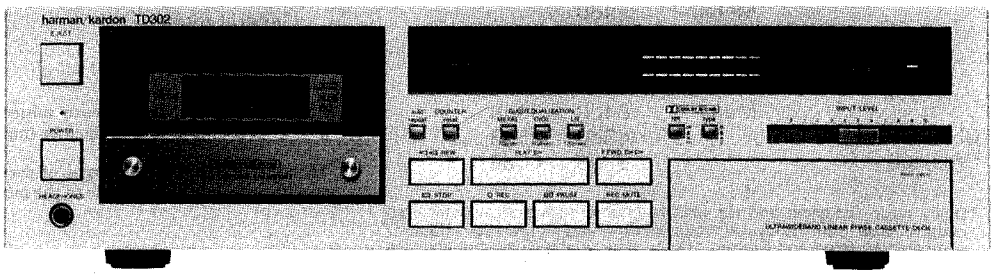
The Harman Kardon Model TD302

Manual 104A

ULTRAWIDEBAND LINEAR PHASE CASSETTE DECK

Technical Manual



TD302

harman/kardon
240 Crossways Park West, Woodbury, N.Y. 11797
1112-3152104A8 P-088606 1850 Printed in Japan

SPECIFICATIONS

	Nominal	Limit
Track Configuration	4-track 2 Channel Stereo Cassette Deck	
• MECHANICAL SECTION		
Record/Playback Tape Speed Deviation 4.75 cm/sec.	0.05%	±1.5%
Drift 4.75 cm/sec.	0.2%	±1.5%
Wow and Flutter	0.05% (NAB)	≤0.08%
	0.08% (CCIR)	≤0.14%
Take Up Torque	50gr. cm	35 ~ 70gr. cm
Back Tension	4gr. cm	2 ~ 6gr. cm
F. FWD Torque	100gr. cm	70 ~ 150gr. cm
REW Torque	100gr. cm	70 ~ 150gr. cm
F. FWD/REW Time (C-60 Tape)	90 sec.	≤100 sec.
Motor	Direct Drive motor	
• AMPLIFIRE SECTION		
Bias Frequency	105kHz	±5kHz
Playback Output	520mV	±1.5dB
Signal-to-Noise Ratio at Line Input (Input 1kHz,100mV) IHF-A WTD at Dolby Level		
Dolby* NR Off		
LN	51dB	
CrO_2	54dB	
Metal	54dB	
Dolby NR On		
LN	61dB	
CrO_2	64dB	≥60dB
Metal	64dB	≥60dB
Channel Separation	45dB	≥35dB
Crosstalk	70dB	≥60dB

*Dolby noise reduction and HX PRO headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX PRO originated by Bang and Olufsen. "Dolby", the double-D symbol and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

	Nominal	Limit
Record/Playback Distortion (Input 1kHz)		
LN	1.0%	≤1.6%
CrO_2	1.8%	≤3.0%
Metal	1.0%	≤1.6%
MPX Filter Attenuation		
at 15kHz	0.3dB	≤1dB
at 19kHz	35dB	≥30dB
Erase Ratio (Input 80Hz)		
LN	70dB	≥60dB
Metal	60dB	≥56dB
Input Sensitivity (Input 1kHz) at Line Input	30mV	20(min) ~ 70(max)mV
Input Impedance (Input 1kHz) at Line Input	23kΩ	19(min) ~ 30(max)kΩ
• DIMENSIONS (W × H × D)	17-7/16" × 4-13/16" × 13-1/8" (443 × 122 × 334 mm)	
• WEIGHT	12lbs. 9oz. (5.7kg)	
• POWER SUPPLY		
U.S.A. model	AC 120V, 60Hz	
General model	AC 220/240V, 50/60Hz	
• POWER CONSUMPTION		
U.S.A. model	20W	
General model	22W	

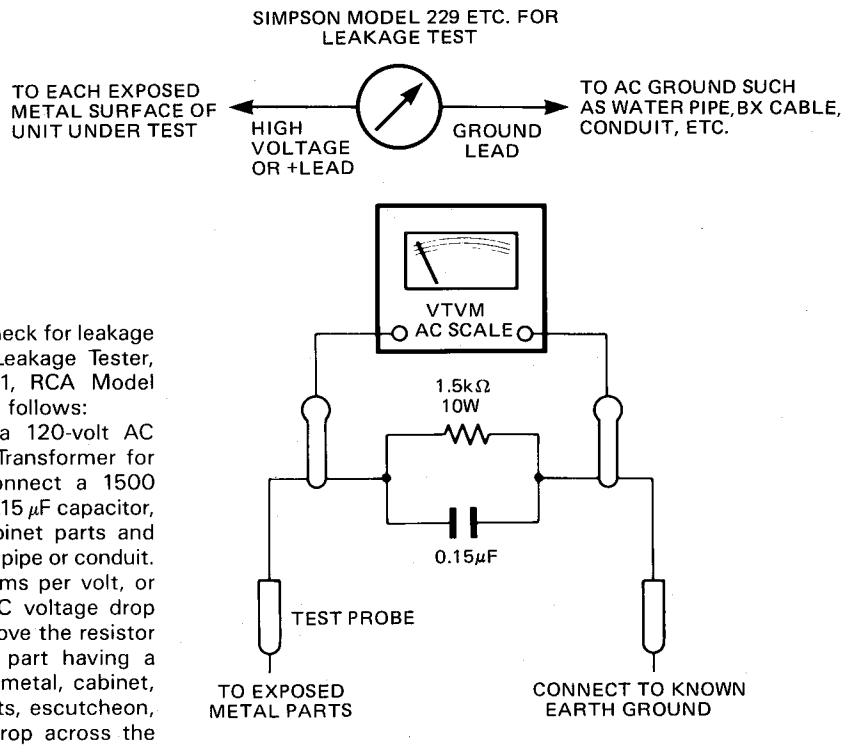
Specifications and components subject to change without notice. Overall performance will be maintained or improved.

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

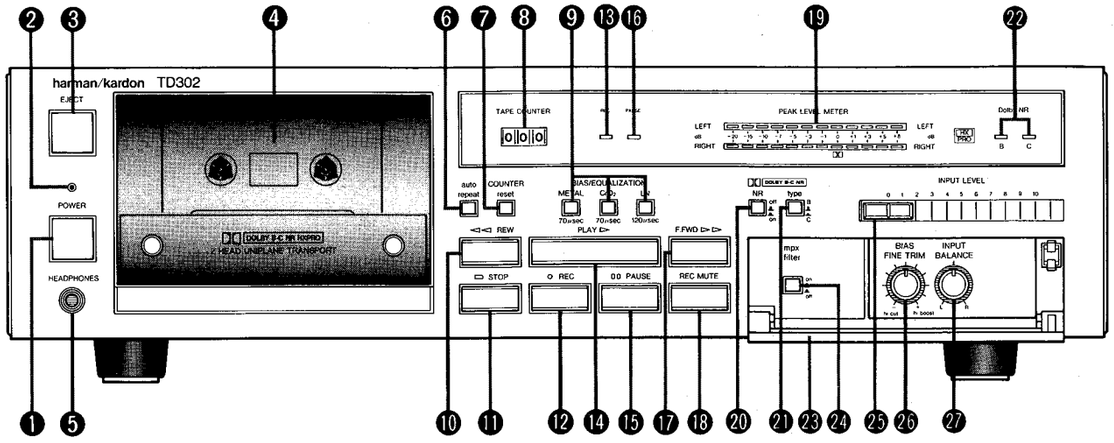
LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

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 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.



CONTROLS AND FUNCTIONS



❶ POWER SWITCH (POWER)
Pressing this switch will turn on the power and the POWER indicator lights up. Press the switch again to turn the power off.

❷ POWER INDICATOR

❸ EJECT BUTTON (EJECT)
The soft eject mechanism opens the door slowly when this button is pressed.

CAUTION: This button cannot be depressed while the tape is running. Be sure to press the STOP button before pressing the EJECT button.

❹ CASSETTE COMPARTMENT

❺ HEADPHONES JACK (HEADPHONES)
Stereo headphones with a standard 1/4 inch plug can be connected to this jack. When headphones are connected, the sound during recording or playback can be listened to without connecting this unit to a receiver.

❻ AUTOMATIC REPEAT BUTTON (auto repeat)
When this button is depressed, the cassette deck will continuously rewind and replay one side of the tape.

❼ COUNTER RESET BUTTON (COUNTER reset)
Press this button to reset the TAPE COUNTER when starting to record.

❽ TAPE COUNTER
For a digital indication of the position on a cassette tape. The figure changes as the tape runs. Cueing for the start of a selection is facilitated by making a note of the counter reading.

❾ TAPE SELECTORS (BIAS/EQUALIZATION)
For selection of the record and playback circuitry that provides the lowest distortion and flattest frequency response for metal, chromium dioxide (CrO_2) or low noise (LN) tape.

❿ REWIND BUTTON (REW)
Press this button to rewind a tape at high speed.

⓫ STOP BUTTON (STOP)
Press this button to stop each operation. Pressing this button stops the playback, recording, fast forward and rewind modes. It also cancels the standby mode activated by the PAUSE button.

⓬ RECORD BUTTON (REC)
Press this button and the PAUSE button simultaneously to provide the record standby mode. The RECORD and PAUSE indicators will illuminate. Recording starts when the PLAY button is pressed.

⓭ RECORD INDICATOR
For indication that the tape is being recorded.

⓮ PLAY BUTTON (PLAY)
Press this button to start playback.

⓯ PAUSE BUTTON (PAUSE)
Press this button to temporarily stop playback or recording. This button also activates the record standby mode when pressed simultaneously with the RECORD button.

⓰ PAUSE INDICATOR
For indication that the pause mode has been activated.

⓱ FAST FORWARD BUTTON (F.FWD)
Press this button to quickly advance the tape in the same direction as it is played.

⓲ RECORD MUTE BUTTON (REC MUTE)
This button allows you to create a silent segment of tape at any time while recording. The button is a momentary contact type and will not lock in the depressed position. The record mute feature will only operate while the button is held in the depressed position.

⓳ PEAK LEVEL METER
The level of the signal being recorded or played is displayed clearly on this meter.

⓴ DOLBY NR SWITCH (NR)
Depress this switch for recording or playback using the Dolby NR system. The green DOLBY NR indicator (for B-type) or the amber one (for C-type) illuminates according to the DOLBY NR TYPE selector position. Press the switch again to turn off the Dolby NR system.

㉑ DOLBY NR TYPE SELECTOR (type)
For selection of the Dolby B- or C-type NR system. Depress this switch to select the Dolby C-type NR system. Press it again to select the Dolby B-type system.

㉒ DOLBY NR INDICATOR
For indication that Dolby B or C noise reduction circuitry is activated.

㉓ SUB-PANEL DOOR
Press the upper right part of the SUB-PANEL DOOR and it will release. Then open the door with your hand to access the sub-panel.

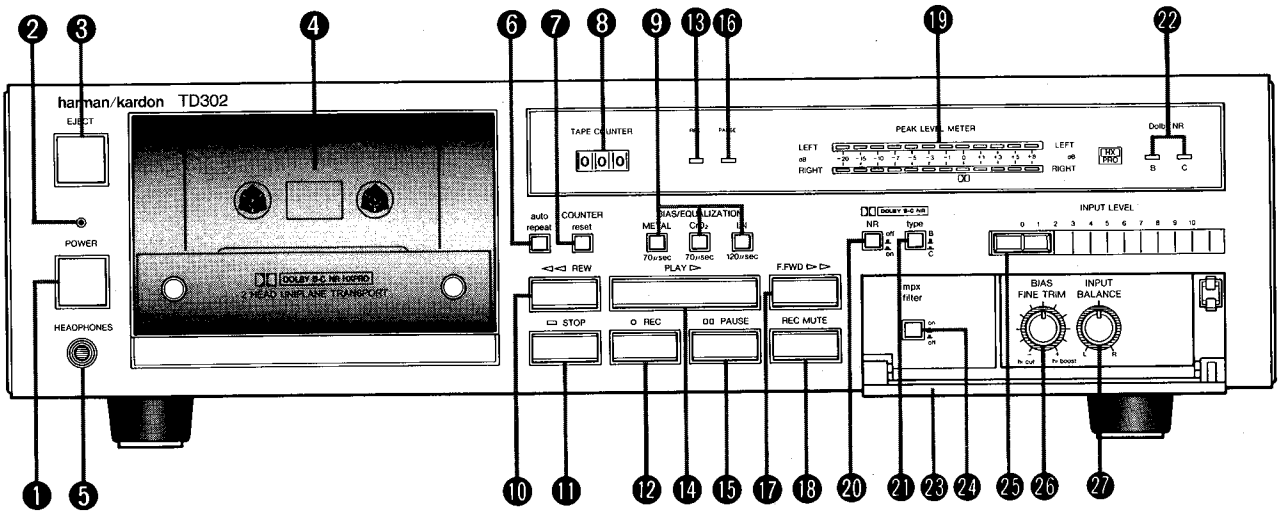
㉔ MPX FILTER SWITCH (mpx filter)
The MPX filter is a high frequency filter that has very little effect below 16kHz, but has 30dB attenuation at 19kHz, the frequency of the FM stereo pilot signal. Depress and release this switch (to the "on" position) when recording from an FM stereo tuner or receiver. However, to appreciate the ultrawideband frequency response of the TD302, depress this switch (to the "off" position) when recording all other sources, such as a turntable, tape deck, etc.

㉕ INPUT LEVEL CONTROL KNOB (INPUT LEVEL)
This knob adjusts the record level of the input signal.

㉖ BIAS FINE TRIM KNOB (BIAS FINE TRIM)
For precise adjustment of the bias used during recording.

㉗ INPUT BALANCE CONTROL KNOB (INPUT BALANCE)
This knob is used to restore the input level balance when the levels of the right and left channels are extremely different or to deliberately upset the input level balance as you like. Usually, it is set at the center. Turn it to the clockwise, the recording level of left channel is decreased. Turn it to the counterclockwise, the recording level of right channel is decreased.

CONTROLS AND FUNCTIONS



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DISASSEMBLY PROCEDURES (REFER TO PAGES 5 AND 16)

1 CABINET TOP ASSEMBLY (101) REMOVAL

Remove 6 screws Ⓐ and then remove the Cabinet Top Assembly (101).

2 FRONT PANEL ASSEMBLY (102) REMOVAL

1. Remove the Cabinet Top Assembly (101). (Refer to step 1.)
2. Remove 7 screws Ⓑ and then remove the Front Panel Assembly (102).

3 CASSETTE TAPE RECORDER MECHANISM ASSEMBLY (111) REMOVAL

1. Remove the Front Panel Assembly (102). (Refer to step 2.)
2. Disconnect the LCN201 connected to the Cassette Tape Recorder Mechanism Assembly (111).
3. From the Record/Playback Head and Erase Head, unsolder the lead wires connected to the Main P. C. Board (PCB-1).
4. Loosen 8 screws Ⓒ and then remove the Cabinet Bottom (128).
5. Remove the Belt (211) of the Tape Counter.
6. Remove 4 screws Ⓓ and then remove the Cassette Tape Recorder Mechanism Assembly (111).

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

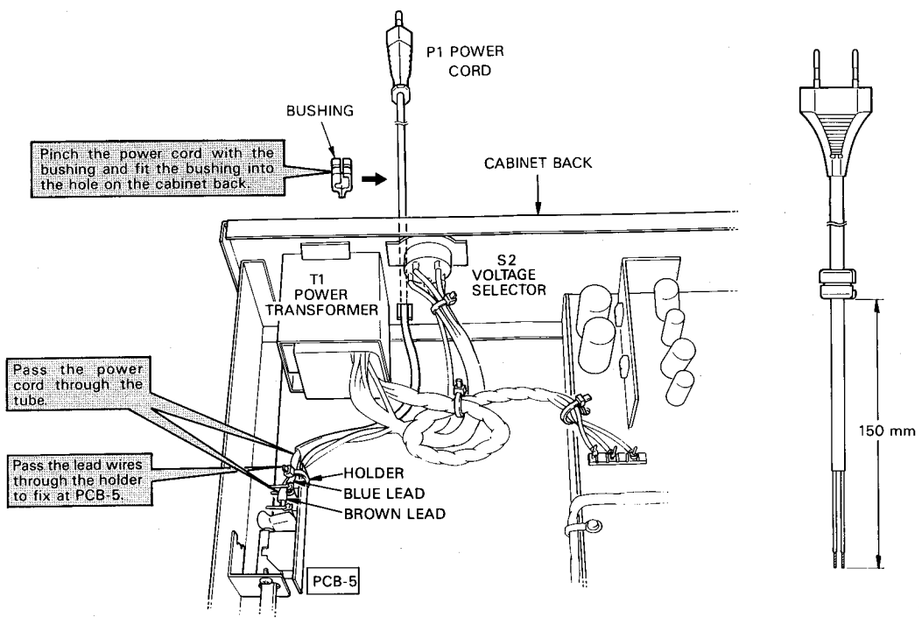
1. Remove the Cabinet Top Assembly (101). (Refer to step 1.)
2. Disconnect the LCN201 and LCN202 connected to the Cassette Tape Recorder Mechanisum Assembly (111) and Peak Level Meter (D401).
3. Open the lid of connectors (CN103 ~ CN108, CN110, CN301 and CN302) on the Main P. C. Board (PCB-1) and disconnect the lead wires.
4. Unsolder the lead wires connected to the Main P. C. Board (PCB-1).
5. Remove 7 screws Ⓔ and then remove the Main P. C. Board (PCB-1).

5 OTHER P. C. BOARDS REMOVAL

1. Remove the Front Panel Assembly (102). (Refer to step 2.)
2. Remove the Belt (211) of the Tape Counter.
3. Remove screw Ⓕ and then remove the Plate Assembly (104) with the Dolby NR Ind. P. C. Board (PCB-6) and Rec/Pause Ind. P. C. Board (PCB-7).
4. Remove screw Ⓖ and then remove the Function Switch P. C. Board (PCB-2). If necessary, unsolder the lead wires connected to the PCB-2.
5. Remove 2 screws Ⓗ and then remove the Input Level Control P. C. Board (PCB-4). If necessary, unsolder the lead wires connected to the PCB-4.
6. Remove 2 screws Ⓘ and then remove the VR P. C. Board (PCB-3) with the Bracket (184). If necessary, unsolder the lead wires connected to the PCB-3.

