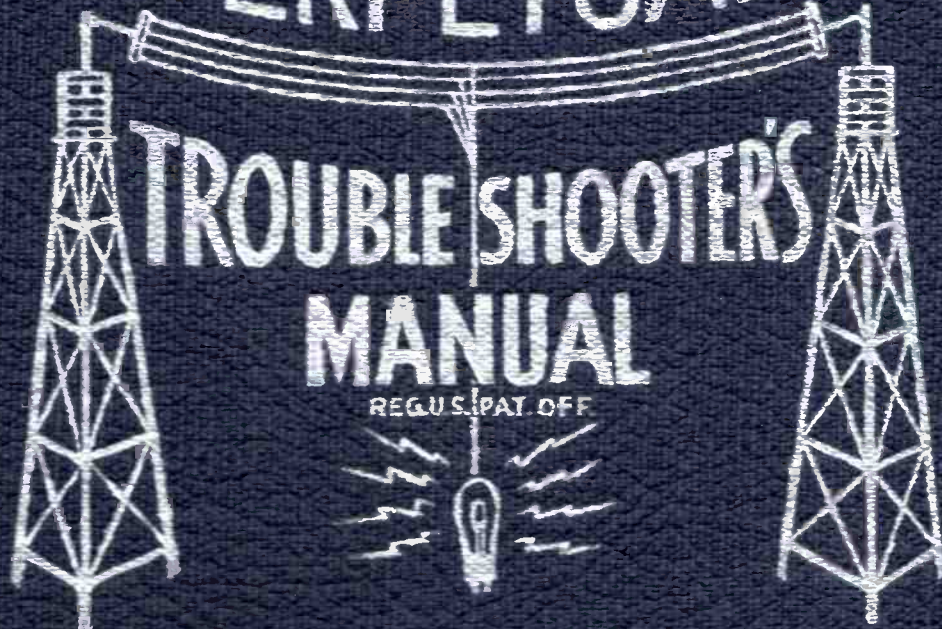


VOLUME XIV

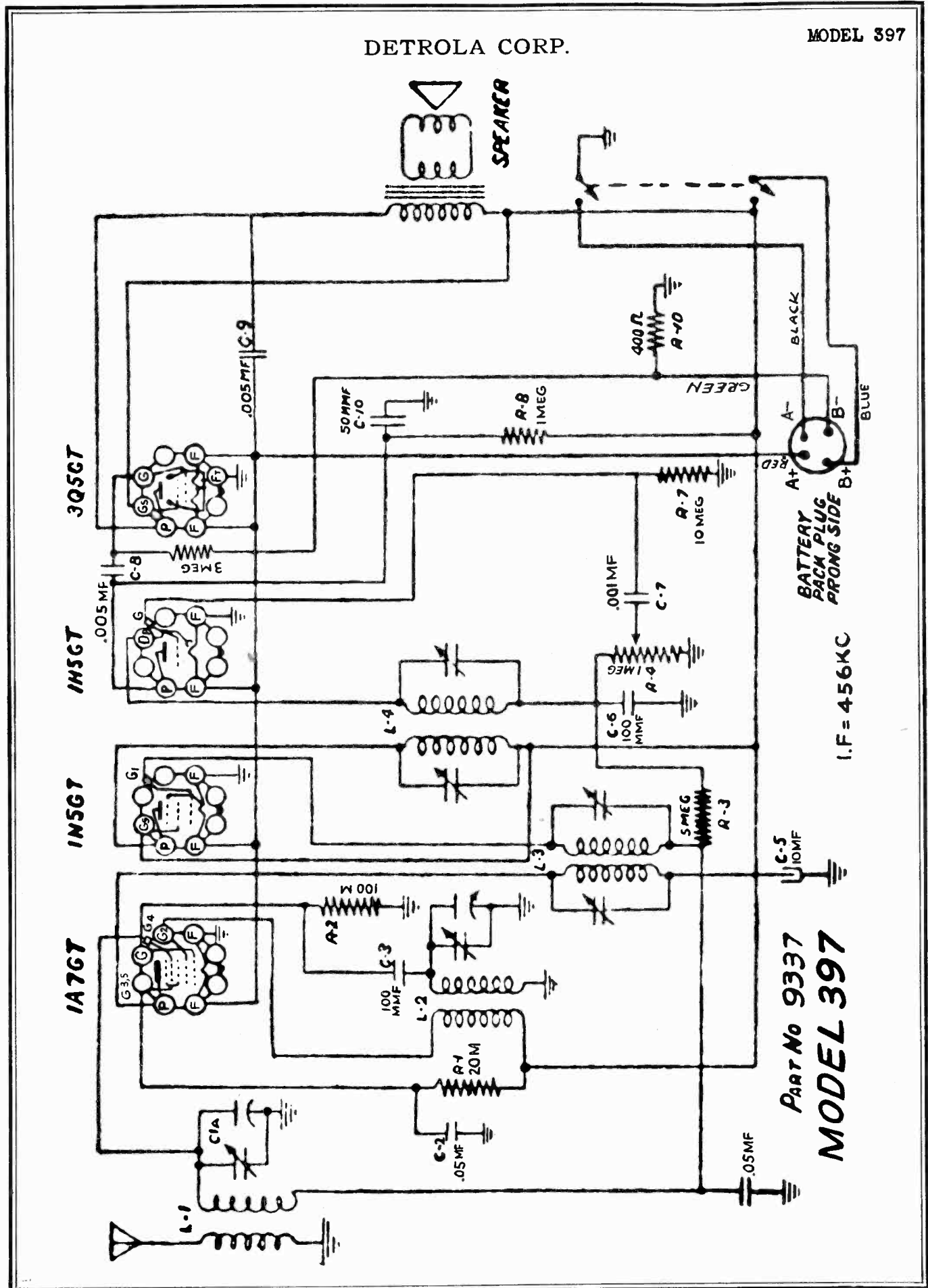
PERPETUAL



JOHN F. RIDER

DETROLA CORP.

MODEL 397



PART No 9337
MODEL 397

I.F. = 456KC

MODEL 397
 MODEL 408
 MODEL 428

DETROLA CORP.

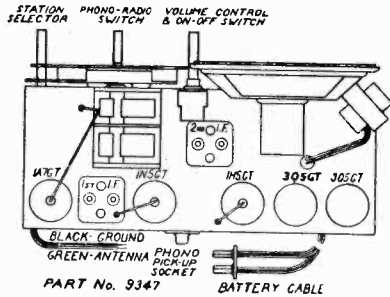
MODELS 400, 401,
 402, Series

MODEL 428 ALIGNMENT PROCEDURE

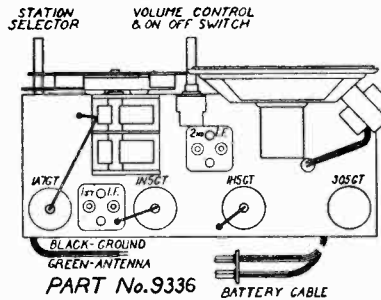
Output meter connection.....Across speaker voice coil
 Phono Radio Switch.....Radio Position
 Connection of generator ground lead.....To Chassis
 Connection of generator output lead.....See chart below
 Dummy antenna value to be used in series with generator.....See chart
 Position of volume control.....Full on (Clockwise)
 Position of Tone Control.....In Brilliant Position

POSITION OF TUNING DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED
High Frequency end	455 kc.	.1 mfd.	6SA7 Grid	Align IF. Four Trimmers Oscillator Trimmer Set limit of Band
Low Frequency end	535 kc.	.1 mfd.	6SA7 Grid	
1400 kc.	1400 kc.	200 mmf.	Antenna Lead—with built-in antenna connected	Antenna Trimmer Tune to max.
10 mc.	10 mc.	400 ohms	Antenna Lead—with built-in antenna connected	Short wave oscillator trimmer Set limit of band
9.6 mc.	9.6 mc.	400 ohms	Antenna Lead—with built-in antenna connected	Short wave antenna trimmer Tune to max.

FOR RECORD CHANGER SEE MODELS N-100 AND N-200
 IN RIDER'S "AUTOMATIC RECORD CHANGER AND RECORDER" BOOK

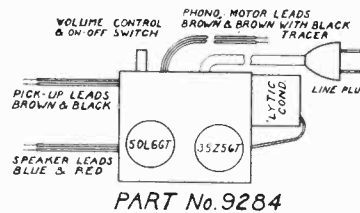
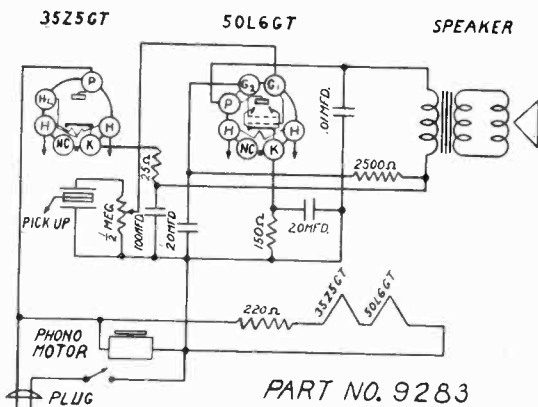


MODEL 408



MODEL 397

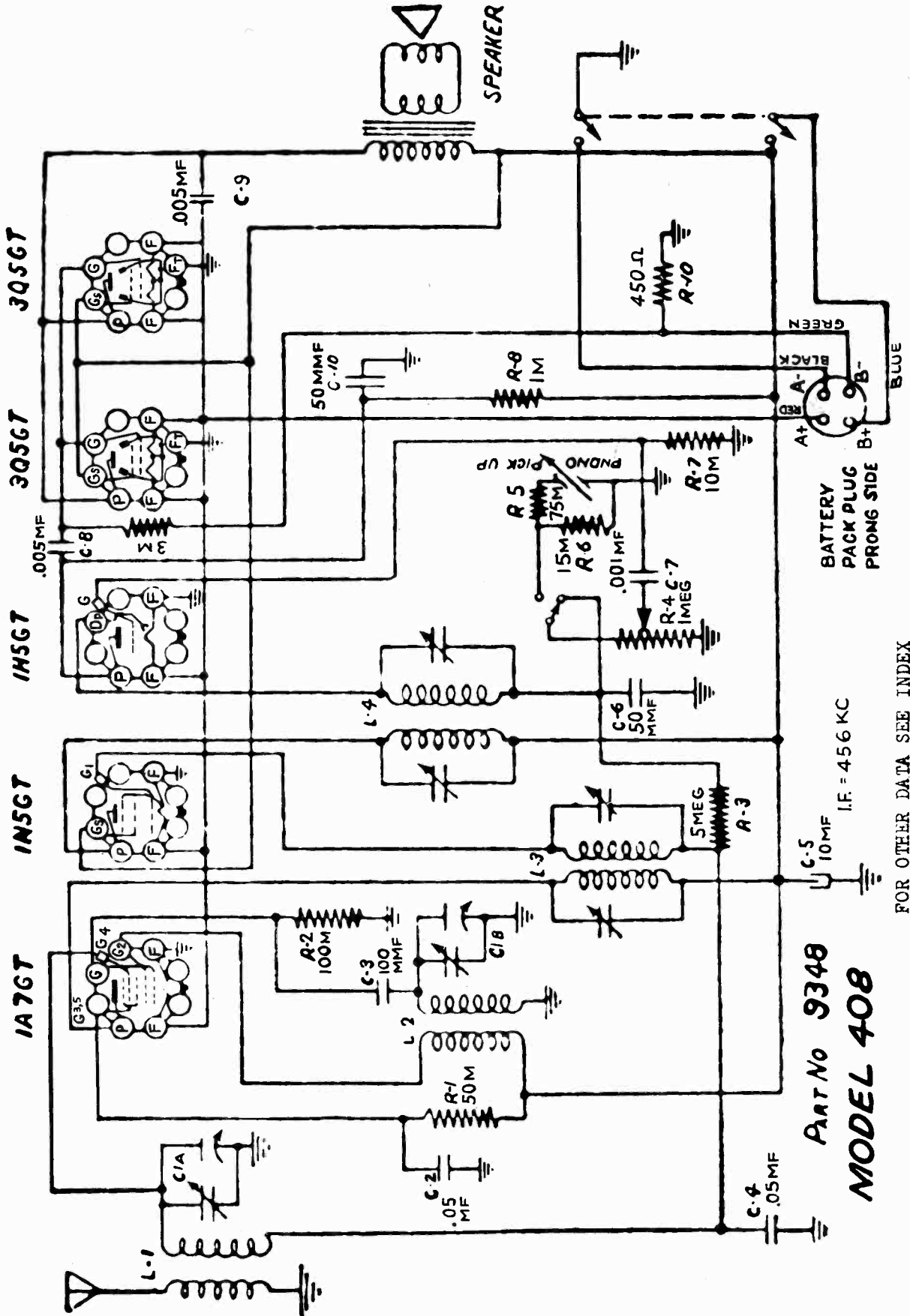
FOR OTHER DATA SEE INDEX



PHONO MODELS
 400 SERIES
 401 SERIES
 402 SERIES

MODEL 408

DETROLA CORP.



Part No 9348
MODEL 408

FOR OTHER DATA SEE INDEX

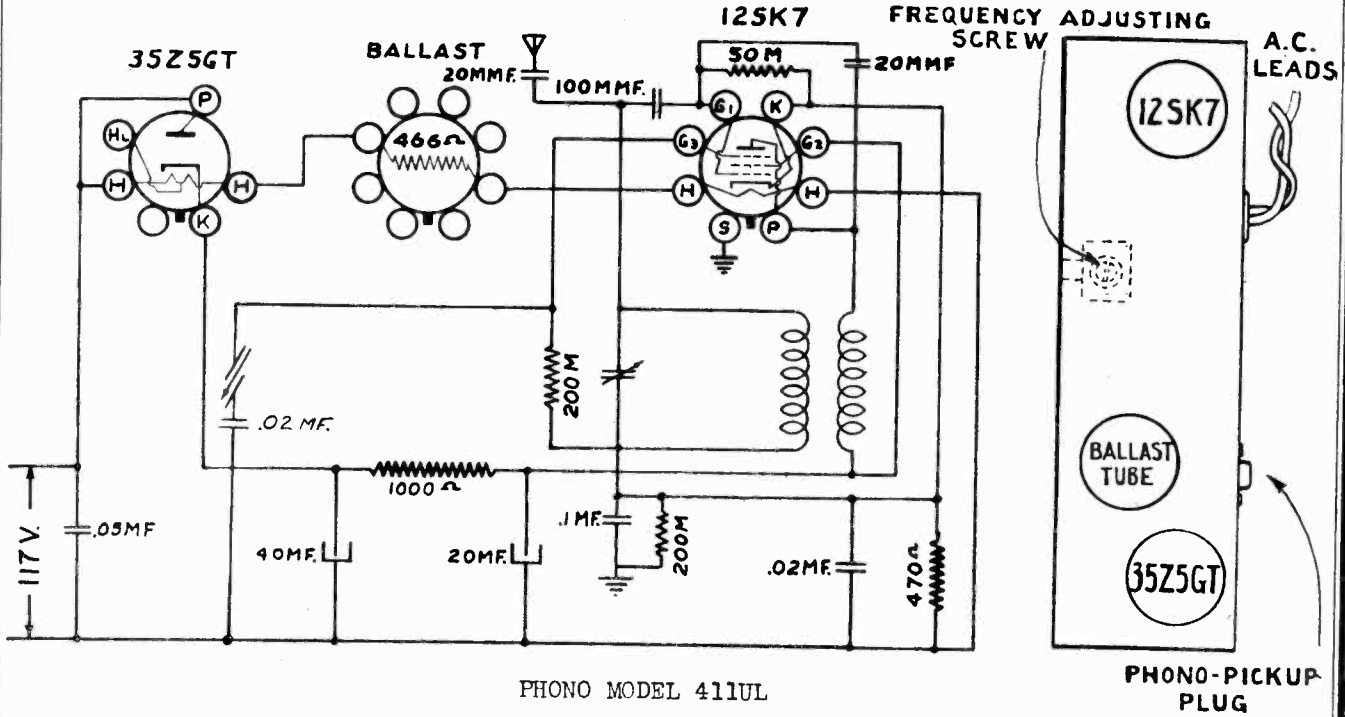
MODEL 411-UL, MODEL 417 Series,
MODELS 419, 421 Series, 421-1

DETROLA CORP.

TO CHANGE THE FREQUENCY

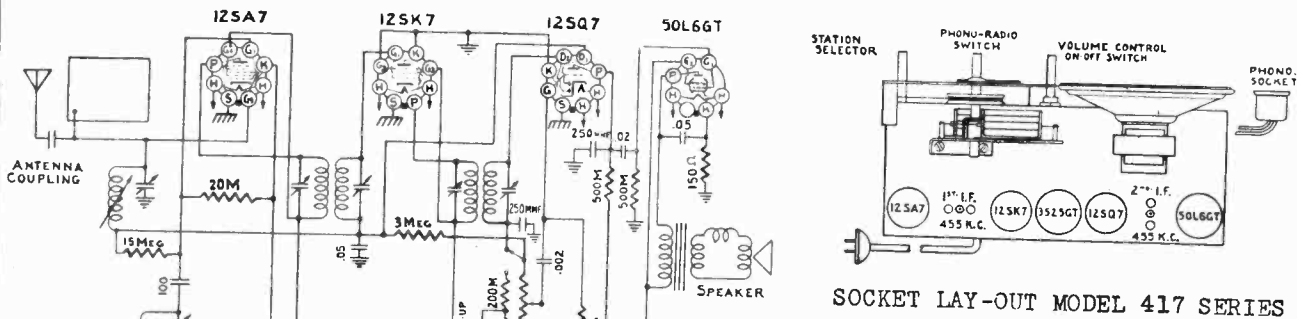
If a broadcast station is received at the same frequency as the wireless record changer, reset the frequency of the wireless record changer as follows:

1. Tune your radio to any frequency between 1250 and 1700 kilocycles that is free of interference.
2. Let the wireless record changer overhang the edge of a table for enough to reach the **frequency adjusting screw** through slot in the bottom cover.
3. While the wireless record changer is playing a record, tune the **frequency adjusting screw** until the recording is heard through your radio.



PHONO MODEL 411UL

PHONO-PICKUP PLUG



SOCKET LAY-OUT MODEL 417 SERIES

ALIGNMENT PROCEDURE FOR MODELS 417 SERIES, 419, 421 SERIES, 421-1

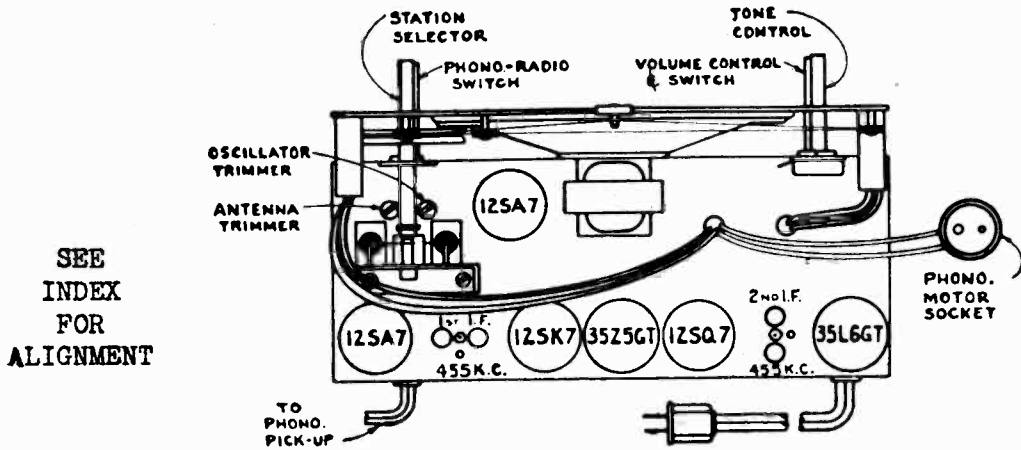
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver.
4. Dummy antennae—.1 mfd., 200 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I. F. 455 kc	12SA7 Grid	.1 mfd	H. F. end	I. F. Transformers	Tune to Max.
1720 kc	Ext. Ant. Wire	200 mmf	H. F. end	Oscillator Trimmer	Set Limit of band
1400 kc	Ext. Ant. Wire	200 mmf	1400	Antenna Trimmer	Tune to Max.

DETROLA CORP.

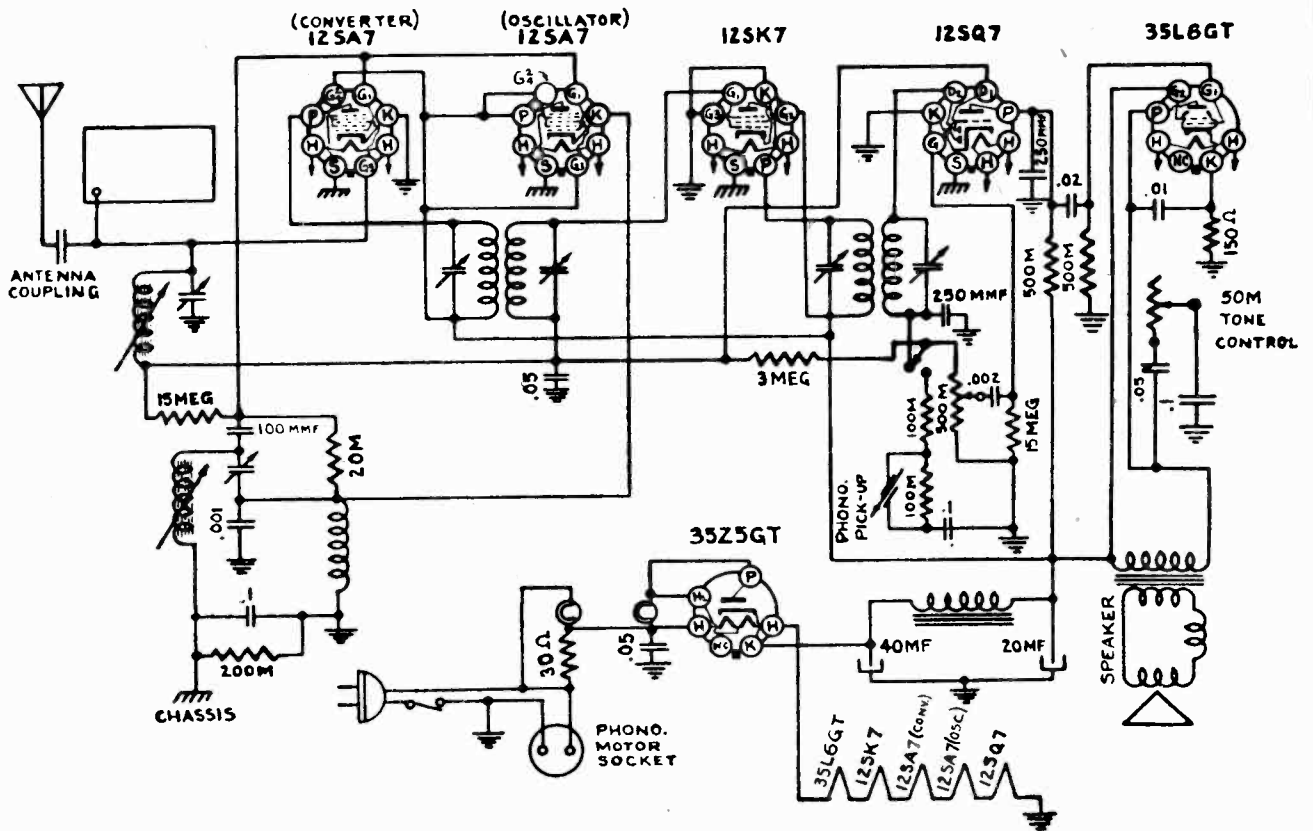
MODEL 419



SEE INDEX FOR ALIGNMENT

SOCKET LAYOUT

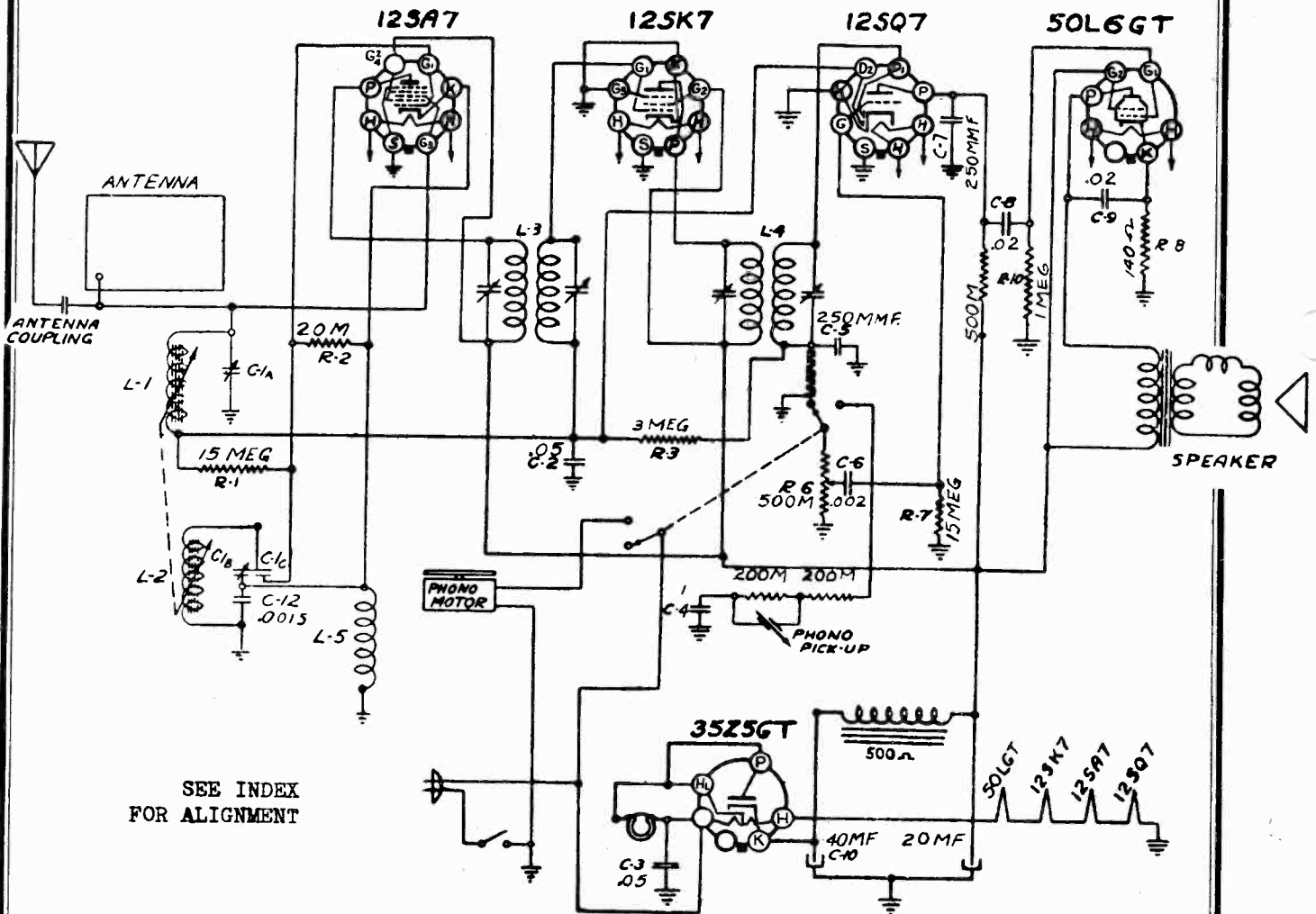
IF PEAK 455 KC



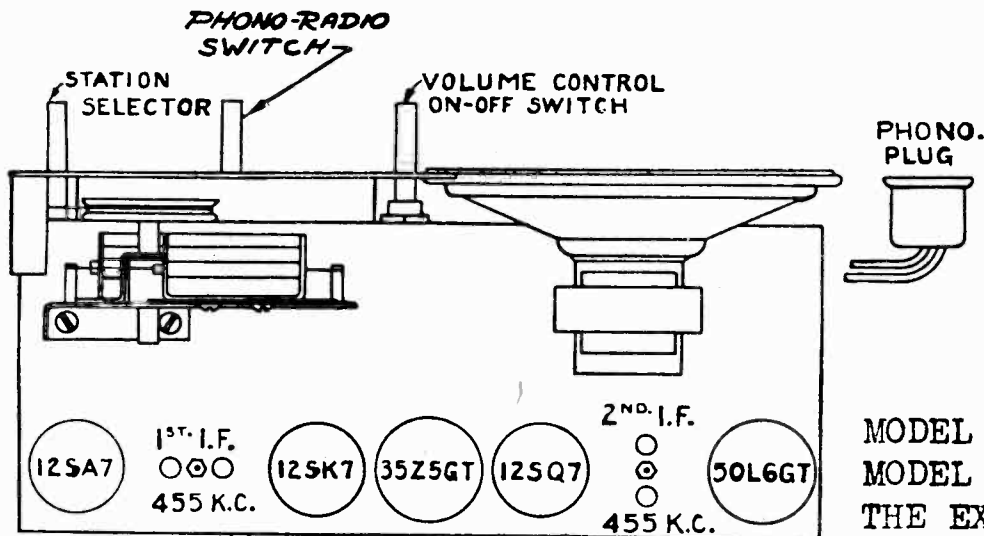
MODEL 419

MODELS 421 Series,
421-1

DETROLA CORP.



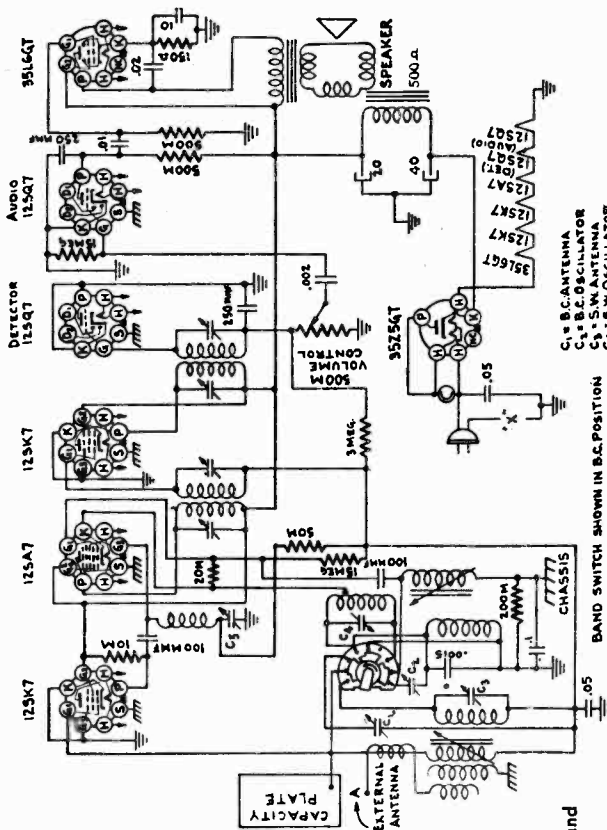
SEE INDEX
FOR ALIGNMENT



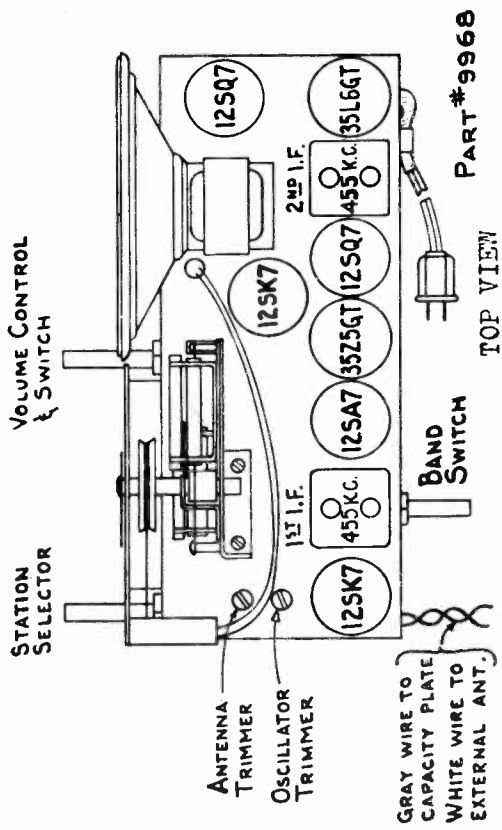
I.F. PEAK 455 KC

MODEL 421 SAME AS
MODEL 421-1 WITH
THE EXCEPTION OF
R8 AND R10 WHICH
IS 150Ω AND 500Ω
RESPECTIVELY

DETROLA CORP.



I.F. PEAK 455 KC
BAND SWITCH SHOWN IN B.C. POSITION

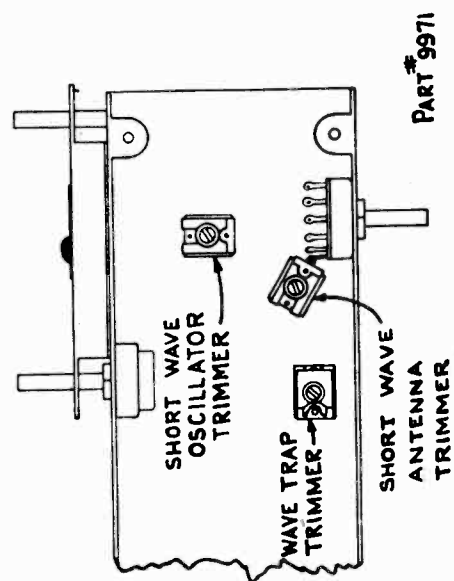


ALIGNMENT PROCEDURE

WARNING! This information is to be used by a COMPETENT SERVICE MAN ONLY and not by an untrained person.

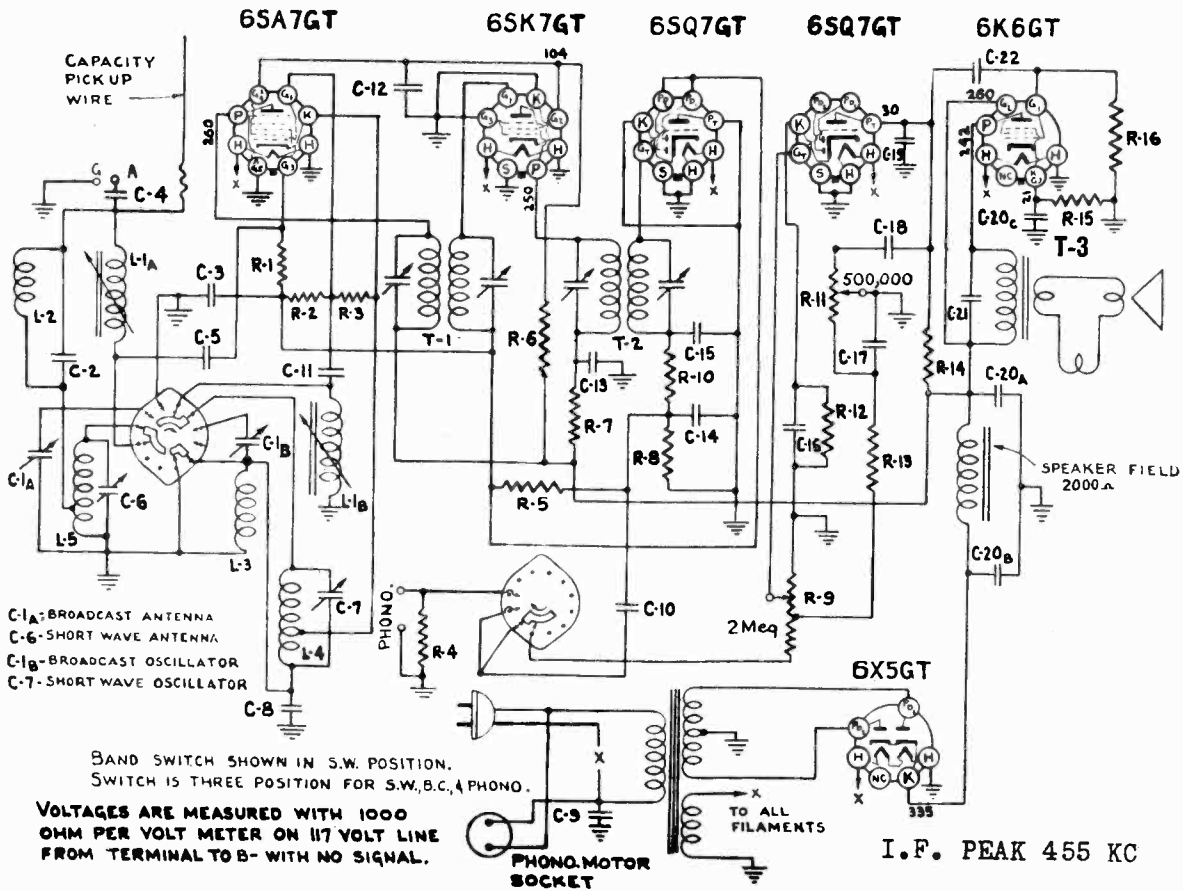
- TUBES:**
- 1-12SK7-R.F.
 - 1-12SA7-Oscillator-Converter
 - 1-12SK7-I.F. Amplifier
 - 1-12SK7-Detector A.V.C.
 - 1-12SQ7-Audio Amplifier
 - 1-35L6GT-Power Output
 - 1-35Z5GT-Rectifier
- The following equipment is necessary to properly align this chassis:
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
 2. An output meter.
 3. A non-metallic screw driver.
 4. Dummy Antennae-.1 mfd., 200 mmf., 400 ohm.

POSITION OF TUNING DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED
High Freq. End	455 K.C.	.1 mfd.	12SA7 Grid	Align I.F. 4 Trimmers
High Freq. End	455 K. C.	.1 mfd.	12SK7 RF	Wave Trap Trimmer Adjust to Min.
Low Freq. End	540 K.C.	.1 mfd.	12SK7 Grid	Oscillator Trimmer Set limit of band
1400 K.C.	1400 K.C.	200 mmf.	Antenna Lead with capacity plate in operating position.	Antenna Trimmer Tune to Max.
10 M.C.	10 M.C.	400 ohms.	Antenna Lead Capacity Plate in position.	Oscillator Trimmer Set limit of band
9.6 M.C.	9.6 M.C.	400 ohms.	Antenna Lead Capacity Plate in position.	Antenna Trimmer Tune to Max.



MODEL 428

DETROLA CORP.

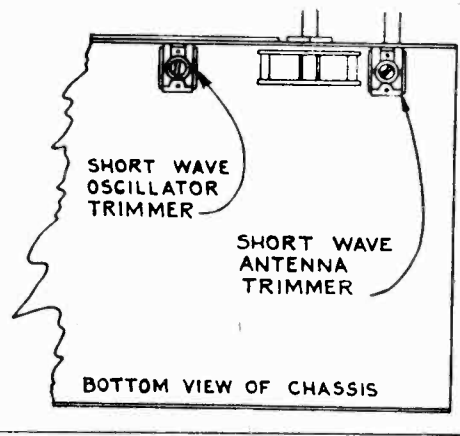
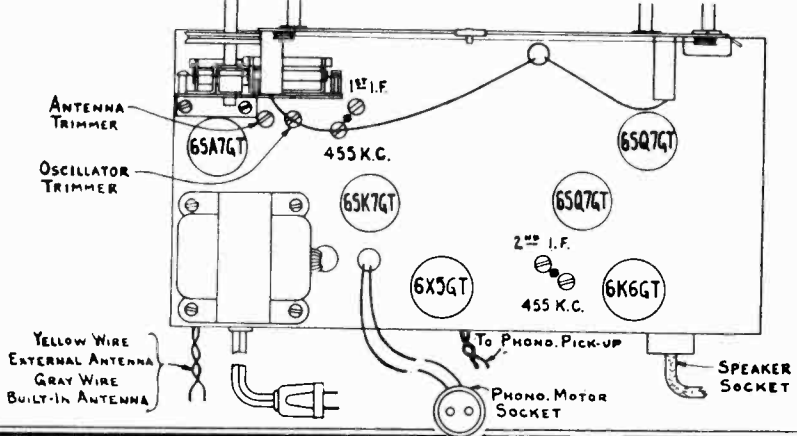


BAND SWITCH SHOWN IN S.W. POSITION.
SWITCH IS THREE POSITION FOR S.W., B.C., & PHONO.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT METER ON 117 VOLT LINE FROM TERMINAL TO B- WITH NO SIGNAL.

