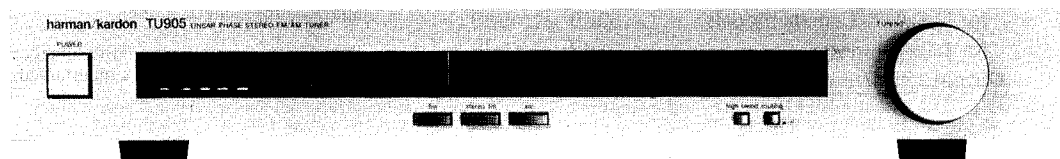


# The Harman Kardon Model TU905

Manual 83A

## LINEAR PHASE STEREO FM/AM TUNER

# Technical Manual



TU905

**harman/kardon**

240 Crossways Park West, Woodbury, N.Y. 11797  
1112-H15283A7 P-088502 1850 Printed in Japan

## SPECIFICATIONS

### ● FM SECTION

	Nominal	Limit
Tuning Range	87.3 ~ 108.4 MHz	
50dB Quieting Sensitivity		
Mono	15.2dBf	≤ 18dBf
Stereo	36.2dBf	≤ 40dBf
Usable Sensitivity	10.2dBf (IHF)	≤ 15dBf
Image Ratio	56dB	≥ 50dB
IF Rejection	83dB	≥ 70dB
Spurious Response Rejection	88dB	≥ 60dB
Capture Ratio	1.1dB	≤ 2.0dB
Alternate Channel Selectivity	72dB	≥ 55dB
AM Rejection	54dB	≥ 45dB
Signal to Noise Ratio		
for U.S.A. & Canada models		
Mono	82dB	≥ 75dB
Stereo	73dB	≥ 70dB
for General model		
Mono	76.5dB	≥ 69dB
Stereo	67.5dB	≥ 64dB
Total Harmonic Distortion		
Mono	0.09%	≤ 0.2%
Stereo	0.15%	≤ 0.3%
Stereo Separation at 1kHz		
for U.S.A. & Canada models	53dB	≥ 45dB
for General model	53dB	≥ 40dB
Output Level/Impedance (Stereo)	775mV/2.2kΩ	

### ● AM SECTION

	Nominal	Limit
Tuning Range	515 ~ 1,680 kHz	
Usable Sensitivity		
External Antenna	10μV	≤ 20μV
Loop Antenna	280μV/m	
Selectivity	42dB	≥ 35dB
Signal to Noise Ratio	53dB	≥ 50dB
Image Rejection	44dB	≥ 38dB
IF Rejection	67dB	≥ 50dB
● DIMENSIONS (W x H x D)	17-1/2"x2-11/16"x14-11/16"	(443 x 68 x 372 mm)
● WEIGHT	7 lbs. 11 oz. (3.5 kg)	
● POWER SUPPLIES		
for U.S.A. & Canada models	AC120V, 60Hz	
for General model	AC 100/120/220/240V, 50/60Hz	
● POWER CONSUMPTION	15W	

This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

The FM section modulation is 100% for U.S.A. and Canada models and 53% for General model.

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

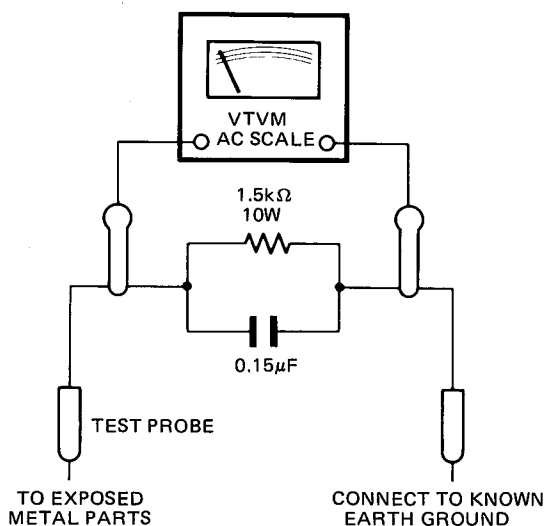
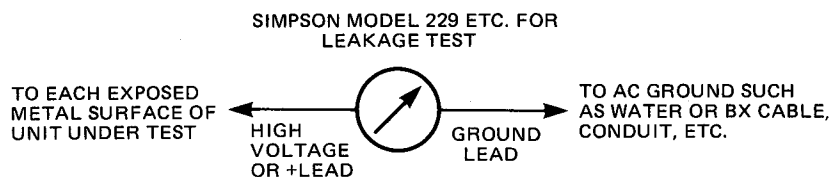
## LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:

Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 Ohm, 10-watt resistor paralleled by a 0.15μF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 Ohms per volt, or higher, sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



## DISASSEMBLY PROCEDURES (REFER TO PAGES 8 AND 14 )

### 1 CABINET TOP (131) REMOVAL

Remove 6 screws **A** and remove the Cabinet Top (131).

### 2 CABINET BOTTOM (132) REMOVAL

Remove 4 screws **B** and remove the Cabinet Bottom (132).

### 3 FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (131). (Refer to step 1.)
2. Remove 4 screws **C** and remove the Front Panel Assembly (101).

### 4 MAIN P.C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet Top (131). (Refer to step 1.)
2. Secure the dial string to the pulley by winding adhesive tape or vinyl tape.
3. Open the lid of connectors (CN101, CN102, CN103) on the Main P.C. Board (PCB-1) and then disconnect the lead wires.
4. Unsolder the lead wires connected to the Main P.C. Board (PCB-1).
5. Remove 5 screws **D** and remove the Main P.C. Board (PCB-1).

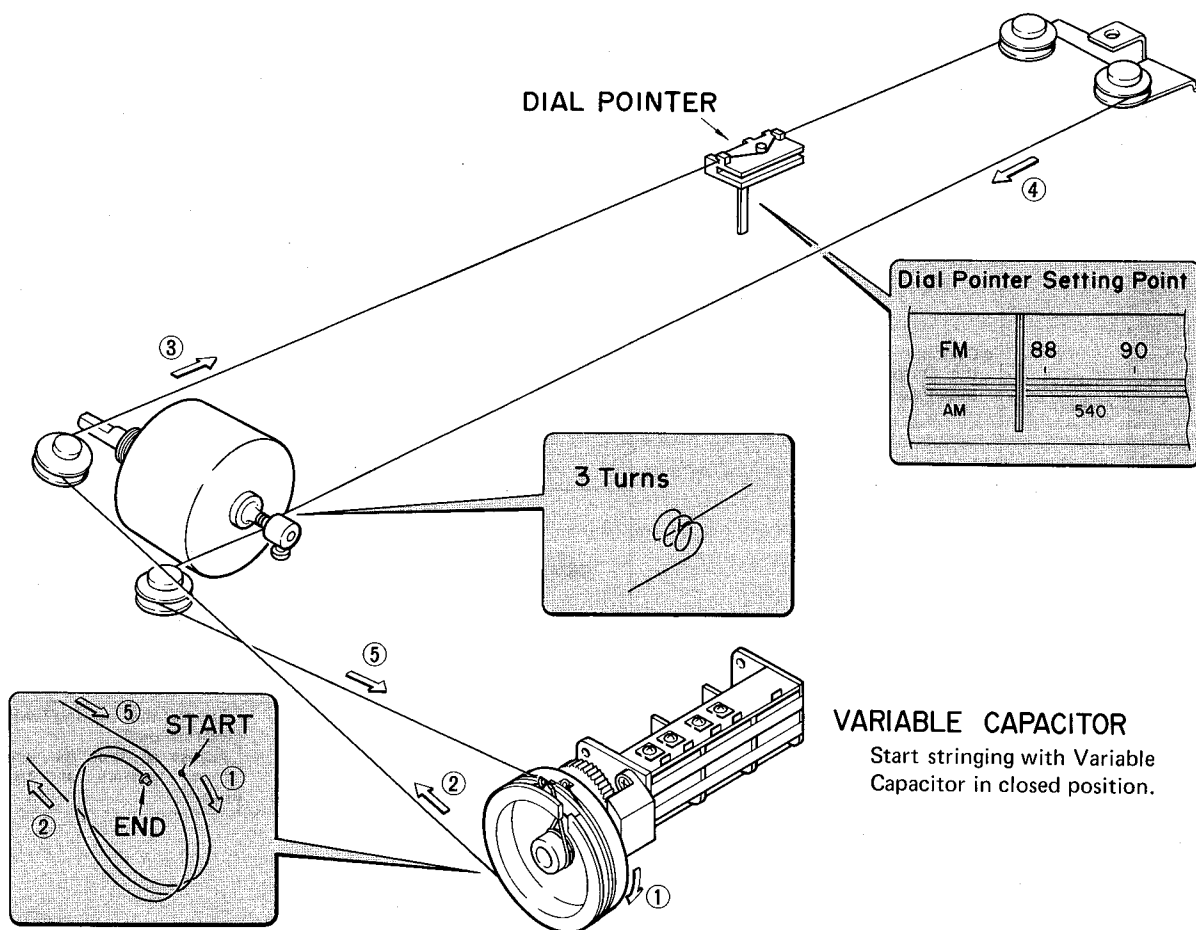
### 5 LAMP P.C. BOARD (PCB-2) REMOVAL

1. Remove the Front Panel Assembly (101). (Refer to step 2.)
2. Open the lid of connector (CN101) on the Main P.C. Board (PCB-1) and then disconnect the lead wires.
3. Remove the Dial Pointer (155).
4. Remove 4 screws **E** and remove the Lamp P.C. Board (PCB-2) with Dial Back Assembly (106), Holders (183) and Dial Panel (142).

### 6 FUNCTION SELECTOR P.C. BOARD (PCB-5) REMOVAL

1. Remove the Lamp P.C. Board (PCB-2). (Refer to step 5.)
2. Pull out 5 Push Button Assemblies (104 and 105) with Shafts (186).
3. Open the lid of connectors (CN102, CN103) on the Main P.C. Board (PCB-1) and then disconnect the lead wires.
4. Unsolder the lead wires connected to the Function Selector P.C. Board (PCB-5).
5. Remove 4 screws **F** and remove the Function Selector P.C. Board (PCB-5).

## DIAL CORD STRINGING



## ALIGNMENT PROCEDURES (REFER TO PAGES 13 AND 14 )

## ■ AM ALIGNMENT

- Conditions:
- Press the "am" switch.
  - Press the "muting" switch to the "off" position.
  - Standard modulation of the AM Signal Generator is 400Hz at 30%.

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For
1	IF	<ul style="list-style-type: none"> <li>● Connect the AM Test Loop Antenna cable into the output jack of AM Signal Generator. Place AM Test Loop Antenna close enough to couple signal into the AM Loop Antenna (L1). Make the signal as weak as possible.</li> <li>● Connect the VTVM and Oscilloscope to the Output jacks.</li> </ul>	450kHz	Maximum frequency	T251 T252	Maximum output
2	Frequency coverage (band age)		1680kHz	Maximum frequency	TC252	Maximum output
3			515kHz	Minimum frequency	L253	Maximum output
4			Repeat steps 2 and 3 for optimum sensitivity.			
5	Tracking		1400kHz	1400kHz	TC251	Maximum output
6			600kHz	600kHz	L251	Maximum output
7			Repeat steps 5 and 6 for optimum sensitivity.			

## ■ FM ALIGNMENT

- Conditions:
- Press the "stereo fm" switch.
  - Press the "muting" switch to the "off" position.
  - Press the "high blend" switch.
- FM Signal Generator Standard Modulation

U.S.A. & Canada models	General model
1kHz, 100% modulation	1kHz, 53% modulation

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For	
1	IF	<ul style="list-style-type: none"> <li>● Connect the VTVM and Oscilloscope to the Output jacks.</li> <li>● Connect the FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy.</li> <li>● Connect the VTVM and Oscilloscope to the Output jacks.</li> <li>● Connect the Distortion meter to the Output jacks through 15kHz Low Pass Filter.</li> </ul>			T101	Maximum noise	
2	Frequency coverage (band age)		87.3MHz	Minimum frequency	L104	Maximum output with week input signal.	
3			108.4MHz	Maximum frequency	TC103		
4			Repeat steps 2 and 3 for optimum sensitivity.				
5	Tracking		90MHz	90MHz	L102 L103	Maximum output with week input signal.	
6			106MHz	106MHz	TC101 TC102		
7			Repeat steps 5 and 6 for optimum sensitivity.				
8	Discriminator		98MHz	98MHz		Obtain intune with week input signal.	
9					T201 (A)	Maximum output at 1mV input.	
10					T201 (B)	Minimum distortion at 1mV input.	
11	Repeat steps 9 and 10 for optimum sensitivity.						
12	Signal Indicator level		98MHz	98MHz		Obtain intune with week input signal.	
13					VR218	Adjust so that the one signal indicator lights at 10μV input.	
14					VR356	Adjust so that the five signal indicator lights at 100μV input.	
15	Repeat steps 13 and 14 for optimum sensitivity.						
16	Muting level		98MHz	98MHz	VR370	Repress the "muting" switch (button out). Adjust so that the waveform appears at 16μV input.	

## FM MPX ALIGNMENT

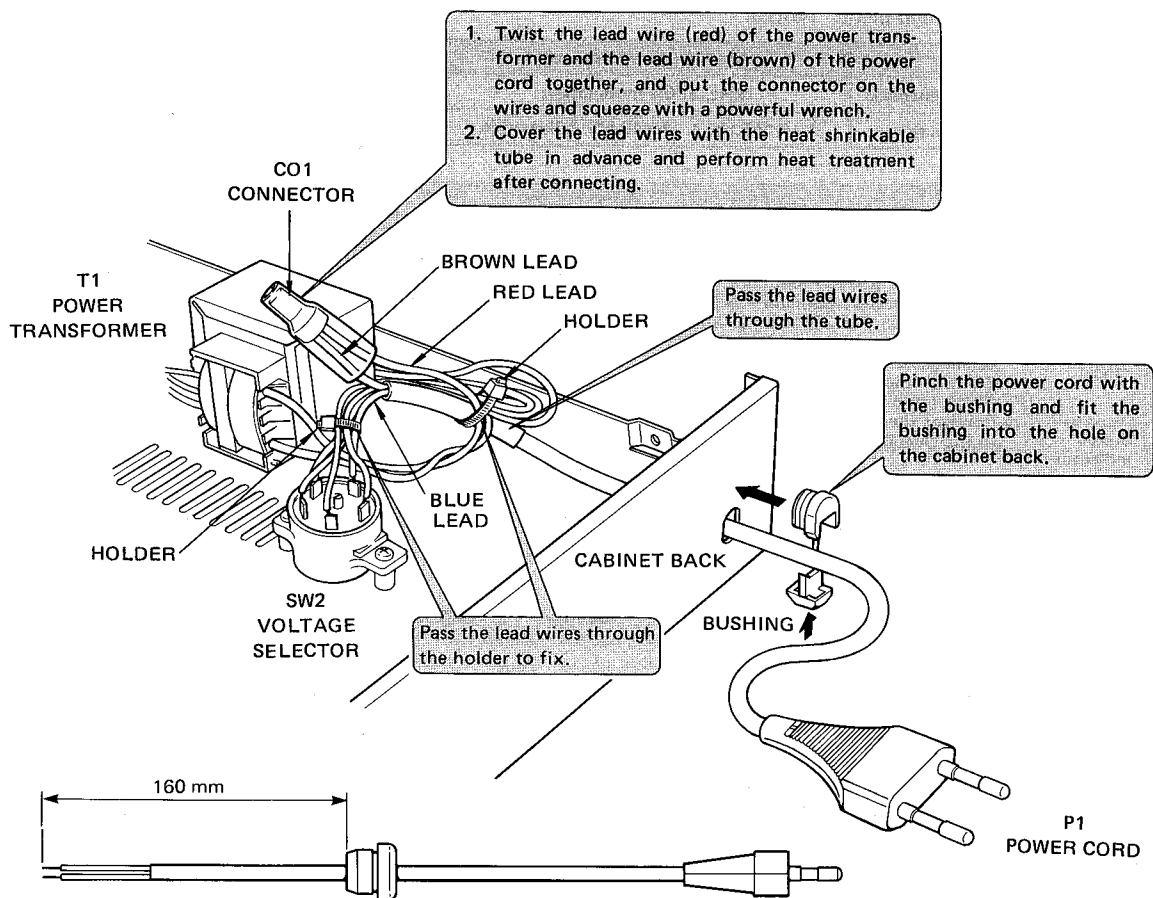
- Conditions:
- Press the "stereo fm" switch.
  - Press the "muting" switch to the "off" position.
  - Press the "high blend" switch.

	U.S.A. & Canada models	General model
FM Signal Generator	1kHz, 100% modulation	1kHz, 53% modulation
Stereo Modulator	L+R=45.5%, L-R=45.5%, 19kHz=9%	L+R=22.5%, L-R=22.5%, 19kHz=8%

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For
1	Free Run	<ul style="list-style-type: none"> <li>● Connect the Stereo Modulator to FM Signal Generator. Connect FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy.</li> <li>● Connect the Frequency Counter to TP1 (+) and ground.</li> <li>● Connect the VTVM and Oscilloscope to the Output jacks.</li> </ul>	98MHz (unmodulation)	98MHz	VR303	75.95kHz ± 0.04kHz at 1mV input.
2	19kHz cancel		98MHz	98MHz	VR309	Obtain intune with weak input signal.
3			98MHz	98MHz	VR389	Minimum output at 19kHz pilot signal only by Stereo Modulator and at 1mV input.
4	Stereo indicator level		98MHz	98MHz	VR389	Stereo FM indicator lights at 25μV input.
5	Separation		98MHz	98MHz	VR335	Adjust so that the right channel output becomes minimum at 1mV input and when only the left channel of the Stereo Modulator is modulated.
6			98MHz	98MHz	VR335	Adjust so that the left channel output becomes minimum at 1mV input and when only the right channel of the Stereo Modulator is modulated.
7			Make R channel and L channel balanced at their closest-to-minimum points by repeating steps 5 and 6.			

## POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the parts with the standard supply parts.



## CIRCUIT DESCRIPTION

### (1) SIGNAL PATH

The FM signal is amplified in the RF amplifier Q101 at the front end, then mixed with the output of the local oscillator (Q103) in Q102 and converted into a signal of the 10.7MHz intermediate frequency. This 10.7MHz signal is amplified in the IF amplifier consisting of the ceramic filters CF201 ~ CF203 and Q201, Q202 and fed to ① pin of IC201. In IC201, the signal is amplified in the triple IF amplifiers, and after being detected in the quadrature, it is put out from ⑥ pin as an audio signal, and fed to ② pin of IC301. In IC301, the signal is demodulated by means of 38kHz signal produced in IC301 and it is fed to the audio power amplifier stages.

### (2) MUTING OPERATION WHILE TUNING

When not of tune or the signal is too weak, the muting control voltage is taken out from ⑫ pin of IC201 and it is fed to the base of Q352, whose collector then becomes low level. The muting signal is sent to the muting control circuit. Q355 and Q356 become low level and high level respectively

and muting gates Q305 (Rch) and Q306 (Lch) become low level, thus muting operation is completed.

### (3) SIGNAL INDICATOR CIRCUIT

#### 1. FM tuner section

The signal indicator drive signal is taken out from ⑬ pin of IC201 and passes through VR356. It is then amplified in amplifiers Q353 and Q354 and fed to LED driver IC351.

