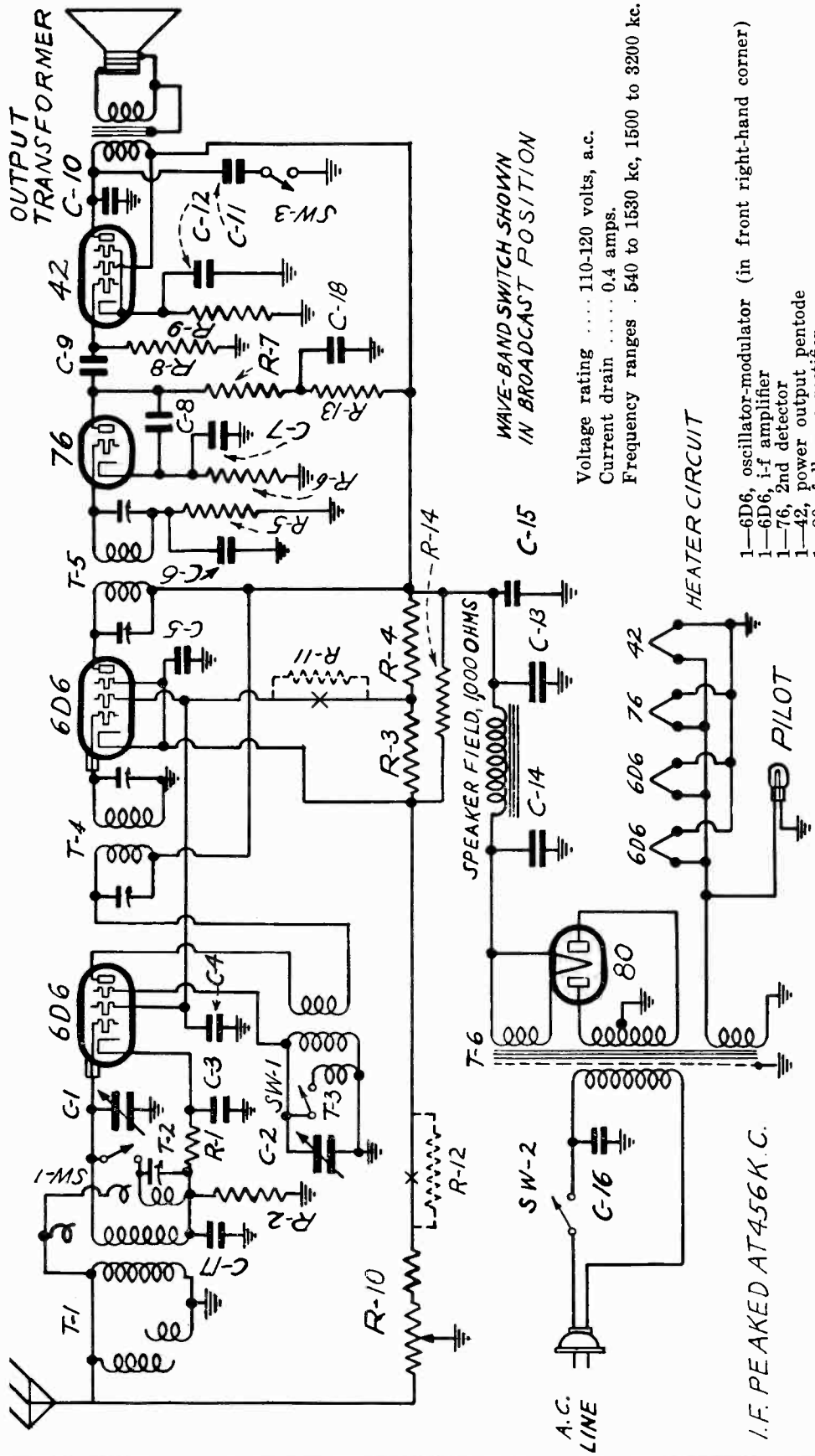
When replacing the oscillator coil, part number KKT-135, be sure to mount it in the correct position. The locating hole in the square fibre terminal strip should be nearest the rear of the chassis.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L2	KKT-138	Filter choke—300 ohms	$ .70
T1, L1	KKT-134	Antenna coil with 456 kc wave trap	.85
T2	KKT-135	Oscillator coil	.40
T3	KKT-136	456 kc first i-f transformer	1.40
T4	KKT-137B	456 kc second i-f transformer	1.10
R1, S1	KKR-134B	Volume control with line switch—75,000 ohms	.85
R2	KKR-163	6,000 ohm ¼ watt carbon resistor	.16
R3, R14	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R4, R8	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R5	*FFR-133	650 ohm ½ watt wire-wound resistor	.16
R6	KR-57	1 megohm ¼ watt carbon resistor	.16
R7	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R9	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	KR-56	0.5 megohm ¼ watt carbon resistor	.16
R11	KKR-135A	650 ohm 1 watt wire-wound resistor	.16
R12	2DR-200	25 ohm wire-wound metal clad resistor	.20
R13	KKW-46A	135 ohm, 17 watt resistor wire, built into line cord	.70
C1	AAC-114	0.001 mf mica condenser	.16
C2, C3	KKC-142A	Two-gang variable condenser	2.15
C4	NC-70A	0.0002 mf mica condenser	.16
C5, C8, C9 C11, C14	AC-6A	0.1 mf, 200 volt tubular condenser	.16
C7, C12	KKC-145	Dual 5 mf, 25 volt tubular electrolytic condenser	.90
C8	AC-7A	0.00025 mf mica condenser	.16
C10, C13	KC-58A	0.01 mf, 400 volt tubular condenser	.16
C15	GC-87	0.1 mf, 400 volt tubular condenser	.16
C16, C17	KKC-143	8 and 12 mf electrolytic filter condenser C16—8 mf, 150 volts C17—12 mf, 150 volts	1.50

EMERSON RADIO & PHONO. CORP.

MODELS 116,121
Chassis 65
Schematic
Voltage



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. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6 (in front right-hand corner)	230	107	21.5	6.3 a.c.
6D6 (i-f)	230	107	4.0	6.3 a.c.
76	125	—	9.8	6.3 a.c.
42	210	230	13.5	6.3 a.c.

B plus at filament of 80 tube—295 volts.
Voltage across speaker field—65 volts.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 42 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.

2. The color coding of the leads of the composite first i-f transformer and oscillator coil, part no. TTT-173, is as follows:
   B plus—red
   Plate—blue
   I-f grid return—white. (See following line.)
   In some receivers the i-f grid return and the oscillator grid return were brought out in one common black lead.
   Oscillator grid return—black
   Suppressor grid—green with white tracer
   I-f grid—green

3. The color coding of the leads of the second i-f transformer, part no. TTT-176A, is as follows:
   Grid—green
   Grid return—black
   Plate—blue
   B plus—red

4. The color coding of the leads on the power transformer is as follows:
   Primary—two green leads.
   High voltage secondary—two black leads.
   High voltage secondary center-tap—yellow lead.
   6.3 volt secondary—two heavy blue leads.
   5 volt secondary—two heavy red leads.

5. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue
   B plus—red
   Screen—brown
   Cathode—white or yellow
   Grid—green
   Filament and ground—black.

6. 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.

7. It is not necessary to remove the chassis from the cabinet to replace the pilot light. Simply slip the push-on bracket off the dial and unscrew the bulb.

ADJUSTMENTS

An oscillator with frequencies of 456, 1425 and 2500 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. Part no. TTT-173 is a composite broadcast oscillator coil and first i-f transformer.

The broadcast antenna coil is mounted underneath the chassis deck, directly below the variable condenser. The short-wave oscillator coil is mounted on the right-hand wall of the chassis. The short-wave antenna coil is located underneath the chassis deck near the oscillator coil. The trimmer for this short-wave antenna coil is mounted on the coil tubing.

I-f Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and swing the variable condenser to the maximum capacity position. Feed 456 kc to the stator of the front (antenna) section of the variable condenser. Adjust the four i-f trimmers (at tops of i-f cans) for maximum response.

Broadcast Alignment (Use a .0002 mf condenser as a dummy antenna.)

With the wave-band switch in the broadcast position, set the dial pointer at 1425. Feed 1425 kc to the antenna and adjust first the oscillator trimmer (rear) and then the antenna trimmer (front) on the variable condenser for maximum response.

Short-wave Alignment

Rotate the wave-band switch to the short-wave position, counter-clockwise. Feed 2500 kc through the antenna and rotate the variable condenser in the vicinity of the 2500 mark until this signal is picked up. Adjust the short-wave antenna trimmer (at the top of the small coil beneath the chassis deck) for maximum response on this signal.

PRODUCTION CHANGES

Receivers bearing serial numbers from 119,051 to 122,050—

The two resistors R11 and R12, shown by dotted lines on the schematic diagram were used in the circuit.

Receivers bearing serial numbers from 126,051 to 127,050—

a. R3 and R4, wire-wound tapped resistor, changed from part no. TTR-173 to part no. 2TR-221. In this new resistor R3 is 20,500 ohms, ½ watt, and R4 is 12,500 ohms, 1.5 watts.
b. The volume control was changed from part no. TTR-159A to TTR-159B. The latter control has 250 ohm bias stop.
c. R11 was omitted.
d. R12 was omitted.
e. The speaker was changed from part no. TTS-110 to part no. 2TS-162.

NOTE: Changes a, b, c and d were made simultaneously.

Receivers bearing serial numbers above 127,401—

a. R3 and R4, wire-wound tapped resistor, replaced by carbon resistors.
R3 is part no. DDR-122, 20,000 ohm ½ watt carbon resistor.
R4 is part no. 2TR-225, 12,000 ohm 2 watt carbon resistor.

Receivers bearing serial numbers above 726,018—

a. R14, 50,000 ohm 2 watt carbon resistor, was added. (Part no. 2TR-233.)
b. R13, 25,000 ohm ¼ watt carbon resistor, was added. (Part no. OR-73.)
c. C18, a 0.5 mf 400 volt tubular condenser, was added. (Part no. IC-46.)
d. C6 and R5 were omitted and the grid return of the second i-f transformer was grounded to chassis.

Receivers bearing serial numbers above 750,450—

a. The wave-band switch (S1) was changed from part no. TTS-111E to part no. TTS-111H.
b. The tone-control switch (S3) was changed from part no. 2TS-145B to part no. 2TS-145D.
c. The volume control (R10, S2) was changed from part no. TTR-159B to part no. TTR-159C.
d. The airplane dial was changed from part no. 2TD-30A to part no. 2TD-30B.
NOTE: Above four revisions involve only changes in shaft lengths.

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS

EMERSON PRODUCTION CHANGES AS OF 4/29/36
NOT ALREADY NOTED IN SERVICE NOTES

Chassis Model G-5; Cabinet Models 116 and 121

Receivers bearing serial numbers higher than 753,600:
The bias stop on the volume control, R-10, made 200 ohms instead of 250 and the part number was changed from TTR-159C to TTR-159D

R-3, 20,000 ohm resistor changed from ½ watt to 1 watt and part number changed from DDR-122 to GR-31.

C-10, .006 output condenser, put across 43 plate and screen, instead of plate to ground.

Receivers bearing serial numbers higher than 753,800:
R-6, 150,000 ohm resistor in 76 cathode circuit changed to 50,000 ohms, ½ watt; part number changed from LLR-152 to KR-53.
Recommended to cure microphonic 76's.

REPLACEMENT PARTS

*Item No.	Part No.	DESCRIPTION	PRICE List Price on Effective as of Sept. 1st, 1935
T1	TTT-172	Broadcast antenna coil	$ .60
T2	TTT-177	Short-wave antenna coil	.40
T3	TTT-178	Short-wave oscillator coil	.20
T4	TTT-173	Composite broadcast oscillator and 456 kc first i-f transformer	1.20
T5	TTT-176A	456 kc second i-f transformer	.90
T6	BRT-114A	Power transformer	2.70
R1	TTR-175	300 ohm ¼ watt wire-wound resistor	.16
R2	TTR-201	3,000 ohm ¼ watt carbon resistor	.16
†R3, R4	TTR-173	Wire-wound tapped resistor R3—27,000 ohms, 2.5 watts R4—9,000 ohms, 1.5 watts	.40
†R5	HR-42	2 megohm ¼ watt carbon resistor	.16
R6	LLR-152	150,000 ohm ¼ watt carbon resistor	.16
R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R9	TTR-174	410 ohm 1 watt wire-wound resistor	.80
†R10, S2	TTR-159A	Volume control with line switch—5,000 ohms (This volume control has a 150 ohm bias stop)	
†R11	LR-64	5,000 ohm ¼ watt carbon resistor	.16
†R12	LLR-147	100 ohm ½ watt wire-wound resistor	.16
†R13	OR-73	25,000 ohm ¼ watt carbon resistor	.16
†R14	2TR-233	50,000 ohm 2 watt carbon resistor	.16
C1, C2	2TC-180	Two-gang variable condenser	1.85
C3, C17	TTC-176	Dual 0.02 mf, 400 volt tubular condenser	.20
C4	FC-29	0.02 mf, 200 volt tubular condenser	.16
†C5, C6, C7	AC-6	0.1 mf, 200 volt tubular condenser	.16
C8	AAC-114	0.001 mf mica condenser	.16
C9	BC-23	0.03 mf, 400 volt tubular condenser	.16
C10	HC-34	0.006 mf, 600 volt tubular condenser	.16
C11	2TC-189	0.015 mf, 1000 volt tubular condenser	.16
C12, C13, C14	TTC-159	Multiple dry electrolytic filter condenser C12—12 mf, 25 volt C13—6 mf, 400 volt C14—8 mf, 400 volt	2.20
C15	EEC-132	0.1 mf, 400 volt tubular condenser	.16
C16	TTC-177	0.01 mf, 600 volt tubular condenser	.16
†C18	IC-46	0.5 mf, 400 volt tubular condenser	.30
†	TTS-110	5" dynamic speaker	3.20
S1	TTS-111E	Wave-band switch	.40
S3	2TS-145B	Tone-control switch	.25
	XL-9	Pilot light, 6.3 volts, .25 amp. Mazda No. 46	.15
	2TD-30A	Airplane dial	1.30
	2NZ-306	Escutcheon with crystal	.50

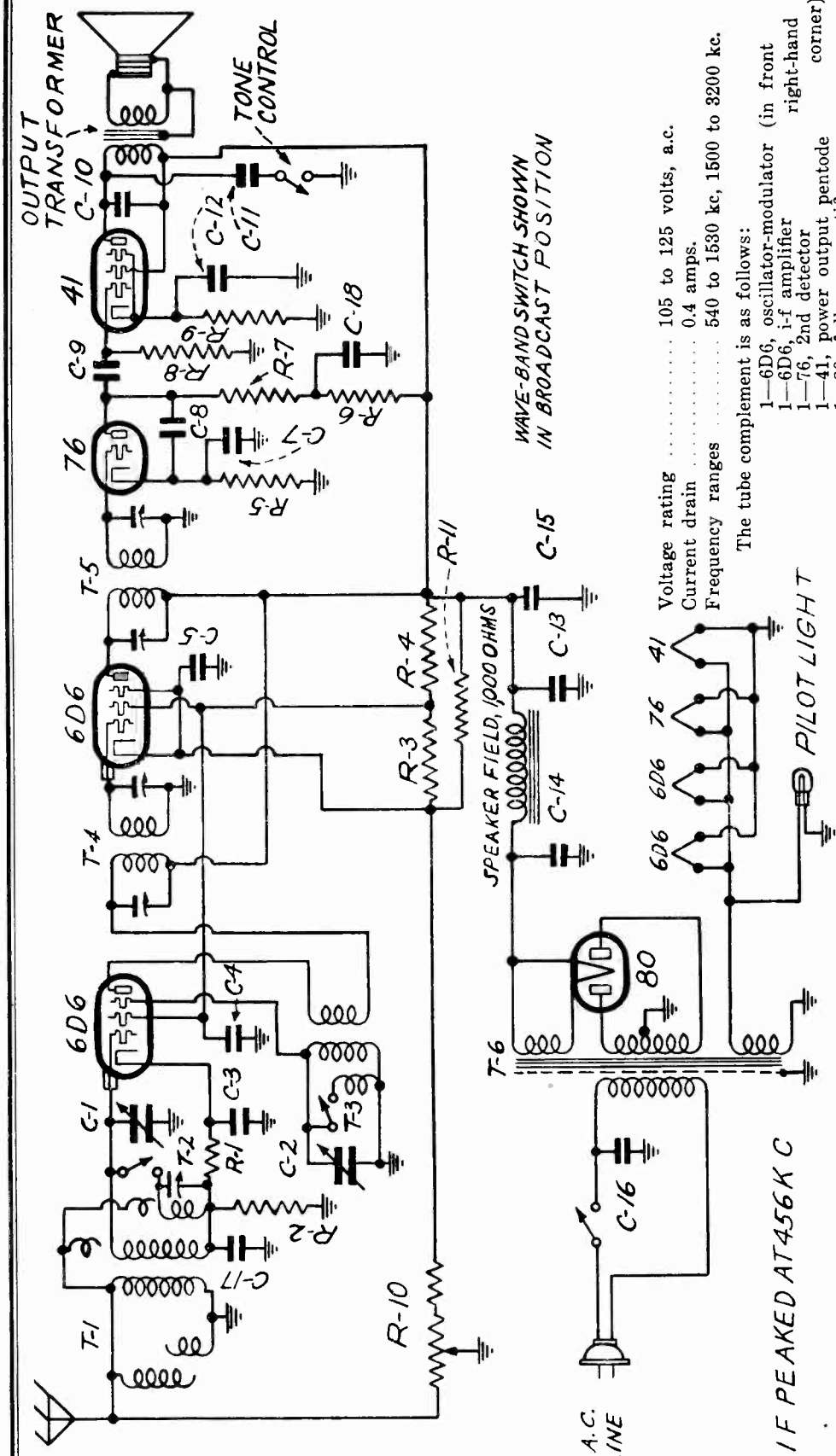
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

† See Production Changes

*Item number locates the article on the schematic diagram.

EMERSON RADIO & PHONO. CORP

MODELS K116, K121, K123
Chassis K
Schematic, Voltage



Voltage rating ..... 105 to 125 volts, a.c.
Current drain ..... 0.4 amps.
Frequency ranges ..... 540 to 1530 kc, 1500 to 3200 kc.

The tube complement is as follows:
1—6D6, oscillator-modulator (in front right-hand corner)
1—6D6, i-f amplifier
1—76, 2nd detector
1—41, power output pentode
1—80, full-wave rectifier.

VOLTAGE ANALYSIS

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

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6 (in front right-hand corner)	242	130	21.5	6.3 a.c.
6D6 (i-f)	242	130	4.0	6.3 a.c.
76	100	—	9.8	6.3 a.c.
41	216	242	13.5	6.3 a.c.

B plus at filament of 80 tube—305 volts.
Voltage across speaker field—60 volts.

MODELS K116, K121, K123
Chassis K
Alignment, Parts

EMERSON RADIO & PHONO. CORP.

I-f Alignment

An oscillator with frequencies of 456, 1425 and 2500 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate the wave-band switch to the broadcast position, clockwise, and swing the variable condenser to the maximum capacity position. Feed 456 kc to the stator of the front (antenna) section of the variable condenser. Adjust the four i-f trimmers (at tops of i-f cans) for maximum response.

Short-wave Alignment

Rotate the wave-band switch to the short-wave position, counter-clockwise. Feed 2500 kc through the antenna and rotate the variable condenser in the vicinity of the 2500 mark until this signal is picked up. Adjust the short-wave antenna trimmer (at the top of the small coil beneath the chassis deck) for maximum response on this signal.

Broadcast Alignment (Use a .0002 mf condenser as a dummy antenna.)

With the wave-band switch in the broadcast position, set the dial pointer at 1425. Feed 1425 kc to the antenna and adjust first the oscillator trimmer (rear) and then the antenna trimmer (front) on the variable condenser for maximum response.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. Part no. TTT-173 is a composite broadcast oscillator coil and first i-f transformer.

The broadcast antenna coil is mounted underneath the chassis deck, directly below the variable condenser. The short-wave oscillator coil is mounted on the right-hand wall of the chassis. The short-wave antenna coil is located underneath the chassis deck near the oscillator coil. The trimmer for this short-wave antenna coil is mounted on the coil tubing.

The color coding of the leads of the composite first i-f transformer and oscillator coil, part no. TTT-173, is as follows:

B plus—red
Plate—blue
I-f and oscillator grid return—black
Suppressor grid—green with white tracer
I-f grid—green

The color coding of the leads of the second i-f transformer, part no. TTT-176A, is as follows:

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

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

Primary—two green leads.
High voltage secondary—two black leads.
High voltage secondary center-tap—yellow lead.
6.3 volt secondary—two heavy blue leads.
5 volt secondary—two heavy red leads.

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

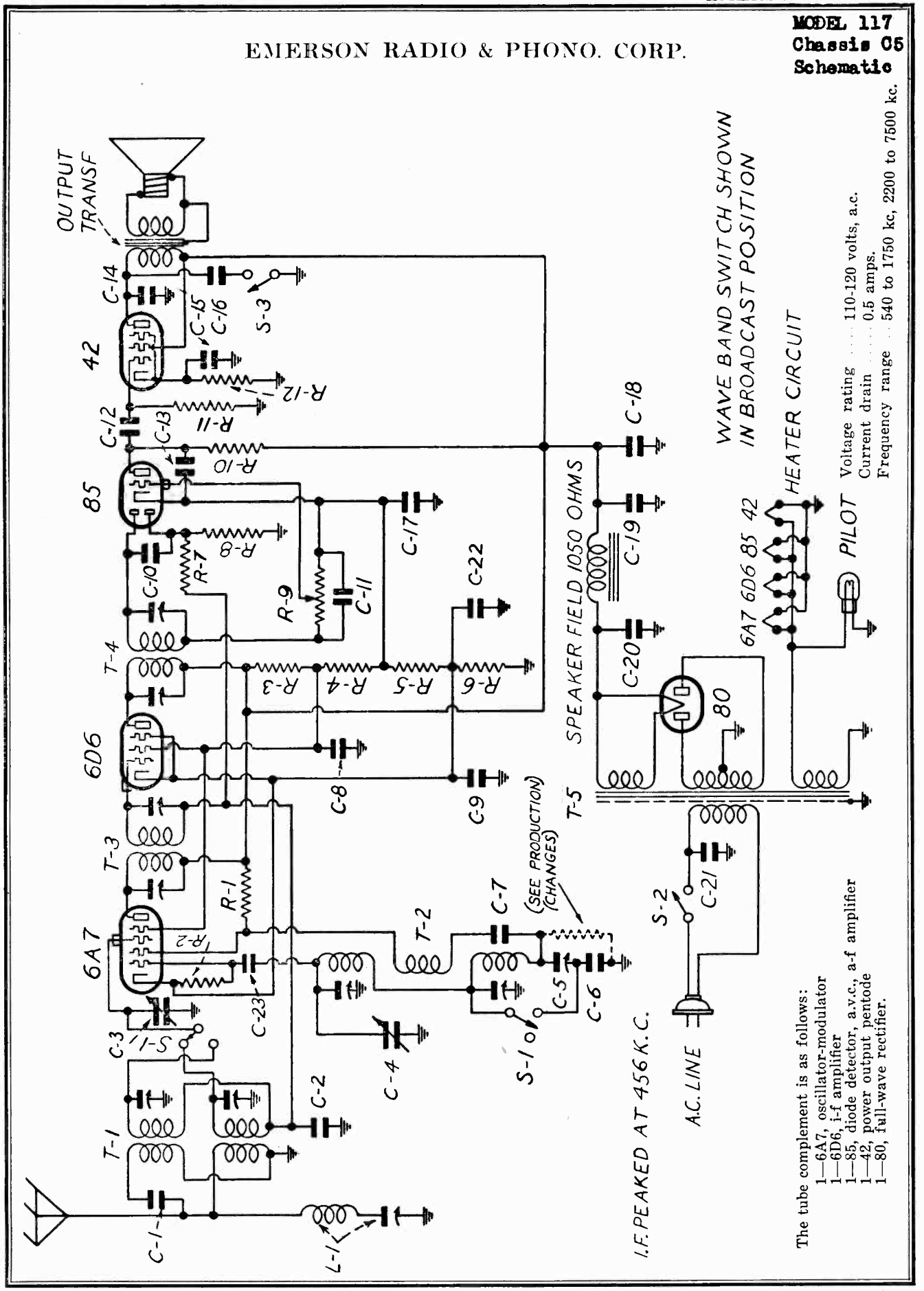
Plate—blue
B plus—red
Screen—brown
Cathode—white or yellow
Grid—green
Filament and ground—black.

REPLACEMENT PARTS

*Item No.	Part No.	DESCRIPTION	PRICE List Price ea. Effective as of Aug. 1st, 1936
T1	TTT-172	Broadcast antenna coil	$ .90
T2	TTT-177	Short-wave antenna coil	.60
T3	TTT-178	Short-wave oscillator coil	.30
T4	TTT-173	Composite broadcast oscillator and 456 kc first i-f transformer	1.80
T5	TTT-176A	456 kc second i-f transformer	1.35
T6	BBT-114A	Power transformer	4.05
R1	TTR-175	300 ohm ¼ watt wire-wound resistor	.16
R2	TTR-201	3,000 ohm ¼ watt carbon resistor	.16
R3	GR-31	20,000 ohm 1 watt carbon resistor	.16
R4	2TR-225	12,000 ohm 2 watt carbon resistor	.16
R5	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R6	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R9	TTR-174	410 ohm 1 watt wire-wound resistor	.16
R10	TTR-159F	Volume control with line switch—5,000 ohms (This volume control has 200 ohm bias stop)	1.20
R11	2TR-233	50,000 ohm 2 watt carbon resistor	.16
C1, C2	3KC-287	Two gang variable condenser	3.50
C3, C17	TTC-176	Dual 0.02 mf, 400 volt tubular condenser	.30
C4	FC-29	0.02 mf, 200 volt tubular condenser	.20
C5, C7	AC-6	0.1 mf, 200 volt tubular condenser	.20
C8	AAC-114	0.001 mf mica condenser	.20
C9	EC-23	0.03 mf, 400 volt tubular condenser	.20
C10	HC-34	0.006 mf, 600 volt tubular condenser	.20
C11	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C12, C13, C14	TTC-159	Multiple dry electrolytic filter condenser C12—12 mf, 25 volt C13—6 mf, 400 volt C14—8 mf, 400 volt	3.30
C15	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C16	3LC-297	0.01 mf, 250 volt a.c. tubular condenser in metal container	.30
C18	IC-46	0.5 mf, 400 volt tubular condenser	.45
	2TS-162	6½" dynamic speaker	5.25
	TTS-111K	Wave-band switch	.60
	2TS-145E	Tone-control switch	.35
	XL-9	Pilot light, 6.3 volts, .25 amp., Mazda No. 46	.20
	2TZ-363	Dial face	.75
	3KZ-404	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal (For Models K-116 and K-123)	1.05
	3CZ-350A	Escutcheon with crystal (For Model K-121)	1.05

EMERSON RADIO & PHONO. CORP.

MODEL 117
Chassis C5
Schematic



Voltage rating . . . . 110-120 volts, a.c.
Current drain . . . . . 0.5 amps.
Frequency range . . 540 to 1750 kc, 2200 to 7500 kc.

The tube complement is as follows:
1—6A7, oscillator-modulator
1—6D6, i-f amplifier
1—85, diode detector, a.v.c., a-f amplifier
1—42, power output pentode
1—80, full-wave rectifier.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 42 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:

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

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 condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder which is a 1350 mmf molded mica condenser. (Note that this condenser is coded 1300 mmf.) When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1350 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:

Plate—blue	Cathode—white or yellow
B plus—red	Grid—green
Screen—brown	Fil. and ground—black.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments

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

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

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

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

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

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response*.

Short-wave Alignment

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

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

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

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

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

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
85	37	—	5.5	—	6.3 a.c.
42	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts
Voltage across speaker field—70 volts.

REPLACEMENT PARTS

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

*Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L1	MMT-149	456 kc adjustable wave trap	$ .35
T1	2NT-226	Two-band antenna coil	1.10
T2	2NT-227	Two-band oscillator coil	.90
T3	2NT-230	456 kc first i-f transformer	.90
T4	2NT-231	456 kc second i-f transformer	.90
T5	2NT-233	Power transformer	2.70
R1	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
R4	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R5	FFR-126	500 ohm ½ watt wire-wound resistor	.16
R6	IIR-130	150 ohm ½ watt wire-wound resistor	.16
R7, R8	KR-57	1 megohm ¼ watt carbon resistor	.16
R9, S2	2NR-214	Volume control with line switch—250,000 ohms	.80
R10	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R11	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C1, C23	AAC-106A	0.00005 mf mica condenser	.16
C2, C8	BC-12	0.05 mf, 200 volt tubular condenser	.16
C3, C4	2NC-228	Two gang variable condenser	2.00
C5	2NC-231	Single adjustable padding condenser Range—300 to 600 mmf	.35
C6	2NC-230	0.00135 mf mica condenser	.20
C7	KC-58	0.01 mf, 400 volt tubular condenser	.16
C9	BC-13	0.25 mf, 200 volt tubular condenser	.16
C10, C11, C22	AC-7A	0.00025 mf mica condenser	.16
C12	LC-65	0.02 mf, 400 volt tubular condenser	.16
C13	IC-47	0.0005 mf mica condenser	.16
C14	ZC-115	0.006 mf, 1000 volt tubular condenser	.16
C15	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.60
C16	2TC-189	0.015 mf, 1000 volt tubular condenser	.16
C17	AC-6	0.1 mf, 200 volt tubular condenser	.16
C18	EEC-132	0.1 mf, 400 volt tubular condenser	.16
C19	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	.80
C20	2NC-246	16 mf, 450 volt wet electrolytic condenser	.80
C21	2NC-250	0.01 mf, 250 volt a-c condenser in tubular metal container	.20
	2NS-122	6½" dynamic speaker	3.75
S1	TTS-111E	Wave-band switch	.40
S3	2TS-145B	Tone control switch	.25
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.15
	2ND-34B	Airplane dial	1.30
	2NZ-306	Escutcheon with crystal	.50
	2TM-211	Escutcheon reflector ring	.10

PRODUCTION CHANGES

In early production:

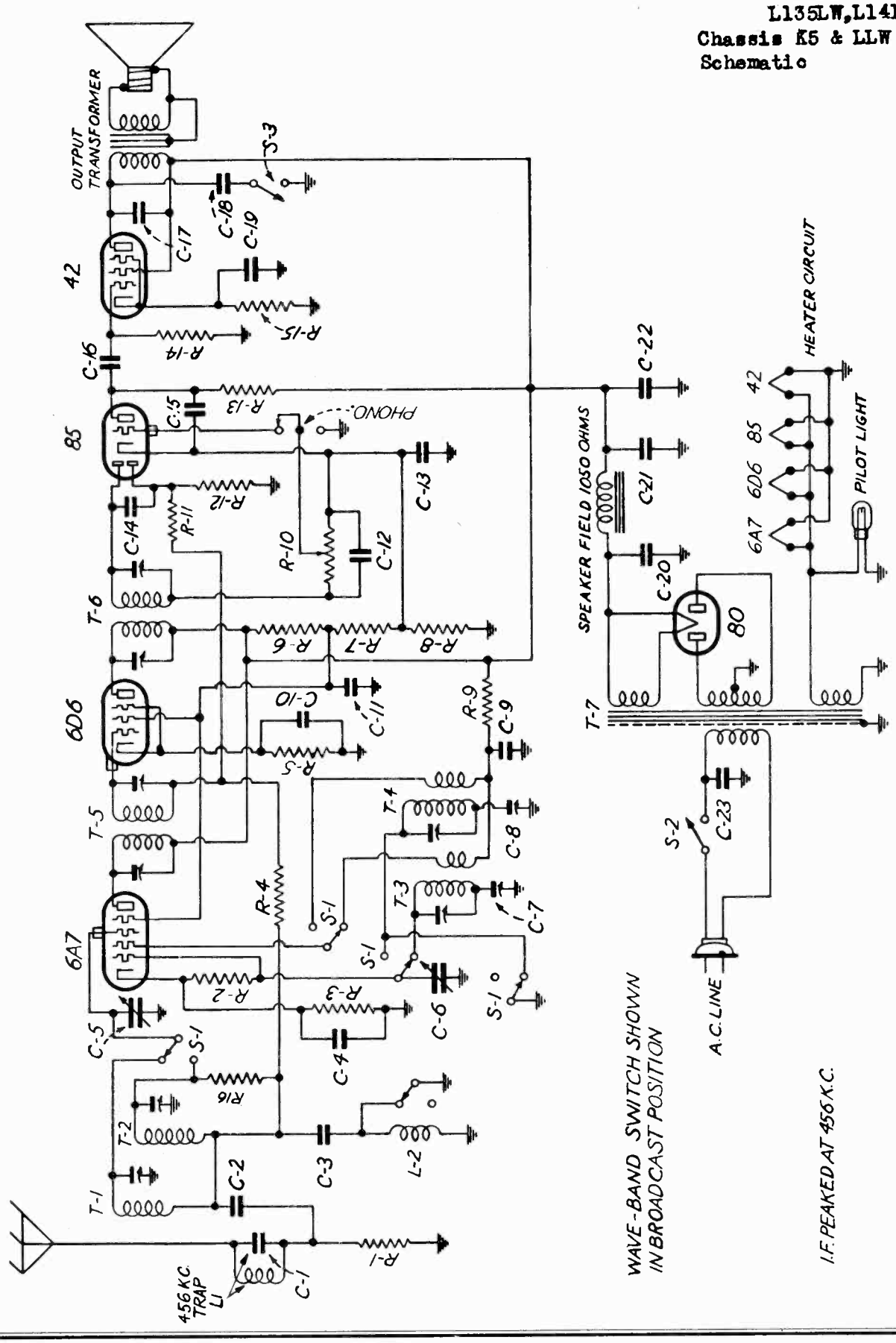
a. Airplane dial was part number 2ND-34 and had a grey dial face. Later dial, part number 2ND-34B, has a black dial face.

b. C19 and C20 were each 12 mf, 450 volt electrolytics.

c. R2 was originally in position indicated by dotted lines. It was later placed across the oscillator grid and cathode of the 6A7 tube (as now shown in the schematic) and at the same time C23 was added and C22 omitted.

EMERSON RADIO & PHONO. CORP.

MODELS 117LW, L117LW
L122LW, L133LW
L135LW, L141LW
Chassis K5 & LLW
Schematic



MODELS 117LW,L117LW, L122LW,L133LW, EMERSON RADIO & PHONO. CORP.
L135LW,L141LW
Chassis K5 & LLW
Notes,Voltage,Parts
Alignment

Chassis Models K5 and LLW
(Chassis model number is printed on the license plate)

Voltage rating	105-125 volts a.c. (unless otherwise specified)
Current drain	0.5 amps.
Frequency range	540 to 1750 kc., 150 to 375 kc.

NOTE: The two frequency ranges are referred to as broadcast and long-wave which, in Europe, are commonly known as medium-wave and long-wave broadcast, respectively.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the output tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green
   B plus—red
   Grid return—black
   Plate—blue
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 dual adjustable padding condenser is mounted on the left side of the front chassis wall. The hexagon nut is the adjustment for the long-wave band and the screw in the center of this nut is the adjustment for the broadcast band.
6. With few exceptions, the color coding of the general wiring is as follows:
   Plate—blue
   B plus—red
   Screen—brown
   Cathode—white or yellow
   Grid—green
   Fil. and ground—black

Tube Data

The tube complement is as follows:

1-6A7, oscillator-modulator
1-6D6, i-f amplifier
1-85, diode detector, a.v.c., a-f amplifier
1-42 or 41, power output pentode.
(In chassis model LLW the output tube is a 41. The 42 tube was used only in the **K5** chassis)
1-80, full-wave rectifier.

VOLTAGE ANALYSIS

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

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	250	90	3.8	143	6.3 a.c.
6D6	250	90	3.3	—	6.3 a.c.
85	36	—	4.1	—	6.3 a.c.
42 or 41	240	250	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts.
Voltage across speaker field—75 volts.

ADJUSTMENTS

An oscillator with frequencies of 172.5, 345, 456, 600 and 1600 kc should he used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Use a standard dummy antenna when aligning either band. A .0002 mf condenser may be used as a substitute.

Location of Coils and Trimmer Adjustments

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

The dual adjustable padding condenser is mounted on the left side of the front chassis wall. (See General Notes).

The antenna coils for the broadcast and long-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the broadcast antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.

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

I-f Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Swing the variable condenser to the *minimum capacity* position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Broadcast Alignment

With the switch in the broadcast position set the dial pointer to 60 and feed 600 kc through the dummy antenna. Adjust the broadcast series padding condenser (slotted screw on dual unit at left hand side of front chassis wall) for maximum response. Move the pointer to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (closest to front beside variable condenser) for maximum response and then adjust the broadcast antenna trimmer (closest to front at left side of chassis) for maximum response. Return pointer to 60, feed 600 kc and readjust the padding condenser while rocking the variable condenser (rotate back and forth through small arc) for maximum response.

Long-Wave Alignment

Rotate the wave-band switch to the long-wave position, counter-clockwise, and set the dial pointer at 345. Feed 345 kc through the dummy antenna and adjust the long-wave oscillator trimmer (farthest from front beside variable condenser) for maximum response and then adjust the long-wave antenna trimmer (farthest from front at left side of chassis). Move the pointer to 172.5 kc and feed 172.5 kc. Adjust the long-wave series padder (hexagon nut on dual unit) for maximum response. Return the pointer to 345 kc and adjust the long-wave oscillator and antenna trimmers and then return to 172.5 kc and readjust the long-wave padding condenser. If appreciable shift is noticed align again at 345 kc and then at 172.5 kc repeating this procedure until no further change occurs.

GENERAL INSTRUCTIONS

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

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

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

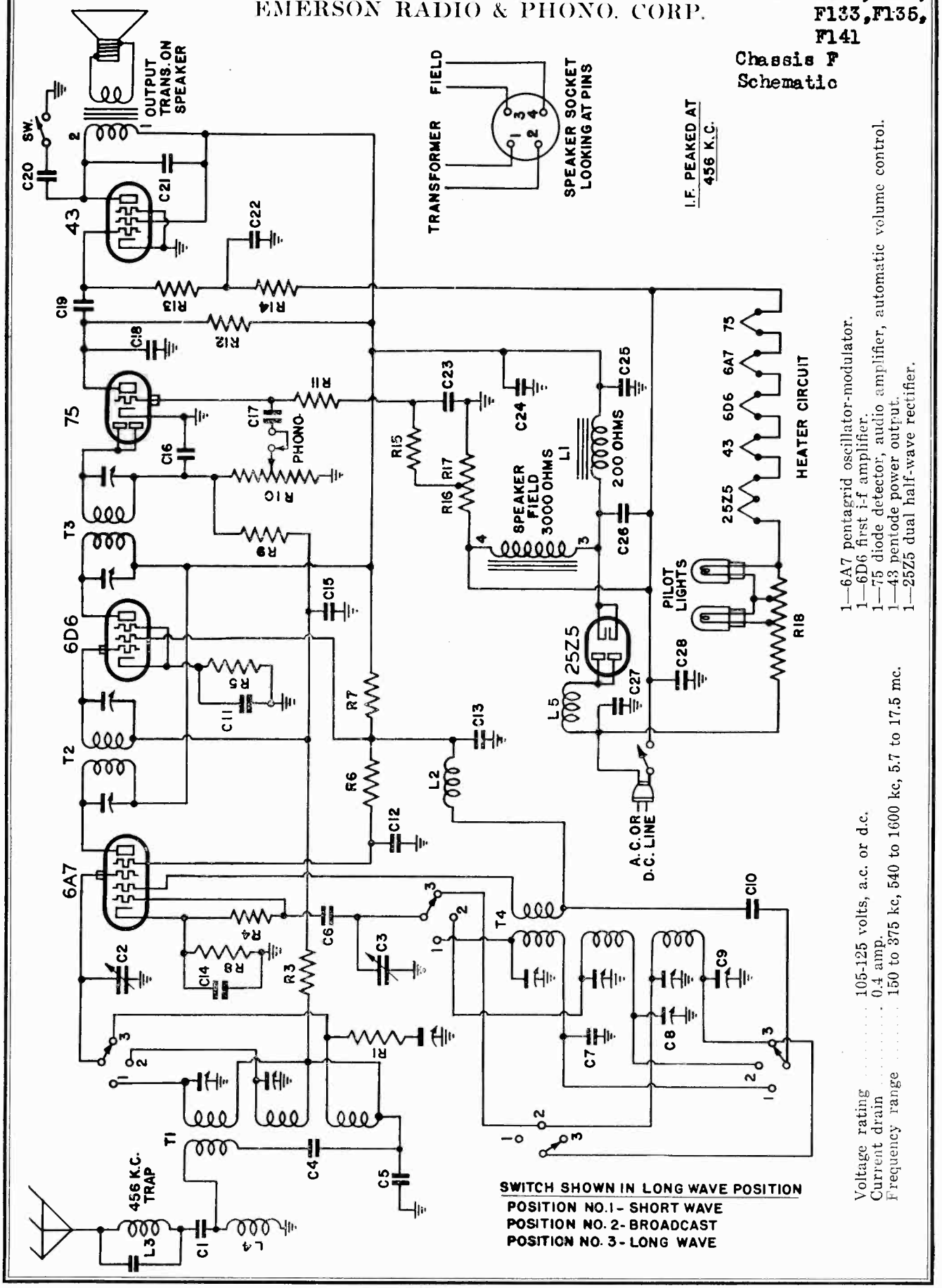
REPLACEMENT PARTS LIST

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Item	Part No.	DESCRIPTION	PRICE
L1	2ZT-268	Fixed 456 kc wave-trap	$ .50
L2	2ZT-267	Trap inductor	.10
T1, T2	2ZT-265	Two band antenna coil assembly	1.10
T3, T4	2ZT-266	Two band oscillator coil assembly	.95
T5	2NT-230	456 kc first i-f transformer	.90
T6	2NT-231	456 kc second i-f transformer	.90
T7	2NT-233	Power transformer	2.70
R1	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R4, R14	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R5	2ZR-231	450 ohm ½ watt wire-wound resistor	.16
R6	BR-12	25,000 ohm 1 watt carbon resistor	.16
R7	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R8	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R9	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R10, S2	2NR-214D (for LLW chassis)	Volume control with line switch—250,000 ohms	.80
	2NR-214 (for K5 chassis)	Volume control with line switch—250,000 ohms	.80
R11, R12, R16	KR-57	1 megohm ¼ watt carbon resistor	.16
R13	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R15	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C1		Condenser supplied with trap 2ZT-268	
C2	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C3	2ZC-253	0.0025 mf mica condenser	.20
C4, C10, C13	AC-6	0.1 mf, 200 volt tubular condenser	.16
C5, C6	2NC-228 (for K5 chassis)	Two-gang variable condenser	2.00
	3EC-284 (for LLW chassis)	Two-gang variable condenser	2.45
C7, C8	2ZC-257	Dual adjustment padding condenser C7-250 to 500 mmf C8-100 to 200 mmf	.45
C9	KC-58	0.01 mf, 400 volt tubular condenser	.16
C11,	BC-12	0.05 mf, 200 volt tubular condenser	.16
C12, C15	IC-47	0.0005 mf mica condenser	.16
C14	AC-7A	0.00025 mf mica condenser	.16
C16	LC-65	0.02 mf, 400 volt condenser	.16
C17	ZC-115	0.006 mf, 1000 volt tubular condenser	.16
C18	2TC-189	0.015 mf, 1000 volt tubular condenser	.16
C19	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.60
C20	2NC-246	16 mf, 450 volt wet electrolytic condenser	.80
C21	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	
C22	IC-46	0.5 mf, 400 volt tubular condenser	.30
C23	2NC-250	0.01 mf, 250 volt a.c. tubular condenser-in metal container	.20
	2NS-122	6½" dynamic speaker	3.75
	2ZS-168 (for K5 chassis)	Wave-band switch	1.15
	2ZS-168A (for LLW chassis)	Wave-band switch	1.15
	2TS-145B (for K5 chassis)	Tone-control switch	.25
	2TS-145E (for LLW chassis)	Tone-control switch	.25
	XL-9	Pilot light, 6.3 volt .25 amp., Mazda No. 46	.15
	2ZD-40 (for K5 chassis)	Airplane dial	1.30
	2NZ-306 (for K5 chassis)	Dial escutcheon	.50
	3CZ-350 (for LLW chassis)	Dial escutcheon	.70
	3LZ-403 (for LLW chassis)	Drive belt	.10

EMERSON RADIO & PHONO. CORP.

MODELS F117, F122, F133, F135, F141
Chassis F
Schematic



1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—75 diode detector, audio amplifier, automatic volume control.
1—43 pentode power output.
1—25Z5 dual half-wave rectifier.

Voltage rating ..... 105-125 volts, a.c. or d.c.
Current drain ..... 0.4 amp.
Frequency range ..... 150 to 375 kc, 540 to 1600 kc, 5.7 to 17.5 mc.

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

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

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

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

Location of Coils and Trimmers

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

The dual adjustable padding condenser is mounted on the left side of the front chassis wall.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.

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

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 15 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 35 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 15, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 35, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 60. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 150, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 60, feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 150, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

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

GENERAL INSTRUCTIONS

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

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

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

GENERAL NOTES

1. Only the Models F117 and F135 are available for 210-250 volt operation. The standard 105-125 volt Model F117 and F135 receivers may be easily converted for 210-250 volt operation by replacing the ballast resistor. Resistor part no. 3ER-248 is for 105 to 125 volt operation. Resistor part no. 3ER-249 is for 210 to 250 volt operation. Due to the greater amount of heat radiated from the higher voltage resistor, part no. 3ER-249, this conversion can be made only on Models F117 and F135. For Models F122, F133 and F141 it is imperative that an *external* line ballast resistor be used for voltages above 125.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
3. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
4. When operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.
5. 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.
6. The color coding of the i-f transformers is as follows:

   B plus—red — Grid return—black
   Grid—green — Plate—blue
7. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to this receiver may be made at the "phono" jack which is located on the rear wall of the receiver chassis. A separate volume control of the potentiometer type is necessary in addition to the phonograph pick-up. The two pick-up lead wires should be connected to the two outside terminals of this volume control. A lead from the center terminal should be plugged into the right-hand hole in the phono jack. A lead from one of the outside terminals of the volume control should be plugged into the other hole in the phono jack. The leads to be plugged in the jack should be fitted with tips. The volume control in the receiver should be turned down to the zero volume position when operating the phonograph. The required over-all resistance of the separate volume control will, of course, depend on the type of phonograph pick-up to be used. A matching input transformer must be used if the pick-up is of the low impedance type. In this case the volume control is connected to the secondary of the transformer. It is important that the phonograph leads be removed from the jack when it is desired to operate the receiver for ordinary radio reception.
8. An efficient antenna system (often called aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

VOLTAGE ANALYSIS

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

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	48	*1.1	80	6.3
6D6	100	90	2	—	6.3
75	45	—	0	—	6.3
43	88	100	0	—	24

Voltage across speaker field—125

Voltage across filter choke—10

The 250 ohm bias resistor, R14 and R15 on schematic diagram, is located underneath the chassis near the volume control. Voltage across the two outside terminals of this resistor—12. Voltage from chassis to central terminal of resistor—1.

The voltage drop across the ballast resistor part no. 3ER-248 (R18—see schematic diagram) is 49 volts measured between pins 3 and 8. This resistor is for 105 to 125 volt operation.

The voltage drop across the ballast resistor part no. 3ER-249 is 166 volts measured between pins 3 and 7. This resistor is for 210 to 250 volt operation.

**On receivers bearing serial numbers below* 847,450 *this voltage is 2 volts.*

PRODUCTION CHANGES

a. In receivers bearing serial numbers between 861,950 and 862,950 C21 was .006 mf, 600 volt tubular condenser.

b. In receivers bearing serial numbers below 861,950 r-f choke L5 was not in the circuit.

c. In receivers bearing serial numbers below 847,350 the 6A7 and 6D6 cathodes were connected together. R5 was 150 ohm, ½ watt wire-wound resistor and C11 was 25 mf, 200 volt tubular condenser. R8 and C14 were not in the circuit. The screen of 6D6 was connected to B plus through a separate 5000 ohm ¼ watt carbon resistor and by-passed with a .1 mf. 200 volt tubular condenser. R11 and R13 were 250,000 ¼ watt carbon resistors. R1 was a 500,000 ohm ¼ watt carbon resistor and was connected directly across the long-wave antenna coil secondary.

REPLACEMENT PARTS LIST

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

*Item No.	Part No.	DESCRIPTION	List Price as Effective as of Aug. 1st, 1936 PRICE
L1	2CT-207C	Iron-core filter choke	$ .90
L2, L4	3ET-299	R-f choke—5 millihenries	.55
L3	2ZT-268	456 kc wave-trap	.75
L5	3ET-316	R-f choke—400 microhenries	.30
T1	3ET-297	Three-band antenna coil	2.05
T4	3ET-298	Three-band oscillator coil	1.90
T2	2NT-230	456 kc first i-f transformer	1.35
T3	2NT-281	456 kc second i-f transformer	1.35
R1	TTR-201	3,000 ohm ¼ watt carbon resistor	.16
R3, R12, R15	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R4	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R5, R8	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R6	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R7	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R9	KR-57	1 megohm, ¼ watt carbon resistor	.16
R10	2NR-214D	Volume control with switch—250,000 ohms	1.20
R11, R13	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R14	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R16, R17	2CR-211	Metal-clad, 1 watt wire-wound resistor R16—230 ohms R17— 20 ohms	.35
R18	3ER-248	Plug-in type ballast resistor for 105 to 125 volt operation (See General Notes)	.80
C1, C4	FC-29	.02 mf, 200 volt tubular condenser	.20
C10, C17	3EC-284	Two-gang variable condenser	3.65
C2, C3	2ZC-253	0.0025 mf mica condenser	.30
C5	AAC-106A	0.00005 mf mica condenser	.20
C6	3EC-286	0.0024 mf mica condenser	.30
C7	2ZC-257	Dual adjustable padding condenser C8—250 to 500 mmf. C9—100 to 200 mmf.	.65
C8, C9	AC-6	0.1 mf, 200 volt tubular condenser	.20
C11, C12, C14	YC-98A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C22, C23, C24	BC-12	0.05 mf, 200 volt tubular condenser	.20
C13	AC-7A	0.00025 mf mica condenser	.20
C15	LC-65	0.02 mf, 400 volt tubular condenser	.20
C16, C18	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C19	TTC-177	0.01 mf, 600 volt tubular condenser	1.00
C20	3EC-288	20 mf, 200 volt wet electrolytic condenser	.20
C21	3EC-296	0.01 mf, 400 volt tubular condenser	5.60
C25, C26	3ES-175	6½" dynamic speaker	1.10
C27, C28	3ES-197	Wave-band switch	.35
	2TS-145E	Tone-control switch	.20
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.75
	3EZ-394	Dial face	.10
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.05
	3CZ-339	Dial idler pulley	.05
	3CZ-340	Dial idler pulley spring	.10
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	1.05
	3CZ-350	Escutcheon with crystal	

When ordering replacement parts specify part number

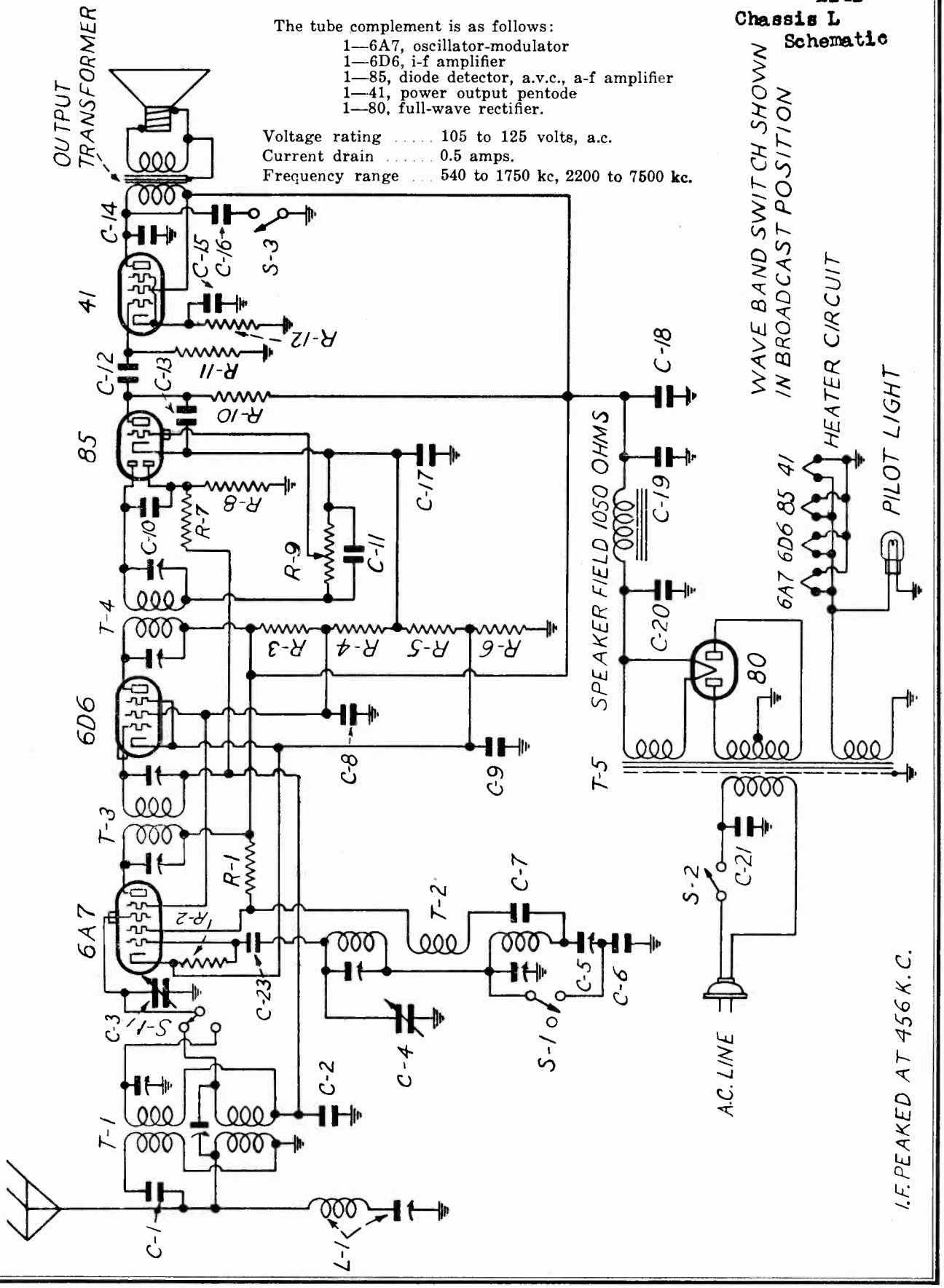
*Item number locates the article on the schematic diagram.

EMERSON RADIO & PHONO. CORP.

MODELS L117, L122, L133, L135, L141
Chassis L
Schematic

The tube complement is as follows:
1—6A7, oscillator-modulator
1—6D6, i-f amplifier
1—85, diode detector, a.v.c., a-f amplifier
1—41, power output pentode
1—80, full-wave rectifier.

Voltage rating ..... 105 to 125 volts, a.c.
Current drain ..... 0.5 amps.
Frequency range ... 540 to 1750 kc, 2200 to 7500 kc.



Five-Tube, A.C., Dual-Wave Superheterodyne

MODELS L117, L122, L133, L135 and L141

Chassis Model L

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:

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

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 condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder which is a 1350 mmf molded mica condenser. (Note that this condenser is coded 1300 mmf.) When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1350 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:

Plate—blue	Cathode—white or yellow
B plus—red	Grid—green
Screen—brown	Fil. and ground—black.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

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

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

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

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

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

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response.*

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

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
85	37	—	5.5	—	6.3 a.c.
41	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts
Voltage across speaker field—70 volts.

