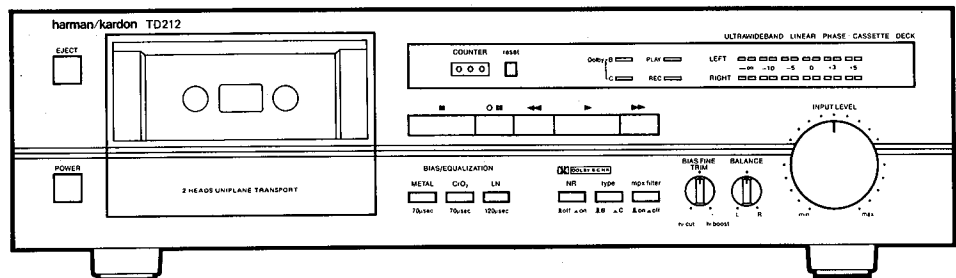


The Harman Kardon Model TD212

Manual 124A

ULTRAWIDEBAND LINEAR PHASE CASSETTE DECK

Technical Manual



The following mark found in the parts list of this manual identify the model as follows.

CB : General model Black version

harman/kardon

240 Crossways Park West, Woodbury, N.Y. 11797
1112-3152124A8 P-078801 1500 Printed in Japan

SPECIFICATIONS

Track Configuration 4-track 2 Channel Stereo
Cassette Deck

●MECHANICAL SECTION

Record/Playback Tape Speed
Deviation 4.75cm/sec. 0.05% ± 1.5%
Drift 4.75cm/sec. 0.2% ± 2.0%
Wow and Flutter 0.05% (NAB) ≤ 0.1%
0.008% (CCIR)
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 85 sec. ≤ 100 sec.
Motor Direct Drive Motor

●AMPLIFIER SECTION

Bias Frequency 105 kHz ± 5 kHz
Playback Output 480mV ± 1.5dB
Signal-to-Noise Ratio at Line Input (Input 1 kHz, 100 mV)
IHf-A WTD at Dolby Level
Dolby NR off
LN 51 dB
CrO₂ 54 dB
Metal 54 dB
Dolby B NR
LN 61 dB
CrO₂ 64 dB ≥ 60 dB
Metal 64 dB ≥ 60 dB
Dolby C NR
LN 66 dB
CrO₂ 70 dB ≥ 66 dB
Metal 70 dB ≥ 66 dB

Channel Separation 45 dB ≥ 35 dB
Crosstalk 70 dB ≥ 60 dB
Record/Playback Distortion (Input 1 kHz)

LN 1.3% ≤ 2.0%
CrO₂ 1.8% ≤ 3.0%
Metal 1.5% ≤ 2.0%
MPX Filter Attenuation
at 15 kHz 0.3 dB ≤ 1 dB
at 19 kHz 35 dB ≥ 30 dB
Erase Ratio (Input 80 Hz)
LN 70 dB ≥ 60 dB
Metal 61 dB ≥ 56 dB
Input Sensitivity (Input 1 kHz) at Line Input 52 mV 40(min) ~ 100(max) mV
Input Impedance (Input 1 kHz) at Line Input 23 kΩ 19(min) ~ 30(max) kΩ

●DIMENSIONS (W x H x D) 17-3/8" x 4-13/16" x 9-1/16"
(443 x 122 x 230 mm)
●WEIGHT 8.5lbs (3.9kg)

●POWER SUPPLY

U.S.A. & Canada models AC120V, 60Hz
General model AC220V/240V 50/60Hz

●POWER CONSUMPTION

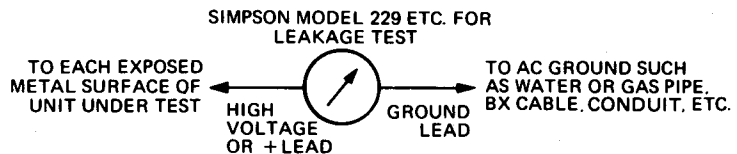
U.S.A. & Canada models 18W
General model 20W

These specifications are service target specs.
Specifications and components are subject to change without notice.
Overall performance will be maintained or improved.

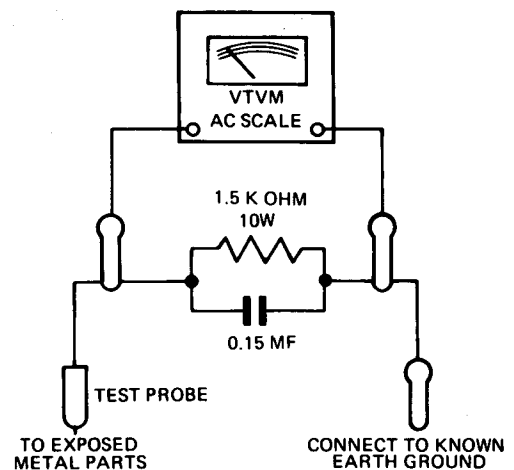
LEAKAGE TEST (FOR SERVICE ENGINEERS IN THE U.S.A.)

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

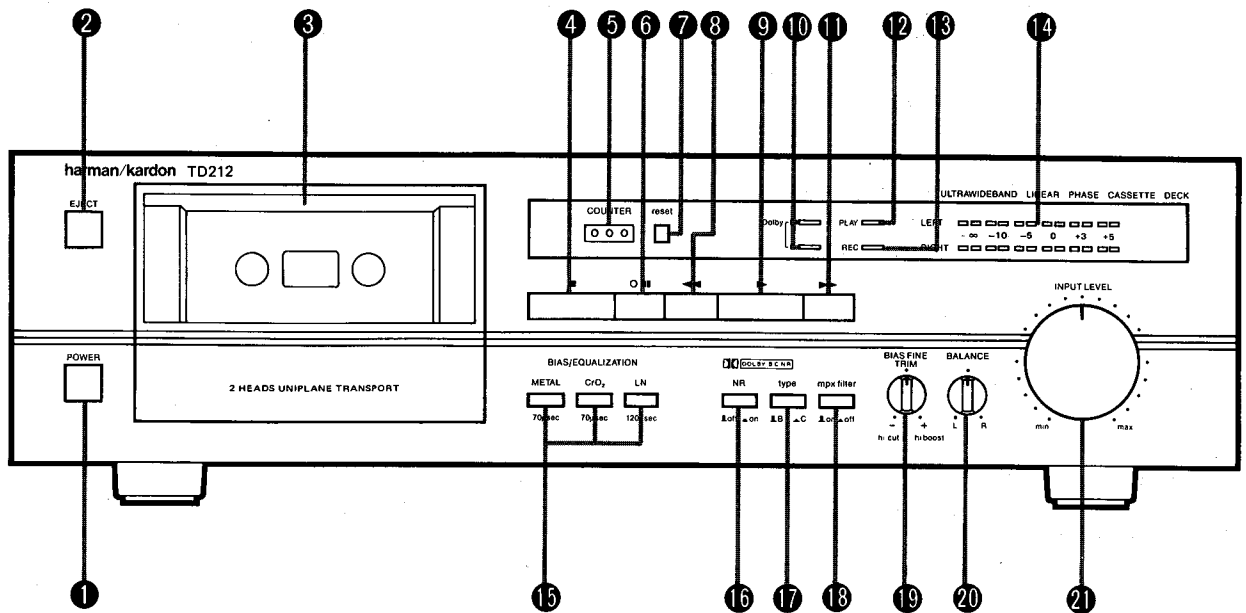
1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Replace all protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
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 AC line 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

**1 POWER SWITCH (POWER)**

Pressing this switch will turn on the power. Press the switch again to turn the power off.

2 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.

3 CASSETTE COMPARTMENT**4 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 record standby mode activated by the "REC/PAUSE" button.

5 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.

6 RECORD/PAUSE BUTTON (REC/PAUSE)

Press this button to provide the record standby mode. The "REC" indicator will illuminate and the "PLAY" indicator will blink. Recording starts when the "PLAY" button is pressed. The "PLAY" indicator will then stop blinking and remain illuminated. Also, press this button to temporarily stop recording.

7 COUNTER RESET BUTTON (COUNTER reset)

Press this button to reset the "TAPE COUNTER" indication when starting to record.

8 REWIND BUTTON (REW)

Press this button to rewind a tape at high speed.

9 PLAY BUTTON (PLAY)

Press this button to start playback.

10 DOLBY NR INDICATOR

For indication that Dolby B or C noise reduction circuitry is activated.

11 FAST FORWARD BUTTON (F. FWD)

Press this button to quickly advance the tape in the same direction as it is played.

12 PLAY INDICATOR

For indication that the tape is playing.

13 RECORD INDICATOR

For indication that the tape is being recorded.

14 PEAK LEVEL METER

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

15 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 (CrO₂) or low noise (LN) tape.

16 DOLBY* NR SWITCH (NR)

Depress this switch for recording or playback using the Dolby NR system. The "Dolby NR" indicator will light up. Press the switch again to turn off the Dolby NR system.

17 DOLBY NR TYPE SWITCH (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. The green "Dolby NR" indicator (for B-type) or the amber one (for C-type) illuminates according to the "type" switch position.

⑩ 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. Set this switch to the "on" position when recording from an FM stereo tuner or receiver. However, to appreciate the ultra-wideband frequency response of your cassette deck, depress this switch to the "off" position when recording all other sources, such as a turntable, tape deck, etc.

⑪ BIAS FINE TRIM KNOB (BIAS FINE TRIM)

For precise adjustment of the bias used during recording.

⑫ INPUT BALANCE CONTROL KNOB (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.

⑬ INPUT LEVEL CONTROL KNOB (INPUT LEVEL)

This knob adjusts the record level of the input signal.

*Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

DISASSEMBLY PROCEDURES (REFER TO PAGES 5, 6 AND 13)**① CABINET TOP (126) REMOVAL**

Remove 6 screws (A) and then remove the Cabinet Top (126).

② FRONT PANEL ASSEMBLY (AC) REMOVAL

1. Remove the Cabinet Top (126). (Refer to step ①.)
2. Remove the Belt of the Tape Counter.
3. Disconnect LCN101 and JL101 connected to the Main P.C. Board (PCB-1).
4. Remove the Rotary Knob (145) and Nut. Remove 7 screws (B) and 4 screws (C), then remove the Front Panel Assembly (AC).

③ CASSETTE TAPE RECORDER MECHANISM ASSEMBLY (103) REMOVAL

1. Remove the Front Panel Assembly (AC). (Refer to step ②.)
2. Disconnect LCN801 and LCN802 connected to the Cassette Tape Recorder Mechanism Assembly (103).
3. Disconnect CN106 and CN107 connected to the Main P.C. Board (PCB-1).

4. Remove 2 screws (D) and then remove the Cassette Tape Recorder Mechanism Assembly (103).

④ MAIN P.C. BOARD (PCB-1) REMOVAL

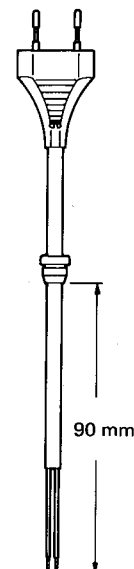
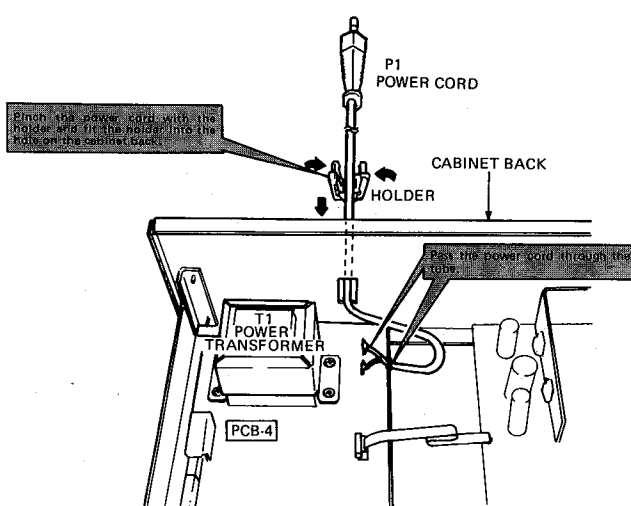
1. Remove the Cabinet Top (126). (Refer to step ①.)
2. Disconnect CN106 and CN107 connected to the Cassette Tape Recorder Mechanism Assembly (103).
3. Disconnect CN101 and CN102 connected to the Display P.C. Board (PCB-2).
4. Disconnect the JL102 connected to the Power P.C. Board (PCB-4).
5. Remove 3 screws (E) and 2 screws (F), then remove the Main P.C. Board (PCB-1).

⑤ OTHER P.C. BOARDS REMOVAL

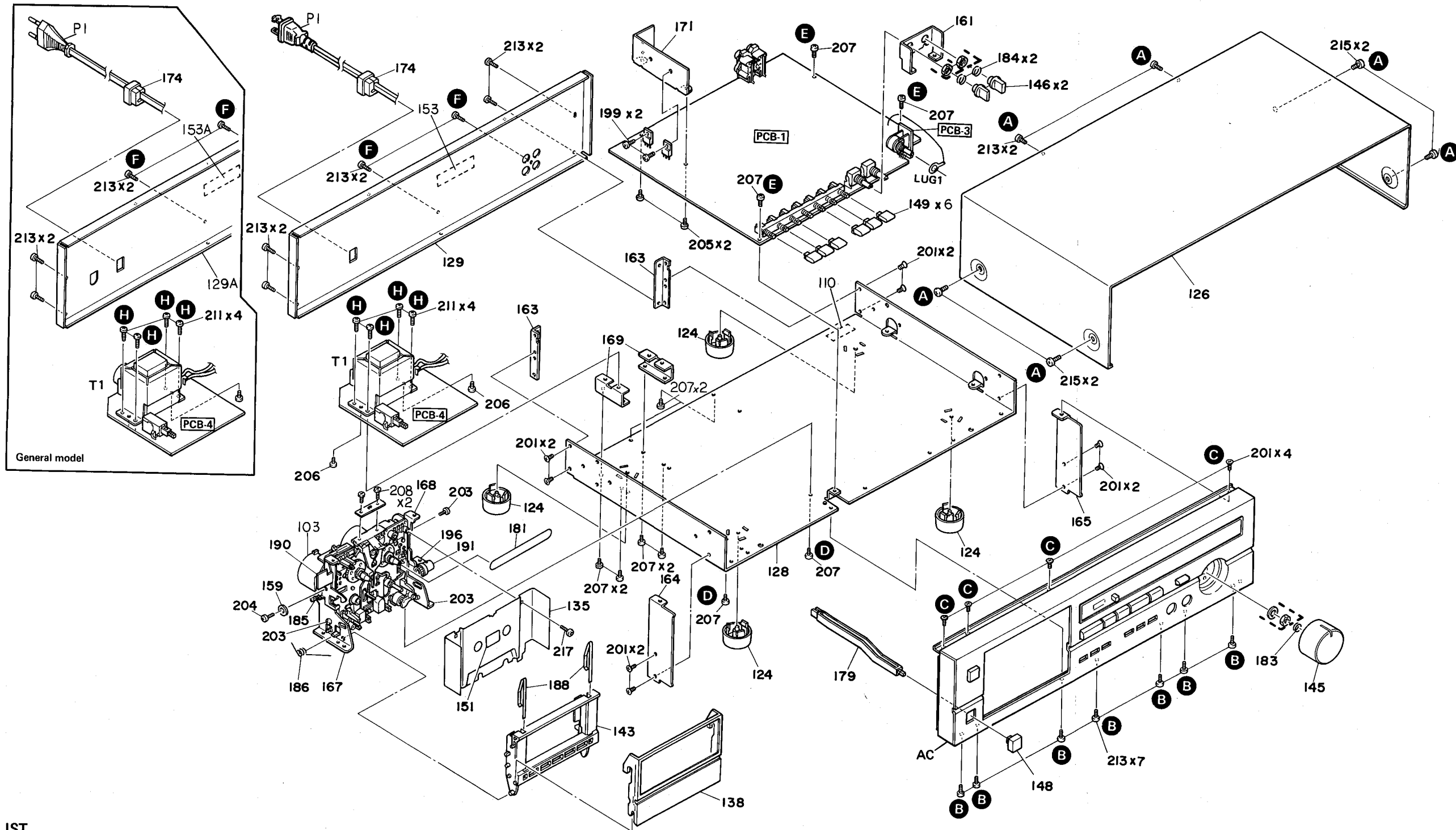
1. Remove the Front Panel Assembly (AC). (Refer to step ②.)
2. Remove 2 screws (G) and then remove the Display P.C. Board (PCB-2).
3. Remove 4 screws (H) and then remove the Power P.C. Board (PCB-4). If necessary, disconnect the connector.

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 part with the standard supply parts.



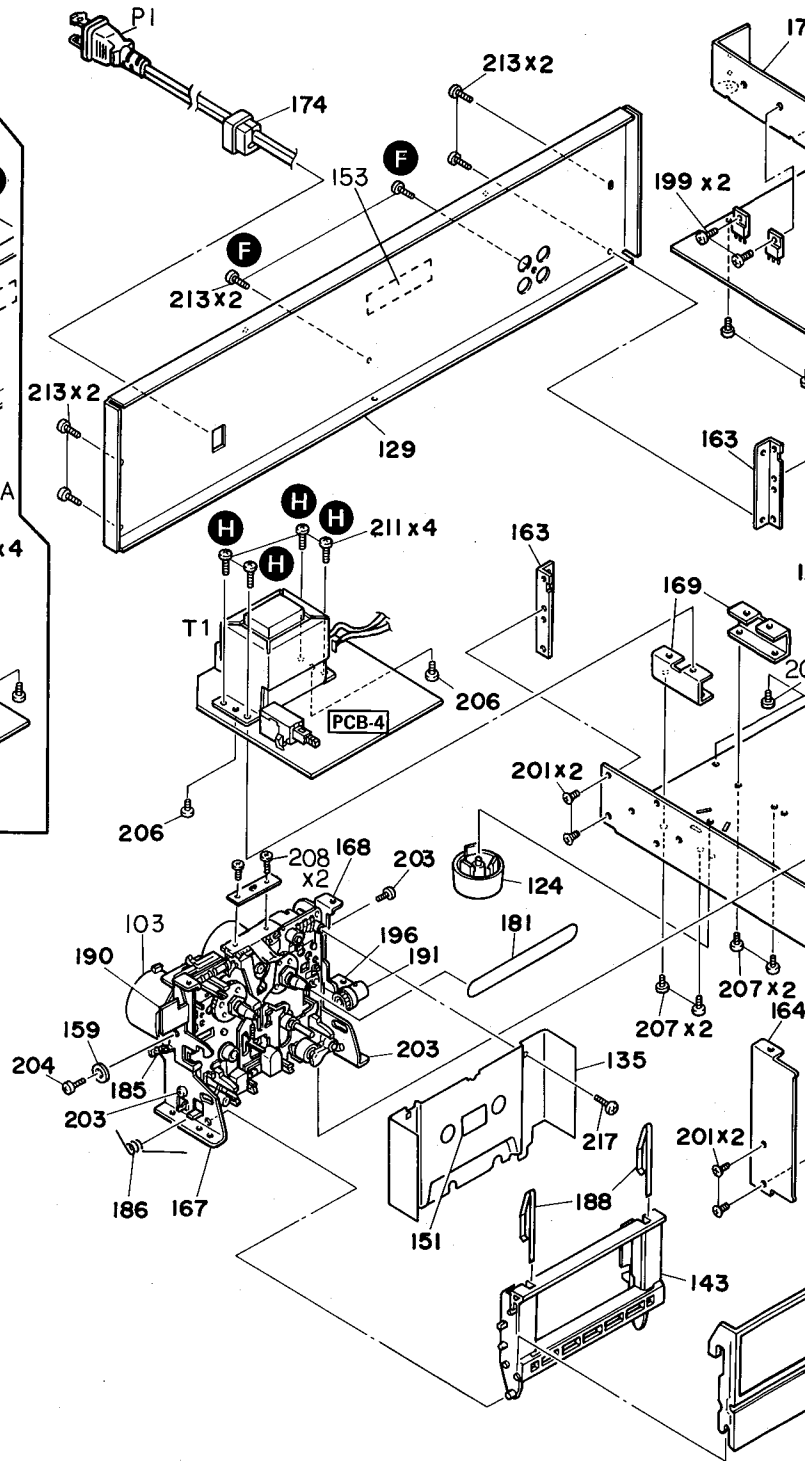
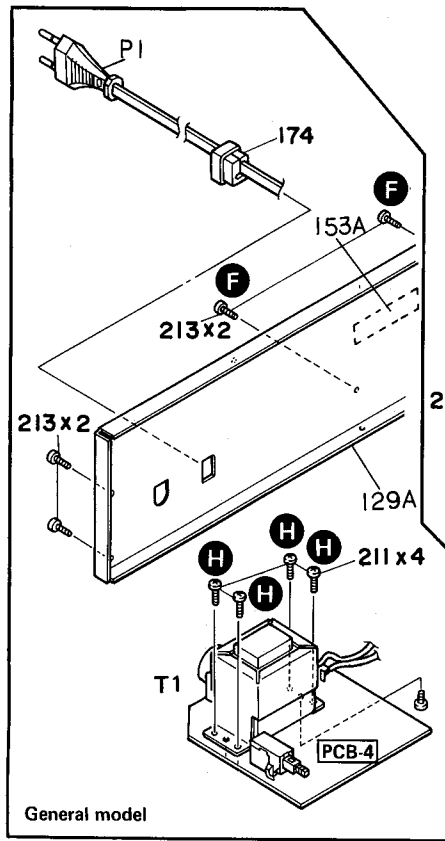
**GENERAL UNIT
EXPLODED VIEW**



PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AC	A443-TD212A	FRONT PANEL ASS'Y	149	1662-35301	PUSH BUTTON	179	2601-7172	SHAFT, POWER	204	2347-300627	SCREW
103	3112-13704	CASSETTE TAPE RECORDER MECHANISM ASS'Y	151	1741-01601	ORNAMENT	181	2642-01439	BELT	205	2343-300812	SCREW
110	1117-78	SERIAL LABEL	153	1756-CSA	LABEL	183	2651-110518	SPRING	206	2347-R0130062	SCREW
124	1319-0139	LEG	159	2132-7155	SPACER	184	2651-110541	SPRING	207	2347-R0130062	SCREW
126	1414-11201	CABINET, TOP COVER	161	2213-7019	BRACKET	185	2651-0000221	SPRING	208	2347-300627	SCREW
128	1424-23801	CABI BACK, BOTTOM	163	2219-8183	METAL FITTG, BOTTOM REAR	186	2651-11212	SPRING	211	2347-R0130082	SCREW
129	1424-18405	CABI BACK, REAR	164	2219-8184	METAL FITTG, BOTTOM FRONT L	188	2652-105	LEAF SPRING	213	2347-R0130084	SCREW
129A	1424-18406	CABI BACK, REAR (GB)	165	2219-8185	METAL FITTG, BOTTOM FRONT R	190	2672-7040	LEVER	215	2347-R0140064	SCREW
135	1514-22401	PLATE	167	2219-8190	METAL FITTG	191	2692-12	DAMPER	217	2347-R0130084	SCREW
138	1532-15201	WINDOW	168	2219-8191	METAL FITTG	196	2459-3005511	PLASTC RIVET	ΔP1	4161-71151	CORD W/PLUG
143	1612-06201	CASSETTE LID	169	2219-8100	METAL FITTG, TRANS	199	2327-R0130082	SCREW	ΔP1	4161-7256	CORD W/PLUG (GB)
145	1630-02903	ROTARY KNOB	171	2222-7238	HEAT SINK	201	2343-300627	SCREW	ΔT1	5584-S1801	XFORMER, POWER
146	1632-17201	ROTARY KNOB	174	2240-364	HOLDER, AC CORD	203	2347-300427	SCREW	ΔT1	5584-S1802	XFORMER, POWER (GB)
148	1662-25402	PUSH BUTTON									