I.F. PEAK 455 KC

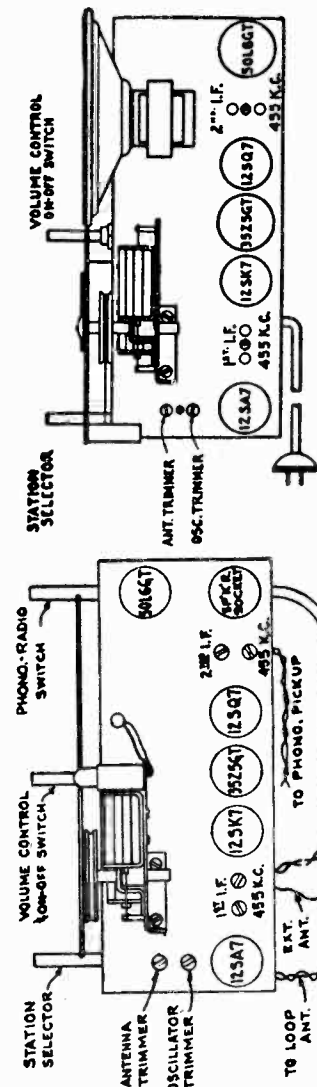
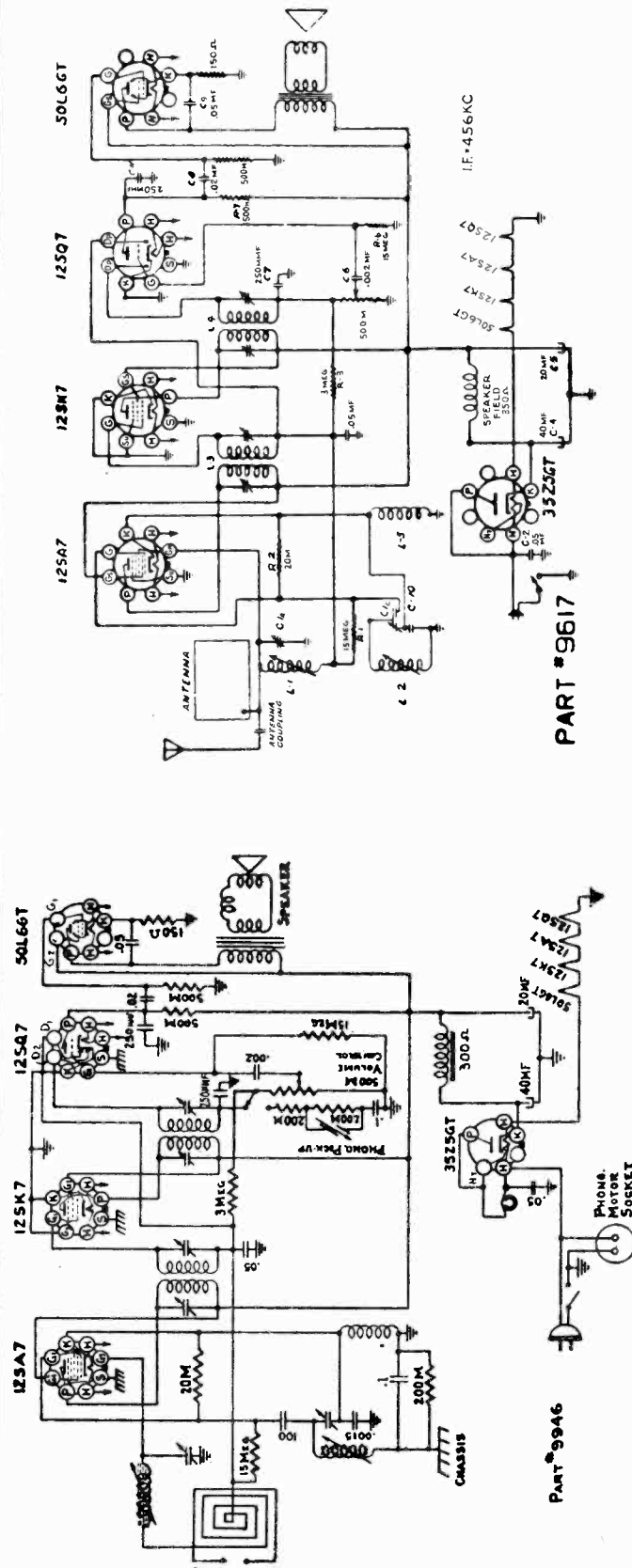
CHASSIS PARTS

Schematic Location	Part Number	Description	Schematic Location	Part Number	Description
C-4	D5399	Condenser—Mica 20 mmf.	R-15	D9661	Resistor—1W—500 ohm
C-5, 11, 14, 15,	D1285	Condenser—Mica 100 mmf.	R-7	D8965	Resistor—1/3 W—1M
C-2	D9627	Condenser—Mica 150 mmf.	R-12	D7125	Resistor—1/3 W—5M
C-19	D1286	Condenser—Mica 250 mmf.	R-6	D10056	Resistor—1/3 W—12M
C-1a, b	D9719	Condenser—Dual Trimmer	R-3	D7121	Resistor—1/3 W—20M
C-6, 7	D9704	Condenser—Trimmer	R-10, 13	D8580	Resistor—1/3 W—50M
C-8	D9672	Condenser—Paper .0015 mfd.—400V	R-4	D7123	Resistor—1/3 W—400M
C-21	D824	Condenser—Paper .002 mfd.—600V	R-16, 8, 14	D6722	Resistor—1/3 W—500M
C-10, 17, 18	D2782	Condenser—Paper .005 mfd.—600V	R-1	D6723	Resistor—1/3 W—1 meg.
C-22	D568	Condenser—Paper .01 mfd.—400V	R-5	D7959	Resistor—1/3 W—3 meg.
C-3	D580	Condenser—Paper .05 mfd.—200V	R-2	D8402	Resistor—1/3 W—15 meg.
C-9, 13	D563	Condenser—Paper .05 mfd.—400 V.		D10203	Socket—Pilot Lamp
C-12	D575	Condenser—Paper .1 mfd.—400V		D5247	Studs—Pulley
C-20a,b,c	D9657	Condenser—Elect. (b15 mf.-400) (a10 mf.-330) (c10mf.-50)		D9662	Switch—Wave Band
	D3915	Cord—Line	L-1a, L-1b	D9663	Tuner—Permeability
	D6158	Lamp—Pilot—No. 47 Mazda		D9664	Transformer—Power
	D9660	Pointer	T-1	D9993	Transformer—1st. I. F.
	D6244	Pulley—Wood	T-2	D9893	Transformer—2nd I. F.
			T-3	D10055-1	Output Transformer



DETROLA CORP.

MODEL 429 Series
MODEL 442



MODEL 442

Alignment Procedure

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver.
4. Dummy antennae—.1 mfd., 200 mmf.

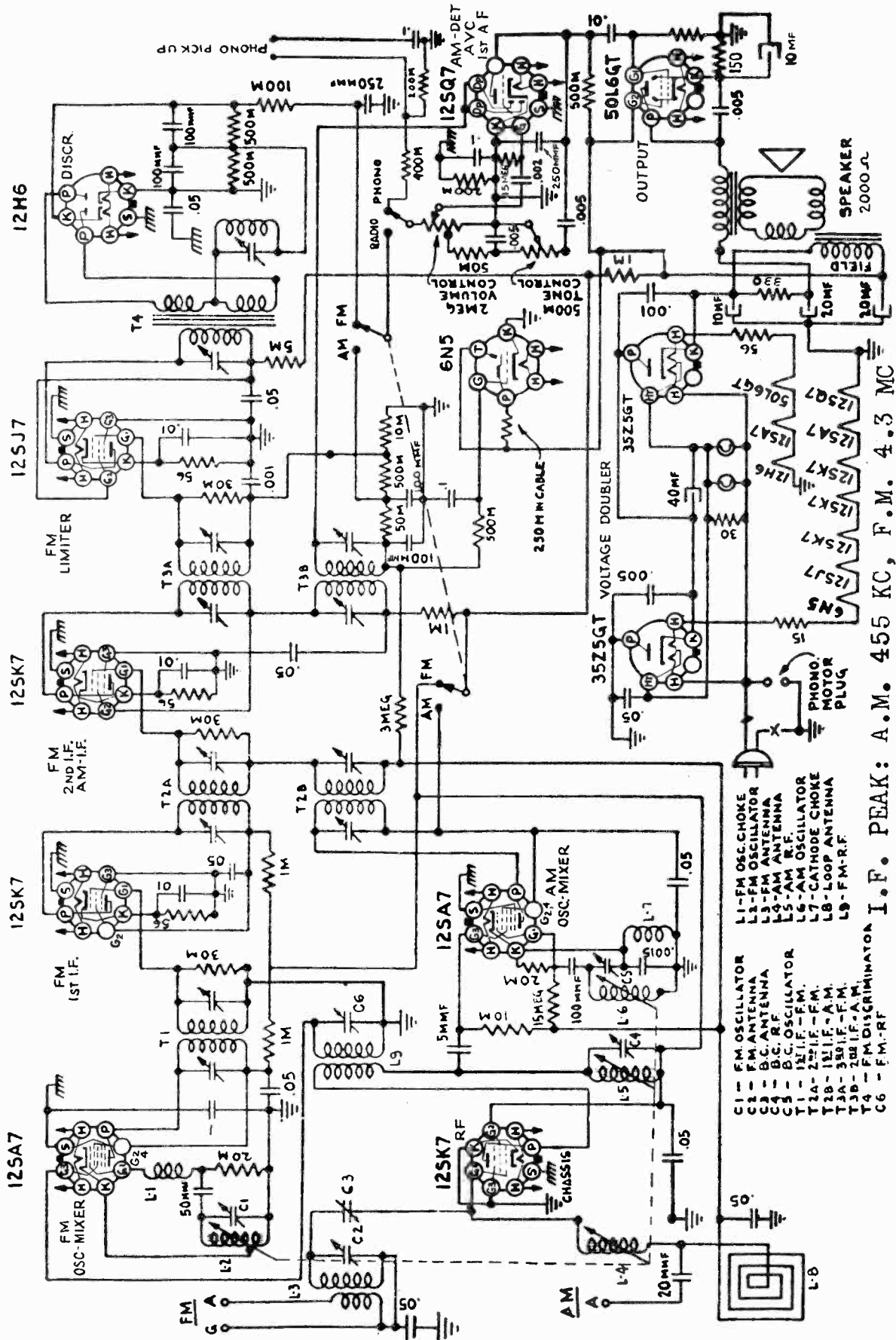
SOCKET LAY-OUT
MODEL 429 SERIES

INTERMEDIATE
FREQUENCY
PEAK
455 KC

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I. F. 455kc	12SA7 Grid	.1 mfd.	H. F. End	I. F. Transformers	Tune to Max.
1620kc.	Ext. Ant. Wire	200 mmf.	H. F. End	Oscillator Trimmer	Set Limit of Band
1400kc.	Ext. Ant. Wire	200 mmf.	1400	Antenna Trimmer	Tune to Max.

MODEL 446

DETROLA CORP.



- C1 - FM OSCILLATOR
- C2 - FM ANTENNA
- C3 - BC ANTENNA
- C4 - BC RF
- C5 - BC OSCILLATOR
- T1 - 1st I.F. - FM.
- T2A - 2nd I.F. - FM.
- T2B - 1st I.F. - AM.
- T3A - 3rd I.F. - FM.
- T3B - 2nd I.F. - AM.
- T4 - FM DISCRIMINATOR
- C6 - FM-RF
- L1 - FM OSC. CHOKE
- L2 - FM ANTENNA
- L3 - FM ANTENNA
- L4 - FM ANTENNA
- L5 - AM ANTENNA
- L6 - AM ANTENNA
- L7 - OSCILLATOR
- L8 - LOOP ANTENNA
- L9 - FM-RF

I.F. PEAK: A.M. 455 KC, F.M. 4.3 MC

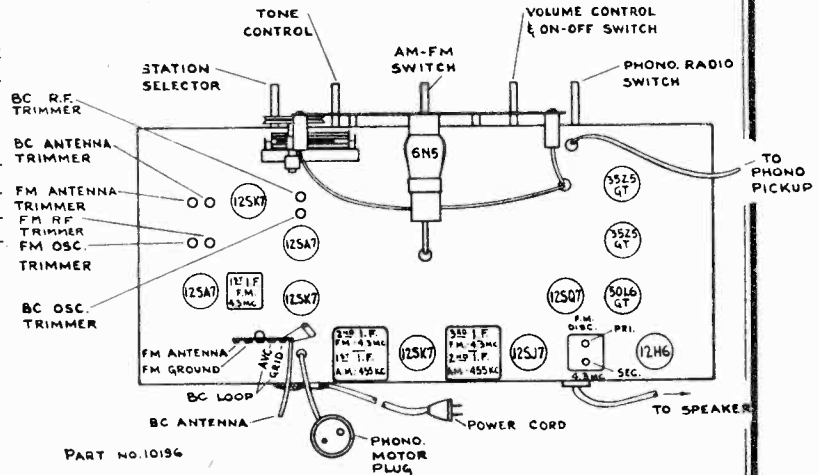
DETROLA CORP.

ALIGNMENT PROCEDURE

The alignment of this receiver is one of the most important operations performed by a service man. Follow all instructions and read all notes.

EQUIPMENT REQUIRED

1. Signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter: Must be vacuum tube voltmeter or a high impedance microampere indicating device.
3. A non-metallic screw driver.
4. Dummy antenna as specified.

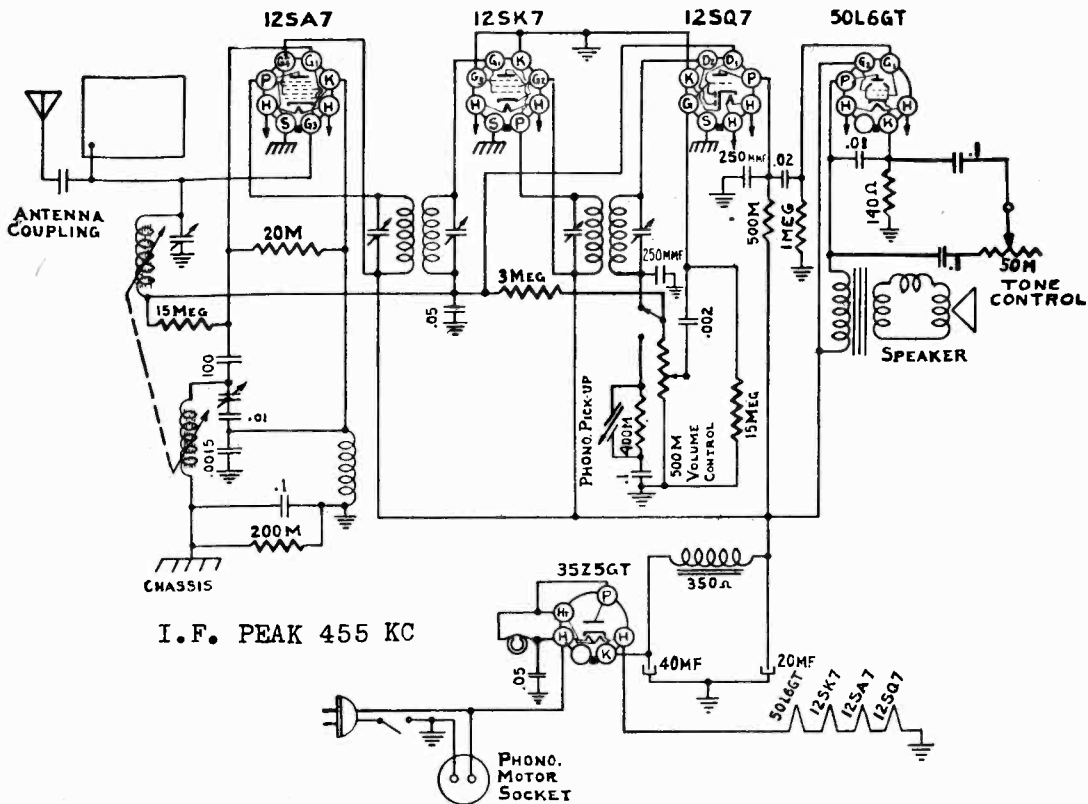


- ★ Connection is (B—) to No. 6 pin 12H6
- Connection is (B—) to No. 6 pin 12H6
- ‡ Coil adjusted by loosening screws and sliding coil

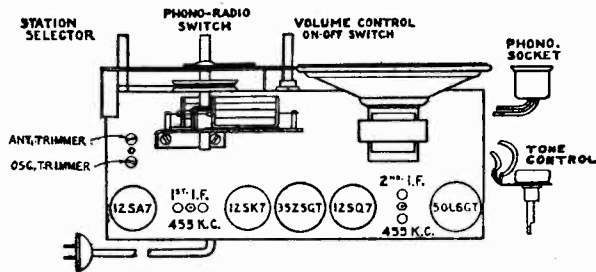
Operation Sequence	Generator Frequency	Output Meter Connection	Function	A.M. F.M. Switch	Dial Position	Dummy	Generator Connection	Trimmer
1	455 K.C.	Across Voice Coil	Tune to Maximum	A.M.	H.F. End	.1 Mfd.	A.M. 12SA7 Grid	A.M. I.F. 4 Trimmers
2	4.3 Meg.	A ★	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	12SJ7 Grid	Disc Pri.
3	4.3 Meg.	B ●	Tune to Minimum	F.M.	H.F. End	.1 Mfd.	12SJ7 Grid	Disc Sec.
4 Repeat Operations No. 2 and No. 3								
5	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	2nd I.F. 12SK7 Grid	3rd F.M. I.F. Trimmers
6	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	1st I.F. 12SK7 Grid	2nd F.M. I.F. Trimmers
7	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	F.M. Conv. 12SA7 Grid	1st F.M. I.F. Trimmers
8	540 K.C.	Across Voice Coil	Set Osc. To Scale	A.M.	L.F. End	.1 Mfd.	A.M. 12SA7 Grid	A.M. Osc. Trimmer
9	1000 K.C.	Across Voice Coil	To Calibrate Osc. Coil	A.M.	1000 K.C.	.1 Mfd.	A.M. 12SA7 Grid	Move Osc. Coil To Correct Calibration
10 Repeat Operation No. 8								
11	1400 K.C.	Across Voice Coil	Tune to Maximum	A.M.	1400 K.C.	.1 Mfd.	R.F. 12SK7 Grid	A.M. R.F. Trimmer
12	600 K.C.	Across Voice Coil	Move R.F. Coil to Track	A.M.	600 K.C.	.1 Mfd.	R.F. 12SK7 Grid	Move R.F. Coil ‡
13 Repeat Operation No. 11								
14	1400 K.C.	Across Voice Coil	Trim Ant. Loop Con. in Position	A.M.	1400 K.C.	200 Mmf.	A.M. Antenna	A.M. Ant. Trimmer
15	600 K.C.	Across Voice Coil	Move Ant. Coil to Track	A.M.	600 K.C.	200 Mmf.	A.M. Antenna	Move Ant. Coil To Track
16 Repeat Operation No. 14								
17	47. Meg.	A	Set Osc. To Scale	F.M.	47. Meg.	100 Ohms	F.M. Antenna	F.M. Osc. Trimmer
18	47. Meg.	A	Tune to Maximum	F.M.	47. Meg.	100 Ohms	F.M. Antenna	F.M. R.F. Trimmer
19	45 M.C.	A	Tune to Maximum	F.M.	45 M.C.	100 Ohms	F.M. Antenna	F.M. Ant. Trimmer

MODEL 448

DETROLA CORP.



I. F. PEAK 455 KC



SOCKET LAY-OUT

MAIN PARTS DESCRIPTION

#	DESCRIPTION
559	Reel—Antenna.....
1207	Retainer—Shaft.....
9546	Shaft—Drive.....
9073	Switch—Phono-radio.....
9473	Transformer 2nd I.F.....
9472	Transformer 1st I.F.....
9581	Tuner—Permeability.....
9733	Speaker—5" Dynamic.....
10179	Book—Instruction.....
9923	Book—Changer Instruction.....
7084	Crystal—Dial.....

ALIGNMENT PROCEDURE

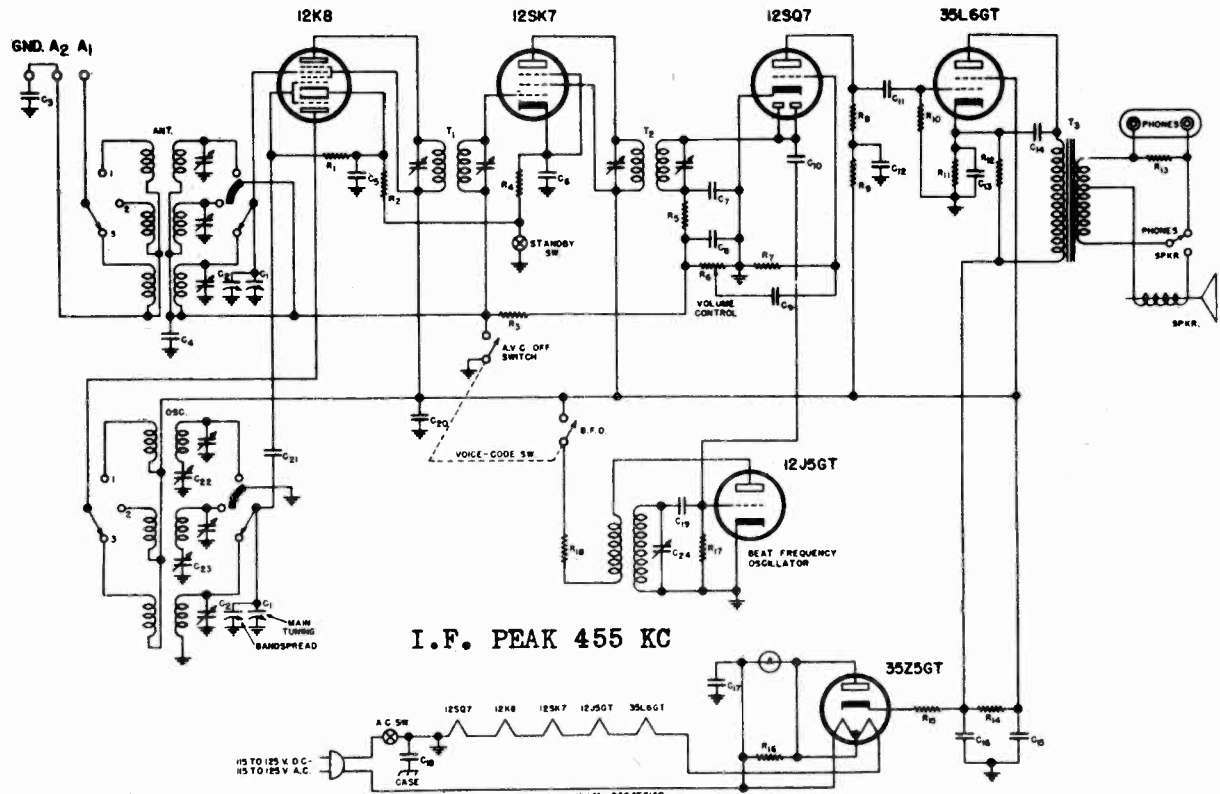
- Output meter connection.....Across speaker voice coil
- Connection of generator ground lead.....To Chassis
- Connection of generator out put lead.....See chart below
- Dummy antenna value to be used in series with generator.....See chart
- Position of volume control.....Full on (Clockwise)

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1720 KC	Antenna	200 mmf.	H. F. End (1720)	Oscillator Trimmer	Set Limit of Band
1400 KC	"	"	1400	Antenna Trimmer	Tune to Max.

Repeat above Alignment Procedure at least once.

ECHOPHONE RADIO MFG. CO.

MODEL EC-1

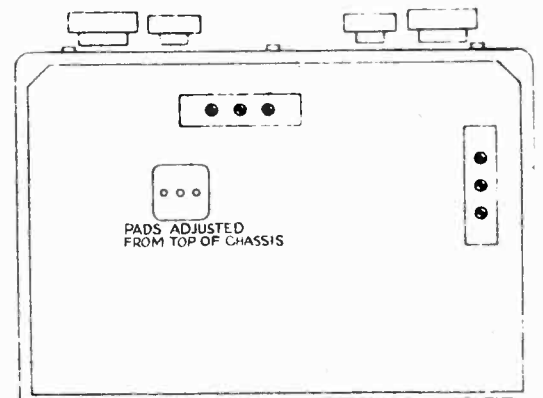
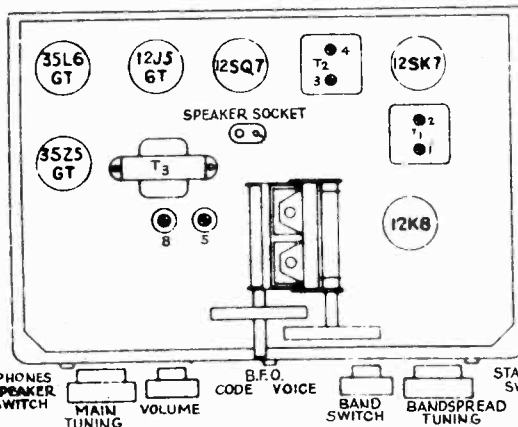


I.F. PEAK 455 KC

C1	530 mmf	Main tuning	16	40.	mfd	150	4	400
2		Band Spread	17	.02	mfd	400	5	50,000
3	.01 mfd	400	18	.25	mfd	200	6	500,000
4	.05 mfd	200	19	150	mmf	Section of C24	7	10,000,000
5	.02 mfd	400	20	.05	mfd	200	8	250,000
6	.05 mfd	200	21	50	mmf		9	100,000
7	100 mmf		22	600	mmf	Pad	10	500,000
8	100 mmf		23	1,900	mmf	Pad	11	150
9	.005 mfd	200	24	450	mmf	BFO Trimer	12	7,500
10	10 mmf						13	15
11	.01 mfd	400					14	750
12	.05 mfd	200					15	25
13	20. mfd	25	R1			50,000	16	300
14	.01 mfd	400	2			300	17	50,000
15	30. mfd	150	3			2,000,000	18	500



TRIMMER LOCATION



MODEL EC-1

ECHOPHONE RADIO MFG. CO.

Alignment Procedure

EQUIPMENT NEEDED FOR ALIGNING:

- * An all wave signal generator which will provide an accurately calibrated signal at test frequencies listed.
- * Output indicating meter.
- * Non-metallic screw driver.
- * Dummy antennas 400 ohm, 200 mmfd and .1 mfd.
- * Volume control - Maximum all adjustments.
- * Connect B - of radio chassis to ground post of signal generator through .1 mfd. condenser.
- * Connect Dummy antenna value in series with generator output lead.
- * Connect output meter across primary of output transformer.
- * Allow chassis and signal generator to "heat up" for several minutes.

BAND	Signal Generator Frequency Setting	Dummy Antenna	Pad	Trimmers	Adjustment
I. F.	455 kc	.1 mfd.	none	# 1-2-3-4 on top of IF can	Adjust to maximum output
1	600 kc 1800 kc	200 mmf 200 mmf	#5 none	none #6-7	maximum output maximum output
2	2.5 mc 7.0 mc	400 ohm 400 ohm	#8 none	none #9-10	maximum output maximum output
3	no padding condenser on this band 28 mc	400 ohm		#11-12	maximum output

Specifications

Power Consumption	35 watt
Power Output	600 milliwatts undistorted
Sensitivity (for .05 watts output)	20 microvolts average
Selectivity	54 kc at 1000 times down at 1000 kc
Frequency Range	545 kc to 30.5 mc
Intermediate Frequency	455 kc
Speaker	5 inch PM dynamic

NOTES ON OPERATION

ANTENNA: This receiver will require a piece of wire connected to A-1 terminal of the antenna terminal strip appearing on the rear apron of the receiver's chassis. Very satisfactory operation of the receiver throughout its 3 band tuning range will be secured by using an outside antenna approximately 50 to 75 feet long including leadin. This antenna should be erected as high as possible and removed from surrounding objects. Be sure the antenna is insulated from the ground at all points. For minimum interference it should be at right angles to street car lines, power lines and other electrical apparatus in the vicinity. When using this type of antenna the jumper between A2 and G terminals should remain connected. A doublet antenna can be used and should be connected to terminals A1 - A2. The jumper can remain connected between A2 and G or removed depending upon its favorable effect on reception. A ground can be connected to the G terminal and should be used only when it materially improves the operation of the receiver.

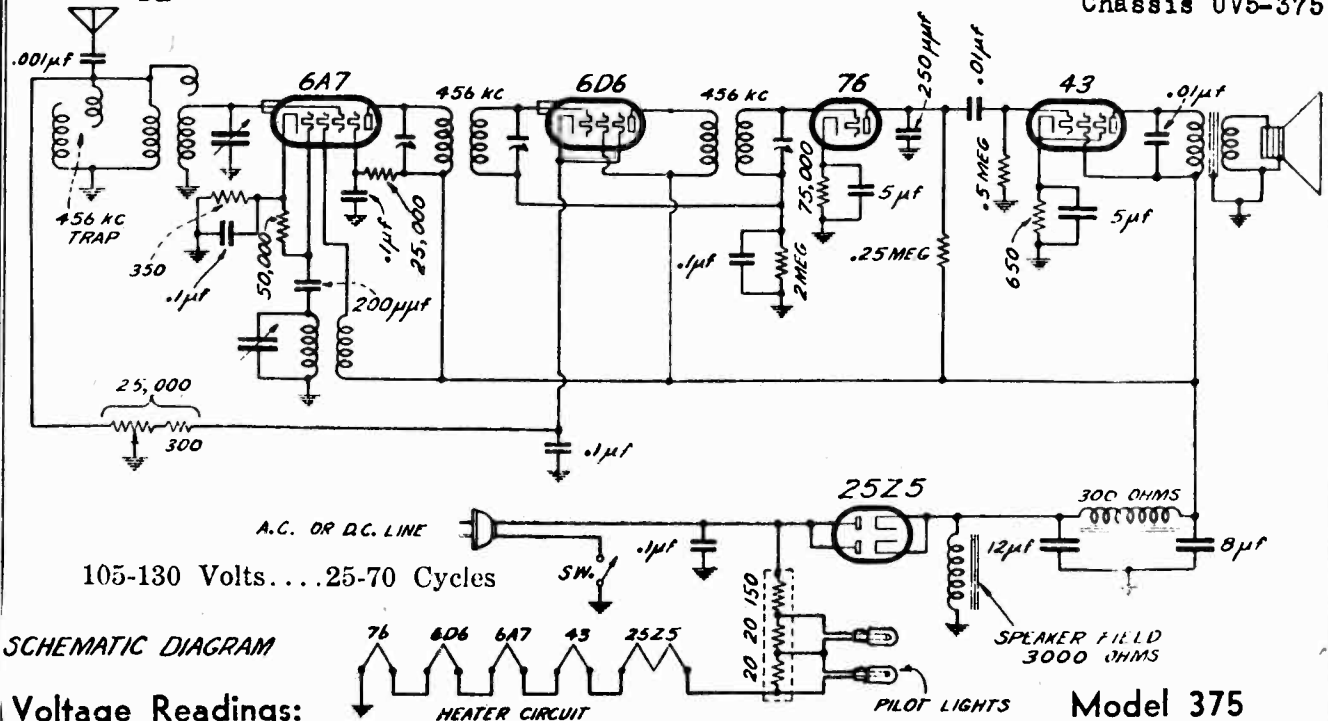
BANDSPREAD: This control will be of most help on the higher frequencies covered by bands 2 and 3. The bandspread control varies in much smaller quantities the capacity of the main tuning condenser. For fine adjustment the bandspread control will prove to be of great help. When this control is adjusted a pointer moves horizontally in front of a numbered scale which is at the bottom of the main dial. This scale can be used for reference points and should be used in conjunction with the logging scale appearing on the outer edge of the main dial. **NOTE:** The bandspread pointer should be left at 0 if the main dial calibration is to be accurate. When the bandspread control is used the main tuning dial pointer should be left at a frequency slightly higher than the desired signal - operating the bandspread control will then enable you to easily and accurately tune in the signal.

BFO - ON-OFF: CODE-VOICE switch in the ON position disconnects the automatic volume control or AVC circuit and also supplies a beat note for the copying of code or CW stations. This feature will be of help in locating weak broadcasting or phone signals. After they are located the switch should be thrown to the VOICE position which will remove the BFO whistle.

NOTE: The EC-1 Receiver can be used as a test code oscillator by connecting a Mackey in series with the phones. The BFO switch should be placed in the CODE position and a broadcast station carrier tuned in. Operation of the key will then provide a signal which will sound like CW code transmission.

STANDBY: This switch is used should the receiver be operated in conjunction with a transmitter and makes the receiver inoperative during transmission periods by removing the plate voltage from the tubes.

CHASSIS DB, DB1, EMERSON RADIO & PHONOGRAPH CORP. MODEL 375
Chassis UV5-375



SCHMATIC DIAGRAM

Voltage Readings:

Readings should be taken with volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements given are for a line voltage of 117.5 volts, 60 cycles and are measured from point indicated to ground with the antenna grounded to the metal chassis.

	Plate	Screen	Cathode	Suppressor	Osc. Plate
6A7 Oscillator-modulator	100	55	3	-----	100
6D6 I.f.	100	100	3	3	-----
76 Detector	50	-----	5	-----	-----
43 Output	90	100	14	-----	-----

Model 375

Chassis Model UV5-375

Tuning Range

540 to 1530 Kilocycles
(550 to 195 Meters)

IF PEAK 456 KC

Voltage across speaker field, 125 volts.

CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION RIDER'S VOLUME VIII.

The following tubes are employed:

- 1 — 6A7 Oscillator-modulator.
- 1 — 6D6 I-f amplifier.
- 1 — 76 Detector and automatic overload control.
- 1 — 43 Pentode power output tube.
- 1 — 25Z5 Dual half-wave rectifier.

Part No.	Description		
KKT-134	Antenna coil		
KKT-135	Oscillator coil	GGR-128	Ballast resistor
UUT-180	First i-f transformer	PPC-200	Variable condenser
UUT-181	Second i-f transformer	PPC-201	Combination by-pass and filter condenser
KKT-138	Filter choke	KS-38B	5" Dynamic speaker
PPR-168	Volume control	KL-6	Pilot light

CHASSIS DB, DB1, DL
PRODUCTION CHANGES

DB and DB1 chassis which use second i-f transformer, part number: 7BT-489 or 7FT-513B may use 7BT-550B for replacement. In DB and DB1 chassis bearing serial numbers below 2,817,946, resistor R2, 15 megohms, was not used.

DL chassis which use (a) first i-f, part number 6JT-466DU may use 7BT-488 for replacement. (b) second i-f transformer, part number 6XT-514, may use 7BT-550B for replacement. (c) dual electrolytic, part number 6JC-466AU or 6JC-466D may use 6JC-426C for replacement.

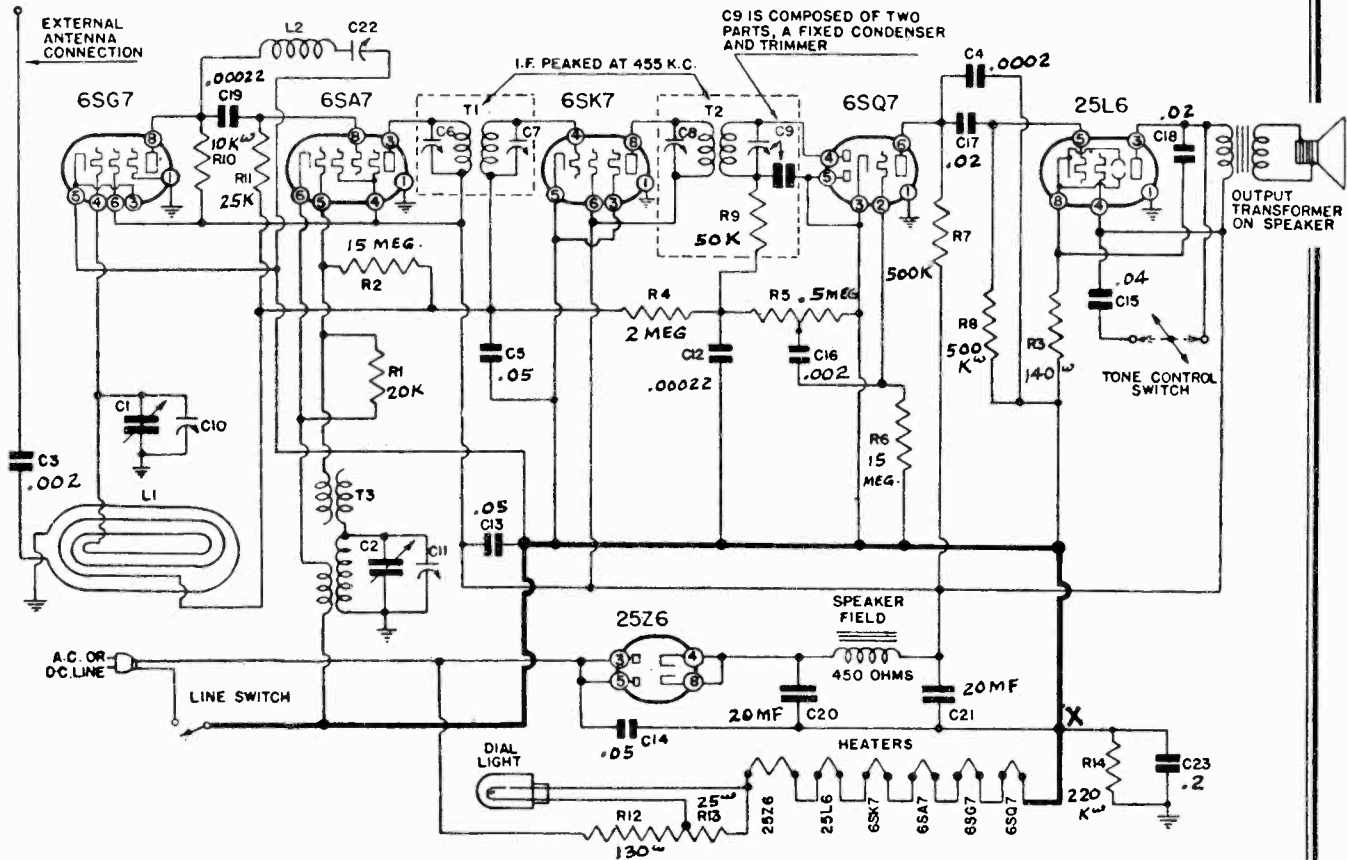
MODELS GA-439, GA-441

Chassis GA

EMERSON RADIO & PHONOGRAPH CORP.

MODELS GA1-439, GA1-441

Chassis GA1



SCHEMATIC DIAGRAM FOR MODELS GA AND GA1

Note: 1—On Model GA R14 and C23 are omitted and point "X" as indicated in schematic is connected to chassis.

SEE NOTES ON ALTERNATE TUBES USED.
FOR OTHER DATA SEE INDEX

REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION	†C10, C11		
L1	7BW-179	Loop assembly	†C12, C19	4XC-394A	Trimmers, part of variable condenser.
L2	9LT-619A	455 k.c. wave-trap (GA)	C13	BC-12	0.00022 mica condenser
L2	9LT-619B	455 k.c. wave-trap (GA1)	C14	LC-64	0.05 mf, 200 volt tubular condenser
T1	8CT-566E	Double-tuned 455 k.c. first i-f transformer (GA1)	C15	9PC-554	0.05 mf, 400 volt tubular condenser
T1	8CT-566D	Double-tuned 455 k.c. first i-f transformer (GA)	C17, C18	LC-65	0.04 mf, 200 volt tubular condenser
T2	9HT-638B	Double-tuned 455 k.c. second i-f transformer	†C19	4XC-394A	0.00022 mica condenser
T3	10BT-666A	Oscillator coil (GA1)	C20, C21	6JC-426Q	Dual 20 mf, 150 volt, dry electrolytic condenser
T3	10BT-666	Oscillator coil (GA)	†C22		Trimmer, part of L2.
R1	LR-60	20,000 ohm 1/4 watt carbon resistor	C23	2CC-208	0.2 mf, 200 volt tubular condenser
R2, R6	4XR-327	15 megohm 1/4 watt carbon resistor		9HS-541	5" dynamic speaker (GA-439)
R3	3FR-293	140 ohm 1/4 watt wire-wound resistor		9HS-549A	4"x6" oval dynamic speaker (GA-441)
R4	HR-42	2 megohm 1/4 watt carbon resistor		9PS-602	5" dynamic speaker (GA1-439)
R5	9PR-447	Volume control .5 meg. (Model 431)		9PS-601	4"x6" oval dynamic speaker (GA1-441)
R5	9PR-447A	Volume control .5 meg. (Model 439)		9PS-551A	Tone control switch (GA-439, GA1-439)
R7, R8	KR-56	500,000 ohm 1/4 watt carbon resistor		9PS-551	Tone control switch (GA-441, GA1-441)
R9		50,000 ohm 1/4 watt carbon resistor, part of T2.		9PS-550B	Line switch (GA-439, GA1-439)
R10	LR-65	10,000 ohm 1/4 watt carbon resistor		9PS-550	Line switch (GA-441, GA1-441)
R11	OR-73	25,000 ohm 1/4 watt carbon resistor			DIAL PARTS
R12, R13	9HR-489	Ballast resistor: R12—130 ohm, 12.5 watt; R13—25 ohm, 2.5 watt.		9PB-80B	Pilot light socket
R14	10TR-485	220,000 ohm 1/4 watt carbon resistor		6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47
C1, C2	9PC-533	Two-gang variable condenser		9HH-83A	Drive shaft (GA-439, GA1-439)
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser		9HH-83	Drive shaft (GA-441, GA1-441)
C4	5AC-384	0.0002 mf, 600 volt tubular condenser		6QZ-863	Drive cord
C5	BC-12	0.05 mf, 200 volt tubular condenser		6QW-169	Drive cord spring
†C6, C7, C8, C9		Trimmers, part of i-f transformers.		9PD-145B	Glass dial (GA-439, GA1-439)
				9PD-145A	Glass dial (GA-441, GA1-441)

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

EMERSON RADIO & PHONOGRAPH CORP.

MODELS GA-439, GA-441
Chassis GA
MODELS GA1-439, GA1-441
Chassis GA1

ADJUSTMENTS

An oscillator with frequencies of 455, 600 and 1400 kc is required.

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

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

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the loop antenna. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the 25L6 tube. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna loop and the oscillator coil are located on the variable condenser. The front section is for the oscillator. The rear section is for the antenna loop. The oscillator coil is located beneath the chassis deck.

The 455 kc wave-trap is located below the chassis deck.

I-f and Wave-trap Alignment

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

Feed 455 kc to the external antenna lead and adjust the wave-trap for minimum response.

R-f Alignment

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

VOLTAGE ANALYSIS

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

Tube	Plate	Screen	Cathode	Fil.
6SG7 or 7H7	87	39	0	6.3
6SA7	87	87	0	6.3
6SK7 or 7A7	87	87	0	6.3
6SQ7 or 7B6	32	—	0	6.3
25L6	79	87	6.0	25

Voltage at 25Z6 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

DESCRIPTION

TYPE: Single-band superheterodyne.
FREQUENCY RANGE: 540-1630 kc.
NUMBER OF TUBES: Six.

TYPE OF TUBES:

- 1—6SG7 or *7H7, r-f amplifier
- 1—6SA7, pentagrid oscillator-modulator
- 1—6SK7 or *7A7, i-f amplifier
- 1—6SQ7 or *7B6, diode detector, a-f amplifier, a.v.c.
- 1—25L6, beam power output
- 1—25Z6, half-wave rectifier.

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

*Some receivers use lock-in tubes instead of equivalent octal types. Due to different socket requirements these tubes are not directly interchangeable.