GENERAL INSTRUCTIONS

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

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

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

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

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price Effective as of Aug. 1st, 1936 PRICE
L1	MMT-149	456 kc adjustable wave trap	$ .50
T1	2NT-226	Two-band antenna coil	1.65
T2	2NT-227	Two-band oscillator coil	1.35
T3	2NT-230	456 kc first i-f transformer	1.35
T4	2NT-231	456 kc second i-f transformer	1.35
T5	2NT-233	Power transformer	4.05
R1	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
R4	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R5	FFR-126	500 ohm ½ watt wire-wound resistor	.16
R6	HR-130	150 ohm ½ watt wire-wound resistor	.16
R7, R8	KR-57	1 megohm ¼ watt carbon resistor	.16
R9, S2	2NR-214D	Volume control with line switch—250,000 ohms	1.20
R10	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R11	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C1, C23	AAC-106A	0.00005 mf mica condenser	.20
C2, C8	BC-12	0.05 mf, 200 volt tubular condenser	.20
C3, C4	3EC-284	Two gang variable condenser	3.65
C5	2NC-231	Single adjustable padding condenser Range—300 to 600 mmf	.50
C6	2NC-230	0.00135 mf mica condenser	.30
C7	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	BC-13	0.25 mf, 200 volt tubular condenser	.20
C10, C11	AC-7A	0.00025 mf mica condenser	.20
C12	LC-65	0.02 mf, 400 volt tubular condenser	.20
C13	IC-47	0.0005 mf mica condenser	.20
C14	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C15	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.90
C16	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C18	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C19	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	1.20
C20	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
C21	3LC-297	0.01 mf, 250 volt a-c condenser in tubular metal container	.30
	2NS-122	6½" dynamic speaker (Models L117, L122, L141)	5.60
	3LS-199	10" dynamic speaker (Model L135)	8.25
S1	TTS-111K	Wave-band switch	.60
S3	2TS-145E	Tone control switch	.35
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	2NZ-364	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

*Item number locates the article on the schematic diagram.

EMERSON RADIO & PHONO. CORP.

MODEL 119 (Revised) Chassis U6A Schematic, Voltage Alignment

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1760, 4500 and 15,000 kc should be used. In addition, an output meter should be used across the voice coil or output transformer secondary for observing maximum response.

I-f Alignment

The i-f transformers ZZT-194 and ZZT-195 are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response*. The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer furthest from the end of chassis is for the short-wave antenna coil. The central trimmer is for the police antenna coil and the trimmer nearest the end of chassis is for the broadcast antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand-wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response, and then the broadcast antenna trimmer (on antenna coil, nearest the end of chassis). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust antenna trimmer (on antenna coil, nearest the end of chassis) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect image responses.

General Instructions

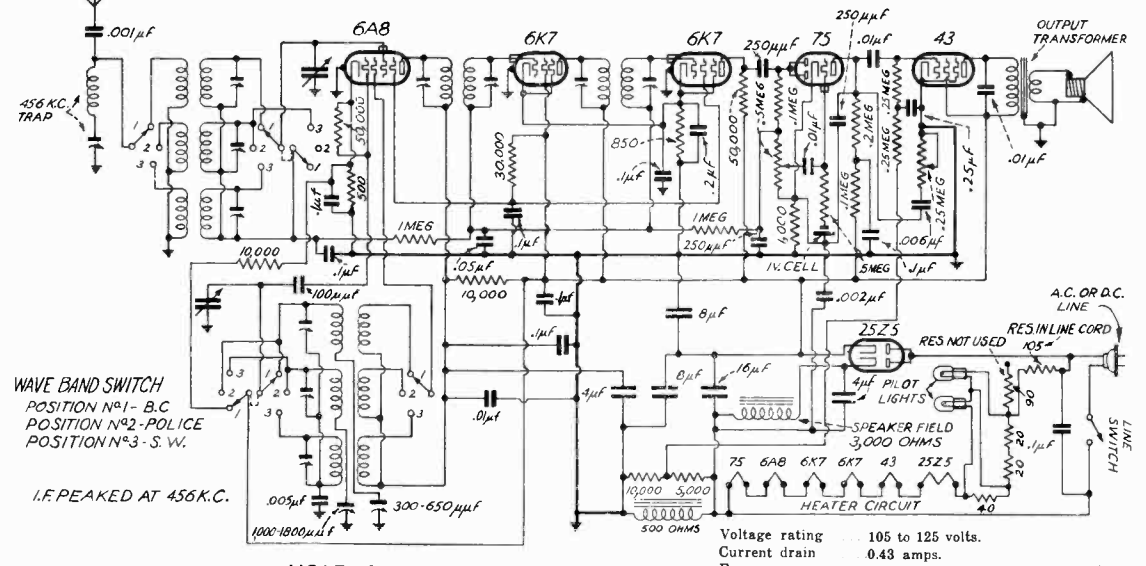
The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on the antenna trimmers. The last motion in adjusting trimmers should always be a tightening one.

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

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

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip in the front corner of the chassis near the volume control. Do not put a voltmeter across this bias cell. If the set distorts, check it by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup.
4. The filament dropping resistor, 6J105 (see schematic), is a resistance wire in the special line cord. The cord will therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.



Voltage rating 105 to 125 volts.
Current drain 0.43 amps.
Frequency ranges 540-1660 kc, 1580-4750 kc, 5.5—16 mc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8	78	50	*7	78	6
6K7 1st i-f	107	107	4.7	—	6
6K7 2nd i-f	70	50	5	—	6
75	45	—	0.2	—	6
43	95	107	0	—	24

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.

Voltage across choke (43 cathode to line switch) — 22 volts.

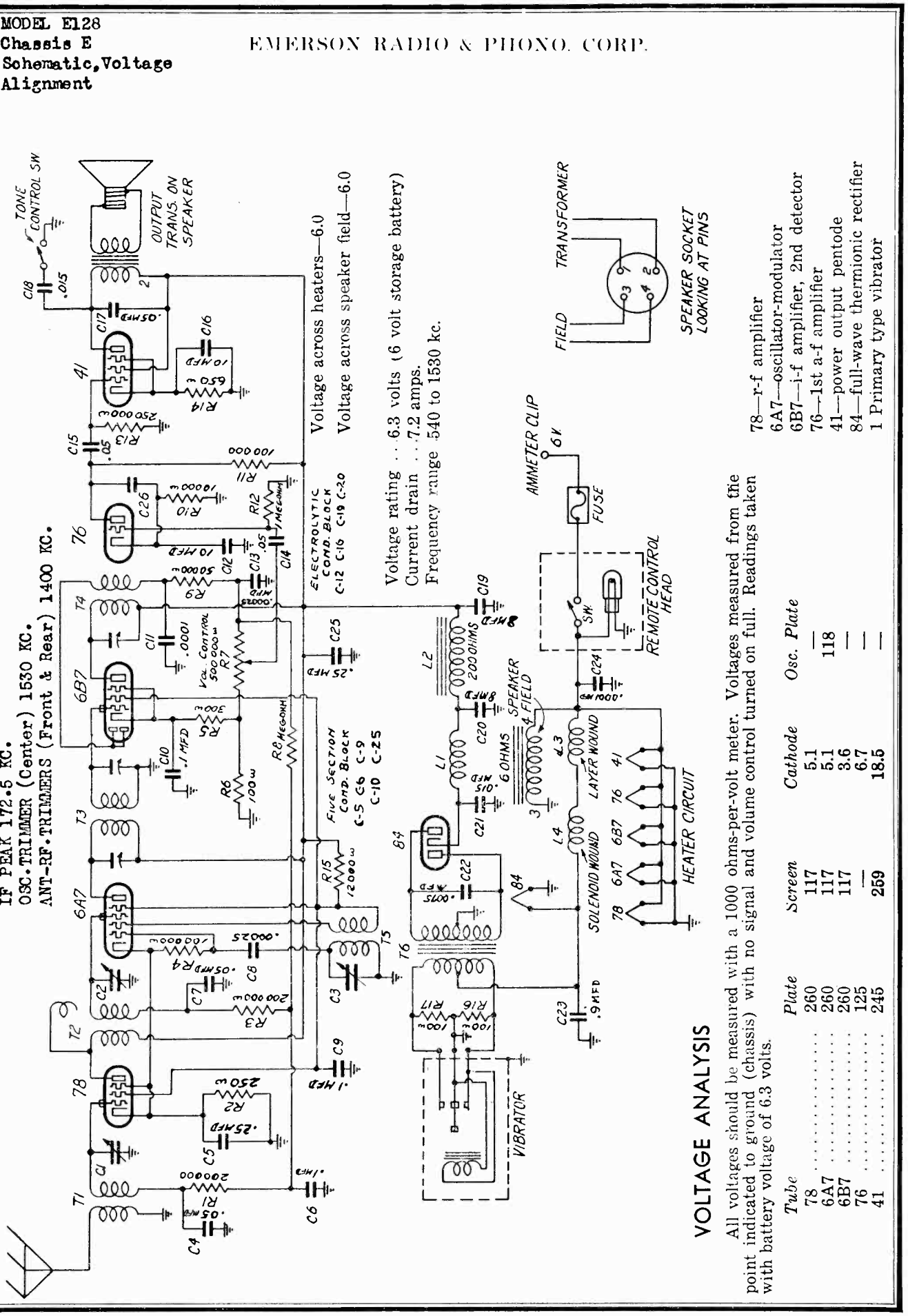
*Voltage indicated is with wave-band switch in broadcast position. On the police and short-wave bands this voltage is 2.3 volts.

The tube complement is as follows:

1—6A8 (metal) Pentagrid oscillator-modulator.
1—6K7 (metal) 1st i-f amplifier.
1—6K7 (metal) 2nd i-f amplifier (adjacent to 75).
1—75 (glass) 2nd detector—a-f amplifier—a.v.c.
1—43 (glass) Power output pentode.
1—25Z5 (glass) Half-wave rectifier.

MODEL E128
Chassis E
Schematic, Voltage
Alignment

EMERSON RADIO & PHONO. CORP.



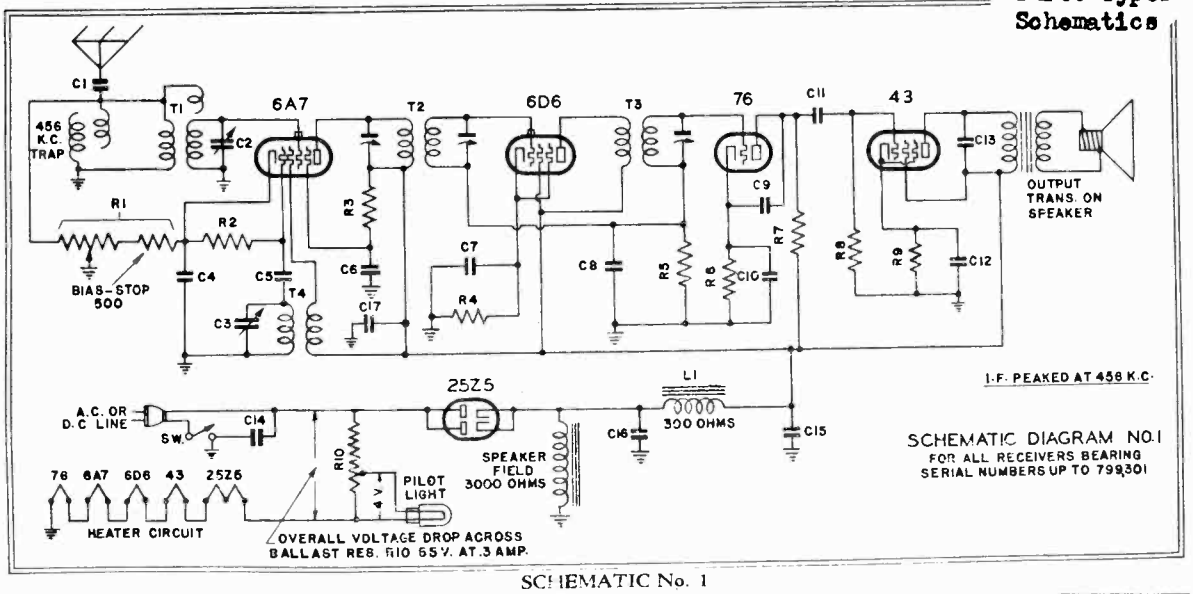
VOLTAGE ANALYSIS

All voltages should be measured with a 1000 ohms-per-volt meter. Voltages measured from the point indicated to ground (chassis) with no signal and volume control turned on full. Readings taken with battery voltage of 6.3 volts.

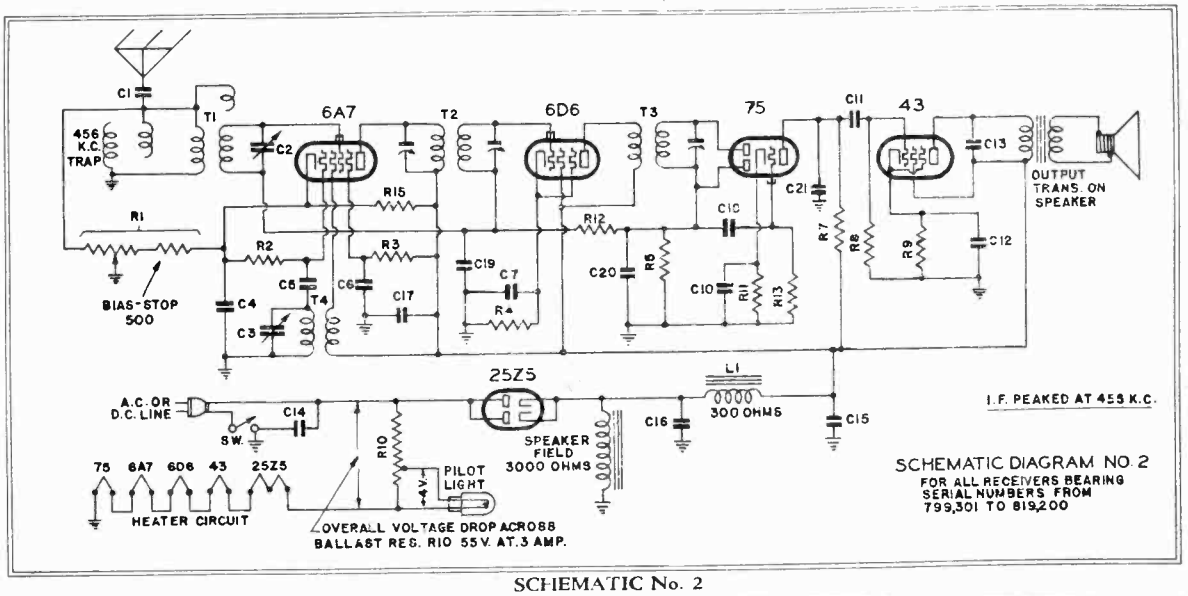
Tube	Plate	Screen	Cathode	Osc. Plate
78	260	117	5.1	—
6A7	260	117	5.1	118
6B7	260	117	3.6	—
76	125	—	6.7	—
41	245	259	18.5	—

EMERSON RADIO & PHONO. CORP.

MODELS A130, A132
Chassis A
Three Types
Schematics



SCHEMATIC No. 1



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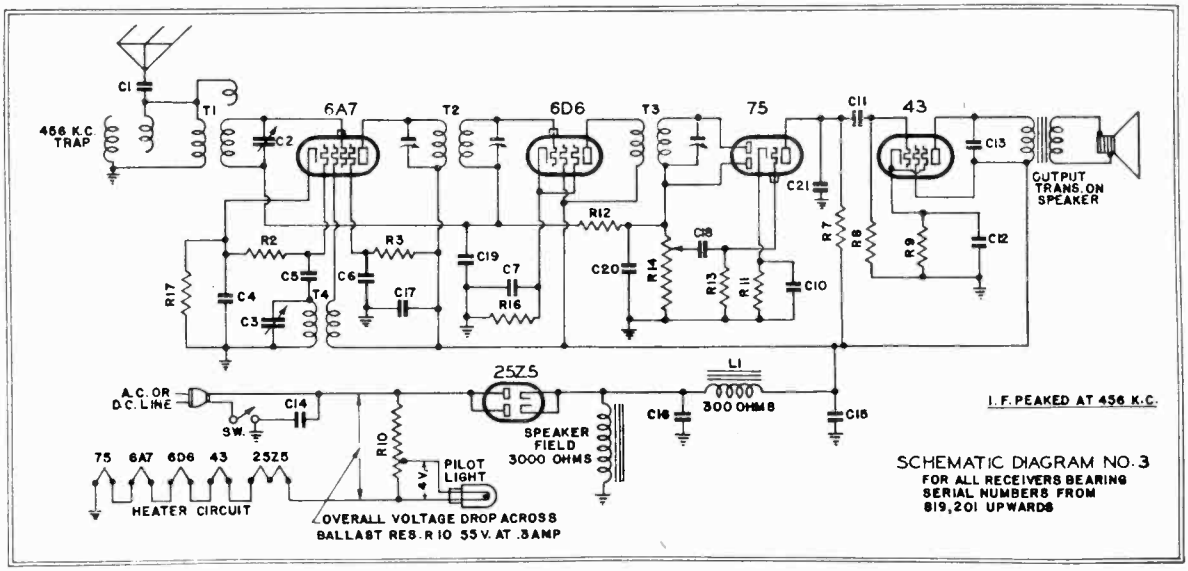


SCHEMATIC No. 3

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. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R10—see schematic) is in a special metal tube at back of the chassis. This tube will, therefore, become quite hot under normal operating conditions. For voltage drop see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The first i-f transformer (one directly behind variable condenser) is of the plug-in type. To remove, unsolder all leads under the chassis, pinch together the prongs of the plug-in fastener and lift out.
6. The color coding of the i-f transformer leads is as follows:

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

Tube Data

The tube complement, for sets bearing serial numbers above 799301, is as follows:

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—75 diode detector, audio amplifier, automatic volume control.
1—43 pentode power output.
1—25Z5 dual half-wave rectifier.

On sets bearing serial numbers below 799301, the 75 tube is replaced with a 76 tube, which functions only as a second detector.

VOLTAGE ANALYSIS

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

The voltage analysis on sets bearing serial numbers above 799,301 is as follows:

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7	112	50	112	1.5	6 a.c.
6D6	112	112	—	4.6	6 a.c.
75	40	—	—	0.5	6 a.c.
43	100	112	—	15.0	25 a.c.

The voltage analysis on sets bearing serial numbers below 799,301 is as follows:

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7	112	50	112	2.5	6 a.c.
6D6	112	112	—	5.5	6 a.c.
76	50	—	—	5.0	6 a.c.
43	100	112	—	15.0	25 a.c.

Voltage across speaker field, (25Z5 cathode to ground)—125 volts.
Voltage across filter choke, (25Z5 cathode to B plus)—12 volts.
Voltage drop across ballast tube, (See R10, schematic)—45 volts, a.c.
Voltage drop across the pilot light section of ballast tube—4 volts, a.c.

ADJUSTMENTS

An oscillator with frequencies of 456 kc and 1500 kc should be used.

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

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3CT-274, is in an oblong coil can located on the top of the chassis directly behind the variable condenser. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number UUT-181 is in a round coil can located on top of the chassis to the right of the speaker. The single trimmer for this i-f is accessible through a hole in the top of the coil can.

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

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 6A7 tube.
3. Adjust the three i-f trimmers, repeating for maximum response.
4. Set the dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard broadcast dummy antenna. (A .0002 mf mica condenser may be used as a substitute).
5. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
6. Adjust the antenna trimmer (on front section of variable condenser) for maximum response.

Range

The receiver is designed to operate over a frequency range from 540 to 1700 kilocycles. This range covers all of the standard broadcast stations and includes police calls above 1600 kilocycles.

Voltage rating	105-125 volts, a.c. or d.c.
Current drain	0.4 amp.
Frequency range	540 to 1700 kc.

REPLACEMENT PARTS

* ITEM Schematic No. 1	* ITEM Schematic No. 2	* ITEM Schematic No. 3	PART No.	DESCRIPTION	PRICE
L1	L1	L1	3CT-276	Filter choke	$ .60
T1	T1	T1	3FT-280	Antenna coil with 456 kc. wave trap	.75
T2	T2	T2	3CT-274	456 kc first i-f transformer	1.00
T3	T3	T3	UUT-181	456 kc second i-f transformer	1.00
T4	T4	T4	3FT-281	Oscillator coil	.35
R1	R1	——	TTR-159E	Volume control with line switch—5000 ohms with 500 ohm bias stop	.80
R2	R2	R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	R3	R3	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R4	R4	——	ZZR-197	850 ohm ½ watt wire-wound resistor	.16
R5	——	——	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R6	——	——	LLR-154	75,000 ohm ¼ watt carbon resistor	.16
R7	R7	R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	R8	R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R9	R9	R9	KKR-135	650 ohm ½ watt wire-wound resistor	.16
R10	R10	R10	2UR-224	Plug-in type ballast resistor	.55
——	R11	R11	LR-64	5,000 ohm ¼ watt carbon resistor	.16
——	R12	R12	NNR-220	3 megohm ¼ watt carbon resistor	.16
——	R13	R13	NNR-220	3 megohm ¼ watt carbon resistor	.16
——	——	R14	3FR-256	Volume control with line switch—500,000 ohms	.70
——	R15	——	LLR-154	75,000 ohm ¼ watt carbon resistor	.16
——	——	R16	FFR-126	500 ohm ½ watt wire-wound resistor	.16
——	——	R17	AAR-119	300 ohm ½ watt wire-wound resistor	.16
C1	C1	C1	AAC-114	0.001 mf mica condenser	.16
C2, C3	C2, C3	C2, C3	3FC-269	Two-gang variable condenser	1.95
C4	C4	C4	FC-29	0.02 mf 200 volt tubular condenser	.16
C5	C5	C5	NC-70A	0.0002 mf mica condenser	.16
C6	C6	C6	AC-6	0.1 mf 200 volt tubular condenser	.16
C7	C7	C7	FC-29	0.02 mf 200 volt tubular condenser	.16
C8	——	——	AC-6	0.1 mf 200 volt tubular condenser	.16
C9	——	——	AAC-114	0.001 mf mica condenser	.16
C10, C12	C10, C12	C10, C12	KKC-145	Dual 5 mf, 25 volt electrolytic condenser	.90
C11	C11	C11	KC-58	0.01 mf 400 volt tubular condenser	.16
C13	C13	C13	HC-34	0.006 mf 600 volt tubular condenser	.16
C14	C14	C14	2VC-242	.1 mf 250 volt a.c. tubular condenser	.16
C15, C16	C15, C16	C15, C16	3CC-261	20 mf 150 volt electrolytic condenser	.60
C17	C17	C17	AC-6	.1 mf 200 volt tubular condenser	.16
——	C18	C18	CCC-127	.01 mf 200 volt tubular condenser	.16
——	C19	C19	AC-6	.1 mf 200 volt tubular condenser	.16
——	C20	C20	NC-70A	0.0002 mf mica condenser	.16
——	C21	C21	NC-70A	0.0002 mf mica condenser	.16
			3FS-179	6" dynamic speaker	3.25
			XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.15
			3FZ-352	Dial face	.10
			3CZ-336	Dial drive belt	.10
			3CZ-337	Dial drive shaft and pulley	.05
			3CZ-339	Dial idler pulley	.05
			3CZ-341	Condenser shaft pulley	.10
			3CZ-340	Dial idler pulley spring	.02
			3FZ-353	Dial pointer	.05
			3FZ-351	Escutcheon with crystal. (For model A-130)	.70
			3FZ-398	Dial crystal. (For model A-132)	.35
			3FZ-399	Clip for dial crystal. (Model A-132)	.01

When Ordering Replacement Parts Specify Part Numbers

* Item number locates the article on the schematic diagram. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

PRODUCTION CHANGES

Schematic no. 1 applies to all receivers bearing serial numbers up to 799,301.

Schematic no. 2 applies to all receivers bearing serial numbers from 799,301 to 819,200.

Schematic no. 3 applies to all receivers bearing serial numbers above 819,200.

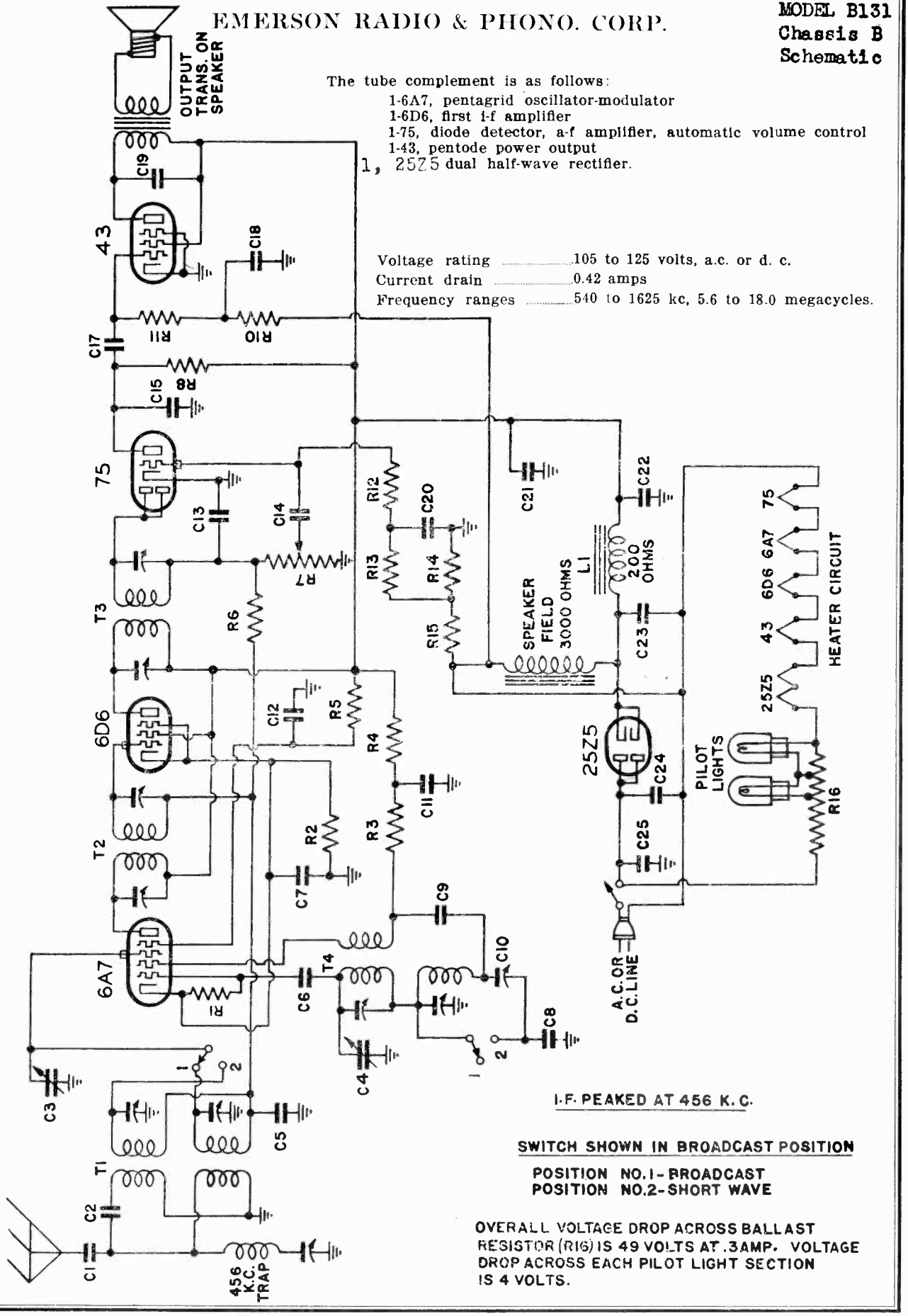
EMERSON RADIO & PHONO. CORP.

MODEL B131
Chassis B
Schematic

The tube complement is as follows:

1-6A7, pentagrid oscillator-modulator
1-6D6, first i-f amplifier
1-75, diode detector, a-f amplifier, automatic volume control
1-43, pentode power output
1, 25Z5 dual half-wave rectifier.

Voltage rating ..... 105 to 125 volts, a.c. or d. c.
Current drain ..... 0.42 amps
Frequency ranges ..... 540 to 1625 kc, 5.6 to 18.0 megacycles.



I.F. PEAKED AT 456 K.C.

SWITCH SHOWN IN BROADCAST POSITION

POSITION NO.1 - BROADCAST
POSITION NO.2 - SHORT WAVE

OVERALL VOLTAGE DROP ACROSS BALLAST RESISTOR (R16) IS 49 VOLTS AT .3AMP. VOLTAGE DROP ACROSS EACH PILOT LIGHT SECTION IS 4 VOLTS.

A.C.-D.C. Dual-Wave Superheterodyne

SIX TUBES, INCLUDING BALLAST TUBE

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425 and 15,000 kc should be used.

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

Location of Coils and Trimmer Adjustments

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

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

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

The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

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

Short-Wave Alignment

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

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

Broadcast Alignment

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

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

GENERAL INSTRUCTIONS

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

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

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

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

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R16 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:

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

VOLTAGE ANALYSIS

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

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100.0	42	2.0	60	6.8 a.c.
6D6	100.0	100	2.0	—	6.8 a.c.
75	39.5	0	0	—	6.8 a.c.
43	87.0	100	0	—	25 a.c.

Voltage at ~~2525~~ 25Z5 cathode—110 volts.

Voltage drop across ballast tube (including pilot-light section) —49 volts.

Voltage drop across each pilot light section—4 volts.

REPLACEMENT PARTS

List Price ea. Effective as of Aug. 1st, 1936

*Item	Part No.	DESCRIPTION	PRICE
T1	3CT-289	Two-band antenna coil	$2.40
T2	3CT-274	456 kc first i-f transformer	1.50
T3	3CT-275	456 kc second i-f transformer	1.35
T4	3CT-290	Two-band oscillator coil	1.10
L1	2CT-207	Iron-core filter choke	.90
R1, R9	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	HR-130	150 ohm ½ watt wire-wound resistor	.16
R3, R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R6	KR-57	1 megohm, ¼ watt carbon resistor	.16
R7	2NR-214C	Volume control with line switch—250,000 ohms	1.20
R8, R11			
R12, R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R14	3CR-242	20 ohm ½ watt wire-wound resistor	.16
R15	3CR-243	230 ohm ½ watt wire-wound resistor	.16
R16	3CR-241	Plug-in type ballast resistor	.80
C1	AAC-114	0.001 mf mica condenser	.20
C9	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C2		0.00005 mf. mica condenser (part of 3CT-289 antenna coil assembly)	
C3, C4	3CC-275	Two gang variable condenser	3.65
C5	BC-12	0.05 mf, 200 volt tubular condenser	.20
C6	AAC-106A	0.00005 mf mica condenser	.20
C7	3CC-302	0.15 mf, 200 volt tubular condenser	.20
C8	3EC-267	0.0042 mf mica condenser	.20
C10	2NC-231	Single adjustable padding condenser—300 to 600 mmf.	.50
C11	YC-98A	4 mf, 150 volt tubular electrolytic condenser	1.05
C12, C16	AC-6	0.1 mf, 200 volt tubular condenser	.20
C18, C20			
C21			
C13, C15	AC-7A	0.00025 mf mica condenser	.20
C14, C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C22, C23	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C25	2NC-250	0.01 mf, 250 volt a-c metal-clad tubular condenser	.20
C24	EEC-132	0.1 mf 400 volt tubular condenser	.20
	TTS-111J	Wave-band switch	.60
	3CS-171	6½" dynamic speaker	5.25
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
	3CZ-356	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

PRODUCTION CHANGES

1. In receivers bearing serial numbers below 812, 500—
   a. C7 was a .1mf 200 volt tubular condenser.
   b. C16, a .1mf 200 volt tubular condenser, and R9, a 50,000 ohm resistor, were in the plate circuit of the 75 tube.
2. In receivers bearing serial numbers below 823,873—
   a. Rotor of ~~broadcast~~ SHORTWAVE oscillator trimmer was returned to ground instead of the coil.
3. In receivers bearing serial numbers below 828,500 C1 was an .01 mf 200 volt tubular condenser.

EMERSON RADIO & PHONO. CORP.

MODELS C134,C136, C138,C139, C140,C142
Chassis C
Alignment, Voltage Notes, Parts

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	250	100	3.8	—	6.3 a.c.
6A8	250	100	3.8	180	6.3 a.c.
6K7 (i-f)	250	100	3.6	—	6.3 a.c.
6R7	90	—	0	—	6.3 a.c.
6C5	150	—	0	—	6.3 a.c.
6F6	240	250	0	—	6.3 a.c.
6G5	10 (blue lead)	250 (red lead)	0	—	6.3 a.c.

Voltage across speaker field—100 volts.
B plus at 5W4 filament to B minus (center tap of secondary)—350 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 6000 and 16000 kc should be used.

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

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

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

The broadcast, police and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the broadcast band are in separate cans on top of the tuner unit.

Tube Data

The tube complement is as follows:

1—6K7—R-f amplifier (on r-f unit)
1—6A8—Pentagrid modulator-oscillator (on r-f unit)
1—6K7—I-f amplifier
1—6R7—Second detector, a.v.c., and a-f amplifier
1—6C5—A-f amplifier
1—6F6—Pentode output
1—6G5—Electron ray tuning indicator
1—5W4—Full-wave rectifier

I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust 456 wave-trap for *minimum response.*

Broadcast Alignment

Both pointers on the dial should coincide vertically at 890 kc. The gold pointer may be slipped around its shaft. With the wave-band switch at the broadcast (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

Set the switch at police (central) position and the pointer at 1.8. Feed 1800 kc to antenna (using a 0.0001 mf condenser for a dummy antenna), and adjust the police band series padder for maximum response. Move the pointer to 6.0, feed 6000 kc to the antenna and adjust the police-band oscillator for maximum response. If two peaks are obtained select the minimum capacity peak. (See General Instructions below.) Then adjust the antenna and detector trimmers for maximum response. If two peaks are obtained select the maximum capacity peak. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while adjusting the police-band series padder for maximum response. Return to 6000 and check alignment. If readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

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

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

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

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

GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the end of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.
2. The receiver should never be turned on with either the speaker plug or the 6F6 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:
   - Primary—two black leads
   - High voltage sec.—two red leads
   - High voltage center tap—red and yellow lead
   - 6.3V sec.—two heavy green leads
   - 5V sec.—two heavy yellow leads
6. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table-type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:
   - Shield—cathode
   - Blue—plate
   - Red—target
   - Filament—Black
   - Green—grid
7. An efficient antenna system (often called aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

REPLACEMENT PARTS LIST

*Item No.	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
L1	3AT-291	Oscillator choke	$ .20
L2	2PT-283	456 kc wave trap	.60
T1	3AT-251	Broadcast antenna coil	.95
T4	3AT-252	Broadcast detector coil	.95
T7	3AT-253	Broadcast oscillator coil	.75
T2	3AT-254	Police-band antenna coil	.60
T5	3AT-255	Police-band detector coil	.60
T8	3AT-256	Police-band oscillator coil	.50
T3	3AT-257	Short-wave antenna coil	.60
T6	3AT-258	Short-wave detector coil	.70
T9	3AT-259	Short-wave oscillator coil	.50
T10	3BT-269	456 kc first i-f transformer	2.00
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3BT-271	Power transformer	5.40
R1	3AR-245	220 ohm, ½ watt wire-wound resistor	.16
R2, R16, R20	KR-53	50,000 ohm, ¼ watt carbon resistor	.16
R3	YR-97	15,000 ohm, ½ watt carbon resistor	.16
R4	FFR-126	500 ohm, ½ watt wire-wound resistor	.16
R5, R8, R14, R18, R21, R23	KR-57	1 megohm, ¼ watt carbon resistor	.16
R6, R7, R11, R15, R26	KR-54	100,000 ohm, ¼ watt carbon resistor	.16
R9	NNR-157B	Volume control—500,000 ohms	.90
R10	NNR-157B	Tone control—500,000 ohms	.90
R12, R17	OR-73	25,000 ohm, ¼ watt carbon resistor	.16
R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R19	2CR-193	30,000 ohm, ½ watt carbon resistor	.16
R22	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
R24	KR-63	15,000 ohm, ¼ watt carbon resistor	.16
R25	3BR-247	40,000 ohm, ¼ watt carbon resistor	.16
R27	LLR-152	150,000 ohm, ¼ watt carbon resistor	.16
R28	3BR-246	10,000 ohm, 2 watt carbon resistor	.28
R29	2TR-225	12,000 ohm, 2 watt carbon resistor	.28
C1, C2, C3	3AC-276	Three gang variable condenser	7.40
C4, C5, C6, C7, C8, C9, C10, C11, C12	3AC-278	1.5 to 12 mmf. trimmer condensers—(See Production Changes)	.15
C13, C14	JJC-144C	Dual adjustable padding condenser C13—250 to 500 mmf. C14—800 to 1400 mmf.	.90
C15	LC-65	0.02 mf, 400 volt tubular condenser	.20
C16, C24	AC-6	0.1 mf, 200 volt tubular condenser	.20
C17	AAC-114	0.001 mf mica condenser	.20
C18	AAC-106A	0.00005 mf mica condenser	.20
C19	NNC-158	0.05 mf, 200 volt tubular condenser	.20
C20, C35	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C21, C40, C41, C42	BC-13	0.25 mf, 200 volt tubular condenser	.20
C22	IIC-133A	0.000025 mf mica condenser	.20
C23	XXC-197	0.0038 mf mica condenser	.35
C25	EC-24A	0.0001 mf mica condenser	.20
C26	IC-47	0.0005 mf mica condenser	.20
C27, C33, C34	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C28	AC-7A	0.00025 mf mica condenser	.20
C29	KC-58	0.01 mf, 400 volt tubular condenser	.20
C30	AAC-112	0.25 mf, 400 volt tubular condenser	.20
C31	LC-64	0.05 mf, 400 volt tubular condenser	.20
C32	NC-70A	0.0002 mf mica condenser	.20
C36	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C37	3BC-289	40 mf, 300 volt wet electrolytic condenser	1.30
C38	3BC-281	8 mf, 250 volt dry electrolytic condenser	1.00
C39	3BC-282	12 mf, 400 volt wet electrolytic condenser	1.15
C43, C44	XXC-220	Dual 0.01 mf, 250 volt a.c. metal clad tubular condenser	.45
	3AS-166	Wave-band switch	2.25
	3BS-169	On-off switch	.50
	3BS-191	8" dynamic speaker (for Models C-134 and C-140)	8.80
	3BS-176	12" dynamic speaker (for Models C-136, C-138, C-139, and C-142)	10.60
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
	3AD-41	Dial plate with band-indicator mechanism	2.20
	3AZ-397	Dial face	1.25
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05
	3AZ-371	Dial drive belt	.20
	3AZ-414	Planetary dial drive (for two knob assembly)	1.85
	3AZ-372	Planetary dial drive (for single knob assembly)	1.85
	3AZ-366	Frequency indicating pointer	.10
	3AZ-367	Band-spread pointer	.15
	3AZ-406	Dial escutcheon with crystal	1.65
	3AZ-322A	Electron Ray socket and cable	.85
	3AZ-407	Electron Ray escutcheon	.20

When Ordering Replacement Parts Specify Part Numbers

*Item number locates the article on the schematic diagram.

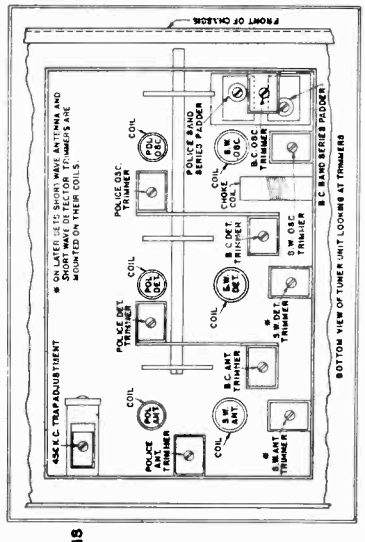
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

PRODUCTION CHANGES

On early receivers C4, C5, C6, C7, C8, C9, C10, C11 and C12 were air trimmers part No. 3AC-252. On these trimmers a clockwise rotation of the trimmer screw decreases the capacity.

MODELS C134, C136
C138, C139
C140, C142
Chassis C
Schematic, Socket

EMERSON RADIO & PHONO. CORP.



TRANSFORMER FIELD

SPEAKER SOCKET LOOKING AT PINS

I.F. PEAKED AT 456 K. C.

OUTPUT TRANS. ON SPEAKER

SPEAKER FIELD 1300 OHMS

PILOT LIGHTS

TO ALL HEATERS

TO A.C. LINE

GRD. SYMBOL INDICATES CONNECTIONS TO CHASSIS

FLOATING TUNING UNIT

REMOVE LINK WHEN TRANSMISSION LINE IS USED

ANT. TRANS. GRD.

LINK TRANS.

456 K.C. TRAP

SWITCH SHOWN IN BROADCAST POSITION

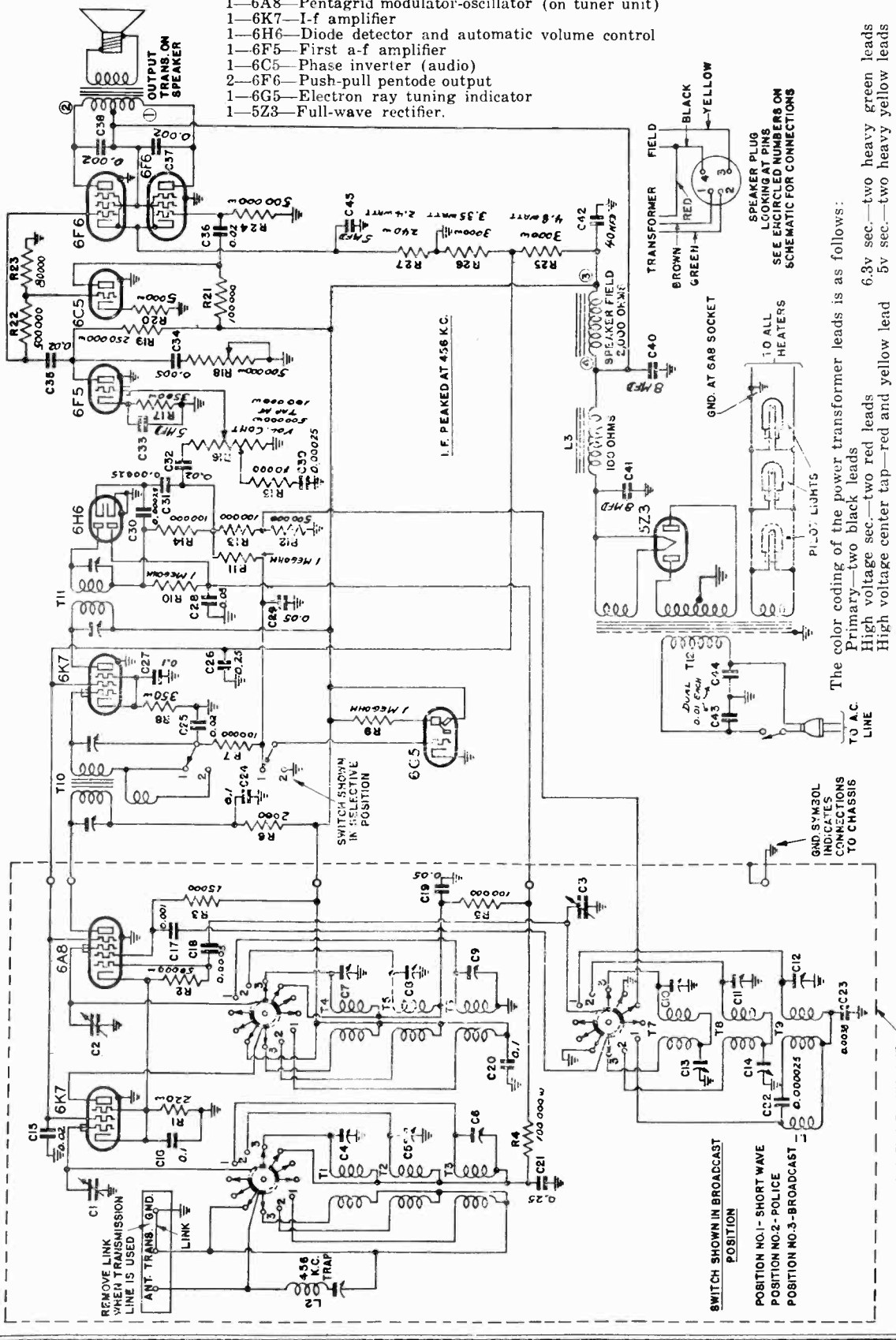
POSITION NO. 1 - SHORT WAVE
POSITION NO. 2 - POLICE
POSITION NO. 3 - BROADCAST

Voltage rating	105-125 volts, a.c.
Current drain	.70 amps., a.c.
Frequency ranges	540 to 1800 kc, 1750 to 6000 kc, 5.5 to 18.0 megacycles.

EMERSON RADIO & PHONO. CORP.

MODELS D134,D136,D138
D139,D140,D142
Chassis D D146
Schematic

The tube complement is as follows:
1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6K7—I-f amplifier
1—6H6—Diode detector and automatic volume control
1—6F5—First a-f amplifier
1—6C5—Phase inverter (audio)
2—6F6—Push-pull pentode output
1—6G5—Electron ray tuning indicator
1—5Z3—Full-wave rectifier.



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

Primary—two black leads	Voltage rating	105-125 volts, a.c.
High voltage sec.—two red leads	6.3v sec.—two heavy green leads	Current drain 1.1 amps., a.c.
High voltage center tap—red and yellow lead	5v sec.—two heavy yellow leads	Frequency ranges . 540 to 1800 kc, 1750 to 6000 kc, 5.5 to 18.0 megacycles.

The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table-type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:

Shield—cathode	Black—filament
Blue—plate	Green—grid
Red—target	

MODELS D-134, D-136, D-138, D-139, D-140, D-142 and D-146
Chassis Model D

MODELS D134, D136, D138
D139, D140, D142
Chassis D D146

EMERSON RADIO & PHONO. CORP.

Alignment, Voltage
Socket, Trimmers, Notes

PRODUCTION CHANGES

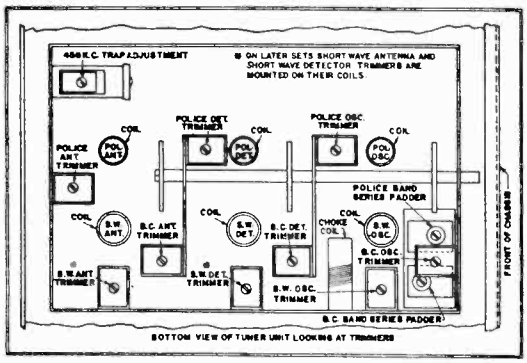
On early receivers C4, C5, C6, C7, C8, C9, C10, C11 and C12 were air trimmers part No. 3AC-252. On these trimmers a clockwise rotation of the trimmer screw decreases the capacity. C21 was a .05 mf 200 volt tubular condenser.

ADJUSTMENTS

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

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

The broadcast, police and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the broadcast band are in separate cans on top of the tuner unit.



Checking High-Fidelity Operation

On the oscillograph screen the peak of the selectivity curve (i-f response curve with fidelity-selectivity switch in selective position, clockwise) should appear in a position midway between the two peaks of the high-fidelity curve (i-f response curve with fidelity-selectivity switch in fidelity position, counter clockwise). In other words the central vertical axis of the selectivity curve should be coincident on the screen with the central vertical axis of the high-fidelity curve.

An approximate check of the high-fidelity operation can be made with the use of the oscillator and output meter. First, the i-f's should be very carefully peaked at 456 kc *with the fidelity-selectivity switch in the selective position.* Turn the switch to the fidelity position, counter-clockwise, and vary the frequency of the oscillator. Two peaks should be observed on the output meter, approximately 7 kc on each side of the selectivity peak.

I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.*

Broadcast Alignment

Both pointers on the dial should coincide vertically at 890 kc. (For adjustment, the gold pointer may be slipped around its shaft.) With the wave-band switch at the broadcast (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

Set the switch at police (central) position and the pointer at 1.8. Feed 1800 kc to antenna (using a 0.0001 mf condenser for a dummy antenna), and adjust the police band series padder for maximum response. Move the pointer to 6.0, feed 6000 kc to the antenna and adjust the police-band oscillator for maximum response. If two peaks are obtained select the minimum capacity peak. (See General Instructions below.) Then adjust the antenna and detector trimmers for maximum response. If two peaks are obtained select the maximum capacity peak. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while adjusting the police-band series padder for maximum response. Return to 6000 and check alignment. If readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, 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 and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

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

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

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

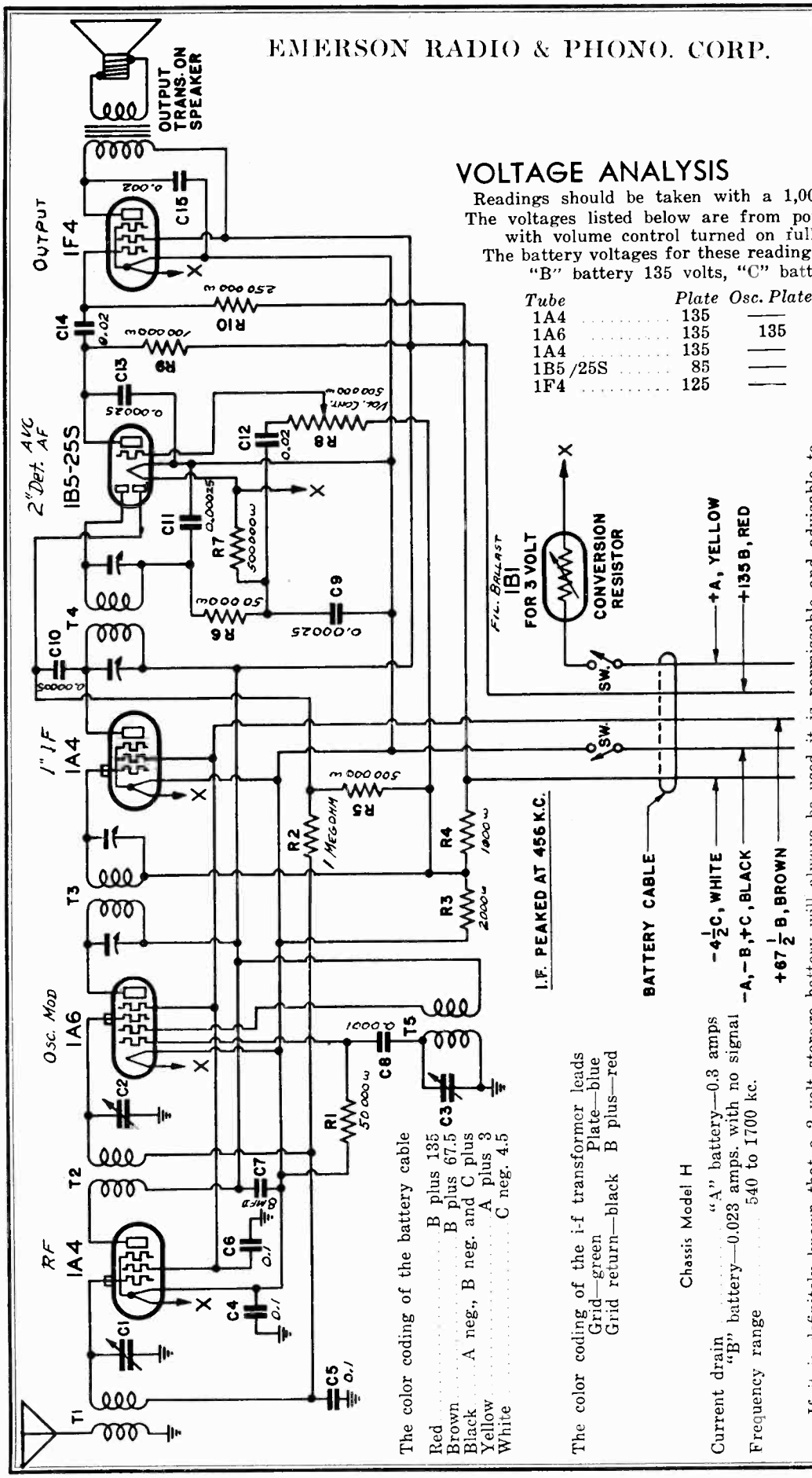
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8 osc.-mod.	210	100	3.2	150	6.3 a.c.
6K7 r-f amp.	215	100	3.2	—	6.3 a.c.
6K7 i-f amp.	215	100	2.6	—	6.3 a.c.
6H6 diode det.	—	—	0		6.3 a.c.
6F5 1st audio	75	—	1.1	—	6.3 a.c.
6C5 phase inverter	98	—	4		6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.

Voltage at 5Z3 filament—350.
Voltage across speaker field—110.
Voltage across choke—15.
Voltages, to chassis measured along voltage divider, starting at end nearest rear of chassis.
Tap 1 (nearest rear of chassis)—215
Tap 2—100
Tap 3—0
Tap 4—22

EMERSON RADIO & PHONO. CORP.

MODELS H130, H137
Chassis H
Schematic, Voltage Alignment



VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. The voltages listed below are from point indicated to A minus with volume control turned on full and no signal. The battery voltages for these readings "A" battery 3 volts, "B" battery 135 volts, "C" battery 4.5 volts.

Tube	*Plate*	*Osc. Plate*	*Screen*	*Fil.*
1A4	135	—	67.5	2.0
1A6	135	135	67.5	2.0
1A4	135	—	67.5	2.0
1B5/25S	85	—	—	2.0
1F4	125	—	135	2.0

The color coding of the battery cable

Red	B plus 135
Brown	B plus 67.5
Black	A neg., B neg. and C plus
Yellow	A plus 3
White	C neg. 4.5

The color coding of the i-f transformer leads

Grid	green
Plate	blue
Grid return	black
B plus	red

Chassis Model H

Current drain	"A" battery—0.3 amps
	"B" battery—0.023 amps. with no signal
Frequency range	540 to 1700 kc.

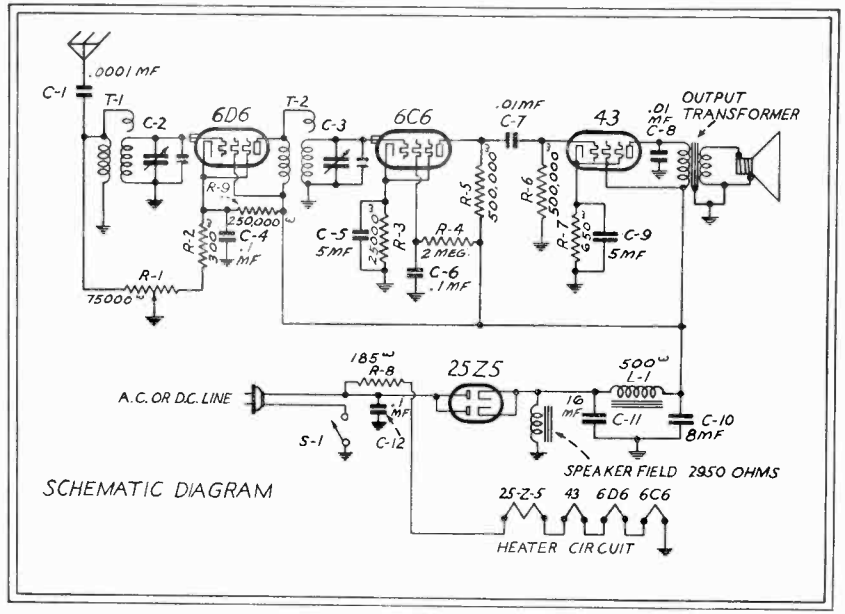
If it is definitely known that a 2 volt storage battery will always be used it is permissable and advisable to short-circuit the two heavy prongs on the 1B1 tube by connecting them with a short piece of bare wire. *Be sure that the two small prongs on the tube are free of this bare wire.*

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3HT-287 is in an oblong coil can located on the top of the chassis to the right of the speaker. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 3HT-288 is in an oblong coil can located directly behind the second i-f tube. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The oscillator, antenna, and r-f trimmers are located on the top of the variable condenser. The oscillator trimmer is on the center section of the variable condenser, the antenna trimmer is on the front section of the variable condenser and the r-f trimmer is on the rear section of the variable condenser.



REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION	PRICE List Price as Effective as of Sept. 1st, 1935
L1	ZZT-196	Iron-core filter choke—500 ohms	$ .60
T1	2WT-243	Antenna coil	.55
T2	2VT-242	Detector coil	.55
R1	2WR-218	Volume control with line switch—75,000 ohms	.75
R2	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R3	OR-73	25,000 ohm ¼ watt carbon resistor	.16
†R4	HR-42	2 megohm ¼ watt carbon resistor	.16
R5, R6	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R7	KKR-135A	650 ohm 1 watt wire-wound resistor	.16
R8		185 ohm, 17 watt resistor built into line cord (see part no. KKW-46A below).	
†R9	KR-55	250,000 ohm ½ watt carbon resistor	.16
C1	AAC-114	0.001 mf mica condenser	.16
C2, C3	RC-79	Two-gang variable condenser	1.85
C4, C6	AC-6	0.1 mf, 200 volt tubular condenser	.16
C5, C9, C10	2WC-239	Combination filter and by-pass electrolytic condenser block C5—5 mf, 25 volts. C10—8 mf, 150 volts. C9—5 mf, 25 volts.	1.55
C7	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C8	KC-58	0.01 mf, 400 volt tubular condenser	.16
C11	2WC-240	16 mf, 150 volt dry electrolytic condenser block	1.00
C12	2VC-242	0.1 mf, 250 volt a-c tubular condenser	.16
	2VS-157	5" dynamic speaker	3.25
	KKW-46A	Line cord with built-in resistance wire	.70

† See Production Changes below.
* Item number locates the article on the schematic diagram.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS

Chassis Model U4C

Voltage rating	105 to 130 volts a-c. or d-c.
Current drain	0.88 amps.
Frequency range	540 to 1650 kc.

