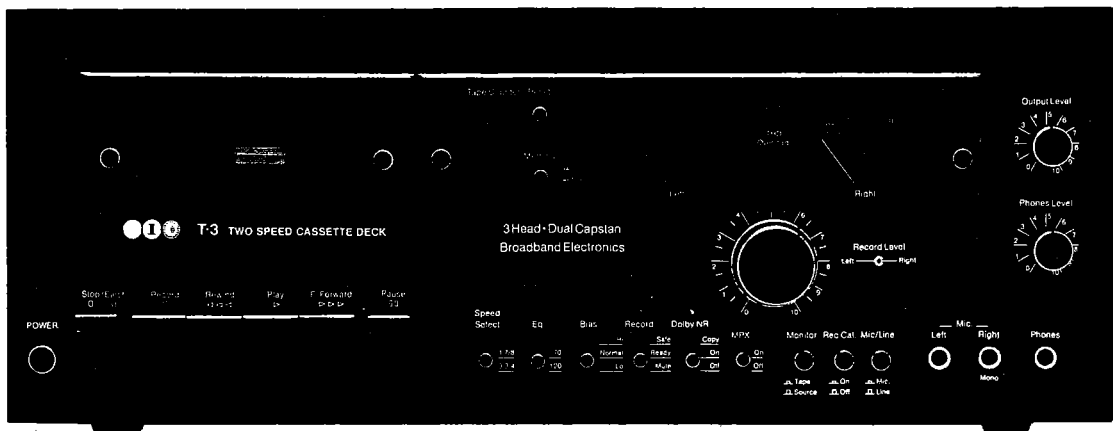


# Two Speed Cassette Deck T-3

## Technical Service Manual



## **Important Note**



*Our experience shows that 75% of so-called repairs can directly attributed to improper installation or the user not being familiar with the operation of the unit.*

*For this reason, we have decided to include the Owner's Manual with the B·I·C Two Speed Cassette Deck with the Technical Service Manual.*

*We recommend that you read the instructions pertaining to set-up prior to attempting to repair or adjust the unit.*

# Contents

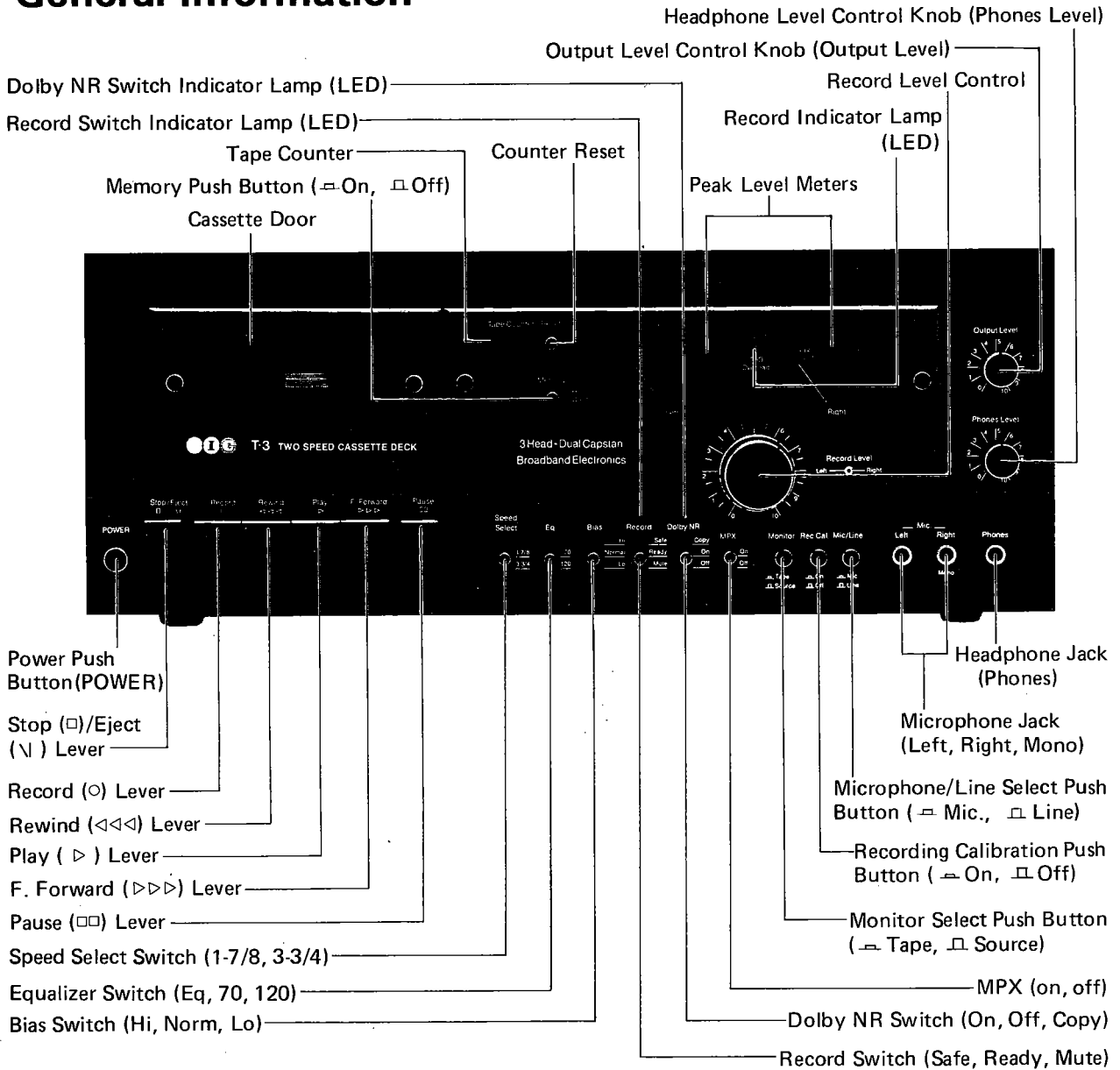
Important Note.....	2
Specifications.....	3
General Information.....	4 ~ 5
Test Equipment Required.....	5
Block Diagram.....	6
Disassembly Instructions.....	7 ~ 10
Mechanical Adjustment.....	11 ~ 16
Alignment Procedure.....	17 ~ 20
Adjustment Locations.....	21
Trouble Shooting.....	22 ~ 24
Lubrication Points.....	25 ~ 26
Wiring Diagram.....	27 ~ 28
Parts Layout On P.C. Board.....	29 ~ 31
Semiconductor Lead Identification.....	32
Schematic Diagram.....	33 ~ 34
Exploded View (General).....	35 ~ 36
Exploded View (Mechanical).....	37 ~ 38
Packing Method.....	39
Parts List.....	40 ~ 50

# Specifications

Type.....	Front Loading Vertical Type
Power Requirements.....	105 to 132V AC 60 Hz
Input Power.....	35W Maximum
Input.....	Line: 250mV, Mic:3mV
Output.....	.20V $\pm$ 1.5 dB
Wow & Flutter.....	4.76cm $\pm$ 0.1% Maximum (DIN WTD Playback Mode) 9.5cm $\pm$ 0.08% Maximum (DIN WTD Playback Mode)
Tape Speed.....	4.76cm/sec $\pm$ 2% Maximum $\pm$ 0.5% Typical 9.5cm/sec $\pm$ 2% Maximum $\pm$ 0.5% Typical
Fast Forward & Rewind Time.....	50sec Typical 60 sec Maximum (C-60, 8gcm Tape)
Frequency Responce.....	31.5 Hz to 14 kHz
Rec/Play Head.....	Two Gaps One Housing Combination Ferrite Core
Erase Head.....	Double Gaps Ferrite Core
Motor.....	2 Speed Electrical Governor Controlled DC Type
Take Up Torque.....	70 - 120gcm
Level Meter.....	Back Lighting Two Meters
Indicators.....	Record Peak, Dolby* NR, Record Ready
Memory Tape Counter.....	Resettable Three Figure Digital Type
Dimensions.....	17-3/10(W) x 6-1/2(H) x 10(D) Inch
Weight.....	7.2kg (15.8 lbs)

\* Noise reduction circuit made under licence from Dolby Laboratories. The word "Dolby" and the Double-D symbol are trade marks of Dolby Laboratories.

# General Information



**CAUTION** – Before attempting repairs or maintenance, make certain the unit is disconnected from the power supply to prevent electric shock.

## MAINTENANCE

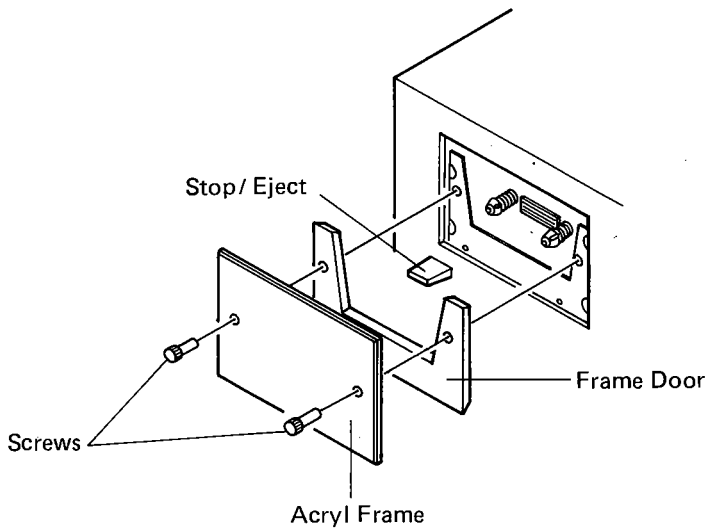
Routine maintenance, such as cleaning the heads, capstan shaft and pinch roller and demagnetization of the heads are required in order to maintain specifications.

