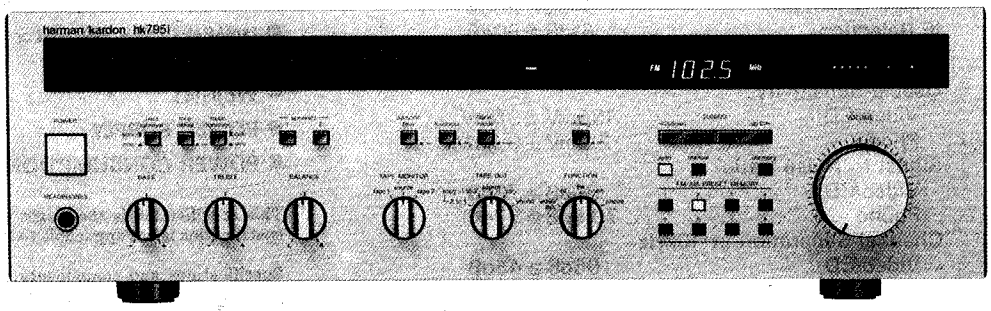
The Harman Kardon Model hk795i

Manual 101A

DIGITAL SYNTHESIZED QUARTZ-LOCKED STEREO RECEIVER

Technical Manual



hk795i

harman/kardon
240 Crossways Park West, Woodbury, N.Y. 11797
1112-3152101A5 P-088603 1850 Printed in Japan

SPECIFICATIONS

● FM SECTION	Nominal	Limit
Tuning Range	87.5 ~ 108.0MHz	
50dB Quieting Sensitivity		
Mono	14.9dBf	≤ 18dBf
Stereo	36.9dBf	≤ 40dBf
Usable Sensitivity	10.6dBf	≤ 14dBf
Image Ratio	76.5dB	≥ 60dB
IF Rejection	76dB	≥ 70dB
Spurious Response Rejection	101dB	≥ 80dB
Capture Ratio	1.5dB	≤ 2.5dB
Alternate Channel Selectivity	66.5dB	≥ 50dB
AM Rejection	54.5dB	≥ 45dB
Signal to Noise Ratio		
Mono	82dB	≥ 78dB
Stereo	74.5dB	≥ 72dB
Total Harmonic Distortion (65dBf 1kHz Input)		
Mono	0.09%	≤ 0.2%
Stereo	0.12%	≤ 0.3%
Stereo Separation at 1kHz	52.9dB	≥ 45dB

● AM SECTION	
Tuning Range	520 ~ 1,710kHz
Usable Sensitivity	14μVm ≤ 20μVm
Selectivity	30dB ≥ 22dB
Signal to Noise Ratio	53dB ≥ 50dB
Image Rejection	34dB ≥ 28dB
IF Rejection	61dB ≥ 50dB

● AUDIO SECTION	
Usable Sensitivity	
Video/CD	135mV ± 25mV
Phono	2.2mV ± 0.2mV
Signal to Noise Ratio	
Video/CD	80dB ≥ 78dB
Phono	79.5dB ≥ 77dB
Channel Separation at 10kHz	
Video/CD	66dB ≥ 45dB
Phono	57.5dB ≥ 45dB

	Nominal	Limit
IM Distortion Ratio	0.13%	≤ 0.25%
RMS Output Power		
8Ω, 1kHz, THD 0.08%	77.6W	≥ 70W
4Ω, 1kHz, THD 1.0%	123.2W	≥ 110W
Damping Factor at 1kHz	44	≥ 40
Tone Control Characteristics		
Bass Turnover Frequency	400Hz/200Hz	
Treble Turnover Frequency	2kHz/6kHz	
Bass at 50Hz		
Boost	10dB ± 2dB	
Cut	−10dB ± 2dB	
Treble at 10kHz		
Boost	10dB ± 2dB	
Cut	−10dB ± 2dB	
Loudness Control		
at 10kHz	3dB ± 1dB	
at 50Hz	10dB ± 2dB	
Subsonic Control		
at 15Hz	3dB ± 1dB	
DC Output Voltage		
L channel	0mV ± 60mV	
R channel	0mV ± 60mV	
RIAA Equalization at Tape Out (20Hz/20kHz)	0.15dB ± 0.5dB/0.15dB ± 0.5dB	

● DIMENSIONS (W x H x D)	17-3/8" x 5-1/4" x 14-1/2" (443 x 134 x 368 mm)
● WEIGHT	24.3 lbs. (1kg)
● POWER SUPPLY	AC120V, 60Hz
● POWER CONSUMPTION	240W (330VA)

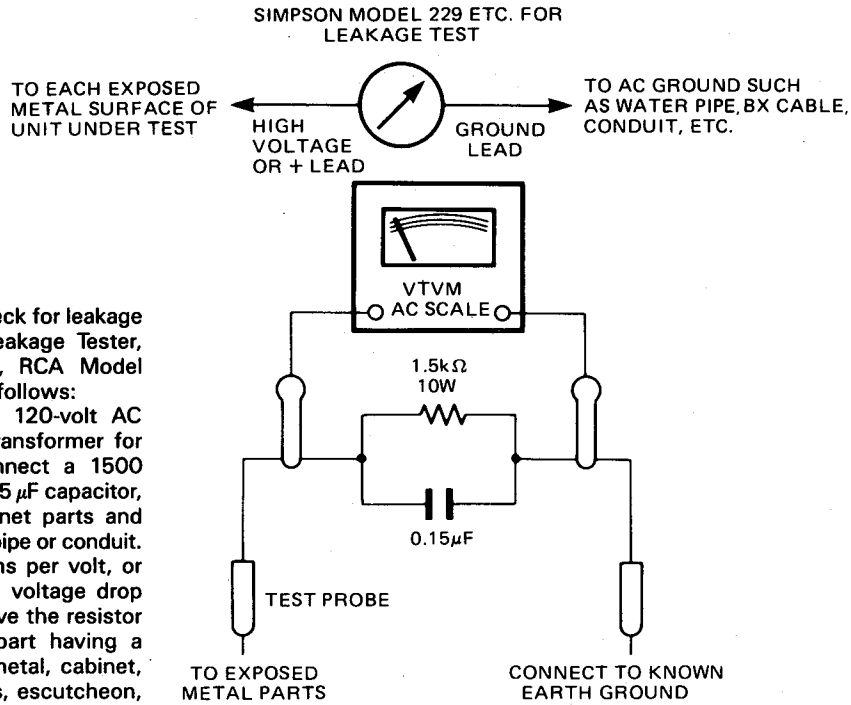
This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

Specifications and components subject to change without notice. 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 0.15 μF 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 5 AND 15)

1 CABINET TOP (133) REMOVAL

Remove 6 screws Ⓐ and then remove the Cabinet Top (133).

2 CABINET BOTTOM (135) REMOVAL

Remove 8 screws Ⓑ and then remove the Cabinet Bottom (135).

3 FRONT PANEL ASSEMBLY (101) REMOVAL

1. Remove the Cabinet Top (133), referring to the previous step 1.
2. Remove 7 screws Ⓒ and then remove the Front Panel Assembly (101).

4 DIAL PANEL (140) AND DIAL BACK ASSEMBLY (102) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step 3.
2. Remove 3 screws Ⓓ and then remove the Dial Panel (140) and the Dial Back Assembly (102).

5 FREQUENCY DISPLAY P. C. BOARD (PCB-3) REMOVAL

1. Remove the Dial Panel (140) and the Dial Back Assembly (102), referring to the previous step 4.
2. Disconnect LCN101 and LCN102 from CN701 and CN706 on the Frequency Display P. C. Board (PCB-3).
3. Open the lid of connectors (CN702, CN703, CN704, CN705, CN707 and CN708) on the Frequency Display P. C. Board (PCB-3) and then disconnect the lead wires.
4. Remove 2 screws Ⓔ and then remove the Frequency Display P. C. Board (PCB-3) with Bracket (181), Spacer (172), Shield Plates (176 and 190) and Rivet (239).

6 VOLUME P. C. BOARD (PCB-15) REMOVAL

1. Remove the Frequency Display P. C. Board (PCB-3), referring to the previous step 5.
2. Pull out Volume Knob Assembly (103).
3. Remove hexagon nut Ⓕ and then remove the Volume P. C. Board (PCB-15).
   If necessary, unsolder the lead wires connected to the PCB-15.

7 EQUALIZER P. C. BOARD (PCB-4) REMOVAL

1. Remove the Cabinet Top (133), referring to the previous step 1.
2. Open the lid of connectors (CN601 and CN602) on the Equalizer P. C. Board (PCB-4) and then disconnect the lead wires.
3. Unbend 2 catches fixing the Equalizer P. C. Board (PCB-4) and remove it.
   If necessary, unsolder the lead wires connected to the PCB-4.

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

1. Remove the Volume and Equalizer P. C. Boards (PCB-3 and PCB-4), referring to the previous steps 6 and 7.
2. Open the lid of connectors (CN301, CN302 and CN304) on the Tuner P. C. Board (PCB-1) and then disconnect the lead wires.
3. Remove 2 screws Ⓖ and then remove the Tuner P. C. Board (PCB-1).
   If necessary, unsolder the lead wires connected to the PCB-1.

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

1. Remove the Cabinet Bottom (135), referring to the previous step 2.
2. Remove the Frequency Display P. C. Board (PCB-3), referring to the previous step 5.
3. Remove 12 screws Ⓗ and then shift the Cabinet Back (134) backward.
4. Pull out the Push Button Assembly (106).
5. Remove 2 screws Ⓘ and then remove the Speaker Switches and Speaker Terminal P. C. Boards (PCB-9 and PCB-10).
   If necessary, unsolder the lead wires connected to the PCB-9 and PCB-10.
6. Open the lid of connectors (CN521 and CN523) on the Power Amp P. C. Board (PCB-2) and then disconnect the lead wires.
7. Remove 4 screws Ⓙ and then remove the Power Amp P. C. Board (PCB-2).
   If necessary, unsolder the lead wires connected to the PCB-2.

10 TONE SELECTOR P. C. BOARD (PCB-7) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step 3.
2. Remove 2 screws Ⓚ and then remove the Tone Selector P. C. Board (PCB-7).
   If necessary, unsolder the lead wires connected to the PCB-7.

11 PUSH SWITCHES P. C. BOARD (PCB-8) REMOVAL

1. Remove the Front Panel Assembly (101), referring to the previous step 3.
2. Remove 2 screws Ⓛ and then remove the Push Switches P. C. Board (PCB-8).
   If necessary, unsolder the lead wires connected to the PCB-8.

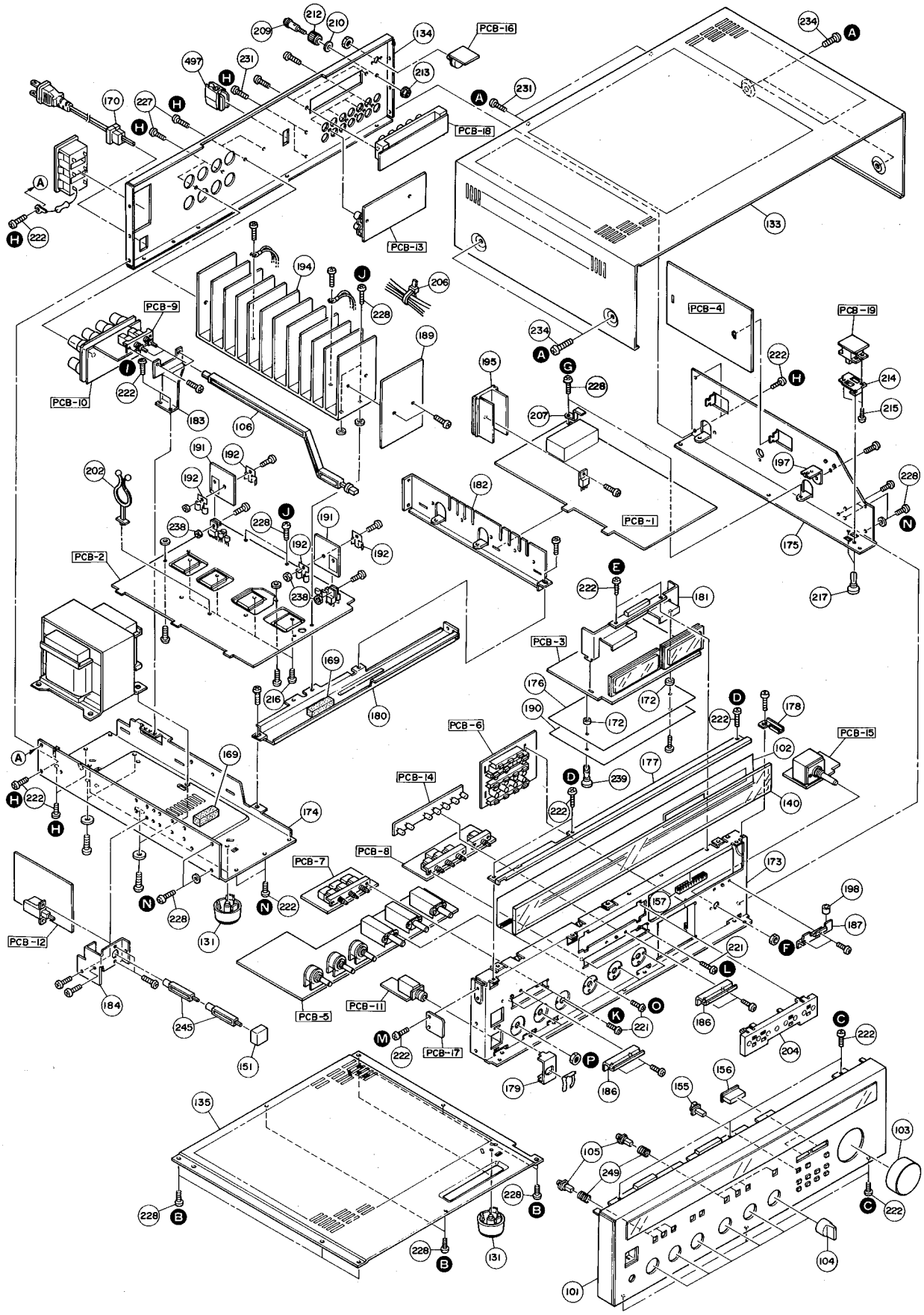
12 TONE CONTROL P. C. BOARD (PCB-5) REMOVAL

1. Remove the Volume P. C. Board (PCB-15), referring to the previous step 6.
2. Remove the Tone Selector and Push Switches P. C. Boards (PCB-7 and PCB-8), referring to the previous steps 10 and 11.
3. Remove screw Ⓜ and then remove the Lamp P. C. Board (PCB-17).
4. Pull out Bass, Treble, Balance, Tape Monitor, Tape Out and Function Knob Assemblies (104).
5. Pull out the Push Button Assemblies (106).
6. Pull out the Shaft (245) with Push Button (151).
7. Open the lid of connector (CN401) on the Headphone Jack P. C. Board (PCB-11) and then disconnect the lead wires.
8. Remove the Cabinet Bottom (135), referring to the previous step 2.
9. Remove 6 screws Ⓝ and then shift the Chassis (173) forward.
10. Remove 3 screws Ⓞ and 3 hexagon nuts Ⓟ and then remove the Tone Control P. C. Board (PCB-5).
    If necessary, unsolder the lead wires connected to the PCB-5.

GENERAL UNIT PARTS LIST

Ref.No.	Part No.	Description
101	A443-HK795A	Front Panel Ass'y
102	A531-HK795A	Dial Back Ass'y
103	4630-HK795A	Knob Ass'y, Volume
104	A630-HK795B	Knob Ass'y, Bass, Treble, Balance, Tape Monitor, Tape Out, Function
105	A662-HK795A	Push Button Ass'y, Bass Turnover, Tone Defeat, Treble Turnover, Subsonic Filter, Loudness, Audio Mode, FM Muting
106	A662-HK795B	Push Button Ass'y, Speakers 1 and 2
131	1319-0139	Foot
133	1414-04401	Cabinet Top
134	1424-17101	Cabinet Back
135	1424-11701	Cabinet Bottom
140	1541-02304	Dial Panel
151	1660-00401	Push Button, Power
155	1662-12701	Push Button, Auto, Manual, Memory, Preset Memory
156	1662-12801VN	Push Button, Tuning
157	2114-71283	Bushing
169	2112-11769	Sponge
170	2240-364	Holder
172	2132-5052	Spacer
173	2211-7274	Chassis
174	2211-7275	Chassis
175	2211-7242	Chassis
176	2216-7142	Shield Plate
177	2219-7645	Bracket
178	2219-7671	Bracket
179	2219-7879	Bracket
180	2219-7913	Bracket
181	2219-7914	Bracket
182	2219-7915	Bracket
183	2219-7916	Bracket
184	2219-8064	Bracket
186	2219-7920	Bracket
187	2219-7921	Bracket
189	2224-7085	Insulator
190	2216-7143	Shield Plate
191	2222-7192	Heat Sink
192	2219-8065	Bracket
194	2222-7152	Heat Sink
195	2222-7149	Heat Sink
197	2219-7415	Bracket
198	2132-01406	Spacer
202	2240-7050	Holder
204	2240-7206	Holder
206	2240-7120	Holder
207	2218-7001	Bracket
209	2310-7015	Special Screw
210	2410-7005	Special Washer
212	2440-7011	Special Nut
213	2440-7016	Special Nut
214	2219-7964	Bracket
215	2327-200529	Screw (2 ×5mm)
216	2552-301229	Screw (3 × 12mm)
217	2459-3003511	Rivet
221	2327-300629	Screw (3 ×6mm)
222	2347-300626	Screw (3 ×6mm)
227	2347-301046	Screw (3 × 10mm)
228	2347-300826	Screw (3 ×8mm)
231	2347-300646	Screw (3 ×6mm)
234	2347-400647	Screw (4 ×6mm)
238	2440-7016	Special Nut
239	2459-3008011	Rivet
245	2601-7018	Shaft
249	2651-210189	Spring
497	2240-7218	Holder, AM Loop Antenna
	1111-J30233	Owner Guide
	1222-7264	Packing Cushion(L)
	1222-7265	Packing Cushion(R)
	1221-747167	Packing Box

GENERAL UNIT EXPLODED VIEW



CIRCUIT DESCRIPTION

■ FM TUNER SECTION

The FM signal which has entered through the antenna is high-frequency amplified by Q101 in the front end. Then it is 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, Q202, CF202 and CF203 and fed to 1 pin of IC201. In IC201, the signal is sent through the IF amplifier in three steps, and after being detected in the quadrature, it is sent through the post amplifier to 6 pin and then inputted to 4 pin of IC301 via Q301. 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 8 pin for the left channel and from 10 pin for the right channel and transmitted to the amplifier section.

■ AM TUNER SECTION

The AM signal which has entered through the antenna passes through the tuning circuit consisting of L251 and TC251 and is inputted to 3 pin of IC251. In IC251, it undergoes high-frequency amplification, local oscillation, intermediate-frequency amplification and detection and is output from 13 pin. This signal is turned ON and OFF at Q251 according to the signal from the input selector and fed to IC301 via Q301.

■ 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 inputted into the pre-amplifier.
Then it is inputted into the power amplifier through the tone control circuit, power amplified and 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 Q7 (L ch) and Q8 (R ch) and the protective circuit consisting of Q1, Q2, Q4, Q9 and Q10 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 or AM is received out of tuning or in a very weak field intensity, 13 pin of IC201 (when FM received) or 15 pin of IC251 (when AM received) becomes low level and the signal is fed to the base of Q351. Thus Q351 becomes ON, Q352 and Q353 OFF and the collector of Q353 low level. As the signal is then inputted to the base of Q354 via the mute level VR, Q354 becomes ON, Q355 OFF and the collector of Q355 high level. In this state, the high level is inputted into 9 pin of IC352, the low level output from 10 pin is inputted into 11 pin of IC352 and 12 pin (output) becomes high level. Consequently, Q357 and Q358 become ON and Q302 (R ch) and Q303 (L ch) are conducted to mute the output.

■ SYNTHESIZER SECTION

● FM

The local oscillation output at the front end is fed to 5 pin of the prescaler IC701 and after being frequency divided into 30 or 32, it is fed to 37 pin of the PLL synthesizer IC702. In IC702, the standard frequency is oscillated by the crystal oscillator, compared with the divided local oscillation output and output to 35 pin. This voltage is level converted at Q702, Q703 and Q712, and fed to the varicap diode at the front end.

● AM

The local oscillation output is fed from 20 pin of IC251 to 39 pin of IC702. In IC702, the standard frequency is oscillated by the crystal oscillator, compared with the local oscillation output and output to 35 pin.