TUBE COMPLEMENT

The tubes used are as follows:
1 - 6D6, r-f. amplifier.
1 - 6C6, biased detector.
1 - 43, power output pentode.
1 - 25Z5, dual half-wave rectifier.

VOLTAGE ANALYSIS

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

Tube	Plate	Screen	Cathode	Fil.
6D6	100	102	3	6.3
6C6	30	21	2	6.3
43	95	101	13	25.0

Voltage across speaker field (25Z5 cathode to chassis) - 118 volts.
Voltage across choke (25Z5 cathode to 43 screen) - 16.5 volts.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1425 kc. is required.

Rotate the variable condenser shaft 25 degrees from the minimum capacity position. (This may be done by affixing a protractor, or a similarly calibrated scale, to the condenser shaft.) With the condenser in this position, feed 1425 kc. to the antenna and adjust both trimmers on the variable condenser for maximum response. Use as weak a test signal as possible.

Range: The receiver is designed to operate over the broadcast range from 540 to 1650 kilocycles. This range covers all of the standard American broadcast stations and some of the low-frequency police transmitters.

Power Supply: The power supply for this receiver should be either a. c. 50 to 60 cycles, or d. c., of any voltage between 105 and 130 volts. With special external line cord ballast resistors this receiver may be operated on higher voltages.

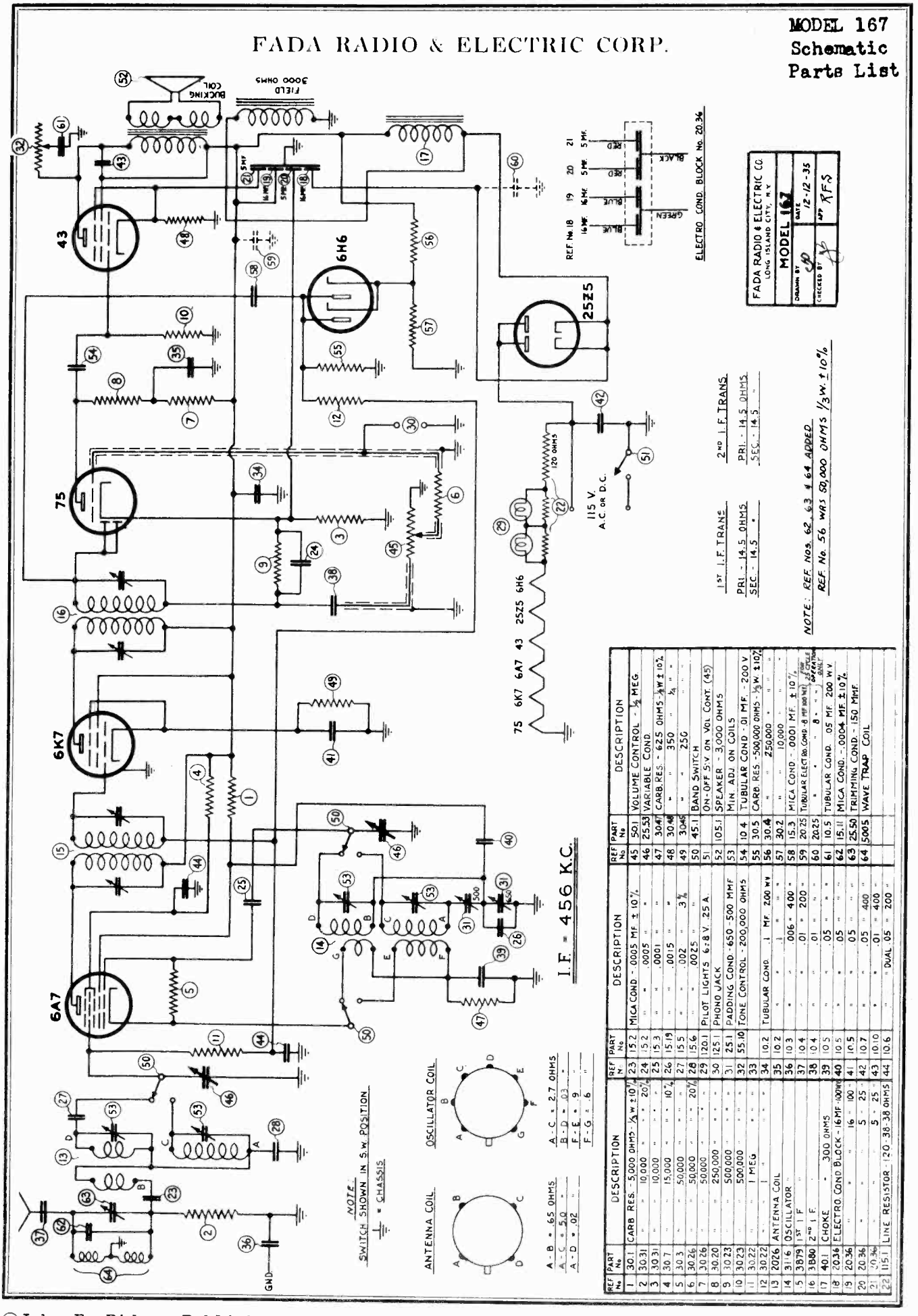
THE RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THE RECEIVER.

PRODUCTION CHANGES

In early production receivers—
a. R9 was omitted.
b. R4 was a 500,000 ohm ¼ watt carbon resistor.

FADA RADIO & ELECTRIC CORP.

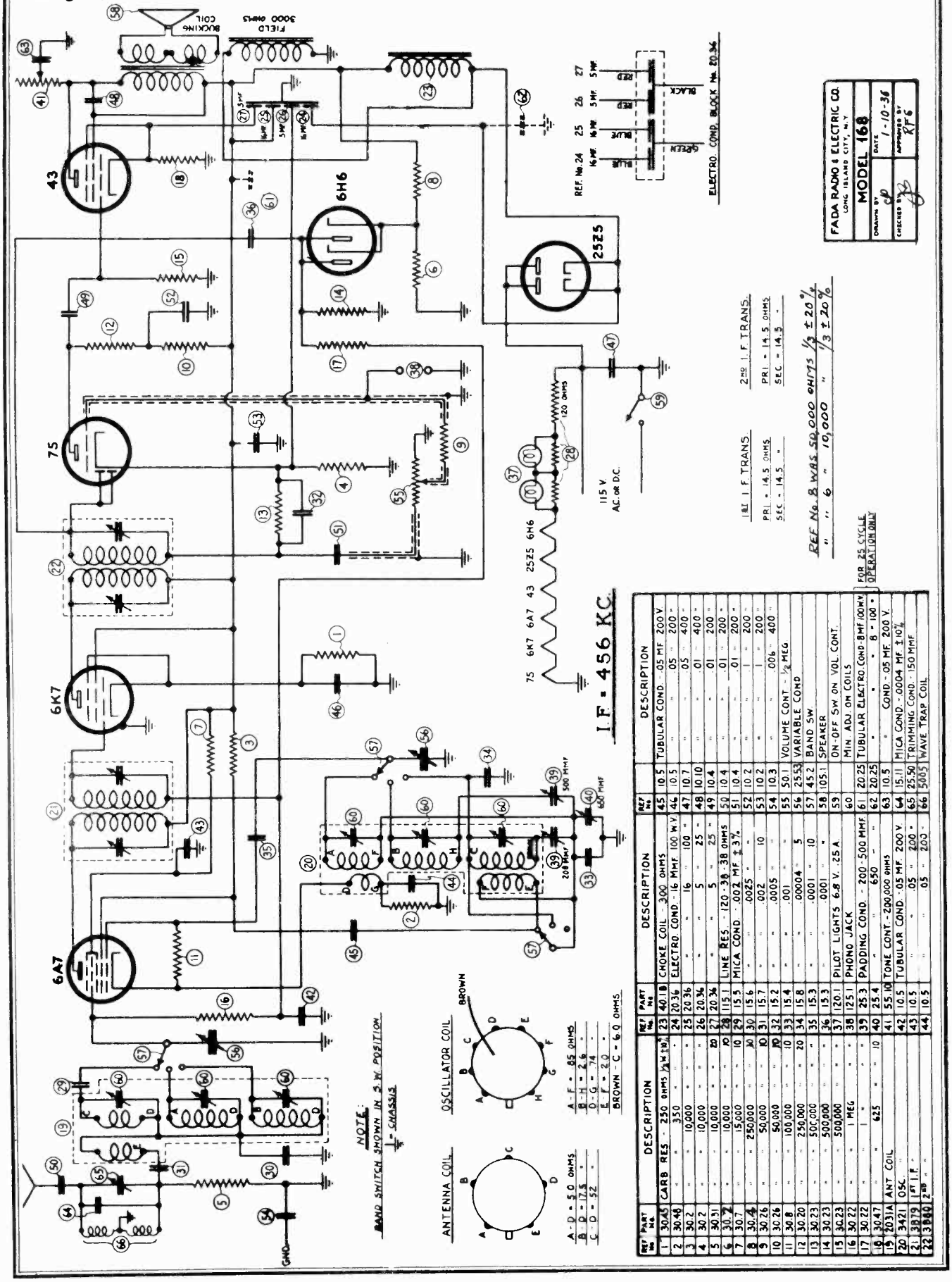
MODEL 167
Schematic
Parts List



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	30.1	CARB. RES. - 5,000 OHMS - ½ W ± 10%	23	15.2	MICA COND. - .0005 MF. ± 10%	45	50.1	VOLUME CONTROL - ½ MEG
2	30.31	" " 10,000 " " " " 20%	24	15.2	" " .0005 " "	46	25.53	VARIABLE COND.
3	30.31	" " 10,000 " " " "	25	15.3	" " .0001 " "	47	30.47	CARB. RES. - 625 OHMS - ½ W ± 10%
4	30.7	" " 15,000 " " " " 10%	26	15.19	" " .0015 " "	48	30.48	" " 350 " " " "
5	30.3	" " 50,000 " " " "	27	15.5	" " .002 " 3%	49	30.45	" " 256 " " " "
6	30.26	" " 50,000 " " " " 20%	28	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " " "	29	120.1	PILOT LIGHTS 6.8 V. .25 A.	51		ON-OFF S.W. ON VOL CONT. (45)
8	30.20	" " 250,000 " " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " " "	31	25.1	PADDING COND. - 650 - 500 MMF	53		MIN. ADJ. ON COILS
10	30.23	" " 500,000 " " " "	32	55.10	TONE CONTROL - 200,000 OHMS	54	10.4	TUBULAR COND. - .01 MF. - 200 V
11	30.22	" " 1 MEG " " " "	33			55	30.5	CARB. RES. - 500,000 OHMS - ½ W ± 10%
12	30.22	" " 1 " " " "	34	10.2	TUBULAR COND. - .1 MF. 200 WV	56	30.4	" " 250,000 " " " "
13	2026	ANTENNA COIL	35	10.2	" " .1 " " "	57	30.2	" " 10,000 " " " "
14	31.6	OSCILLATOR "	36	10.3	" " .006 " 400 "	58	15.3	MICA COND. - .0001 MF. ± 10%
15	3879	1ST I.F. "	37	10.4	" " .01 " 200 "	59	20.25	TUBULAR ELECTRO. COND. - 8 MF 300 VO. FOR 25 CYCLE OPERATION ONLY
16	3880	2ND I.F. "	38	10.4	" " .01 " " "	60	20.25	" " 8 " " " "
17	40.1	CHOKE - 300 OHMS	39	10.5	" " .05 " " "	61	10.5	TUBULAR COND. .05 MF. 200 WV
18	2036	ELECTRO COND. BLOCK - 16 MF - 400 VO	40	10.5	" " .05 " " "	62	15.11	MICA COND. - .0004 MF. ± 10%
19	20.36	" " 16 - 400 "	41	10.5	" " .05 " " "	63	25.50	TRIMMING COND. - 150 MMF
20	20.36	" " 5 - 25 "	42	10.7	" " .05 " 400 "	64	5005	WAVE TRAP COIL
21	20.36	" " 5 - 25 "	43	10.10	" " .01 " 400 "			
22	1151	LINE RESISTOR - 120-38-38 OHMS	44	10.6	" DUAL .05 " 200 "			

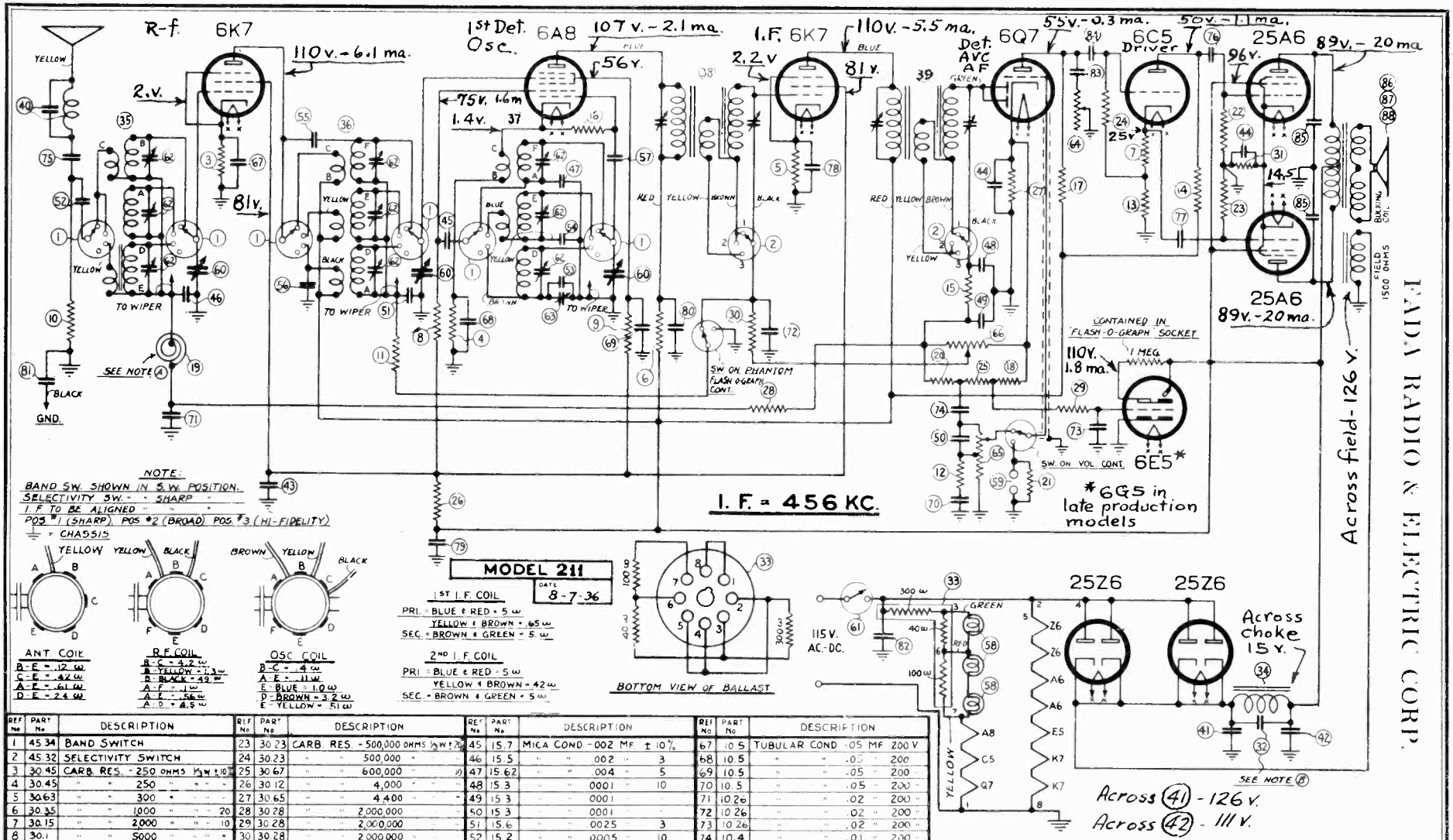
MODEL 168
Schematic
Changes, Parts

FADA RADIO & ELECTRIC CORP.



REF No.	PART No.	DESCRIPTION
1	30.45	CARB. RES. - 250 OHMS ½ W. TAP
2	30.48	" - 350 " " "
3	30.2	" - 10,000 " " "
4	30.2	" - 10,000 " " "
5	30.31	" - 10,000 " " "
6	30.7	" - 10,000 " " "
7	30.7	" - 15,000 " " "
8	30.4	" - 250,000 " " "
9	30.26	" - 50,000 " " "
10	30.26	" - 50,000 " " "
11	30.8	" - 100,000 " " "
12	30.20	" - 250,000 " " "
13	30.23	" - 500,000 " " "
14	30.23	" - 500,000 " " "
15	30.23	" - 500,000 " " "
16	30.22	" - 1 MEG " " "
17	30.22	" - 1 " " "
18	30.47	" - 625 " " "
19	20.31A	ANT. COIL
20	34.21	OSC. "
21	38.19	1ST I.F. "
22	38.00	2ND " "
23	40.18	CHOKE COIL - 300 OHMS
24	20.36	ELECTRO COND. - 16 MMF 100 W.V.
25	20.36	" " - 16 " 100 "
26	20.36	" " - 5 " 25 "
27	20.36	" " - 5 " 25 "
28	11.9.1	LINE RES. 120-30-30 OHMS
29	15.5	MICA COND. .002 MF ± 3%
30	15.6	" " .0025 " "
31	15.7	" " .002 " 10
32	15.2	" " .0005 " "
33	15.4	" " .001 " "
34	15.8	" " .00004 " 5
35	15.3	" " .0001 " 10
36	15.3	" " .0001 " "
37	12.0.1	PILOT LIGHTS 6.8 V. .25 A.
38	12.5.1	PHONO JACK
39	25.3	PADDING COND. - 200-500 MMF
40	25.4	" " 650 " "
41	55.10	TONE CONT. - 200,000 OHMS
42	10.5	TUBULAR COND. - .05 MF. 200 V.
43	10.5	" " .05 " 200 "
44	10.5	" " .05 " 200 "
45	10.5	TUBULAR COND. - .05 MF. 200 V.
46	10.5	" " .05 " 400 "
47	10.7	" " .01 " 400 "
48	10.10	" " .01 " 400 "
49	10.4	" " .01 " 200 "
50	10.4	" " .01 " 200 "
51	10.4	" " .1 " 200 "
52	10.2	" " 1 " 200 "
53	10.2	" " 1 " 200 "
54	10.3	" " .006 " 400 "
55	50.11	VOLUME CONT - ½ MEG
56	25.53	VARIABLE COND
57	45.2	BAND SW
58	10.5.1	SPEAKER
59		ON-OFF SW ON VOL CONT.
60		MIN. ADJ. ON COILS
61	20.25	TUBULAR ELECTRO COND - 8 MF 100 WKG
62	20.25	" " - 8 - 100 "
63	10.5	" COND. - .05 MF. 200 V.
64	15.11	MICA COND. - .0004 MF. ± 10%
65	25.50	TRIMMING COND. - 150 MMF
66	5005	WAVE TRAP COIL

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 168
DRAWN BY JP DATE 1-10-36
CHECKED BY JP APPROVED BY JFR



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	45 34	BAND SWITCH	23	30 23	CARB. RES. - 500,000 OHMS ½W ±20	45	15.7	MICA COND. - 002 MF. ± 10%	67	10 5	TUBULAR COND. - 05 MF. 200 V
2	45 32	SELECTIVITY SWITCH	24	30.23	" " 500,000 "	46	15.5	" " .002 " 3	68	10 5	" " .05 " 200 "
3	30 45	CARB. RES. - 250 OHMS ½W ±10%	25	30 67	" " 600,000 " 10	47	15.62	" " .004 " 5	69	10 5	" " .05 " 200 "
4	30.45	" " 250 " " "	26	30 12	" " 4,000 " "	48	15.3	" " .0001 " 10	70	10. 5	" " .05 " 200 "
5	30.63	" " 300 " " "	27	30.65	" " 4,400 " "	49	15 3	" " .0001 "	71	10 26	" " .02 " 200 "
6	30.35	" " 1000 " " 20	28	30 28	" " 2,000,000 "	50	15 3	" " .0001 "	72	10 26	" " .02 " 200 "
7	30.15	" " 2,000 " " 10	29	30.28	" " 2,000,000 "	51	15.6	" " .0025 " 3	73	10 26	" " .02 " 200 "
8	30.1	" " 5000 " " "	30	30.28	" " 2,000,000 "	52	15.2	" " .0005 " 10	74	10.4	" " .01 " 200 "
9	30.2	" " 10000 " " "	31	30.43	" " 315 " 1 W. 10	53	15.52	" " .00026 " 5	75	10.4	" " .01 " 200 "
10	30 31	" " 10,000 " " 20	32	10.30	TUBULAR COND. - 75 MF. 200 V.	54	15.63	" " .00093 " 3	76	10 2	" " .1 " 200 "
11	30 31	" " 10,000 " "	33	115 17	BALLAST RES. - 40 - 100 - 300 OHMS	55	15.16	" " 3 MMF 10	77	10 2	" " .1 " 200 "
12	30 58	" " 20,000 " " 10	34	40.3A	CHOKE COIL - 200 OHMS	56	15.61	" " 35 " 5	78	10 2	" " .1 " 200 "
13	30 59	" " 27,000 " "	35	35 15	ANTENNA	57	15 10	" " 50 " 10	79	10 2	" " .1 " 200 "
14	30 10	" " 30,000 " "	36	35 16	R F	58	20.3	PILOT LT'S. - 6-8 V 15 A	80	10.2	" " .1 " 200 "
15	30.26	" " 50,000 " " 20	37	35 17	OSCILLATOR	59	125 1	PHONO JACK	81	10 23	" " .006 " 200 "
16	30 8	" " 100,000 " " 10	38	35 18	1ST I. F	60	25 61	VARIABLE COND	82	10 9	" " .1 " 400 "
17	30.66	" " 150,000 " " 20	39	35 19	2ND I F	61		ON-OFF SW ON TONE CONT	83	10 10	" " .01 " 400 "
18	30 62	" " 400,000 " " 10	40	35 6	WAVE TRAP	62		MIN. ADJ ON COILS	84	10 0	" " .01 " 400 "
19	32 16	CHOKE COIL - 2.3 MH.	41	20.47	ELECTRO COND - 32 MF 100 W.V.	63	25 49	PADDING COND - 70 MMF	85	10 17	" DUAL .001 " 600 "
20	.0 20	CARB. RES. 250,000 OHMS ½W ±20	42	20.47	" " 16 100 "	64	55 11	TONE CONTROL - ½ MEG	86	105 44	SPEAKER - 1500 ω (MODEL 211 T)
21	30 23	" " 500,000 " "	43	20.25	" " 8 10.0 " tub	65	50 25	VOLUME 1 MEG TAPPED @ 50,000 OHMS	87	105 45	" " (211 C)
22	30 23	" " 500,000 " "	44	20.44	" DUAL 10-10 25 "	66	50 24	PHANTOM FLASH-O-GRAPH CONTROL 1 MEG	88	105 46	" " (211 CK)

SPEAKER D.C. RES. VALUES

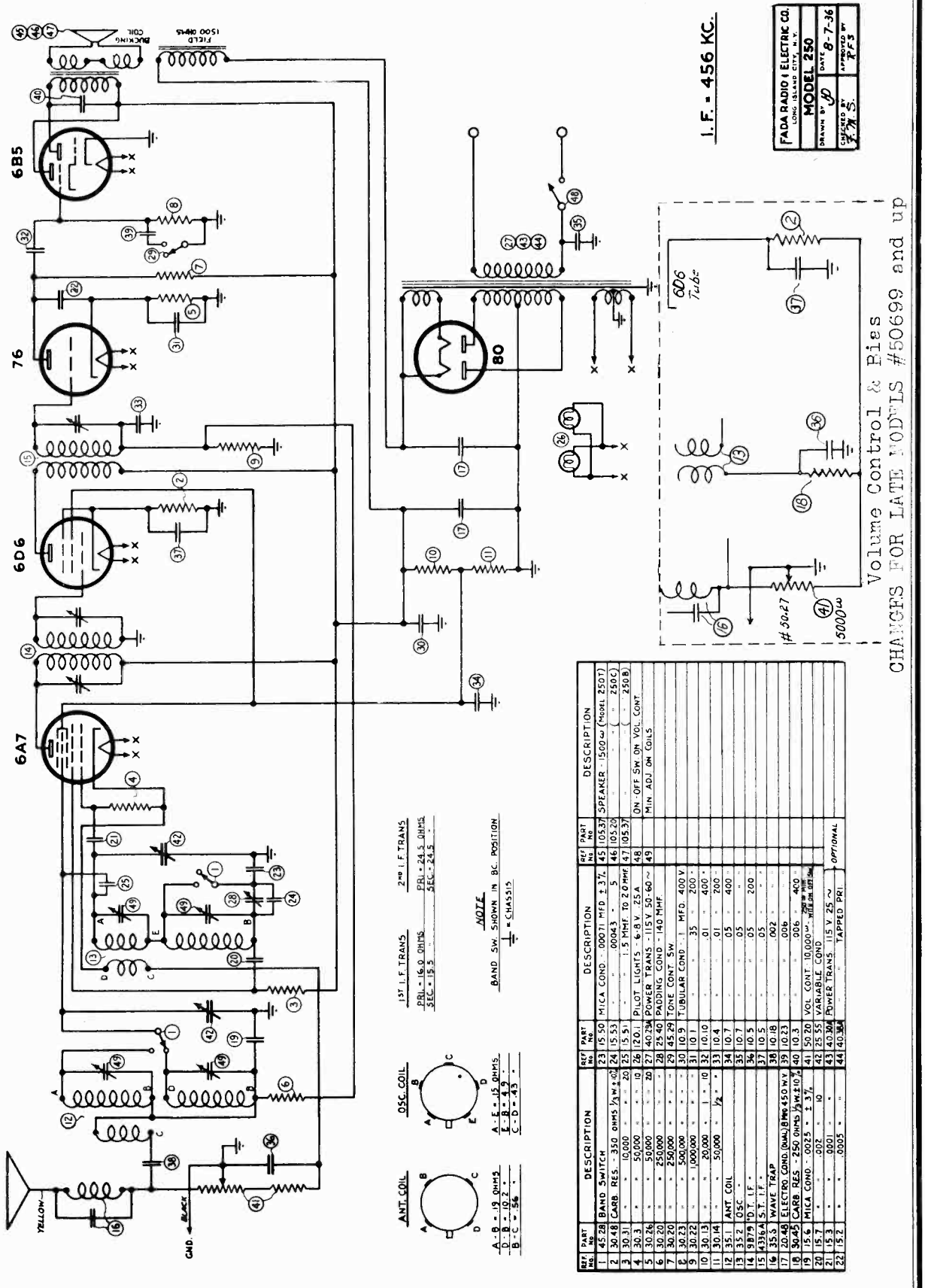
PART NO.	A.-F. TRANS.		VOICE C.
105.44	PRIM. 740*	SEC. .5**	2.0
105.45	740*	.7**	2.7
105.46	700*	.8**	2.5

* THESE ARE COLD D.C. RES. VALUES
* THIS READING INCLUDES RES. OF HUM BUCK. COIL

NOTE (A) ON SOME EARLY MODELS A 250,000 OHM RES. WAS USED IN PLACE OF THIS CHOKE.
NOTE (B) ON LATER MODELS THIS TUB COND HAS BEEN ADDED.

FADA RADIO & ELECTRIC CORP.
MODEL 211
Schematic
Voltage, Parts

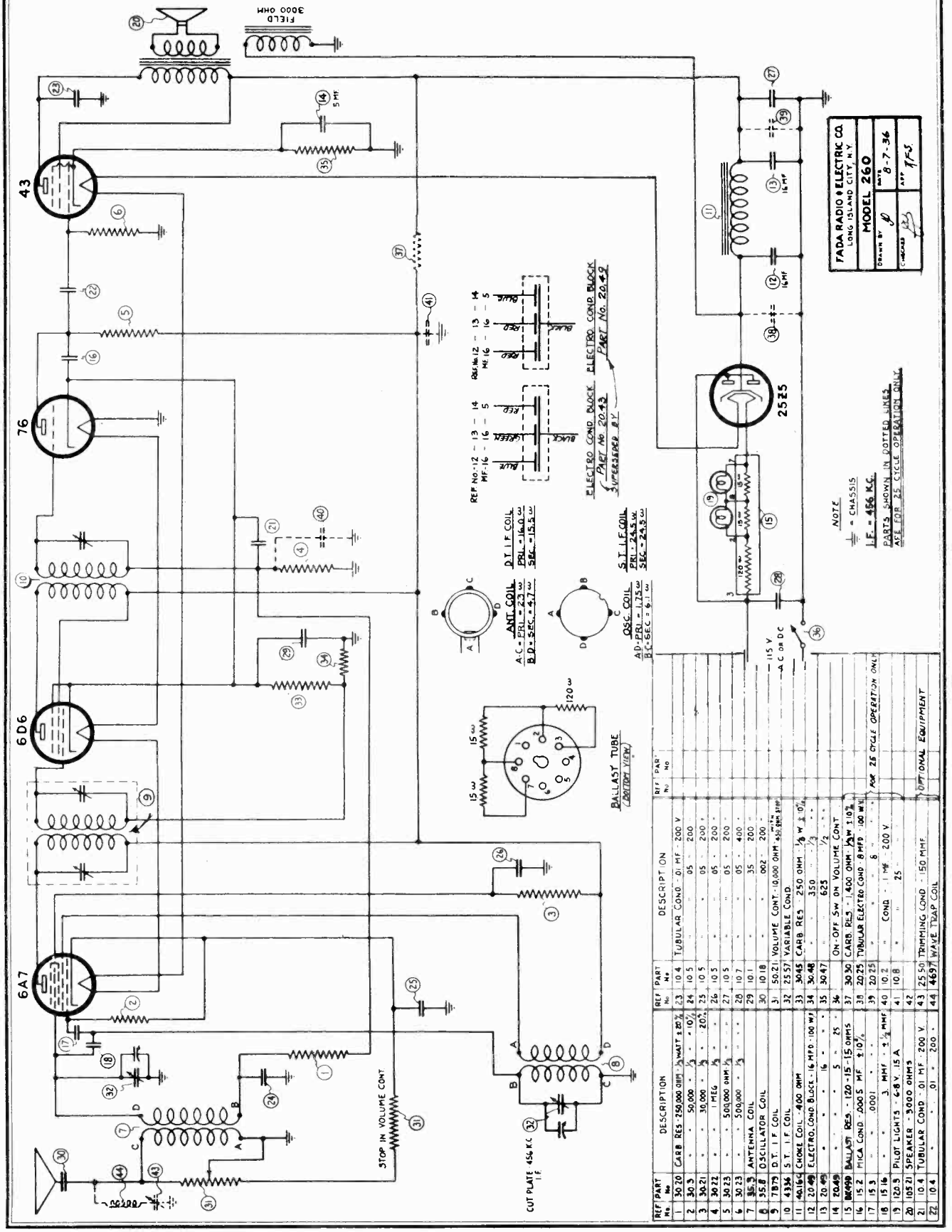
MODEL 250,2 Types
Early,Up to Serial 50698 FADA RADIO & ELECTRIC CORP.
Late,From Serial 50699
Schematic,Parts List



REF. NO.	PART NO.	DESCRIPTION
1	45.28	BAND SWITCH
2	30.48	CARB. RES. - 350 OHMS ½W ± 10%
3	30.31	" " 10,000 " " " 20
4	30.3	" " 50,000 " " " 10
5	30.26	" " 50,000 " " " 20
6	30.20	" " 250,000 " " " -
7	30.21	" " 250,000 " " " -
8	30.23	" " 500,000 " " " -
9	30.22	" " 1,000,000 " " " -
10	30.13	" " 20,000 " 1 " 10
11	30.14	" " 50,000 " ½ " "
12	35.1	ANT. COIL
13	35.2	OSC. "
14	9879	1ST I.F. "
15	4336A	2ND I.F. "
16	35.3	WAVE TRAP
17	20.48	ELECTRO. COND. (DUAL) 8 MFD 450 W.V.
18	30.45	CARB. RES. - 250 OHMS ½W ± 10%
19	15.6	MICA COND. - .0025 - ± 3%
20	15.7	" " .002 " " 10
21	15.3	" " .0001 " "
22	15.2	" " .0005 " "
23	15.50	MICA COND. - .00071 MFD ± 3%
24	15.53	" " .00043 " 5
25	15.51	" " 1.5 MMF. TO 2.0 MMF
26	120.1	PILOT LIGHTS - 6.8 V. 2.5 A.
27	40.384	POWER TRANS. - 115 V. 50-60 ~
28	23.40	PADDING COND. - 140 MMF.
29	45.29	TONE CONT. SW.
30	10.9	TUBULAR COND. - 1 MFD. 400 V.
31	10.1	" " .35 " 200 "
32	10.10	" " .01 " 400 "
33	10.4	" " .01 " 200 "
34	10.7	" " .05 " 400 "
35	10.7	" " .05 " "
36	10.5	" " .05 " 200 "
37	10.5	" " .05 " "
38	10.18	" " .002 " "
39	10.23	" " .006 " 400 "
40	10.3	" " .006 " "
41	50.20	VOL. CONT. 10,000 ω
42	25.55	VARIABLE COND.
43	40.304	POWER TRANS. 115 V. 25 ~
44	40.364	" " TAPPED PRI.
45	105.37	SPEAKER - 1500 ω (MODEL 250T)
46	105.20	" " " 250(-)
47	105.37	" " " 250B)
48		ON - OFF SW. ON VOL. CONT.
49		MIN. ADJ. ON COILS

FADA RADIO & ELECTRIC CORP.

MODEL 260
Schematic
Parts



REF No.	PART No.	DESCRIPTION
1	30.20	CARB RES - 250,000 OHM ½ WATT ±20%
2	30.3	" " 50,000 " ½ " ±10%
3	30.21	" " 30,000 " ½ " ±20%
4	30.22	" " 1 MEG ½ " "
5	30.23	" " 500,000 OHM ½ " "
6	30.23	" " 500,000 " ½ " "
7	35.3	ANTENNA COIL
8	35.8	OSCILLATOR COIL
9	7879	D.T. I.F. COIL
10	4336	S.T. I.F. COIL
11	40.16	CHOKE COIL - 400 OHM
12	20.42	ELECTRO. COND BLOCK - 16 MFD - 100 WV
13	20.43	" " " 16 " "
14	20.45	" " " 5 " "
15	BR.99	BALLAST RES - 120 - 15 - 15 OHMS
16	15.2	MICA COND .0005 MF ±10%
17	15.3	" " .0001 " " "
18	15.16	" " 3 MMF - 4½ MMF
19	120.3	PILOT LIGHTS - 6-8 V. .15 A
20	105.21	SPEAKER - 3000 OHMS
21	10.4	TUBULAR COND - .01 MF - 200 V.
22	10.4	" " .01 " 200 "
23	10.4	TUBULAR COND - .01 MF - 200 V
24	10.5	" " .05 " 200 "
25	10.5	" " .05 " 200 "
26	10.5	" " .05 " 200 "
27	10.5	" " .05 " 400 "
28	10.7	" " .05 " 200 "
29	10.1	" " .35 " 200 "
30	10.18	" " .002 " 200 "
31	50.21	VOLUME CONT - 10,000 OHM ±5% WITH SWITCH
32	25.57	VARIABLE COND
33	30.45	CARB RES - 250 OHM 1/8 W ± 10%
34	30.48	" " 350 " " "
35	30.47	" " 625 " " "
36		ON-OFF SW ON VOLUME CONT
37	30.30	CARB RES - 1,400 OHM ½W ±10%
38	20.25	TUBULAR ELECTRO COND 8 MFD 100 WV
39	20.25	" " " 8 " "
40	10.2	" " COND - 1 MF 200 V
41	10.8	" " " 25 "
42		
43	25.50	TRIMMING COND - 150 MMF
44	4697	WAVE TRAP COIL

ADD 25 CYCLE OPERATION ONLY

OPTIONAL EQUIPMENT

MODEL 260
Alignment, Voltage
Socket, Trimmers

FADA RADIO & ELECTRIC CORP.

ALIGNING INSTRUCTIONS FOR MODEL 260 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC and 1500 KC.

This receiver is equipped with an automatic overload control which necessitates setting the manual volume control of the receiver to the maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

NOTE: Do not remove knobs, screws or chassis from the cabinet before removing the line cord plug from the power line socket. If the above precaution is not followed a severe electric shock, or damage to the receiver, may result.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, connect a .1 mfd. tubular condenser from the oscillator stator section (see sketch) of the ganged variable condenser to chassis.

2nd - Disconnect the control grid lead from the 6A7 oscillator-modulator tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 oscillator-modulator tube, and the low potential lead to the receiver chassis.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw drive

1st - Remove signal generator connection from control grid of 6A7 oscillator-modulator tube and replace control grid lead.

2nd - Connect the antenna wire of the receiver to the high potentia lead of the signal generator through a 250 mmfd. condenser.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - Set the dial pointer directly at "E" in the word "POLICE" with the ganged variable condenser rotor plates open.

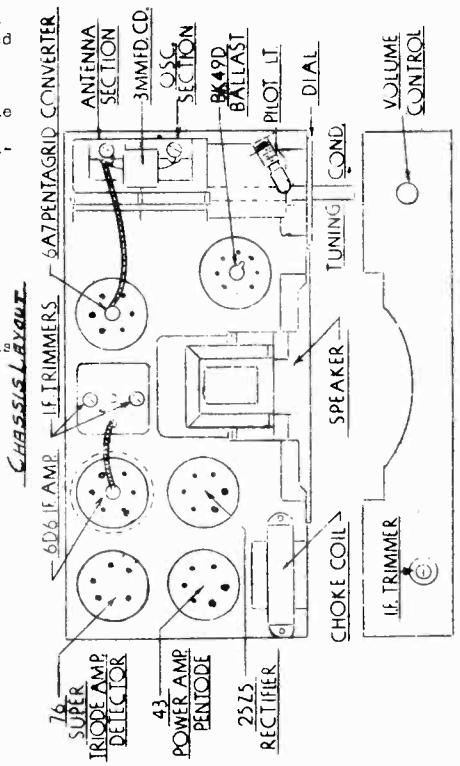
5th - Rotate the receiver dial to read 1500 KC.

6th - Starting with the compensator nearest the front of the receiver, adjust each compensator (as indicated on sketch) for maximum signal output. Do not disturb the setting of the gang condenser during these operations.

Voltage across 3,000 ohm speaker field	128 volts
" " 300 " filter choke	15.5 "

DC RESISTANCE VALUES

		PRIMARY	SECONDARY
35.3	Antenna coil	23.0 ohms	4.7 ohms
35.8	Oscillator coil	1.75 "	6.1 "
7B79	1st I.F. trans.	15.0 "	15.0 "
4336	2nd I.F. trans.	25.0 "	25.0 "
40.16C	Filter choke	400.0 "	
105.21	Speaker input audio trans.	340.0 "	.5 "
105.21	Speaker field	3000.0 "	
105.21	Speaker voice coil	3.0 "	



CONTINUITY AND VOLTAGE READINGS ON MODEL 260 SERIES

Line Voltage - 119 v. A.C. Input watts - 48

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6A7	1st Det. Osc.	108	1.4	2.6**	54
6D6	I.F. Amp.	105	8.4	2.6	105
76	2nd Det.	36*	.05	6.2**	--
43	Pwr. Pentode	90	20.0	15.0**	97
2525	Rectifier	--	78. TOTAL	---	--

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

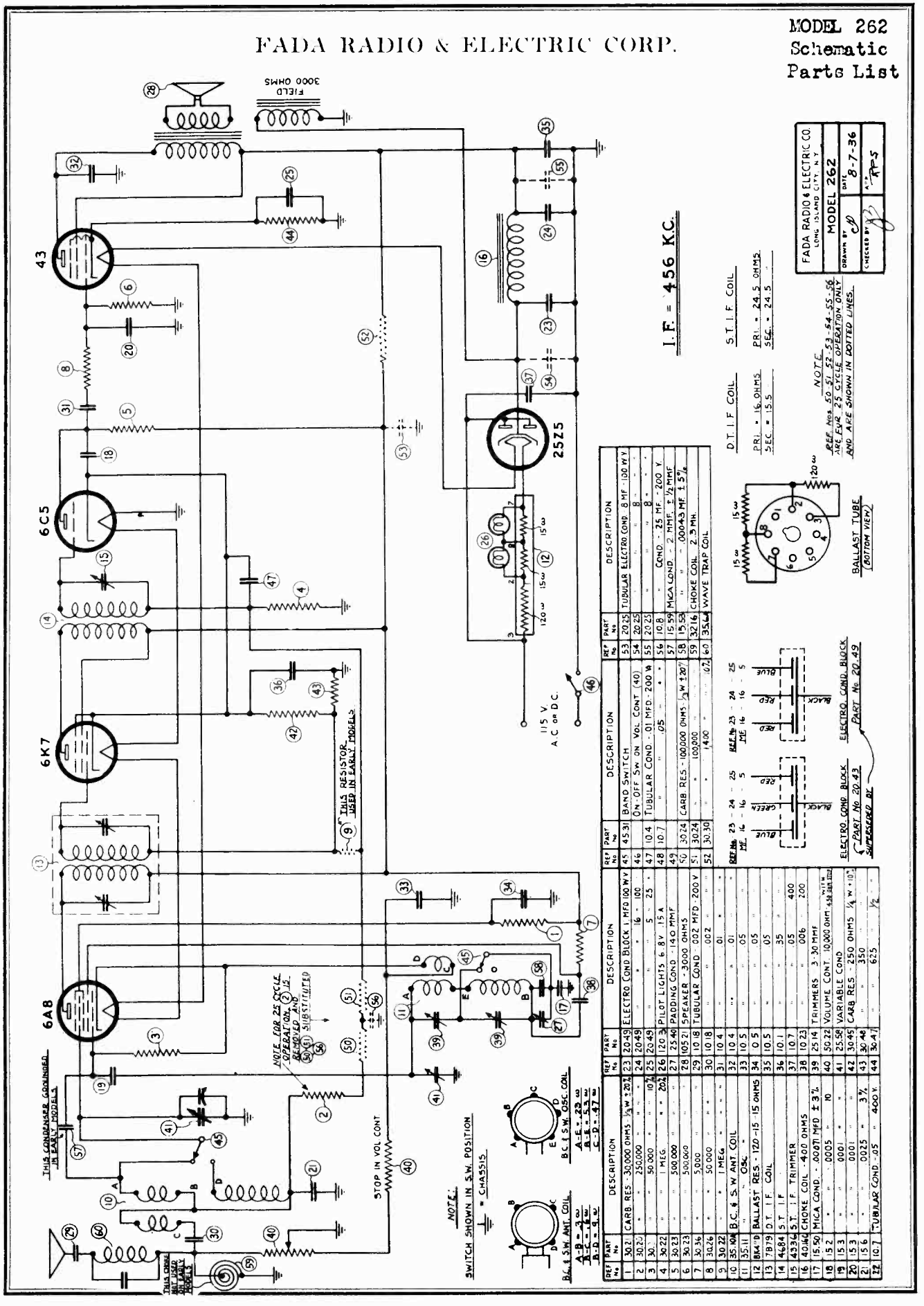
** Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (Part #20.49)

1st section	2nd section
128	112

FADA RADIO & ELECTRIC CORP.

MODEL 262
Schematic
Parts List



REF No.	PART No.	DESCRIPTION
1	30.21	CARB. RES. - 30,000 OHMS ½W ± 20%
2	30.20	" " 250,000 " " " "
3	30	" " 50,000 " " " 10%
4	30.22	" " 1 MEG " " " 20%
5	30.03	" " 500,000 " " "
6	30.23	" " 500,000 " " "
7	30.36	" " 5,000 " " "
8	30.26	" " 50,000 " " "
9	30.22	" " 1 MEG " " "
10	35.10A	B.C. & S.W. ANT. COIL
11	35.11	" " OSC. "
12	BA-19	BALLAST RES. - 120-15 OHMS
13	7879	D.T. I.F. COIL
14	4684	S.T. I.F.
15	4336	S.T. I.F. TRIMMER
16	40.146	CHOKE COIL - 400 OHMS
17	15.50	MICA COND. - .0001 MFD ± 3%
18	15.2	" " .0005 " "
19	15.3	" " .001 " "
20	15.3	" " .001 " "
21	15.6	" " .0025 " 3%
22	10.7	TUBULAR COND. - .05 " 400 V.
23	20.49	ELECTRO COND BLOCK 1 MFD 100 W.V.
24	20.49	" " " 16 - 100 "
25	20.49	" " " 5 - 25 "
26	120.3	PILOT LIGHTS 6.8V. .15 A
27	25.40	PADDING COND - 140 MMF
28	105.21	SPEAKER - 3000 OHMS
29	10.18	TUBULAR COND. .002 MFD. 200 V
30	10.18	" " " .002 " " "
31	10.4	" " " .01 " " "
32	10.4	" " " .01 " " "
33	10.5	" " " .05 " " "
34	0.5	" " " .05 " " "
35	10.5	" " " .05 " " "
36	10.1	" " " .35 " " "
37	10.7	" " " .05 400 "
38	10.23	" " " .006 200 "
39	25.14	TRIMMERS 3-30 MMF
40	50.22	VOLUME CONT. 10,000 OHM 4W TAPPED
41	25.58	VARIABLE COND
42	30.45	CARB. RES. - 250 OHMS ¼ W ± 10%
43	30.48	" " " 350 " " "
44	30.47	" " " 625 " " ½ "
45	45.31	BAND SWITCH
46		ON-OFF SW. ON VOL CONT (40)
47	10.4	TUBULAR COND. - .01 MFD - 200 W
48	10.7	" " " .05 " " "
49		
50	30.24	CARB. RES. - 100,000 OHMS ½W ± 20%
51	30.24	" " " 100,000 " " "
52	30.30	" " " 1400 " " "
53	20.25	TUBULAR ELECTRO COND. 8 MF - 100 W.V.
54	20.25	" " " " 8 - " "
55	20.25	" " " " 8 " "
56	10.8	" COND. - .25 MF. - 200 V.
57	15.59	MICA COND. - 2 MMF. ± ½ MMF
58	15.58	" " " - .00043 MF ± 5%
59	32.16	CHOKE COIL 2.5 MH.
60	35.4	WAVE TRAP COIL

ELECTRO COND. BLOCK
PART No. 20.49
SUBSTRATE

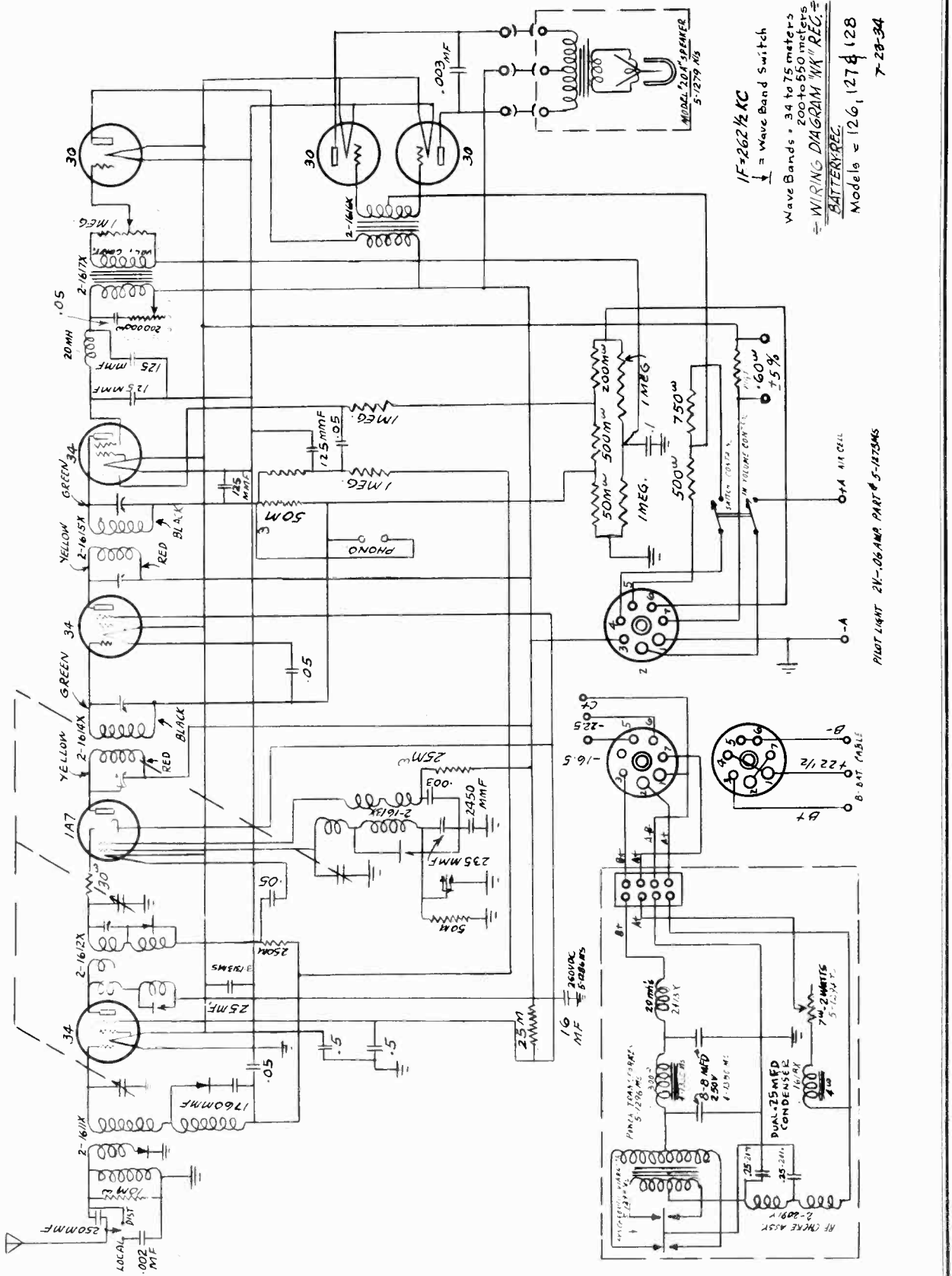
REF. Nos. 23 - 24 - 25
MF. 16 - 16 - 5

REF. Nos. 23 - 24 - 25
MF. 16 - 16 - 5

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 262
DRAWN BY CJD
DATE 8-7-36
CHECKED BY
APP. RFS

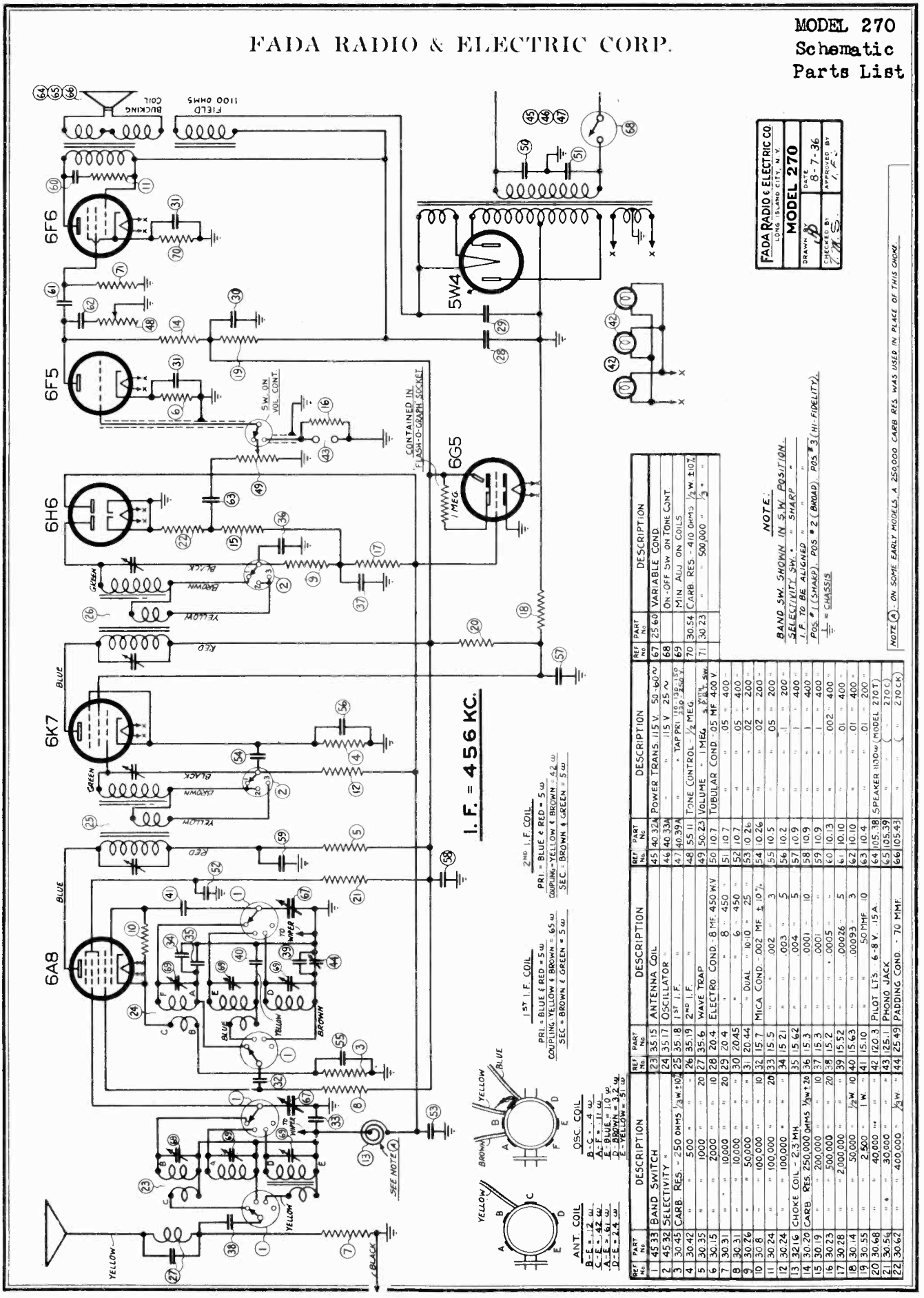
MODELS 126,127,128
Chassis NK
Schematic

FADA RADIO & ELECTRIC CORP.



FADA RADIO & ELECTRIC CORP.

MODEL 270
Schematic
Parts List



Ref No.	Part No.	Description	Ref No.	Part No.	Description	Ref No.	Part No.	Description
1	45 33	Band Switch	23	35 15	Antenna Coil	45	40 32A	Power Trans. 115 V. 50-60 ~
2	45 32	Selectivity "	24	35 17	Oscillator "	46	40 33A	" " 115 V 25 ~
3	30 45	Carb Res. - 250 ohms 1/2 W ±10%	25	35 18	1st I.F. "	47	40 39A	" Tap Pri 115 - 130 - 150
4	30 42	" " 500 " " "	26	35 19	2nd I.F. "	48	55 11	Tone Control - 1/2 Meg.
5	30 35	" " 1000 " " " 20	27	35 6	Wave Trap	49	50 23	Volume " 1 Meg " "
6	30 15	" " 2000 " " " 10	28	20 4	Electro Cond. - 8 Mf. 450 W.V.	50	10 7	Tubular Cond - .05 Mf 400 V
7	30 31	" " 5000 " " "	29	20 4	" " 8 " 450 "	51	10 7	" " " .05 " 400 "
8	30 31	" " 10,000 " " "	30	20 45	" " 6 " 450 "	52	10 7	" " " .05 " 400 "
9	30 26	" " 50,000 " " "	31	20 44	" Dual " 10-10 " 25 "	53	10 26	" " " .02 " 200 "
10	30 8	" " 100,000 " " " 10	32	15 7	Mica Cond. - .002 Mf. ± 10%	54	10 26	" " " .02 " 200 "
11	30 24	" " 100,000 " " " 20	33	15 5	" " " .002 " 3	55	10 5	" " " .05 " 200 "
12	30 24	" " 100,000 " " "	34	15 21	" " " .003 " 5	56	10 2	" " " .1 " 200 "
13	32 16	Choke Coil - 2.3 Mh	35	15 62	" " " .004 " 5	57	10 9	" " " .1 " 400 "
14	30 20	Carb. Res. 250,000 ohms 1/2 W ±20	36	15 3	" " " .0001 " 10	58	10 9	" " " .1 " 400 "
15	30 19	" " 200,000 " " "	37	15 3	" " " .0001 "	59	10 9	" " " .1 " 400 "
16	30 23	" " 500,000 " " " 20	38	15 2	" " " .0005 "	60	10 13	" " " .002 " 400 "
17	30 28	" " 2,000,000 " " "	39	15 52	" " " .00026 " 5	61	10 10	" " " .01 " 400 "
18	30 14	" " 50,000 " 1/2 W 10	40	15 63	" " " .00093 " 3	62	10 10	" " " .01 " 400 "
19	30 55	" " 2,500 " 1 W "	41	15 10	" " " 50 MMF 10	63	10 4	" " " .01 " 200 "
20	30 68	" " 40,000 " " "	42	120 3	Pilot Lt's 6-8 V .15 A	64	105 38	Speaker 1050 (Model 270)
21	30 54	" " 30,000 " " "	43	25 1	Phono Jack " "	65	105 39	" " " 270 C
22	30 67	" " 400,000 " 1/2 W "	44	25 43	Padding Cond. - 70 MMF	66	105 43	" " " 270 CK

Ref No.	Part No.	Description	Ref No.	Part No.	Description
67	25 60	Variable Cond.	70	30 54	Carb. Res. - 410 ohms 1/2 W ±10%
68		On-Off Sw on Tone Cont	71	30 23	" " " 500,000 " " "
69		Min. Adj. on Coils			

NOTE:
Band Sw. shown in S.W. position
Selectivity Sw. " Sharp "
I.F. to be aligned " " "
Pos. #1 (Sharp) Pos. #2 (Broad) Pos. #3 (Hi-Fidelity)
⏚ = Chassis

NOTE (A) On some early models a 250,000 carb. res. was used in place of this choke.