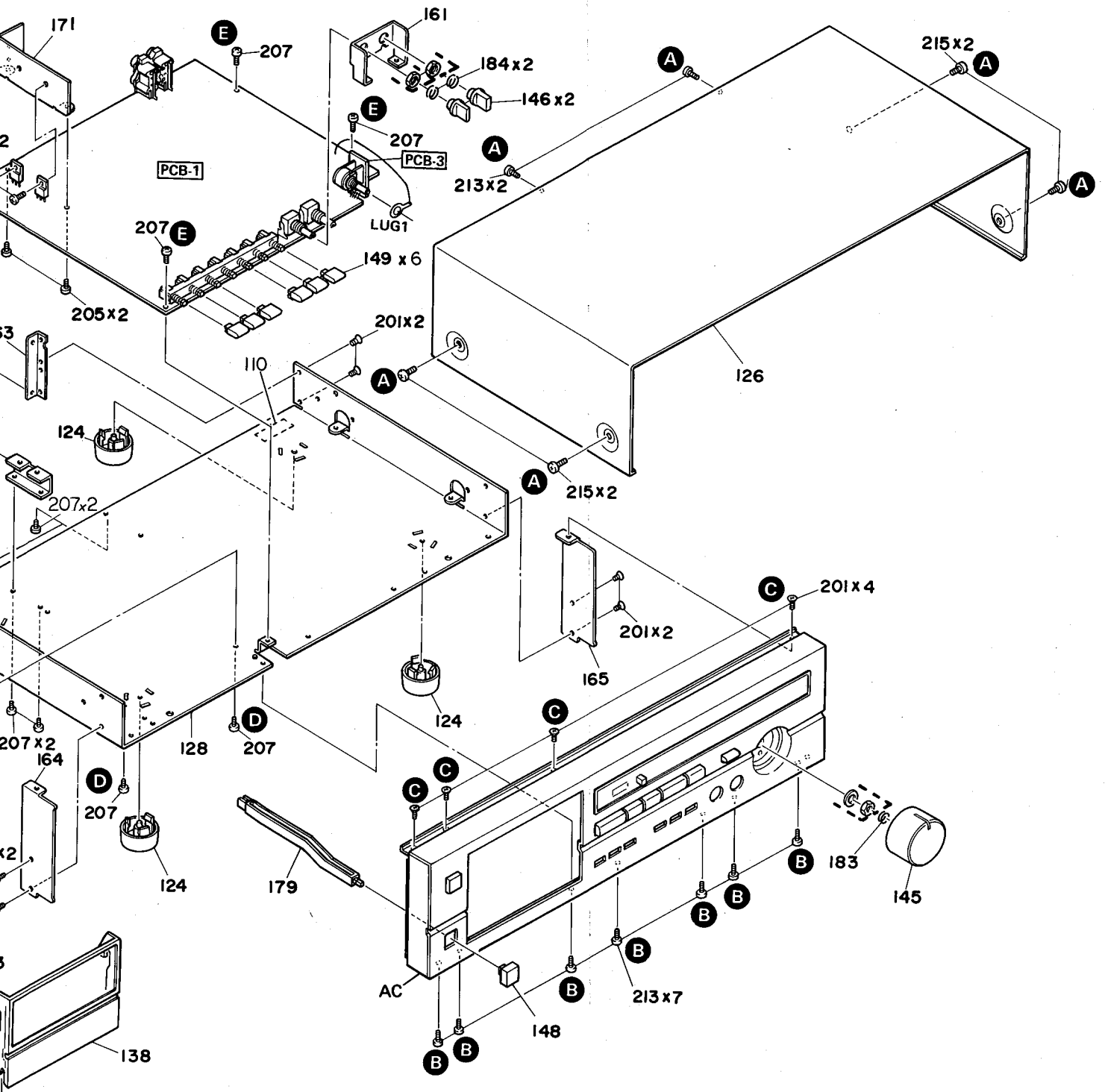
GENERAL UNIT EXPLODED VIEW



PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
AC	A443-TD212A	FRONT PANEL ASS'Y	149	1662-35301	PUSH BUTTON
103	3112-13704	CASSETTE TAPE RECORDER MECHANISM ASS'Y	151	1741-01601	ORNAMENT
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124	1319-0139	LEG	159	2132-7155	SPACER
126	1414-11201	CABINET, TOP COVER	161	2213-7019	BRACKET
128	1424-23801	CABI BACK, BOTTOM	163	2219-8183	METAL FITTG, BOTTOM REAR
129	1424-18405	CABI BACK, REAR	164	2219-8184	METAL FITTG, BOTTOM FRONT L
129A	1424-18406	CABI BACK, REAR (GB)	165	2219-8185	METAL FITTG, BOTTOM FRONT R
135	1514-22401	PLATE	167	2219-8190	METAL FITTG
138	1532-15201	WINDOW	168	2219-8191	METAL FITTG
143	1612-06201	CASSETTE LID	169	2219-8100	METAL FITTG, TRANS
145	1630-02903	ROTARY KNOB	171	2222-7238	HEAT SINK
146	1632-17201	ROTARY KNOB	174	2240-364	HOLDER, AC CORD
148	1662-25402	PUSH BUTTON			

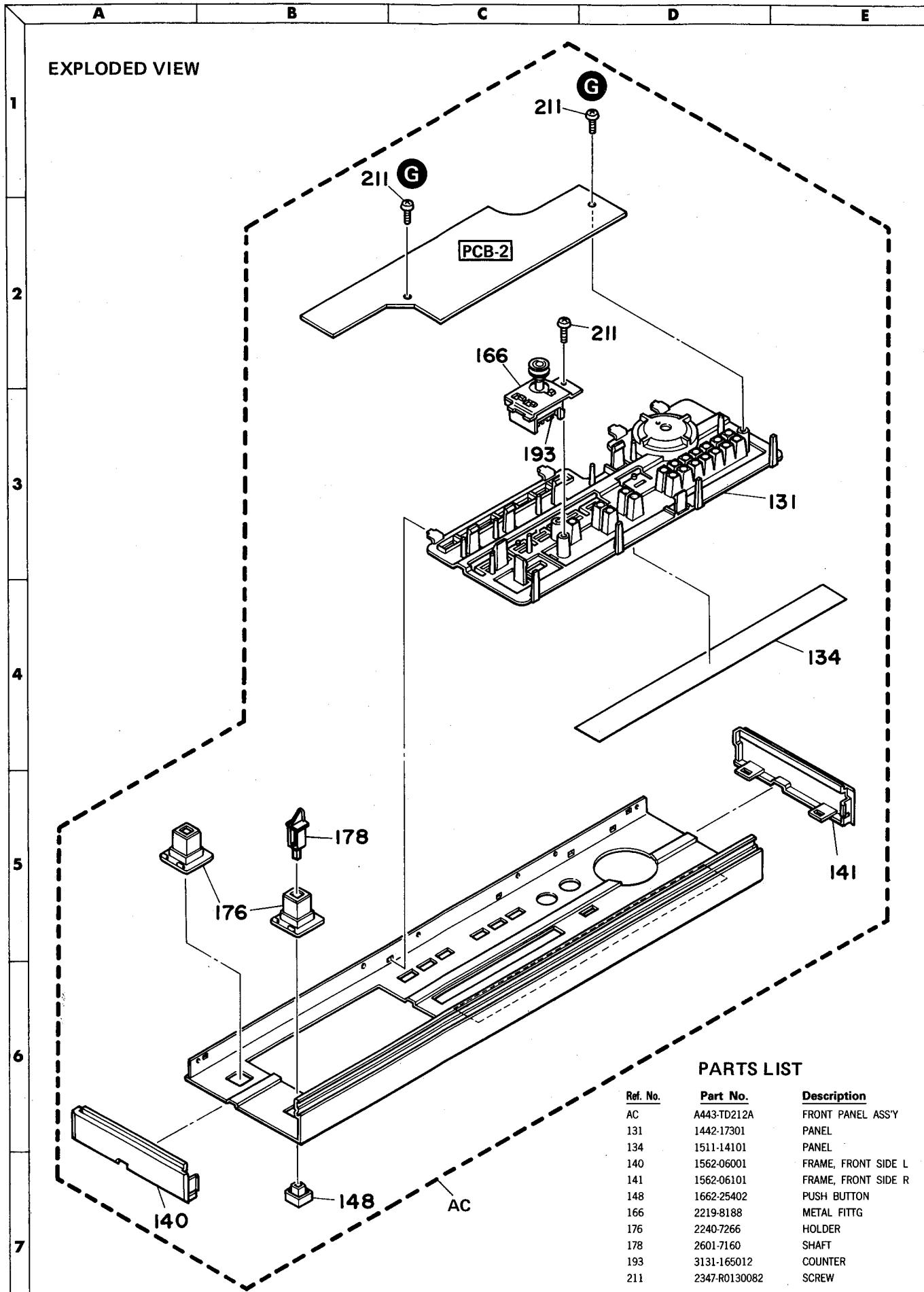
F G H I J



Ref. No.	Part No.	Description
179	2601-7172	SHAFT, POWER
181	2642-01439	BELT
183	2651-110518	SPRING
184	2651-110541	SPRING
185	2651-0000221	SPRING
186	2651-11212	SPRING
188	2652-105	LEAF SPRING
190	2672-7040	LEVER
191	2692-12	DAMPER
196	2459-3005511	PLASTC RIVET
199	2327-R0130082	SCREW
201	2343-300627	SCREW
203	2347-300427	SCREW

Ref. No.	Part No.	Description
204	2347-300627	SCREW
205	2343-300812	SCREW
206	2347-R0130062	SCREW
207	2347-R0130062	SCREW
208	2347-300627	SCREW
211	2347-R0130082	SCREW
213	2347-R0130084	SCREW
215	2347-R0140064	SCREW
217	2347-R0130084	SCREW
△P1	4161-71151	CORD W/PLUG
△P1	4161-7256	CORD W/PLUG (GB)
△T1	5584-S1801	XFORMER, POWER
△T1	5584-S1802	XFORMER, POWER (GB)

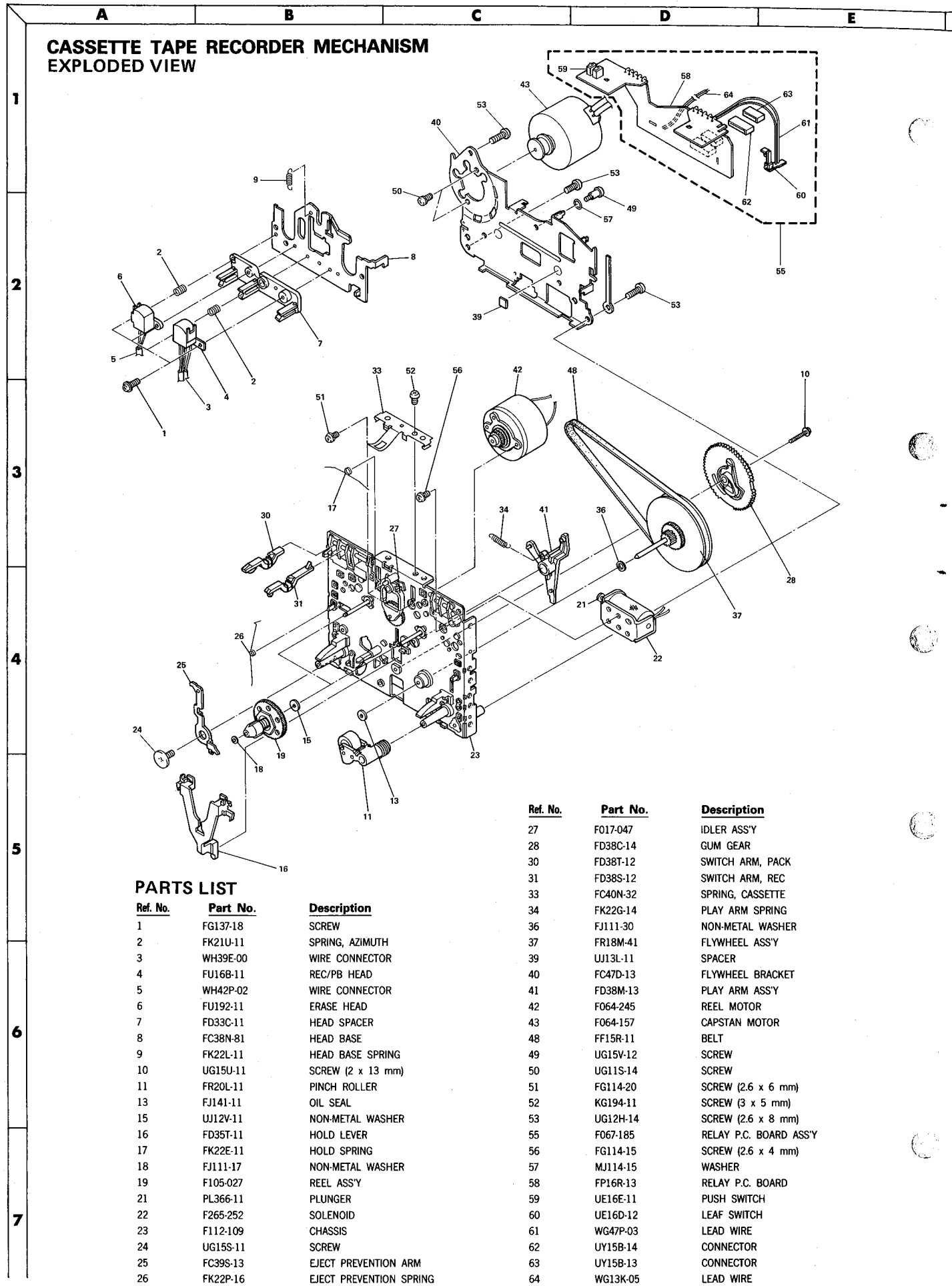
EXPLODED VIEW



PARTS LIST

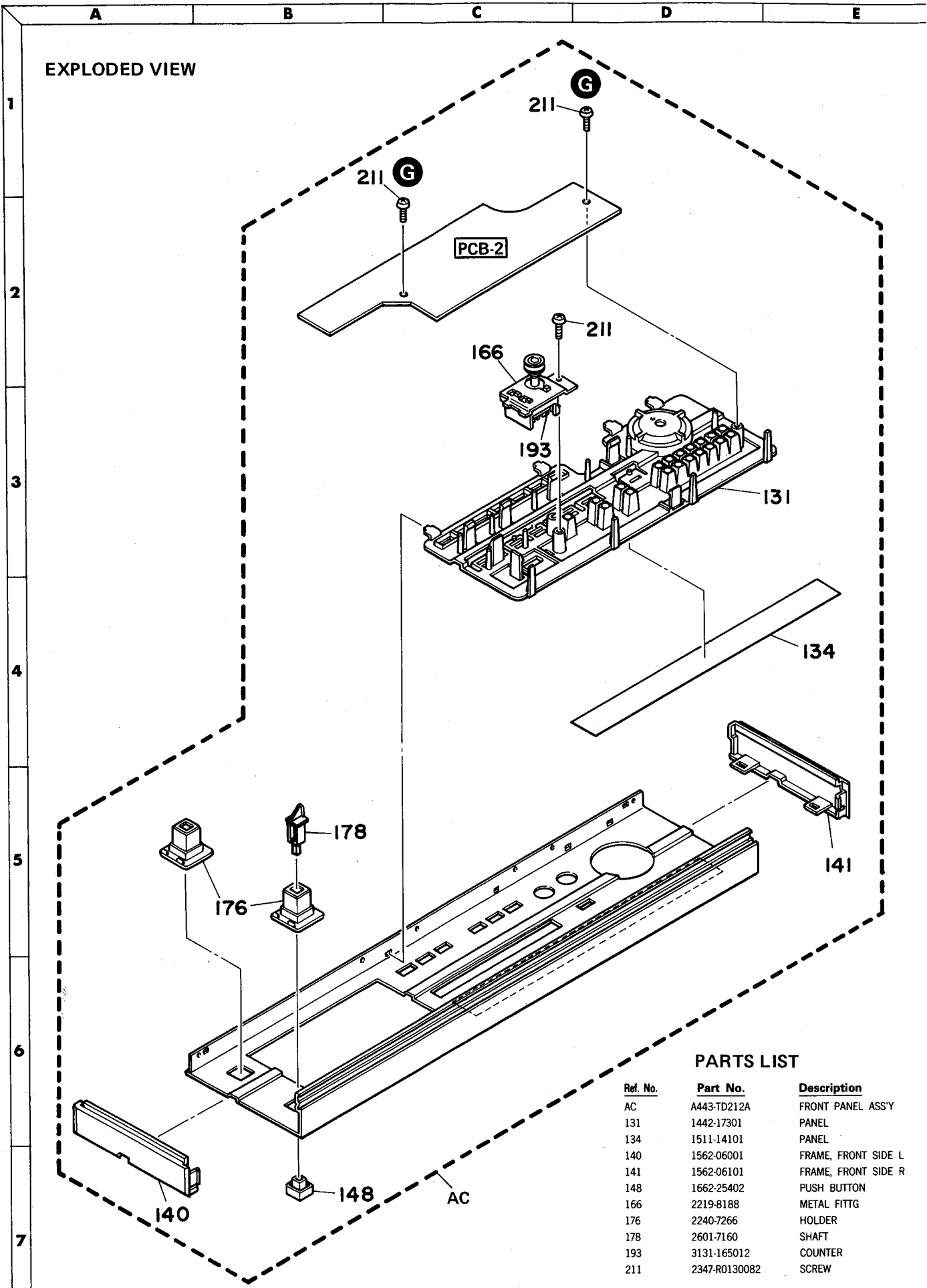
Ref. No.	Part No.	Description
AC	A443-TD212A	FRONT PANEL ASS'Y
131	1442-17301	PANEL
134	1511-14101	PANEL
140	1562-06001	FRAME, FRONT SIDE L
141	1562-06101	FRAME, FRONT SIDE R
148	1662-25402	PUSH BUTTON
166	2219-8188	METAL FITTG
176	2240-7266	HOLDER
178	2601-7160	SHAFT
193	3131-165012	COUNTER
211	2347-R0130082	SCREW

CASSETTE TAPE RECORDER MECHANISM EXPLODED VIEW



PARTS LIST

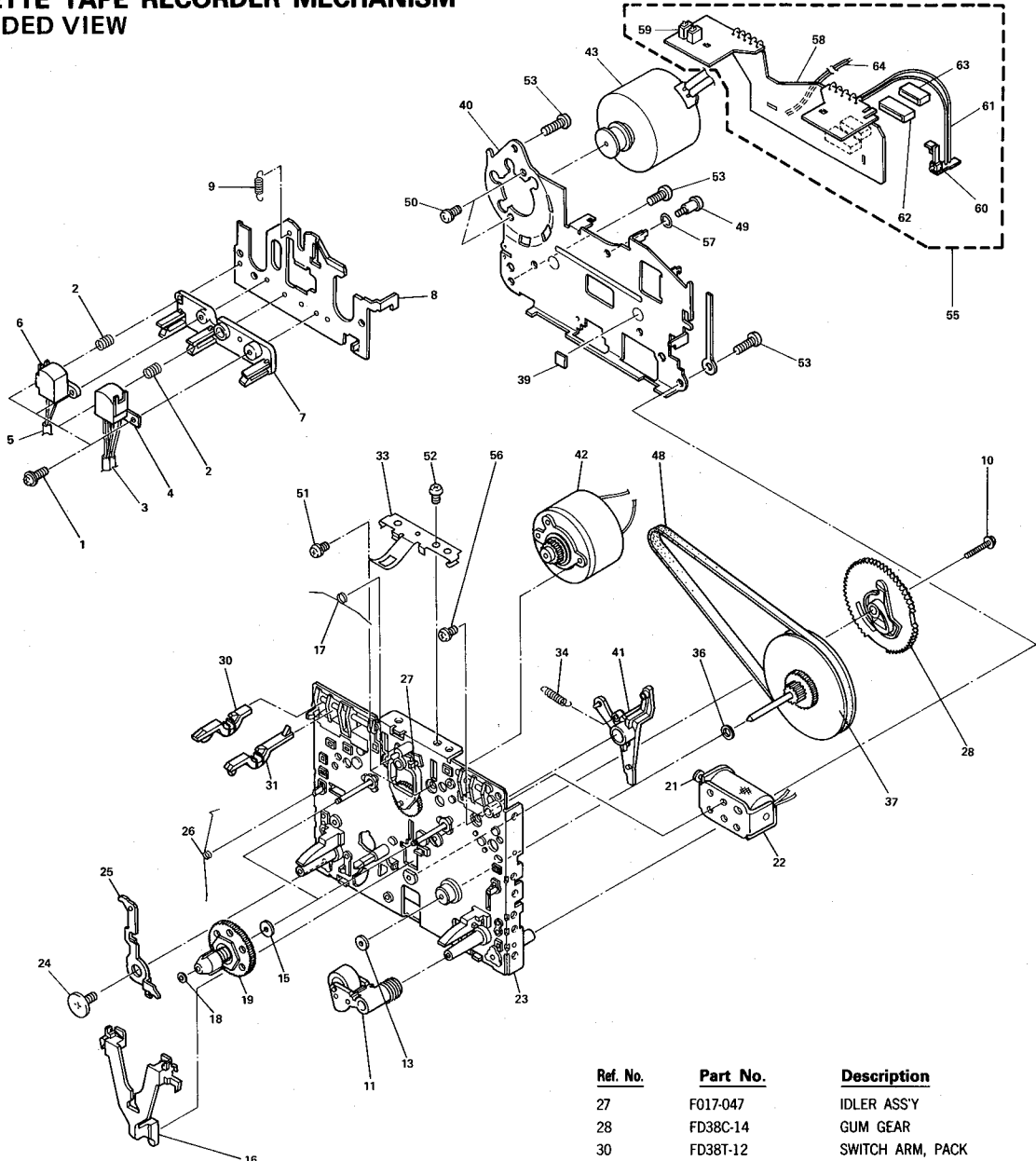
Ref. No.	Part No.	Description
1	FG137-18	SCREW
2	FK21U-11	SPRING, AZIMUTH
3	WH39E-00	WIRE CONNECTOR
4	FU16B-11	REC/PB HEAD
5	WH42P-02	WIRE CONNECTOR
6	FU192-11	ERASE HEAD
7	FD33C-11	HEAD SPACER
8	FC38N-81	HEAD BASE
9	FK22L-11	HEAD BASE SPRING
10	UG15U-11	SCREW (2 x 13 mm)
11	FR20L-11	PINCH ROLLER
13	FJ141-11	OIL SEAL
15	UJ12V-11	NON-METAL WASHER
16	FD35T-11	HOLD LEVER
17	FK22E-11	HOLD SPRING
18	FJ111-17	NON-METAL WASHER
19	F105-027	REEL ASS'Y
21	PL366-11	PLUNGER
22	F265-252	SOLENOID
23	F112-109	CHASSIS
24	UG15S-11	SCREW
25	FC39S-13	EJECT PREVENTION ARM
26	FK22P-16	EJECT PREVENTION SPRING
27	F017-047	IDLER ASS'Y
28	FD38C-14	GUM GEAR
30	FD38T-12	SWITCH ARM, PACK
31	FD38S-12	SWITCH ARM, REC
33	FC40N-32	SPRING, CASSETTE
34	FK22G-14	PLAY ARM SPRING
36	FJ111-30	NON-METAL WASHER
37	FR18M-41	FLYWHEEL ASS'Y
39	UJ13L-11	SPACER
40	FC47D-13	FLYWHEEL BRACKET
41	FD38M-13	PLAY ARM ASS'Y
42	F064-245	REEL MOTOR
43	F064-157	CAPSTAN MOTOR
48	FF15R-11	BELT
49	UG15V-12	SCREW
50	UG11S-14	SCREW
51	FG114-20	SCREW (2.6 x 6 mm)
52	KG194-11	SCREW (3 x 5 mm)
53	UG12H-14	SCREW (2.6 x 8 mm)
55	F067-185	RELAY P.C. BOARD ASS'Y
56	FG114-15	SCREW (2.6 x 4 mm)
57	MJ114-15	WASHER
58	FP16R-13	RELAY P.C. BOARD
59	UE16E-11	PUSH SWITCH
60	UE16D-12	LEAF SWITCH
61	WG47P-03	LEAD WIRE
62	UY15B-14	CONNECTOR
63	UY15B-13	CONNECTOR
64	WG13K-05	LEAD WIRE