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

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



GENERAL UNIT PARTS LIST

Ref.No.	Part No.	Description
101	A414-TD302A	Cabinet Top Ass'y
102	A443-TD302A	Front Panel Ass'y (U) (G)
102	A443-TD302B	Front Panel Ass'y (BK) (GB)
103	A453-TD302A	Sub-Panel Lid Ass'y (U) (G)
103	A453-TD302B	Sub-Panel Lid Ass'y (BK) (GB)
104	A513-TD302A	Plate Ass'y
105	A514-TD302A	Dressing Plate Ass'y
106	A632-TD302A	Knob Ass'y, Bias Fine Trim, Input Balance
107	A642-TD302A	Knob Ass'y, Input Level (U) (G)
107	A642-TD302B	Knob Ass'y, Input Level (BK) (GB)
108	A662-TD302A	Push Button Ass'y, Auto Repeat, Bias/Equalization, Dolby NR, NR Type (U) (G)
108	A662-TD302D	Push Button Ass'y, Auto Repeat, Bias/Equalization, Dolby NR, NR Type (BK) (GB)
109	A662-TD302B	Push Button Ass'y, Counter Reset (U) (G)
109	A662-TD302E	Push Button Ass'y, Counter Reset (BK) (GB)
110	A662-TD302C	Push Button Ass'y, MPX Filer
111	3112-12802	Cassette Tape Recorder Mechanism Ass'y
124	1319-0139	Foot
128	1423-02301	Cabinet Bottom
129	1424-19601	Cabinet Back (U) (BK)
129	1424-19602	Cabinet Back (G) (GB)
131	1442-10901	Panel, Input Level (U) (G)
131	1442-10902	Panel, Input Level (BK) (GB)
139	1514-17005	Dressing Plate (U) (G)
139	1514-17006	Dressing Plate (BK) (GB)
143	1531-08501	Door Cover
154	1660-00401	Push Button, Power (U) (G)
154	1660-00403	Push Button, Power (BK) (GB)
155	1660-00501	Push Button, Eject (U) (G)
155	1660-00502	Push Button, Eject (BK) (GB)
158	1660-00801	Push Button, REC, FF, REW, Stop, Pause, REC Mute (U) (G)
158	1660-00802	Push Button, REC, FF, REW, Stop, Pause, REC Mute (BK) (GB)
159	1660-00901	Push Button, Play (U) (G)
159	1660-00902	Push Button, Play (BK) (GB)
175	2114-01224	Bushing
180	2211-7268	Chassis
181	2215-7005	Bracket
183	2219-8048	Bracket
184	2219-8049	Bracket
185	2219-8050	Bracket
186	2219-8051	Bracket
187	2219-8052	Bracket
188	2219-7755	Bracket
189	2218-7001	Holding Bracket
194	2222-7186	Heat Sink
195	2222-7067	Heat Sink
196	2240-364	Holder
197	2240-7120	Holder
204	2430-7008	Special Fastener
205	2440-7026	Special Nut
209	2601-7156	Shaft, Power Switch
211	2642-01440	Belt
213	2651-210189	Spring
214	2651-2101721	Spring
216	2674-7020	Slider
219	2310-7025	Special Screw (U) (G)
219	2310-7026	Special Screw (BK) (GB)
227	2327-200329	Screw (2×3mm)
229	2327-300529	Screw (3×5mm)
230	2327-401049	Screw (4×10mm)
233	2343-300627	Screw (3×6mm)
235	2347-300846	Screw (3×8mm)
239	2347-300626	Screw (3×6mm)
243	2347-300826	Screw (3×8mm)
245	2347-300646	Screw (3×6mm)
247	2347-400646	Screw (4×6mm)
251	2440-7017	Special Nut (G) (GB)
252	2132-01406	Spacer (G) (GB)
253	2327-301449	Screw (3×14mm)
	1111-J30241	Owner Guide (U) (BK)
	1111-J30242	Owner Guide (G) (GB)
	1221-747181	Packing Box
	1222-7284	Packing Cushion

CASSETTE TAPE RECORDER MECHANISM PARTS LIST

Ref.No.	Part No.	Description
1	F245-011	Switch Arm, Pack
2	F244-011	Switch Arm, REC
3	FD35C-11	Cassette Support
4	FK568-11	Spring, Door
5	EC30K-12	Eject Lock Arm
6	FM296-11	Spacer
7	KY130-11	Connecter, 8 Pos.
8	UE13K-11	Switch
9	FU14K-11	REC/PB Head
10	FU192-11	Erase Head
11	FK572-11	Spring, Azimuth
12	FD23C-15	Head Spacer
13	F105-020	Supply Reel Ass'y
14	F123-033	Take-up Reel Ass'y
15	FC29K-11	Spring Holder
16	FC29N-13	Head Base
17	FD24H-12	Brake Arm (L)
18	FD24K-12	Brake Arm (R)
19	FK18U-11	Spring, Brake
20	FO14-075	Pinch Roller
21	FK18S-11	Spring, Pinch Roller
22	FK18V-11	Spring, Solenoid Arm
23	FK18T-14	Spring, Assist
24	FK11F-47	Spring, Back Tension
25	FN14B-12	Idler Gear
26	FK18M-11	Spring, Eject Arm
27	F011-163	Chassis Ass'y
28	FC29E-11	Spring, Cassette
29	F265-216	Solenoid, FF, REW
30	FR17M-13	Clutch Ass'y
31	FC29F-11	Bracket, Dumper
32	FP472-11	Dumper Ass'y
33	FD23B-12	FF/REW Solenoid Arm
34	FP463-11	Sub Belt
35	FF14A-11	Main Belt
36	F265-217	Solenoid, PB
37	FD23E-12	PB Arm
38	FK18W-12	Spring, PB Arm
39	FR17N-11	Idler Ass'y
40	FK18R-12	Spring, Idler
41	FC29G-14	Bracket, Door
42	FK18N-11	Spring Head Base
43	FK18P-11	Spring, Assist Base
44	FC29M-12	Assist Base
45	FN14C-13	PB Gear
46	FD24G-12	Collar
47	FK11F-51	Spring, Flywheel
48	FR17E-11	Flywheel Ass'y
49	UJ11S-11	Spacer
50	WH20C-01	Connector, 4 Pos.
51	FC29H-15	Bracket, Motor
52	F064-179	Motor
53	FP12T-12	Connecter Panel
54	FJ115-12	Cushion, Motor
55	KG194-12	Screw (3×6mm)
56	FG114-15	Screw (2.6×4mm)
57	UG12R-11	Screw (2×12mm)
58	KG189-11	Screw (3×5mm)
59	UG12W-12	Screw
60	FG137-17	Screw
61	FJ111-18	Non-metal Washer
62	FJ141-11	Oil Seal
63	UJ12B-11	Lock Washer
64	FJ123-14	Lock Washer
65	FJ123-13	Lock Washer
66	FJ123-21	Lock Washer

DISASSEMBLY PROCEDURES (REFER TO PAGES 5 AND 16)

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Remove 6 screws Ⓐ and then remove the Cabinet Top Assembly (101).

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3 CASSETTE TAPE RECORDER MECHANISM ASSEMBLY (111) REMOVAL

1. Remove the Front Panel Assembly (102). (Refer to step 2.)
2. Disconnect the LCN201 connected to the Cassette Tape Recorder Mechanism Assembly (111).
3. From the Record/Playback Head and Erase Head, unsolder the lead wires connected to the Main P. C. Board (PCB-1).
4. Loosen 8 screws Ⓒ and then remove the Cabinet Bottom (128).
5. Remove the Belt (211) of the Tape Counter.
6. Remove 4 screws Ⓓ and then remove the Cassette Tape Recorder Mechanism Assembly (111).

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

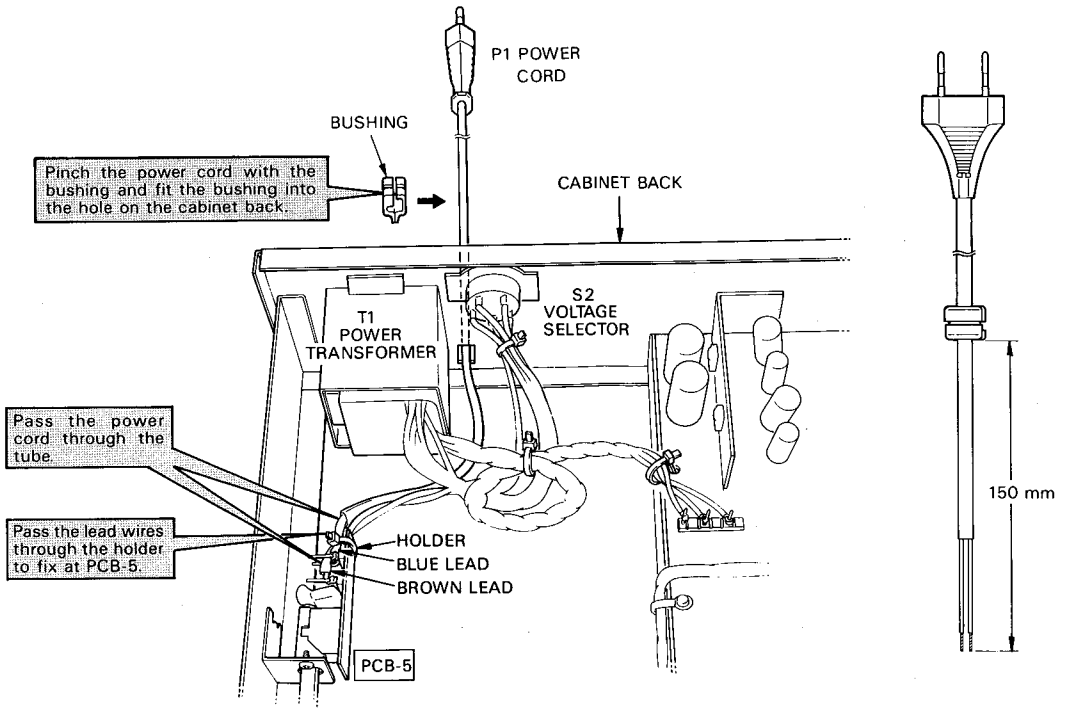
1. Remove the Cabinet Top Assembly (101). (Refer to step 1.)
2. Disconnect the LCN201 and LCN202 connected to the Cassette Tape Recorder Mechanisum Assembly (111) and Peak Level Meter (D401).
3. Open the lid of connectors (CN103 ~ CN108, CN110, CN301 and CN302) on the Main P. C. Board (PCB-1) and disconnect the lead wires.
4. Unsolder the lead wires connected to the Main P. C. Board (PCB-1).
5. Remove 7 screws Ⓔ and then remove the Main P. C. Board (PCB-1).

5 OTHER P. C. BOARDS REMOVAL

1. Remove the Front Panel Assembly (102). (Refer to step 2.)
2. Remove the Belt (211) of the Tape Counter.
3. Remove screw Ⓕ and then remove the Plate Assembly (104) with the Dolby NR Ind. P. C. Board (PCB-6) and Rec/Pause Ind. P. C. Board (PCB-7).
4. Remove screw Ⓖ and then remove the Function Switch P. C. Board (PCB-2). If necessary, unsolder the lead wires connected to the PCB-2.
5. Remove 2 screws Ⓗ and then remove the Input Level Control P. C. Board (PCB-4). If necessary, unsolder the lead wires connected to the PCB-4.
6. Remove 2 screws Ⓘ and then remove the VR P. C. Board (PCB-3) with the Bracket (184). If necessary, unsolder the lead wires connected to the PCB-3.

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

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



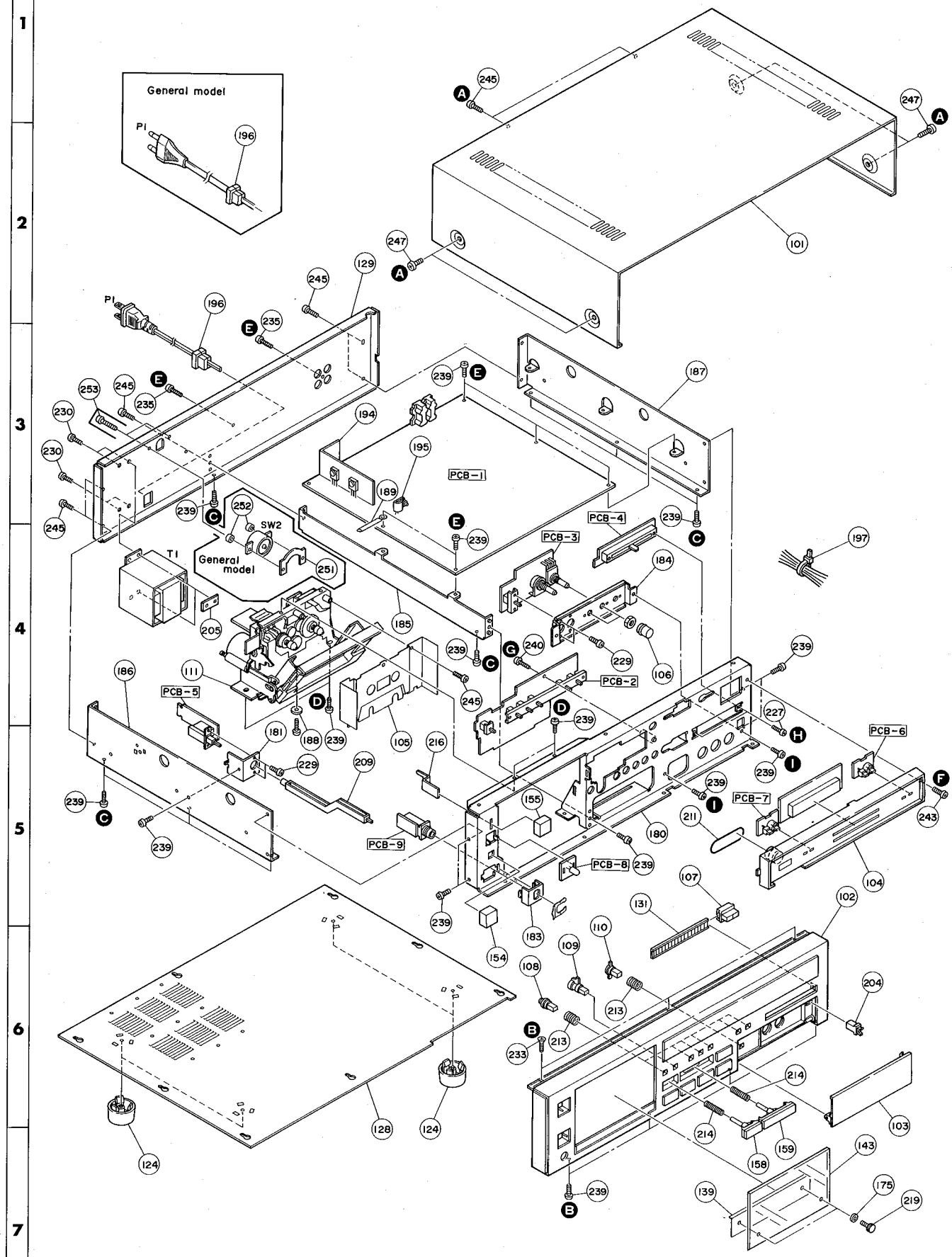
GENERAL UNIT PARTS LIST

Ref.No.	Part No.	Description
101	A414-TD302A	Cabinet Top Ass'y
102	A443-TD302A	Front Panel Ass'y (U) (G)
102	A443-TD302B	Front Panel Ass'y (BK) (GB)
103	A453-TD302A	Sub-Panel Lid Ass'y (U) (G)
103	A453-TD302B	Sub-Panel Lid Ass'y (BK) (GB)
104	A513-TD302A	Plate Ass'y
105	A514-TD302A	Dressing Plate Ass'y
106	A632-TD302A	Knob Ass'y, Bias Fine Trim, Input Balance
107	A642-TD302A	Knob Ass'y, Input Level (U) (G)
107	A642-TD302B	Knob Ass'y, Input Level (BK) (GB)
108	A662-TD302A	Push Button Ass'y, Auto Repeat, Bias/Equalization, Dolby NR, NR Type (U) (G)
108	A662-TD302D	Push Button Ass'y, Auto Repeat, Bias/Equalization, Dolby NR, NR Type (BK) (GB)
109	A662-TD302B	Push Button Ass'y, Counter Reset (U) (G)
109	A662-TD302E	Push Button Ass'y, Counter Reset (BK) (GB)
110	A662-TD302C	Push Button Ass'y, MPX Filer
111	3112-12802	Cassette Tape Recorder Mechanism Ass'y
124	1319-0139	Foot
128	1423-02301	Cabinet Bottom
129	1424-19601	Cabinet Back (U) (BK)
129	1424-19602	Cabinet Back (G) (GB)
131	1442-10901	Panel, Input Level (U) (G)
131	1442-10902	Panel, Input Level (BK) (GB)
139	1514-17005	Dressing Plate (U) (G)
139	1514-17006	Dressing Plate (BK) (GB)
143	1531-08501	Door Cover
154	1660-00401	Push Button, Power (U) (G)
154	1660-00403	Push Button, Power (BK) (GB)
155	1660-00501	Push Button, Eject (U) (G)
155	1660-00502	Push Button, Eject (BK) (GB)
158	1660-00801	Push Button, REC, FF, REW, Stop, Pause, REC Mute (U) (G)
158	1660-00802	Push Button, REC, FF, REW, Stop, Pause, REC Mute (BK) (GB)
159	1660-00901	Push Button, Play (U) (G)
159	1660-00902	Push Button, Play (BK) (GB)
175	2114-01224	Bushing
180	2211-7268	Chassis
181	2215-7005	Bracket
183	2219-8048	Bracket
184	2219-8049	Bracket
185	2219-8050	Bracket
186	2219-8051	Bracket
187	2219-8052	Bracket
188	2219-7755	Bracket
189	2218-7001	Holding Bracket
194	2222-7186	Heat Sink
195	2222-7067	Heat Sink
196	2240-364	Holder
197	2240-7120	Holder
204	2430-7008	Special Fastener
205	2440-7026	Special Nut
209	2601-7156	Shaft, Power Switch
211	2642-01440	Belt
213	2651-210189	Spring
214	2651-2101721	Spring
216	2674-7020	Slider
219	2310-7025	Special Screw (U) (G)
219	2310-7026	Special Screw (BK) (GB)
227	2327-200329	Screw (2×3mm)
229	2327-300529	Screw (3×5mm)
230	2327-401049	Screw (4×10mm)
233	2343-300627	Screw (3×6mm)
235	2347-300846	Screw (3×8mm)
239	2347-300626	Screw (3×6mm)
243	2347-300826	Screw (3×8mm)
245	2347-300646	Screw (3×6mm)
247	2347-400646	Screw (4×6mm)
251	2440-7017	Special Nut (G) (GB)
252	2132-01406	Spacer (G) (GB)
253	2327-301449	Screw (3×14mm)
	1111-J30241	Owner Guide (U) (BK)
	1111-J30242	Owner Guide (G) (GB)
	1221-747181	Packing Box
	1222-7284	Packing Cushion