FADA RADIO & ELECTRIC CO.
Long Island City, N.Y.
MODEL 270
Drawn JP Date 8-7-36
Checked by J.M.S. Approved by J.F.R.

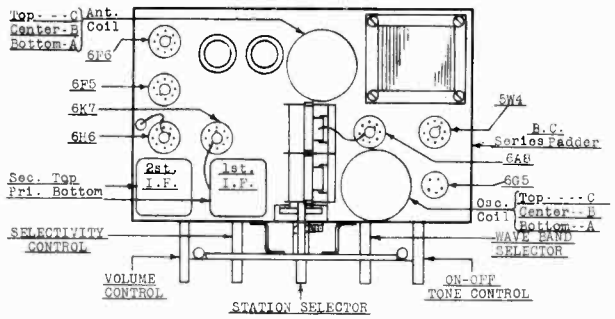
MODEL 270
Alignment, Voltage
Socket, Trimmers

FADA RADIO & ELECTRIC CORP.

ALIGNING INSTRUCTIONS FOR MODEL 270 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 2 MC, 5 MC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

IMPORTANT: All adjustments must be made with the selectivity control in the "S" position.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6A8 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance; adjusting first the I.F. condenser across the secondary winding of the 2nd I.F. transformer and then each in turn, ending with the adjustment of the condenser across the primary winding of the 1st I.F. transformer.

ADJUSTMENT OF BAND "A" SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 15 MC.

4th - Turn the wave band selector switch to band "A" and set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the "A" band oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original signal frequency output reading.

6th - Having determined the correct peak, and maximum setting, for the "A" band shunt compensator, adjust the antenna band "A" shunt compensator for maximum output.

7th - Adjust the carrier frequency output of the signal generator to 6 MC. Rotate the station selector to pick up this 6 MC signal and check for calibration and sensitivity.

ADJUSTMENT OF BAND "B" SHUNT COMPENSATOR

The compensators are located as indicated in the sketch.

1st - Turn the wave band selector switch to band "B".

2nd - Adjust the carrier frequency output of the signal generator to 5 MC.

3rd - Turn the receiver dial to read 5 MC.

4th - Adjust the band "B" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "out". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 4 MC. If no signal is heard at this setting, even with a greater signal generator output, the compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 4 MC.

5th - Having determined the correct peak and maximum setting for the band "B" oscillator shunt compensator, adjust the antenna shunt compensator for maximum output.

6th - Adjust the carrier frequency output of the signal generator to 2 MC. Rotate the station selector to pick up this 2 MC signal and check for calibration and sensitivity.

ADJUSTMENT OF BAND "C" SHUNT COMPENSATOR

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to band "C".

3rd - Adjust the carrier frequency to 1500 KC.

4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the band "C" oscillator shunt compensator for maximum signal output.

6th - Adjust band "C" antenna shunt compensator for maximum signal output.

ADJUSTMENT OF BAND "C" OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust band "C" oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of band "C" oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust band "C" oscillator shunt compensator, and then, antenna shunt compensator for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 270 SERIES

Line Voltage 118 A.C. - Input Current .6 Amp.

(No signal input)

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Detector Oscillator	225 183	4.2 3.4	2.8 ---	114 ---
6K7	Int. Freq.	230	5.4	3.5	98
6H6	2nd Detector A.V.C.	--- ---	--- ---	--- ---	--- ---
6F5	1st Audio	99	.5	.9	---
6F6	2nd Audio	242	40.	17.9	272
6G5	Flash-o-graph	232	1.2	---	---
5W4	Rectifier	---	67.0 TOTAL	---	---

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

Above readings taken with a 105.39 speaker in circuit.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS

1st - 370 2nd - 290

Voltage across speaker field		80 volts
" " 2,500 ohm resistor	(#30.55)	58 "
" " 40,000 " "	(#30.68)	133 "
" " 50,000 " "	(#30.14)	97 "

SPEAKER D.C. RESISTANCE VALUES

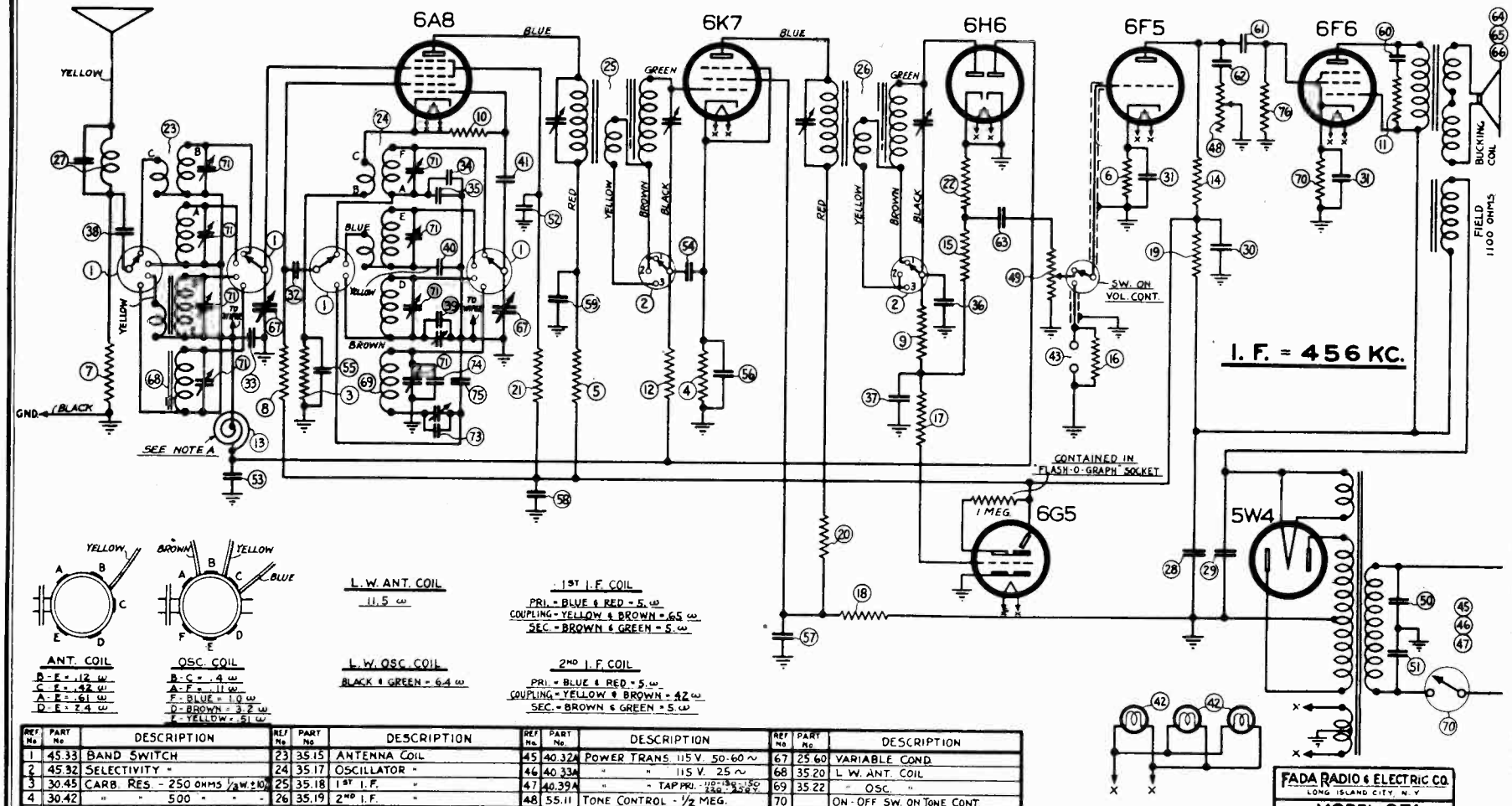
PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.38	1,100*	500*	.8**	3.0
105.39	1,100*	700*	1.0**	2.8
105.43	1,100*	400*	1.0**	6.5

* These are cold D.C. resistance values.

** This reading includes resistance of hum bucking coil.

FADA RADIO & ELECTRIC CORP.

MODEL 271 Schematic Parts List



ANT. COIL
B - E = .12 ω
C - E = .42 ω
A - E = .61 ω
D - E = 2.4 ω

OSC. COIL
B - C = .4 ω
A - F = .11 ω
F - BLUE = 1.0 ω
D - BROWN = 3.2 ω
E - YELLOW = .51 ω

L.W. ANT. COIL
11.5 ω

L.W. OSC. COIL
BLACK & GREEN = 6.4 ω

1ST I.F. COIL
PRI. = BLUE & RED = 5. ω
COUPLING = YELLOW & BROWN = .65 ω
SEC. = BROWN & GREEN = 5. ω

2ND I.F. COIL
PRI. = BLUE & RED = 5. ω
COUPLING = YELLOW & BROWN = .42 ω
SEC. = BROWN & GREEN = 5. ω

REF No	PART No	DESCRIPTION
1	45.33	BAND SWITCH
2	45.32	SELECTIVITY "
3	30.45	CARB. RES. - 250 OHMS 1/2W ± 10%
4	30.42	" " 500 " " " -
5	30.35	" " 1000 " " 20
6	30.15	" " 2000 " " 10
7	30.31	" " 10,000 " " 20
8	30.31	" " 10,000 " " "
9	30.26	" " 50,000 " " "
10	30.8	" " 100,000 " " 10
11	30.24	" " 100,000 " " 20
12	30.24	" " 100,000 " " "
13	32.16	CHOKE COIL - 2.3 MH.
14	30.20	CARB. RES. 250,000 OHMS 1/2W ± 20
15	30.19	" " 200,000 " " 10
16	30.23	" " 500,000 " " 20
17	30.28	" " 2,000,000 " " "
18	30.14	" " 50,000 " 1/2W 10
19	30.55	" " 2,500 " 1 W "
20	30.68	" " 40,000 " " "
21	30.56	" " 30,000 " " "
22	30.62	" " 400,000 " 1/3W "
23	35.15	ANTENNA COIL
24	35.17	OSCILLATOR "
25	35.18	1ST I.F. "
26	35.19	2ND I.F. "
27	35.6	WAVE TRAP
28	20.4	ELECTRO. COND. - 8 MF. 450 W.V.
29	20.4	" " 8 " 450 "
30	20.45	" " 6 " 450 "
31	20.44	" DUAL " 10-10 " 25 "
32	15.7	MICA COND. .002 MF. ± 10%
33	15.5	" " .002 " 3
34	15.21	" " .003 " 5
35	15.62	" " .004 " 5
36	15.3	" " .0001 " 10
37	15.3	" " .0001 " "
38	15.2	" " .0005 " "
39	15.52	" " .00026 " 5
40	15.63	" " .00093 " 3
41	15.10	" " 50 MMF 10
42	120.3	PILOT LTS 6-8 V. .15 A.
43	125.1	PHONO JACK
44	25.49	PADDING COND
45	40.32A	POWER TRANS. 115 V. 50-60 ~
46	40.33A	" " 115 V. 25 ~
47	40.39A	" " TAP PRI. 110-130-150 / 220-240-260 V.
48	55.11	TONE CONTROL - 1/2 MEG.
49	50.23	VOLUME " 1 MEG WITH S.P.S.T. SW.
50	10.7	TUBULAR COND. .05 MF 400 V.
51	10.7	" " .05 " 400 "
52	10.7	" " .05 " 400 "
53	10.26	" " .02 " 200 "
54	10.26	" " .02 " 200 "
55	10.5	" " .05 " 200 "
56	10.2	" " .1 " 200 "
57	10.9	" " .1 " 400 "
58	10.9	" " .1 " 400 "
59	10.9	" " .1 " 400 "
60	10.13	" " .002 " 400 "
61	10.10	" " .01 " 400 "
62	10.10	" " .01 " 400 "
63	10.4	" " .01 " 200 "
64	105.38	" " (MODEL 270T)
65	105.39	" " (" 270C)
66	105.43	" " (" 270CK)
67	25.60	VARIABLE COND.
68	35.20	L.W. ANT. COIL
69	35.22	" OSC. "
70		ON-OFF SW. ON TONE CONT.
71		MIN. ADJ. ON COILS
72	30.54	CARB. RES. - 410 OHMS 1/2 W. ± 10%
73	15.58	MICA COND. - .00018 MF. ± 5%
74	15.10	" " 50 MMF. 10
75	15.2	" " .0003 MF. "
76	30.23	CARB. RES. - 500,000 OHMS 1/3W ± 20%

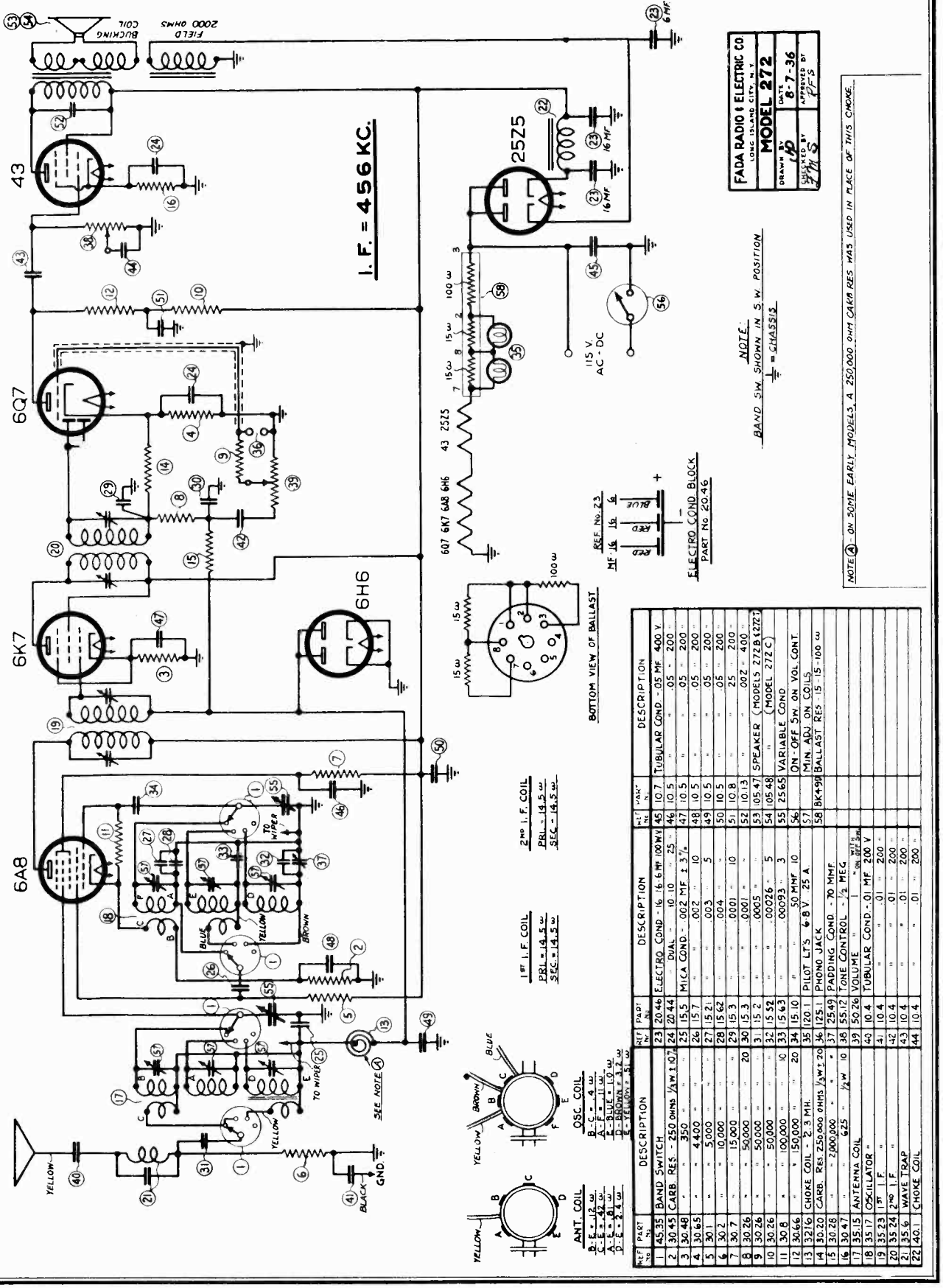
NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW " " SHARP "
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS #3 (HI-FIDELITY).
⏚ = CHASSIS

NOTE A - ON SOME EARLY MODELS, A 250,000 CARB. RES WAS USED IN PLACE OF THIS CHOKE.

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL 271	
DRAWN JP	DATE 8-7-36
CHECKED BY F.M.S.	APPROVED BY R.F.S.

MODEL 272
Schematic
Parts List

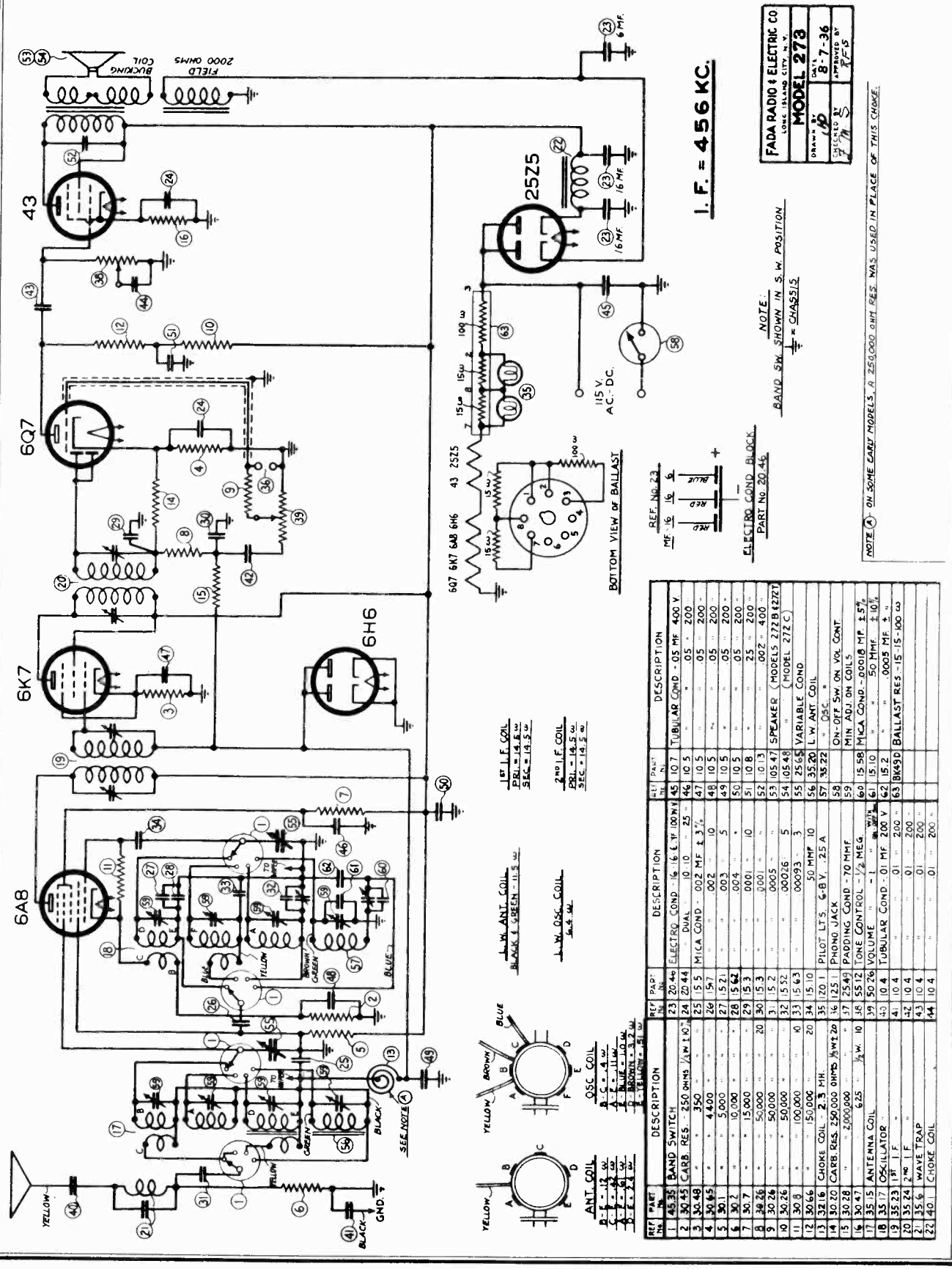
FADA RADIO & ELECTRIC CORP.



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	45.35	BAND SWITCH	23	20.46	ELECTRO COND - 16-16 MF 100 WV
2	30.45	CARB RES - 250 OHMS ½W ± 10%	24	20.44	" DUAL " 10-10 " 25 "
3	30.48	" " 350 " " "	25	15.5	MICA COND - .002 MF ± 3%
4	30.65	" " 4,400 " " "	26	15.7	" " .002 " 10 "
5	30.1	" " 5,000 " " "	27	15.21	" " .003 " 5 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " 10 "
8	30.26	" " 50,000 " " 20	30	15.3	" " .0001 " "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " "
10	30.26	" " 50,000 " " "	32	15.52	" " .00026 " 5
11	30.8	" " 100,000 " " 10	33	15.63	" " .00093 " 3
12	30.66	" " 150,000 " " 20	34	15.10	" " 50 MMF 10
13	32.16	CHOKE COIL - 2.3 MH.	35	20.1	PILOT LTS 6.8 V. .25 A.
14	30.20	CARB. RES. 250,000 OHMS ½W ± 20%	36	125.1	PHONO JACK
15	30.28	" " 2,000,000 " " "	37	25.49	PADDING COND. .70 MMF.
16	30.47	" " .625 " ½W 10	38	55.12	TONE CONTROL - ½ MEG
17	35.15	ANTENNA COIL	39	50.26	VOLUME " 1 " "
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND - .01 MF 200 V
19	35.23	1ST I.F. "	41	10.4	" " " .01 " 200 "
20	35.24	2ND I.F. "	42	10.4	" " " .01 " 200 "
21	35.6	WAVE TRAP	43	10.4	" " " .01 " 200 "
22	40.1	CHOKE COIL	44	10.4	" " " .01 " 200 "
			45	10.7	TUBULAR COND - .05 MF 400 V.
			46	10.5	" " " .05 " 200 "
			47	10.5	" " " .05 " 200 "
			48	10.5	" " " .05 " 200 "
			49	10.5	" " " .05 " 200 "
			50	10.5	" " " .05 " 200 "
			51	10.8	" " " .25 " 200 "
			52	10.13	" " " .002 " 400 "
			53	105.47	SPEAKER (MODELS 272 B & 272 C)
			54	105.48	" (MODEL 272 C)
			55	2565	VARIABLE COND
			56		ON-OFF SW. ON VOL. CONT.
			57		MIN. ADJ. ON COILS
			58	BK+90	BALLAST RES. 15-15-100 ω

FADA RADIO & ELECTRIC CORP.

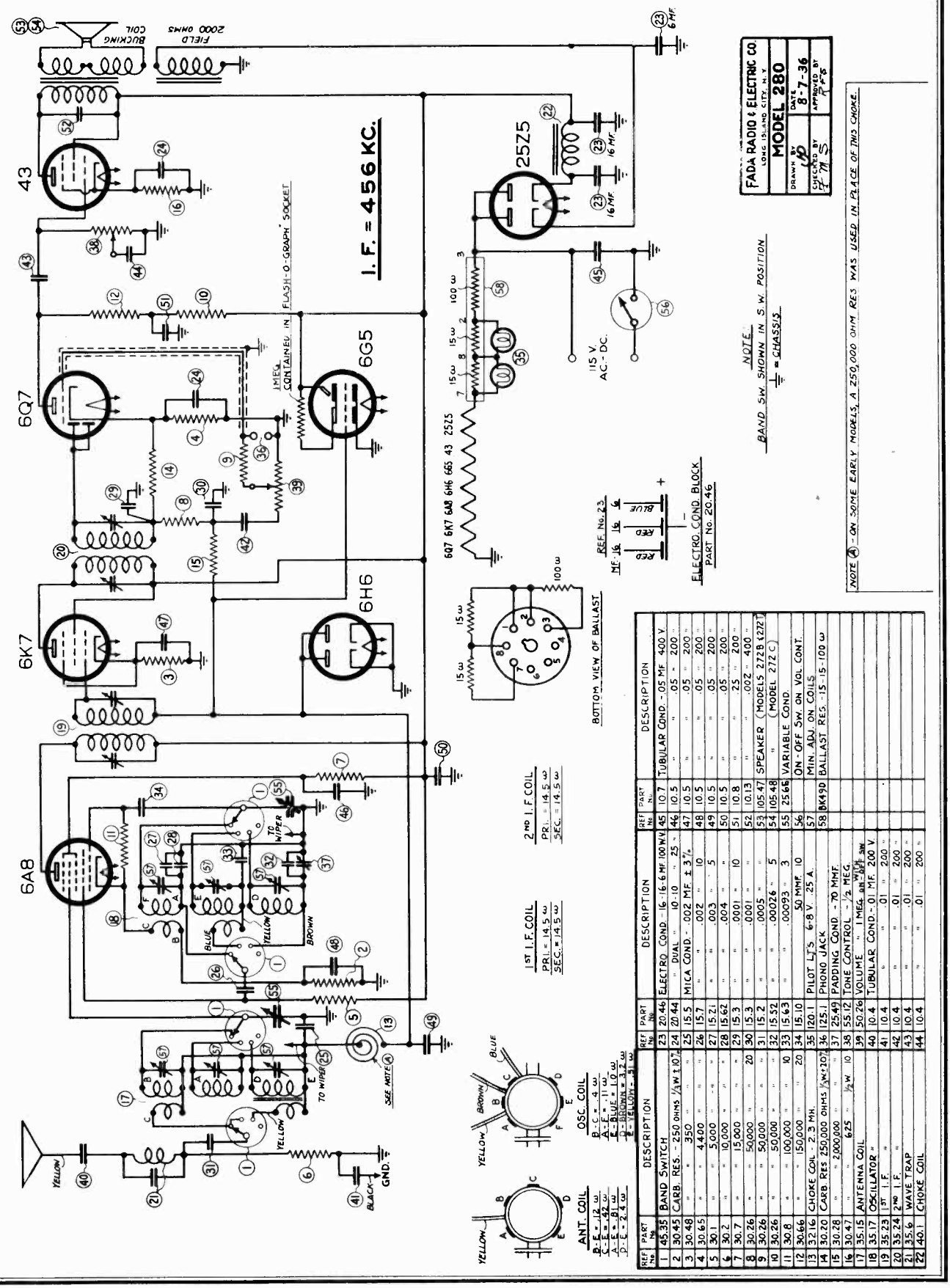
MODEL 273
Schematic
Parts List



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.35	BAND SWITCH	23	20.44	ELECTRO. COND. 16 - 16 - 16 MF 100 W.V.
2	30.45	CARB. RES. - 250 OHMS ½ W. ± 10%	24	20.44	" " DUAL .10 - .10 " 25 "
3	30.48	" " 350 " " "	25	15.5	MICA COND. - .002 MF ± 3% " .05 " 200 "
4	30.45	" " 4,400 " " "	26	15.7	" " .002 " .10 " .05 " 200 "
5	30.1	" " 5,000 " " "	27	15.21	" " .003 " .5 " .05 " 200 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " " " .05 " 200 "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " .10 " .25 " 200 "
8	30.26	" " 50,000 " " " 20	30	15.3	" " .0001 " " " .002 " 400 "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " " " SPEAKER (MODELS 272 B & 272 T)
10	30.26	" " 50,000 " " "	32	15.52	" " .00026 " 5 " (MODEL 272 C)
11	30.8	" " 100,000 " " " 10	33	15.63	" " .00093 " 3 " VARIABLE COND.
12	30.66	" " 150,000 " " " 20	34	15.10	50 MMF 10 " OSC. "
13	32.16	CHOKE COIL - 2.3 MH.	35	20.1	PILOT LITE 6.8 V. .25 A 57 35.22 L.W. ANT. COIL
14	30.20	CARB. RES. 250,000 OHMS ½ WATT 20	16	1251	PHONO JACK 58 ON-OFF SW. ON VOL. CONT.
15	30.28	" " 2,000,000 " " " 17	2549		PADDING COND - 70 MMF 59 MIN. ADJ. ON COILS
16	30.47	" " 625 " ½ W. 10	18	55.12	TONE CONTROL - ½ MEG. 60 15.58 MICA COND. - .00016 MF ± 5%
17	35.15	ANTENNA COIL	39	50.26	VOLUME " - 1 " " " 61 15.10 " " 50 MMF ± 10%
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND. - .01 MF 200 V 62 15.2 " " .0005 MF ± "
19	35.23	1ST I.F. "	41	10.4	" " .01 " 200 " 63 BK49D BALLAST RES - 15-15-100 ω
20	35.24	2ND I.F. "	42	10.4	" " .01 " 200 "
21	35.6	WAVE TRAP	43	10.4	" " .01 " 200 "
22	40.1	CHOKE COIL	44	10.4	" " .01 " 200 "

MODEL 280
Schematic
Parts List

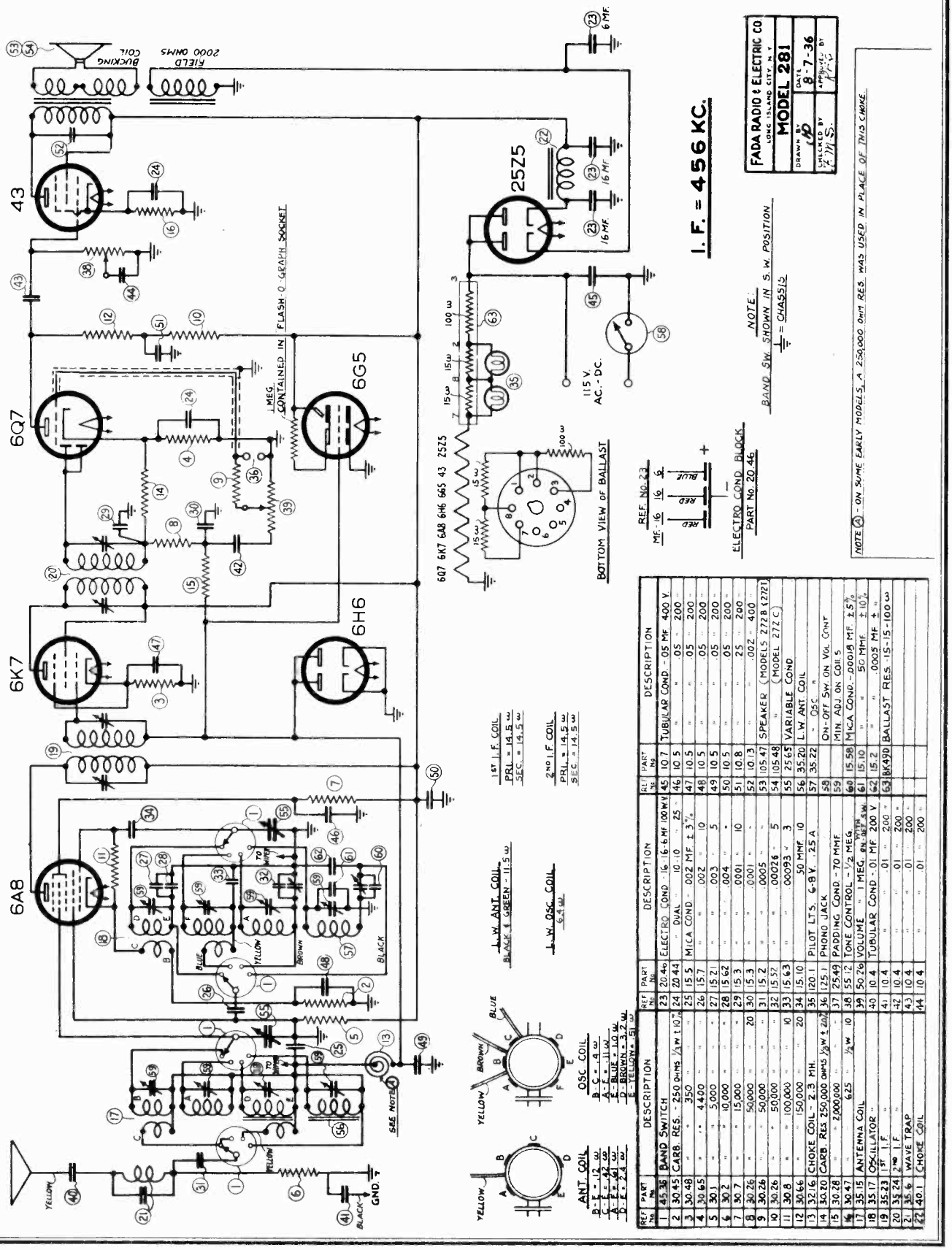
FADA RADIO & ELECTRIC CORP.



REF No.	PART No.	DESCRIPTION
1	45.35	BAND SWITCH
2	30.45	CARB. RES. - 250 OHMS ½W ± 10%
3	30.48	" 350 " " " "
4	30.65	" 4,400 " " " "
5	30.1	" 5,000 " " " "
6	30.2	" 10,000 " " " "
7	30.7	" 15,000 " " " "
8	30.26	" 50,000 " " " "
9	30.26	" 50,000 " " " "
10	30.26	" 50,000 " " " "
11	30.8	" 100,000 " " " "
12	30.66	" 150,000 " " " "
13	32.16	CHOKE COIL - 2.3 MH.
14	30.20	CARB RES 250,000 OHMS ½W ±20%
15	30.28	" 2,000,000 " " " "
16	30.47	" 625 " ½W 10%
17	35.15	ANTENNA COIL
18	35.17	OSCILLATOR "
19	35.23	1ST I.F. "
20	35.24	2ND I.F. "
21	35.6	WAVE TRAP
22	40.1	CHOKE COIL
23	20.46	ELECTRO COND. - 16-16 MF 100 W.V.
24	20.44	" DUAL " 10-10 " 25 "
25	15.5	MICA COND. - .002 MF. ± 3%
26	15.7	" " .002 " 10 "
27	15.21	" " .003 " 5 "
28	15.62	" " .004 " " "
29	15.3	" " .0001 " 10 "
30	15.3	" " .0001 " " "
31	15.2	" " .0005 " " "
32	15.52	" " .00026 " 5 "
33	15.63	" " .00093 " 3 "
34	15.10	" " 50 MMF. 10 "
35	120.1	PILOT LTS 6-8 V. .25 A.
36	125.1	PHONO JACK
37	25.49	PADDING COND. - 70 MMF.
38	55.12	TONE CONTROL - ½ MEG.
39	50.26	VOLUME " 1 MEG. ON-OFF SW.
40	10.4	TUBULAR COND. - .01 MF. 200 V
41	10.4	" " .01 " 200 "
42	10.4	" " .01 " 200 "
43	10.4	" " .01 " 200 "
44	10.4	" " .01 " 200 "
45	10.7	TUBULAR COND. - .05 MF 400 V
46	10.5	" " .05 " 200 "
47	10.5	" " .05 " 200 "
48	10.5	" " .05 " 200 "
49	10.5	" " .05 " 200 "
50	10.8	" " .25 " 200 "
51	10.13	" " .002 " 400 "
52	105.47	SPEAKER (MODELS 272B \272T)
53	105.48	" (MODEL 272 C)
54	25.66	VARIABLE COND
55		ON-OFF SW. ON VOL CONT.
56	BK49D	MIN. ADJ. ON COILS
57		BALLAST RES. - 15-15-100 ω
58		

FADA RADIO & ELECTRIC CORP.

MODEL 281
Schematic
Parts List



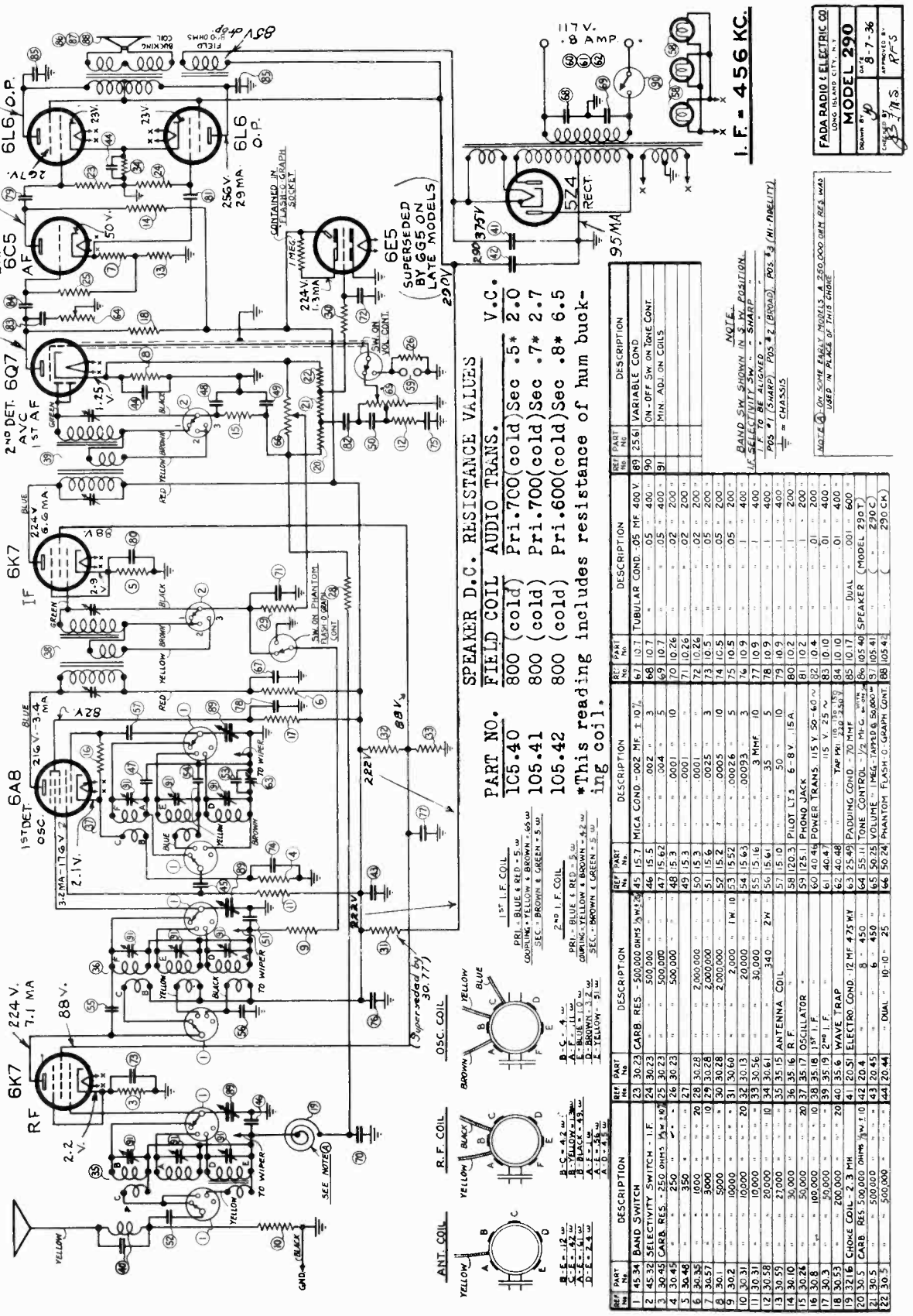
REF No.	PART No.	DESCRIPTION
1	45.36	BAND SWITCH
2	30.45	CARB. RES. - 250 OHMS ½W ± 10%
3	30.48	" " 350 " " " "
4	30.65	" " 4400 " " " "
5	30.1	" " 5,000 " " " "
6	30.2	" " 10,000 " " " "
7	30.7	" " 15,000 " " " "
8	30.26	" " 50,000 " " " " 20
9	30.26	" " 50,000 " " " "
10	30.26	" " 50,000 " " " "
11	30.8	" " 100,000 " " " " 10
12	30.66	" " 150,000 " " " " 20
13	32.16	CHOKE COIL - 2.3 MH.
14	30.20	CARB. RES 250,000 OHMS ½W ± 20%
15	30.28	" " 2,000,000 " " " "
16	30.47	" " 625 " ½W 10
17	35.15	ANTENNA COIL
18	35.17	OSCILLATOR "
19	35.23	1ST I.F. "
20	35.24	2ND I.F. "
21	35.6	WAVE TRAP
22	40.1	CHOKE COIL

REF No.	PART No.	DESCRIPTION
23	20.44	ELECTRO COND. 16-16-6 MF 100 WV
24	20.43	" DUAL 10-10 " 25 "
25	15.5	MICA COND. .002 MF ± 3%
26	15.7	" " .002 " " 10
27	15.21	" " .003 " " 5
28	15.62	" " .004 " " "
29	15.3	" " .0001 " " 10
30	15.3	" " .0001 " " "
31	15.2	" " .0005 " " "
32	15.52	" " .00026 " " 5
33	15.63	" " .00093 " " 3
34	15.10	50 MMF 10
35	120.1	PILOT LTS. 6-8 V. .25 A
36	125.1	PHONO JACK
37	25.49	PADDING COND. - 70 MMF
38	55.12	TONE CONTROL - ½ MEG.
39	50.26	VOLUME " 1 MEG. ON SW. ½W
40	10.4	TUBULAR COND. .01 MF 200 V
41	10.4	" " .01 " 200 "
42	10.4	" " .01 " 200 "
43	10.4	" " .01 " 200 "
44	10.4	" " .01 " 200 "

REF No.	PART No.	DESCRIPTION
45	10.7	TUBULAR COND. .05 MF 400 V
46	10.5	" " .05 " 200 "
47	10.5	" " .05 " 200 "
48	10.5	" " .05 " 200 "
49	10.5	" " .05 " 200 "
50	10.5	" " .05 " 200 "
51	10.8	" " .25 " 200 "
52	10.13	" " .002 " 400 "
53	105.47	SPEAKER (MODELS 272B & 272I)
54	105.48	" (MODEL 272C)
55	25.65	VARIABLE COND.
56	35.20	L.W. ANT. COIL
57	35.22	" OSC. "
58		ON-OFF SW. ON VOL. CONT.
59		MIN. ADJ. ON COIL S
60	15.58	MICA COND. - .00018 MF ± 5%
61	15.10	" " 50 MMF ± 10%
62	15.2	" " .0005 MF ± "
63	BK490	BALLAST RES. 15-15-100 Ω

MODEL 290
Schematic,
Voltage
Parts List

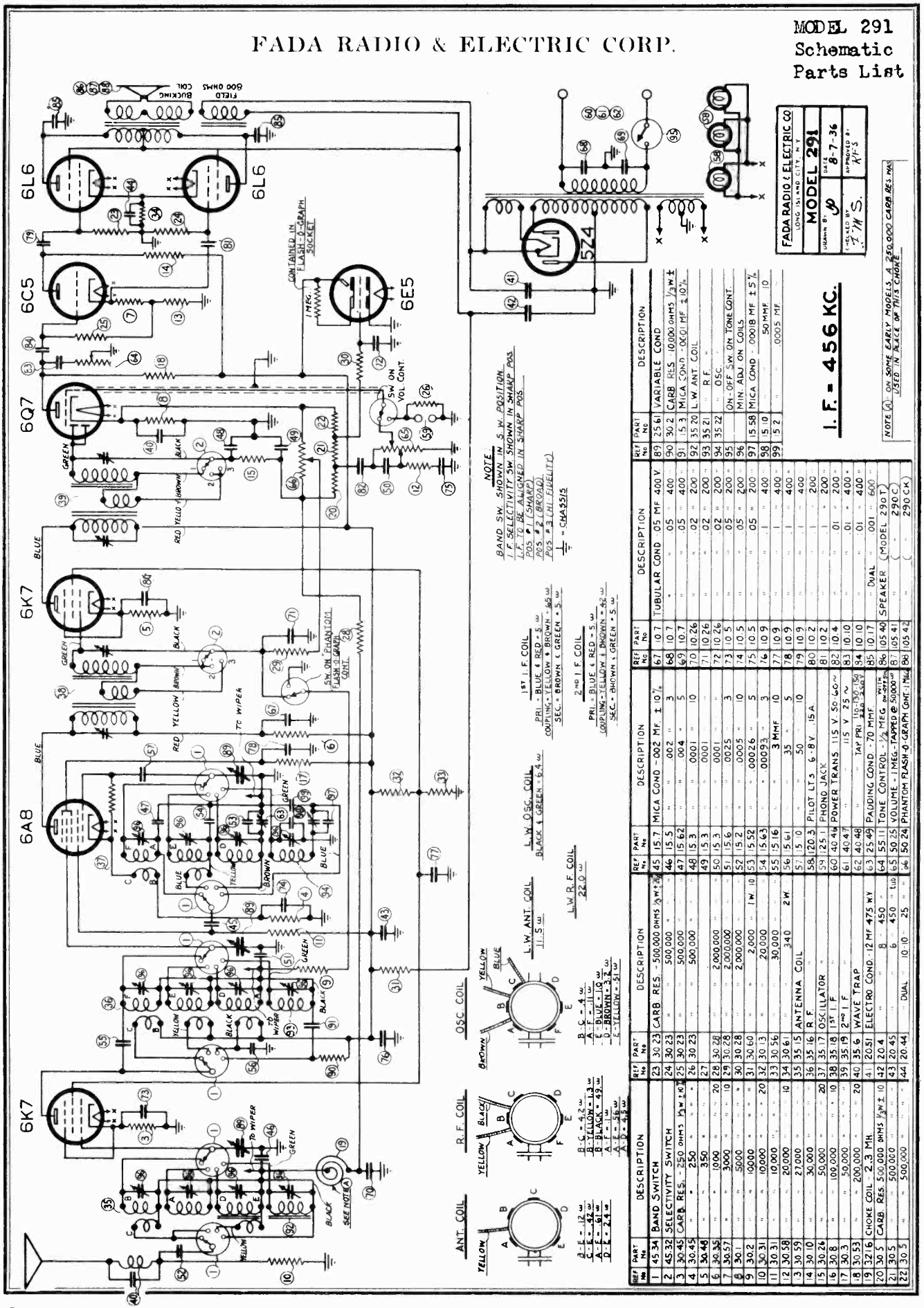
FADA RADIO & ELECTRIC CORP.



Ref No	Part No	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH - I.F.
3	30.45	CARB. RES. - 250 OHMS ½W ± 10%
4	30.45	" " 250 " " "
5	30.46	" " 350 " " "
6	30.35	" " 1000 " " " 20
7	30.57	" " 3000 " " "
8	30.1	" " 5000 " " " "
9	30.2	" " 10000 " " " 10
10	30.31	" " 10000 " " " 20
11	30.31	" " 10,000 " " "
12	30.58	" " 20,000 " " " 10
13	30.59	" " 27,000 " " "
14	30.10	" " 30,000 " " "
15	30.24	" " 50,000 " " " 20
16	30.8	" " 100,000 " " " 10
17	30.3	" " 50,000 " " "
18	30.53	" " 200,000 " " " 20
19	32.16	CHOKE COIL - 2.3 MH
20	30.5	CARB. RES. 500,000 OHMS ½W ± 10
21	30.5	" " 500,000 " " " 43
22	30.5	" " 500,000 " " " 44
23	30.23	CARB. RES. - 500,000 OHMS ½W ± 20%
24	30.23	" " 500,000 " " "
25	30.23	" " 500,000 " " "
26	30.23	" " 500,000 " " "
27		
28	30.28	" " 2,000,000 " " "
29	30.28	" " 2,000,000 " " "
30	30.28	" " 2,000,000 " " "
31	30.60	" " 2,000 " 1W 10
32	30.13	" " 20,000 " " "
33	30.56	" " 30,000 " " "
34	30.61	" " 340 " 2W
35	35.15	ANTENNA COIL
36	35.16	R.F. "
37	35.17	OSCILLATOR "
38	35.18	1ST I.F. "
39	35.19	2ND I.F. "
40	35.6	WAVE TRAP
41	20.51	ELECTRO COND. .12 MF. 475 WV
42	20.4	" " " 8 - 450 "
43	20.45	" " " 6 - 450 "
44	20.44	" DUAL - 10-10 - 25 "
45	15.7	MICA COND. - .002 MF. ± 10%
46	15.5	" " .002 " " 3
47	15.62	" " .004 " " 5
48	15.3	" " .0001 " " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " " 3
52	15.2	" " .0005 " " 10
53	15.52	" " .00026 " " 5
54	15.63	" " .00093 " " 3
55	15.16	" " 3 MMF " 10
56	15.41	" " 35 " " 5
57	15.10	" " 50 " " 10
58	120.3	PILOT LTS 6 - 8 V. .15 A.
59	125.11	PHONO JACK
60	40.46	POWER TRANS. 115 V. 50 - 60 ~
61	40.47	" " 115 V. 25 ~
62	40.48	" " TAP PRI. 100 - 115 V.
63	25.49	PADDING COND. - 70 MMF
64	55.11	TONE CONTROL - ½ MEG. " "
65	50.25	VOLUME " 1 MEG - TAPER 0 & 50,000 Ω
66	50.24	PHANTOM FLASH O GRAPH CONT
67	10.7	TUBULAR COND. - .05 MF. 400 V
68	10.7	" " .05 " 400 "
69	10.7	" " .05 " 400 "
70	10.26	" " .02 " 200 "
71	10.26	" " .02 " 200 "
72	10.26	" " .02 " 200 "
73	10.5	" " .05 " 200 "
74	10.5	" " .05 " 200 "
75	10.5	" " .05 " 200 "
76	10.9	" " .1 " 400 "
77	10.9	" " .1 " 400 "
78	10.9	" " .1 " 400 "
79	10.9	" " .1 " 400 "
80	10.2	" " .1 " 200 "
81	10.2	" " .1 " 200 "
82	10.4	" " .01 " 400 "
83	10.10	" " .01 " 400 "
84	10.10	" " .01 " 400 "
85	10.17	" DUAL - .001 " 600 "
86	105.40	SPEAKER (MODEL 290T)
87	105.41	" " 290 C)
88	105.42	" " 290 CK)
89	25.61	VARIABLE COND
90		ON - OFF SW. ON TONE CONT.
91		MIN. ADJ. ON COILS

FADA RADIO & ELECTRIC CORP.

MODEL 291
Schematic
Parts List



I.F. = 456 KC.

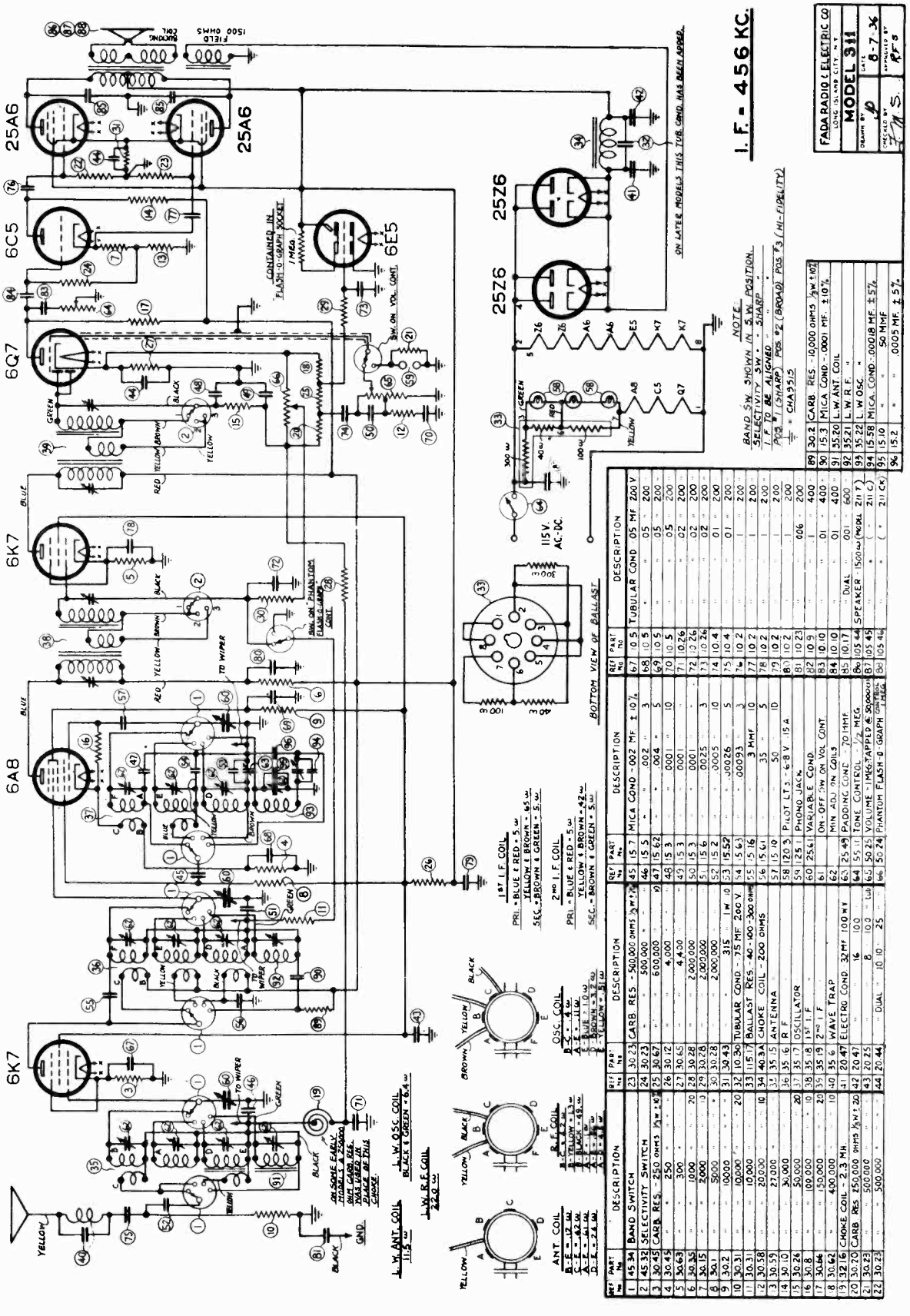
FADA RADIO & ELECTRIC CO	LONG ISLAND CITY, N.Y.
MODEL 291	
DRAWN BY: JB	DATE 8-7-36
CHECKED BY: F.W.S.	APPROVED BY: R.F.S.