PARTS LIST

Ref. No.	Part No.	Description
AC	A443-TD212A	FRONT PANEL ASS'Y
131	1442-17301	PANEL
134	1511-14101	PANEL
140	1562-06001	FRAME, FRONT SIDE L
141	1562-06101	FRAME, FRONT SIDE R
148	1662-25402	PUSH BUTTON
166	2219-8188	METAL FITTG
176	2240-7266	HOLDER
178	2601-7160	SHAFT
193	3131-165012	COUNTER
211	2347-R0130082	SCREW

CASSETTE TAPE RECORDER MECHANISM EXPLODED VIEW



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Ref. No.	Part No.	Description
1	FG137-18	SCREW
2	FK21U-11	SPRING, AZIMUTH
3	WH39E-00	WIRE CONNECTOR
4	FU16B-11	REC/PB HEAD
5	WH42P-02	WIRE CONNECTOR
6	FU192-11	ERASE HEAD
7	FD33C-11	HEAD SPACER
8	FC38N-81	HEAD BASE
9	FK22L-11	HEAD BASE SPRING
10	UG15U-11	SCREW (2 x 13 mm)
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15	UJ12V-11	NON-METAL WASHER
16	FD35T-11	HOLD LEVER
17	FK22E-11	HOLD SPRING
18	FJ111-17	NON-METAL WASHER
19	F105-027	REEL ASSY
21	PL366-11	PLUNGER
22	F265-252	SOLENOID
23	F112-109	CHASSIS
24	UG15S-11	SCREW
25	FC39S-13	EJECT PREVENTION ARM
26	FK22P-16	EJECT PREVENTION SPRING

Ref. No.	Part No.	Description
27	F017-047	IDLER ASSY
28	FD38C-14	GUM GEAR
30	FD38T-12	SWITCH ARM, PACK
31	FD38S-12	SWITCH ARM, REC
33	FC40N-32	SPRING, CASSETTE
34	FK22G-14	PLAY ARM SPRING
36	FJ111-30	NON-METAL WASHER
37	FR18M-41	FLYWHEEL ASSY
39	UJ13L-11	SPACER
40	FC47D-13	FLYWHEEL BRACKET
41	FD38M-13	PLAY ARM ASSY
42	F064-245	REEL MOTOR
43	F064-157	CAPSTAN MOTOR
48	FF15R-11	BELT
49	UG15V-12	SCREW
50	UG11S-14	SCREW
51	FG114-20	SCREW (2.6 x 6 mm)
52	KG194-11	SCREW (3 x 5 mm)
53	UG12H-14	SCREW (2.6 x 8 mm)
55	F067-185	RELAY P.C. BOARD ASSY
56	FG114-15	SCREW (2.6 x 4 mm)
57	MJ114-15	WASHER
58	FP16R-13	RELAY P.C. BOARD
59	UE16E-11	PUSH SWITCH
60	UE16D-12	LEAF SWITCH
61	WG47P-03	LEAD WIRE
62	UY15B-14	CONNECTOR
63	UY15B-13	CONNECTOR
64	WG13K-05	LEAD WIRE

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

■ 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

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

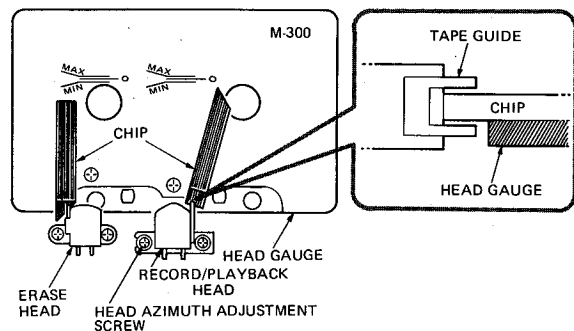


Fig. 1

● Head position

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

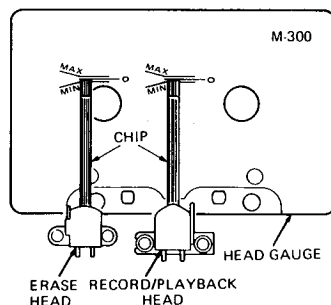


Fig. 2

■ 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 adjustment.

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 or TCC-153
- Tape speed adjustment MTT-111, MTT-111DN or TCC-110
- Playback output level adjustment TCC-130
- Playback frequency characteristic confirmation TCC-1216 or TCC-162C and TCC-262C
- Reference tapes

LN	SCC-502
CrO ₂	SCC-1360
METAL	SCC-565

Note:

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

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

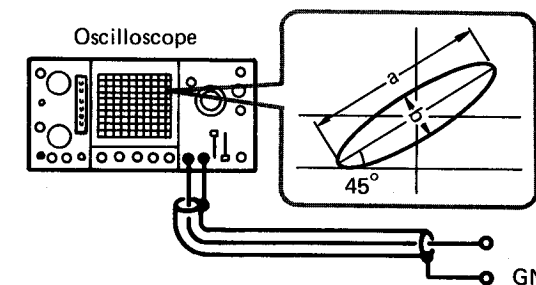
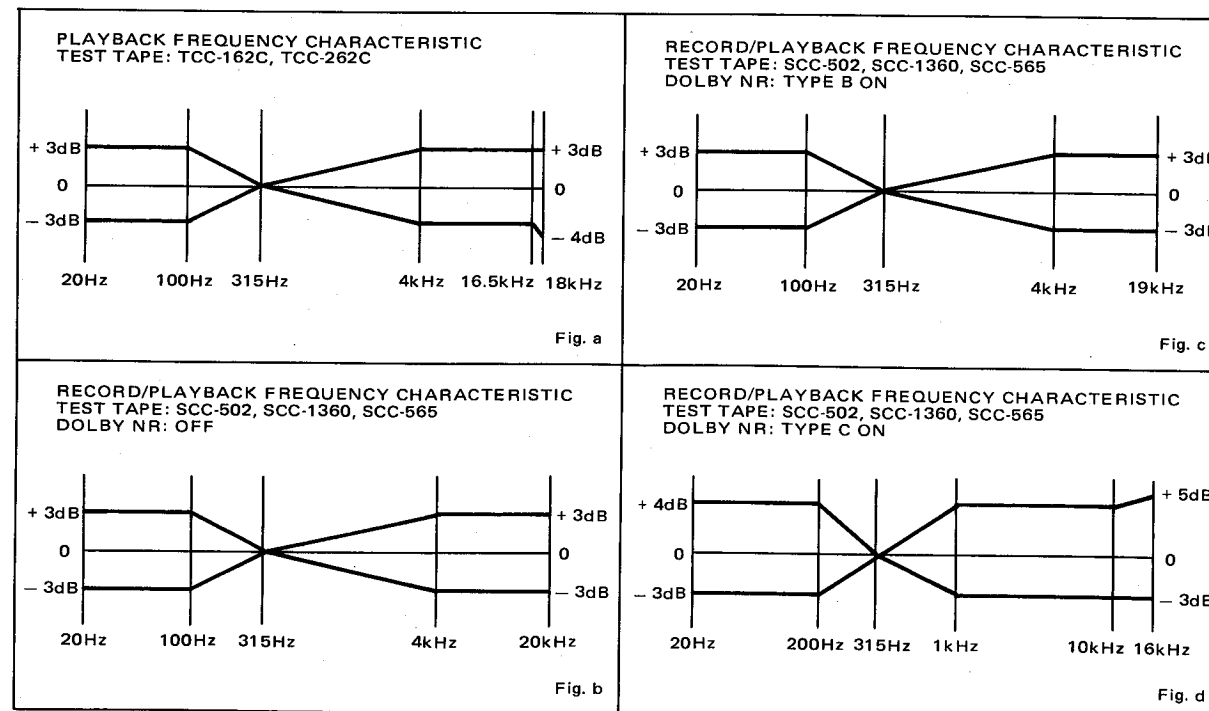


Fig. 3



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

■ 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

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

● Head position

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

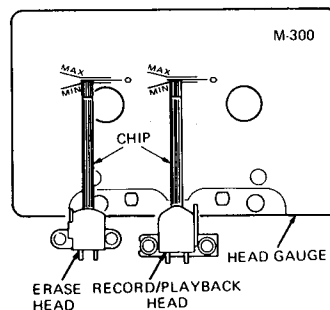


Fig. 2

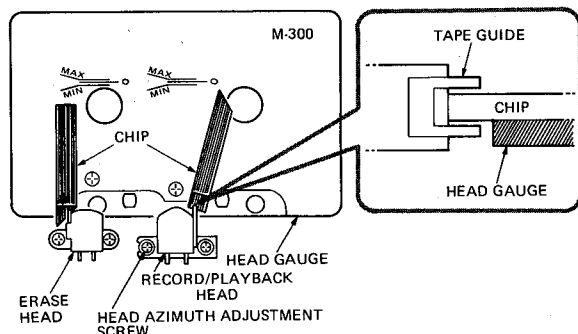


Fig. 1

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 adjustment.

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 or TCC-153
- Tape speed adjustment MTT-111, MTT-111DN or TCC-110
- Playback output level adjustment TCC-130
- Playback frequency characteristic confirmation TCC-1216 or TCC-162C and TCC-262C
- Reference tapes
 LN SCC-502
 CrO₂ SCC-1360
 METAL SCC-565

Note:

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

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

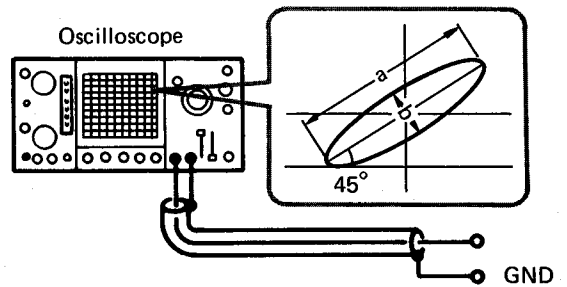
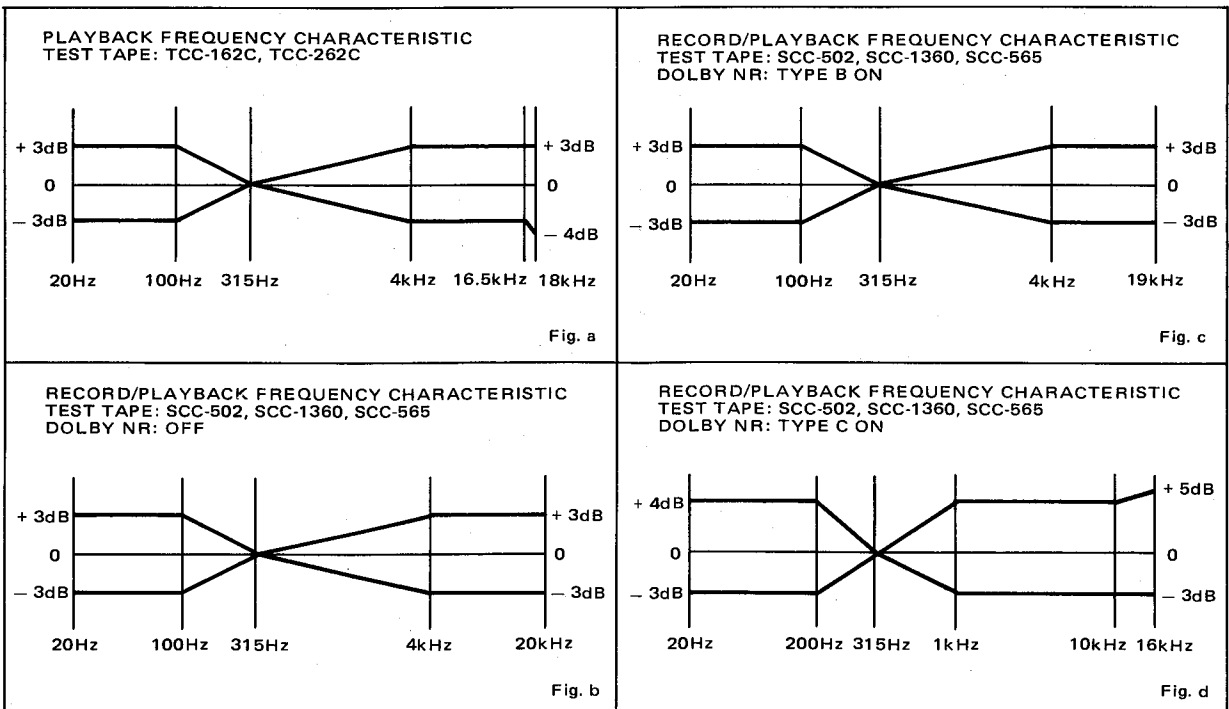


Fig. 3



Step	Alignment	Instrument Required	Input Signal	Mode	Test Point	Adjustment	For
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114 or TCC-153)		PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	Azimuth screw	Maximum output Refer to "Azimuth Adjustment" on page 7.
2	Tape speed	Frequency counter Test tape (MTT-111, MTT-111DN or TCC-110)		PB	TP501 (Lch), GND TP502 (Rch), GND	VR (built in motor)	3000Hz \pm 10Hz Adjust at the center of test tape.
3	Playback output level	VTVM Test tape (TCC-130)		PB	TP501 (Lch), GND TP502 (Rch), GND	VR101 (Lch) VR102 (Rch)	600mV Tape selector is LN position.
4	Playback frequency characteristic confirmation	VTVM Test tape (TCC-1216 or TCC-162C and TCC-262C)		PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	R117, R118 R127, R128 R129, R130	Unsolder resistors of R117 and R118, R127 and R128, or R129 and R130 so that the frequency response is within the range as shown in Fig. a.
5	Bias frequency confirmation	Frequency counter		REC-PAUSE	TP101 (Lch), GND TP102 (Rch), GND	T301	105kHz \pm 3kHz Tape selector is METAL position.
6	Bias level (pre-adjustment)	VTVM		REC-PAUSE	TP101 (Lch), GND TP102 (Rch), GND	VR301 VR302	60mV Tape selector is METAL position
						VR305	40mV Tape selector is CrO ₂ position.
						VR304	27mV Tape selector is LN position
7	Bias trap	VTVM		REC-PAUSE	TP201 (Lch), GND TP202 (Rch), GND	LC201 LC202	Minimum output Tape selector is METAL position.
8	Record level (pre-adjustment)	VTVM Blank tape (SCC-565)	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202 VR301 VR302	600mV Tape selector is METAL position. Adjust VR301 and VR302 so that the distortion becomes 1.2% ~ 1.4%.
9	Record level (pre-adjustment)	VTVM Blank tapes (CrO ₂ SCC-1360) (LN SCC-502)	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202 VR305 VR304	600mV Adjust VR305 so that the distortion becomes 1.8% (CrO ₂) Adjust VR304 so that the distortion becomes 1.0% (LN) This confirmation should be at each tape selector position.
10	Record/playback equalizer frequency characteristic	VTVM Blank tapes (METAL SCC-565) (CrO ₂ SCC-1360) (LN SCC-502)	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 25dB below 600mV in REC-PAUSE mode. Then adjust with a 20Hz to 30kHz sweep signal.	REC/PB	OUTPUT jack	VR305	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO ₂ position.
						VR301 VR302	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is METAL position.
						VR304	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 .
11	Record level	VTVM Blank tapes (METAL SCC-565) (CrO ₂ SCC-1360) (LN SCC-502)	Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202	600mV Perform adjustment using CrO ₂ . Perform checking only for LN and METAL tapes.
12	Meter level	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.	REC-PAUSE	PEAK LEVEL METER		Confirm peak level meter reads: 0 dB \pm 1 dB.
13	MPX filter characteristic confirmation	VTVM	Apply 19kHz, 15kHz and 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.	REC-PAUSE MPX filter ON	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	LC501 LC502	Adjust for -0.3 dB at 15kHz and > 30 dB at 19kHz.
14	Anti-Skewing level confirmation	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.	REC-PAUSE Dolby C ON	IC501, pin22, pin21, GND	LC503 LC504	Confirm that attenuation of 20kHz \pm 300Hz is maximum. Dolby C NR is on.

Step	Alignment	Instrument Required	Input Signal
1	Azimuth	VTVM Oscilloscope Test tape (MTT-114 or TCC-153)	
2	Tape speed	Frequency counter Test tape (MTT-111, MTT-111DN or TCC-110)	
3	Playback output level	VTVM Test tape (TCC-130)	
4	Playback frequency characteristic confirmation	VTVM Test tape (TCC-1216 or TCC-162C and TCC-262C)	
5	Bias frequency confirmation	Frequency counter	
6	Bias level (pre-adjustment)	VTVM	
7	Bias trap	VTVM	
8	Record level (pre-adjustment)	VTVM Blank tape (SCC-565)	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.
9	Record level (pre-adjustment)	VTVM Blank tapes (CrO ₂ SCC-1360) (LN SCC-502)	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.
10	Record/playback equalizer frequency characteristic	VTVM Blank tapes (METAL SCC-565) (CrO ₂ SCC-1360) (LN SCC-502)	
11	Record level	VTVM Blank tapes (METAL SCC-565) (CrO ₂ SCC-1360) (LN SCC-502)	Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV in REC-PAUSE mode.
12	Meter level	VTVM	Apply 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.
13	MPX filter characteristic confirmation	VTVM	Apply 19kHz, 15kHz and 1kHz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.
14	Anti-Skewing level confirmation	VTVM	Apply 400Hz signal to INPUT jack. Set INPUT LEVEL knob so that TP501 and TP502 to GND voltage is 600mV.

	Mode	Test Point	Adjustment	For
	PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	Azimuth screw	Maximum output Refer to "Azimuth Adjustment" on page 7.
	PB	TP501 (Lch), GND TP502 (Rch), GND	VR (built in motor)	3000Hz \pm 10Hz Adjust at the center of test tape.
	PB	TP501 (Lch), GND TP502 (Rch), GND	VR101 (Lch) VR102 (Rch)	600mV Tape selector is LN position.
	PB	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	R117, R118 R127, R128 R129, R130	Unsolder resistors of R117 and R118, R127 and R128, or R129 and R130 so that the frequency response is within the range as shown in Fig. a.
	REC-PAUSE	TP101 (Lch), GND TP102 (Rch), GND	T301	105kHz \pm 3kHz Tape selector is METAL position.
	REC-PAUSE	TP101 (Lch), GND TP102 (Rch), GND	VR301 VR302	60mV Tape selector is METAL position
VR305			40mV Tape selector is CrO ₂ position.	
VR304			27mV Tape selector is LN position	
	REC-PAUSE	TP201 (Lch), GND TP202 (Rch), GND	LC201 LC202	Minimum output Tape selector is METAL position.
so that E mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202 VR301 VR302	600mV Tape selector is METAL position. Adjust VR301 and VR302 so that the distortion becomes 1.2% ~ 1.4%.
so that E mode.	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202 VR305 VR304	600mV Adjust VR305 so that the distortion becomes 1.8% (CrO ₂) Adjust VR304 so that the distortion becomes 1.0% (LN) This confirmation should be at each tape selector position.
so that 00mV in	REC/PB	OUTPUT jack	VR305	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is CrO ₂ position.
			VR301 VR302	So that the record/playback frequency response is flat (at least within the range in Fig. b). Tape selector is METAL position.
			VR304	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 .
voltage is	REC/PB	TP501 (Lch), GND TP502 (Rch), GND	VR201 VR202	600mV Perform adjustment using CrO ₂ . Perform checking only for LN and METAL tapes.
so that	REC-PAUSE	PEAK LEVEL METER		Confirm peak level meter reads: 0 dB \pm 1 dB.
et INPUT s 600mV.	REC-PAUSE MPX filter ON	TP501 (Lch), GND TP502 (Rch), GND or OUTPUT jack	LC501 LC502	Adjust for -0.3 dB at 15kHz and > 30 dB at 19kHz.
so that	REC-PAUSE Dolby C ON	IC501, pin22, pin21, GND	LC503 LC504	Confirm that attenuation of 20kHz \pm 300Hz is maximum. Dolby C NR is on.

CIRCUIT DESCRIPTION

PLAYBACK SIGNAL

The signal from the playback head is amplified by the playback amplifier IC101, and is applied to the pins ④ (L ch.) and ⑤ (R ch.) of the Dolby NR IC501 (B/C type). Switching of the playback signal from the record mode (external input signal) to the playback mode is performed inside IC501.

IC501 is usually switched to the playback mode. However, the control signal transmitted to the pin ⑫ of IC501 from IC801 through Q505 switches IC501 from the record mode to the playback mode. The input signal to IC501 is output from the pins ④ (L ch.) and ⑤ (R ch.) and applied to the OUTPUT jack and the PEAK LEVEL METER circuit. The characteristics of the playback equalizer are defined by the BIAS/EQUALIZATION switch and are selected and specified in Q101 (L ch.) and Q102 (R ch.)

RECORD SIGNAL

The signal from the INPUT jack is controlled by the INPUT LEVEL control and BALANCE control and are applied to pins ⑩ (L ch.) and ③ (R ch.) of the Dolby NR IC501 (B/C type). Switching of the record signal from the playback mode to the record mode is performed inside IC501.

The control signal transmitted to the pin ⑫ of IC501 from IC801 through Q505 switches IC501 from the playback mode to the record mode.

The input signal to the Dolby NR IC is output from pins ⑥ (L ch.) and ⑦ (R ch.) of IC501 and passes through the MPX filter. Then it is input to the pins ⑪ (L ch.) and ⑥ (R ch.) and is output from the pins ⑫ (L ch.) and ⑬ (R ch.) The signal output from IC501 passes through the record equalizer circuit and is amplified by the record amplifier IC201. The amplified signal is then applied to the recording head after being synthesized by a bias signal.

MUTING OPERATION

The signal that mutes the sound produced at switching to recording or playback is applied from IC801 of the logic control block.