#### 2. AM tuner section

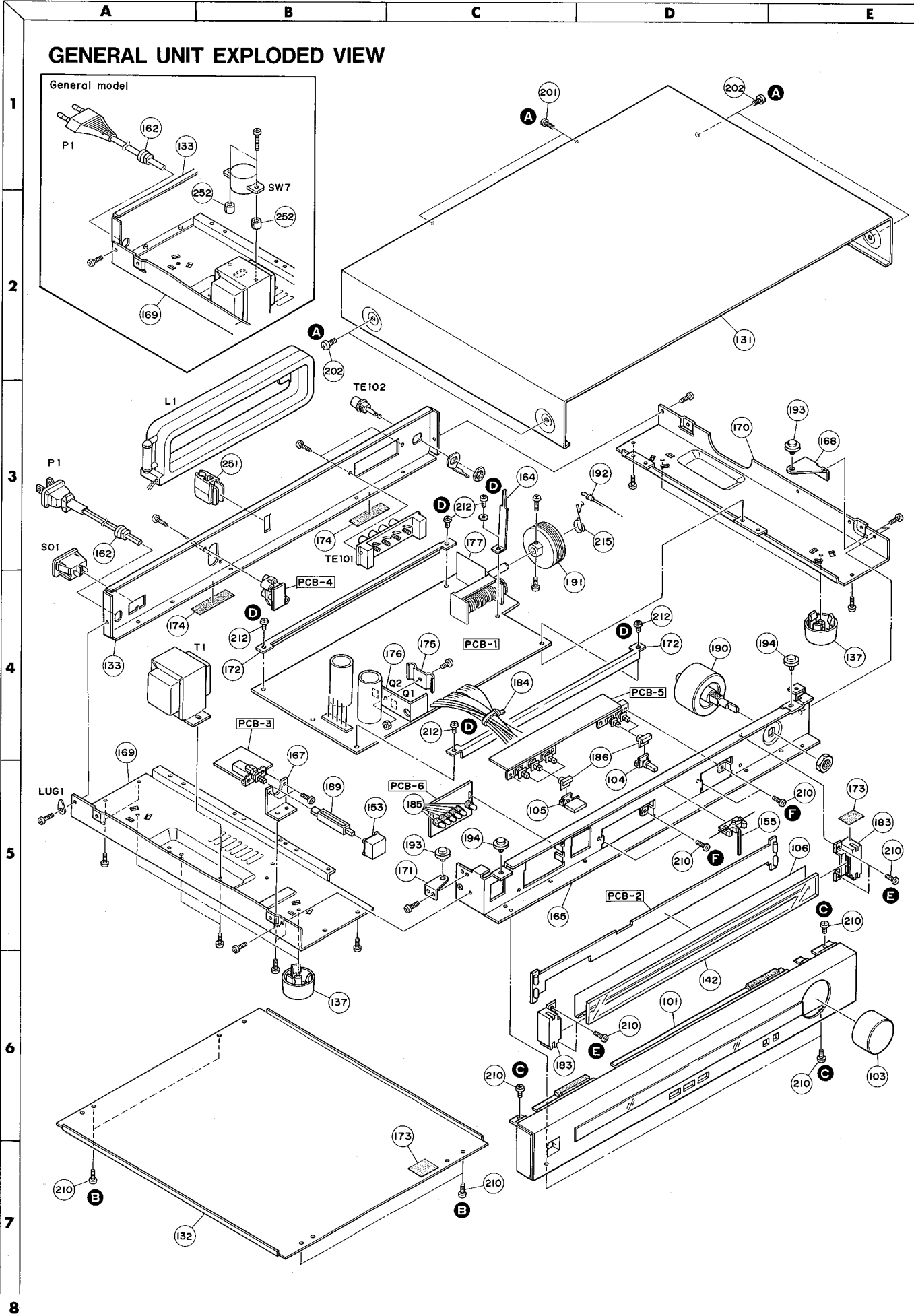
The signal indicator drive signal is taken out from ⑮ pin of IC251 and fed to the base of Q353. It is then amplified in amplifiers Q353 and Q354 and fed to LED driver IC351.

### (4) TUNING INDICATOR CIRCUIT

In tune, the output of Q354 in the signal indicator circuit is fed to the base of Q357. Then Q357 and Q358 become off and Q359 becomes on and tuning indicator lamp illuminates in green color.



GENERAL UNIT EXPLODED VIEW





## GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-TU905A	Front Panel Assembly
103	A630-TU905A	Knob Assembly, Tuning
104	A662-TU905A	Push Button Assembly, High Blend, Muting
105	A662-TU905B	Push Button Assembly, FM, Stereo FM, AM
106	A554-TU905A	Dial Back Assembly
131	1414-02201	Cabinet Top
132	1424-05901	Cabinet Bottom
133	1424-15001	Cabinet Back (for U.S.A. and Canada models)
"	1424-15201	Cabinet Back (for General and German models)
137	1319-0139	Foot
142	1541-04601	Dial Panel
153	1660-00401	Push Button, Power
155	1674-04601	Dial Pointer
162	2114-415027	Bushing
164	2218-7016	Holding Bracket
165	2211-7266	Chassis
167	2219-7984	Bracket
168	2219-7806	Bracket
169	2219-7981	Bracket (for U.S.A. and Canada models)
"	2219-8000	Bracket (for General and German models)
170	2219-7825	Bracket
171	2219-7986	Bracket
172	2219-7783	Bracket
173	2111-11763	Felt
174	2111-11132	Felt
175	2222-7066	Heat Sink
176	2222-7185	Heat Sink
177	2216-7106	Shield Plate
183	2240-7236	Holder
184	2240-7120	Holder
185	2132-7016	Spacer
186	2601-7098	Shaft
189	2672-7018	Lever
190	2602-007118	Tuning Shaft
191	2611-7154	Dial Drum
192	2424-20351	Eyelet
193	2612-7001	Pulley
194	2612-7002	Pulley
201	2347-300647	Screw (+) (3 x 6 mm)
202	2347-400647	Screw (+) (4 x 6 mm)
210	2347-300627	Screw (+) (3 x 6 mm)
212	2347-300827	Screw (+) (3 x 8 mm)
215	2651-0000111	Spring
251	2240-7218	Holder
252	2132-7116	Spacer (only General and German models)
	1111-J30201	Owner Guide (for U.S.A. model)
	1111-J30202	Owner Guide (for Canada, General and German models)
	1222-7227	Packing Cushion, Front
	1222-7224	Packing Cushion, Side
	1221-797147	Packing Box

## ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
<b>CHASSIS MISCELLANEOUS</b>		
△P1	4161-71147	Power Cord (for U.S.A. and Canada models)
△ "	4161-7256	Power Cord (for General and German models)
△T1	5584-701477	Power Transformer (for U.S.A. and Canada models)
△ "	5584-701478	Power Transformer (for General and German models)
△SO1	4474-164	AC Outlet, Unswitched (only U.S.A. and Canada models)
△CO1	4443-712	Connector, Power Cord (only General and German models)
△SW7	4411-104736	Rotary Switch, Voltage Selector (only General model)
△R1	5135-335J50P	Resistor, 3.3MΩ, 1/2W, Carbon (only U.S.A. and Canada models)
L1	5911-244	AM Loop Antenna
L101	5995-703027	Coil, Balun (Except German model)
TE101	4214-160	External Antenna Terminals
TE102	4214-129	75Ω UNBAL Antenna Terminal (for U.S.A. and Canada models)
"	4214-126	75Ω UNBAL Antenna Terminal (for General and German models)
LUG1	4211-5005	Lug Terminal
	4161-71184	Connection Cord (Accessory)
	1397-6	Dipole Antenna (Accessory) (for U.S.A., Canada and General models)
	1397-10	Dipole Antenna (for German model)
<b>PCB-1 MAIN P.C. BOARD</b>		
<b>RESISTORS</b>		
△R4, 5	5102-4R74713	4.7Ω, ±2%, 1/4W, Fuse
△R220, 262	5102-1004713	10Ω, ±2%, 1/4W, Fuse
R304	5174-153381	15kΩ, ±1%, 1/4W, Metal
△R305	5102-4704713	47Ω, ±2%, 1/4W, Fuse
R308	5174-751381	750Ω, ±1%, 1/4W, Metal
△R379	5102-6R84713	6.8Ω, ±2%, 1/4W, Fuse
△R380	5102-1504713	15Ω, ±2%, 1/4W, Fuse
<b>CONTROLS</b>		
VR218	5101-30371920	30kΩB
VR303	5101-5027187	5kΩB
VR309	5101-20371920	20kΩB
VR335	5101-10171920	100ΩB
VR356, 370, 389	5101-50371920	50kΩB
<b>CAPACITORS</b>		
C5, 6	5345-228D041	2200μF, ±20%, 25V, Electrolytic
C11	5345-476C041	47μF, ±20%, 16V, Electrolytic
C207, 264	5345-474F041	0.47μF, ±20%, 50V, Electrolytic
C212	5359-1015851	100pF, ±5%, 100V, Polypropylene
C213, 215, 301, 315, 316	5345-106C0952	10μF, ±20%, 16V, Electrolytic
C214, 307, 309, 311, 312	5345-105F0952	1μF, ±20%, 50V, Electrolytic
C216, 313, 314	5345-105F041	1μF, ±20%, 50V, Electrolytic
C253	5359-4315851	430pF, ±5%, 100V, Polypropylene
C257, 317, 318	5345-475D041	4.7μF, ±20%, 25V, Electrolytic
C258, 351	5345-335F041	3.3μF, ±20%, 50V, Electrolytic
C261	5345-106C041	10μF, ±20%, 16V, Electrolytic
C267	5345-104F0952	0.1μF, ±20%, 50V, Electrolytic
C269	5345-107C041	100μF, ±20%, 16V, Electrolytic
C302	5359-8215851	820pF, ±5%, 100V, Polypropylene
C304	5345-227C041	220μF, ±20%, 16V, Electrolytic
C305	5359-5115851	510pF, ±5%, 100V, Polypropylene
C306	5345-685D0952	6.8μF, ±20%, 25V, Electrolytic
C321, 322	5359-1225851	1200pF, ±5%, 100V, Polypropylene (only U.S.A. and Canada models)
C352	5345-475F041	4.7μF, ±20%, 50V, Electrolytic
C354	5345-477D041	470μF, ±20%, 25V, Electrolytic
C361, 362	5359-6215851	620pF, ±5%, 100V, Polypropylene
VC101/102/103/251/252	5315-7112	Variable Capacitor (w/Trimmers TC101, 102, 251, 252)
TC103	5371-91	Trimmer Capacitor

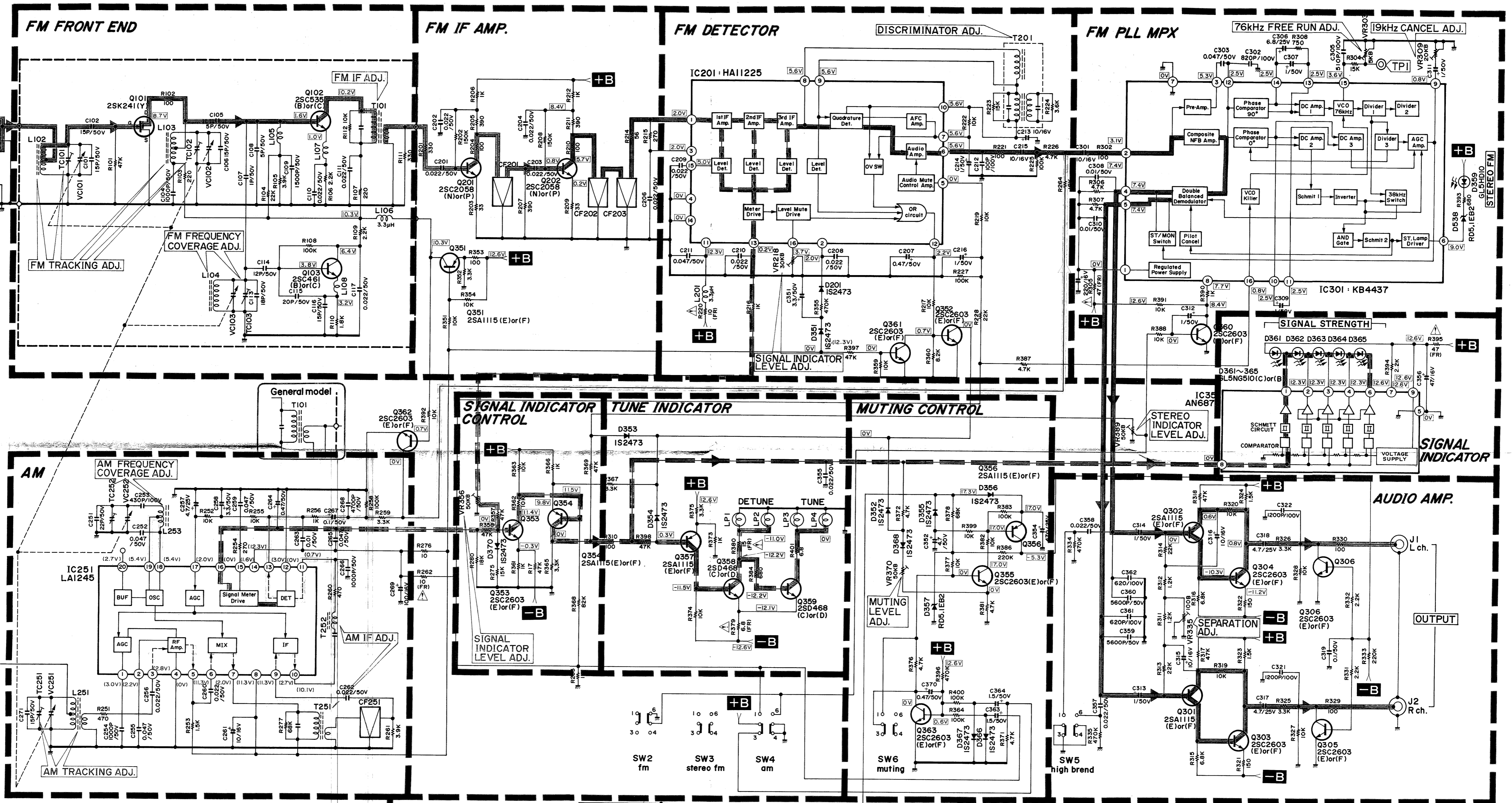
Ref. No.	Part No.	Description
<b>INTEGRATED CIRCUITS</b>		
IC201	5652-HA11225	HA11225
IC251	5652-LA1245	LA1245
IC301	5652-KB4437	KB4437
<b>TRANSISTORS</b>		
Q1	5611-966(O)	2SA966(O) or 2SA966(Y)
Q2	5613-2236(O)	2SC2236(O) or 2SC2246(Y)
Q3, 303, 304, 305, 306, 352, 353, 355, 360, 361, 362	5613-2603(E)	2SC2603(E) or 2SC2603(F)
Q4, 301, 302, 351, 354, 356, 357	5611-1115(E)	2SA1115(E) or 2SA1115(F)
Q101	5616-2SK241(Y)	F.E.T., 2SK241(Y)
Q102	5613-535(B)	2SC535(B) or 2SC535(C)
Q103	5613-461(B)	2SC461(B) or 2SC461(C)
Q201, 202	5613-2058(N)	2SC2058(N) or 2SC2058(P)
Q358, 359	5614-468(C)	2SD468(C) or 2SD468(D)
Q501	5616-2SK168(D)	F.E.T., 2SK168(D) (only German model)
<b>DIODES</b>		
△ D1	5685-S1WB20	Bridge Silicon, S1WB20
D2, 201, 351, 352, 353, 354, 355, 356, 368, 370	5631-1S2473	1S2473
D3, 4	5635-RD9R1EB1	Zener, RD9.1EB1
D10	5635-RD16EB3	Zener, RD16EB3
D357, 358	5635-RD5R1EB2	Zener, RD5.1EB2
D501, 502	5631-1S2473	1S2473 (only German model)
<b>COILS</b>		
L102	5943-70325	
L103	5943-70225	
L104	5942-00420	
L105	5991-7065	
L106, 201	5995-3R3225	3.3μH
L107, 108	5597-4	
L251	5933-70328	
L253	5923-71027	
L501, 502	5995-3R3225	(only German model)
<b>TRANSFORMERS</b>		
T101	5563-0027	
T201	5574-7023	
T251	5552-70113	
T252	5932-70123	
<b>MISCELLANEOUS</b>		
CF201, 202, 203	5671-7117(Y)	Ceramic Filter, SFE10.7MA (for U.S.A. and Canada models)
CF201	5671-7141A	Ceramic Filter, MZ2 (for General and German models)
CF202, 203	5671-7142A	Ceramic Filter, MZ3G (for General and German models)
CF251	5671-7139G	Ceramic Filter
LPF1	5214-30	LC Composite (only General and German models)
LPF501	5214-36	LC Composite (only German model)
SW8	4421-022110	Slide Switch, De-Emphasis (only General and German models)
CN101	4443-030185	Connector, 3 Pos.
CN102	4443-040185	Connector, 4 Pos.
CN103	4443-050185	Connector, 5 Pos.
<b>PCB-2 LAMP P.C. BOARD</b>		
LP1, 2	5731-1207167	Lamp, Orange, 12V 40mA
LP3, 4	5731-1207144	Lamp, Green, 12V 100mA
<b>PCB-3 POWER SWITCH P.C. BOARD</b>		
△ SW1	4431-A02715	Push Switch, Power
<b>PCB-4 OUTPUT JACKS P.C. BOARD</b>		
J1/2	4482-7117	2-Pin Jack, Output

Ref. No.	Part No.	Description
<b>PCB-5 FUNCTION SELECTOR P.C. BOARD</b>		
<b>CAPACITORS</b>		
C363, 364	5345-155F0952	1.5 $\mu$ F, $\pm$ 20%, 50V, Electrolytic
C370	5345-474F041	0.47 $\mu$ F, $\pm$ 20%, 50V, Electrolytic
<b>TRANSISTOR</b>		
Q363	5613-2603(E)	2SC2603(E) or 2SC2603(F)
<b>DIODES</b>		
D366, 367	5631-1S2473	1S2473
<b>MISCELLANEOUS</b>		
SW2/3/4	4431-03067950	Push Switch, Stereo FM, FM, AM
SW5/6	4431-0204859	Push Switch, High Blend, Muting
<b>PCB-6 LEVEL METER P.C. BOARD</b>		
<b>RESISTOR</b>		
$\Delta$ R395	5102-4704713	47 $\Omega$ , $\pm$ 2%, 1/4W, Fuse
<b>CAPACITOR</b>		
C356	5345-476C041	47 $\mu$ F, $\pm$ 20%, 16V, Electrolytic
<b>INTEGRATED CIRCUIT</b>		
IC351	5652-AN6875	AN6875
<b>DIODES</b>		
D359	5637-GL5HD10	L.E.D., GL5HD10, Red, Stereo FM
D361, 362, 363, 364, 365	5637-5NG510(C)	L.E.D., GL5NG510(C) or GL5NG510(B), Green, Signal Strength