Many problems, such as poor “Wow and Flutter” performance, low output level and degraded high frequency response, are traceable to residue build-up. It is important to assure that all the elements which come into contact with the tape are clean and free of foreign matter. It is suggested that the heads, capstan shaft and pinch roller be cleaned with a cotton swab moistened (do not saturate) in methyl alcohol every 20 hours of use:

**CAUTION** – Use only methyl alcohol, as other solvents may cause damage. Do not use any sharp or metallic objects as the head gaps are fragile and can be easily damaged.

## REMOVING CASSETTE DOOR COVER

Close the cassette door and remove the two thumb screws which hold the door cover in place. The cover will come off, allowing access to the heads, pinch roller and capstan shaft. (See Diagram Below)



## DEMAGNETIZING

Magnetic build-up on the heads and capstan will increase the noise level and decrease high frequency response. It is necessary to demagnetize the heads and all other metallic parts that are in close proximity to the tape every 20 hours. Any good quality demagnetizer can be used and the manufacturers' directions should be followed.

## Test Equipment Required

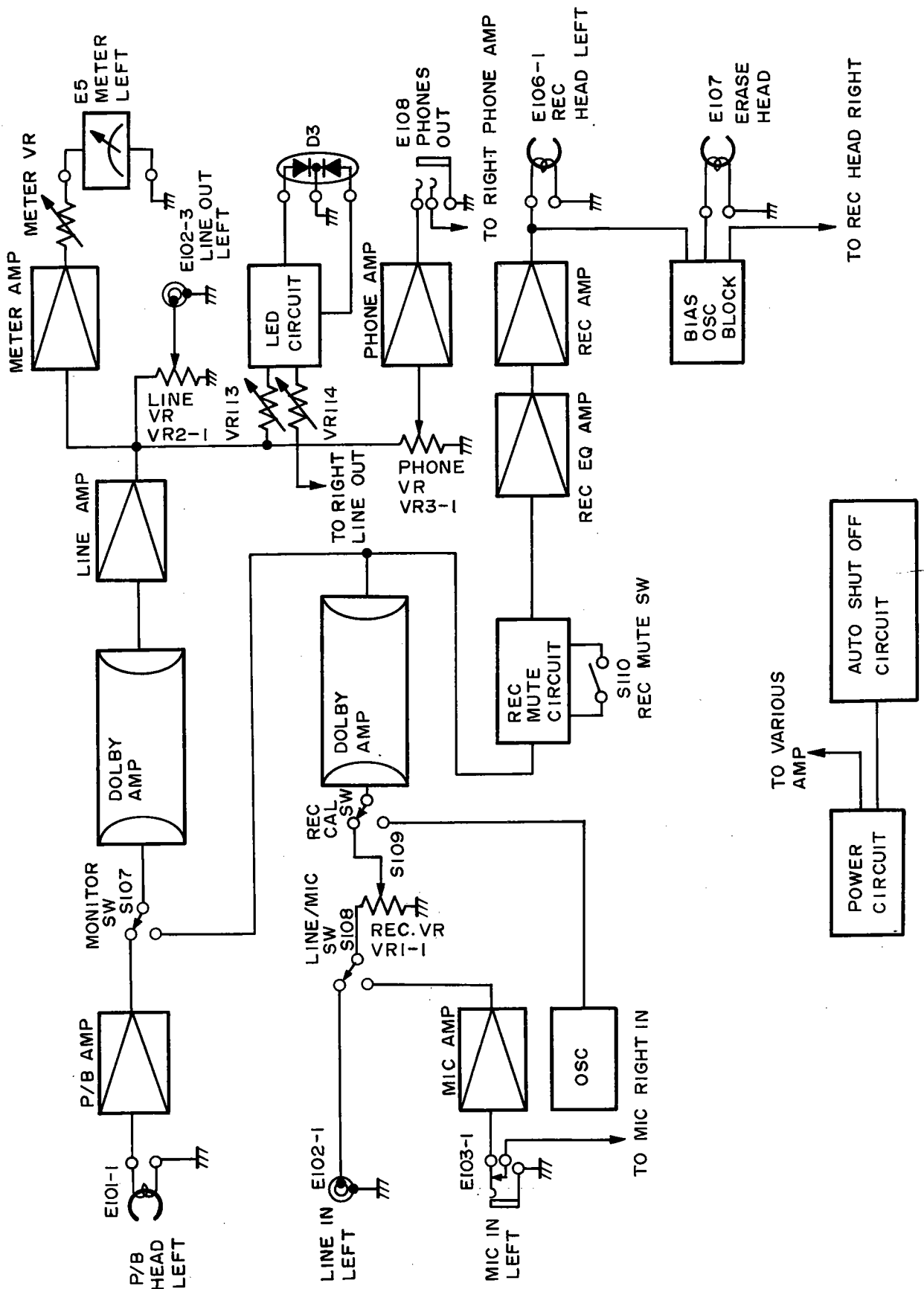
To properly test, adjust and repair B.I.C Two Speed Cassette Decks the equipment listed below is needed.

- (1) AC Volt Meter calibrated in dB.
- (2) Oscilloscope – DC 5 MHz with X - Y display and dual trace.
- (3) Wow/Flutter Meter with Drift Meter.
- (4) VOM
- (5) Frequency Counter – 1 MHz band width.
- (6) Distortion Analyzer.
- (7) Tension Gauge.
- (8) Feeler Gauge.

### Test Cassettes

- |   |                           |
|---|---------------------------|
| (1) Torque Cassette   |                           |
| (2) 333 Hz Reference Tape 200nw/m. . . . .                  | MTT112                    |
| (3) 3 kHz Wow/Flutter Tape . . . . .                        | MTT111 (-10 dB, 3 kHz)    |
| (4) 10 kHz Azimuth Tape . . . . .                           | MTT119 (-10 dB, 10 kHz)   |
| (5) Test Cassette (120 $\mu$ s) Frequency Response. . . . . | (AD) TDK AC221            |
| (6) Test Cassette (70 $\mu$ s) Frequency Response . . . . . | (SA) TDK AC511            |
| (7) Track Crosstalk. . . . .                                | MTT 121 (-10 dB, 1 kHz)   |
| (8) Dólbey Level Tape . . . . .                             | MTT150 or VTT 666         |
| (9) 120 $\mu$ s EQ Alignment . . . . .                      | MTT217G (12.5K/1K/40 Hz)  |
| (10) 70 $\mu$ s EQ Alignment . . . . .                      | MTT 317G (12.5K/1K/40 Hz) |

# Block Diagram



# Disassembly Instructions

## 1. Removal of Wood Cabinet

- (1) Remove four screws from both side of the wood cabinet as shown in Figures 1 and 2.
- (2) Lift up the wood cabinet in the direction of the arrow as shown in Figure 2.

Wood Cabinet Screws

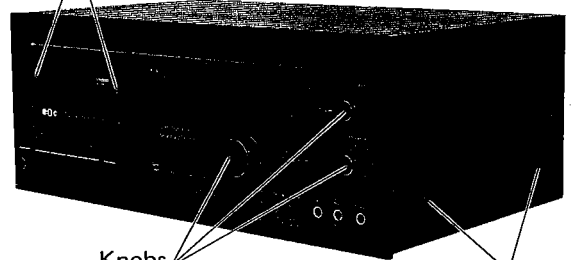


Figure 1

## 2. Removal of Front Panel

- (1) After removing the wood cabinet, pull out three knobs from the front of the unit as shown in Figure 2. (The large knob is a dual knob.)
- (2) Remove six screws from the top and bottom of the unit as shown in Figures 3 and 4.
- (3) Remove two special screws holding the Cassette Door as shown in Figure 2, and then remove the door.
- (4) Front Panel can be removed from the main chassis in arrow direction as shown in Figure 3.

Special Screws Holding  
Cassette Door



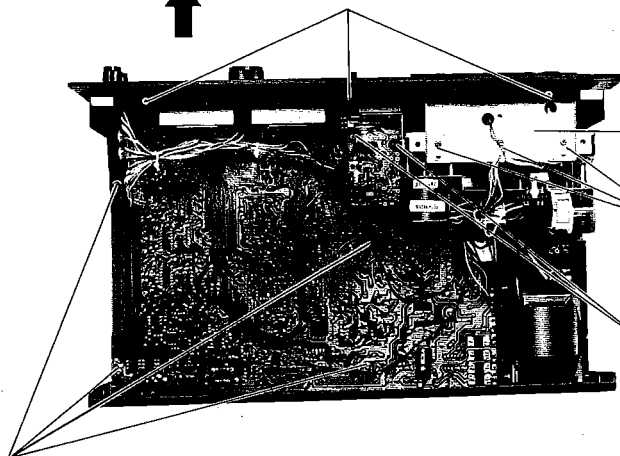
Knobs

Wood Cabinet Screws

Figure 2



Front Panel Screws



Deck Support

Cassette Deck Screws

Auto Stop P.C.B. Screws

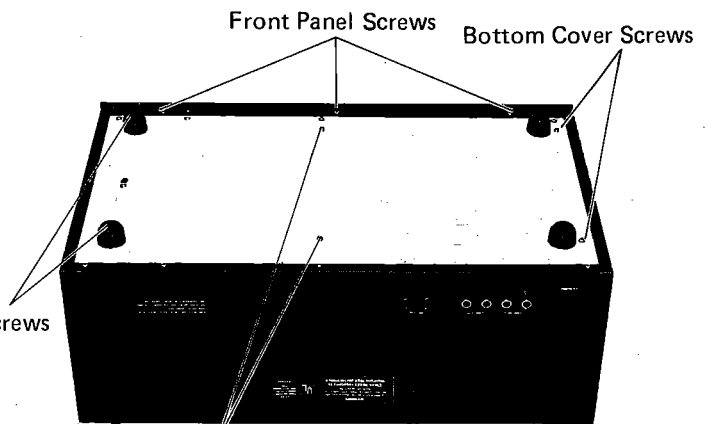
Master P.C.B. Screws

Figure 3

## 3. Removal of Bottom Cover

- (1) Remove six screws as shown in Figure 4.