NOTE (A) ON SOME EARLY MODELS A 250,000 CARB. RES. WAS USED IN PLACE OF THIS CHOKE

REF No	PART No	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS ½W ± 10%
4	30.45	" " 250 " " "
5	30.46	" " 350 " " "
6	30.35	" " 1000 " " 20
7	30.57	" " 3000 " " 10
8	30.1	" " 5000 " " "
9	30.2	" " 10000 " " "
10	30.31	" " 10000 " " 20
11	30.31	" " 10000 " " "
12	30.58	" " 20000 " " 10
13	30.59	" " 27000 " " "
14	30.10	" " 30,000 " " "
15	30.26	" " 50,000 " " "
16	30.8	" " 100,000 " " 10
17	30.3	" " 50,000 " " "
18	30.53	" " 200,000 " " 20
19	32.16	CHOKE COIL - 2.3 MH
20	30.5	CARB. RES. 500,000 OHMS ½W ± 10
21	30.5	" " 500,000 " " "
22	30.5	" " 500,000 " " "
23	30.23	CARB. RES. - 500,000 OHMS ½W ± 20%
24	30.23	" " 500,000 " " "
25	30.23	" " 500,000 " " "
26	30.23	" " 500,000 " " "
27		
28	30.28	" " 2,000,000 " " "
29	30.28	" " 2,000,000 " " "
30	30.28	" " 2,000,000 " " "
31	30.60	" " 2,000 " 1W 10
32	30.13	" " 20,000 " " "
33	30.56	" " 30,000 " " "
34	30.61	" " 340 2W "
35	35.15	ANTENNA COIL
36	35.16	R.F. "
37	35.17	OSCILLATOR "
38	35.18	1ST I.F. "
39	35.19	2ND I.F. "
40	35.6	WAVE TRAP
41	20.51	ELECTRO COND. - 12 MF 475 WV
42	20.4	" " " 8 " 450 "
43	20.45	" " " 6 " 450 " tub
44	20.44	" " DUAL 10-10 " 25 " "
45	15.7	MICA COND - .002 MF ± 10%
46	15.5	" " .002 " 3
47	15.62	" " .004 " 5
48	15.3	" " .0001 " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " 3
52	15.2	" " .0005 " 10
53	15.52	" " .00026 " 5
54	15.63	" " .00093 " 3
55	15.16	" " 3 MMF 10
56	15.61	" " 35 " 5
57	15.10	" " 50 " 10
58	20.3	PILOT LT. 5 6-8 V .15 A
59	25.11	PHONO JACK
60	40.46	POWER TRANS. 115 V 50-60~
61	40.47	" " 115 V 25 ~
62	40.48	" " TAP PRI. 105-130-150
63	25.49	PADDING COND. - 70 MMF MICA
64	55.11	TONE CONTROL - ½ MEG. TAPPED @ 50,000Ω
65	50.25	VOLUME - 1 MEG. TAPPED @ 50,000Ω
66	50.24	PHANTOM FLASH-O-GRAPH CONT. 1 MEG
67	10.7	TUBULAR COND .05 MF 400 V
68	10.7	" " .05 " 400 "
69	10.7	" " .05 " 400 "
70	10.26	" " .02 " 200 "
71	10.26	" " .02 " 200 "
72	10.26	" " .02 " 200 "
73	10.5	" " .05 " 200 "
74	10.5	" " .05 " 200 "
75	10.5	" " .05 " 200 "
76	10.9	" " .1 " 400 "
77	10.9	" " .1 " 400 "
78	10.9	" " .1 " 400 "
79	10.9	" " .1 " 400 "
80	10.2	" " .1 " 200 "
81	10.2	" " .1 " 200 "
82	10.4	" " .01 " 200 "
83	10.10	" " .01 " 400 "
84	10.10	" " .01 " 400 "
85	10.17	" DUAL .001 " 600 "
86	105 40	SPEAKER (MODEL 290T)
87	105 41	" (" 290C)
88	105 42	" (" 290CK)
89	25.61	VARIABLE COND
90	30.2	CARB. RES. 10000 OHMS ½W ± 10%
91	15.3	MICA COND - .0001 MF ± 10%
92	35.20	L.W. ANT. COIL
93	35.21	R.F. "
94	35.22	OSC. "
95		ON-OFF SW. ON TONE CONT.
96		MIN. ADJ. ON COILS
97	15.58	MICA COND - .00018 MF ± 5%
98	5.10	" " 50 MMF 10
99	5.2	" " .0005 MF "

MODEL 311
Schematic
Parts List

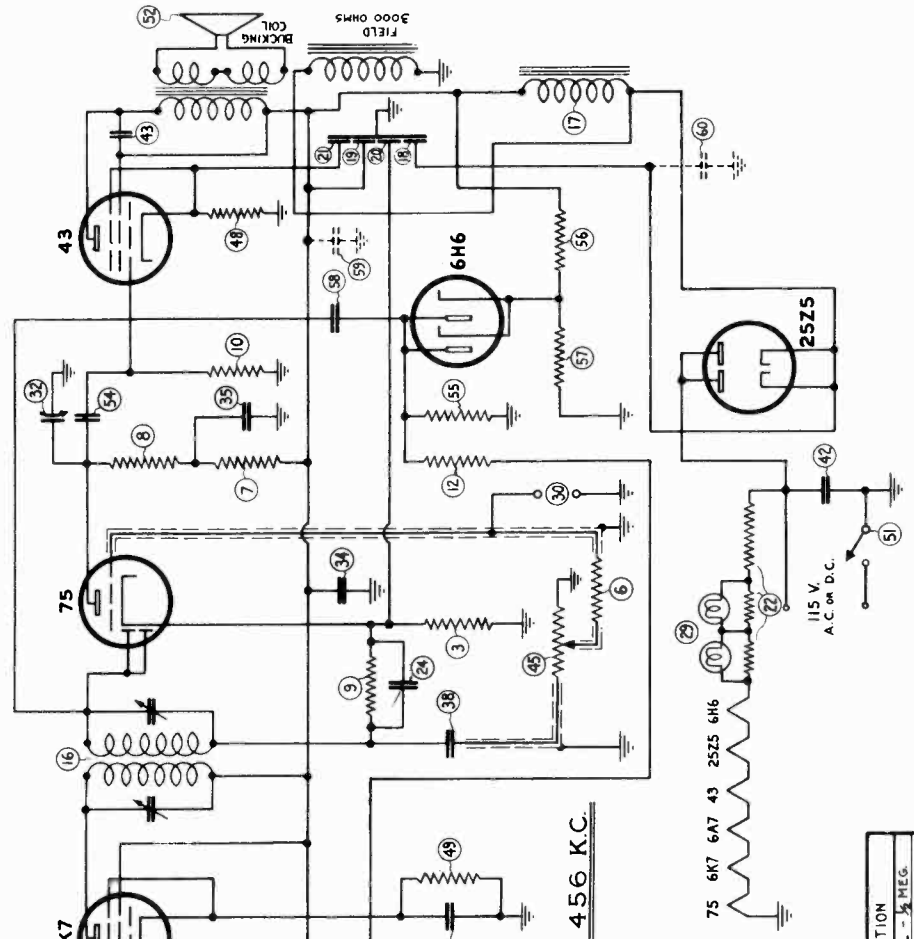
FADA RADIO & ELECTRIC CORP.



REF No	PART No	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS ½W ± 10%
4	30.45	" 250 " "
5	30.63	" 300 " "
6	30.35	" 1000 " " 20
7	30.15	" 2000 " "
8	30.1	" 5000 " "
9	30.2	" 10000 " "
10	30.31	" 10000 " " 20
11	30.31	" 10,000 " "
12	30.58	" 20,000 " " 10
13	30.59	" 27,000 " "
14	30.10	" 30,000 " "
15	30.26	" 50,000 " " 20
16	30.8	" 100,000 " " 10
17	30.66	" 150,000 " " 20
18	30.62	" 400,000 " " 10
19	32.16	CHOKE COIL - 2.3 MH
20	30.20	CARB. RES. 250,000 OHMS ½W ± 20
21	30.23	" 500,000 " "
22	30.23	" 500,000 " "
23	30.23	CARB. RES. - 500,000 OHMS ½W ± 20
24	30.23	" 500,000 " "
25	30.67	" 600,000 " " 10
26	30.12	" 4,000 " "
27	30.65	" 4,400 " "
28	30.28	" 2,000,000 " "
29	30.28	" 2,000,000 " " 10
30	30.28	" 2,000,000 " "
31	30.43	" 2,000,000 " "
32	30.30	TUBULAR COND. - 75 MF 200 V
33	115.17	BALLAST RES. - 40 - 100 - 300 OHMS
34	40.34	CHOKE COIL - 200 OHMS
35	35.16	R F
36	35.16	A F
37	35.17	OSCILLATOR
38	35.18	1ST I.F.
39	35.19	2ND I.F.
40	35.6	WAVE TRAP
41	20.47	ELECTRO COND 32 MF 100 WV
42	20.47	" 16 100
43	20.25	" 8 100
44	20.44	" DUAL - 10-10 25
45	15.7	MICA COND - 002 MF ± 10%
46	15.5	" .002 "
47	15.62	" .004 " 5
48	15.3	" .0001 " 10
49	15.3	" .0001 "
50	15.3	" .0001 "
51	15.6	" .0025 " 3
52	15.62	" .0005 " 10
53	15.52	" .00026 " 5
54	15.63	" .00093 " 3
55	15.16	" 3 MMF 10
56	15.61	" 35 " 5
57	15.10	" 50 " 10
58	120.3	PILOT LT. 3 - 6-8 V .15 A
59	125.1	PHONO JACK
60	25.61	VARIABLE COND.
61		ON-OFF SW. ON VOL. CONT.
62		MIN. ADJ. SW. COILS
63	25.49	PADDING COND - 70 MMF
64	55.11	TONE CONTROL - ½ MEG.
65	50.25	VOLUME - IMEG. TAPPED @ 50,000Ω
66	50.24	PHANTOM FLASH-O-GRAPH CONTROL - 1 MEG.
67	10.5	TUBULAR COND .05 MF 200 V
68	10.5	" " .05 " 200
69	10.5	" " .05 " 200
70	10.5	" " .05 " 200
71	10.26	" " .02 " 200
72	10.26	" " .02 " 200
73	10.26	" " .02 " 200
74	10.4	" " .01 " 200
75	10.4	" " .01 " 200
76	10.2	" " .1 " 200
77	10.2	" " .1 " 200
78	10.2	" " .1 " 200
79	10.2	" " .1 " 200
80	10.23	" " .006 " 200
81	10.23	" " .1 " 400
82	10.9	" " .1 " 400
83	10.10	" " .01 " 400
84	10.10	" " .01 " 400
85	10.17	" DUAL .001 " 600
86	105.44	SPEAKER - 1500 Ω (MODEL 211 F)
87	105.45	" " " (MODEL 211 G)
88	105.46	" " " (MODEL 211 CK)
89	30.2	CARB. RES. - 10,000 OHMS ½W ± 10%
90	15.3	MICA COND. - .0001 MF. ± 10%
91	35.20	L.W. ANT. COIL
92	35.21	L.W. R.F. "
93	35.22	L.W. OSC. "
94	15.58	MICA COND. .00018 MF. ± 5%
95	15.10	" " 50 MMF
96	15.2	" " .0005 MF. ± 5%

FADA RADIO & ELECTRIC CORP.

MODEL 1462, Revised
Above Serial 22102
Schematic, Parts



NOTE:
SWITCH SHOWN IN S.W. POSITION
= CHASSIS

NOTE:
THIS SCHEMATIC APPLIES TO ALL CHASSIS WITH SERIAL NOS. ABOVE 22102.
REF. No. 56 WAS 50,000 OHMS 1/3 W. ±10%

NOTE: Ref. Nos. 47 and 48 are reversed in the Parts List.

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.
MODEL 1462
DRAWN BY JP
DATE 7-17-35
CHECKED BY
APP APFS

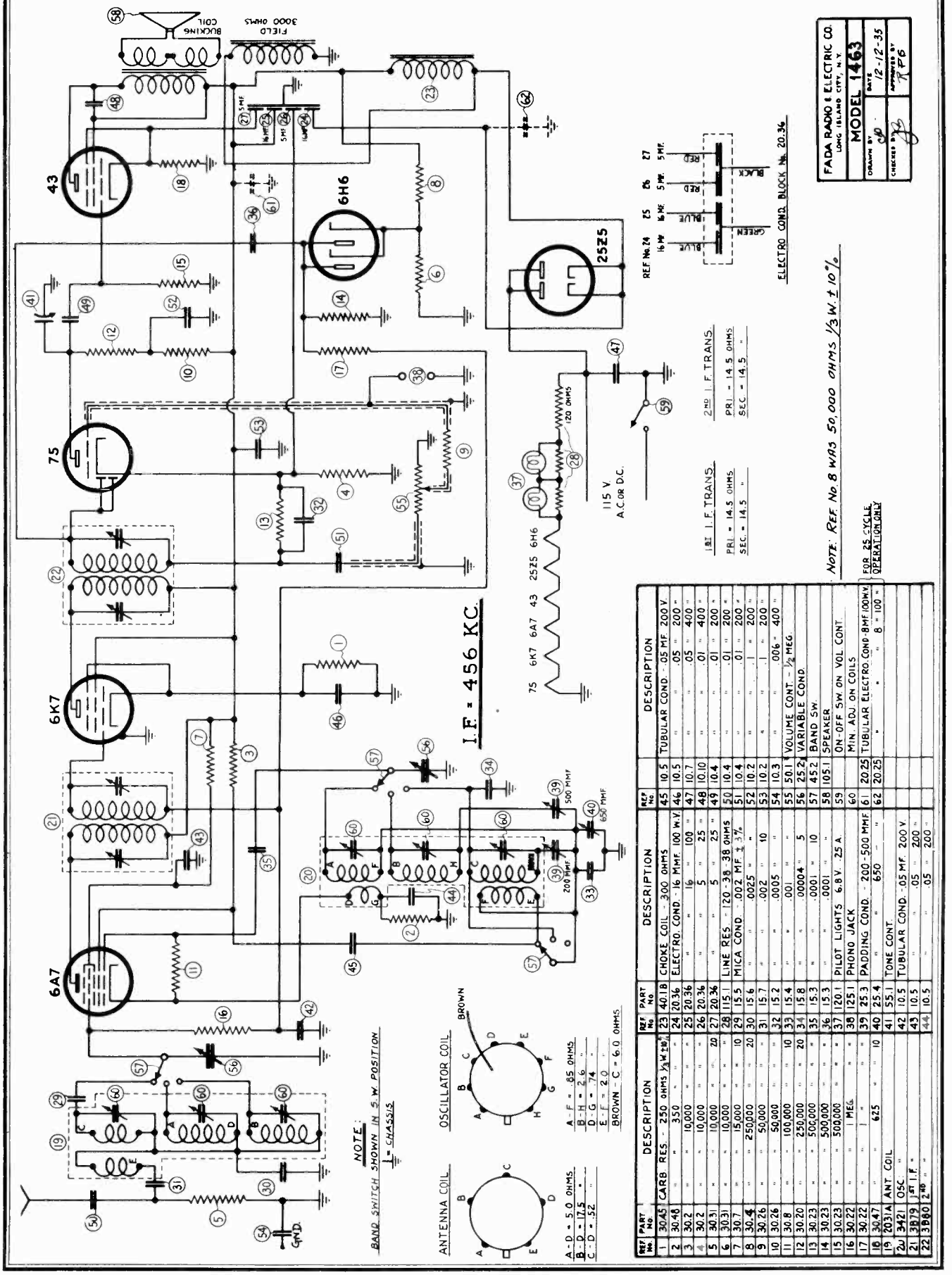
REF No.	PART No.	DESCRIPTION
1	30.1	CARB. RES. - 5,000 OHMS - 1/2 W ± 10%
2	30.31	" " 10,000 " " " 20%
3	30.31	" " 10,000 " " " "
4	30.7	" " 15,000 " " " 10%
5	30.3	" " 50,000 " " " "
6	30.36	" " 50,000 " " " 20%
7	30.26	" " 50,000 " " " "
8	30.20	" " 250,000 " " " "
9	30.23	" " 500,000 " " " "
10	30.23	" " 500,000 " " " "
11	30.22	" " 1 MEG " " " "
12	30.22	" " 1 " " " "
13	2026	ANTENNA COIL
14	3116	OSCILLATOR "
15	3879	1ST I.F. "
16	3880	2ND I.F. "
17	40.1	CHOKE " 300 OHMS
18	2036	ELECTRO. COND. BLOCK - 16 MF. 400 VW
19	20.36	" " " 16 " 100 "
20	20.36	" " " 5 " 25 "
21	20.34	" " " 5 " 25 "
22	115.1	LINE RESISTOR - 180-38-38 OHMS

REF No.	PART No.	DESCRIPTION
23	15.2	MICA COND. - .0005 MF. ± 10%
24	15.2	" " .0005 " "
25	15.3	" " .0001 " "
26	15.19	" " .0015 " "
27	15.5	" " .002 " 3%
28	15.6	" " .0025 " "
29	120.1	PILOT LIGHTS 6-8 V. .25 A.
30	125.1	PHONO JACK
31	25.1	PADDING COND - 650-500 MMF.
32	55.1	TONE CONTROL
33		
34	10.2	TUBULAR COND. .1 MF. 200 WV
35	10.2	" " .1 " " "
36	10.3	" " .006 " 400 "
37	10.4	" " .01 " 200 "
38	10.4	" " .01 " " "
39	10.5	" " .05 " " "
40	10.5	" " .05 " " "
41	10.5	" " .05 " " "
42	10.7	" " .05 " 400 "
43	10.10	" " .01 " 400 "
44	10.6	" DUAL .05 " 200 "

REF No.	PART No.	DESCRIPTION
45	50.1	VOLUME CONTROL - 1/2 MEG.
46	25.2	VARIABLE COND.
47	30.47	CARB. RES. - 7,625 OHMS 1/2 W ± 10%
48	30.48	" " 350 " 1/2 " "
49	30.49	" " 250 " " "
50	45.1	BAND SWITCH
51		ON-OFF SW. ON VOL. CONT. (45)
52	105.1	SPEAKER - 3,000 OHMS
53		MIN. ADJ. ON COILS
54	10.4	TUBULAR COND. - .01 MF. - 200 V
55	30.5	CARB. RES. - 500,000 OHMS - 1/2 W. ± 10%
56	30.4	" " 250,000 " " " "
57	30.2	" " 10,000 " " " "
58	15.3	MICA COND. - .0001 MF. ± 10%
59	20.25	TUBULAR ELECTRO. COND. - 8 MF 300 WV. FOR OSCILLATOR CIRCUIT
60	20.25	" " " 8 " " " "

MODEL 1463
Schematic
Parts List

FADA RADIO & ELECTRIC CORP.



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	DESCRIPTION
1	30.45	CARB. RES. - 250 OHMS 1/4 W ±10%	23	40.18	CHOKE COIL - 300 OHMS	45	10.5 TUBULAR COND. - .05 MF. 200 V.
2	30.48	" " 350 " " "	24	20.36	ELECTRO. COND. - 16 MMF. 100 W.V.	46	10.5 " " .05 " 200 "
3	30.2	" " 10,000 " " "	25	20.36	" " 16 " 100 "	47	10.7 " " .05 " 400 "
4	30.2	" " 10,000 " " "	26	20.36	" " 5 " 25 "	48	10.10 " " .01 " 400 "
5	30.31	" " 10,000 " " " 20	27	20.36	" " 5 " 25 "	49	10.4 " " .01 " 200 "
6	30.31	" " 10,000 " " "	28	115.1	LINE RES. - 120-30-30 OHMS	50	10.4 " " .01 " 200 "
7	30.7	" " 15,000 " " " 10	29	15.5	MICA COND. - .002 MF ± 3%	51	10.4 " " .01 " 200 "
8	30.4	" " 250,000 " " "	30	15.6	" " .0025 " "	52	10.2 " " .1 " 200 "
9	30.26	" " 50,000 " " "	31	15.7	" " .002 " 10	53	10.2 " " .1 " 200 "
10	30.26	" " 50,000 " " "	32	15.2	" " .0005 " "	54	10.3 " " .006 " 400 "
11	30.8	" " 100,000 " " " 10	33	15.4	" " .001 " "	55	50.1 VOLUME CONT. - 1/2 MEG.
12	30.20	" " 250,000 " " " 20	34	15.8	" " .00004 " 5	56	25.2 VARIABLE COND.
13	30.23	" " 500,000 " " "	35	15.3	" " .0001 " 10	57	45.2 BAND SW.
14	30.23	" " 500,000 " " "	36	15.3	" " .0001 " "	58	105.1 SPEAKER
15	30.23	" " 500,000 " " "	37	120.1	PILOT LIGHTS 6.8 V. 25 A.	59	ON-OFF SW. ON VOL CONT.
16	30.22	" " 1 MEG " " "	38	125.1	PHONO JACK	60	MIN. ADJ. ON COILS
17	30.22	" " 1 " " "	39	25.3	PADDING COND. - 200-500 MMF	61	20.25 TUBULAR ELECTRO. COND. 8 MF 100 W.V.
18	30.47	" " 625 " " " 10	40	25.4	" " 650 " "	62	20.25 " " " 8 " 100 "
19	203 A	ANT. COIL	41	55.1	TONE CONT.		
20	342 I	OSC. "	42	10.5	TUBULAR COND. - .05 MF. 200 V.		
21	3879	1ST I.F. "	43	10.5	" " " .05 " 200 "		
22	3880	2ND " "	44	10.5	" " " .05 " 200 "		

FAIRBANKS-MORSE HOME APP., INC.

MODEL 40
Schematic
Voltage
Resistance

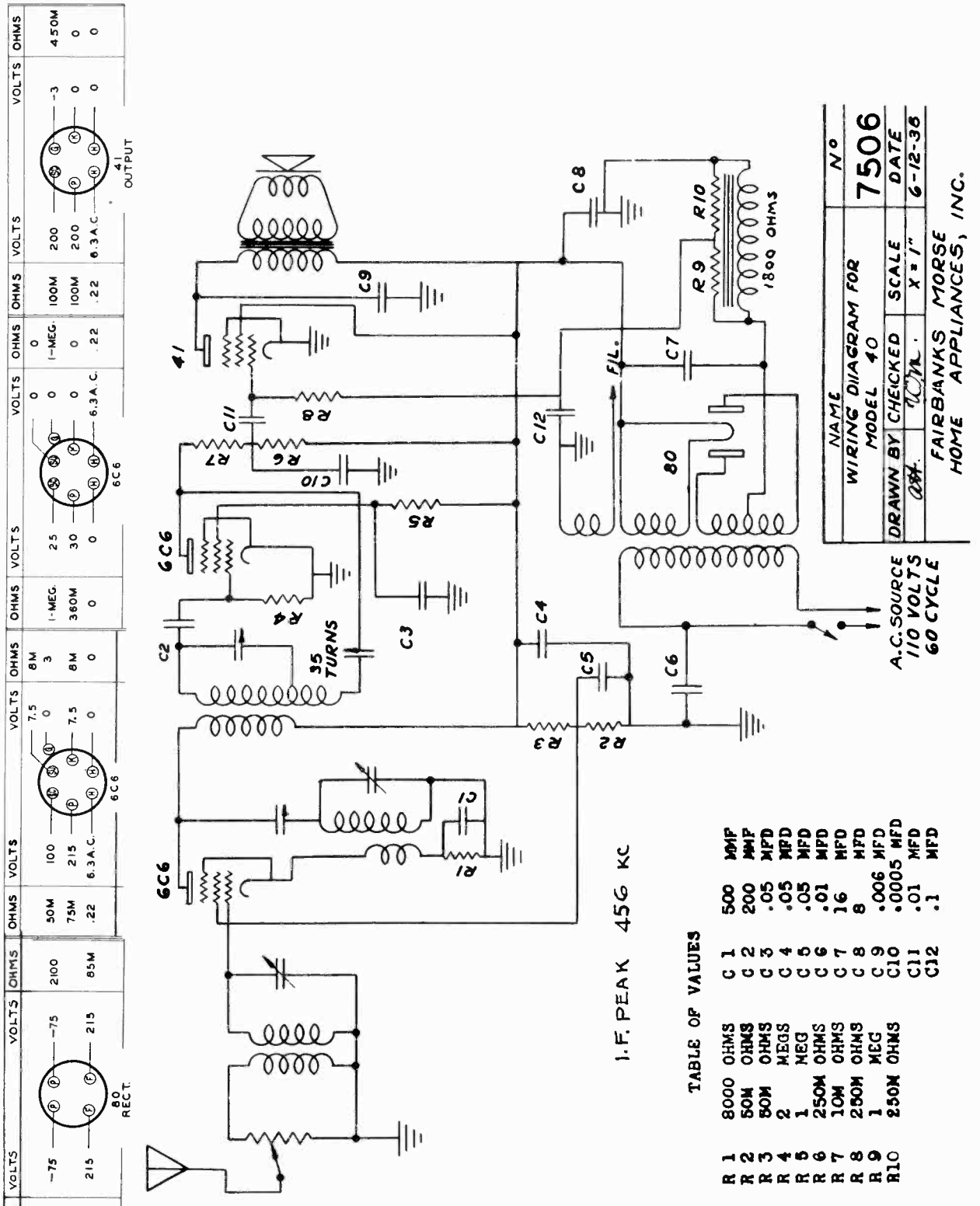
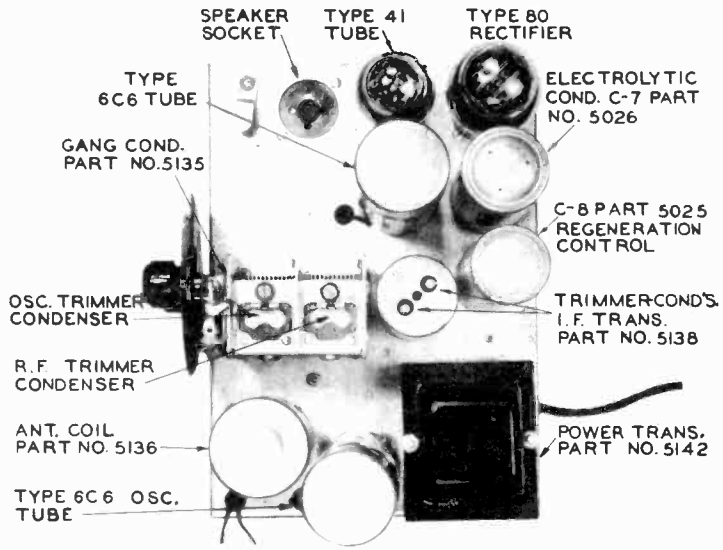
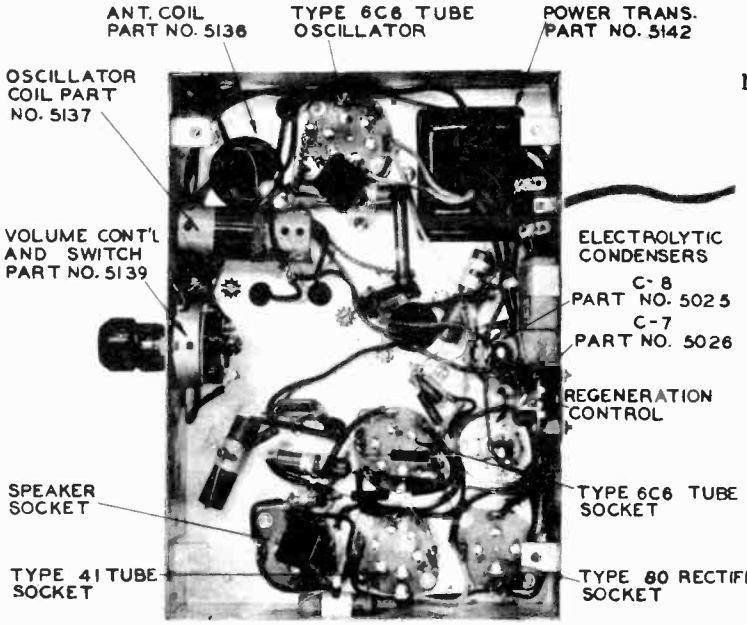


TABLE OF VALUES

R 1	8000 OHMS	C 1	500 MMF
R 2	50M OHMS	C 2	200 MMF
R 3	50M OHMS	C 3	.05 MFD
R 4	2 MEGS	C 4	.05 MFD
R 5	1 MEG	C 5	.05 MFD
R 6	250M OHMS	C 6	.01 MFD
R 7	10M OHMS	C 7	16 MFD
R 8	250M OHMS	C 8	8 MFD
R 9	1 MEG	C 9	.006 MFD
R10	250M OHMS	C10	.0005 MFD
		C11	.01 MFD
		C12	.1 MFD





INTERMEDIATE FREQUENCY ALIGNMENT

1 - Turn the gang condenser to approximately one half maximum capacity (half meshed).

2 - Supply a 456 kilocycle signal from the signal generator to the antenna lead of the receiver through a .1 Mfd. condenser connected in series with the signal generator lead.

3 - Back the regeneration control trimmer (see Figure 1) out (counter-clockwise) to a point just below the point of oscillation.

4 - Adjust the two trimmers of the intermediate frequency transformer (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers are on the gang condenser. These trimmers are used for aligning the high frequency end of the broadcast band. The location of the trimmers is shown in Figure 1.

1 - Tune the receiver to 1500 kilocycles.

2 - Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd.(.0002 Mfd.)condenser, connected in series with the signal generator lead.

3 - Adjust the trimmer condenser on the front section of the gang condenser (Figure 1) to bring in the signal.

4 - Adjust the rear (R.F.) trimmer on the gang condenser for maximum output with minimum input from the service oscillator.

5 - Adjust the regeneration control by turning the adjusting screw clockwise until oscillation starts. Then back the adjusting screw out approximately one quarter turn. Check the sensitivity and, if the receiver is weak, bring up the sensitivity by readjusting the regeneration control.

MODEL 40

POWER TRANSFORMERS

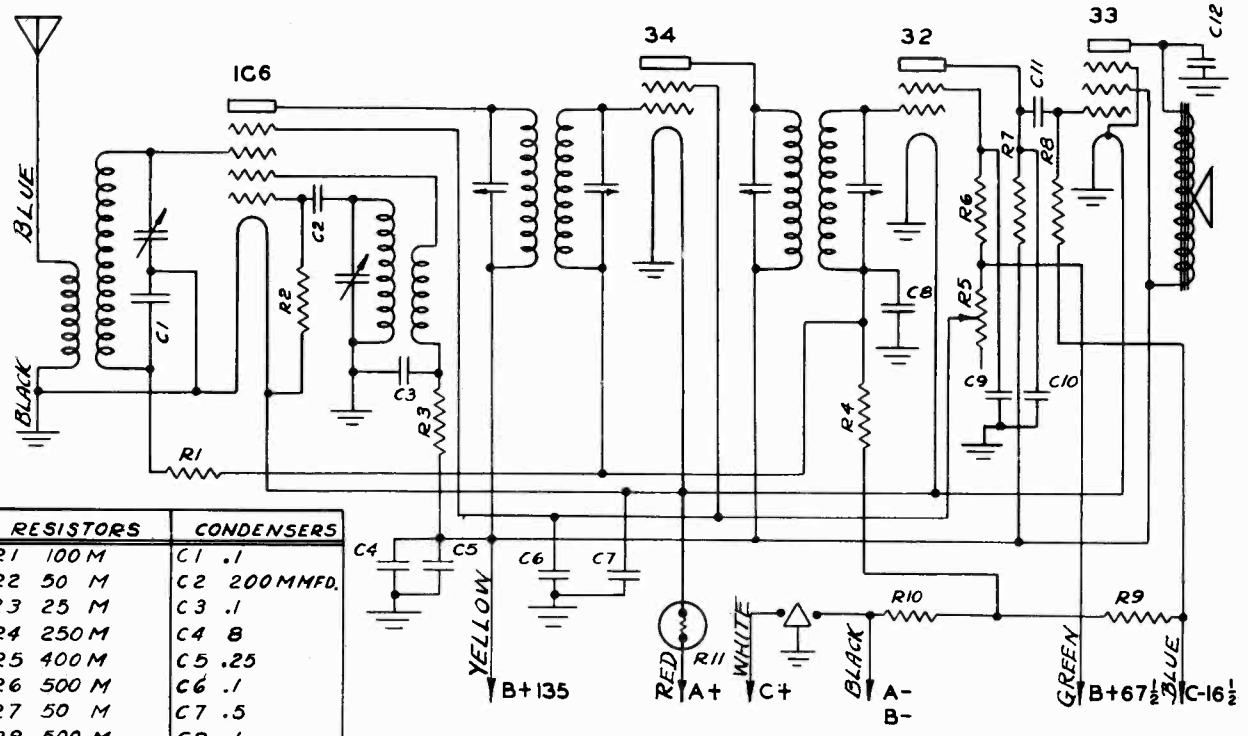
Part No. 5142	110 Volt	50-60 cycle
Lead Color	Voltage	Resistance
Yellow	5.0	.33 ohm
Blue	6.3	.22 ohm
Black	110 (Primary)	12.10 ohms
Green	High Voltage	745. ohms
Red	Center Tap (Hi-Volt.)	

Part No. 5477	Universal	40-50-60 cycles
Lead Color	Voltage	Resistance
Yellow	5.0	.46 ohm
Blue	6.3	.29 ohm
Green	High Voltage	1080. ohms
Red	Center Tap (Hi-Volt.)	
Black	Common Primary	
White & Black	100-125 Primary	16.06 ohms
Red & Black	130-155 Primary	19.16 ohms
Brown & White	200-250 Primary	51.37 ohms

Part No. 5591		25 cycle
Lead Color	Voltage	Resistance
Blue	6.3	.32 ohm
Yellow	5.0	.44 ohm
Green	High Voltage	1093. ohms
Red	Center Tap (Hi-Volt.)	
Black	110 Primary	17.8 ohms

MODEL 41
Schematic, Socket Alignment, Trimmers

FAIRBANKS-MORSE HOME APP., INC.



RESISTORS	CONDENSERS
R1 100 M	C1 .1
R2 50 M	C2 200 MMFD.
R3 25 M	C3 .1
R4 250 M	C4 8
R5 400 M	C5 .25
R6 500 M	C6 .1
R7 50 M	C7 .5
R8 500 M	C8 .1
R9 5 M	C9 .05
R10 1000	C10 200 MMFD.
R11 .6	C11 .02
	C12 .02

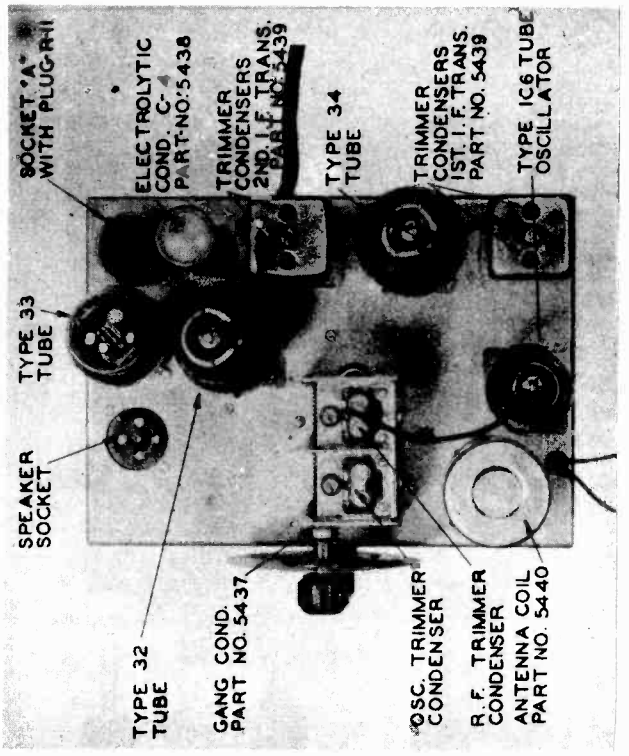
I.F. PEAK 456 KC

MODEL 41

NAME			Nº
WIRING DIAGRAM FOR MODEL # 41			7521
DRAWN BY	CHECKED	SCALE	DATE
			9-11-35

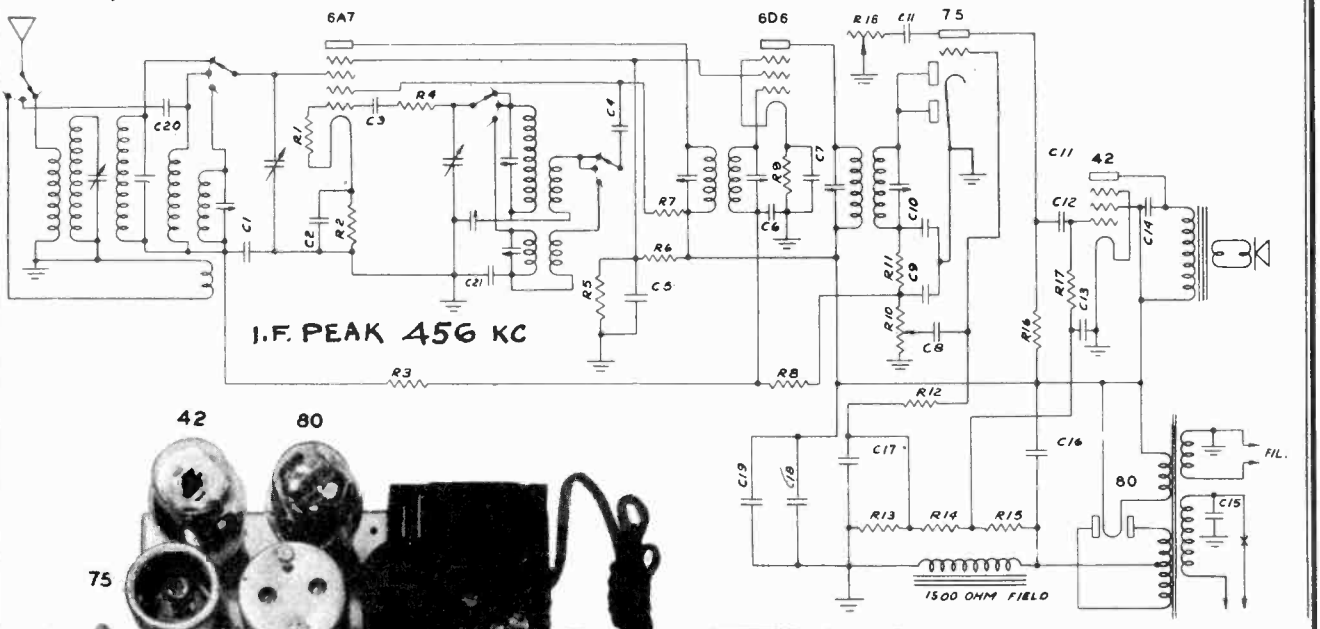
FAIRBANKS MORSE
HOME APPLIANCES, INC.

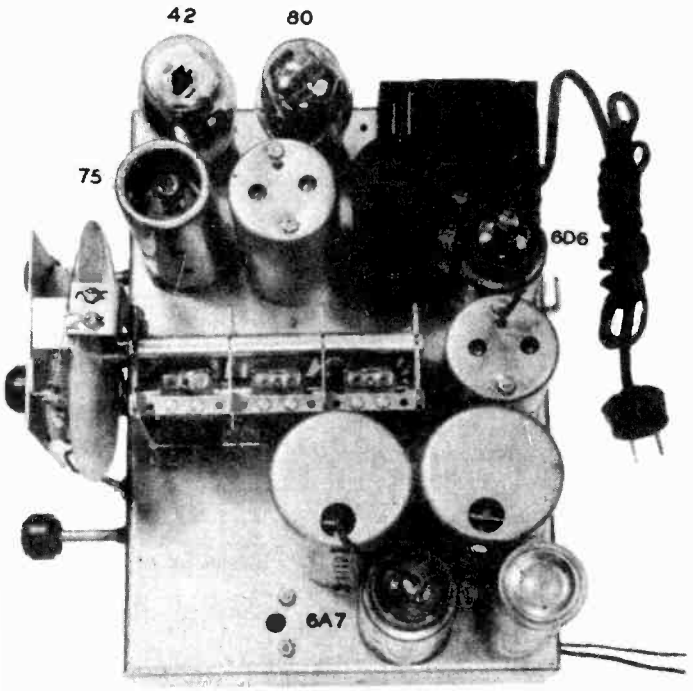
I-F. ALIGNMENT:
Set dial at 530 kc. with gang condenser fully meshed and tighten set screw. Connect 456-kc. signal to grid of 1C6 and adjust i-f. trimmers.
R-F. ALIGNMENT:
Set dial to 1500 kc. Connect 1500-kc. signal to antenna lead (blue) through dummy or .0002-mf. condenser. Adjust oscillator and r-f. trimmers in this order.
BATTERY DATA:
If set is operated on Air Cell "A" battery, the resistance link plug must be in Socket "A".
If set is operated on 2-volt storage battery, the the jumper link must be substituted for the plug.
If a 3-volt battery is used, a special ballast tube is plugged in the "A" socket. Tube part #5674

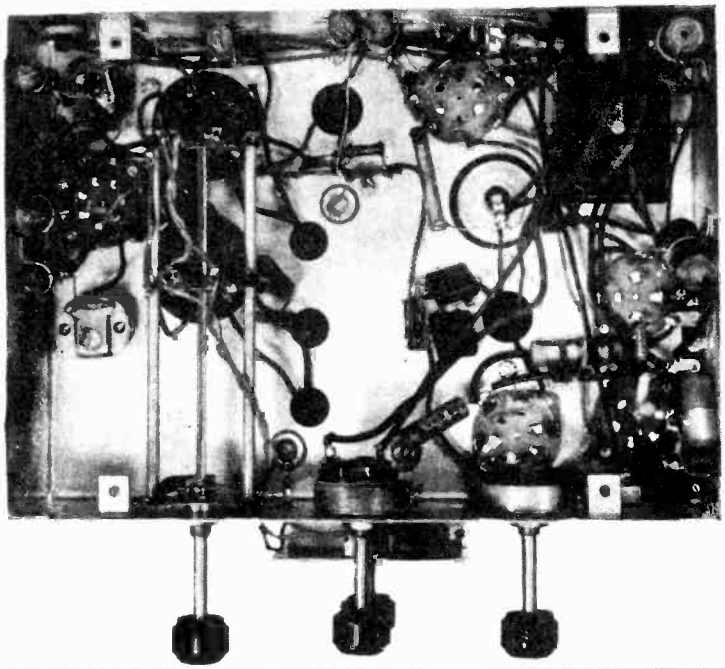


MODEL 54
Schematic, Voltage
Socket, Resistance

FAIRBANKS-MORSE HOME APP., INC.







RESISTORS		CONDENSERS IN MFD. UNLESS SHOWN	
R 1	50M	C1	.05
R 2	300	C2	.05
R 3	500M	C3	100 MMF.
R 4	100	C4	.001
R 5	50M	C5	.1
R 6	20M	C6	.05
R 7	10M	C7	.05
R 8	500M	C8	.02
R 9	300	C9	100 MMF
R 10	500M	C10	100 MMF
R 11	50M	C11	.006
R 12	800M	C12	.02
R 13	35M	C13	.25
R 14	400M	C14	.006
R 15	2 MEG	C15	.01
R 16	500M	C16	16
R 17	500M	C17	.1
R 18	500M	C18	18.
		C19	.05
		C20	10MMF
		C21	.006

NAME			NO.
WIRING DIAGRAM FOR MODEL "54			7520
DRAWN BY	CHECKED	SCALE	DATE
CH		X"=1"	8-26-35
FAIRBANKS MORSE HOME APPLIANCES, INC.			

MODEL 54

OHMS	VOLTS		VOLTS	OHMS
			180	80M
			-7.5	50M
50M	100	6A7	0	2-MEG.
			3.5	300
70M	240		0	0
.1	6.3 A.C.	OSC. 1ST DET.		
1800	-105		-105	1800
70M	240	80 RECT.	240	70M
			3	300
50M	100		0	1-MEG.
70M	240	6D6	3	300
.1	6.3 A.C.	I.F.	0	0
			-2	550M
550M	-.2		-.2	530M
570M	80	75	0	0
.1	6.3 A.C.	DET-AVC-AF.	0	0
70M	240		-3.5	1-MEG.
70M	225	42	0	0
.1	6.3 A.C.	OUTPUT	0	0

INTERMEDIATE FREQUENCY ALIGNMENT

1 - Turn the gang condenser to maximum capacity (fully meshed).

MODELS 54 AND 66

2 - Set band selector switch on "Broadcast" position.

3 - Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube (6A7 or 6A8) through a .1 Mfd. condenser connected in series with the signal generator lead.

4 - Adjust the four trimmers of the two intermediate frequency transformers (see Figure 3) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil.These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 3.

The oscillator, adjustable, series padding condenser is used for tracking the oscillator at the low frequency end of the broadcast band. The padding condenser may be adjusted from the top of the chassis through the holes indicated in Figure 3. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and then tighten the screw.

BROADCAST BAND

1 - Turn the band selector switch to the broadcast (counter-clockwise) position.

2 - Tune the receiver to 1715 kilocycles.

3 - Supply a 1715 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd.(.0002 Mfd.)condenser, connected in series with the signal generator lead.

4 - Adjust the broadcast band oscillator trimmer condenser (Figure 3)for maximum output with minimum input from the signal generator.

5 - Tune the receiver to 1500 kilocycles.

6 - Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver, through the same connections used in the previous adjustment.

7 - Adjust the broadcast band radio frequency and preselector trimmers (see Figure 3) for maximum output with minimum input from the signal generator.

8 - Tune the receiver to 600 kilocycles.

9 - Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

10 - Adjust the broadcast band oscillator padding condenser (top of chassis,see Figure 3)for maximum output with minimum input from the signal generator,at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

11 - Check at 1715 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

POLICE BAND

1 - Turn the band selector switch to the police band (center) position.

2 - Tune the receiver to a 2.4 megacycles.

3 - Supply a 2.4 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - The 2.4 megacycle signal should be received near the calibrated section of the dial.If this is not the case, check the oscillator tube,switch connections and coils.No adjustment is necessary on this band.

SHORT WAVE BAND

1 - Turn the band selector switch to the short wave (clockwise) position.

2 - Tune the receiver to 18 megacycles.

3 - Supply an 18 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - Turn the short wave oscillator trimmer(see Figure 3)all the way in and back it out until the 18 megacycle signal from the signal generator is received. The first signal, found at about 17 megacycles, should be the image; the second should be the 18 megacycle signal.

5 - Adjust the short wave radio frequency trimmer (see Figure 3) for maximum output with minimum input from the signal generator.

6 - Check and, if necessary, readjust all trimmers for maximum output with minimum input from the signal generator.

WARNING The image signal should be received at approximately 17 megacycles on the dial.If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 18 megacycles and the image at approximately 17 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.

THE MODEL 54 CHASSIS The Model 54 chassis employs a type 6A7 pentagrid converter.The incoming signal is supplied to this tube through a preselector coil arrangement. This tube serves the dual function of first detector and oscillator. A type 6D6 tube is employed as the intermediate frequency amplifier. This tube and the two intermediate frequency transformers are responsible for the selectivity and gain obtained from the intermediate frequency amplifier.

A type 75 tube performs the triple function of diode detector, automatic volume control and first audio amplifier tube. The output of the triode section of the type 75 tube is resistance coupled to a type 42 tube, connected as a pentode in the power output stage. A type 80 rectifier tube is employed in a conventional power supply circuit.

THE MODEL 66 CHASSIS The Model 66 chassis employs a type 6A8 tube as the pentagrid converter.A type 6K7 is used in the intermediate frequency amplifier. A type 6H6 diode, connected as a half wave rectifier, performs the dual function of second detector and automatic volume control tube. A type 6F5 tube is employed as the first audio amplifier and the output of this stage is resistance coupled to the type 6F6 tube, connected as a pentode in the power output stage.A single type 5Z4 full wave rectifier tube is employed in a conventional power supply circuit.

AUTOMATIC VOLUME CONTROL

MODEL 66 CHASSIS A type 6H6 tube is employed as the second detector in a half wave rectifier circuit, the diode plates being connected together. Current flows from the diode plates to the cathode and to ground. Here it is picked up at the point where resistor R-10 is grounded and flows through resistors R-10 and R-11, through the secondary of the second intermediate frequency transformer, back to the plates, thus forming the complete circuit.

The D. C. component of this current produces a voltage drop across resistor R-10 in proportion to the strength of the incoming signal. The grid returns of the 6A8 pentagrid converter and the 6K7 intermediate frequency amplifier are connected through the isolating resistors R-3 and R-8 to the point of juncture between resistors R-10 and R-11, thus adding the voltage drop obtained across resistor R-10 to the fixed bias on the two controlled tubes.The fixed bias is obtained from the individual bias resistors, R-2 and R-9, located in the cathode circuits of the tubes. Resistor R-10 is also the manual volume control. The audio component of voltage drop across the resistor is taken off on the sliding arm of the control through condenser C-8 and is applied to grid of the type 6F5, first audio amplifier tube.

MODEL 54 CHASSIS The A. V. C. circuit and its operation in the Model 54 chassis is identical to that in the Model 66. The only differences are in the tubes. A type 75 tube performs the dual function of diode rectifier and first audio amplifier in place of the type 6H6 tube and the type 6F5 tube in the Model 66 chassis. A type 6D6 tube is found in place of the type 6K7 tube in the intermediate frequency stage. A type 6A7 pentagrid converter replaces the type 6A8 found in the Model 66 chassis.

THE ANTENNA

A good outside antenna is recommended for best results. An inside antenna will usually give satisfactory results on local broadcast stations, but it cannot be relied upon for distant and short wave reception.

The most suitable antenna for use in large cities or congested radio districts, where interference is a serious problem, is the doublet. In small centers of population, where interference is not serious, a single wire antenna having a total length of from 75 to 100 feet, erected as high as possible, with a good insulator at each end, will prove satisfactory. The lead-in should go to the receiver by the most direct route and should be kept away, as far as possible, from obstructions. Such an antenna will have less directional properties and less tendency to pick up power line interference than a low antenna with a long horizontal lead.

THE FAIRBANKS-MORSE ANTENNA For those installations where a doublet type antenna is most suitable, the Fairbanks-Morse engineers offer the FAIRBANKS-MORSE MODEL 20 NOISE REDUCING ANTENNA SYSTEM. This antenna is especially designed for these receivers and requires no switching arrangement, since it automatically balances itself to the receiver on all bands.

The BLUE wire on the receiver is to be connected to the antenna. The BLACK wire on the receiver is to be connected to the ground. When a FAIRBANKS-MORSE ANTENNA is used, the BLUE wire from the receiver is to be connected to the red wire on the antenna set coupler, and the BLACK wire from the receiver is to be connected to the black wire on the antenna set coupler and to a good ground.

POWER TRANSFORMERS

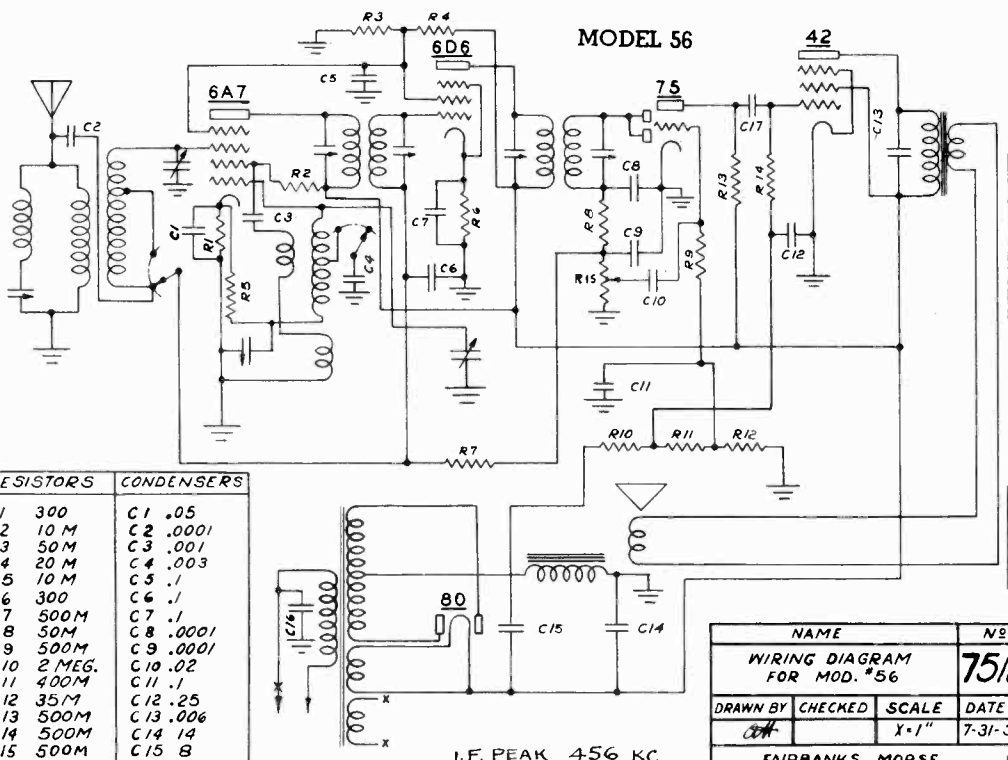
Part No. 5121	110 Volt	50-60 cycle
Lead Color	Voltage	Resistance
Black	6.3	.18 ohm
Yellow	5.0	.14 ohm
Brown	110 (Primary)	11.0 ohms
Green	High Voltage	596.5 ohms
Red	Center Tap (Hi-Volt)	

Part No. 5174	Universal	40-50-60 cycle
Lead Color	Voltage	Resistance
Black	6.3	.25 ohm
Yellow	5.0	.16 ohm
Green	High Voltage	657.
Red	Center Tap (Hi-Volt)	
Brown	Common Primary	
Black & White	100-125 Primary	14.7 ohms
Red & Black	110-135 Primary	20.5 ohms
Brown & White	200-250 Primary	52.8 ohms

Part No. 5592		25 cycle
Lead Color	Voltage	Resistance
Black	6.3	.22 ohm
Yellow	5.0	.18 ohm
Green	High Voltage	816.0 ohms
Red	Center Tap (Hi-Volt)	
Brown	110 Primary	14.9 ohms

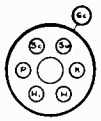
MODEL 56
Schematic, Voltage
Transformer Data
Parts List

FAIRBANKS-MORSE HOME APP., INC.



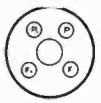
RESISTORS		CONDENSERS	
R1	300	C1	.05
R2	10 M	C2	.0001
R3	50 M	C3	.001
R4	20 M	C4	.003
R5	10 M	C5	.1
R6	300	C6	.1
R7	500M	C7	.1
R8	50M	C8	.0001
R9	500M	C9	.0001
R10	2 MEG.	C10	.02
R11	400M	C11	.1
R12	35M	C12	.25
R13	500M	C13	.006
R14	500M	C14	14
R15	500M	C15	8
		C16	.01
		C17	.02

NAME			Nº
WIRING DIAGRAM FOR MOD. #56			7512
DRAWN BY	CHECKED	SCALE	DATE
		X=1"	7-31-35
FAIRBANKS MORSE HOME APPLIANCES, INC.			



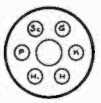
6D6

VOLTS		OHMS
6.3 A.C.	H_1	0
0	H	0
2.8	K	300
0	G_c	1 MEG.
2.8	S_s	300
100	S_c	50 M
260	P	70 M



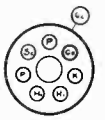
80

VOLTS		OHMS
260	F_1	70 M
260	F	70 M
A.C.	P_1	2000
A.C.	P	2000



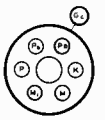
42

VOLTS		OHMS
6.3 A.C.	H_1	0
0	H	0
0	K	0
-7	G	1 MEG.
260	S_c	70 M
245	P	70 M



6A7

VOLTS		OHMS
6.3 A.C.	H_1	0
0	H	0
3	K	300
0	G_c	1 MEG.
-3	G_s	1900
200	P_s	80 M
100	S_c	50 M
260	P	35 M



75

VOLTS		OHMS
6.3 A.C.	H_1	0
0	H	0
0	K	0
-5	G_c	500 M
-1	P_s	500 M
-1	P_s	500 M
90	P	600 M

POWER TRANSFORMERS

Part No. 5520	110 Volt 50-60 cycle	
Lead Color	Voltage	Resistance
Red	6.3	.295 ohm
Blue	5.0	.19 ohm
Brown	10.9 (Primary)	10.9 ohms
Green	High Voltage	686.6 ohms
Black	Center Tap (Hi-Volt.)	