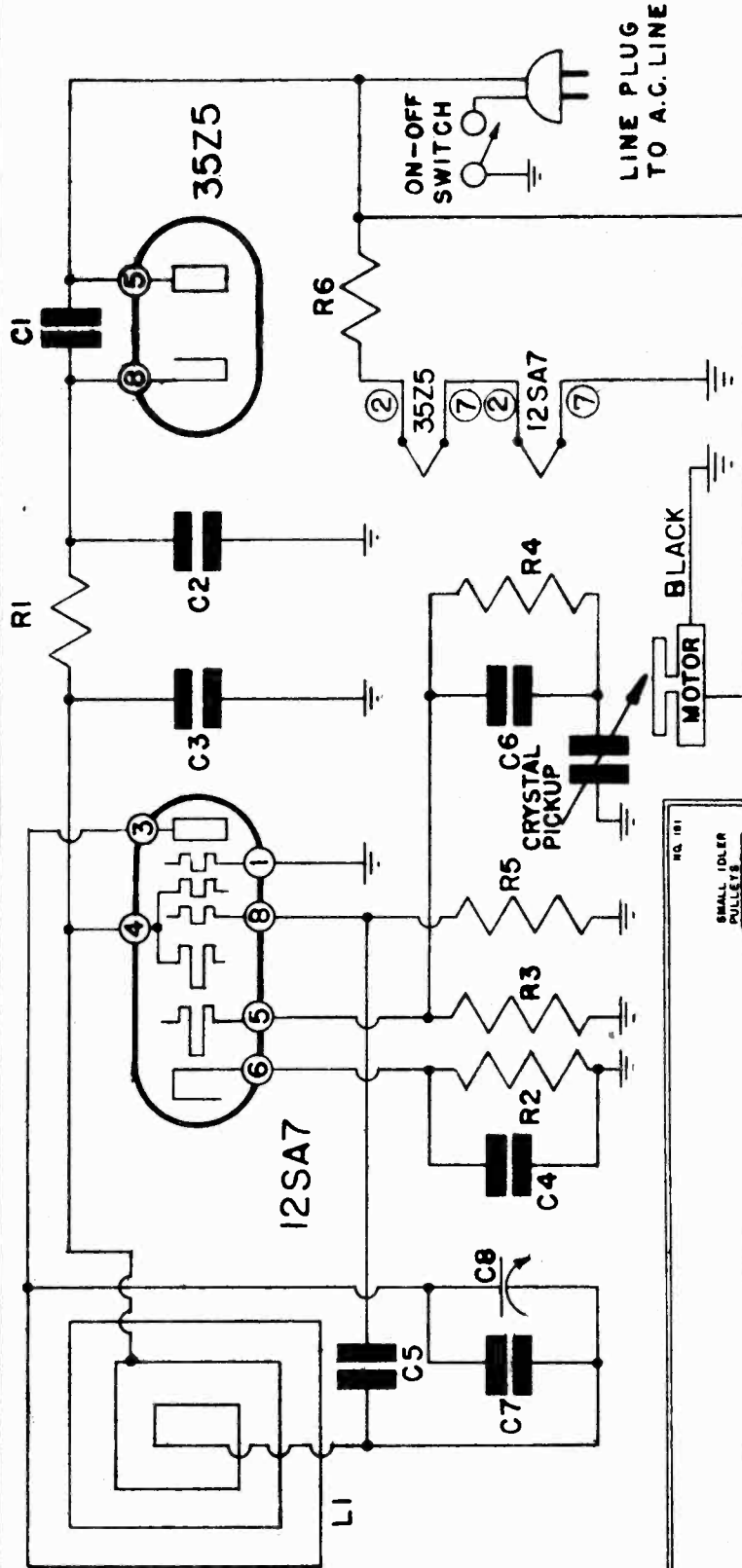
GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.
4. The self-contained loop antenna has directional properties. It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.

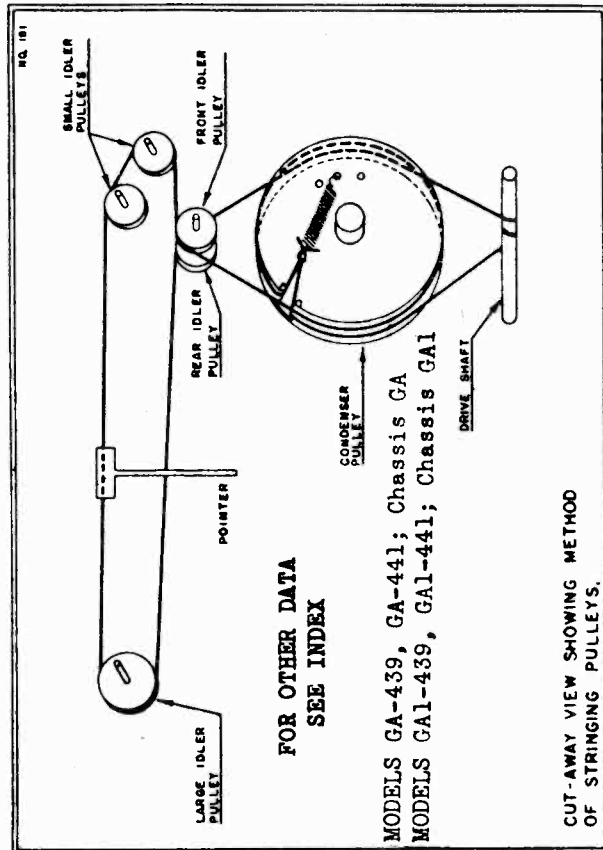
MODEL GJ-449,
Chassis GJ

EMERSON RADIO & PHONOGRAPH CORP.

MODELS GA-439, GA-441
Chassis GA
MODELS GAL-439, GAL-441
Chassis GAL



ITEM	PART NO.	DESCRIPTION
C1	EEG-132	.1 MF. 400 VOLT TUBULAR CONDENSER
C2	2CC-208	.2 MF. 200 VOLT "
C3	6YC-450	40 MF. 135 VOLT ELECTROLYTIC COND.
C4	1C-43A	5 MF. 25 VOLT "
C5	GRC-441	.00045 MICA CONDENSER TYPE "W"
C6	75C-500	.000 025 MF. MICA CONDENSER TYPE "O"
C7	5LC-410A	.000 11 MF. "
C8	10JC-567	TRIMMER CONDENSER
R1	LR-64	5000 OHM 1/4 WATT
R2	KR-50	500 OHM 1/4 WATT
R3	KR-56	500,000 OHM 1/4 WATT
R4	3RR-274	5 MEGOHM 1/4 WATT
R5	LR-60	20,000 OHM 1/4 WATT
R6	10JR-467	METAL CLAD BALLAST RESISTOR



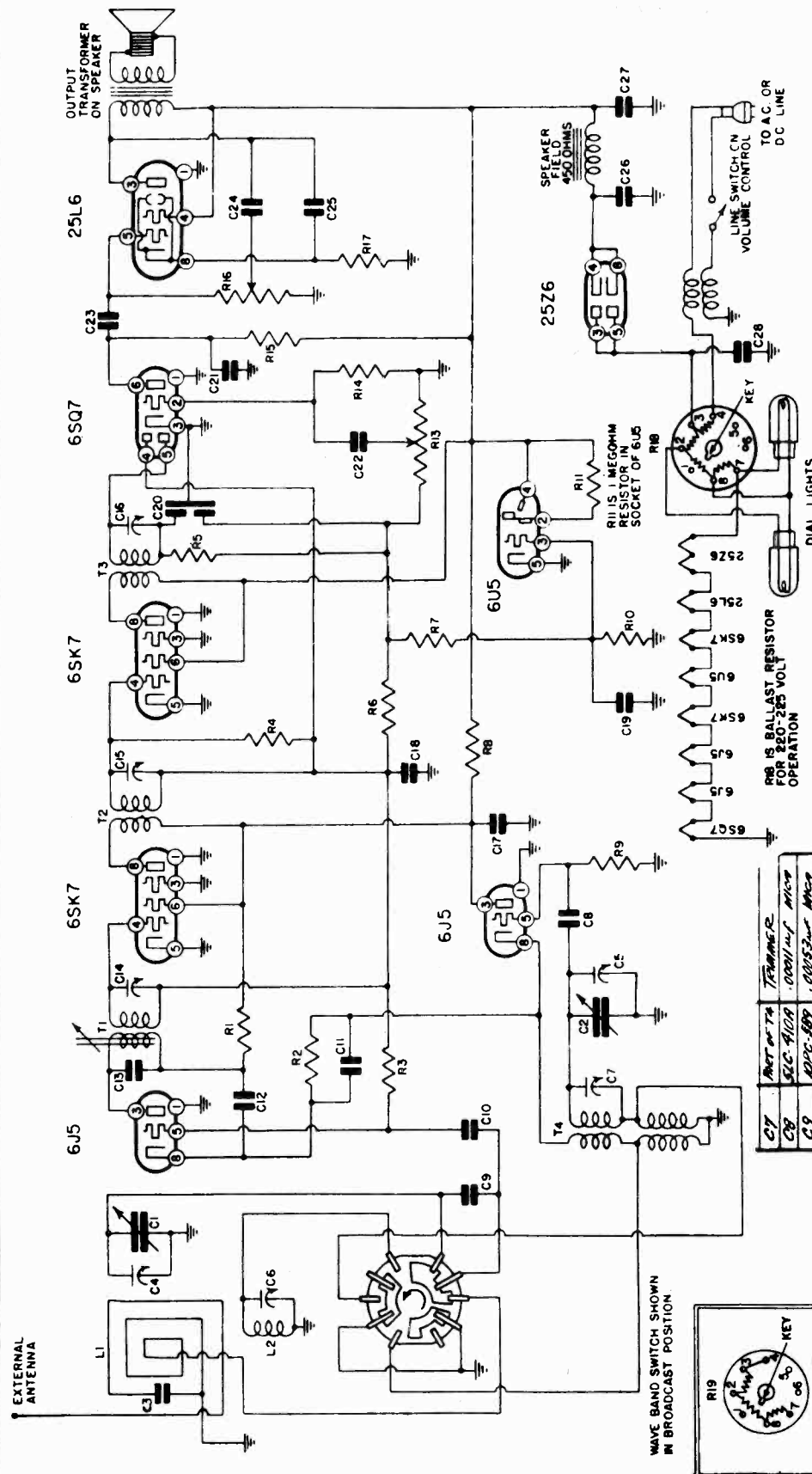
FOR OTHER DATA
SEE INDEX

MODELS GA-439, GA-441; Chassis GA
MODELS GAL-439, GAL-441; Chassis GAL

CUT-AWAY VIEW SHOWING METHOD
OF STRINGING PULLEYS.

MODEL GU-446.
Chassis GU

EMERSON RADIO & PHONOGRAPH CORP.



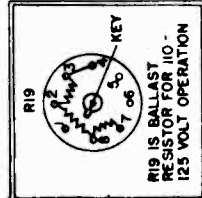
Part No.	Description
R1	10MΩ-471 Volume Control
R2	47K-317 15 MEG 1/4W.
R3	22K-278 470,000 1/4W.
R4	10MΩ-472 TONE CONTROL
R5	31K-273 150 1/2W.
R6	10MΩ-511 BALLAST RES 200-225
R7	10MΩ-510 BALLAST RES 10-105

Part No.	Description
C1	500PF-649
C2	100PF-651
C3	100PF-652 1st I.F. TRANS.
C4	100PF-653 2nd I.F. TRANS.
C5	100PF-654 COS. COIL
C6	10MΩ-576 VARIABLE
C7	3MΩ-274 0.02 μF 600V.
C8	100PF-022 TRIMMER
C9	100PF-022 TRIMMER
C10	100PF-022 TRIMMER
C11	100PF-022 TRIMMER
C12	100PF-022 TRIMMER
C13	100PF-022 TRIMMER
C14	100PF-022 TRIMMER
C15	100PF-022 TRIMMER
C16	100PF-022 TRIMMER
C17	100PF-022 TRIMMER
C18	100PF-022 TRIMMER
C19	100PF-022 TRIMMER
C20	100PF-022 TRIMMER
C21	100PF-022 TRIMMER
C22	100PF-022 TRIMMER
C23	100PF-022 TRIMMER
C24	100PF-022 TRIMMER
C25	100PF-022 TRIMMER
C26	100PF-022 TRIMMER
C27	100PF-022 TRIMMER
C28	100PF-022 TRIMMER

Part No.	Description
R1	10,000 1/4W.
R2	22,000 1/4W.
R3	47,000 1/4W.
R4	100,000 1/4W.
R5	200,000 1/4W.
R6	470,000 1/4W.
R7	1,000 1/4W.
R8	100,000 1/4W.
R9	10,000 1/4W.
R10	10,000 1/4W.
R11	1,000,000 1/4W.

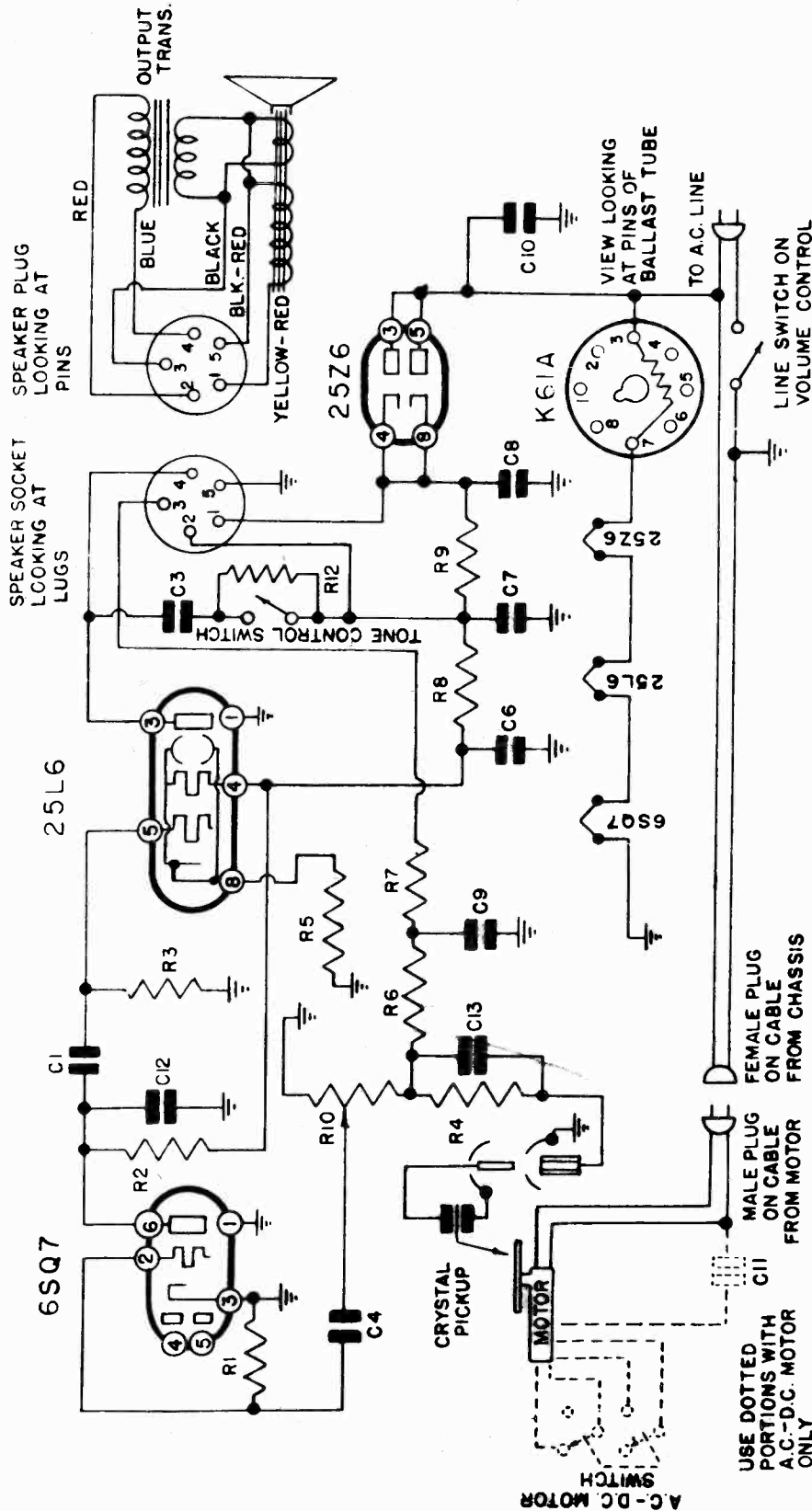
Item	Part No.	Description
L1	100MΩ-390	Loop Antenna
L2	100PF-649	5.0 Antenna Coil
T1	100PF-651	1st I.F. TRANS.
T2	100PF-652	2nd I.F. TRANS.
T3	100PF-653	3rd I.F. TRANS.
T4	100PF-654	COS. COIL
C1, C2	10MΩ-576	VARIABLE
C3	3MΩ-274	0.02 μF 600V.
C4	100PF-022	TRIMMER
C5	100PF-022	TRIMMER
C6	100PF-022	TRIMMER

I.F. PEAK 455 KC



MODEL GL-457,
Chassis GL

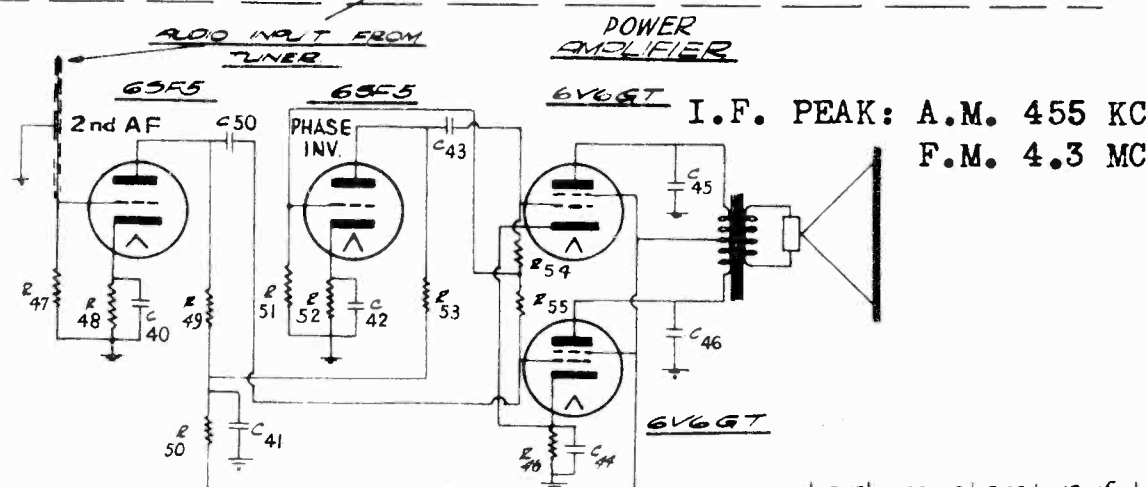
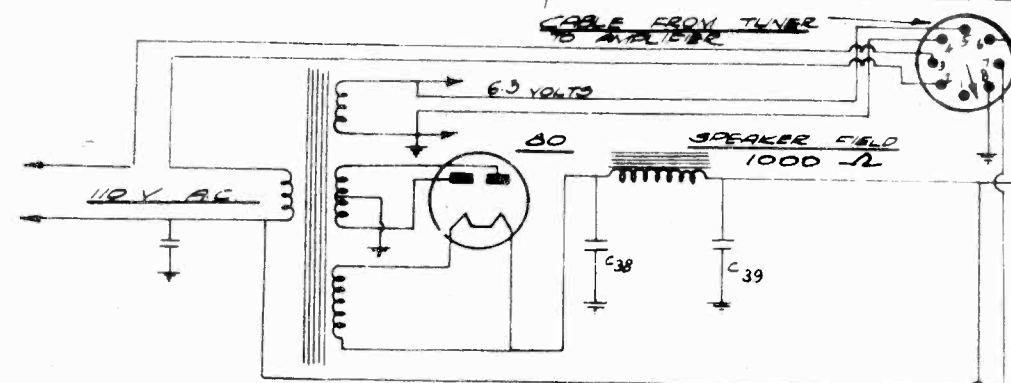
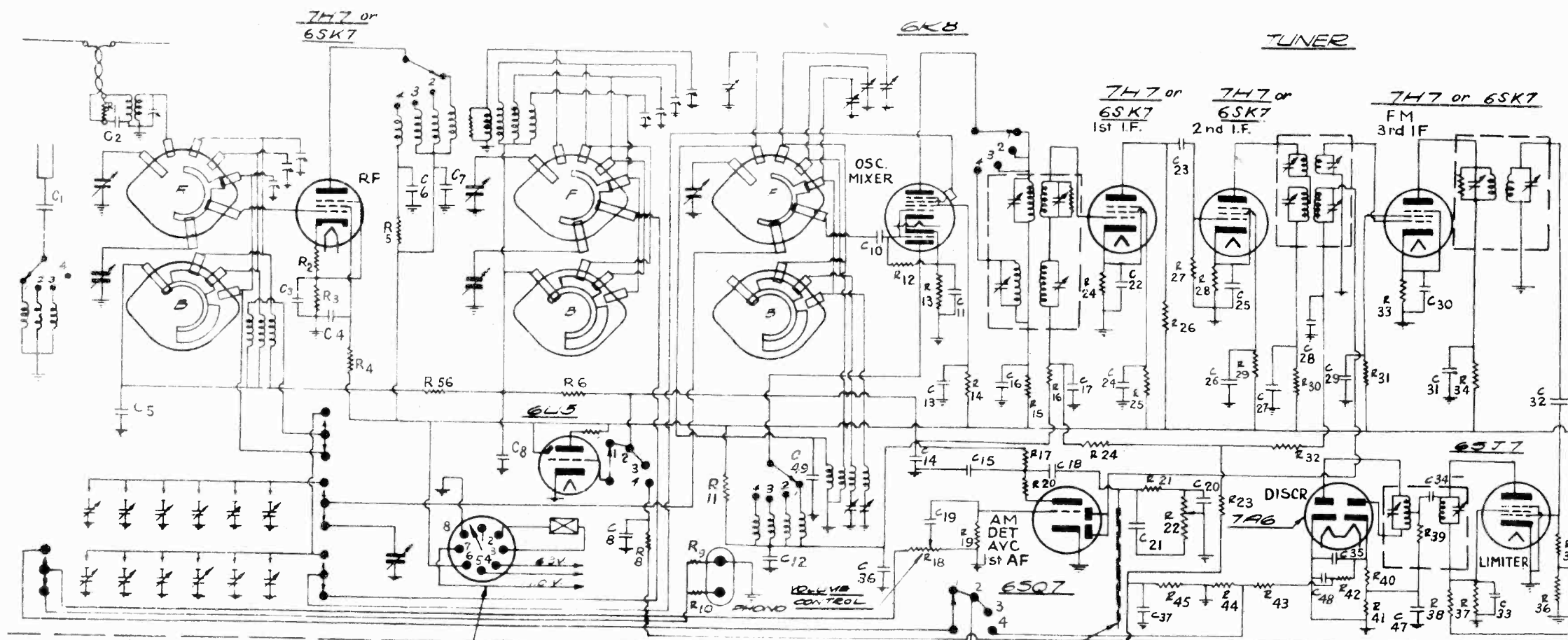
EMERSON RADIO & PHONOGRAPH CORP.



ITEM	PART NO.	DESCRIPTION
R1	4XR-327	15 MEG. 1/4 W
R2	9ZR-47B	470,000 1/4 W
R3	9ZR-47B	470,000 1/4 W
R4	9ZR-479	2.2 MEG. 1/4 W
R5	9ZR-481	150 Ω 1/2 W W.W.
R6	KR-57	1 MEG. 1/4 W
R7		47,000 1/4 W
R8	7UR-39A	2,200 1/4 W
R9	9YR-495	180 1 W
R10	9YR-459	VOLUME CONTROL
R11	K-61-A	BALLAST TUBE
R12	7UR-39A	2,200 1/4 W
C1	LC-65	.02 MFD. 400V.
C2	BC-12	.05 MFD. 200V.
C3	BC-12	.05 MFD. 200V.
CA	3HC-27A	.002 MFD. 600V
C4		
C5		
C6	9JC-513D	20 MFD. 150V.
C7	"	40 MFD. 150V.
C8	"	20 MFD. 150V.
C9	FC-25	.02 MFD. 200V.
C10	LC-64	.05 MFD. 400V.
C11	BC-12	.05 MFD. 200V.
C12	IC-47	.0005 MFD MKA
C13	4XC-394A	.00022 MFD MKA
SW1	9YS-665B	TONE CONTROL SWITCH

ESPEY MFG. CO., INC.

MODEL 1141 with 7H7 Octals
MODEL 1141 with 6SK7 Octals

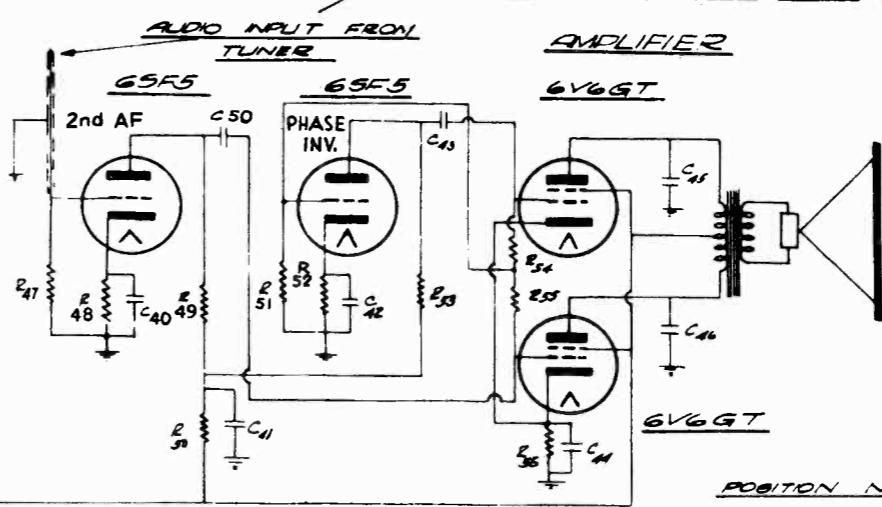
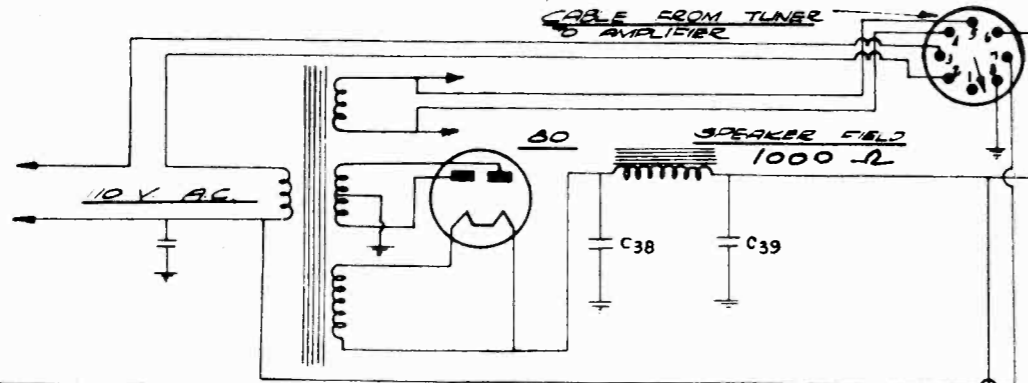
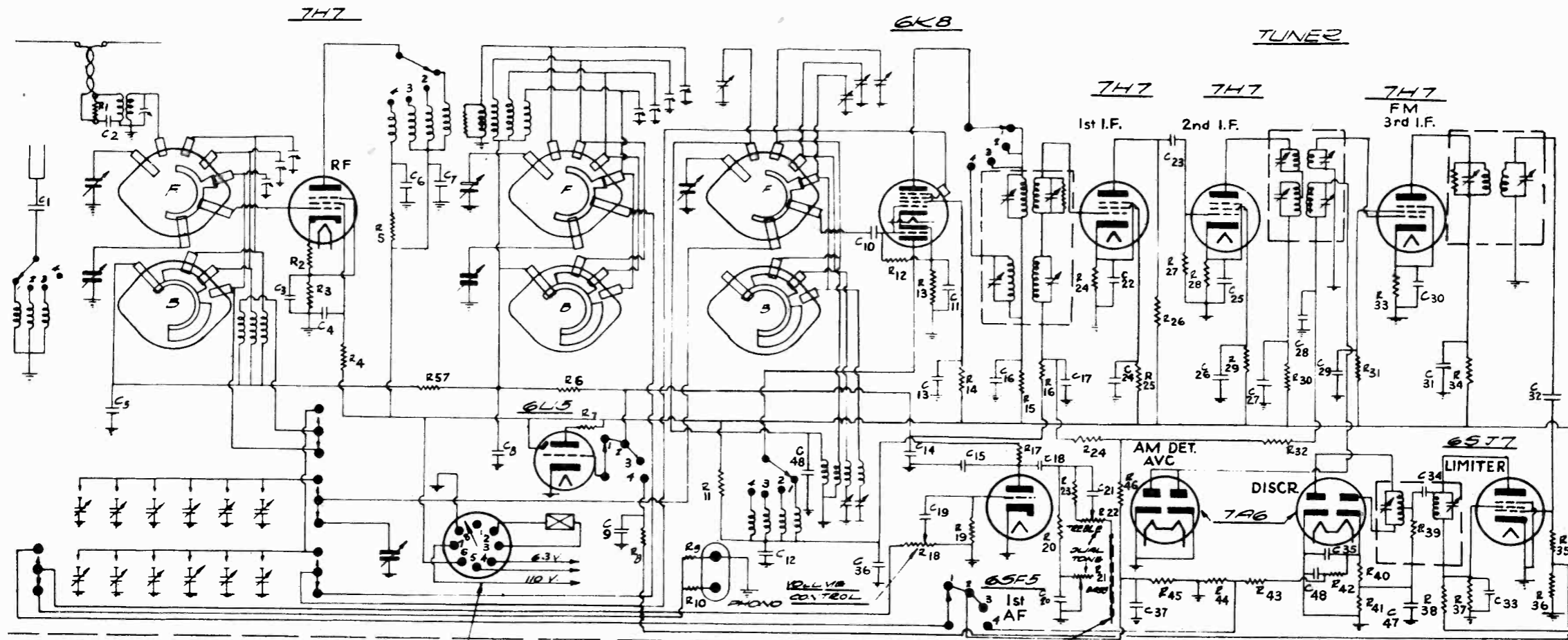


I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

- POSITION No. 1. - BROADCAST
- POSITION No. 2. - POLICE BAND
- POSITION No. 3. - 31-METER BAND
- POSITION No. 4. - F.M.

F = FRONT OF BAND SWITCH
B = BACK OF BAND SWITCH
BAND SWITCH SHOWN IN BROADCAST POSITION

R1	1000Ω	C1	.001μf	R4	25KΩ	C16	.02μf	R22	1000Ω	C20	.0001μf	R42	100KΩ	C49	10μf
R2	50Ω	C2	.00025μf	R5	1000Ω	C17	.0001μf	R23	30KΩ	C21	.05μf	R43	100KΩ	C50	.01μf
R3	100Ω	C3	.05μf	R6	100KΩ	C18	.05μf	R24	1000Ω	C22	.05μf	R44	5000Ω	C51	.25μf
R4	30KΩ	C4	.02μf	R7	250KΩ	C19	.02μf	R25	30KΩ	C23	.05μf	R45	250Ω	C52	.006μf
R5	1000Ω	C5	.02μf	R8	1/2 MΩ	C20	.02μf	R26	50KΩ	C24	.30μf	R46	240Ω	C53	.006μf
R6	100KΩ	C6	.02μf	R9	5 MEG	C21	.006μf	R27	500Ω	C25	.02μf	R47	50KΩ	C54	100μf
R7	1MEG	C7	.1μf	R10	250,000Ω	C22	.015μf	R28	1000Ω	C26	.10μf	R48	2000Ω	C55	100μf
R8	1MEG	C8	.02μf	R11	5000Ω	C23	.02μf	R29	25,000Ω	C27	.20μf	R49	100KΩ	C56	5μf 3%
R9	50KΩ	C9	.05μf	R12	500,000Ω	C24	.05μf	R30	20,000Ω	C28	.20μf	R50	50KΩ	C57	.01μf
R10	250KΩ	C10	.50μf	R13	100,000Ω	C25	.0001μf	R31	12,000Ω	C29	.10μf	R51	800Ω		
R11	0KΩ	C11	.05μf	R14	200Ω	C26	.05μf	R32	12,000Ω	C30	.16μf	R52	100KΩ		
R12	50KΩ	C12	.05μf	R15	30KΩ	C27	.05μf	R33	50KΩ	C31	.16μf	R53	250KΩ		
R13	200Ω	C13	.05μf	R16	4000Ω	C28	.05μf	R34	100KΩ	C32	.10μf	R54	250KΩ		
				R17	1/2MEG	C29	.05μf	R35	100KΩ	C33	.16μf	R55	250KΩ		



R1	100K	C1	.001μ	R17	250K	C17	.02μ	R33	500K	C33	.02μ	R49	100K	C49	5μ	(10)
R2	50K	C2	.0005μ	R18	1/2 MEG	C18	.02μ	R34	1000K	C34	10μ	R50	50K	C50	1μ	
R3	100K	C3	.05μ	R19	5 MEG	C19	.0005μ	R35	25,000K	C35	20μ	R51	100K			
R4	30K	C4	.02μ	R20	5000K	C20	1μ	R36	20,000K	C36	20μ	R52	2000K			
R5	1000K	C5	.02μ	R21	250,000K	C21	.005μ	R37	1,000K	C37	100μ	R53	100K			
R6	100K	C6	.02μ	R22	250,000K	C22	.05μ	R38	2,000K	C38	16μ	R54	250K			
R7	1 MEG	C7	.1μ	R23	100K	C23	.001μ	R39	50K	C39	16μ	R55	250K			
R8	1 MEG	C8	.02μ	R24	200K	C24	.05μ	R40	100K	C40	10μ	R56	250K			
R9	50K	C9	.05μ	R25	30K	C25	.05μ	R41	100K	C41	16μ	R57	250K			
R10	250K	C10	.05μ	R26	4000K	C26	.05μ	R42	100K	C42	10μ	R58	250K			
R11	10K	C11	.05μ	R27	1/2 MEG	C27	.05μ	R43	100K	C43	.01μ	R59	250K			
R12	50K	C12	.05μ	R28	1000K	C28	.001μ	R44	5000K	C44	25μ	R60	250K			
R13	25K	C13	.02μ	R29	30K	C29	.05μ	R45	250K	C45	.006μ	R61	250K			
R14	1000K	C14	.001μ	R30	100K	C30	.05μ	R46	250K	C46	.006μ	R62	250K			
R15	100K	C15	.05μ	R31	30K	C31	.05μ	R47	50K	C47	100μ	R63	250K			
R16	100K	C16	.05μ	R32	50K	C32	.05μ	R48	2000K	C48	100μ	R64	2000K			

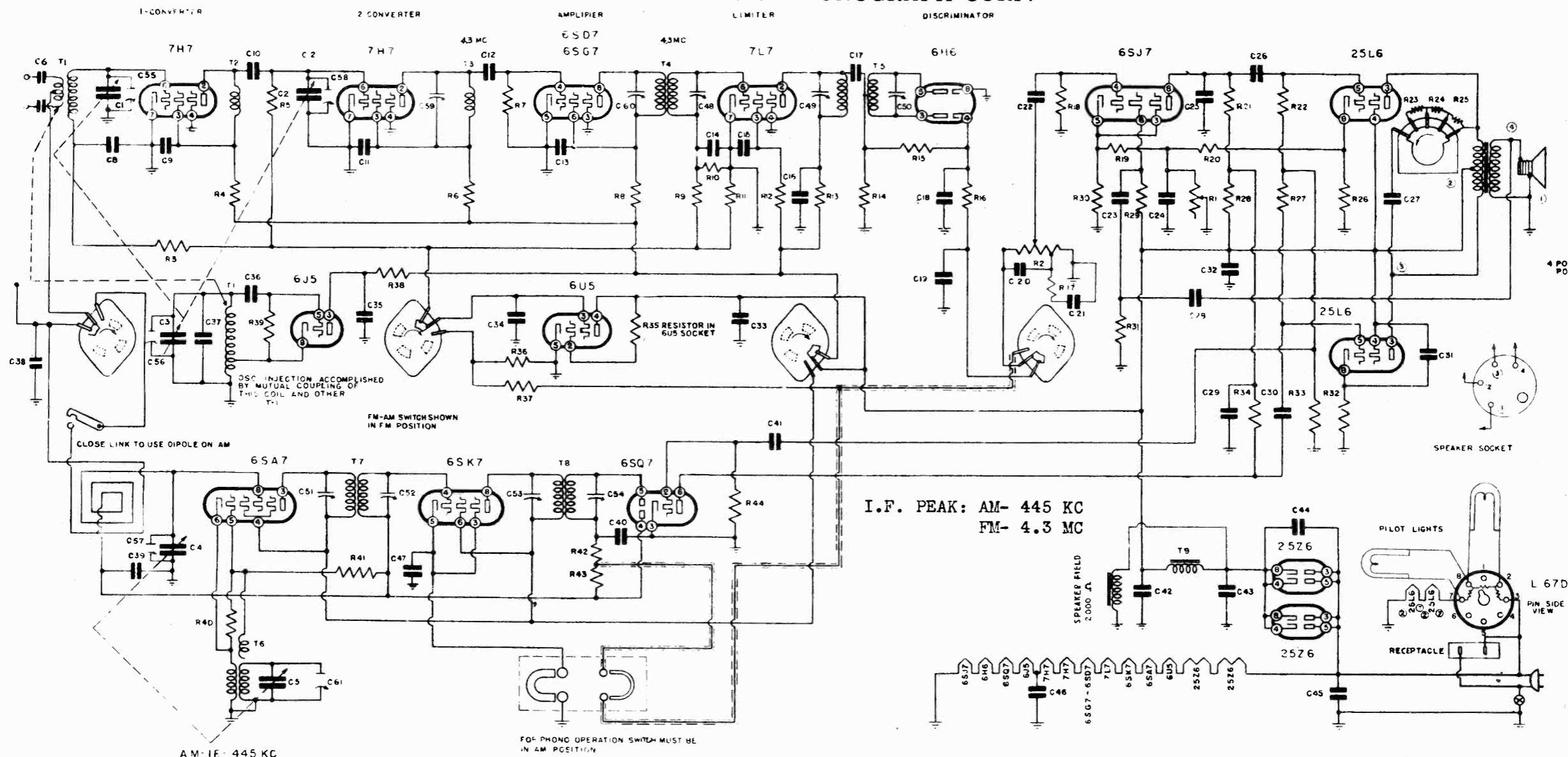
R1 - IN 6U5 SOCKET
 CM - PART OF TRIMMER

I.F. PEAK: A.M. 455 KC
 F.M. 4.3 MC

POSITION NO.1 BROADCAST
 POSITION NO.2 POLICE BAND
 POSITION NO.3 31M. BAND
 POSITION NO.4 F.M.
 F - FRONT OF BAND SWITCH
 B - BACK OF BAND SWITCH
 BAND SWITCH SHOWN IN BROADCAST POSITION

EMERSON RADIO & PHONOGRAPH CORP.