When the "STOP" button is pressed, the mute signal output from the pin ⑭ of IC801 turns ON Q707 (L ch.) and Q708 (R ch.) to short-circuit the output signals of the playback amplifiers for muting. Also, this mute signal turns ON Q714 as well as Q709 (L ch.) and Q710 (R ch.) to mute the output line signal from the Dolby NR ICs. For the purpose of preventing generation of noise at power ON/OFF, the mute signal is output from Q51. The muting is done by short circuiting the output signal with Q709 (L ch.) and Q710 (R ch.) turned ON.

LOGIC IN RECORD MODE

When the "REC" button is pressed, the pin ⑮ of IC801 becomes high level and Q705 (L ch.) and Q706 (R ch.) turn ON. The input to the playback amplifiers is muted. Also Q807 and Q808 turn ON and Q809 turns OFF. Therefore Q701, Q703 (L ch.) and Q702, Q704 (R ch.) turn OFF to release the muting of the outputs from the record amplifiers.

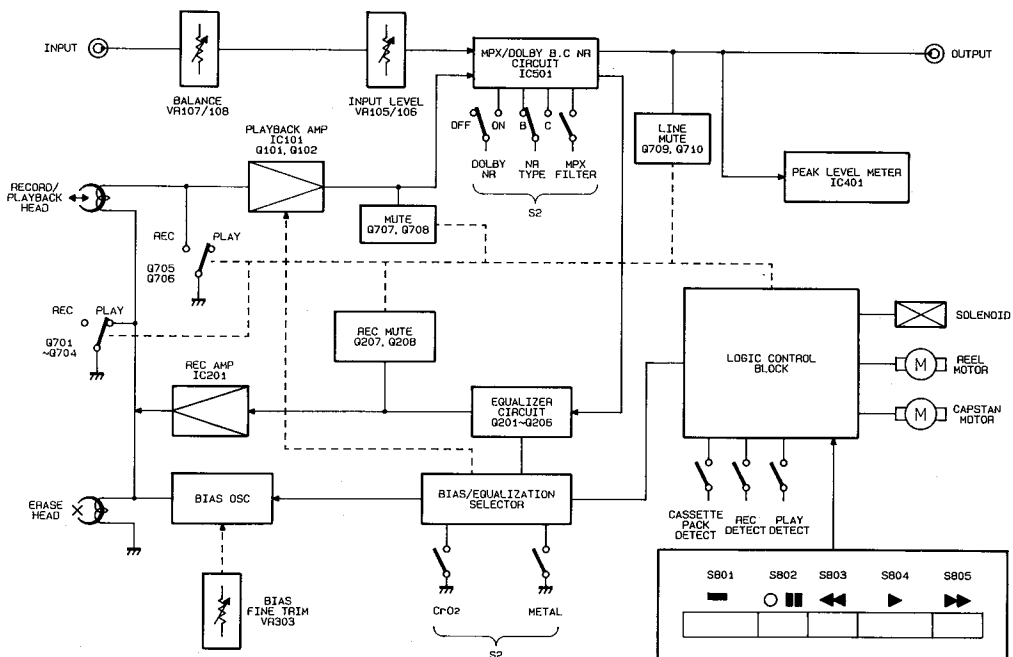
Also, Q505 turns ON to make the pin ⑫ of IC501 low level. Therefore the mode is switched to the record mode.

SWITCHING FROM RECORD MODE TO PLAYBACK MODE IN LOGIC

When the "STOP", "PAUSE" or "PLAY" button is pressed, the pin ⑯ of IC801 becomes low level. Q705 (L ch.) and Q706 (R ch.) turn OFF to release the muting of the inputs to the playback amplifiers. Also, Q807 and Q808 turn OFF and Q809 turns ON to turn ON Q701, Q703 (L ch.) and Q702, Q704 (R ch.). Therefore the outputs from the record amplifiers are muted.

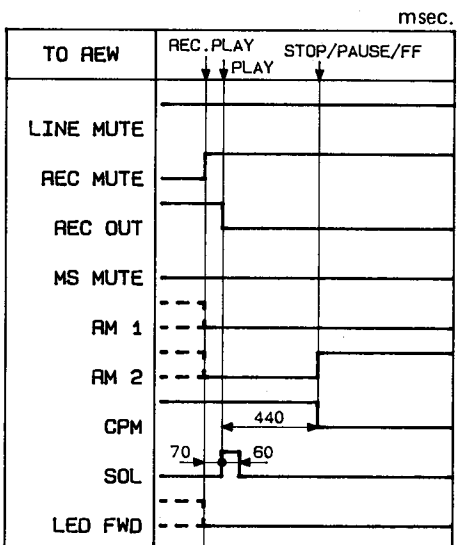
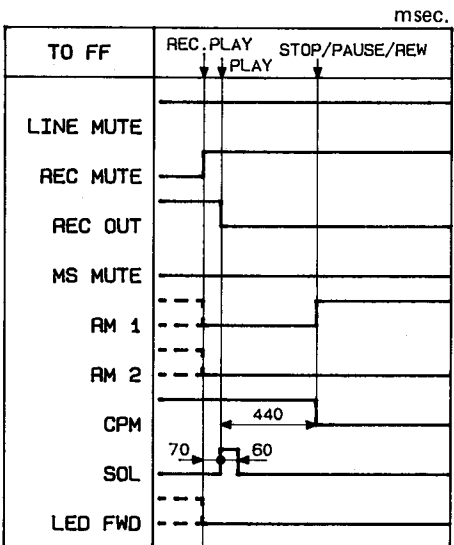
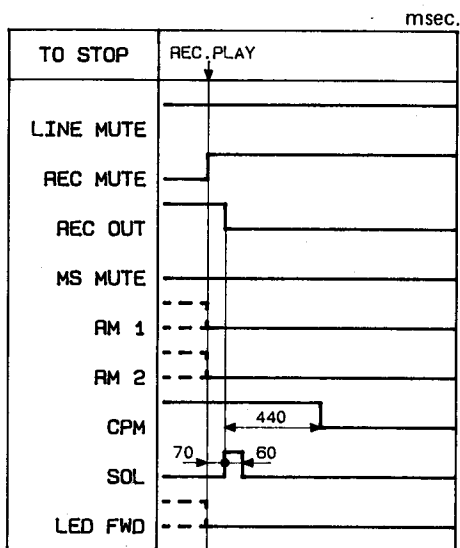
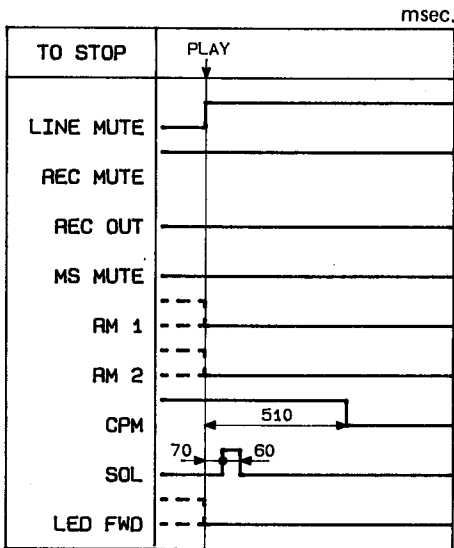
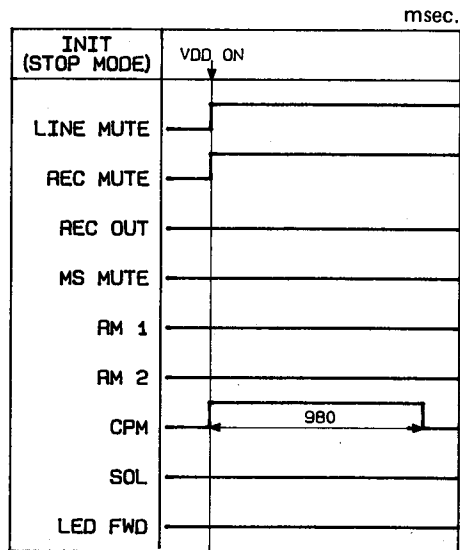
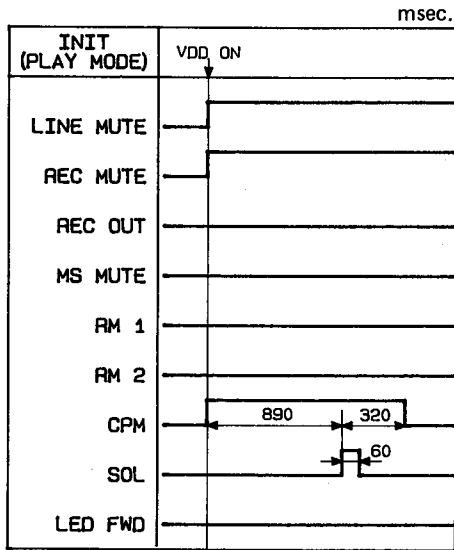
Also, Q505 turns OFF to make the pin ⑫ of IC501 high level. Therefore the mode is switched to the playback mode.

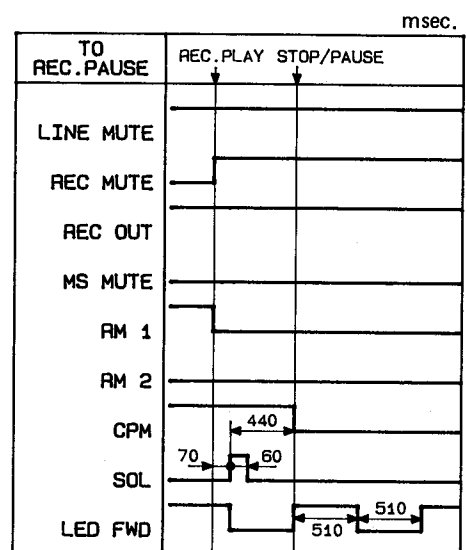
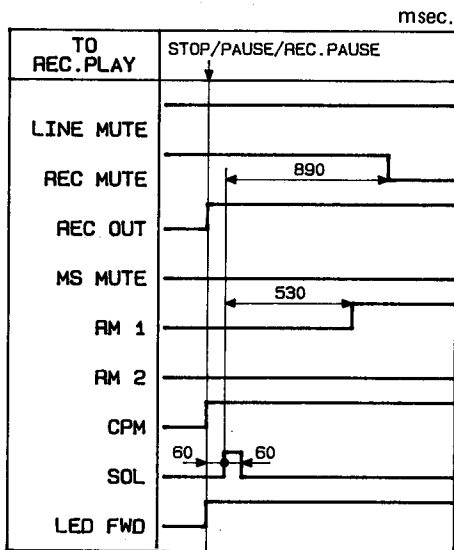
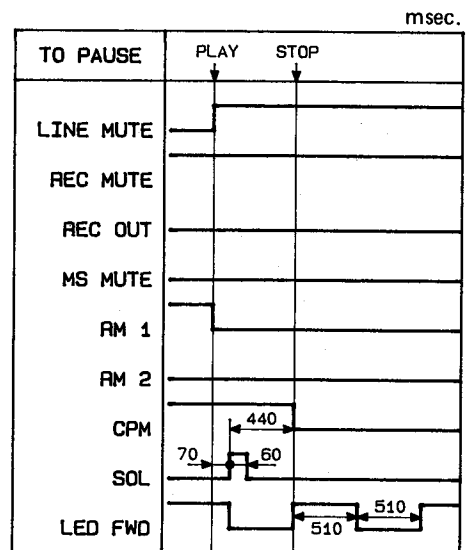
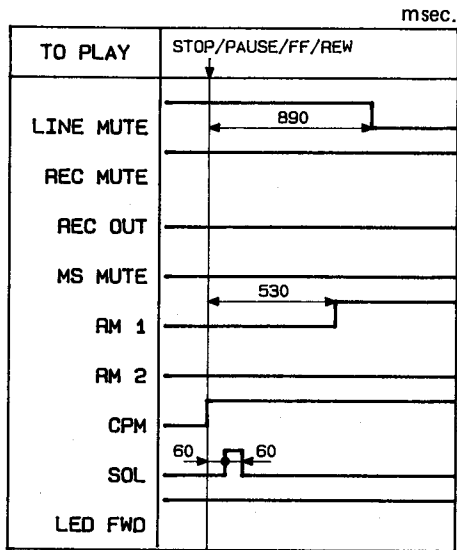
BLOCK DIAGRAM



TIMING CHART

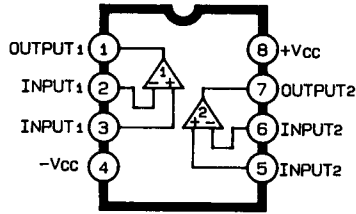
IC801: TC9312N-038



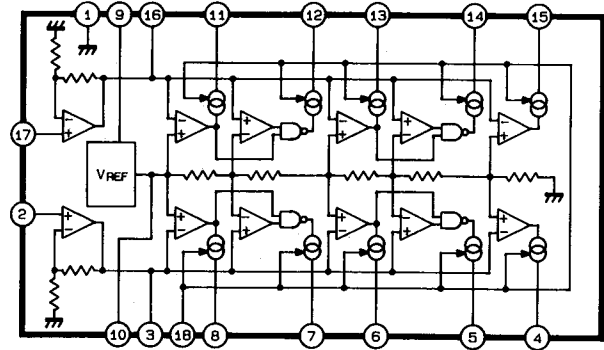


IC BLOCK DIAGRAM

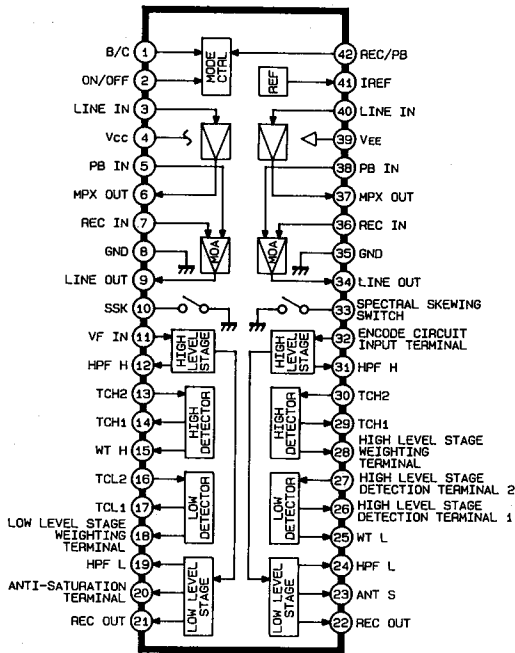
IC101: 201: μ PC4570C
Dual Operational Amplifier



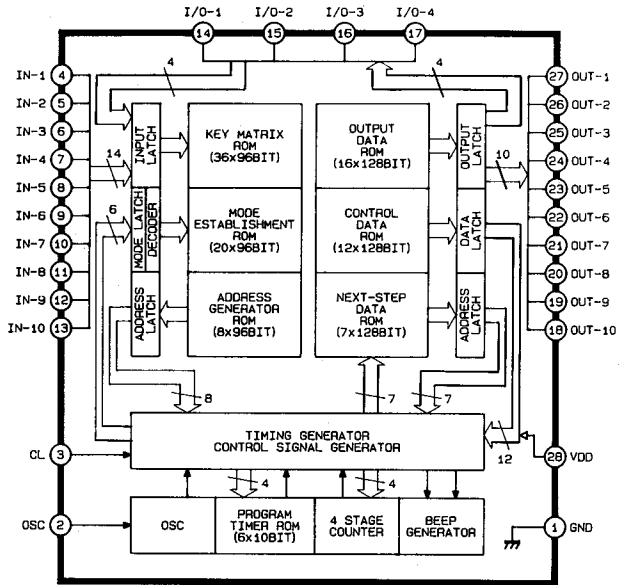
IC401: AN6888
12-Dot LED Driver



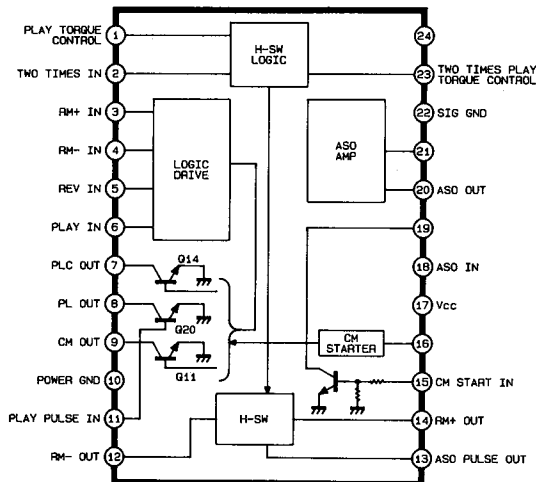
IC501: CX20187
Dolby NR



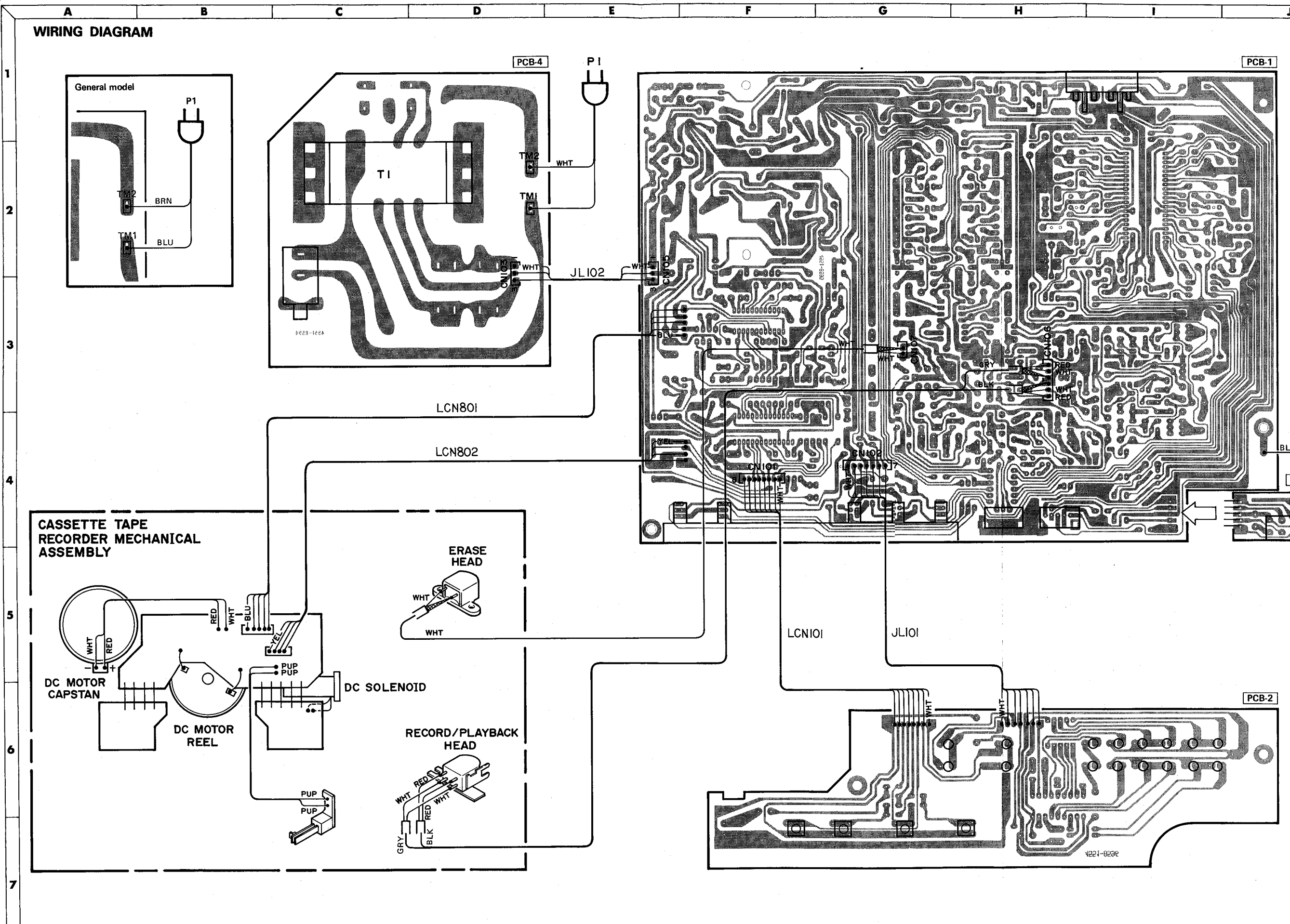
IC801 : TC 9312N-038
Logic Controller



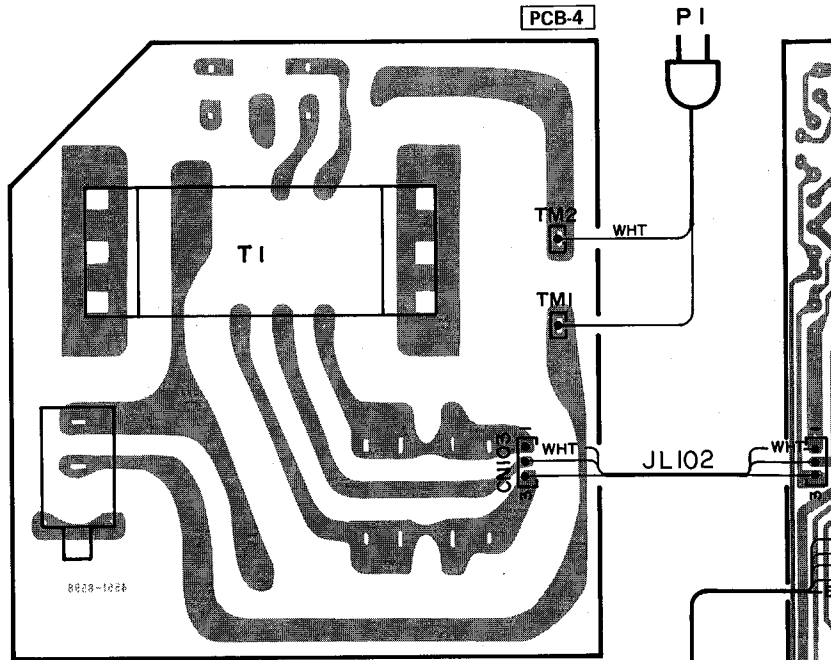
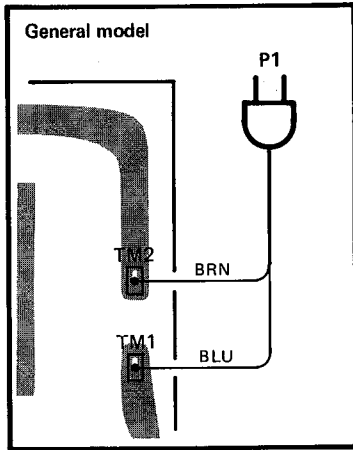
IC802: TA7780BN
Motor Driver