■ INDICATOR SECTION

● Frequency display

The output of 24 to 27 pins of the PLL synthesizer IC702 is fed to the frequency indicating driver IC703. The indicator tube is turned ON by the output decoded in IC703.

● Signal strength

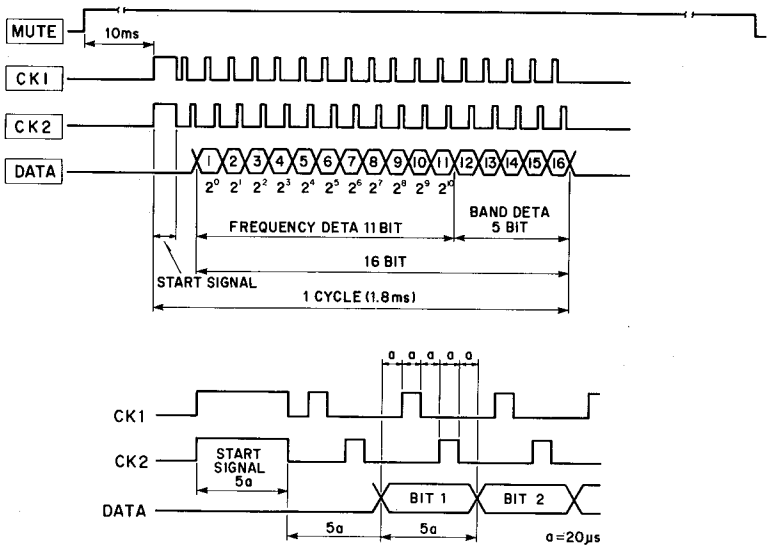
The voltage corresponding to the signal level is output from 13 pin of IC201 (when FM received) or 15 pin of IC251 (when AM received) and inputted into 8 pin of the level comparator IC351 via Q351, Q352 and Q353. Then D371, D372, D373, D374 and D375 of the signal strength indicator turn ON according to the signal level.

● Tuning

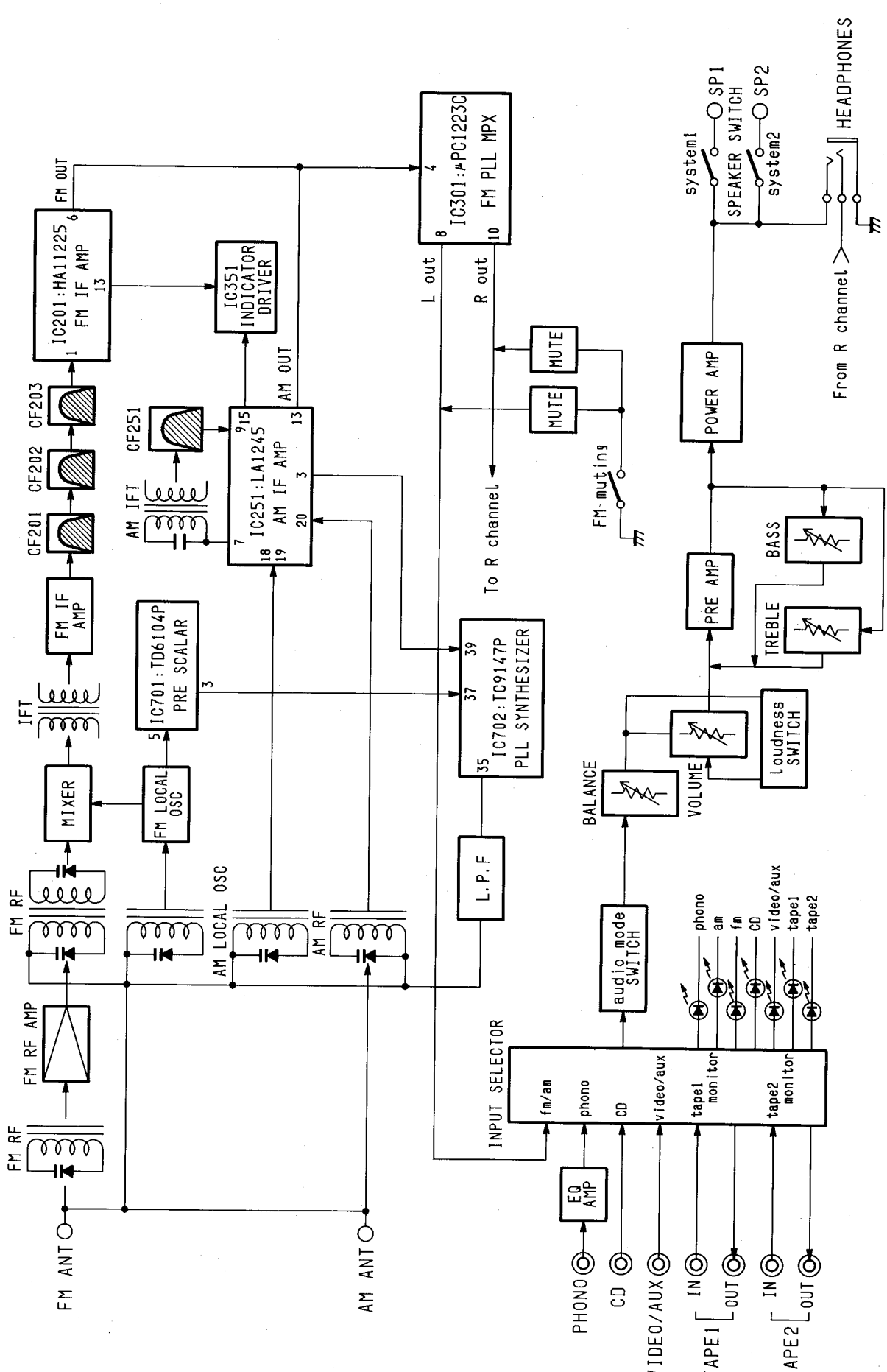
As 10 pin of IC352 in the muting circuit becomes high level when tuned, Q356 becomes ON and the tuned indicator D376 which is connected to Q356 turns ON.
When FM or stereo broadcast is received, 12 pin of IC301 becomes low level and the stereo indicator D377 which is connected there turns ON.

TIMING CHART

Frequency display timing chart of IC702 (TC9147BP)



BLOCK DIAGRAM



ALIGNMENT PROCEDURES (REFER TO PAGES 13, 14, 16, 17 AND 18)

■ DC BALANCE AND IDLING ADJUSTMENTS

Conditions: ● Set the Function selector to "video/aux" position.
● Set the volume to minimum.
● Press the "speakers 1 and 2" switches to off (button out) position.
● Make the adjustment at a room temperature of 25°C.

Step	Alignment	Connections Equipments	Adjustment	For
1	DC balance	● Connect the Digital Voltmeter to TP1 and ground.	VR403 (L channel)	0±10mV
2		● Connect the Digital Voltmeter to TP2 and ground.	VR404 (R channel)	0±10mV
3	Idling	● Connect the Digital Voltmeter to TP3 and TP4.	VR401 (L channel)	33mV
4		● Connect the Digital Voltmeter to TP5 and TP6.	VR402 (R channel)	33mV
5	Repeat steps 1 through 4 after aging for 15 minutes.			

■ STANDARD FREQUENCY CHECK

Condition: ● Set the Function selector to "fm" position.

Step	Connection Equipments	Station Display	For
1	● Connect the Frequency Counter to TP7 and ground.	98.3MHz	109MHz ± 2kHz

■ AM ADJUSTMENT

Conditions: ● Set the Function selector to "am" position.
● Standard modulation of the AM Signal Generator is 400Hz at 30%.

Step	Alignment	Connection Equipments	Measurement Frequency	Station Display	Adjustment	For
1	Tuning voltage	● Connect the DC Voltmeter to TP8 and ground.		520kHz	L252	1.5V±0.05V
2				1710kHz	TC252	23V±0.5V
3	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 (L1). ● Connect the Oscilloscope to TP9 and ground.	450kHz	1600kHz	T251 T252	Maximum output level and symmetrical curve on scope.
4	Tracking	● 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). ● Connect the VTVM and Oscilloscope to the Tape 1 Out jacks.	600kHz	600kHz	L251	Maximum output
5			1400kHz	1400kHz	TC251	
6			Repeat steps 4 and 5 for optimum sensitivity.			
7	Tuned indicator		1000kHz	1000kHz	VR251	Adjust so that the Tuned indicator lights at 47dB input.

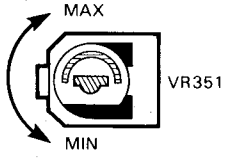
■ FM ADJUSTMENT

Conditions:
- Set the Function selector to "fm" position.
- Press the "fm 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%

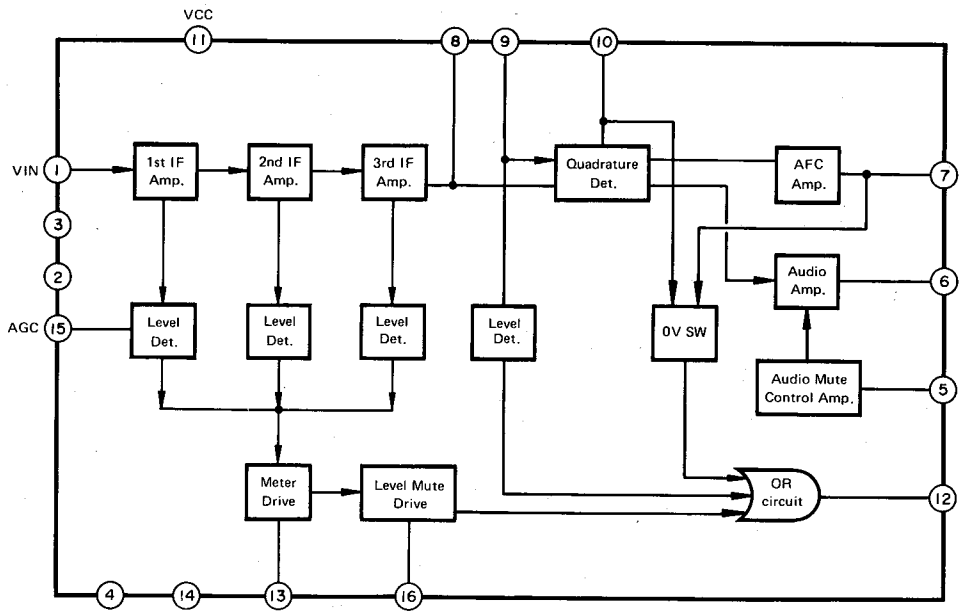
Step	Alignment	Connection Equipments	Measurement Frequency	Station Display	Adjustment	For
1	Discriminator	• Connect the FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy. (1mV input) • Connect the Distortion meter and Oscilloscope to the Tape 1 Out jacks.	98.1MHz ±30 ~ 40kHz	98.1MHz	T201(A)	Adjust so that the Tuned indicator lights in the same range on both plus (+) and minus (−) sides of 98.1MHz.
2			98.1MHz	98.1MHz	T201(B)	Minimum distortion
3			Repeat steps 1 and 2 for optimum sensitivity.			
4	Tuned indicator	• Connect the DC Voltmeter to TP10 and ground.			VR202	Adjust so that the Tuned indicator lights at 10μV input.
5	Signal indicator				VR201	Adjust so that the DC voltage becomes 11V at 1mV input. And then, confirm the five signal indicator lights.
6	MPX free run	• Connect the Stereo Modulator to FM Signal Generator. Connect FM Signal Generator to FM 300Ω BAL Antenna terminals through the 300Ω balanced dummy. • Connect the Frequency Counter to TP11 and ground. • Connect the VTVM and Oscilloscope to the Tape 1 Out jacks.	98.1MHz (unmodulation)	98.1MHz	VR303	75.95kHz ± 0.05kHz
7	Stereo threshold		98.1MHz	98.1MHz	VR351 (MAX)	Confirm the Stereo indicator lights at 30μV ± 2dB input.
8	Sub-carrir rejection		98.1MHz	98.1MHz	VR301	Minimum output at 19kHz pilot signal only by Stereo Modulator.
9	Separation		98.1MHz	98.1MHz	VR302	Adjust so that the left channel output becomes minimum when only the right channel of the Stereo Modulator is modulated.
					VR302	Adjust so that the right channel output becomes minimum when only the left channel of the Stereo Modulator is modulated.

NOTE: Adjustment of step 7 should be done after setting the VR351 in the position as shown in the figure.