MODEL FM-460:
Chassis FM



SYMBOL DESCRIPTION

T1	FM OSC & ANTENNA COIL
T2	FM 2nd R-F COIL
T3	FM 1st I-F COIL
T4	FM 2nd I-F COIL
T5	FM DISCRIMINATOR TRANS.
T6	AM OSC COIL
T7-	AM 1st I-F TRANS.
T8	AM 2nd I-F TRANS.
T9	IRON CORE FILTER CHOKE
L-1	LOOP ANTENNA
C1, C2, C3	FM 3 GANG VARIABLE
C4, C5	AM 2 GANG VARIABLE
C6	.00006 mf MICA TYPE "C"
C7	.00006 mf MICA TYPE "C"
C8	.0005 mf MICA TYPE "W"
C9	.002 mf MICA TYPE "W"
C10	.0005 mf MICA TYPE "W"
C11	.002 mf MICA TYPE "W"
C12	.0005 mf MICA TYPE "W"

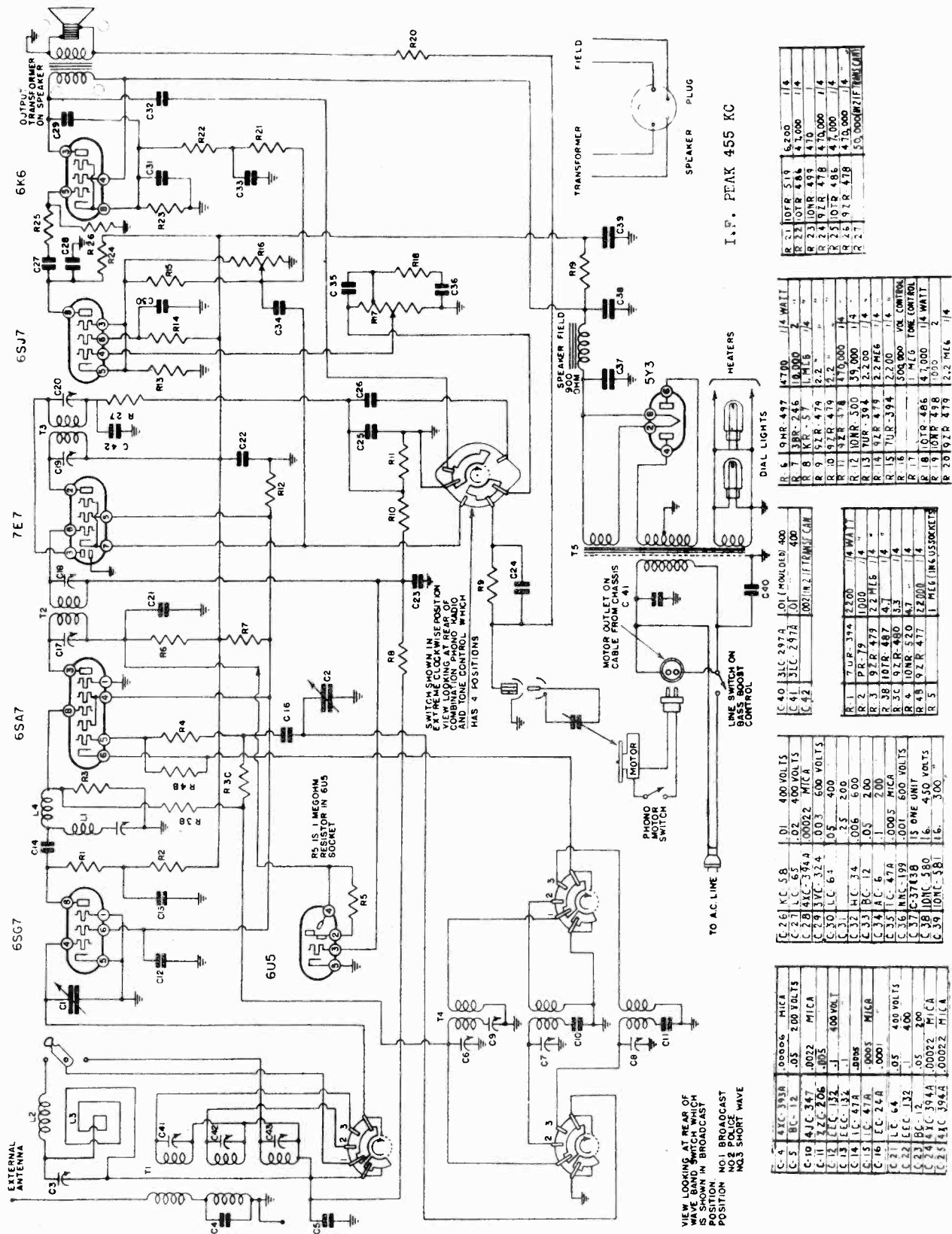
C13	.002 mf MICA TYPE "W"
C14	.00006 mf MICA TYPE "O"
C15	.002 mf MICA TYPE "W"
C16	.001 mf MICA TYPE "W"
C17	PART OF T2
C18	.00006 mf MICA TYPE "O"
C19	.0003 mf MICA TYPE "O"
C20	.0005 mf MICA TYPE "W"
C21	.002 mf 600 V. ROLL TYPE
C22	.002 mf 600 V. ROLL TYPE
C23	.05 mf 200 V. ROLL TYPE
C24	.05 mf 200 V. ROLL TYPE
C25	.00022 mf MICA TYPE "C"
C26	.002 mf 600 V. ROLL TYPE
C27	.04 mf 400 V. ROLL TYPE
C28	.1 mf 200 V. ROLL TYPE
C29	.1 mf 200 V. ROLL TYPE
C30	.01 mf 400 V. ROLL TYPE
C31	.0001 mf MICA TYPE "C"
C32	DUAL 40 mf 150V. ELECTROLYTIC
C33	DUAL 40 MF 150V. ELECTROLYTIC
C34	.05 mf 200 V. ROLL TYPE

C35	.0005 mf MICA TYPE "W"
C36	.0001 mf MICA TYPE "O"
C37	.00003 mf MICA TYPE "O"
C38	.002 mf 600V. ROLL TYPE
C39	.05 mf 200V. ROLL TYPE
C40	.00001 mf MICA TYPE "O"
C41	.002 mf 600 V. ROLL TYPE
C42	DUAL 40 mf 150 V. ELECTROLYT.
C43	DUAL 40 mf 150 V. ELECTROLYT.
C44	.004 mf 600 V. ROLL TYPE
C45	.05 mf 400 V. ROLL TYPE
C46	.002 mf MICA TYPE "W"
C47	.05 mf 200 V. ROLL TYPE
R1	TONE CONTROL
R2	VOLUME CONTROL
R3	4.7 MEG. 1/4 W.
R4	470 1/4 W.
R5	3.3 MEG. 1/4 W.
R6	470 1/4 W.
R7	1 MEG. 1/4 W.
R8	470 MEG. 1 W.

R9	3.3 MEG. 1/4 W.
R10	47,000 1/4 W.
R11	3.3 MEG. 1/4 W.
R12	68,000 1/4 W.
R13	22,000 1/4 W.
R14	100,000 1/4 W.
R15	100,000 1/4 W.
R16	100,000 1/4 W.
R17	47,000 1/4 W.
R18	2.2 MEG. 1/4 W.
R19	25,000 1/4 W.
R20	30,000 1/4 W.
R21	470,000 1/4 W.
R22	470,000 1/4 W.
R23	10,000 1/4 W.
R24	2,700 1/4 W.
R25	470 1/4 W.
R26	150 1/4 W.
R27	470,000 1/4 W.
R28	47,000 1/4 W.
R29	2.2 MEG. 1/4 W.
R30	3,900 1/4 W.

R31	100,000 1/4 W.
R32	150 1/4 W.
R33	220,000 1/4 W.
R34	470,000 1/4 W.
R35	1 MEG. in 6U5
R36	10 MEG. 1/4 W.
R37	4.7 MEG. 1/4 W.
R38	470 1/4 W.
R39	27,000 1/4 W.
R40	22,000 1/4 W.
R41	15 MEG. 1/4 W.
R42	47,000 1/4 W.
R43	3.3 MEG. 1/4 W.
R44	10 MEG. 1/4 W.

EMERSON RADIO & PHONOGRAPH CORP. MODEL GF-452,
Chassis GF



R 21	OTR	519	6,200	1/4
R 22	OTR	486	47,000	1/4
R 23	OTR	499	470	1/4
R 24	OTR	478	470,000	1/4
R 25	OTR	486	47,000	1/4
R 26	OTR	478	470,000	1/4
R 27			50,000	1/2 WATT

R 6	9HR	497	47,000	1/4 WATT
R 7	3BR	246	10,000	1/4
R 8	8R	5	1 MEG	1/4
R 9	8Z	479	2.2	1/4
R 10	3R	478	470,000	1/4
R 11	3R	478	470,000	1/4
R 12	WR	500	50,000	1/4
R 13	WR	304	30,000	1/4
R 14	WR	478	2.2 MEG	1/4
R 15	TUR	394	2.2 MEG	1/4
R 16			500,000 VOL CONTROL	
R 17			1 MEG	1/4 WATT
R 18	OTR	486	47,000	1/4
R 19	OTR	478	470,000	1/4
R 20	OTR	478	2.2 MEG	1/4

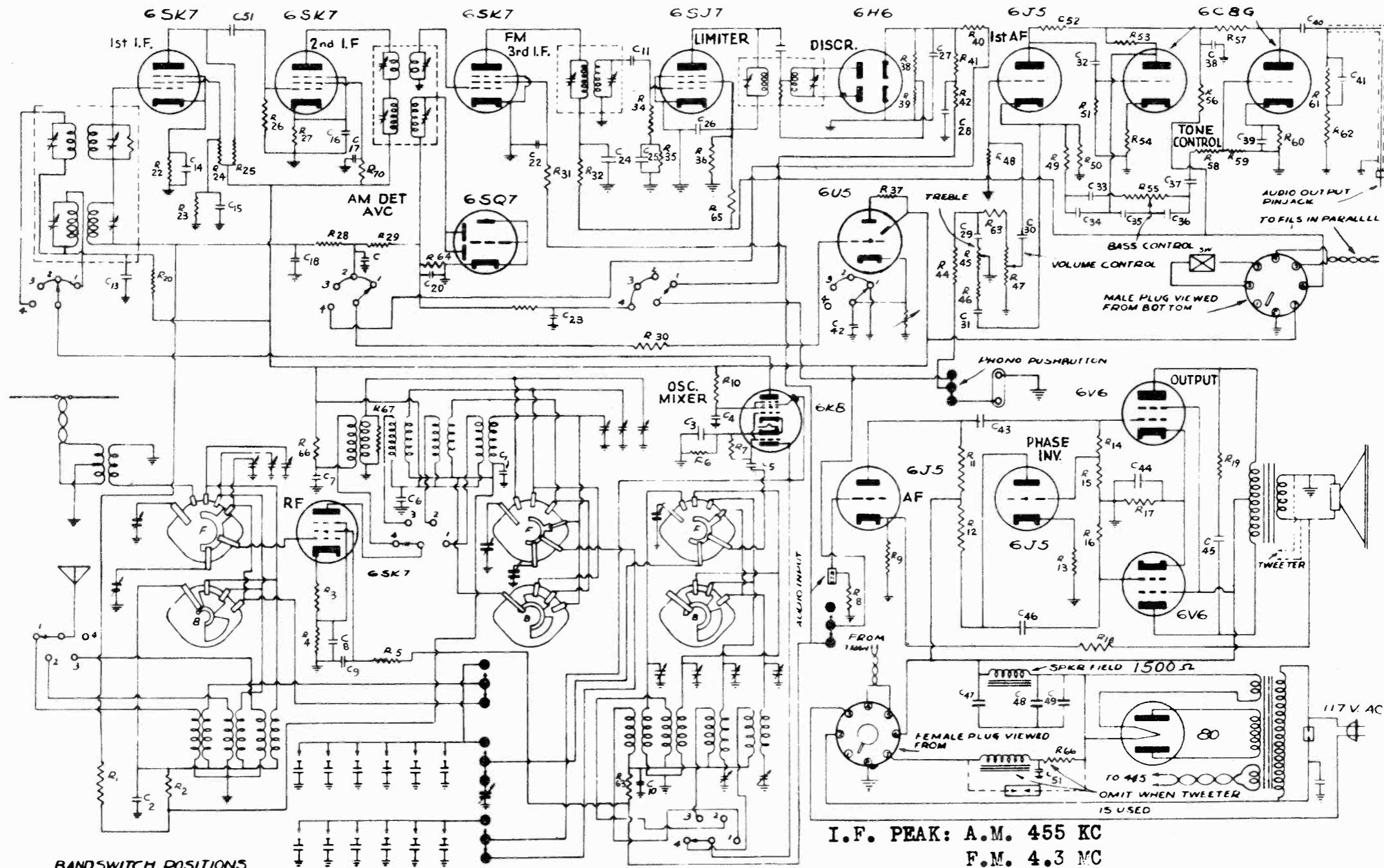
C-40	31C	287A	0.1 (MULDED) 400	400
C-41	31C	287A	0.001	2.7 MEG
C-42			0.001	2.7 MEG

C-56	MC	58	0.1	400 VOLTS
C-57	LC	65	.02	400 VOLTS
C-58	LC	65	.00022	MICA
C-59	LC	394A	.003	500 VOLTS
C-60	LC	64	.05	400
C-61	LC	64	.2	200
C-62	LC	64	.006	500
C-63	LC	64	.05	200
C-64	LC	64	.005	400
C-65	LC	64	.005	500 VOLTS
C-66	LC	37	.01	500 VOLTS
C-67	LC	37	.01	500 VOLTS
C-68	LC	37	.01	500 VOLTS
C-69	LC	37	.01	500 VOLTS
C-70	LC	37	.01	500 VOLTS

C-1	47C	393A	.00006	MICA
C-2	47C	393A	.05	200 VOLTS
C-3	47C	393A	.00022	MICA
C-4	47C	393A	.0005	MICA
C-5	47C	393A	.0005	MICA
C-6	47C	393A	.0005	MICA
C-7	47C	393A	.0005	MICA
C-8	47C	393A	.0005	MICA
C-9	47C	393A	.0005	MICA
C-10	47C	393A	.0005	MICA
C-11	47C	393A	.0005	MICA
C-12	47C	393A	.0005	MICA
C-13	47C	393A	.0005	MICA
C-14	47C	393A	.0005	MICA
C-15	47C	393A	.0005	MICA
C-16	47C	393A	.0005	MICA
C-17	47C	393A	.0005	MICA
C-18	47C	393A	.0005	MICA
C-19	47C	393A	.0005	MICA
C-20	47C	393A	.0005	MICA
C-21	47C	393A	.0005	MICA
C-22	47C	393A	.0005	MICA
C-23	47C	393A	.0005	MICA
C-24	47C	393A	.0005	MICA
C-25	47C	393A	.0005	MICA

ESPEY MFG. CO., INC.

MODEL 2161-91



R1	100K
R2	100K
R3	50K
R4	100
R5	30K
R6	200
R7	50K
R8	100K
R9	4K
R10	25K
R11	100K
R12	100K
R13	4K
R14	250K
R15	50K
R16	250K
R17	250
R18	50K
R19	25K
R20	1K
R21	200
R22	30K
R23	25K
R24	10K
R25	0.5MEG
R26	100
R27	100K
R28	1.0MEG
R29	100K
R30	50K
R31	1A
R32	50K
R33	50K
R34	50K
R35	350K
R36	10K
R37	1.0MEG
R38	100K
R39	100K
R40	250K
R41	100K
R42	10K
R43	15K
R44	250K
R45	5MEG
R46	4K
R47	0.5MEG
R48	250K
R49	50K
R50	2K
R51	500K
R52	50K
R53	50K
R54	2K
R55	2MEG
R56	50K
R57	50K
R58	200K
R59	20K
R60	2K
R61	250K
R62	100K
R63	100K
R64	150K
R65	2K
R66	1K
R67	7500

BANDSWITCH POSITIONS

- 1. BROADCAST
- 2. POLICE AND AMATEUR
- 3. SHORT WAVE
- 4. FREQ. MOD.

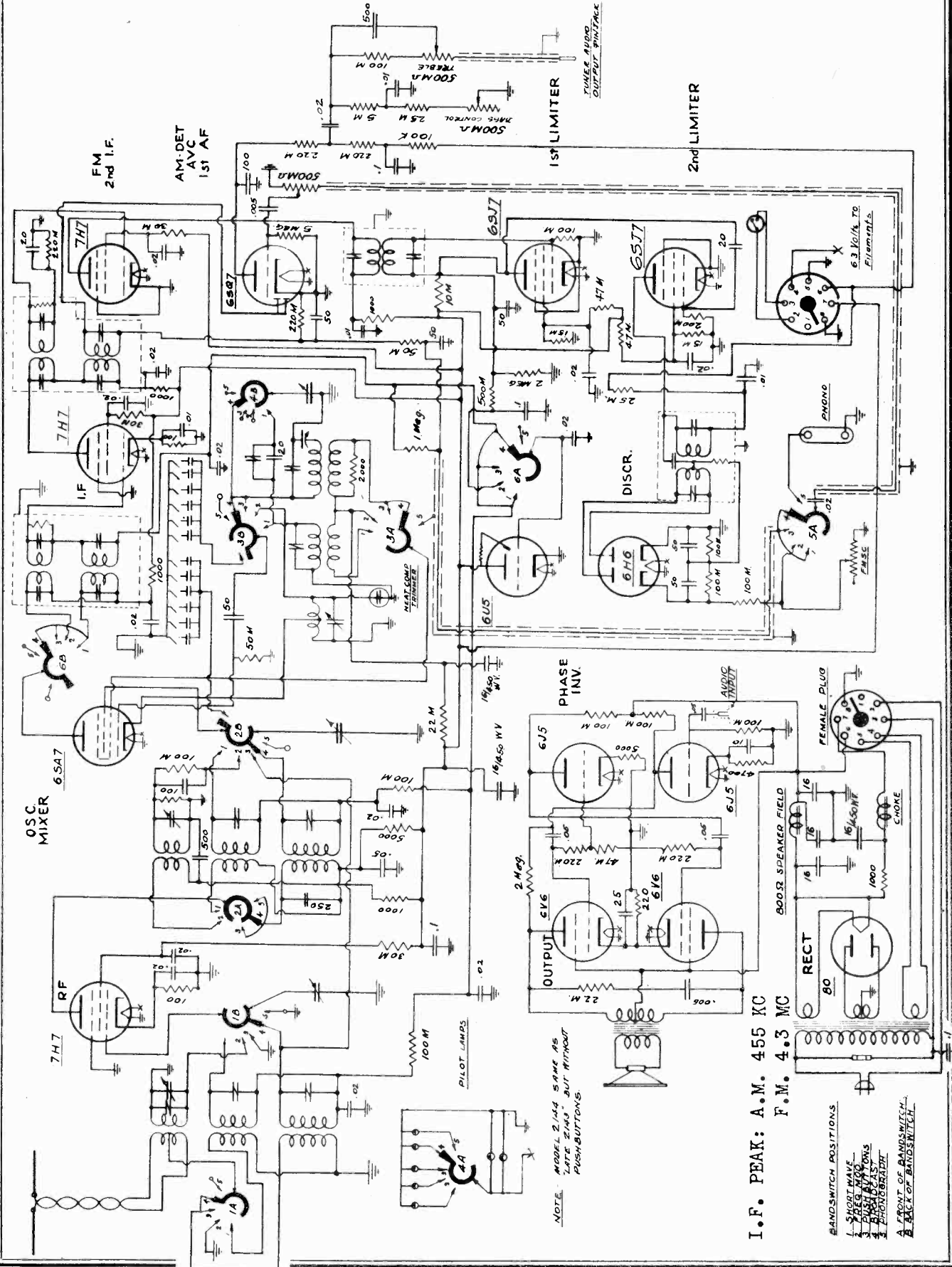
F=FRONT OF BANDSWITCH
B=BACK OF BANDSWITCH

I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

C1	0.02 ufd	C9	0.02	C17	0.05	C25	0.00025	C33	0.1	C41	0.0005	C49	10.0
C2	0.02	C10	0.02	C18	0.02	C26	0.02	C34	0.005	C42	0.05	C50	0.05
C3	0.05	C11	0.00005	C19	0.02	C27	0.00025	C35	0.1	C43	0.05	C51	16.0 ufd
C4	0.05	C12	0.05	C20	0.00005	C28	0.00025	C36	0.001	C44	25.0		
C5	0.00005	C13	0.05	C21	0.05	C29	0.001	C37	0.05	C45	0.005		
C6	0.02	C14	0.05	C22	0.05	C30	0.1	C38	0.1	C46	0.05		
C7	0.02	C15	0.05	C23	0.00005	C31	0.05	C39	10.0	C47	10.0		
C8	0.05	C16	0.05	C24	0.05	C32	0.1	C40	0.05	C48	16.0		

ESPEY MFG. CO., INC.

MODEL 2143 late
MODEL 2144



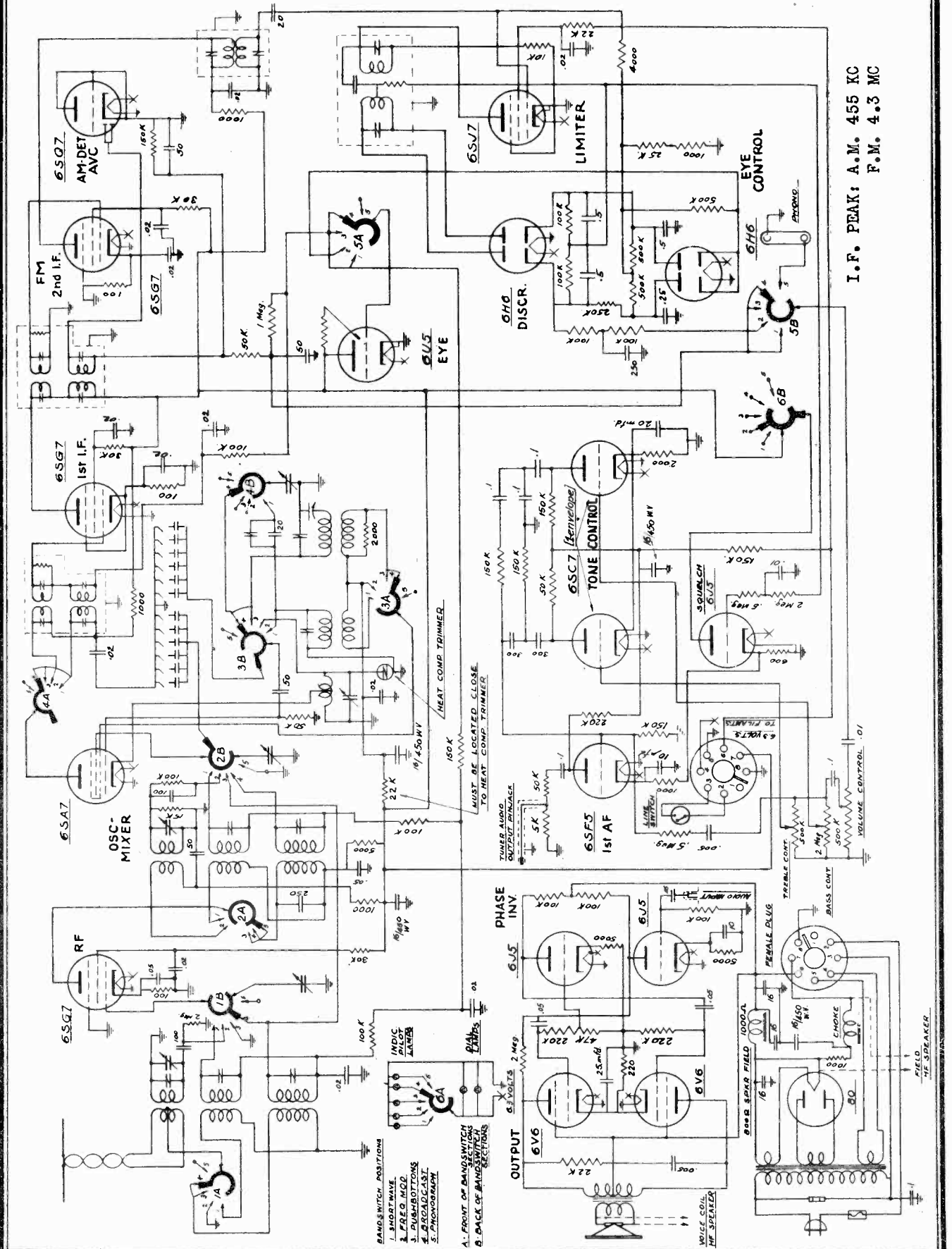
I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

- BANDSWITCH POSITIONS
- 1. SHORT WAVE
 - 2. FREQ. MOD.
 - 3. PUSH BUTTONS
 - 4. PROGRAMMABLE
 - 5. FRONT OF BANDSWITCH
 - 6. BACK OF BANDSWITCH

NOTE: MODEL 2144 SAME AS LATE 2143 BUT WITHOUT PUSHBUTTONS

ESPEY MFG. CO., INC.

MODEL 2170

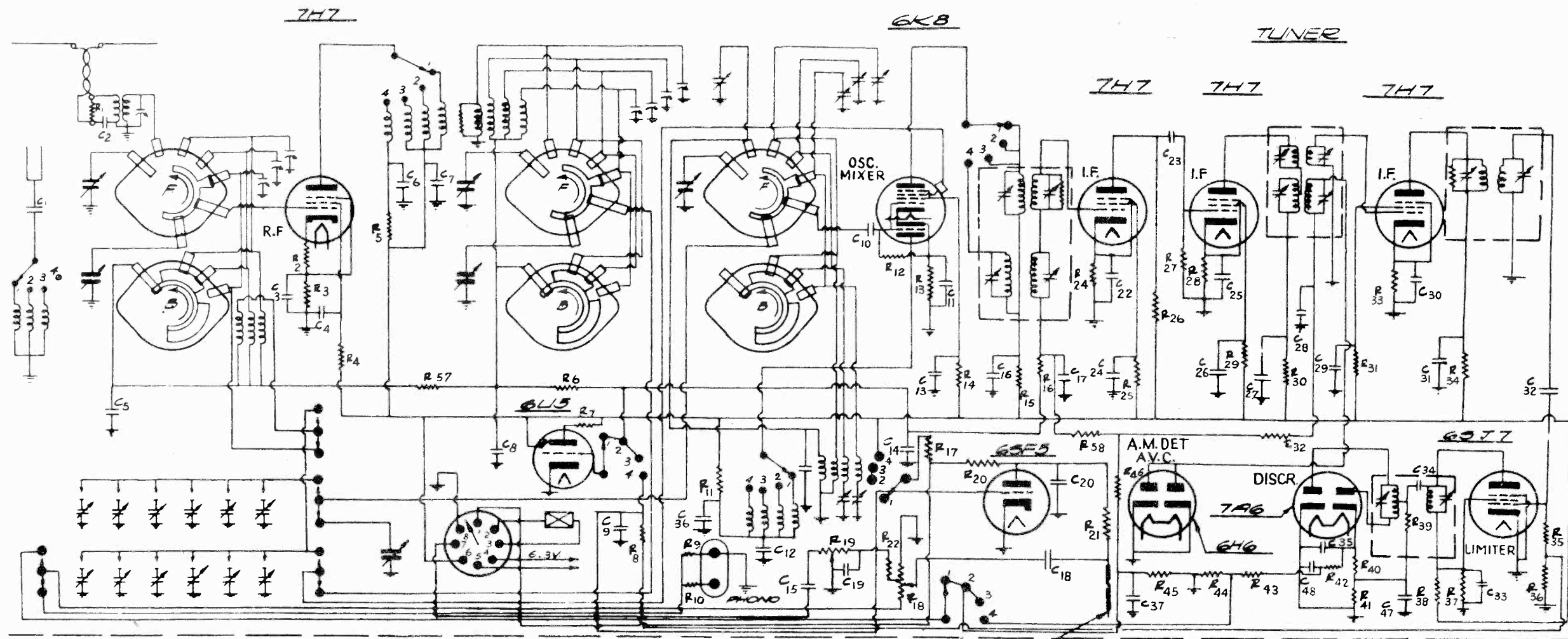


I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

- BANDSWITCH POSITIONS
- 1. SHORT WAVE
 - 2. FREQ. MOD.
 - 3. PUSH BUTTONS
 - 4. PROGRAMMABLE
 - 5. FRONT OF BANDSWITCH
 - 6. BACK OF BANDSWITCH

ESPEY MFG. CO., INC.

MODEL 1152



R1	200Ω
R2	50Ω
R3	100Ω
R4	30KΩ
R5	1000Ω
R6	100Ω
R7	1MΩ
R8	1MΩ
R9	50KΩ
R10	250KΩ
R11	10KΩ
R12	50KΩ
R13	200Ω
R14	25KΩ
R15	100Ω
R16	100KΩ
R17	75,000Ω
R18	1MΩ
R19	12MΩ
R20	10MΩ
R21	2MΩ
R22	25,000Ω
R23	100KΩ
R24	200Ω
R25	30KΩ
R26	4000Ω
R27	1/2MΩ
R28	100Ω
R29	30KΩ

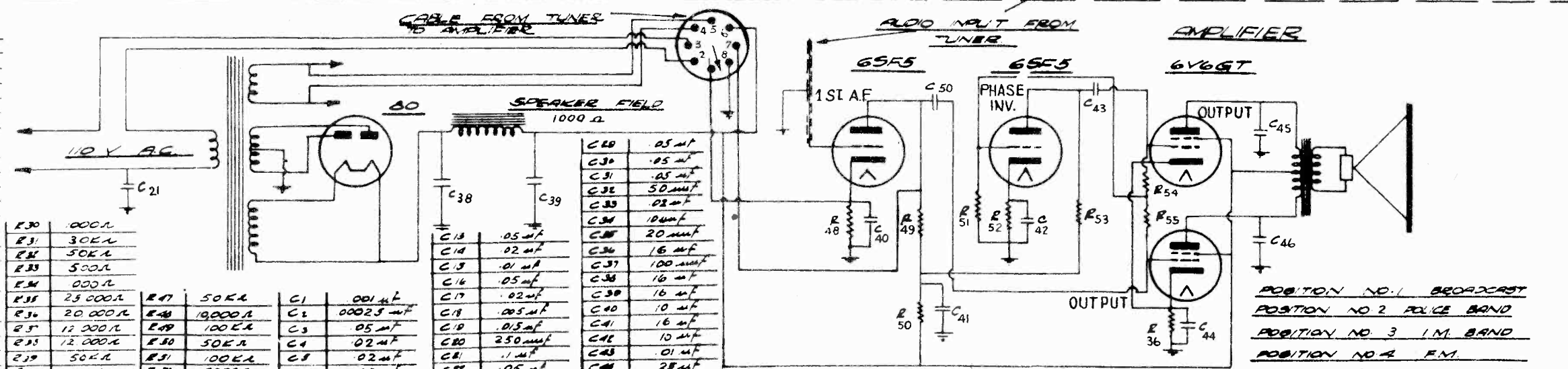
R30	1000Ω
R31	30KΩ
R32	50KΩ
R33	500Ω
R34	100Ω
R35	25,000Ω
R36	20,000Ω
R37	12,000Ω
R38	12,000Ω
R39	50KΩ
R40	100Ω
R41	100KΩ
R42	100Ω
R43	100Ω
R44	5000Ω
R45	250KΩ
R46	240Ω

R47	50KΩ
R48	10,000Ω
R49	100KΩ
R50	50KΩ
R51	100KΩ
R52	2000Ω
R53	100KΩ
R54	100Ω
R55	250KΩ
R56	100KΩ
R57	1MΩ
R58	1MΩ

C1	.001μF
C2	.00025μF
C3	.05μF
C4	.02μF
C5	.02μF
C6	.02μF
C7	.1μF
C8	.02μF
C9	.05μF
C10	.50μF
C11	.05μF
C12	.05μF

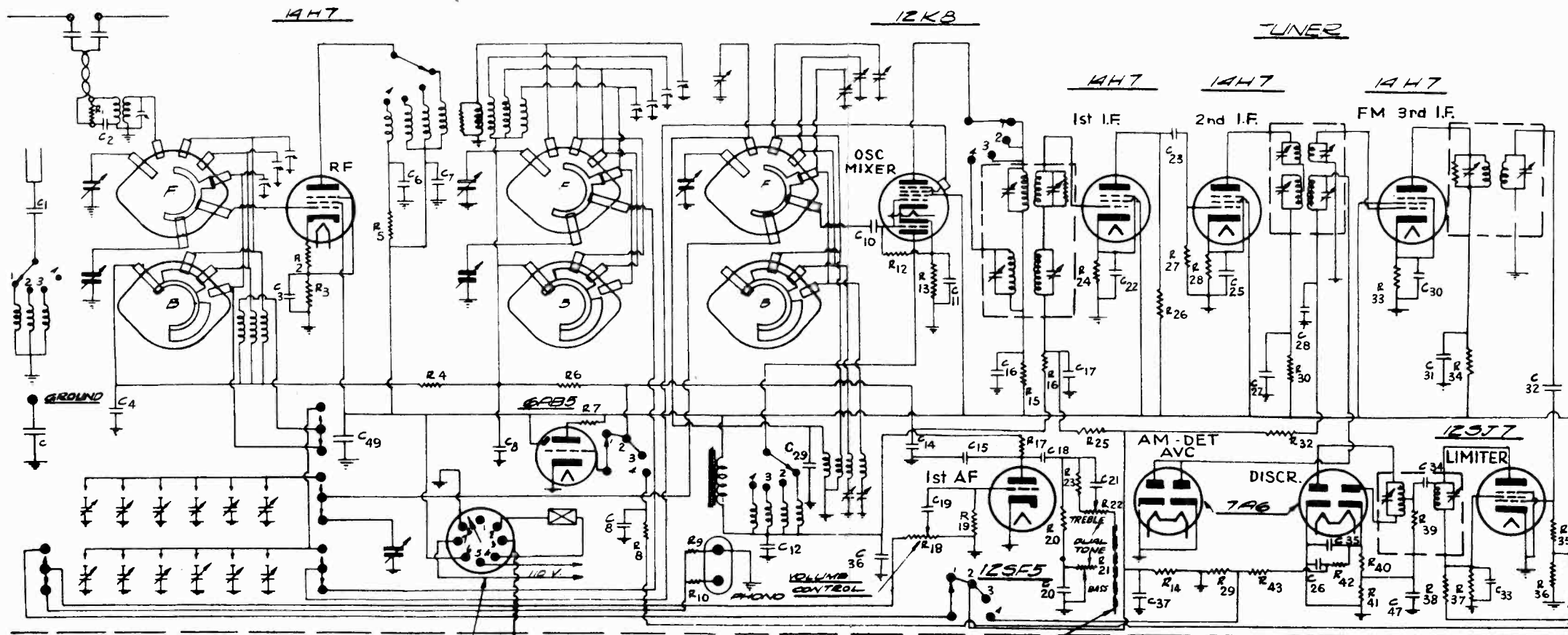
C13	.05μF
C14	.02μF
C15	.01μF
C16	.05μF
C17	.02μF
C18	.005μF
C19	.015μF
C20	.250μF
C21	.1μF
C22	.05μF
C23	.0001μF
C24	.05μF
C25	.05μF
C26	.05μF
C27	.05μF
C28	.05μF
C29	.05μF
C30	.05μF
C31	.05μF
C32	.05μF
C33	.05μF
C34	.05μF
C35	.05μF
C36	.05μF
C37	.05μF
C38	.05μF
C39	.05μF
C40	.05μF
C41	.05μF
C42	.05μF
C43	.05μF
C44	.05μF
C45	.05μF
C46	.05μF
C47	.05μF
C48	.05μF

C49	.05μF
C50	.05μF
C51	.05μF
C52	.05μF
C53	.05μF
C54	.05μF
C55	.05μF
C56	.05μF
C57	.05μF
C58	.05μF
C59	.05μF
C60	.05μF

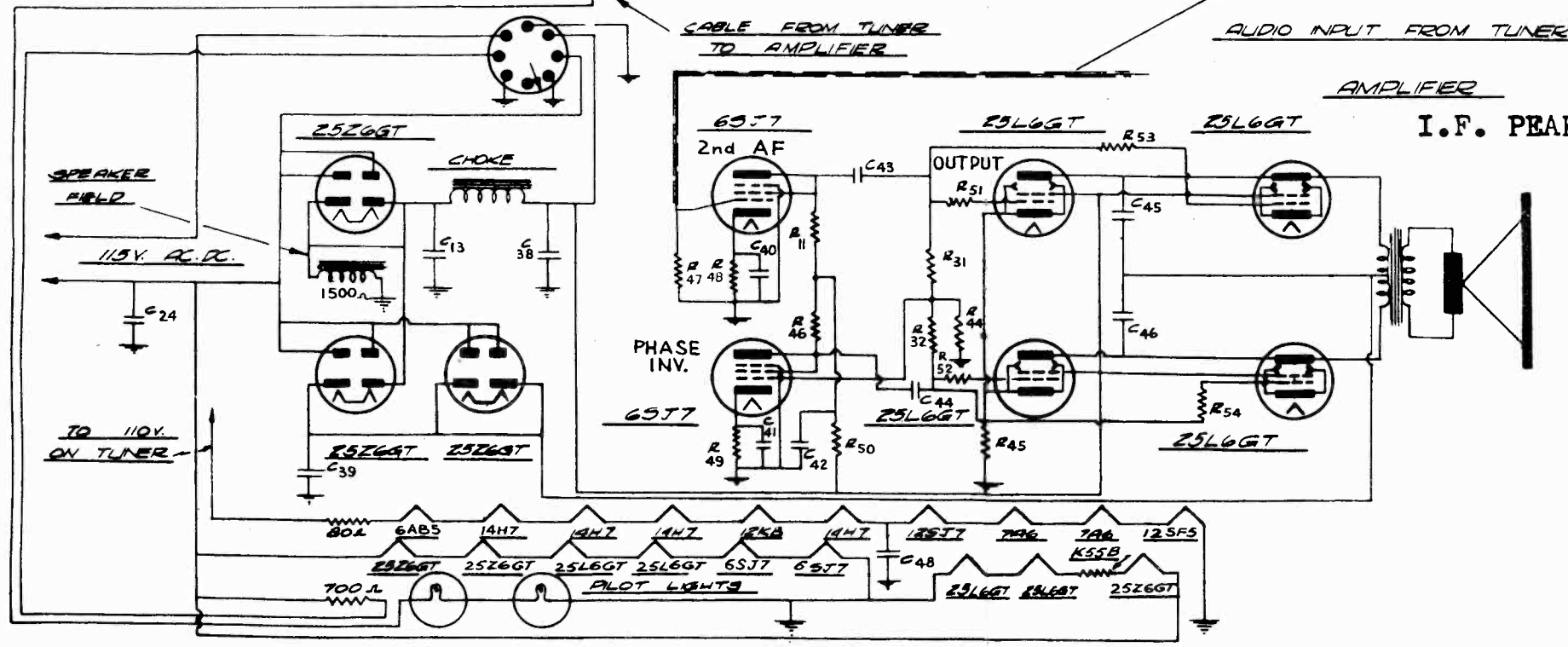


I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

POSITION NO. 1 BROADCAST
POSITION NO. 2 POLICE BAND
POSITION NO. 3 I.M. BAND
POSITION NO. 4 F.M.
F. FRONT OF BAND SWITCH
: BACK OF BAND SWITCH
BAND SWITCH SHOWN IN
BROADCAST POSITION

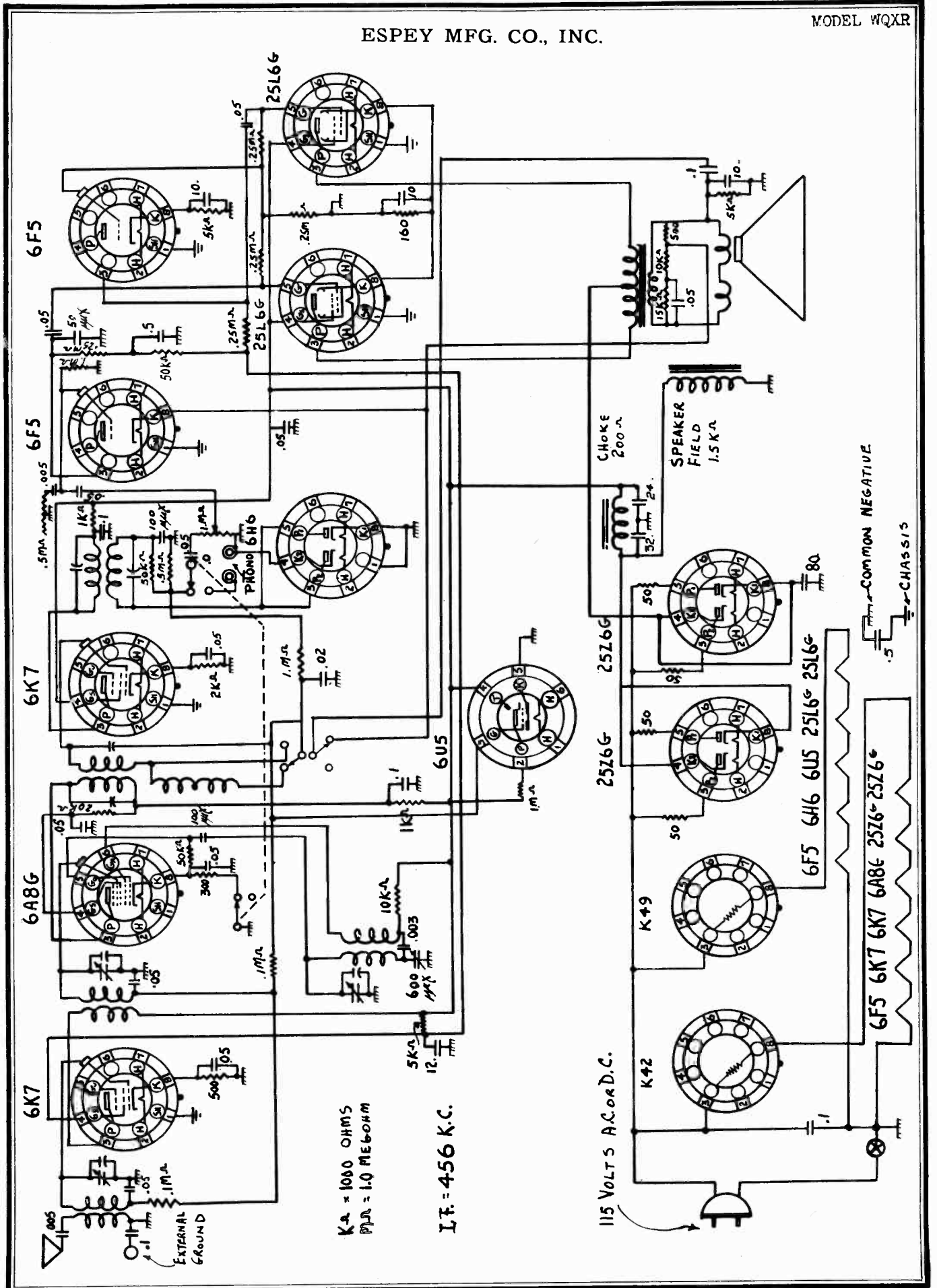


R1	500Ω
R2	30Ω
R3	100Ω
R4	100KΩ
R5	1000Ω
R6	100KΩ
R7	1 MEG
R8	1 MEG
R9	50KΩ
R10	250KΩ
R11	250KΩ
R12	50KΩ
R13	200Ω
R14	250KΩ
R15	1000Ω
R16	100KΩ
R17	250KΩ
R18	1/2 MEG
R19	5 MEG
R20	5000Ω
R21	250KΩ
R22	250KΩ
R23	100KΩ
R24	200Ω
R25	1 MEG
R26	4000Ω
R27	1/2 MEG
R28	200Ω
R29	25KΩ
R30	1000Ω
R31	250KΩ
R32	50KΩ
R33	300Ω
R34	1000Ω
R35	25,000Ω
R36	20,000Ω
R37	12,000Ω
R38	12,000Ω
R39	50KΩ
R40	100KΩ
R41	80Ω
R42	250KΩ
R43	250KΩ
R44	50Ω
R45	10,000Ω
R46	10,000Ω
R47	500Ω
R48	500Ω
R49	500Ω
R50	500Ω



C1	.001μF
C2	250μF
C3	.05μF
C4	.01μF
C5	.02μF
C6	.02μF
C7	.01μF
C8	.02μF
C9	.05μF
C10	30μF
C11	.05μF
C12	.05μF
C13	60μF
C14	.02μF
C15	.02μF
C16	.006μF
C17	.01μF
C18	.0001μF
C19	.05μF
C20	.0001μF
C21	.0001μF
C22	.01μF
C23	.01μF
C24	.01μF
C25	.01μF
C26	.005μF
C27	.05μF
C28	.0001μF
C29	.01μF
C30	.05μF
C31	.05μF
C32	50μF
C33	50μF
C34	50μF
C35	50μF
C36	50μF
C37	50μF
C38	50μF
C39	50μF
C40	50μF
C41	50μF
C42	50μF
C43	50μF
C44	50μF
C45	50μF
C46	50μF
C47	50μF
C48	50μF
C49	50μF

ESPEY MFG. CO., INC.