WIRING DIAGRAM



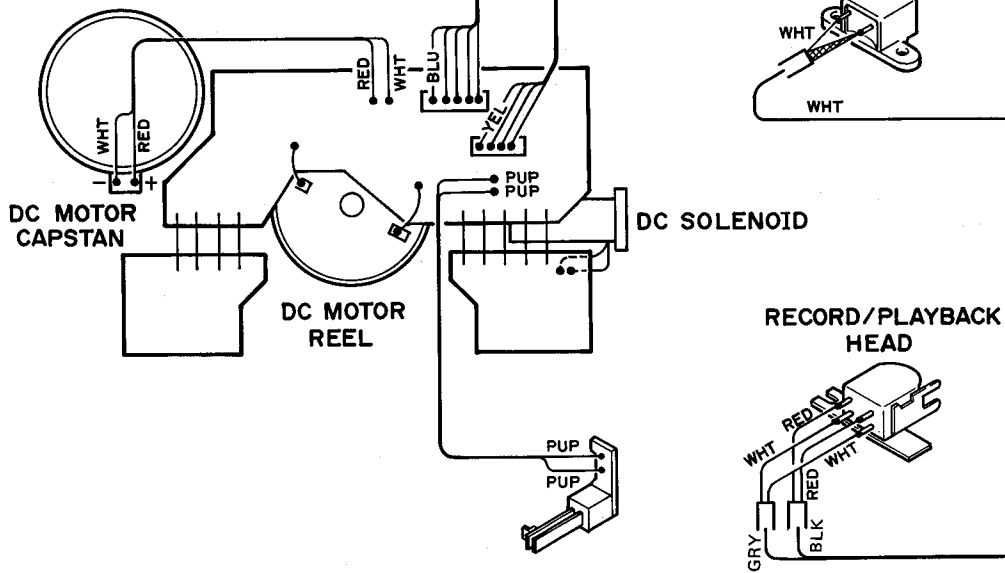
WIRING DIAGRAM



LCN801

LCN802

CASSETTE TAPE RECORDER MECHANICAL ASSEMBLY



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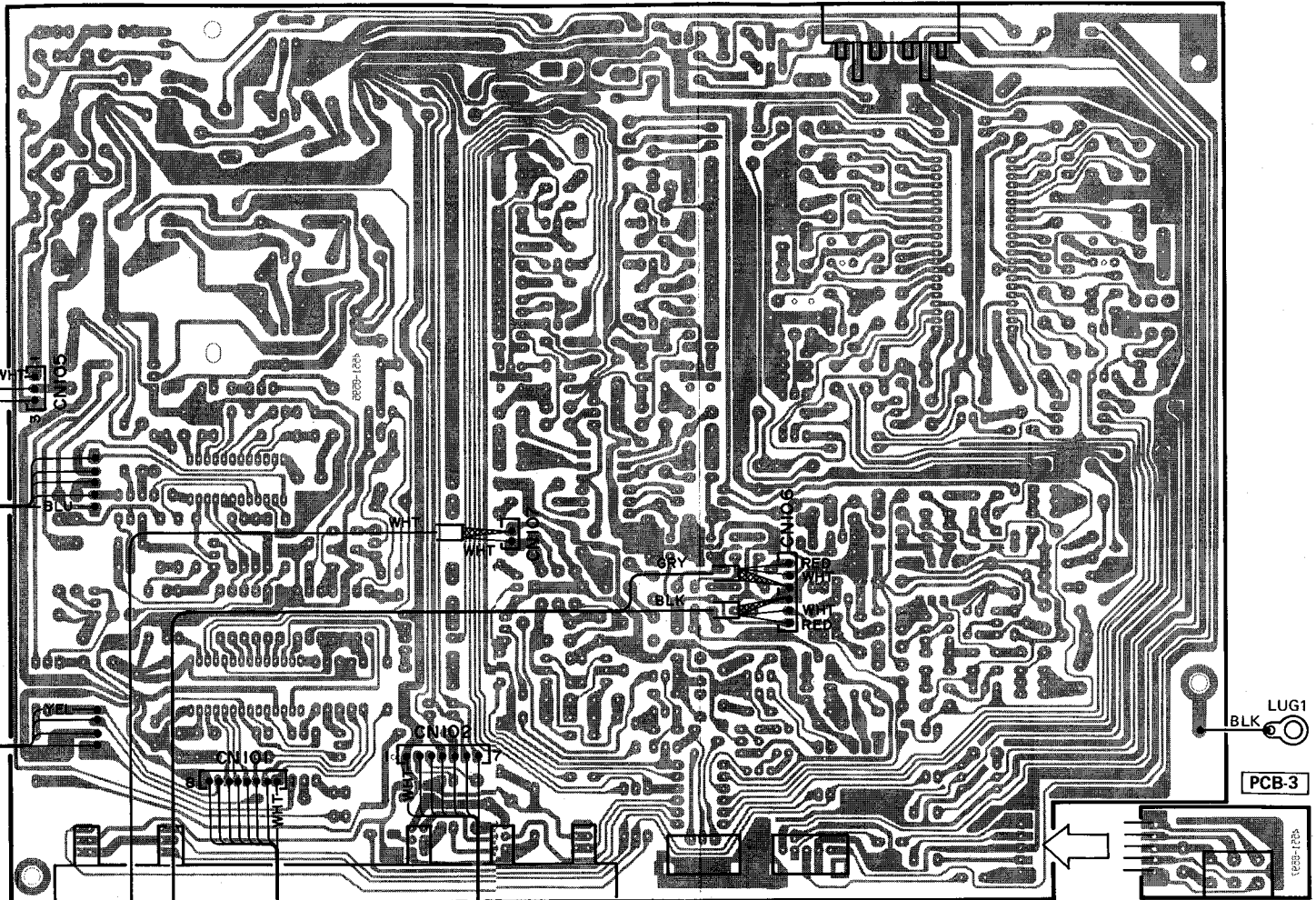
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PCB-1

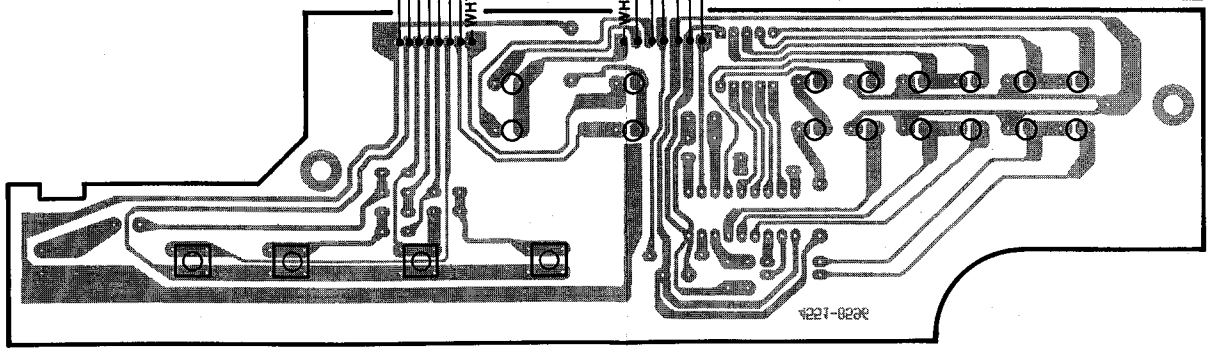


PCB-3

LCN101

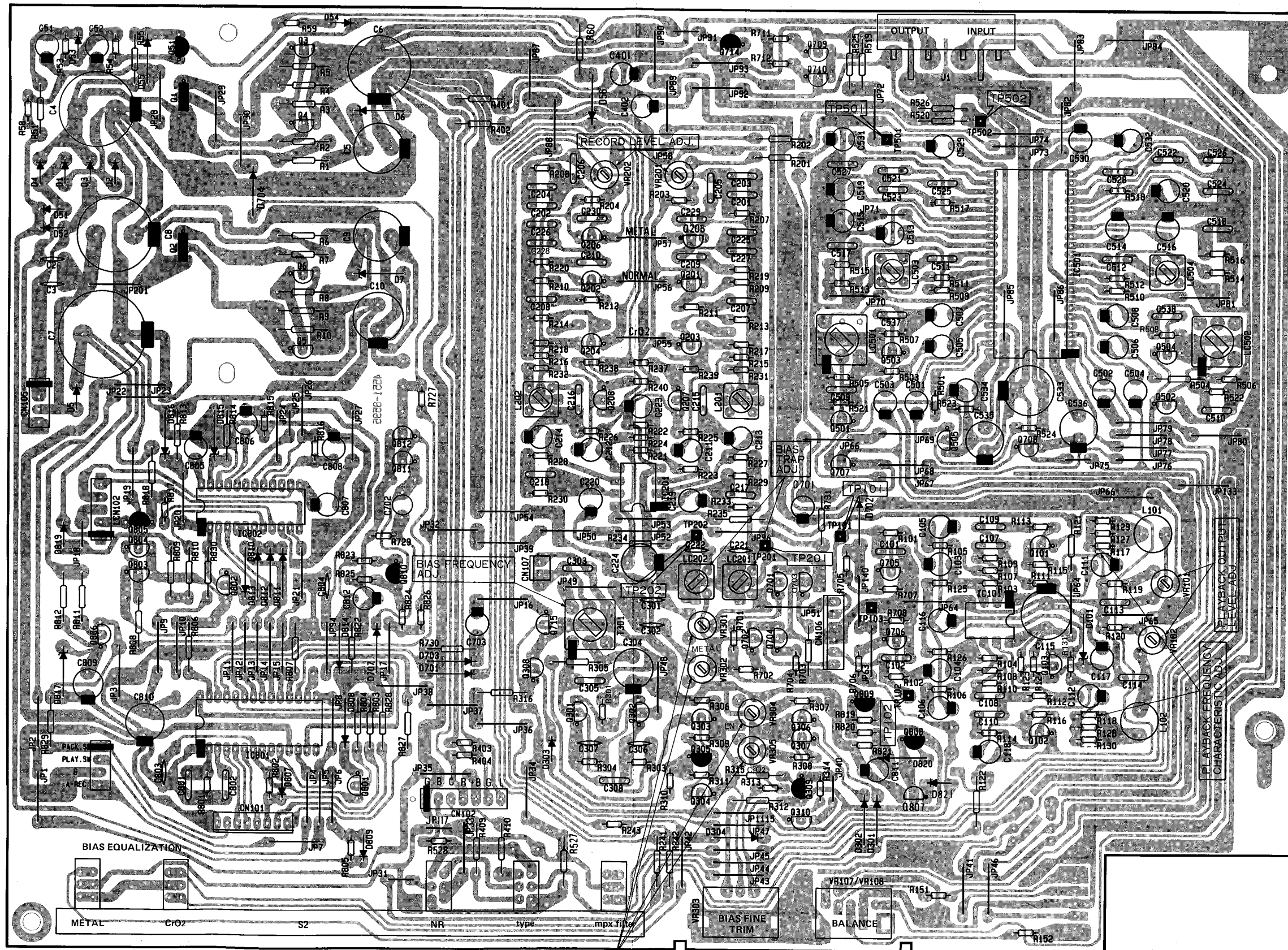
JL101

PCB-2



P.C. BOARDS (1)

PCB-1 Main P.C.Board



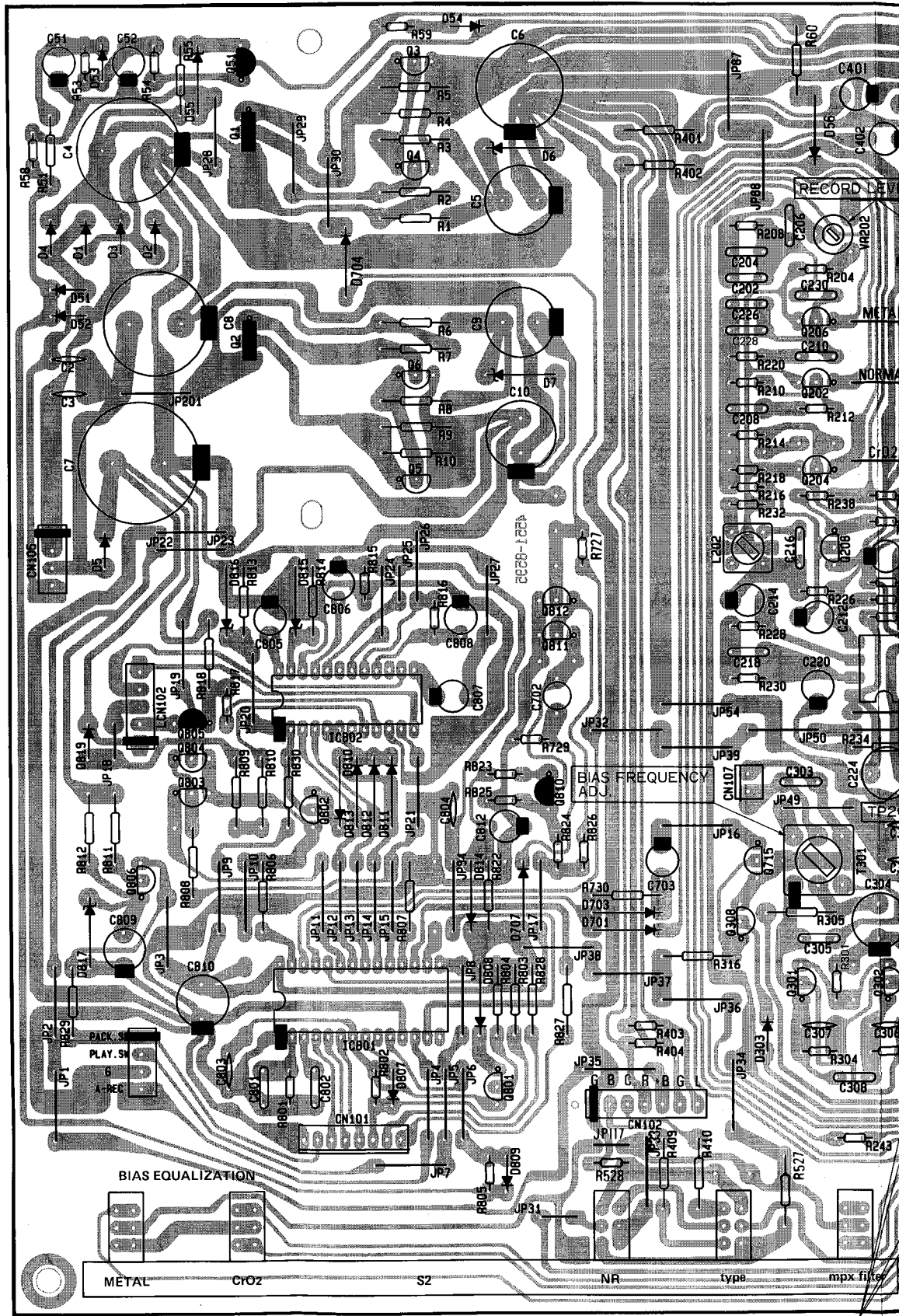
BIAS LEVEL & RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJ.

P.C. BOARDS (1)

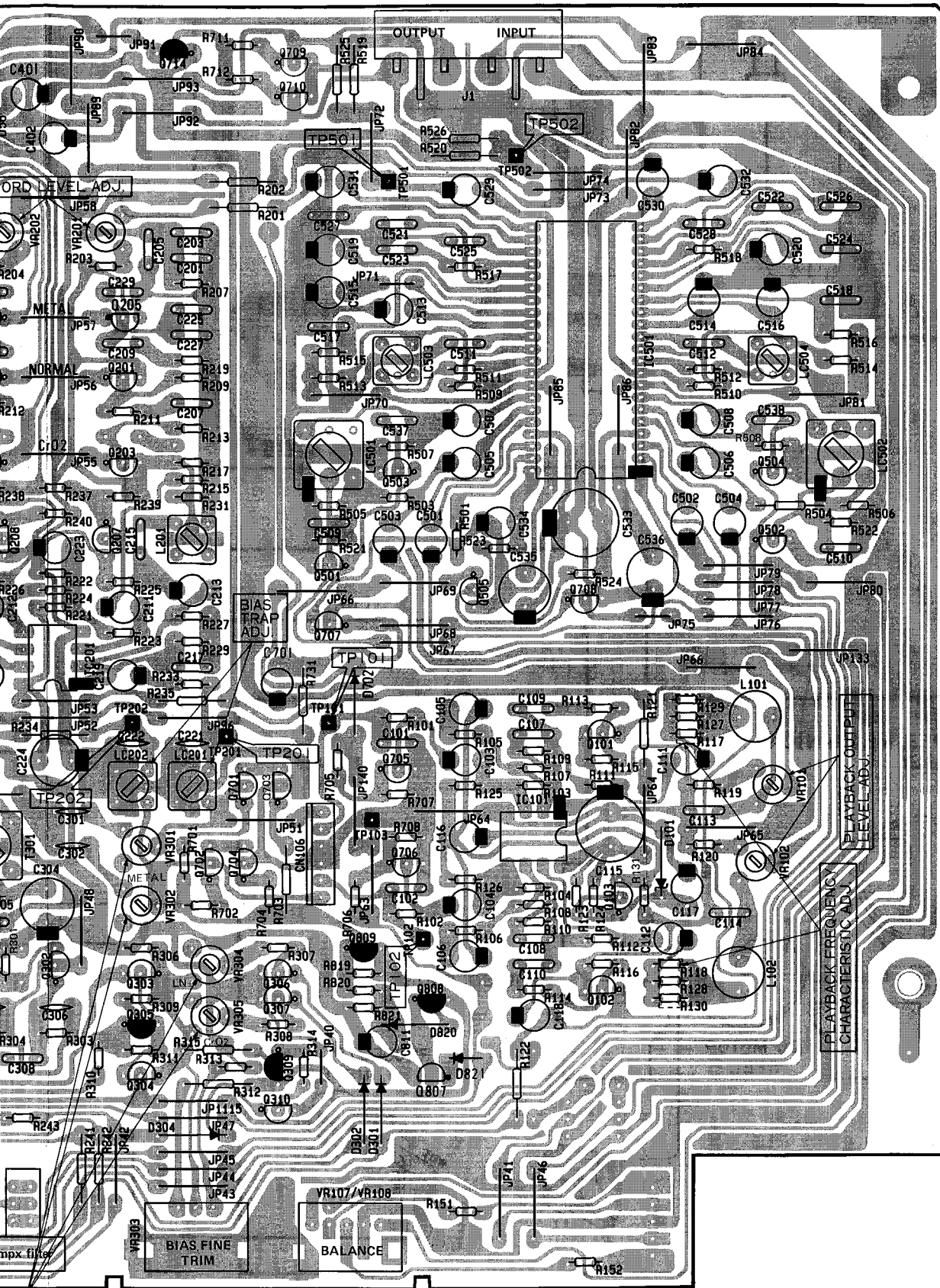
PCB-1 Main P.C.Board

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A B C D E



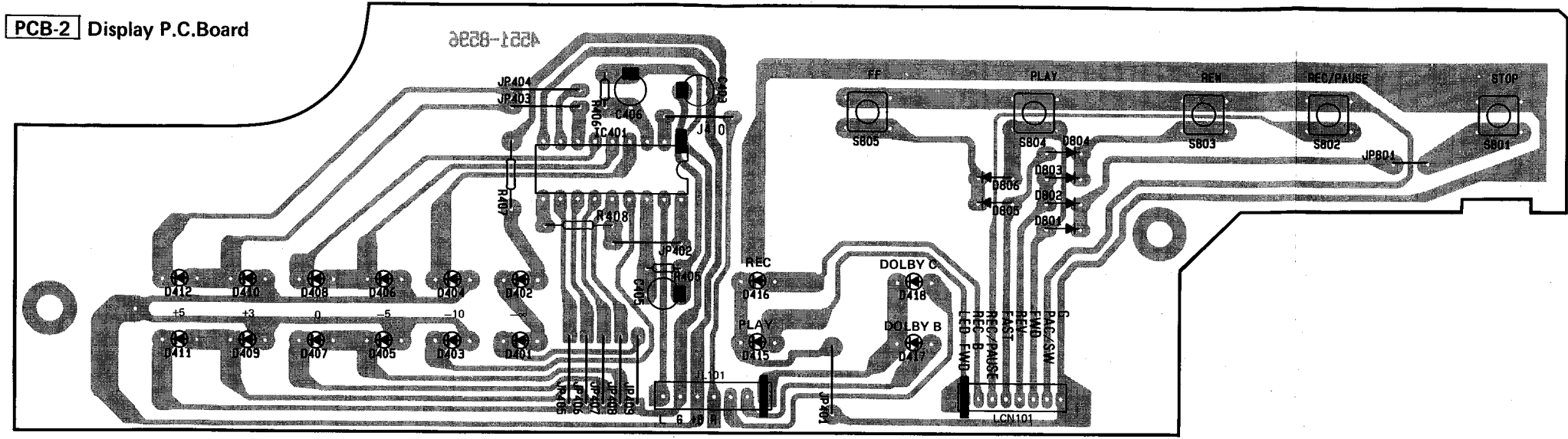
BIAS LEVEL & REC FREQUENCY CHAR.



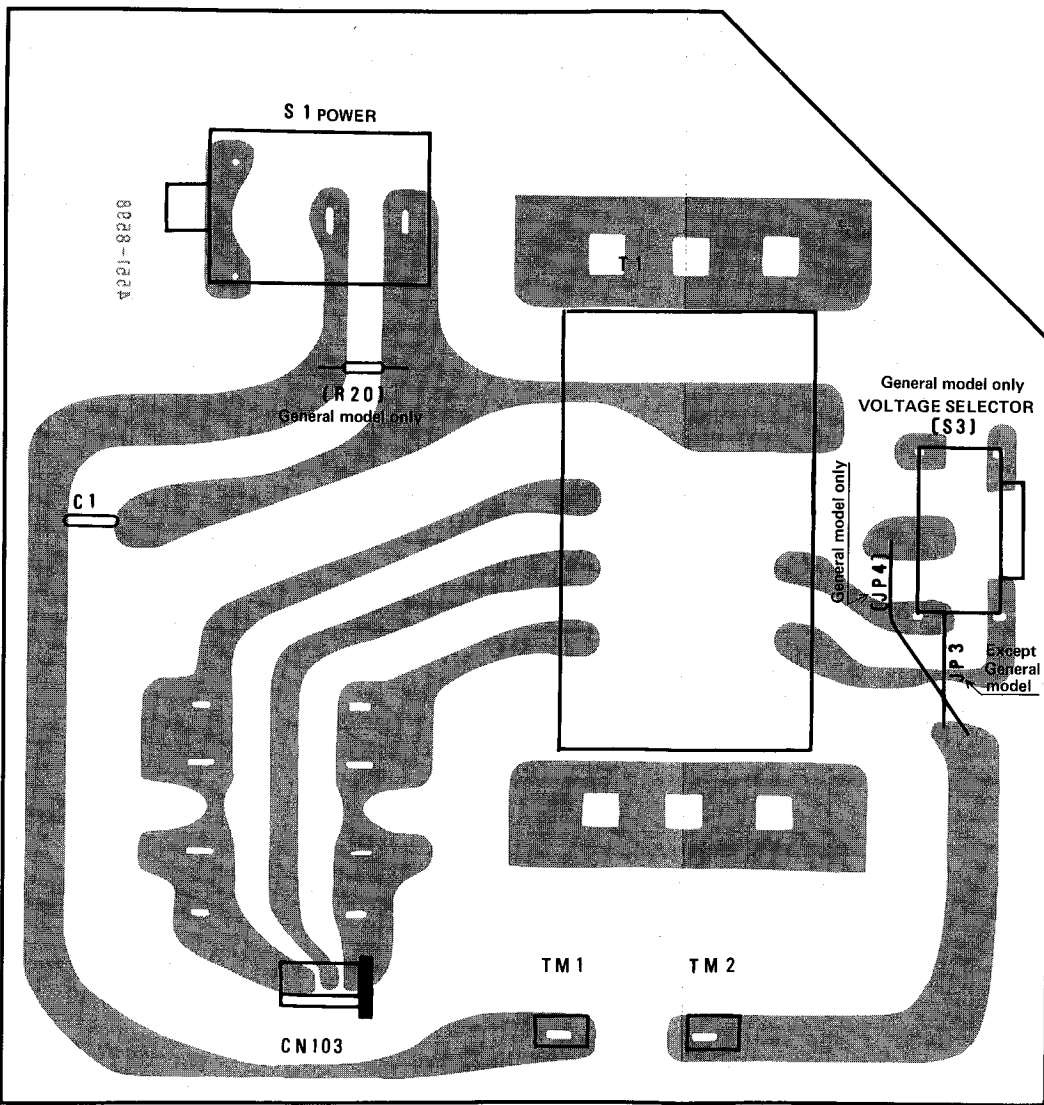
EL & RECORD/PLAYBACK EQUALIZER
CY CHARACTERISTIC ADJ.