Bottom Cover Screws



Front Panel Screws

Bottom Cover Screws

Bottom Cover Screws

Figure 4

#### 4. Removal of Master Board P.C.B.

- (1) Remove two screws from the front chassis and two rivets from the rear cover as shown in Figures 5 and 6.
- (2) Remove four screws on the solder side of Master P.C.B. as shown in Figure 3.
- (3) Disconnect all wires from the P.C.B..
- (4) The P.C.B. can be completely removed from the chassis.

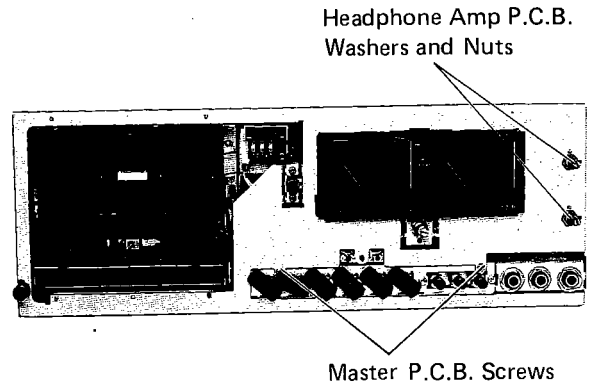


Figure 5

#### 5. Removal of Auto Stop P.C.B.

- (1) Remove two screws as shown in Figure 6.
- (2) Disconnect all wires from the P.C.B..

#### 6. Removal of Headphone Amp P.C.B.

- (1) Remove two nuts and two washers from the front chassis as shown in Figure 5.
- (2) Disconnect all wires from the P.C.B..

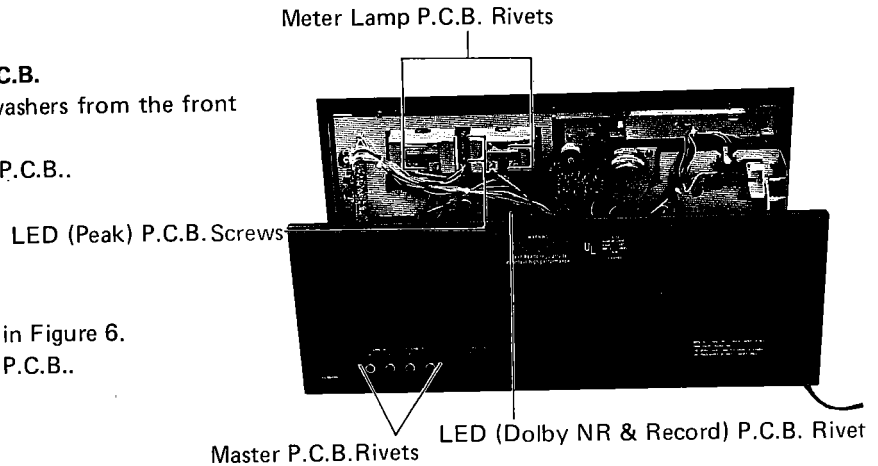


Figure 6

#### 7. Removal of LED (Peak) P.C.B.

- (1) Remove two screws as shown in Figure 6.
- (2) Disconnect all wires from the P.C.B..

#### 8. Removal of LED (Dolby NR & Record) P.C.B.

- (1) Remove one rivet from the P.C.B. as shown in Figure 6.
- (2) Disconnect all wires from the P.C.B..

#### 9. Removal of Meter Lamp P.C.B.

- (1) Remove four rivets from the P.C.B. as shown in Figure 6.
- (2) Disconnect all wires from P.C.B..

#### 10. Removal of Switch P.C.B.

- (1) Remove two screws as shown in Figure 7.
- (2) Detach the switch lever from the switch spacer as shown in Figure 7.
- (3) Disconnect all wires from the P.C.B..

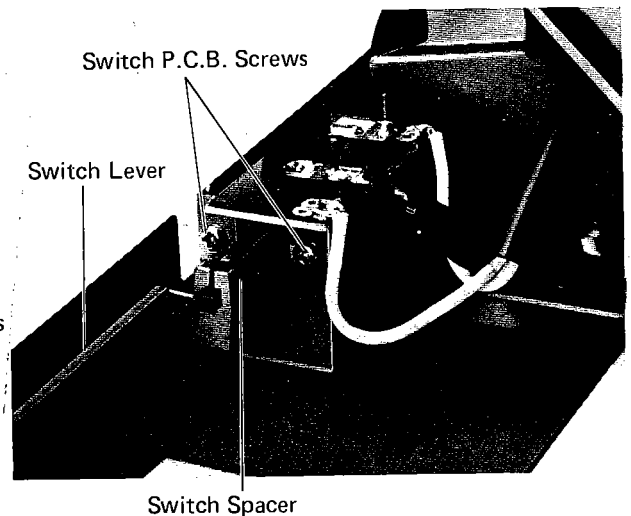


Figure 7



### 11. Removal of Cassette Deck

- (1) After removal of Bottom Cover, remove seven screws from each Deck Support as shown in Figure 3 and 8.
- (2) Disconnect all wires from the cassette deck.
- (3) The cassette deck can be completely removed from the chassis.

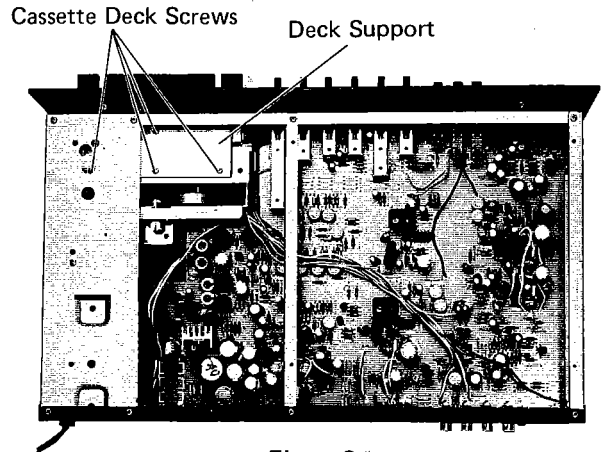


Figure 8

### 12. Removal of Main Belt and Sub Belt

- (1) Remove four screws from the sub chassis as shown in Figure 9.
- (2) Remove "C" washer from the door lever as shown in Figure 10.
- (3) The sub chassis can be completely removed from the cassette deck chassis, and then remove the Sub Belt or the Main Belt.

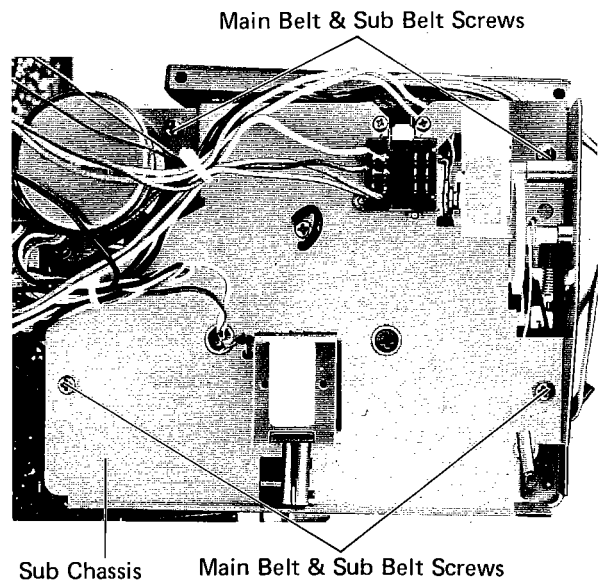


Figure 9

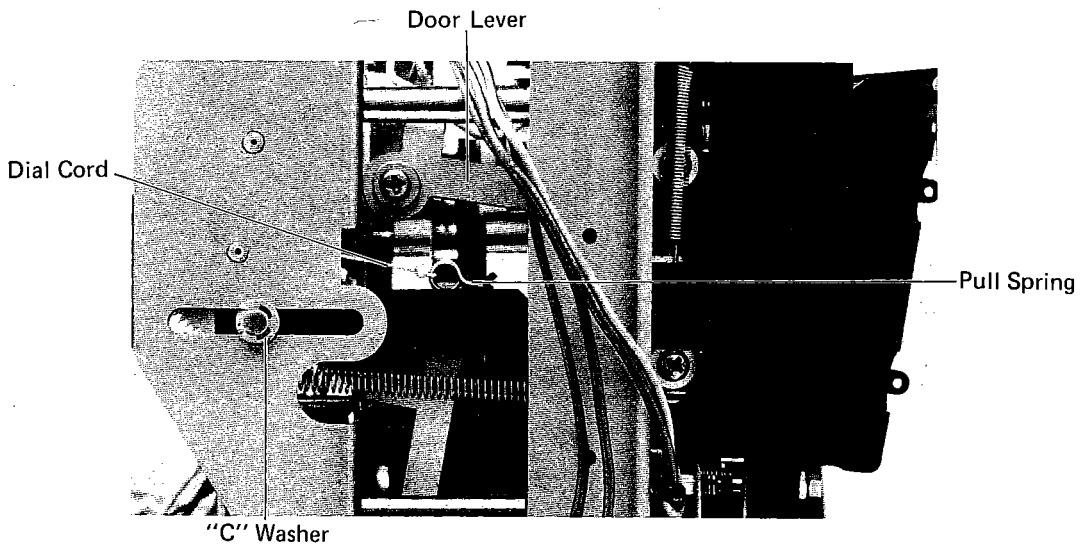


Figure 10

### 13. Removal of Counter Belt

- (1) Remove a "C" washer from the door lever and then remove the door lever and the door frame as shown in Figure 11.
- (2) Remove four screws from the dust cover as shown in Figure 11.
- (3) After removal of the dust cover remove the Counter Belt.
- (4) For above procedures, make sure not to touch and close magnetic tools to tape heads.