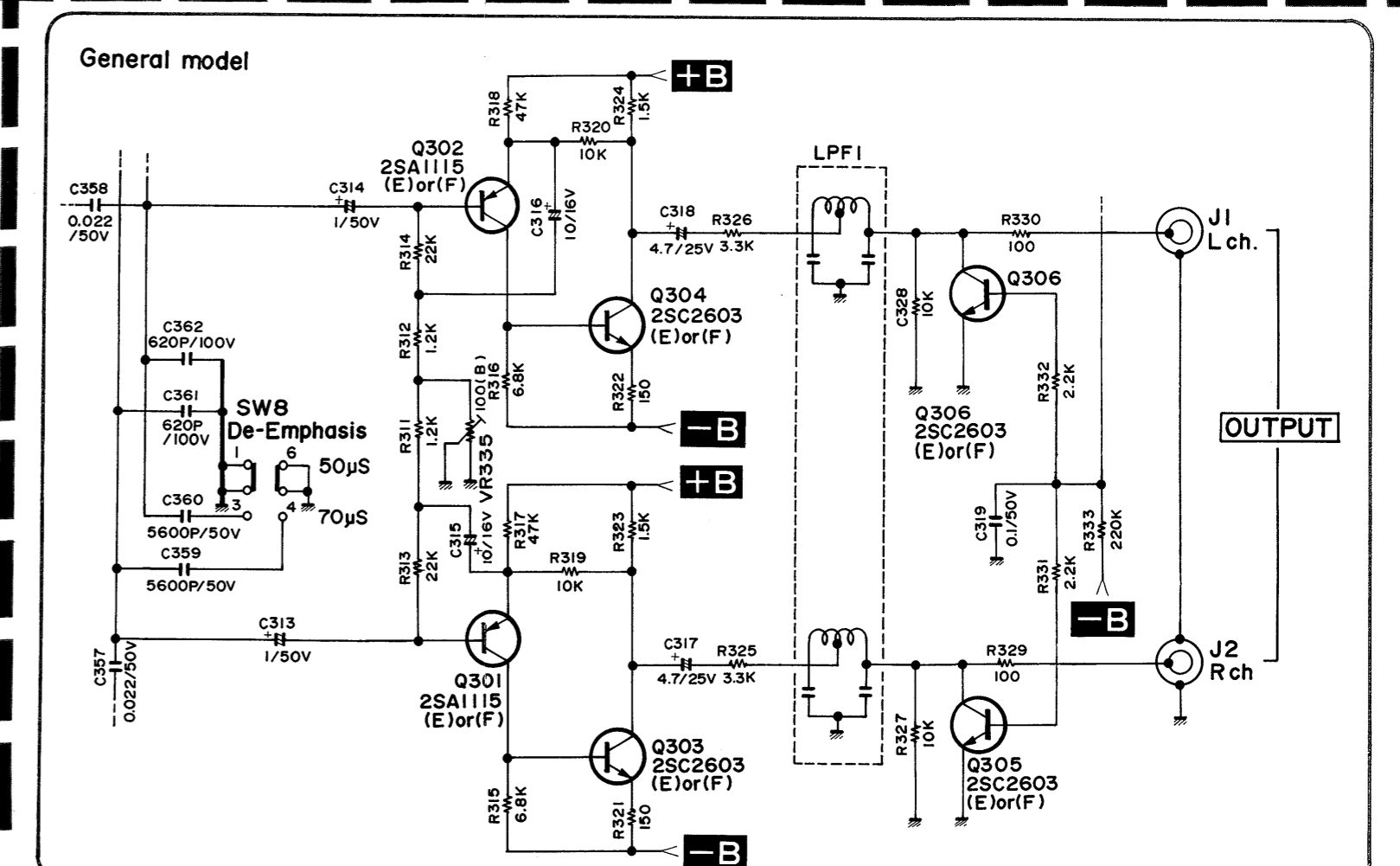
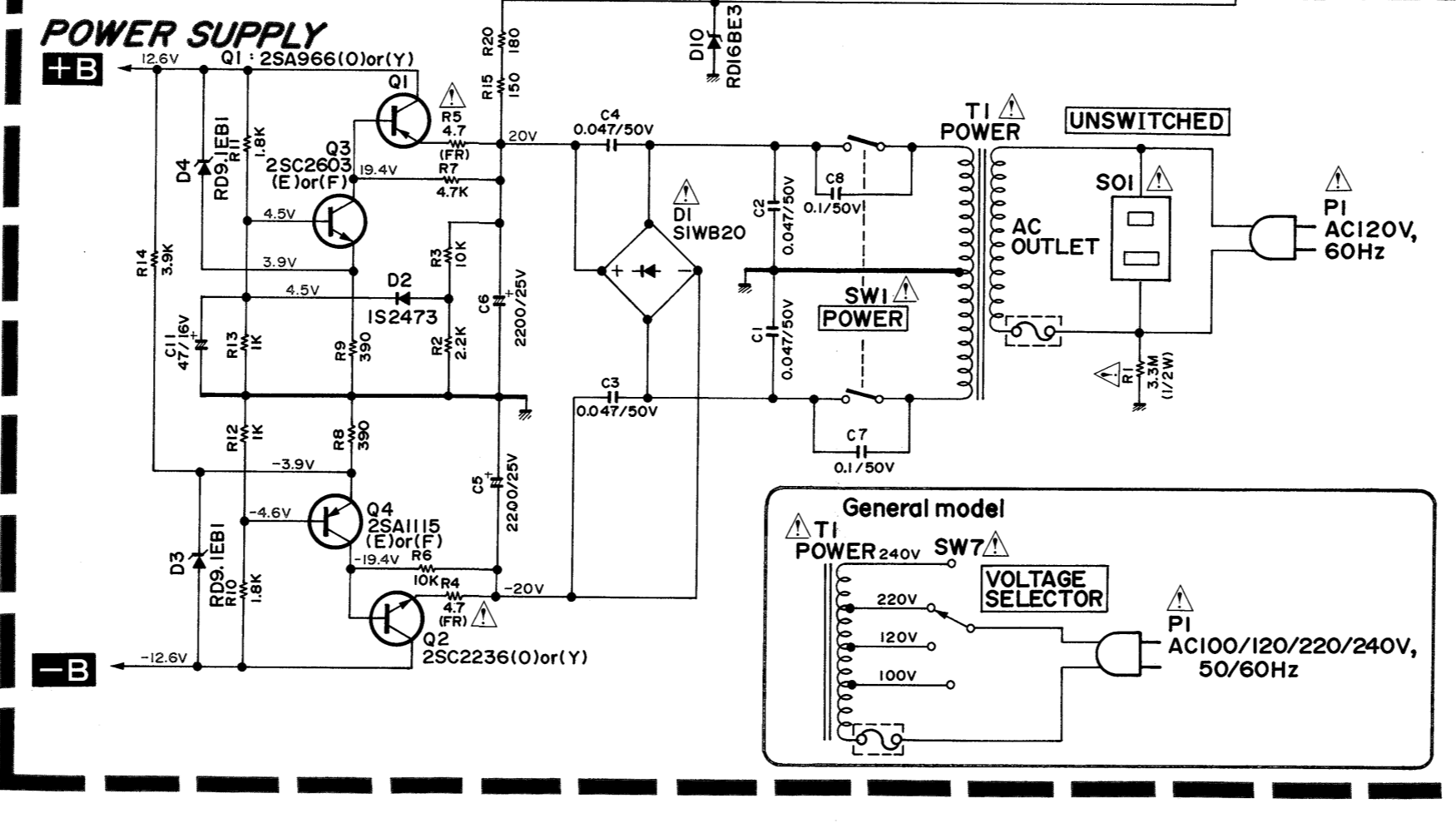


SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

SCHEMATIC DIAGRAM



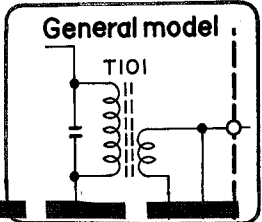
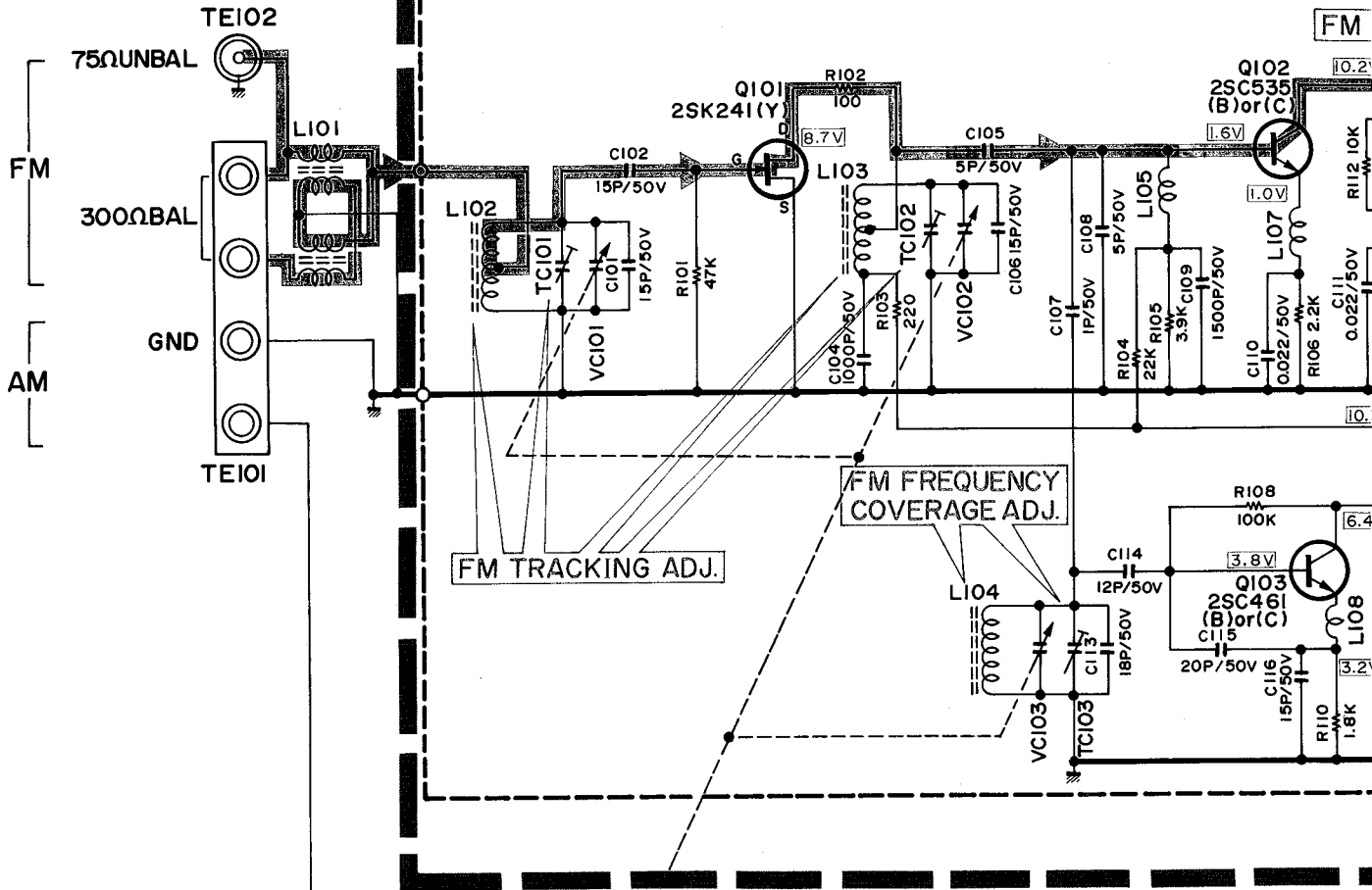
- FM SIGNAL
  - AM SIGNAL
  - INDICATOR DRIVE SIGNAL
1. ALL RESISTANCE VALUES ARE IN Ω.  
KΩ=1000Ω, MΩ=1000KΩ.
  2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
  3. ALL CAPACITANCE VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μF.
  4. V: DC VOLTAGE AT NO SIGNAL
  - FM POSITION
  - AM POSITION
  5. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.



**A** **B** **C** **D**

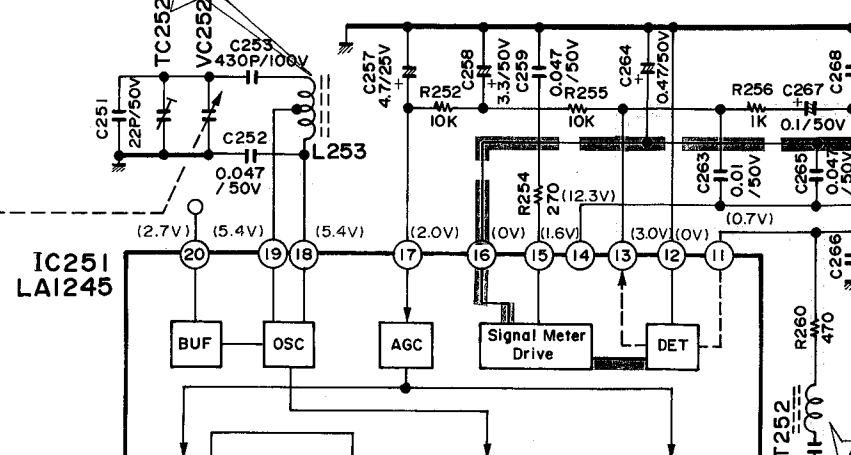
**SCHEMATIC DIAGRAM**

**FM FRONT END**



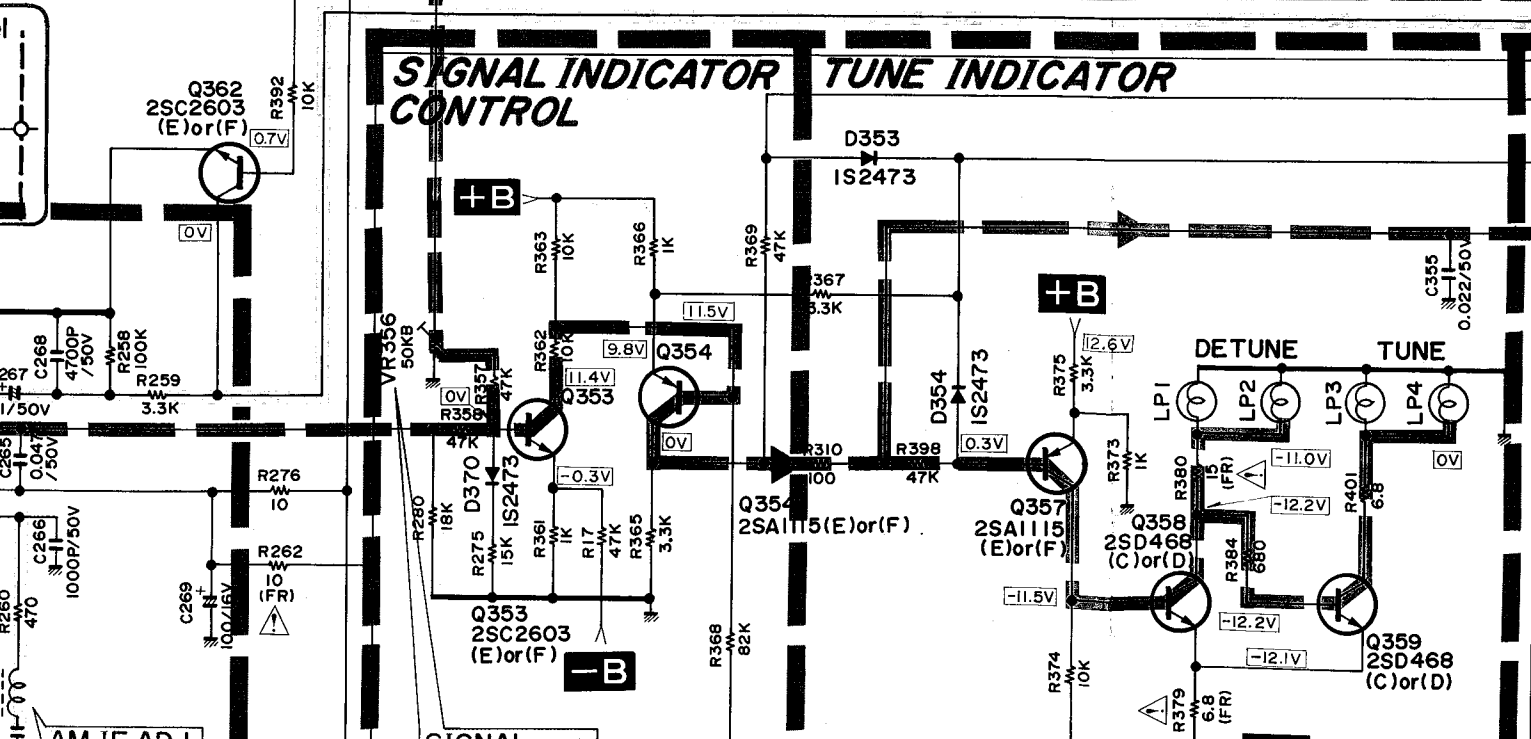
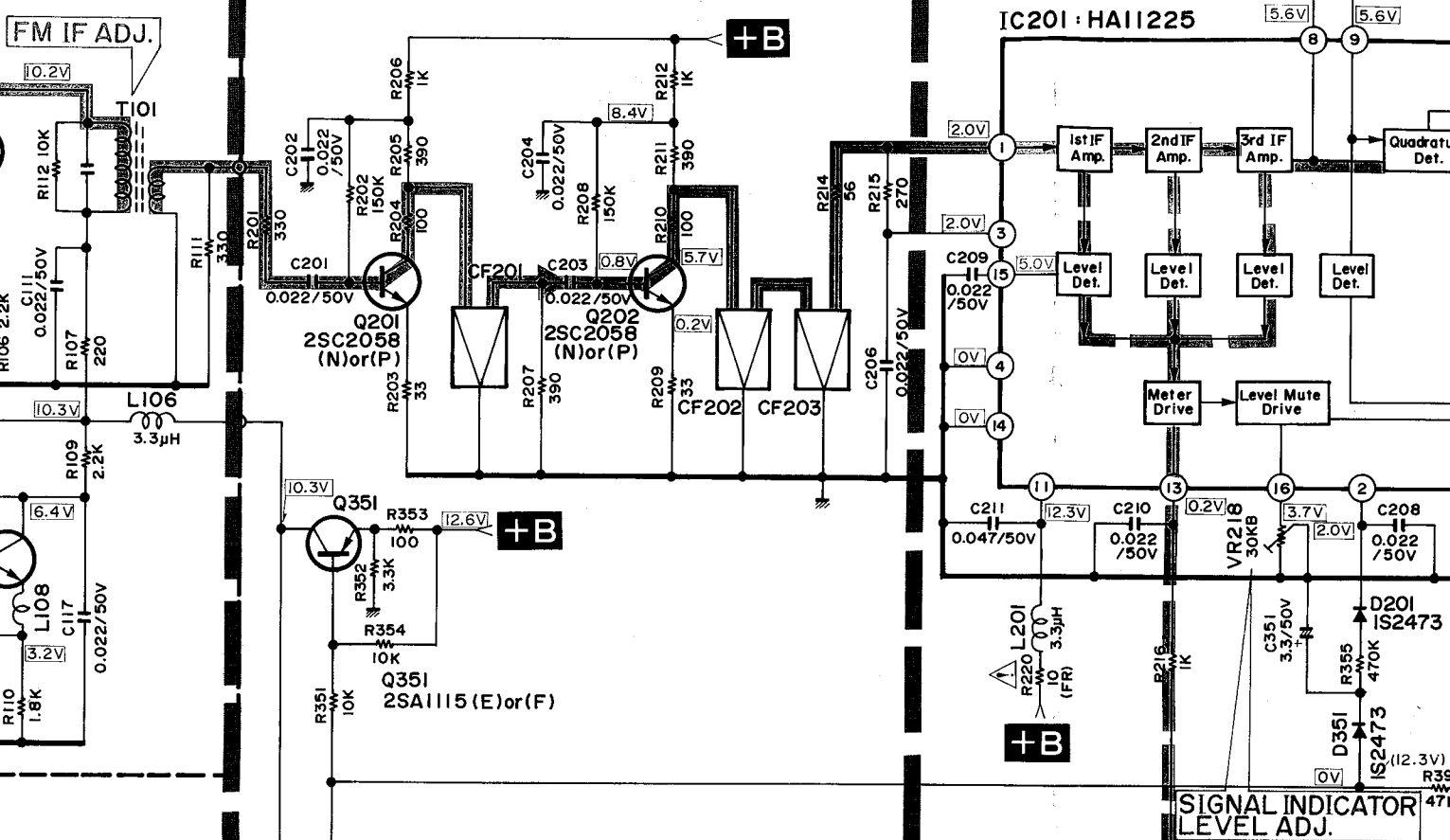
**AM**