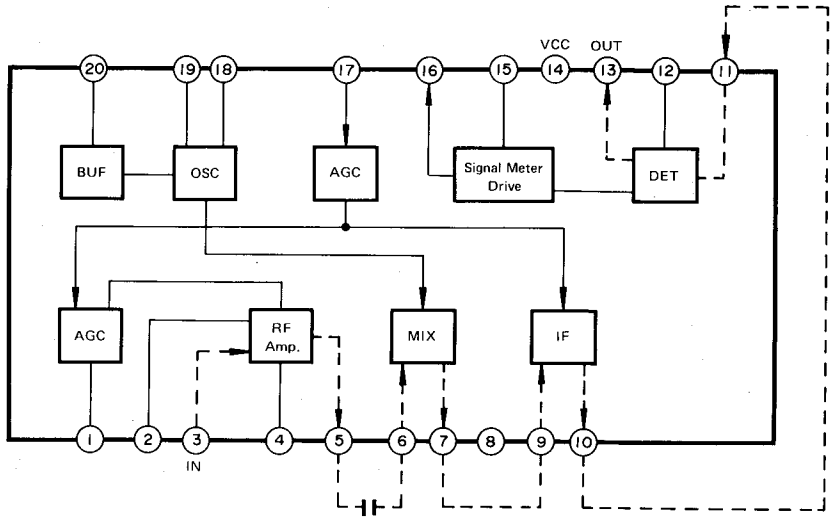


IC BLOCK DIAGRAM

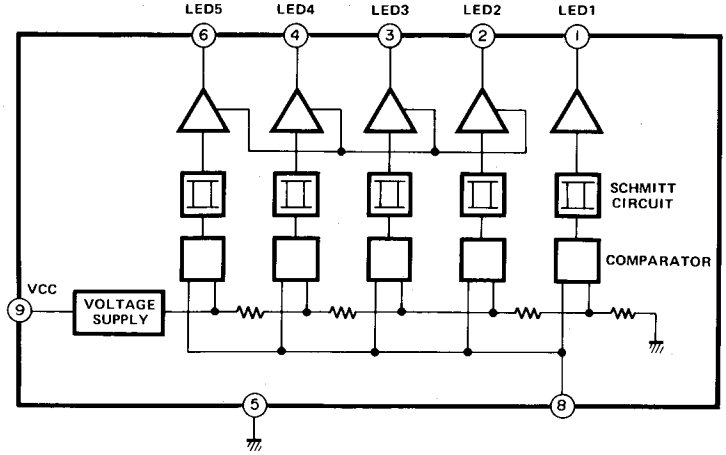
IC201 : HA11225



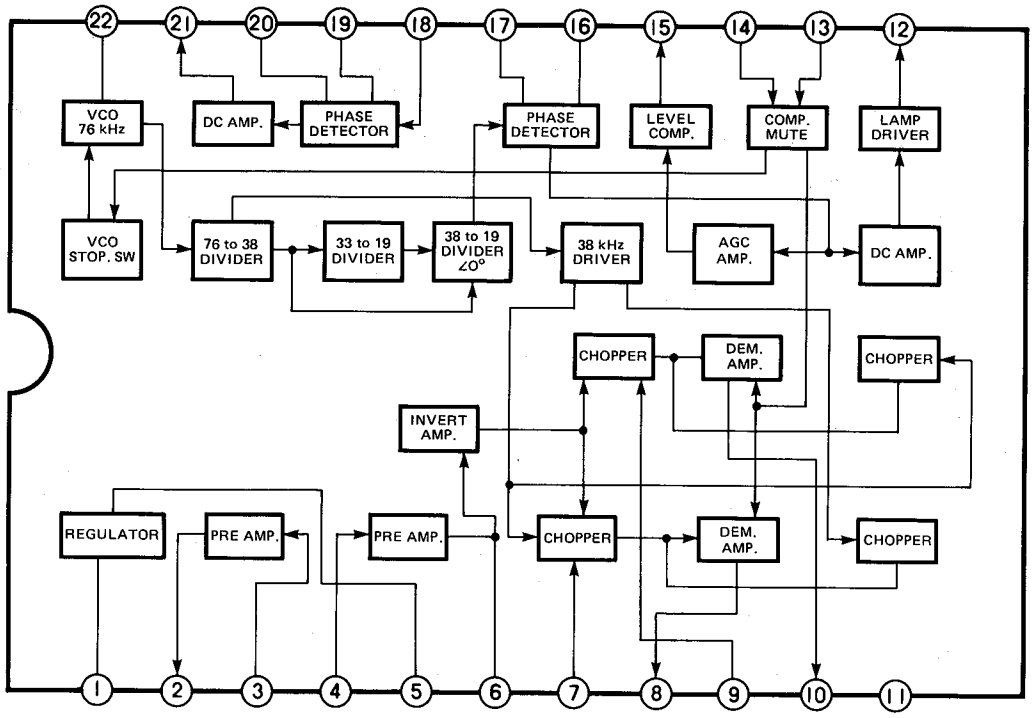
IC251 : LA1245



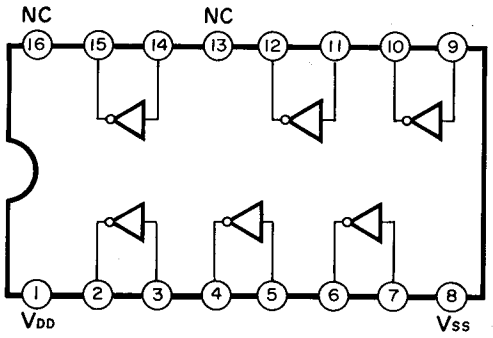
IC351 : AN6875



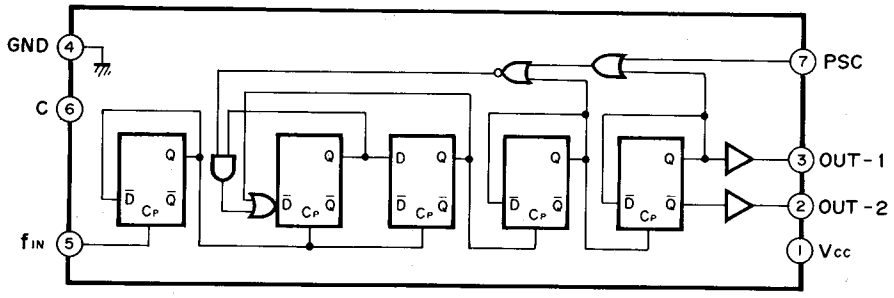
IC301 : μPC1223C



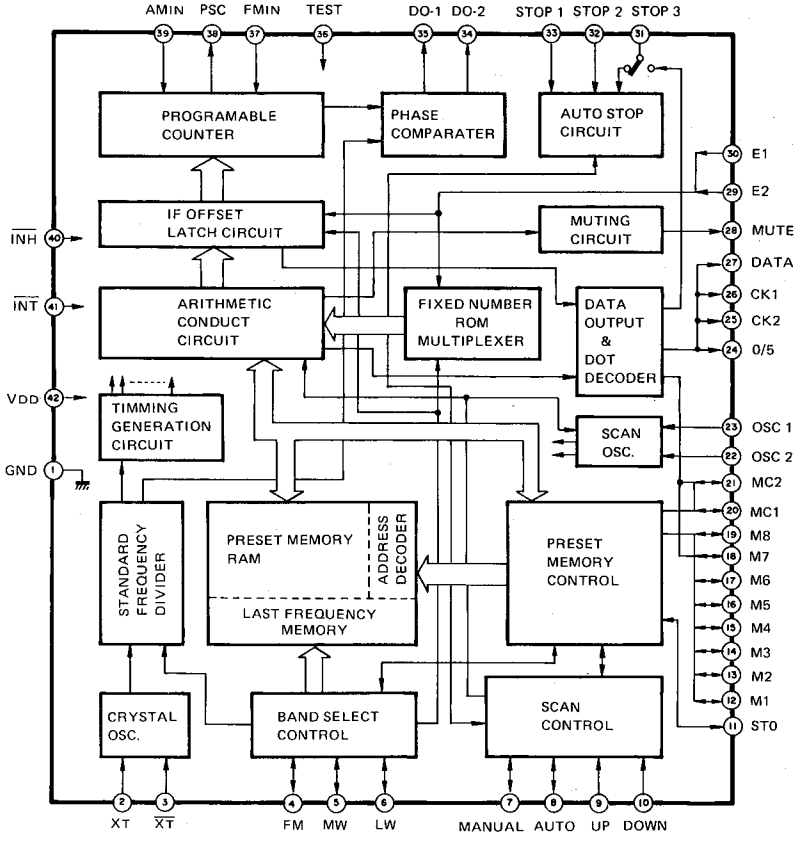
IC352 : TC4049BP



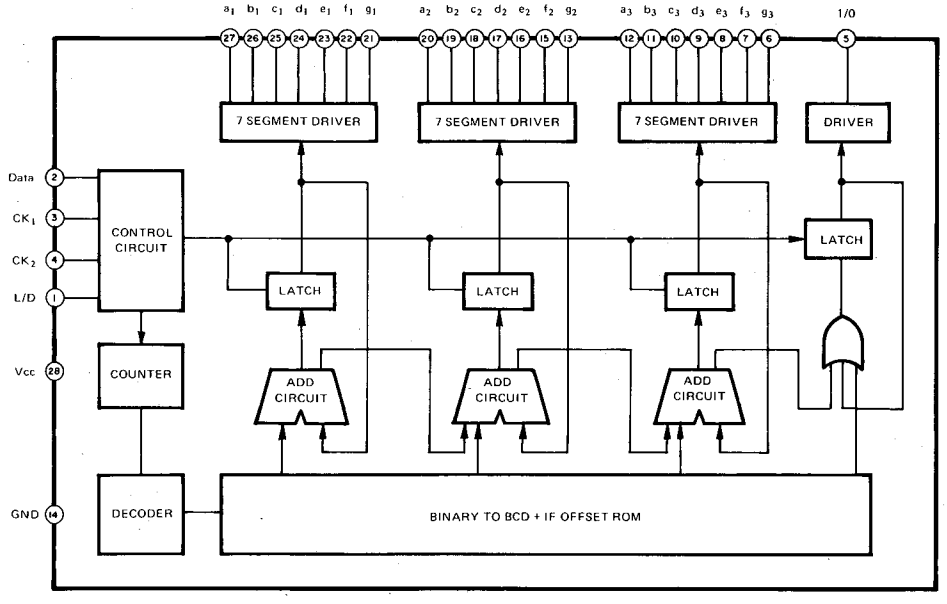
IC701 : TD6104P



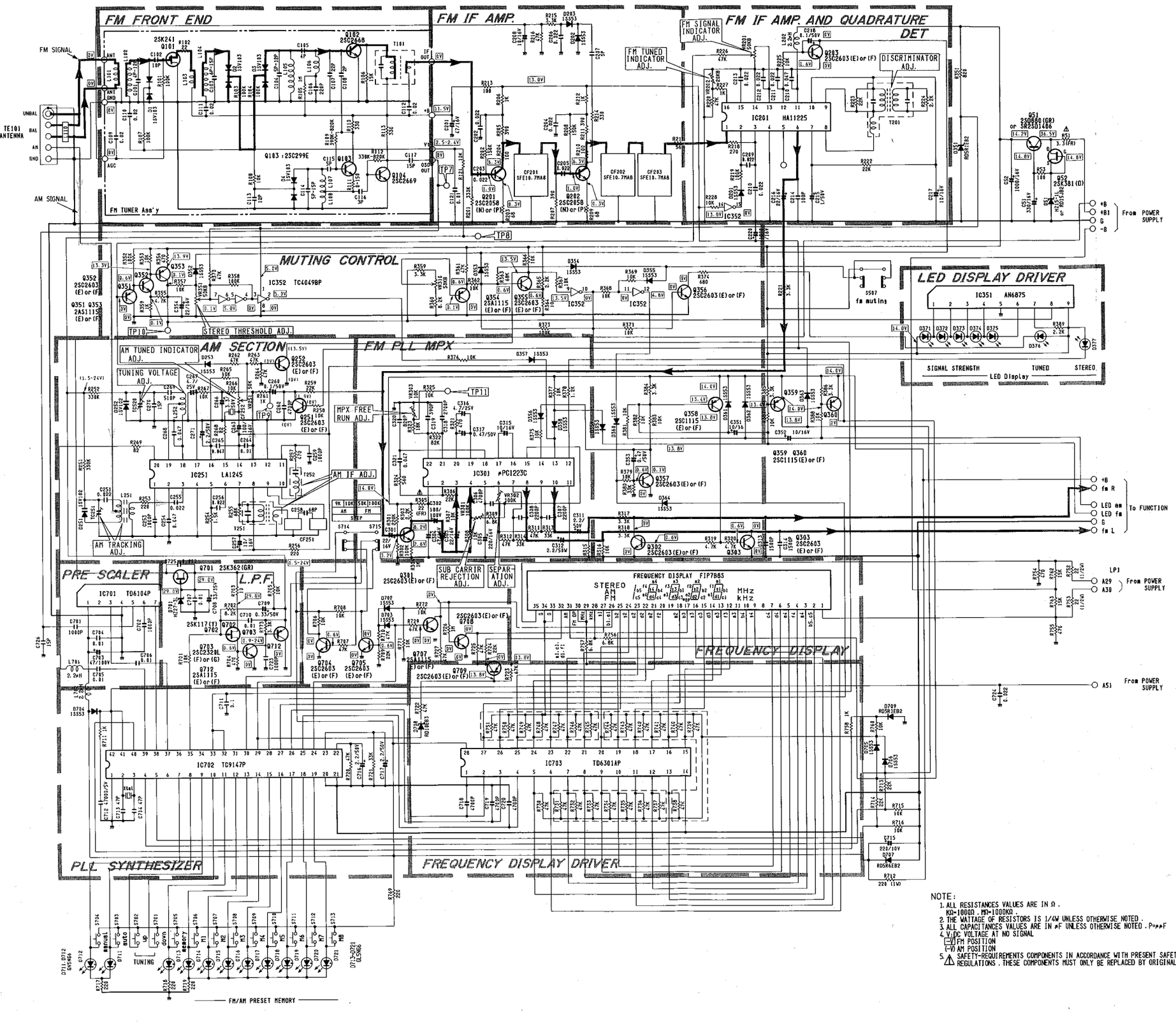
IC702 : TC9147BP



IC703 : TD6301AP



SCHEMATIC DIAGRAM (1)



DC VOLTAGE
FM : FM POSITION
AM : AM POSITION

IC201 HA11225

MODE / Pin No.	FM	AM
1	2.1V	
2	2.1V	
3	2.1V	
4	0V	
5	0.8V	
6	5.6V	
7	5.6V	
8	5.6V	
9	5.6V	
10	5.6V	
11	14.0V	
12	3.2V	
13	0V	
14	0V	
15	5.6V	
16	3.9V	

IC251 LA1245

MODE / Pin No.	FM	AM
1		5.5V
2		9.2V
3		2.7V
4		0V
5		11.8V
6		2.8V
7		11.7V
8		11.7V
9		2.8V
10		9.8V
11		0.7V
12		0V
13		2.1V
14		13.8V
15		1.8V
16		0.1V
17		2.1V
18		5.5V
19		5.5V
20		2.8V

IC301 μPC1223C

MODE / Pin No.	FM	AM
1	12.3V	
2	6.8V	
3	6.8V	
4	6.8V	
5	6.8V	
6	6.8V	
7	5.3V	
8	5.6V	
9	5.3V	
10	5.6V	
11	0V	
12	12.5V	
13	4.4V	
14	1.6V	
15	5.6V	
16	2.9V	
17	2.9V	
18	2.9V	
19	2.9V	
20	2.9V	
21	4.6V	
22	3.2V	

IC351 AN6875

MODE / Pin No.	FM	AM
1	13.2V	
2	13.2V	
3	13.2V	
4	13.2V	
5	0V	
6	13.2V	
7	14.0V	
8	8.1V	
9	14.0V	

IC702 TC9147P

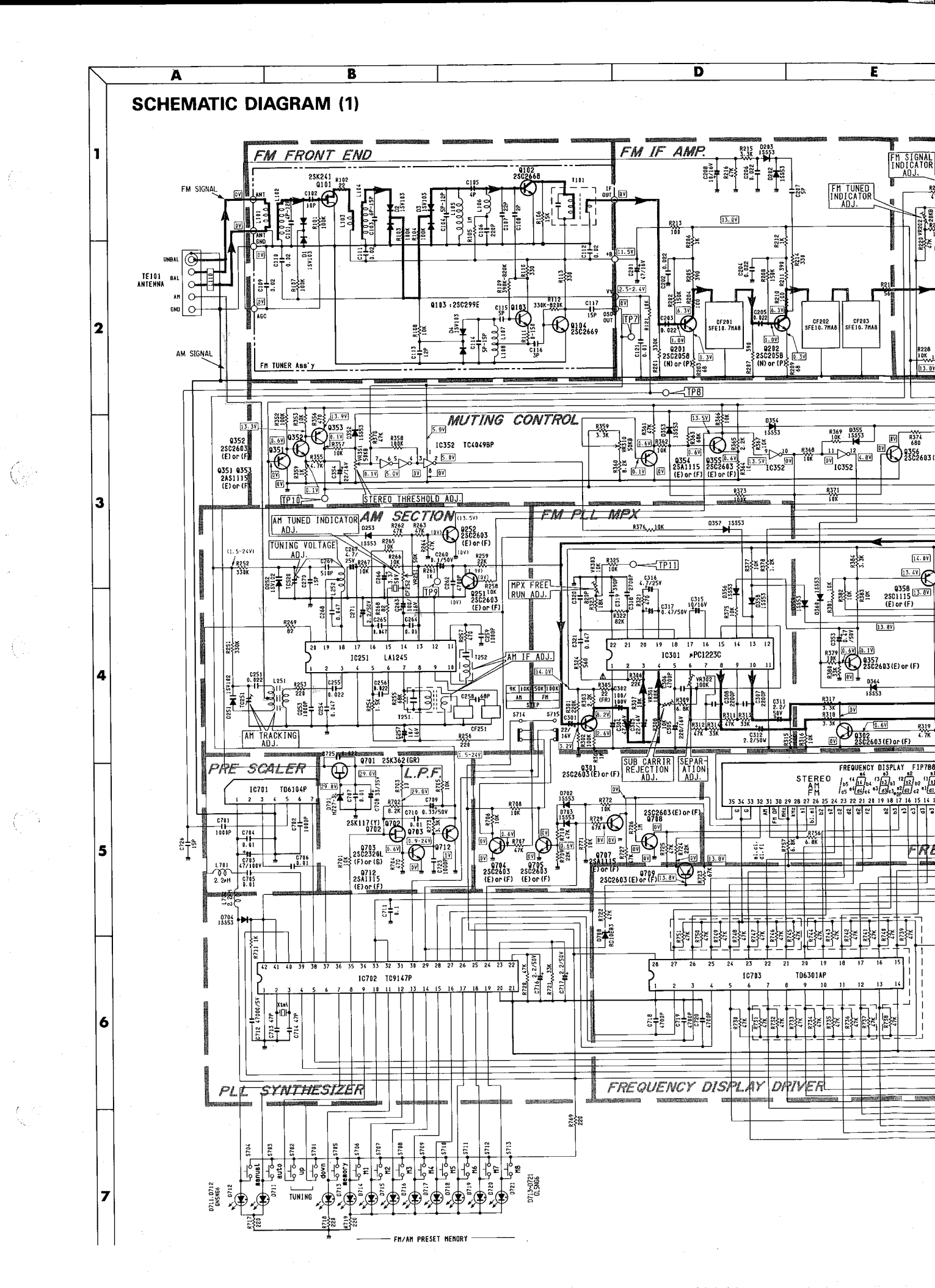
MODE / Pin No.	FM	AM
1	0V	
2	2.8V	
3	2.8V	
4	4.3V	
5	0V	
6	0V	
7	4.8V or 0V	
8	4.8V or 0V	
9	4.8V or 0V	
10	4.8V or 0V	
11	4.8V or 0V	
12	4.8V or 0V	
13	4.8V or 0V	
14	4.8V or 0V	
15	4.8V or 0V	
16	4.8V or 0V	
17	4.8V or 0V	
18	4.8V or 0V	
19	4.8V or 0V	
20	0V	
21	0V	
22	0V	
23	0V	
24		
25		
26		
27		
28	0V	
29	5.5V	
30	5.5V	
31	4.5V	
32	0V	
33	0V	
34	8.7V	
35		
36	0V	
37	2.8V	
38		
39	4.5V	
40	4.2V	
41	4.8V	
42	4.8V	

IC703 TD6301AP

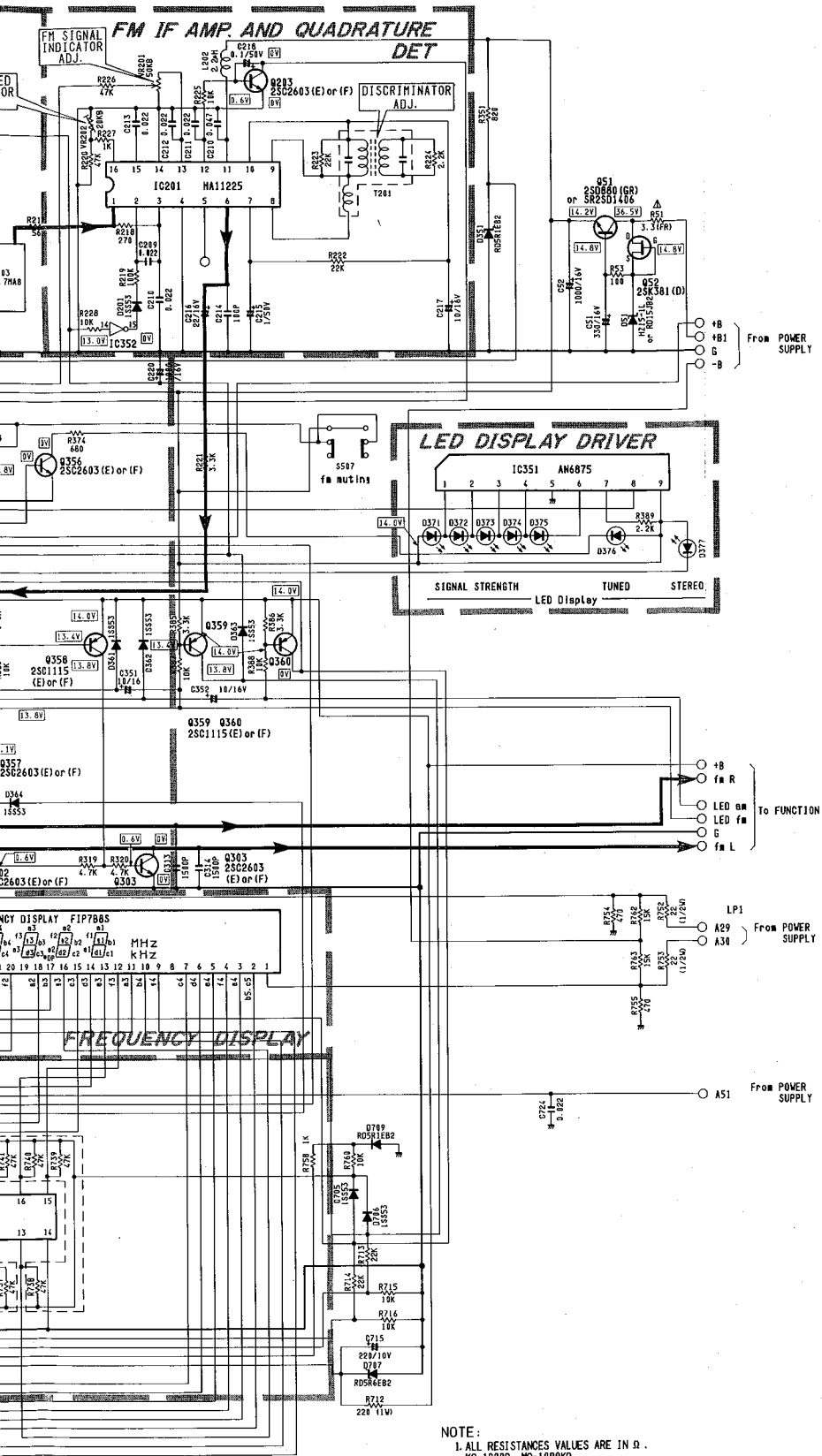
MODE / Pin No.	FM	AM
1	0V	
2	10.5V or 0.6V	
3	10.5V or 0.6V	
4	10.5V or 0.6V	
5	10.5V or 0.6V	
6	10.5V or 0.6V	
7	10.5V or 0.6V	
8	10.5V or 0.6V	
9	10.5V or 0.6V	
10	10.5V or 0.6V	
11	10.5V or 0.6V	
12	10.5V or 0.6V	
13	10.5V or 0.6V	
14	0V	
15	10.5V or 0.6V	
16	10.5V or 0.6V	
17	10.5V or 0.6V	
18	10.5V or 0.6V	
19	10.5V or 0.6V	
20	10.5V or 0.6V	
21	10.5V or 0.6V	
22	10.5V or 0.6V	
23	10.5V or 0.6V	
24	10.5V or 0.6V	
25	10.5V or 0.6V	
26	10.5V or 0.6V	
27	10.5V or 0.6V	
28	5.5V	

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

SCHEMATIC DIAGRAM (1)



E | F | G | H | I | J



DC VOLTAGE
FM -- FM POSITION
AM -- AM POSITION

IC201 HA11225

Pin No. \ MODE	FM	AM
1	2.1V	
2	2.1V	
3	2.1V	
4	0V	
5	0.8V	
6	5.6V	
7	5.6V	
8	5.6V	
9	5.6V	
10	5.6V	
11	14.0V	
12	3.2V	
13	0V	
14	0V	
15	5.8V	
16	3.9V	

IC251 LA1245

Pin No. \ MODE	FM	AM
1		5.5V
2		2.9V
3		2.7V
4		0V
5		11.8V
6		2.0V
7		11.7V
8		11.7V
9		2.8V
10		9.8V
11		0.7V
12		0V
13		2.1V
14		13.8V
15		1.8V
16		0.1V
17		2.1V
18		5.5V
19		5.5V
20		2.8V

IC301 MPC1223C

Pin No. \ MODE	FM	AM
1	12.3V	
2	6.8V	
3	6.8V	
4	6.8V	
5	6.8V	
6	6.8V	
7	5.3V	
8	5.6V	
9	5.3V	
10	5.6V	
11	8V	
12	12.5V	
13	4.4V	
14	1.6V	
15	5.8V	
16	2.9V	
17	2.9V	
18	2.9V	
19	2.9V	
20	2.9V	
21	4.4V	
22	3.2V	