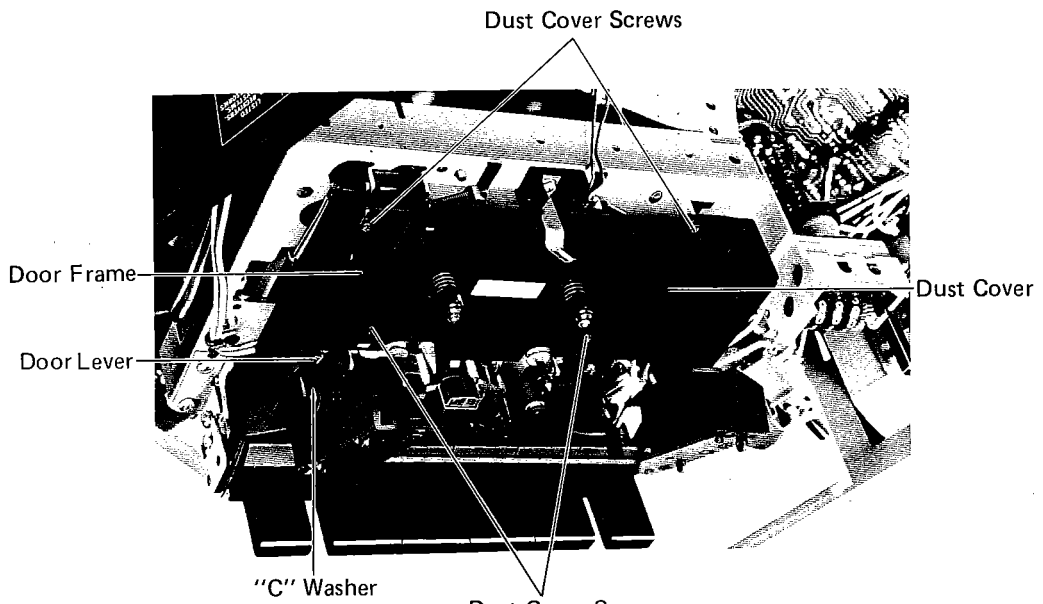


Figure 11

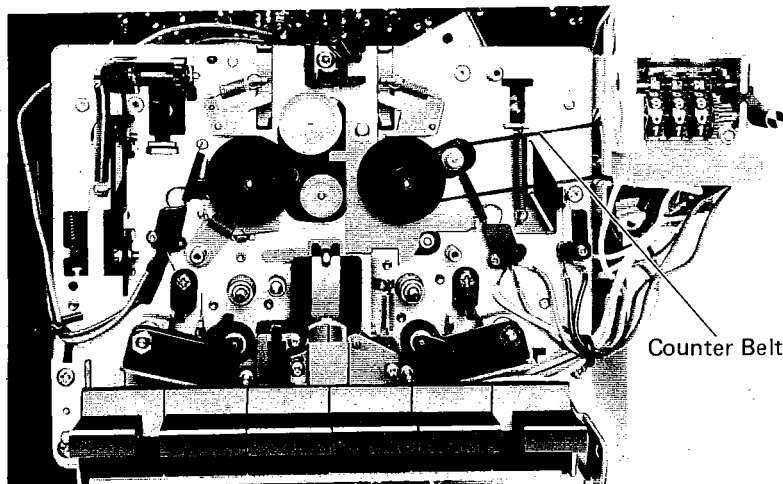
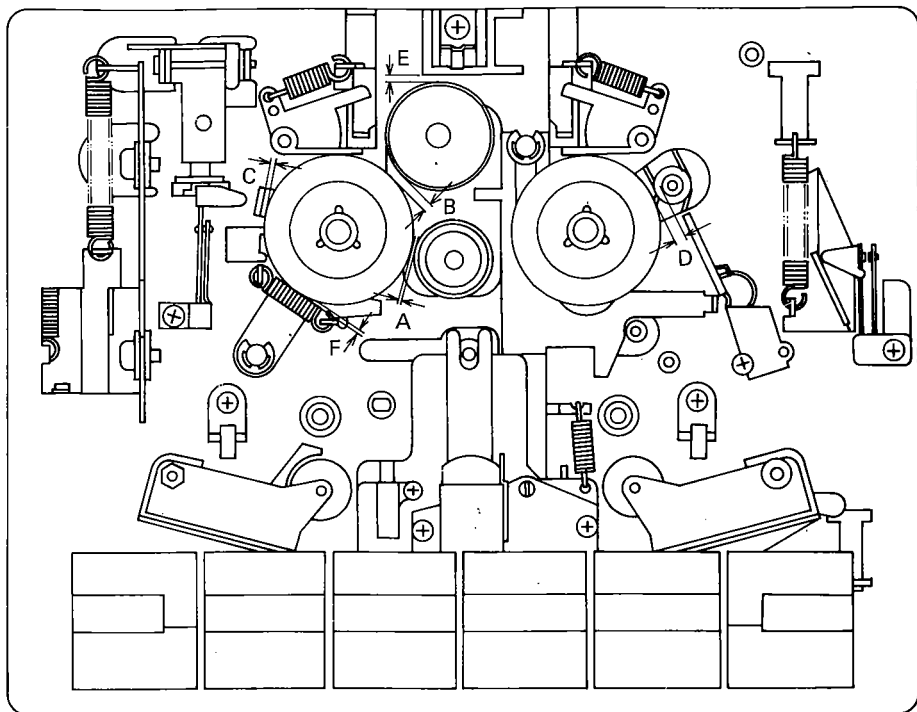


Figure 12

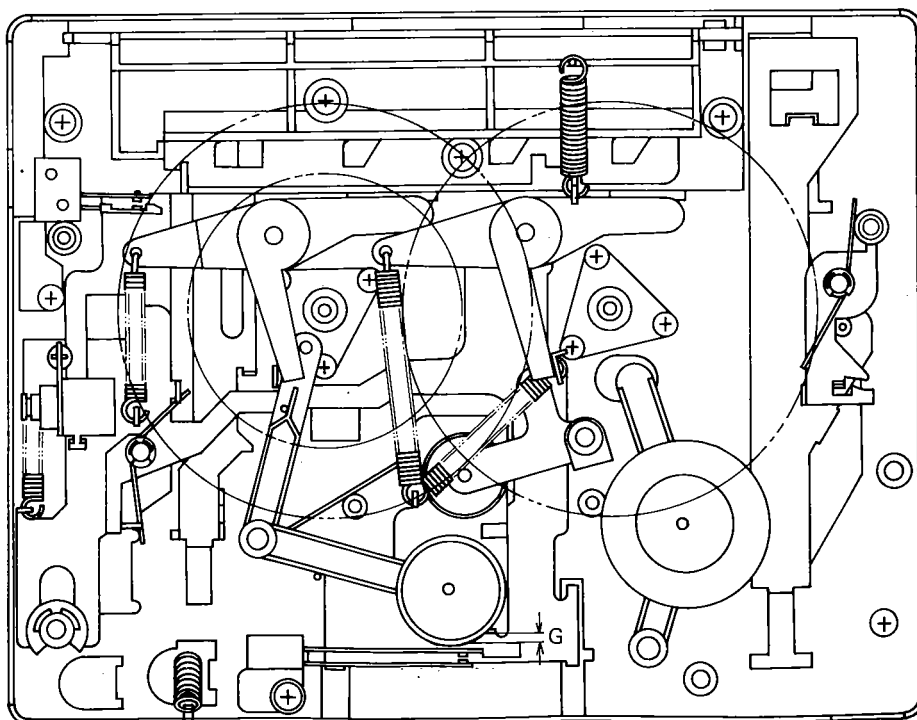
# Mechanical Adjustment

- Adjustment in Normal Mode



STOP EJECT      REC      REW      PLAY      FF      PAUSE

Figure 14

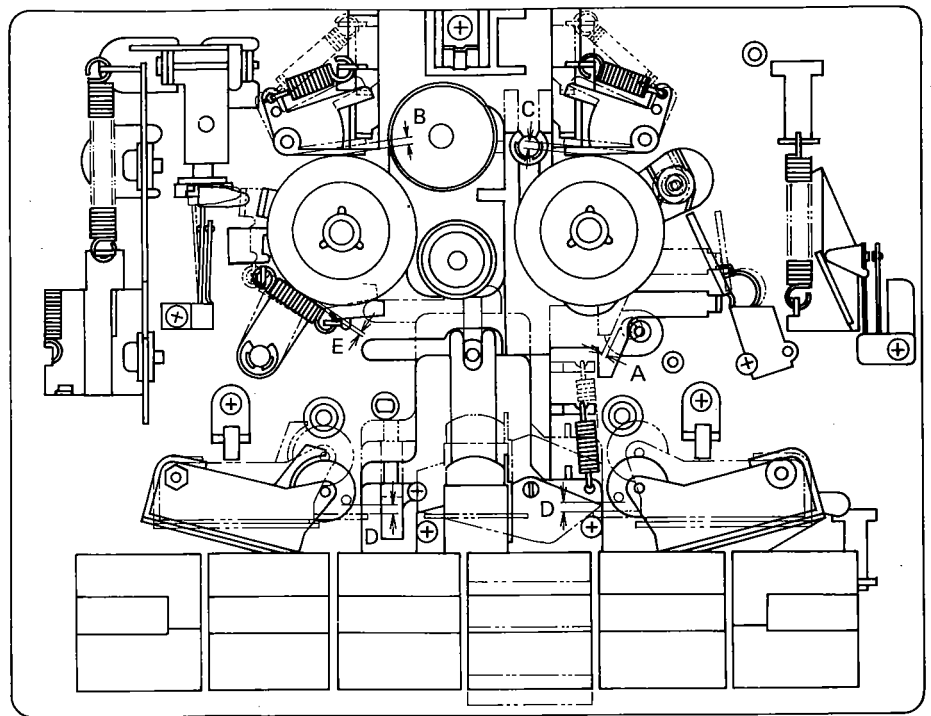


## Specified clearance:

- A = More than 1 mm
- B = More than 2 mm
- C = More than 0.5 mm
- D = More than 1 mm
- E = More than 0.5 mm
- F = More than 1 mm
- G = More than 0.1 mm