**AM FREQUENCY COVERAGE ADJ.**



**FM IF AMP.**

**FM DETECTOR**



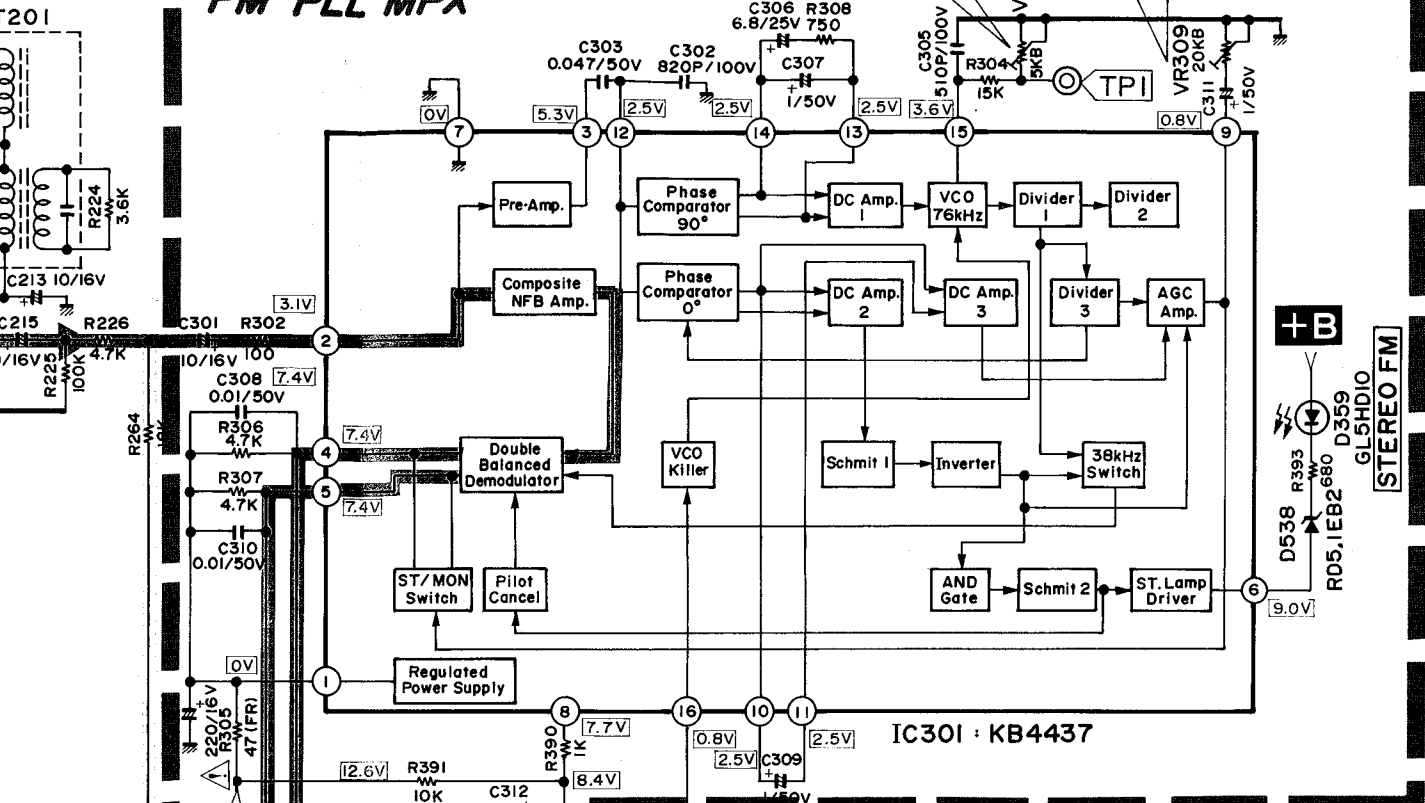




# FM PLL MPX

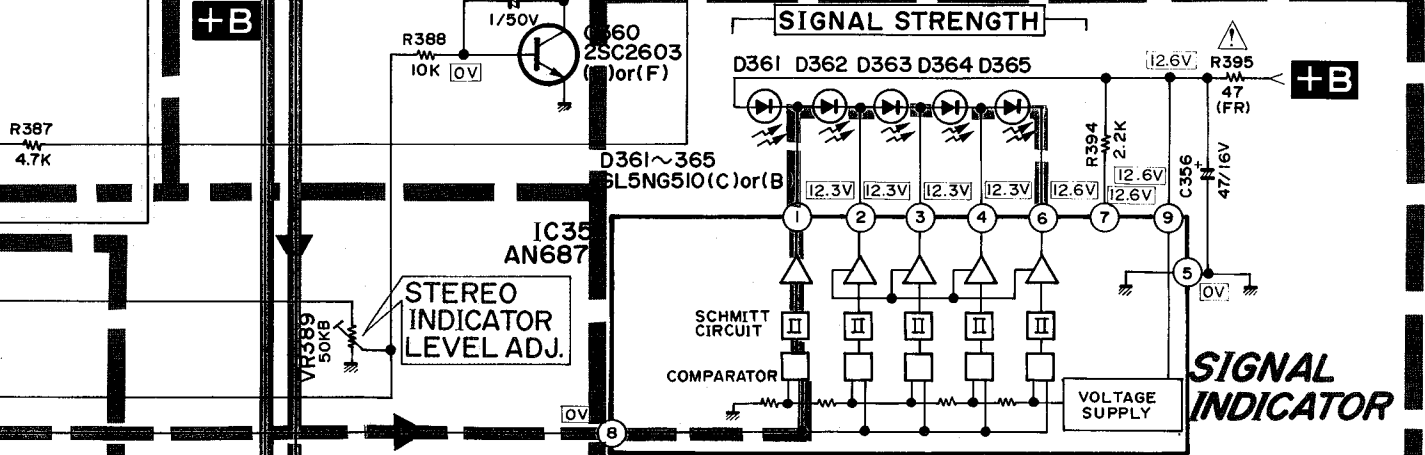
76kHz FREE RUN ADJ.

19kHz CANCEL ADJ.



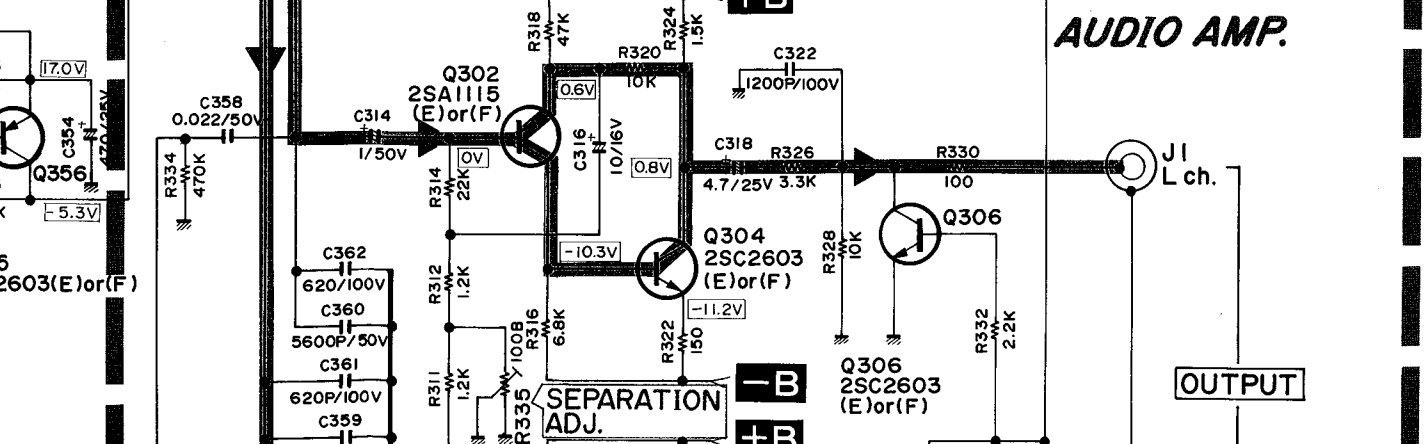
**STEREO FM**  
D538 R393  
RD5.1EB2 680 D359  
GL5HD10

# SIGNAL STRENGTH



**SIGNAL INDICATOR**

# AUDIO AMP.



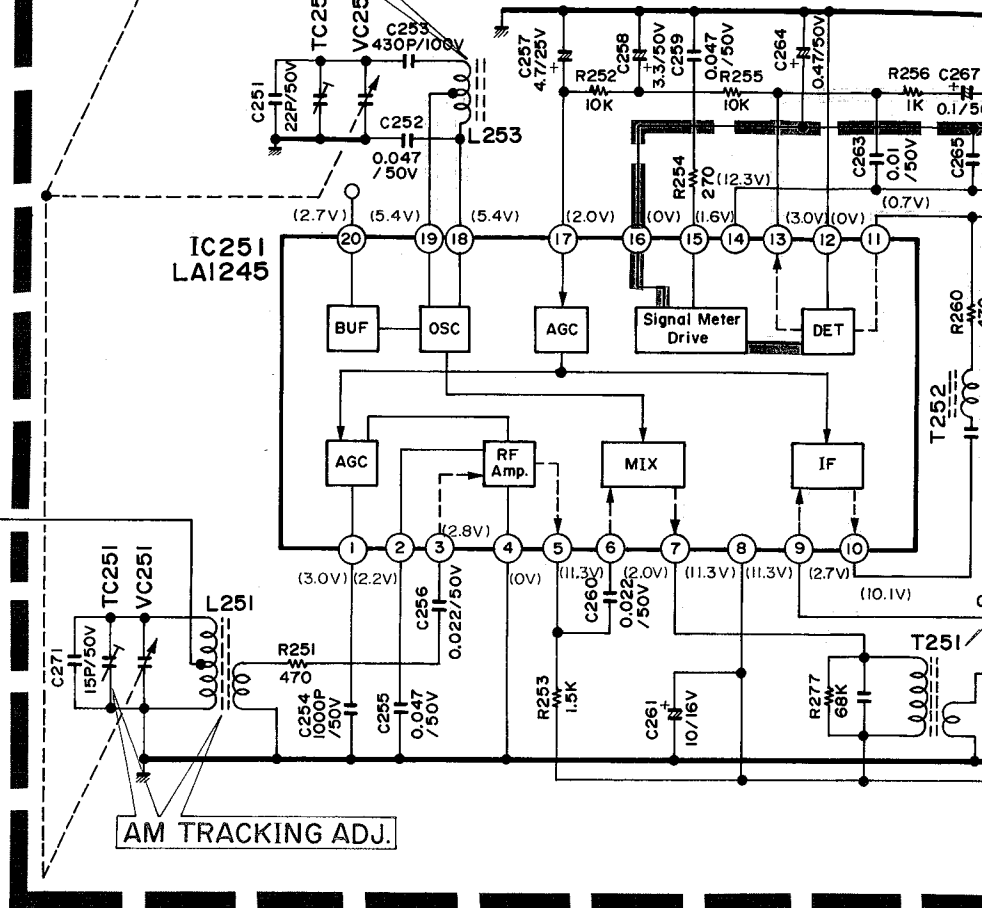
**OUTPUT**

5  
6  
7  
8  
9  
10

AM

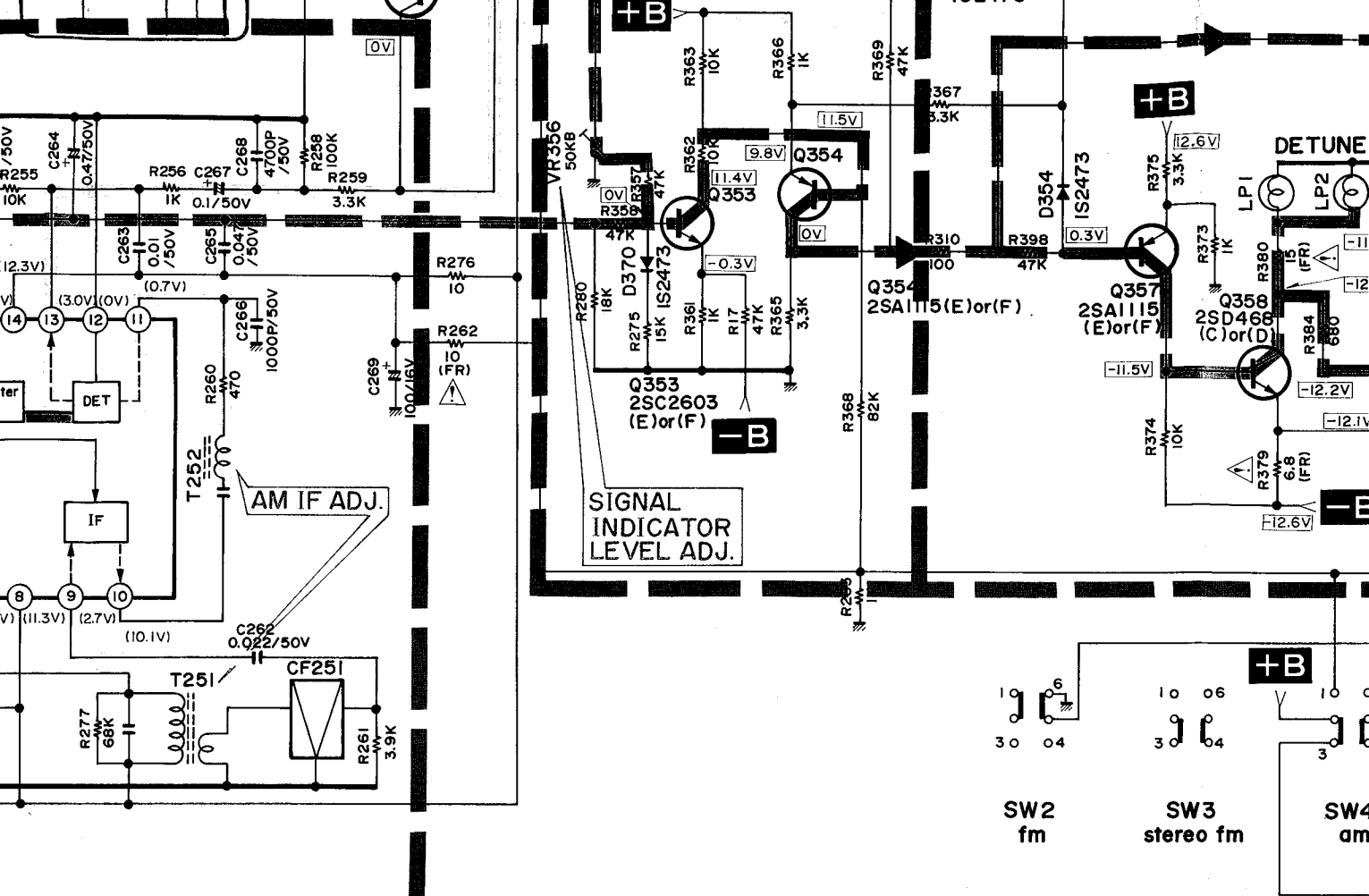
AM FREQUENCY  
COVERAGE ADJ.

AM TRACKING ADJ.

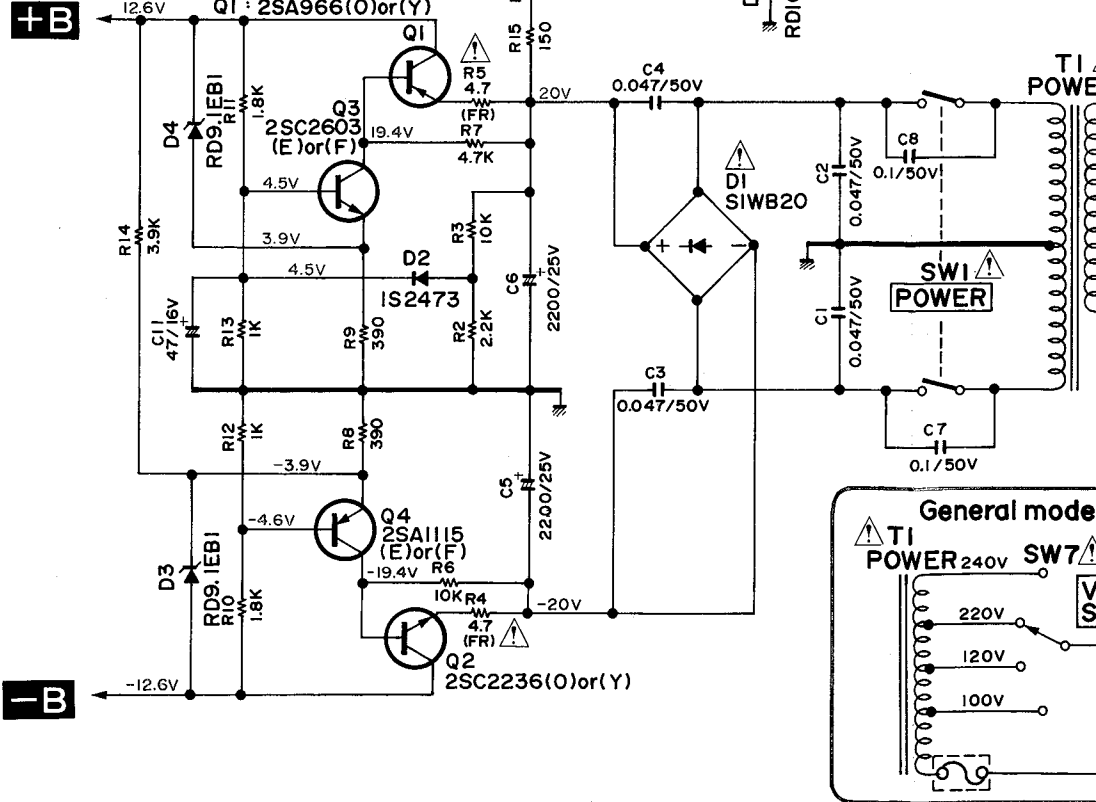


- ..... FM SIGNAL
- ..... AM SIGNAL
- ..... INDICATOR DRIVE SIGNAL

1. ALL RESISTANCES VALUES ARE IN  $\Omega$ .  
 $K\Omega=1000\Omega$ ,  $M\Omega=1000K\Omega$ .
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN  $\mu F$  UNLESS OTHERWISE NOTED.  $P=\mu\mu F$
4. V: DC VOLTAGE AT NO SIGNAL  
 ( . . . V ) FM POSITION  
 ( . . . V ) AM POSITION
5. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SA REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL

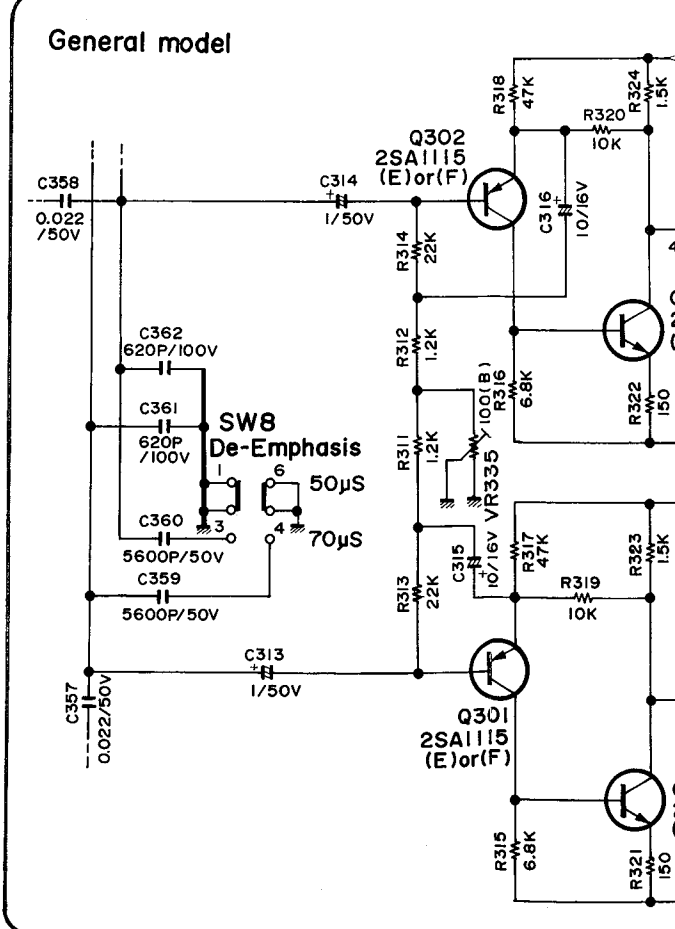
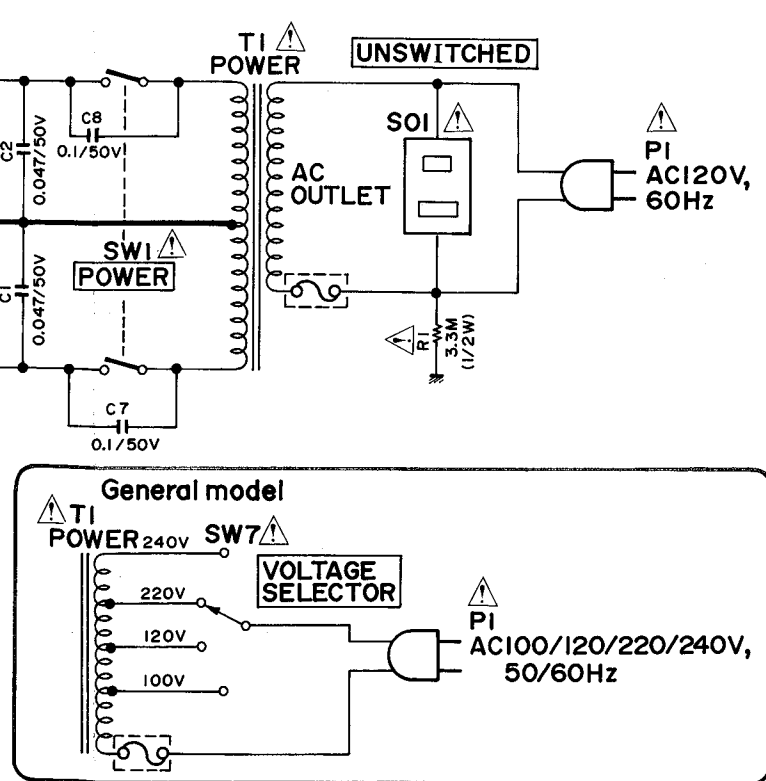
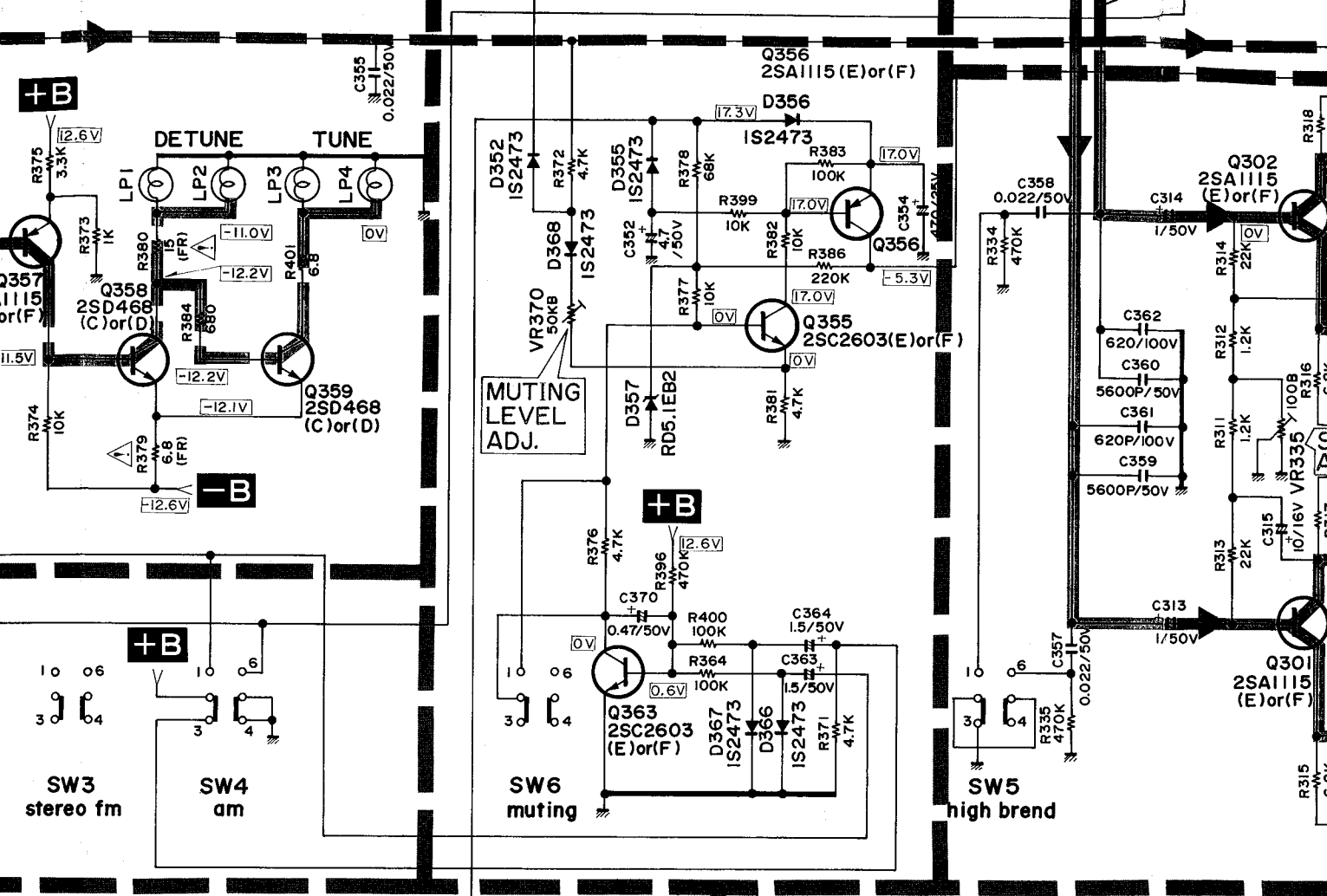


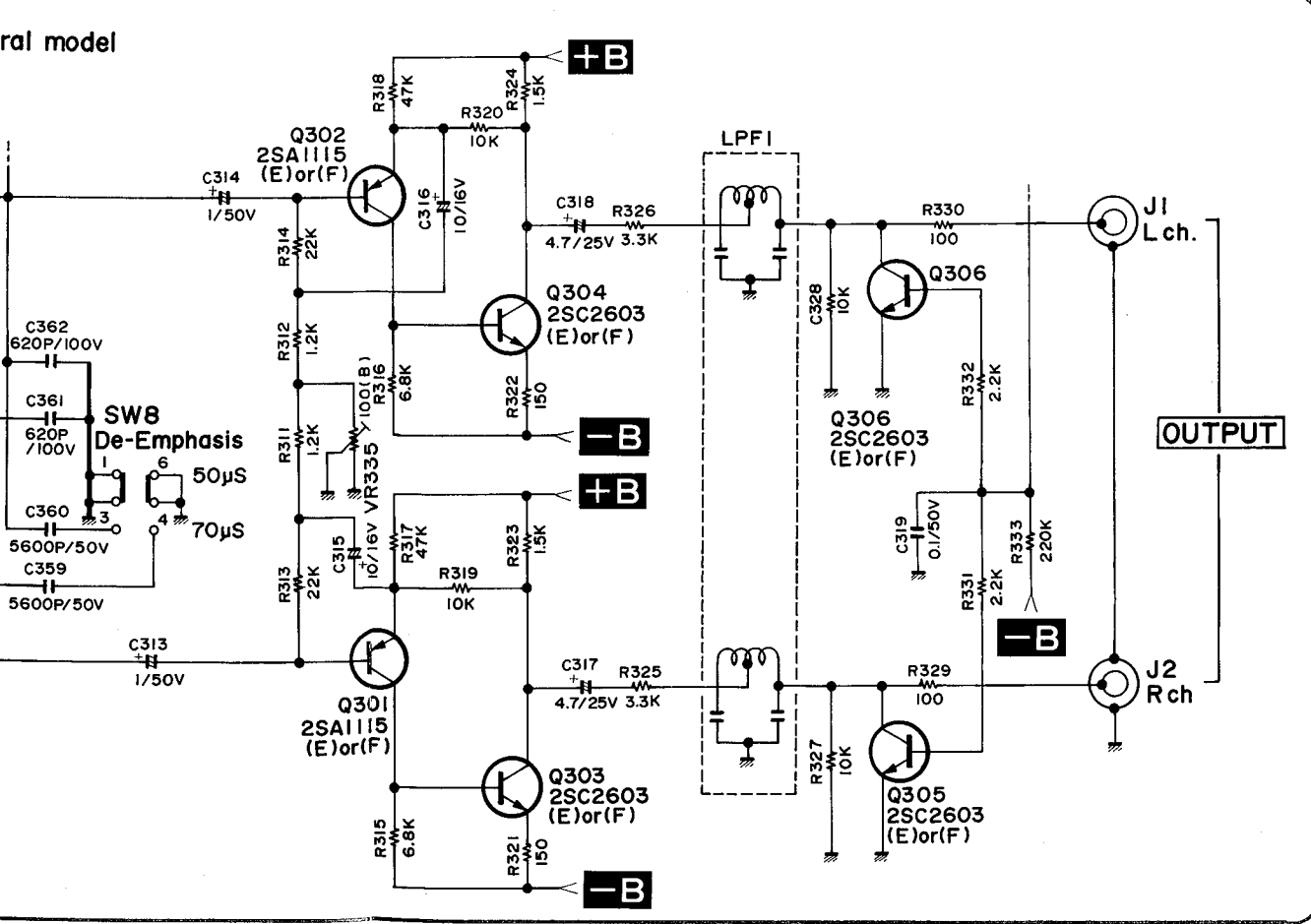
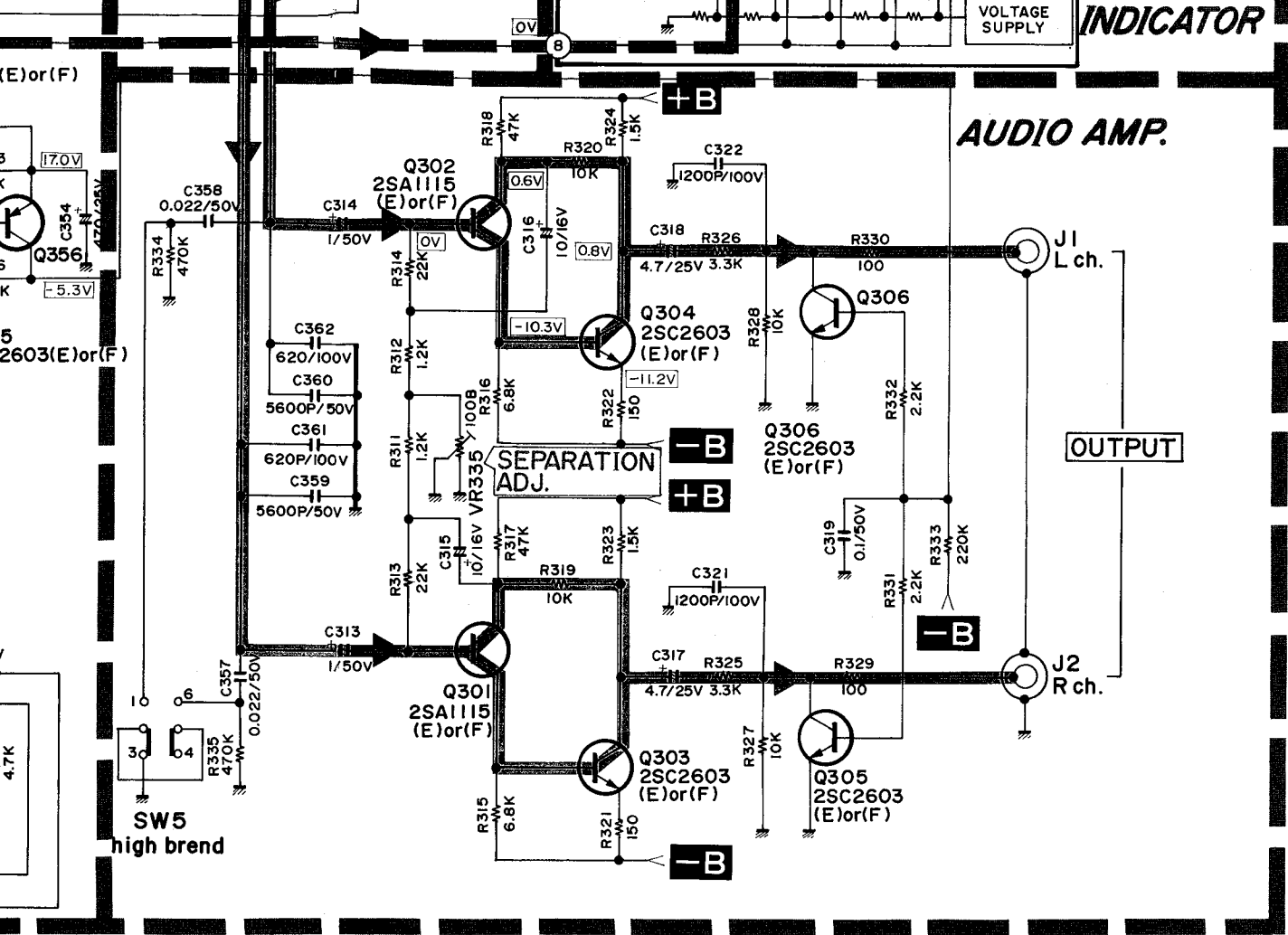
### POWER SUPPLY