IC351 AN6875

Pin No. \ MODE	FM	AM
1	13.2V	
2	13.2V	
3	13.2V	
4	13.2V	
5	0V	
6	13.2V	
7	14.0V	
8	0.1V	
9	14.0V	

IC702 TC9147P

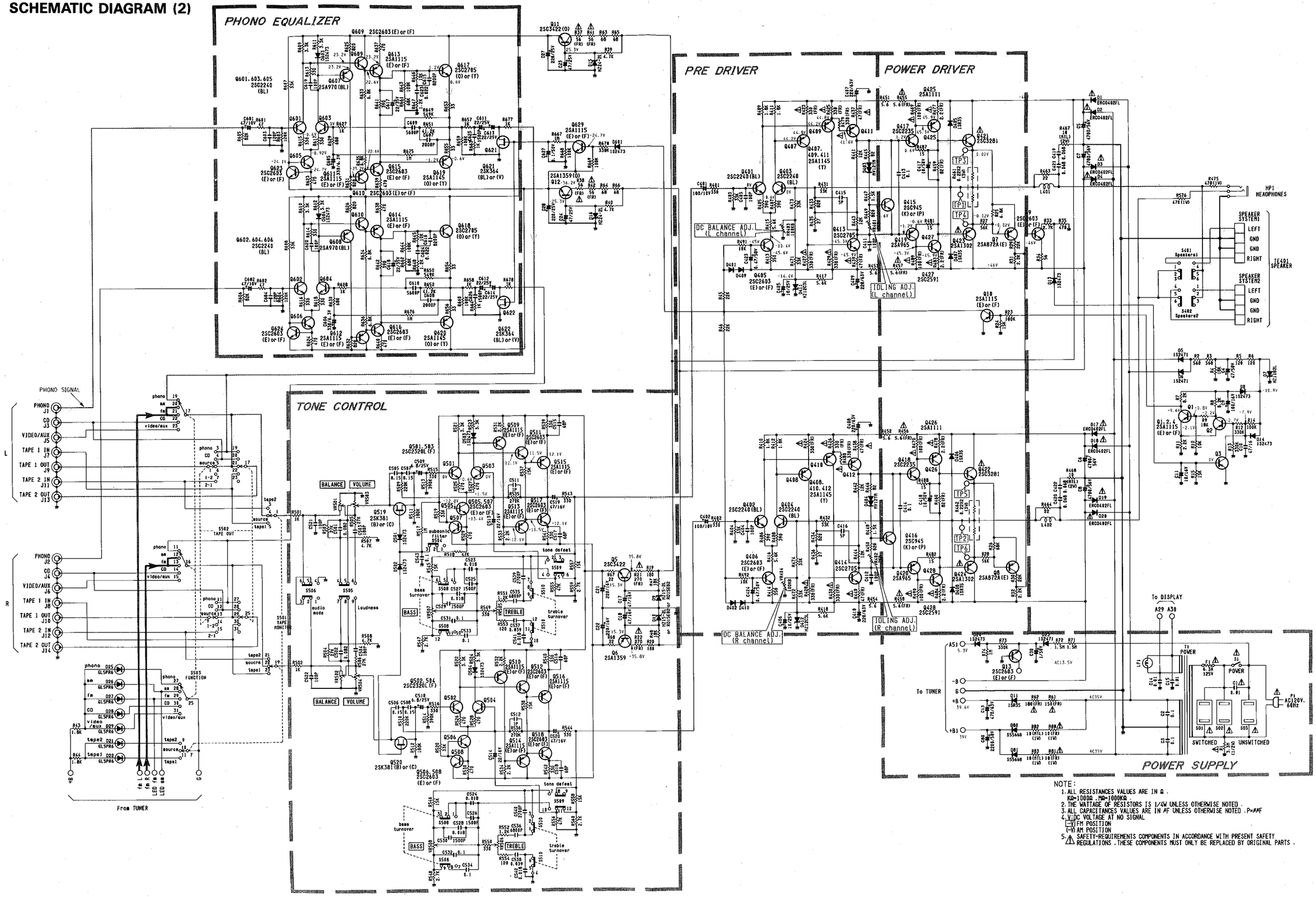
Pin No. \ MODE	FM	AM
1	0V	
2	2.0V	
3	2.0V	
4	4.3V	
5	0V	
6	0V	
7	4.0V or 0V	
8	4.0V or 0V	
9	4.0V or 0V	
10	4.0V or 0V	
11	4.0V or 0V	
12	4.0V or 0V	
13	4.0V or 0V	
14	4.0V or 0V	
15	4.0V or 0V	
16	4.0V or 0V	
17	4.0V or 0V	
18	4.0V or 0V	
19	4.0V or 0V	
20	0V	
21	0V	
22	0V	
23	0V	
24		
25		
26		
27		
28	0V	
29	5.5V	
30	5.5V	
31	4.5V	
32	0V	
33	0V	
34	0.7V	
35		
36	0V	
37	2.0V	
38		
39	4.5V	
40	4.2V	
41	4.8V	
42	4.8V	

IC703 TD6301AP

Pin No. \ MODE	FM	AM
1	0V	
2	10.5V or 0.6V	
3	10.5V or 0.6V	
4	10.5V or 0.6V	
5	10.5V or 0.6V	
6	10.5V or 0.6V	
7	10.5V or 0.6V	
8	10.5V or 0.6V	
9	10.5V or 0.6V	
10	10.5V or 0.6V	
11	10.5V or 0.6V	
12	10.5V or 0.6V	
13	10.5V or 0.6V	
14	0V	
15	10.5V or 0.6V	
16	10.5V or 0.6V	
17	10.5V or 0.6V	
18	10.5V or 0.6V	
19	10.5V or 0.6V	
20	10.5V or 0.6V	
21	10.5V or 0.6V	
22	10.5V or 0.6V	
23	10.5V or 0.6V	
24	10.5V or 0.6V	
25	10.5V or 0.6V	
26	10.5V or 0.6V	
27	10.5V or 0.6V	
28	5.5V	

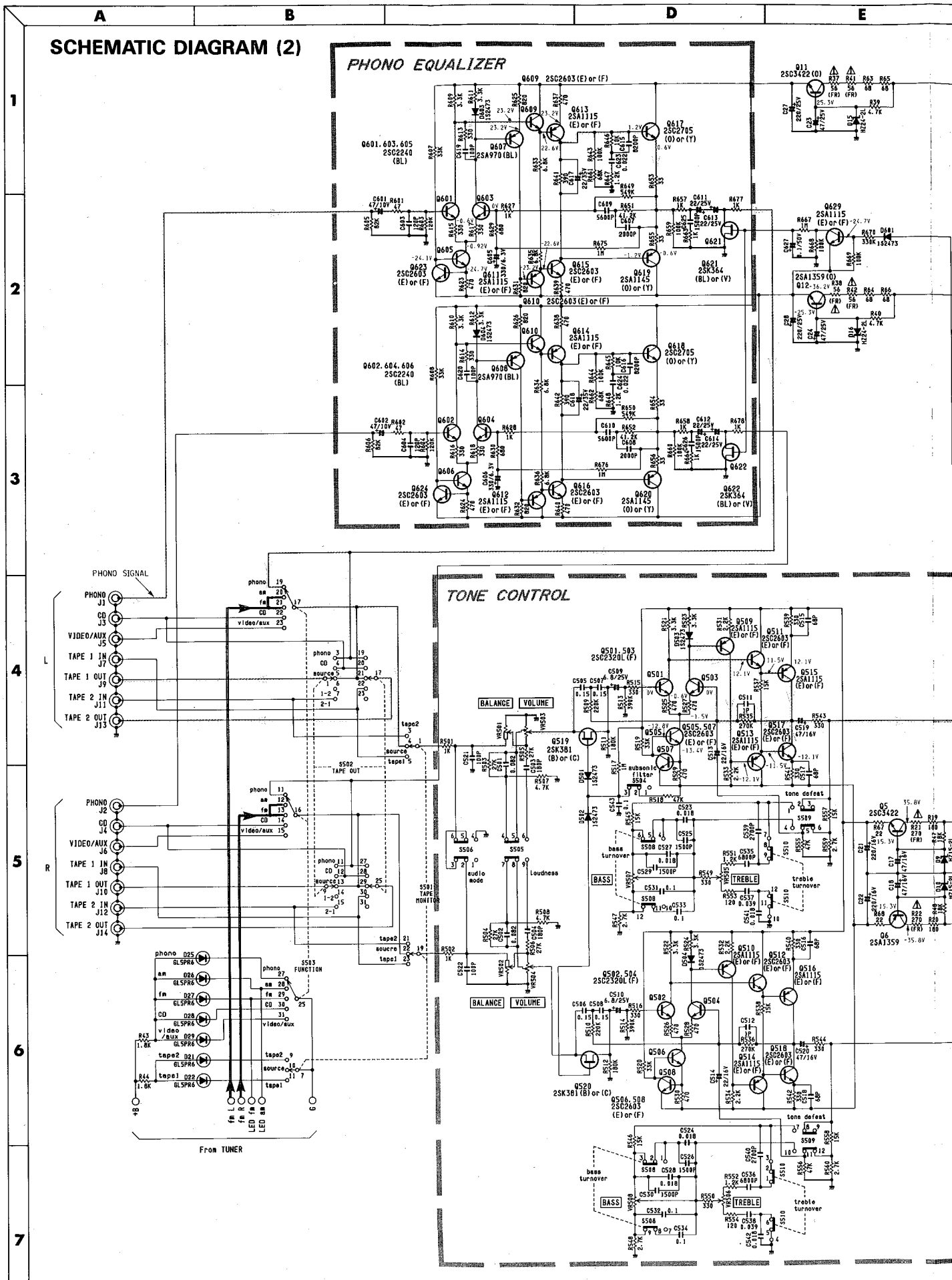
NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω.
   KΩ=1000Ω, MΩ=1000KΩ.
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μμF
4. V:DC VOLTAGE AT NO SIGNAL
   (+V) FM POSITION
   (-V) AM POSITION
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN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

SCHEMATIC DIAGRAM (2)

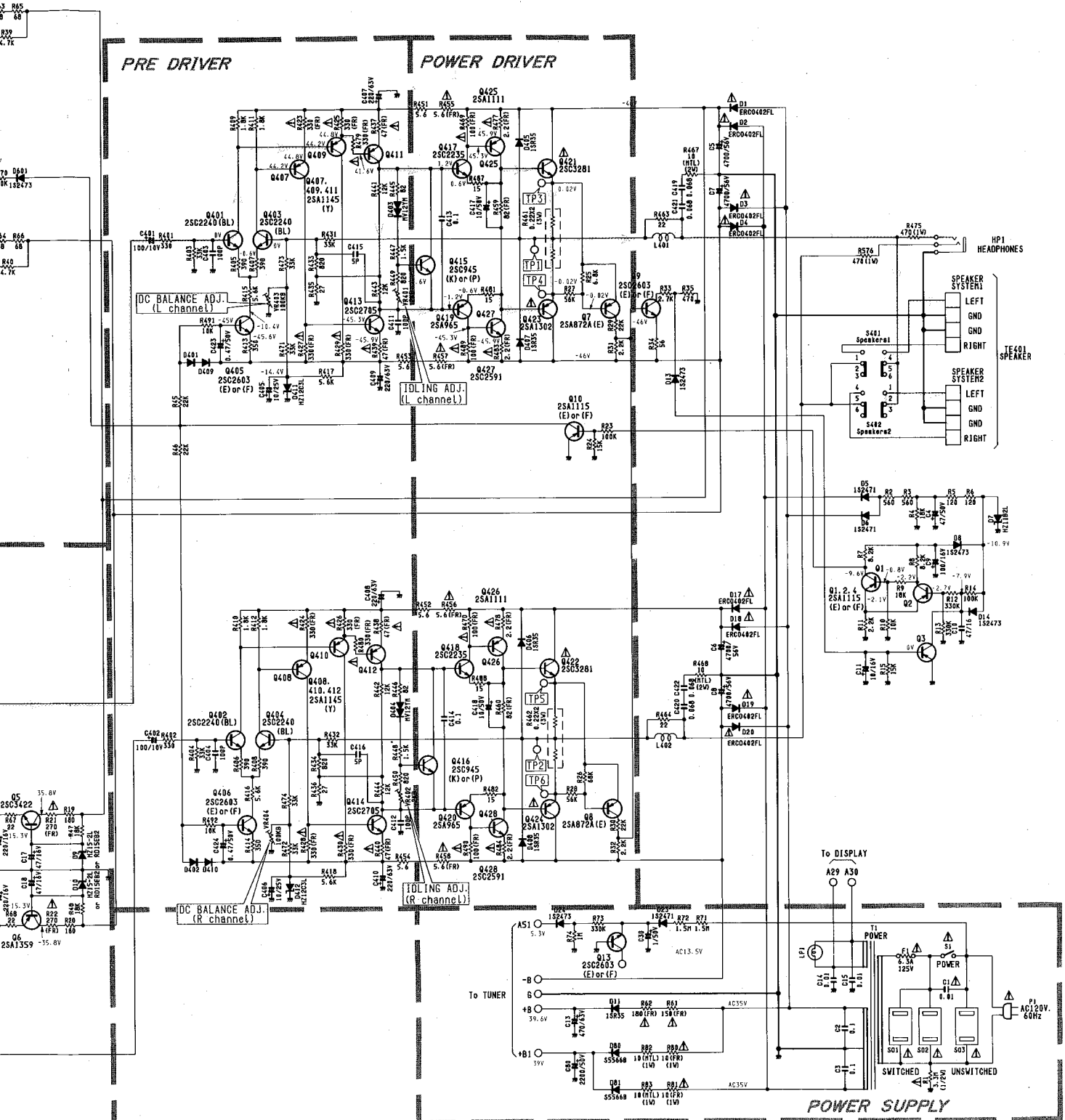


NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω .
   KΩ-1000Ω , MΩ-1000KΩ
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED .
3. ALL CAPACITANCES VALUES ARE IN #F UNLESS OTHERWISE NOTED . P=##F
4. V:DC VOLTAGE AT NO SIGNAL
   (-V) FM POSITION
   (-V) AM POSITION
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS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

SCHEMATIC DIAGRAM (2)

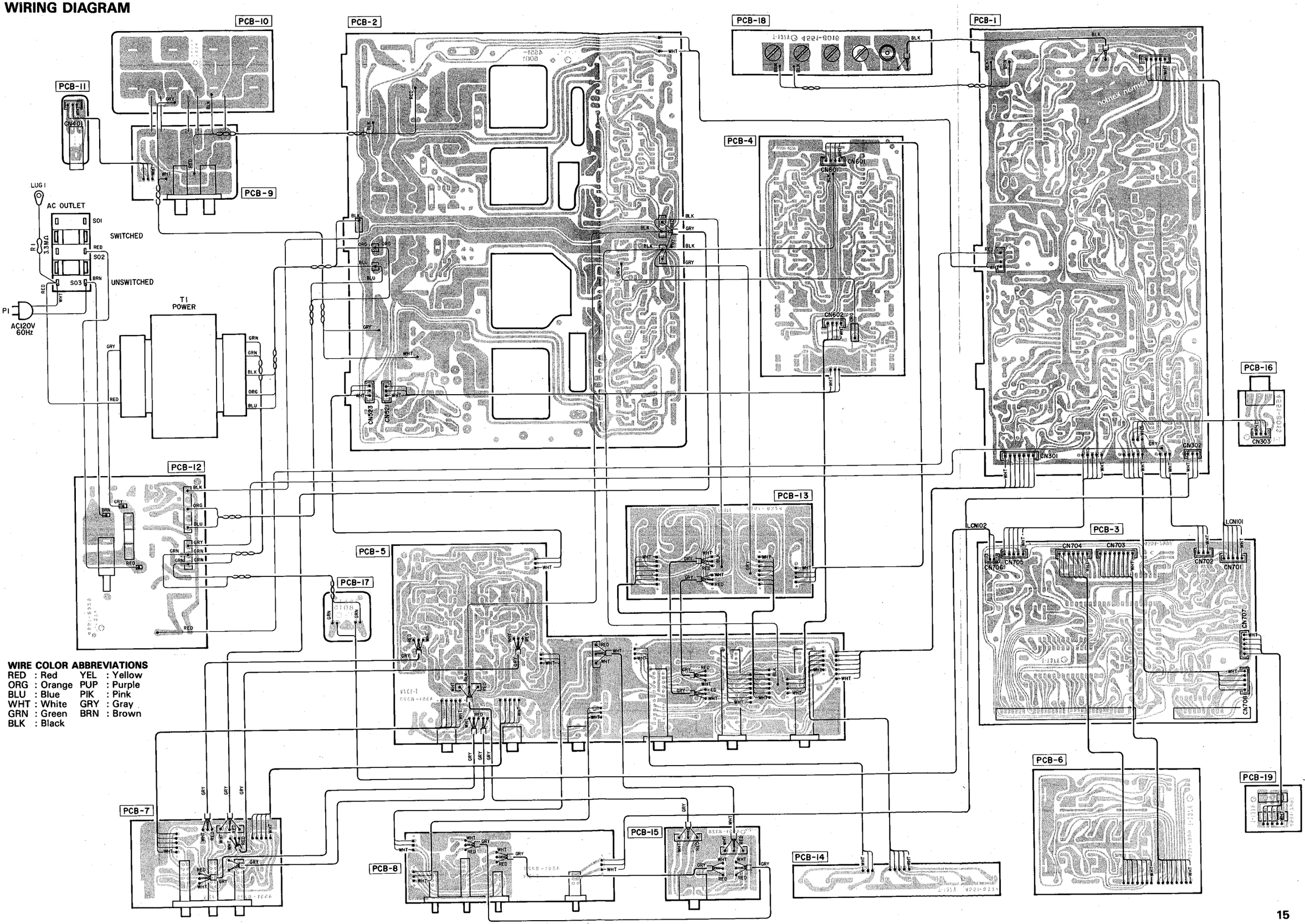


F G H I J



NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω .
KΩ=1000Ω . MΩ=1000KΩ .
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED .
3. ALL CAPACITANCES VALUES ARE IN #F UNLESS OTHERWISE NOTED . P=#F
4. V:DC VOLTAGE AT NO SIGNAL
(-V) FM POSITION
(-V) AM POSITION
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS . THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS .

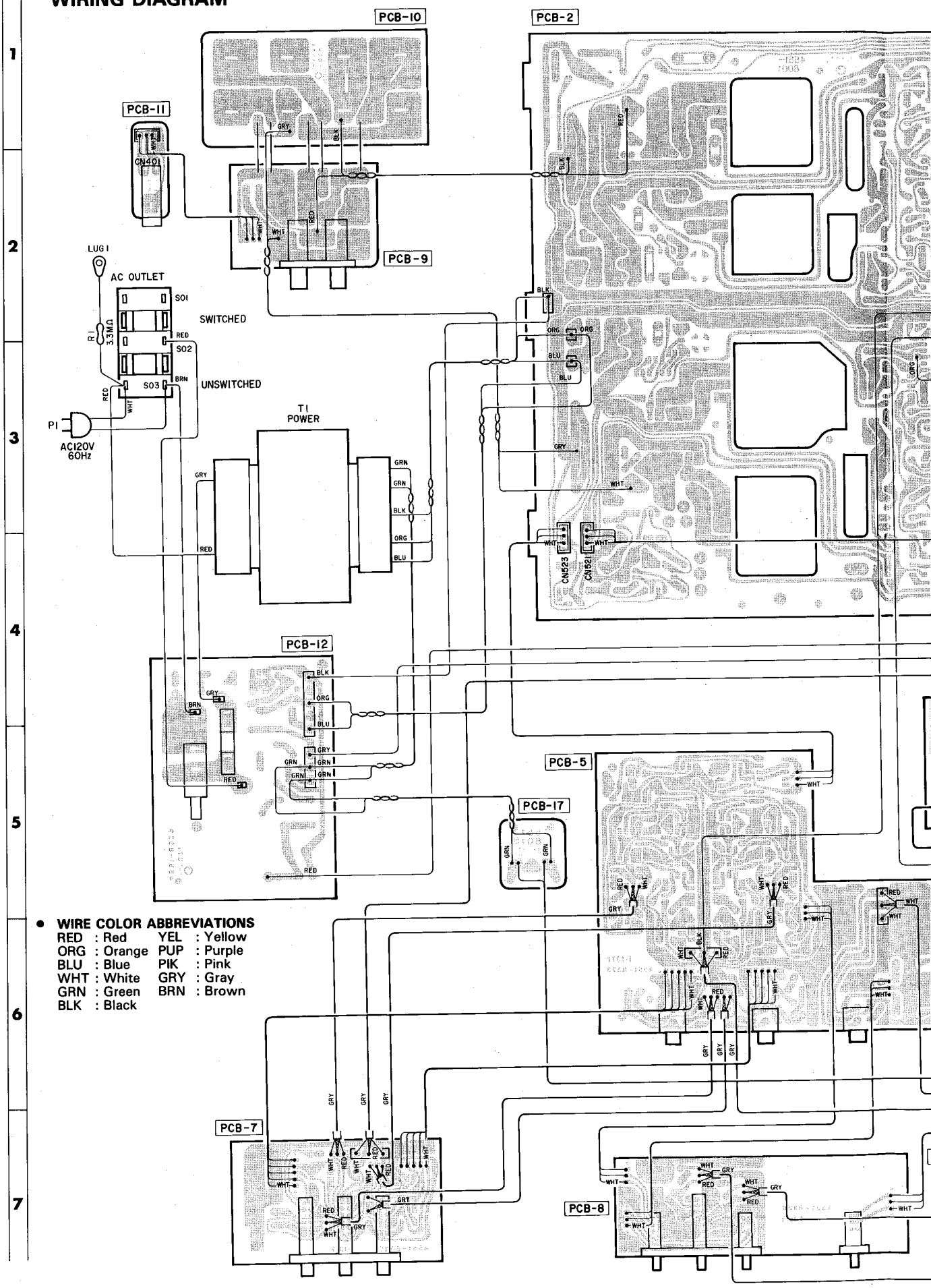
WIRING DIAGRAM



- **WIRE COLOR ABBREVIATIONS**

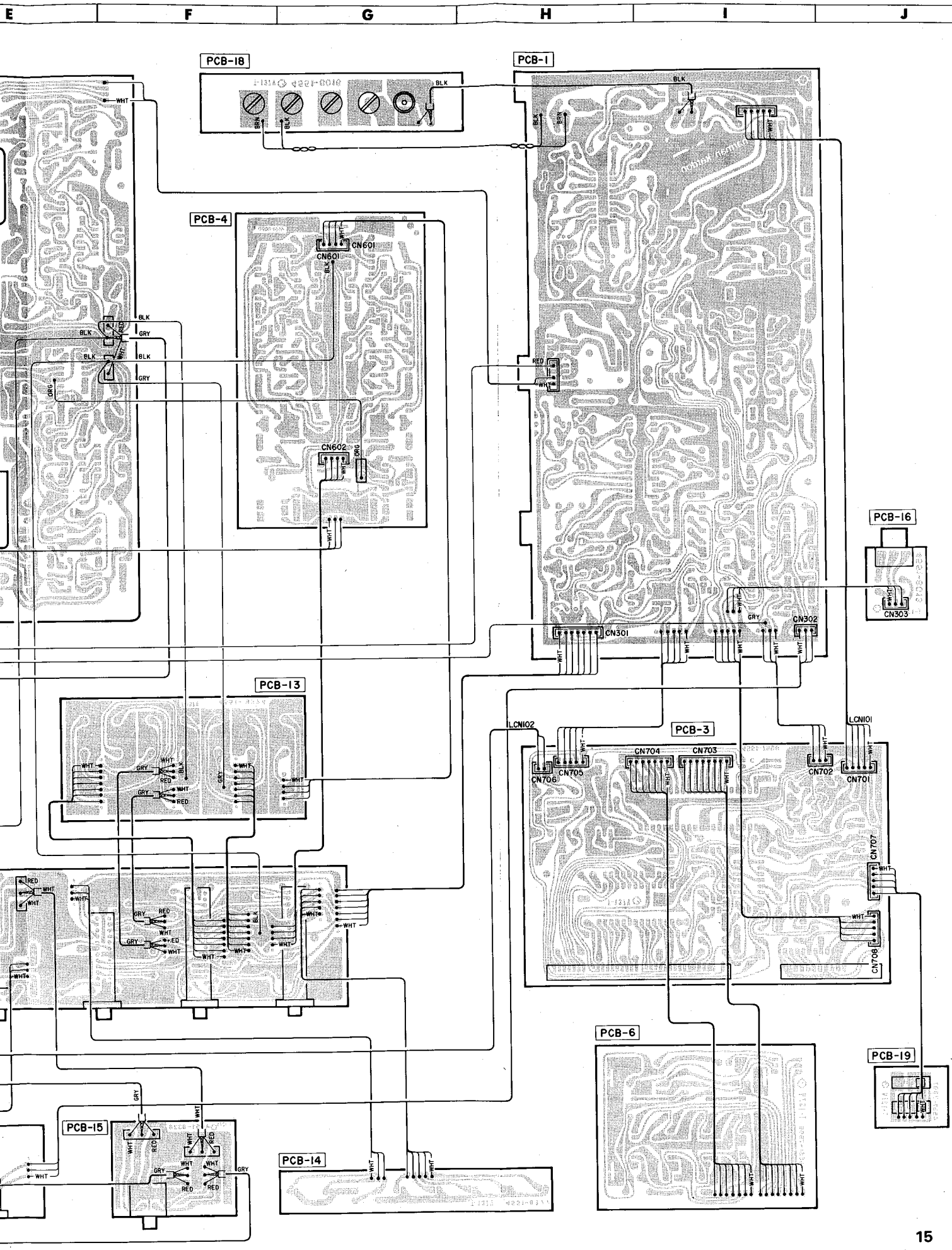
RED	: Red	YEL	: Yellow
ORG	: Orange	PUP	: Purple
BLU	: Blue	PIK	: Pink
WHT	: White	GRY	: Gray
GRN	: Green	BRN	: Brown
BLK	: Black		

