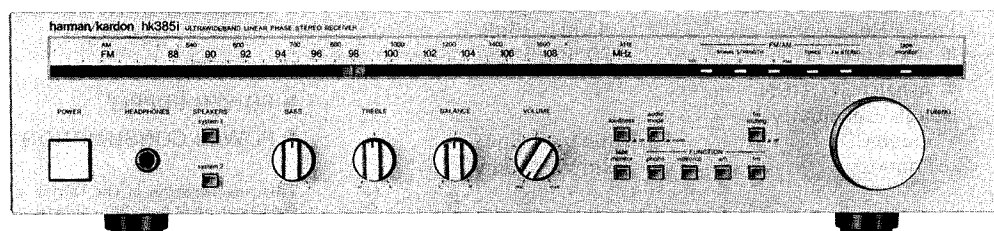


The Harman Kardon Model hk385i

Manual 94A

ULTRAWIDEBAND LINEAR PHASE STEREO RECEIVER

Technical Manual



harman/kardon

240 Crossways Park West, Woodbury, N.Y. 11797
1112-H15294A8 P-088509 1850 Printed in Japan

hk385i

SPECIFICATIONS

● FM SECTION

	Nominal	Limit
Tuning Range	87.3 ~ 108.4 MHz	
50dB Quieting Sensitivity		
Mono	15.1dBf $\leq$ 19dBf	
Stereo	36.5dBf $\leq$ 40dBf	
Usable Sensitivity	10.2dBf $\leq$ 15dBf	
Image Ratio	52dB $\geq$ 42dB	
IF Rejection	90dB $\geq$ 75dB	
Spurious Response Rejection	87dB $\geq$ 60dB	
Capture Ratio	1.0dB $\leq$ 2dB	
Alternate Channel Selectivity	67dB $\geq$ 50dB	
AM Rejection	59dB $\geq$ 45dB	
Signal to Noise Ratio		
Mono	82dB $\geq$ 75dB	
Stereo	75dB $\geq$ 70dB	
Total Harmonic Distortion		
Mono	0.08% $\leq$ 0.3%	
Stereo	0.08% $\leq$ 0.4%	
Stereo Separation at 1kHz	49dB $\geq$ 40dB	

● AM SECTION

Tuning Range	515 ~ 1,680kHz
Usable Sensitivity	
External Antenna	11 μ V $\leq$ 20 μ V
Loop Antenna	240 μ V/m
Selectivity	41dB $\geq$ 35dB
Signal to Noise Ratio	54dB $\geq$ 48dB
Image Rejection	41dB $\geq$ 35dB
IF Rejection	70dB $\geq$ 50dB

● AUDIO SECTION

Usable Sensitivity	
Video/CD	135mV $\pm$ 25mV
Phono	2.2mV $\pm$ 0.3mV

	Nominal	Limit
Signal to Noise Ratio		
Video/CD	84dB $\geq$ 78dB	
Phono	80dB $\geq$ 72dB	
Channel Separation at 10kHz		
Video/CD	52dB $\geq$ 45dB	
Phono	57dB $\geq$ 45dB	
IM Distortion Ratio	0.1% $\leq$ 0.2%	
RMS Output Power	35W $\geq$ 30W	
8 Ω , 1kHz, THD 0.09%		
Damping Factor at 1kHz	70 $\geq$ 60	
Tone Control Characteristics		
Bass at 50Hz		
Boost	10dB $\pm$ 2dB	
Cut	-10dB $\pm$ 2dB	
Treble at 10kHz		
Boost	10dB $\pm$ 2dB	
Cut	-10dB $\pm$ 2dB	
Loudness Control		
at 10kHz	3dB $\pm$ 1dB	
at 50Hz	10dB $\pm$ 2dB	
DC Output Voltage		
L channel	0mV $\pm$ 60mV	
R channel	0mV $\pm$ 60mV	
RIAA Equalization at Tape Out (20Hz/20kHz)	1.2dB $\pm$ 1.8dB/0.3dB $\pm$ 1.0dB	

● DIMENSIONS (W x H x D) 17-1/2" x 4-1/16" x 14-1/2"
(443 x 103 x 368 mm)

● WEIGHT

13lbs. 14oz. (6.3kg)

● POWER SUPPLY

AC120V, 60Hz

● POWER CONSUMPTION

165W

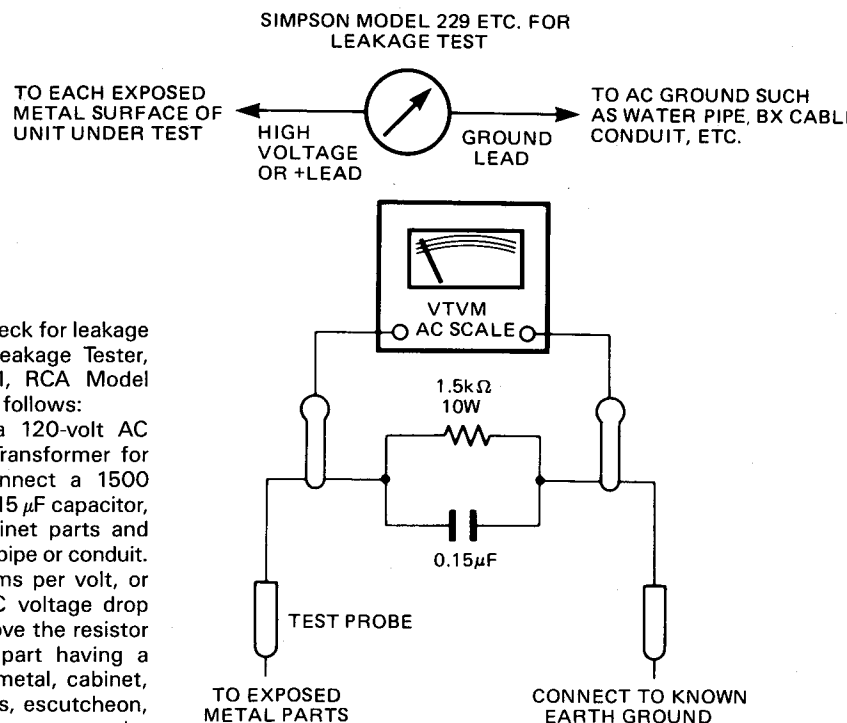
This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

Specifications and components subject to change without notice. Over time, 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 cover 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 0.15 μ F 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 3 AND 11)

1 CABINET TOP (128) REMOVAL

Remove 4 screws (A) and then remove the Cabinet Top (128).

2 CABINET BOTTOM (130) REMOVAL

Remove 8 screws (B) and then remove the Cabinet Bottom (130).

3 FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (128), referring to the previous step 1.
2. Remove 6 screws (C) and then remove the Front Panel Assembly (101).

4 TUNER P. C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet Top (128), referring to the previous step 1.
2. Secure the dial string to the pulley by winding adhesive tape or vinyl tape.
3. Open the lid of connector (CN404) on the Tuner P. C. Board (PCB-1) and then disconnect the lead wires.
4. Remove 3 screws (D) and then pull off the Tuner P. C. Board (PCB-1) from the Holder (177).
If necessary, unsolder the lead wires connected to the PCB-1.

5 POWER AMP P. C. BOARD (PCB-2) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step 3.
2. Remove the Tuner P. C. Board (PCB-1), referring to the previous step 4.
3. Open the lid of the connector (CN402) on the Power Amp. P. C. Board (PCB-2) and connectors (CN401 and CN403) on the Push Switches P. C. Board (PCB-4) and then disconnect the lead wires.
4. Remove 2 screws (E) and then remove the Push Switches P. C. Board (PCB-4).
5. Pull out Volume, Balance, Treble and Bass Knobs (104).
6. Remove the Cabinet Bottom (130), referring to the previous step 2.
7. Remove 7 screws (F).
8. Remove 11 screws (G) and then remove the Cabinet Back Assembly (102).
9. Remove the screw (H) and then remove the Lug Terminal (LUG1).
10. Remove 2 screws (I) and 4 hexagon nuts (J) and then remove the Power Amp. P. C. Board (PCB-2).
If necessary, unsolder the lead wires connected to the PCB-2.

GENERAL UNIT PARTS LIST

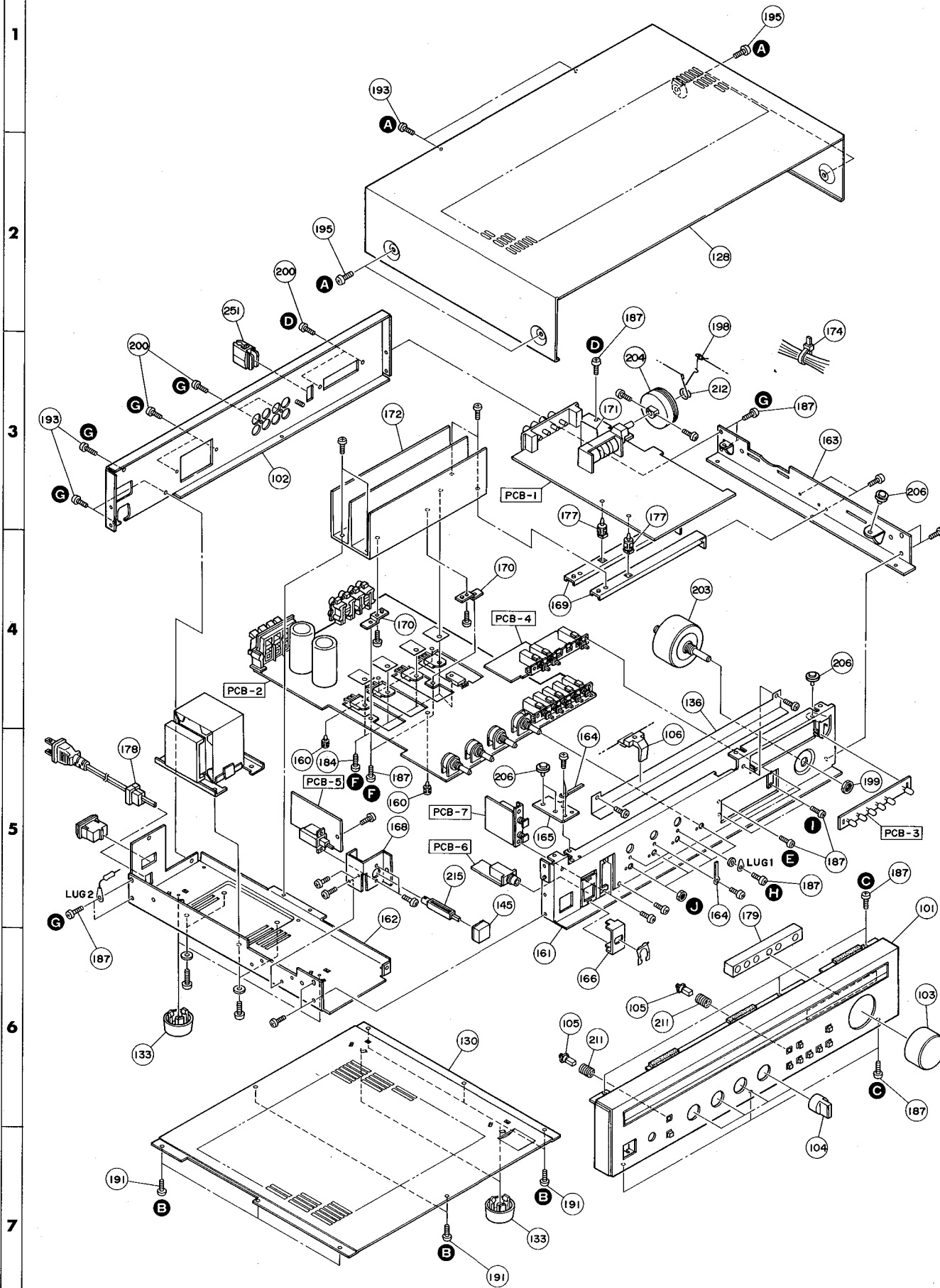
Ref. No.	Part No.	Description
101	A443-HK385A	Front Panel Ass'y
102	A424-HK385A	Cabinet Back Ass'y
103	A630-HK385A	Tuning Knob Ass'y
104	A630-HK385B	Knob Ass'y, Bass, Treble, Balance, Volume
105	A662-HK385A	Push Button Ass'y, Tape Monitor, Phono, Video/CD, AM, FM, Loudness, Audio Mode, FM Muting, Speaker System 1/2
106	A672-HK385A	Dial Pointer Ass'y
128	1414-04601	Cabinet Top
130	1424-16501	Cabinet Bottom
133	1319-0139	Foot
136	1554-02701	Dial Back Plate
145	1660-00401	Push Button, Power
160	2132-7139	Spacer
161	2211-7269	Chassis
162	2211-7271	Chassis
163	2211-7273	Chassis
164	2218-7001	Bracket
165	2219-7878	Bracket
166	2219-7879	Bracket
168	2219-7987	Bracket
169	2219-8057	Bracket
170	2219-8060	Bracket
171	2216-7056	Shield Plate
172	2222-7188	Heat Sink

Ref. No.	Part No.	Description
174	2240-7120	Holder
175	2240-7141	Holder
176	2240-7209	Holder
177	2240-7250	Holder
178	2240-364	Holder
179	2240-7252	Holder
184	2552-301029	Screw (3 x 10mm)
187	2347-300627	Screw (3 x 6mm)
191	2347-300827	Screw (3 x 8mm)
193	2347-300647	Screw (3 x 6mm)
195	2347-400647	Screw (4 x 6mm)
198	2424-20351	Eyelet
199	2447-10227	Hexagon Nut
200	2347-301041	Screw (3 x 10mm)
203	2602-007114	Tuning Shaft
204	2611-7154	Tuning Drum
206	2612-7001	Roller
211	2651-210189	Spring
212	2651-0000111	Spring
215	2672-7018	Lever
251	2240-7218	Holder, AM Loop Antenna
	1111-J30221	Owner Guide (U)
	1111-J30222	Owner Guide (A)
	1221-817144	Packing Box
	1222-7216	Packing Cushion

(U) : U.S.A. model
(A) : Canada model

* The part with the above mark is used only in the model made for the particular market the mark indicates.

GENERAL UNIT EXPLODED VIEW



DISASSEMBLY PROCEDURES (REFER TO PAGES 3 AND 11)

① CABINET TOP (128) REMOVAL

Remove 4 screws **A** and then remove the Cabinet Top (128).

② CABINET BOTTOM (130) REMOVAL

Remove 8 screws **B** and then remove the Cabinet Bottom (130).

③ FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (128), referring to the previous step ①.
2. Remove 6 screws **C** and then remove the Front Panel Assembly (101).

④ TUNER P. C. BOARD (PCB-1) REMOVAL

1. Remove the Cabinet Top (128), referring to the previous step ①.
2. Secure the dial string to the pulley by winding adhesive tape or vinyl tape.
3. Open the lid of connector (CN404) on the Tuner P. C. Board (PCB-1) and then disconnect the lead wires.
4. Remove 3 screws **D** and then pull off the Tuner P. C. Board (PCB-1) from the Holder (177).
If necessary, unsolder the lead wires connected to the PCB-1.

⑤ POWER AMP P. C. BOARD (PCB-2) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step ③.
2. Remove the Tuner P. C. Board (PCB-1), referring to the previous step ④.
3. Open the lid of the connector (CN402) on the Power Amp. P. C. Board (PCB-2) and connectors (CN401 and CN403) on the Push Switches P. C. Board (PCB-4) and then disconnect the lead wires.
4. Remove 2 screws **E** and then remove the Push Switches P. C. Board (PCB-4).
5. Pull out Volume, Balance, Treble and Bass Knobs (104).
6. Remove the Cabinet Bottom (130), referring to the previous step ②.
7. Remove 7 screws **F**.
8. Remove 11 screws **G** and then remove the Cabinet Back Assembly (102).
9. Remove the screw **H** and then remove the Lug Terminal (LUG1).
10. Remove 2 screws **I** and 4 hexagon nuts **J** and then remove the Power Amp. P. C. Board (PCB-2).
If necessary, unsolder the lead wires connected to the PCB-2.

GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-HK385A	Front Panel Ass'y
102	A424-HK385A	Cabinet Back Ass'y
103	A630-HK385A	Tuning Knob Ass'y
104	A630-HK385B	Knob Ass'y, Bass, Treble, Balance, Volume
105	A662-HK385A	Push Button Ass'y, Tape Monitor, Phono, Video/CD, AM, FM, Loudness, Audio Mode, FM Muting, Speaker System 1/2
106	A672-HK385A	Dial Pointer Ass'y
128	1414-04601	Cabinet Top
130	1424-16501	Cabinet Bottom
133	1319-0139	Foot
136	1554-02701	Dial Back Plate
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160	2132-7139	Spacer
161	2211-7269	Chassis
162	2211-7271	Chassis
163	2211-7273	Chassis
164	2218-7001	Bracket
165	2219-7878	Bracket
166	2219-7879	Bracket
168	2219-7987	Bracket
169	2219-8057	Bracket
170	2219-8060	Bracket
171	2216-7056	Shield Plate
172	2222-7188	Heat Sink

Ref. No.	Part No.	Description
174	2240-7120	Holder
175	2240-7141	Holder
176	2240-7209	Holder
177	2240-7250	Holder
178	2240-364	Holder
179	2240-7252	Holder
184	2552-301029	Screw (3 x 10mm)
187	2347-300627	Screw (3 x 6mm)
191	2347-300827	Screw (3 x 8mm)
193	2347-300647	Screw (3 x 6mm)
195	2347-400647	Screw (4 x 6mm)
198	2424-20351	Eyelet
199	2447-10227	Hexagon Nut
200	2347-301041	Screw (3 x 10mm)
203	2602-007114	Tuning Shaft
204	2611-7154	Tuning Drum
206	2612-7001	Roller
211	2651-210189	Spring
212	2651-0000111	Spring
215	2672-7018	Lever
251	2240-7218	Holder, AM Loop Antenna
	1111-J30221	Owner Guide U
	1111-J30222	Owner Guide A
	1221-817144	Packing Box
	1222-7216	Packing Cushion

U : U.S.A. model
A : Canada model

* The part with the above mark is used only in the model made for the particular market the mark indicates.

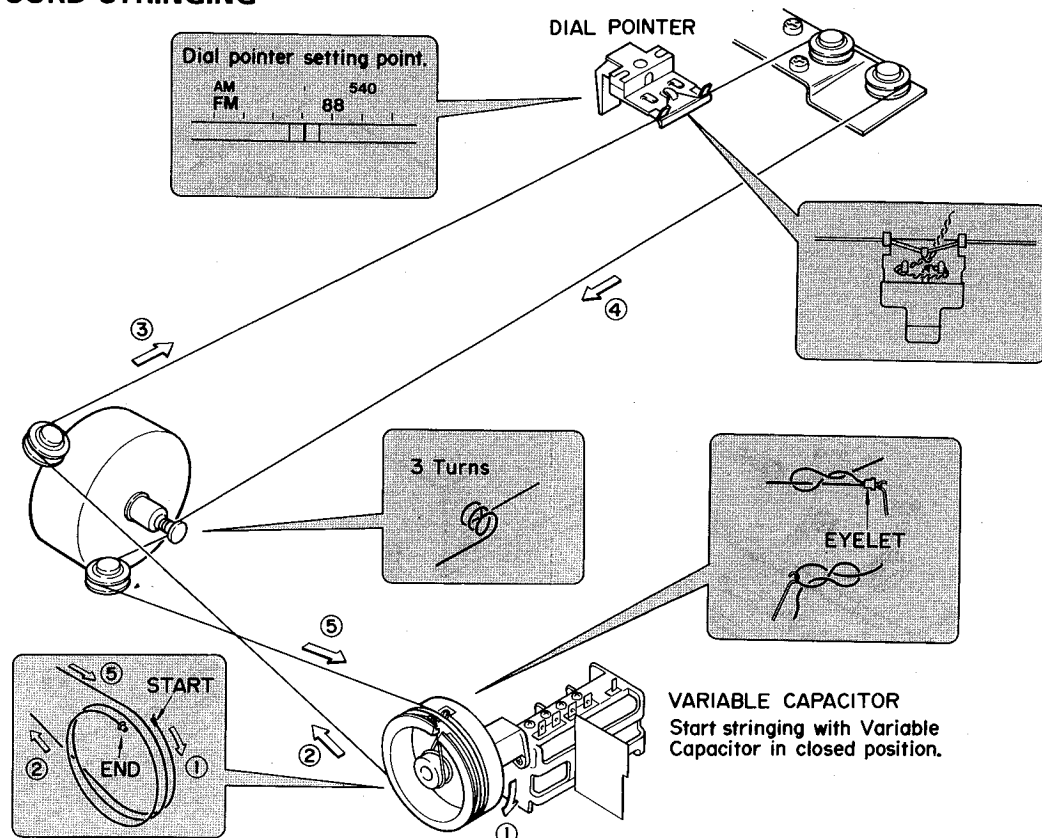
CORRECTION

An erroneous description in the section of ALIGNMENT PROCEDURES of hk385i Technical Manual 94A should be corrected as follows.

In the FM ALIGNMENT table on page 6, L102, L103 in the column of Alignment of Step 5 Tracking Alignment should be only L102. The L103 coil is NOT adjustable.

Also note that the same correction should be made as to the adjusting items in the SCHEMATIC DIAGRAM (1) on page 7 and in the **PCB-1** Tuner P.C. Board on page 9. In both cases L103 should be omitted.

DIAL CORD STRINGING



CIRCUIT DESCRIPTION

FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified in Q101 at the front end, mixed with the output of the local oscillators Q103 and Q104 in Q102 and converted into the 10.7MHz intermediate frequency.

The 10.7MHz signal is amplified in the intermediate-frequency amplifying section which consists of Q201, CF201 and CF202 and fed to 1 pin of IC201. In IC201, the signal is transmitted through the IF amplifier in two steps, and after being detected in the quadrature, it is transmitted through the post amplifier to 10 pin and then input to 2 pin of IC301. In IC301, the pilot signal is detected out of the signal which has been fed and 38kHz signal is produced. Then by this signal, stereo signal is demodulated, output from 4 pin for the left channel and from 7 pin for the right channel and transmitted through the low pass filters LPF301 (L ch) and LPF302 (R ch) to the amplifier.

■ AM TUNER SECTION

The AM signal which has entered through the antenna is transmitted through the tuning circuit consisting of L252 and VC252 to IC201. In IC201 it undergoes high-frequency amplification, local oscillation, intermediate-frequency amplification and detection, and then output from 12 pin. This signal is turned ON and OFF according to the signal from the input selector at Q251 and fed to 2 pin of IC301.

AUDIO AMPLIFIER SECTION

The signal which has entered from each input terminal is selected by the input selector, passes through the audio mode switch, balance circuit, volume and loudness circuit and is input into the power amplifier, where it goes through the tone control circuit and after being power amplified, it is transmitted to the speaker terminal. The power amplifier has an over-output protective circuit. If current exceeding the specification flows to Q421, Q423 (L ch), Q422, Q424 (R ch), it is detected at Q5 (L ch) and Q6 (R ch) and the protective circuit consisting of Q1, Q2, Q3 and Q4 draws in the base of Q405 (L ch) and Q406 (R ch), and thus the input signal is cut to protect the circuit.

■ MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, 8 pin of IC201 becomes high level. This is fed to the base of Q354, whose collector then becomes low level and the collector of Q353 high level. As a result, Q301 (L ch) and Q302 (R ch) are conducted to mute the output.

INDICATOR SECTION

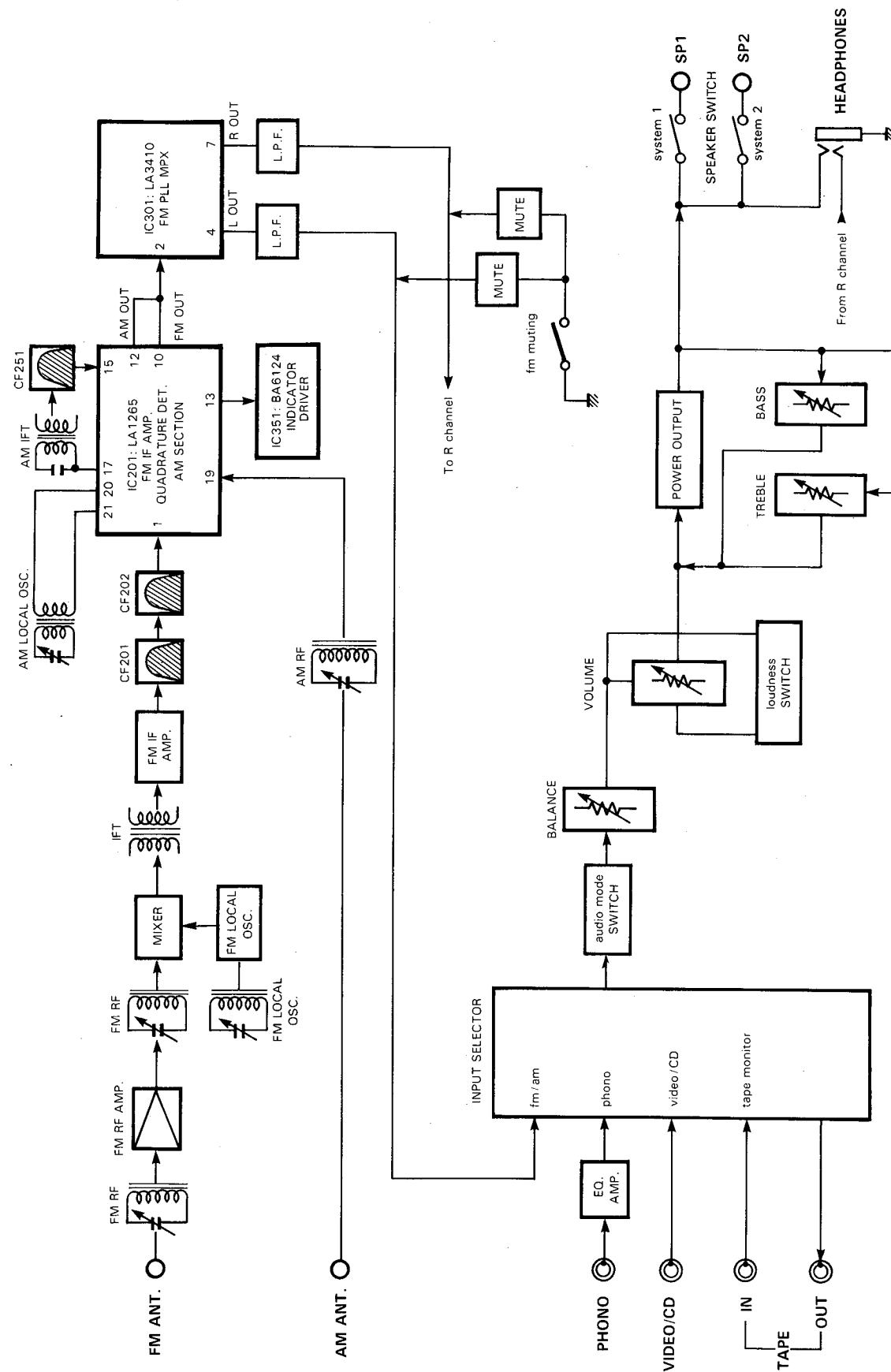
- **Signal strength**

The voltage corresponding to the signal level is output from 13 pin of IC201 and input into 8 pin of the level comparator IC351. D361, D362 and D363 of the signal strength indicator turn ON according to the signal level.

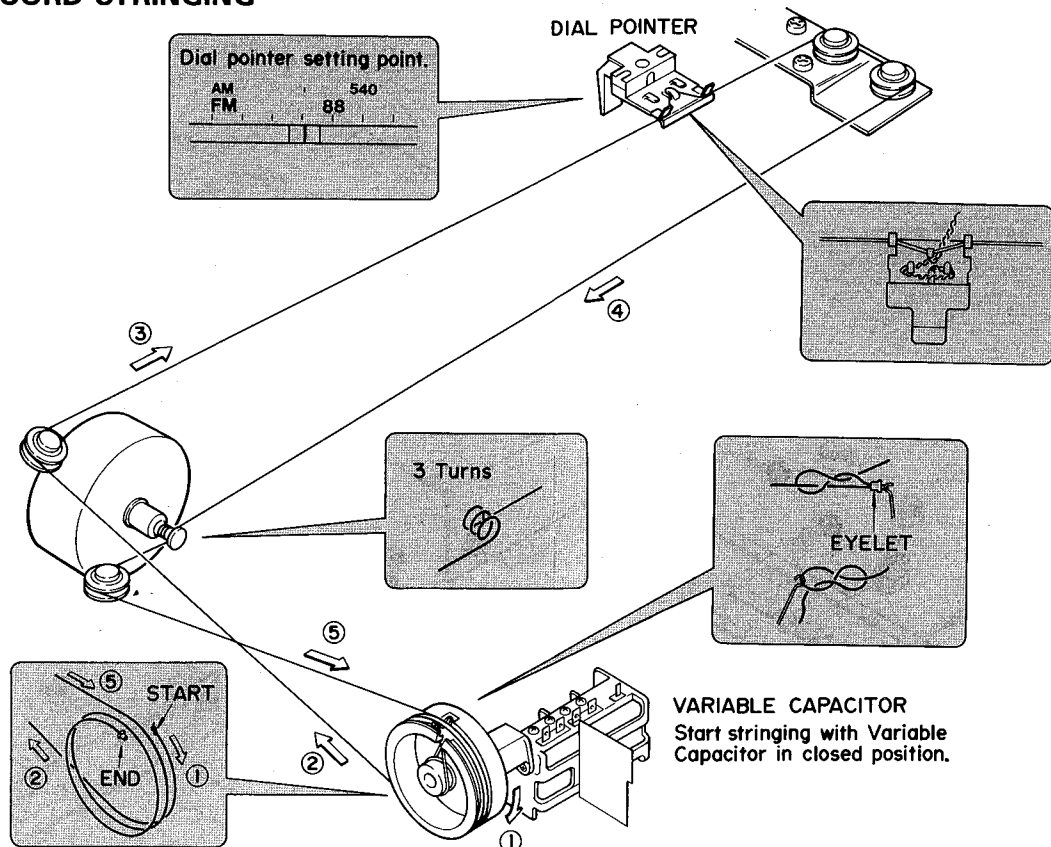
- **Tuning**

8 pin of IC201 becomes low level when tuned and the tuned indicator D364 connected there turns ON.

BLOCK DIAGRAM



DIAL CORD STRINGING



CIRCUIT DESCRIPTION

FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified in Q101 at the front end, mixed with the output of the local oscillators Q103 and Q104 in Q102 and converted into the 10.7MHz intermediate frequency.

The 10.7MHz signal is amplified in the intermediate-frequency amplifying section which consists of Q201, CF201 and CF202 and fed to 1 pin of IC201. In IC201, the signal is transmitted through the IF amplifier in two steps, and after being detected in the quadrature, it is transmitted through the post amplifier to 10 pin and then input to 2 pin of IC301. In IC301, the pilot signal is detected out of the signal which has been fed and 38kHz signal is produced. Then by this signal, stereo signal is demodulated, output from 4 pin for the left channel and from 7 pin for the right channel and transmitted through the low pass filters LPF301 (L ch) and LPF302 (R ch) to the amplifier.

AM TUNER SECTION

The AM signal which has entered through the antenna is transmitted through the tuning circuit consisting of L252 and VC252 to IC201. In IC201 it undergoes high-frequency amplification, local oscillation, intermediate-frequency amplification and detection, and then output from 12 pin. This signal is turned ON and OFF according to the signal from the input selector at Q251 and fed to 2 pin of IC301.

AUDIO AMPLIFIER SECTION

The signal which has entered from each input terminal is selected by the input selector, passes through the audio mode switch, balance circuit, volume and loudness circuit and is input into the power amplifier, where it goes through the tone control circuit and after being power amplified, it is transmitted to the speaker terminal. The power amplifier has an over-output protective circuit. If current exceeding the specification flows to Q421, Q423 (L ch), Q422, Q424 (R ch), it is detected at Q5 (L ch) and Q6 (R ch) and the protective circuit consisting of Q1, Q2, Q3 and Q4 draws in the base of Q405 (L ch) and Q406 (R ch), and thus the input signal is cut to protect the circuit.

MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, 8 pin of IC201 becomes high level. This is fed to the base of Q354, whose collector then becomes low level and the collector of Q353 high level. As a result, Q301 (L ch) and Q302 (R ch) are conducted to mute the output.

INDICATOR SECTION

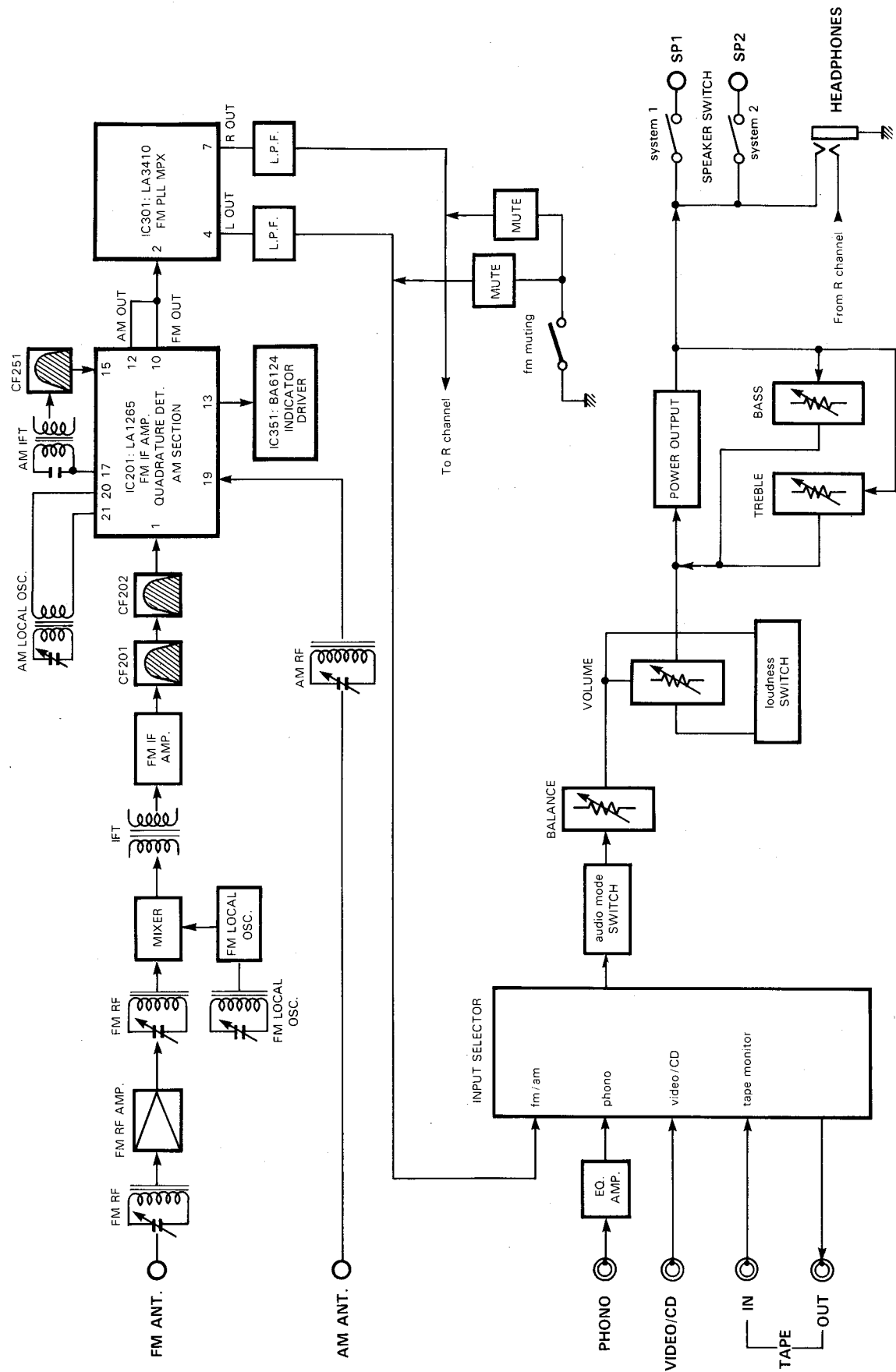
Signal strength

The voltage corresponding to the signal level is output from 13 pin of IC201 and input into 8 pin of the level comparator IC351. D361, D362 and D363 of the signal strength indicator turn ON according to the signal level.

Tuning

8 pin of IC201 becomes low level when tuned and the tuned indicator D364 connected there turns ON.

BLOCK DIAGRAM



ALIGNMENT PROCEDURES (REFER TO PAGES 7, 8, 9 AND 10)**■ IDLING ADJUSTMENT**

- Conditions:
- Press the "Video/CD" switch.
 - Set the volume to minimum.
 - Press the "SPEAKERS system 1/2" switch to the "off" (button out) position.

Step	Connection Equipments	Adjustment	For
1	● Connect the Digital Voltmeter to TP1 and TP2.	VR401 (L channel)	36mV
2	● Connect the Digital Voltmeter to TP3 and TP4.	VR402 (R channel)	36mV
3	Repeat steps 1 and 2 after aging for 15 minutes.		

■ AM ALIGNMENT

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

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For
1	IF	● 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. Make the signal as weak as possible. ● Connect the VTVM and Oscilloscope to the Tape Out jacks.	450kHz	Maximum frequency	T251	Maximum output
2	Frequency coverage (band age)		1680kHz	Maximum frequency	TC251	Maximum output
3			515kHz	Maximum frequency	L251	Maximum output
4			Repeat steps 2 and 3 for optimum sensitivity.			
5	Tracking		1400kHz	1400kHz	TC252	Maximum output
6			600kHz	600kHz	L252	Maximum output
7			Repeat steps 5 and 6 for optimum sensitivity.			

- Note:
- As a strong input is necessary for the IF adjustment, bring the AM Test Loop Antenna close to the AM Loop Antenna.
 - When making adjustments in steps 2 through 7, be sure to start from the higher frequency side.

FM ALIGNMENT

Conditions: • Press the "fm" switch.

• Press the "fm muting" switch to the "off" position.

• Press the "audio mode" switch to the "stereo" (button out) position.

• Standard modulation of the FM Signal Generator is 1kHz at 100% modulation.

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For
1	IF	● Connect the VTVM and Oscilloscope to the Tape Out jacks.			T101	Maximum noise
2	Frequency coverage (band age)	● Connect the FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy. ● Connect the VTVM and Oscilloscope to the Tape Out jacks.	87.3MHz	Minimum frequency	L105	Maximum output with weak 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 weak input signal.
6			106MHz	106MHz	TC101 TC102	
7			Repeat steps 5 and 6 for optimum sensitivity.			
8	Discriminator	● Connect the Distortion meter to the Tape Out jacks through 15 kHz Low Pass Filter.	98MHz	98MHz		Obtain intune with weak input signal.
9					T201 (A)	Maximum output at 1mV input.
10					T201 (B)	Maximum distortion at 1mV input.
11			Repeat steps 9 and 10 for optimum sensitivity.			
12	Muting level		98MHz	98MHz	VR201	Repress the “fm muting” switch (button out). Adjust so that the waveform appears at 20μV input.

FM MPX ALIGNMENT

Conditions: • Press the "fm" switch.

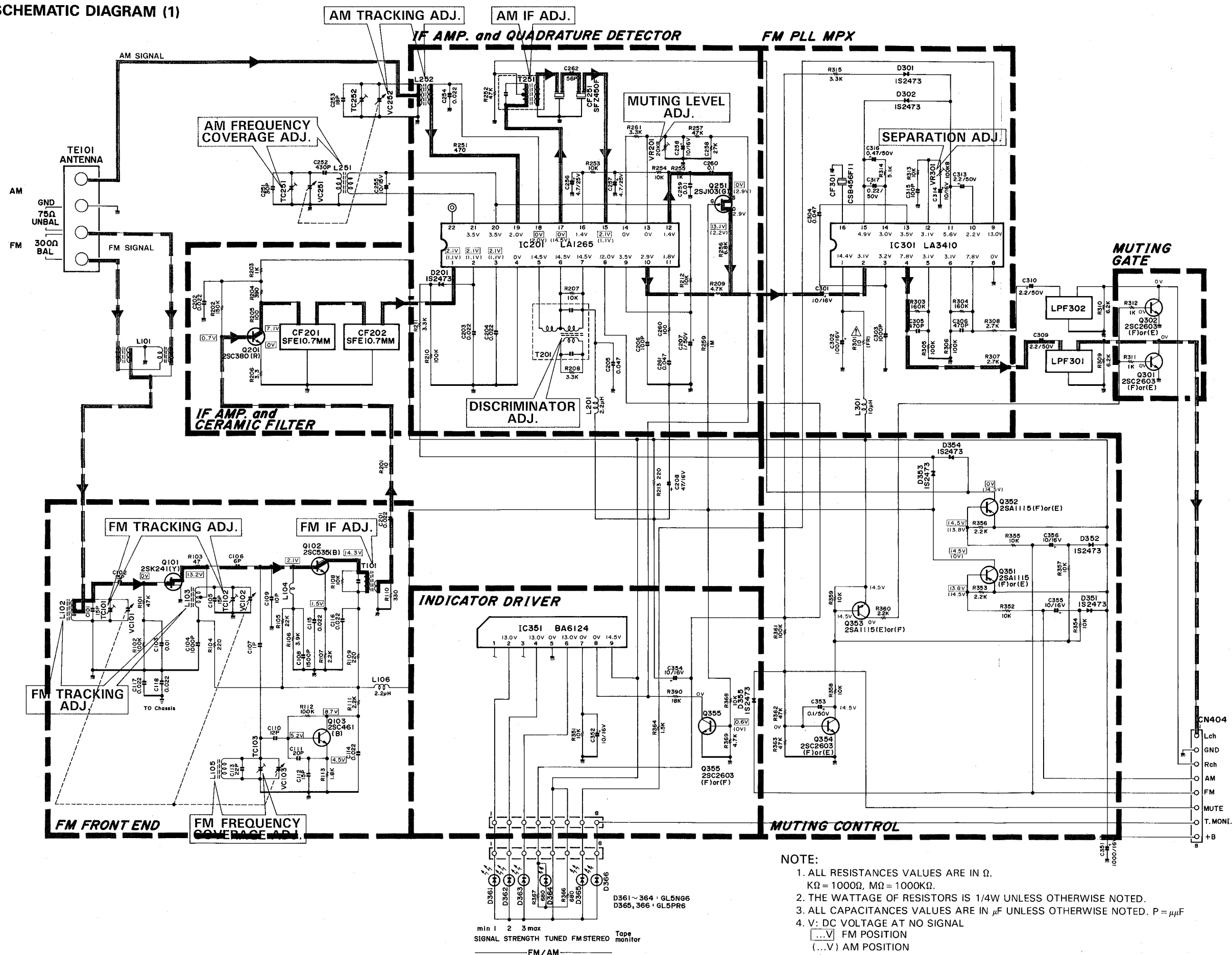
• Press the "muting" switch to the "off" position.

• Press the "audio mode" switch to the "stereo" (button out) position.

FM Signal Generator	1kHz, 100% modulation
Stereo Modulator	L + R = 45.5%, L - R = 45.5%, 19kHz = 9%

Step	Alignment	Connection Equipments	Measurement Frequency	Dial Setting	Adjustment	For
1	Separation	• Connect the Stereo Modulator to FM Signal Generator. Connect FM Signal Generator to FM 300 Ω BAL Antenna terminals through the 300Ω balanced dummy. • Connect the VTVM and Oscilloscope to the Tape Out jacks through 15kHz Low Pass Filter.	98MHz	98MHz	VR301	Adjust so that the right channel output becomes minimum at 1mV input and when only the left channel of the Stereo Modulator is modulated.
2					VR301	Adjust so that the left channel output becomes minimum at 1mV input and when only the right channel of the Stereo Modulator is modulated.
3					Make R channel and L channel balanced at their closest-to-minimum points by repeating steps 1 and 2.	

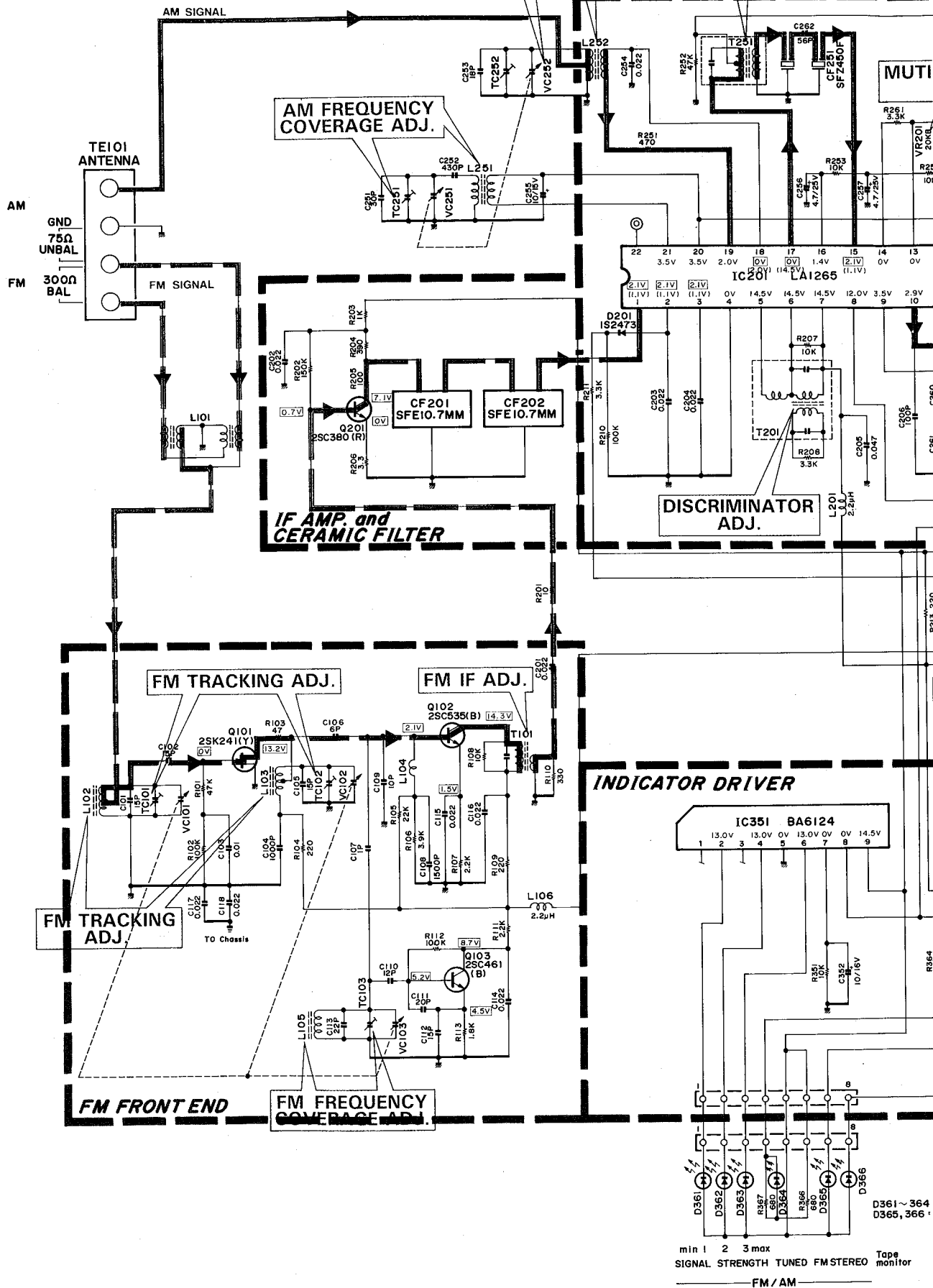
SCHEMATIC DIAGRAM (1)