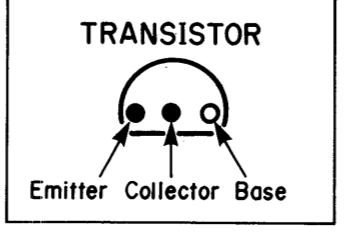
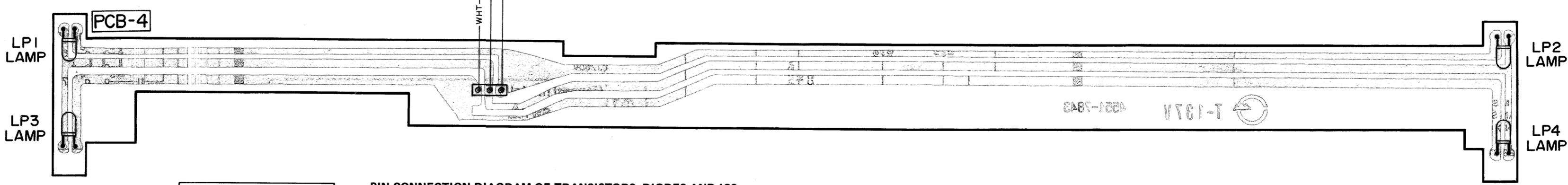
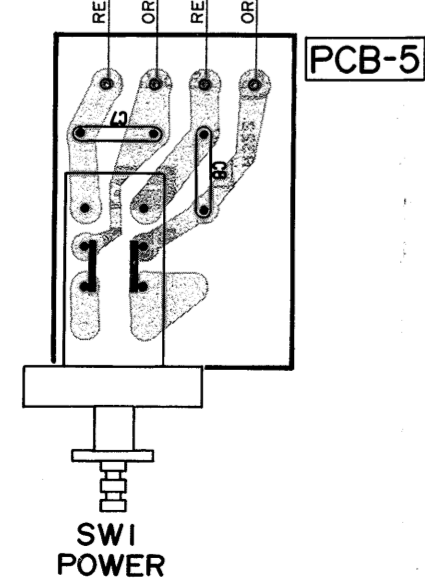
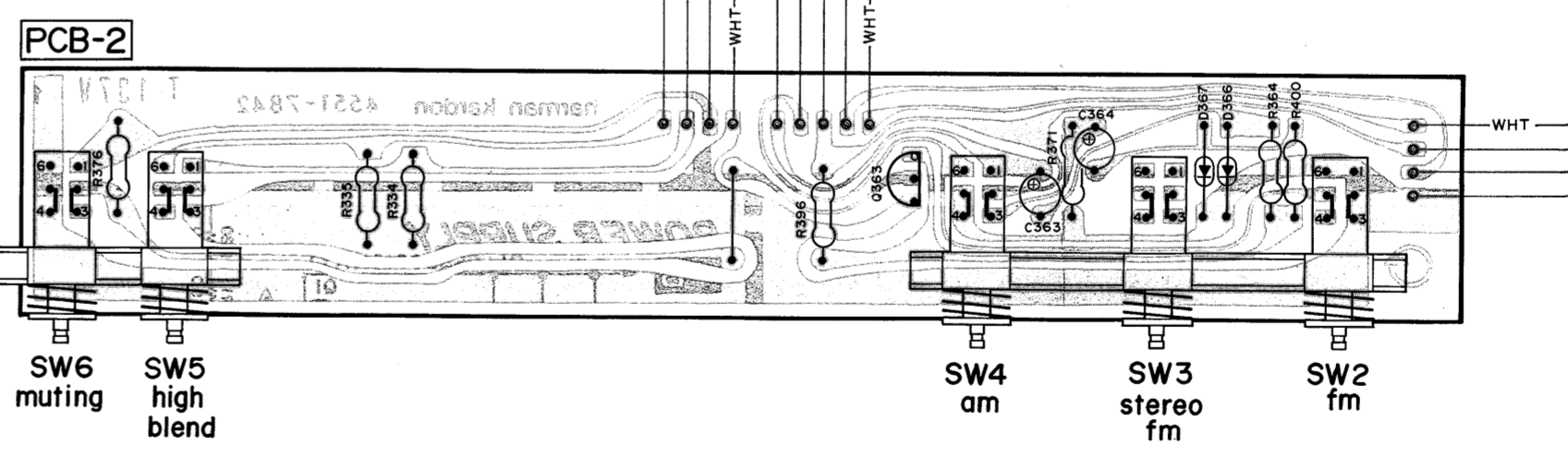
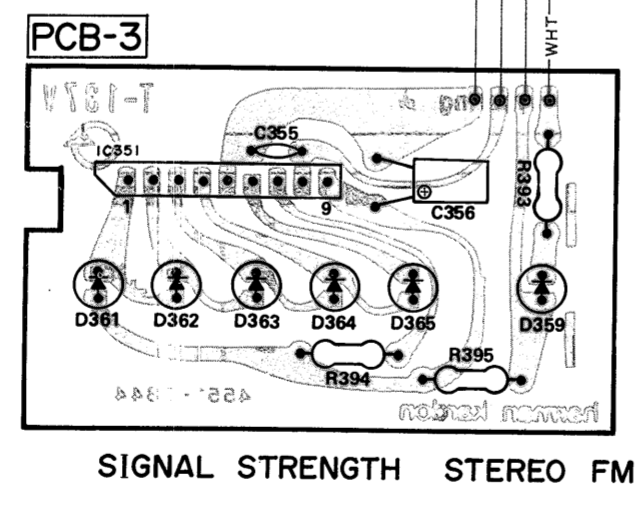
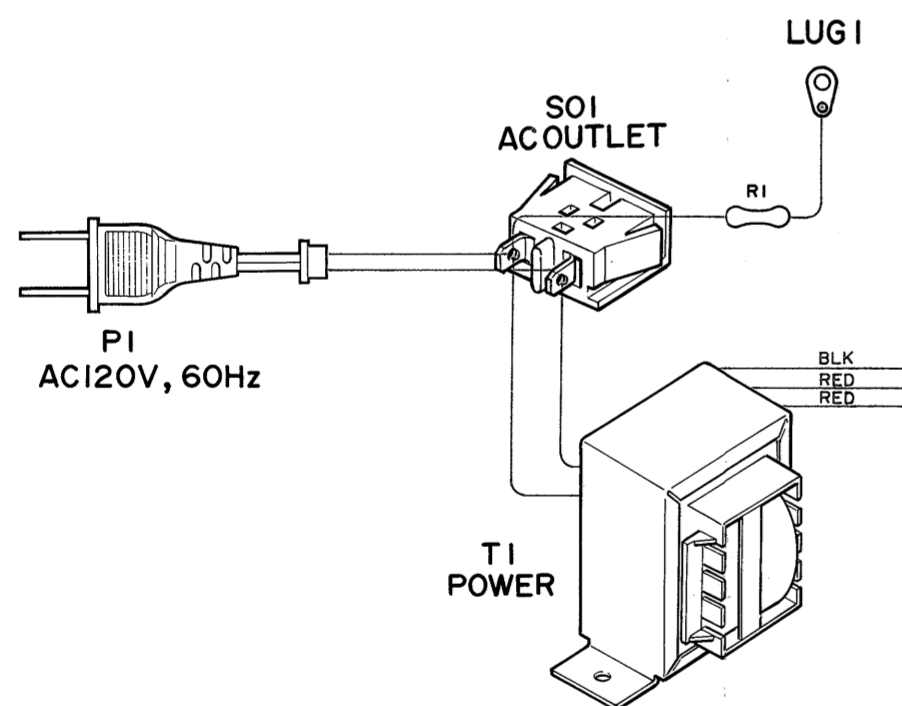
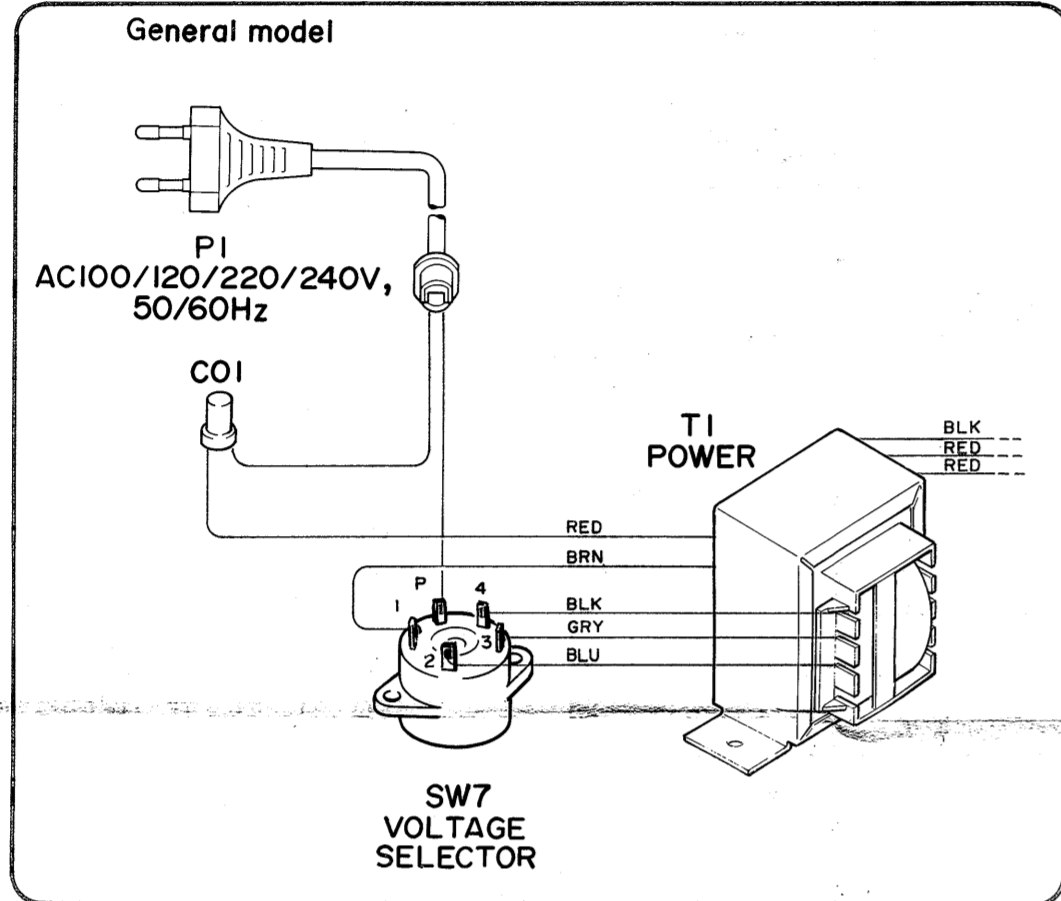
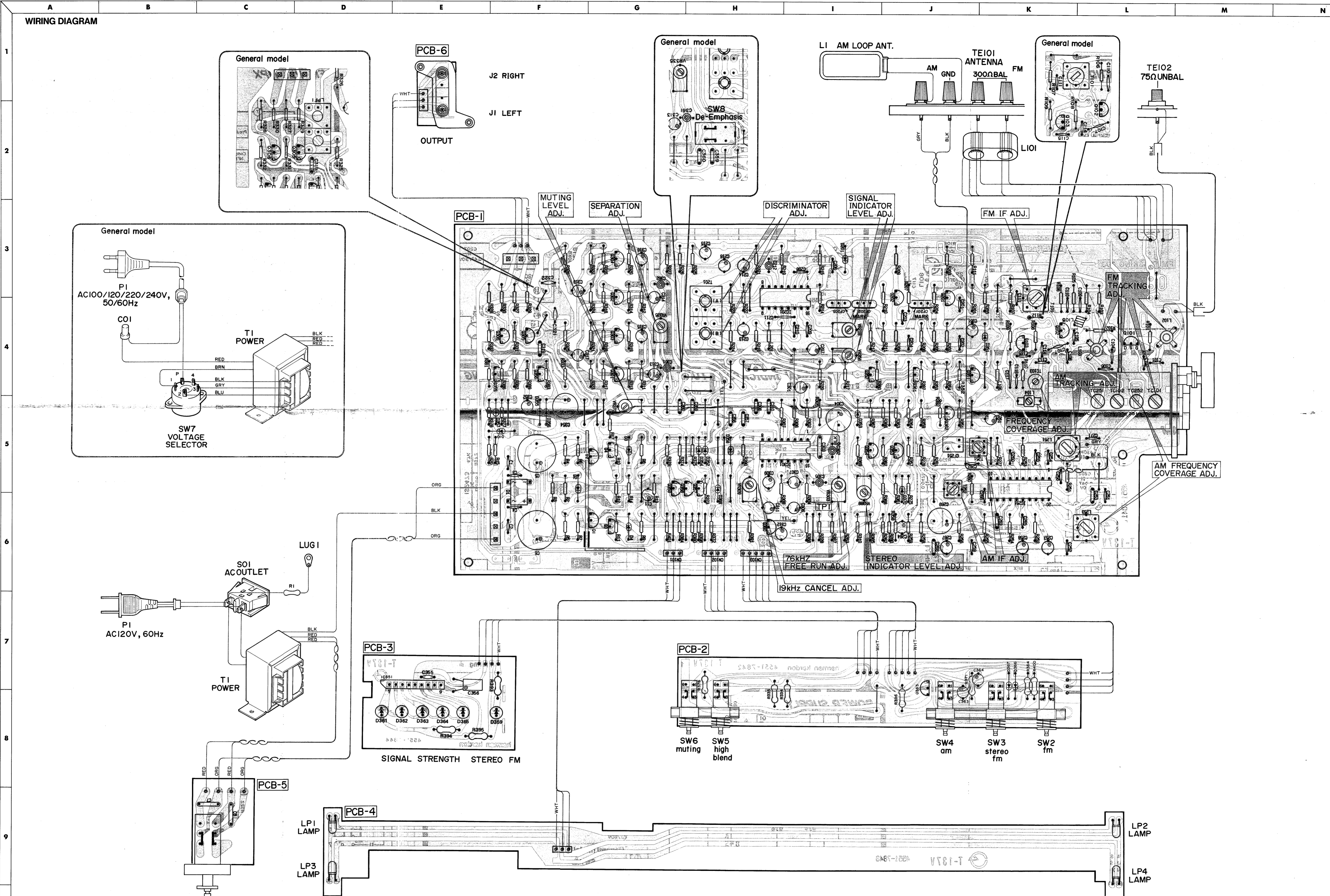
UNLESS OTHERWISE NOTED.  
RESISTOR VALUES UNLESS OTHERWISE NOTED. P=μF

FOR SAFETY COMPLIANCE WITH PRESENT SAFETY  
REQUIREMENTS, THIS PRODUCT MAY BE REPLACED BY ORIGINAL PARTS.





WIRING DIAGRAM



**PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.**

2SA966 2SC2236 2SC535 2SC461	2SC2058 2SD468	2SC2603 2SA1115	2SK241	2SK168	S1WB20	1S2473 RD5.1EB1 RD5.1EB3 RD5.1EB2	GL5HD10 GL5NG510	HA11225 KB4437	LA1245	AN6875
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- WIRE COLOR ABBREVIATIONS**
- RED : Red
  - ORG : Orange
  - BLU : Blue
  - WHT : White
  - GRN : Green
  - BLK : Black
  - YEL : Yellow
  - PUR : Purple
  - PIK : Pink

**WIRING DIAGRAM**

1

2

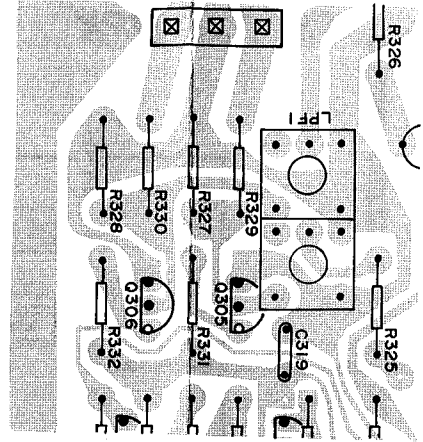
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4

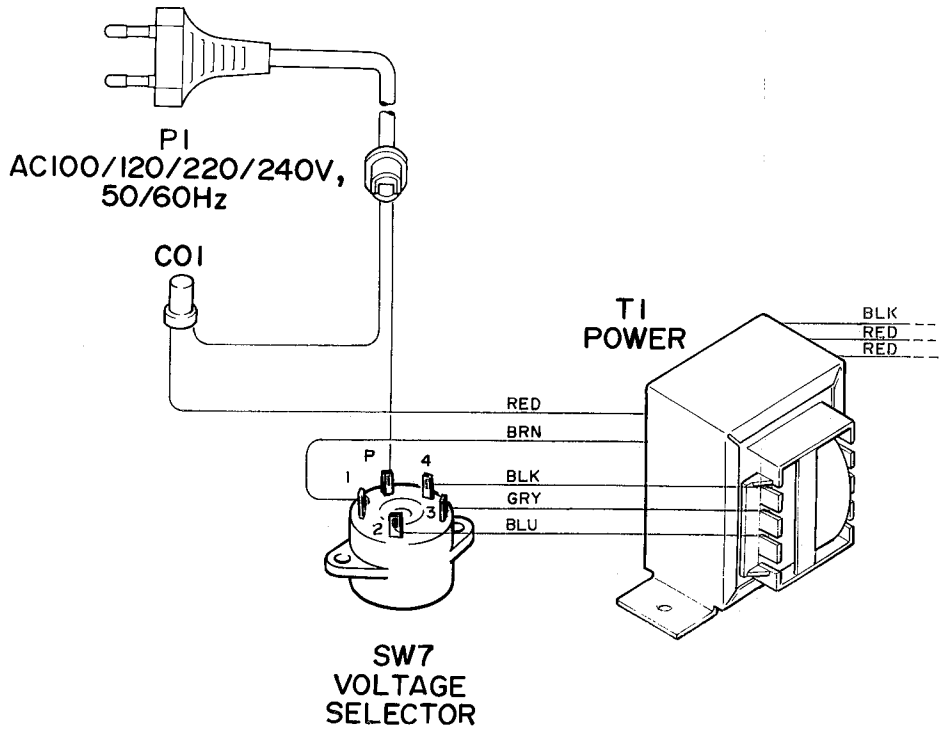
5

6

**General model**



**General model**



LUG I

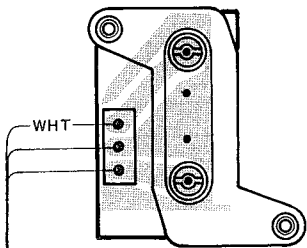
E

F

G

H

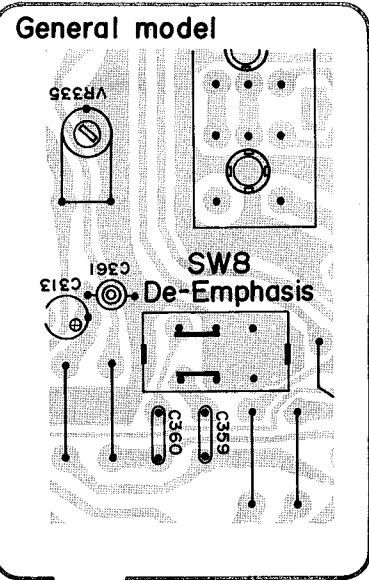
PCB-6



OUTPUT

J2 RIGHT

J1 LEFT

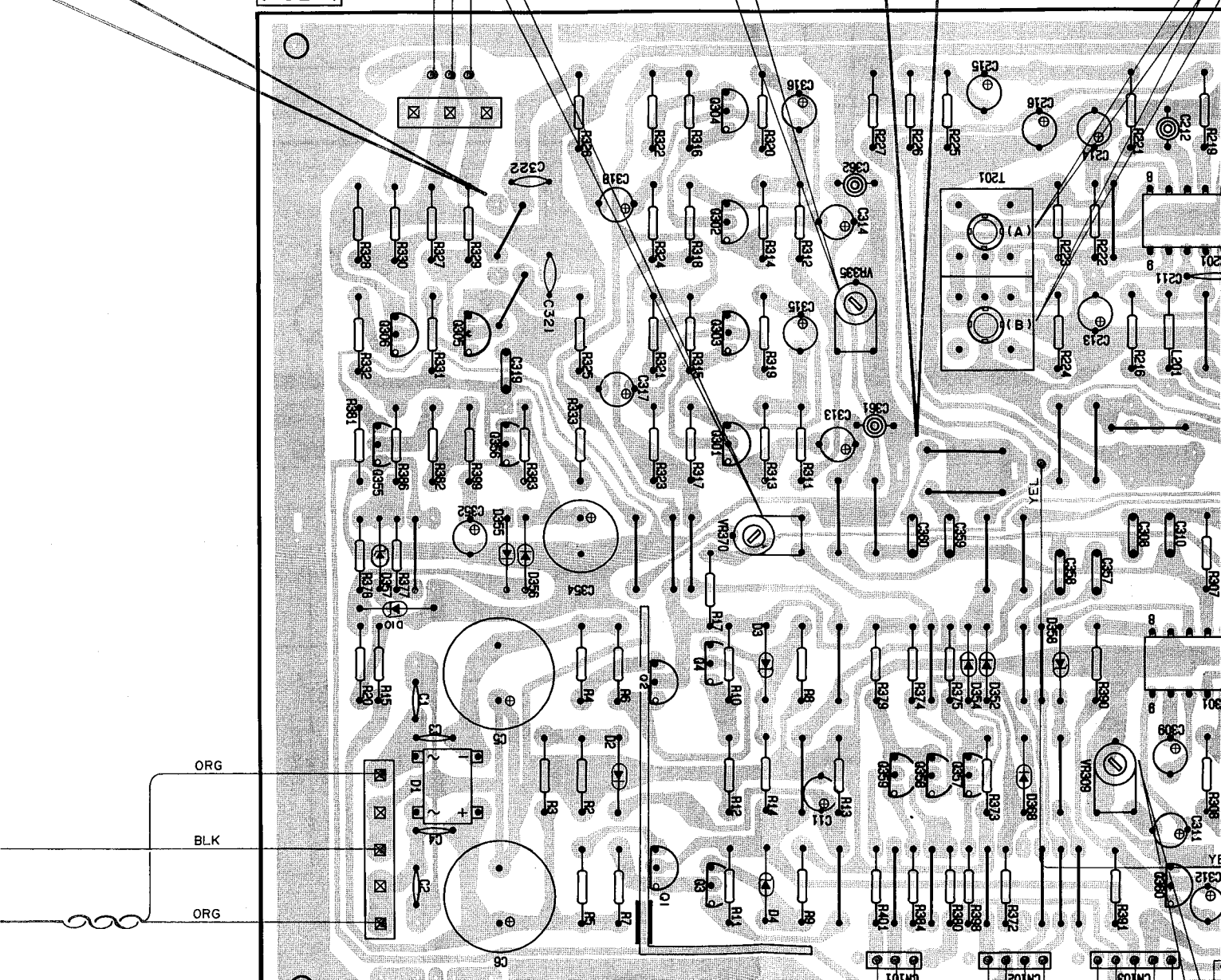


PCB-1

MUTING LEVEL ADJ.