CASSETTE TAPE RECORDER MECHANISM PARTS LIST

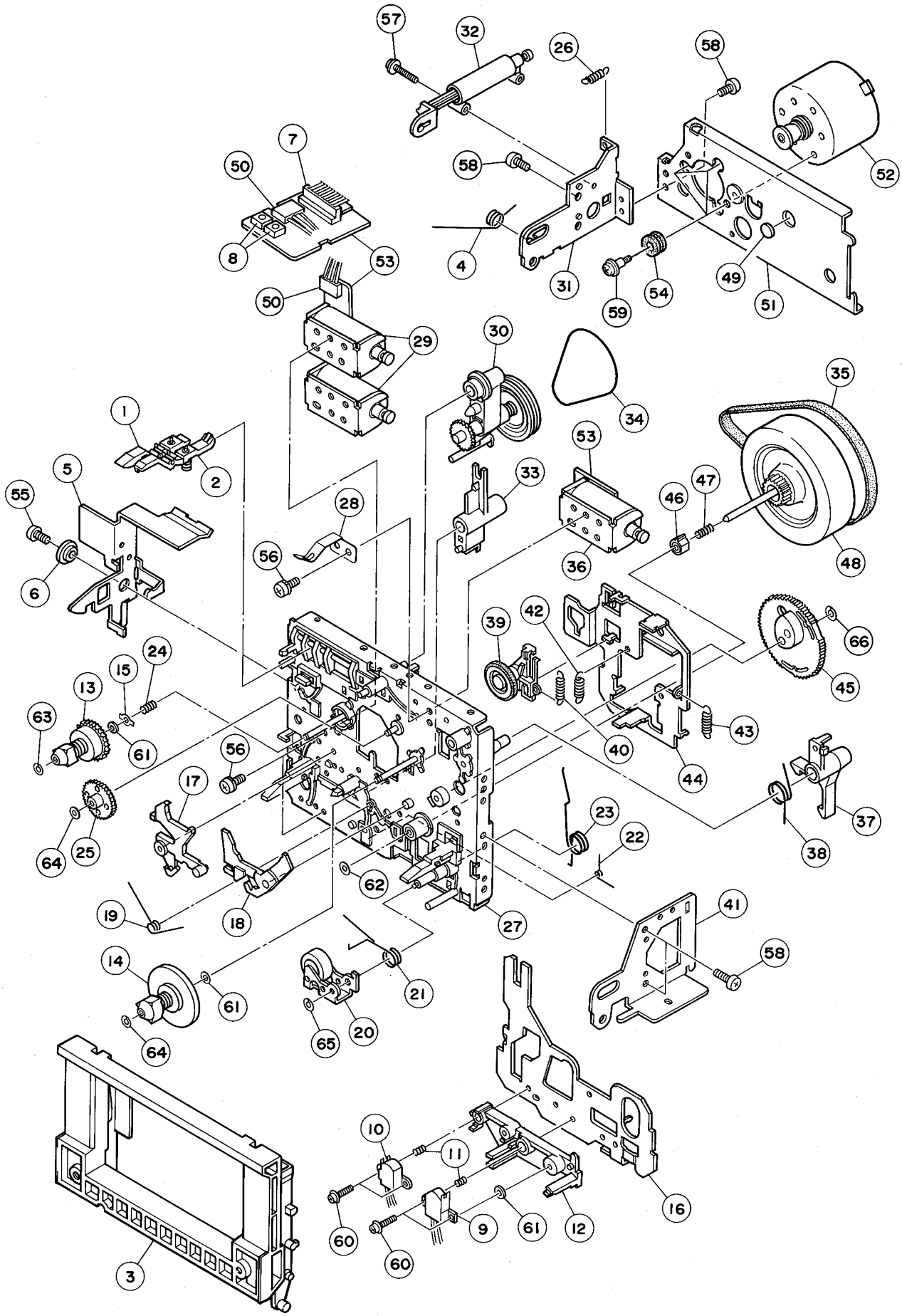
Ref.No.	Part No.	Description
1	F245-011	Switch Arm, Pack
2	F244-011	Switch Arm, REC
3	FD35C-11	Cassette Support
4	FK568-11	Spring, Door
5	EC30K-12	Eject Lock Arm
6	FM296-11	Spacer
7	KY130-11	Connecter, 8 Pos.
8	UE13K-11	Switch
9	FU14K-11	REC/PB Head
10	FU192-11	Erase Head
11	FK572-11	Spring, Azimuth
12	FD23C-15	Head Spacer
13	F105-020	Supply Reel Ass'y
14	F123-033	Take-up Reel Ass'y
15	FC29K-11	Spring Holder
16	FC29N-13	Head Base
17	FD24H-12	Brake Arm (L)
18	FD24K-12	Brake Arm (R)
19	FK18U-11	Spring, Brake
20	FO14-075	Pinch Roller
21	FK18S-11	Spring, Pinch Roller
22	FK18V-11	Spring, Solenoid Arm
23	FK18T-14	Spring, Assist
24	FK11F-47	Spring, Back Tension
25	FN14B-12	Idler Gear
26	FK18M-11	Spring, Eject Arm
27	F011-163	Chassis Ass'y
28	FC29E-11	Spring, Cassette
29	F265-216	Solenoid, FF, REW
30	FR17M-13	Clutch Ass'y
31	FC29F-11	Bracket, Dumper
32	FP472-11	Dumper Ass'y
33	FD23B-12	FF/REW Solenoid Arm
34	FP463-11	Sub Belt
35	FF14A-11	Main Belt
36	F265-217	Solenoid, PB
37	FD23E-12	PB Arm
38	FK18W-12	Spring, PB Arm
39	FR17N-11	Idler Ass'y
40	FK18R-12	Spring, Idler
41	FC29G-14	Bracket, Door
42	FK18N-11	Spring Head Base
43	FK18P-11	Spring, Assist Base
44	FC29M-12	Assist Base
45	FN14C-13	PB Gear
46	FD24G-12	Collar
47	FK11F-51	Spring, Flywheel
48	FR17E-11	Flywheel Ass'y
49	UJ11S-11	Spacer
50	WH20C-01	Connector, 4 Pos.
51	FC29H-15	Bracket, Motor
52	F064-179	Motor
53	FP12T-12	Connecter Panel
54	FJ115-12	Cushion, Motor
55	KG194-12	Screw (3×6mm)
56	FG114-15	Screw (2.6×4mm)
57	UG12R-11	Screw (2×12mm)
58	KG189-11	Screw (3×5mm)
59	UG12W-12	Screw
60	FG137-17	Screw
61	FJ111-18	Non-metal Washer
62	FJ141-11	Oil Seal
63	UJ12B-11	Lock Washer
64	FJ123-14	Lock Washer
65	FJ123-13	Lock Washer
66	FJ123-21	Lock Washer

GENERAL UNIT EXPLODED VIEW



A	B	C	D	E

CASSETTE TAPE RECORDER MECHANISM EXPLODED VIEW



CIRCUIT DESCRIPTION

Playback Signal

The playback signal from the playback head is amplified in the playback amplifiers Q101, Q103, Q105 (L ch.), Q102, Q104 and Q106 (R ch.) and fed to the IC501 (Dolby NR circuit). The signal enters pin ③ of IC501 where it is encoded and output through pin ⑨. The output signal is fed from pin ⑨ to the OUTPUT jack, IC301 (headphone amplifier) and METER.

The characteristics of the playback equalizer are selected by the BIAS EQUALIZATION switch, by means of Q107 (L ch.) and Q108 (R ch.).

Record Signal

The input signal coming through the INPUT jacks is adjusted by INPUT LEVEL and INPUT BALANCE and fed to IC501 (Dolby NR circuit). The signal enters pin ① of IC501, is decoded and fed through the MPX filter. The output signal appears on pin ㉑.

The output signal passes through the record equalizer circuit, amplified in the record amplifier IC201, combined with the bias signal and fed to the record head.

Muting Operation

The Record/Playback switch control signal and mute signal are obtained from IC801 of the logic control block.

The signal output throught pin ⑨ of IC801 turns Q804 and 805 to ON, whereby the mute signal is output. At the power ON/OFF, however, the mute signal is from Q51. When the STOP button is pressed, this mute signal turns Q711 (L ch.) and Q712 (R ch.) ON to short-circuit the output signal for muting.

Logic in Record Mode

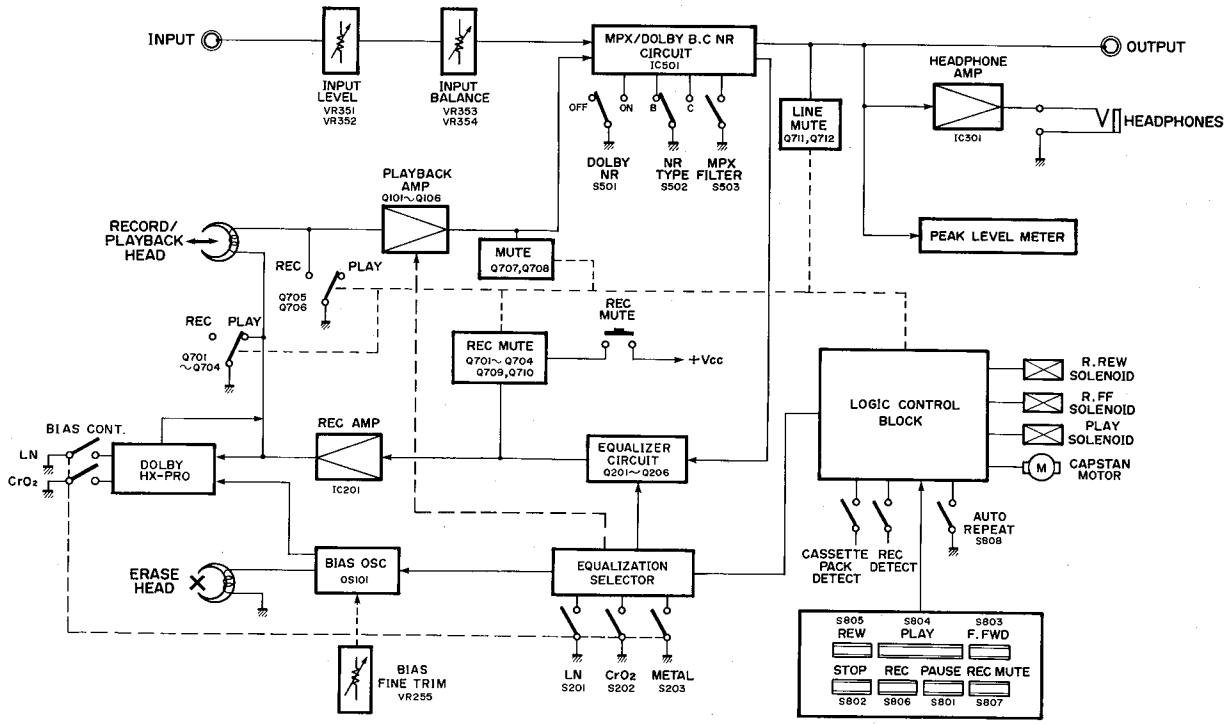
When the REC button is pressed, pin ⑮ of IC801 becomes low level and causes Q801 and Q802 to turn ON, and $\overline{\text{REC}}$ and REC signals are generated. The $\overline{\text{REC}}$ signal causes the bias circuit to turn ON and the REC signal turns Q705, 707 (L ch.) and Q706 and 708 (R ch.) ON to short-circuit the input and output signals of the playback amplifiers.

Also, the REC signal switches Q803 OFF. As the PLAY signal turns OFF thereby, Q701, Q703 (L ch.), Q702, 704 (R ch.) and Q709 (L ch.), 710 (R ch.) switch off, resulting in the record mode.

Logic in Playback Mode

With the STOP, PAUSE or PLAY button pressed, Q803 becomes ON (OFF when pin ⑮ of IC801 is low level), the PLAY signal is output and Q701, 703 (L ch.) and Q702, 704 (R ch.) turn ON. Then the output side of the IC201 is short-circuited and at the same time one side of the record/playback head is short-circuited to the ground. Also, Q709 (L ch.), 710 (R ch.) are turned ON to short-circuit the input side of the IC201, resulting in the playback mode.

BLOCK DIAGRAM



TIMING CHART

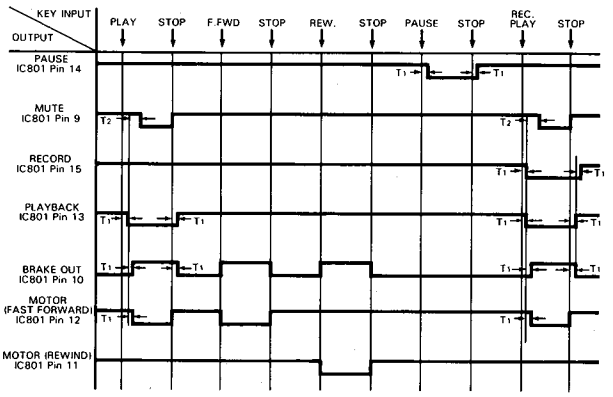


Fig. A

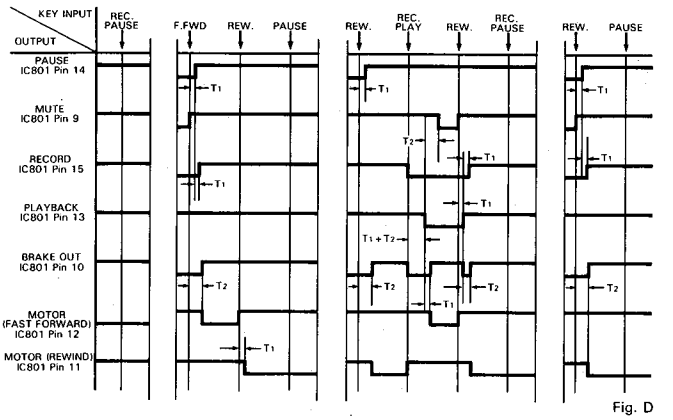


Fig. D

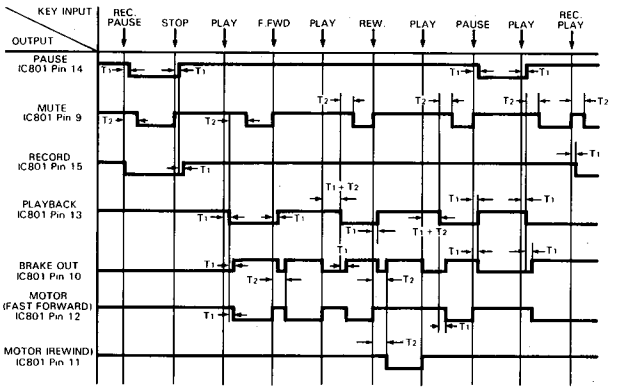


Fig. B

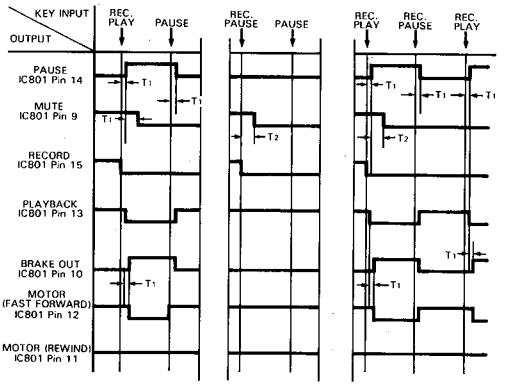


Fig. E

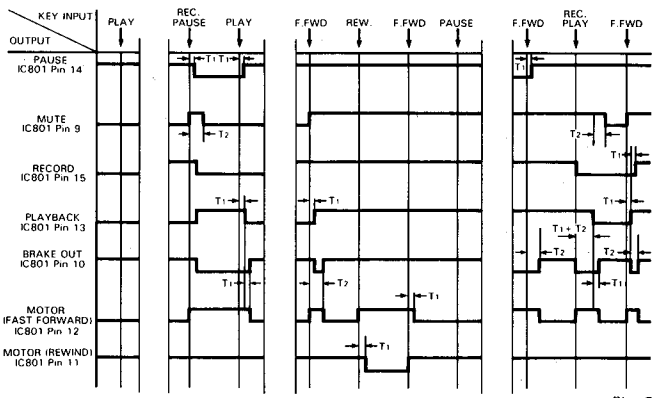


Fig. C

NOTE
After the power switch is pushed on, the unit remains in stop mode for about 1.6 second. After that, it operates according to each input key as shown figure. During this 1.6 second all input keys are ineffective.

T1 = 61 (msec)
T2 = 400 (msec)

ALIGNMENT PROCEDURES (REFER TO PAGES 15, 17 AND 18)

■ CASSETTE MECHANISM CONFIRMATION

Make sure to confirm conditions of the cassette mechanism as follows before adjustment.

1. Confirmation of erroneous erase preventive function

- The switch should turn ON when a tape with erroneous erase preventive pawl is inserted. (Use a tape which is 0.2mm smaller than the minimum size of 62.9mm or a MAZ-0184-C gauge one.)

2. Confirmation of cassette pack detection function

- The switch should turn ON when a tape is inserted. (Use a tape whose minimum size is 63.5mm or a MAZ-0184-C gauge one.)
- When the switch arm is moved back gradually from the ON position, the switch should turn OFF.

3. Confirmation of eject function

- The cassette compartment opens smoothly and no abnormal noise should be heard while opening and closing.
- The eject lock arm opens smoothly without contacting the chassis and damper.
- The eject button can not be pressed during playback.

4. Confirmation of playback, fast forward and rewind functions

- The torque used in each of the playback, fast forward and rewind modes should be within specification.
  Playback ..... 35gr. cm ~ 70gr. cm
  Fast Forward ..... 70gr. cm ~ 150gr. cm
  Rewind ..... 70gr. cm ~ 150gr. cm
- No abnormal noise should be heard during operation in any mode. The solenoid switching sound should not be considered as a noise.

5. Confirmation of positions of record/playback head and erase head

- **Head height**
  a) Set the M-300 head gauge.
  b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 1.
  c) The adjustment chip should not contact the tape guide of both record/playback head and erase head.

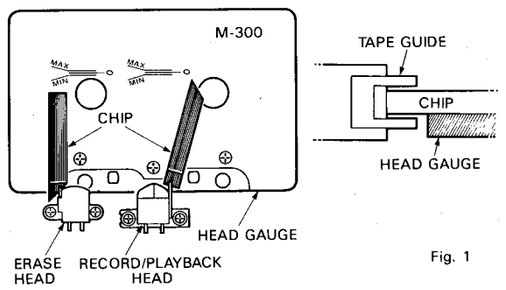


Fig. 1

- **Head position**
  a) Set the M-300 head gauge.
  b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 2.
  c) With both record/playback head and erase head, the adjustment chip should be between MIN and MAX of the M-300 head gauge.

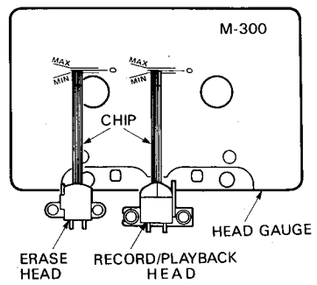


Fig. 2

■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

1. Before adjustment

- Before electrical adjustment, make sure that confirmations of the cassette mechanism are all completed.
- After the power switch is pushed on, wait for 10 minutes before measuring to be sure of the most stable operation.
- Since head magnetization, dust accumulations, etc. are likely to introduce errors in the various characteristics, it is very important that the heads are properly demagnetized and cleaned before commencing any adjustment, particularly frequency response and head azimuth adjusment.

2. Instruments required

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/flutter meter
- Frequency counter

3. Test tapes

- Azimuth adjustment MTT-114
- Tape speed adjustment ..... MTT-111 or MTT-111D
- Playback output level adjustment
  ..... MTT-150 or TCC-130
- Playback frequency characteristic confirmation
  ..... TCC-288H or TCC-162C, TCC-262C
- Reference tapes
  LN SCC-502
  CrO_2 ..... SCC-504
  METAL SCC-565

Note:
C-90 differes with C-60 in the thickness and bias is of unequal, so adjust with the tape whose bias in of specified value.