P.C. BOARDS (2)

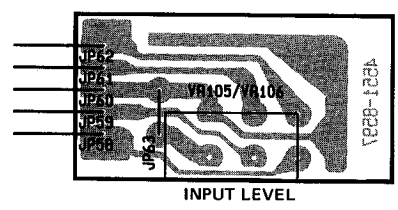
PCB-2 Display P.C.Board



PCB-4 Power P.C.Board

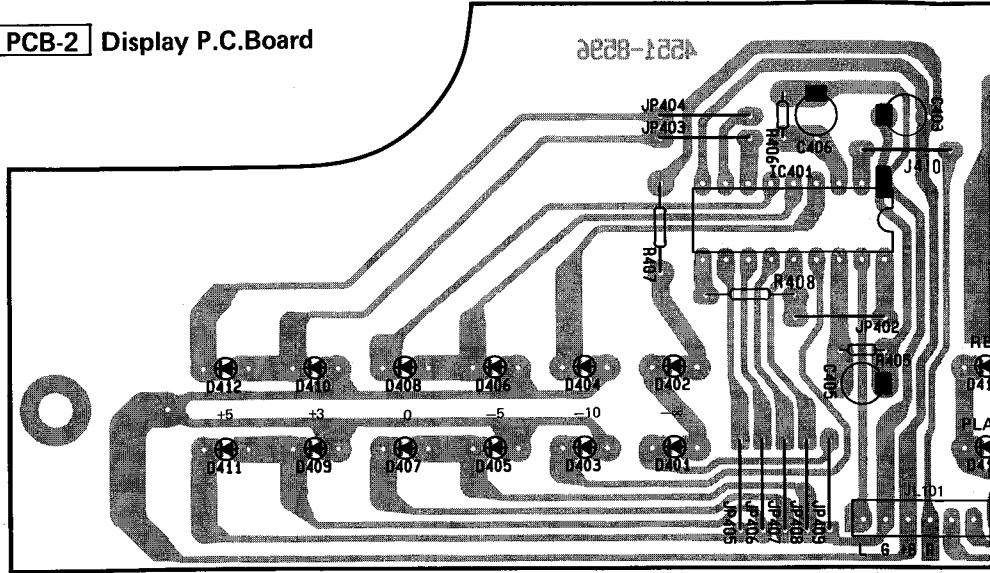


PCB-3 Input VR P.C.Board



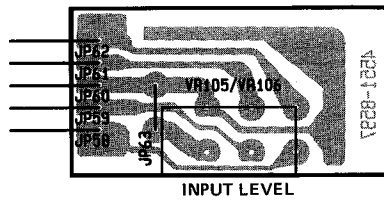
P.C. BOARDS (2)

PCB-2 Display P.C.Board



PCB-4 Power P.C.Board

PCB-3 Input VR P.C.Board



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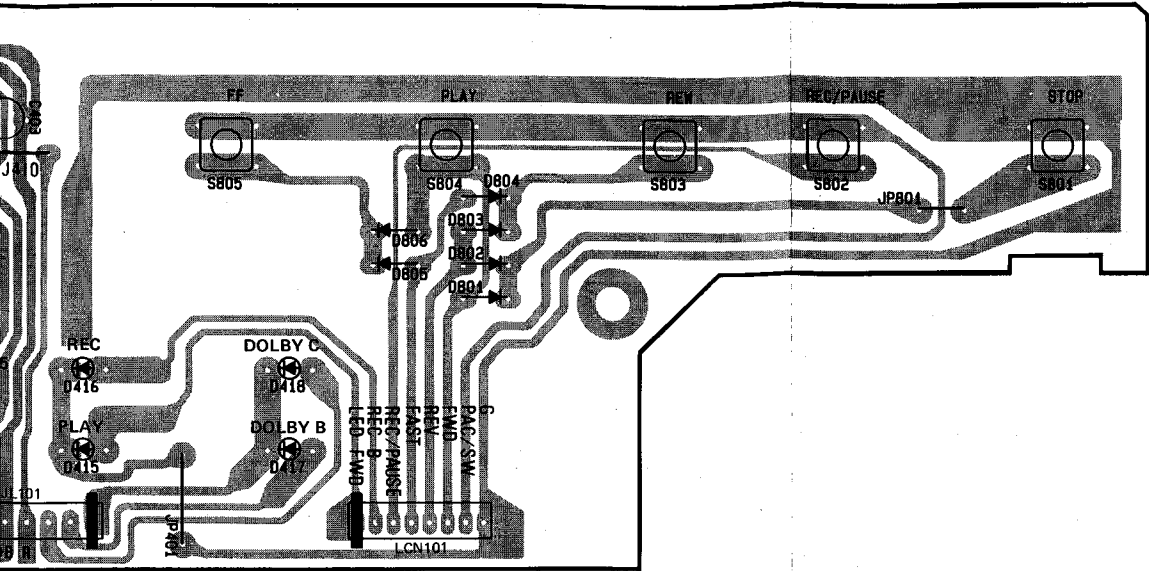
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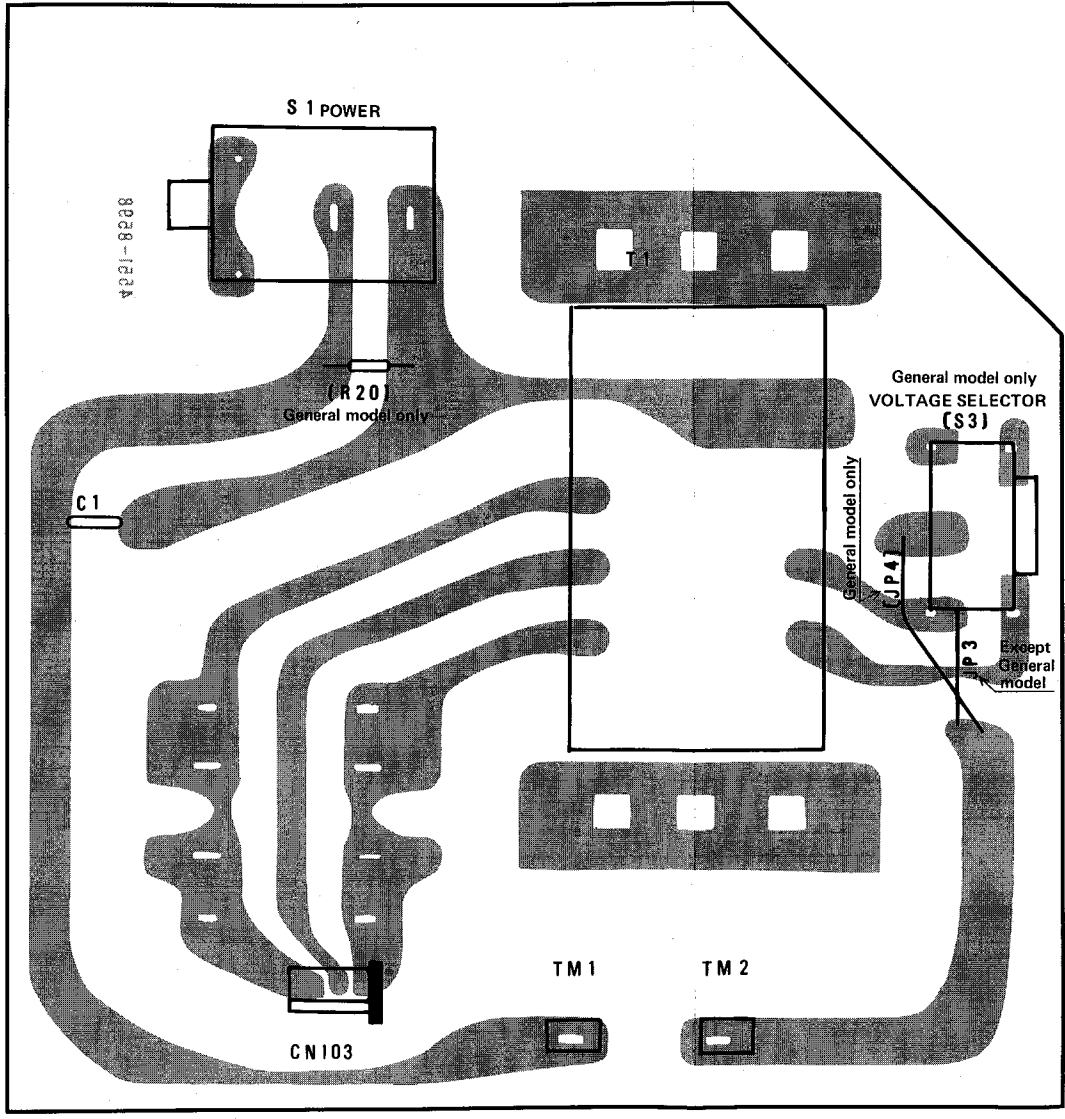
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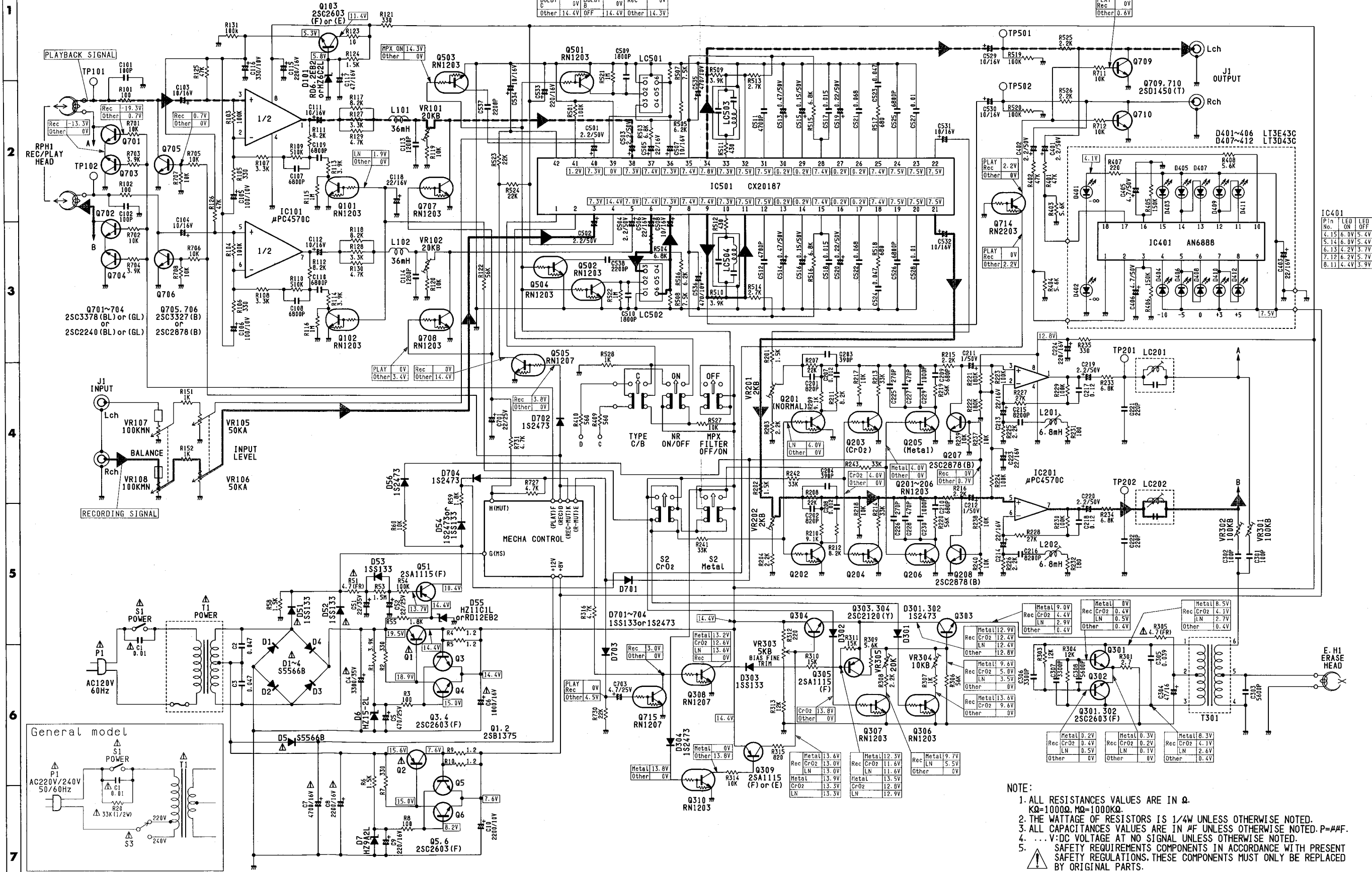


t.Board



SCHEMATIC DIAGRAM (1)

IC501	
Pin No	Pin No
1	2
DOLBY	DOLBY
C	B
Other	Other
14.4V	OFF
14.4V	Other
14.3V	0V



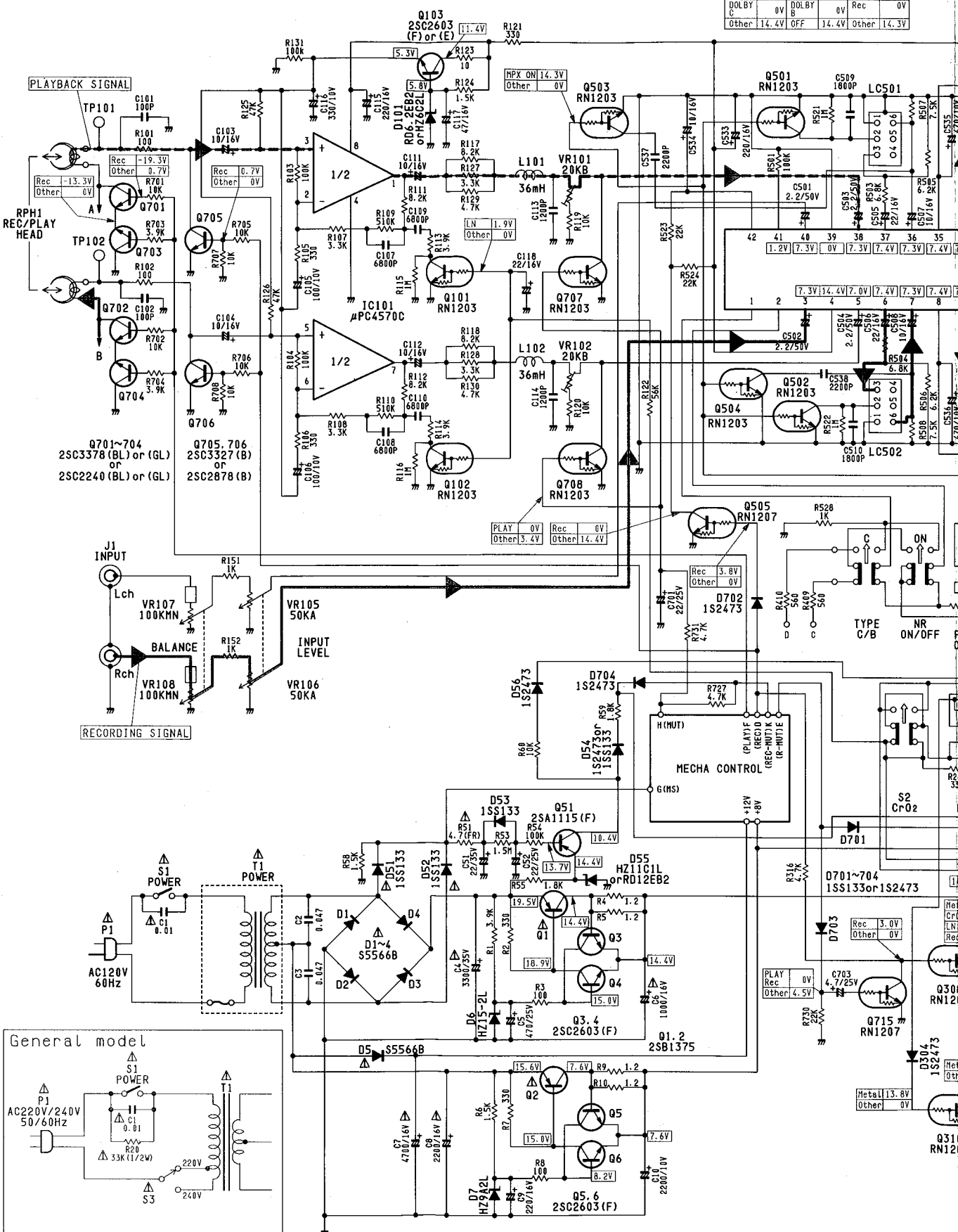
IC401	
Pin No.	LED
4	ON
5	OFF
14	0V
15	5.4V
16	5.4V
17	3.7V
18	5.7V
19	3.7V
20	4.4V
21	3.9V

- NOTE:**
1. ALL RESISTANCE VALUES ARE IN Ω .
K Ω =1000 Ω , M Ω =1000K Ω .
 2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
 3. ALL CAPACITANCE VALUES ARE IN μ F UNLESS OTHERWISE NOTED. P=#F.
 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 ORIGINAL PARTS.

SCHEMATIC DIAGRAM (1)

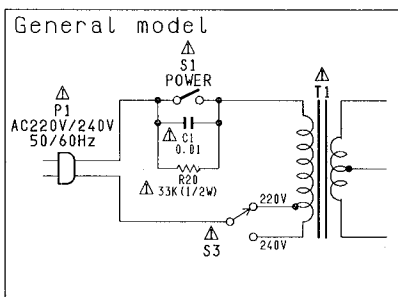
IC501						
Pin No	1	Pin No	2	Pin No	42	
DOLBY	0V	DOLBY	B	0V	Rec	0V
Other	14.4V	OFF	14.4V	Other	14.3V	

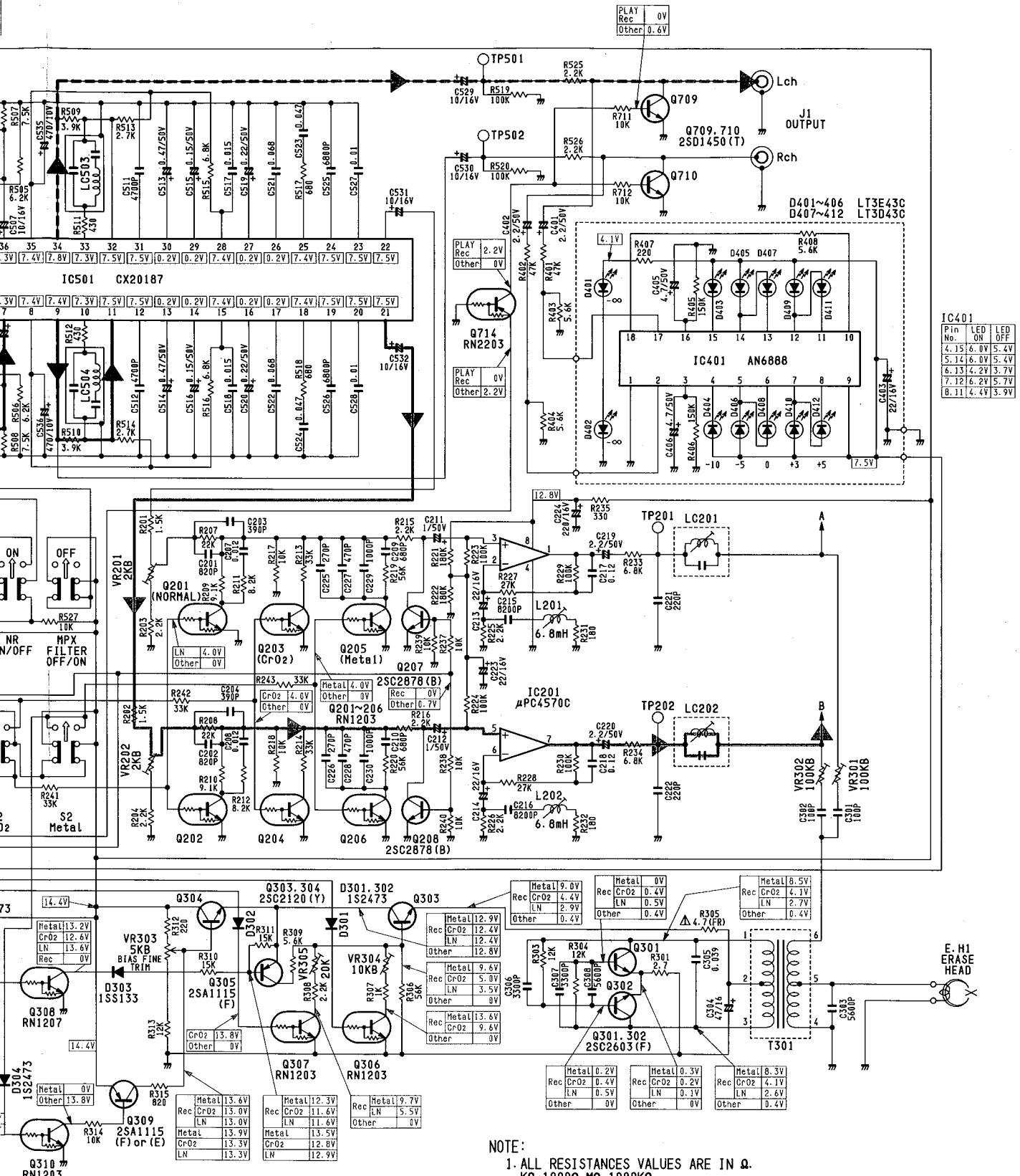
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Q701~704
2SC3378 (BL) or (GL)
or
2SC2240 (BL) or (GL)

Q705, 706
2SC3327 (B)
or
2SC2878 (B)