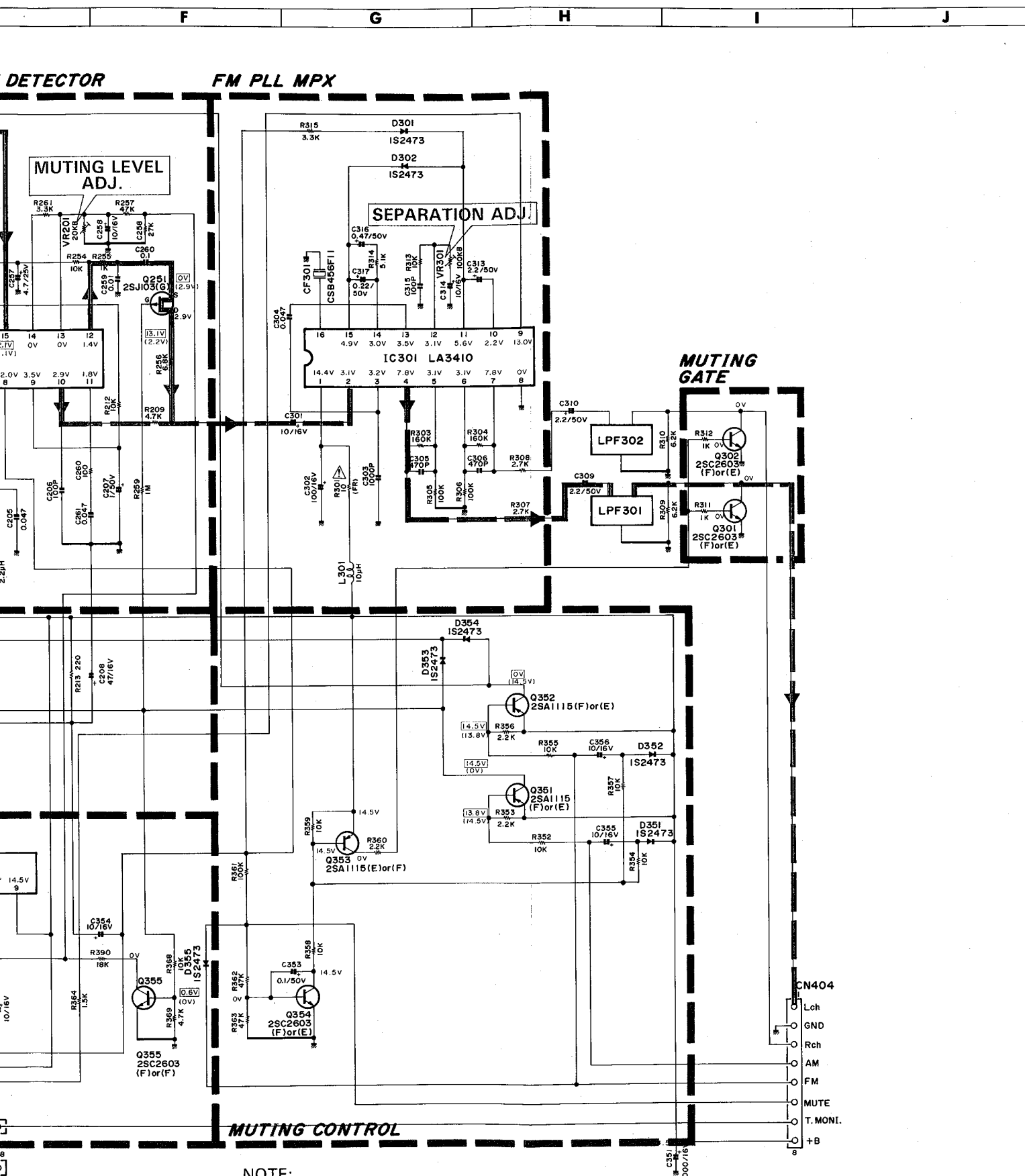
NOTE:

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

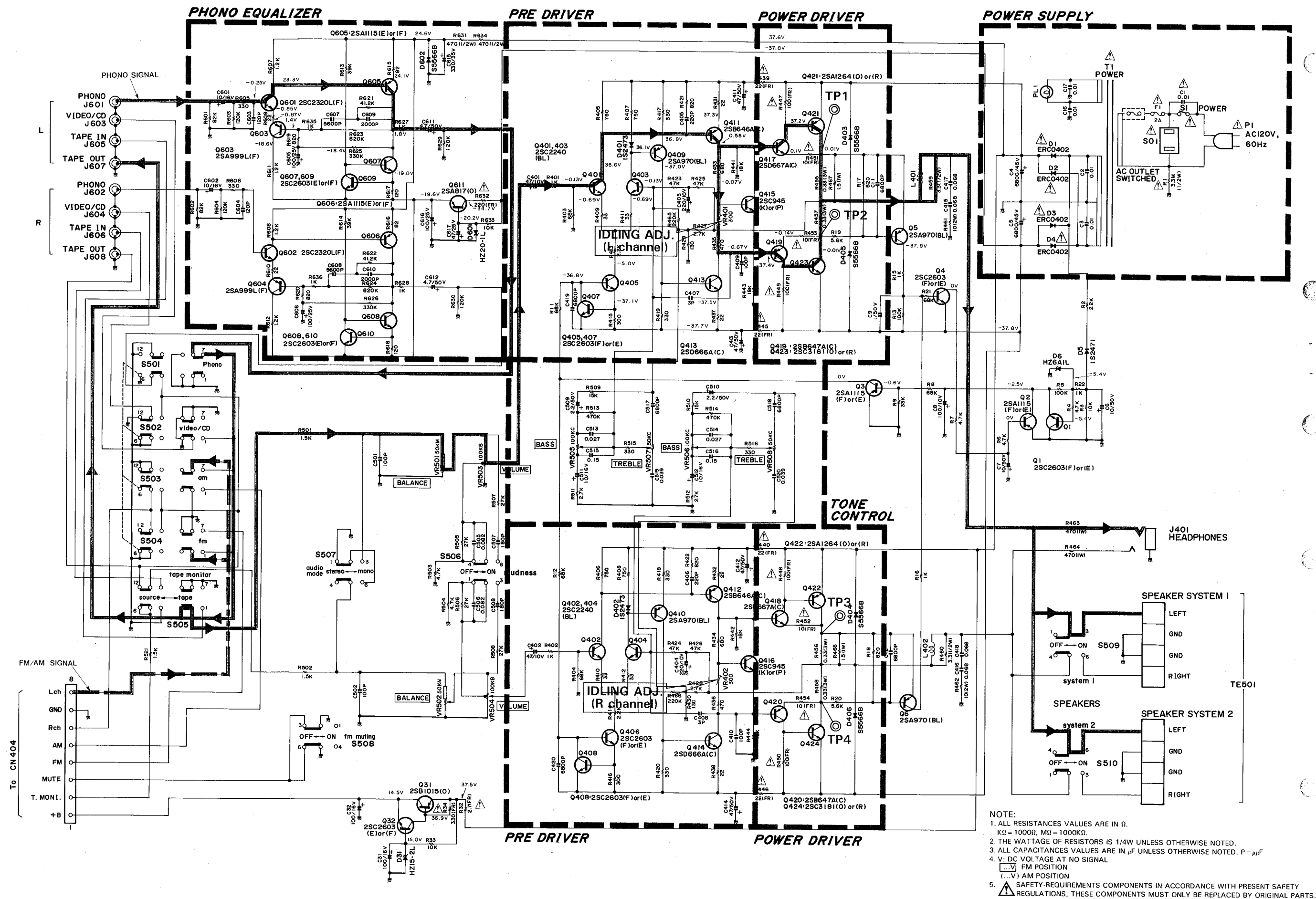
SCHEMATIC DIAGRAM (1)



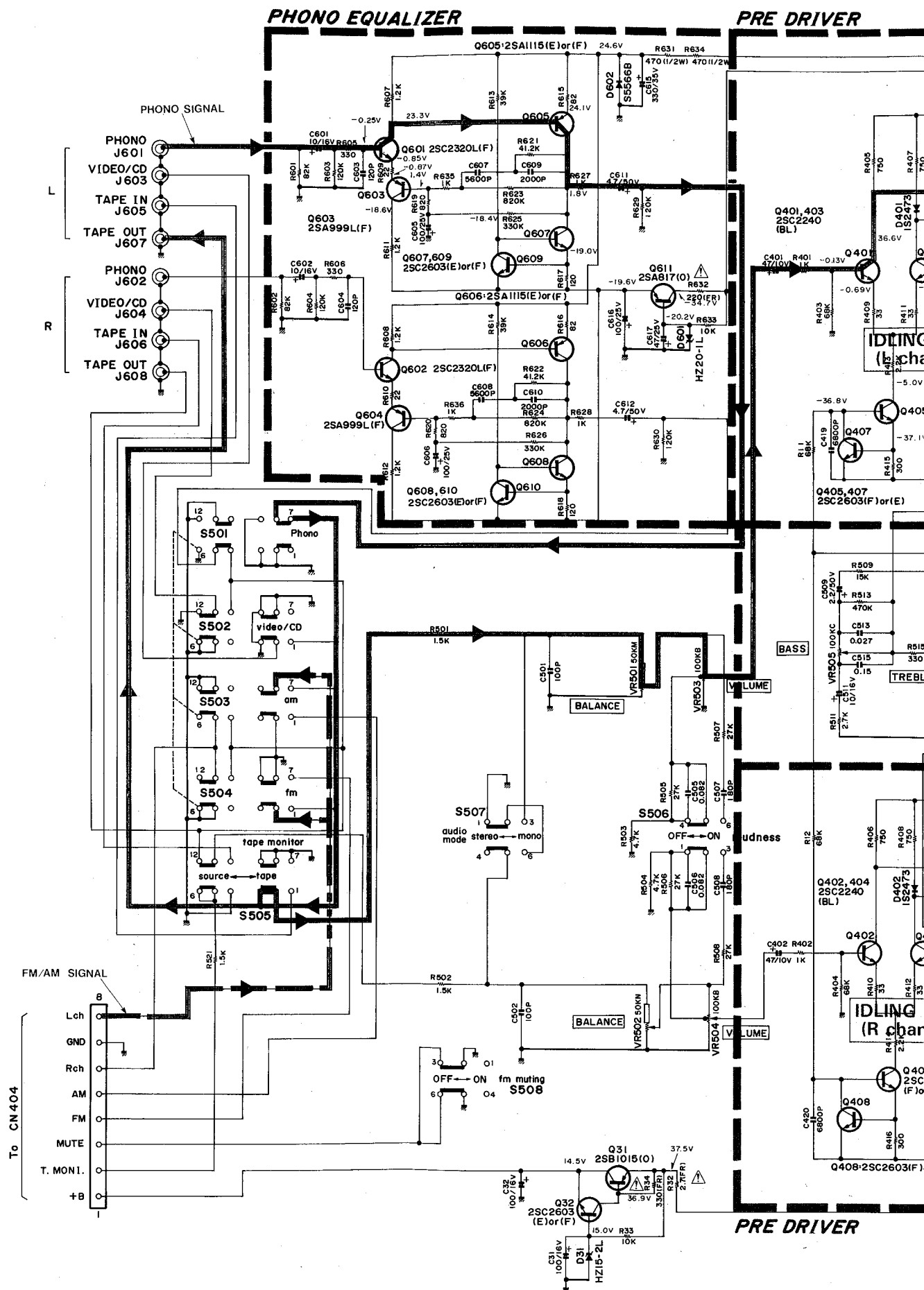
min 1 2 3 max
SIGNAL STRENGTH TUNED FM STEREO monitor
FM/AM

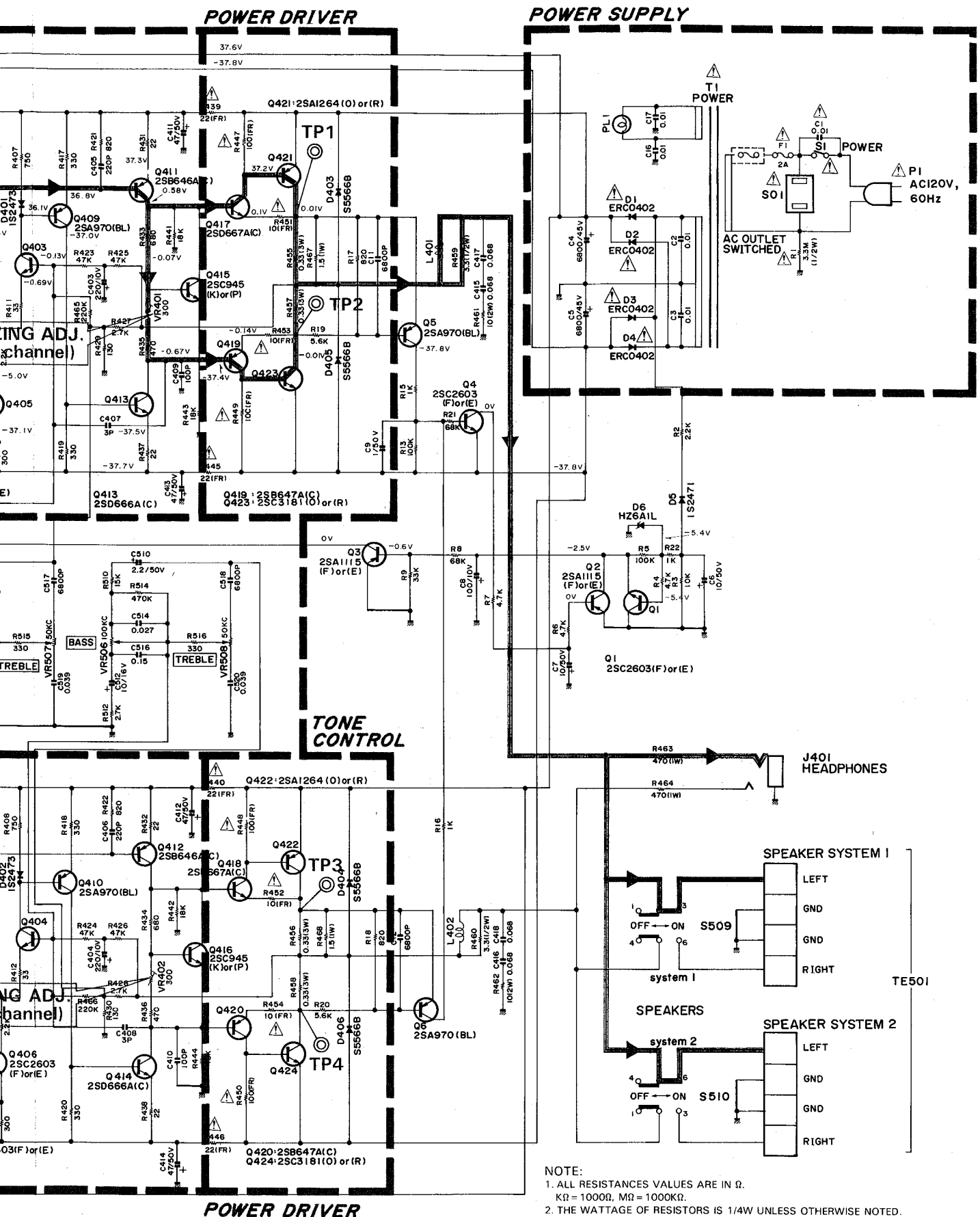


SCHEMATIC DIAGRAM (2)



SCHEMATIC DIAGRAM (2)