4. General conditions (unless otherwise noted)

Controls and Switches	Settings
Dolby NR	Off
Input Level	Maximum
MPX Filter	Off
Bias Fine Trim	Center
Input Balance	Center

Azimuth Adjustment

When the maximum level point of R channel does not equal that L channel, connect the oscilloscope as shown in Fig. 3 and proceed with azimuth adjustment so that L and R channels are in phase.

a) Connect L cnannel tape out to "X (or V)" and R channel to "Y (or H)". Observe the lissajouss waveform.
b) Set L and R channels to monaural. Adjust vertical and horizontal gain so that the waveform becomes 45 degree.
c) Adjust azimuth so that the measurement of "a" becomes maximum and the measurement of "b" becomes minimum against the 45 degree line.

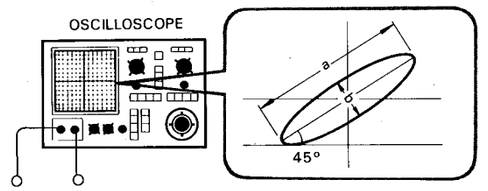
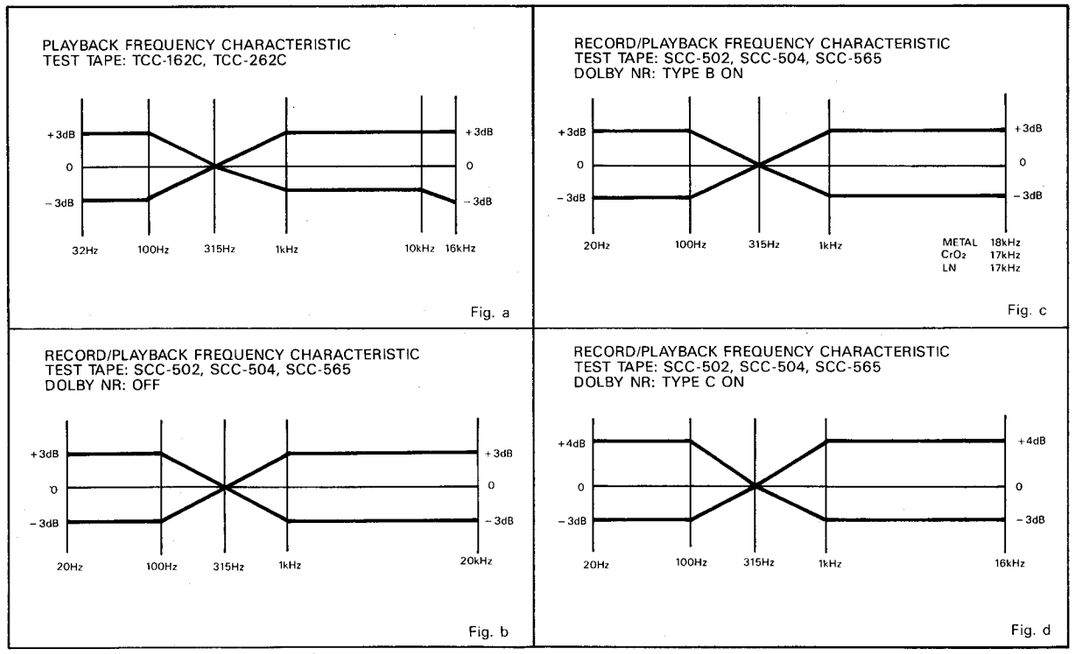


Fig. 3



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5. Confirmation of positions of record/playback head and erase head

- **Head height**
  a) Set the M-300 head gauge.
  b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 1.
  c) The adjustment chip should not contact the tape guide of both record/playback head and erase head.

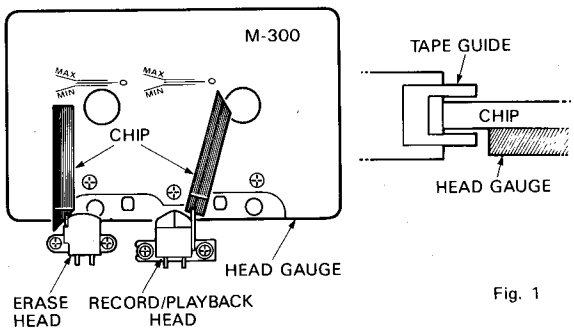

Fig. 1

- **Head position**
  a) Set the M-300 head gauge.
  b) Set the unit in the playback mode and place the adjustment chip on the head gauge as shown in the Fig. 2.
  c) With both record/playback head and erase head, the adjustment chip should be between MIN and MAX of the M-300 head gauge.

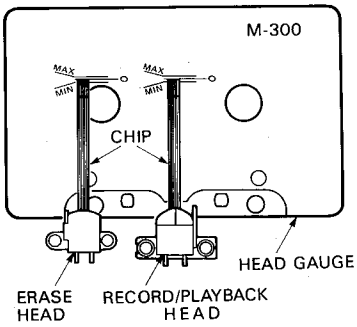

Fig. 2

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1. Before adjustment

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  ..... MTT-150 or TCC-130
- Playback frequency characteristic confirmation
  ..... TCC-288H or TCC-162C, TCC-262C
- Reference tapes
  - LN SCC-502
  - CrO_2 ..... SCC-504
  - METAL SCC-565

Note:

C-90 differes with C-60 in the thickness and bias is of unequal, so adjust with the tape whose bias in of specified value.

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Input Level	Maximum
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Bias Fine Trim	Center
Input Balance	Center

Azimuth Adjustment

When the maximum level point of R channel does not equal that L channel, connect the oscilloscope as shown in Fig. 3 and proceed with azimuth adjustment so that L and R channels are in phase.

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b) Set L and R channels to monaural. Adjust vertical and horizontal gain so that the waveform becomes 45 degree.

c) Adjust azimuth so that the measurement of "a" becomes maximum and the measurement of "b" becomes minimum against the 45 degree line.

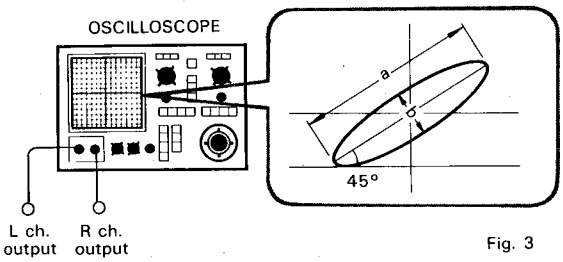


Fig. 3

PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE: TCC-162C, TCC-262C

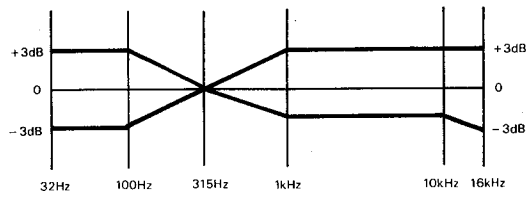


Fig. a

RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE: SCC-502, SCC-504, SCC-565
DOLBY NR: TYPE B ON

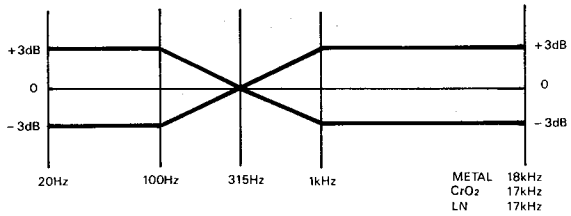


Fig. c

RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE: SCC-502, SCC-504, SCC-565
DOLBY NR: OFF

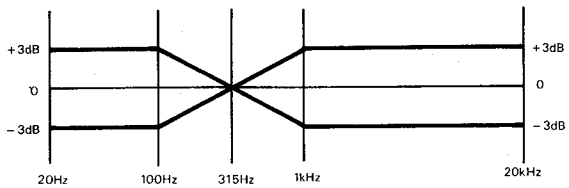


Fig. b

RECORD/PLAYBACK FREQUENCY CHARACTERISTIC
TEST TAPE: SCC-502, SCC-504, SCC-565
DOLBY NR: TYPE C ON

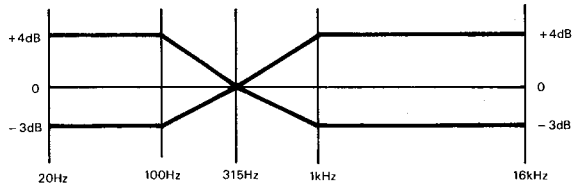


Fig. d

Step	Alignment	Instrument Required	Input Signal	Mode	Test Point	Adjustment	For
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114)		PB	TP1 TP2	Azimuth screw	Maximum output Refer to "Azimuth adjustment" on page 9.
2	Tape speed	Frequency counter Test tape (MTT-111 or MTT-111D)		PB	TP1 TP2	VR built in motor	3000Hz ± 10Hz Adjust at the center of test tape.
3	Playback output level	VTVM Test tape (MTT-150 or TCC-130)		PB	TP1 TP2	VR101 VR102	300mV
4	Playback frequency characteristic	VTVM Test tape (TCC-288H or TCC-162C and TCC-262C)		PB	OUTPUT jack	VR103 VR104	+0.5dB ~ – 2dB (at 1kHz to 20kHz)
5	Step up trans	VTVM Blank tape (SCC-565)		REC-PAUSE	TP101 TP102	L651, L203 L652, L204	Maximum output Set the Bias Fine Trim to the "hi cut" position. Set the VR251 all the way to counterclockwise. Set the VR252 all the way to clockwise. Tape selector is metal position.
6	Bias trap	VTVM Blank tape (SCC-565)		REC-PAUSE	TP253 TP254	L205 L206	Minimum output Set the Bias Fine Trim to the "hi cut" position. Set the VR251 all the way to counterclockwise. Set the VR252 all the way to clockwise. Tape selector is metal position.
7-1	Bias level (pre-adjustment)	VTVM Blank tapes (metal SCC-565 CrO2 SCC-504 LN SCC-502)		REC-PAUSE	TP101 TP102	VR251 VR252	110mV Tape selector is metal position.
7-2						VR253 VR254	56mV Tape selector is CrO2 position.
7-3						VR257 VR258	34mV Tape selector is LN position.
8	Bias frequency confirmation	Frequency counter		REC-PAUSE	TP251		105kHz ± 5kHz Tape selector is metal position.
9	Record level (pre-adjustment)	VTVM Blank tape (SCC-504)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV in REC-PAUSE mode.	REC/PB	TP1 TP2	VR201 VR202	300mV Tape selector is CrO2 position.
10	Peaking coil (pre-adjustment)	VTVM Blank tape (SCC-565)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP101 and TP102 voltage is 300mV – 25dB in REC mode.	REC-PAUSE	TP101 TP102	L201 L202	So that output becomes maximum at 22kHz input. Disconnect the connector (CN110). Tape selector is metal position.
11-1	Record/playback equalizer frequency characteristic	VTVM Blank tapes (metal SCC-565 CrO2 SCC-504 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	OUTPUT jack	VR251 L201	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is metal position.
11-2						VR252 L202	
11-3						VR253 L201	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO2 position.
11-4						VR254 L202	
11-5						VR257 VR258	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is LN position.
11-6						L201 L202	So that the record/playback frequency is balanced at each position of metal and CrO2.
12	Record level	VTVM Blank tape (SCC-504)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	TP1 TP2	VR201 VR202	300mV Tape selector is CrO2 position.
13	Record level confirmation	VTVM Blank tapes (metal SCC-565 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	TP1 TP2		300mV ± 1dB This confirmation shoud be done at each tape selector position of metal and LN.
14	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (metal SCC-565 CrO2 SCC-504 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	OUTPUT jack		Confirm that the record/playback frequency response is within the range in Fig. c and Fig. d. If it is not within the specification, redo the adjustment and confirmation in steps 10, 11, 12 and 13. This confirmation should be done at each tape selector position under each of the following conditions, Dolby NR B type on and Dolby NR C type on.
15	Meter level	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 0.5dB in REC-PAUSE mode.	REC-PAUSE	PEAK LEVEL METER	VR401 VR402	Adjust to the point where the 0dB LED of the peak level meter lights.
16	MPX filter characteristic confirmation	VTVM	Apply 19kHz and 15kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV in REC-PAUSE mode.	REC-PAUSE	OUTPUT jack		Confirm that attenuation of 15kHz and 19kHz is within the specification when MPX filter on.
17	Anti skwing level confirmation	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300mV – 25dB in REC-PAUSE mode.	REC-PAUSE	TP201 TP202		Confirm that attenuation of 20kHz is maximum. Dolby NR C type is on.

Step	Alignment	Instrument Required	Input Signal
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114)	
2	Tape speed	Frequency counter Test tape (MTT-111 or MTT-111D)	
3	Playback output level	VTVM Test tape (MTT-150 or TCC-130)	
4	Playback frequency characteristic	VTVM Test tape (TCC-288H or TCC-162C and TCC-262C)	
5	Step up trans	VTVM Blank tape (SCC-565)	
6	Bias trap	VTVM Blank tape (SCC-565)	
7-1 7-2 7-3	Bias level (pre-adjustment)	VTVM Blank tapes (metal SCC-565 CrO_2 SCC-504 LN SCC-502)	
8	Bias frequency confirmation	Frequency counter	
9	Record level (pre-adjustment)	VTVM Blank tape (SCC-504)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 300m REC-PAUSE mode.
10	Peaking coil (pre-adjustment)	VTVM Blank tape (SCC-565)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so TP101 and TP102 voltage is 300mV −25dB in REC mode.
11-1 11-2 11-3 11-4	Record/playback equalizer frequency characteristic	VTVM Blank tapes (metal SCC-565 CrO_2 SCC-504 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.
12	Record level	VTVM Blank tape (SCC-504)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.
13	Record level confirmation	VTVM Blank tapes (metal SCC-565 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.
14	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (metal SCC-565 CrO_2 SCC-504 LN SCC-502)	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −25dB in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.
15	Meter level	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −0.5dB in REC-PAUSE mode.
16	MPX filter characteristic confirmation	VTVM	Apply 19kHz and 15kHz signal to INPUT jack. Set INPUT LEVEL so that TP3 and TP4 voltage is 300mV in REC-PAUSE mode.
17	Anti skwing level confirmation	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP3 and TP4 voltage is 30 −25dB in REC-PAUSE mode.

	Mode	Test Point	Adjustment	For
	PB	TP1 TP2	Azimuth screw	Maximum output Refer to "Azimuth adjustment" on page 9.
	PB	TP1 TP2	VR built in motor	3000Hz ± 10Hz Adjust at the center of test tape.
	PB	TP1 TP2	VR101 VR102	300mV
	PB	OUTPUT jack	VR103 VR104	+0.5dB ~ −2dB (at 1kHz to 20kHz)
	REC-PAUSE	TP101 TP102	L651, L203 L652, L204	Maximum output Set the Bias Fine Trim to the "hi cut" position. Set the VR251 all the way to counterclockwise. Set the VR252 all the way to clockwise. Tape selector is metal position.
	REC-PAUSE	TP253 TP254	L205 L206	Minimum output Set the Bias Fine Trim to the "hi cut" position. Set the VR251 all the way to counterclockwise. Set the VR252 all the way to clockwise. Tape selector is metal position.
	REC-PAUSE	TP101 TP102	VR251 VR252	110mV Tape selector is metal position.
			VR253 VR254	56mV Tape selector is CrO_2 position.
			VR257 VR258	34mV Tape selector is LN position.
	REC-PAUSE	TP251		105kHz ± 5kHz Tape selector is metal position.
is 300mV in	REC/PB	TP1 TP2	VR201 VR202	300mV Tape selector is CrO_2 position.
knob so that	REC-PAUSE	TP101 TP102	L201 L202	So that output becomes maximum at 22kHz input. Disconnect the connector (CN110). Tape selector is metal position.
e is 300mV	REC/PB	OUTPUT jack	VR251 L201	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is metal position.
			VR252 L202	
			VR253 L201	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO_2 position.
			VR254 L202	
			VR257 VR258	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is LN position.
			L201 L202	So that the record/playback frequency is balanced at each position of metal and CrO_2.
e is 300mV	REC/PB	TP1 TP2	VR201 VR202	300mV Tape selector is CrO_2 position.
e is 300mV	REC/PB	TP1 TP2		300mV ± 1dB This confirmation shoud be done at each tape selector position of metal and LN.
e is 300mV	REC/PB	OUTPUT jack		Confirm that the record/playback frequency response is within the range in Fig. c and Fig. d. If it is not within the specification, redo the adjustment and confirmation in steps 10, 11, 12 and 13. This confirmation should be done at each tape selector position under each of the following conditions, Dolby NR B type on and Dolby NR C type on.
e is 300mV	REC-PAUSE	PEAK LEVEL METER	VR401 VR402	Adjust to the point where the 0dB LED of the peak level meter lights.
LEVEL knob ode.	REC-PAUSE	OUTPUT jack		Confirm that attenuation of 15kHz and 19kHz is within the specification when MPX filter on.
e is 300mV	REC-PAUSE	TP201 TP202		Confirm that attenuation of 20kHz is maximum. Dolby NR C type is on.