Figure 15

• Adjustment in Play Mode



STOP  
EJECT

REC

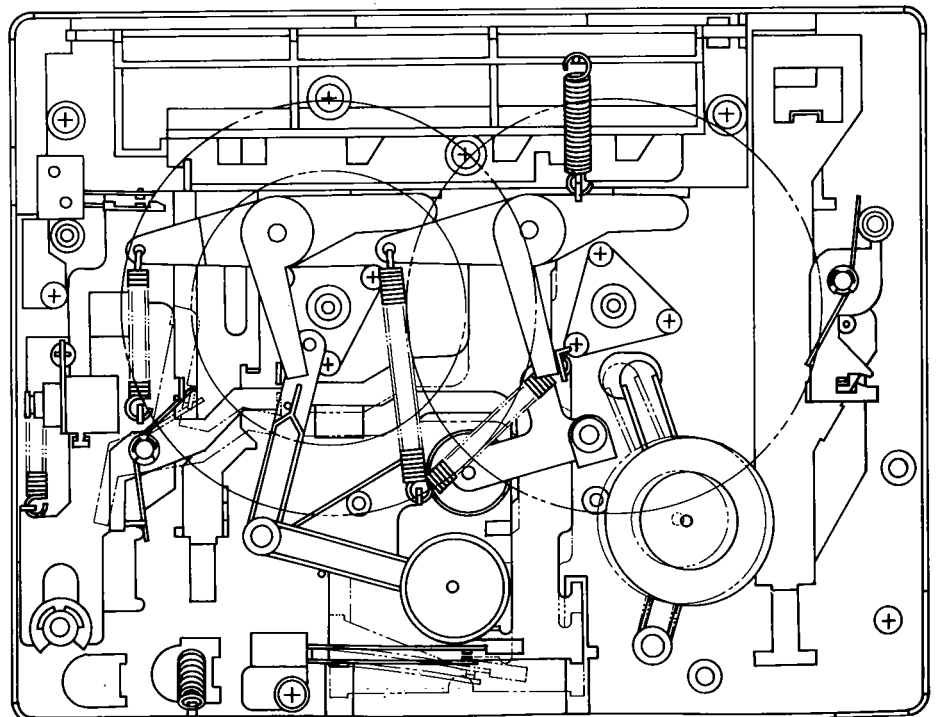
REW

PLAY

FF

PAUSE

Figure 16



**Specified clearance:**

A = More than 0.5 mm

B = More than 1 mm

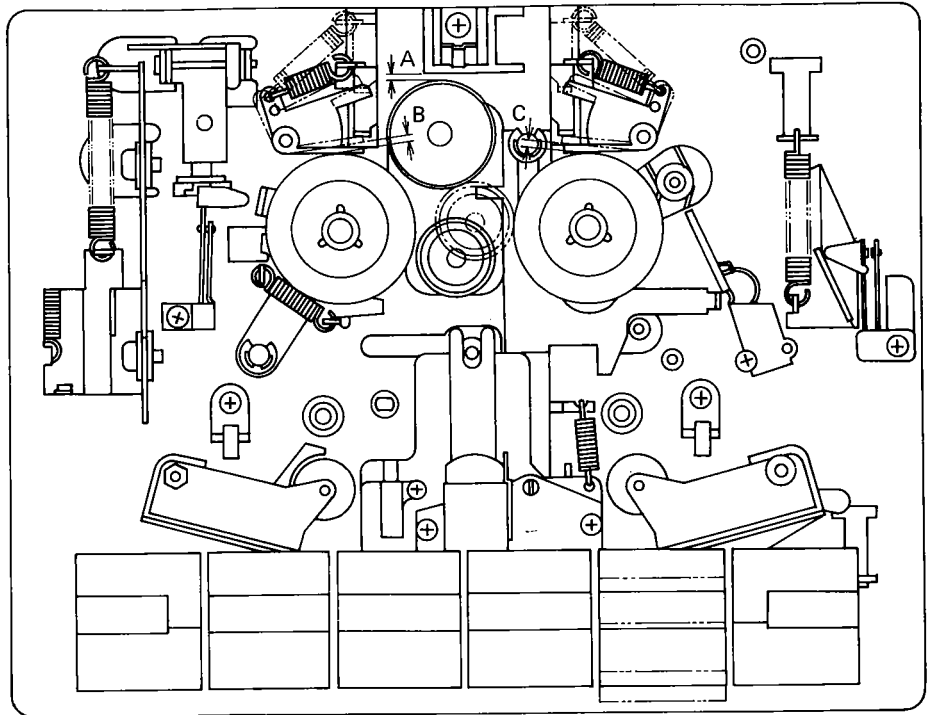
C = More than 1 mm

D = More than 0.2 mm

E = More than 1 mm

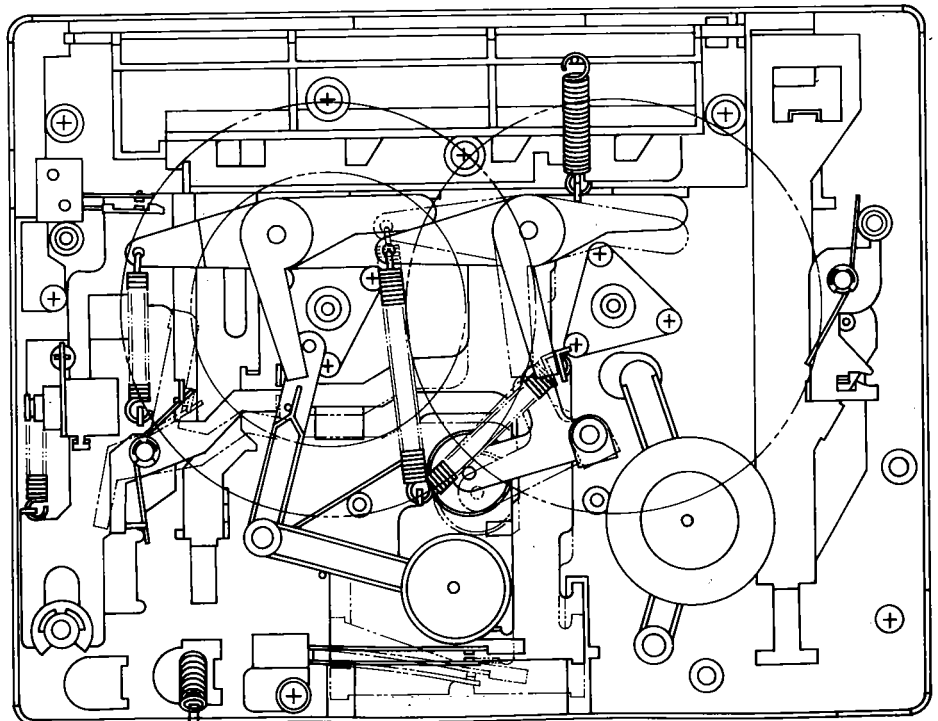
Figure 17

• Adjustment in Fast Forward Mode



STOP EJECT      REC      REW      PLAY      FF      PAUSE

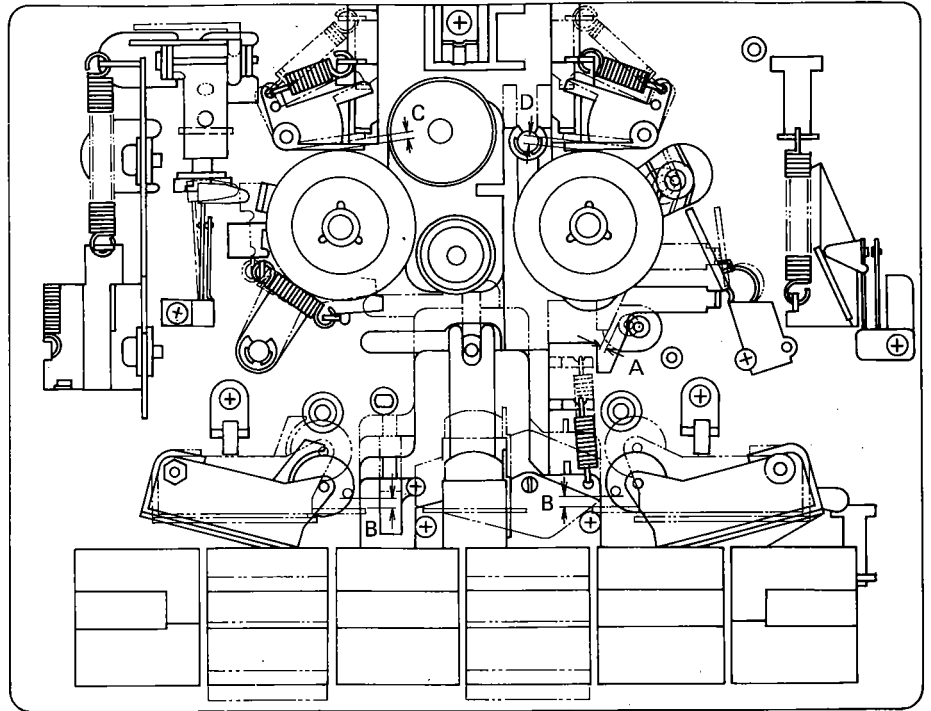
Figure 18



**Specified clearance:**  
 A = More than 0.5 mm  
 B = More than 1 mm  
 C = More than 1 mm

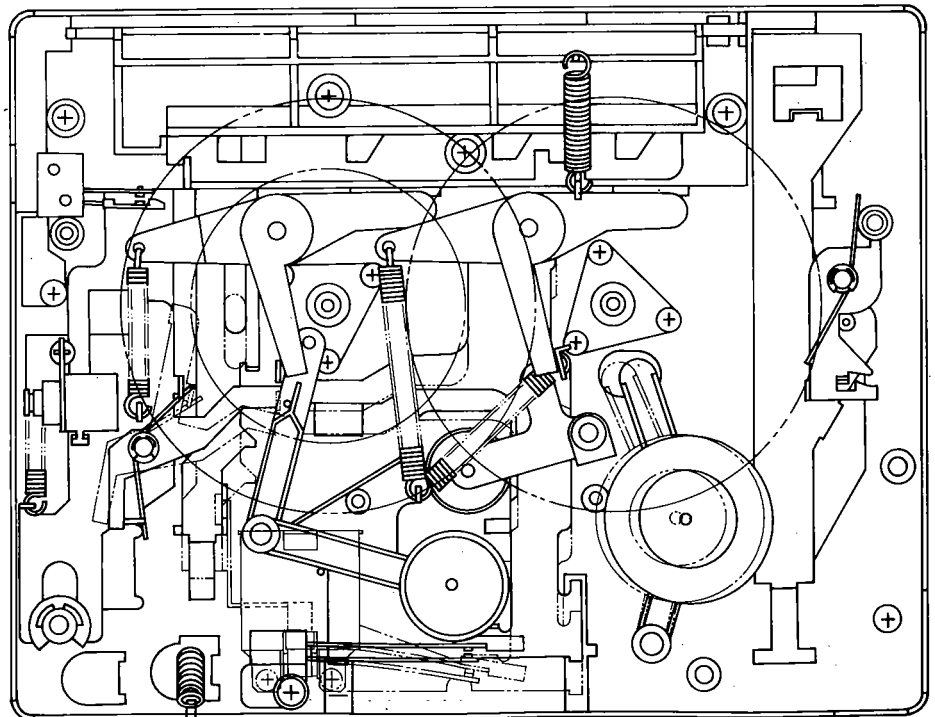
Figure 19