MODEL WQXR, Series A, E

ESPEY MFG. CO., INC.

SEPTEMBER 12, 1940

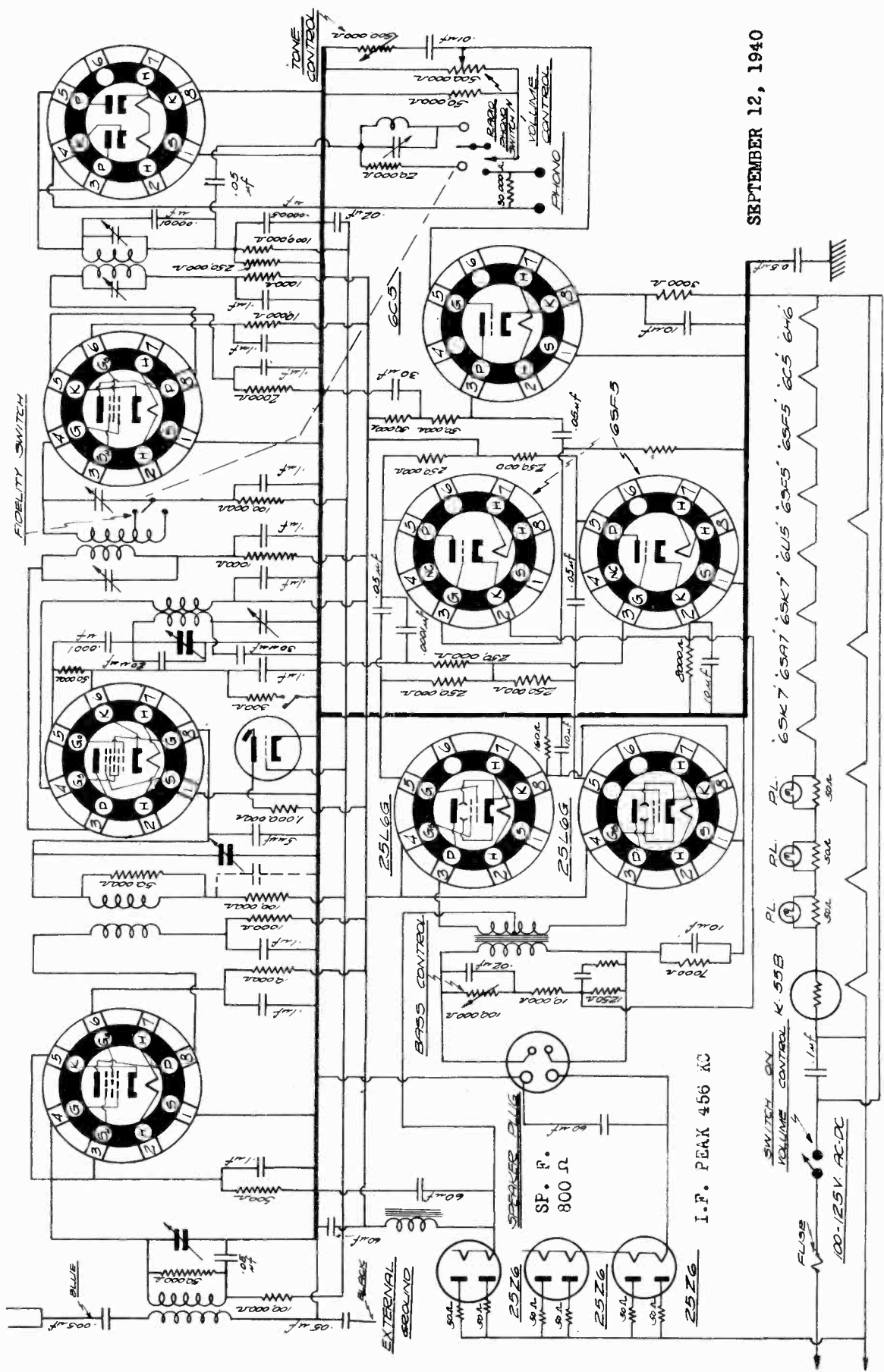
6HG

6SK7

6SA7

6SK7

ANTENNA



25L6G

25L6G

25Z6

25Z6

25Z6

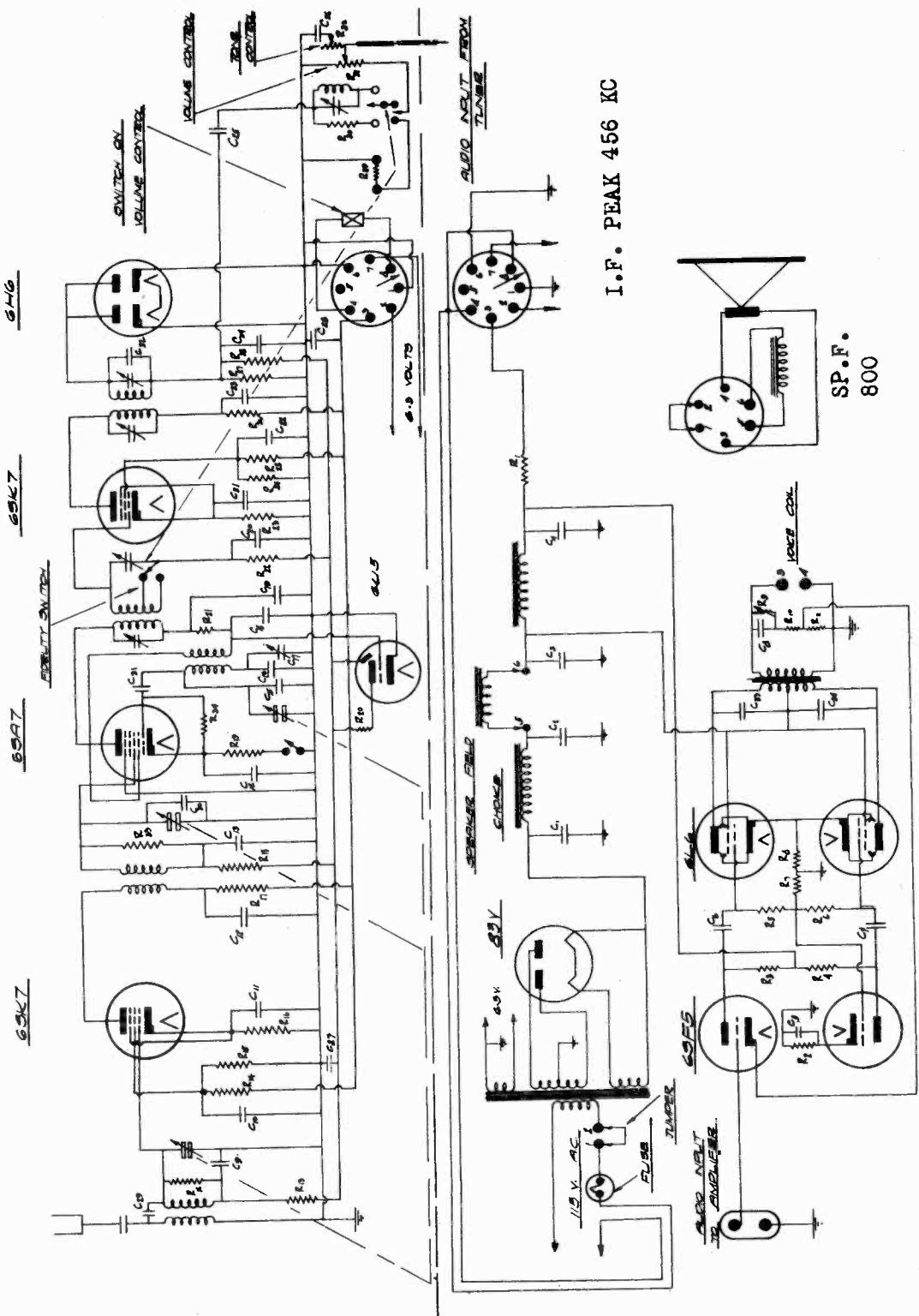
25Z6

25Z6

25L6G

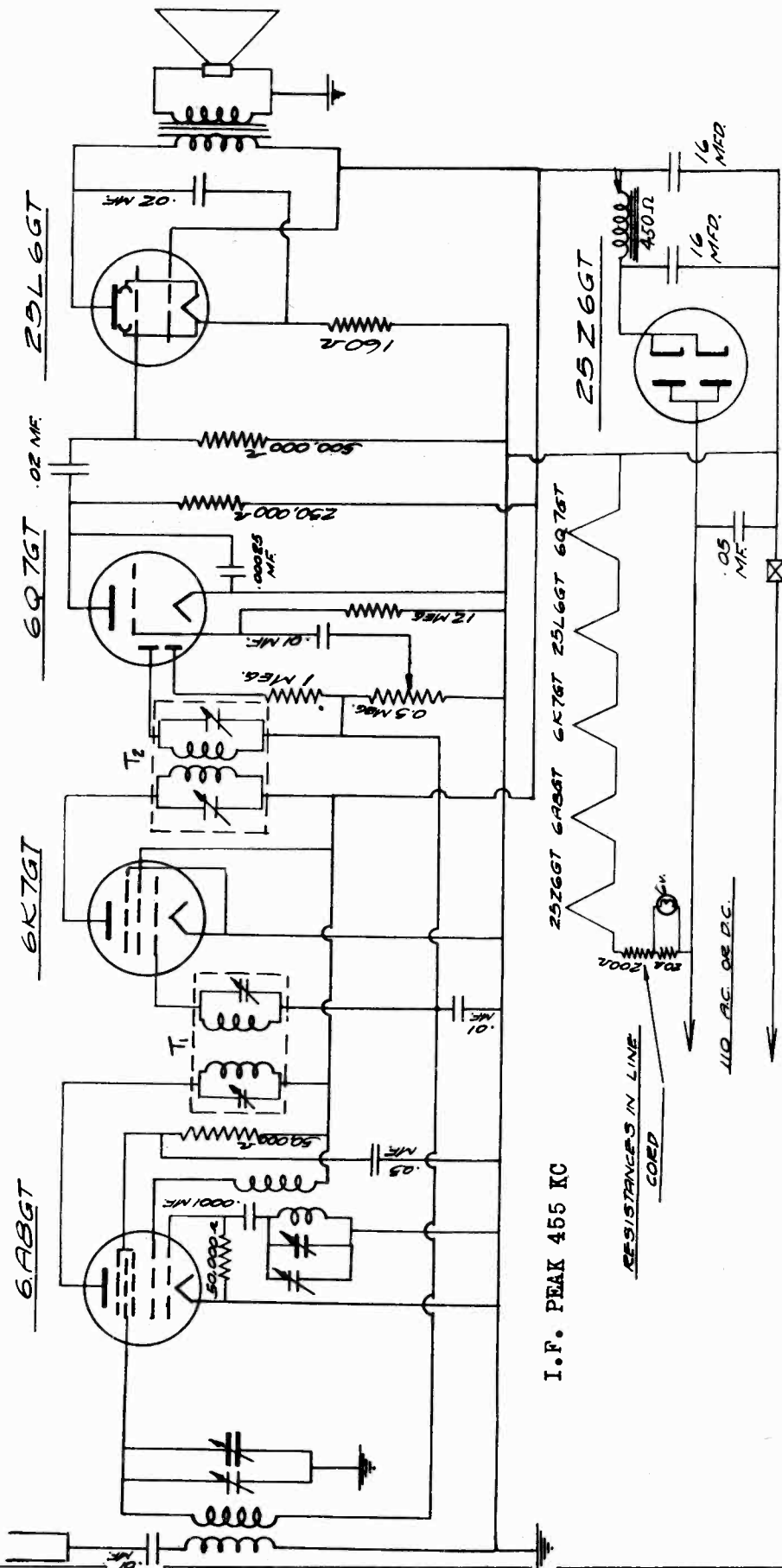
ESPEY MFG. CO., INC.

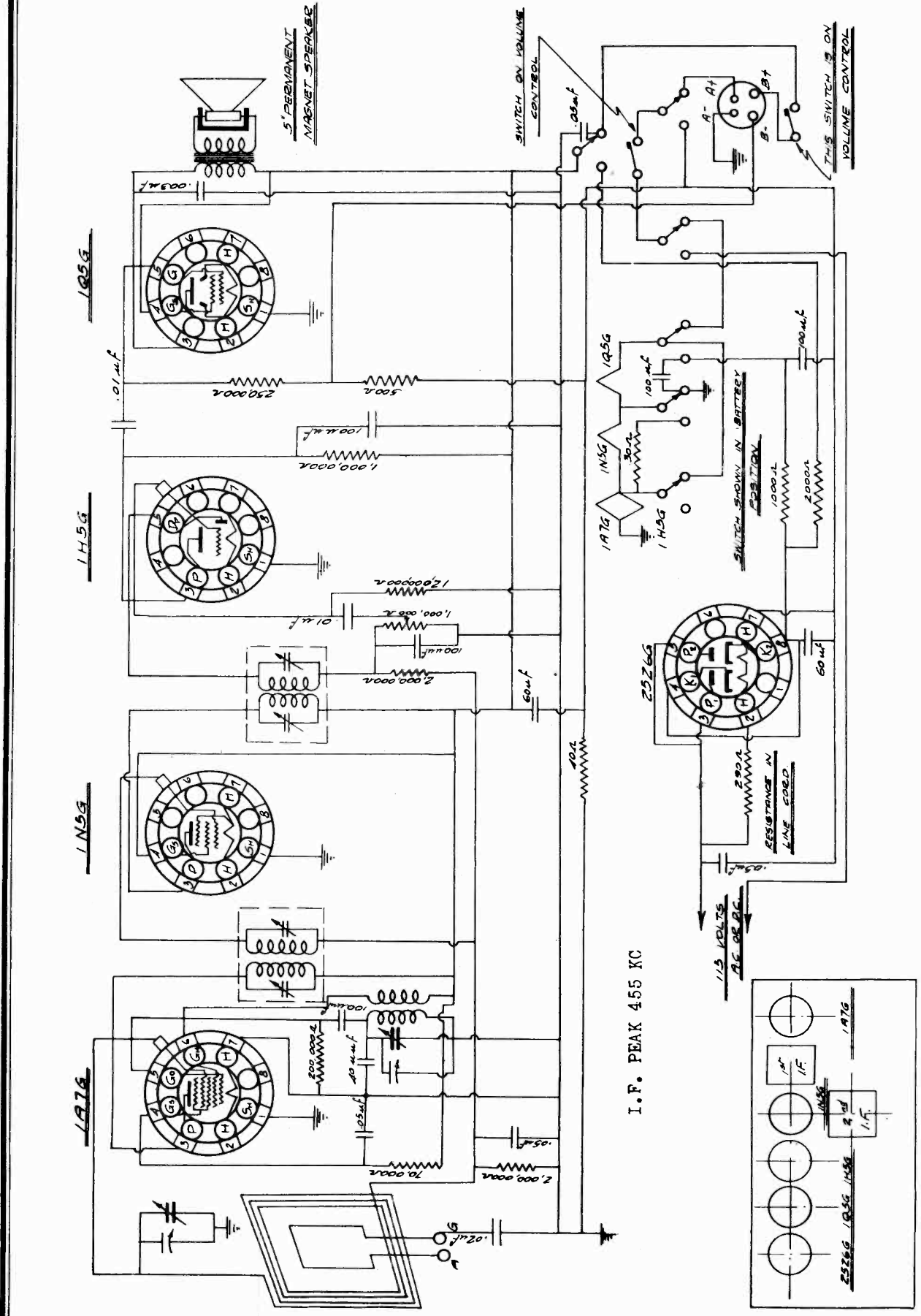
R1	1000Ω
R2	1000Ω
R3	1000Ω
R4	1000Ω
R5	1000Ω
R6	1000Ω
R7	1000Ω
R8	1000Ω
R9	1000Ω
R10	1000Ω
R11	1000Ω
R12	1000Ω
R13	1000Ω
R14	1000Ω
R15	1000Ω
R16	1000Ω
R17	1000Ω
R18	1000Ω
R19	1000Ω
R20	1000Ω
R21	1000Ω
R22	1000Ω
R23	1000Ω
R24	1000Ω
R25	1000Ω
R26	1000Ω
R27	1000Ω
R28	1000Ω
R29	1000Ω
R30	1000Ω
R31	1000Ω
R32	1000Ω
R33	1000Ω
R34	1000Ω
R35	1000Ω
R36	1000Ω
R37	1000Ω
R38	1000Ω
R39	1000Ω
R40	1000Ω
R41	1000Ω
R42	1000Ω
R43	1000Ω
R44	1000Ω
R45	1000Ω
R46	1000Ω
R47	1000Ω
R48	1000Ω
R49	1000Ω
R50	1000Ω
R51	1000Ω
R52	1000Ω
R53	1000Ω
R54	1000Ω
R55	1000Ω
R56	1000Ω
R57	1000Ω
R58	1000Ω
R59	1000Ω
R60	1000Ω
R61	1000Ω
R62	1000Ω
R63	1000Ω
R64	1000Ω
R65	1000Ω
R66	1000Ω
R67	1000Ω
R68	1000Ω
R69	1000Ω
R70	1000Ω
R71	1000Ω
R72	1000Ω
R73	1000Ω
R74	1000Ω
R75	1000Ω
R76	1000Ω
R77	1000Ω
R78	1000Ω
R79	1000Ω
R80	1000Ω
R81	1000Ω
R82	1000Ω
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R92	1000Ω
R93	1000Ω
R94	1000Ω
R95	1000Ω
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R98	1000Ω
R99	1000Ω
R100	1000Ω
C1	100 μF
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C13	100 μF
C14	100 μF
C15	100 μF
C16	100 μF
C17	100 μF
C18	100 μF
C19	100 μF
C20	100 μF
C21	100 μF
C22	100 μF
C23	100 μF
C24	100 μF
C25	100 μF
C26	100 μF
C27	100 μF
C28	100 μF
C29	100 μF
C30	100 μF
C31	100 μF
C32	100 μF
C33	100 μF
C34	100 μF
C35	100 μF
C36	100 μF
C37	100 μF
C38	100 μF
C39	100 μF
C40	100 μF
C41	100 μF
C42	100 μF
C43	100 μF
C44	100 μF
C45	100 μF
C46	100 μF
C47	100 μF
C48	100 μF
C49	100 μF
C50	100 μF



MODEL 851

ESPEY MFG. CO., INC.





5" PERMANENT
MAGNET SPEAKER

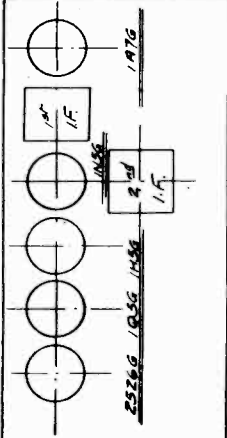
SWITCH ON VOLUME
CONTROL

THIS SWITCH IS ON
VOLUME CONTROL

SWITCH SHOWN IN BATTERY
OPERATION

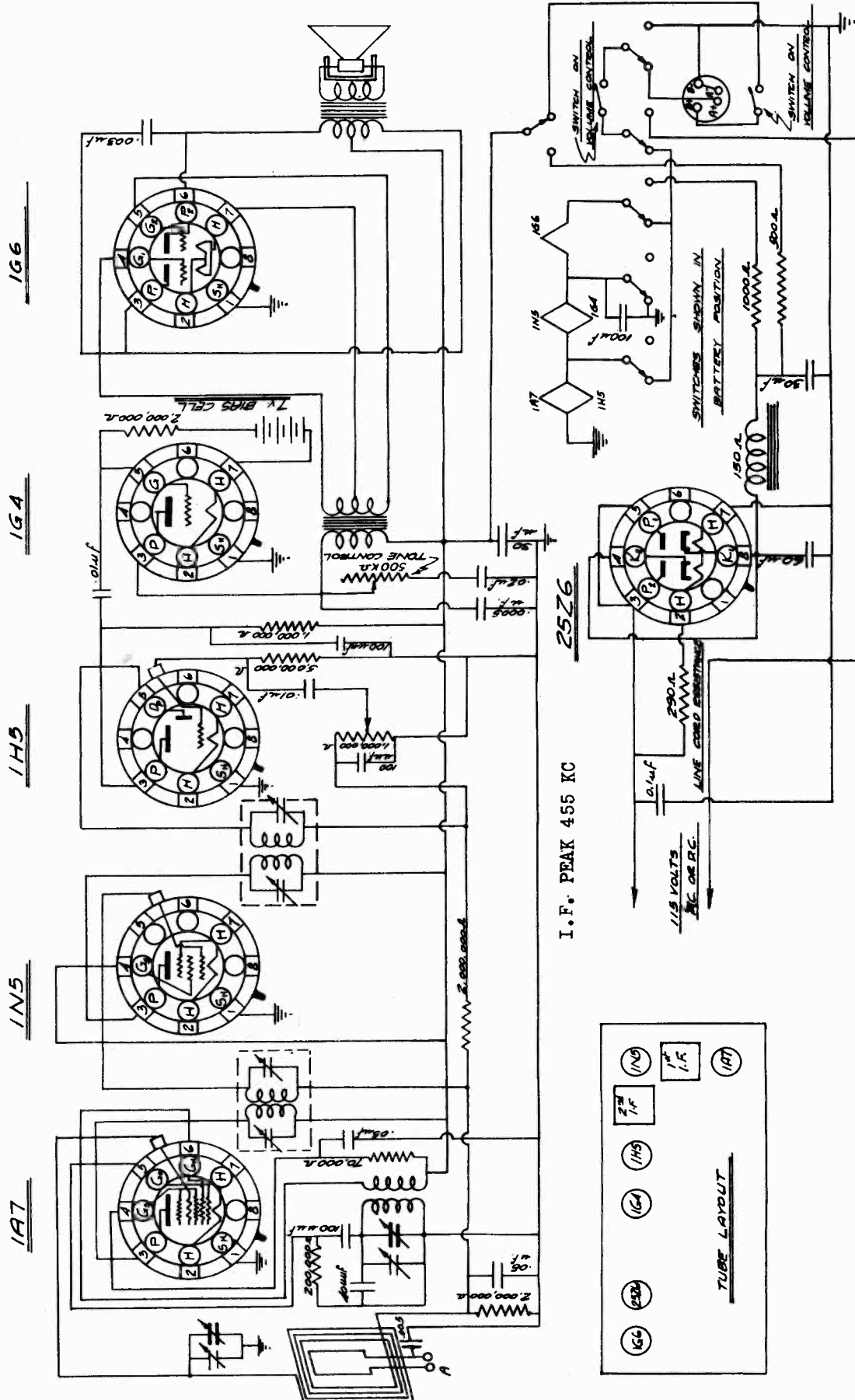
RESISTANCE IN
LINE CORD

TUBE LAYOUT



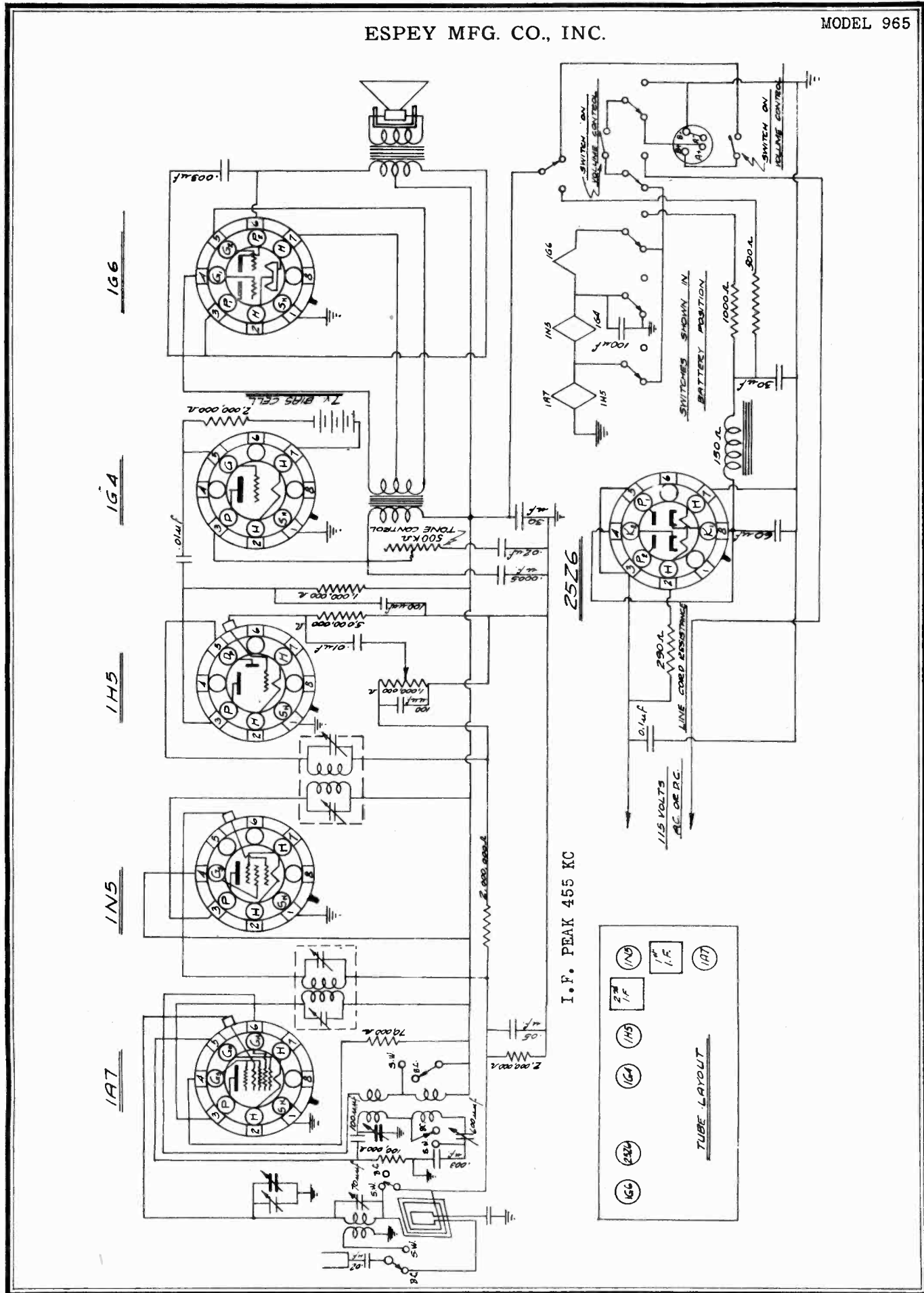
MODEL 964

ESPEY MFG. CO., INC.



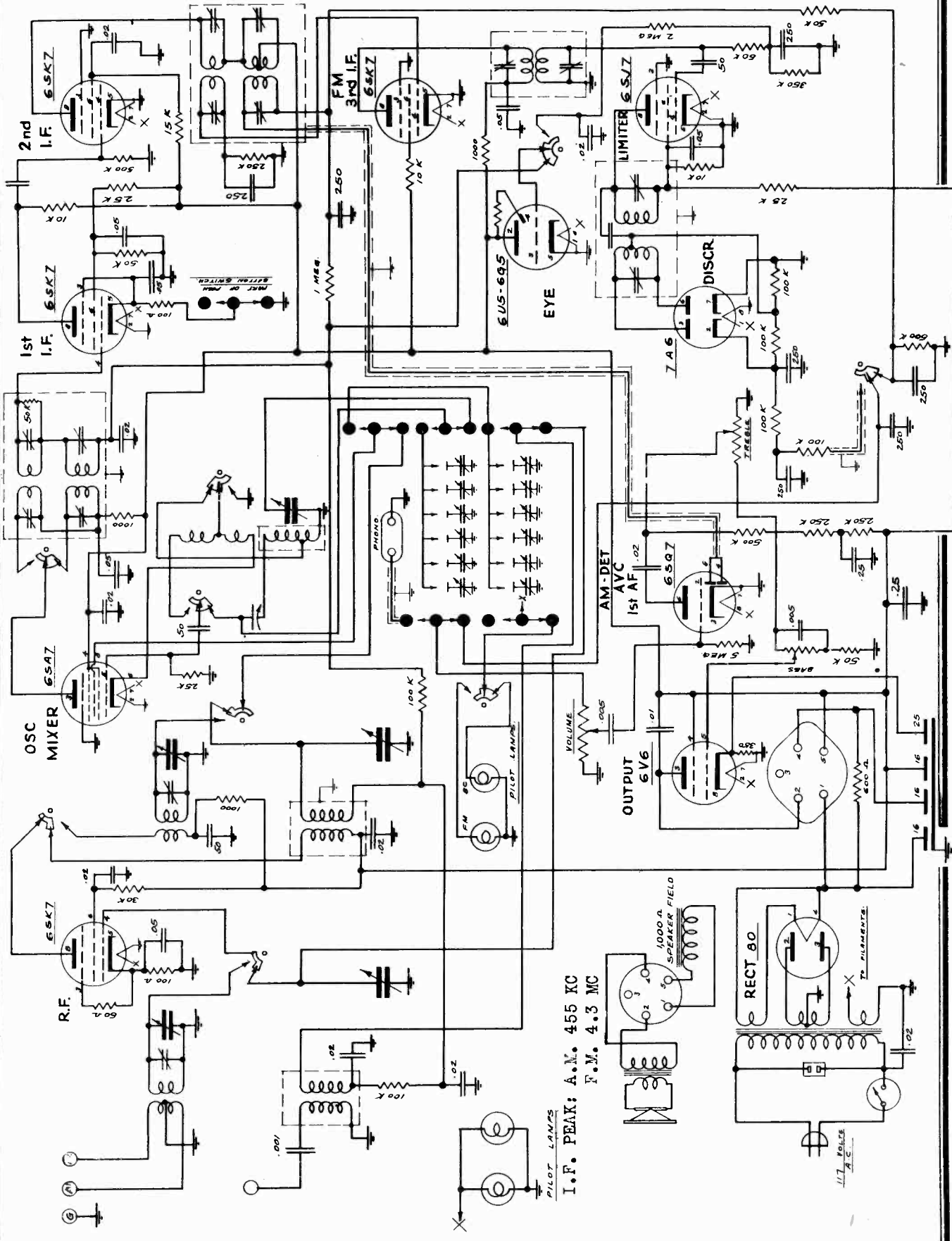
ESPEY MFG. CO., INC.

MODEL 965



MODEL 2111

ESPEY MFG. CO., INC.



I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

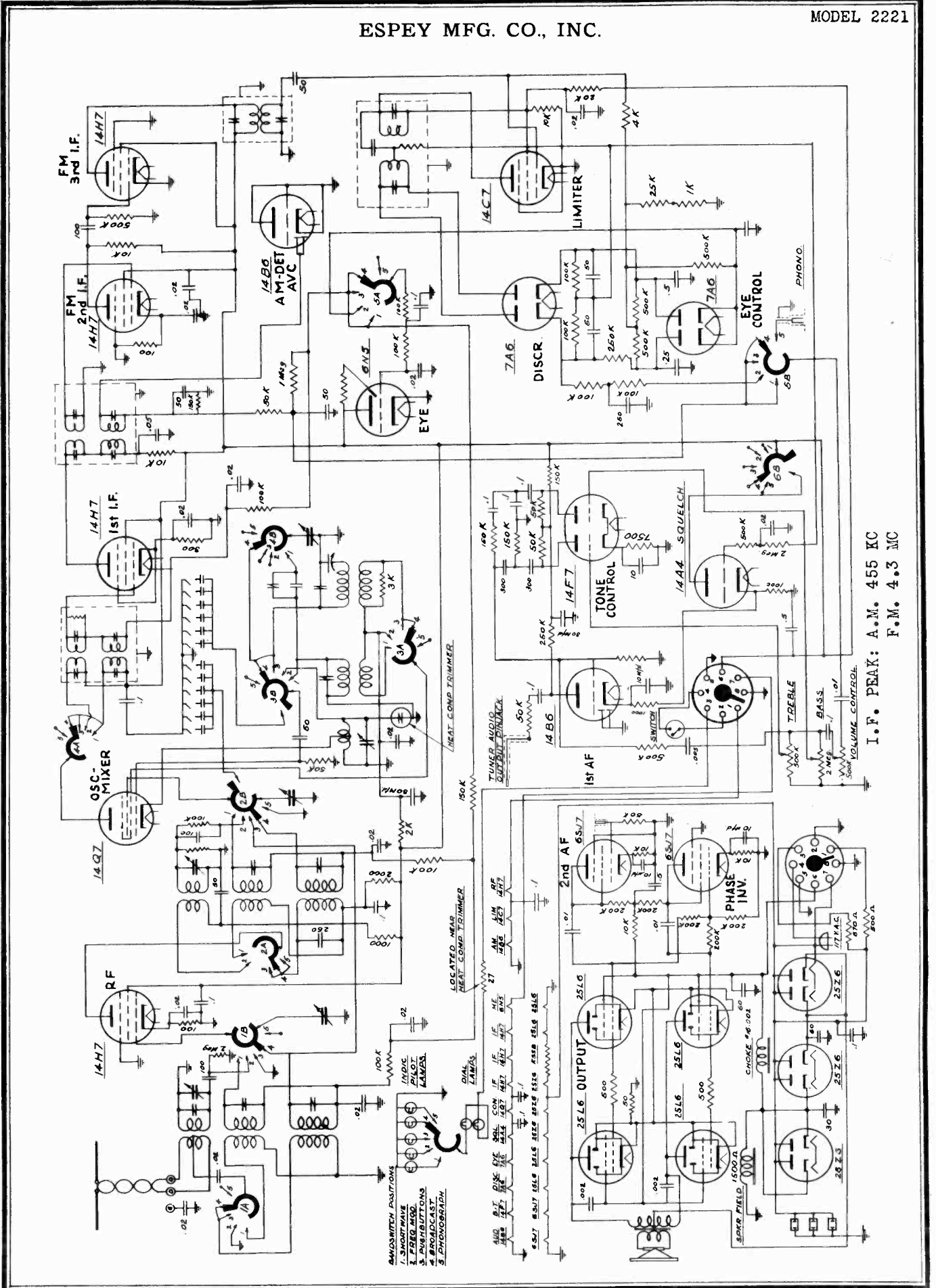
PILDT LAMP

1000 OHM SPEAKER FIELD

RECT 60

117 VOLT A.C.

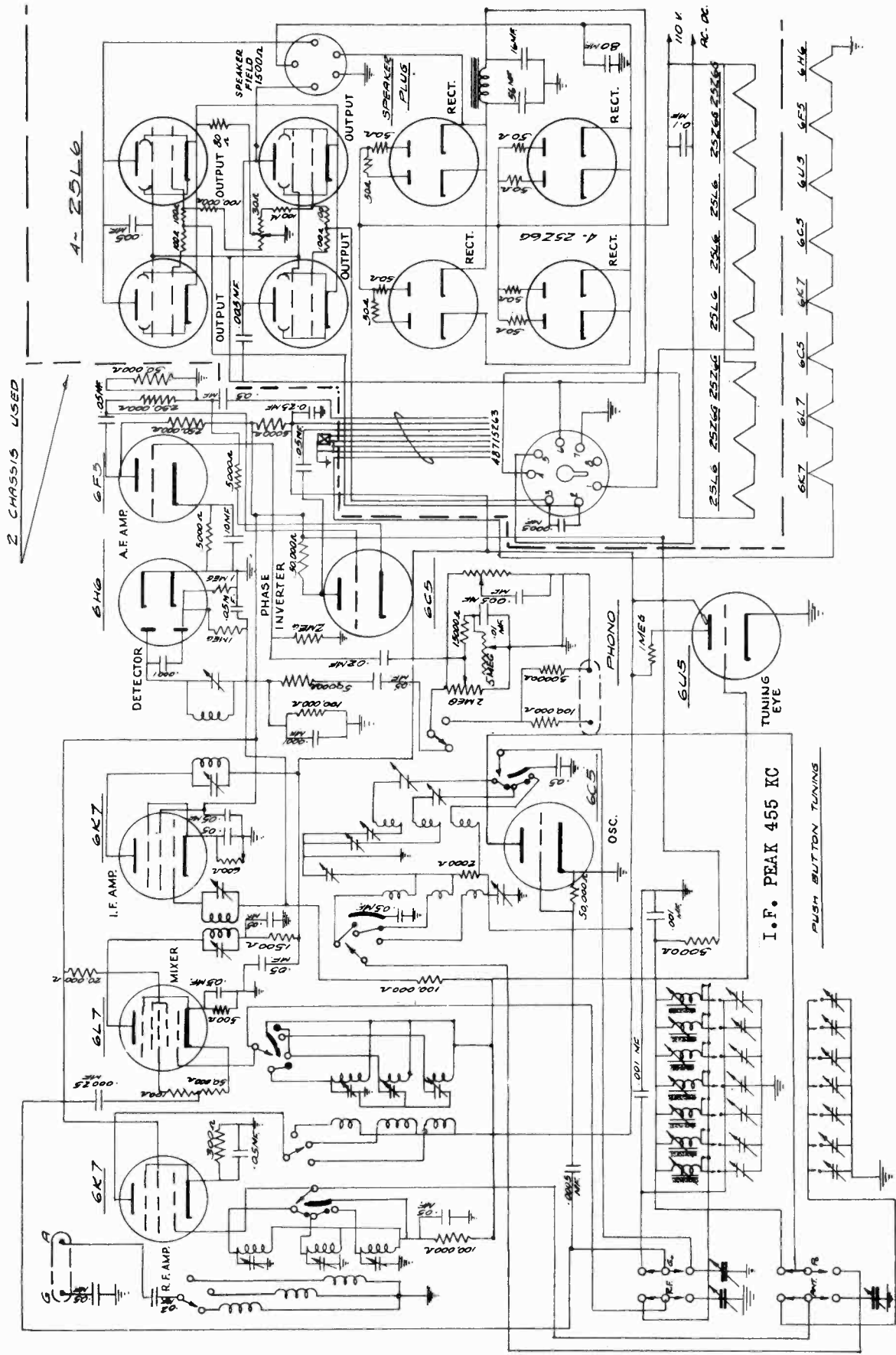
ESPEY MFG. CO., INC.



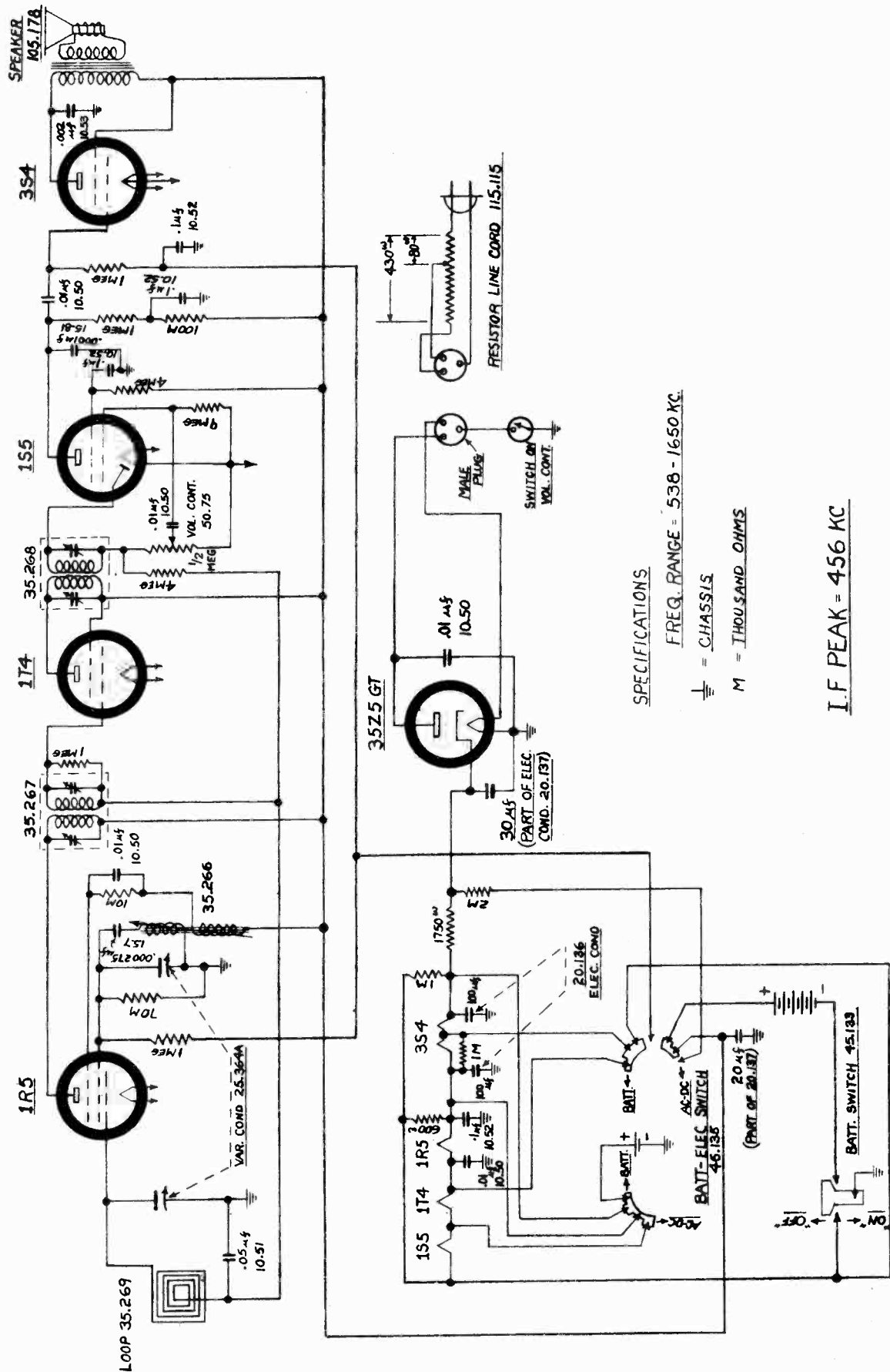
I.F. PEAK: A.M. 455 KC
 F.M. 4.3 MC

MODEL 9161

ESPEY MFG. CO., INC.