ELECTRICAL PARTS LIST

	Ref.No.	Part No.	Description
		CHASSIS MISCELLANEOUS	
⚠	PI	4161-71151	Power Cord (U) (BK)
⚠	PI	4161-7256	Power Cord (G) (GB)
⚠	TI	5584-702376	Power Trans. (U) (BK)
⚠	TI	5584-703392	Power Trans. (G) (GB)
⚠	S2	4411-102729	Rotary Switch, Voltage Selector (G) (GB)
⚠	FI	5732-102052	Fuse, TIA (G) (GB)
⚠	F2	5732-102052	Fuse, TIA (G) (GB)
	D401	5623-LT1151	Peak Level Meter
		4161-71184	Connection Cord (Accessory)
		PCB-1 MAIN P.C. BOARD	
		RESISTORS	
⚠	RI2	5102-2205114	22Ω, 1/2W, FR
⚠	R51	5102-4R74715	4.7Ω, 1/4W, FR
⚠	R52	5102-4R74715	4.7Ω, 1/4W, FR
⚠	RI37	5102-4R74715	4.7Ω, 1/4W, FR
⚠	R252	5102-8204715	82Ω, 1/4W, FR
⚠	R253	5102-8204715	82Ω, 1/4W, FR
⚠	R313	5102-1014715	100Ω, 1/4W, FR
⚠	R314	5102-1014715	100Ω, 1/4W, FR
	R513	5174-332381	3.3kΩ, 1/4W, MR
	R514	5174-332381	3.3kΩ, 1/4W, MR
	R515	5174-102381	1kΩ, 1/4W, MR
	R516	5174-102381	1kΩ, 1/4W, MR
	R522	5174-203381	20kΩ, 1/4W, MR
⚠	R530	5102-1004715	10Ω, 1/4W, FR
⚠	R667	5102-1014715	100Ω, 1/4W, FR
⚠	R668	5102-1014715	100Ω, 1/4W, FR
⚠	R673	5102-1004715	10Ω, 1/4W, FR
⚠	R674	5102-1004715	10Ω, 1/4W, FR
		CONTROLS	
	VR101	5101-20371920	20kΩB
	VR102	5101-20371920	20kΩB
	VR103	5101-20201927	2kΩ
	VR104	5101-20201927	2kΩ
	VR201	5101-20271927	2kΩB
	VR202	5101-20271927	2kΩB
	VR251	5101-20371920	20kΩB
	VR252	5101-20371920	20kΩB
	VR253	5101-10301927	10kΩ
	VR254	5101-10301927	10kΩ
	VR257	5101-50201927	5kΩB
	VR258	5101-50201927	5kΩB
	VR401	5101-30371920	30kΩ
	VR402	5101-30371920	30kΩ
		CAPACITORS	
	C4	5345-228D041	2200μF/25V, EC
	C5	5345-228D041	2200μF/25V, EC
	C6	5345-477C041	470μF/16V, EC
	C7	5345-477C041	470μF/16V, EC
	C8	5345-108C041	1000μF/16V, EC
	C9	5345-108C041	1000μF/16V, EC
	C51	5345-226F041	22μF/50V, EC
	C52	5345-226D041	22μF/25V, EC
	C101	5353-101534	100pF/500V, MC
	C102	5353-101534	100pF/500V, MC
	C103	5345-226C0951	22μF/16V, EC
	C104	5345-226C0951	22μF/16V, EC
	C105	5345-107B041	100μF/10V, EC
	C106	5345-107B041	100μF/10V, EC
	C107	5359-6825851	6800pF/100V, PC
	C108	5359-6825851	6800pF/100V, PC
	C109	5359-6825851	6800pF/100V, PC
	C110	5359-6825851	6800pF/100V, PC
	C111	5345-106C0951	10μF/16V, EC
	C112	5345-106C0951	10μF/16V, EC
	C113	5359-1825851	1800pF/100V, PC
	C114	5359-1825851	1800pF/100V, PC
	C115	5345-477C041	470μF/16V, EC
	C116	5345-336C041	33μF/16V, EC
	C201	5359-4715851	470pF/100V, EC
	C202	5359-4715851	470pF/100V, PC
	C209	5359-3315851	330pF/100V, PC
	C210	5359-3315851	330pF/100V, PC
	C211	5345-105F0951	1μF/50V, EC
	C212	5345-105F0951	1μF/50V, EC
	C213	5345-226C0952	22μF/16V, EC
	C214	5345-226C0952	22μF/16V, EC
	C219	5342-225F041	2.2μF/50V, EC
	C220	5342-225F041	2.2μF/50V, EC
	C223	5345-107C041	100μF/16V, EC
	C224	5345-107C041	100μF/16V, EC
	C229	5359-2215851	220pF/100V, PC
	C230	5359-2215851	220pF/100V, PC
	C251	5342-476C041	47μF/16V, EC
	C252	5342-476D041	47μF/25V, EC
	C253	5345-225F041	2.2μF/50V, EC
	C254	5345-475C041	4.7μF/16V, EC
	C255	5342-335C041	3.3μF/16V, EC
	C301	5345-106C041	10μF/16V, EC
	C302	5345-106C041	10μF/16V, EC
	C303	5345-336C041	33μF/16V, EC
	C304	5345-336C041	33μF/16V, EC
	C305	5345-107C041	100μF/16V, EC
	C306	5345-107C041	100μF/16V, EC
	C401	5345-105F041	1μF/50V, EC
	C402	5345-105F041	1μF/50V, EC
	C403	5345-226C041	22μF/16V, EC
	C404	5345-226C041	22μF/16V, EC
	C507	5345-106C0951	10μF/16V, EC
	C508	5345-106C0951	10μF/16V, EC
	C509	5345-477C041	470μF/16V, EC
	C511	5345-106C0951	10μF/16V, EC
	C512	5345-106C0951	10μF/16V, EC
	C513	5345-106C0951	10μF/16V, EC
	C514	5345-106C0951	10μF/16V, EC
	C515	5345-477C041	470μF/16V, EC
	C516	5345-226C041	22μF/16V, EC
	C517	5345-106C041	10μF/16V, EC
	C518	5345-106C041	10μF/16V, EC
	C519	5345-226C0951	22μF/16V, EC
	C520	5345-226C0951	22μF/16V, EC
	C521	5359-103741	0.01μF/100V, PC
	C522	5359-103741	0.01μF/100V, PC
	C523	5345-105F0952	1μF/50V, EC
	C524	5345-105F0952	1μF/50V, EC
	C527	5345-684F0952	0.68μF/50V, EC
	C528	5345-684F0952	0.68μF/50V, EC
	C529	5345-225F0952	2.2μF/50V, EC
	C530	5345-225F0952	2.2μF/50V, EC
	C533	5359-103741	0.01μF/100V, PC
	C534	5359-103741	0.01μF/100V, PC
	C537	5345-684F0952	0.68μF/50V, EC
	C538	5345-684F0952	0.68μF/50V, EC
	C539	5345-225F0952	2.2μF/50V, EC
	C540	5345-225F0952	2.2μF/50V, EC
	C541	5345-106C0951	10μF/16V, EC
	C542	5345-106C0951	10μF/16V, EC
	C543	5345-106C0951	10μF/16V, EC
	C544	5345-106C0951	10μF/16V, EC
	C546	5345-476C041	47μF/16V, EC
	C651	5359-2715851	270pF/100V, PC
	C652	5359-2715851	270pF/100V, PC
	C661	5359-4715851	470pF/100V, PC
	C662	5359-4715851	470pF/100V, PC
	C665	5353-101534	100pF/500V, MC
	C666	5353-101534	100pF/500V, MC

Ref.No.	Part No.	Description
C667	5345-107C041	100μF/16V, EC
C668	5345-107C041	100μF/16V, EC
C701	5345-475D041	4.7μF/25V, EC
C702	5342-106D041	10μF/25V, EC
C804	5345-474F041	0.47μF/50V, EC
C805	5345-227B041	220μF/10V, EC
C806	5345-335D041	3.3μF/25V, EC
C807	5345-475D041	4.7μF/25V, EC
C808	5345-476C041	47μF/16V, EC
C809	5345-475D041	4.7μF/25V, EC
C810	5345-106C041	10μF/16V, EC
C811	5345-105F041	1 μF/50V, EC
C812	5345-475D041	4.7μF/25V, EC
	INTEGRATED CIRCUIT	
IC201	5652-M5219P	M5219P
IC301	5652-M5216P	M5216P
IC501	5652-HA12088	HA12088
IC651	5652-HA17082P	HA17082P
IC652	5652-HA17082P	HA17082P
IC653	5652-M5218P	M5218P
IC801	5654-M54886P	M54886P
IC802	5652-BA335	BA335
	TRANSISTORS	
Q1	5611-1359(Y)	2SA1359(Y)or(O)
Q2	5613-3422(Y)	2SC3422(Y)or(O)
Q3	5613-2603(F)	2SC2603(F)
Q4	5611-1115(F)	2SA1115(F)
Q5	5613-2603(F)	2SC2603(F)
Q6	5611-1115(F)	2SA1115(F)
Q7	5613-3246(H)	2SC3246(H)
Q8	5613-RN1203	RN1203
Q51	5611-1115(F)	2SA1115(F)
Q101	5613-1775(F)	2SC1775(F)
Q102	5613-1775(F)	2SC1775(F)
Q103	5613-1775(F)	2SC1775(F)
Q104	5613-1775(F)	2SC1775(F)
Q105	5613-2320L(F)	2SC2320L(F)
Q106	5613-2320L(F)	2SC2320L(F)
Q107	5613-RN1203	RN1203
Q108	5613-RN1203	RN1203
Q109	5613-2603(F)	2SC2603(F)or(E)
Q201	5613-RN1203	RN1203
Q202	5613-RN1203	RN1203
Q203	5613-RN1203	RN1203
Q204	5613-RN1203	RN1203
Q205	5613-RN1203	RN1203
Q206	5613-RN1203	RN1203
Q251	5611-RN2203	RN2203
Q252	5613-RN1203	RN1203
Q253	5613-RN1203	RN1203
Q254	5613-RN1203	RN1203
Q255	5613-2603(F)	2SC2603(F)or(E)
Q501	5613-RN1203	RN1203
Q502	5613-RN1203	RN1203
Q503	5613-RN1203	RN1203
Q504	5613-RN1203	RN1203
Q505	5613-2603(F)	2SC2603(F)
Q506	5613-2603(F)	2SC2603(F)
Q507	5613-RN1203	RN1203
Q508	5613-2603(F)	2SC2603(F)
Q651	5613-3246(H)	2SC3246(H)
Q652	5613-3246(H)	2SC3246(H)
Q701	5613-3378(BL)	2SC3378(BL)
Q702	5613-3378(BL)	2SC3378(BL)
Q703	5613-3378(BL)	2SC3378(BL)
Q704	5613-3378(BL)	2SC3378(BL)
Q705	5613-2603(F)	2SC2603(F)
Q706	5613-2603(F)	2SC2603(F)
Q707	5613-2603(F)	2SC2603(F)
Q708	5613-2603(F)	2SC2603(F)
Q709	5613-2878(B)	2SC2878(B)

Ref.No.	Part No.	Description
Q710	5613-2878(B)	2SC2878(B)
Q711	5613-2878(B)	2SC2878(B)
Q712	5613-2878(B)	2SC2878(B)
Q801	5613-RN1203	RN1203
Q802	5611-RN2203	RN2203
Q803	5611-1335(GR)	2SA1335(GR)or(BL)
Q804	5613-RN1203	RN1203
Q805	5611-RN2203	RN2203
Q806	5613-2603(F)	2SC2603(F)
Q807	5612-561(C)	2SB561(C)
Q808	5613-RN1203	RN1203
Q809	5612-561(C)	2SB561(C)
Q810	5612-561(C)	2SB561(C)
Q811	5611-RN2203	RN2203
Q812	5613-RN1203	RN1203
Q813	5613-RN1203	RN1203
Q814	5613-RN1203	RN1203
	DIODES	
⚠ D1	5685-1F	Bridge Silicon, SIRBA
D2	5635-HZ12C2L	ZD, HZ12C2L
D3	5635-HZ12C2L	ZD, HZ12C2L
D4	5635-HZ11B2L	ZD, HZ11B2L
D51	5636-MC921	MC921
D52	5635-RD12EB2	ZD, RD12EB2
D53	5631-1S2473	1S2473
D101	5635-HZ11B2L	ZD, HZ11B2L
D251	5636-MC911	MC911
D253	5636-MC921	MC921
D255	5636-MC921	MC921
D651	5636-MC931	MC931
D652	5636-MC931	MC931
D701	5631-1S2473	1S2473
D702	5631-1S2473	1S2473
D703	5631-1S2473	1S2473
D704	5636-1S2471	1S2471
D705	5635-2R7EB2	ZD, RD2.7EB2
D706	5631-1S2473	1S2473
D707	5631-1S2473	1S2473
D709	5631-1S2473	1S2473
D710	5631-1S2473	1S2473
D801	5631-1S2473	1S2473
D802	5635-RD5R1EB2	ZD, RD5.1EB2
D803	5631-1S2473	1S2473
D804	5631-1S2473	1S2473
D805	5631-1S2473	1S2473
D806	5632-S5566B	S5566B
D807	5632-S5566B	S5566B
D808	5632-S5566B	S5566B
D809	5631-1S2473	1S2473
D810	5631-1S2473	1S2473
D811	5631-1S2473	1S2473
D812	5631-1S2473	1S2473
	COILS	
L101	5995-223296	22mH
L102	5995-223296	22mH
L201	5932-70223	3.3mH
L202	5932-70223	3.3mH
L203	5932-70115	
L204	5932-70115	
L205	5932-70116	
L206	5932-70116	
L501	5995-102269	
L502	5995-102269	
L651	5933-70223	
L652	5933-70223	

Ref.No.	Part No.	Description
	MISCELLANEOUS	
LC501	5214-84	LC Components
LC502	5214-84	LC Components
LC503	5214-77	LC Components
LC504	5214-77	LC Components
OS101	6171-1508	Bias Osc.
J351/ J352/ J353/ J354	4484-45	4-Pin Jack, Input, Output
LCN201	4163-0822029	CLW, 8 Pos.
LCN202	4163-0812029	CLW, 8 Pos.
CN103	4443-050185	Connector, 5 Pos.
CN104	4443-050185	Connector, 5 Pos.
CN105	4443-030185	Connector, 3 Pos.
CN106	4443-030185	Connector, 3 Pos.
CN107	4443-080185	Connector, 8 Pos.
CN108	4443-030185	Connector, 3 Pos.
CN110	4443-030185	Connector, 3 Pos.
CN111	4443-030185	Connector, 3 Pos.
CN301	4443-030185	Connector, 3 Pos.
CN302	4443-030185	Connector, 3 Pos.
	2132-7048	Spacer, R12
	4472-0131	Fuse Holder G GB
	PCB-2 FUNCTION SWITCH P.C. BOARD	
C569	5345-335F041	Capacitor, 3.3 μF/50V, EC
MR801	5193-DM106A	Magnet Resistor
S201	4431-05107160	Push Switch, LN
S202	4431-05107160	Push Switch, CrO_2
S203	4431-05107160	Push Switch, Metal
S501	4431-04087171	Push Switch, Dolby NR
S502	4431-05107160	Push Switch, NR Type
S801	4431-A010131	Push Switch, Pause
S802	4431-A010131	Push Switch, Stop
S803	4431-A010131	Push Switch, F. FWD
S804	4431-A010131	Push Switch, Play
S805	4431-A010131	Push Switch, REW
S806	4431-A010131	Push Switch, REC
S807	4431-A010131	Push Switch, REC Mute
S808	4431-A027136	Push Switch, Auto Repeat
	PCB-3 VR P.C. BOARD	
VR255	5113-20271159	Control, 2kΩB, Bias Fine Trim
VR353 VR354	5113-10471158	Control, 100kΩMN, Input Balance
S503	4431-A027336	Push Switch MPX Filter
	PCB-4 INPUT LEVEL CONTROL P.C. BOARD	
VR351, VR352	5224-503719	Control, 50kΩA, Input Level
	PCB-5 POWER SWITCH P.C. BOARD	
⚠ R13	5135-335J50P	Resistor, 3.3MΩ, 1/2W, CAR G GB
⚠ C1	5361-1030419	Capacitor, 0.01μF/AC 125V, CC U BK
⚠ C1	5352-1030958	Capacitor, 0.01μF/AC 250V, MPC G GB
⚠ S1	4431-A01056	Push Switch, Power
	PCB-6 DOLBY NR IND. P.C. BOARD	
D402	5637-GL9PG19	LED, GL9PG19, Green Dolby B
D406	5637-GL9HY9	LED, GL9HY9, Amber, Dolby C

Ref.No.	Part No.	Description
	PCB-7 REC/PAUSE IND. P.C. BOARD	
D403	5637-GL9PR9	LED, GL9PR9, Red, REC Level
D404	5637-GL9HY9	LED, GL9HY9, Amber, Pause
	PCB-8 POWER IND. P.C. BOARD	
D405	5637-GL5HD5	LED, GL5HD5, Red, Power
	PCB-9 HEADPHONES JACK P.C. BOARD	
J301	4451-00159	Jack, Headphones

KEY TO ABBREVIATIONS

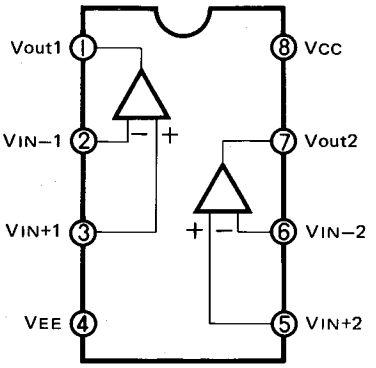
FR : Fuse Resistor
MR : Metal Resistor
CR : Cement Resistor
CAR : Carbon Resistor
EC : Electrolytic Capacitor
PC : Polypropylene Capacitor
MC : Mica Capacitor
CC : Ceramic Capacitor
MPC : Metalized Polyester Capacitor
ZD : Zener Diode
CLW : Connector with Lead Wire

U : U.S.A. model
BK : U.S.A. model Black Version
G : General model
GB : General model Black Version
* The part with the above mark is used only in the model made for the particular market the mark indicates.

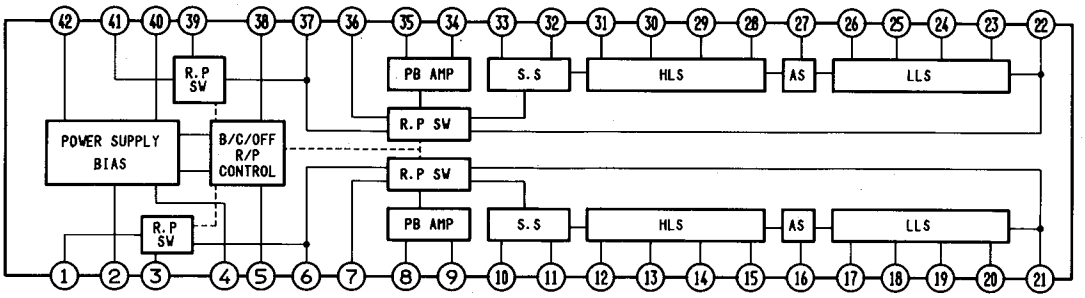
⚠ SAFETY RELATED COMPONENT.USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

IC BLOCK DIAGRAM

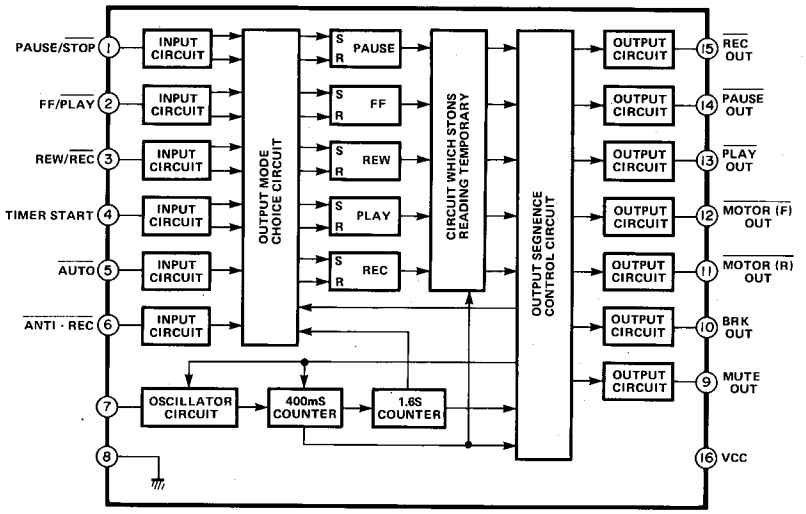
IC201 : M5219P
IC301 : M5216P
IC651, 652 : HA17082P
IC653 : M5218P