WIRING DIAGRAM



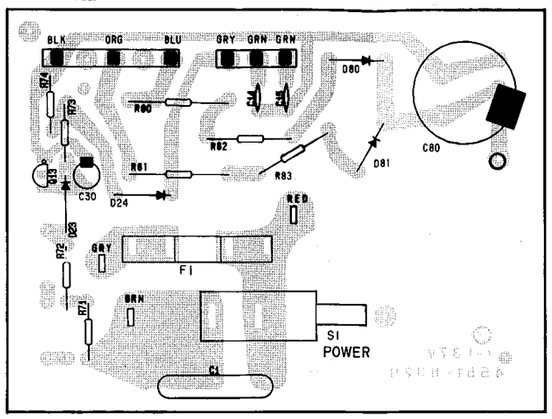
- **WIRE COLOR ABBREVIATIONS**

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

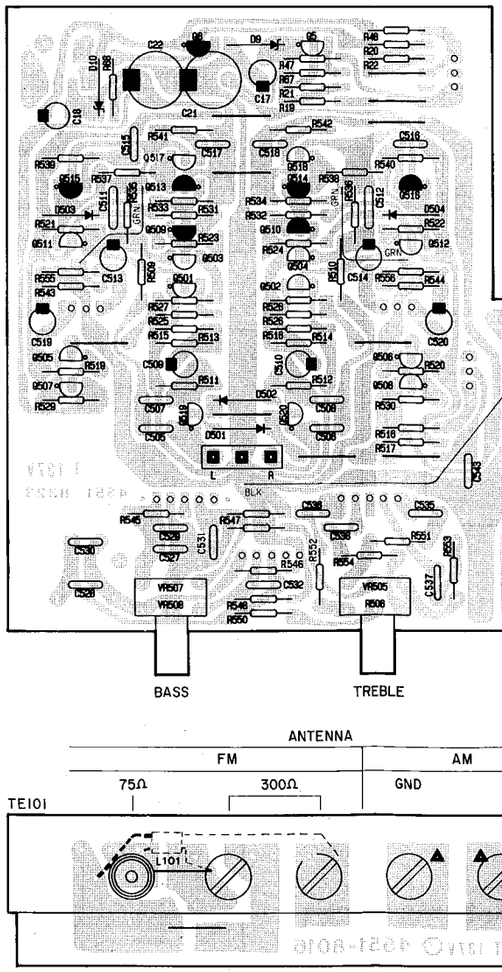

E
F
G
H
I
J
PCB-18
PCB-1
PCB-4
CN601
CN602
CN301
CN302
CN303
PCB-16
PCB-13
PCB-3
LCN102
LCN101
CN704
CN703
CN705
CN706
CN702
CN701
CN707
CN708
PCB-6
PCB-19
PCB-15
PCB-14
WHT
BLK
GRY
RED
ORG