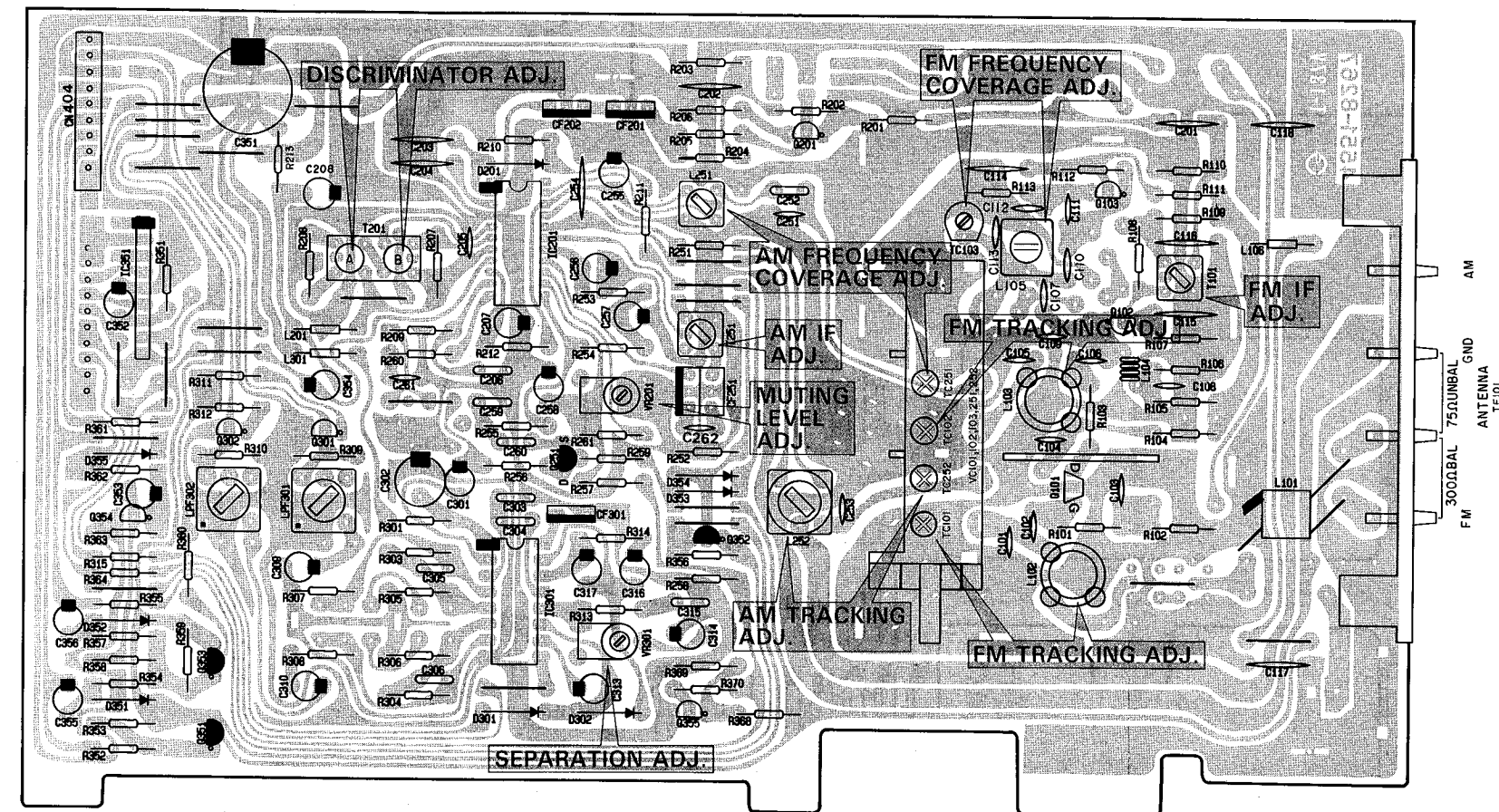


NOTE:

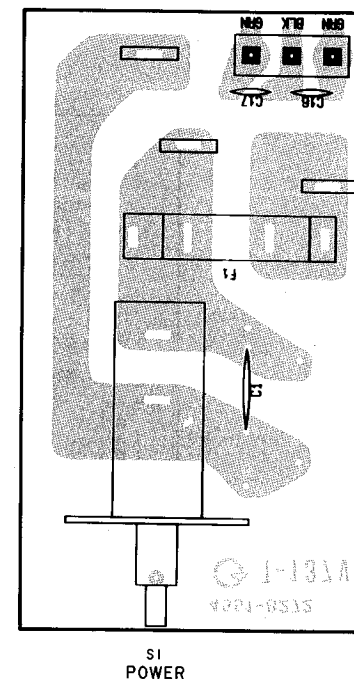
1. ALL RESISTANCES VALUES ARE IN Ω .
K Ω = 1000 Ω , M Ω = 1000K Ω .
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P = μ μF
4. V: DC VOLTAGE AT NO SIGNAL
[] FM POSITION
[] AM POSITION
5. SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE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

P. C. BOARDS (1)

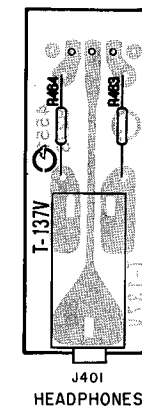
PCB-1 Tuner P. C. Board



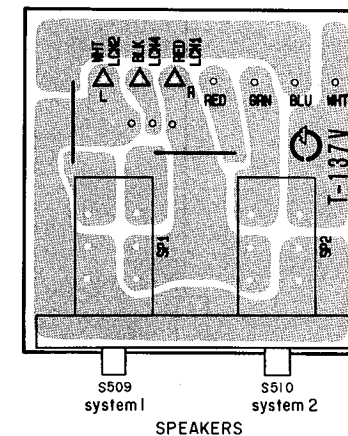
PCB-5 Power Switch P. C. Board



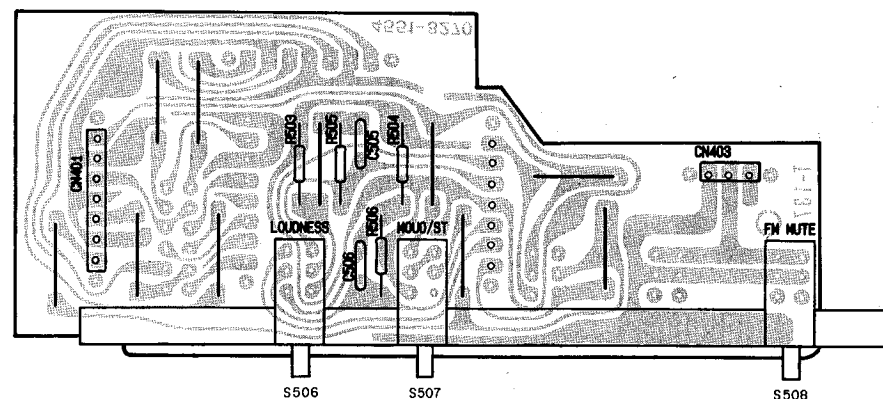
PCB-6 Headphone Jack P. C. Board



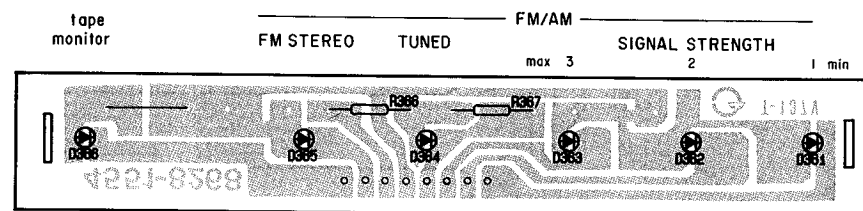
PCB-7 Speaker Switches P. C. Board



PCB-4 Push Switches P. C. Board

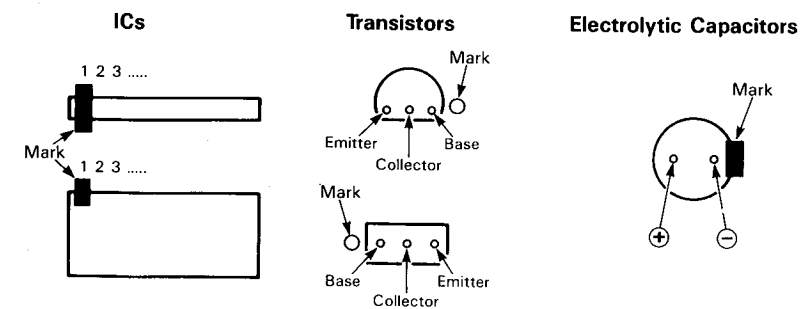


PCB-3 LED P. C. Board



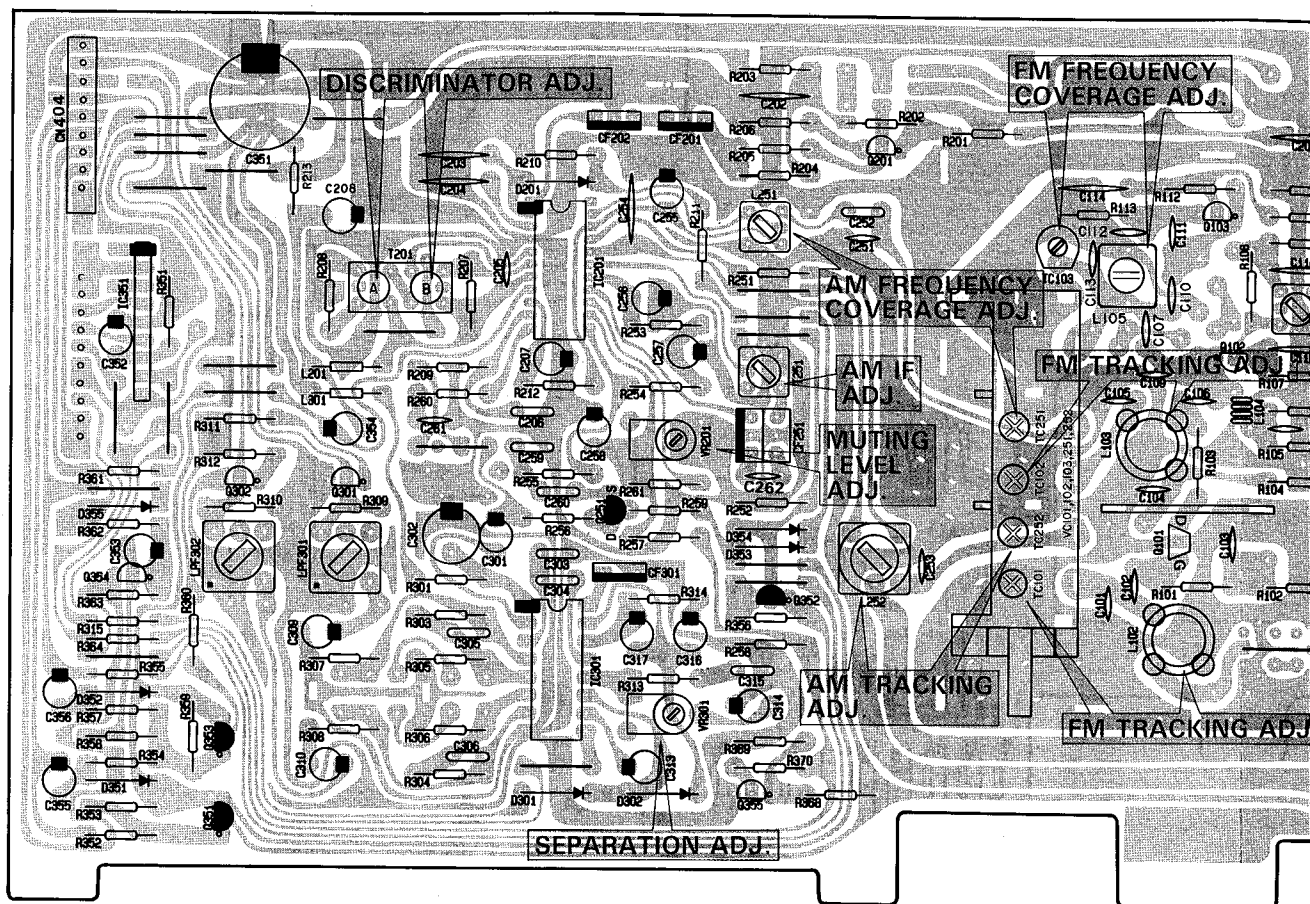
PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.

2SC535 2SC461 2SA970 2SB646A 2SD666A 2SC945 2SD667A 2SB647A 2SC2320L	2SA999L 2SA817	2SC2603 2SA1115	2SC380	2SA1264 2SC3181	2SB1015	2SJ103	2SK241	1S2473 ERC402FL 1S2471 HZ6A 1L HZ15-2L S5566B HZ20-1L	GL5NG6 GL5PR6	BA6124	LA3410	LA1265
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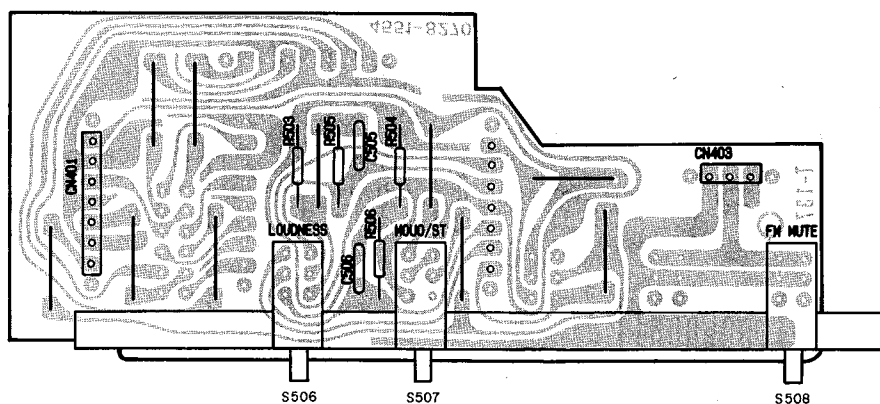


P. C. BOARDS (1)

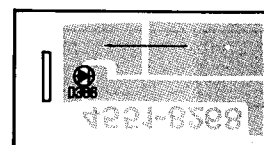
PCB-1 Tuner P. C. Board



PCB-4 Push Switches P. C. Board



tape monitor



PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

2SC535 2SC461 2SA970 2SB646A 2SD666A 2SC945 2SD667A 2SB647A 2SC2320L	2SA999L 2SA817	2SC2603 2SA1115	2SC380	2SA1264 2SC3181	2SB1015	2SJ103	2SK241
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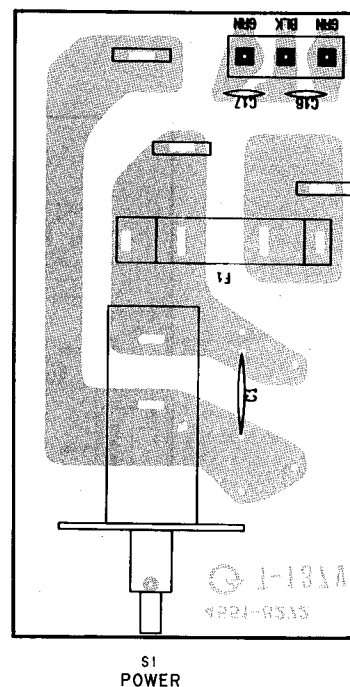
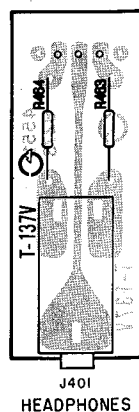
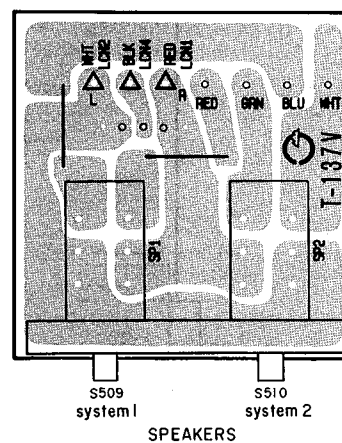
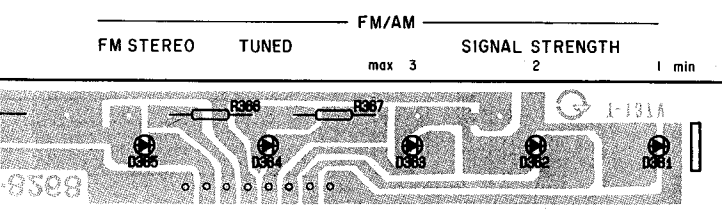
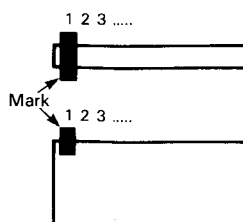
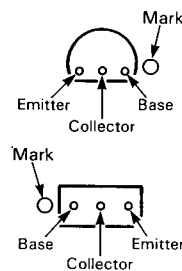
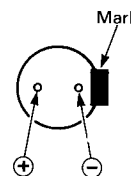
F