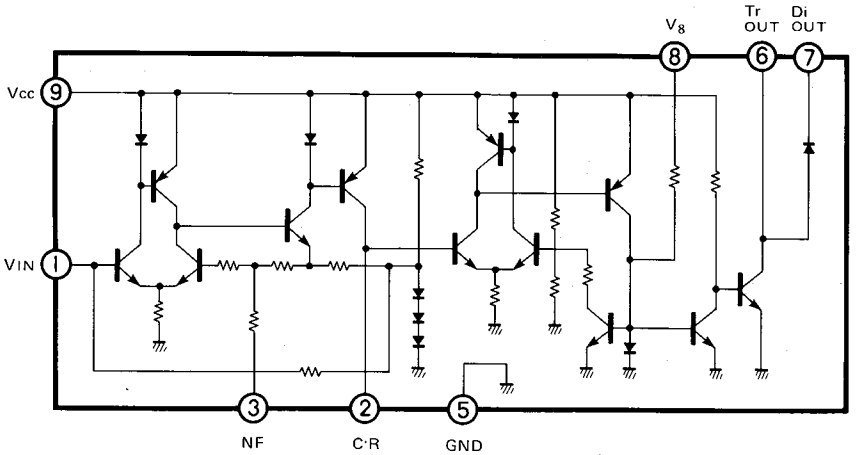
IC501 : HA12088



IC801 : M54886P

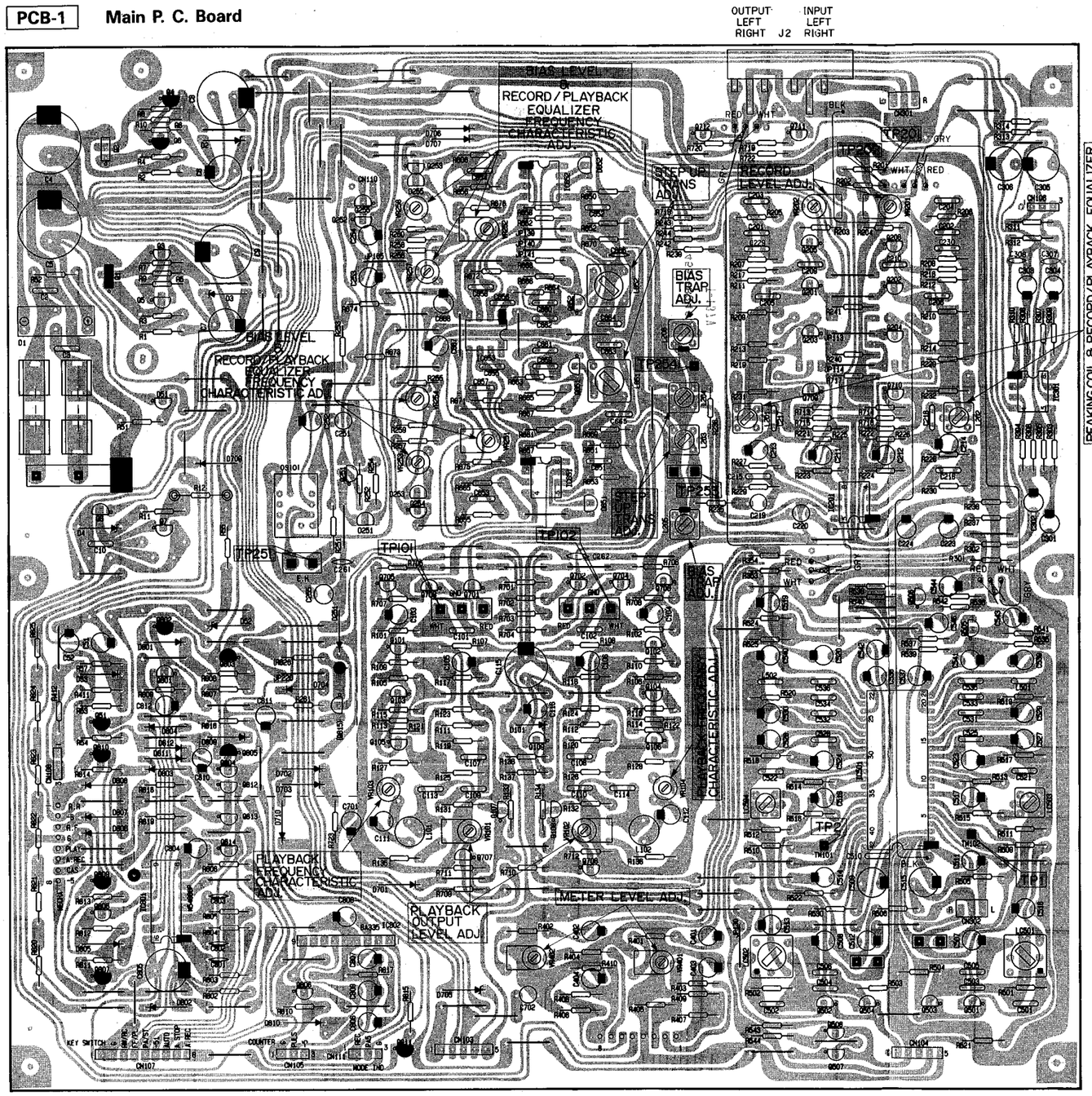


IC802 : BA335

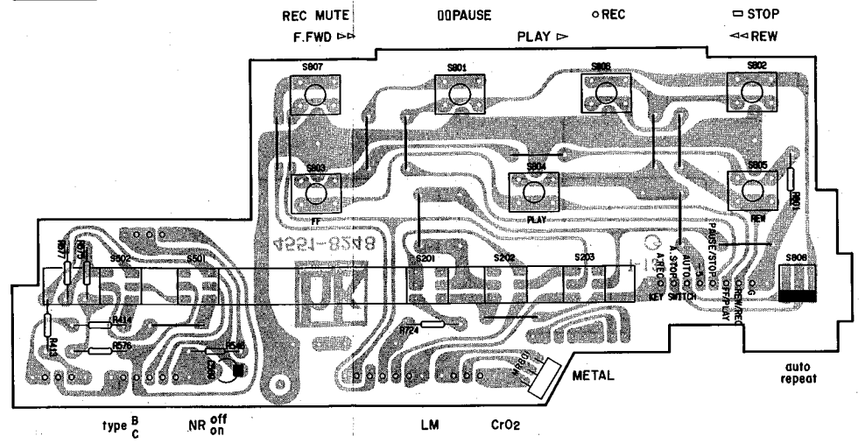


P. C. BOARDS

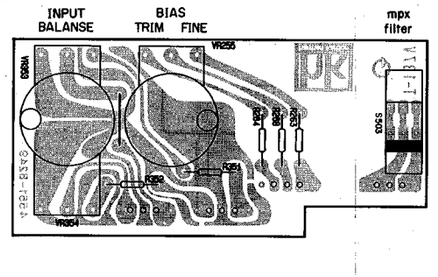
PCB-1 Main P. C. Board



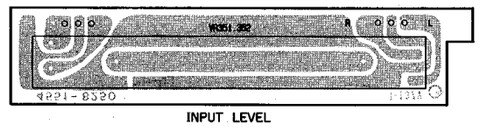
PCB-2 Function Switch P. C. Board



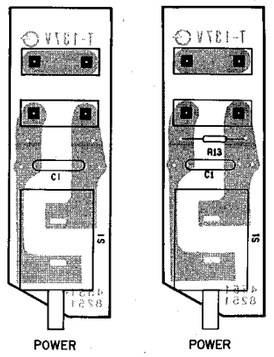
PCB-3 VR P. C. Board



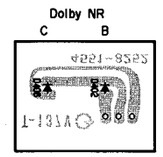
PCB-4 Input Level Control P. C. Board



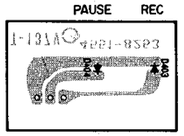
PCB-5 Power Switch P. C. Borad



PCB-6 Dolby NR Ind. P. C. Board



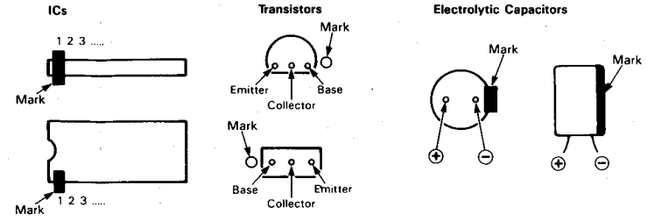
PCB-7 Rec/Pause Ind. P. C. Board



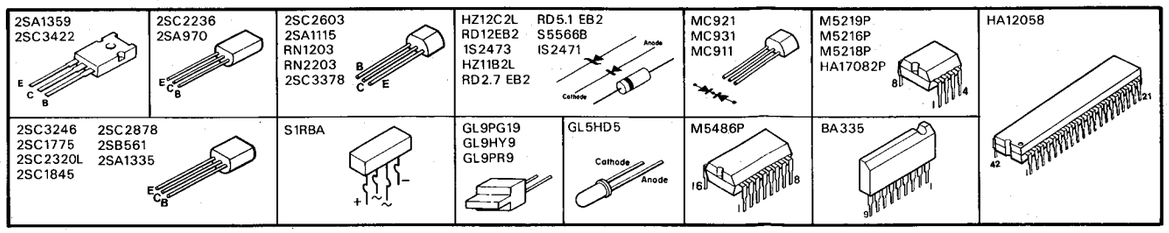
PCB-8 Power Ind. P. C. Board

PCB-9 Headphones Jack P. C. Board

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

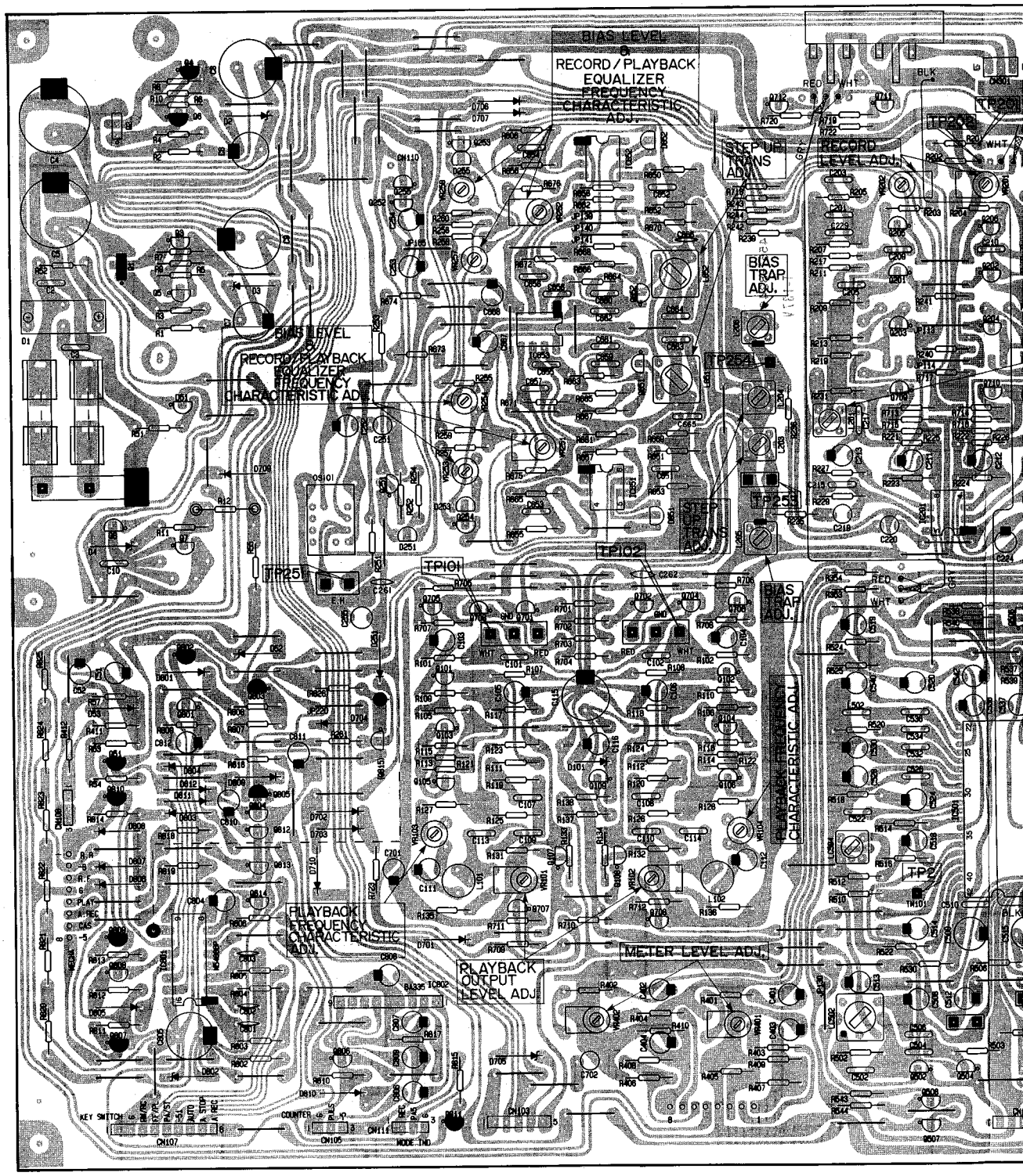


PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.



P. C. BOARDS

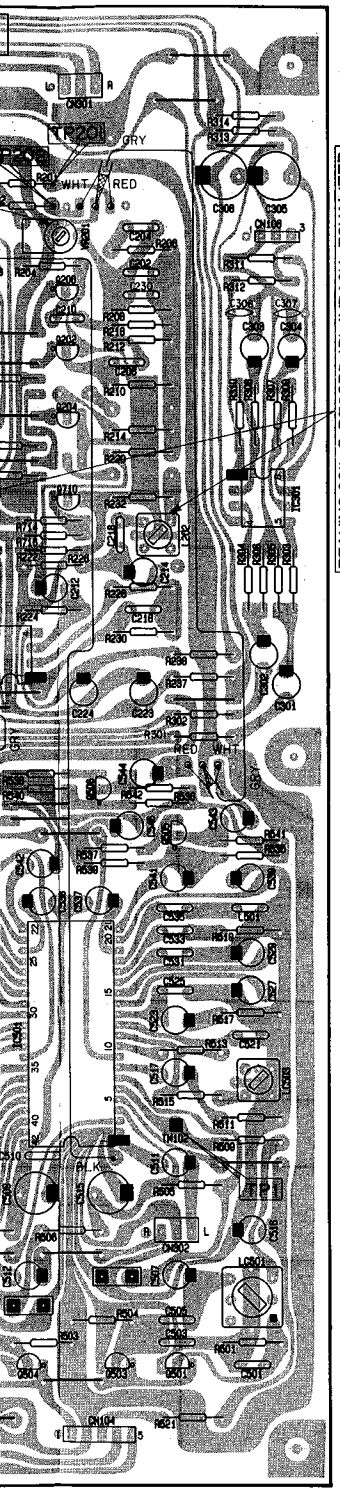
PCB-1 **Main P. C. Board**



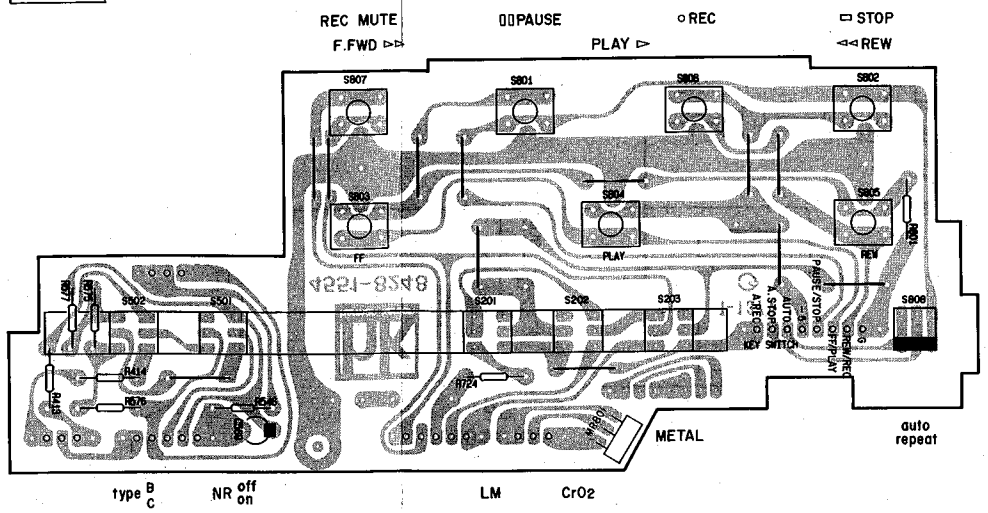
PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

2SA1359 2SC3422	2SC2236 2SA970	2SC2603 2SA1115 RN1203 RN2203 2SC3378	HZ12C2L RD12EB2 1S2473 HZ11B2L RD2.7 EB2	RD5.1 EB2 S5566B IS2471	MC921 MC931 MC911
2SC3246 2SC1775 2SC2320L 2SC1845	2SC2878 2SB561 2SA1335	S1RBA	GL9PG19 GL9HY9 GL9PR9	GL5HD5	M5486P

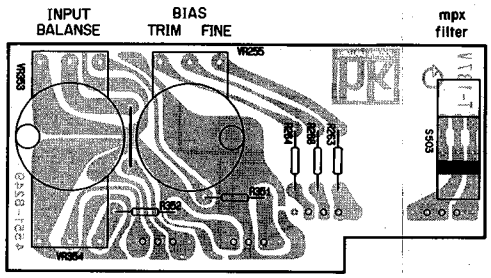
E | F | G | H | I | J



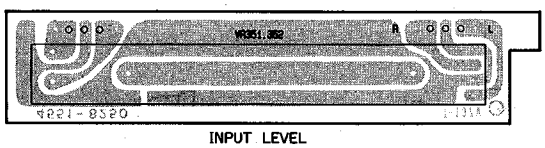
PCB-2 Function Switch P. C. Board



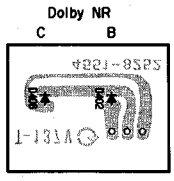
PCB-3 VR P. C. Board



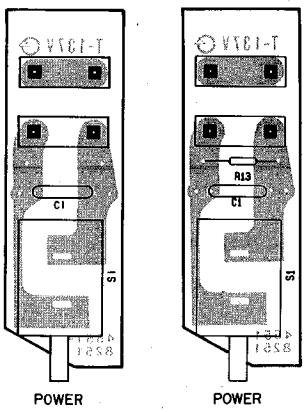
PCB-4 Input Level Control P. C. Board



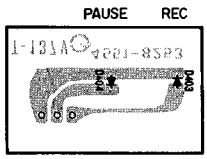
PCB-6 Dolby NR Ind. P. C. Board



PCB-5 Power Switch P. C. Borad



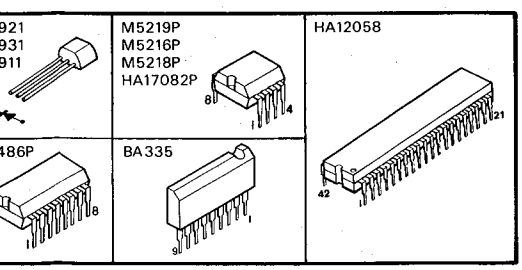
PCB-7 Rec/Pause Ind. P. C. Board



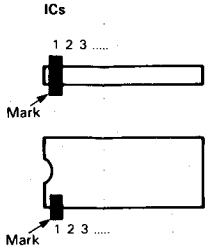
PCB-8 Power Ind. P. C. Board

PCB-9 Headphones Jack P. C. Board

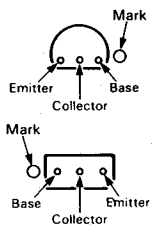
NOTE:
In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.