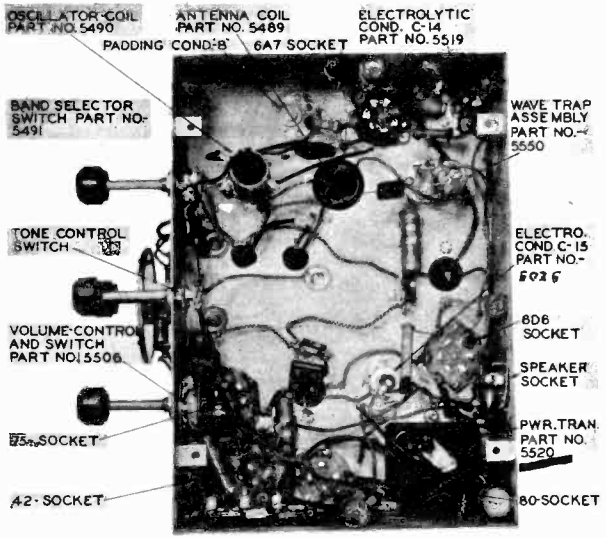
Part No. 5174	Universal 40-50-60 cycles	
Lead Color	Voltage	Resistance
Black	6.3	.25 ohm
Yellow	5.0	.16 ohm
Green	High Voltage	657. ohms
Red	Center Tap (Hi-Volt.)	
Brown	Common Primary	
Black & White	100-125 Primary	14.7 ohms
Red & Black	130-155 Primary	20.5 ohms
Brown & White	200-250 Primary	52.8 ohms

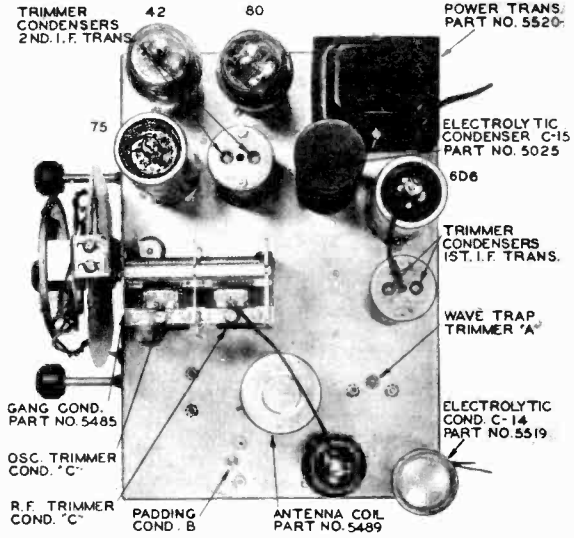
Part No. 5592	25 cycle	
Lead Color	Voltage	Resistance
Black	6.3	.22 ohm
Yellow	5.0	.18 ohm
Green	High Voltage	816.0 ohms
Red	Center Tap (Hi-Volt.)	
Brown	110 Primary	14.6 ohms

PARTS LIST FOR MODEL 56 RADIO RECEIVER

Part Number	Description	List Price
5578	Cabinet and Carton, #19	8.35
5194	Cabinet and Carton, #45	28.00
5489	Coil Assembly - Antenna	1.00
5490	Coil Assembly - Oscillator	1.00
5485	Condenser - Variable, 2 gang	2.50
5025	Condenser - Electrolytic, 8 Mfd. 450 volt - Wet	1.10
5519	Condenser - Electrolytic, 14 Mfd. 300 volt	1.25
5150	Condenser - Padding (500 Mmf. Max.)	.50
5015	Condenser - .1 Mfd. 200 volt - Paper	.20
5012	Condenser - Paper, .05 Mfd. 200 volt	.20
5017	Condenser - Paper, .25 Mfd. 200 volt	.25
5013	Condenser - Paper, .02 Mfd. 600 volt	.20
5016	Condenser - Paper, .006 Mfd. 600 volt	.20
5014	Condenser - Paper, .05 Mfd. 400 volt	.20
5018	Condenser - Metal Clad, .01 Mfd. 1000 volt	.30
5019	Condenser - Mica, 100 Mmfd., Wire Leads	.20
5020	Condenser - Mica, 1000 Mmfd., Wire Leads	.20
5345	Condenser - Mica, 3000 Mmfd., Wire Leads	.35
5035	Cord - A.C. Line	.50
5506	Control Assembly - Volume and Switch	1.25
5672	Control - Tone Switch	.35
5493	Dial Assembly	2.50
5567	Dial Window - Glass	.30
5494	Dial Escutcheon - Metal	.50
5085	Knobs - Wood	.20
5048	Pilot Light - 6-8 volt	.15
5103	Resistor, 20,000 ohm 1 watt - Carbon	.20
5002	Resistor, 50,000 ohm 1/2 watt - Carbon	.20
5006	Resistor, 50,000 ohm 1/2 watt - Carbon	.20
5007	Resistor, 500,000 ohm 1/2 watt - Carbon	.20
5004	Resistor, 300 ohm 1/4 watt - Carbon	.20
5010	Resistor, 2 Megohm 1/2 watt - Carbon	.20
5009	Resistor, 400,000 ohm 1/2 watt - Carbon	.20
5008	Resistor, 35,000 ohm 1/2 watt - Carbon	.20
5003	Resistor, 10,000 ohm 1/4 watt - Carbon	.20
5492	Resistor, 10,000 ohm 1 2 watt - Carbon	.20
5032	Socket - 4-Prong	.10
5033	Socket - 6-Prong	.15
5034	Socket - 7-Prong	.15
5331	Speaker - 6 inch Dynamic	5.50
5334	Speaker - 8 inch, 1500 ohm field	6.50
5491	Switch Assembly - Band	.65
5520	Transformer - Power, 110 volt 50-60 cycle	3.50
5174	Transformer - Universal Power	4.75
5592	Transformer - Power, 25 cycle	5.40
5487	Transformer - I.F. Input	1.50
5488	Transformer - I.F. Output	1.50
5550	Wave Trap Assembly	1.00

MODEL 56 ALIGNMENT PROCEDURE





To insure obtaining the performance the model 56 receiver is capable of delivering, it is essential that it be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will be possible only through the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected across the voice coil leads of the loud speaker.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT

1 - Turn the gang condenser to maximum capacity (fully meshed).

2 - Set the band selector switch on the "Broadcast" position.

3 - Supply a 456 kilocycle signal from the signal generator to the antenna lead of the receiver through a .1 Mfd. condenser connected in series with the signal generator lead.

4 - Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

5 - Adjust the wave trap trimmer "A" (see Figure 1) for minimum output.

RADIO FREQUENCY ALIGNMENT The parallel or high frequency trimmer condensers for the broadcast band are on the gang condenser. These trimmers are used for aligning the high frequency end of the broadcast band. The location of the trimmers is shown in Figure 1.

The oscillator adjustable series padding condenser is used for tracking the oscillator at the low frequency end of the broadcast band. The padding condenser may be adjusted from the top of the chassis through the hole indicated in Figure 1. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT Before making any alignment adjustments, close the variable tuning condenser (maximum capacity), place the dial pointer in a horizontal position (gang condenser still closed) and then proceed with the following adjustments.

BROADCAST BAND

1 - Turn the band selector switch to the broadcast (counter-clockwise) position.

2 - Tune the receiver to 1500 kilocycles.

3 - Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4 - Adjust the trimmer condensers on the gang condenser (Figure 1) for maximum output with minimum input from the signal generator.

5 - Tune the receiver to 600 kilocycles.

6 - Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7 - Adjust the broadcast band oscillator padding condenser "B" (top of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

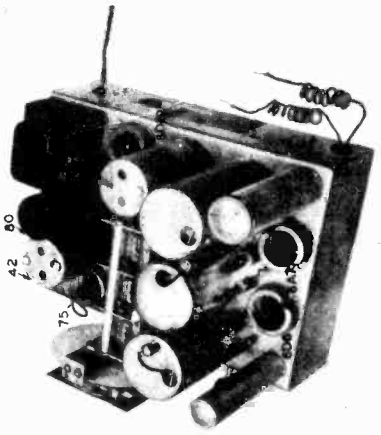
8 - Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

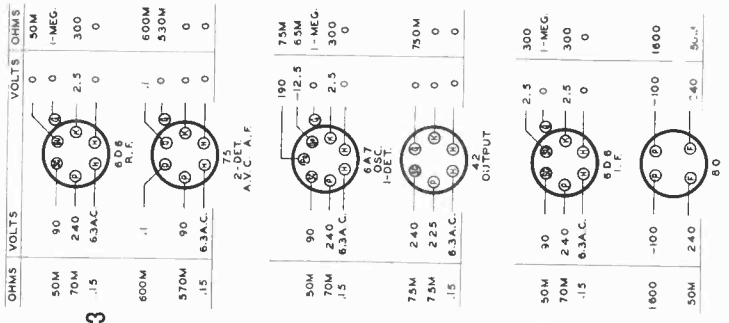
ANTENNA AND GROUND CONNECTIONS

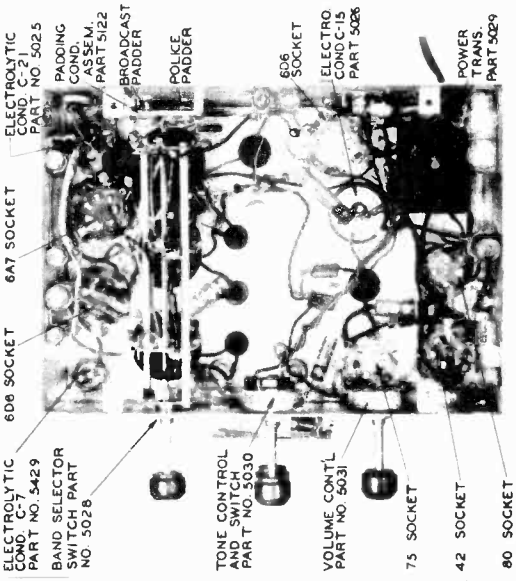
The BLUE wire on the receiver is to be connected to the antenna. The BLACK wire on the receiver is to be connected to the ground. When a FAIRBANKS-MORSE ANTENNA is used, the BLUE wire from the receiver is to be connected to the red wire on the antenna set coupler and the BLACK wire from the receiver is to be connected to the black wire on the antenna set coupler and to a good ground.

MODEL 63
Schematic, Socket
Chassis, Trimmers
Voltage, Resistance

FAIRBANKS-MORSE HOME APP., INC.







MODEL 63

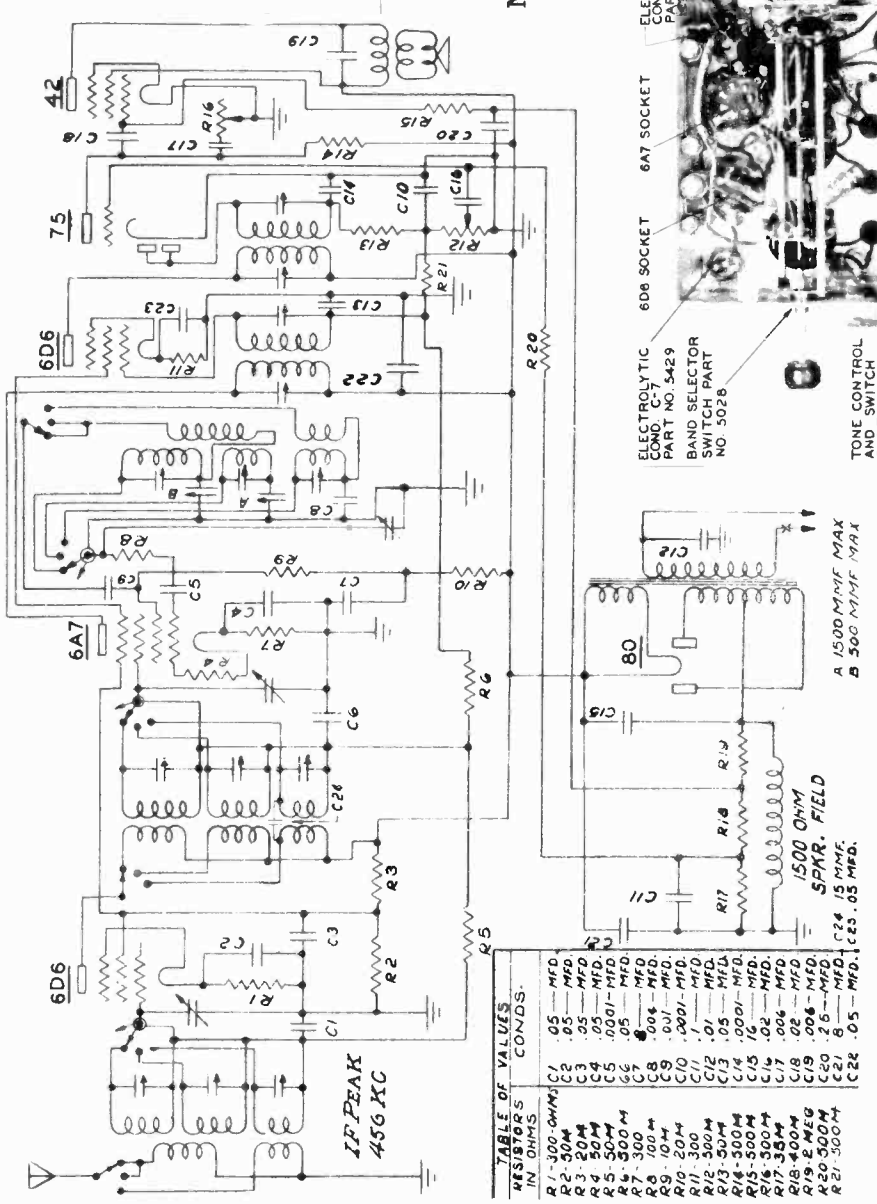


TABLE OF VALUES

RESISTORS IN OHMS		CONDS.
R1 - 300 OHMS	C1	.05 — MFD
R2 - 30M	C2	.05 — MFD
R3 - 20M	C3	.05 — MFD
R4 - 500M	C4	.0001 — MFD
R5 - 300M	C5	.0001 — MFD
R6 - 300M	C6	.05 — MFD
R7 - 300M	C7	.05 — MFD
R8 - 10M	C8	.004 — MFD
R9 - 20M	C9	.001 — MFD
R10 - 20M	C10	.0001 — MFD
R11 - 300M	C11	.1 — MFD
R12 - 300M	C12	.01 — MFD
R13 - 50M	C13	.05 — MFD
R14 - 300M	C14	.0001 — MFD
R15 - 300M	C15	.16 — MFD
R16 - 300M	C16	.02 — MFD
R17 - 3M	C17	.004 — MFD
R18 - 400M	C18	.02 — MFD
R19 - 2 MEG	C19	.006 — MFD
R20 - 300M	C20	.25 — MFD
R21 - 300M	C21	.8 — MFD
	C22	.05 — MFD
	C23	.05 — MFD
	C24	.15 MMF.

NAME	DWG. NO.
WIRING DIAGRAM FOR MOD. 63	7511
DRAWN BY	CHECKED
SCALE	X = 1"
DATE	7-24-35

FAIRBANKS MORSE
HOME APPLIANCES, INC.

ALIGNMENT PROCEDURE MODEL 63 MODEL 71

Proper adjustment of the various tuned circuits will only be possible through the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected across the voice coil leads of the loud speaker.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT

1 - Turn the gang condenser to maximum capacity (fully meshed).

2 - Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube (6A7 or 6A8) through a .1 Mfd. condenser connected in series with the signal generator lead.

3 - Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 1.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condenser may be adjusted from the rear of the chassis through the holes indicated in Figure 1. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and then tighten the screw.

BROADCAST BAND

1 - Turn the band selector switch to the broadcast (counter-clockwise) position.

2 - Tune the receiver to 1500 kilocycles.

3 - Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4 - Adjust the broadcast band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the broadcast band radio frequency and antenna stage trimmers for maximum output.

5 - Tune the receiver to 600 kilocycles.

6 - Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7 - Adjust the broadcast band oscillator padding condenser (rear of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8 - Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

POLICE BAND

1 - Turn the band selector switch to the police band (center) position.

2 - Tune the receiver to 5.4 megacycles.

3 - Supply a 5.4 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - Adjust the police band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator, then adjust the police band radio frequency and antenna stage trimmers for maximum output.

5 - Tune the receiver to 1.8 megacycles.

6 - Supply a 1.8 megacycle signal to the receiver through the same connections used on the previous adjustment.

7 - Adjust the police band oscillator padding condenser (rear of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8 - Check at 5.4 megacycles and then at 1.8 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1 - Turn the band selector switch to the short wave (clockwise) position.

2 - Tune the receiver to 18 megacycles.

3 - Supply an 18 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - Turn the short wave antenna stage trimmer (see Figure 1) all the way in and then back it out one turn.

5 - Turn the short wave radio frequency stage trimmer (see Figure 1) all the way in and back it out one-half turn.

6 - Turn the short wave oscillator trimmer (see Figure 1) all the way in and back it out until the 18 megacycles signal from the signal generator is received. The first signal, found at about 17 megacycles, should be the image; the second, should be the 18 megacycle signal.

7 - Check and, if necessary, readjust all three stages for maximum output with minimum input from the signal generator.

WARNING - The image signal should be received at approximately 17 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 18 megacycles and the image at approximately 17 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.

AUTOMATIC VOLUME CONTROL

MODEL 71 CHASSIS A type 6H6 tube is employed as the second detector in a half wave rectifier circuit, the diode plates being connected together. Current flows from the diode plates to the cathode and to ground. Here it is picked up at the point where resistor R-12 is grounded and flows through resistor R-12 and R-13, through the secondary of the second intermediate frequency transformer, back to the plates, thus forming the complete circuit.

The D.C. component of this current produces a voltage drop across resistor R-12 in proportion to the strength of the incoming signal. The grid returns of the 6K7 radio frequency amplifier, the 6A8 pentagrid converter and the 6K7 intermediate frequency amplifier, are connected through the isolating resistors R-5, R-6 and R-21 to the point of juncture between resistors R-12 and R-13, thus adding the voltage drop obtained across resistor R-12 to the fixed bias on the three controlled tubes. Resistor R-12 is also the manual volume control. The audio component of voltage drop across the resistor is taken off on the sliding arm of the control through condenser C-16 and is applied to grid of the type 6F8, first audio amplifier tube.

MODEL 63 CHASSIS The A.V.C. circuit and its operation in the model 63 chassis is identical to that in the model 71. The only differences are in the tubes. A type 75 tube performs the triple function of diode rectifier, automatic volume control and first audio amplifier in place of the type 6H6 tube and the type 6F5 tube in the model 71 chassis. Type 6D6 tubes are found in place of the type 6K7 tubes in the radio frequency and intermediate frequency stages. A type 6A7 pentagrid converter replaces the type 6A8 found in the model 71 chassis.

THE ANTENNA

The most suitable antenna for use in large cities or congested radio districts, where interference is a serious problem, is the doublet. In small centers of population, where interference is not serious, a single wire antenna having a total length of from 75 to 100 feet, erected as high as possible, with a good insulator at each end, will prove satisfactory. The lead-in should go to the receiver by the most direct route and should be kept away, as far as possible, from obstructions. Such an antenna will have less directional properties and less tendency to pick up power line interference than a low antenna with a long horizontal lead.

THE FAIRBANKS-MORSE ANTENNA For those installations where a doublet type antenna is most suitable, FAIRBANKS-MORSE engineers offer the FAIRBANKS-MORSE MODEL 20 NOISE REDUCING ANTENNA SYSTEM. This antenna is especially designed for these receivers and requires no switching arrangement, since it automatically balances itself to the receiver on all bands.

The BLUE wire on the receiver is to be connected to the antenna. The BLACK wire on the receiver is to be connected to the ground. When a FAIRBANKS-MORSE ANTENNA is used, the BLUE wire from the receiver is to be connected to the red wire on the antenna set coupler and the BLACK wire from the receiver is to be connected to the black wire on the antenna set coupler and to a good ground.

POWER TRANSFORMER

Part No. 5029	110 Volt	50-60 cycle
Lead Color	**Voltage**	**Resistance**
Black	6.3	.15 ohm
Yellow	5.0	.12 ohm
Brown	110 (Primary)	8.1 ohms
Green	High Voltage	471.3 ohms
Red	Center Tap (Hi-Volt.)	
Part No. 5478	**Universal**	**40-50-60 cycles**
Lead Color	**Voltage**	**Resistance**
Black	6.3	.15 ohm
Yellow	5.0	.12 ohm
Green	High Voltage	469.5 ohms
Red	Center Tap (Hi-Volt.)	
Brown	Common Primary	
Black & White	100-125 Primary	9.7 ohms
Red & Black	130-155 Primary	13.4 ohms
Brown & White	200-250 Primary	34.6 ohms
Part No. 5693		**25 cycle**
Lead Color	**Voltage**	**Resistance**
Yellow	5.0	.14 ohm
Black	6.3	.16 ohm
Green	High Voltage	642.4 ohms
Red	Center Tap (Hi-Volt.)	
Brown	110 Primary	10.32 ohms

MODEL 64 Auto
MODEL 74 Auto
Schematics
Voltages

FAIRBANKS-MORSE HOME APP., INC.

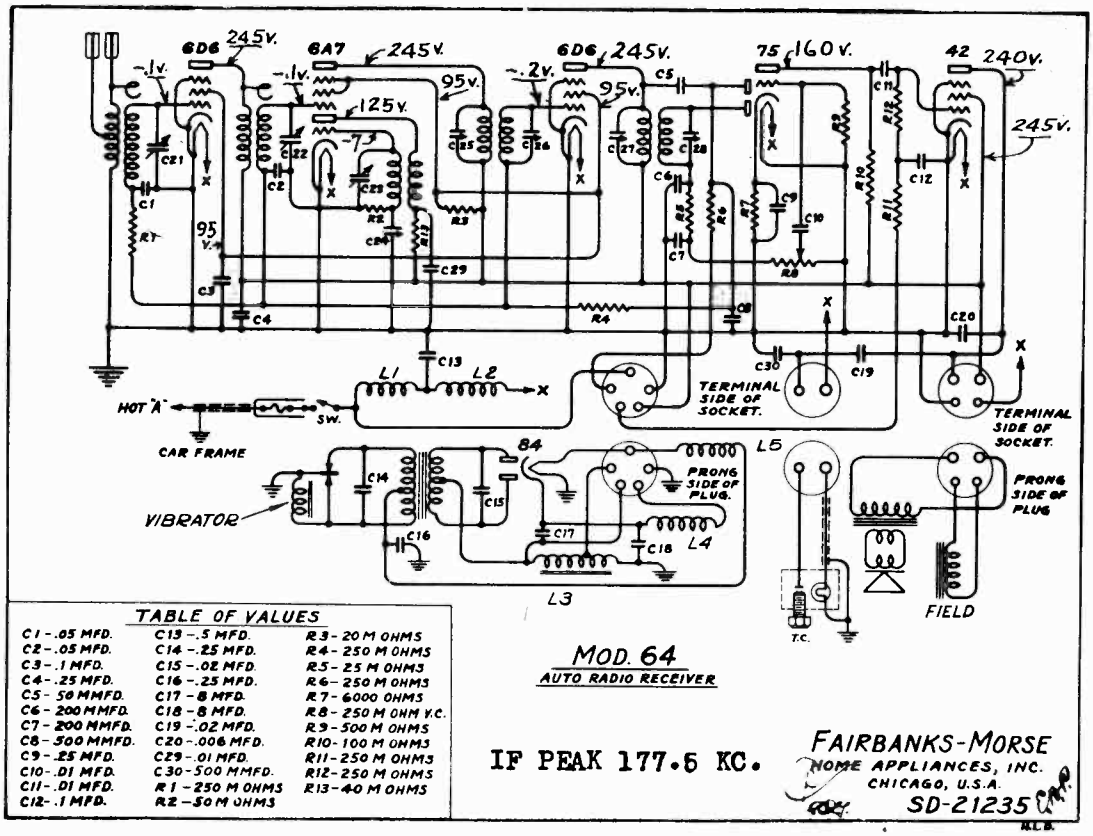


TABLE OF VALUES

C1 - .05 MFD.	C13 - .5 MFD.	R3 - 20 M OHMS
C2 - .05 MFD.	C14 - .25 MFD.	R4 - 250 M OHMS
C3 - .1 MFD.	C15 - .02 MFD.	R5 - 25 M OHMS
C4 - .25 MFD.	C16 - .25 MFD.	R6 - 250 M OHMS
C5 - 50 MMFD.	C17 - 8 MFD.	R7 - 6000 OHMS
C6 - 200 MMFD.	C18 - 8 MFD.	R8 - 250 M OHM V.C.
C7 - 200 MMFD.	C19 - .02 MFD.	R9 - 500 M OHMS
C8 - 500 MMFD.	C20 - .006 MFD.	R10 - 100 M OHMS
C9 - .25 MFD.	C29 - .01 MFD.	R11 - 250 M OHMS
C10 - .01 MFD.	C30 - 500 MMFD.	R12 - 250 M OHMS
C11 - .01 MFD.	R1 - 250 M OHMS	R13 - 40 M OHMS
C12 - .1 MFD.	R2 - 50 M OHMS	

MOD. 64
AUTO RADIO RECEIVER

IF PEAK 177.5 KC.

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-21235

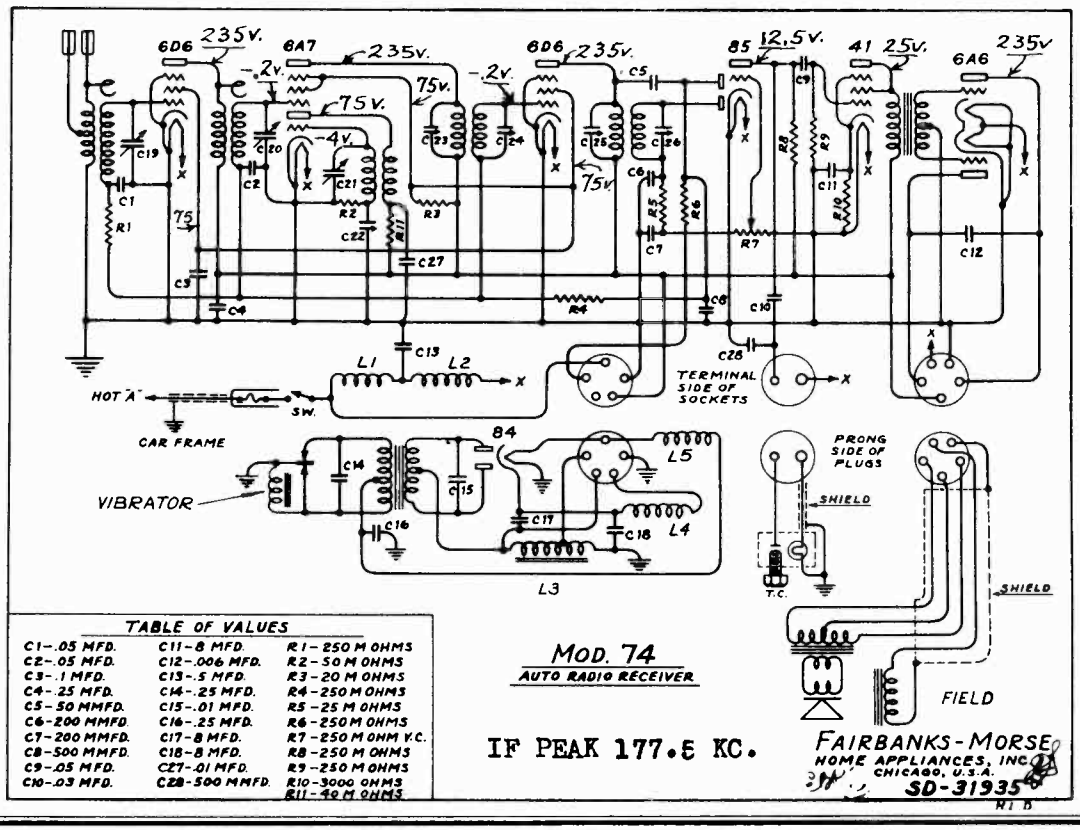


TABLE OF VALUES

C1 - .05 MFD.	C11 - 8 MFD.	R1 - 250 M OHMS
C2 - .05 MFD.	C12 - .006 MFD.	R2 - 50 M OHMS
C3 - .1 MFD.	C13 - .5 MFD.	R3 - 20 M OHMS
C4 - .25 MFD.	C14 - .25 MFD.	R4 - 250 M OHMS
C5 - 50 MMFD.	C15 - .01 MFD.	R5 - 25 M OHMS
C6 - 200 MMFD.	C16 - .25 MFD.	R6 - 250 M OHMS
C7 - 200 MMFD.	C17 - 8 MFD.	R7 - 250 M OHM V.C.
C8 - 500 MMFD.	C18 - 8 MFD.	R8 - 250 M OHMS
C9 - .05 MFD.	C27 - .01 MFD.	R9 - 250 M OHMS
C10 - .03 MFD.	C28 - 500 MMFD.	R10 - 3000 OHMS
		R11 - 40 M OHMS

MOD. 74
AUTO RADIO RECEIVER

IF PEAK 177.5 KC.

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-31935

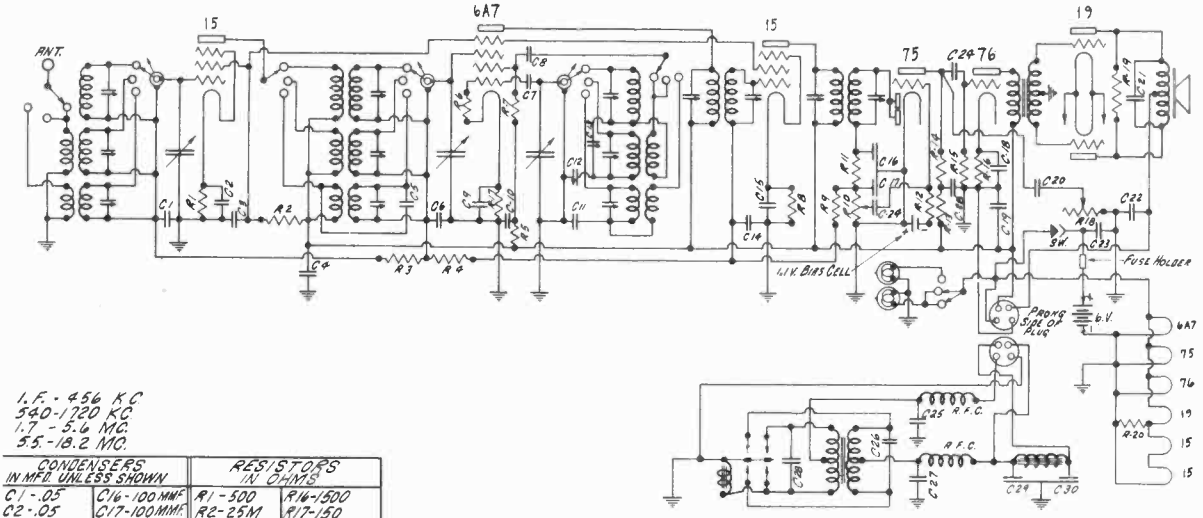
For Alignment, see Index.

FAIRBANKS-MORSE HOME APP., INC.

MODEL 66
Schematic
Socket, Trimmers
Voltage, Resistance

MODEL 67
Scheratic, Voltage
Resistance, Socket
Trimmers, Chassis

FAIRBANKS-MORSE HOME APP., INC.

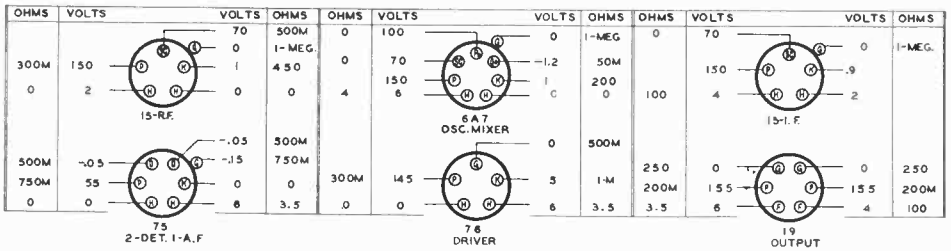


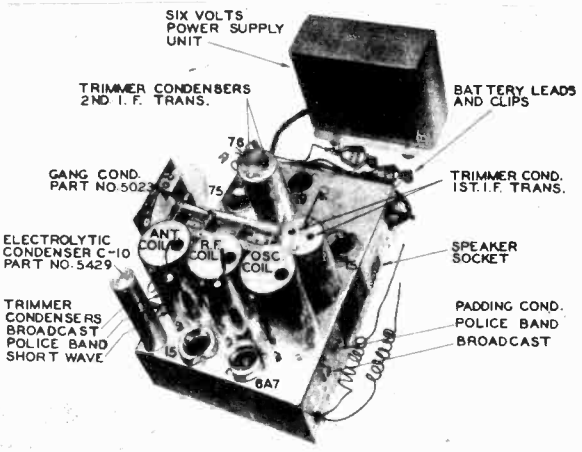
I.F. - 456 K.C.
540-1720 K.C.
1.7 - 5.6 MC.
5.5 - 18.2 MC.

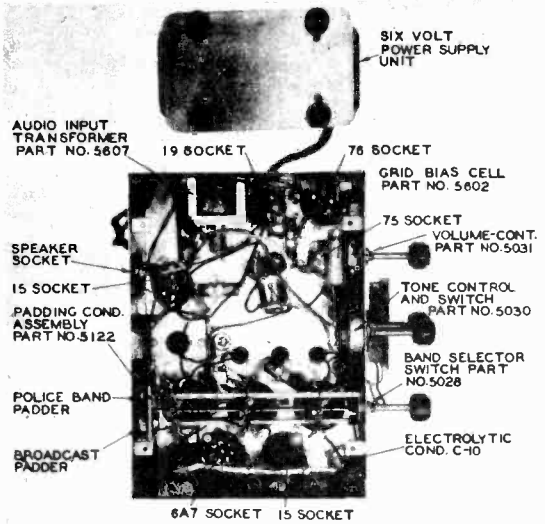
CONDENSERS IN MFD. UNLESS SHOWN		RESISTORS IN OHMS	
C1 - .05	C16 - 100 MMF.	R1 - 500	R16 - 1500
C2 - .05	C17 - 100 MMF.	R2 - 25 M	R17 - 150
C3 - .1	C18 - 10	R3 - 50 M	R18 - 500 M
C4 - .25	C19 - .25	R4 - 500 M	R19 - 50 M
C5 - 15 MMF.	C20 - .006	R5 - 10 M	R20 - 100
C6 - .05	C21 - .003	R6 - 50 M	
C7 - 100 MMF.	C22 - .25	R7 - 10 M	
C8 - .001	C23 - .25	R8 - 500	
C9 - .05	C24 - .02	R9 - 500 M	
C10 - 8	C25 - .25	R10 - 500 M	
C11 - .004	C26 - .01	R11 - 50 M	
C12 - 1500 MMF.	C27 - .1	R12 - 500 M	
C13 - 500 MMF.	C28 - .25	R13 - 250 M	
C14 - .05	C29 - 8	R14 - 250 M	
C15 - .05	C30 - 8	R15 - 500 M	

MODEL 67 (6 VOLT BATTERY) RADIO RECEIVER

NAME			NO.
WIRING DIAGRAM FOR MODEL # 67			7522
DRAWN BY	CHECKED BY	SCALE	DATE
R.P.	[illegible]	X - 1"	11-15-35
FAIRBANKS MORSE HOME APPLIANCES, INC.			







MODEL 67

TUBES AND CIRCUIT

The information in this service manual covers the model 67, a 6 volt battery operated radio receiver chassis, with a self-contained "B" power supply unit. Many familiar design features that have proven their value over a period of years are combined in this chassis with the latest worthwhile developments of the radio industry and several new developments of the FAIRBANKS-MORSE laboratories.

The model 67 chassis employs a type 15 tube in the radio frequency amplifier stage. The incoming signal is fed to this tube through the antenna coil on each of the three bands. Through the use of this stage, high image and signal to noise ratios are maintained on all bands. Amplification and some selectivity are also realized from this stage.

A type 6A7 pentagrid converter is employed. This tube serves the dual function of first detector and oscillator. A type 15 tube is employed as the intermediate frequency amplifier. This tube and the two special intermediate frequency transformers are responsible for the exceptional selectivity and high gain obtained from the intermediate frequency amplifier.

A type 75 tube performs the triple function of diode detector, automatic volume control and first audio amplifier tube. The output of the triode section of the type 75 tube is resistance coupled to a type 76 tube, which drives a type 19 tube in a class "B" power output stage.

A full-wave synchronous type vibrator is employed in the power supply. This vibrator accomplishes the dual functions of interrupting the primary current and rectifying the secondary current. The power supply unit is housed in an individual container that is separate from the chassis and is connected to the chassis by means of a power supply cable.

AUTOMATIC VOLUME CONTROL

A type 75 tube is employed as the second detector in a half wave rectifier circuit, the diode plates being connected together. Current flows from the diode plates to the cathode and through resistors R-10 and R-11, through the secondary of the second intermediate frequency transformer, back to the plates, thus forming the complete circuit.

The D.C. component of this current produces a voltage drop across resistor R-10 in proportion to the strength of the incoming signal. The grid returns of the type 15 radio frequency amplifier, the type 6A7 pentagrid converter and the type 15 intermediate frequency amplifier are connected through the isolating resistors R-3, R-4 and R-9 to the point of juncture between resistors R-10 and R-11, thus adding the voltage drop obtained across resistor R-12 to the fixed bias on the three controlled tubes. The fixed bias is obtained from the individual bias resistors, R-1, R-17 and R-8, located in the cathode circuits of the tubes. Resistor R-10 is also the manual volume control. The audio component of voltage drop across this resistor is taken off on the sliding arm of the control through condenser C-24 and is applied to the grid of the triode section of the tube which serves as the first audio amplifier.

ALIGNMENT PROCEDURE

To insure obtaining the performance the model 67 is capable of delivering, it is essential that it be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will only be possible through the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected, through a blocking condenser, from plate to ground on the output tube.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT

1 - Turn the gang condenser to maximum capacity (fully meshed).

2 - Supply a 456 kilocycle signal from the signal generator to the grid of the type 6A7 first detector tube through a .1 Mfd. condenser connected in series with the signal generator lead.

3 - Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 1.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condenser may be adjusted from the rear of the chassis through the holes indicated in Figure 1. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustments to the peak of greatest intensity.

BATTERY AND POWER SUPPLY

BATTERY A storage battery having a capacity of at least 135 ampere hours should be used with the receiver. The storage battery should be located as far from the chassis of the receiver as the battery cables will permit. Attach the long, red lead from the receiver to the positive (+) side of the storage battery. Attach the long, black lead from the receiver to the negative (-) side of the battery.

FUSE In case of difficulty, the fuse located in a metal cartridge near the end of the positive (red) battery lead should be checked. A 15 ampere fuse, FAIRBANKS-MORSE part number 5606, should be used for replacement purposes.

POWER SUPPLY UNIT The power supply unit contains all of the parts of the power supply circuit, including the vibrator. The power supply unit should be located as far from the receiver chassis as the length of the cable will permit. The power supply cable (the cable with a plug on its end) should be plugged into the socket on the side of the power supply unit.

The corrugated fibre container in which the power supply unit is packed is designed to reduce mechanical vibration and noise. For this reason, it should not be removed.

THE WINCHARGER The "Wincharger" is designed to eliminate battery charging difficulties by charging the battery continuously as long as a breeze of sufficient velocity is blowing. Service information concerning this unit must be obtained from the manufacturer, The Wincharger Corporation, 2700 Hawkeye Drive, Sioux City, Iowa.

5 - Tune the receiver to 1.8 megacycles.

6 - Supply a 1.8 megacycle signal to the receiver through the same connections used on the previous adjustment.

7 - Adjust the police band oscillator padding condenser (rear of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8 - Check at 5.4 megacycles and then at 1.8 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1 - Turn the band selector switch to the short wave (clockwise) position.

2 - Tune the receiver to 18 megacycles.

3 - Supply an 18 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - Turn the short wave antenna stage trimmer (see Figure 1) all the way in and then back it out one turn.

5 - Turn the short wave radio frequency stage trimmer (see Figure 1) all the way in and back it out one-half turn.

6 - Turn the short wave oscillator trimmer (see Figure 1) all the way in and back it out until the 18 megacycle signal from the signal generator is received. The first signal, found at about 17 megacycles, should be the image; the second, should be the 18 megacycle signal.

7 - Check and, if necessary, readjust all three stages for maximum output with minimum input from the signal generator.

WARNING - The image signal should be received at approximately 17 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 18 megacycles and the image at approximately 17 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.

DIAL ADJUSTMENT Before making any alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and tighten the screw.

BROADCAST BAND

1 - Turn the band selector switch to the broadcast (counter-clockwise) position.

2 - Tune the receiver to 1500 kilocycles.

3 - Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4 - Adjust the broadcast band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the broadcast band radio frequency and antenna stage trimmers for maximum output.

5 - Tune the receiver to 600 kilocycles.

6 - Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7 - Adjust the broadcast band oscillator padding condenser (rear of chassis, see Figure 2) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8 - Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

POLICE BAND

1 - Turn the band selector switch to the police band (center) position.

2 - Tune the receiver to 5.4 megacycles.

3 - Supply a 5.4 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4 - Adjust the police band oscillator trimmer condenser (Figure 1) for maximum ouput with minimum input from the signal generator, then adjust the police band radio frequency and antenna stage trimmers for maximum output.

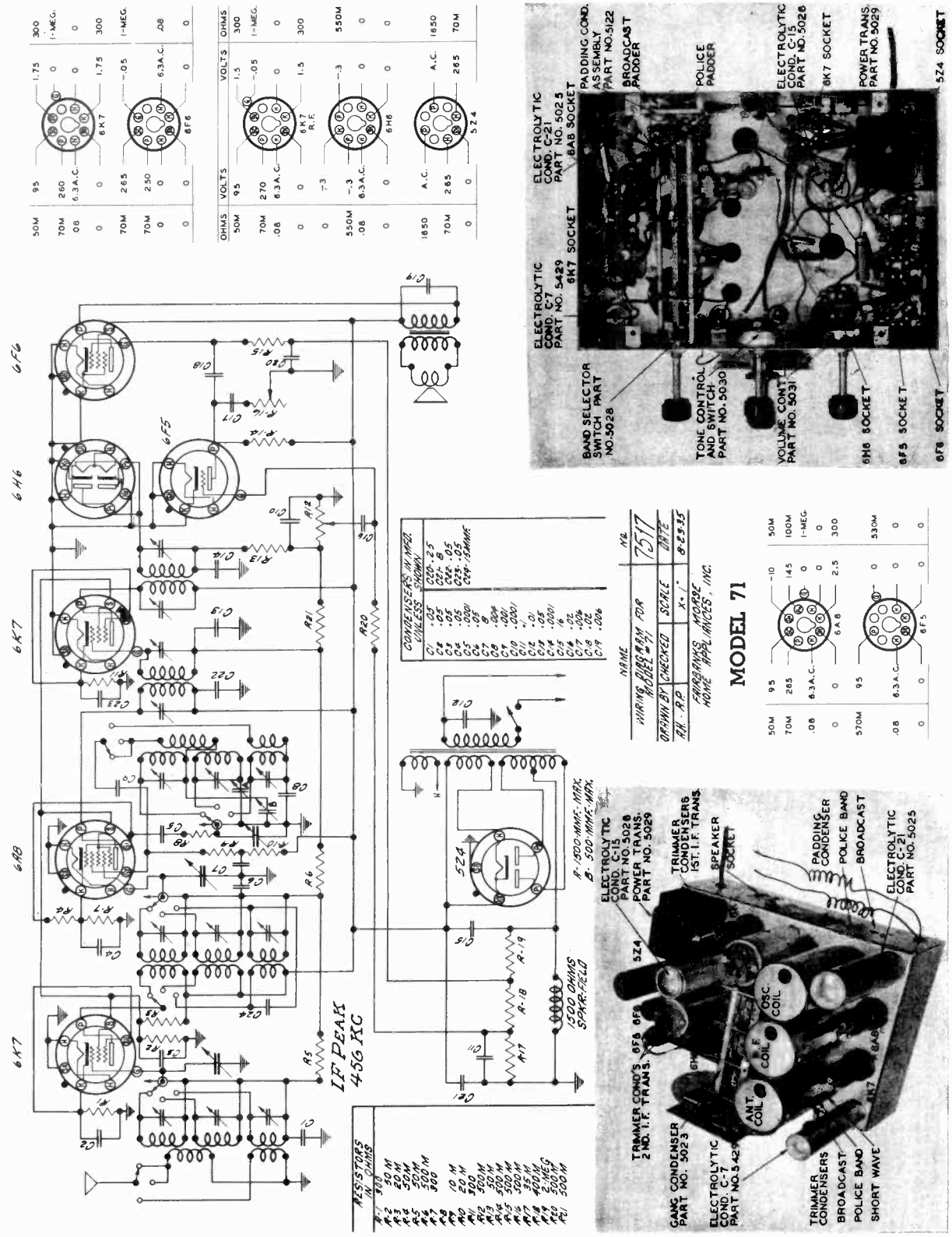
ANTENNA AND GROUND CONNECTIONS

The BLUE wire on the receiver is to be connected to the antenna. The BLACK wire on the receiver is to be connected to the ground. When a FAIRBANKS-MORSE ANTENNA is used, the BLUE wire from the receiver is to be connected to the red wire on the antenna set coupler and the BLACK wire from the receiver is to be connected to the black wire on the antenna set coupler and to a good ground.

NOTE - The antenna lead-in should be placed so as to avoid running close to the battery, power supply unit or the cables to avoid pickup from the power supply unit.

MODEL 71
Schematic, Voltage
Socket, Trimmers
Chassis, Resistance

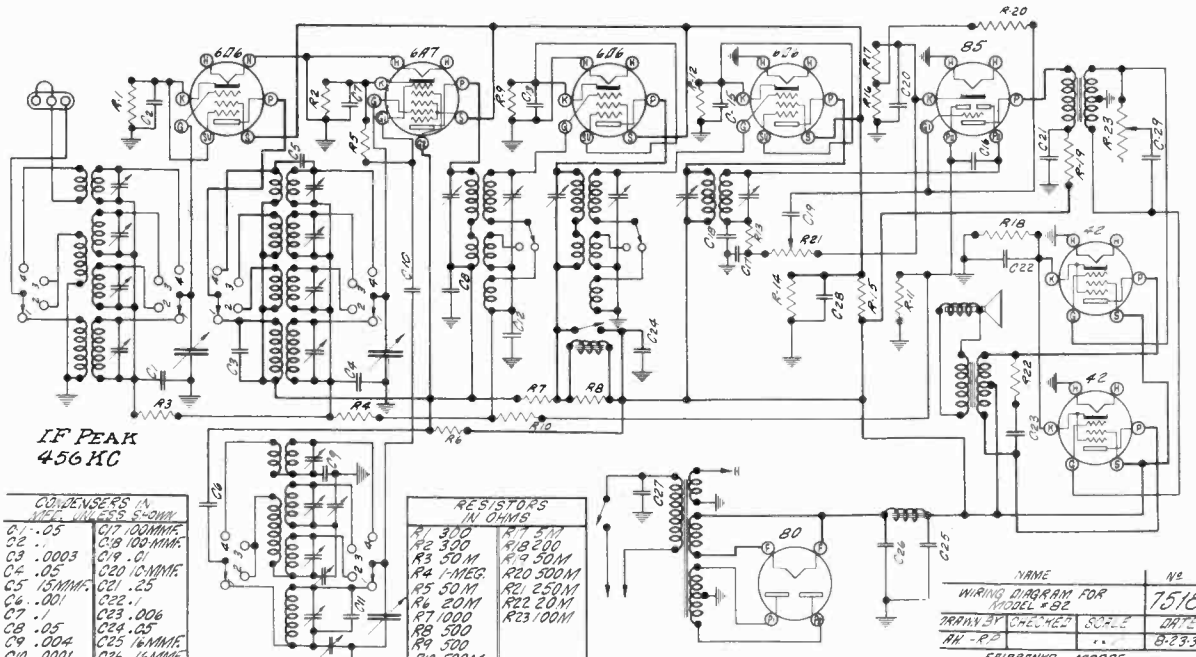
FAIRBANKS-MORSE HOME APP., INC.



MODEL 82

FAIRBANKS-MORSE HOME APP., INC.

Schematic, Voltage
Socket, Trimmers
Chassis. Resistance



CONDENSERS IN MFD. UNLESS SHOWN

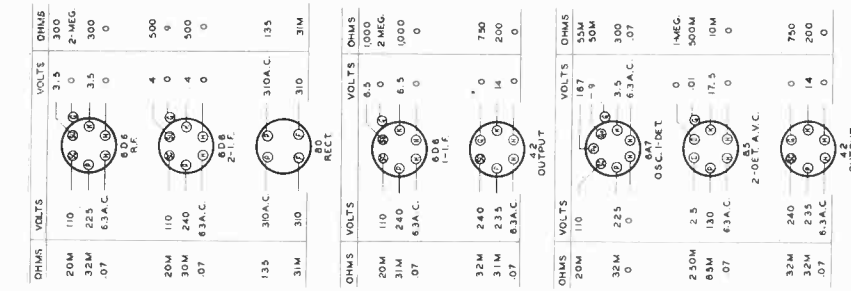
C1 .05	C17 100MMF.
C2 .	C18 100 MMF.
C3 .0003	C19 .01
C4 .05	C20 10 MMF.
C5 15MMF.	C21 .25
C6 .001	C22 .1
C7 .1	C23 .006
C8 .05	C24 .05
C9 .004	C25 16MMF.
C10 .0001	C26 16MMF.
C11 75MMF.	C27 .01
C12 .05	C28 .25
C13 .1	C29 .05
C14	
C15 .05	
C16 25MMF.	

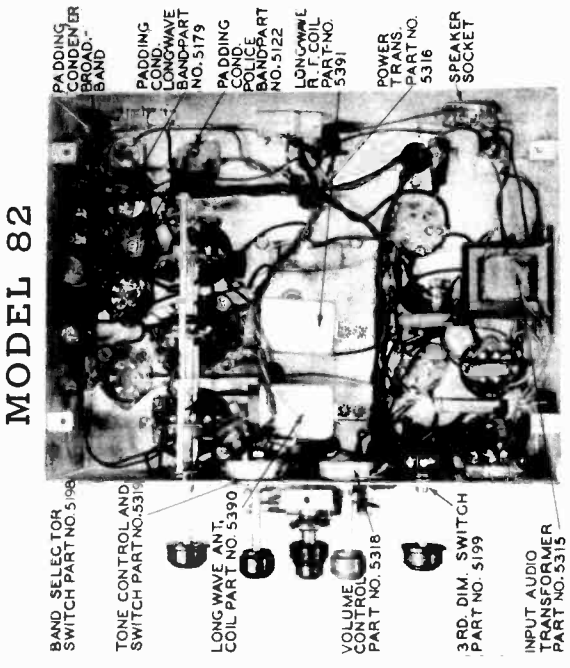
RESISTORS IN OHMS

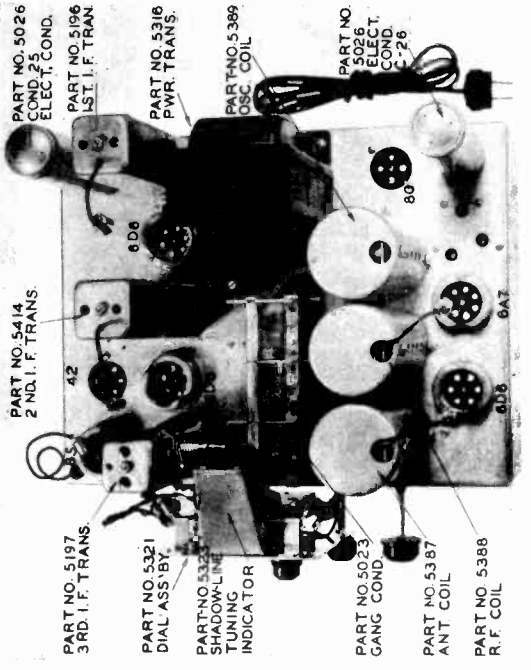
R1 300	R17 5M
R2 300	R18 200
R3 50M	R19 50M
R4 1-MEG.	R20 500M
R5 50M	R21 250M
R6 20M	R22 20M
R7 1000	R23 100M
R8 500	
R9 500	
R10 500M	
R11 1-MEG.	
R12 1000	
R13 50M	
R14 20M	
R15 10M	
R16 5M	

NAME	No.
WIRING DIAGRAM FOR MODEL #82	7518
DRAWN BY	CHECKED
RH -RP	
SCALE	DATE
	8-23-35

FAIRBANKS MORSE HOME APPLIANCES INC.







MODEL 82 AND 90

ALIGNMENT PROCEDURE

To insure obtaining the performance the models 82 and 90 are capable of delivering, it is essential that they be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will only be possible through the use of an accurate and reliable signal generator employed in conjunction with an output meter connected across the voice coil leads of the speaker. In the adjustment of the third intermediate frequency transformer, it is recommended that a cathode ray oscillograph be used for most accurate results.

With the receiver operating on the "Sharp" position, the intermediate frequency amplifier resonance curve will appear on the screen. When the receiver is switched to the "3RD DIMENSION" position, symetrical double humps, approaching a wide flat top resonance curve, should appear in place of the "Sharp" resonance curve (see Figure 10). Each side of the curve should be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer should be adjusted until the proper curve is obtained. The adjustment of one trimmer, in addition to effecting its own side of the curve, will reflect in the other side and, for this reason, great care must be exercised in making these adjustments.

R.F. ALIGNMENT The parallel or high frequency trimmer condensers for each coil are housed in the same can with the coil. These trimmers are used for aligning the high frequency end of each band. The location of the various coils and their respective trimmers is shown on Figure 8. It is essential that the bands be aligned in the order they appear in the following instructions. In other words, the police band alignment must be completed before the broadcast band alignment is started because of the interlocking effect of the padding condensers on these bands.

Adjustable series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis, through the holes indicated in Figure 8. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

NOTE: All adjustments, unless otherwise noted, should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT With the range switch on the broadcast position, the fidelity switch on "Sharp" (clockwise) and the gang condenser closed (maximum capacity), supply a 456 kilocycle signal, stage by stage, to the intermediate frequency amplifier, beginning with the grid of the second intermediate frequency tube. To accomplish this, a .1 Mfd. condenser should be connected between the signal generator supply lead and the second intermediate frequency tube.

The trimmers of the third intermediate frequency transformer (Figure 8) should be adjusted for maximum output with minimum input from the signal generator. Then the signal generator lead should be moved to the first intermediate frequency tube and the trimmers of the second intermediate transformer should be adjusted. The next step is to supply the signal to the grid of the first detector tube and adjust the trimmers of the first intermediate frequency transformer. This method of procedure is essential because of the extreme selectivity of the receiver. After each stage has been aligned, it is well to go back over all adjustments to make sure they are accurate.

The next step in the intermediate frequency aligument is to supply a very strong (about 1000 microvolt) signal to the grid of the first detector tube through the .1 Mfd. condenser. CAUTION: Before the signal is applied to the receiver, the volume control should be retarded to zero. After the signal is applied to the receiver, the volume control should be advanced slowly and carefully until a suitable indication appears on the output meter.

The fidelity switch should be turned to the high fidelity or Third Dimension position. Symetrical double humps should appear, one on each side of where the sharp resonance point appeared on the "Sharp" position (see Figure 10), when the signal generator is tuned approximately 2 kilocycles on each side of the resonance point. The two humps must be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer must be adjusted until a condition of equal amplitude is obtained. This may be found to be a very difficult adjustment unless an oscillograph is used.

USE OF THE OSCILLOGRAPH A signal generator with a sweep circuit must be employed in making this check. The output of the signal generator should be fed to the grid of the first detector tube in the receiver. The grid clip must be removed from the tube, but, since the first detector is one of the A.V.C. controlled tubes, it is necessary to complete the grid circuit. To accomplish this, connect a large resistor (about 50,000 or 100,000 ohms) between the grid clip and the grid cap of the tube. The low side of the signal generator should be connected to the chassis ground.

The "vertical binding posts of the oscillograph should be connected to the audio output of the second detector. In the model 82, a type 85 tube serves as a diode rectifier and, in the model 90, a type 6H6 tube is employed. In both of these circuits, R-21 is the manual volume control resistor. The high side connection from the "vertical" plates should be made to the point of juncture between resistors R-21 and R-13. The low side connection may be made to ground. Thus, the audio voltage is applied to the "vertical" plates of the oscillograph.

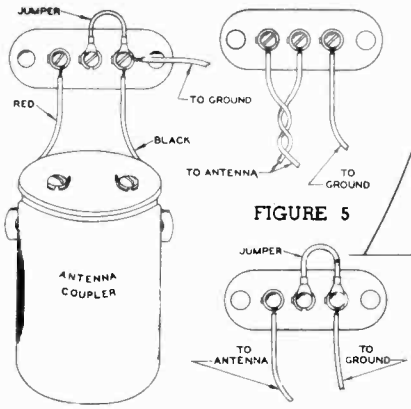


FIGURE 4 FIGURE 5 FIGURE 6

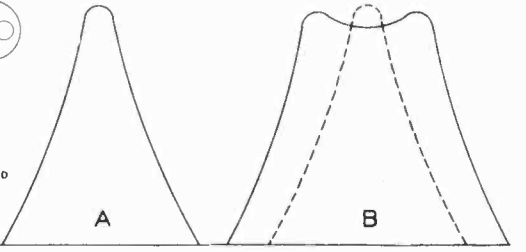


FIGURE 10

ALIGNMENT PROCEDURE (CONTINUED)

POLICE BAND (1.7 to 5.5 Megacycles) With the band selector switch in the police or "P" position and the fidelity switch on the "Sharp" position, supply a 5 megacycle signal from the signal generator to the antenna of the receiver, using a 400 ohm carbon resistor in series with the signal generator lead. Tune the receiver to 5 megacycles and then adjust the oscillator, ratio frequency and antenna stage police band trimmers for maximum output with minimum input from the signal generator. WARNING: Care must be exercised to avoid aligning the receiver to the image frequency as outlined under "short wave band".

Supply a 1.8 megacycle signal to the receiver and tune the receiver to 1.8 megacycles. Adjust the police band oscillator padding condenser (located on the chassis at the rear, (see Figure 8) for the signal of greatest intensity, rocking the gang condenser back and forth across the signal while making the adjustment. Check at 5 megacycles and then at 1.8 megacycles to correct for any frequency change.

BROADCAST BAND (540 to 1740 Kilocycles) With the band selector switch on the broadcast or "B" position, supply a 1500 kilocycle signal from the signal generator to the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series between the signal generator and the antenna post of the receiver to serve as the dummy antenna. Make certain that the fidelity switch is on the "Sharp" position.