G

H

I

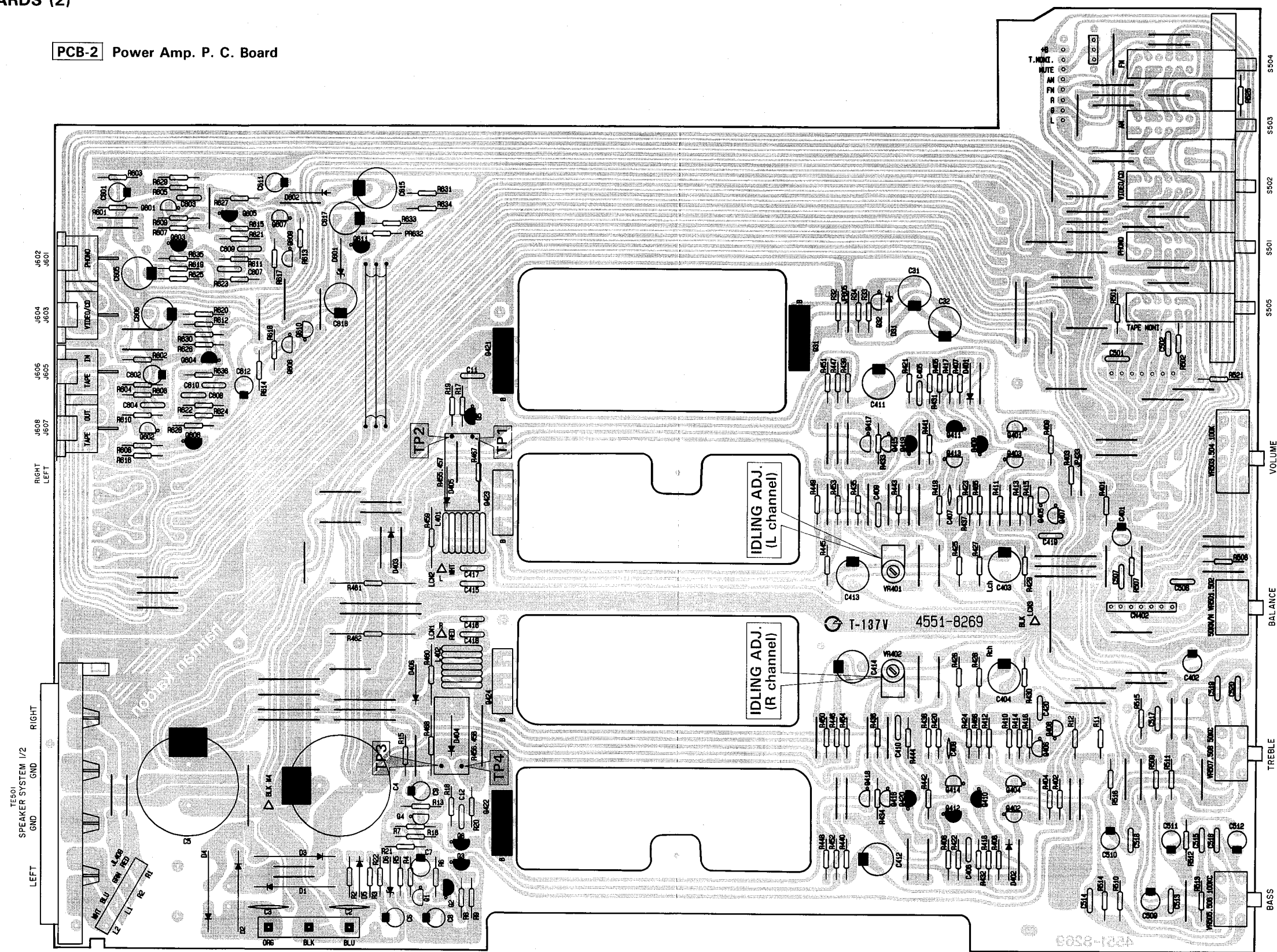
J

PCB-5 Power Switch P. C. Board**PCB-6** Headphone Jack P. C. Board**PCB-7** Speaker Switches P. C. Board**PCB-3** LED P. C. Board**ICs****Transistors****Electrolytic Capacitors**

K241	1S2473 ERC402FL 1S2471 HZ6A 1L HZ15-2L S5566B HZ20-1L	GL5NG6 GL5PR6	BA6124	LA3410	LA1265

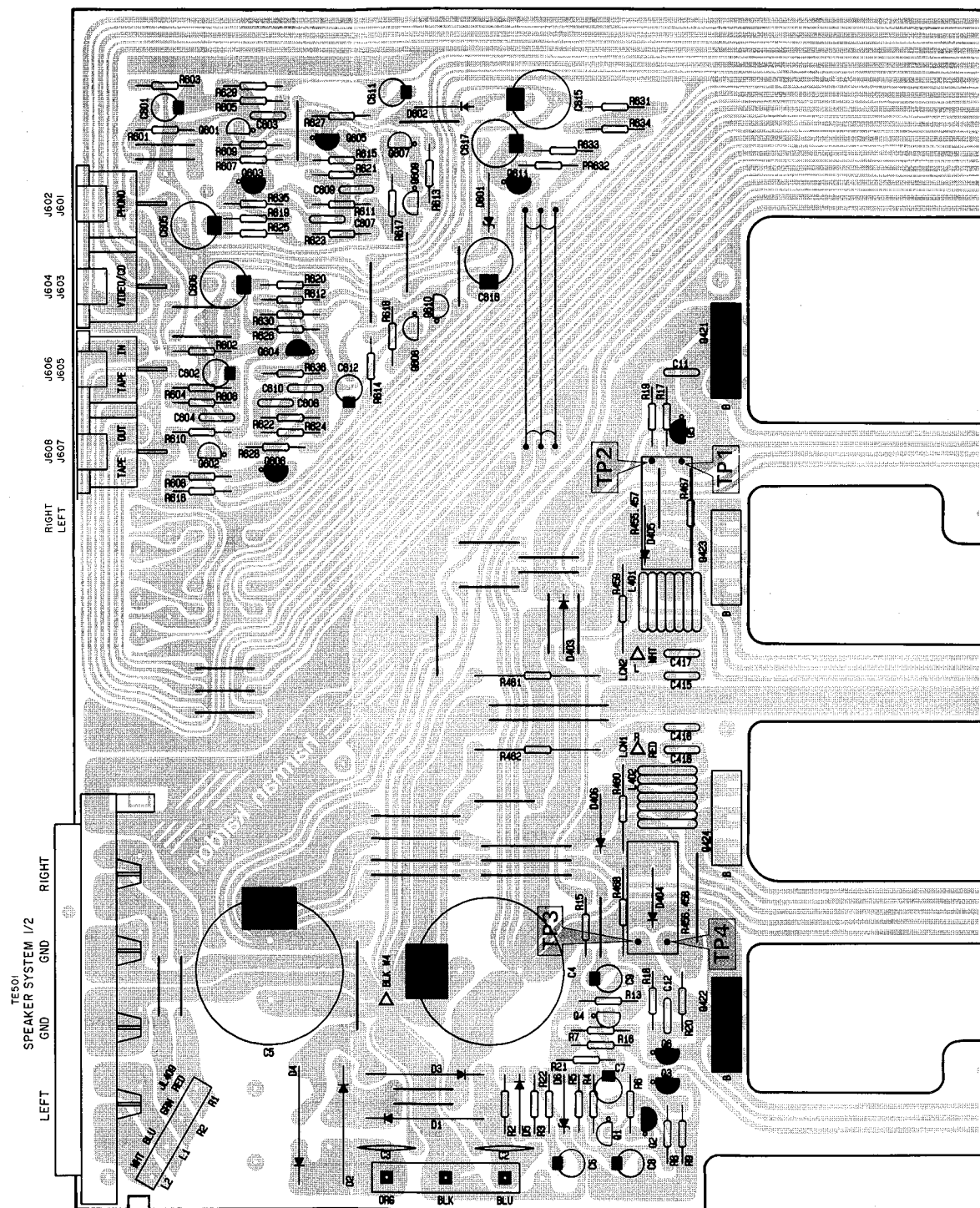
P. C. BOARDS (2)

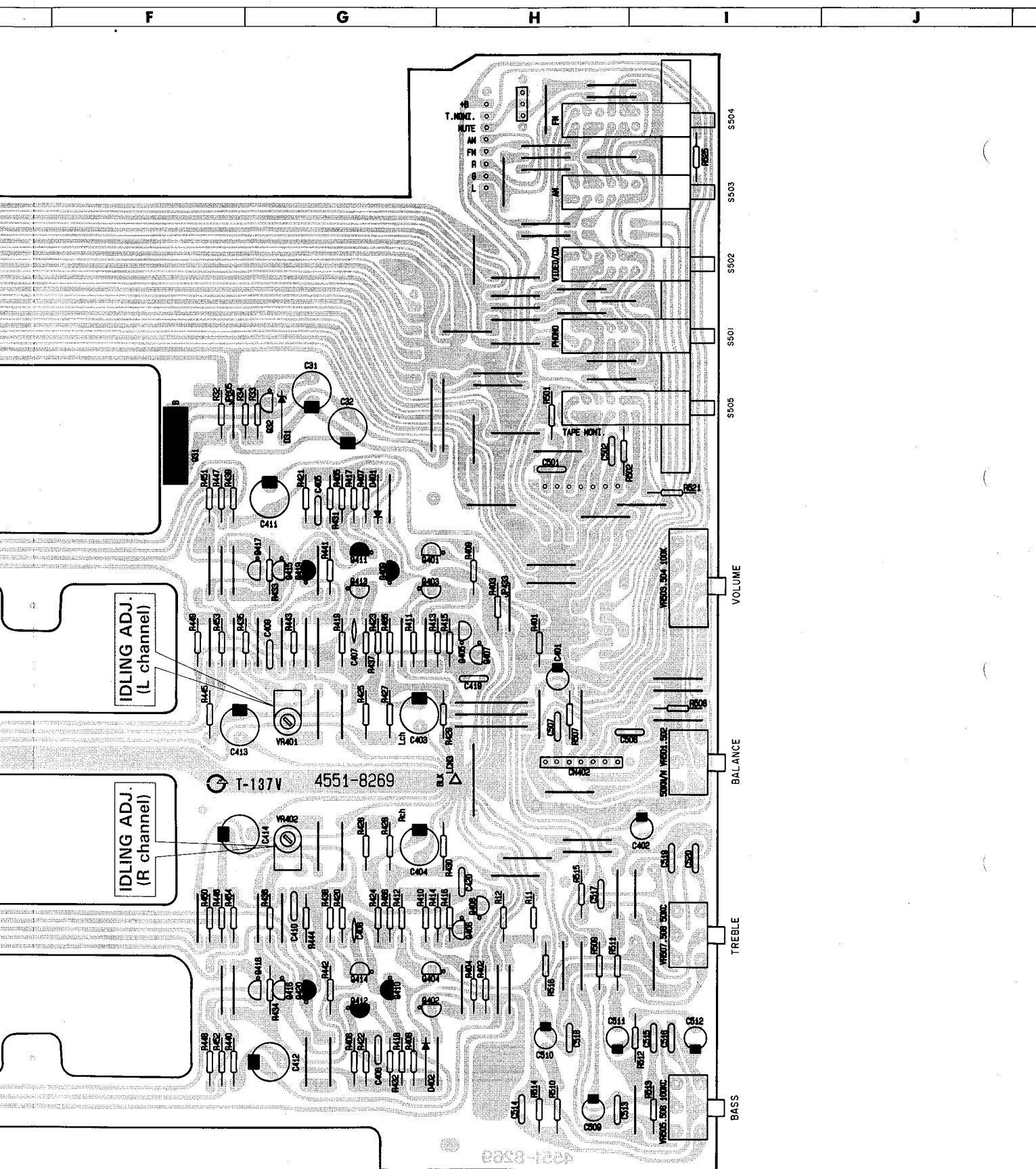
PCB-2 Power Amp. P. C. Board



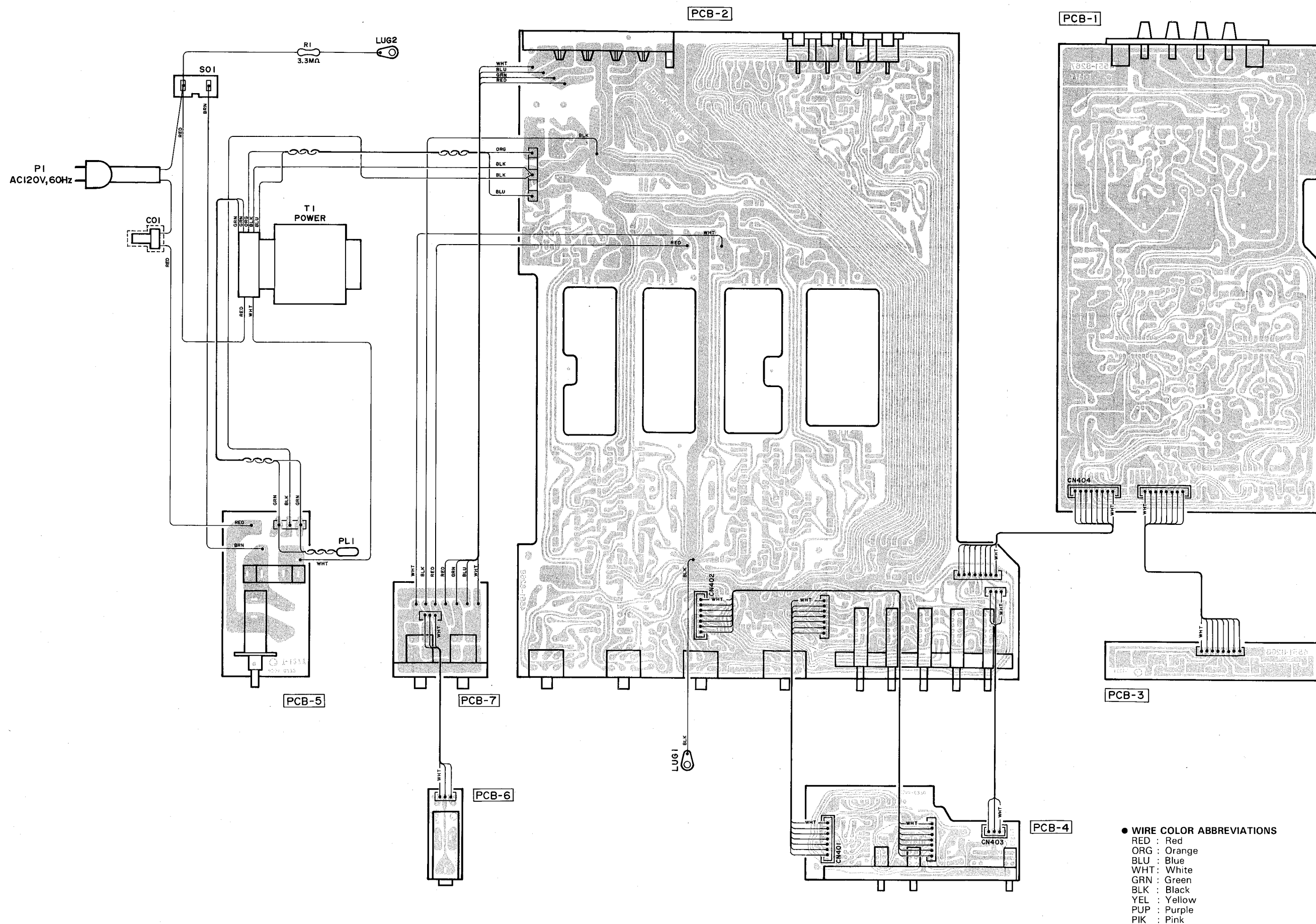
P. C. BOARDS (2)