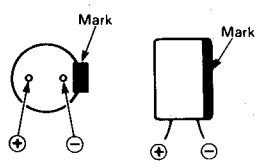
ICs



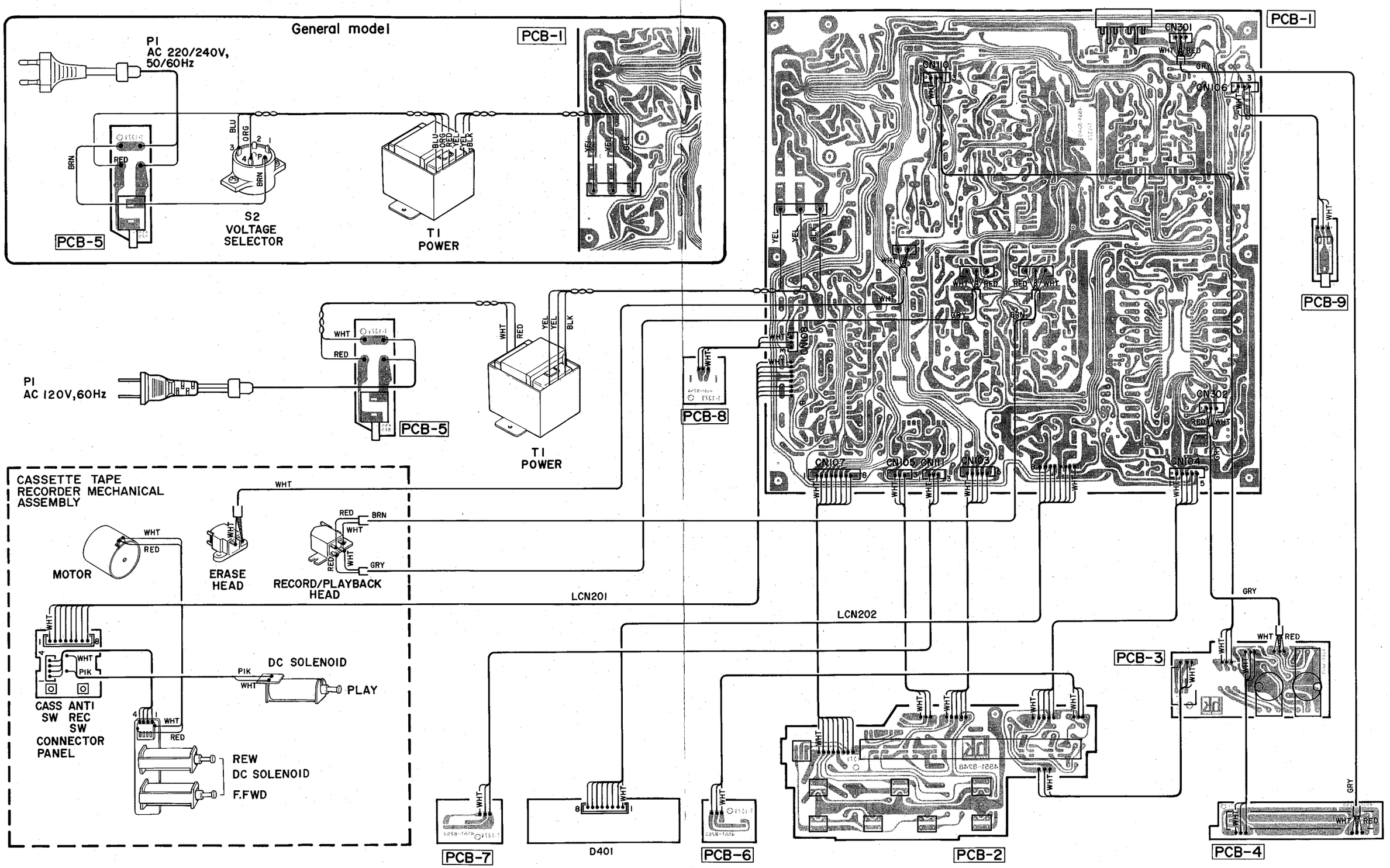
Transistors



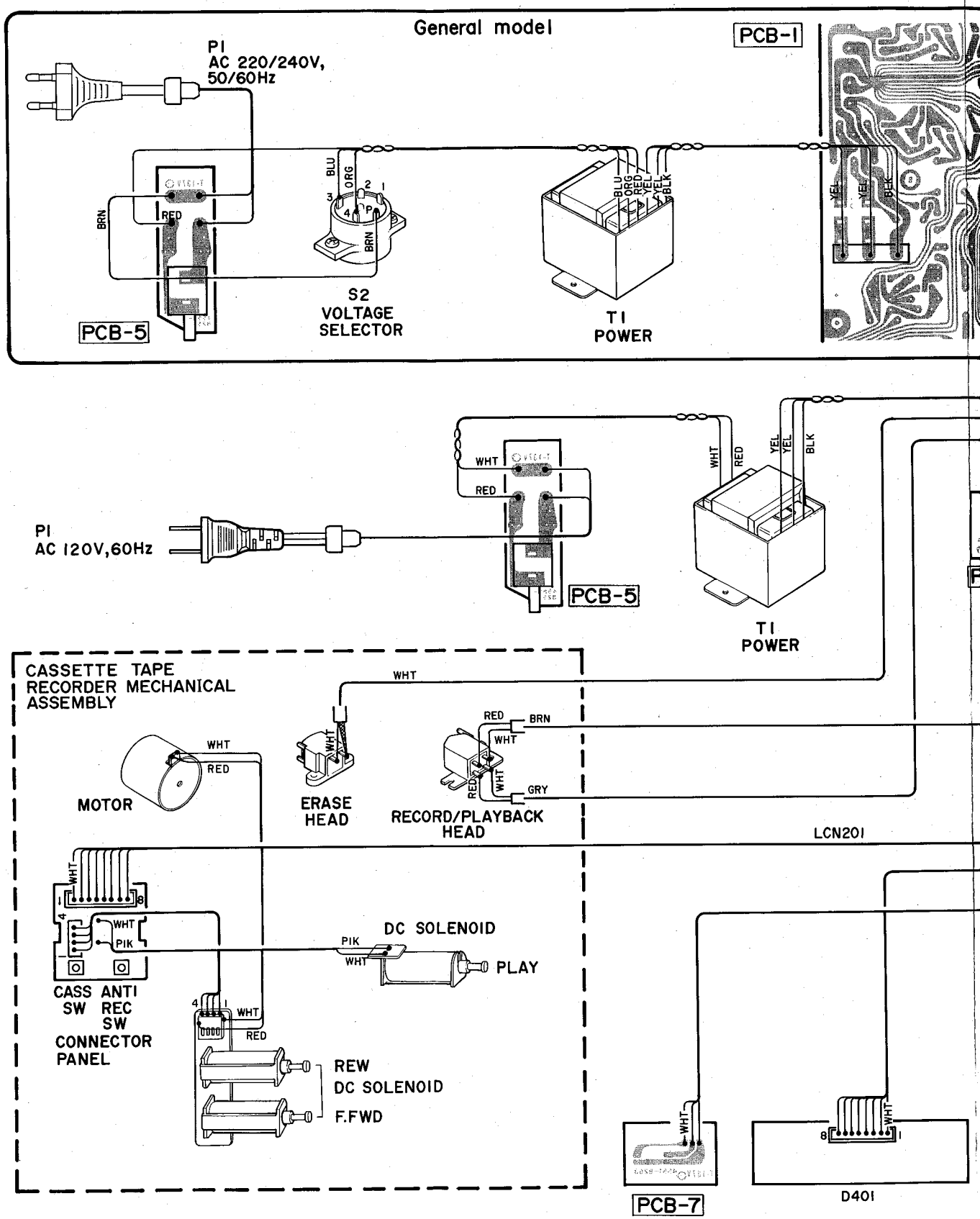
Electrolytic Capacitors

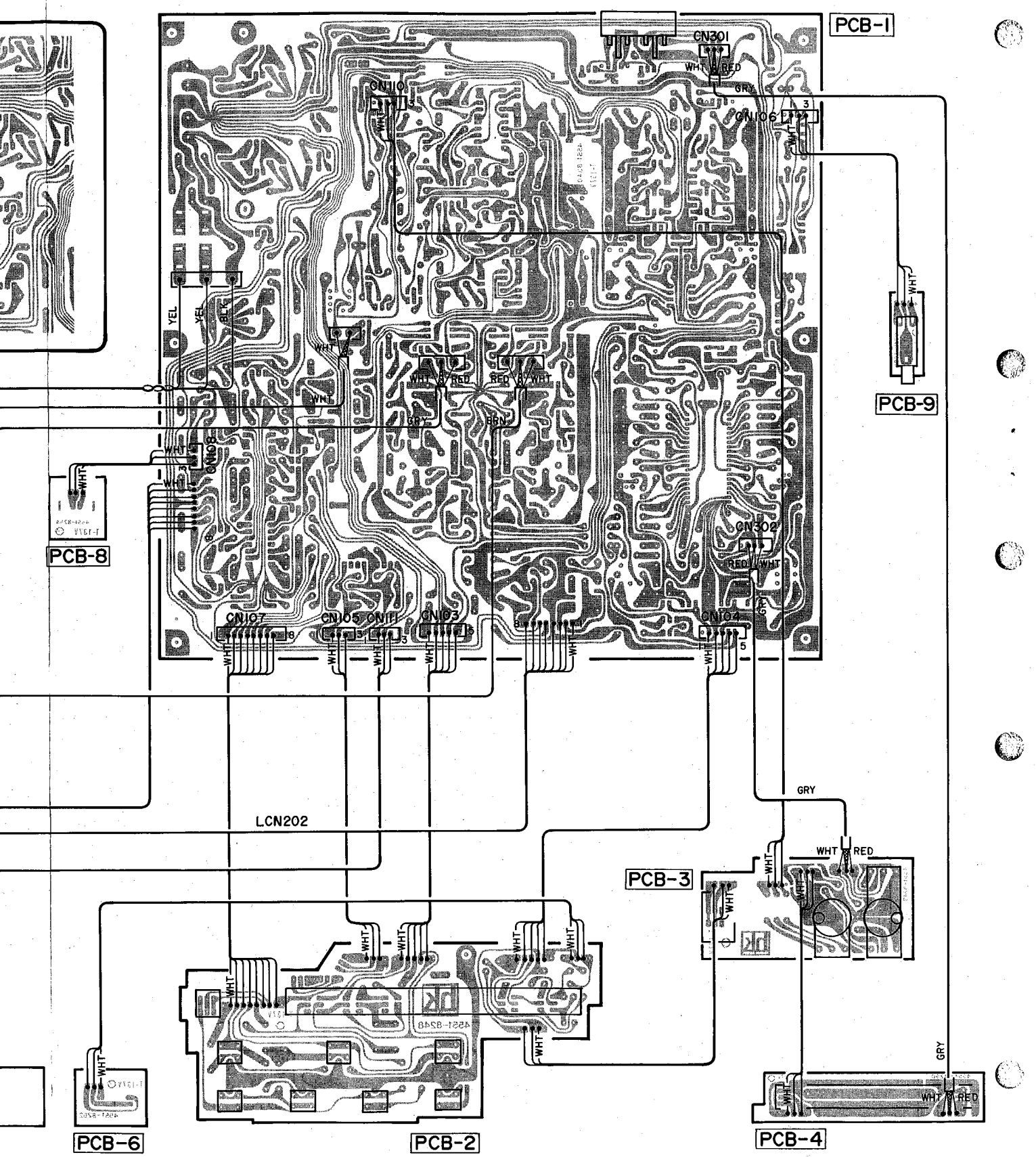


WIRING DIAGRAM

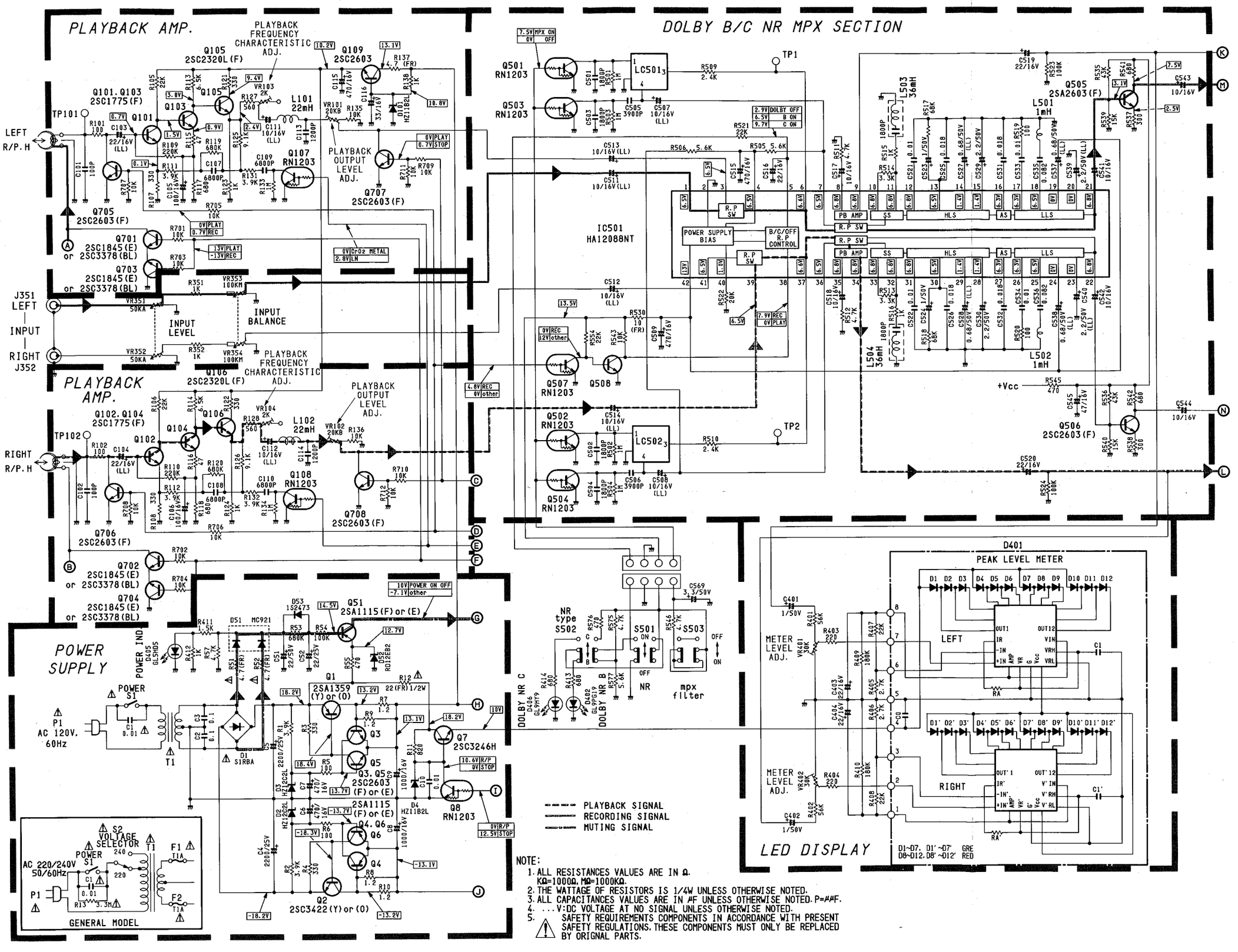


WIRING DIAGRAM



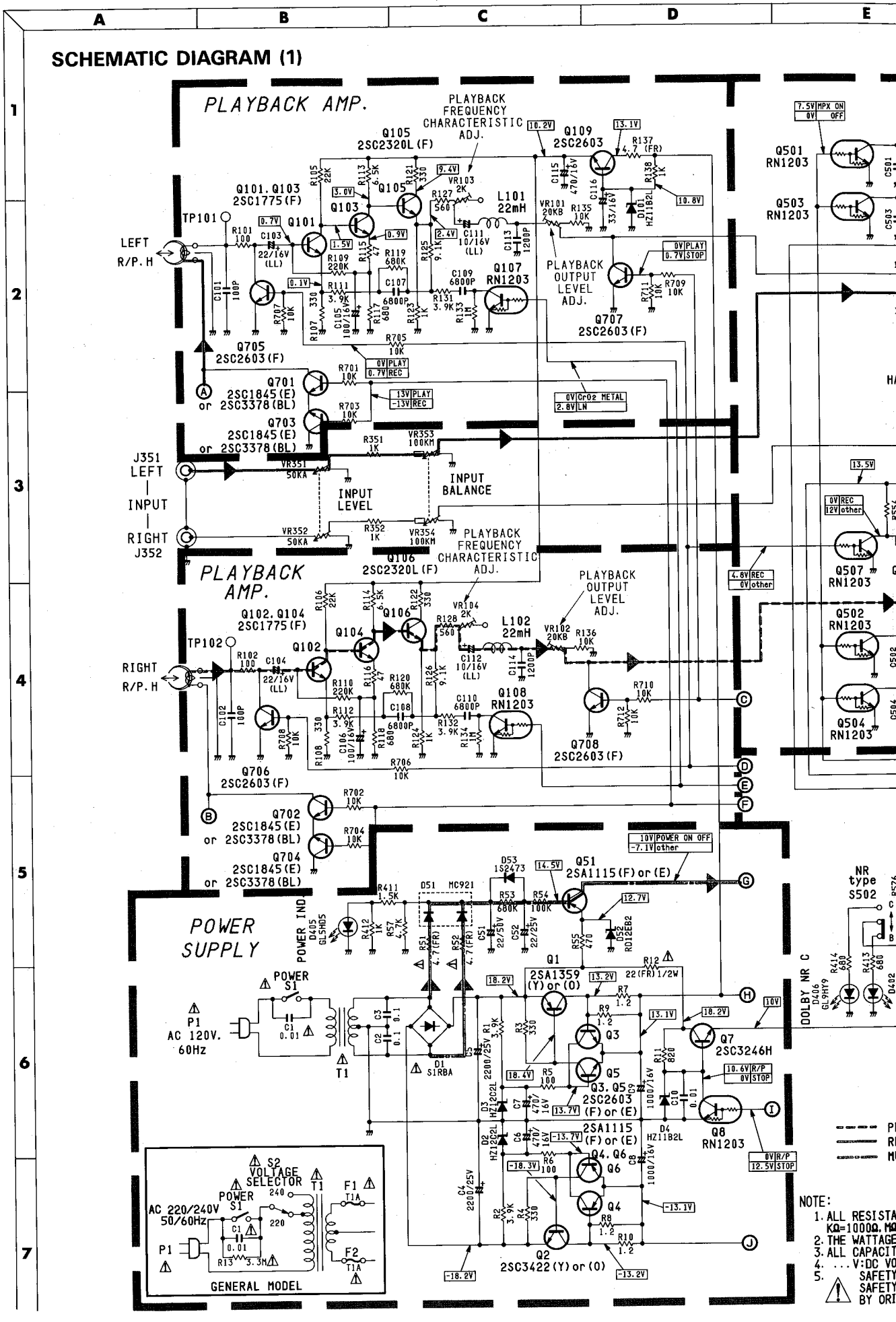

PCB-1
CN301
WHT
RED
GRY
CN106
CN110
CN108
YEL
YEL
BLK
WHT
WHT
RED
RED
WHT
WHT
GRY
BRN
PCB-9
PCB-8
CN302
RED
WHT
GRY
CN107
CN105
CN111
CN103
CN104
LCN202
GRY
PCB-3
WHT
RED
PCB-6
PCB-2
PCB-4
GRY
WHT
RED

SCHEMATIC DIAGRAM (1)