FADA RADIO & ELECTRIC CO.

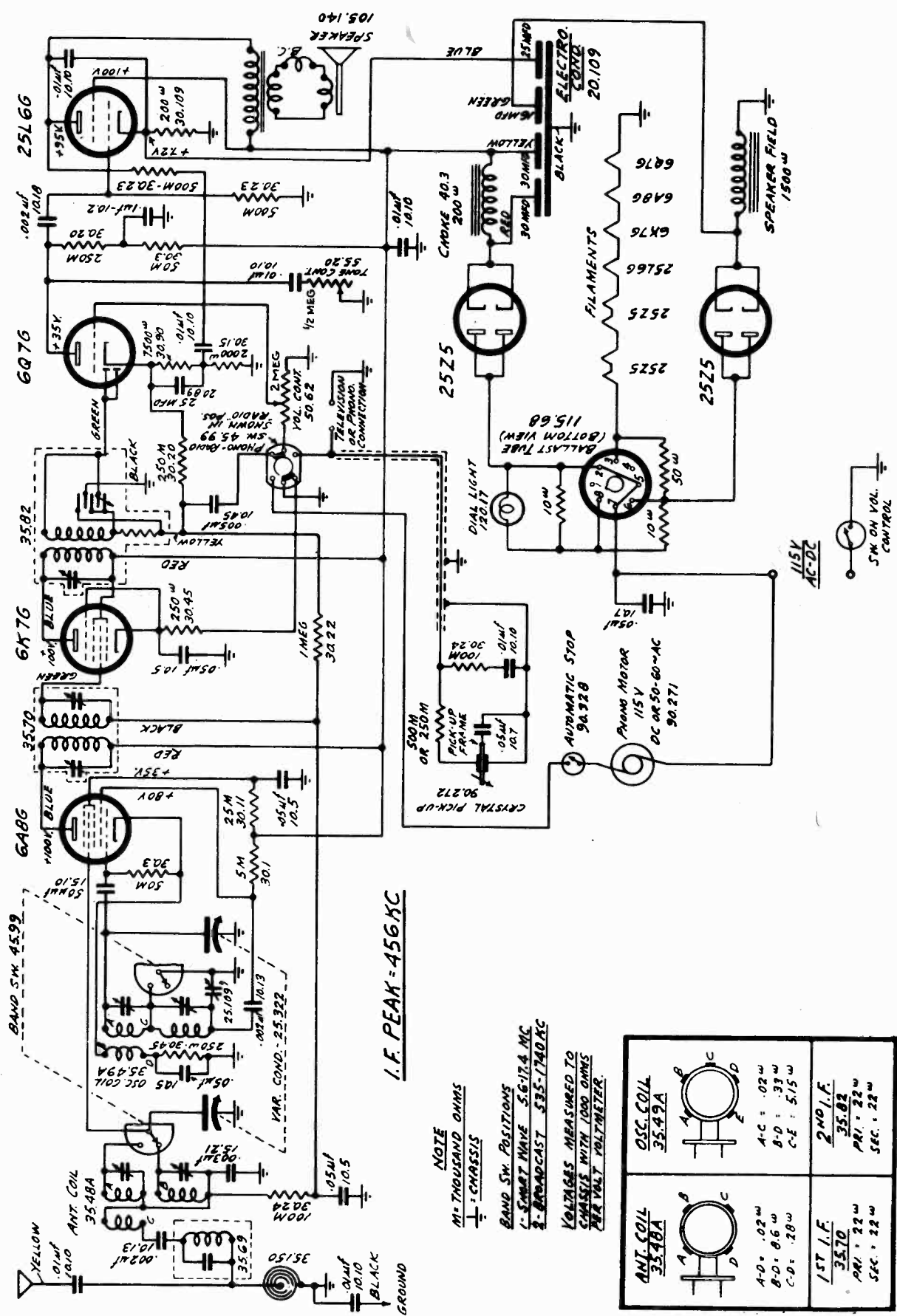


SPECIFICATIONS
 FREQ. RANGE = 530 - 1650 KC.
 ♯ = CHASSIS
 M = THOUSAND OHMS

I.F. PEAK = 456 KC

MODEL 75PC

FADA RADIO & ELECTRIC CO



I.F. PEAK = 456 KC

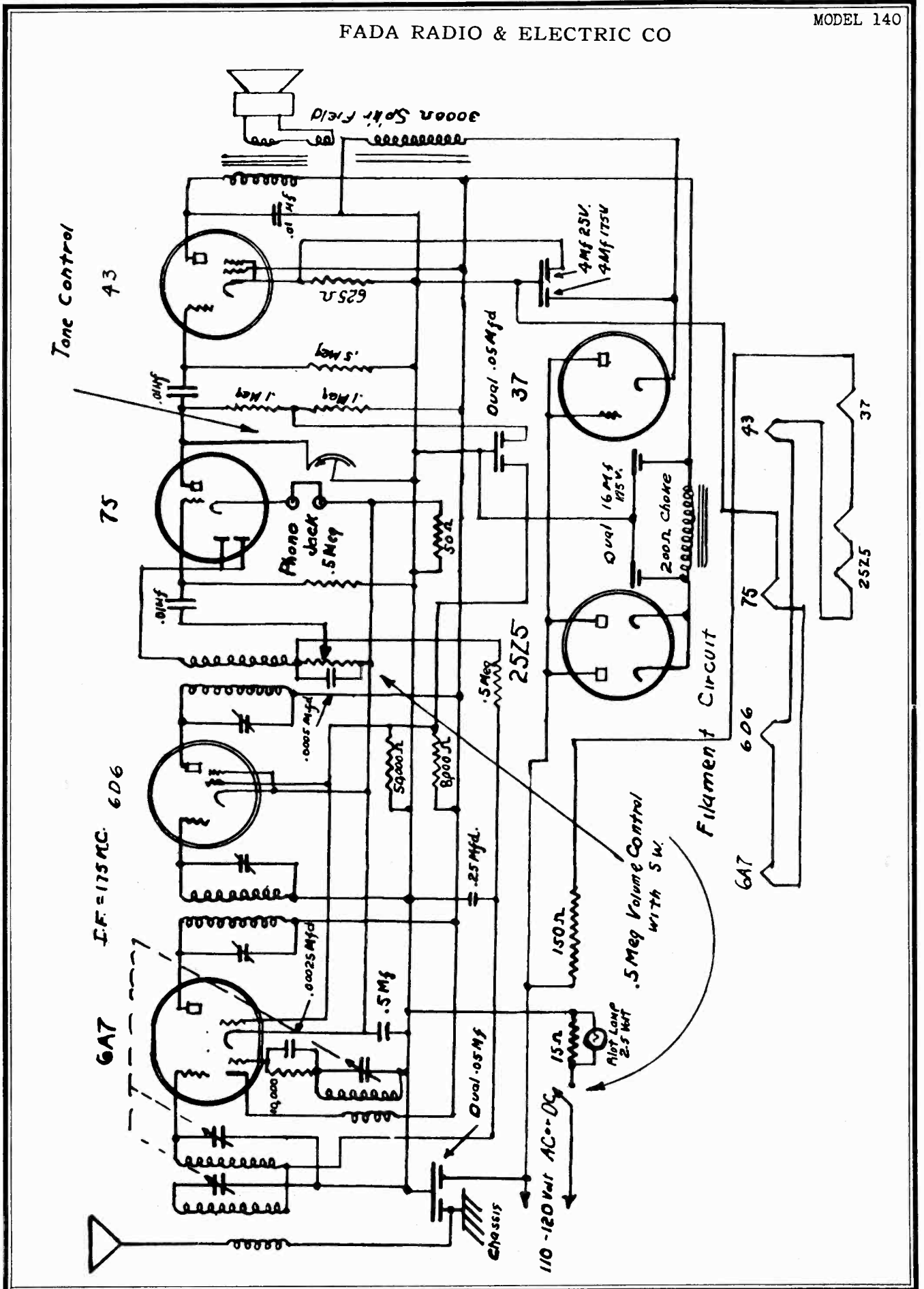
- NOTE**
M = THOUSAND OHMS
= CAPACITANCE
BAND SW. POSITIONS
1 - SHORT WAVE 5.6174 MC
2 - BROADCAST 535-1740 KC

VOLTAGES MEASURED TO
CHARISTS WITH 1000 OHMS
PER VOLT VOLTMETER.

<p>ANT. COIL 35.48A</p> <p>A-C : .02 μ B-D : .33 μ C-E : .15 μ</p>	<p>OSC. COIL 35.49A</p> <p>A-C : .02 μ B-D : .33 μ C-E : .15 μ</p>
<p>1ST I.F. 35.70</p> <p>PRI. : 22 μ SEC. : 22 μ</p>	<p>2ND I.F. 35.82</p> <p>PRI. : 22 μ SEC. : 22 μ</p>

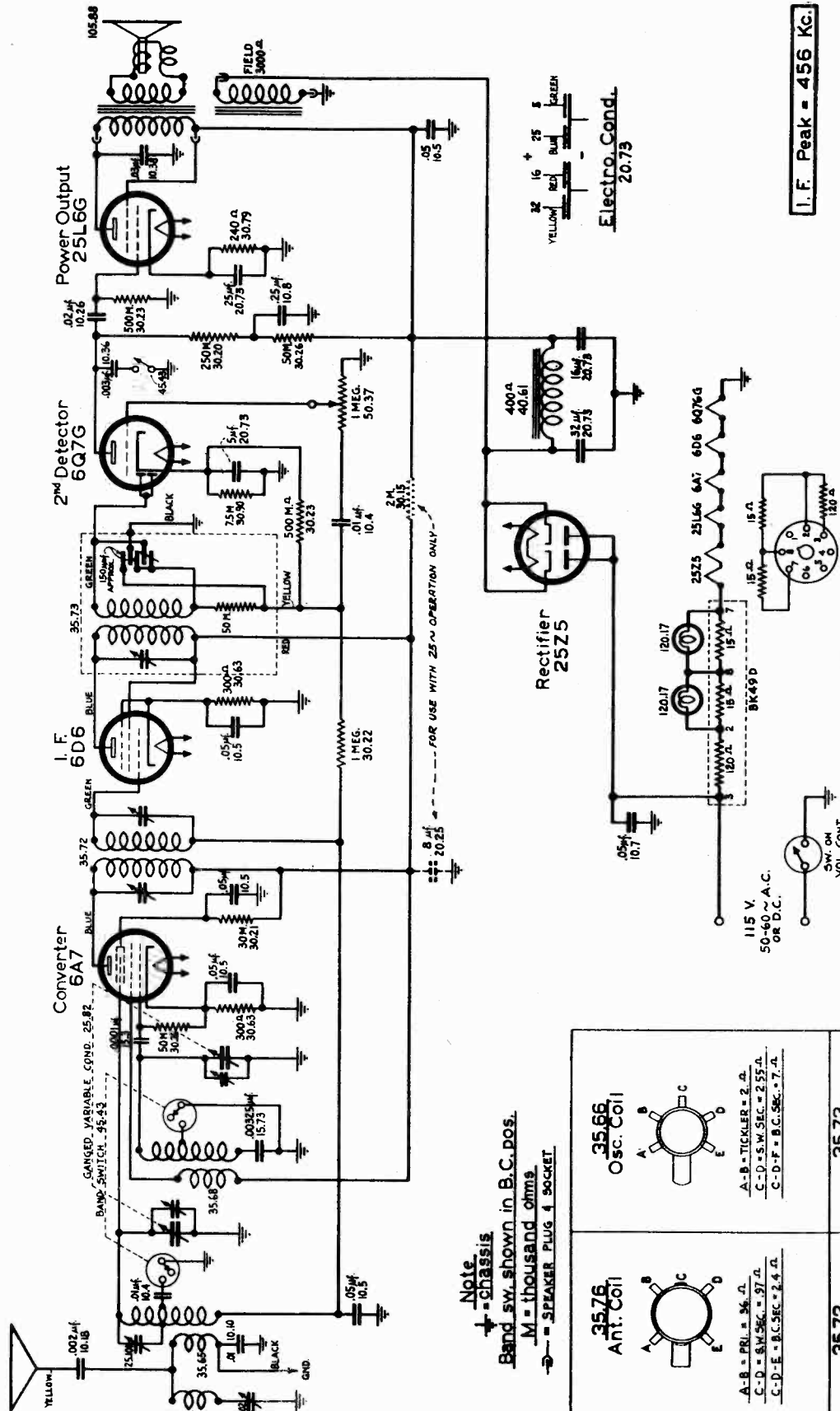
FADA RADIO & ELECTRIC CO

MODEL 140



MODEL 361

FADA RADIO & ELECTRIC CO



I.F. Peak = 456 Kc.

Electro. Cond. 20.73
 25 16 + 25 5
 YELLOW RED BLUE GREEN

Bottom View of Ballast BK 49 D

NOTE: FOR 250 V OPERATION, BALLAST TUBE 115-44 IS USED.

Note
 + = chassis
 Band sw. shown in B.C. pos.
 M = thousand ohms
 → = SPEAKER PLUG 4 SOCKET

<p>35.75 Ant. Coil</p> <p>A-B = PRI. = 54 Ω C-D = S.W. SEC. = 97 Ω C-D-E = B.C. SEC. = 2.4 Ω</p>	<p>35.66 Osc. Coil</p> <p>A-B = TICKLER = 2 Ω C-D = S.W. SEC. = 2.55 Ω C-D-F = B.C. SEC. = 7 Ω</p>
<p>35.72 I.F. Coil</p> <p>PRI. & SEC. = 28 Ω</p>	<p>35.73 I.F. Coil</p> <p>PRI. & SEC. = 28 Ω</p>

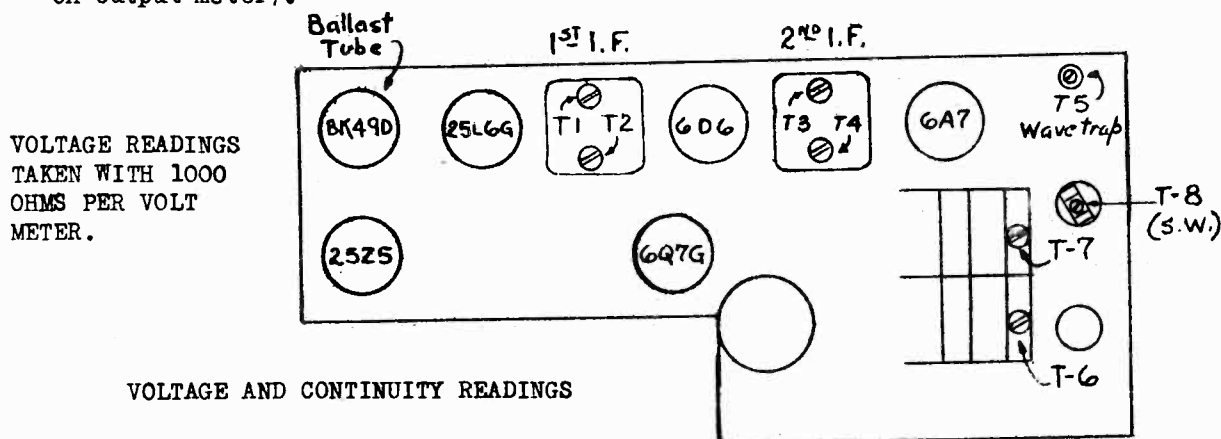
FADA RADIO & ELECTRIC CO

MODEL 361

ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	.001 mfd. 50,000 ohms	Control grid of 6A7 tube	T-1, T-2, T-3, T-4
B.C.	550 KC	456 KC	200 mmfd. condenser	Yellow antenna lead	T-5*
B.C.	1500 KC	1500 KC	200 mmfd. condenser	Yellow antenna lead	T-6, T-7
S.W.	2.4 MC	2.4 MC	400 ohm resistor	Yellow antenna lead	T-8
B.C.	1500 KC	1500 KC	200 mmfd. condenser	Yellow antenna lead	T-7

*This is a wave trap alignment. Adjust for minimum signal (lowest deflection on output meter).



VOLTAGE AND CONTINUITY READINGS

Line voltage 116 A.C. - Input watts - 52

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Detector	105	1.6	1.5	52
	Oscillator	105	2.2	---	---
6D6	I.F. Amp.	105	7.4	3.0	105
6Q7G	2nd Detector	42	.2	.8	---
25L6G	Pwr. Pentode	92	30.0	8.2	97
25Z5	Rectifier	---	90.0 TOTAL	---	---

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (PART #20.73)

1st SECTION	2nd SECTION
125	105

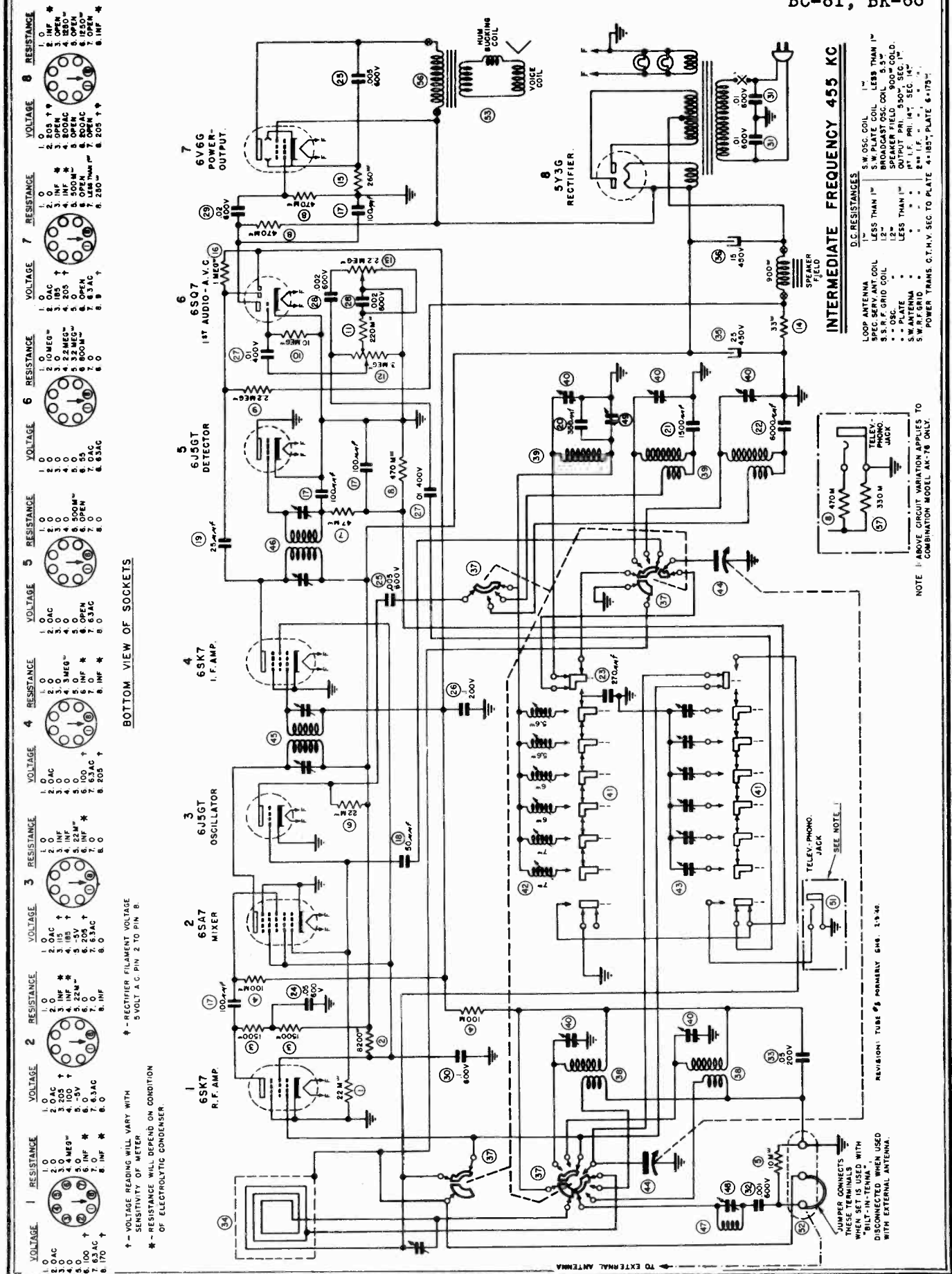
Voltage across 3,000 ohm speaker field - - - - - 125 volts
 " " 400 " filter choke - - - - - 20.0 "

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.88	3,000*	130 ohms*	.8 ohms*	3.2

*These are cold D.C. resistance values.

FARNSWORTH TELEVISION & RADIO CORP. MODELS BC-72, BC-80, BC-81, BK-86



VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE
1. 0 AC	1. 0	1. 0 AC	1. 0	1. 0 AC	1. 0	1. 0 AC	1. 0	1. 0 AC	1. 0
2. 205 V	2. 10 MEG	2. 205 V	2. 10 MEG	2. 205 V	2. 10 MEG	2. 205 V	2. 10 MEG	2. 205 V	2. 10 MEG
3. 115 V	3. 3.0	3. 115 V	3. 3.0	3. 115 V	3. 3.0	3. 115 V	3. 3.0	3. 115 V	3. 3.0
4. 100 V	4. 3 MEG	4. 100 V	4. 3 MEG	4. 100 V	4. 3 MEG	4. 100 V	4. 3 MEG	4. 100 V	4. 3 MEG
5. 205 V	5. 100 M	5. 205 V	5. 100 M	5. 205 V	5. 100 M	5. 205 V	5. 100 M	5. 205 V	5. 100 M
6. 100 V	6. 100 M	6. 100 V	6. 100 M	6. 100 V	6. 100 M	6. 100 V	6. 100 M	6. 100 V	6. 100 M
7. 6.3 AC	7. 0	7. 6.3 AC	7. 0	7. 6.3 AC	7. 0	7. 6.3 AC	7. 0	7. 6.3 AC	7. 0
8. 0	8. 0	8. 0	8. 0	8. 0	8. 0	8. 0	8. 0	8. 0	8. 0

BOTTOM VIEW OF SOCKETS

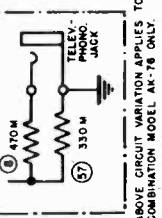
* - RECTIFIER FILAMENT VOLTAGE
5 VOLT A.C. PIN 2 TO PIN 8.

† - VOLTAGE READING WILL VARY WITH SENSITIVITY OF METER
* - RESISTANCE WILL DEPEND ON CONDITION OF ELECTROLYTIC CONDENSER.

INTERMEDIATE FREQUENCY 455 KC

D.C. RESISTANCES

LOOP ANTENNA	12"	S.W. OSC. COIL	12"
SPEC. SERVO ANT. COIL	LESS THAN 1"	S.W. PLATE COIL	LESS THAN 1"
S.W. F. GRID COIL	12"	BROADCAST OSC. COIL	5.5"
S.W. OSC.	12"	SPEAKER FIELD	900" COLD.
PLATE	LESS THAN 1"	OUTPUT PHIL. 500"	SEC. 14"
S.W. ANTENNA	12"	PHIL. 14"	SEC. 14"
S.W. ANTENNA	12"	PHIL. 14"	SEC. 14"
POWER TRANS.	G.T.N.V. SEC TO PLATE 4-185"	PLATE 6-175"	



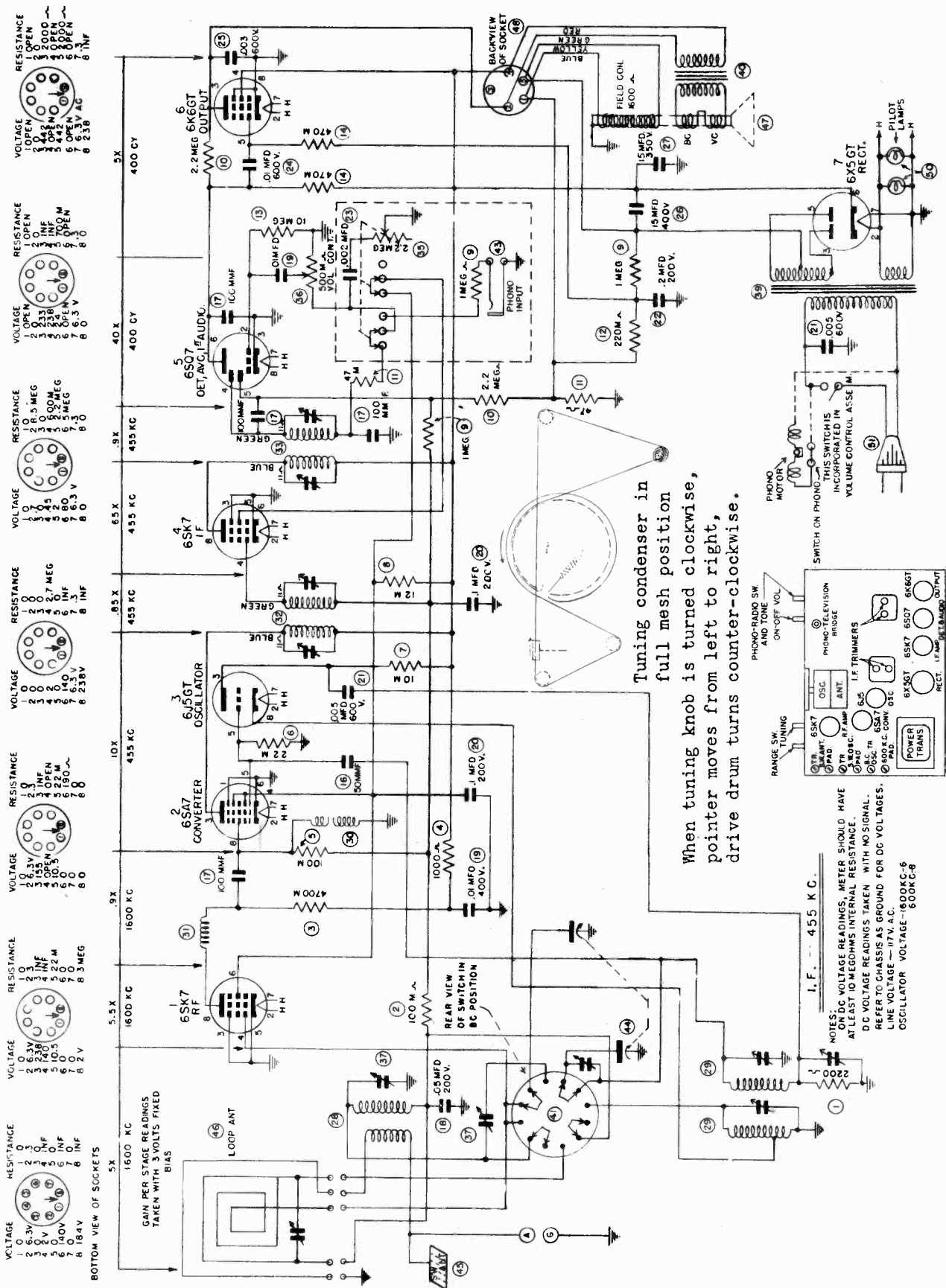
NOTE: ABOVE CIRCUIT VARIATION APPLIES TO COMBINATION MODEL AK-78 ONLY.

REVISION: TUBE #5 PREVIOUSLY 6SK7 1-3-36

JUMPER CONNECTS THESE TERMINALS WHEN SET IS USED WITH "BUILT-IN-ANTENNA". DISCONNECTED WHEN USED WITH EXTERNAL ANTENNA.

MODELS DK-73, DK-75
Ch. C-140-1, C-140-2

FARNSWORTH TELEV. & RADIO CORP.



Tuning condenser in full mesh position
When tuning knob is turned clockwise, pointer moves from left to right, drive drum turns counter-clockwise.

BOTTOM VIEW OF SOCKETS

RESISTANCE	VOLTAGE
1 OPEN	1 0.3V
2 0.1M	2 2.38V
3 0.1M	3 1.5V
4 0.1M	4 1.4V
5 0.1M	5 0.5V
6 0.1M	6 0.5V
7 0.1M	7 0.5V
8 0.1M	8 0.5V

RESISTANCE	VOLTAGE
1 OPEN	1 0.3V
2 0.1M	2 2.38V
3 0.1M	3 1.5V
4 0.1M	4 1.4V
5 0.1M	5 0.5V
6 0.1M	6 0.5V
7 0.1M	7 0.5V
8 0.1M	8 0.5V

RESISTANCE	VOLTAGE
1 OPEN	1 0.3V
2 0.1M	2 2.38V
3 0.1M	3 1.5V
4 0.1M	4 1.4V
5 0.1M	5 0.5V
6 0.1M	6 0.5V
7 0.1M	7 0.5V
8 0.1M	8 0.5V

RESISTANCE	VOLTAGE
1 OPEN	1 0.3V
2 0.1M	2 2.38V
3 0.1M	3 1.5V
4 0.1M	4 1.4V
5 0.1M	5 0.5V
6 0.1M	6 0.5V
7 0.1M	7 0.5V
8 0.1M	8 0.5V

NOTES:
ON DC VOLTAGE READINGS, METER SHOULD HAVE AT LEAST 10 MEGOHMS INTERNAL RESISTANCE.
DC VOLTAGE READINGS TAKEN WITH NO SIGNAL.
REFER TO CHASSIS AS GROUND FOR DC VOLTAGES.
LINE VOLTAGE - 117V A.C.
OSCILLATOR VOLTAGE - 1600KC-5 600KC-8

MODELS DK-73, DK-75

FARNSWORTH TELEV. & RADIO CORP. Ch. C-140-1,
C-140-2

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

WHEN ALIGNING THIS RECEIVER A SIGNAL GENERATOR CALLIBRATED AT 455 Kc, 600 Kc, 1500 Kc, 1720 Kc, 9.5 Mc, 12 Mc, AND 12.1 Mc, ALSO AN OUTPUT INDICATOR ARE REQUIRED. ALL ADJUSTMENTS SHOULD BE MADE WITH THE VOLUME CONTROL SET FOR MAXIMUM VOLUME, KEEPING THE GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT A.V.C. ACTION AND FALSE READINGS. BEFORE RE-ALIGNING THE SET BE SURE ALL ADJUSTING SCREWS FOR THE IRON CORE OSCILLATOR COILS ARE FLUSH WITH OR INSIDE THE CHASSIS BASE.

CONNECT THE LOW SIDE OF THE SIGNAL GENERATOR TO THE TERMINAL MARKED G. (GROUND), AND THE HIGH SIDE OF THE GENERATOR TO THE TERMINAL MARKED A. (ANTENNA). (SEE FIG.A).

CAUTION--OFTEN TWO PEAKS ARE FOUND AT 12.1 Mc. USE THE ONE FOUND AT THE MAXIMUM SETTING OF THE OSCILLATOR TRIMMER.

CAUTION--BE SURE AND REMOVE THE DIAL POINTER BEFORE REMOVING THE SET FROM THE CABINET.

STEPS	USE IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN	
1.	SET VOLUME CONTROL AT MAXIMUM						
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT	
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.		
4.		1720 Mc.	1720	B.C. R.F. TRIMMER	SEE FIG.		
5.		1500 Kc.	1500	B.C. R.F. TRIMMER	ON THE LOOP		
6.		600 Kc.	600 Kc. ROCK GANG	B.C. PADDER	SEE FIG.		
7.		RECHECK 1600 Kc.					
8.	400 OHMS	12.1 Mc.	12.1 Mc.	S.W. Osc. TRIMMER			
9.		12.1 Mc.	12.1 Mc.	S.W. R.F. TRIMMER			
10.		9.5	9.5 Mc. ROCK GANG	S.W. PADDER			

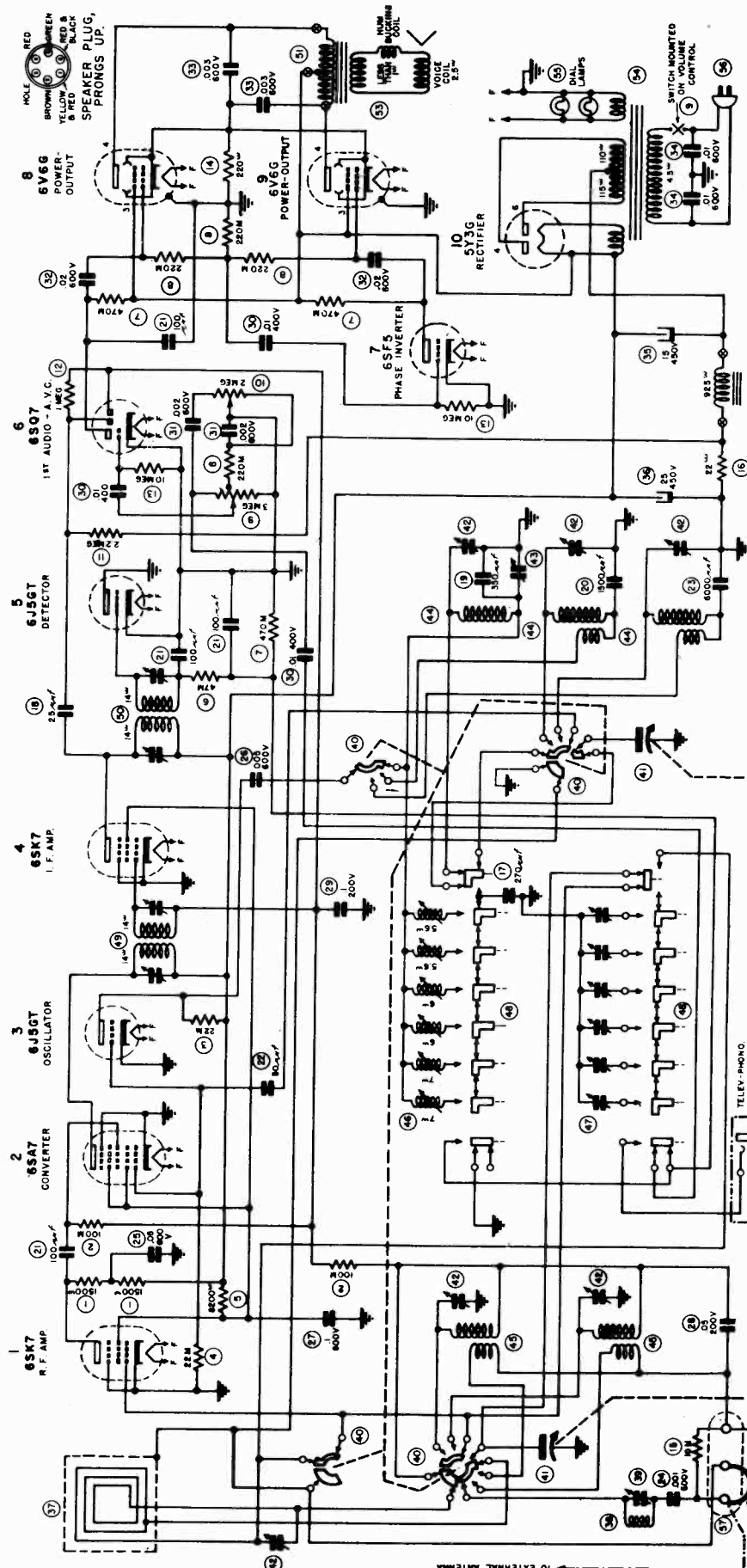
MODELS BC-92, BC-101, FARNSWORTH TELEV. & RADIO CORP.
BC-102

VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE
1	0	1	0	1	0	1	0	1	0	1	0
2	0	2	0	2	0	2	0	2	0	2	0
3	0	3	0	3	0	3	0	3	0	3	0
4	0	4	0	4	0	4	0	4	0	4	0
5	0	5	0	5	0	5	0	5	0	5	0
6	0	6	0	6	0	6	0	6	0	6	0
7	0	7	0	7	0	7	0	7	0	7	0
8	0	8	0	8	0	8	0	8	0	8	0
9	0	9	0	9	0	9	0	9	0	9	0
10	0	10	0	10	0	10	0	10	0	10	0

LINE VOLTAGE - 110.
RECTIFIER FILAMENT VOLTAGE 5 V.A.C.
MEASURED FROM PIN E TO PIN 8 OF
SOCKET 70.

BOTTOM VIEW OF SOCKETS

↑ - VOLTAGE READINGS WILL VARY WITH
SENSITIVITY OF METER AND ON CONDITION
OF ELECTROLYTIC CONDENSER

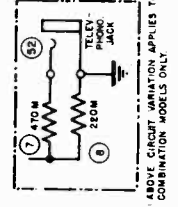


INTERMEDIATE FREQUENCY 455 KC

D.C. RESISTANCES

LESS THAN 1 ^Ω	1 ^Ω - 10 ^Ω	10 ^Ω - 100 ^Ω	100 ^Ω - 1000 ^Ω	1000 ^Ω - 10000 ^Ω	10000 ^Ω - 100000 ^Ω	100000 ^Ω - 1000000 ^Ω
SW OSC COIL	SW PLATE COIL	SPEC SERV ANT COIL	2 ND OSC GRID COIL	OSC	OUTPUT P.C.	SW ANTENNA
LESS THAN 1 ^Ω	LESS THAN 1 ^Ω	LESS THAN 1 ^Ω	LESS THAN 1 ^Ω	LESS THAN 1 ^Ω	LESS THAN 1 ^Ω	LESS THAN 1 ^Ω
12 ^Ω	55 ^Ω	330 ^Ω	330 ^Ω	330 ^Ω	330 ^Ω	330 ^Ω
100 ^Ω	100 ^Ω	100 ^Ω	100 ^Ω	100 ^Ω	100 ^Ω	100 ^Ω
1000 ^Ω	1000 ^Ω	1000 ^Ω	1000 ^Ω	1000 ^Ω	1000 ^Ω	1000 ^Ω
10000 ^Ω	10000 ^Ω	10000 ^Ω	10000 ^Ω	10000 ^Ω	10000 ^Ω	10000 ^Ω
100000 ^Ω	100000 ^Ω	100000 ^Ω	100000 ^Ω	100000 ^Ω	100000 ^Ω	100000 ^Ω
1000000 ^Ω	1000000 ^Ω	1000000 ^Ω	1000000 ^Ω	1000000 ^Ω	1000000 ^Ω	1000000 ^Ω

MEASURED FROM PIN #3 TO #4 OF EACH OUTPUT TUBE
POWER TRANS C.T.V. SEC TO PLATE 4:105-PLATE 8:175

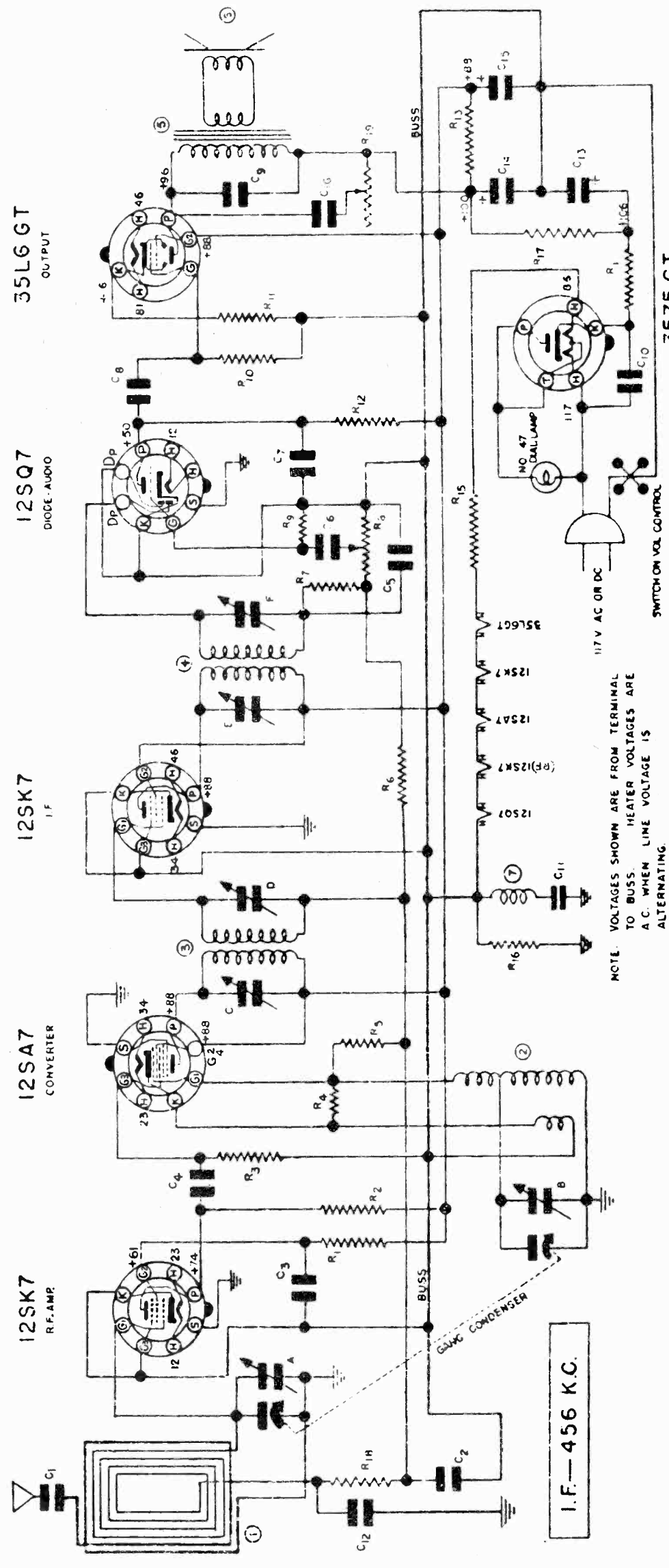


NOTE #1: ABOVE CIRCUIT VARIATION APPLIES TO
COMBINATION MODELS ONLY

REVISION TABLE PREVIOUSLY 016, 1-9-44

SWITCH MOUNTED ON VOLUME CONTROL

FIRESTONE TIRE & RUBBER CO.



NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

6 TUBE A.C.-D.C. SUPERHETERODYNE

SINGLE BAND

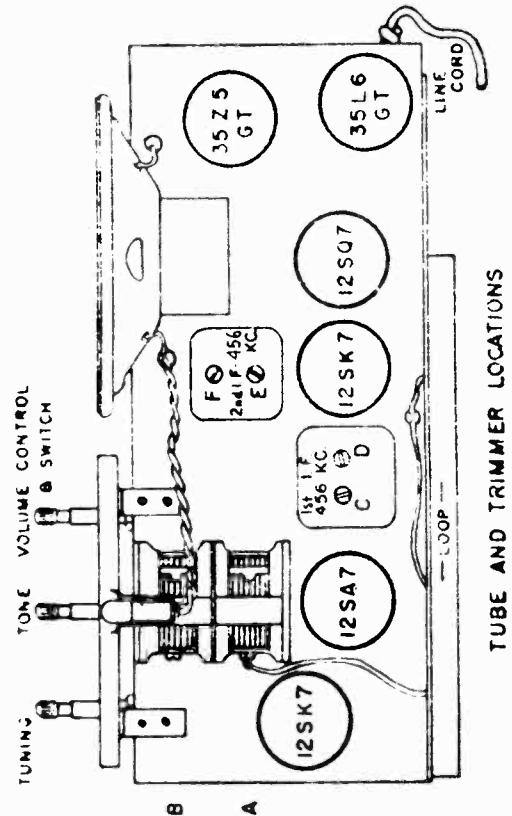
DRAWN H.H. APPROVED *J.F.R.*
JANUARY 31, 1941.

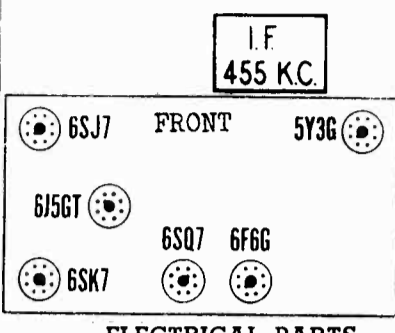
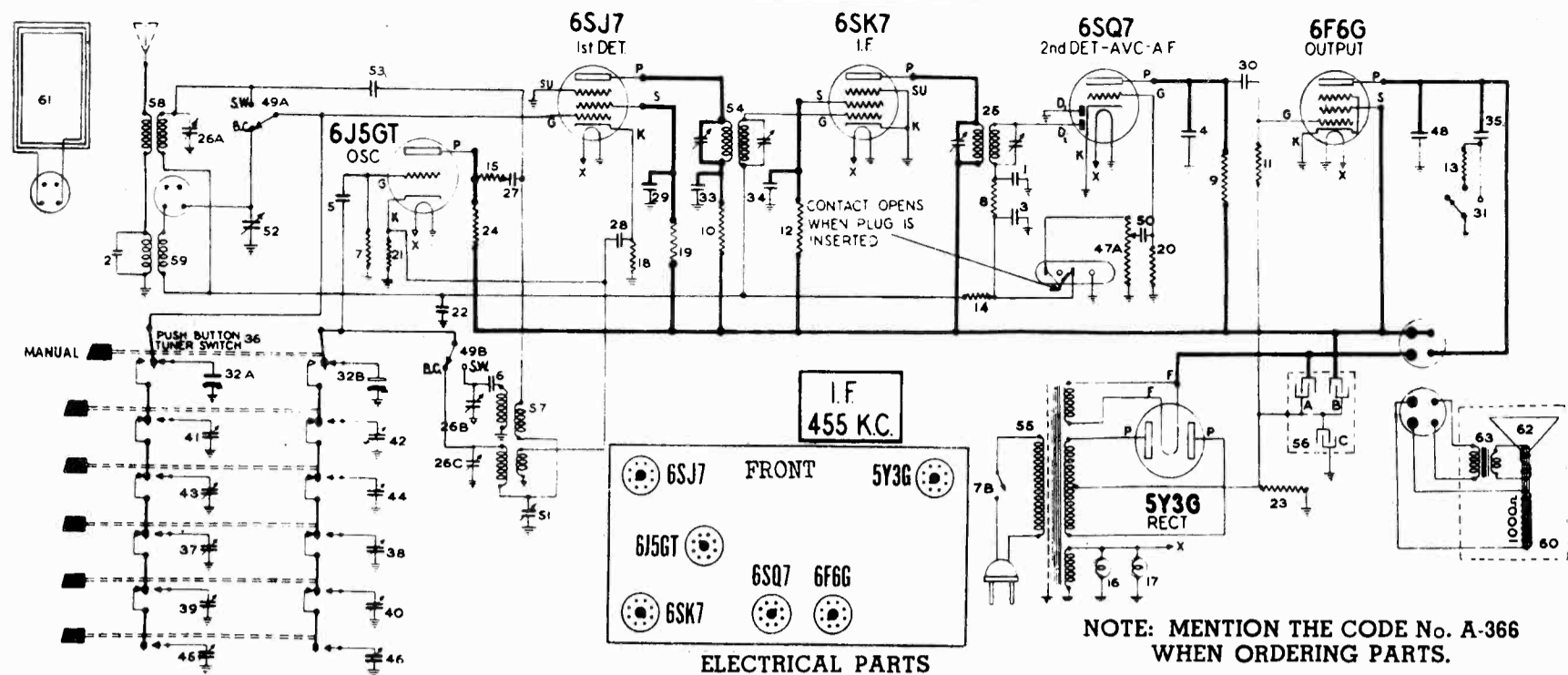
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1344	0.1 MFD. 400 V. 20%	R11	N-4067	180 OHM. 5 W. 10%
C2	N-1345	.05 MFD. 200 V. 20%	R12	N-4026	220,000 OHM. 5 W. 20%
C3	N-1343	.05 MFD. 200 V. 20%	R13	N-4066	470 OHM. 5 W. 10%
C4	N-2303	150 MMFD. MICA 20%	R14	N-4068	33 OHM. 10 W. 20%
C5	N-1374	100 MMFD. MICA 20%	R15	N-4068	33 OHM. 10 W. 20%
C6	N-1344	.01 MFD. 400 V. 20%	R16	N-4026	220,000 OHM. 5 W. 20%
C7	N-1447	.0005 MFD. 400 V. 20%	R17	N-1615	100 OHM. 5 W. 10%
C8	N-1344	.01 MFD. 400 V. 20%	R18	N-1262	1 MEGOHM. .5 W. 20%
C9	N-1376	.02 MFD. 400 V. 20%	R19	N-4033	25,000 OHM. TONE CONTROL
C10	N-1346	.05 MFD. 400 V. 20%			
C11	N-3086	22 MFD. 200 V. 10%			
C12	N-1344	.05 MFD. 200 V. 20%			
C13	N-4027	40 MFD. 150 V. ELECTROLYTIC	1	N-4033	ANTENNA LOOP COIL
C14	N-4027	20 MFD. 150 V. ELECTROLYTIC	2	N-3286	OSCILLATOR COIL
C15	N-1346	.30 MFD. 150 V. 20%	3	N-4069	1ST. I.F. TRANSFORMER
C16	N-1346	.05 MFD. 400 V. 20%	4	N-4073	2ND. I.F. TRANSFORMER
			5	N-4060	OUTPUT TRANSFORMER
			6	N-4030	6" P.M. SPEAKER
			7		CHIME (WOUND ON C13)
R1	N-1259	15,000 OHM. 5 W. 20%			
R2	N-4025	2200 OHM. 5 W. 10%			
R3	N-4063	47,000 OHM. .5 W. 20%			
R4	N-4025	22,000 OHM. 5 W. 20%			
R5	N-1263	10 MEGOHM. .5 W. 20%			
R6	N-4052	3.3 MEGOHM. .5 W. 20%			
R7	N-4064	33,000 OHM. .5 W. 20%			
R8	N-4071	0.5 MEGOHM. VOLUME CONTROL			
R9	N-4061	4.7 MEGOHM. .5 W. 20%			
R10	N-4027	470,000 OHM. .5 W. 20%			

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

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





NOTE: MENTION THE CODE No. A-366 WHEN ORDERING PARTS.

Diagram Number	Part Number	Description
1	83539	Condenser, mica 260 mmfd.
2-3-4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Condenser, mica .0042 mid.
7-8	110552	Resistor—carbon 47,000 ohms 1/4 watt.
9	110553	Resistor—carbon 220,000 ohms 1/4 watt.
10	110557	Resistor—carbon 4,700 ohms 1/4 watt.
11	110559	Resistor—carbon 470,000 ohms 1/4 watt.
12	110564	Resistor—carbon 100,000 ohms 1/4 watt.
13	110569	Resistor—carbon 10,000 ohms 1/4 watt.
14	110570	Resistor—carbon 2.2 meg. 1/4 watt.
15	110590	Resistor—carbon 180 ohms 1/4 watt.
16-17	110629	Dial light bulb—6.3 volt (Mazda No. 44)
18	112952	Resistor—carbon 3,300 ohms 1/4 watt.
19	112962	Resistor—carbon 150,000 ohms 1/4 watt.
20	112975	Resistor—carbon 10 meg. 1/4 watt.
21	116078	Resistor—560 ohms 1/4 watt.
22	116819	Condenser—.05 mfd. 600 volt.
23	117075	Resistor—300 ohm 1 watt W.W.
24	118805	Resistor—carbon 10,000 ohms 1 watt.
25	119024	Transformer—2nd I.F.
26A to 26C	119174	Condenser—trimmer 3 section.
27 to 30	119193	Condenser—.01 mfd. 600 volt.
31	119289	Switch—tone
32A-32B	119291	Condenser—variable tuning
33 to 35	119414	Condenser—.02 mfd. 600 volt.
36	119603	Push Button Switch
37 to 40	119663	Condenser—Push Button trimmer (750 to 1375 KC.)
41 to 44	119664	Condenser—Push Button trimmer (980 to 1600 KC.)
45-46	119753	Condenser—Push Button trimmer (540 to 1000 KC.)

Diagram Number	Part Number	Description
47A-47B	119779	Volume control 1/2 meg. (with switch)
48	119817	Condenser .004 mfd. 600 volt.
49A-49B	119859	Switch—band
50	119875	Condenser—.002 mfd. 600 volt.
51	119934	Condenser—padder
52	160449	Condenser—trimmer
53	161315	Condenser—twisted wire—5 mmfd.
54	500131	Transformer—1st I.F.
55	500137	Transformer—power (60 cycles)
	500202	Transformer—power (25 cycles)

Diagram Number	Part Number	Description
57	500248	Coil—oscillator
58	500249	Coil—short wave antenna
59	500255	Coil—B.C. antenna loading
60	M-500280	Speaker—dynamic (6")
61	500295	Loop antenna & cabinet back
62	M-500303	Cone & Voice coil for M-500280 speaker
63	M-500302	Transformer—output for M-500280 speaker

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

TUBE	FUNCTION	DIAL TUNED TO 540 KC.							
		H	K	G	S	SU	P	D ₁	D ₂
6SJ7	1st DET.	6.0 A.C.	6.5	O	140	0	215		
6J5GT	OSC.	6.0 A.C.	0	—3			160		
6SK7	I.F.	6.0 A.C.	0	O	60	0	225		
6SQ7	2nd DET. — A.V.C. & A.F.	6.0 A.C.	0	O			90	0	0
6F6G	OUTPUT	6.0 A.C.	0	Note A	225		215		
5Y3G	RECTIFIER	5.0 A.C.							

NOTE A: The bias for this grid is -15 volts measured across resistor No. 23. Use a high resistance voltmeter of at least 1000 ohms per volt.

MODELS S-7398-5, S-7398-6, Code A-366

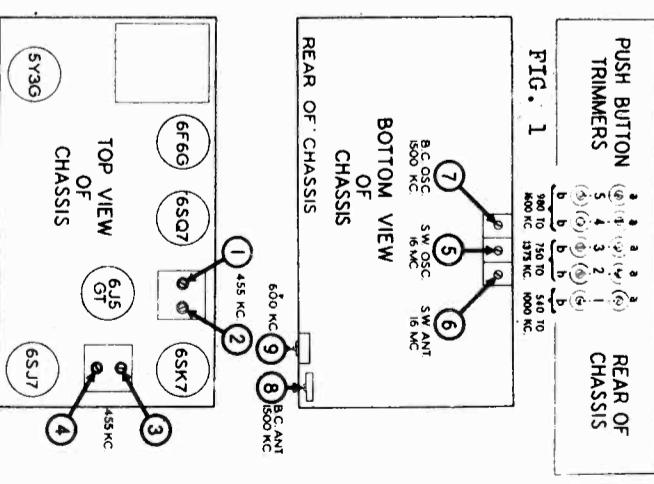
TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the back of the chassis will be seen ten adjusting screws. (See Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons you select stations whose frequency is in the indicated range of that button. ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.
5. Turn the band switch to the "AM" position, push in the button labeled "MANUAL", then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a (the top one) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b (the one below 1a) and turn it until the program is heard with the deepest tone. Now again check the setting of screw No. 1a, making sure it is adjusted to give the deepest tone.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure: push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for the deepest tone as before.

ALIGNMENT EQUIPMENT & PROCEDURE

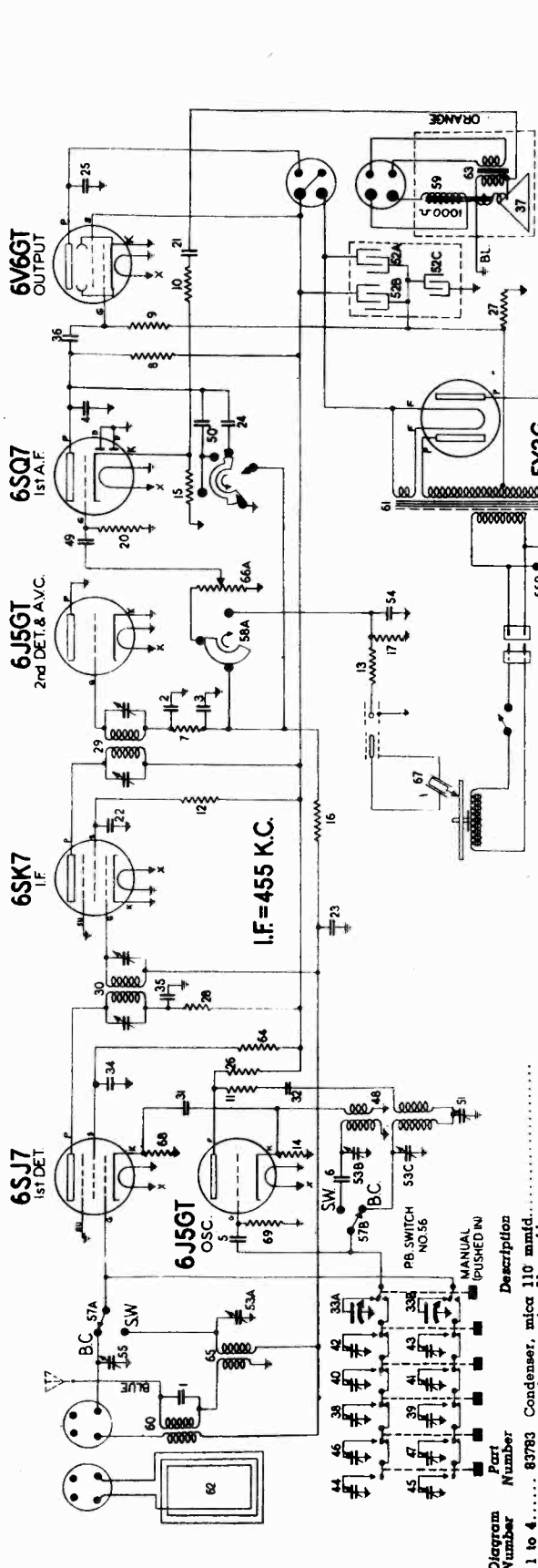
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Front Section of Gang Cond.	455 KC	American	Any Point Where It Differs from Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Redign at 16 MC. with Trimmer Screw (either out, Recheck Image).
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Return Receiver Dial until Maximum Output is Obtained.
200 M.MFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 M.MFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	8	Broadcast Antenna	Adjust for Maximum Output.
200 M.MFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Return Receiver Dial until Maximum Output is Obtained.

Now replace the chassis and loop antenna in the cabinet before proceeding further.



FIRESTONE TIRE & RUBBER CO.

MODEL S-7393-1,
Code A-400



NOTE: A 33,000 ohm 2W. resistor is connected from 6V6GT screen to chassis (not shown).

ELECTRICAL PARTS

Diagram Number	Part Number	Description
52	501060	Condenser—electrolytic
	Section A—20 mid.	400 volt
	Section B—15 mid.	400 volt
	Section C—20 mid.	25 volt
53A to 53C	160415	Condenser—trimmer (3 section)
54	160430	Condenser—001 mid. 600 volt.
55	160449	Condenser—trimmer
56	500058	Switch—push button
57A-57B	500057	Switch—Radio-Phono tone
58A-58B	501028	Switch—Dynamic (10')
59	M-500948	Speaker—Dynamic
60	500253	Coil—compensating

NO SIGNAL CONDITION

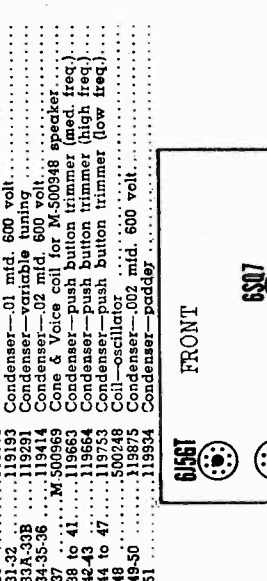
TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6S17	1st Det.	6.0 A.C.	9.0	0	105	0	220		
6J5GT	Osc.	6.0 A.C.	0	-3					
6SK7	I.F.	6.0 A.C.	0	0	46	0	230		
6J5GT	2nd Det.—A.V.C.	6.0 A.C.	0	0					
6SQ7	1st A.F.	6.0 A.C.	1	0					
6V6GT	Output	6.0 A.C.	0	Note A	230				
5Y3G	Rectifier	5.0 A.C.							

Diagram Number	Part Number	Description
1 to 4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Resistor—carbon 47,000 ohms 1/4 watt.
7	110552	Resistor—carbon 220,000 ohms 1/4 watt.
8-9	110553	Resistor—carbon 6800 ohms 1/4 watt.
10	118818	Resistor—carbon 180 ohms 1/4 watt.
11	110590	Resistor—carbon 50 ohms 1/4 watt.
12-13	110564	Resistor—carbon 50 ohms 1/4 watt.
14-15	110570	Resistor—carbon 330,000 ohms 1/4 watt.
16	110584	Resistor—carbon 330,000 ohms 1/4 watt.
17	112978	Resistor—carbon 10 meg. 1/4 watt.
18-19	112978	Resistor—carbon 10 meg. 1/4 watt.
20	116273	Resistor—carbon 10 meg. 1/4 watt.
21	119414	Resistor—02 mid. 600 volt.
22	119414	Resistor—02 mid. 600 volt.
23	119416	Resistor—05 mid. 600 volt.
24	119417	Resistor—008 mid. 600 volt.
25	118805	Resistor—carbon 10,000 ohms 1 watt.
26	118812	Resistor—180 ohms 1 watt W.W.
27	118812	Resistor—180 ohms 1 watt W.W.
28	110557	Resistor—carbon 4700 ohms 1/4 watt.
29	119024	Transformer—2nd I.F.
30	500801	Transformer—1st I.F.
31-32	119193	Condenser—01 mid. 600 volt.
33A-33B	119291	Condenser—variable tuning
34-35-36	119414	Condenser—.02 mid. 600 volt.
37	M-500969	Cone & Voice coil for M-500948 speaker
38 to 41	119663	Condenser—push button trimmer (med. freq.)
42-43	119664	Condenser—push button trimmer (high freq.)
44 to 47	119753	Condenser—push button trimmer (low freq.)
48	500248	Coil—oscillator
49-50	119875	Condenser—.002 mid. 600 volt.
51	119954	Condenser—padding

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

DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	S	SU	P	D ₁	D ₂
6S17	1st Det.	6.0 A.C.	9.0	0	105	0	220		
6J5GT	Osc.	6.0 A.C.	0	-3					
6SK7	I.F.	6.0 A.C.	0	0	46	0	230		
6J5GT	2nd Det.—A.V.C.	6.0 A.C.	0	0					
6SQ7	1st A.F.	6.0 A.C.	1	0					
6V6GT	Output	6.0 A.C.	0	Note A	230				
5Y3G	Rectifier	5.0 A.C.							



NOTE A: The 6V6GT grid bias voltage is -13.5 volts measured across resistor No. 27. Use a high resistance voltmeter of at least 1000 ohms per volt.

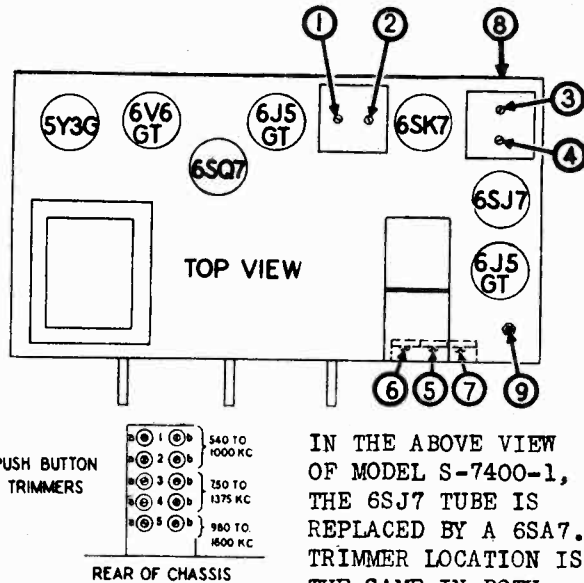
Plates 350 V.A.C. to C.T.

MODEL S-7393-1,
Code A-400
MODEL S-7400-1

FIRESTONE TIRE & RUBBER CO.

TO SET UP THE BUTTONS FOR AUTO-MATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the plate just under the dial will be seen ten adjusting screws (see Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons, you select stations whose frequency is in the indicated range of that button.
5. Turn the BAND SWITCH to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b and turn it until the program is heard with deepest tone. Now again check the setting of screw No. 1a making sure it is adjusted to give maximum volume.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure; push in the "MANUAL" button, tune in the station using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2 etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.



REAR OF CHASSIS

Fig. 1

IN THE ABOVE VIEW OF MODEL S-7400-1, THE 6SJ7 TUBE IS REPLACED BY A 6SA7. TRIMMER LOCATION IS THE SAME IN BOTH MODELS.

ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or, from plate of the 6V6GT output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the RADIO-PHONO TONE SWITCH to the "Radio-Speech" position.
4. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
5. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
6. The loop must be connected as indicated in circuit diagram at all times.

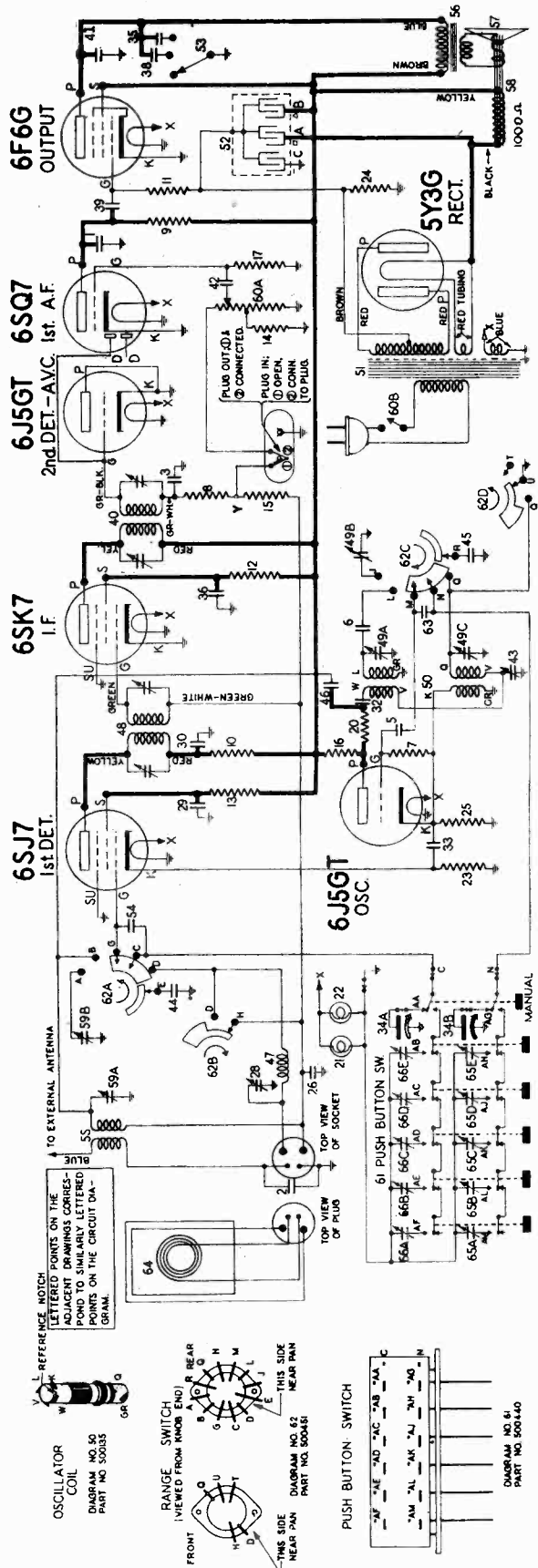
Dummy Ant. In Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on front Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2 3-4	2nd I.F. 1st I.F.	Adjust for Maximum Output. Then repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.

Now replace the chassis and loop antenna in the cabinet before proceeding further.

200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

FIRESTONE TIRE & RUBBER CO.

MODEL S-7397-9
Code A-393



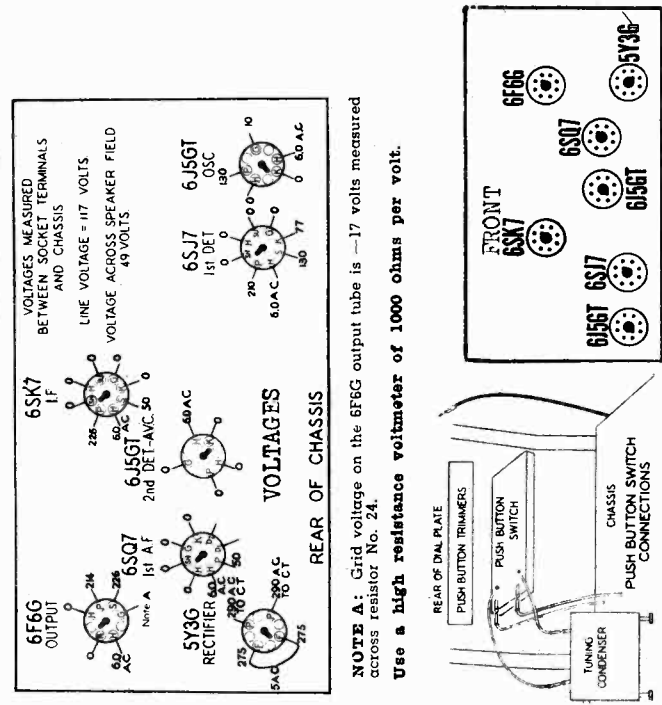
NOTE: A 110 MMFD. MICA CONDENSER IS CONNECTED FROM POINT "Y" TO CHASSIS.

ELECTRICAL PARTS

I.F. PEAK 455 KC

Diagram Number	Part Number	Description
1	83783	Condenser—mica 110 mmfd.
2-3	83539	Condenser—mica 260 mmfd.
5	85061	Condenser—mica 51 mmfd.
6	88587	Condenser—mica .0042 mfd.
7-8	110552	Resistor—carbon 47,000 ohms 1/4 watt
9	110553	Resistor—carbon 220,000 ohms 1/4 watt
10	110557	Resistor—carbon 4700 ohms 1/4 watt
11	110559	Resistor—carbon 470,000 ohms 1/4 watt
12-13	110564	Resistor—carbon 100,000 ohms 1/4 watt
14	110565	Resistor—carbon 22,000 ohms 1/4 watt
15	110570	Resistor—carbon 2.2 Meg. 1/4 watt
16	110576	Resistor—carbon 10,000 ohms 1/2 watt
17	112975	Resistor—carbon 300 Meg. 1/4 watt
18-19	110584	Resistor—carbon 30,000 ohms 1/4 watt
20	110590	Resistor—carbon 180,000 ohms 1/4 watt
21-22	112982	Diode Light Bulb 8 V.olt (Mazda No. 44)
23	112075	Resistor—300 ohm 1 watt w.w.
25	116079	Resistor—560 ohm 1/4 watt
26-27	116819	Condenser—.05 mfd. 600 volt
29	119132	Condenser—trimmer
29 to 33	119193	Condenser—.01 mfd. 600 volt
34A-34B	119291	Condenser—variable tuning
35	119680	Condenser—.04 mfd. 600 volt
36-37	119414	Condenser—.02 mfd. 600 volt
38	119416	Condenser—.008 mfd. 600 volt
39	116819	Condenser—.05 mfd. 600 volt
40	119024	Transformer—2nd I.F.
41	119417	Condenser—.006 mfd. 600 volt
42	119875	Condenset—.002 mfd. 600 volt
43	119394	Condenser—padder
44-45	187415	Condenser—compensating, 100 mmfd.
46	500108	Coil—twisted wire—5 mmfd.
47	500131	Coil—compensating
48	500133	Transformer—1st I.F.
49	500135	Transformer—three section trimmer
50	500137	Coil—B.C. & S.W. Osc.
51	500202	Transformer—power (60 cycles)
52	501321	Transformer—electrolytic A—20 mfd.—350 volt B—10 mfd.—350 volt C—20 mfd.—25 volt
53	500207	Switch—tone
54	500212	Condenser—compensating 200 mmfd.
55	500249	Coil—short wave antenna
56	R-500710	Transformer—output for R-500426 Spkr.
57	R-500711	Cone & Voice Coil for R-500426 Spkr.
58	R-500438	Socket, dynamic (6")
59A-59B	500438	Condenser—trimmer, two section
60A-60B	501488	Volume Control—1 Meg. (with switch)
61	500440	Switch—push button
62A to 62D	501490	Switch—band
63	500484	Condenser—compensating, 215 mmfd.
64	501889	Loop antenna & cabinet back
65A to 65E	500860	Trimmers—push button (top bank)
66A to 66E	500861	Trimmers—push button (bottom bank)

NOTE: RESISTOR No. 7 RETURNS TO CHASSIS INSTEAD OF CATHODE AS SHOWN.



NOTE A: Grid voltage on the 6F6G output tube is —17 volts measured across resistor No. 24.
Use a high resistance voltmeter of 1000 ohms per volt.

MODEL S-7397-9
Code A-393

FIRESTONE TIRE & RUBBER CO. ALIGNMENT EQUIPMENT & PROCEDURE

THIS RECEIVER MAY BE ALIGNED IN THE CABINET WITH LOOP CONNECTED

1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to chassis through a .1 mfd. condenser.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Make sure that the wires coming from the chassis and push button switch are connected as shown in the figure below.
4. Push in the "manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
5. Turn the volume control to the maximum volume position, and the tone control to the "speech" position.
6. FOLLOW THE ORDER OF ALIGNMENT INDICATED BELOW.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Outer Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M	11.5 MC	7	Spread Band Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M	Tune to 11.5 MC Generator Signal	8	Spread Band Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.

NOW PLACE THE CABINET BACK AND LOOP ANTENNA INTO POSITION AT THE BACK OF THE CABINET.

No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	10	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	11	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you and remove the cabinet back. **DO NOT DISCONNECT ANY WIRES WHICH COME FROM THE CABINET BACK.**
4. Just behind the dial plate, when viewed from the rear, will be seen ten push button adjusting screws (see Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
5. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1.

Buttons No. 1 and 2 may be set up to any station which operates between 540 and 1000 KC. in frequency. Buttons No. 3 and 4 may be set up to stations operating between 750 and 1375 KC., while button No. 5 may be set up to stations operating between 980 and 1600 KC.

6. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
7. Push in button No. 1 and using a screwdriver, turn adjusting screw No. 1a (the extreme right hand screw) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
8. Insert the screwdriver in screw No. 1b (just to the left of, and behind, 1a) and turn it until the program is heard with the deepest tone. Check the setting of screw No. 1a, making sure it still is adjusted to give deepest tone.
9. The set-up for button No. 1 is now complete.
10. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.

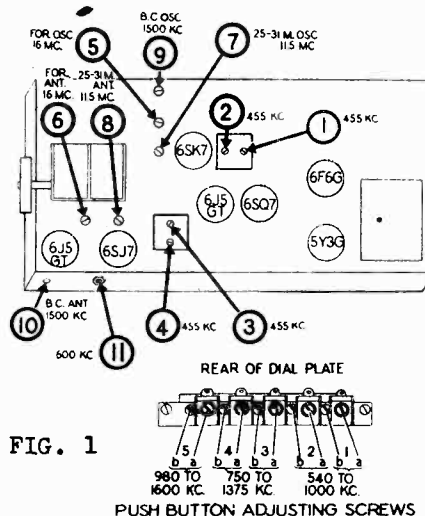
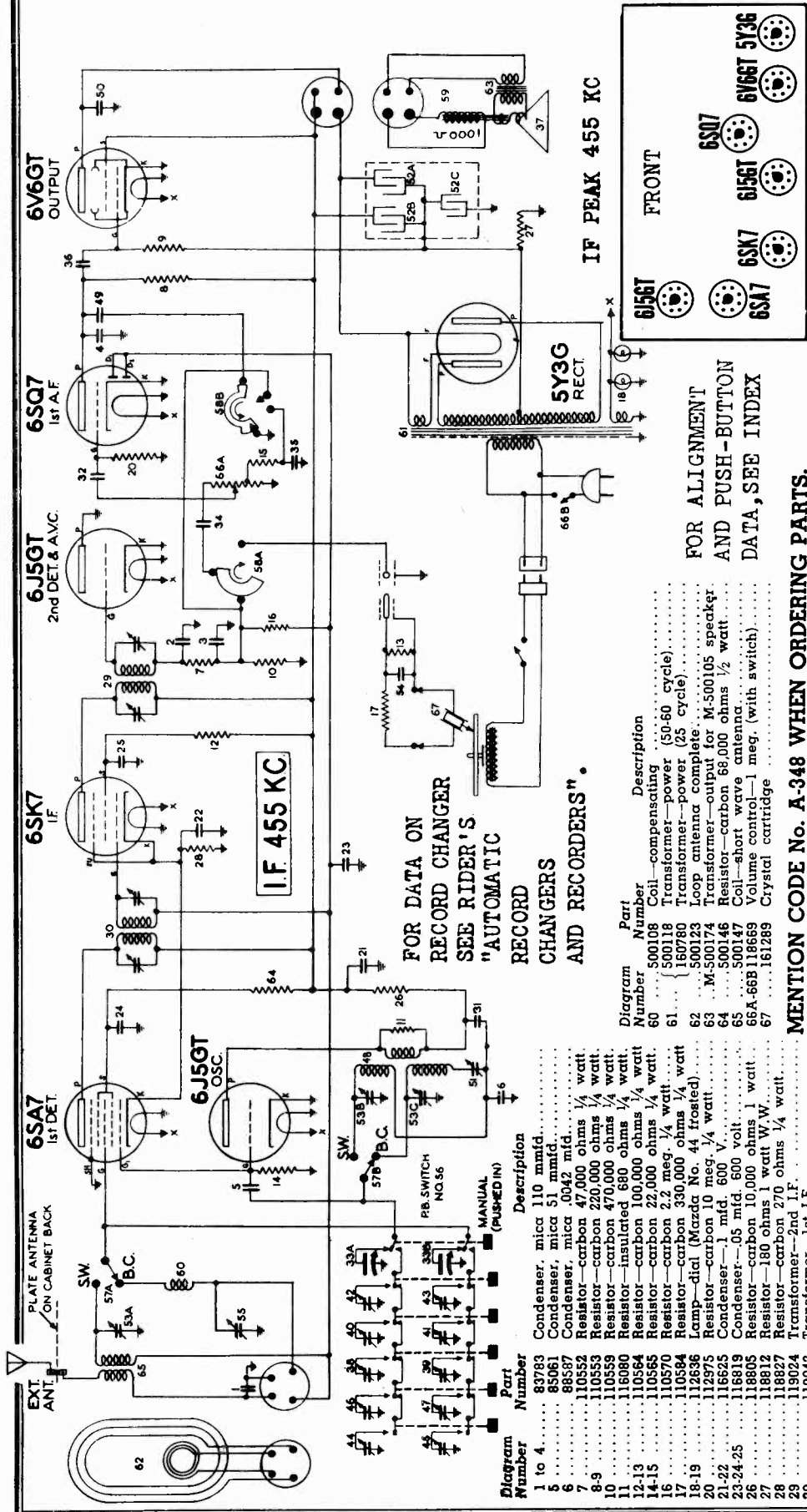


FIG. 1

PUSH BUTTON ADJUSTING SCREWS

FIRESTONE TIRE & RUBBER CO.



FOR DATA ON RECORD CHANGER SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

- | Diagram Number | Part Number | Description |
|----------------|-------------|---|
| 60 | 500108 | Coil—compensating (50-60 cycle) |
| 61 | 500118 | Coil—compensating (50-60 cycle) |
| 62 | 500123 | Transformer—power (25 cycle) |
| 63 | 500174 | Loop antenna complete |
| 64 | 500146 | Transformer—output for M-500105 speaker |
| 65 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 66 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 67 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 68 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 69 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 70 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 71 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 72 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 73 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 74 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 75 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 76 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 77 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 78 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 79 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 80 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 81 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 82 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 83 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 84 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 85 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 86 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 87 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 88 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 89 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 90 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 91 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 92 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 93 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 94 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 95 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 96 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 97 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 98 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 99 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |
| 100 | 500147 | Resistor—carbon 68,000 ohms 1/2 watt |

FOR ALIGNMENT AND PUSH-BUTTON DATA, SEE INDEX

MENTION CODE NO. A-348 WHEN ORDERING PARTS.

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS. NO SIGNAL CONDITION. DIAL TUNED TO 540 KC.

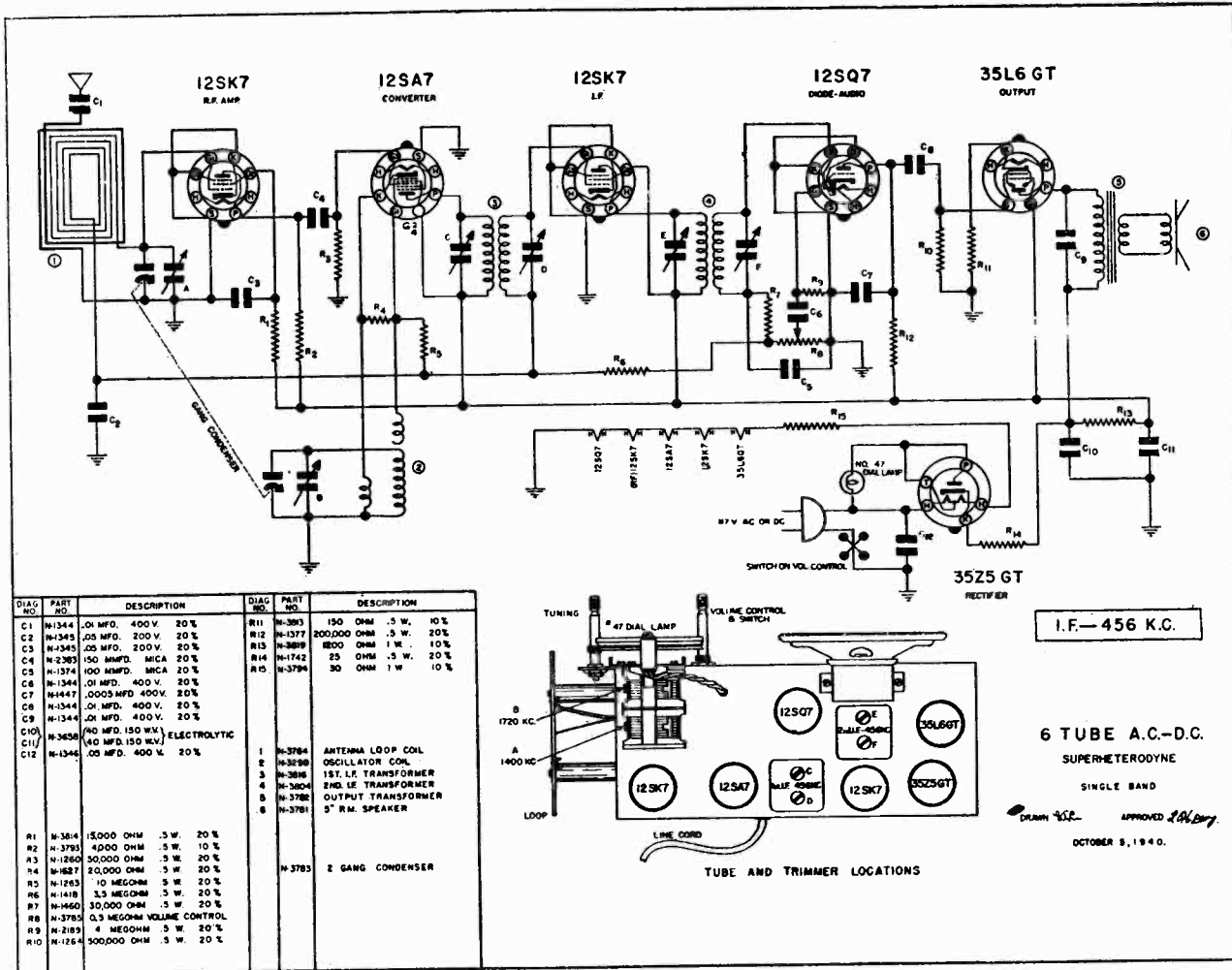
TUBE	FUNCTION	H	K	G	G1	S	SU	P	D1	D2
6SA7	1st Det.	6.0 A.C.	3.2	0	-5	73		242		
6J5GT	Osc.	6.0 A.C.	0	-5				152		
6SK7	I.F.	6.0 A.C.	3.2	0		96	3.2	242		
6J5GT	2nd Det.-A.V.C.	6.0 A.C.	0	0				0		
6SQ7	1st A.F.	6.0 A.C.	0	0				75	0	0
6V6GT	Output	6.0 A.C.	0	Note A		242		218		
5Y3G	Rectifier	5.0 A.C.								Plates 350 V.A.C. to C.T.