PCB-2 Power Amp. P. C. Board





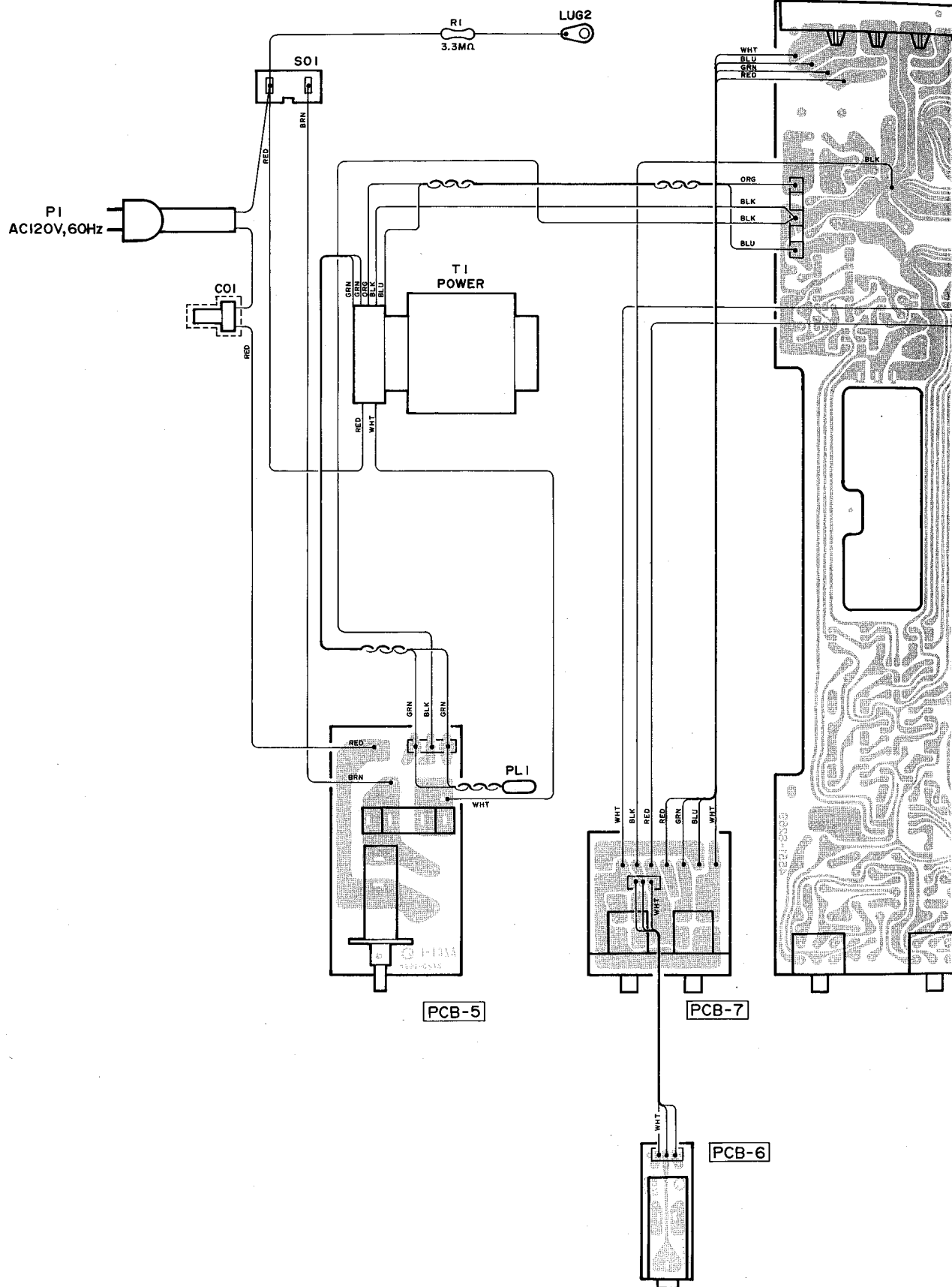
WIRING DIAGRAM



● WIRE COLOR ABBREVIATIONS

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

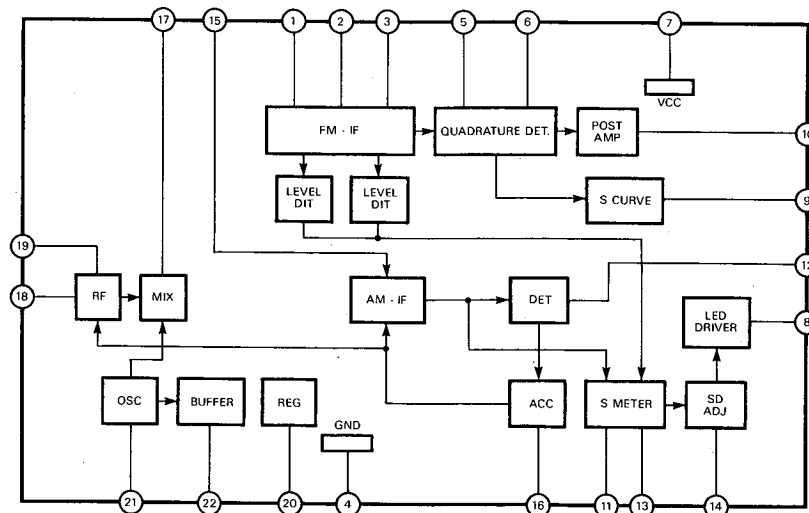
WIRING DIAGRAM



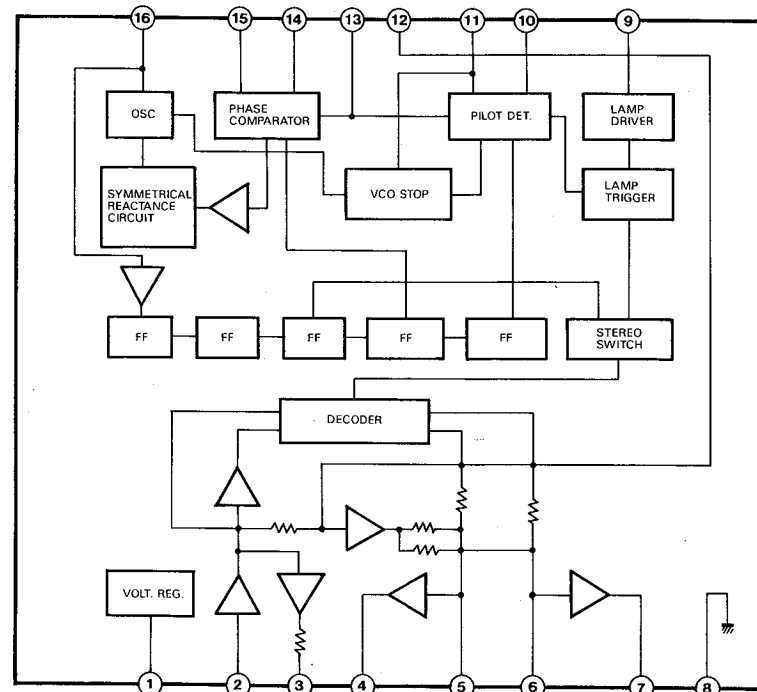


IC BLOCK DIAGRAM

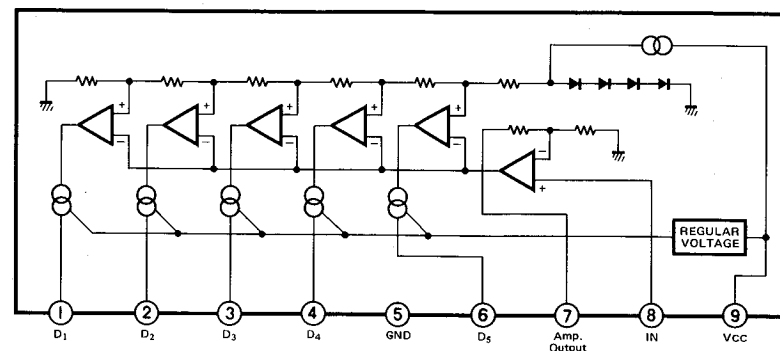
IC201: LA1265



IC301: LA3410



IC351: BA6124



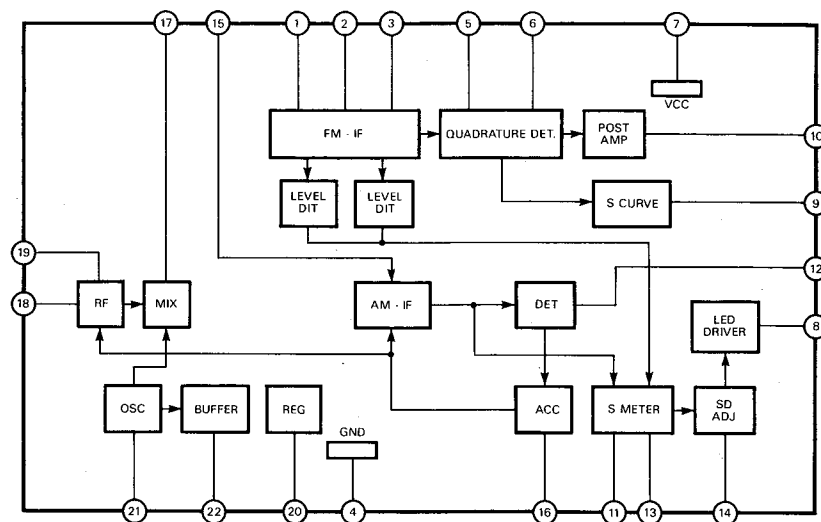
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
CHASSIS MISCELLANEOUS		
△ P1	4161-71151	Power Cord
△ T1	5584-701507	Power Transformer
△ SO1	4474-164	AC Outlet, Switched
△ CO1	4443-712	Connector, Power Cord
△ PL1	5731-0507172	Lamp
△ F1	5732-202031	Fuse, 2A, 125V
△ R1	5135-335J50P	3.3MΩ, CAR
LUG1	4211-4	AM Loop Antenna
LUG2	4211-4	Lug Terminal
	1397-6	Dipole Antenna
PCB-1 TUNER P. C. BOARD		
△ R301	RESISTORS 5102-1004715	10Ω, FR
VR201	CONTROLS 5101-20371920	20kΩ
VR301	5101-10471920	100kΩ
C206	CAPACITORS 5359-1015851	100pF/100V, PC
C207	5345-105F041	1μF/50V, EC
C208	5345-476C041	47μF/16V, EC
C252	5359-4315851	430pF/100V, PC
C255	5345-106C041	10μF/16V, EC
C256	5345-475D041	4.7μF/25V, EC
C257	5345-475D041	4.7μF/25V, EC
C258	5345-106C041	10μF/16V, EC
C301	5345-106C0952	10μF/16V, EC
C302	5345-107C041	100μF/16V, EC
C303	5359-1025851	1000pF/100V, PC
C305	5359-4715851	470pF/100V, PC
C306	5359-4715851	470pF/100V, PC
C309	5345-225F0952	2.2μF/50V, EC
C310	5345-225F0952	2.2μF/50V, EC
C313	5345-225F0952	2.2μF/50V, EC
C314	5345-106C041	10μF/16V, EC
C315	5359-1015851	100pF/100V, PC
C316	5345-474F0952	0.47μF/50V, EC
C317	5345-224F0952	0.22μF/50V, EC
C351	5345-108C041	1000μF/16V, EC
C352	5345-106C041	10μF/16V, EC
C353	5345-104F0952	0.1μF/50V, EC
C354	5345-106C041	10μF/16V, EC
C355	5345-106C041	10μF/16V, EC
C356	5345-106C041	10μF/16V, EC
VC101/ VC102/ VC103/ VC251/ VC252	5315-7111	Variable Capacitor (w/Trimmers TC101, 102, 251, 252)
TC103	5371-91	Trimmer Capacitor
IC201	INTEGRATED CIRCUITS 5653-LA1265	LA1265
IC301	5653-LA3410	LA3410
IC351	5652-BA6124	BA6124
Q101	TRANSISTORS 5616-2SK241(Y)	F. E. T., 2SK241(Y)
Q102	5613-535(B)	2SC535(B)
Q103	5613-461(B)	2SC461(B)
Q201	5613-380(R)	2SC380(R)
Q251	5615-2SJ103(G)	F. E. T., 2SJ103(G)
Q301	5613-2603(F)	2SC2603(F) or (E)
Q302	5613-2603(F)	2SC2603(F) or (E)
Q351	5611-1115(F)	2SA1115(F) or (E)
Q352	5611-1115(F)	2SA1115(F) or (E)
Q353	5611-1115(F)	2SA1115(F) or (E)
Q354	5613-2603(F)	2SC2603(F) or (E)
Q355	5613-2603(F)	2SC2603(F) or (E)

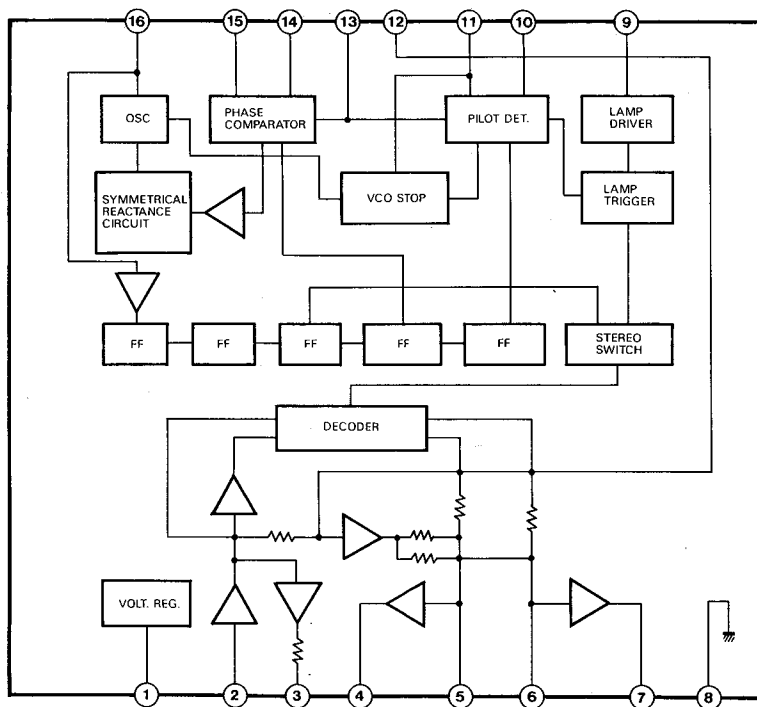
Ref. No.	Part No.	Description
DIODES		
D201	5631-1S2473	1S2473
D301	5631-1S2473	1S2473
D302	5631-1S2473	1S2473
D351	5631-1S2473	1S2473
D352	5631-1S2473	1S2473
D353	5631-1S2473	1S2473
D354	5631-1S2473	1S2473
D355	5631-1S2473	1S2473
COILS		
L101	5995-703027	
L102	5943-70325	
L103	5943-70725	
L104	5991-7065	
L105	5942-00420	
L106	5995-2R2K82	2.2μH
L201	5995-2R2K82	2.2μH
L251	5922-00112	
L252	5933-70428	
L301	5995-100K82	10μH
TRANSFORMERS		
T101	5562-0237	
T201	5572-00113	
T251	5552-70114	
MISCELLANEOUS		
CF201	5671-7120Y	Ceramic Filter
CF202	5671-7120Y	Ceramic Filter
CF251	5671-7138F	Ceramic Filter
CF301	5693-CSB456F1	Ceramic Filter
LPF301	5214-75	LC Composite
LPF302	5214-75	LC Composite
TE101	4214-164	Antenna Terminal
CN404	4443-080185	Connector, 8 Pos.
PCB-2 POWER AMP. P. C. BOARD		
△ R32	RESISTORS 5102-2R7579	2.7Ω, FR
△ R34	5102-3314715	330Ω, FR
△ R439	5102-2204715	22Ω, FR
△ R440	5102-2204715	22Ω, FR
△ R445	5102-2204715	22Ω, FR
△ R446	5102-2204715	22Ω, FR
△ R447	5102-1014715	100Ω, FR
△ R448	5102-1014715	100Ω, FR
△ R449	5102-1014715	100Ω, FR
△ R450	5102-1014715	100Ω, FR
△ R451	5102-1004715	10Ω, FR
△ R452	5102-1004715	10Ω, FR
△ R453	5102-1004715	10Ω, FR
△ R454	5102-1004715	10Ω, FR
△ R455	5273-R33672	0.33Ω, CR
△ R456	5273-R33672	0.33Ω, CR
△ R457	5273-R33672	0.33Ω, CR
△ R458	5273-R33672	0.33Ω, CR
△ R461	5173-100571	10Ω, MR
△ R462	5173-100571	10Ω, MR
△ R467	5171-1R5571	1.5Ω, MR
△ R468	5171-1R5571	1.5Ω, MR
△ R621	5174-2412228	41.2kΩ, MR
△ R622	5174-2412228	41.2kΩ, MR
△ R632	5102-2214715	220Ω, FR
CONTROLS		
VR401	5101-30171920	300Ω
VR402	5101-30171920	300Ω
VR501/ VR502	5113-50399122	50kΩMN, Balance
VR503/ VR504	5113-10498122	100kΩ, Volume
VR505/ VR506	5113-10441122	100kΩC, Bass
VR507/ VR508	5113-50342122	50kΩC, Treble