P. C. BOARDS (1)

PCB-12 Power Switch P. C. Board

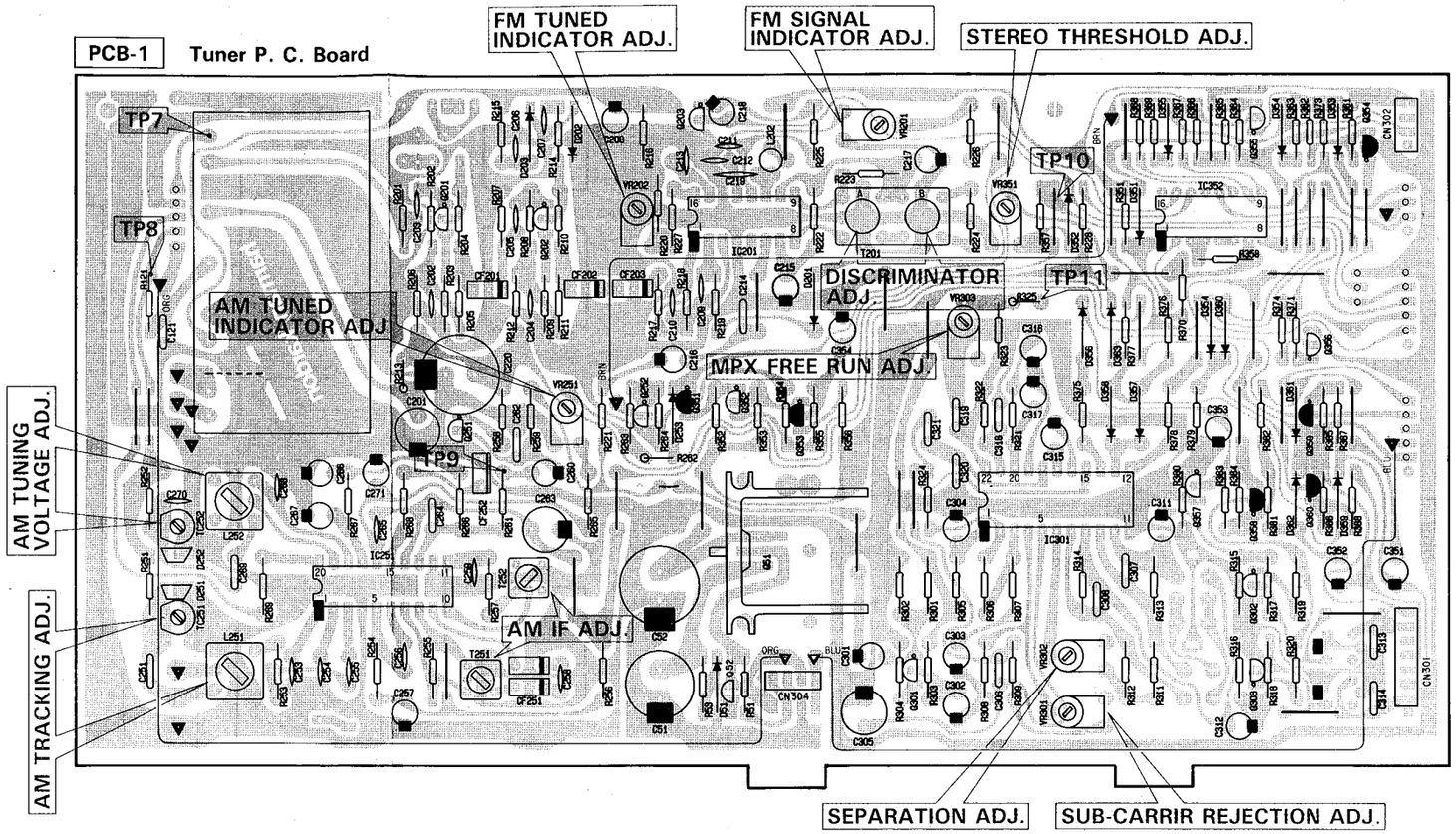


PCB-5 Tone Control P. C. Board

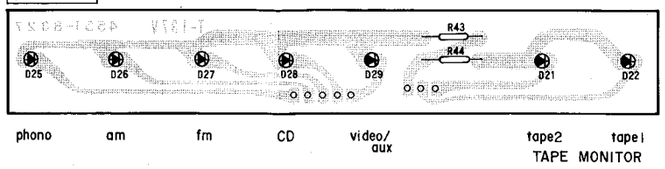


PCB-18 Antenna Terminal P. C. Board

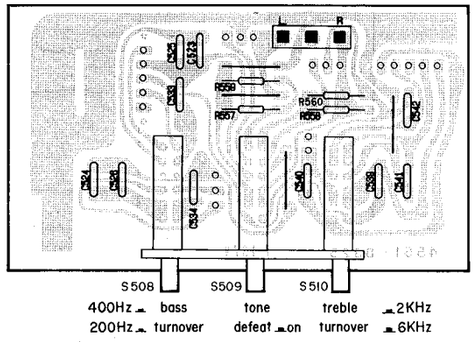
PCB-1 Tuner P. C. Board



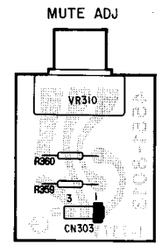
PCB-14 Function Indicator P. C. Board



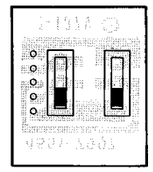
PCB-7 Tone Selector P. C. Board



PCB-16 Mute Adj. VR P. C. Board

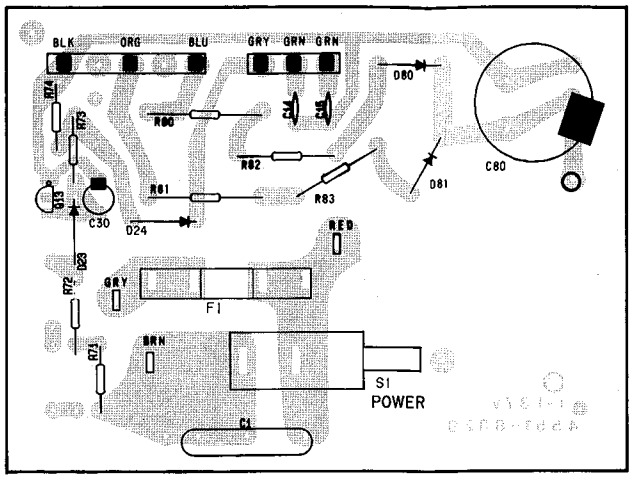


PCB-19 Step Control Switches P. C. Board

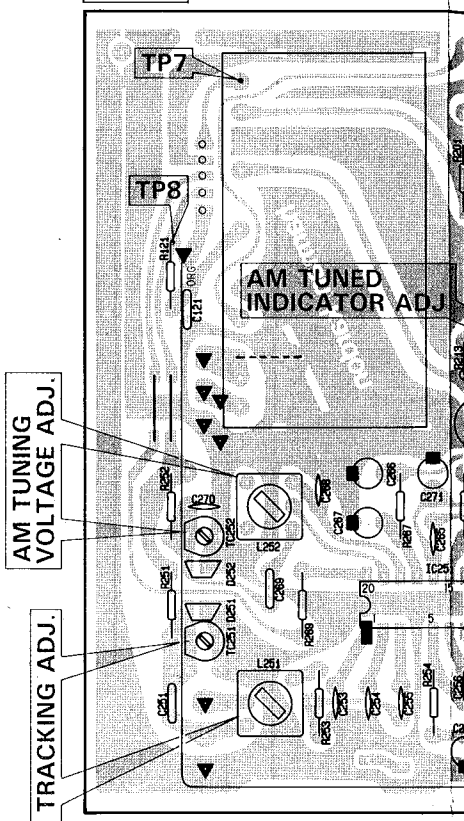


P. C. BOARDS (1)

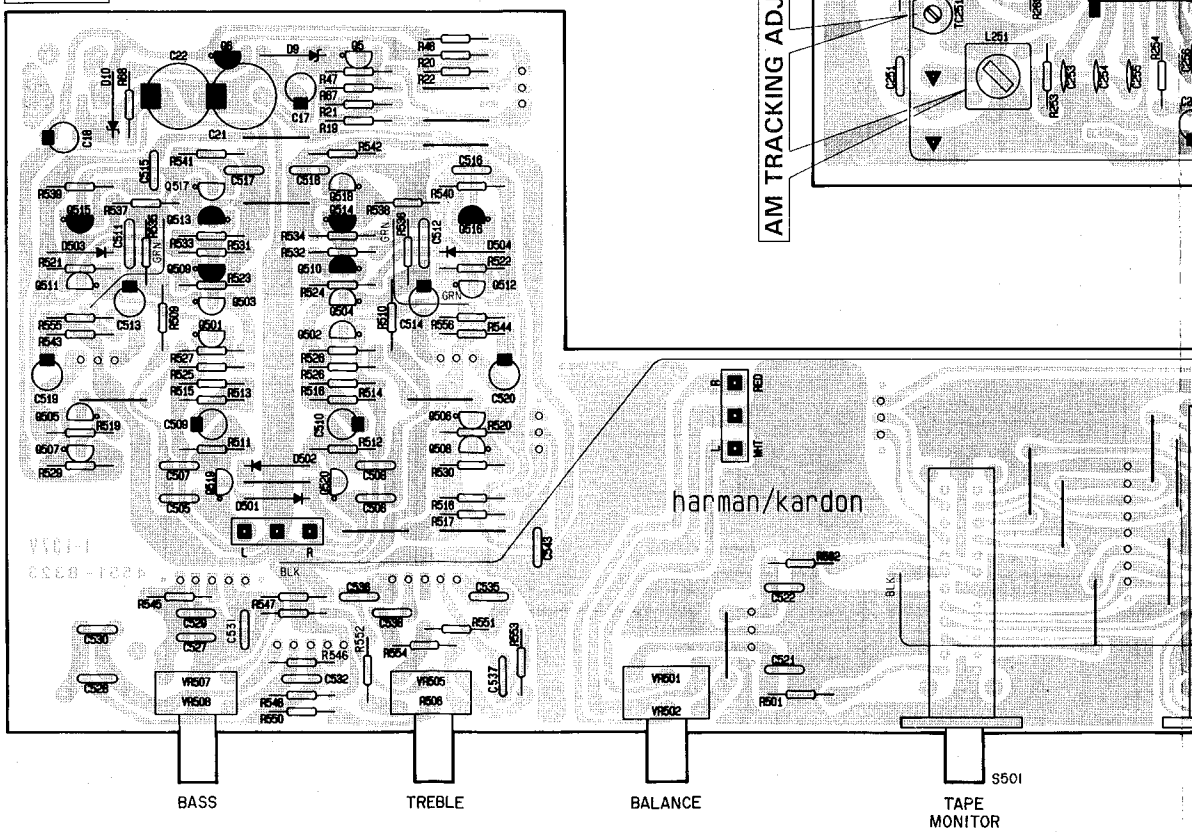
PCB-12 Power Switch P. C. Board



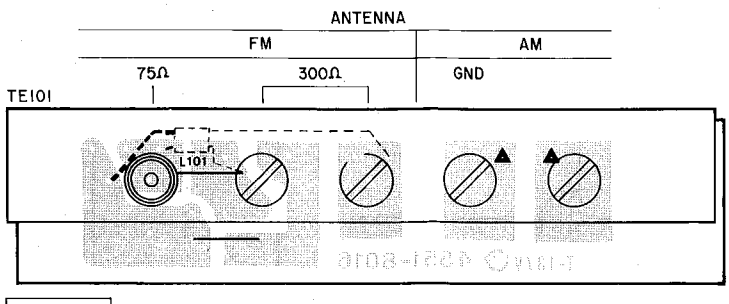
PCB-1 Tuner P. C. Board



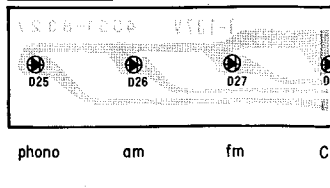
PCB-5 Tone Control P. C. Board



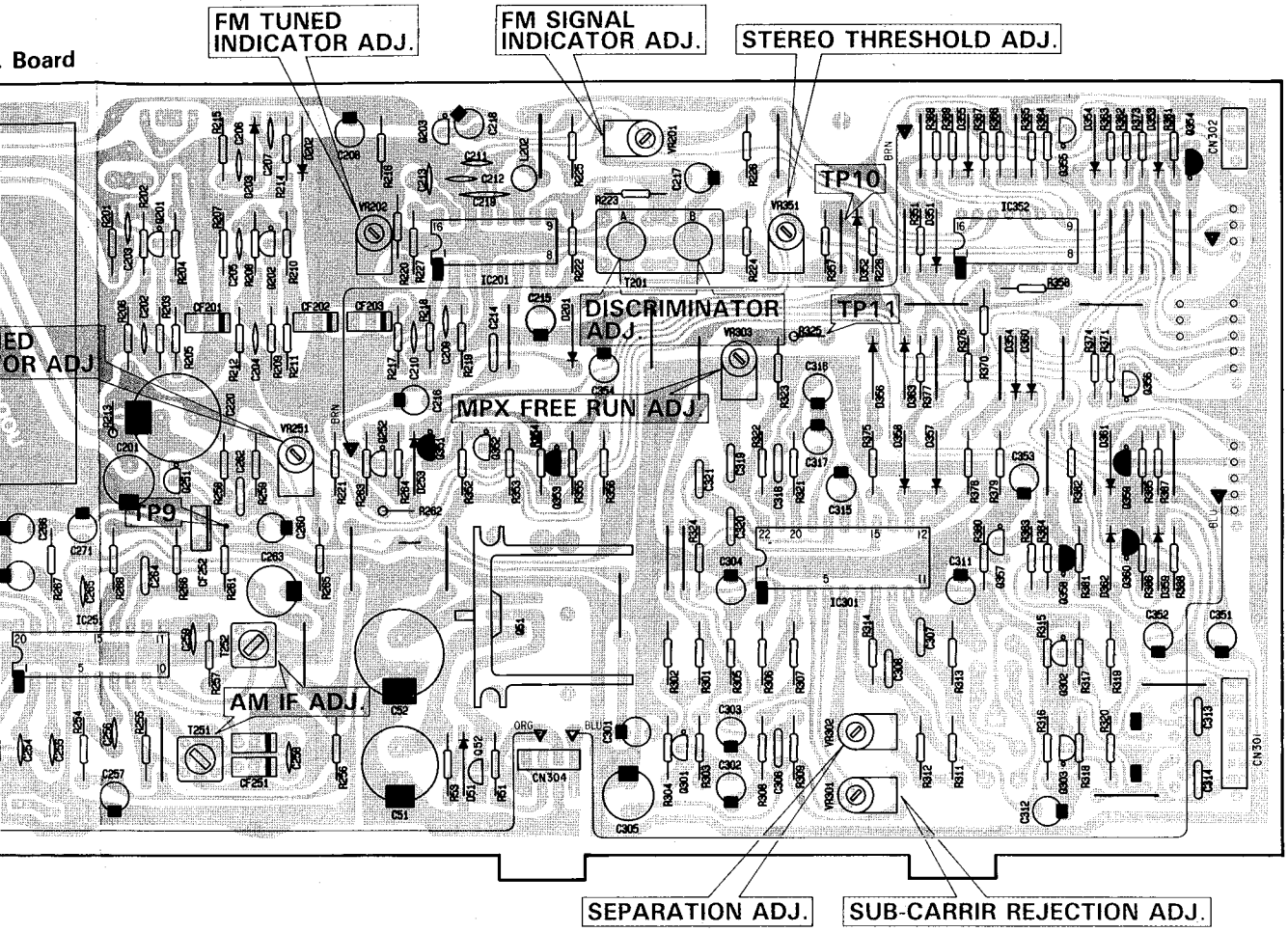
PCB-18 Antenna Terminal P. C. Board

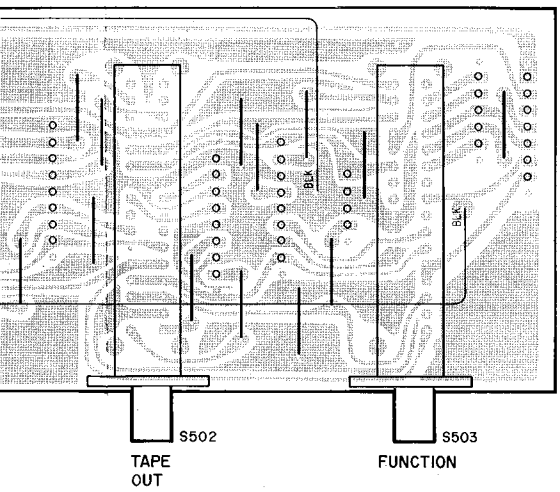


PCB-14 Function Indicat

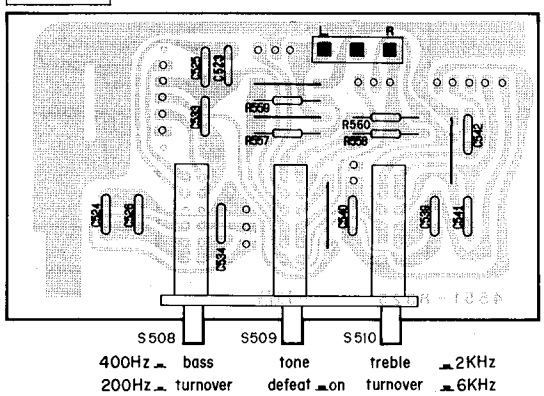


. Board

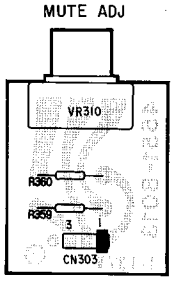




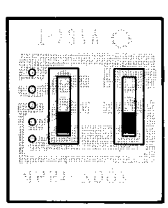
PCB-7 Tone Selector P. C. Board



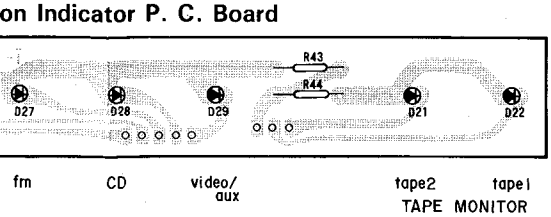
PCB-16
Mute Adj. VR P. C. Board



PCB-19
Step Control Switches P. C. Board

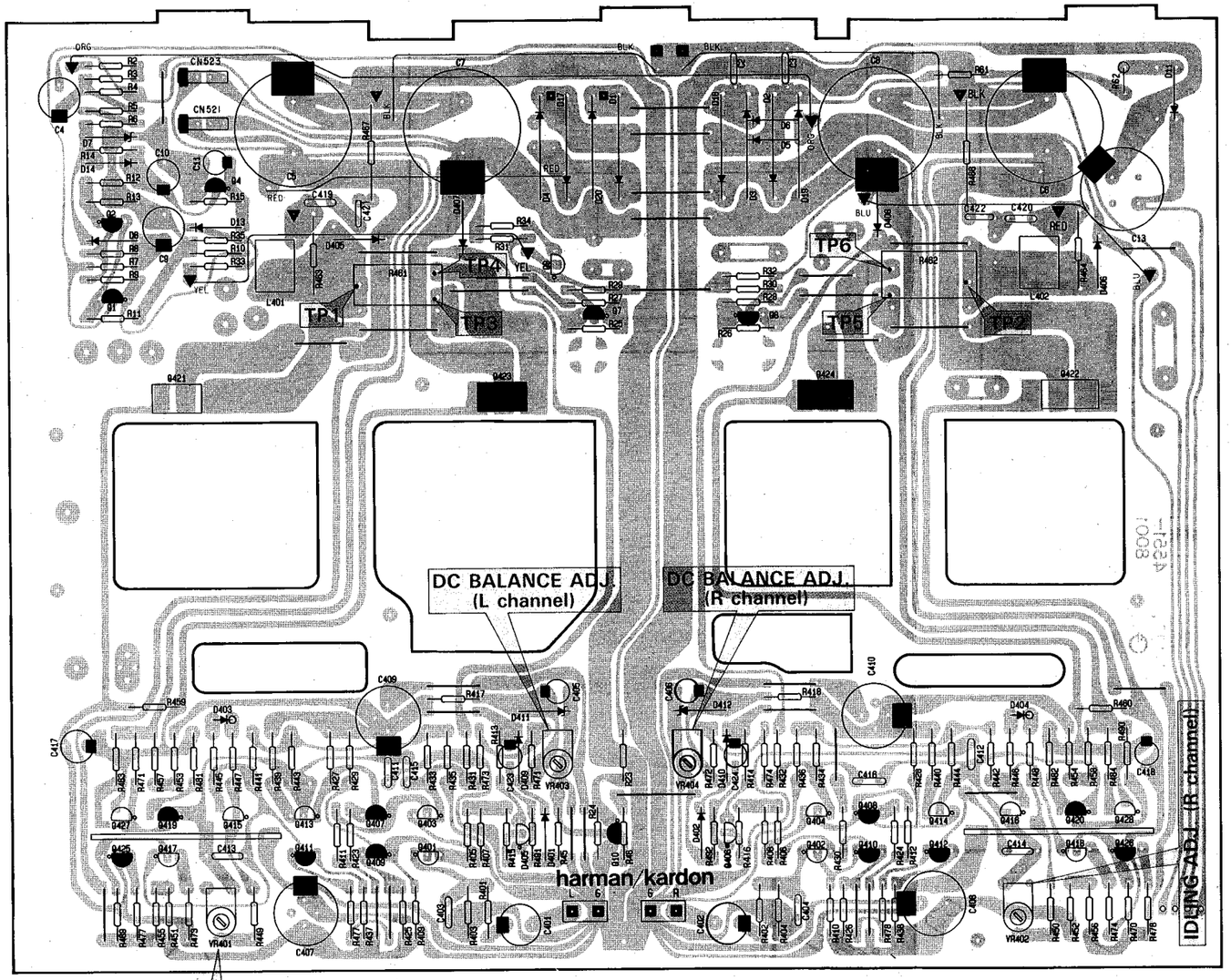


on Indicator P. C. Board

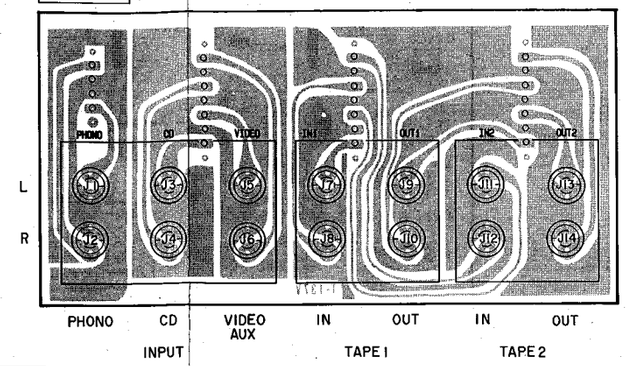


P. C. BOARDS (2)

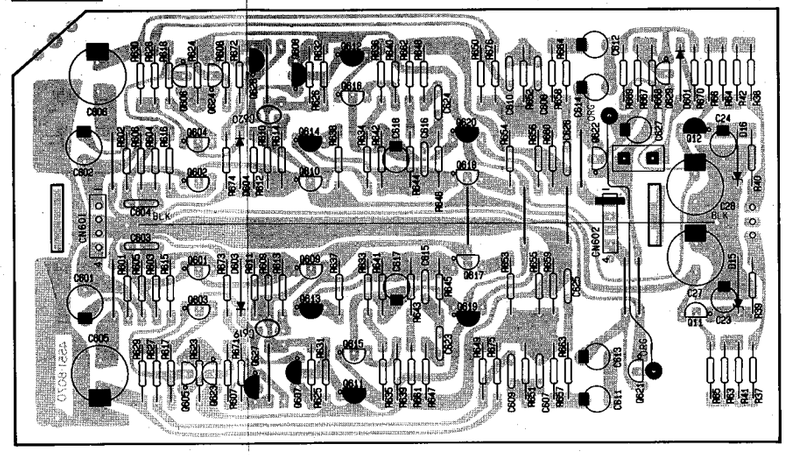
PCB-2 Power Amp. P. C. Board



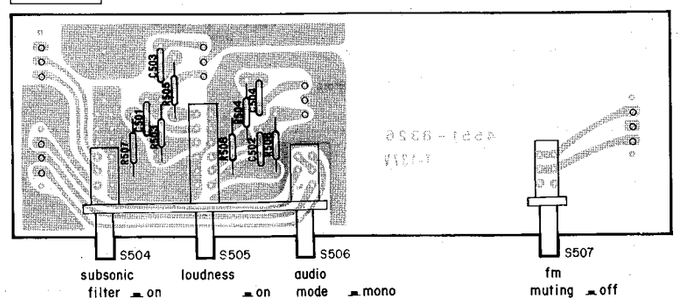
PCB-13 Pin Jack P. C. Board



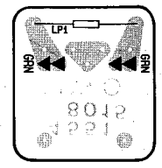
PCB-4 Equalizer P. C. Board



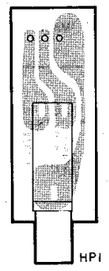
PCB-8 Push Switches P. C. Board



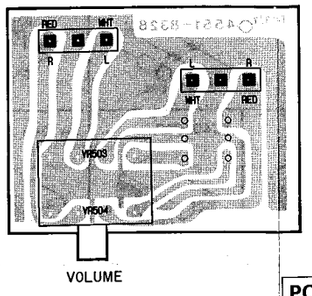
PCB-17 Lamp P. C. Board



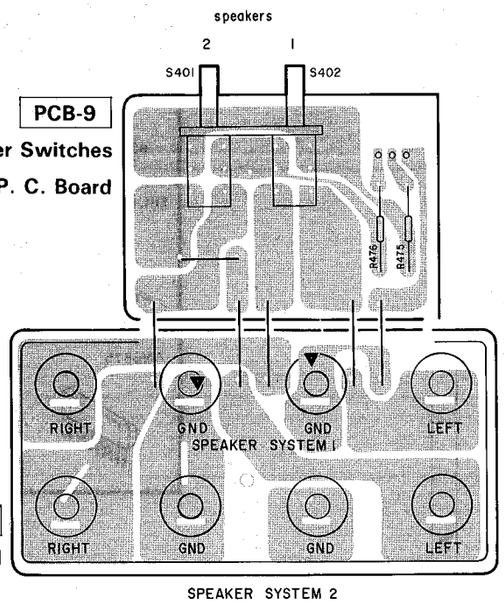
PCB-11 Headphone Jack P. C. Board



PCB-15 Volume P. C. Board



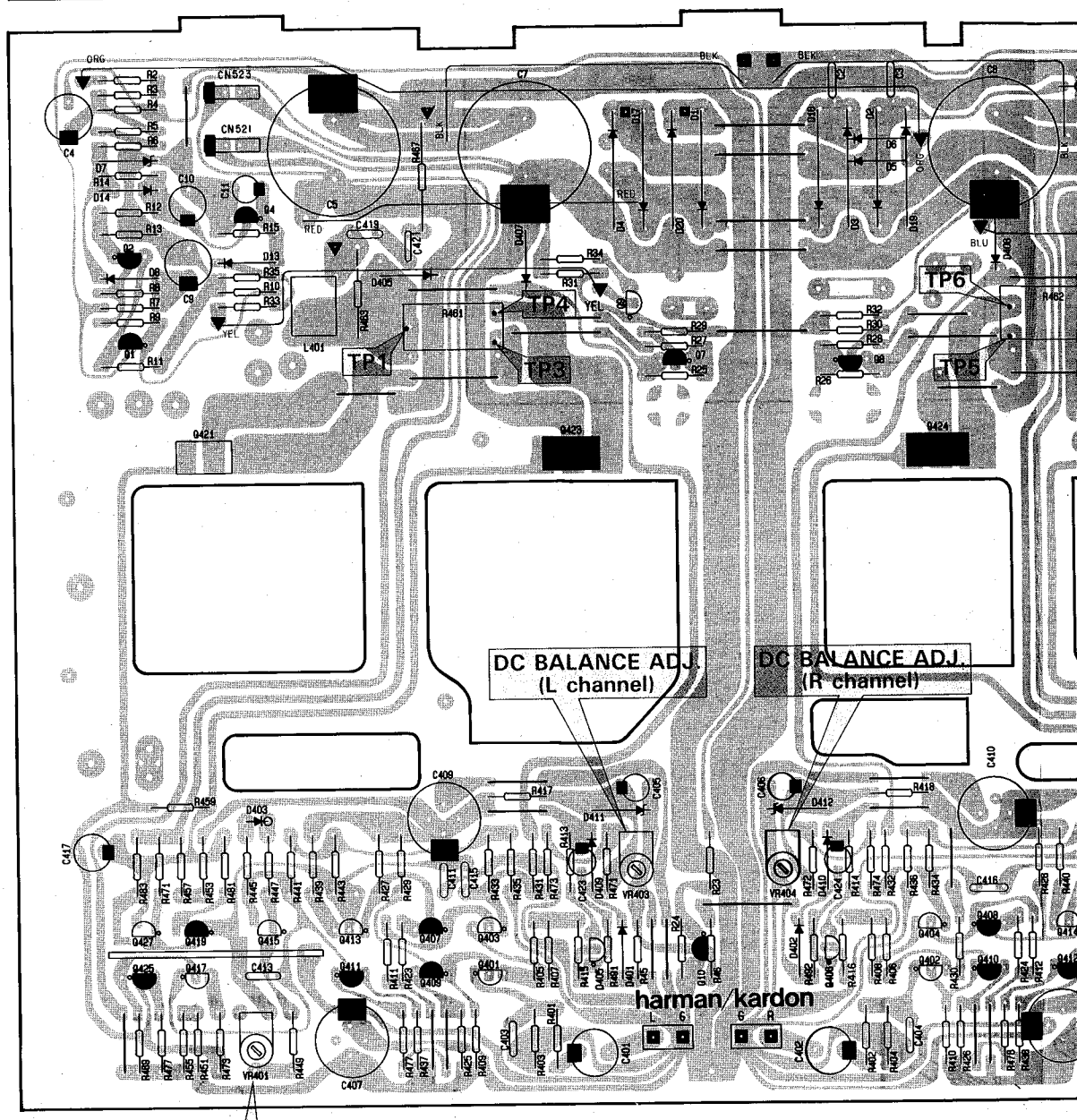
PCB-9 Speaker Switches P. C. Board



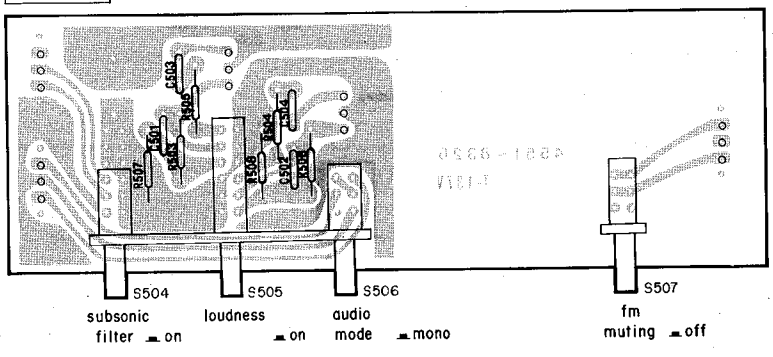
PCB-10 Speaker Terminal P. C. Board

P. C. BOARDS (2)

PCB-2 Power Amp. P. C. Board



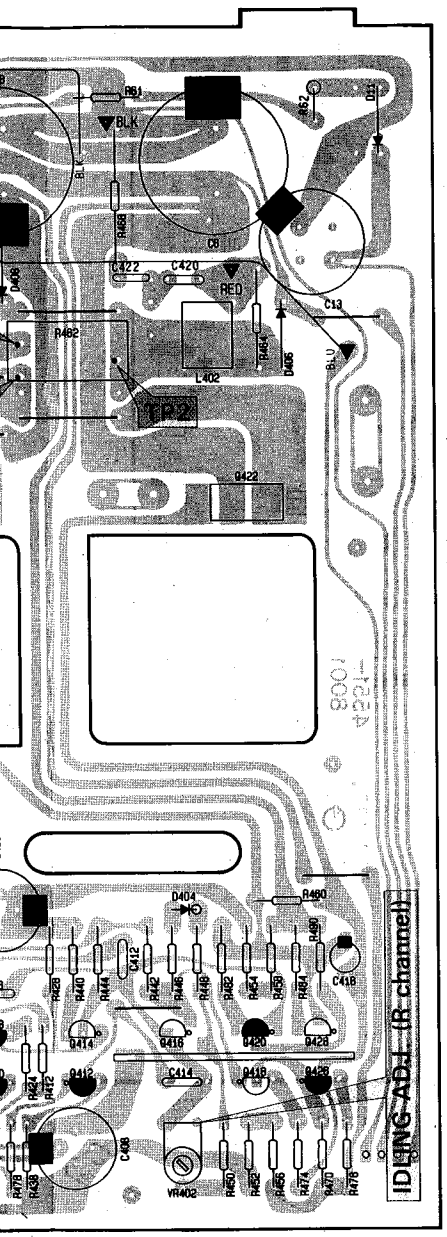
PCB-8 Push Switches P. C. Board



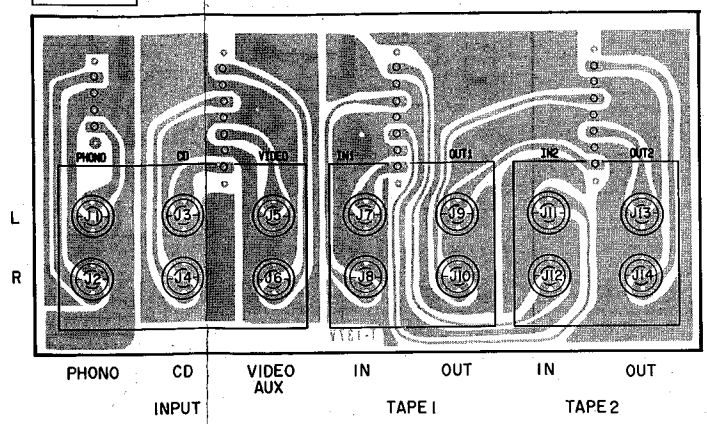
PCB-17

Lamp P. C. Boar

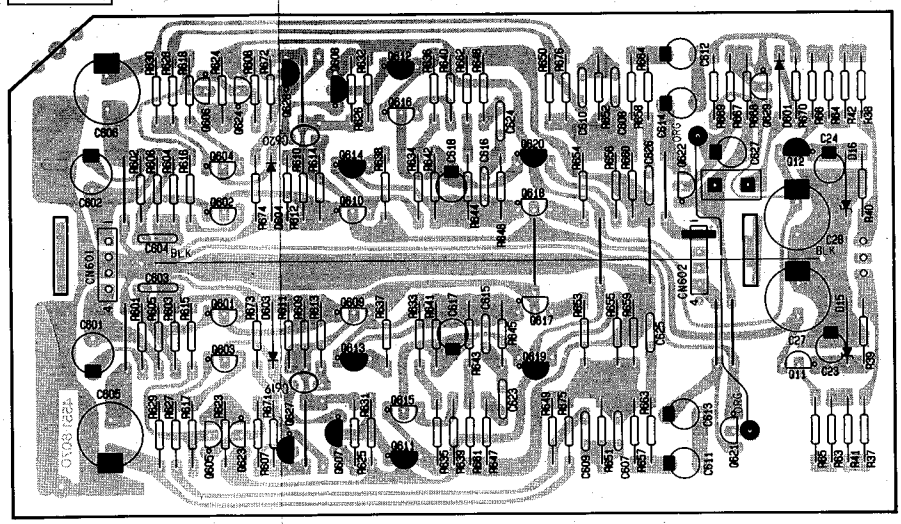
E | F | G | H | I | J



PCB-13 Pin Jack P. C. Board



PCB-4 Equalizer P. C. Board



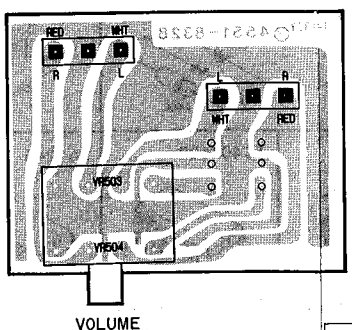
C. Board

PCB-11

Headphone Jack P. C. Board

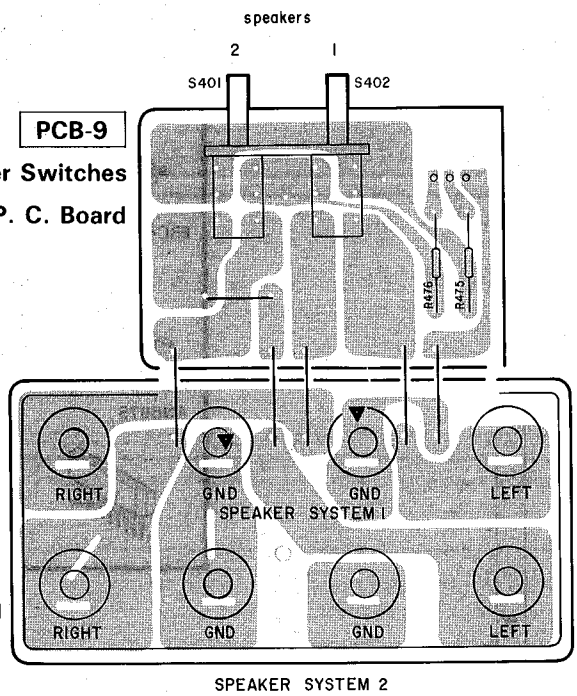
PCB-15

Volume P. C. Board



PCB-9

Speaker Switches P. C. Board

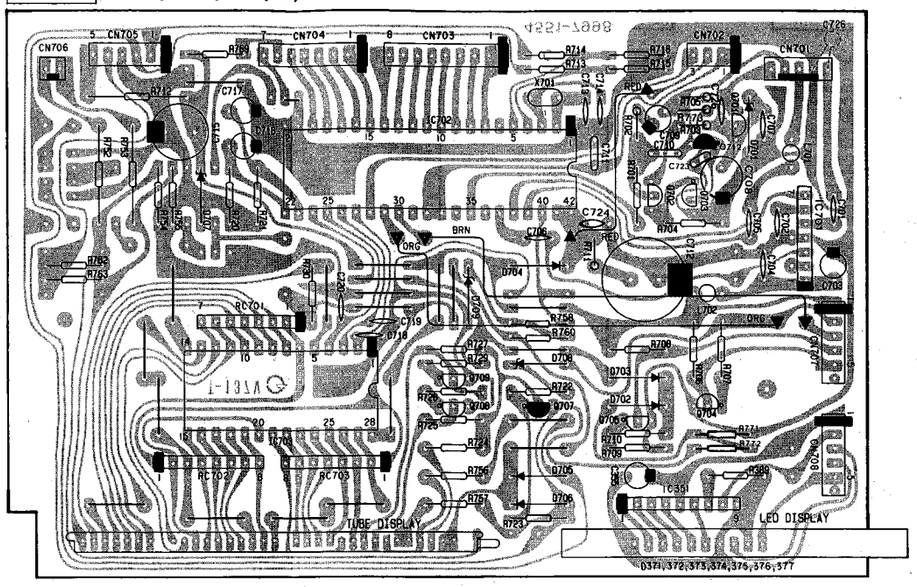


PCB-10

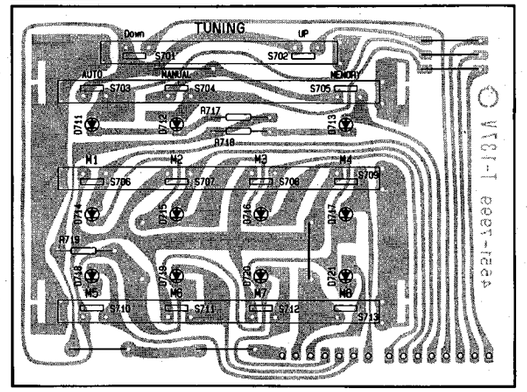
Speaker Terminal P. C. Board

P. C. BOARDS (3)

PCB-3 Frequency Display P. C. Board



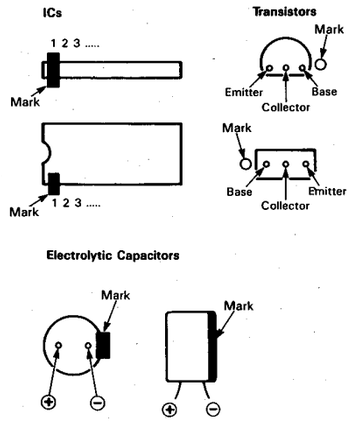
PCB-6 Tact Switches P. C. Board



PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

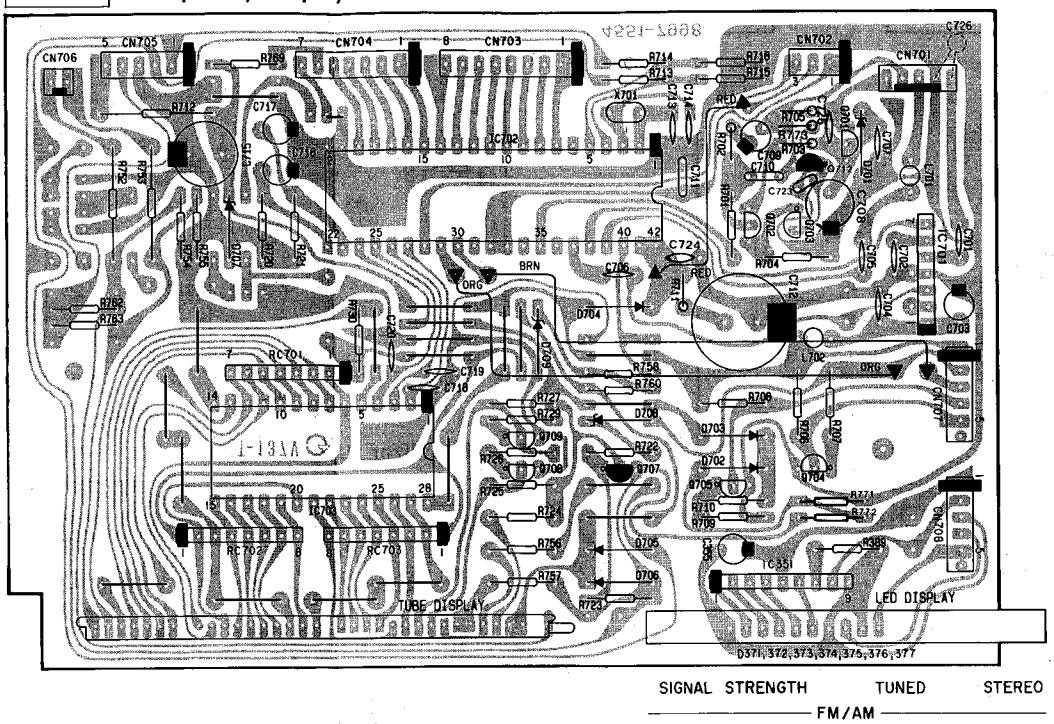
2SA1115 2SC2603	2SD880 2SA1111 2SC2591	2SA872A 2SC2058 2SC2240 2SC945 2SC2320L 2SA970	2SA965 2SC2705 2SA1145 2SC2235	2SC3281 2SA1302	2SC3422 2SA1359	2SK381 2SK362 2SK117 2SK364
ERC402FL	1S2473 HZ24-2L 1S2471 RD5.1EB2 HZ11B2L RD5.6EB2 HZ15-1L RD10EB3 HZ12C3L HZ27-3L 1SS53 1SR35-20		1SV102	MV12YM	GL5NG6 GL5PR6	TD6104P
AN6875	HA11225	TC4049BP	LA1245	μPC1223C	TD6301AP	TC9147BP

NOTE:
In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.



P. C. BOARDS (3)

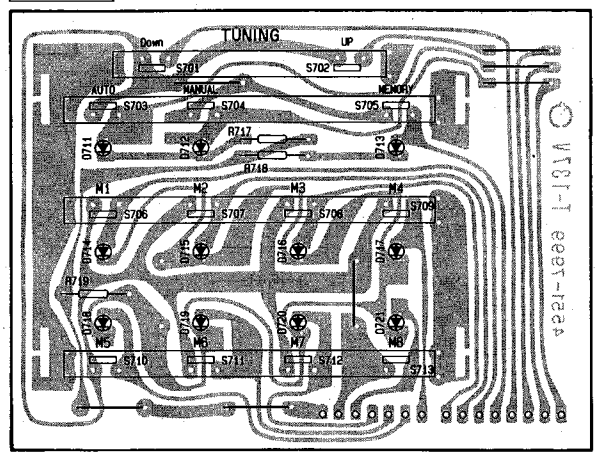
PCB-3 Frequency Display P. C. Board

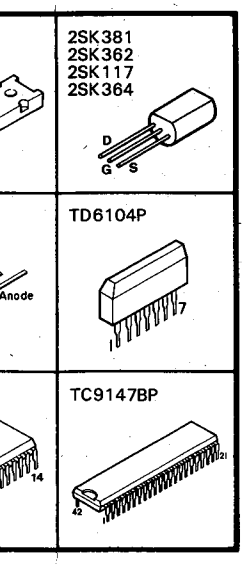


PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

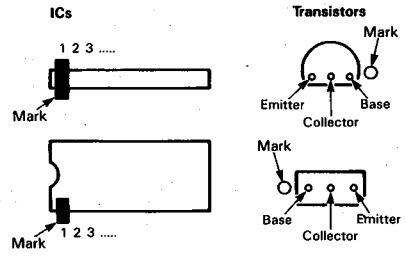
2SA1115 2SC2603	2SD880 2SA1111 2SC2591	2SA872A 2SC2058 2SC2240 2SC945 2SC2320L 2SA970	2SA965 2SC2705 2SA1145 2SC2235	2SC3281 2SA1302	2SC3422 2SA1359
ERC402FL Anode / Cathode	1S2473 HZ24-2L 1S2471 RD5.1EB2 HZ11B2L RD5.6EB2 HZ15-1L RD10EB3 HZ12C3L HZ27-3L 1SS53 1SR35-20 Anode / Cathode DIODE		1SV102 Anode / Cathode	MV12YM MARK	GL5NG6 GL5PR6 Cathode / Anode
AN6875	HA11225	TC4049BP	LA1245	μPC1223C	TD6301AP