Tune the receiver to 1500 kilocycles and adjust the radio frequency, antenna and oscillator stage broadcast band trimmers for maximum output with minimum input from the signal generator.

Supply a 600 kilocycle signal to the receiver through the same connections. Tune the receiver to 600 kilocycles. Adjust the broadcast band oscillator padding condenser (located on the chassis at the rear, (see Figure 8) for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Recheck at 1500 kilocycles and then at 600 kilocycles and make any frequency corrections that appear necessary.

LONG WAVE BAND (140 to 360 kilocycles) With the band selector switch on the long wave or "L" position, supply a 350 kilocycle signal from the signal generator to the antenna of the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series with the lead. Make sure the fidelity switch is on the "Sharp" position. Tune the receiver to 350 kilocycles and adjust the oscillator, ratio frequency and antenna stage trimmer condensers for maximum output with minimum input from the signal generator.

Supply a 175 kilocycle signal to the receiver through the same connections used in the previous adjustment. Tune the receiver to 175 kilocycles. Adjust the long wave oscillator padding condenser for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Readjust at 350 kilocycles and then at 175 kilocycles as many times as may be necessary to obtain satisfactory tracking.

SHORT WAVE BAND (5.5 to 18.4 Megacycles) Turn the band selector switch to the short wave or "S" position. Supply an 18 megacycle signal from the signal generator through a 400 ohm carbon resistor (dummy antenna) to the antenna post of the receiver. Tune the receiver to 18 megacycles on the dial. Turn the short wave R.F. trimmer in all the way and then back it out one-half turn. Turn the short wave oscillator trimmer in all the way and then back it out until the 18 megacycle signal (the first signal found at about 17 megacycles should be the image; the second, should be the 18 megacycle signal) from the signal generator is received. Readjust all three short wave trimmers for maximum output with minimum input from the signal generator.

WARNING: The image signal should be received at approximately 17 megacycles after the above adjustments have been made. If it cannot be located, the oscillator has probably been aligned to the image frequency and the oscillator trimmer must be backed out until the proper signal comes in at 18 megacycles and the somewhat weaker image is received at approximately 17 megacycles. If this readjustment is necessary, it will also be necessary to again align all three trimmers for maximum output.

GANG CONDENSER PLATES The adjustment of the various plates of the gang condenser is very critical, since it must be accurate on all bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.

MODEL 82 AND 90 RADIO RECEIVER

ANTENNA AND GROUND CONNECTIONS

FAIRBANKS-MORSE ANTENNA A set coupling transformer or coil is supplied with the FAIRBANKS-MORSE antenna kit. This coupler is to be attached to the radio cabinet directly to the rear of the antenna terminals on the chassis. The red lead from the coupler is to be connected to the antenna terminals on the rear of the receiver chassis. The black lead from the coupler is to be attached to the ground terminal on the rear of the receiver chassis. (When the chassis is viewed from the rear, the left haud terminal is Antenna and the right hand terminal is Ground). The connector link or jumper must remain between the center terminal and the ground terminal of the terminal strip (see Figure 4).

ORDINARY DOUBLET ANTENNA When a doublet type of antenna that does not employ coupling transformers is to be used on the receiver, the connector link or jumper should be removed from between the ground terminal and the center terminal on the rear of the chassis. The transmission lines or lead-in wires from the antenna should be connected to the left hand terminal and the center terminal of the terminal strip. The right hand terminal should be used for the ground connection (see Figure 5).

ORDINARY ANTENNA When an ordinary single wire antenna is to be used on the receiver, the antenna lead-in wire should be connected to the left hand terminal on the terminal strip on the rear of the chassis. The connector link or jumper must remain between the center terminal and the ground terminal of the terminal strip (see Figure 6). As a rule, it is a good policy to erect the antenna as high as possible and run the lead-in to the receiver by as direct a route as possible. The most satisfactory antenna for any installation will vary, depending largely upon local structural details and sources of interference. It should he kept as far as possible from buildings, trees and other obstructions. The antenna should not run parallel to nearby power lines and should not run near a tin roof or any metallic structure.

In general, the longer the antenna, the better the results will be on distant stations, especially if the flat portion of the antenna is erected as high as possible. When conditions permit, we recommend an antenna between 75 and 100 feet in length, including the lead-in, and at least 30 feet high.

GROUND CONNECTIONS The ground lead is to be connected to the right hand terminal on the terminal strip located on the rear of the chassis (see Figure 4 and 5).

Since the ground is an essential part of the installation, care must be exercised to see that a good ground is obtained with any type of antenna. In many installations, a satisfactory ground can be made by connecting to a nearby cold water pipe by means of an approved ground clamp. The pipe to which the connection is made should be cleaned thoroughly and scraped or filed bright at the point where the connection is to be made. If no other suitable ground is available, a length of galvanized iron pipe or a ground rod may be driven into moist earth. This usually proves to be a very satisfactory ground.

INTERFERENCE AND THE ANTENNA

The results obtainable from these radio receivers can we no better than the antennae. In order to enjoy the full advantage of 3RD DIMENSION TONE, the background noises ordinarily heard in a radio receiver must be reduced to a minimum. A high order of sensitivity has been incorporated in these radio receivers so that weak, distant stations may be readily tuned in. This also makes the receiver sensitive to such local interference as is given off by vacuum cleaners, door bells, oil burners, elevators and all sorts of small appliances.

It has been found that most of this man-made static travels close to the ground and is picked up on the lead-in of the average antenna. It follows then that, if an antenna could be developed with a special lead-in arrangement that would reject this interference, it would give far better and more noise-free reception than has been possible before.

THE FAIRBANKS-MORSE ANTENNA FAIRBANKS-MORSE engineers offer you just such an antenna as is described in the previous paragraph and, in addition, the FAIRBANKS-MORSE MODEL 20 NOISE REDUCING ANTENNA SYSTEM is especially designed to match the sensitive antenna circuit in these receivers. This assures maximum performance on all wave bands and without the necessity of switching the antenna from band to band, since, through ingenious design, this antenna system automatically balances itself to the receiver on any band. In addition to these features, the antenna is designed to eliminate dead spots and is of the proper length to give maximum results on all wave bands.

THIRD DIMENSION TONE

THIRD DIMENSION TONE is FAIRBANKS-MORSE'S improved high fidelity reproduction. THIRD DIMENSION TONE is designed to bring in a program just as it is rendered before the microphone in the broadcasting station studio. High notes that are not heard on a conventional radio come in with marvelous clearness, giving depth to music.

THIRD DIMENSION TONE is natural, unadulterated quality. It puts nothing into a program that does not exist in the original broadcast. If overtones have been lost in making a radio transcription, in transmission over a broadcast chain, or if the studio or transmitter do not broadcast them, THIRD DIMENSION TONE will not restore the missing musical elements. When listening to programs in which certain notes are missing, little difference will be noted when the switch is turned to the Third Dimension position. However, when the studio program and transmitter are of high quality and when the receiver is located reasonably close to them, the Third Dimension switch will open up a new world of radio realism.

FEATURES The special construction of the audio input transformer and the audio frequency equalizer circuit, both special THIRD DIMENSION TONE features, have been discussed in other paragraphs, but there is still one more outstanding feature that contributes much to make THIRD DIMENSION TONE outstanding over ordinary high fidelity.

In high fidelity transmission, a much wider band is required than has been the case with conventional transmitters in the past. In some cases, a band 30 kilocycles wide is employed, as compared to 10 kilocycles for ordinary transmission. It becomes evident then, that in order to enjoy the advantages of high fidelity transmission, the receiver must accept a band as wide as that being used by the transmitter. However, because only few stations operate high fidelity transmitters as yet and because the number of high quality regular stations is limited, it is necessary to employ an arrangement whereby the receiver may be switched from high fidelity to regular reception or, in other words, from a broad to a selective Intermediate Frequency channel at the will of the operator.

I.F. COUPLING CIRCUIT There are numerous ways in which the coupling in the intermediate frequency transformers can be varied to change from a selective to a broad circuit. However, to do this without detuning the receiver is a difficult engineering problem. FAIRBANKS-MORSE engineers have developed special first and second intermediate frequency transformers in which the primaries and secondaries are made up of multiple windings and connected in conjunction with a switch so the selectivity may be changed from sharp to broad at will without detuning the receiver.

The secondary of each intermediate frequency transformer is composed of three sections, the upper, center and lower (see Figures 1 and 2). The primary is composed of two sections, the upper and lower. The upper sections of the primary and secondary are loosely coupled to each other and constitute the major portion of the primary and secondary inductance respectively. The lower section of the primary and the center section of the secondary are tightly coupled. The coupling between the lower section of the secondary and the primary is loose. When the switch is on the Third Dimension position, the lower section of the secondary is out of the circuit and the secondary winding is made up of the other two windings, connected in series. Because the coupling between the lower section of the primary and the center section of the secondary is tight, a broad response will result.

When the switch is on the "Sharp" position, the center section of the secondary is cut out of the circuit and the loosely coupled lower section is substituted, thus the selectivity is increased the desired amount. Since the inductance of the center section and the lower section of the secondary are identical, the tuning is not altered when switching from the "Sharp" to the Third Dimension position. Because of this very practical and unique design, it is possible to arrange the tuning indicator circuit in such a manner that it is only engaged on the "Sharp" position of the switch. This serves to remind the operator that all tuning should be done on the "Sharp" setting to insure perfect resonance and most faithful reproduction.

Alignment Procedure

Models C-6, 64 and 74

General - When making alignment adjustments, the chassis should be placed in a metal case, similar to the regular set case, having suitable holes to make the various trimmers accessible. All adjustments should be made with the volume control advanced to maximum. An output meter and an accurate service oscillator should be used in making all adjustments.

I-F. Alignment - Supply a 177.5 kc. signal from a reliable service oscillator to the grid of the type 6A7 tube through a 200 mmfd. condenser. Set the gang condenser to 1000 kc. Align the four intermediate frequency trimmer condensers for maximum output with minimum input from the service oscillator. The two intermediate frequency transformers are housed in the square cans at the rear and on top of the chassis. The trimmer condensers are accessible through the two round holes in the top of each of these cans. After these adjustments have been made, the trimmers should all be checked again to make sure that the correct peaks have been obtained.

R-F., Oscillator and Antenna Alignment - Set the gang condenser at 1400 kc. Supply a 1400 kc. signal from a reliable service oscillator to the front antenna connector at the left side of the chassis, through a 200 mmfd. condenser. This connection should be made through the standard length of shielded antenna lead-in as supplied with the receiver.

The oscillator high frequency trimmer condenser should be adjusted for maximum output with minimum input from the service oscillator. The oscillator trimmer condenser is located on the rear section of the gang condenser. The r-f. trimmer condenser should next be adjusted in the same manner. This trimmer is located on the center section of the gang condenser. The antenna trimmer is located on the front section of the gang condenser and should be adjusted in the same manner.

Oscillator Padding Condenser Adjustment - Set the gang condenser to 600 kc. Supply a 600 kc. signal to the antenna of the set in the same manner as described in the previous paragraph. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator, at the same time rocking the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. The low frequency padding condenser is located at the rear of the left side of the chassis.

Note - After these adjustments have been made, the set should be checked at 1400 kc. to make sure the correct alignment still exists. If not, the oscillator, r-f. and antenna adjustments, as well as the padding condenser adjustments, must be repeated.

TUBES AND CIRCUIT

MODEL 82 CHASSIS The model 82 chassis employs a type 6D6 tube in the radio frequency amplifier stage. The incoming signal is fed to this tube through the antenna coil on each of the four bands. Through the use of this stage, high image and signal to noise ratios are maintained on all bands. Amplification and some selectivity are also realized in this stage.

A type 6A7 pentagrid converter is employed. This tube serves the dual function of first detector and oscillator. The oscillator section of the tube, on all but the long wave band, is connected to a MacNabb constant voltage oscillator circuit. Through the use of both inductive and capacitive coupling, the output of the oscillator remains at a uniform level over the entire frequency range of the band in use. On the long wave band, the oscillator tube works easily and with fairly constant intensity on all frequencies and, for this reason, only capacitive coupling is employed.

Two type 6D6 tubes serve as intermediate frequency amplifiers. These tubes, together with the three intermediate frequency transformers, comprise the I.F. amplifier. Here most of the gain and selectivity of the receiver is realized.

A type 85 tube, connected as a diode, performs the triple function of second detector, automatic volume control and first audio amplifier tube. The output of this tube is coupled to two type 42 tubes, connected as pentodes, in a class "A" output stage. The input transformer is of special design, being wound for low leakage inductance, which makes for high efficiency, high fidelity reproduction. Condenser C-23 and resistor R-22 comprise an audio frequency equalizer circuit connected across the primary of the output transformer. A type 80 full wave rectifier tube is employed in a conventional power supply circuit.

MODEL 90 CHASSIS The model 90 chassis employs a type 6K7 tube in the radio frequency amplifier stage. The pentagrid converter in this chassis is a type 6A8 tube. Two type 6K7 tubes are used in the intermediate frequency amplifier. A type 6H6 diode performs the dual function of second detector and automatic volume control tube. No gain is obtained from this stage and, as a results, a type 6C5 tube is employed as the first audio amplifier, driving two type 6F6 tubes, connected as pentodes, in a class "A" power output stage. In the power supply section, a type 5Z4 tube is connected as a full wave rectifier in a conventional power supply circuit.

AUTOMATIC VOLUME CONTROL

MODEL 90 CHASSIS A type 6H6 tube is employed to perform the dual function of second detector and delayed automatic volume control. In the diode section of this tube, one plate is used for the audio signal, while the other plate is used for A.V.C. The R.F., first detector and first I.F. tubes have a fixed minimum bias applied to their grids, which is obtained from the separate bias resistors (R-1, R-2 and R-9) located in the cathode circuits of the respective tubes. An R.F. voltage is applied to the A.V.C. diode plate from the secondary of the third I.F. transformer, through condenser C-16, is rectified and, in so doing, current flows from the plate to the cathode and to ground, where it is picked up at the point where R-11 is grounded, flows through R-11 and back to the plate, thus forming the complete circuit. This current flow creates a voltage drop across resistor R-11 that is in proportion to the strength of the incoming signal. This voltage is applied to the grids of the controlled tubes, through isolating resistors R-3, R-4 and R-10, and is added to the fixed bias on the tubes, thus producing automatic volume control.

Two resistors (R-16 and R-17) are located between the cathode of the 6H6 tube and ground. The cathode of the 6C5 first audio amplifier is also connected to ground through these resistors, thus the plate current of the 6C5 flows through resistors R-16 and R-17, producing a voltage drop. Half of this drop is applied to the grid of the 6C5, through resistor R-20 and serves as a grid bias. The total drop is applied to the A.V.C. diode plate, thereby biasing it negatively about 10 volts and producing A.V.C. delay.

An R.F. voltage is also applied to the second diode plate from the secondary of the third I.F. transformer. Current flows from the plate to cathode, through resistors R-21 and R-13, through the secondary of the I.F. transformer, back to the plate. This current produces an audio voltage across resistor R-21, the manual volume control. This voltage is taken off through condenser C-19 and is applied to the grid of the first audio amplifier tube. Resistor R-13 and condenser C-17 and C-18 comprise a "tweet" filter circuit.

MODEL 82 CHASSIS The A.V.C. circuit and its operation in the model 82 chassis is identical to that in the model 90. The only differences are in the tubes. In the model 82 chassis, a type 85 tube performs the triple function of diode detector, automatic volume control and first audio amplifier. The connections to the triode section of this tube are the same as those of the type 6C5 tube in the case of the model 90.

TUNING INDICATORS

THE SHADOW LINE TUNING INDICATOR On all model 82 and on some model 90 chassis, the tuning indicator is of the magnetic type, operating a vane in such a manner as to cast a shadow of variable width on the upper portion of the dial. When the shadow is contracted to its narrowest possible dimension, the receiver is properly tuned. This indicator is connected into the circuit as indicated on the schematic diagrams, Figures 1 and 2. It will be noted that the tuning indicator is only in the circuit when the 3rd Dimension switch is on the "Sharp" position. This is intended to encourage tuning only on the "Sharp" position.

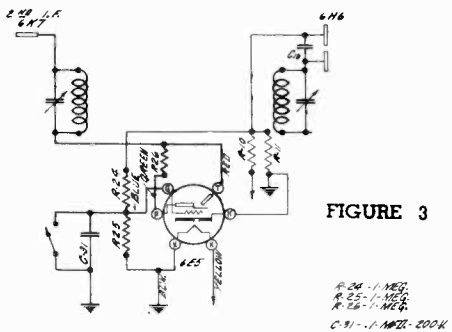
The 6E5 is a high vacuum, heater cathode type of cathode ray tube, designed to indicate visually the effect of change in the controlling voltage. The tube, therefore, is a voltage indicator. The visible effect is observed on a flourescent target located in the dome of the bulb. For different controlling voltages, the pattern of the target varies through a shaded angle from 90 degrees to approximately 0 degrees. Exact tuning is indicated by the narrowest shaded angle obtainable.

In the type 6E5, the cathode provides a source of electrons. These are attracted to the prositively-charged target (T), (see Figure 3). Electrons impinging on the coated target cause it to glow. The extent of flourescent area is controlled by means of the "ray-control electrode", which is an extension of the triode plate (P). The voltage on the ray-control electrode is determined by the voltage applied to the grid (G) of the triode. This voltage is obtained by tapping the A.V.C. circuit between resistors R-10 and R-11 by means of a voltage divider network consisting of two 1 megohm resistors, R-24 and R-25, connected in series to ground. Through this arrangement, the grid of the 6E5 tube has half of the control voltage applied to it. The target is connected to the high voltage supply at the same point where the first intermediate frequency tube "B" supply lead is connected.

A series resistor R-26 is connected between the triode plate and the high voltage supply. The effect of the series resistor is to reduce the voltage applied to the triode plate and, consequently, to the ray-control electrode, under conditions of decreased triode grid bias (increased triode plate current). Under these conditions, the flourescent area on the target will become wider. For conditions of increasing triode grid bias (decreasing triode-plate current), the triode plate voltage increases and approaches the value of the supply voltage. Under these conditions, the flourescent area on the target will become narrower, indicating that the receiver is approaching the resonance point.

The 6E5 is so connected that it operates only when the receiver is switched to "Sharp". When the receiver is switched to "3rd DIMENSION", the grid circuit is grounded, thus rendering the tube inoperative. A condenser C-31 is connected as a filter from the point of juncture between resistors R-24 and R-25 to ground, thus preventing audio voltage from entering the tube.

THE CATHODE RAY TUNING INDICATOR On some model 90 chassis, an electron ray or cathode ray tube tuning indicator, known as the 6E5, is employed. The connections for this tube are shown in Figure 3.



CATHODE RAY TUNING INDICATOR USED ON MODEL 90

MODEL 82 AND 90

RADIO RECEIVER

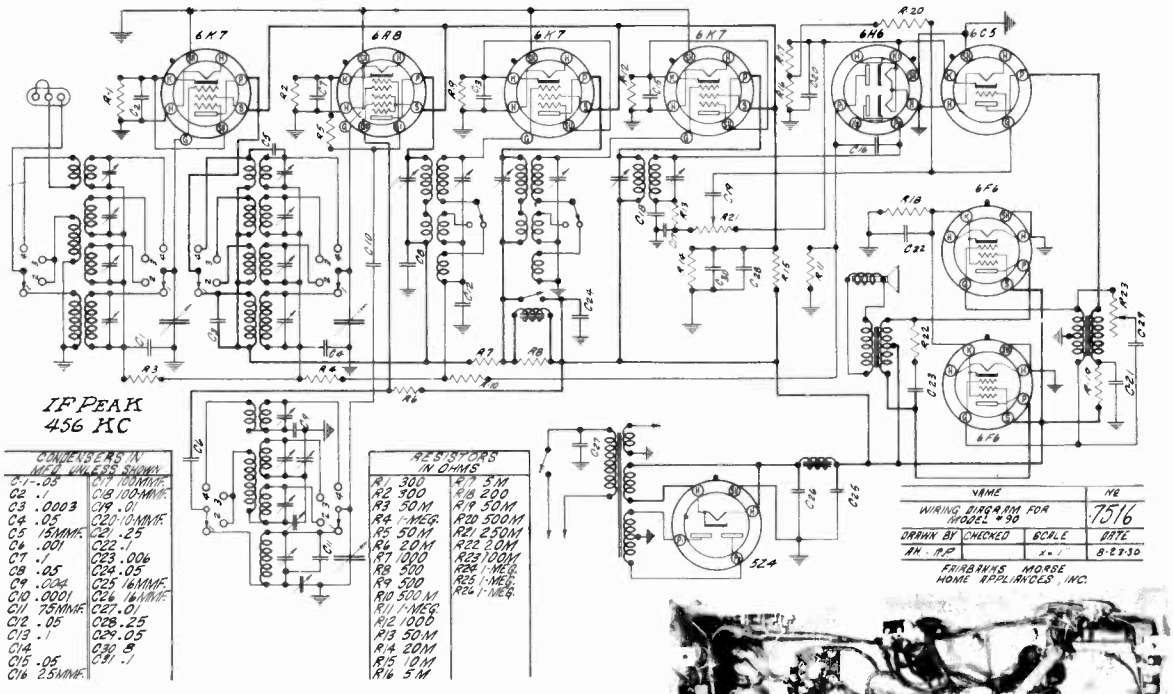
FIGURE 3

POWER TRANSFORMERS

Part No. 5316	110 Volt	50-60 cycle
Lead Color	Voltage	Resistance
Black	6.3	.14 ohm
Blue	5.0	.22 ohm
Brown	110 (Primary)	5.3 ohms
Yellow	High Voltage	271.5 ohms
Green & Yellow	Center Tap (Hi-Volt.)	
Part No. 5514	**Universal**	**40-50-60 cycle**
Lead Color	Voltage	Resistance
Black	6.3	.14 ohm
Blue	5.0	.22 ohm
Yellow	High Voltage	251. ohms
Green & Yellow	Center Tap (Hi-Volt.)	
Brown	Common Primary	
Black & White	100-125 Primary	4.8 ohms
Black & Red	130-155 Primary	5.7 ohms
Brown & White	200-250 Primary	17.2 ohms
Part No. 5594		**25 cycle**
Lead Color	Voltage	Resistance
Black	6.3	.14 ohm
Blue	5.0	.22 ohm
Yellow	High Voltage	269.8 ohms
Green & Yellow	Center Tap (Hi-Volt.)	
White	110 Primary	4.3 ohms

MODEL 90
Schematic, Voltage
Socket, Trimmers
Chassis, Resistance

FAIRBANKS-MORSE HOME APP., INC.

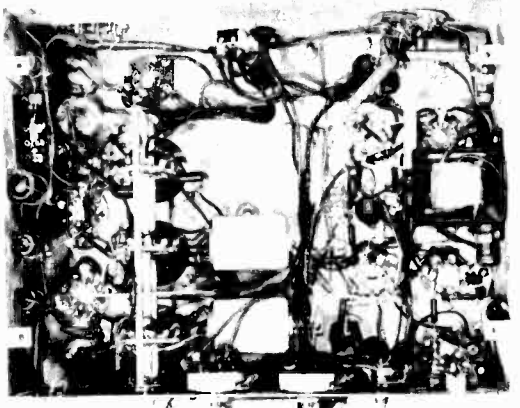


MODEL 90 10-TUBE

OHMS	VOLTS		VOLTS	OHMS
20M	107		3	300
30M	230	6K7 R.F.	0	1.5MEG.
.07	6.3		0	0
0	0		3	300
20M	107		5.5	1,000
30M	.1	6K7 2-I.F.	0	9
.07	6.3		0	0
0	0		5.5	1000
10M	8.5		0	1-MEG.
310M	.1	6H6 A.V.C. 2-DET.		
.07	6.3		0	0
0	0		8.5	10M
750M	0		250	45M
1-MEG.	20	6E5 TUNER	0	0
.08	6.3A.C.		0	0
OHMS	VOLTS		VOLTS	OHMS
20M	107		-9	50M
30M	230		170	50M
.07	6.3	6A8 OSC.-1-DET.	0	1.5MEG.
0	0		0	0
			3	300
			0	500M
22M	105		0	0
.07	6.3	6C5 1-I.F.		
0	0		8.5	10M
30M	255		0	750
30M	245			
.07	6.3	6F6 2-A.F.	0	0
0	0		13.4	200
OHMS	VOLTS		VOLTS	OHMS
20M	107		6	1000
30M	240		0	1.5MEG.
.07	6.3	6K7 1-I.F.	0	0
0	0		6	1,000
30M	255		0	750
30M	245			
.07	6.3	6F6 2-A.F.	0	0
0	0		13.4	200
135	A.C.		A.C.	135
30M	325	5Z4 RECT.		
0	0		325	30M

MODEL 90 9-TUBE

OHMS	VOLTS		VOLTS	OHMS
20M	120		7	1,000
30M	260	6K7 1-I.F.	0	1-MEG.
.07	6.3A.C.		0	0
0	0		7	1000
30M	260		0	800
30M	255	6F6 2-A.F.		
.07	6.3		0	0
0	0		15	200
135	AC			
30M	335	5Z4 RECT.	A.C.	135
0	0		335	30M
OHMS	VOLTS		VOLTS	OHMS
20M	120		8	50M
30M	240		180	50M
.07	6.3A.C.	6A8 OSC. 1-DET.	0	1.5MEG.
0	0		3	300
			0	500M
75M	170			
.07	6.3A.C.	6C5 1-A.F.	0	0
0	0		13.5	10M
30M	260		0	800
30M	255			
.07	6.3A.C.	6F6 2-A.F.	0	0
0	0		15	200
OHMS	VOLTS		VOLTS	OHMS
20M	125		3	300
30M	240		0	1.5MEG.
.07	6.3AC	6K7 R.F.	0	0
0	0		3	300
20M	120		5.5	1000
30M	260		0	9
.07	6.3AC	6K7 2-I.F.	0	0
0	0		5.5	1000
10 M	13.5		0	1-MEG.
250M	2			
.07	6.3A.C.	6H6 A.V.C. 2-DET.	0	0
0	0		13.5	10M



FOR ALIGNMENT DATA SEE INDEX

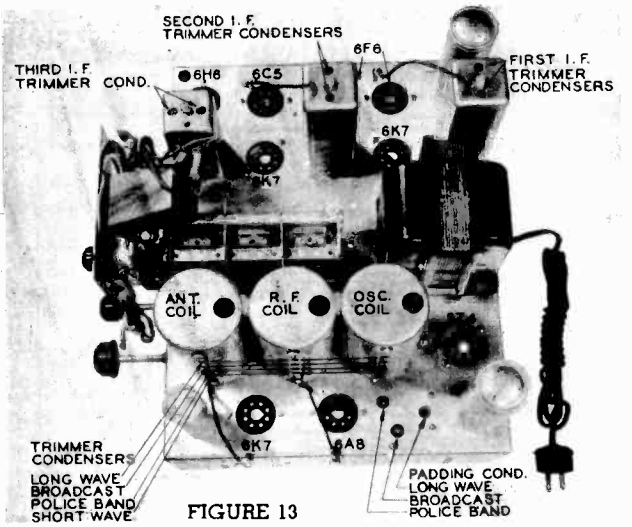
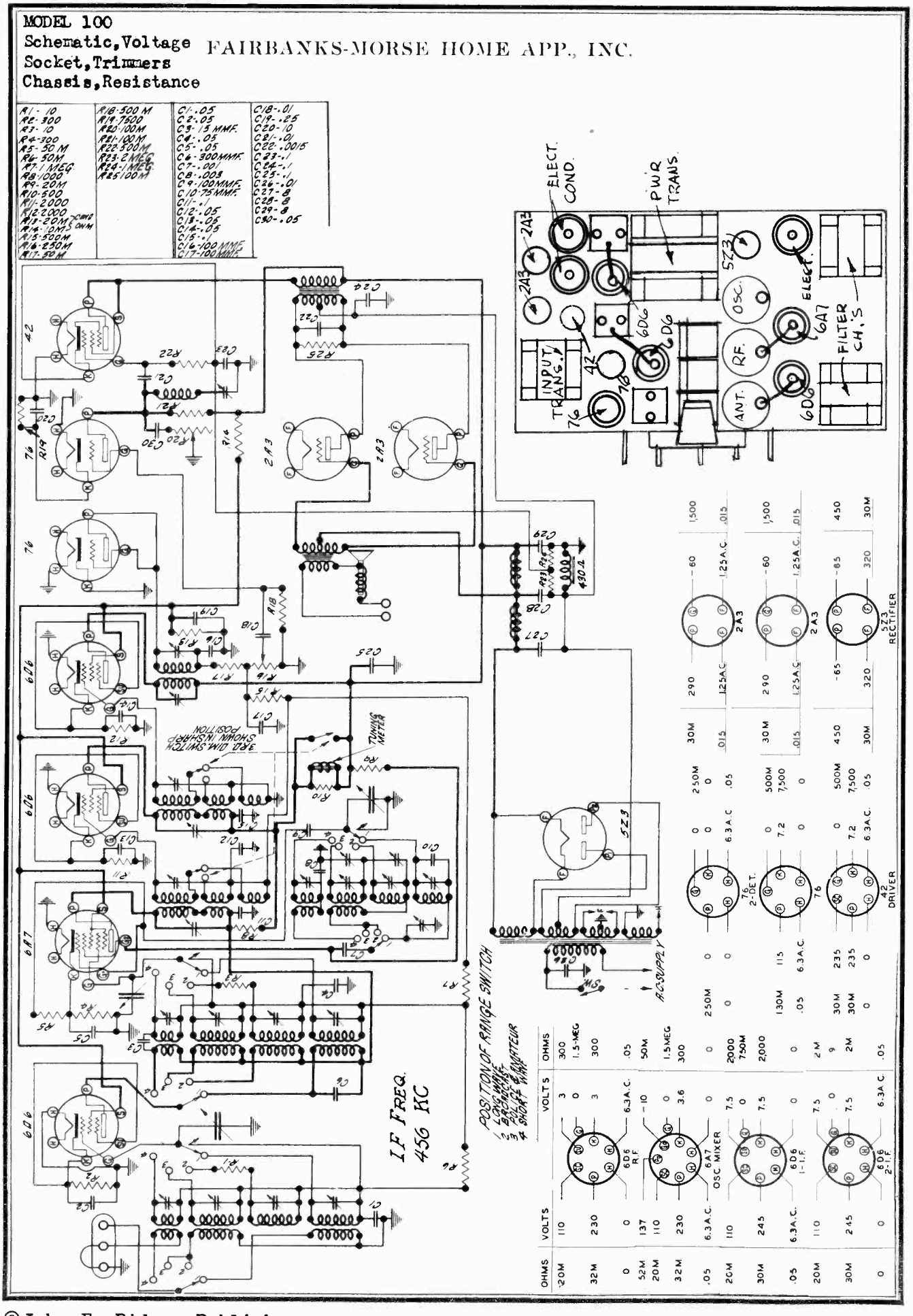


FIGURE 13

Top view of the model 90 chassis, employing Shadow Line Tuning. The tube locations are shown and the locations of the various trimmers are indicated.

MODEL 100
Schematic, Voltage
Socket, Trimmers
Chassis, Resistance

FAIRBANKS-MORSE HOME APP., INC.



TUBES AND CIRCUIT

MODEL 100 CHASSIS The model 100 chassis employs a type 6D6 tube in the radio frequency amplifier stage. The incoming signal is fed to this tube through the antenna coil on each of the four bands. Through the use of this stage, high image and signal to noise ratios are maintained on all bands. Amplification and some selectivity are also realized in this stage.

A type 6A7 pentagrid converter is employed. This tube serves the dual function of first detector and oscillator. The oscillator section of the tube, on all but the long wave band, is connected to a MacNabb constant voltage oscillator circuit. Through the use of both inductive and capacitive coupling, the output of the oscillator remains at a uniform level over the entire frequency range of the band in use. On the long wave band, the oscillator tube works easily and with fairly constant intensity on all frequencies and, for this reason, only capacitive coupling is employed.

Two type 6D6 tubes serve as intermediate frequency amplifiers. These tubes, together with the three intermediate frequency transformers, comprise the I.F. amplifier. Here most of the gain and selectivity of the receiver is realized.

A type 76 tube, connected as a diode, performs the dual function of second detector and automatic volume control tube. Since no gain is obtained from this stage, the output is resistance coupled to another type 76 tube that serves as an audio amplifier. The output of this tube is, in turn, resistance coupled to a type 42 tube, connected as a triode, driving two type 2A3 tubes in a class "A" output stage.

The input transformer is of special design, being wound for low leakage inductance, which makes for high efficiency high fidelity reproduction. Condenser C-22 and Resistor R-25 comprise an audio frequency equalizer circuit connected across the secondary of the input transformer. A type 5Z3 full wave rectifier tube is employed in a conventional power supply circuit.

MODEL 110 CHASSIS The model 110 chassis employs a type 6K7 tube in the radio frequency amplifier stage. The pentagrid converter in this chassis is a type 6A8 tube. Two type 6K7 tubes are used in the intermediate frequency amplifier. A type 6H6 diode, connected as a half wave rectifier, performs the dual function of second detector and automatic volume control tube. As in the case of the type 76 tube in the model 100 chassis, no gain is obtained from this stage and, as a result, a type 6C5 tube is employed as the first audio amplifier. A type 6F6 tube, connected as a triode, is the second audio frequency amplifier, driving two type 2A3 tubes in a class "A" power output stage.

In the power supply section, two type 5Z4 tubes, each connected as a half wave rectifier, are employed in a full wave rectifier circuit. By connecting the rectifier tubes in this manner, the drain on each tube is reduced, thus lessening the possibility of difficulty and assuring better regulation than if only one rectifier were used to supply the entire current requirements of the receiver.

TUNING INDICATORS

THE SHADOW LINE TUNING INDICATOR On all model 100 and on some model 110 chassis, the tuning indicator is of the magnetic type, operating a vane in such a manner as to cast a shadow of variable width on the upper portion of the dial. When the shadow is contracted to its narrowest possible dimension, the receiver is properly tuned. This indicator is connected into the circuit as indicated on the schematic diagrams, Figures 1 and 2. It will be noted that the tuning indicator is only in the circuit when the 3rd Dimension switch is on the "Sharp" position. This is intended to encourage tuning only on the "Sharp" position.

THE CATHODE RAY TUNING INDICATOR On some model 110 chassis, an electron ray or cathode ray tube tuning indicator, known as the 6E5, is employed. The connections for this tube are shown in Figure 3.

The 6E5 is a high vacuum, heater cathode type of cathode ray tube, designed to indicate visually the effect of change in the controlling voltage. The tube, therefore, is a voltage indicator. The visible effect is observed on a flourescent target located in the dome of the bulb. For different controlling voltages, the pattern of the target varies through a shaded angle from 90 degrees to approximately 0 degrees. Exact tuning is indicated by the narrowest shaded angle obtainable.

In the type 6E5, the cathode provides a source of electrons. These are attracted to the positively-charged target (T), (see Figure 3). Electrons impinging on the coated target cause it to glow. The extent of flourescent area is controlled by means of the "ray-control electrode", which is an extension of the triode plate(P). The voltage on the ray-control electrode is determined by the voltage applied to the grid (G) of the triode. This voltage is obtained by tapping the A.V.C. circuit between resistors R-16 and R-17 by means of a voltage divider network consisting of two 1 megohm resistors(R-26 and R-27) connected in series to ground. Through this arrangement, the grid of the 6E5 tube has half of the control voltage applied to it. The target is connected to the high voltage supply at the same point where the first intermediate frequency tube "B" supply lead is connected.

A series resistor R-28 is connected between the triode plate and the high voltage supply. The effect of the series resistor is to reduce the voltage applied to the triode plate and, consequently, to the ray-control electrode, under conditions of decreased triode grid bias (increased triode plate current). Under these conditions, the flourescent area on the target will become wider. For conditions of increasing triode grid bias (decreasing triode-plate current), the triode plate voltage increases and approaches the value of the supply voltage. Under these conditions, the flourescent area on the target will become narrower, indicating that the receiver is approaching the resonance point.

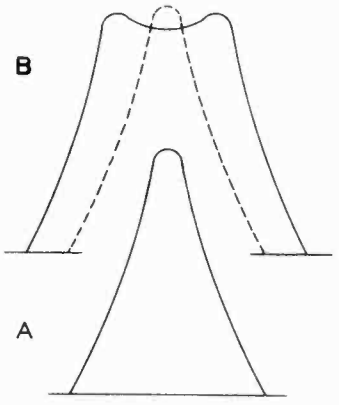
The 6E5 is so connected that it operates only when the receiver is switched to "Sharp". When the receiver is switched to "3rd DIMENSION", the grid circuit is grounded, thus rendering the tube inoperative. A condenser C-31 is connected as a filter from the point of juncture between resistors R-26 and R-27 to ground, thus preventing audio voltage from entering the tube.

LONG WAVE BAND (140 to 360 Kilocycles) With the band selector switch on the long wave or "L" position, supply a 350 kilocycle signal from the signal generator to the antenna of the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series with the lead. Make sure the fidelity switch is on the "Sharp" position. Tune the receiver to 350 kilocycles and adjust the oscillator, radio frequency and antenna stage trimmer condensers for maximum output with minimum input from the signal generator.

Supply a 175 kilocycle signal to the receiver through the same connections used in the previous adjustment. Tune the receiver to 175 kilocycles. Adjust the long wave oscillator padding condenser for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Readjust at 350 kilocycles and then at 175 kilocycles as many times as may be necessary to obtain satisfactory tracking.

SHORT WAVE BAND (5.5 to 18.4 Megacycles) Turn the band selector switch to the short wave or "S" position. Supply an 18 megacycle signal from the signal generator through a 400 ohm carbon resistor (dummy antenna) to the antenna post of the receiver. Tune the receiver to 18 megacycles on the dial. Turn the short wave R.F. trimmer in all the way and then back it out one-half turn. Turn the short wave oscillator trimmer in all the way and then back it out until the 18 megacycle signal (the first signal found at about 17 megacycles should be the image; the second, should be the 18 megacycle signal) from the signal generator is received. Readjust all three short wave trimmers for maximum output with minimum input from the signal generator.
WARNING: The image signal should be received at approximately 17 megacycles after the above adjustments have been made. If it cannot be located, the oscillator has probably been aligned to the image frequency and the oscillator trimmer must be backed out until the proper signal comes in at 18 megacycles and the somewhat weaker image is received at approximately 17 megacycles. If this readjustment is necessary, it will also be necessary to again align all three trimmers for maximum output.

GANG CONDENSER PLATES The adjustment of the various plates of the gang condenser is very critical, since it must be accurate on all bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.



SELECTIVITY CURVES

FIGURE 13

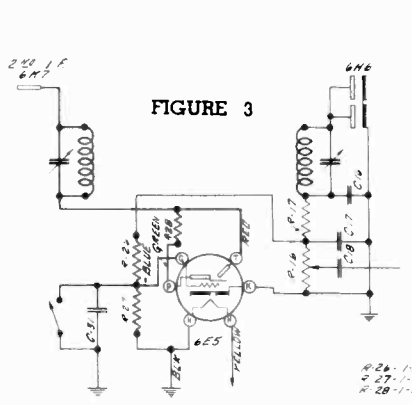


FIGURE 3

CATHODE RAY TUNING INDICATOR USED ON MODEL 110

AUTOMATIC VOLUME CONTROL

MODEL 110 CHASSIS A type 6H6 tube is employed as the second detector in a half wave rectifier circuit, the diode plates being connected together. Current flows from the diode plates to the cathode and to ground. Here it is picked up at the point where resistor R-16 is grounded and flows through resistors R-16 and R-17, through the secondary of the third intermediate frequency transformer back to the plates, thus forming the complete circuit.

The DC component of this current produces a voltage drop across resistor R-16 in proportion to the strength of the incoming signal. The grid returns of the 6K7 radio frequency amplifier, the 6A8 pentagrid converter and the 6K7 first intermediate frequency amplifier are connected, through the isolating resistors R-6, R-7 and R-15, to the point of juncture between resistors R-16 and R-17, thus adding the voltage drop obtained across resistor R-16 to the fixed bias on the three controlled tubes. The fixed bias is obtained from the individual bias resistors R-2, R-4 and R-11, located in the cathode circuits of the tubes. Resistor R-16 is also the manual volume control. The audio component of the voltage drop cross this resistor is taken off on the sliding arm of the control through condenser C-18 and is applied to the grid of the 6C5 audio amplifier tube.

MODEL 100 CHASSIS The A.V.C. circuit and its operation in the model 100 chassis is identical to that in the model 110. The only differences are in the tubes. A type 76 tube is employed as the diode rectifier in place of the 6H6. A type 76 tube is also used as the first audio amplifier in place of the 6C5 metal tube. Type 6D6 tubes will be found in place of type 6K7 tubes in the radio frequency and intermediate frequency amplifier stages. A 6A7 pentagrid converter replaces the 6A8 found in the model 110.

ALIGNMENT PROCEDURE

To insure obtaining the performance the models 100 and 110 are capable of delivering, it is essential that they be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will only be possible through the use of an accurate and reliable signal generator employed in conjunction with an output meter connected across the voice coil leads of the speaker. In the adjustment of the third intermediate frequency transformer, it is recommended that a cathode ray oscillograph be used for most accurate results.

NOTE: All adjustments, unless otherwise noted, should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT With the range switch on the broadcast position, the fidelity switch on "Sharp" (clockwise)and the gang condenser closed (maximum capacity), supply a 456 kilocycle signal, stage by stage, to the intermediate frequency amplifier, beginning with the grid of the second intermediate frequency tube. To accomplish this, a .1 Mfd. condenser should be connected between the signal generator supply lead and the second intermediate frequency tube.

The trimmers of the third intermediate frequency transformer (Figure 6)should be adjusted for maximum output with minimum input from the signal generator. Then the signal generator lead should be moved to the first intermediate frequency tube and the trimmers of the second intermediate transformer should be adjusted. The next step is to supply the signal to the grid of the first detector tube and adjust the trimmers of the first intermediate frequency transformer. This method of procedure is essential because of the extreme selectivity of the receiver. After each stage has been aligned, it is well to go back over all adjustments to make sure they are accurate.

The next step in the intermediate frequency alignment is to supply a very strong (about 1000 microvolt) signal to the grid of the first detector tube through the .1 Mfd. condenser. CAUTION: Before the signal is applied to the receiver, the volume control should be retarded to zero. After the signal is applied to the receiver, the volume control should be advanced slowly and carefully until a suitable indication appears on the output meter.

The fidelity switch should be turned to the high fidelity or Third Dimension position. Symetrical double humps should appear, one on each side of where the sharp resonance point appeared on the "Sharp" position (see Figure 13), when the signal generator is tuned approximately 2 kilocycles on each side of the resonance point. The two humps must be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer must be adjusted until a condition of equal amplitude is obtained. This may be found to be a very difficult adjustment unless an oscillograph is used.

USE OF THE OSCILLOGRAPH A signal generator with a sweep circuit must be employed in making this check. The output of the signal generator should be fed to the grid of the first detector tube in the receiver. The grid clip must be removed from the tube, but, since the first detector is one of the A.V.C. controlled tubes, it is necessary to complete the grid circuit. To accomplish this, connect a large resistor (about 50,000 or 100,000 ohms) between the grid clip and the grid cap of the tube. The low side of the signal generator should be connected to the chassis ground.

The "vertical" binding posts of the oscillograph should be connected to the audio output of the second detector. In the model 100, a type 76 tube serves as a diode rectifier and in the model 110, a type 6H6 tube is employed. In both of these circuits, R-16 serves the dual purpose of manual and automatic volume control resistor. The high side connection from the "vertical" plates should be made to the point of juncture between resistors R-15, R-16 and R-17. The low side connection may be made to ground. Thus, the audio voltage is applied to the "vertical" plates of the oscillograph.

With the receiver operating on the "Sharp" position, the intermediate frequency amplifier resonance curve will appear on the screen. When the receiver is switched to the "3RD DIMENSION" position, symetrical double humps, approaching a wide flat top resonance curve, should appear in place of the "Sharp" resonance curve (see Figure 13). Each side of the curve should be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer should be adjusted until the proper curve is obtained. The adjustment of one trimmer, in addition to effecting its own side of the curve, will reflect in the other side and, for this reason, great care must be exercised in making these adjustments.

R.F. ALIGNMENT The parallel or high frequency trimmer condensers for each coil are housed in the same can with the coil. These trimmers are used for aligning the high frequency end of each band. The location of the various coils and their respective trimmers is shown on Figure 6. It is essential that the bands be aligned in the order they appear in the following instructions. In other words, the police band alignment must be completed before the broadcast band alignment is started because of the interlocking effect of the padding condensers on these bands.

Adjustable series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis, through the holes indicated in Figure 6. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity) and adjust the black dial pointer to a horizontal position (gang condenser still closed).

POLICE BAND (1.7 to 5.5 Megacycles) With the band selector switch in the police or "P" position and the fidelity switch on the "Sharp" position, supply a 5 megacycle signal from the signal generator to the antenna of the receiver, using a 400 ohm carbon resistor in series with the signal generator lead. Tune the receiver to 5 megacycles and then adjust the oscillator, radio frequency and antenna stage police band trimmers for maximum output with minimum input from the signal generator. WARNING: Care must be exercised to avoid aligning the receiver to the image frequency as outlined under "short wave band".

Supply a 1.8 megacycle signal to the receiver and tune the receiver to 1.8 megacycles. Adjust the police band oscillator padding condenser (located on the chassis at the rear, see Figure 6) for the signal of greatest intensity, rocking the gang condenser back and forth across the signal while making the adjustment. Check at 5 megacycles and then at 1.8 megacycles to correct for any frequency change.

BROADCAST BAND (540 to 1740 Kilocycles) With the band selector switch on the broadcast or "B" position, supply a 1500 kilocycle signal from the signal generator to the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series between the signal generator and the antenna post of the receiver to serve as the dummy antenna. Make certain that the fidelity switch is on the "Sharp" position.

Tune the receiver to 1500 kilocycles and adjust the radio frequency, antenna and oscillator stage broadcast band trimmers for maximum output with minimum input from the signal generator.

Supply a 600 kilocycle signal to the receiver through the same connections. Tune the receiver to 600 kilocycles. Adjust the broadcast band oscillator padding condenser (located on the chassis at the rear, see Figure 6) for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Recheck at 1500 kilocycles and then at 600 kilocycles and make any frequency corrections that appear necessary.

10 KILOCYCLE AUDIO TRAP

Because of the band width necessary to obtain high fidelity reproduction, if a station is operating on a channel adjacent to the station channel being listened to, a 10 kilocycle beat (high pitched whistle) may be heard in the background. To reduce the possibility of this interference, Fairbanks-Morse engineers have developed a 10 kilocycle wave trap, found in the models 100 and 110 chassis. This trap circuit consists of a large, air core choke coil (see Figure 4), and a variable condenser, connected in series. This trap is connected from the plate of the first audio amplifier tube to ground.

ADJUSTMENT It should not be necessary to adjust the trap circuit unless either the choke coil or condenser has been replaced. To adjust the trap, tune in on two adjacent channels on which two distant stations are operating. Turn the selectivity switch to the 3RD DIMENSION POSITION. Tune the interfering whistle to its loudest point by tuning between the two stations. Adjust the 10 kilocycle trap trimmer, located on the front of the chassis (see Figure 4), until the whistle is reduced to a minimum.

POWER TRANSFORMERS

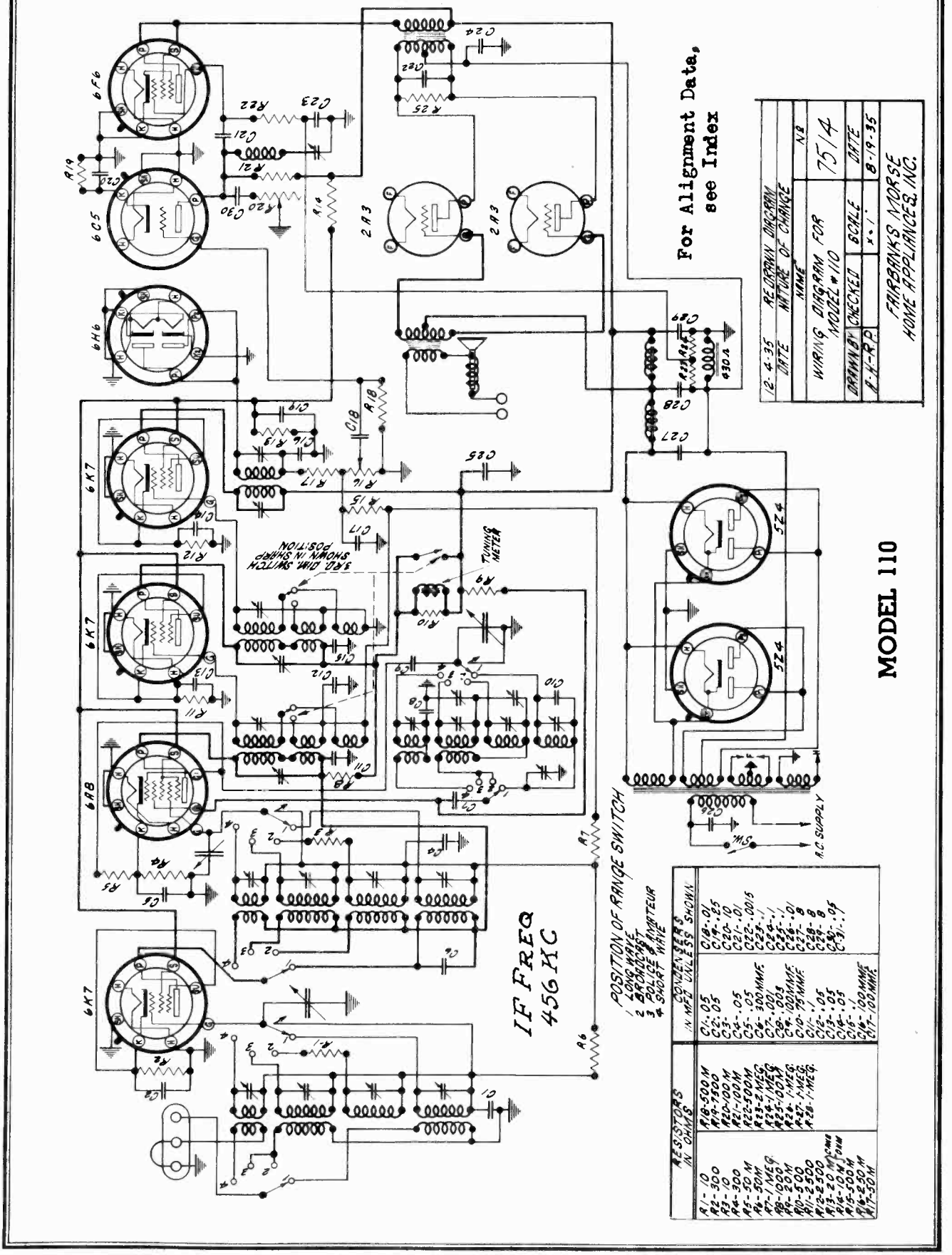
Part No. 5410	110 Volt	50-60 cycle
Lead Color	Voltage	Resistance
Black	2.5	.03 ohm
Black & Yellow	Center Tap (2.5 volt)	
Blue	5.0	.05 ohm
Green	6.3	.10 ohm
White	110 (Primary)	1.79 ohms
Yellow	High Voltage	115.3 ohms
Green & Yellow	Center Tap (Hi-Volt.)	
Part No. 5566	**Universal**	**40-50-60 cycle**
Lead Color	Voltage	Resistance
Black	2.5	.03 ohm
Black & Yellow	Center Tap (2.5 volt)	
Green	6.3	.10 ohm
Blue	5.0	.08 ohm
Yellow	High Voltage	115.3 ohms
Green & Yellow	Center Tap (Hi-Volt.)	
Black	Common Primary	
Red	100-125 Primary	2. ohms
Brown	130-155 Primary	2.2 ohms
White	200-250 Primary	6.2 ohms
Part No. 5589		**25 cycle**
Lead Color	Voltage	Resistance
Blue	5.0	.06 ohm
Green	6.3	.10 ohm
Yellow	High Voltage	154.5 ohms
Black & Yellow	Center Tap (Hi-Volt.)	
White	110 Primary	2.45 ohms

The secondary of each intermediate frequency transformer is composed of three sections, the upper, center and lower (see Figures 1 and 2). The primary is composed of two sections, the upper and lower. The upper sections of the primary and secondary are loosely coupled to each other and constitute the major portion of the primary and secondary inductance respectively. The lower section of the primary and the center section of the secondary are tightly coupled. The coupling between the lower section of the secondary and the primary is loose. When the switch is on the Third Dimension position, the lower section of the secondary is out of the circuit and the secondary winding is made up of the other two windings, connected in series. Because the coupling between the lower section of the primary and the center section of the secondary is tight, a broad response will result.

When the switch is on the "Sharp" position, the center section of the secondary is cut out of the circuit and the loosely coupled lower section is substituted, thus the selectivity is increased the desired amount. Since the inductance of the center section and the lower section of the secondary are identical, the tuning is not altered when switching from the "Sharp" to the Third Dimension position. Because of this very practical and unique design, it is possible to arrange the tuning indicator circuit in such a manner that it is only engaged on the "Sharp" position of the switch. This serves to remind the operator that all tuning should be done on the "Sharp" setting to insure perfect resonance and most faithful reproduction.

MODEL 110
Schematic

FAIRBANKS-MORSE HOME APP., INC.



MODEL 110
Voltage, Socket
Trimmers, Resistance

FAIRBANKS-MORSE HOME APP., INC.