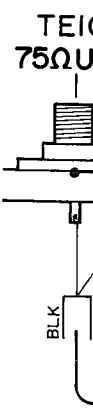
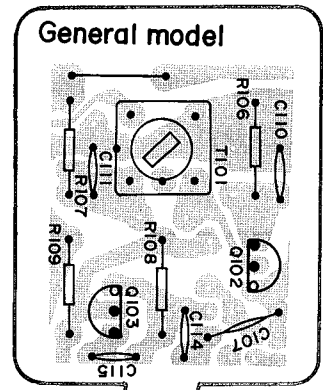
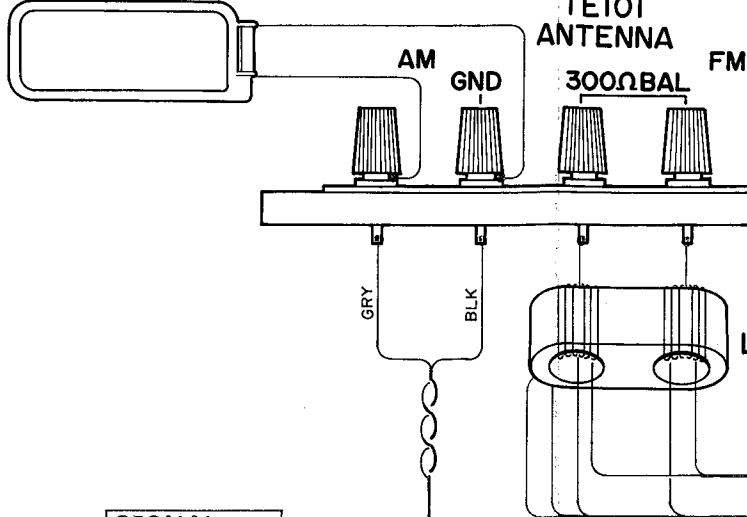
SEPARATION ADJ.

DISCR





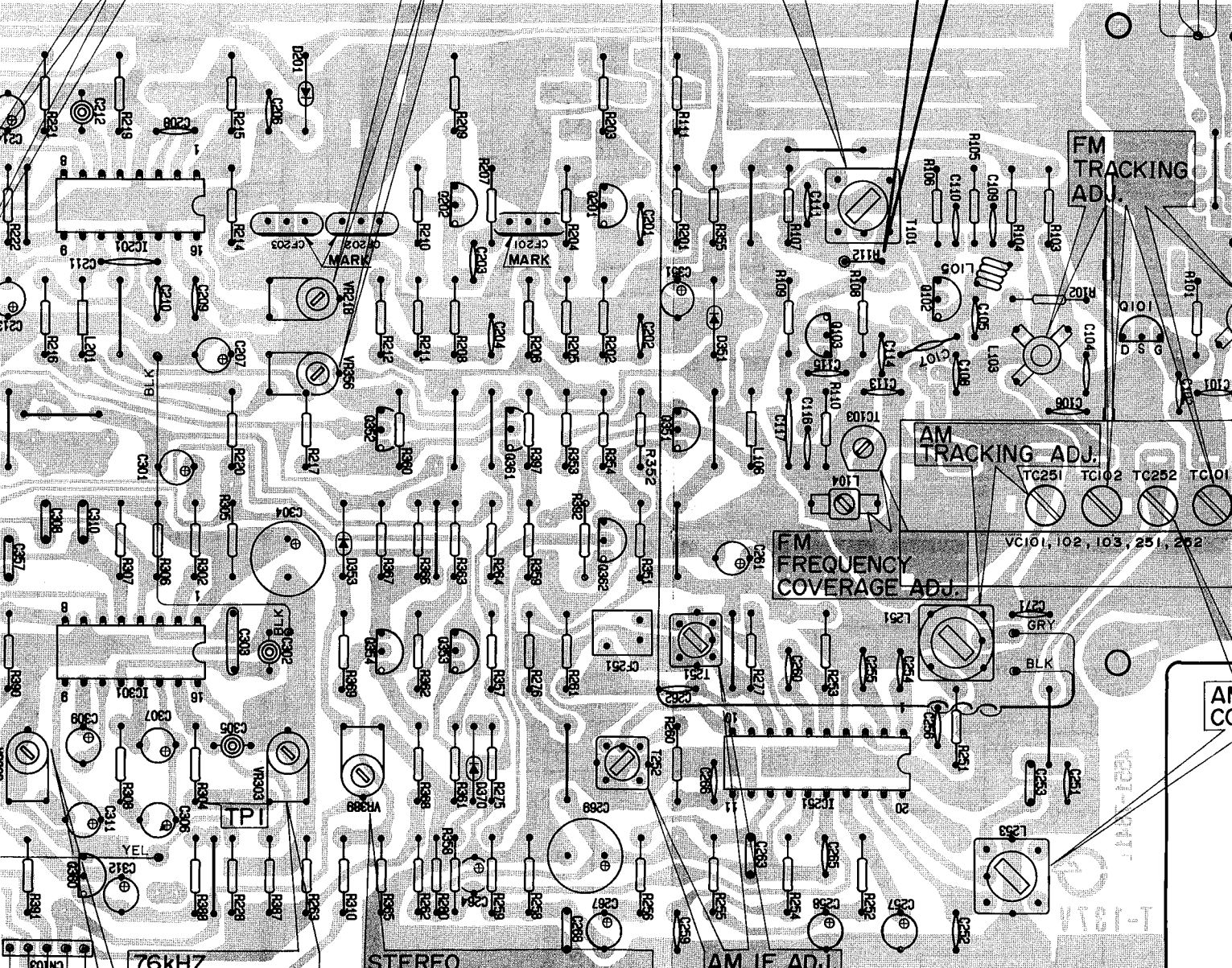
LI AM LOOP ANT.

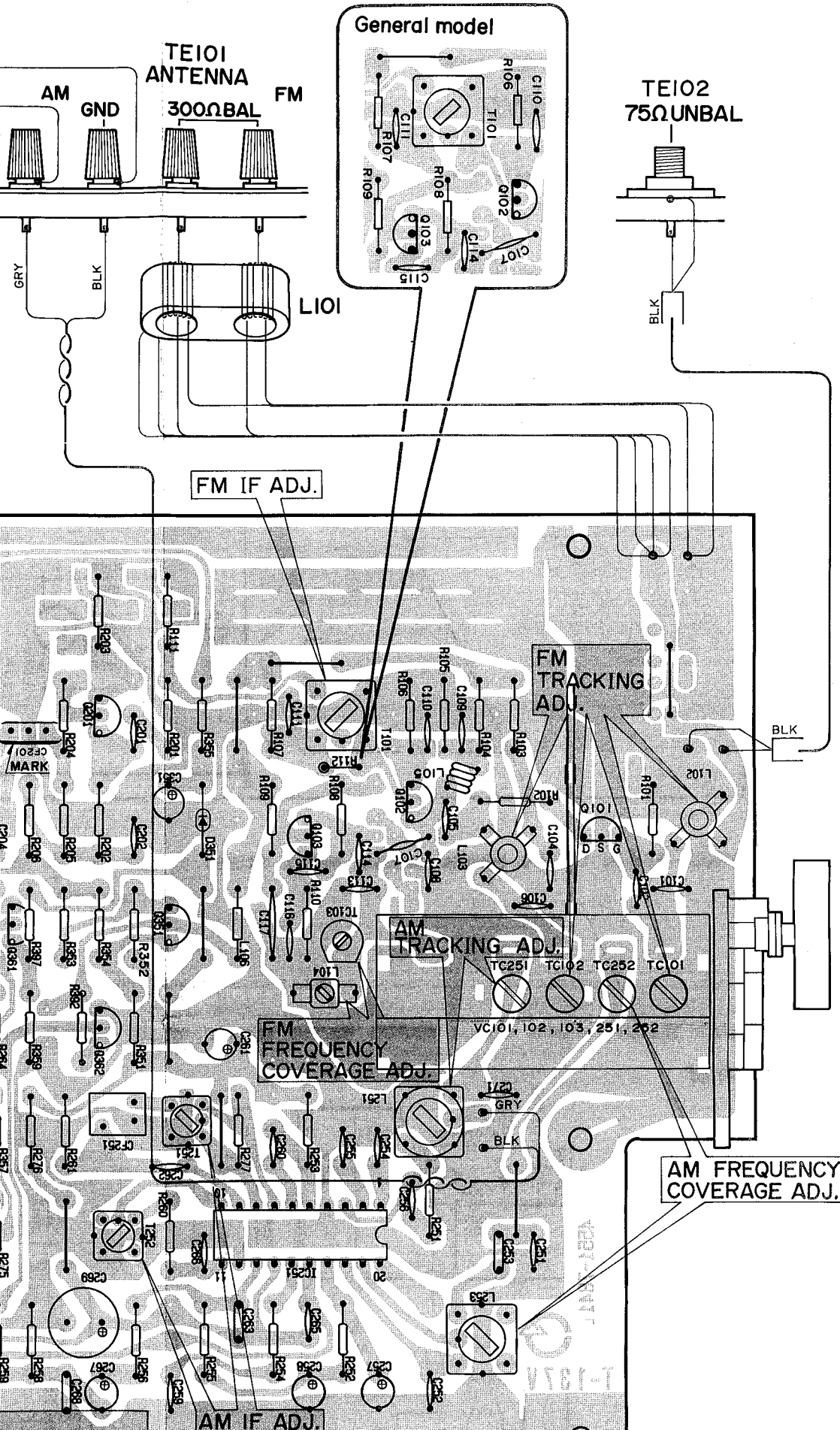


DISCRIMINATOR ADJ.

SIGNAL INDICATOR LEVEL ADJ.

FM IF ADJ.





General model

TE101 ANTENNA  
300Ω BAL

TE102  
75Ω UNBAL

FM IF ADJ.

FM TRACKING ADJ.

AM TRACKING ADJ.

FM FREQUENCY COVERAGE ADJ.

AM FREQUENCY COVERAGE ADJ.

VC101, 102, 103, 251, 252

AM IF ADJ.

5

SW7  
VOLTAGE  
SELECTOR

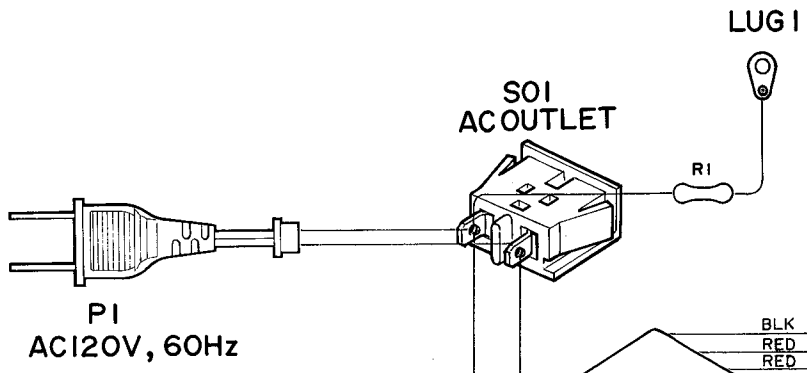
6

7

8

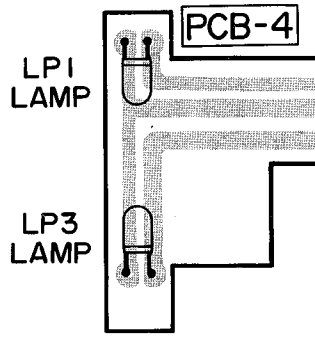
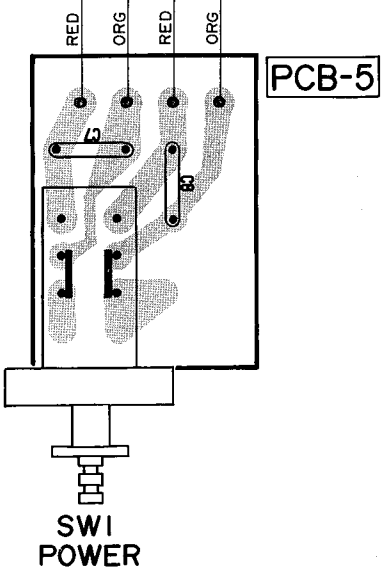
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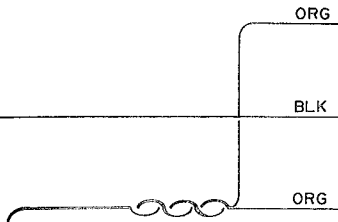
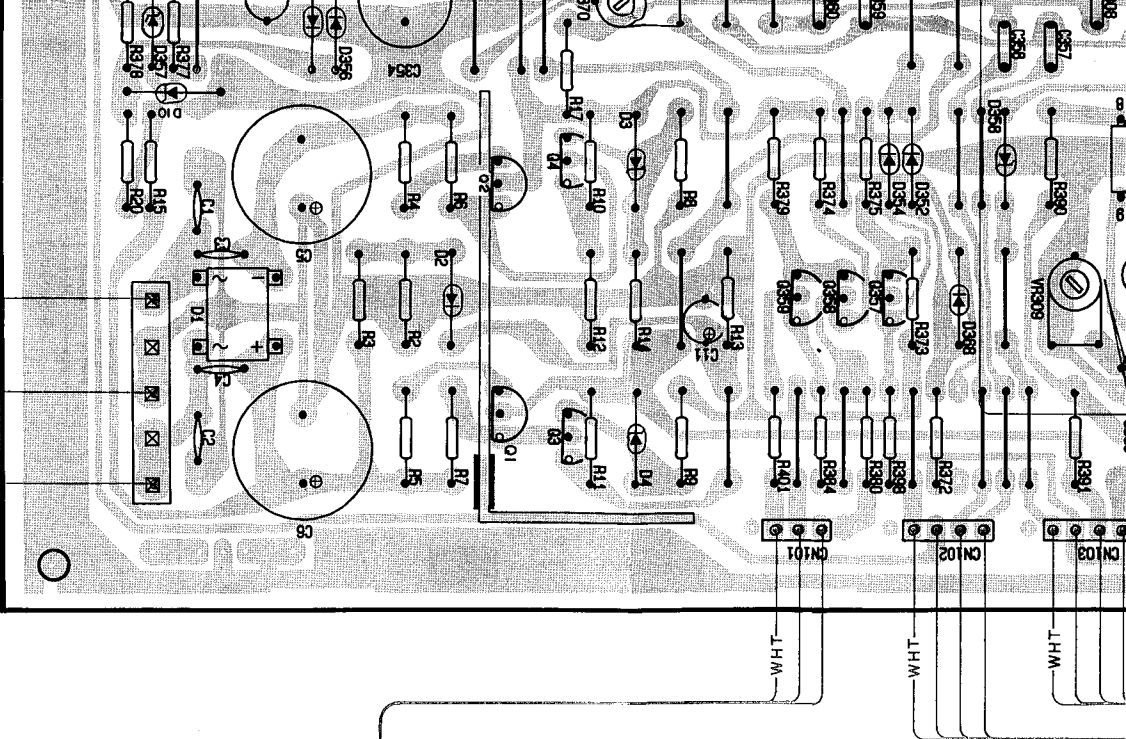
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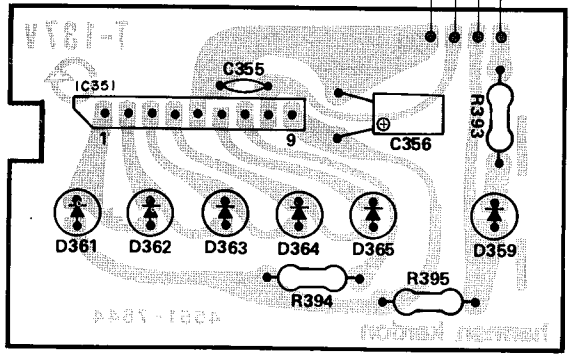
T1  
POWER

BLK  
RED  
RED



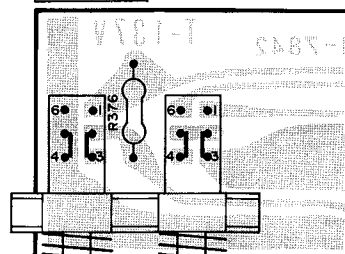


**PCB-3**



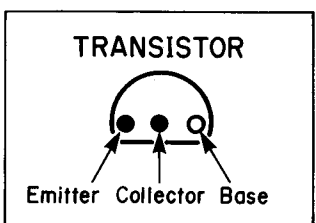
SIGNAL STRENGTH STEREO FM

**PCB-2**



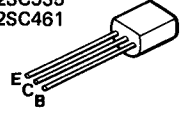
SW6 muting  
SW5 high blend

**PCB-4**

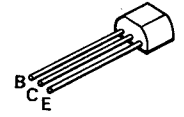


**PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.**

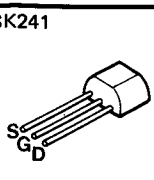
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2SC2236  
2SC535  
2SC461