PCB-6 Tact Switches P. C. Board

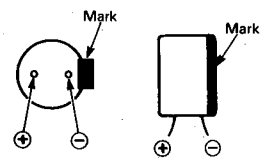




NOTE:
In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.



Electrolytic Capacitors



ELECTRIC PARTS LIST

	Ref.No.	Part No.	Description
		CHASSIS MISCELLANEOUS	
⚠	PI	4161-71151	Power Cord
⚠	TI	5584-701515	Power Transformer
⚠	SOI/	4474-156	AC Outlet, Switched,
⚠	SO2/		Switched,
⚠	SO3		Unswitched
⚠	FI	5732-632031	Fuse, 6.3A, 125V
⚠	RI	5135-335J50P	3.3MΩ, 1/2W, CAR
	LUGI	4211-4	Lug Terminal
		5911-239	AM Loop Antenna
		1397-6	Dipole Antenna (Accessary)
		4442-14	Pin Plug, Tape 2 Input (Accessary)
		PCB-I TUNER P.C.BOARD	
		RESISTORS	
⚠	R51	5102-3R3579	3.3Ω, 1/4W, FR
⚠	R305	5102-2204713	22Ω, 1/4W, FR
	R323	5174-163381	16kΩ, 1/4W, MR
		CONTROLS	
	VR201	5101-50371920	50kΩB
	VR202	5101-50371920	50kΩB
	VR251	5101-50371920	50kΩB
	VR301	5101-10471920	100kΩB
	VR302	5101-10471920	100kΩB
	VR303	5101-1037187	10kΩ
	VR310	5113-50372136	50kΩ
	VR351	5101-10471920	100kΩB
		CAPACITORS	
	C51	5345-337C045	330μF/16V, EC
	C52	5345-108-16	1000μF/16V, EC
	C201	5345-476-16	47μF/16V, EC
	C208	5345-106-16	10μF/16V, EC
	C214	5359-1015851	100pF/100V, PC
	C215	5345-105-50	1μF/50V, EC
	C216	5345-226C0952	22μF/16V, EC
	C217	5345-106-16	10μF/16V, EC
	C218	5345-L104M50	0.1μF/50V, EC
	C220	5345-108-16	1000μF/16V, EC
	C257	5345-106-16	10μF/16V, EC
	C260	5345-L104M50	0.1μF/50V, EC
	C263	5345-107-16	100μF/16V, EC
	C266	5345-335-50	3.3μF/50V, EC
	C267	5345-475-25	4.7μF/25V, EC
	C269	5359-5115851	510pF/100V, PC
	C271	5345-225-50	2.2μF/50V, EC
	C301	5345-L226M16	22μF/16V, EC
	C302	5345-L107M10	100μF/10V, EC
	C303	5345-L226M16	22μF/16V, EC
	C304	5345-476-16	47μF/16V, EC
	C305	5345-227C045	220μF/16V, EC
	C311	5345-L225M50	2.2μF/50V, EC
	C312	5345-L225M50	2.2μF/50V, EC
	C315	5345-L106M16	10μF/16V, EC
	C316	5345-L475M25	4.7μF/25V, EC
	C317	5345-L474M50	0.47μF/50V, EC
	C320	5359-8215851	820pF/100V, PC
	C351	5345-106-16	10μF/16V, EC
	C352	5345-106-16	10μF/16V, EC
	C353	5345-474-50	0.47μF/50V, EC
	C354	5345-226-16	22μF/16V, EC
	TC251	5371-93	Trimmer Capacitor
	TC252	5371-93	Trimmer Capacitor
		INTEGRATED CIRCUITS	
	IC201	5652-HA11225	HA11225
	IC251	5652-LA1245	LA1245
	IC301	5652-μPC1223C	μPC1223C
	IC352	5654-TC4049BP	TC4049BP

Ref.No.	Part No.	Description
	TRANSISTORS	
Q51	5614-880(GR)	2SD880(GR)
Q52	5616-2SK381(D)	F.E.T., 2SK381(D)
Q201	5613-2058(N)	2SC2058(N) or (P)
Q202	5613-2058(N)	2SC2058(N) or (P)
Q203	5613-2603(F)	2SC2603(F) or (E)
Q251	5613-2603(F)	2SC2603(F) or (E)
Q252	5613-2603(F)	2SC2603(F) or (E)
Q301	5613-2603(F)	2SC2603(F) or (E)
Q302	5613-2603(F)	2SC2603(F) or (E)
Q303	5613-2603(F)	2SC2603(F) or (E)
Q351	5611-1115(F)	2SA1115(F) or (E)
Q352	5613-2603(F)	2SC2603(F) or (E)
Q353	5611-1115(F)	2SA1115(F) or (E)
Q354	5611-1115(F)	2SA1115(F) or (E)
Q355	5613-2603(F)	2SC2603(F) or (E)
Q356	5613-2603(F)	2SC2603(F) or (E)
Q357	5613-2603(F)	2SC2603(F) or (E)
Q358	5611-1115(F)	2SA1115(F) or (E)
Q359	5611-1115(F)	2SA1115(F) or (E)
Q360	5611-1115(F)	2SA1115(F) or (E)
	DIODES	
D51	5635-HZ15-1L	ZD, HZ15-1L
D201	5631-1S2473	1S2473
D202	5631-1S2473	1S2473
D203	5631-1S2473	1S2473
D251	5633-1SV102	1SV102
D252	5633-1SV102	1SV102
D253	5631-1S2473	1S2473
D351	5635-RD5R1EB2	ZD, RD5.1EB2
D352	5631-1S2473	1S2473
D353	5631-1S2473	1S2473
D354	5631-1S2473	1S2473
D355	5631-1S2473	1S2473
D356	5631-1S2473	1S2473
D357	5631-1S2473	1S2473
D358	5631-1S2473	1S2473
D359	5631-1S2473	1S2473
D360	5631-1S2473	1S2473
D361	5631-1S2473	1S2473
D362	5631-1S2473	1S2473
D363	5631-1S2473	1S2473
D364	5631-1S2473	1S2473
	COILS	
L202	5995-2R2269	2.2 μH
L251	5933-70428	
L252	5923-70133	
	TRANSFORMERS	
T201	5574-7024	
T251	5552-70113	
T252	5932-70123	
	MISCELLANEOUS	
	6114-7135	FM Tuner Ass'y
CF201	5671-7217A	Ceramic Filter
CF202	5671-7217A	Ceramic Filter
CF203	5671-7217A	Ceramic Filter
CF251	5671-7138F	Ceramic Filter
CF252	5671-7137C	Ceramic Filter
CN301	4443-070185	Connector, 7 Pos.
CN302	4443-030185	Connector, 3 Pos.
CN304	4443-040185	Connector, 4 Pos.
LCN101	4163-70196	CLW, 5 Pos.
	2132-5049	Spacer, R51, D51