NOTE A: The 6V6GT grid bias voltage is -13.5 volts measured across resistor No. 27. Use a high resistance voltmeter of at least 1000 ohms per volt.

MODEL S-7403-2

FIRESTONE TIRE & RUBBER CO.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



ALIGNMENT DATA AND SERVICING

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter 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 be adjusted.

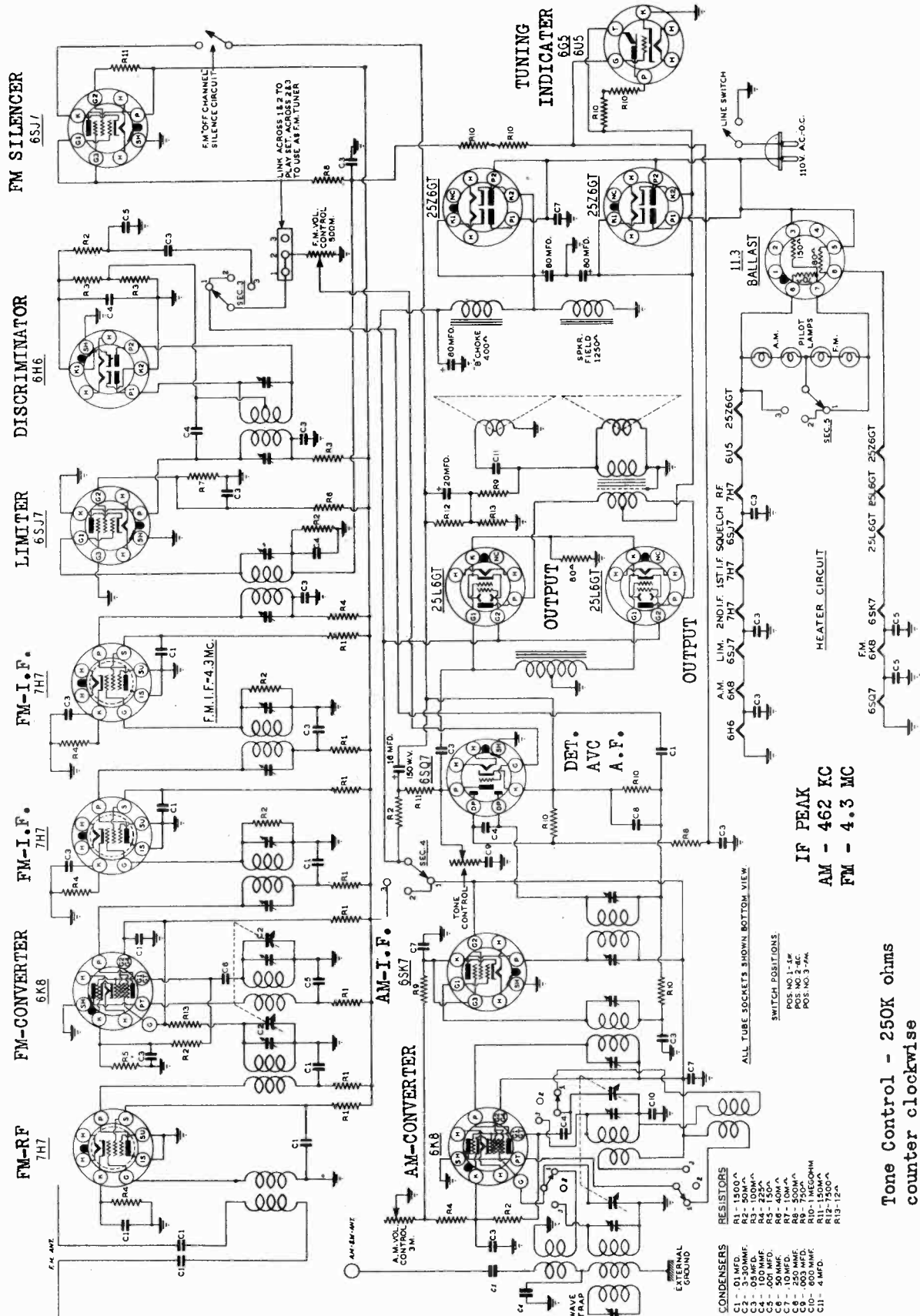
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. con-

denser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

FREED RADIO CORP.



IF PEAK
AM - 462 KC
FM - 4.3 MC

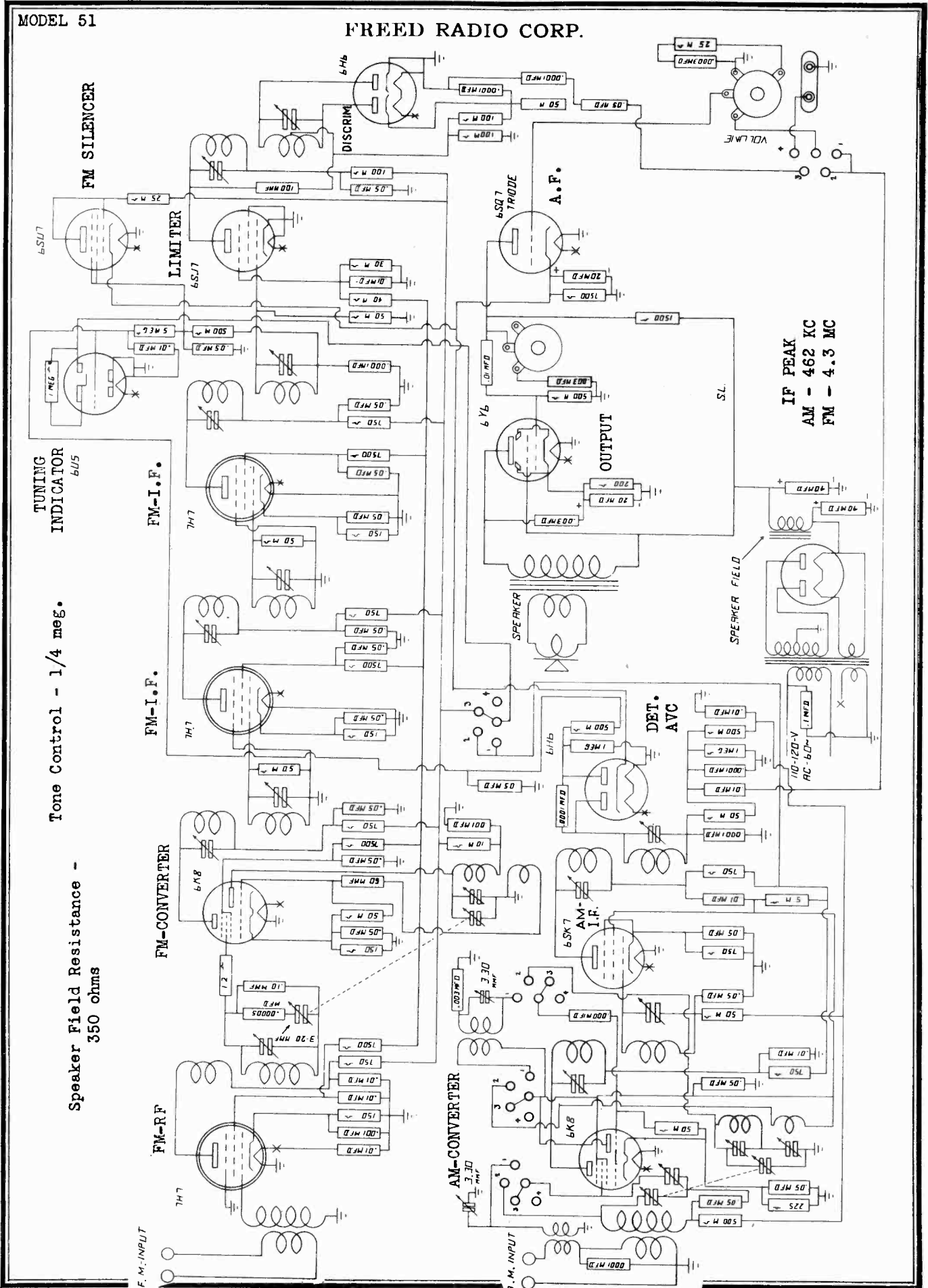
RESISTORS
R1 - 500Ω
R2 - 100MΩ
R3 - 100MΩ
R4 - 25Ω
R5 - 100MΩ
R6 - 50MΩ
R7 - 10MΩ
R8 - 500MΩ
R9 - 500MΩ
R10 - 1MΩ
R11 - 150Ω
R12 - 500Ω
R13 - 12Ω

CONDENSERS
C1 - 0.1MFD.
C2 - 0.05MFD.
C3 - 100MFD.
C4 - 100MFD.
C5 - 100MFD.
C6 - 50MFD.
C7 - 10MFD.
C8 - 0.05MFD.
C9 - 0.05MFD.
C10 - 800MFD.
C11 - 4MFD.

Tone Control - 250K ohms
counter clockwise

MODEL 51

FREED RADIO CORP.



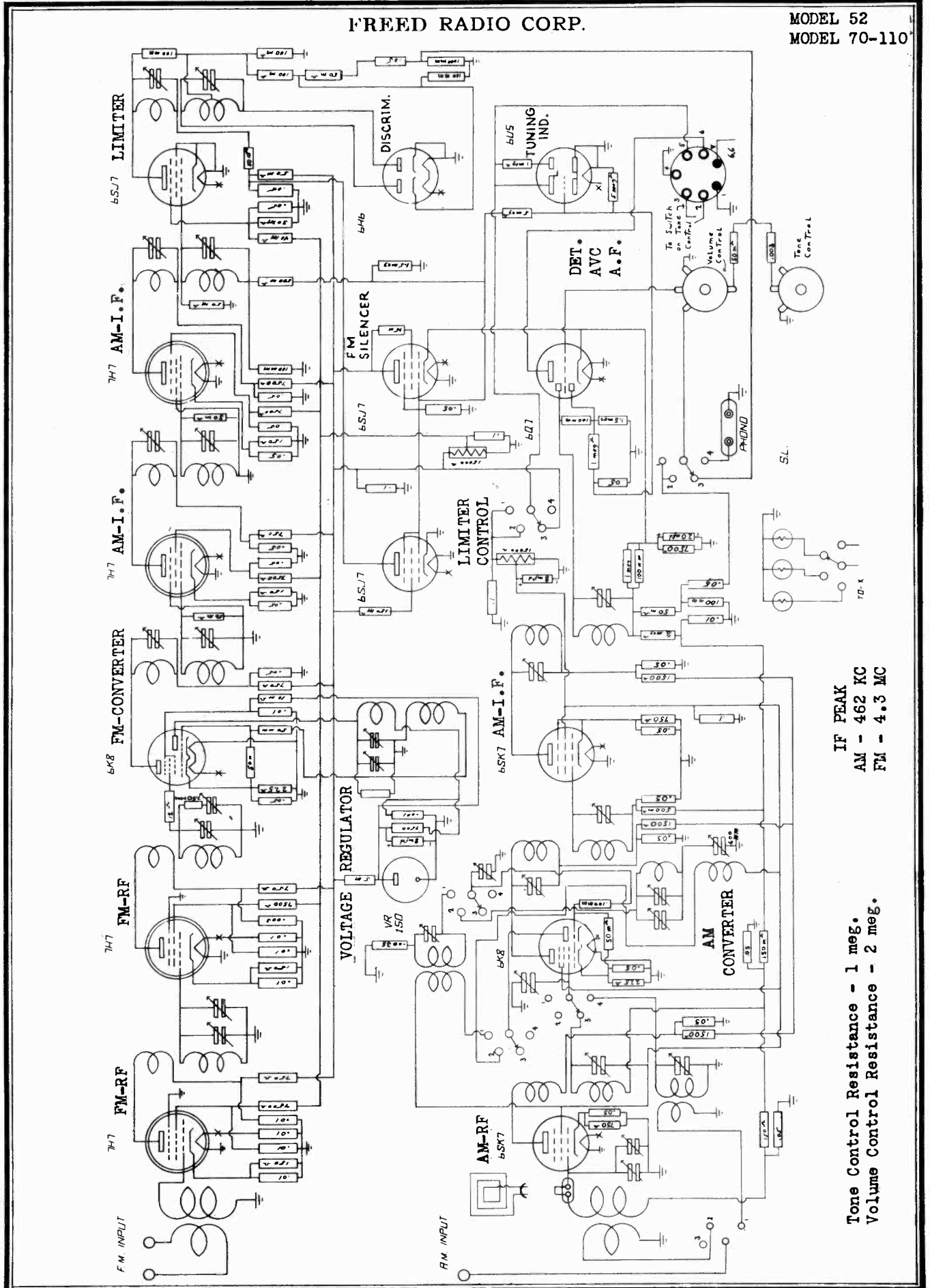
Tone Control - 1/4 meg.

Speaker Field Resistance -
350 ohms

IF PEAK
AM - 462 KC
FM - 4.3 MC

FREED RADIO CORP.

MODEL 52
MODEL 70-110

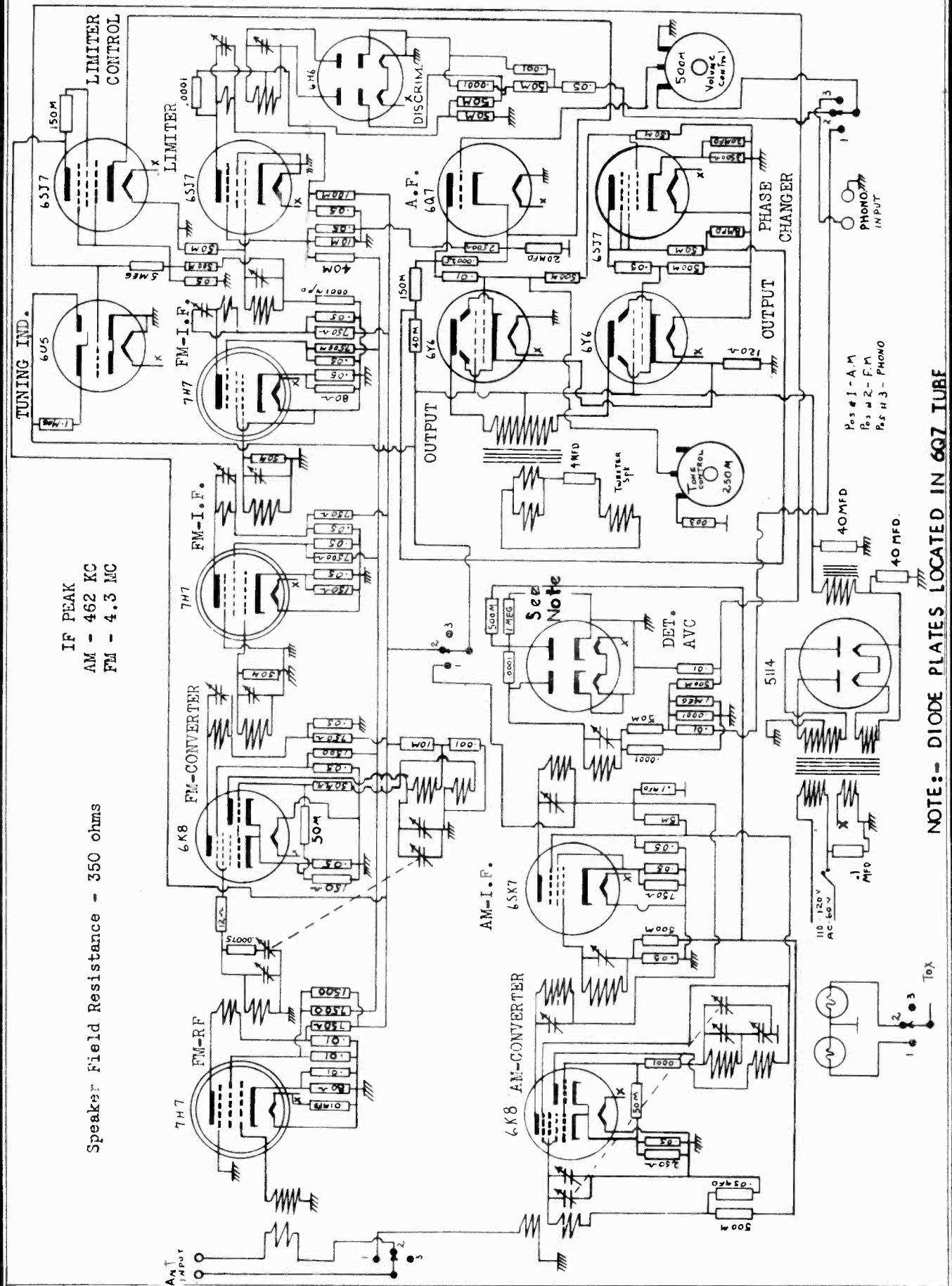


IF PEAK
AM - 462 KC
FM - 4.3 MC

Tone Control Resistance - 1 meg.
Volume Control Resistance - 2 meg.

MODEL 57-71

FREED RADIO CORP.



IF PEAK
 AM - 462 KC
 FM - 4.3 MC

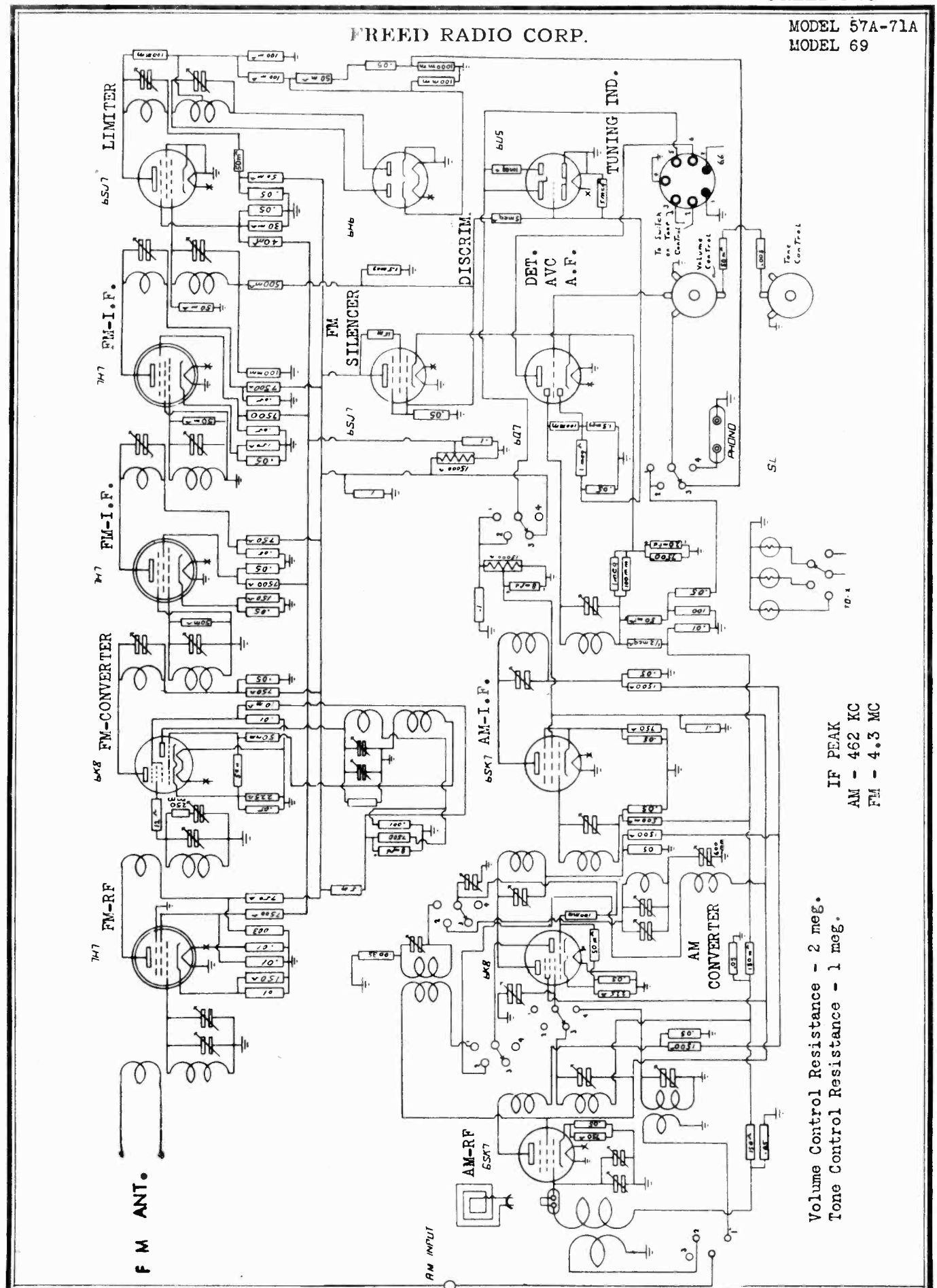
Speaker Field Resistance - 350 ohms

NOTE:-- DIODE PLATES LOCATED IN 6Q7 TUBE

Pos #1 - A.M.
 Pos #2 - F.M.
 Pos #3 - PHONO

FREED RADIO CORP.

MODEL 57A-71A
MODEL 69

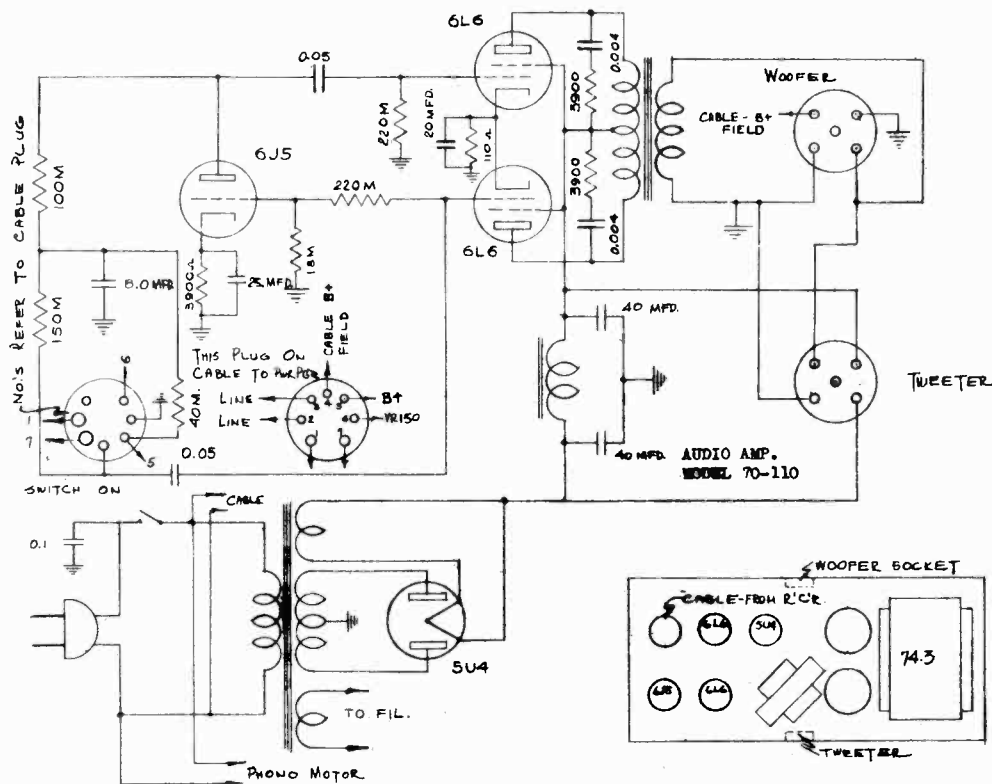
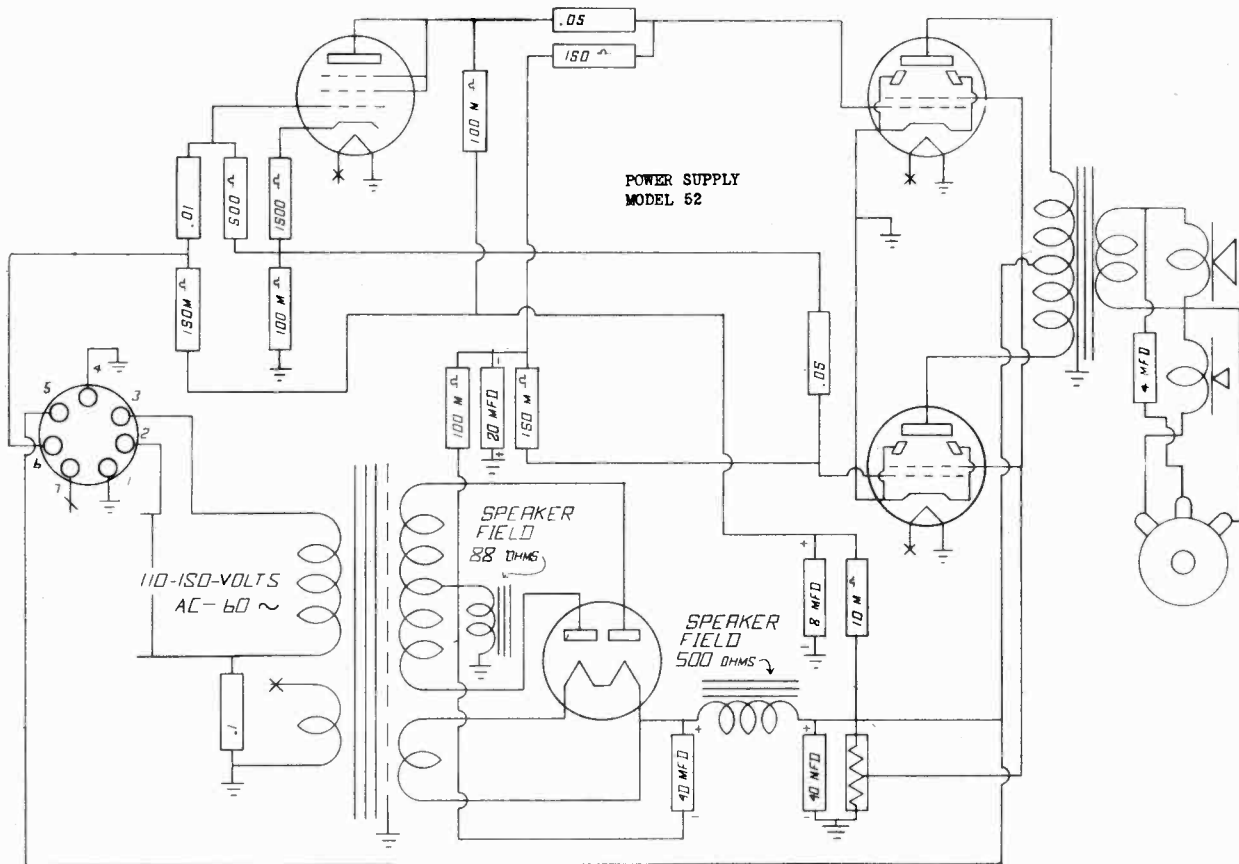


IF PEAK
AM - 462 KC
FM - 4.3 MC

Volume Control Resistance - 2 meg.
Tone Control Resistance - 1 meg.

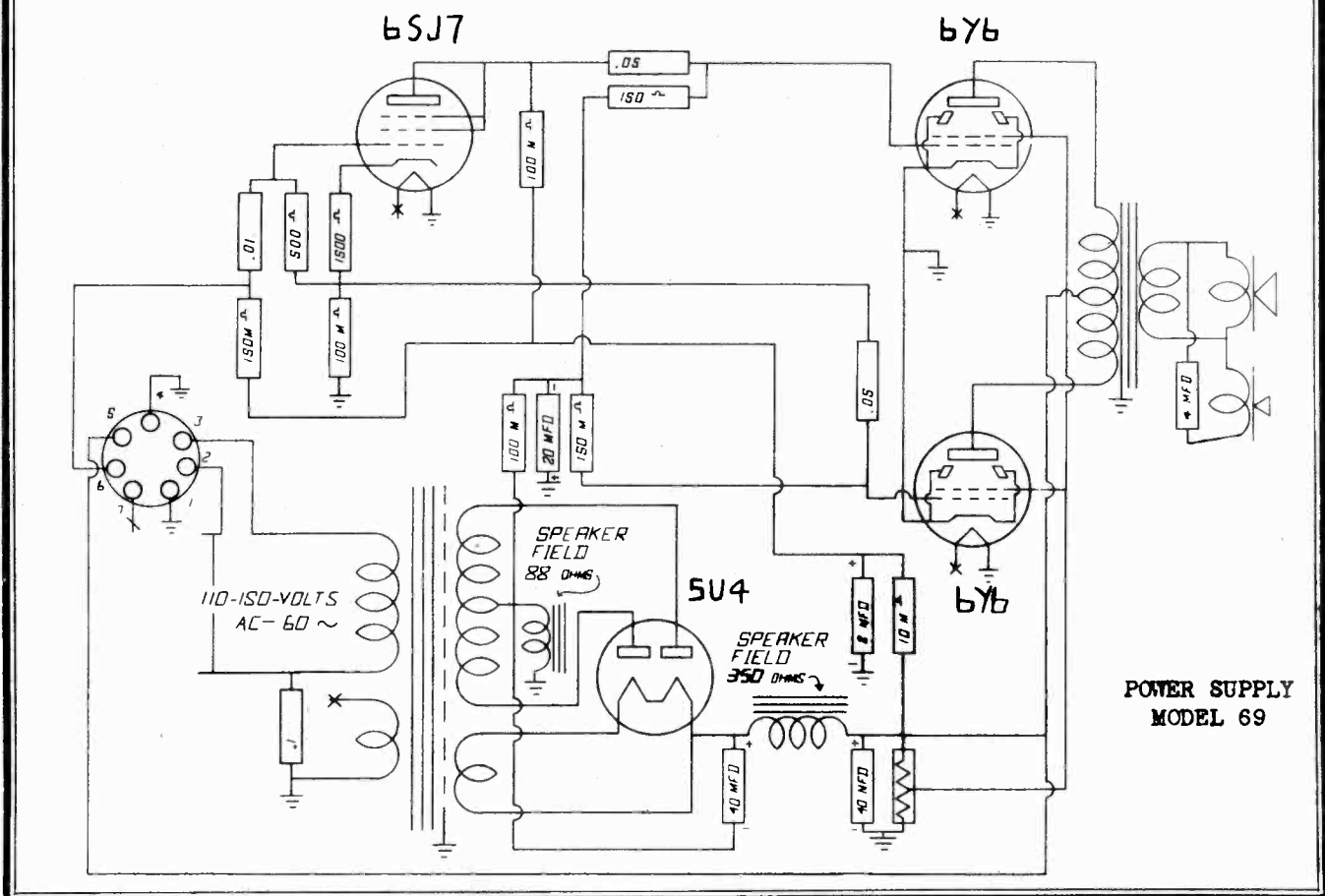
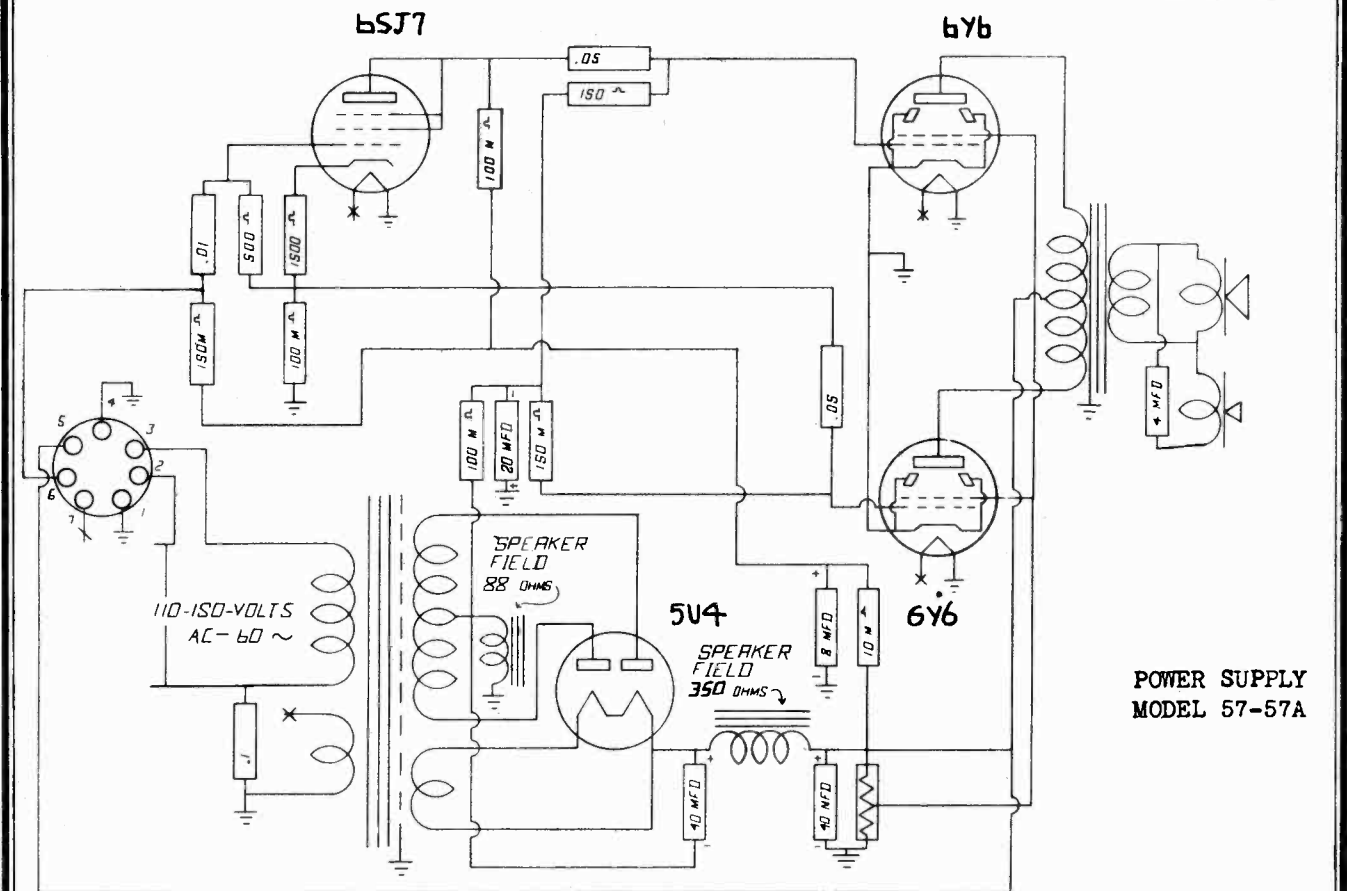
MODEL 52
MODEL 70-110

FREED RADIO CORP.



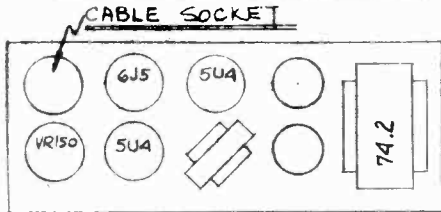
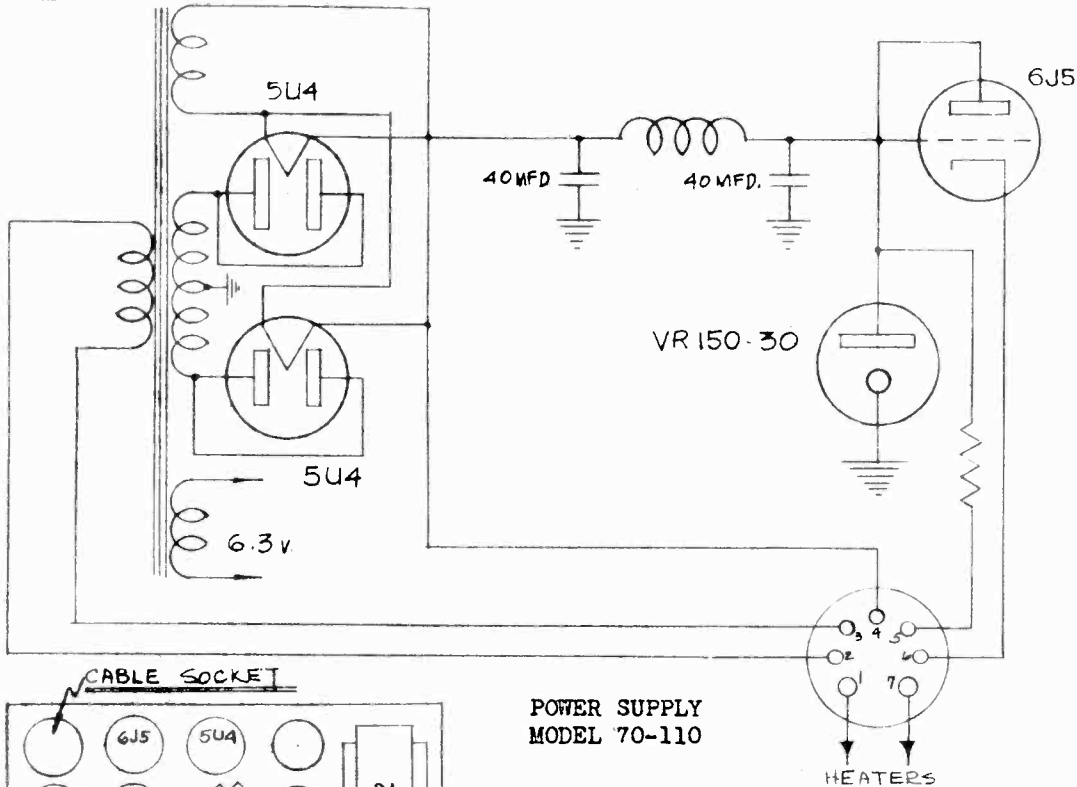
FREED RADIO CORP.

MODEL 57-57A
MODEL 69



MODEL 70-110
MODEL 71-71A

FREED RADIO CORP.

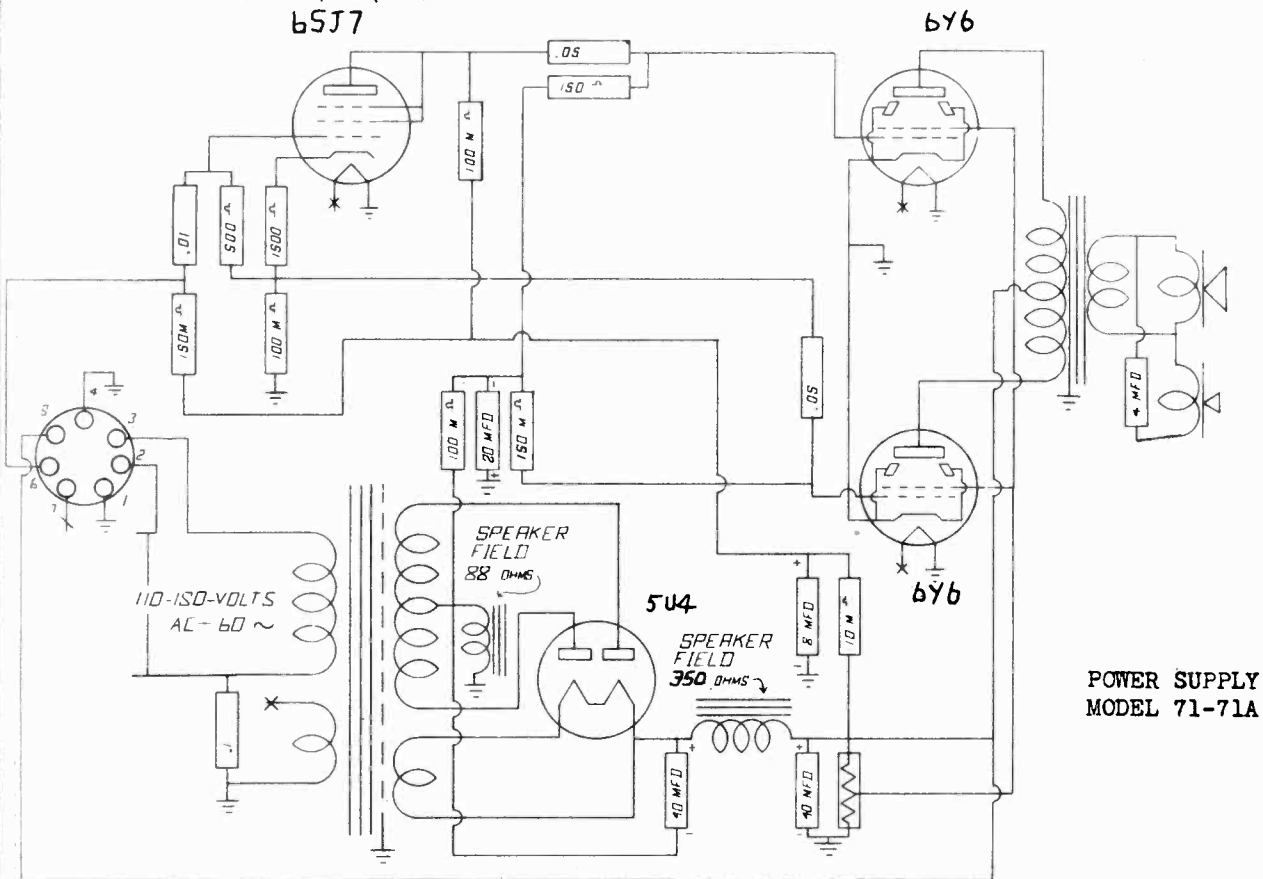


POWER SUPPLY
MODEL 70-110

HEATERS

THIS SOCKET ON CHASSIS. RECEIVES PLUG FROM OTHER POWER PACK. FOR DETAILS SEE DWG. NO. B

CHASSIS LAYOUT - TOP VIEW
65J7



POWER SUPPLY
MODEL 71-71A