2SC2058  
2SD468

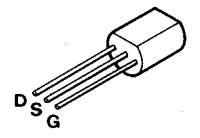


2SC2603  
2SA1115



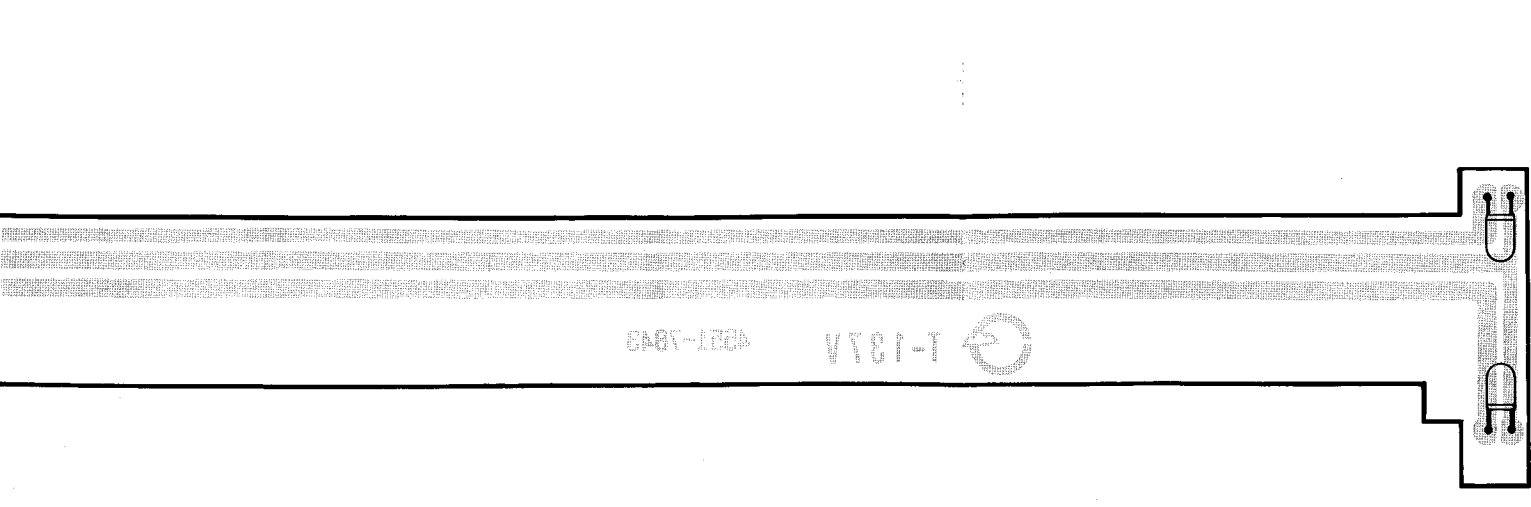
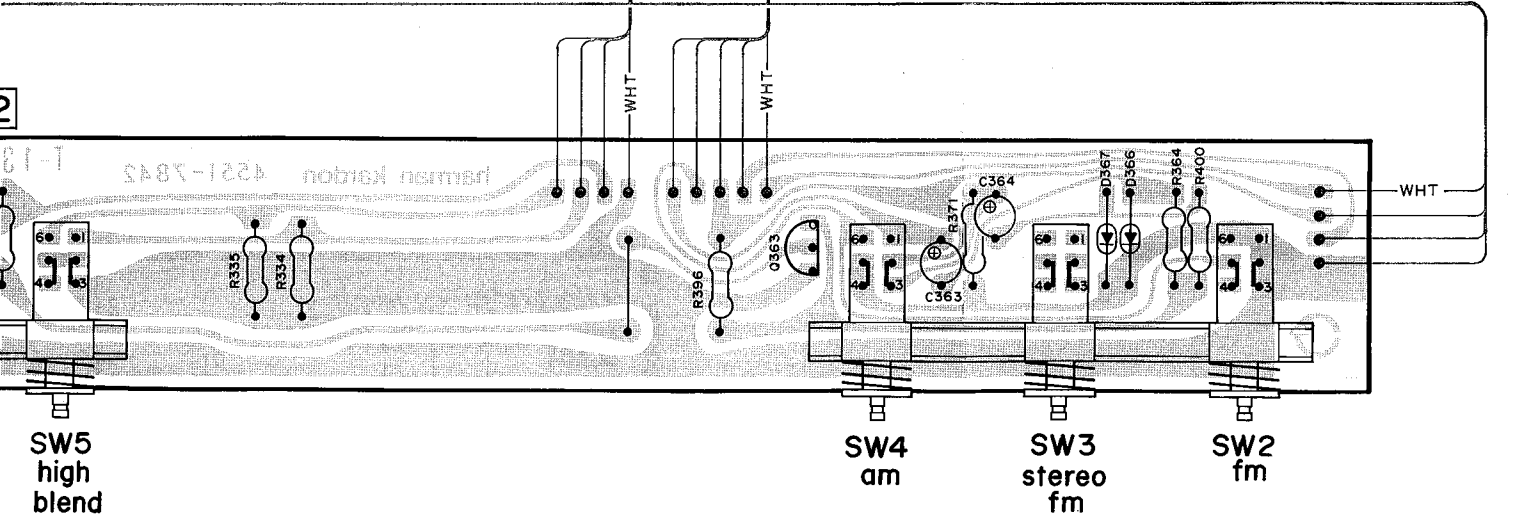
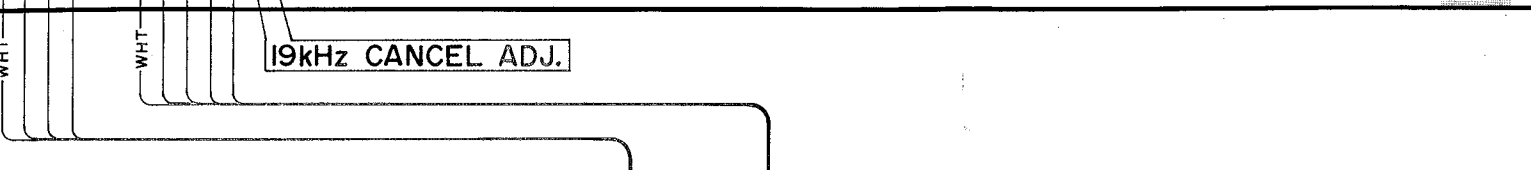
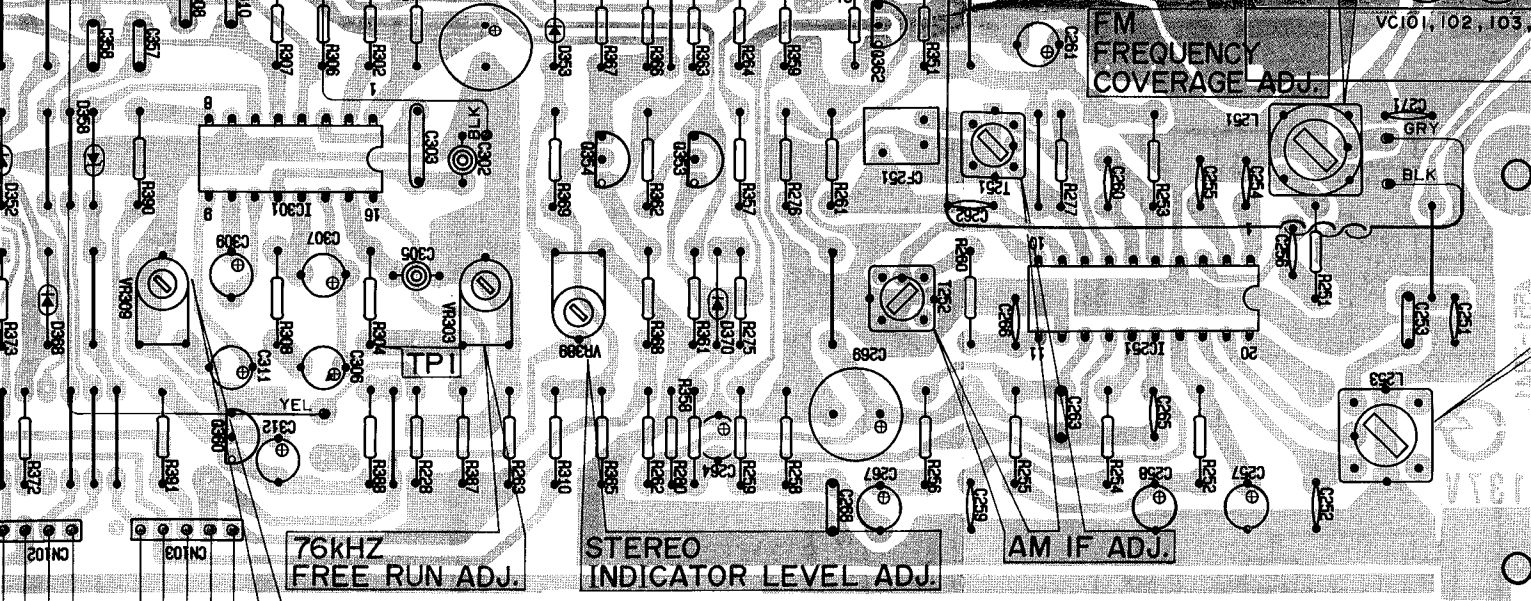
2SK241

2SK168



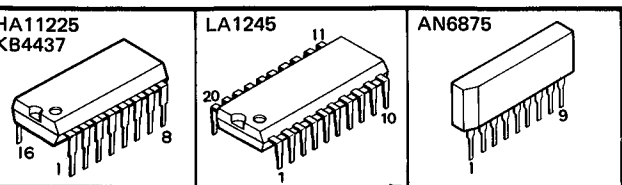
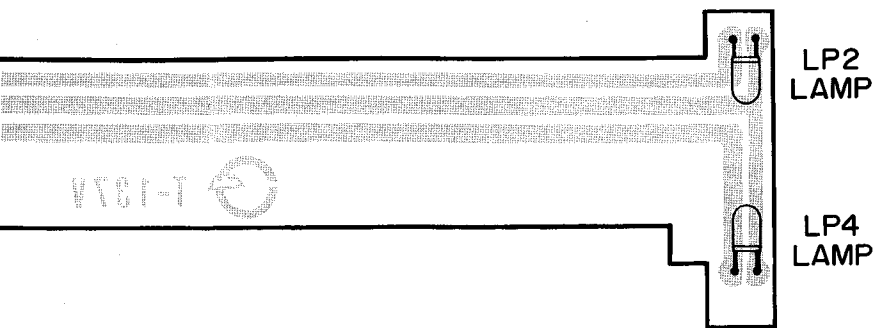
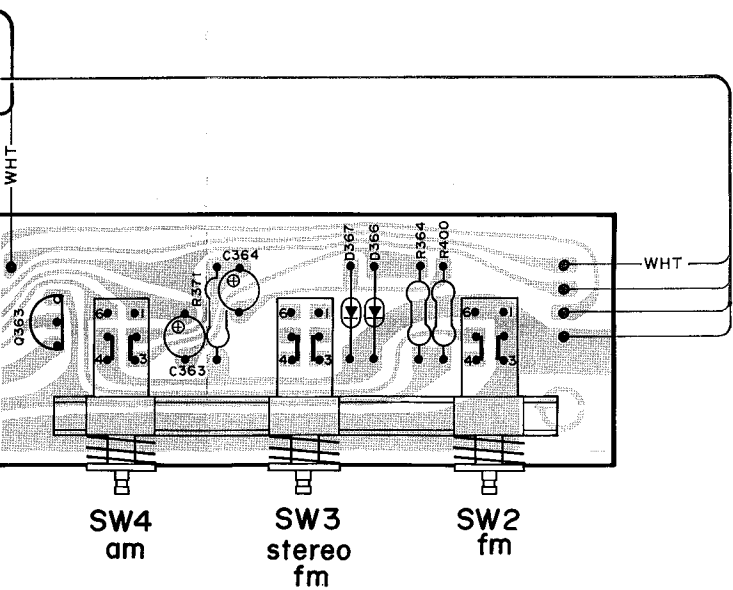
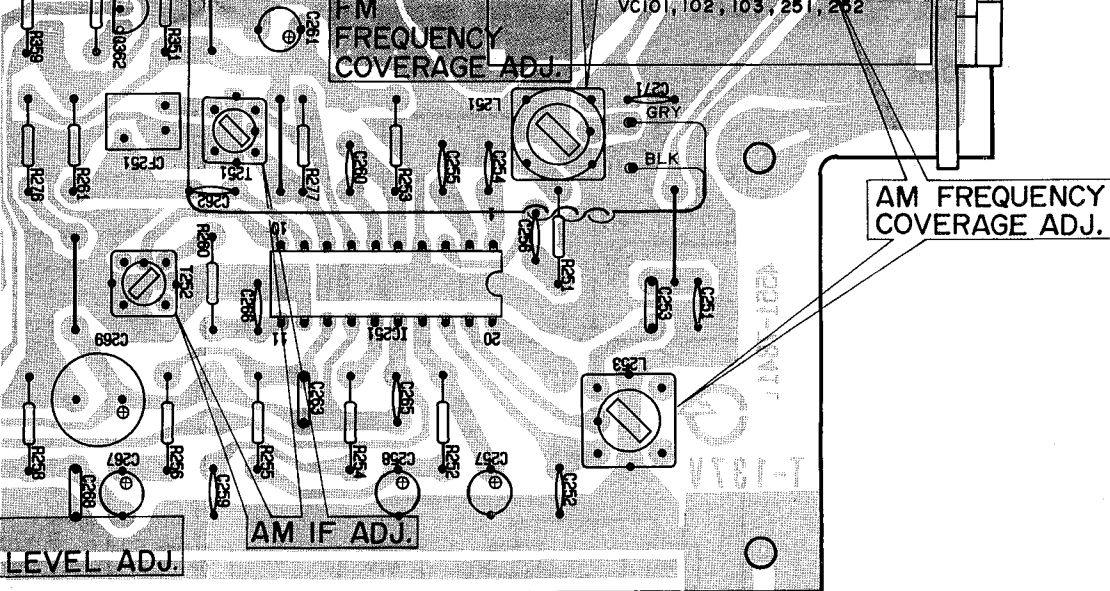
S1WB20





<p>S1WB20</p>	<p>1S2473 RD9.1EB1 RD16EB3 RD5.1EB2</p> <p>Anode</p> <p>Cathode</p>	<p>GL5HD10 GL5NG510</p> <p>Cathode</p> <p>Anode</p>	<p>HA11225 KB4437</p>	<p>LA1245</p>	<p>AN6875</p>
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- WIRE COL
- RED : Re
- ORG : Or
- BLU : Blu
- WHT : Wh
- GRN : Gr
- BLK : Bla
- YEL : Ye
- PUP : Pu
- PIK : Pir

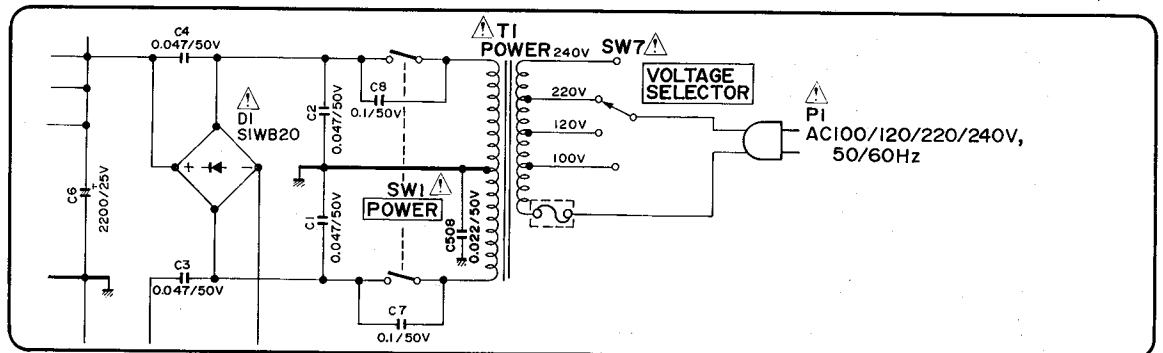
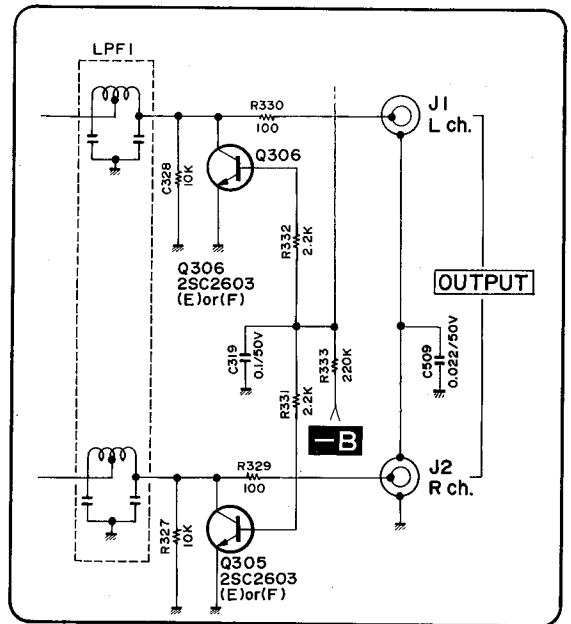
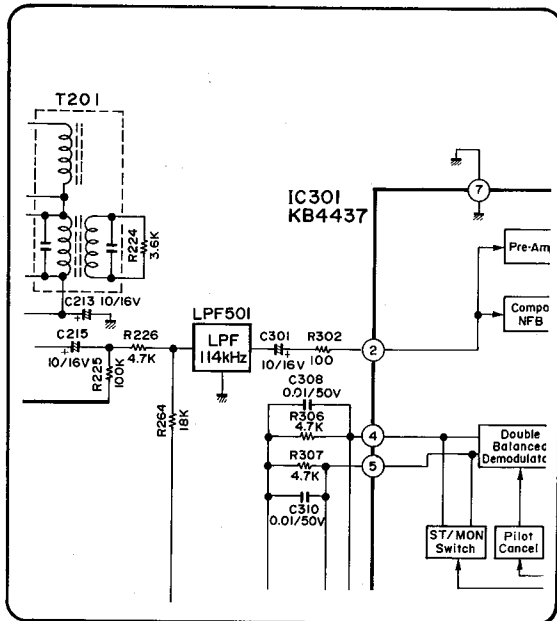
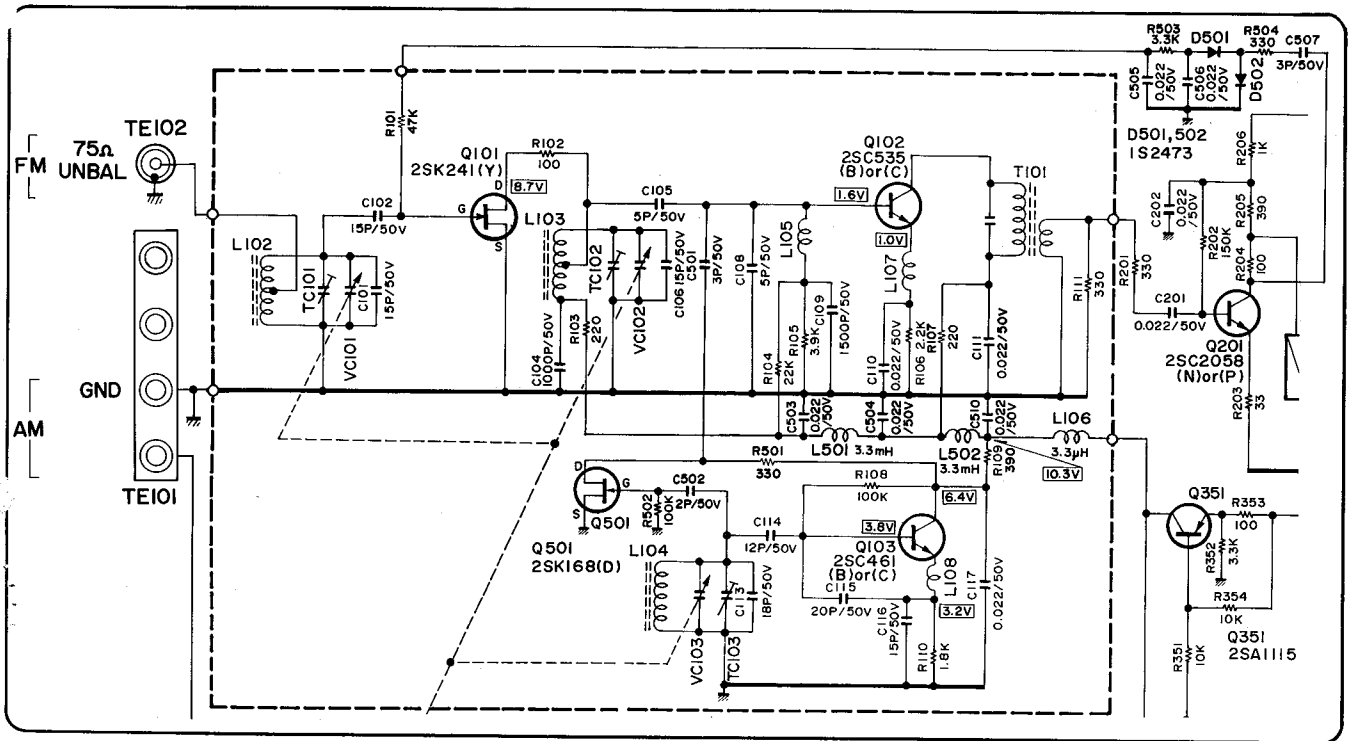


• WIRE COLOR ABBREVIATIONS

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- ORG : Orange
- BLU : Blue
- WHT : White
- GRN : Green
- BLK : Black
- YEL : Yellow
- PUP : Purple
- PIK : Pink

**SCHEMATIC DIAGRAM (only German model)**

For the German model, the circuit is partially modified as shown below. As the rest of the circuit remains the same as the General model circuit, refer to the schematic diagram on page 13.



**WIRING DIAGRAM (only German model)**

For the German model, the circuit is partially modified as shown below. As the rest of the circuit remains the same as the General model circuit, refer to the wiring diagram on page 14.