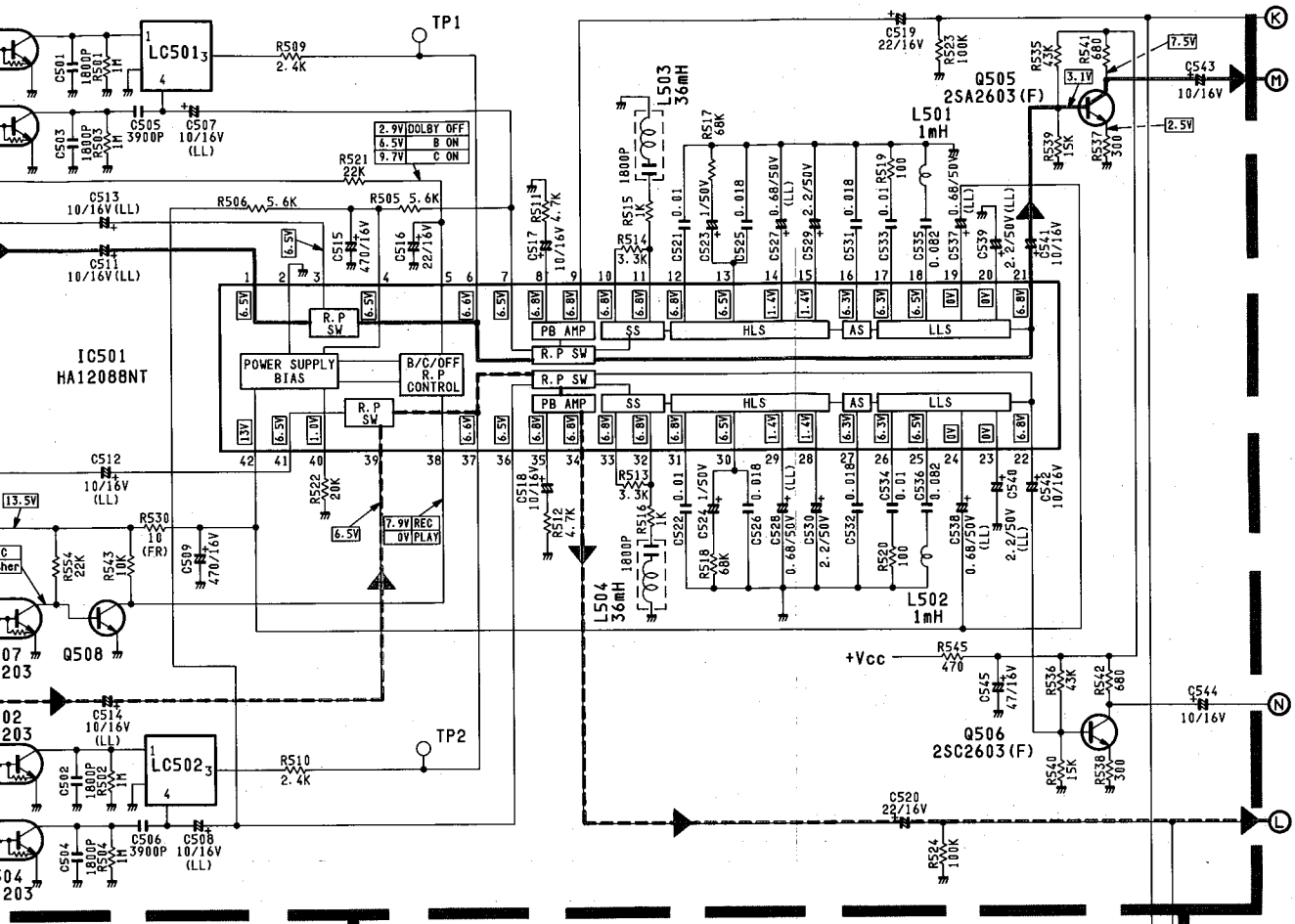
NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω. KΩ=1000Ω, MΩ=1000KΩ.
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μμF.
4. ...V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5. ⚠ SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH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

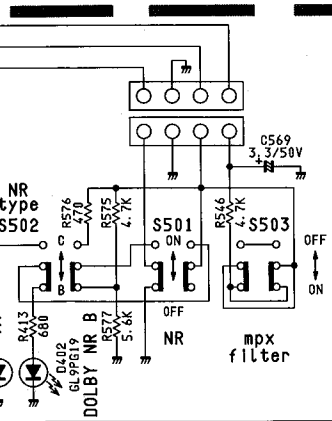
SCHEMATIC DIAGRAM (1)

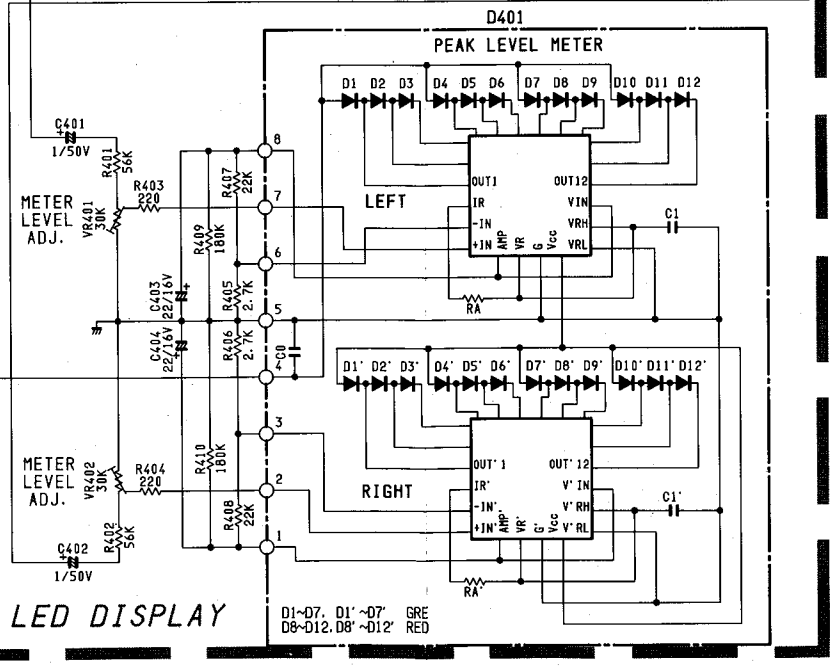


E | F | G | H | I | J

DOLBY B/C NR MPX SECTION



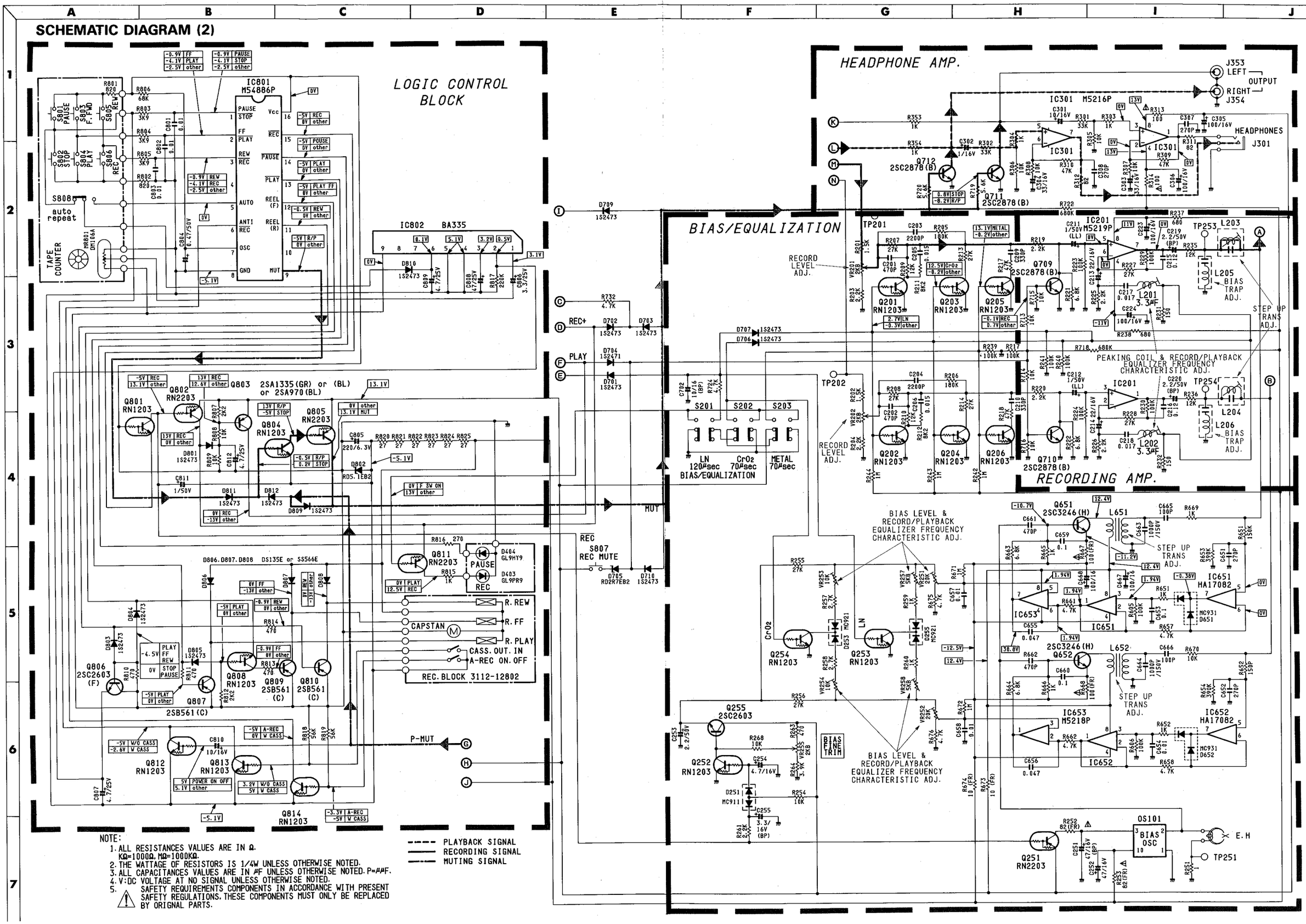




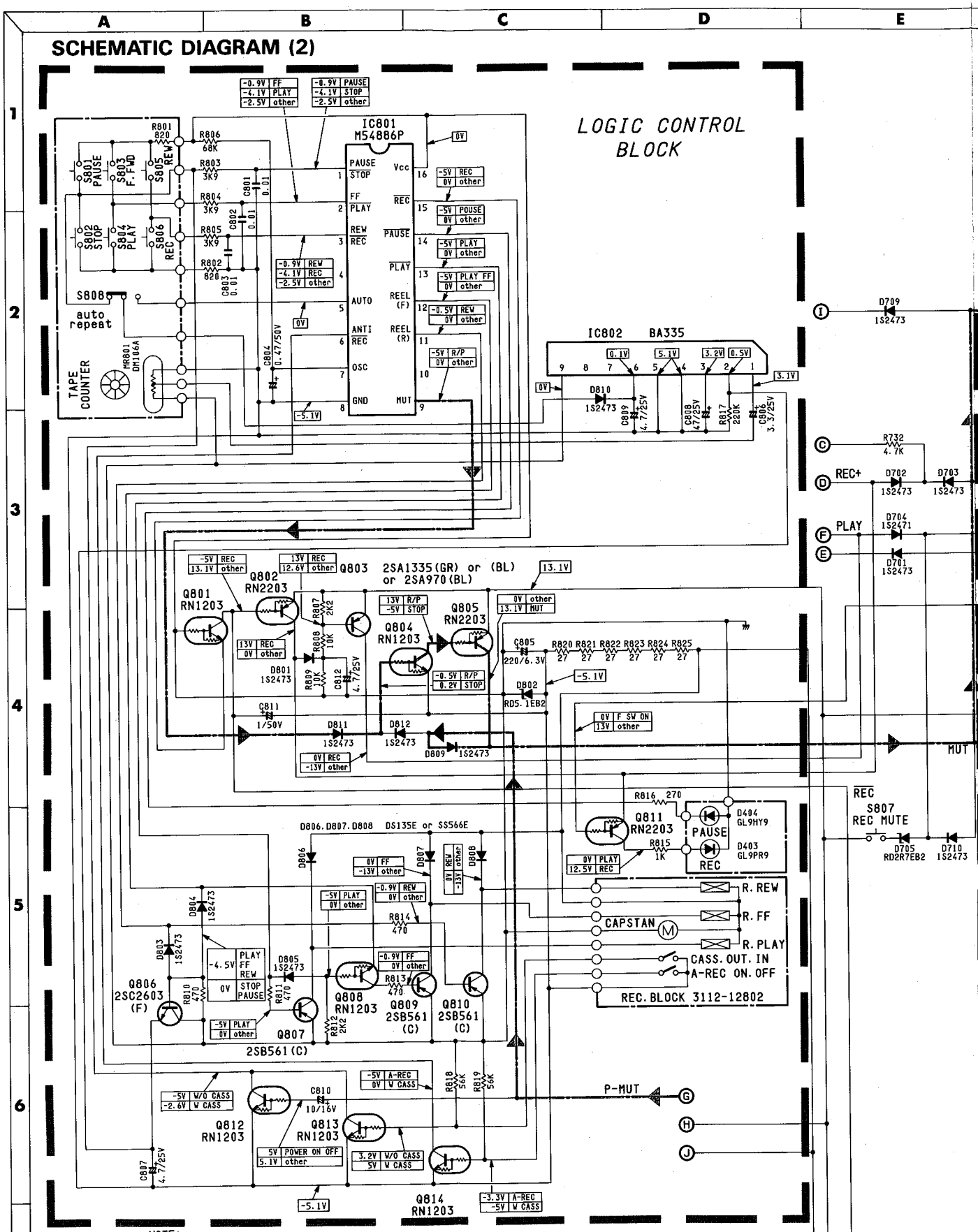
--- PLAYBACK SIGNAL
——— RECORDING SIGNAL
—— MUTING SIGNAL

RESISTANCES VALUES ARE IN Ω.
000Ω, MΩ=1000KΩ.
WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μμF.
V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGNAL PARTS.

SCHEMATIC DIAGRAM (2)

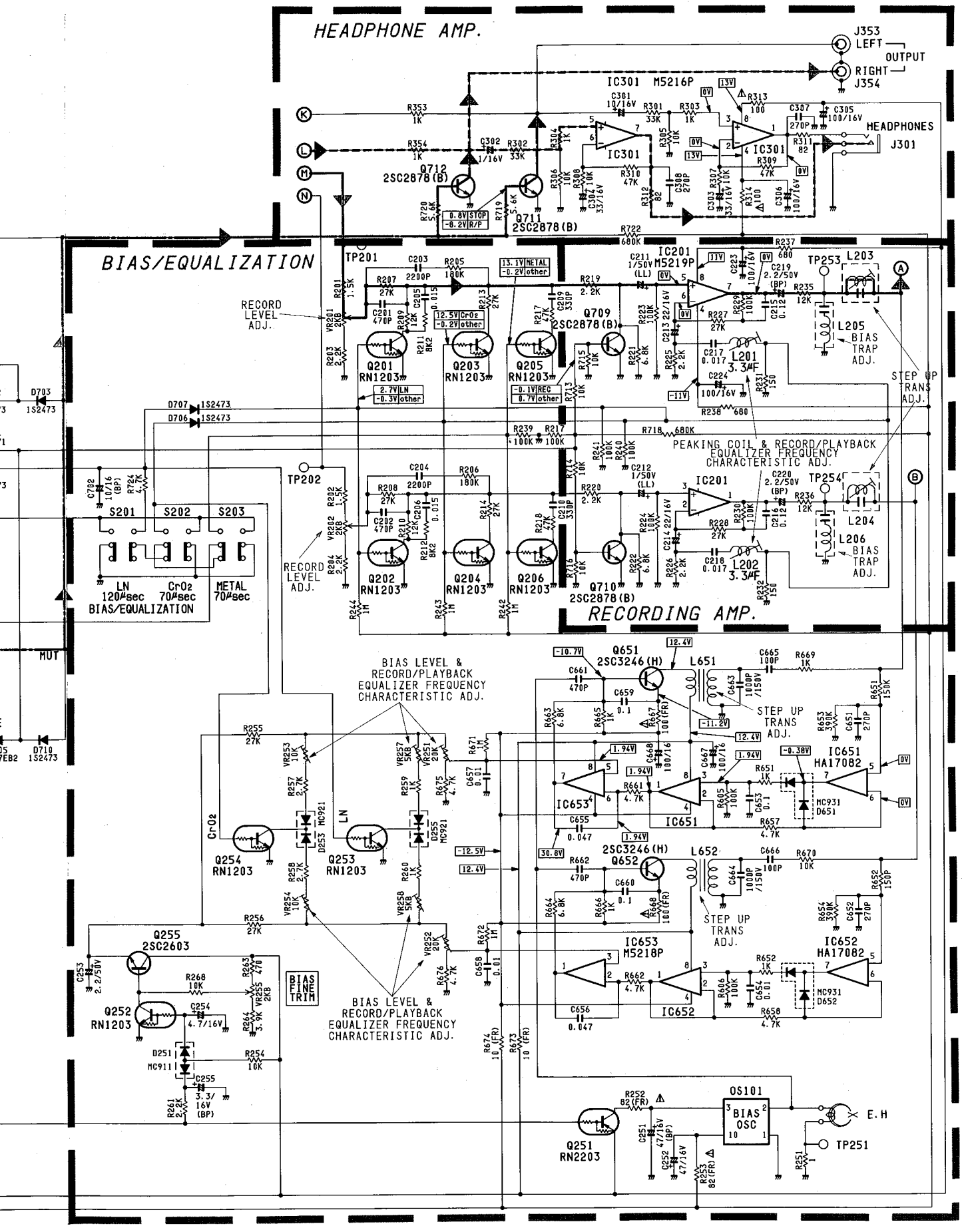


SCHEMATIC DIAGRAM (2)



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 μF UNLESS OTHERWISE NOTED. P=μμF.
4. V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.
5. ⚠ SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGNAL PARTS.

PLAYBACK SIGNAL
RECORDING SIGNAL
MUTING SIGNAL


HEADPHONE AMP.
J353 LEFT OUTPUT
RIGHT J354
IC301 M5216P
HEADPHONES J301
Q712 2SC2878(B)
Q711 2SC2878(B)
BIAS/EQUALIZATION
IC201 M5219P
TP201
TP202
TP253
TP254
L203
L205 BIAS TRAP ADJ.
L201 3.3μF
L204
L206 BIAS TRAP ADJ.
L202 3.3μF
STEP UP TRANS ADJ.
RECORD LEVEL ADJ.
PEAKING COIL & RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJ.
Q201 RN1203
Q202 RN1203
Q203 RN1203
Q204 RN1203
Q205 RN1203
Q206 RN1203
Q709 2SC2878(B)
Q710 2SC2878(B)
S201 S202 S203
LN 120μsec
CrO2 70μsec
METAL 70μsec
BIAS/EQUALIZATION
RECORDING AMP.
BIAS LEVEL & RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJ.
Q651 2SC3246(H)
Q652 2SC3246(H)
L651
L652
IC651 HA17082
IC652 HA17082
IC653 M5218P
STEP UP TRANS ADJ.
Q254 RN1203
Q253 RN1203
Q255 2SC2603
Q252 RN1203
BIAS FINE TRIM
Q251 RN2203
OS101 BIAS OSC
E.H
TP251
MUT