VOLTAGE AND RESISTANCE TABLE
MODEL 110, TWELVE TUBE

OHMS	VOLTS		VOLTS	OHMS
19 M	85	6K7 RF	1.6	300
30 M	175		0	1.8-MEG.
.05	6.3 A.C.		0	0
0	0		1.6	300
19M	85	6K7 2ND. I.F.	5.5	1,700
30M	185		0	7.5
.05	6.3 A.C.		0	0
0	0		8	2,500
30M	160	6F6 DRIVER	0	1,500
30M	160		6.3 A.C.	.05
0	0		0	0
450	-70	5Z4 RECT.	-70	450
31M	280		280	31M
0	0		280	31M

OHMS	VOLTS		VOLTS	OHMS
20M	85	6A8 OSC. 1ST. DET.	-9	50-M
30M	175		115	50 M
0	0		0	1.7-MEG.
0	0		6.3 A.C.	.05
			2.2	300
0	0	6H6 2ND. DET. A.V.C.	-6	250 M
-.6	0		6.3 AC	.05
0	0		0	0
31M	250	2A3 2ND. A.F.	-50	650
.015	1.25 A.C.		1.25 A.C.	.015
450	-70	5Z4 RECT.	-70	450
31M	280		280	31M
0	0		280	31M

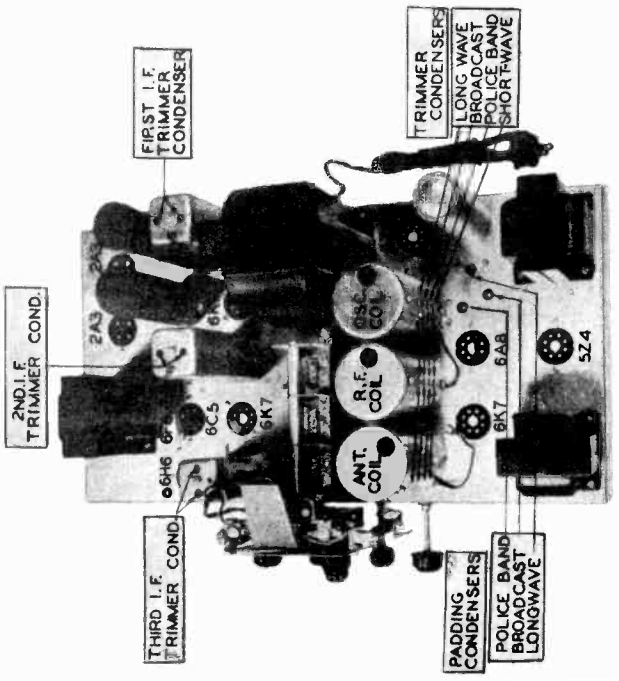
OHMS	VOLTS		VOLTS	OHMS
19M	85	6K7 1ST. I.F.	5.5	1,700
30M	185		0	750,000
.05	6.3 A.C.		6.3 A.C.	.05
0	0		8	2500
			0	500,000
130,000	100	6C5 1ST. A.F.	6.3 AC	.05
0	0		2.5	7,500
31M	250	2A3 2ND. A.F.	-50	650
.015	1.25 A.C.		1.25 A.C.	.015
500M	0	6E5 TUNER	185	30M
1 MEG.	20		0	0
	6.3 AC		0	0

VOLTAGE AND RESISTANCE TABLE
MODEL 110, ELEVEN TUBE

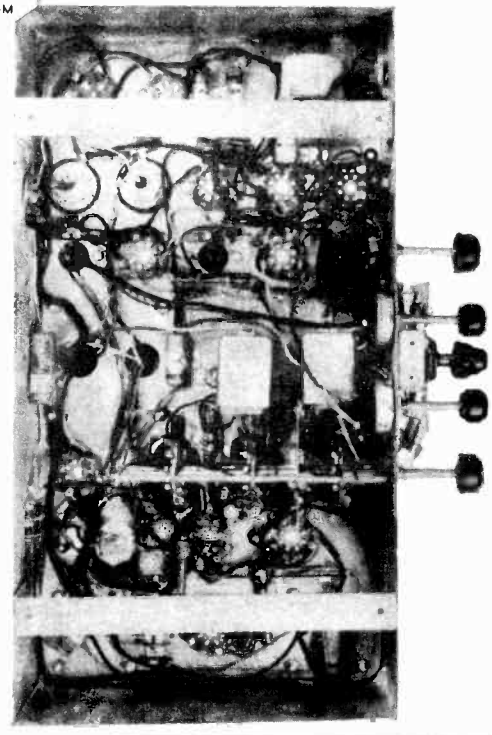
OHMS	VOLTS		VOLTS	OHMS
20M	120	6K7	3	300
26M	230		0	1 MEG.
.05	6.3 A.C.		0	0
0	0		3	300
20M	120	6K7	8	2500
30M	240		0	8
.05	6.3 A.C.		0	0
0	0		8	2,500
30M	240	6F6	-.05	1 MEG.
30M	240		6.3 A.C.	0
.05	6.3 A.C.		0	0
0	0		0	0
450	-65	5Z4	-65	450
30M	330		330	30M
0	0		330	30M

OHMS	VOLTS		VOLTS	OHMS
20M	120	6A8	-.05	50 M
30M	230		0	1 MEG.
.05	6.3 A.C.		165	50M
0	0		0	0
			4	300
0	0	6H6	-3	290M
-.3	6.3 A.C.		0	0
0	0		0	0
295	1.25 A.C.	2A3	-60	650
.015			1.25 A.C.	.015
450	-65	5Z4	-65	450
30M	330		330	30M
0	0		330	30M

OHMS	VOLTS		VOLTS	OHMS
20M	120	6K7	8	2,500
30M	250		0	500M
.05	6.3 A.C.		0	0
0	0		8	2,500
			0	500M
120M	270	6C5	0	0
.05	6.3 A.C.		0	
0	0		7	7,500
30M	295	2A3	-60	650
.015	1.25 A.C.		1.25 A.C.	.015

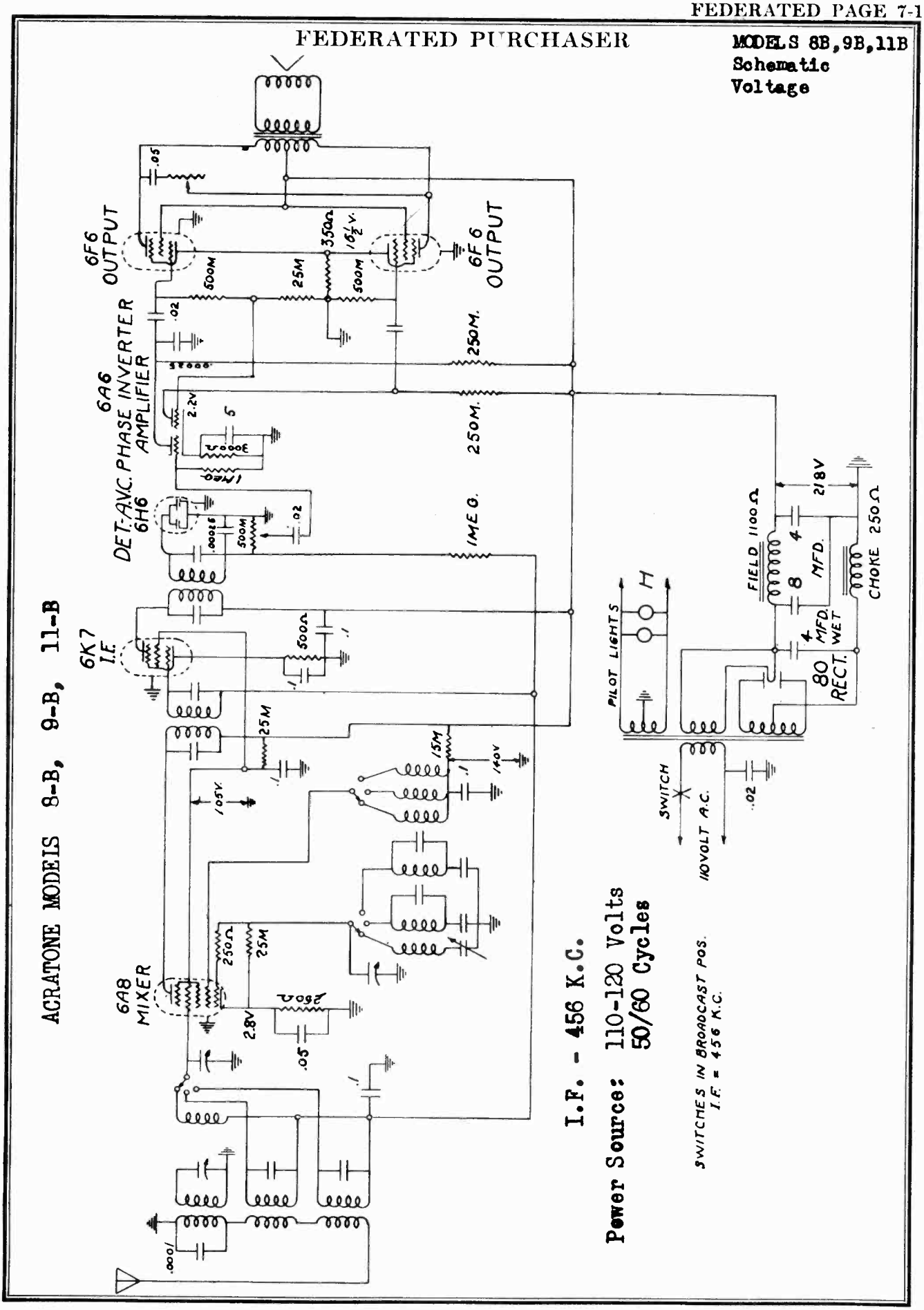


TOP AND BOTTOM VIEWS
MODEL 110



FEDERATED PURCHASER

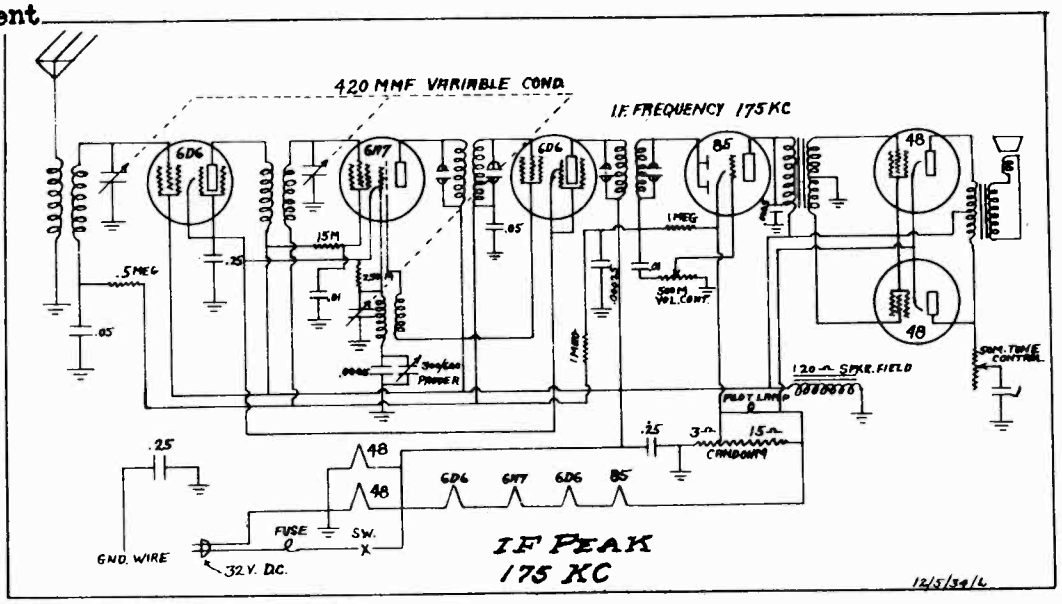
MODELS 8B, 9B, 11B
Schematic
Voltage

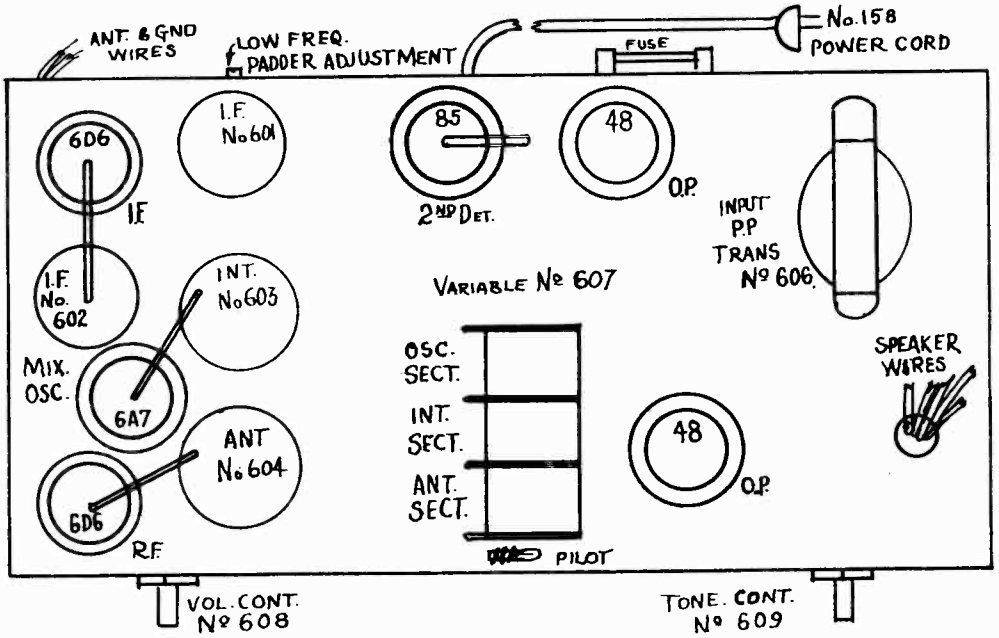


ACRATONE MODELS 8-B, 9-B, 11-B

MODEL 248
Schematic
Socket, Trimmers
Alignment

FEDERATED PURCHASER



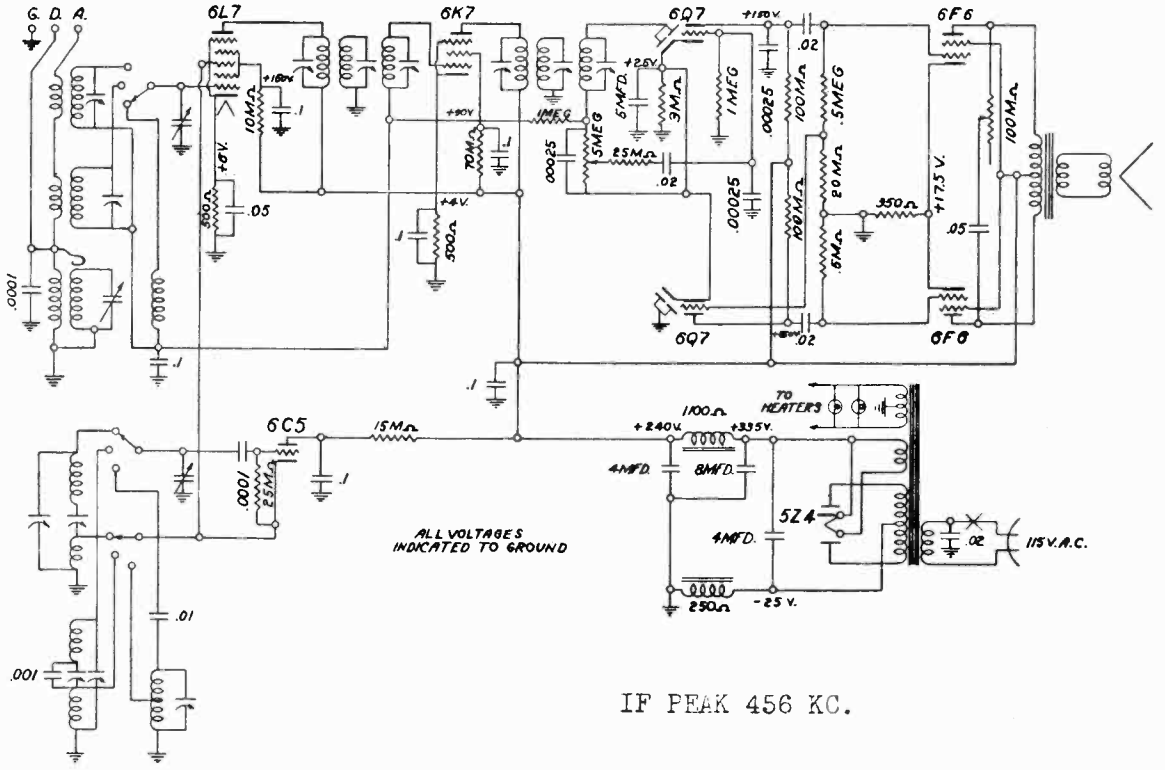


1 - Rebalance I.F. Transformers, applying a 175 K.C. note at 6A7 control grid.
2 - Open variable condenser all the way (minimum capacity) apply a 1720 K.C. note from oscillator at the antenna of receiver.
3 - Check oscillator section of variable to 1720 K.C. then adjust interstage and antenna to maximum peak.
4 - Adjust low frequency padder by applying a 600 K C oscillator note into antenna and while rocking variable condenser across signal adjust padder until maximum output is obtained.

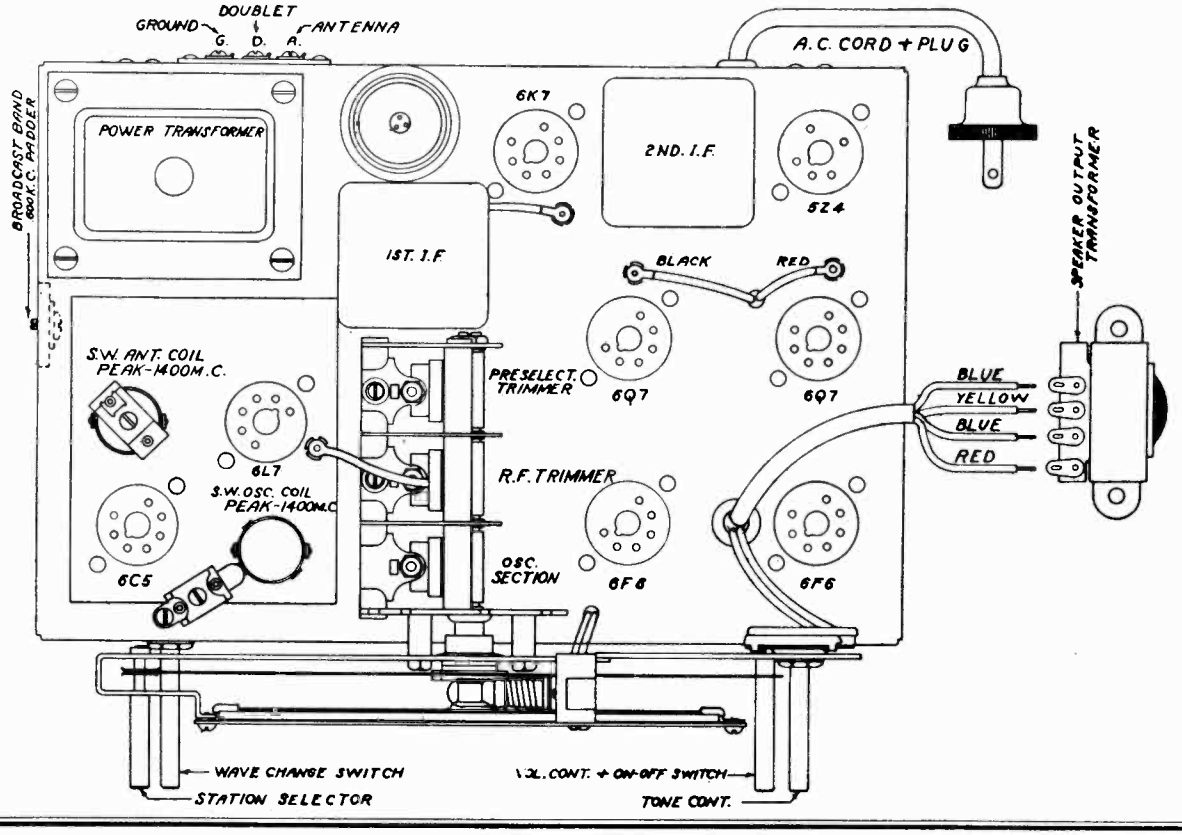
FEDERATED PURCHASER

MODELS 29C,30C,31C
Schematic, Voltage
Socket, Trimmers

Eight Tube A.C. Superheterodyne



IF PEAK 456 KC.



Eight Tube A.C. Wave Superheterodyne

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C). **Never plug into a DC outlet.**

ALIGNMENT DATA

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6L7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all six I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the oscillator trimmer to peak. This trimmer is mounted on the oscillator coil and is located directly under the 6C5 socket. (This adjustment must be made from the bottom of the chassis.) After this has been carefully done, the next step is to adjust the center and rear trimmers of the gang condenser to peak. The center gang section tunes the R.F. or grid coil of the 6L7 tube and the rear condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located in the left end of the chassis. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

If it is found that in returning to 1400 KC the pointer is accurately on scale, the only readjustments that should be made (in this recheck) are the center and rear trimmers of the gang condenser. If the pointer is found off scale, it may be corrected and put on scale by realignment of the oscillator trimmer. Alignment of the pointer can **only** be corrected by adjustment of the oscillator trimmer.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers located on the top of the chassis. The R.F. trimmer is located directly on top of the R.F. or Antenna coil and the oscillator trimmer is mounted on the chassis near the front of the oscillator coil. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The next operation is to adjust the R.F. and oscillator trimmers for peak at 14,000 KC and as the inherent design of the circuit has been expressly engineered for simplicity in servicing, no other adjustments are necessary for aligning this band.

Note: In order to prevent alignment on the image frequency, it is suggested that alignment be started with the antenna coil trimmer screwed down tightly. To check this adjustment, readjust the pointer to 13100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13100 KC is found to be stronger than the signal at 14000 KC, it signifies that alignment was incorrectly made on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the oscillator circuit trimmer to peak. The oscillator trimmer is mounted on the oscillator coil, which is located underneath the chassis. The oscillator coil is wound with enamel wire and is mounted to the front edge of the chassis. After this has been carefully done, the next step is to adjust the antenna trimmer to peak. The antenna trimmer is attached to the antenna coil; also mounted underneath the chassis and wound with enamel wire. The antenna coil is located nearest the power transformer. Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser. This padding condenser is mounted on the underside of the chassis, directly underneath the gang condenser. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section.

Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, the only readjustment that should be made (in this recheck) is the trimmer on the enamel wire antenna coil located underneath the chassis near the power transformer. If the pointer is found off scale, it may be corrected and put on scale by readjustment of the oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

Important: There are only three trimmer adjustments necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band; otherwise, the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. An approximate normal minimum oscillating voltage for the plate of the 6C5 (oscillator tube) at 115 volt line potential is as follows:

Broadcast Band	600 KC	125 Volts
	1400 KC	100 Volts
Foreign Band	6000 KC	135 Volts
	14000 KC	140 Volts
Police Band	1700 KC	135 Volts
	4000 KC	110 Volts

Another way of ascertaining whether the tube is oscillating is to ground the grid of the 6C5. If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

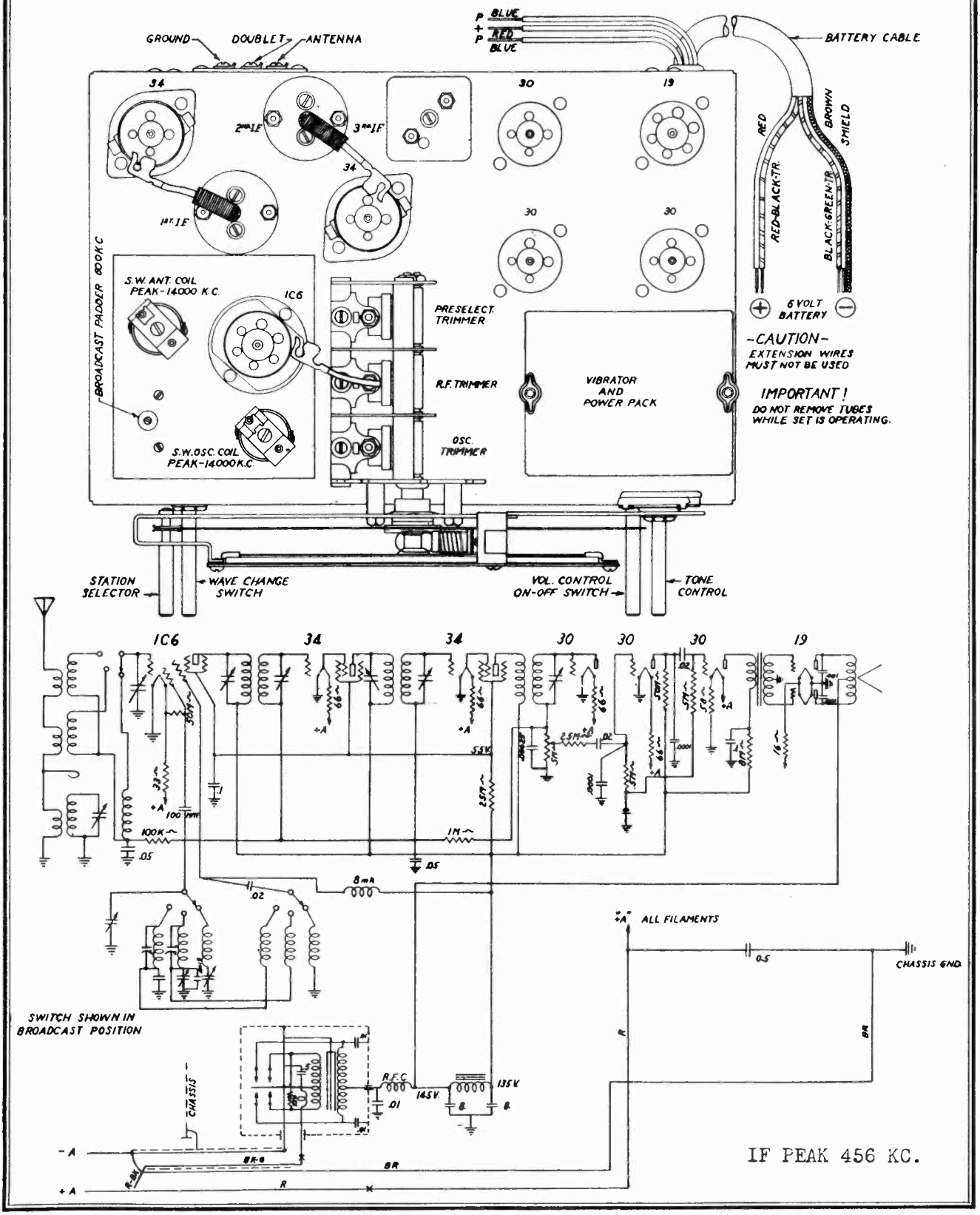
PARTS LIST

Part No.	Description
P160	Elect. Condenser
P670	3 Gang Condenser
P617	Padding Condenser
P193	Pre-selector Coil
P657	1st I.F. Transformer
P658	2nd I.F. Transformer
P656	Oscillator Coil
P669	Power Transformer
P476	Output Transformer
P485	Choke
P659	Wave Change Switch
G728	Short Wave Antenna Coil
G729	Short Wave Oscillator Coil
G730	Police Band Antenna Coil
G731	Police Band Oscillator Coil
P661	Tone Control
P660	Volume Control & "On-Off" Switch
P178	A.C. Cord & Plug
P170	350 Ohm Resistor
P279	500 Ohm ¼ Watt Resistor
P166	25,000 Ohm ¼ Watt Resistor
P673	10,000 Ohm ½ Watt Resistor
P481	3,000 Ohm ¼ Watt Resistor
P258	15,000 Ohm ¼ Watt Resistor
P280	100,000 Ohm ¼ Watt Resistor
P137	500,000 Ohm ¼ Watt Resistor
P674	20,000 Ohm ¼ Watt Resistor
P675	70,000 Ohm ¼ Watt Resistor
P162	1 Megohm ¼ Watt Resistor
P480	.0001 Mica Condenser
P672	.001 Mica Condenser —10%+10%
P147	.00025 Mica Condenser
P143	.02 Mfd. 400 Volt Condenser
P148	.05 Mfd. 200 Volt Condenser
P671	.01 Mfd. 200 Volt Condenser —10%+10%
P334	.05 Mfd. 400 Volt Condenser
P142	.1 Mfd. 200 Volt Condenser
P276	.1 Mfd. 400 Volt Condenser
P474	4 Mfd. 430 Volt Condenser
P304	5 Mfd. Elect. Condenser
P733	12" Speaker Field Coil
P693	12" Speaker Cone & Voice Coil Assembly
	12" Dynamic Speaker
P668	Dial Glass
P648	Dial & Scale—Complete
P634	Knob
P124	Pilot Light

FEDERATED PURCHASER

MODELS 32C, 33C
Schematic, Voltage
Socket, Trimmers

Seven Tube 6 Volt Battery All Wave Superheterodyne
L7 Chassis



IF PEAK 456 KC.

MODELS 32C,33C
Alignment
Parts List

FEDERATED PURCHASER

Seven Tube 6 Volt Battery All Wave Superheterodyne

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC. from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align. The I.F. transformer nearest the type (30) diode detector has only one trimmer, (single tuned) and should be the first adjustment. Next adjust the center I.F. transformer, which has two trimmers (double tuned) for maximum output; then adjust the two trimmers on the input I.F. transformer (double tuned) for peak.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center trimmer of the gang condenser to peak. The center condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, near the extreme front left corner.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator). The oscillator coil is located alongside the oscillator section of the tuning condenser (front section of gang), and the antenna or R.F. is the other coil remaining on top of the chassis. These two trimmers should be adjusted for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.

Note: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND

In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the oscillator circuit trimmer to peak. The oscillator trimmer is mounted on the oscillator coil, which is located underneath the chassis. The oscillator coil is wound with enamel wire and is mounted to the front edge of the chassis. This coil can be identified by the use of a layer of yellow cambric (Empire Cloth) separating the two windings. After this has been carefully done, the next step is to adjust the antenna trimmer to peak. The antenna trimmer is attached to the antenna coil; also mounted underneath the chassis and wound with enamel wire. The antenna coil is mounted at right angles to the oscillator coil and is nearest to the rear of the chassis.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser. This padding condenser is mounted on the underside of the chassis, directly underneath the gang condenser. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, the only readjustment that should be made (in this recheck) is the trimmer on the enamel wire antenna coil located underneath the chassis near the power transformer. If the pointer is found off scale, it may be corrected and put on scale by readjustment of the oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

Important: There are only three trimmer adjustments necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band; otherwise, the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

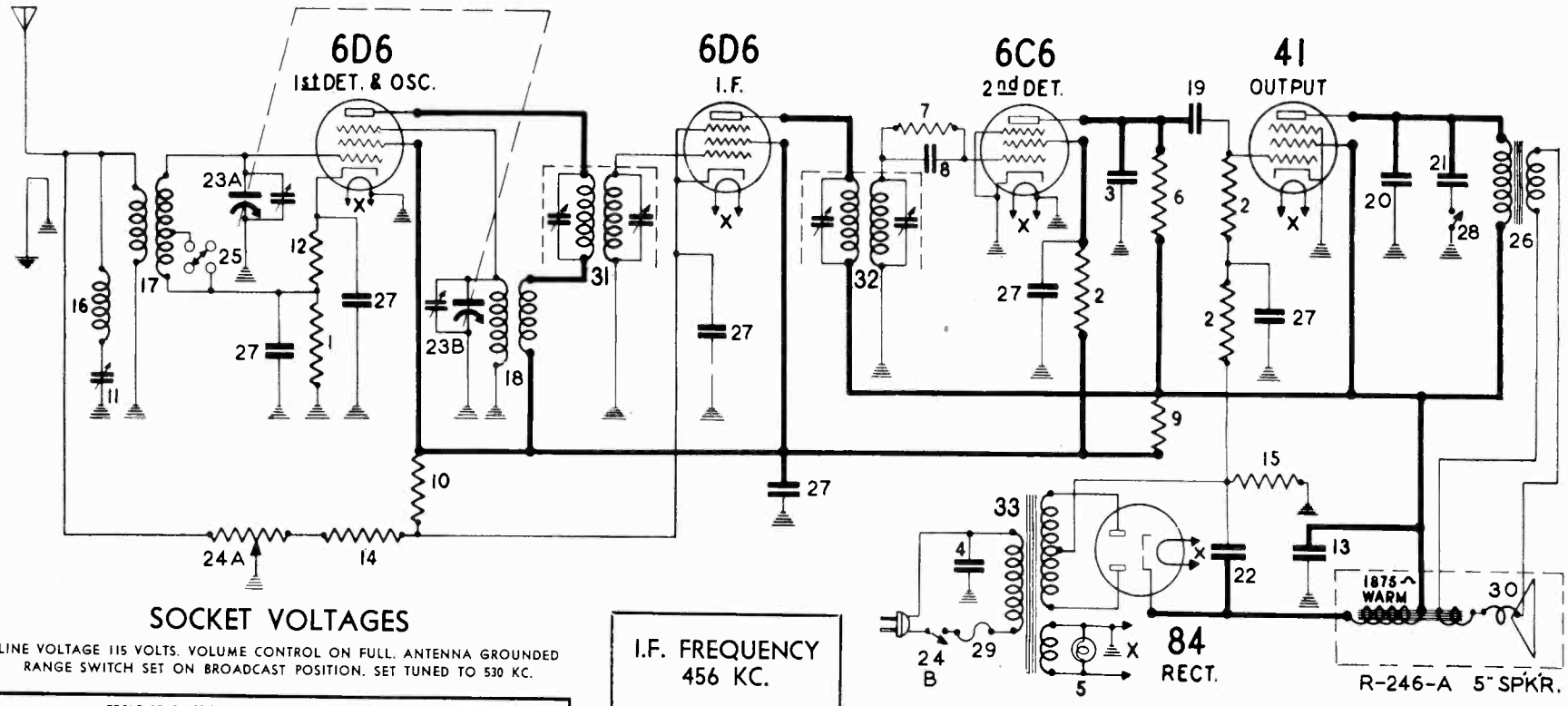
PARTS LIST

Part No.	Description
P870	3 Gang Condenser
P189	1st and 2nd I.F. Trans.
P719	Class B Input Transformer
P688	Single Tuned I.F. Trans.
P691	Vol. Con. & "On-Off" Sw.
P682	Tone Control
P659	Wave Change Switch
G560	Short Wave Antenna Coil
G561	Short Wave Osc. Coil
G562	Police Band Antenna Coil
G563	Police Band Osc. Coil
P173	Oscillator Coil
P193	Pre-selector Coil
P768	R.F. Osc. Plate Choke
P769	R.F. Choke
P617	Padding Condenser

Part No.	Description
P391	Electro. Cond. Dual 8 Mfd.
P392	Battery Cord
P422	40 Ohm Candohm Res.
P766	Gang Candohm
P767	16 Ohm Candohm
P411	Filter Choke
P410	Vibrator Transformer
P402	Vibrator Unit
P457	"A" Choke
P395	.5 Mfd. 10 Volt Condenser
P142	.1 Mfd. 200 V. Condenser
P148	.05 Mfd. 200 V. Condenser
P393	.02 Mfd. 200 V. Condenser
P335	.01 Mfd. 600 V. Condenser
P478	.0012 200 Volt Condenser
P672	.001 Mica Condenser

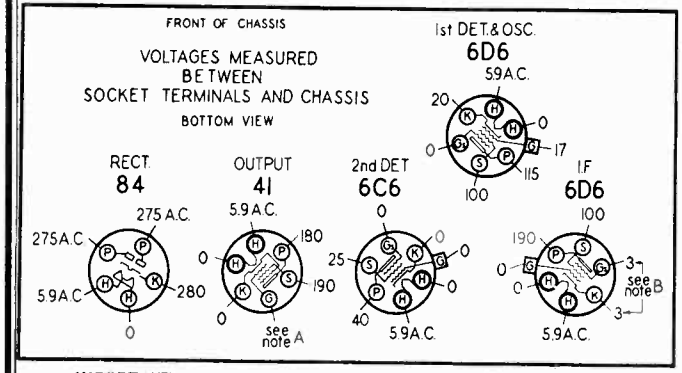
Part No.	Description
P480	.0001 Mfd. Mica Cond.
P147	.00025 Mica Condenser
P136	250 Ohm ¼ Watt Resistor
P168	8,000 Ohm ¼ Watt Res.
P166	25,000 Ohm ¼ Watt Res.
P417	50,000 Ohm ¼ Watt Res.
P280	100,000 Ohm ¼ Watt Res.
P162	1 Megohm ¼ Watt Res.
P688	Bias Cell
P403	6" Speak. (Midget Speak.)
P404	8" Speak. (Cons. Speak.)
P646	Dial and Scale Complete
P666	Escutcheon Plate
P668	Dial Glass
P448	Pilot Lights
P634	Knob

MODELS R-165AS, R-165WS
Air Chief Chassis R-165
Schematic, Voltage, Parts



SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS. VOLUME CONTROL ON FULL. ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION. SET TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

NOTE A: The bias on the 6F6 output is —14 volts measured across the flexible wire wound resistor No. 15 in the circuit diagram.

NOTE B: The cathode voltage varies with the setting of the volume control, from +3 volts for maximum volume to +30 volts for minimum volume.

R-165 PARTS LIST

Diagram Number	Part Number	DESCRIPTION	List Price
1	71657	3000 Ohm ¼ watt Carbon Resistor	$0.25
2	83082	260,000 Ohm ¼ watt Carbon Resistor	.12
3	83539	260 mmfd. Mica Condenser	.20
4	83976	.012 mfd. 1000 volt Paper Condenser	.40
5	83278	Dial lamp 6-8 volts	.15
6	84198	110,000 ohm ¼ watt Carbon Resistor	.12
7	84235	1.1 megohm ¼ watt Carbon Resistor	.12
8	85061	51 mmfd. Mica Condenser	.15
9	85064	10,000 ohm 1 watt Carbon Resistor	.20
10	85266	70,000 ohm ¼ watt Carbon Resistor	.20
11	85285	456 KC. Wave Trap Trimmer	.40
12	85691	500 ohm ½ watt Wire Wound Resistor	.20
13	88007	.8 mfd. 250 volt Electrolytic Condenser	1.00
14	88009	200 ohm ½ watt Wire Wound Resistor	.12
15	88010	320 ohm 1½ watt Wire Wound Resistor	.15
16	88014	456 KC. Wave Trap Coil	.50
17	88018	Antenna Coil	1.00
18	88019	Oscillator Coil	.70
19	88026	.02 mfd. 400 volt Paper Condenser	.25
20	89826	.004 mfd. 750 v. Paper Condenser	$0.24
21	88030	.01 mfd. 400 volt Paper Condenser	.25
22	88033	.8 mfd. 350 volt Electrolytic Condenser	1.00
23A & B	89359	.2 Gang Variable Condenser	4.00
24 A	88036	Volume Control, 22,000 ohm	1.25
24 B	88036	Line Switch	.60
25	88037	Range Switch	.60
26	88040	Output Transformer	1.50
27	88046	.1 mfd. 150 volt Paper Condenser	.25
28	88054	Tone Control Switch	.30
29	IMPORTANT	¾ Amp. Fuse (USE THIS SIZE ONLY)	
30	88100	Diaphragm and voice coil	1.50
31	88389	1st I. F. Transformer	2.00
32	88390	2nd I. F. Transformer	2.00
33	88393	Power Transformer, 115 V-60 cycle (used on 165AS)	4.20
23A & B	89359	.2 Gang Variable Condenser	4.00
33	89756	Power Transformer, 105 to 250 V.—50 to 133 cycles (used on 165WS)	7.00
20	89826	.004 mfd. 750 v. Paper Condenser	.24
	R-246-A	Speaker — 5 inch	4.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS R-1651AS,R-1651WS
Air Chief Chassis R-165
Circuit Data,Alignment
Trimmers

FIRESTONE

CIRCUIT DESCRIPTION

The Air Chief chassis Model 165 includes a speaker that is mounted directly on the chassis.

This receiver uses a superheterodyne circuit which employs five tubes. The intermediate frequency is 456 KC. The tuning range of this chassis includes, in addition to the standard broadcast band, the two police radio bands.

The signal picked up by the antenna is impressed on the primary of the antenna transformer, which has connected across it a wave trap for the purpose of eliminating 456 KC. interference. The signal is then tuned and impressed on the control grid of the 6D6 oscillator and first detector. The suppressor, or No. 3 grid of the 6D6, is used as the oscillator grid. The 456 KC. output of the first detector is amplified in the I. F. stage, using a 6D6 tube.

The second detector is of the grid leak-grid condenser type, and uses a 6C6 tube. The 6D6 is resistance coupled to the 41 pentode power amplifier. Bias for the output tube is obtained by grid return connection to the negative end of a resistor connected between the center tap of the power transformer high-voltage winding and ground. The bias potential so obtained is filtered by a resistance-capacity filter.

The volume control is double acting. It simultaneously changes the antenna signal input and the I. F. stage bias. Because of the sensitivity of this receiver, and due to the fact that it does not have A.V.C., it requires an antenna that is shorter than usual. The short antenna is particularly necessary where intereference from powerful local stations is encountered, and where difficulty is experienced in properly controlling the volume.

When tuning on the short wave band, local broadcast stations can be heard in the background at their regular positions on the dial. This is a normal condition, and is due to the tapped coil method of tuning the antenna coil secondary to the short wave band. No aligning adjustments are required on the short wave band.

ALIGNING EQUIPMENT

For proper alignment of this receiver, an output meter and a high grade modulated service oscillator are essential. The oscillator should be capable of generating the frequencies of 456 KC., 600 KC. and 1400 KC. The test oscillator calibration should be checked, using broadcast station signals as standards. For trimmer adjustment, it is advisable to use an all bakelite screwdriver, although one with a small metal tip may be used.

ALIGNING PROCEDURE

The step by step routine given below should be carefully followed. The trimmer numbers referred to are shown in the illustration.

ALIGNING THE I.F. CIRCUIT

1. Connect the output meter in series with a .25 mfd. condenser between the plate of the 41 tube and ground, or across the voice coil, depending on the type of meter.

2. Turn the volume control to the maximum volume position. (Note: The volume control should be kept in this position throughout the entire alignment procedure.) Ground the antenna lead to the chassis.

3. Turn the range switch to the right (clockwise) to the broadcast position.

4. Adjust the test oscillator to exactly 456 KC. and connect its output in series with a .1 mfd. condenser to the control grid of the 6D6 first detector tube and the chassis.

5. Align I. F. trimmers No. 1, 2, 3 and 4 for maximum output as indicated on the output meter. No inward or sideward pressure should be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

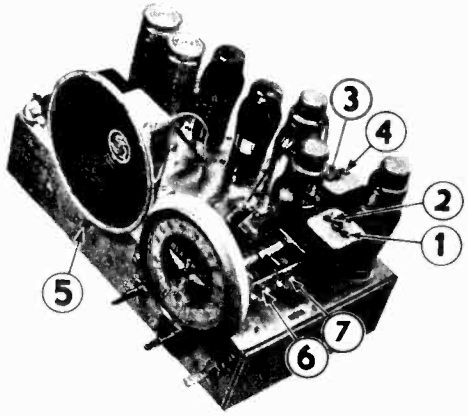
6. Repeat all I. F. trimmer adjustments since the changing of each trimmer will affect the others to a certain extent.

456 KC. WAVE TRAP ADJUSTMENT

1. Disconnect the antenna lead from ground.

2. Connect the test oscillator output in series with a .00025 mfd. condenser to the antenna lead, and connect the test oscillator ground lead to the receiver chassis. Ground the chassis.

3. Without changing the test oscillator from the frequency setting used in aligning the I. F. stage, adjust trimmer No. 5 for **MINIMUM** output. Increase the test oscillator output as a minimum is reached, in order to obtain a clearly defined setting of the trimmer. **NOTE:** If code interference transmitted on a frequency in the neighborhood of 456 KC. is troublesome, the wave trap should be adjusted for **MINIMUM** output with the test oscillator set to the same frequency as the signal that is causing interference.



DIAL CALIBRATION

If the receiver should require calibration, proceed as follows:

1. Turn the gang condenser to full mesh and check to see that the dial pointer indicates 530 KC. If it does not, remove the dial glass and turn the pointer to 530 KC. when the gang condenser is in full mesh. Replace the dial glass.

2. Adjust the test oscillator to 1400 KC.

3. Turn the condenser gang until the dial pointer indicates 1400 KC.

4. Adjust trimmer No. 6 (oscillator shunt trimmer) for maximum output without changing the setting of the gang condenser.

R. F. ALIGNMENT

1. Set the test oscillator to 1400 KC. and apply the signal to the receiver antenna lead through a .00025 mfd. condenser.

2. Tune the receiver to the signal for maximum output.

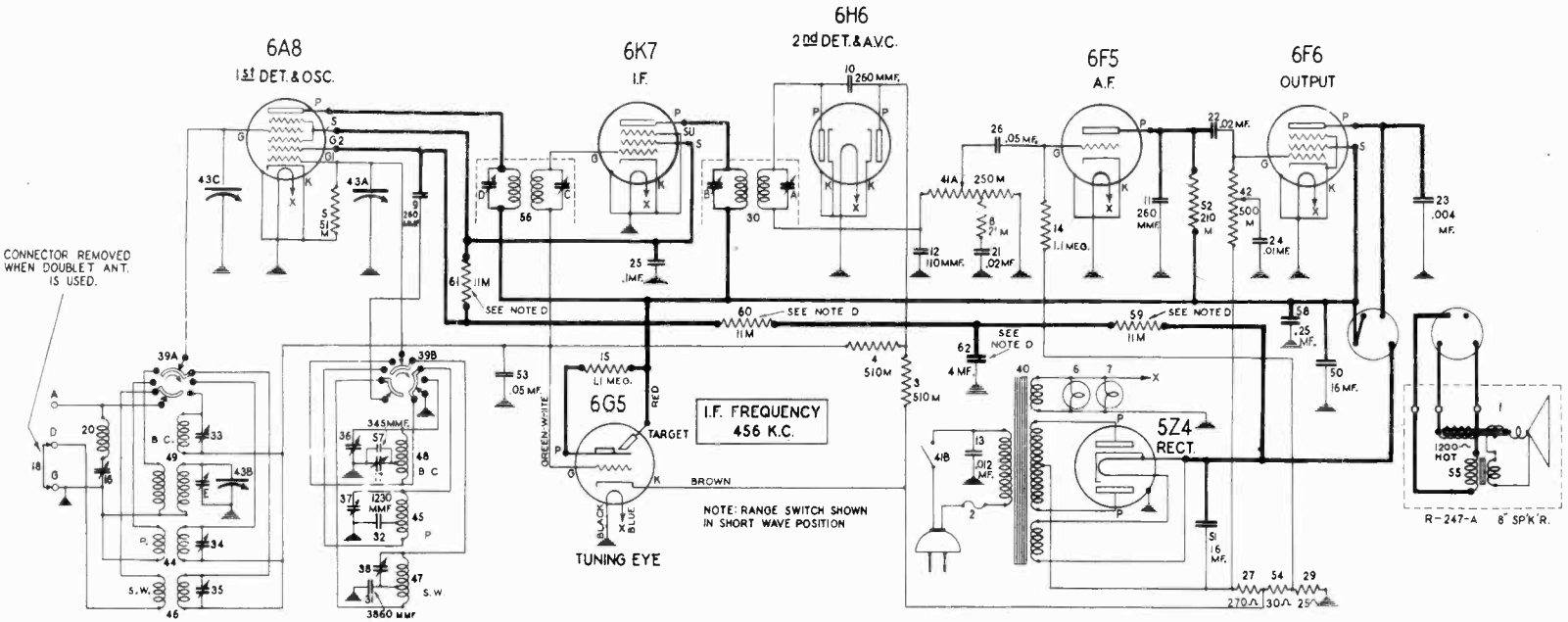
3. Adjust trimmer No. 7 (detector shunt trimmer) for maximum output.

TUNING DRIVE, DIAL, AND MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part Number	DESCRIPTION	List Price
13923	Spring washer (for drive disc)	$0.05
67590	Flat washer for chassis mounting	.01
81090	Escutcheon mounting screw No. 1 x 3/4 oval head W.S.	.60 per C
83552	Chassis mounting screw No. 10 x 7/8	.03
88056	Fuse mounting	.15
88057	Fuse cover	.08
88106	Dial gasket	.01
88108	Dial escutcheon	.50
88162	Tube shield	.08
88164	Tube shield cap	.06
89361	Dial frame and bracket assembly	.25
89363	Pilot lamp socket and bracket	.16
89365	Driven disc and bearing assembly	.36
89371	Dial pointer	.08
89378	Drive disc and shaft assembly	.30
89386	Dial glass	.15
89387	Knob (vol. control and range switch)	.18
89388	Knob (tuning control)	.18
89399	Dial scale	.45

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

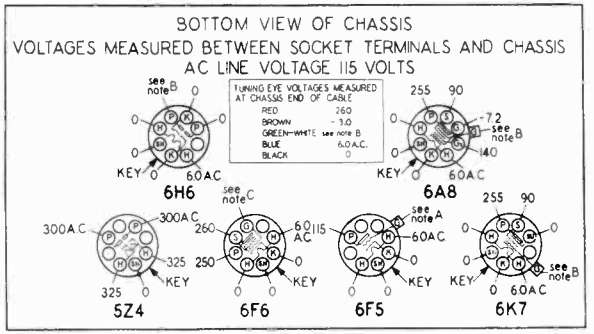
FORM 7648 PRINTED IN U.S.A. 9-19-36



NOTE D: In receivers having serial numbers below 453,400 resistors 59, 60, and 61 are omitted and the screen grids of the 6K7 and 6A8 receive their current through a 26,000 ohm ¼ watt resistor which is connected to the screen grid of the 6F6. The anode grid of the 6A8 is connected in series with a 21,000 ohm ¼ watt resistor to the screen grid of the 6F6. Condenser 62 (4 mfd. 250 V.) is also omitted.

SOCKET VOLTAGES

VOLUME CONTROL ON FULL — ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION — DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The grid bias for the 6F5 is —1.3 volts measured across resistor 29.
NOTE B: The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is —3.0 volts measured across resistors 29 and 54.
NOTE C: The grid bias for the 6F6 output tube is —17.0 volts measured across resistors 29, 54 and 27.

MODEL R-166 PARTS LIST

Diagram Number	Part Number	DESCRIPTION	List Price
1	R-247-A	8" Dynamic Speaker	$9.00
2	IMPORTANT	Fuse, 1 ampere (USE THIS SIZE ONLY)	
3-4	83072	510,000 ohm ¼ watt carbon resistor	.15
5	83080	51,000 ohm ¼ watt carbon resistor	.20
6-7	83278	Pilot lamp, 6-8 volt	.15
8	83286	21,000 ohm ¼ watt carbon resistor	.20
9-10-11	83539	260 mmfd. mica condenser	.15
12	83783	110 mmfd. mica condenser	.16
13	83976	.012 mfd. 1000 v. shielded condenser	.35
14-15	84235	1.1 megohm ¼ watt carbon resistor	.20
16	85285	Wave trap trimmer	.40
17	85285	Padding trimmer	.40
18	85321	Ground connector	.01
20	88011	Wave trap coil	.50
21-22	88026	.02 mfd. 400 v. paper condenser	.30
23	88026	.004 mfd. 750 v. paper condenser	.24
24	88030	.01 mfd. 400 v. paper condenser	.30
25	88046	.1 mfd. 150 v. paper condenser	.30
26	88189	.05 mfd. 200 v. paper condenser	.35
27	88163	270 ohm 1 watt carbon resistor	.15
29	88165	25 ohm ½ watt wire wound resistor	.15
30	88468	2nd I.F. transformer	2.40
31	88172	3860 mmfd. mica condenser	.35
32	88173	1230 mmfd. mica condenser	.25
33-34-35 / 36-37-38	88477	Trimmer condenser	.12
39A & B	88480	Range switch	1.90
40	88481	Power transformer, 115 v. 60 cycle	8.5.00
40	89216	Power transformer, 100 to 240 V.— 25 to 133 cycles	11.50
41-A / 41-B	88487	Volume control (250,000 ohm) / A. C. line switch	1.25
42	88488	Tone control (500,000 ohm)	.80
43A to C	88493	Three gang condenser	5.40
44	88499	Antenna coil (Police)	.85
45	88501	Oscillator coil (Police)	.65
46	88502	Antenna coil (S.W.)	.80
47	88504	Oscillator coil (S.W.)	.80
48	88506	Oscillator coil (B.C.)	.55
49	88507	Antenna coil (B.C.)	1.60
50	88511	16 mfd. 300 v. electrolytic condenser	1.10
51	88512	16 mfd. 400 v. electrolytic condenser	1.10
52	88532	210,000 ohm ¼ watt carbon resistor	.12
53	88534	.05 mfd. 150 v. condenser (low loss)	.25
54	88613	30 ohm ½ watt wire wound resistor	.15
55	88529	Output transformer (on R-247-A speaker)	2.00
56	88466	1st I.F. transformer	2.40
40	89216	Power transformer, 100 to 240 V.— 25 to 133 cycles	11.50
57	89564	345 mmfd. mica condenser	.25
58	89643	.25 mfd. 300 volt paper condenser	.50
59-60	89751	11,000 ohm 1 watt carbon resistor	.12
61	89753	11,000 ohm ½ watt carbon resistor	.15
62	89755	4 mfd. 250 volt electrolytic condenser	1.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL R-1661
Air Chief
Chassis R-166
Alignment, Socket
Trimmers, Parts

FIRESTONE

CALIBRATION AND ALIGNMENT

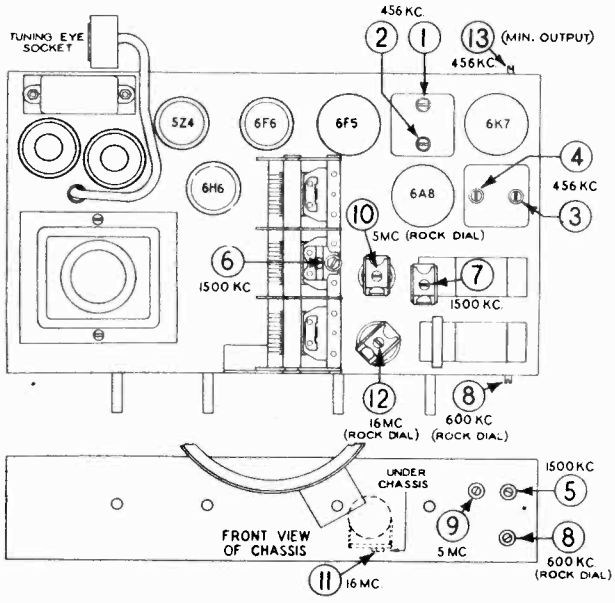
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	456 KC.
2.	2nd I.F. transformer trimmer	456 KC.
3.	1st I.F. transformer trimmer	456 KC.
4.	1st I.F. transformer trimmer	456 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.
13.	Wave-trap trimmer	456 KC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for **minimum** output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1500 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part Number	DESCRIPTION	List Price
67590	Flat steel mtg. washer	$0.01
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1¼ chassis mtg. screw	.03
84805	Felt washer (for knobs)	.01
85066	G.D.A. terminal strip	.20
85321	Ground connector for G.D.A. strip	.01
88056	Fuse mounting	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
89119	Tuning eye cable & plug	1.50
89424	Knob; tuning and tone control	.20
89425	Knob; range switch	.22
89426	Knob; volume control	.20

TUNING DRIVE AND DIAL PARTS

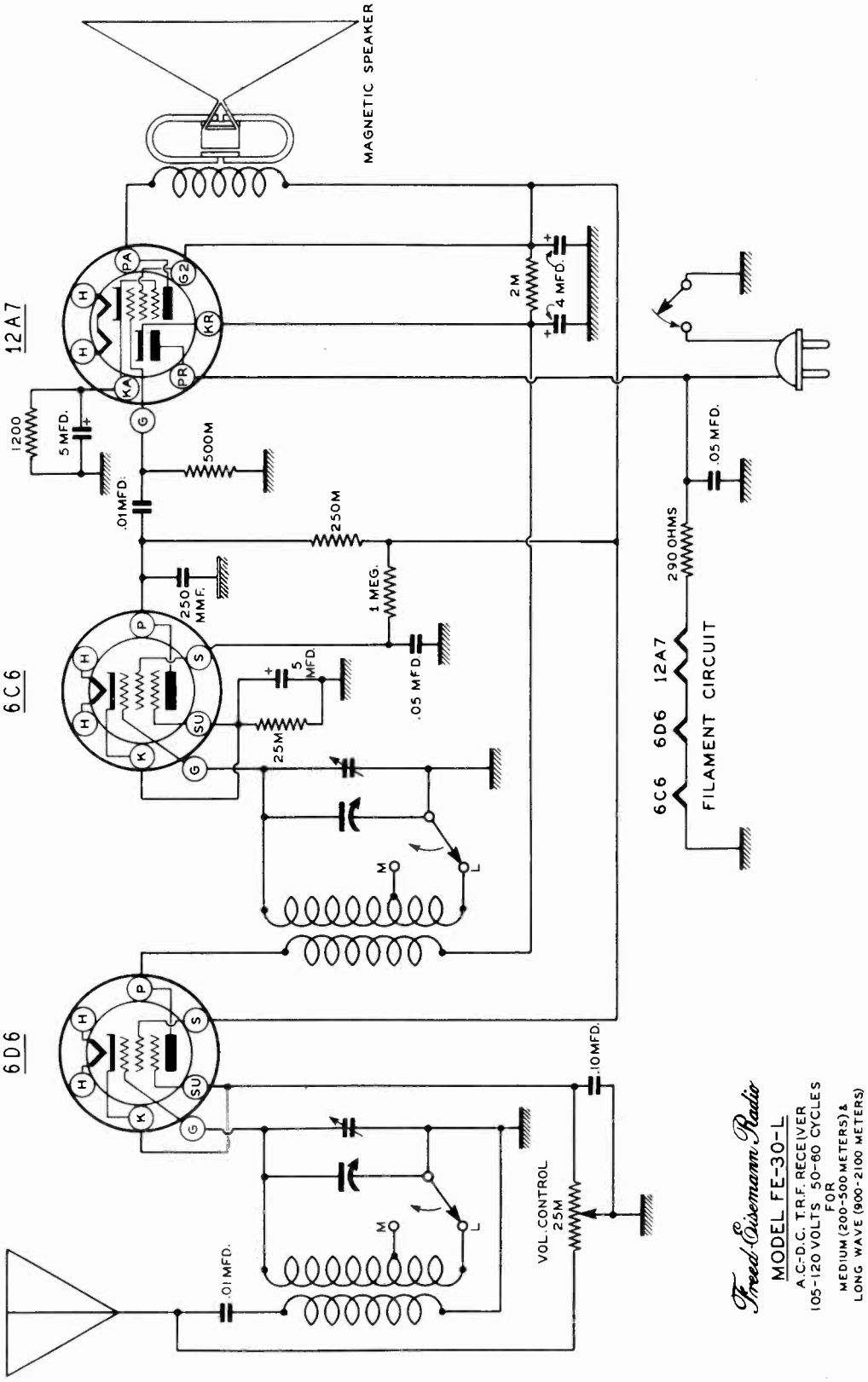
Part Number	DESCRIPTION	List Price
83278	Dial lamp	$0.15
88564	Pointer and stud assembly	.12
88743	Dial drive shaft	.15
88744	Dial drive shaft retainer spring	.05
88745	Dial ring and bracket assembly (for edge lighting)	.90
89748	Dial disc and bushing assembly	.30
88956	Escutcheon with glass	1.65
88958	No. 2 x 3/8 R.H. wood screw for escutcheon (each)	.01
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89285	Dial background	.12
89423	Dial scale	1.80
89432	Escutcheon for tuning eye	.60

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FORM 7855—3-22-36—PRINTED IN U.S.A.

FREED MFG. CO., INC.

Freed
MODEL FE-30L
Schematic



MODELS FE-52, FE-56
FE-58
Schematic

FREED MFG. CO., INC.