• Adjustment in Record Mode



↓
↓  
 STOP REC REW PLAY FF PAUSE  
 EJECT

Figure 20

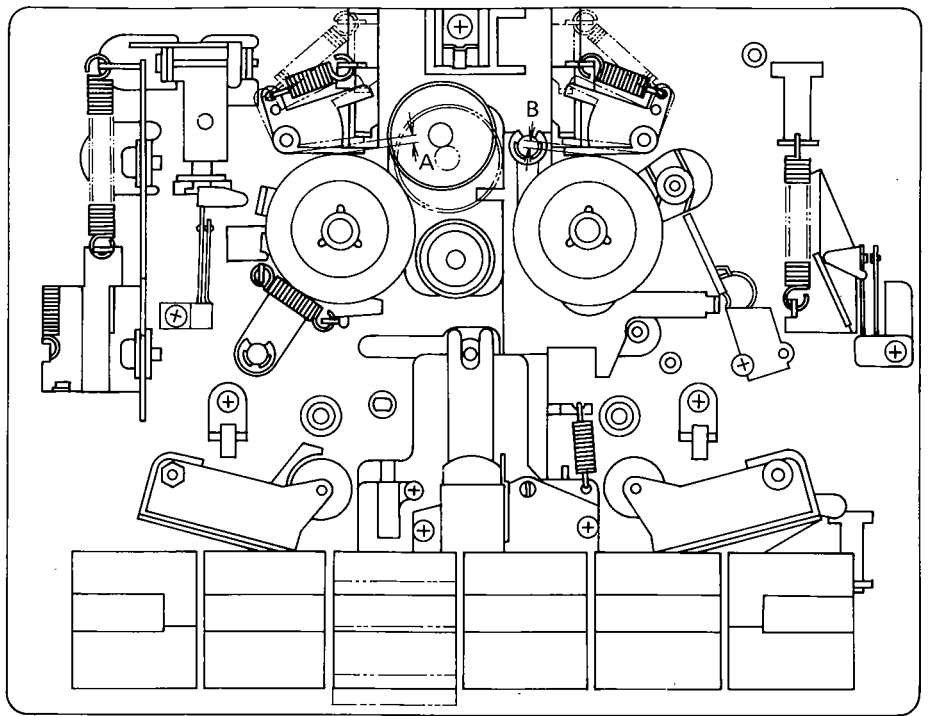


**Specified clearance:**

- A = More than 0.4 mm
- B = More than 0.2 mm
- C = More than 1 mm
- D = More than 1 mm

Figure 21

• Adjustment in Rewind Mode



STOP  
EJECT

REC

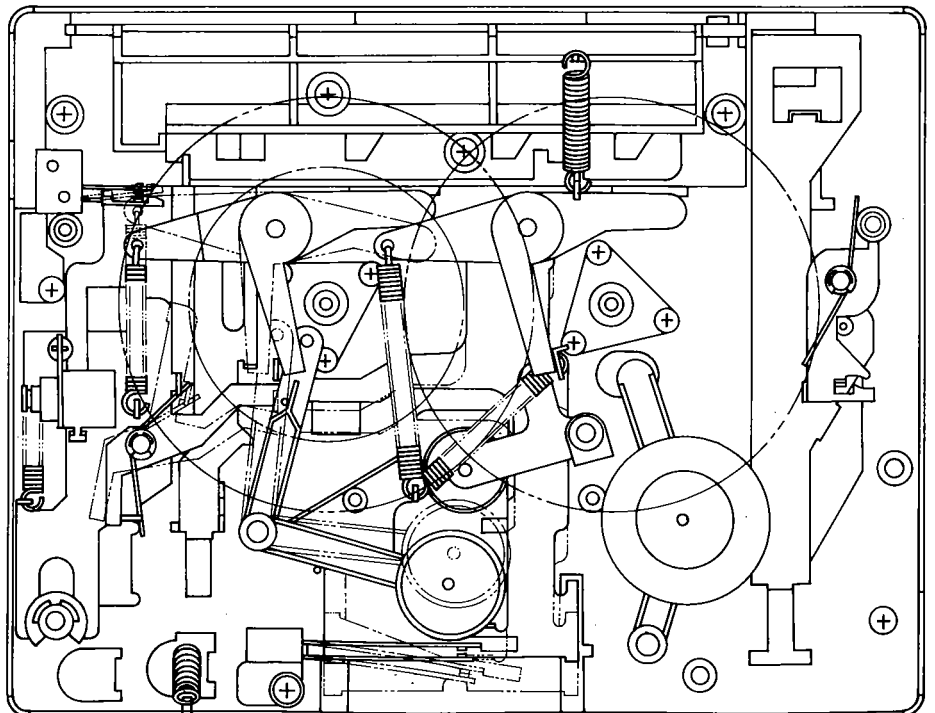
REW

PLAY

FF

PAUSE

Figure 22



**Specified clearance:**

A = More than 1 mm

B = More than 1 mm

Figure 23

● Adjustment in Pause Mode

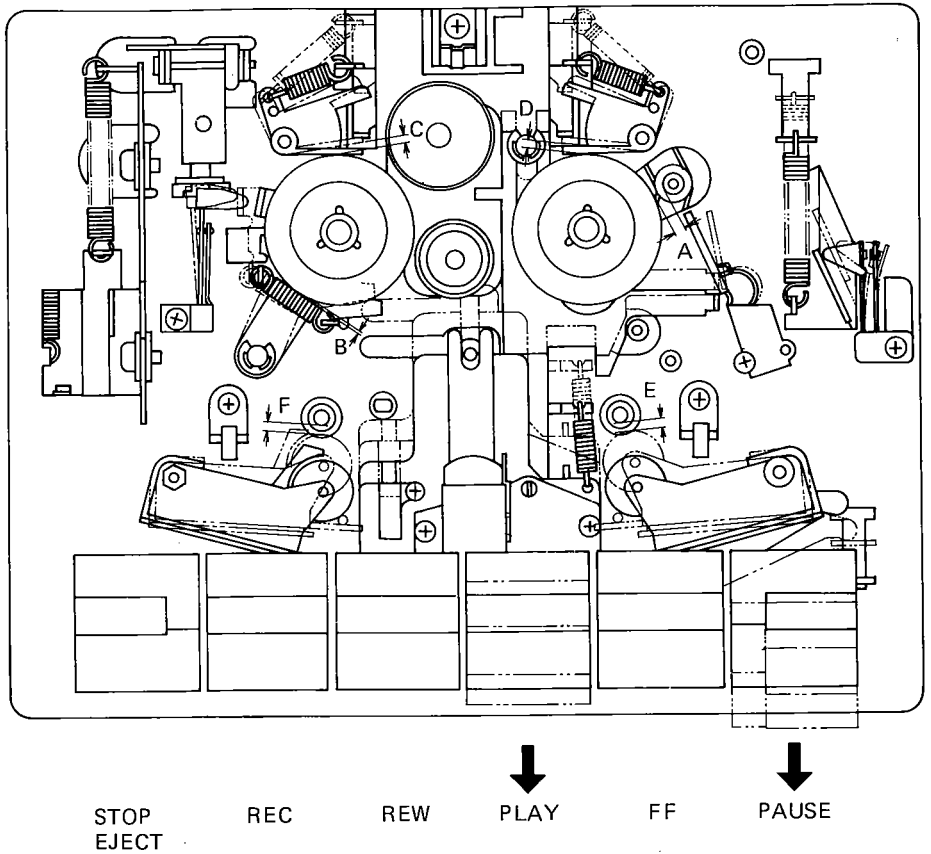


Figure 24

- A = More than 0.5 mm
- B = More than 1 mm
- C = More than 1 mm
- D = More than 1 mm
- E = More than 1 mm
- F = More than 1 mm