PCB-2 POWER AMP P.C.BOARD

	Ref.No.	Part No.	Description
		RESISTOR	
⚠	R61	5102-1514715	150Ω, 1/4W, FR
⚠	R62	5102-1814713	180Ω, 1/4W, FR
	R413	5174-Z350028	350Ω, 1/4W, MR
	R414	5174-Z350028	350Ω, 1/4W, MR
	R417	5174-562381	5.6kΩ, 1/4W, MR
	R418	5174-562381	5.6kΩ, 1/4W, MR
⚠	R423	5102-3314713	330Ω, 1/4W, FR
⚠	R424	5102-3314713	330Ω, 1/4W, FR
⚠	R425	5102-3314715	330Ω, 1/4W, FR
⚠	R426	5102-3314715	330Ω, 1/4W, FR
⚠	R427	5102-3314713	330Ω, 1/4W, FR
⚠	R428	5102-3314713	330Ω, 1/4W, FR
⚠	R429	5102-3314715	330Ω, 1/4W, FR
⚠	R430	5102-3314715	330Ω, 1/4W, FR
⚠	R437	5102-4704713	47Ω, 1/4W, FR
⚠	R438	5102-4704713	47Ω, 1/4W, FR
⚠	R439	5102-4704713	47Ω, 1/4W, FR
⚠	R440	5102-4704713	47Ω, 1/4W, FR
⚠	R455	5102-5R64713	5.6Ω, 1/4W, FR
⚠	R456	5102-5R64713	5.6Ω, 1/4W, FR
⚠	R457	5102-5R64713	5.6Ω, 1/4W, FR
⚠	R458	5102-5R64713	5.6Ω, 1/4W, FR
⚠	R459	5174-820381	82Ω, 1/4W, MR
	R460	5174-820381	82Ω, 1/4W, MR
	R461	5273-R22672	0.22Ω, 3W, CR
	R462	5273-R22672	0.22Ω, 3W, CR
	R467	5173-100571	10Ω, 2W, MR
	R468	5173-100571	10Ω, 2W, MR
⚠	R469	5102-1014713	100Ω, 1/4W, FR
⚠	R470	5102-1014713	100Ω, 1/4W, FR
⚠	R477	5102-2R2579	2.2Ω, 1/4W, FR
⚠	R478	5102-2R2579	2.2Ω, 1/4W, FR
⚠	R479	5102-3314713	330Ω, 1/4W, FR
⚠	R480	5102-3314713	330Ω, 1/4W, FR
⚠	R483	5102-2R2579	2.2Ω, 1/4W, FR
⚠	R484	5102-2R2579	2.2Ω, 1/4W, FR
⚠	R489	5102-1014713	100Ω, 1/4W, FR
⚠	R490	5102-1014713	100Ω, 1/4W, FR
		CONTROLS	
	VR401	5101-20271920	2kΩB
	VR402	5101-20271920	2kΩB
	VR403	5101-10471920	100kΩB
	VR404	5101-10471920	100kΩB
		CAPACITORS	
	C4	5345-476F041	47μF/50V, EC
	C5	5341-478R0955	4700μF/56V, EC
	C6	5341-478R0955	4700μF/56V, EC
	C7	5341-478R0955	4700μF/56V, EC
	C8	5341-478R0955	4700μF/56V, EC
	C9	5345-107C041	100μF/16V, EC
	C10	5345-476C041	47μF/16V, EC
	C11	5345-106C041	10μF/16V, EC
	C13	5345-477G041	470μF/63V, EC
	C401	5345-107B0951	100μF/10V, EC
	C402	5345-107B0951	100μF/10V, EC
	C403	5359-101585I	100pF/100V, PC
	C404	5359-101585I	100pF/100V, PC
	C405	5345-106D041	10μF/25V, EC
	C406	5345-106D041	10μF/25V, EC
	C407	5345-227G041	220μF/63V, EC
	C408	5345-227G041	220μF/63V, EC
	C409	5345-227G041	220μF/63V, EC
	C410	5345-227G041	220μF/63V, EC
	C411	5359-101585I	100pF/100V, PC
	C412	5359-101585I	100pF/100V, PC
	C415	5353-050934	5pF/500V, MC
	C416	5353-050934	5pF/500V, MC
	C417	5345-106F041	10μF/50V, EC
	C418	5345-106F041	10μF/50V, EC
	C423	5345-474F041	0.47μF/50V, EC
	C424	5345-474F041	0.47μF/50V, EC
		TRANSISTORS	
	Q1	5611-1115(E)	2SA1115(E) or (F)
	Q2	5611-1115(E)	2SA1115(E) or (F)
	Q4	5611-1115(E)	2SA1115(E) or (F)
	Q7	5611-872A(E)	2SA872A(E)
	Q8	5611-872A(E)	2SA872A(E)
	Q9	5613-2603(E)	2SC2603(E) or (F)
	Q10	5611-1115(E)	2SA1115(E) or (F)
	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(E)	2SC2603(E) or (F)
	Q406	5613-2603(E)	2SC2603(E) or (F)
	Q407	5611-1145(Y)	2SA1145(Y)
	Q408	5611-1145(Y)	2SA1145(Y)
	Q409	5611-1145(Y)	2SA1145(Y)
	Q410	5611-1145(Y)	2SA1145(Y)
	Q411	5611-1145(Y)	2SA1145(Y)
	Q412	5611-1145(Y)	2SA1145(Y)
	Q413	5613-2705(Y)	2SC2705(Y)
	Q414	5613-2705(Y)	2SC2705(Y)
	Q415	5613-945(K)	2SC945(K) or (P)
	Q416	5613-945(K)	2SC945(K) or (P)
	Q417	5613-2235(Y)	2SC2235(Y)
	Q418	5613-2235(Y)	2SC2235(Y)
	Q419	5611-965(Y)	2SA965(Y)
	Q420	5611-965(Y)	2SA965(Y)
	Q421	5613-3281(O)	2SC3281(O) or (R)
	Q422	5613-3281(O)	2SC3281(O) or (R)
	Q423	5611-1302(O)	2SA1302(O) or (R)
	Q424	5611-1302(O)	2SA1302(O) or (R)
	Q425	5611-1111(Q)	2SA1111(Q)
	Q426	5611-1111(Q)	2SA1111(Q)
	Q427	5613-2591(Q)	2SC2591(Q)
	Q428	5613-2591(Q)	2SC2591(Q)
		DIODES	
⚠	D1	5632-ERC402FL	ERC402FL
⚠	D2	5632-ERC402FL	ERC402FL
⚠	D3	5632-ERC402FL	ERC402FL
⚠	D4	5632-ERC402FL	ERC402FL
	D5	5636-1S2471	1S2471
	D6	5636-1S2471	1S2471
	D7	5635-HZ11B2L	ZD, HZ11B2L
	D8	5631-1S2473	1S2473
	D11	5632-1SR35-20	1SR35-20
	D13	5631-1S2473	1S2473
	D14	5631-1S2473	1S2473
⚠	D17	5632-ERC402FL	ERC402FL
⚠	D18	5632-ERC402FL	ERC402FL
⚠	D19	5632-ERC402FL	ERC402FL
⚠	D20	5632-ERC402FL	ERC402FL
	D401	5631-1S2473	1S2473
	D402	5631-1S2473	1S2473
	D403	5641-MV12YM	Varistor, MV12YM
	D404	5641-MV12YM	Varistor, MV12YM
	D405	5632-1SR35-20	1SR35-20
	D406	5632-1SR35-20	1SR35-20
	D407	5632-1SR35-20	1SR35-20
	D408	5632-1SR35-20	1SR35-20
	D409	5631-1S2473	1S2473
	D410	5631-1S2473	1S2473
	D411	5635-HZ12C3L	ZD, HZ12C3L
	D412	5635-HZ12C3L	ZD, HZ12C3L
		COILS	
	L401	5991-7165	
	L402	5991-7165	

Ref.No.	Part No.	Description
	MISCELLANEOUS	
CN521	4443-030185	Connector, 3 Pos.
CN523	4443-030185	Connector, 3 Pos.

PCB-3 FREQUENCY DISPLAY P.C.BOARD

	RESISTORS	
R712	5171-221581	220Ω, 1W, MR
R752	5171-220581	22Ω, 1W, MR
R753	5171-220581	22Ω, 1W, MR
	CAPACITORS	
C355	5345-106-16	10μF/16V, EC
C703	5345-476-10	47μF/10V, EC
C708	5345-336-35	33μF/35V, EC
C709	5345-334F0951	0.33μF/50V, EC
C712	5350-4730H651	47000μF/5V, SPC
C715	5345-227-10	220μF/10V, EC
C716	5345-L225M50	2.2μF/50V, EC
C717	5345-L225M50	2.2μF/50V, EC
	INTEGRATED CIRCUITS	
IC351	5652-AN6875	AN6875
IC701	5654-TD6104P	TD6104P
IC702	5654-TC9147BP	TC9147BP
IC703	5654-TD6301AP	TD6301AP
	TRANSISTORS	
Q701	5616-2SK362GR	F.E.T., 2SK362(GR)
Q702	5616-2SK117(Y)	F.E.T., 2SK117(Y)
Q703	5613-2320L(F)	2SC2320L(F) or (G)
Q704	5613-2603(F)	2SC2603(F) or (E)
Q705	5613-2603(F)	2SC2603(F) or (E)
Q707	5611-1115(F)	2SA1115(F) or (E)
Q708	5613-2603(F)	2SC2603(F) or (E)
Q709	5613-2603(F)	2SC2603(F) or (E)
Q712	5611-1115(F)	2SA1115(F) or (E)
	DIODES	
D371/	5623-LS007S	LED Display
D372/		
D373/		
D374/		
D375/		
D376/		
D377		
D701	5635-HZ27-3L	ZD, HZ27-3L
D702	5636-ISS53	ISS53
D703	5636-ISS53	ISS53
D704	5636-ISS53	ISS53
D705	5636-ISS53	ISS53
D706	5636-ISS53	ISS53
D707	5635-RD5R6EB2	ZD, RD5.6EB2
D708	5635-RD10EB3	ZD, RD10EB3
D709	5635-RD5R1EB2	ZD, RD5.1EB2
	COILS	
L701	5995-2R2269	
L702	5995-2R2269	
	MISCELLANEOUS	
	5722-10	Frequency Display
X701	5691-00720022	Crystal Osc.
RC701	5212-3	R Composite
RC702	5212-3	R Composite
RC703	5212-3	R Composite
CN701	4443-057114	Connector, 5 Pos.
CN702	4443-030185	Connector, 3 Pos.
CN703	4443-080185	Connector, 8 Pos.
CN704	4443-070185	Connector, 7 Pos.
CN705	4443-050185	Connector, 5 Pos.
CN706	4443-027114	Connector, 2 Pos.
CN707	4443-050185	Connector, 5 Pos.
CN708	4443-050185	Connector, 5 Pos.

Ref.No.	Part No.	Description

PCB-4 EQUALIZER P.C.BOARD

	RESISTORS	
⚠ R37	5102-5604715	56Ω, 1/4W, FR
⚠ R38	5102-5604715	56Ω, 1/4W, FR
⚠ R41	5102-5604715	56Ω, 1/4W, FR
⚠ R42	5102-5604715	56Ω, 1/4W, FR
R649	5174-Z549328	549kΩ, 1/4W, MR
R650	5174-Z549328	549kΩ, 1/4W, MR
R651	5174-Z412228	41.2kΩ, 1/4W, MR
R652	5174-Z412228	41.2kΩ, 1/4W, MR
	CAPACITORS	
C23	5345-476D041	47μF/25V, EC
C24	5345-476D041	47μF/25V, EC
C27	5345-227D041	220μF/25V, EC
C28	5345-227D041	220μF/25V, EC
C601	5345-476B0951	47μF/10V, EC
C602	5345-476B0951	47μF/10V, EC
C603	5359-1215851	120pF/100V, PC
C604	5359-1215851	120pF/100V, PC
C605	5345-337A0952	330μF/6.3V, EC
C606	5345-337A0952	330μF/6.3V, EC
C607	5359-2025851	2000pF/100V, PC
C608	5359-2025851	2000pF/100V, PC
C609	5359-5625851	5600pF/100V, PC
C610	5359-5625851	5600pF/100V, PC
C611	5345-226D0951	22μF/25V, EC
C612	5345-226D0951	22μF/25V, EC
C613	5345-226D0951	22μF/25V, EC
C614	5345-226D0951	22μF/25V, EC
C617	5345-226E041	22μF/35V, EC
C618	5345-226E041	22μF/35V, EC
C619	5359-1015851	100pF/100V, PC
C620	5359-1015851	100pF/100V, PC
C625	5359-1525851	1500pF/100V, PC
C626	5359-1525851	1500pF/100V, PC
C627	5345-104F041	0.1μF/50V, EC
	TRANSISTORS	
Q11	5613-3422(O)	2SC3422(O)
Q12	5611-1359(O)	2SA1359(O)
Q601	5613-2240(BL)	2SC2240(BL)
Q602	5613-2240(BL)	2SC2240(BL)
Q603	5613-2240(BL)	2SC2240(BL)
Q604	5613-2240(BL)	2SC2240(BL)
Q605	5613-2240(BL)	2SC2240(BL)
Q606	5613-2240(BL)	2SC2240(BL)
Q607	5611-970(BL)	2SA970(BL)
Q608	5611-970(BL)	2SA970(BL)
Q609	5613-2603(E)	2SC2603(E) or (F)
Q610	5613-2603(E)	2SC2603(E) or (F)
Q611	5611-1115(E)	2SA1115(E) or (F)
Q612	5611-1115(E)	2SA1115(E) or (F)
Q613	5611-1115(E)	2SA1115(E) or (F)
Q614	5611-1115(E)	2SA1115(E) or (F)
Q615	5613-2603(E)	2SC2603(E) or (F)
Q616	5613-2603(E)	2SC2603(E) or (F)
Q617	5613-2705(O)	2SC2705(O) or (Y)
Q618	5613-2705(O)	2SC2705(O) or (Y)
Q619	5611-1145(O)	2SA1145(O) or (Y)
Q620	5611-1145(O)	2SA1145(O) or (Y)
Q621	5616-2SK364(V)	F.E.T., 2SK364(V) or (BL)
Q622	5616-2SK364(V)	F.E.T., 2SK364(V) or (BL)
Q623	5613-2603(E)	2SC2603(E) or (F)
Q624	5613-2603(E)	2SC2603(E) or (F)
Q629	5613-2603(E)	2SC2603(E) or (F)
	DIODES	
D15	5635-HZ24-2L	ZD, HZ24-2L
D16	5635-HZ24-2L	ZD, HZ24-2L
D601	5631-1S2473	1S2473
D603	5631-1S2473	1S2473
D604	5631-1S2473	1S2473

Ref.No.	Part No.	Description
	MISCELLANEOUS	
CN601	4443-040185	Connector, 4 Pos.
CN602	4443-040185	Connector, 4 Pos.

PCB-5 TONE CONTROL P.C.BOARD

		RESISTORS	
⚠	R21	5102-2714713	270Ω, 1/4W, FR
⚠	R22	5102-2714713	270Ω, 1/4W, FR
		CONTROLS	
	VR501/ VR502	5113-50399122	50kΩMN, Balance
	VR505/ VR506	5113-50342122	50kΩC, Treble
	VR507/ VR508	5113-10441122	100kΩC, Bass
		CAPACITORS	
	C17	5345-476C041	47μF/16V, EC
	C18	5345-476C041	47μF/16V, EC
	C21	5345-227C041	220μF/16V, EC
	C22	5345-227C041	220μF/16V, EC
	C509	5345-685C0951	6.8μF/16V, EC
	C510	5345-685C0951	6.8μF/16V, EC
	C511	5353-010934	1pF/500V, MC
	C512	5353-010934	1pF/500V, MC
	C513	5345-226C0951	22μF/16V, EC
	C514	5345-226C0951	22μF/16V, EC
	C515	5353-680534	68pF/500V, MC
	C516	5353-680534	68pF/500V, MC
	C517	5353-680534	68pF/500V, MC
	C518	5353-680534	68pF/500V, MC
	C519	5345-476C0951	47μF/16V, EC
	C520	5345-476C0951	47μF/16V, EC
	C521	5359-1015851	100pF/100V, PC
	C522	5359-1015851	100pF/100V, PC
		TRANSISTORS	
	Q5	5613-3422(O)	2SC3422(O)
	Q6	5611-1359(O)	2SA1359(O)
	Q501	5613-2320L(F)	2SC2320L(F)
	Q502	5613-2320L(F)	2SC2320L(F)
	Q503	5613-2320L(F)	2SC2320L(F)
	Q504	5613-2320L(F)	2SC2320L(F)
	Q505	5613-2603(E)	2SC2603(E) or (F)
	Q506	5613-2603(E)	2SC2603(E) or (F)
	Q507	5613-2603(E)	2SC2603(E) or (F)
	Q508	5613-2603(E)	2SC2603(E) or (F)
	Q509	5611-1115(E)	2SA1115(E) or (F)
	Q510	5611-1115(E)	2SA1115(E) or (F)
	Q511	5613-2603(E)	2SC2603(E) or (F)
	Q512	5613-2603(E)	2SC2603(E) or (F)
	Q513	5611-1115(E)	2SA1115(E) or (F)
	Q514	5611-1115(E)	2SA1115(E) or (F)
	Q515	5611-1115(E)	2SA1115(E) or (F)
	Q516	5611-1115(E)	2SA1115(E) or (F)
	Q517	5613-2603(E)	2SC2603(E) or (F)
	Q518	5613-2603(E)	2SC2603(E) or (F)
	Q519	5616-2SK381(B)	F.E.T., 2SK381(B) or (C)
	Q520	5616-2SK381(B)	F.E.T., 2SK381(B) or (C)
		DIODES	
	D9	5635-HZ15-2L	ZD, HZ15-2L
	D10	5635-HZ15-2L	ZD, HZ15-2L
	D501	5631-1S2473	1S2473
	D502	5631-1S2473	1S2473
	D503	5631-1S2473	1S2473
	D504	5631-1S2473	1S2473

Ref.No.	Part No.	Description
	MISCELLANEOUS	
S501	4412-043019	Rotary Slide Switch, Tape Monitor
S502	4412-045017	Rotary Slide Switch, Tape Out
S503	4412-045017	Rotary Slide Switch, Function
LCN508	4163-0120024	CLW, 12 Pos.

PCB-6 TACT SWITCHES P.C.BOARD

	DIODES	
D711	5637-GL5NG6	L.E.D., GL5NG6, Green, Auto
D712	5637-GL5NG6	L.E.D., GL5NG6, Green, Manual
D713	5637-GL5NG6	L.E.D., GL5NG6, Green, Memory
D714	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 1
D715	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 2
D716	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 3
D717	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 4
D718	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 5
D719	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 6
D720	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 7
D721	5637-GL5NG6	L.E.D., GL5NG6, Green, Preset Memory 8
	MISCELLANEOUS	
S701/ S702	4431-02027167	Push Switch, Tuning
S703/ S704 S705	4431-03037155	Push Switch, Auto, Manual, Memory,
S706/ S707/ S708/ S709	4431-04047165	Push Switch, M1 M2, M3, M4
S710/ S711/ S712/ S713	4431-04047165	Push Switch, M5, M6, M7, M8,

PCB-7 TONE SELECTOR P.C.BOARD

S508/ S509/ S510	4431-03127253	Push Switch, Bass Turnover, Tone Defeat, Treble Turnover,

PCB-8 PUSH SWITCHES P.C.BOARD

	CAPACITORS	
C503	5359-1815851	180pF/100V, PC
C504	5359-1815851	180pF/100V, PC
	MISCELLANEOUS	
S504/ S505/ S506	4431-03087161	Push Switch, Subsonic Filter, Loudness, Audio Mode
S507	4431-A027173	Push Switch, FM Muting

Ref.No.	Part No.	Description
	PCB-9 SPEAKER SWITCHES P.C.BOARD	
	RESISTORS	
R475	5171-471572	470Ω, 1W, MR
R476	5171-471572	470Ω, 1W, MR
	MISCELLANEOUS	
S401/ S402	4431-02047166	Push Switch, Speakers 1, Speakers 2
	PCB-10 SPEAKER TERMINAL P.C.BOARD	
TE401	4214-156	Terminal, Speaker System 1/2
	PCB-11 HEADPHONE JACK P.C.BOARD	
HP1	4451-00159	Jack, Headphones
CN401	4443-030185	Connector, 3 Pos.
	PCB-12 POWER SWITCH P.C.BOARD	
	RESISTORS	
⚠ R80	5102-100571 1	10Ω, 1W, FR
⚠ R81	5102-100571 1	10Ω, 1W, FR
R82	5171-100572	10Ω, 1W, MR
R83	5171-100572	10Ω, 1W, MR
	CAPACITORS	
⚠ C1	5352-1030959	0.01μF/AC125V, MPC
C30	5345-105F041	1μF/50V, EC
C80	5345-228F0962	2200μF/50V, EC
	TRANSISTORS	
Q13	5613-2603(E)	2SC2603(E) or (F)
	DIODES	
D23	5636-1S2471	1S2471
D24	5631-1S2473	1S2473
D80	5632-S5566B	S5566B
D81	5632-S5566B	S5566B
	MISCELLANEOUS	
⚠ S1	4431-A01716	Push Switch, Power
⚠	4472-7122	Holder, Fuse
	PCB-13 PIN JACK P.C.BOARD	
J1/	4486-16	6 Pin Jack, Phono (L)
J2/		Phono (R),
J3/		CD (L),
J4/		CD (R),
J5/		Video/Aux (L),
J6		Video/Aux (R)
J7/	4484-47	4 Pin Jack, Tape 1 In (L),
J8/		Tape 1 In (R),
J9/		Tape 1 Out (L),
J10		Tape 1 Out (R)
J11/	4484-47	4 Pin Jack, Tape 2 In (L),
J12/		Tape 2 In (R),
J13/		Tape 2 Out (L),
J14		Tape 2 Out (R)
LCN509	4163-0130022	CLW, 13 Pos.

Ref.No.	Part No.	Description
	PCB-14 FUNCTION INDICATOR P.C.BOARD	
D21	5637-GL5PR6	L.E.D., GL5PR6, Red, Tape 2
D22	5637-GL5PR6	L.E.D., GL5PR6, Red, Tape 1
D25	5637-GL5PR6	L.E.D., GL5PR6, Red, Phono
D26	5637-GL5PR6	L.E.D., GL5PR6, Red, AM
D27	5637-GL5PR6	L.E.D., GL5PR6, Red, FM
D28	5637-GL5PR6	L.E.D., GL5PR6, Red, CD
D29	5637-GL5PR6	L.E.D., GL5PR6, Red, Video/Aux
	PCB-15 VOLUME P.C.BOARD	
VR503/ VR504	5113-10471147	100kΩB, Volume
	PCB-16 MUTE ADJ.VR P.C.BOARD	
VR310	5113-50372136	Control, 50kΩB, Mute Adj.
CN303	4443-030185	Connector, 3 Pos.
	PCB-17 LAMP P.C.BOARD	
LP1	5731-0637263	Lamp
LCN102	4163-023503	CLW, 2 Pos.
	PCB-18 ANTENNA TERMINAL P.C.BOARD	
L101	5995-703027	Coil
TE101	4214-95	Antenna Terminal
	PCB-19 STEP CONTROL SWITCHES P.C.BOARD	
S714	4421-012413	Slide Switch, AM 9kHz/10kHz
S715	4421-012413	Slide Switch, FM 50kHz/100kHz

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
SPC : Special Capacitor
ZD : Zener Diode
CLW : Connector with Lead Wire

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