IC BLOCK DIAGRAM

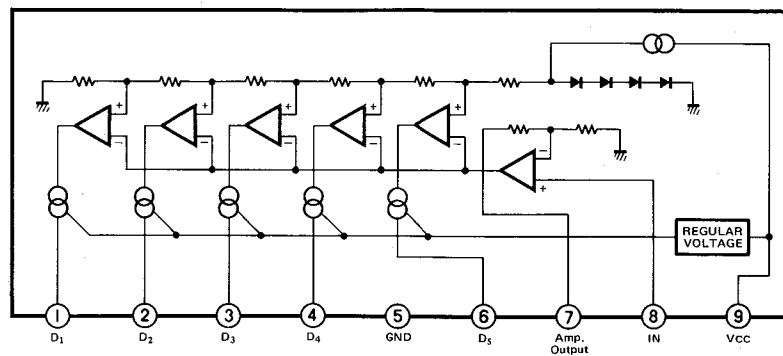
IC201: LA1265



IC301: LA3410



IC351: BA6124



ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
CHASSIS MISCELLANEOUS		
△ P1	4161-71151	Power Cord
△ T1	5584-701507	Power Transformer
△ SO1	4474-164	AC Outlet, Switched
△ CO1	4443-712	Connector, Power Cord
PL1	5731-0507172	Lamp
△ F1	5732-202031	Fuse, 2A, 125V
△ R1	5135-335J50P	3.3MΩ, CAR
	5911-250	AM Loop Antenna
LUG1	4211-4	Lug Terminal
LUG2	4211-4	Lug Terminal
	1397-6	Dipole Antenna
PCB-1 TUNER P. C. BOARD		
△ R301	5102-1004715	10Ω, FR
CONTROLS		
VR201	5101-20371920	20kΩ
VR301	5101-10471920	100kΩ
CAPACITORS		
C206	5359-1015851	100pF/100V, PC
C207	5345-105F041	1μF/50V, EC
C208	5345-476C041	47μF/16V, EC
C252	5359-4315851	430pF/100V, PC
C255	5345-106C041	10μF/16V, EC
C256	5345-475D041	4.7μF/25V, EC
C257	5345-475D041	4.7μF/25V, EC
C258	5345-106C041	10μF/16V, EC
C301	5345-106C0952	10μF/16V, EC
C302	5345-107C041	100μF/16V, EC
C303	5359-1025851	1000pF/100V, PC
C305	5359-4715851	470pF/100V, PC
C306	5359-4715851	470pF/100V, PC
C309	5345-225F0952	2.2μF/50V, EC
C310	5345-225F0952	2.2μF/50V, EC
C313	5345-225F0952	2.2μF/50V, EC
C314	5345-106C041	10μF/16V, EC
C315	5359-1015851	100pF/100V, PC
C316	5345-474F0952	0.47μF/50V, EC
C317	5345-224F0952	0.22μF/50V, EC
C351	5345-108C041	1000μF/16V, EC
C352	5345-106C041	10μF/16V, EC
C353	5345-104F0952	0.1μF/50V, EC
C354	5345-106C041	10μF/16V, EC
C355	5345-106C041	10μF/16V, EC
C356	5345-106C041	10μF/16V, EC
VC101/	5315-7111	Variable Capacitor
VC102/		(w/Trimmers TC101,
VC103/		102, 251, 252)
VC251/		
VC252		
TC103	5371-91	Trimmer Capacitor
INTEGRATED CIRCUITS		
IC201	5653-LA1265	LA1265
IC301	5653-LA3410	LA3410
IC351	5652-BA6124	BA6124
TRANSISTORS		
Q101	5616-2SK241(Y)	F. E. T., 2SK241(Y)
Q102	5613-535(B)	2SC535(B)
Q103	5613-461(B)	2SC461(B)
Q201	5613-380(R)	2SC380(R)
Q251	5615-2SJ103(G)	F. E. T., 2SJ103(G)
Q301	5613-2603(F)	2SC2603(F) or (E)
Q302	5613-2603(F)	2SC2603(F) or (E)
Q351	5611-1115(F)	2SA1115(F) or (E)
Q352	5611-1115(F)	2SA1115(F) or (E)
Q353	5611-1115(F)	2SA1115(F) or (E)
Q354	5613-2603(F)	2SC2603(F) or (E)
Q355	5613-2603(F)	2SC2603(F) or (E)

Ref. No.	Part No.	Description
DIODES		
D201	5631-1S2473	1S2473
D301	5631-1S2473	1S2473
D302	5631-1S2473	1S2473
D351	5631-1S2473	1S2473
D352	5631-1S2473	1S2473
D353	5631-1S2473	1S2473
D354	5631-1S2473	1S2473
D355	5631-1S2473	1S2473
COILS		
L101	5995-703027	
L102	5943-70325	
L103	5943-70725	
L104	5991-7065	
L105	5942-00420	
L106	5995-2R2K82	2.2μH
L201	5995-2R2K82	2.2μH
L251	5922-00112	
L252	5933-70428	
L301	5995-100K82	10μH
TRANSFORMERS		
T101	5562-0237	
T201	5572-00113	
T251	5552-70114	
MISCELLANEOUS		
CF201	5671-7120Y	Ceramic Filter
CF202	5671-7120Y	Ceramic Filter
CF251	5671-7138F	Ceramic Filter
CF301	5693-CSB456F1	Ceramic Filter
LPF301	5214-75	LC Composite
LPF302	5214-75	LC Composite
TE101	4214-164	Antenna Terminal
CN404	4443-080185	Connector, 8 Pos.
PCB-2 POWER AMP. P. C. BOARD		
RESISTORS		
△ R32	5102-2R7579	2.7Ω, FR
△ R34	5102-3314715	330Ω, FR
△ R439	5102-2204715	22Ω, FR
△ R440	5102-2204715	22Ω, FR
△ R445	5102-2204715	22Ω, FR
△ R446	5102-2204715	22Ω, FR
△ R447	5102-1014715	100Ω, FR
△ R448	5102-1014715	100Ω, FR
△ R449	5102-1014715	100Ω, FR
△ R450	5102-1014715	100Ω, FR
△ R451	5102-1004715	10Ω, FR
△ R452	5102-1004715	10Ω, FR
△ R453	5102-1004715	10Ω, FR
R454	5102-1004715	10Ω, FR
R455	5273-R33672	0.33Ω, CR
R456	5273-R33672	0.33Ω, CR
R457	5273-R33672	0.33Ω, CR
R458	5273-R33672	0.33Ω, CR
R461	5173-100571	10Ω, MR
R462	5173-100571	10Ω, MR
R467	5171-1R5571	1.5Ω, MR
R468	5171-1R5571	1.5Ω, MR
R621	5174-Z412228	41.2kΩ, MR
R622	5174-Z412228	41.2kΩ, MR
R632	5102-2214715	220Ω, FR
CONTROLS		
VR401	5101-30171920	300Ω
VR402	5101-30171920	300Ω
VR501/	5113-50399122	50kΩMN, Balance
VR502		
VR503/	5113-10498122	100kΩ, Volume
VR504		
VR505/	5113-10441122	100kΩC, Bass
VR506		
VR507/	5113-50342122	50kΩC, Treble
VR508		

Ref. No.	Part No.	Description
CAPACITORS		
C4	5341-688Z0956	6800 μ F/45V, EC
C5	5341-688Z0956	6800 μ F/45V, EC
C6	5345-106F041	10 μ F/50V, EC
C7	5345-106F041	10 μ F/50V, EC
C8	5345-107B041	100 μ F/10V, EC
C9	5345-105F041	1 μ F/50V, EC
C31	5345-107C041	100 μ F/16V, EC
C32	5345-107C041	100 μ F/16V, EC
C401	5345-476B0951	47 μ F/10V, EC
C402	5345-476B0951	47 μ F/10V, EC
C403	5345-227B041	220 μ F/10V, EC
C404	5345-227B041	220 μ F/10V, EC
C405	5359-2215851	220pF/100V, PC
C406	5359-2215851	220pF/100V, PC
C409	5359-1015851	100pF/100V, PC
C410	5359-1015851	100pF/100V, PC
C411	5345-476F041	47 μ F/50V, EC
C412	5345-476F041	47 μ F/50V, EC
C413	5345-476F041	47 μ F/50V, EC
C414	5345-476F041	47 μ F/50V, EC
C501	5359-1015851	100pF/100V, PC
C502	5359-1015851	100pF/100V, PC
C507	5359-1815851	180pF/100, PC
C508	5359-1815851	180pF/100, PC
C509	5345-225F0951	2.2 μ F/50V, EC
C510	5345-225F0951	2.2 μ F/50V, EC
C511	5345-106C0951	10 μ F/16V, EC
C512	5345-106C0951	10 μ F/16V, EC
C601	5345-106C0951	10 μ F/16V, EC
C602	5345-106C0951	10 μ F/16V, EC
C603	5359-1215851	120pF/100V, PC
C604	5359-1215851	120pF/100V, PC
C605	5345-107D041	100 μ F/25V, EC
C606	5345-107D041	100 μ F/25V, EC
C609	5359-2025851	2000pF/100V, PC
C610	5359-2025851	2000pF/100V, PC
C611	5345-475F0951	4.7 μ F/50V, EC
C612	5345-475F0951	4.7 μ F/50V, EC
C615	5345-337E041	330 μ F/35V, EC
C616	5345-107D041	100 μ F/25V, EC
C617	5345-476D041	47 μ F/25V, EC
TRANSISTORS		
Q1	5613-2603(F)	2SC2603(F) or (E)
Q2	5611-1115(F)	2SA1115(F) or (E)
Q3	5611-1115(F)	2SA1115(F) or (E)
Q4	5613-2603(F)	2SC2603(F) or (E)
Q5	5611-970(BL)	2SA970(BL)
Q6	5611-970(BL)	2SA970(BL)
Q31	5612-1015(O)	2SB1015(O)
Q32	5613-2603(F)	2SC2603(F) or (E)
Q401	5613-2240(BL)	2SC2240(BL)
Q402	5613-2240(BL)	2SC2240(BL)
Q403	5613-2240(BL)	2SC2240(BL)
Q404	5613-2240(BL)	2SC2240(BL)
Q405	5613-2603(F)	2SC2603(F) or (E)
Q406	5613-2603(F)	2SC2603(F) or (E)
Q407	5613-2603(F)	2SC2603(F) or (E)
Q408	5613-2603(F)	2SC2603(F) or (E)
Q409	5611-970(BL)	2SA970(BL)
Q410	5611-970(BL)	2SA970(BL)
Q411	5612-646A(C)	2SB646A(C)
Q412	5612-646A(C)	2SB646A(C)
Q413	5614-666A(C)	2SD666A(C)
Q414	5614-666A(C)	2SD666A(C)
Q415	5613-945(K)	2SC945(K) or (P)
Q416	5613-945(K)	2SC945(K) or (P)
Q417	5614-667A(C)	2SD667A(C)
Q418	5614-667A(C)	2SD667A(C)
Q419	5612-647A(C)	2SB647A(C)
Q420	5612-647A(C)	2SB647A(C)
Q421	5611-1264(O)	2SA1264(O) or (R)
Q422	5611-1264(O)	2SA1264(O) or (R)
Q423	5613-3181(O)	2SC3181(O) or (R)
Q424	5613-3181(O)	2SC3181(O) or (R)

Ref. No.	Part No.	Description
Q601	5613-2320L(F)	2SC2320L(F)
Q602	5613-2320L(F)	2SC2320L(F)
Q603	5611-999L(F)	2SA999L(F)
Q604	5611-999L(F)	2SA999L(F)
Q605	5611-1115(F)	2SA1115(F) or (E)
Q606	5611-1115(F)	2SA1115(F) or (E)
Q607	5613-2603(F)	2SC2603(F) or (E)
Q608	5613-2603(F)	2SC2603(F) or (E)
Q609	5613-2603(F)	2SC2603(F) or (E)
Q610	5613-2603(F)	2SC2603(F) or (E)
Q611	5611-817(O)	2SA817(O)
DIODES		
△ D1	5632-ERC402FL	ERC402FL
△ D2	5632-ERC402FL	ERC402FL
△ D3	5632-ERC402FL	ERC402FL
△ D4	5632-ERC402FL	ERC402FL
D5	5636-1S2471	1S2471
D6	5635-HZ6A1L	ZD, HZ6A1L
D31	5635-HZ15-2L	ZD, HZ15-2L
D401	5631-1S2473	1S2473
D402	5631-1S2473	1S2473
D403	5632-S5566B	S5566B
D404	5632-S5566B	S5566B
D405	5632-S5566B	S5566B
D406	5632-S5566B	S5566B
D601	5635-HZ20-1L	ZD, HZ20-1L
D602	5632-S5566B	S5566B
COILS		
L401	5991-7165	
L402	5991-7165	
MISCELLANEOUS		
S501/ S502/ S503/ S504/ S505	4431-05207158	Push, Swtich, Phono, Video/CD, AM, FM, Tape Monitor
J601/ J602/ J603/ J604	4484-46	4 Pin Jack, Phono, Video/ CD
J605/ J606/ J607/ J608	4484-46	4 Pin Jack, Tape In/Out
TE501	4214-165	Terminal, Speaker System 1/2
CN402	4443-070185	Connector, 7 Pos.
PCB-3 LED P. C. BOARD		
D361	5637-GL5NG6	L.E.D., GL5NG6, Green, Signal Strength
D362	5637-GL5NG6	L.E.D., GL5NG6, Green, Signal Strength
D363	5637-GL5NG6	L.E.D., GL5NG6, Green, Signal Strength
D364	5637-GL5NG6	L.E.D., GL5NG6, Green, Tuned
D365	5637-GL5PR6	L.E.D., GL5PR6, Red, FM Stereo
D366	5637-GL5PR6	L.E.D., GL5PR6, Red, Tape Monitor
PCB-4 PUSH SWITCHES P. C. BOARD		
S506/ S507/ S508	4431-03067160	Push Switch, Loudness, Audio Mode, FM Mute
CN401	4443-070185	Connector, 7 Pos.
CN403	4443-030185	Connector, 3 Pos.

Ref. No.	Part No.	Description
PCB-5 POWER SWITCH P. C. BOARD		
△ C1	5361-1030419	0.01 μ F/AC125V, CC
△ S1	4431-A01716 4472-0131	Push Switch, Power Holder, Fuse
PCB-6 HEADPHONE JACK P. C. BOARD		
R463	5171-471571	470 Ω , MR
R464	5171-471571	470 Ω , MR
J401	4451-00159	Jack, Headphones
PCB-7 SPEAKER SWITCHES P. C. BOARD		
S509/ S510	4431-02047366	Push Switch, Speakers System 1/2

KEY TO ABBREVIATIONS

FR : Fuse Resistor
 MR : Metal Resistor
 CR : Cement Resistor
 CAR : Carbon Resistor

EC : Electrolytic Capacitor
 PC : Polypropylene Capacitor
 MC : Mica Capacitor
 CC : Ceramic Capacitor
 MPC : Metalized Polyester Capacitor
 SC : Semiconductor Capacitor

ZD : Zener Diode

CLW : Connector with Lead Wire

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