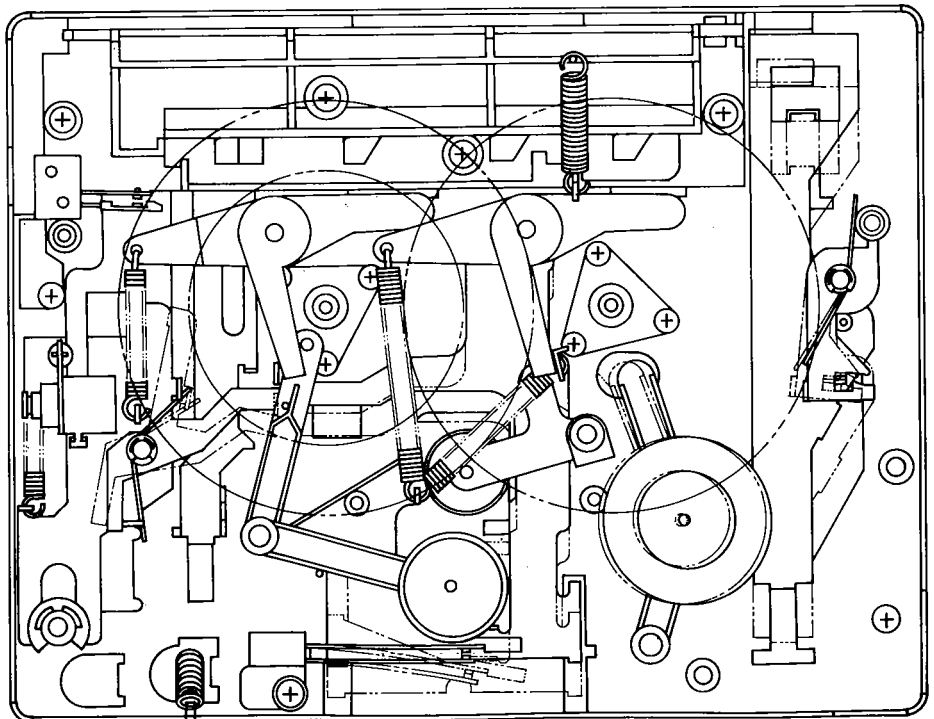


Figure 25



# Alignment Procedure

## MECHANICAL ADJUSTMENT

1. **Flywheel End Play** — Insert a 0.05–0.3mm feeler gauge between the thrust screw and the flywheel bearing point. Turn the screw to achieve the proper clearance.
  2. **Pinch Roller Pressure** — Use a tension gauge to check the pressure at the centerline of the roller shaft. The pressure should be between 270–330 grams. If the pressure is not within this range, change the pinch roller spring.
  3. **Take-up Torque** — Insert a torque cassette (listed under test equipment) and activate play mode. The reading on the take-up reel should be between 30–60 g-cm. If it is not, change the hub assembly.
  4. **Capstan Speed** — Insert a 3 kHz Wow/Flutter test tape. Set tape speed to 1-7/8 ips (4.75cm) and activate play mode. Connect frequency counter to the output terminal and adjust speed (Pot # VR) for 3 kHz on the counter.
  5. **Playback Azimuth** — Connect dual trace oscilloscope to the right and left channel outputs and adjust scope for "X-Y" display\*. Insert wide band noise tape and activate play mode. Adjust Azimuth screw for in phase display.
- \*If oscilloscope does not have X-Y display, connect as above but adjust for normal vertical deflection. Use a 15 kHz Azimuth tape and adjust Azimuth screw for maximum output of both signals shown on display.

## Alignment Procedures

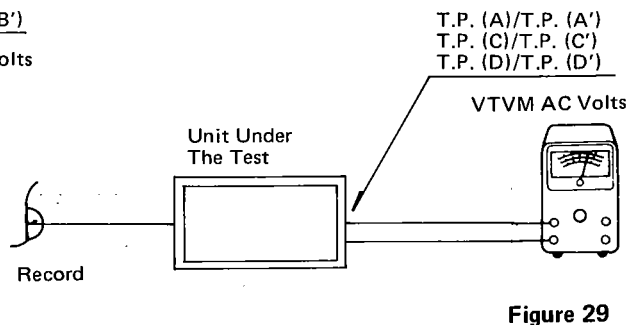
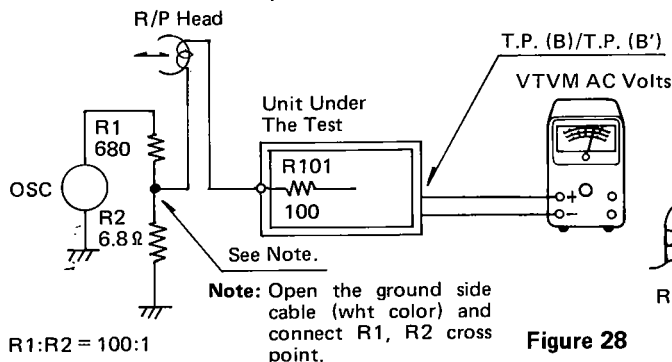
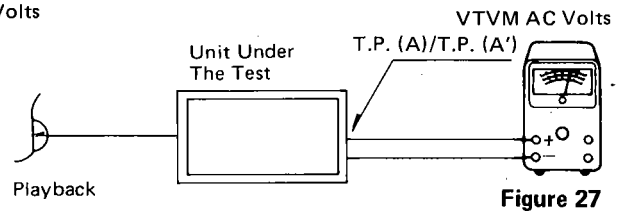
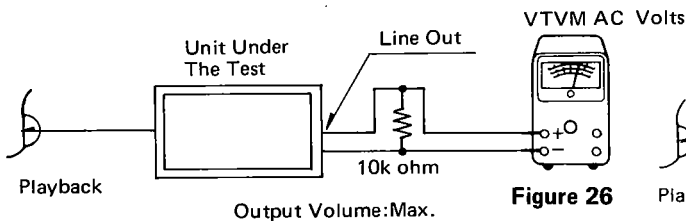
\*Switches not designated are all "Off" position.

STEP	DESCRIPTION	MODE	ADJUST POINTS	TEST POINTS	CONNECTION INSTRUCTION	REMARKS	
1	Playback Gain Adjustment	Playback Monitor:Tape Rec. Sw.:Ready Eq.:120μs Speed:1-7/8	VR103 VR104	Line Out	Figure 26	Test Tape:MTT-150 Test Point Output: 1.4V (Meter Reading: <input type="checkbox"/> <input type="checkbox"/> mark)	
2	Level Meter Gain Adjustment	Playback Monitor:Tape Rec. Sw.:Ready Eq.:120μs Speed:1-7/8	VR111 VR112	T.P. (A) T.P. (A')	Figure 27	Test Tape:MTT-150 Test Point Output: 1.35V	
3	Level Meter Calibration	Playback Monitor:Tape Rec.Sw.:Ready Eq.:120u s Speed:1-7/8	VR123 VR124	Line Out	Figure 26	Test Tape:MTT-150 Test Point Output:2.0V	
4	Playback EQ Adjustment	Playback Monitor:Tape Rec.Sw.:Ready Eq.:70μs Speed:1-7/8	VR101 VR102	T.P. (B) T.P. (B')	Figure 28	OCS Test Signal Reference Signal:200 Hz 200mV Adjustment signal:15 kHz 200mV Set adjustment signal level -26dB from reference signal level. See chart below.	
		Checking	Speed	EQ			
		Tabel	3-3/4	70			15 kHz/200 Hz -26 dB
		Typical Date	3-3/4	120			15 kHz/200 Hz -17 dB
			1-7/8	70			15 kHz/200 Hz -14 dB
	1-7/8	120			15 kHz/200 Hz -9 dB		