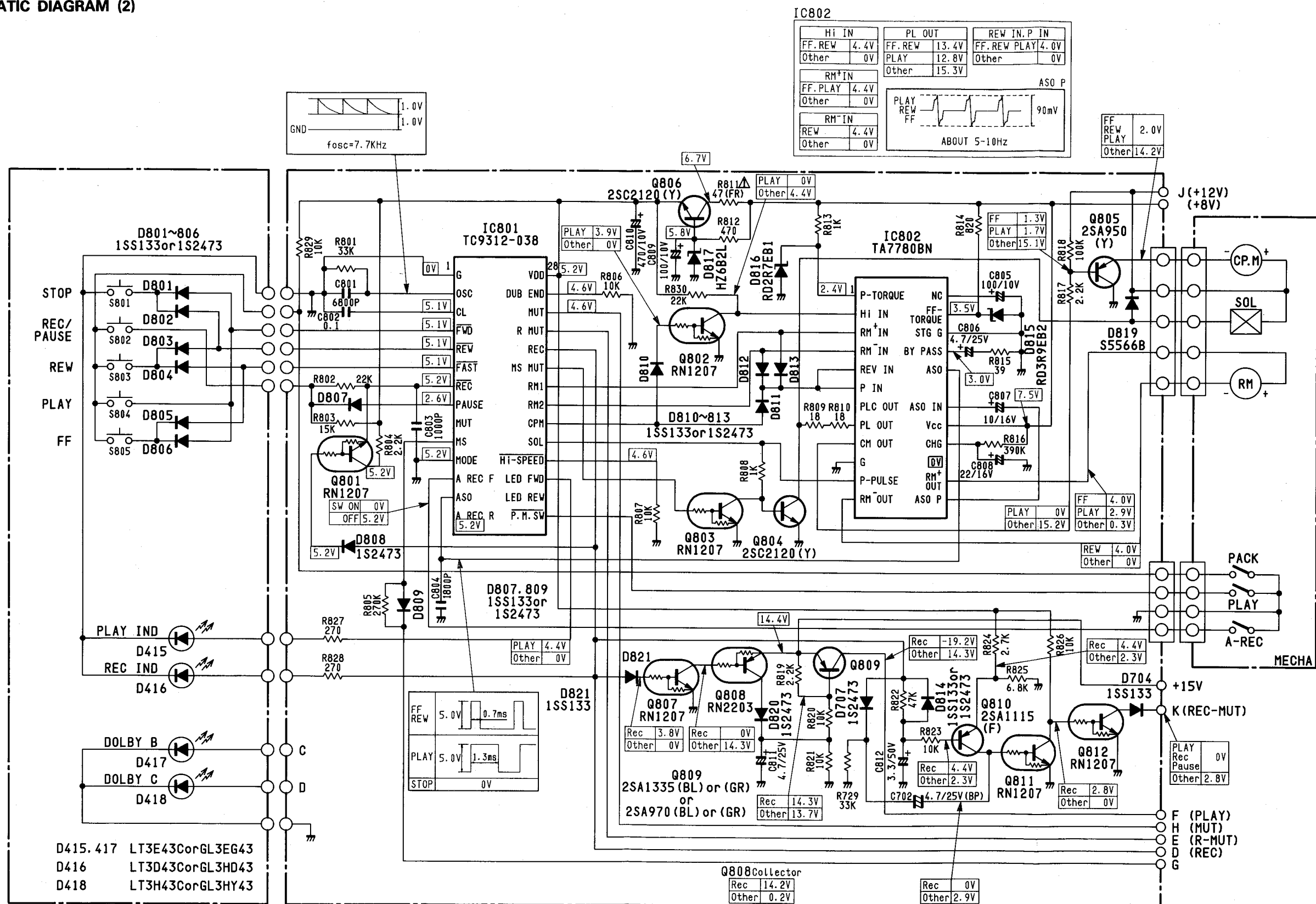
IC401

Pin No.	LED ON	LED OFF
4, 15	6.0V	5.4V
5, 14	6.0V	5.4V
6, 13	4.2V	3.7V
7, 12	6.2V	5.7V
8, 11	4.4V	3.9V

NOTE:

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

SCHEMATIC DIAGRAM (2)



IC802

Hi IN	PL OUT	REW IN, P IN
FF, REW 4.4V	FF, REW 13.4V	FF, REW PLAY 4.0V
Other 0V	PLAY 12.8V	Other 0V
Other 0V	Other 15.3V	

RM+ IN	ASO P
FF, PLAY 4.4V	
Other 0V	

RM IN	
REW 4.4V	
Other 0V	

PLAY REW FF 90mV
ABOUT 5-10Hz

IC801

R MUT	RM1	CPM
Rec Play 0V	FF Play 4.6V	Play 4.5V
Other 4.6V	Other 0V	Other 0V

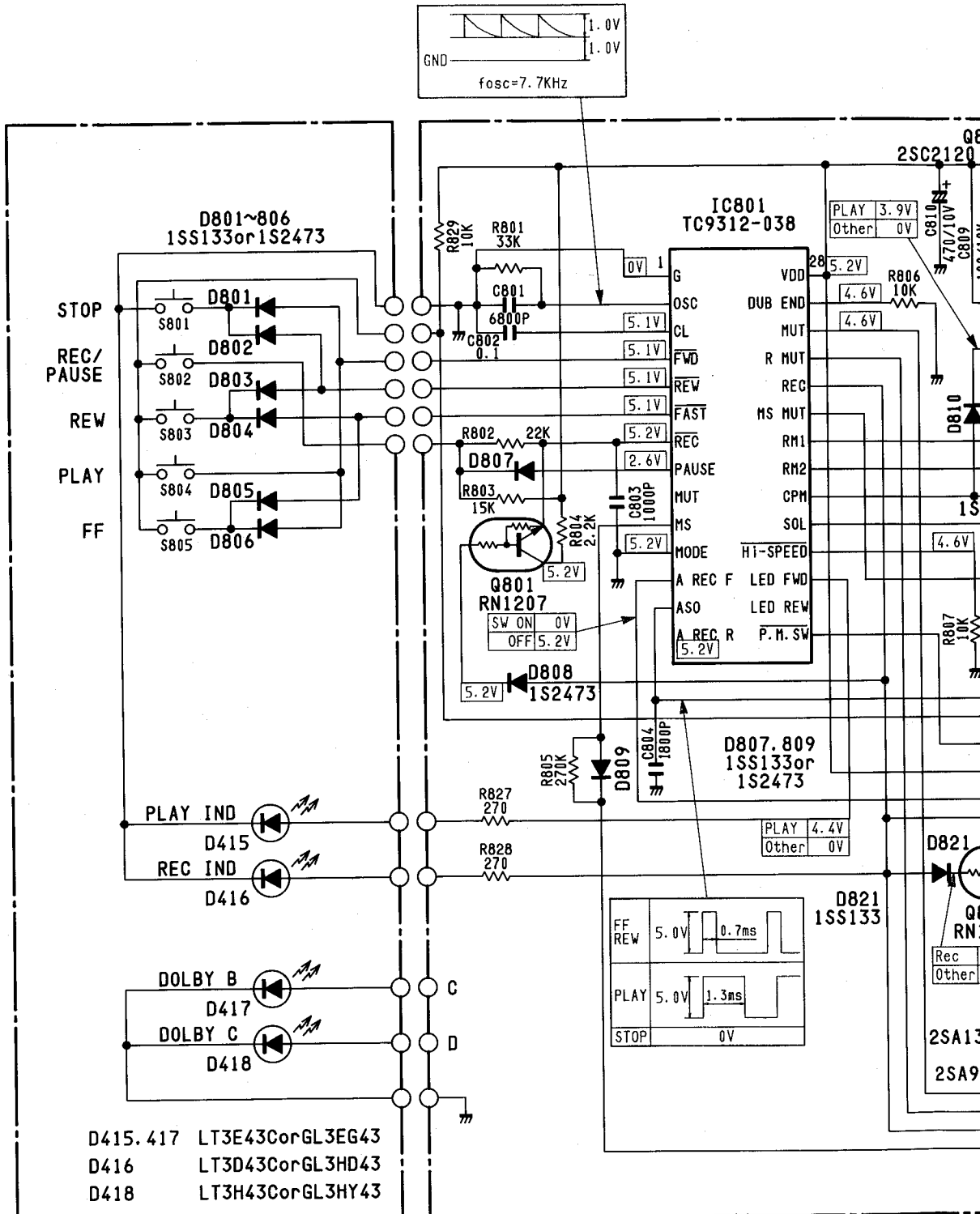
REC	RM2	P. M. SW
Rec 4.4V	REW 4.6V	Play 0V
Other 0V	Other 0V	Other 5.2V

- D415, 417 LT3E43CorGL3EG43
- D416 LT3D43CorGL3HD43
- D418 LT3H43CorGL3HY43

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SCHEMATIC DIAGRAM (2)

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D415. 417 LT3E43CorGL3EG43
 D416 LT3D43CorGL3HD43
 D418 LT3H43CorGL3HY43

IC801

R MUT	RM1	CPM
Rec Play 0V	FF Play 4.6V	Play 4.5V
Other 4.6V	Other 0V	Other 0V
REC	RM2	P.M. SW
Rec 4.4V	REW 4.6V	Play 0V
Other 0V	Other 0V	Other 5.2V

F G H I J

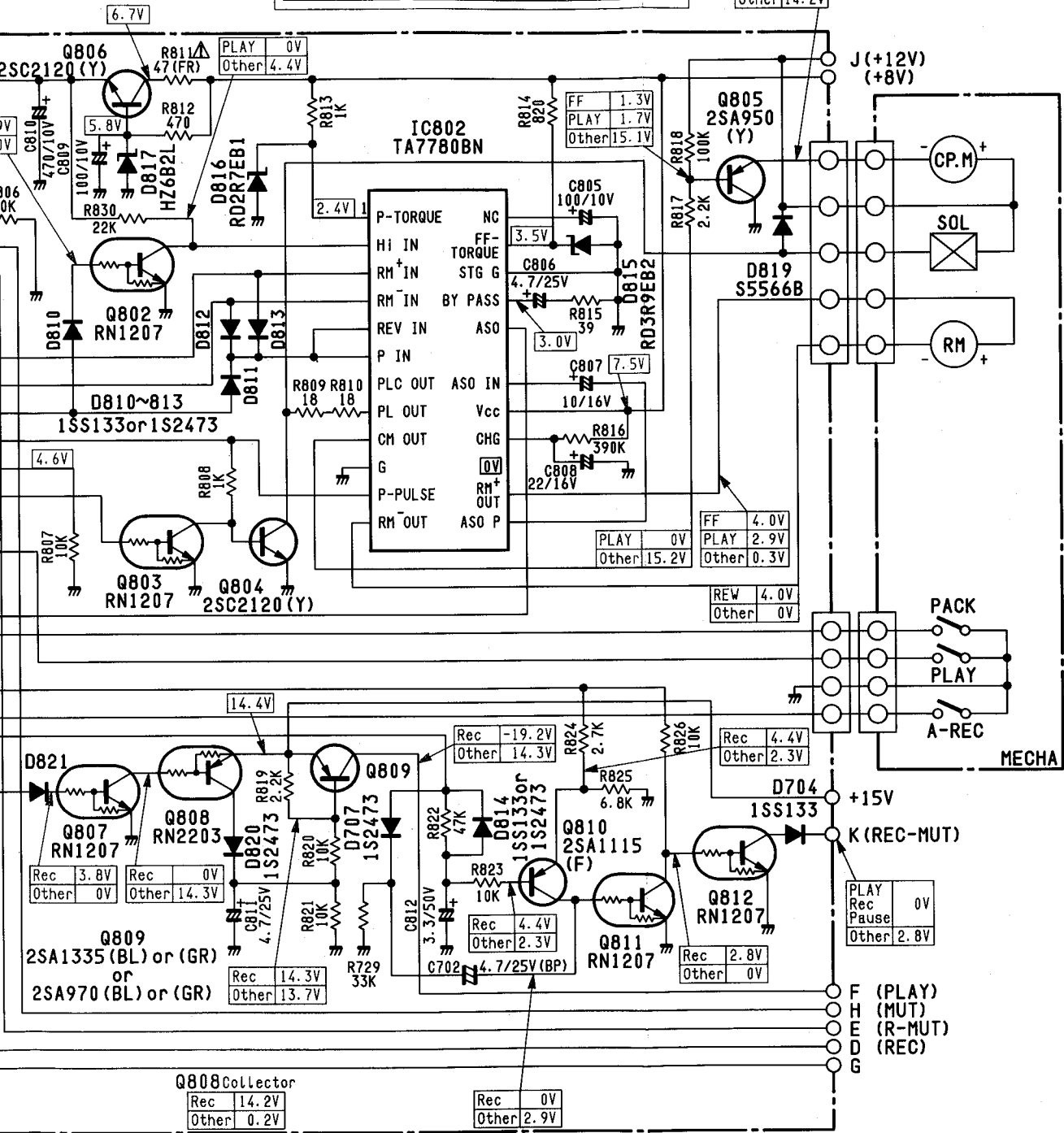
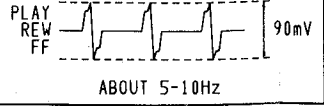
IC802

Hi IN	PL OUT	REW IN.P IN
FF.REW 4.4V	FF.REW 13.4V	FF.REW PLAY 4.0V
Other 0V	PLAY 12.8V	Other 0V
Other 0V	Other 15.3V	

RM+IN	ASO P
FF.PLAY 4.4V	
Other 0V	

RM-IN	
REW 4.4V	
Other 0V	

FF	2.0V
REW	14.2V
PLAY	
Other	



5V
0V
0V
2V

Q808 Collector

Rec	14.2V
Other	0.2V

Rec	0V
Other	2.9V

F (PLAY)
H (MUT)
E (R-MUT)
D (REC)
G

ELECTRICAL PARTS LIST

Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
PCB-1 MAIN P.C. BOARD							
CAPACITORS							
572	C2	5359-S050K473	CAP, PPP .047 μ	619	C505	5345-226C041	CAP, MINI ELE 22 μ /16V
572	C3	5359-S050K473	CAP, PPP .047 μ	619	C506	5345-226C041	CAP, MINI ELE 22 μ /16V
563	Δ C4	5345-338E0962	CAP, MINI ELE 3300 μ /35V	621	C507	5345-106C041	CAP, MINI ELE 10 μ /16V
564	C5	5345-477D041	CAP, MINI ELE 470 μ /25V	621	C508	5345-106C041	CAP, MINI ELE 10 μ /16V
565	Δ C6	5345-108C041	CAP, MINI ELE 1000 μ /16V	630	C509	5359-S010J182	CAP, PPP 1800p
566	Δ C7	5345-478C0962	CAP, MINI ELE 4700 μ /16V	630	C510	5359-S010J182	CAP, PPP 1800p
569	Δ C8	5345-228C041	CAP, MINI ELE 2200 μ /16V	626	C511	5359-S010J472	CAP, PPP 4700p
567	C9	5345-227C041	CAP, MINI ELE 2200 μ /16V	626	C512	5359-S010J472	CAP, PPP 4700p
568	C10	5345-228B045	CAP, MINI ELE 2200 μ /10V	622	C513	5345-L474M50	CAP, MINI ELE .47 μ /50V
679	C51	5345-226E041	CAP, MINI ELE 22 μ /35V	622	C514	5345-L474M50	CAP, MINI ELE .47 μ /50V
685	C52	5345-226D041	CAP, MINI ELE 22 μ /25V	623	C515	5345-L154M50	CAP, MINI ELE .15 μ /50V
427	C101	5359-1015851	CAP, PPP 100p	623	C516	5345-L154M50	CAP, MINI ELE .15 μ /50V
427	C102	5359-1015851	CAP, PPP 100p	629	C517	5359-S010J153	CAP, PPP .015 μ
415	C103	5345-106C0951	CAP, MINI ELE 10 μ /16V	629	C518	5359-S010J153	CAP, PPP .015 μ
415	C104	5345-106C0951	CAP, MINI ELE 10 μ /16V	624	C519	5345-L224M50	CAP, MINI ELE .22 μ /50V
416	C105	5345-107B041	CAP, MINI ELE 100 μ /10V	624	C520	5345-L224M50	CAP, MINI ELE .22 μ /50V
416	C106	5345-107B041	CAP, MINI ELE 100 μ /10V	634	C521	5354-683J1HM	CAP, MYL .068 μ
424	C107	5359-S010J682	CAP, PPP 6800p	634	C522	5354-683J1HM	CAP, MYL .068 μ
424	C108	5359-S010J682	CAP, PPP 6800p	633	C523	5354-473J1HM	CAP, MYL .047 μ
424	C109	5359-S010J682	CAP, PPP 6800p	633	C524	5354-473J1HM	CAP, MYL .047 μ
424	C110	5359-S010J682	CAP, PPP 6800p	627	C525	5359-S010J682	CAP, PPP 6800p
415	C111	5345-106C0951	CAP, MINI ELE 10 μ /16V	627	C526	5359-S010J682	CAP, PPP 6800p
415	C112	5345-106C0951	CAP, MINI ELE 10 μ /16V	628	C527	5359-S010J103	CAP, PPP .01 μ
423	C113	5359-S010J122	CAP, PPP 1200p	628	C528	5359-S010J103	CAP, PPP .01 μ
423	C114	5359-S010J122	CAP, PPP 1200p	621	C529	5345-106C041	CAP, MINI ELE 10 μ /16V
417	C115	5345-227C041	CAP, MINI ELE 220 μ /16V	621	C530	5345-106C041	CAP, MINI ELE 10 μ /16V
418	C116	5345-337B041	CAP, MINI ELE 330 μ /10V	621	C531	5345-106C041	CAP, MINI ELE 10 μ /16V
420	C117	5345-476C041	CAP, MINI ELE 47 μ /16V	621	C532	5345-106C041	CAP, MINI ELE 10 μ /16V
419	C118	5345-226C041	CAP, MINI ELE 22 μ /16V	620	C533	5345-227C041	CAP, MINI ELE 220 μ /16V
493	C201	5359-8215851	CAP, PPP 820p	621	C534	5345-106C041	CAP, MINI ELE 10 μ /16V
493	C202	5359-8215851	CAP, PPP 820p	625	C535	5345-477B041	CAP, MINI ELE 470 μ /10V
494	C203	5359-3915851	CAP, PPP 390p	625	C536	5345-477B041	CAP, MINI ELE 470 μ /10V
494	C204	5359-3915851	CAP, PPP 390p	631	C537	5359-S010J222	CAP, PPP 2200p
492	C207	5359-S010J123	CAP, PPP .012 μ	631	C538	5359-S010J222	CAP, PPP 2200p
492	C208	5359-S010J123	CAP, PPP .012 μ	685	C701	5345-226D041	CAP, MINI ELE 22 μ /25V
489	C209	5359-S010J681	CAP, PPP 680p	686	C702	5342-475D041	CAP, ELE BP 4.7 μ /25V
489	C210	5359-S010J681	CAP, PPP 680p	684	C703	5345-475D041	CAP, MINI ELE 4.7 μ /25V
478	C211	5345-105F0951	CAP, MINI ELE 1 μ /50V	821	C801	5361-682KB	CAP, CER 6800p
478	C212	5345-105F0951	CAP, MINI ELE 1 μ /50V	825	C802	5354-104593	CAP, MYL .1 μ
480	C213	5345-226C041	CAP, MINI ELE 22 μ /16V	822	C803	5361-102KB	CAP, CER 1000p
480	C214	5345-226C041	CAP, MINI ELE 22 μ /16V	823	C804	5361-182KB	CAP, CER 1800p
487	C215	5359-S010J822	CAP, PPP 8200p	819	C805	5345-107B041	CAP, MINI ELE 100 μ /10V
487	C216	5359-S010J822	CAP, PPP 8200p	814	C806	5345-475D041	CAP, MINI ELE 4.7 μ /25V
495	C217	5354-124593	CAP, MYL .12 μ	815	C807	5345-106C041	CAP, MINI ELE 10 μ /16V
495	C218	5354-124593	CAP, MYL .12 μ	816	C808	5345-226C041	CAP, MINI ELE 22 μ /16V
479	C219	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	819	C809	5345-107B041	CAP, MINI ELE 100 μ /10V
479	C220	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	811	C810	5345-477B041	CAP, MINI ELE 470 μ /10V
485	C221	5361-221KB	CAP, CER 220p	814	C811	5345-475D041	CAP, MINI ELE 4.7 μ /25V
485	C222	5361-221KB	CAP, CER 220p	817	C812	5345-335F041	CAP, MINI ELE 3.3 μ /50V
481	C223	5345-226C041	CAP, MINI ELE 22 μ /16V	RESISTORS			
482	C224	5345-227C041	CAP, MINI ELE 220 μ /16V	574	R1	5135-392522	RES, CBN 1/2P 3.9K
491	C225	5359-2715851	CAP, PPP 270p	575	R2	5135-331522	RES, CBN 1/2P 330
491	C226	5359-2715851	CAP, PPP 270p	576	R3	5135-101522	RES, CBN 1/2P 100
490	C227	5359-4715851	CAP, PPP 470p	577	R4	5135-1R2522	RES, CBN 1/2P 1.2
490	C228	5359-4715851	CAP, PPP 470p	577	R5	5135-1R2522	RES, CBN 1/2P 1.2
488	C229	5359-S010J102	CAP, PPP 1000p	578	R6	5135-152522	RES, CBN 1/2P 1.5K
488	C230	5359-S010J102	CAP, PPP 1000p	575	R7	5135-331522	RES, CBN 1/2P 330
535	C301	5361-1010423	CAP, CER 100p	576	R8	5135-101522	RES, CBN 1/2P 100
535	C302	5361-1010423	CAP, CER 100p	577	R9	5135-1R2522	RES, CBN 1/2P 1.2
534	C303	5361-5620423	CAP, CER 5600p	577	R10	5135-1R2522	RES, CBN 1/2P 1.2
530	C304	5345-476C041	CAP, MINI ELE 47 μ /16V	688	Δ R51	5102-4R75116	RES, FUSE 4.7
536	C305	5354-393J1HM	CAP, MYL .039 μ	696	R53	5232-155J16P	RES, CBN 1/6P 1.5M
537	C306	5361-332KB	CAP, CER 3300p	695	R54	5232-104J16P	RES, CBN 1/6P 100K
537	C307	5361-332KB	CAP, CER 3300p	700	R55	5135-182522	RES, CBN 1/2P 1.8K
533	C308	5359-S010J562	CAP, PPP 5600p	697	R58	5232-152J16P	RES, CBN 1/6P 1.5K
590	C401	5345-225-50	CAP, MINI ELE 2.2 μ /50V	698	R59	5232-182J16P	RES, CBN 1/6P 1.8K
590	C402	5345-225-50	CAP, MINI ELE 2.2 μ /50V	683	R60	5135-103522	RES, CBN 1/2P 10K
618	C501	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	431	R101	5232-101J16P	RES, CBN 1/6P 100
618	C502	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	431	R102	5232-101J16P	RES, CBN 1/6P 100
618	C503	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	432	R103	5232-104J16P	RES, CBN 1/6P 100K
618	C504	5345-225F0951	CAP, MINI ELE 2.2 μ /50V	432	R104	5232-104J16P	RES, CBN 1/6P 100K
				433	R105	5232-331J16P	RES, CBN 1/6P 330
				433	R106	5232-331J16P	RES, CBN 1/6P 330
				434	R107	5232-332J16P	RES, CBN 1/6P 3.3K
				434	R108	5232-332J16P	RES, CBN 1/6P 3.3K

Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
435	R109	5232-514J16P	RES, CBN 1/6P 510K	550	R312	5135-221522	RES, CBN 1/2P 220
435	R110	5232-514J16P	RES, CBN 1/6P 510K	543	R313	5232-123J16P	RES, CBN 1/6P 12K
436	R111	5232-822J16P	RES, CBN 1/6P 8.2K	518	R314	5232-103J16P	RES, CBN 1/6P 10K
436	R112	5232-822J16P	RES, CBN 1/6P 8.2K	520	R315	5135-821522	RES, CBN 1/2P 820
437	R113	5232-392J16P	RES, CBN 1/6P 3.9K	519	R316	5135-472522	RES, CBN 1/2P 4.7K
437	R114	5232-392J16P	RES, CBN 1/6P 3.9K	593	R401	5135-473522	RES, CBN 1/2P 47K
438	R115	5232-105J16P	RES, CBN 1/6P 1M	593	R402	5135-473522	RES, CBN 1/2P 47K
438	R116	5232-105J16P	RES, CBN 1/6P 1M	594	R403	5232-562J16P	RES, CBN 1/6P 5.6K
439	R117	5232-822J16P	RES, CBN 1/6P 8.2K	594	R404	5232-562J16P	RES, CBN 1/6P 5.6K
439	R118	5232-822J16P	RES, CBN 1/6P 8.2K	607	R409	5135-561522	RES, CBN 1/2P 560
440	R119	5232-103J16P	RES, CBN 1/6P 10K	607	R410	5135-561522	RES, CBN 1/2P 560
440	R120	5232-103J16P	RES, CBN 1/6P 10K	645	R501	5232-104J16P	RES, CBN 1/6P 100K
443	R121	5135-331522	RES, CBN 1/2P 330	648	R503	5232-682J16P	RES, CBN 1/6P 6.8K
444	R122	5135-563522	RES, CBN 1/2P 56K	654	R504	5135-682522	RES, CBN 1/2P 6.8K
448	R123	5232-100J16P	RES, CBN 1/6P 10	646	R505	5232-622J16P	RES, CBN 1/6P 6.2K
442	R124	5232-152J16P	RES, CBN 1/6P 1.5K	646	R506	5232-622J16P	RES, CBN 1/6P 6.2K
441	R125	5232-473J16P	RES, CBN 1/6P 47K	643	R507	5232-752J16P	RES, CBN 1/6P 7.5K
441	R126	5232-473J16P	RES, CBN 1/6P 47K	643	R508	5232-752J16P	RES, CBN 1/6P 7.5K
445	R127	5232-332J16P	RES, CBN 1/6P 3.3K	641	R509	5232-392J16P	RES, CBN 1/6P 3.9K
445	R128	5232-332J16P	RES, CBN 1/6P 3.3K	641	R510	5232-392J16P	RES, CBN 1/6P 3.9K
446	R129	5232-472J16P	RES, CBN 1/6P 4.7K	644	R511	5232-431J16P	RES, CBN 1/6P 430
446	R130	5232-472J16P	RES, CBN 1/6P 4.7K	644	R512	5232-431J16P	RES, CBN 1/6P 430
432	R131	5232-104J16P	RES, CBN 1/6P 100K	642	R513	5232-272J16P	RES, CBN 1/6P 2.7K
447	R151	5232-102J16P	RES, CBN 1/6P 1K	642	R514	5232-272J16P	RES, CBN 1/6P 2.7K
447	R152	5232-102J16P	RES, CBN 1/6P 1K	648	R515	5232-682J16P	RES, CBN 1/6P 6.8K
501	R201	5135-152522	RES, CBN 1/2P 1.5K	648	R516	5232-682J16P	RES, CBN 1/6P 6.8K
501	R202	5135-152522	RES, CBN 1/2P 1.5K	649	R517	5232-681J16P	RES, CBN 1/6P 680
504	R203	5232-222J16P	RES, CBN 1/6P 2.2K	649	R518	5232-681J16P	RES, CBN 1/6P 680
504	R204	5232-222J16P	RES, CBN 1/6P 2.2K	655	R519	5135-104522	RES, CBN 1/2P 100K
506	R207	5232-223J16P	RES, CBN 1/6P 2.2K	655	R520	5135-104522	RES, CBN 1/2P 100K
506	R208	5232-223J16P	RES, CBN 1/6P 2.2K	652	R521	5232-105J16P	RES, CBN 1/6P 1M
505	R209	5232-912J16P	RES, CBN 1/6P 9.1K	652	R522	5232-105J16P	RES, CBN 1/6P 1M
505	R210	5232-912J16P	RES, CBN 1/6P 9.1K	651	R523	5232-223J16P	RES, CBN 1/6P 22K
507	R211	5232-822J16P	RES, CBN 1/6P 8.2K	651	R524	5232-223J16P	RES, CBN 1/6P 22K
507	R212	5232-822J16P	RES, CBN 1/6P 8.2K	656	R525	5135-222522	RES, CBN 1/2P 2.2K
509	R213	5232-333J16P	RES, CBN 1/6P 33K	656	R526	5135-222522	RES, CBN 1/2P 2.2K
509	R214	5232-333J16P	RES, CBN 1/6P 33K	657	R527	5135-103522	RES, CBN 1/2P 10K
510	R215	5232-222J16P	RES, CBN 1/6P 2.2K	658	R528	5232-102J16P	RES, CBN 1/6P 1K
510	R216	5232-222J16P	RES, CBN 1/6P 2.2K	693	R701	5232-103J16P	RES, CBN 1/6P 10K
508	R217	5232-103J16P	RES, CBN 1/6P 10K	693	R702	5232-103J16P	RES, CBN 1/6P 10K
508	R218	5232-103J16P	RES, CBN 1/6P 10K	687	R703	5135-392522	RES, CBN 1/2P 3.9K
512	R219	5232-563J16P	RES, CBN 1/6P 56K	689	R704	5232-392J16P	RES, CBN 1/6P 3.9K
512	R220	5232-563J16P	RES, CBN 1/6P 56K	693	R705	5232-103J16P	RES, CBN 1/6P 10K
513	R221	5232-184J16P	RES, CBN 1/6P 180K	693	R706	5232-103J16P	RES, CBN 1/6P 10K
513	R222	5232-184J16P	RES, CBN 1/6P 180K	693	R707	5232-103J16P	RES, CBN 1/6P 10K
514	R223	5232-104J16P	RES, CBN 1/6P 100K	693	R708	5232-103J16P	RES, CBN 1/6P 10K
514	R224	5232-104J16P	RES, CBN 1/6P 100K	693	R711	5232-103J16P	RES, CBN 1/6P 10K
504	R225	5232-222J16P	RES, CBN 1/6P 2.2K	693	R712	5232-103J16P	RES, CBN 1/6P 10K
504	R226	5232-222J16P	RES, CBN 1/6P 2.2K	690	R727	5232-472J16P	RES, CBN 1/6P 4.7K
515	R227	5232-273J16P	RES, CBN 1/6P 27K	699	R729	5232-333J16P	RES, CBN 1/6P 33K
515	R228	5232-273J16P	RES, CBN 1/6P 27K	694	R730	5135-223522	RES, CBN 1/6P 22K
514	R229	5232-104J16P	RES, CBN 1/6P 100K	831	R801	5232-333J16P	RES, CBN 1/6P 33K
514	R230	5232-104J16P	RES, CBN 1/6P 100K	832	R802	5232-223J16P	RES, CBN 1/6P 22K
516	R231	5232-181J16P	RES, CBN 1/6P 180	841	R803	5135-153522	RES, CBN 1/2P 15K
516	R232	5232-181J16P	RES, CBN 1/6P 180	842	R804	5135-222522	RES, CBN 1/2P 2.2K
511	R233	5232-682J16P	RES, CBN 1/6P 6.8K	839	R805	5232-274J16P	RES, CBN 1/6P 270K
500	R234	5135-682522	RES, CBN 1/2P 6.8K	844	R806	5135-103522	RES, CBN 1/2P 10K
499	R235	5135-331522	RES, CBN 1/2P 330	844	R807	5135-103522	RES, CBN 1/2P 10K
503	R237	5232-103J16P	RES, CBN 1/6P 10K	845	R808	5135-102522	RES, CBN 1/2P 1K
503	R238	5232-103J16P	RES, CBN 1/6P 10K	846	R809	5135-180522	RES, CBN 1/2P 18
503	R239	5232-103J16P	RES, CBN 1/6P 10K	846	R810	5135-180522	RES, CBN 1/2P 18
503	R240	5232-103J16P	RES, CBN 1/6P 10K	829	△R811	5102-4705116	RES, FUSE 47
502	R241	5135-333522	RES, CBN 1/2P 33K	847	R812	5135-471522	RES, CBN 1/2P 470
502	R242	5135-333522	RES, CBN 1/2P 33K	848	R813	5135-102522	RES, CBN 1/2P 1K
517	R243	5232-333J16P	RES, CBN 1/6P 33K	849	R814	5135-821522	RES, CBN 1/2P 820
544	R301	5232-2R7J16P	RES, CBN 1/6P 2.7	834	R815	5232-390J16P	RES, CBN 1/6P 39
543	R303	5232-123J16P	RES, CBN 1/6P 12K	835	R816	5232-394J16P	RES, CBN 1/6P 390K
543	R304	5232-123J16P	RES, CBN 1/6P 12K	833	R817	5232-222J16P	RES, CBN 1/6P 2.2K
531	△R305	5102-4R74715	RES, FUSE 4.7	850	R818	5135-104522	RES, CBN 1/2P 100K
546	R306	5232-563J16P	RES, CBN 1/6P 56K	833	R819	5232-222J16P	RES, CBN 1/6P 2.2K
549	R307	5232-102J16P	RES, CBN 1/6P 1K	836	R820	5232-103J16P	RES, CBN 1/6P 10K
547	R308	5232-222J16P	RES, CBN 1/6P 2.2K	836	R821	5232-103J16P	RES, CBN 1/6P 10K
542	R309	5232-562J16P	RES, CBN 1/6P 5.6K	851	R822	5135-473522	RES, CBN 1/2P 47K
548	R310	5232-153J16P	RES, CBN 1/6P 15K	836	R823	5232-103J16P	RES, CBN 1/6P 10K
548	R311	5232-153J16P	RES, CBN 1/6P 15K	837	R824	5232-272J16P	RES, CBN 1/6P 2.7K

Ser. No.	Ref. No.	Part No.	Description	Ser. No.	Ref. No.	Part No.	Description
838	R825	5232-682J16P	RES, CBN 1/6P 6.8K	555	△D4	5632-S5566B	DIODE, RECT
836	R826	5232-103J16P	RES, CBN 1/6P 10K	555	△D5	5632-S5566B	DIODE, RECT
852	R827	5135-271522	RES, CBN 1/2P 270	557	D6	5635-HZ15-2L	DIODE, ZENER
853	R828	5135-271522	RES, CBN 1/2P 270	558	D7	5635-HZ9A2L	DIODE, ZENER
844	R829	5135-103522	RES, CBN 1/2P 10K	681	△D51	5631-1SS133	DIODE, DET
854	R830	5135-223522	RES, CBN 1/2P 22K	681	△D52	5631-1SS133	DIODE, DET
INTEGRATED CIRCUITS							
401	IC101	5653-UPC4570C	IC, LINEAR	681	D53	5631-1SS133	DIODE, DET
461	IC201	5653-UPC4570C	IC, LINEAR	681	D54	5631-1SS133	DIODE, DET
611	IC501	5653-CX20187	IC, LINEAR	680	D55	5635-HZ11C1L	DIODE, ZENER
791	IC801	5654-9312-038	IC, DIGITAL	682	D56	5631-1S2473	DIODE, DET
792	IC802	5654-TA7780BN	IC, DIGITAL	407	D101	5635-RD6R2EB2	DIODE, ZENER
TRANSISTORS							
551	△Q1	5612-1375	XISTOR, PNP A	526	D301	5631-1S2473	DIODE, DET
551	△Q2	5612-1375	XISTOR, PNP A	526	D302	5631-1S2473	DIODE, DET
552	Q3	5613-2603 (F) or (E)	XISTOR, NPN R	527	D303	5631-1SS133	DIODE, DET
552	Q4	5613-2603 (F) or (E)	XISTOR, NPN R	526	D304	5631-1S2473	DIODE, DET
552	Q5	5613-2603 (F) or (E)	XISTOR, NPN R	682	D701	5631-1S2473	DIODE, DET
552	Q6	5613-2603 (F) or (E)	XISTOR, NPN R	682	D702	5631-1S2473	DIODE, DET
674	Q51	5611-1115 (F)	XISTOR, PNP R	682	D703	5631-1S2473	DIODE, DET
404	Q101	5613-RN1203	XISTOR, NPN R	682	D704	5631-1S2473	DIODE, DET
404	Q102	5613-RN1203	XISTOR, NPN R	682	D707	5631-1S2473	DIODE, DET
405	Q103	5613-2603 (F) or (E)	XISTOR, NPN R	802	D807	5631-1SS133	DIODE, DET
463	Q201	5613-RN1203	XISTOR, NPN R	801	D808	5631-1S2473	DIODE, DET
463	Q202	5613-RN1203	XISTOR, NPN R	802	D809	5631-1SS133	DIODE, DET
463	Q203	5613-RN1203	XISTOR, NPN R	801	D810	5631-1S2473	DIODE, DET
463	Q204	5613-RN1203	XISTOR, NPN R	801	D811	5631-1S2473	DIODE, DET
463	Q205	5613-RN1203	XISTOR, NPN R	801	D812	5631-1S2473	DIODE, DET
463	Q206	5613-RN1203	XISTOR, NPN R	801	D813	5631-1S2473	DIODE, DET
464	Q207	5613-2878 (B)	XISTOR, NPN R	801	D814	5631-1S2473	DIODE, DET
464	Q208	5613-2878 (B)	XISTOR, NPN R	805	D815	5635-RD3R9EB2	DIODE, ZENER
522	Q301	5613-2603 (F)	XISTOR, NPN R	804	D816	5635-RD2R7EB1	DIODE, ZENER
522	Q302	5613-2603 (F)	XISTOR, NPN R	806	D817	5635-RD6R2EB2	DIODE, ZENER
521	Q303	5613-2120 (Y)	XISTOR, NPN R	808	D819	5632-S5566B	DIODE, RECT
521	Q304	5613-2120 (Y)	XISTOR, NPN R	801	D820	5631-1S2473	DIODE, DET
523	Q305	5611-1115 (F)	XISTOR, PNP R	802	D821	5631-1SS133	DIODE, DET
524	Q306	5613-RN1203	XISTOR, NPN R	COILS			
524	Q307	5613-RN1203	XISTOR, NPN R	409	L101	5995-363261	COIL W/CORE
525	Q308	5613-RN1207	XISTOR, NPN R	409	L102	5995-363261	COIL W/CORE
523	Q309	5611-1115 (F)	XISTOR, PNP R	467	L201	5932-70523	COIL CASE, 7
524	Q310	5613-RN1203	XISTOR, NPN R	467	L202	5932-70523	COIL CASE, 7
613	Q501	5613-RN1203	XISTOR, NPN R	TRANSFORMER			
613	Q502	5613-RN1203	XISTOR, NPN R	528	T301	5933-10101	COIL CASE, 10
613	Q503	5613-RN1203	XISTOR, NPN R	CONTROLS			
613	Q504	5613-RN1203	XISTOR, NPN R	411	VR101	5101-20301927	RES, SEMI FIX 20K
614	Q505	5613-RN1207	XISTOR, NPN R	411	VR102	5101-20301927	RES, SEMI FIX 20K
671	Q701	5613-2240 (BL)	XISTOR, NPN R	772	VR107	5112-1040221	RES, V CBN 12 100K
671	Q702	5613-2240 (BL)	XISTOR, NPN R	772	VR108	5112-1040221	RES, V CBN 12 100K
671	Q703	5613-2240 (BL)	XISTOR, NPN R	470	VR201	5101-20201927	RES, SEMI FIX 2K
671	Q704	5613-2240 (BL)	XISTOR, NPN R	470	VR202	5101-20201927	RES, SEMI FIX 2K
673	Q705	5613-2878 (B)	XISTOR, NPN R	539	VR301	5101-10401927	RES, SEMI FIX 100K
673	Q706	5613-2878 (B)	XISTOR, NPN R	539	VR302	5101-10401927	RES, SEMI FIX 100K
677	Q707	5613-RN1203	XISTOR, NPN R	776	VR303	5112-5020422	RES, V CBN 12 5K
677	Q708	5613-RN1203	XISTOR, NPN R	540	VR304	5101-10301927	RES, SEMI FIX 10K
672	Q709	5614-1450 (T)	XISTOR, NPN A	541	VR305	5101-20301927	RES, SEMI FIX 20K
672	Q710	5614-1450 (T)	XISTOR, NPN A	MISCELLANEOUS			
676	Q714	5611-RN2203	XISTOR, PNP R	703	J1	4484-46	PIN JACK, 4P
678	Q715	5613-RN1207	XISTOR, NPN R	765	S2	4431-S0502610	PUSH SWITCH
799	Q801	5613-RN1207	XISTOR, NPN R	745	CN101	4443-0801140	CONNECTOR
799	Q802	5613-RN1207	XISTOR, NPN R	743	CN102	4443-070185	CONNECTOR
799	Q803	5613-RN1207	XISTOR, NPN R	748	CN106	4443-0601102	CONNECTOR
796	Q804	5613-2120 (Y)	XISTOR, NPN R	749	CN107	4443-0201102	CONNECTOR
795	Q805	5611-950 (Y)	XISTOR, PNP R	732	JL102	4242-R0203800	JUMPER LEAD
796	Q806	5613-2120 (Y)	XISTOR, NPN R	468	LC201	5932-00224	COIL CASE, 7
799	Q807	5613-RN1207	XISTOR, NPN R	468	LC202	5932-00224	COIL CASE, 7
797	Q808	5611-RN2203	XISTOR, PNP R	616	LC501	5214-11301	LC COMPOSITE
794	Q809	5611-970 (BL)	XISTOR, PNP R	616	LC502	5214-11301	LC COMPOSITE
793	Q810	5611-1115 (F) or (E)	XISTOR, PNP R	615	LC503	5214-95	LC COMPOSITE
799	Q811	5613-RN1207	XISTOR, NPN R	615	LC504	5214-95	LC COMPOSITE
799	Q812	5613-RN1207	XISTOR, NPN R	721	TM101	4214-132	TERMINAL
DIODES							
555	△D1	5632-S5566B	DIODE, RECT	721	TM102	4214-132	TERMINAL
555	△D2	5632-S5566B	DIODE, RECT	721	TM201	4214-132	TERMINAL
555	△D3	5632-S5566B	DIODE, RECT	721	TM202	4214-132	TERMINAL
				721	TM501	4214-132	TERMINAL
				721	TM502	4214-132	TERMINAL

Ser. No.	Ref. No.	Part No.	Description
736	LCN801	4163-01301005	CONNECTR W/W
737	LCN802	4163-01302004	CONNECTR W/W

PCB-2 DISPLAY P.C. BOARD

CAPACITORS

588	C403	5345-226C0356	CAP, MINI ELE 22 μ /16V
587	C405	5345-475F0356	CAP, MINI ELE 4.7 μ /50V
587	C406	5345-475F0356	CAP, MINI ELE 4.7 μ /50V

RESISTORS

596	R405	5232-154J16P	RES, CBN 1/6P 150K
596	R406	5232-154J16P	RES, CBN 1/6P 150K
598	R407	5135-221522	RES, CBN 1/2P 220
599	R408	5135-562522	RES, CBN 1/2P 5.6K
692	R731	5135-472522	RES, CBN 1/2P 4.7K

INTEGRATED CIRCUIT

581	IC401	5652-AN6888	IC, MONO
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DIODES

601	D401	5637-LT3E43C	LED
601	D402	5637-LT3E43C	LED
601	D403	5637-LT3E43C	LED
601	D404	5637-LT3E43C	LED
601	D405	5637-LT3E43C	LED
601	D406	5637-LT3E43C	LED
602	D407	5637-LT3D43C	LED
602	D408	5637-LT3D43C	LED
602	D409	5637-LT3D43C	LED
602	D410	5637-LT3D43C	LED
602	D411	5637-LT3D43C	LED
602	D412	5637-LT3D43C	LED
601	D415	5637-LT3E43C	LED
602	D416	5637-LT3D43C	LED
601	D417	5637-LT3E43C	LED
603	D418	5637-LT3H43C	LED
800	D801	5631-1SS133	DIODE, DET
800	D802	5631-1SS133	DIODE, DET
800	D803	5631-1SS133	DIODE, DET
800	D804	5631-1SS133	DIODE, DET
800	D805	5631-1SS133	DIODE, DET
800	D806	5631-1SS133	DIODE, DET

MISCELLANEOUS

767	S801	4437-00401	PUSH SWITCH
767	S802	4437-00401	PUSH SWITCH
767	S803	4437-00401	PUSH SWITCH
767	S804	4437-00401	PUSH SWITCH
767	S805	4437-00401	PUSH SWITCH
731	JL101	4242-R0207151	JUMPER LEAD
735	LCN101	4163-01402008	CONNECTR W/W

PCB-3 INPUT VR P.C. BOARD

CONTROLS

781	VR105	5113-50373158	RES, V CBN 16 50K
781	VR106	5113-50373158	RES, V CBN 16 50K

PCB-4 POWER P.C. BOARD

CAPACITOR

571	Δ C1	5352-S010M103	CAP, MTL .01 μ
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RESISTOR

042A	Δ R20	5135-335522	RES, CBN 1/2P 3.3M GB
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TRANSFORMERS

561	Δ T1	5584-S1801	XFORMER, POWER
561A	Δ T1	5584-S1802	XFORMER, POWER GB

MISCELLANEOUS

761	Δ S1	4433-00701	PUSH SWITCH, POWER
041A	Δ S3	4411-1047111	ROTRY SWITCH, VOLT SELECT GB
744	CN103	4443-030185	CONNECTOR
724	TM1	4214-122	TERMINAL
724	TM2	4214-122	TERMINAL

Ser. No.	Ref. No.	Part No.	Description
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ABBREVIATIONS IN PARTS LIST

CAPACITORS

CAP, MINI ELE	: Electrolytic
CAP, CER	: Ceramic
CAP, PPP	: Polypropylene
CAP, MYL	: Mylar
CAP, MCA	: Mica
CAP, MINI BP	: Bipolar
CAP, ELE BP	: Electrolytic Bipolar
CAP, STY	: Polystyrene Film
CAP, SPE	: Special
CAP, TAN	: Tantalum
470 μ	: 470 μ F
6800p	: 6800pF
.047 μ	: 0.047 μ F

RESISTORS

RES, CBN 1/6P	: Carbon 1/6W
RES, FUSE	: Fuse
RES, CEM 5P	: Cement 5W
RES, MTL 1P	: Metal 1W
2.2K	: 2.2k Ω
220	: 220 Ω

TRANSISTORS

XISTOR	: Transistor
FET	: Field Effect Transistor

CONTROLS

RES, V CBN	: Variable Carbon Resistor
RES, SEMI FIX	: Semi-fixed Resistor

CHASSIS MISCELLANEOUS

701	Δ P1	4161-71151	CORD W/PLUG
701A	Δ P1	4161-7256	CORD W/PLUG GB

PACKAGE PARTS LIST

021A	1756-06303	LABEL GB
022A	1756-03124	LABEL GB
106	1111-J30287	OWNER GUIDE
106A	1111-J30288	OWNER GUIDE GB
107	1111-J90195	OWNER GUIDE
108	1113-717004	OWNER CARD
110	1117-78	SERIAL LABEL
112	1119-047	ATTACH SHEET
113	1119-0137	ATTACH SHEET
114	1221-21001	CARTON BOX
115	1222-7326	CUSHION
117	1223-R0220055	SOFT SHEET
118	1223-009	SOFT SHEET
120	1241-R0160450	POLYETHY BAG
121	1241-R0123350	POLYETHY BAG
153	1756-CSA	LABEL
702	4161-71184	CORD W/PLUG

NOTE



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