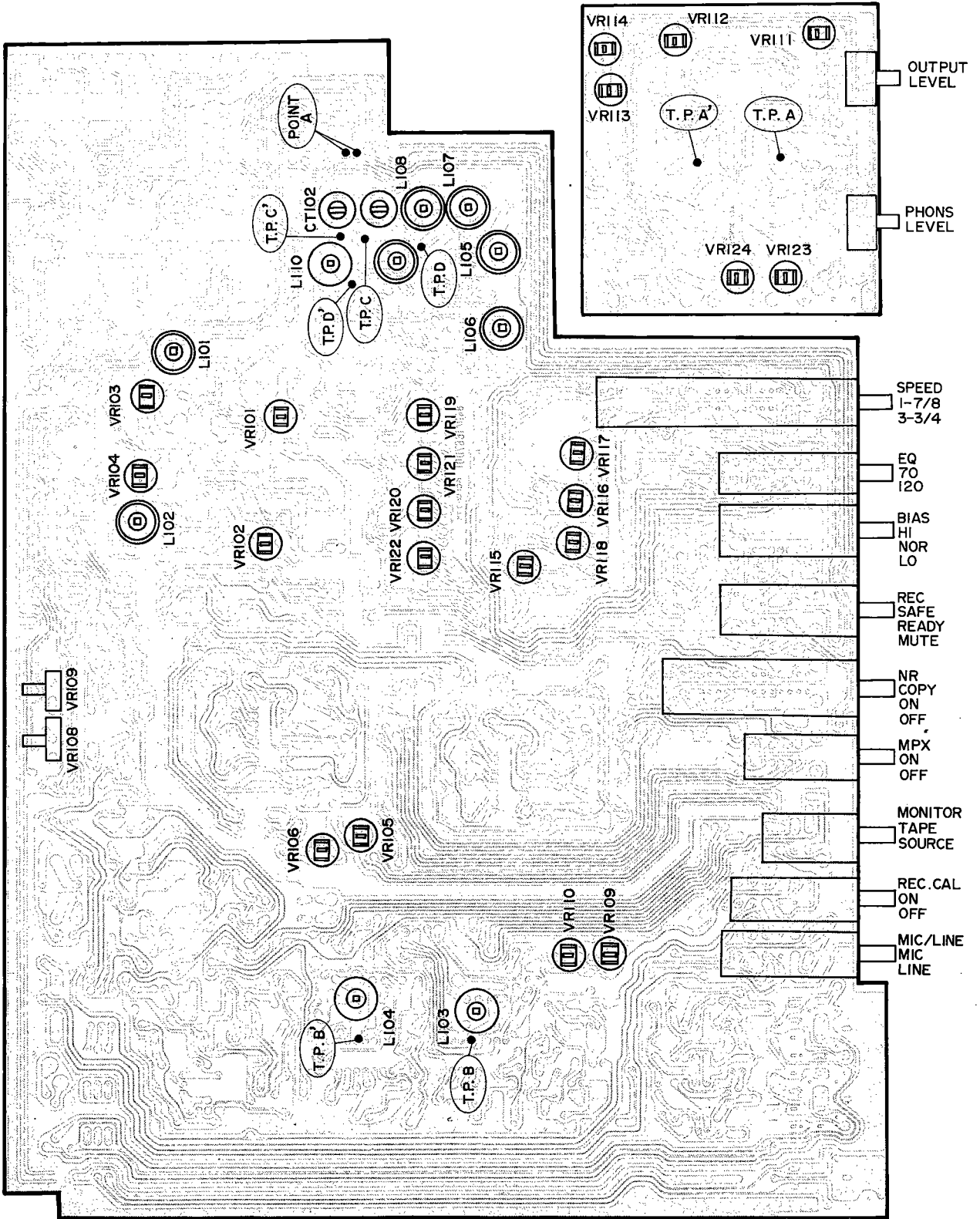
STEP	DESCRIPTION	MODE	ADJUST POINTS	TEST POINTS	CONNECTION INSTRUCTION	REMARKS
5	Test Tone Input Adjustment (DEC)	Rec. Cal.:On Monitor:Source NR:On Rec. Sw.:Ready Eq.:70 $\mu$ s Speed:1-7/8	VR105 VR106			Adjust Level Meter reading level.
	Test Tone Input Adjustment (ENC)	Rec. Cal.:On Monitor:Tape NR:On Rec. Sw.:Ready Bias:Hi Eq.:70 $\mu$ s Speed:1-7/8	VR109 VR110			Adjust Level Meter reading Level.
6	Input Adjustment	Record Mic/Line:Line Monitor:Source Rec. Sw.:Safe Bias:Normal Eq.:120 $\mu$ s Speed:1-7/8	VR1-1 VR1-2			Test Signal Line Input: 1 kHz, 250mV Adjust Rec. Volume to 2.0V. Then lever meter indicates DC level.
	6-A Rec. Signal Current Adjustment	Record Monitor:Source Rec. Sw.:Ready Bias:Off (see remarks) Eq.:120 $\mu$ s Speed:1-7/8	VR107 VR108	T.P. (C) T.P. (C')	Figure 29	Bias:OFF Remove dipping solder on Point (A). Adjust level to 6mV.
	Peaking Frequency Adjustment	Record Monitor:Source Rec. Sw.:Ready Bias:Off Eq.:120 $\mu$ s Speed:1-7/8	L105 L106	T.P. (C) T.P. (C')	Figure 29	Test Signal Line Input: 23 kHz, 25mV Adjust level to maximum.
	6-B EQ Curve Setting	Record Mic/Line:Line Monitor:Source Bias:Off Rec. Sw.:Ready Eq.:120 $\mu$ s Speed:1-7/8		T.P. (C) T.P. (C')	Figure 29	Test Signal Line Input Reference Signal:1 kHz 25mV Adjustment Signal:15 kHz 25mV Set adjustment signal level +9.5 dB from reference signal level. See chart below.
	Checking Table	Speed EQ				
	(Typical Data)	3-3/4 70				15 kHz/1 kHz +14 dB
		3-3/4 120				15 kHz/1 kHz +7 dB
	1-7/8 70				15 kHz/1 kHz +14 dB	
	1-7/8 120				15 kHz/1 kHz +10.5 dB	
7	Parallel Trap CCT Adjustment.	Record Monitor:Source Rec. Sw.:Ready Eq.:70 $\mu$ s Speed:3-3/4	L109 L108	T.P. (C) T.P. (C')	Figure 29	Adjust to maximum.

STEP	DESCRIPTION	MODE	ADJUST POINTS	TEST POINTS	CONNECTION INSTRUCTION	REMARKS																	
	Series Trap CCT Adjustment	Record Monitor:Source Rec. Sw.:Ready Eq.:70 $\mu$ s Speed:3-3/4	L107 L108	T.P. (D) T.P. (D')	Figure 29	Adjust to Minimum.																	
8	Bias Adjustment	Record Monitor:Source Rec. Sw.:Ready Eq.:70 $\mu$ s Speed:1-7/8	CT101 CT102	T.P. (C) T.P. (C')	Figure 29	Adjust to 55 mV. See chart below for another typical bias level. <table border="1"> <thead> <tr> <th>Speed</th> <th>Bias</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1-7/8</td> <td>High</td> <td>55mV</td> </tr> <tr> <td>Norm</td> <td>45mV</td> </tr> <tr> <td>Low</td> <td>36mV</td> </tr> <tr> <td rowspan="3">3-3/4</td> <td>High</td> <td>62.5mV</td> </tr> <tr> <td>Norm</td> <td>51mV</td> </tr> <tr> <td>Low</td> <td>40mV</td> </tr> </tbody> </table>	Speed	Bias	Level	1-7/8	High	55mV	Norm	45mV	Low	36mV	3-3/4	High	62.5mV	Norm	51mV	Low	40mV
Speed	Bias	Level																					
1-7/8	High	55mV																					
	Norm	45mV																					
	Low	36mV																					
3-3/4	High	62.5mV																					
	Norm	51mV																					
	Low	40mV																					
9	Rec. Signal Current Re-adjustment	Rec/Play Mic/Line:Line Monitor:Source EQ:70 $\mu$ s Speed:1-7/8	VR107 VR108	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Volume to 2.0V. Rec/Play Level: <ul style="list-style-type: none"> <li>● 2V → OK</li> <li>● &lt; 2V    Increase bias current. (See 6-A)</li> <li>● &gt; 2V    Decrease bias current. (See 6-A)</li> </ul>																	
10	Playback EQ Readjustment	Playback Monitor:Tape Rec. Sw.:Ready Eq.:70 $\mu$ s Speed:3-3/4	VR101 VR102	Line Out	Figure 26	Test Tape:MTT-317G Adjust output level -8 dB from reference level (0 dBm).																	
11	Bias Readjustment	Rec/Play Mic/Line:Line Monitor:Source Rec.:Sw.:Ready EQ.:70 $\mu$ S Speed:1-7/8	CT101 CT102	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Rec. Volume for level meter reading "OVU". Test Signal Line Input: -30 dB from 300mV. Rec/Play level (15 kHz/1 kHz). <ul style="list-style-type: none"> <li>● 15kHz = 1 kHz → OK</li> <li>● 15 kHz &gt; 1 kHz Decrease bias current.(See step 8)</li> <li>● 15 kHz &lt; 1 kHz Increase bias current. (See step 8)</li> </ul> Repeat step 11 above																	
12	Rec. EQ Re-Adjustment (12-A)	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:120 $\mu$ s Speed:1-7/8	VR115 VR119	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Rec Volume for level meter reading "OVU". Test Signal Line Input: -30 dB from 300mV Rec/Play Level (18 kHz/1 kHz). <ul style="list-style-type: none"> <li>● 18 kHz = 1 kHz → OK.</li> <li>● 18 kHz &gt; 1 kHz More than +10.5 dB(See step 6-B)</li> <li>● 18 kHz &lt; 1 kHz Less than +10.5 dB (See step 6-B)</li> </ul> Repeat step 12-A.																	

STEP	DESCRIPTION	MODE	ADJUST POINTS	TEST POINT	CONNECTION INSTRUCTION	REMARKS
(12-B)	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:70μs Speed:1-7/8	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:70μs Speed:1-7/8	VR116 VR120	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Rec.Volume for level Meter reading "OVU". Test signal Line Input: -30 dB from 300mV Rec/Play level (19 kHz/1 kHz) ●19 kHz = 1 kHz → OK ●19 kHz > 1 kHz More than +14 dB (See step 6-B) ●19 kHz < 1 kHz Less than +14 dB (See step 6-B) Repeat step 12-B.
(12-C)	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:70μs Speed:3-3/4	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:70μs Speed:3-3/4	VR118 VR122	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Rec. Volume for level meter reading "OVU". Test signal Line Input: -20 dB from 300mV Rec/Play level (20 kHz/1 kHz) ●22 kHz = 1 kHz → OK ●22 kHz > 1 kHz More than +14 dB (See step 6-B) ●22 kHz < 1 kHz Less than +14 dB (See step 6-B) Repeat step 12-B.
(12-D)	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:120μs Speed:3-3/4	Rec/Play Mic/Line:Line Monitor:Source Rec. Sw.:Ready Eq.:120μs Speed:3-3/4	VR117 VR121	Line Out	Figure 26	Test Signal Line Input:300mV. Set the Rec. Volume for level meter reading "OVU". Test Signal Line Input: -20 dB from 300mV Rec/Play level (20 kHz/1 kHz). ●22 kHz = 1 kHz → OK ●22 kHz > 1 kHz More than +7 dB (See step 6-B) ●22 kHz < 1 kHz Less than +7 dB (See step 6-B) Repeat step 12-D.



# Adjustment Locations



# Trouble Shooting

Symptom	Possible Cause
No power	<ol style="list-style-type: none"> <li>1. Defective power switch</li> <li>2. Defective DC supply block</li> <li>3. Defective power connections</li> </ol>
No power to motor	<ol style="list-style-type: none"> <li>1. Defective motor</li> <li>2. Defective Servo</li> <li>3. Defective start switch</li> </ol>
Distorted sound	<ol style="list-style-type: none"> <li>1. Record/Play head dirty</li> <li>2. Defective cassette tape</li> <li>3. Record/Play head magnetized</li> <li>4. Record/Play head defective</li> </ol>
High frequency deteriorated	<ol style="list-style-type: none"> <li>1. Playback Azimuth improperly adjusted</li> <li>2. Record/Play head dirty</li> <li>3. Record/Play head magnetized</li> <li>4. Excessive Wow/Flutter</li> <li>5. Incorrect tape travel</li> <li>6. Record/Play head defective</li> <li>7. Cassette tape defective</li> </ol>
Excessive Wow/Flutter	<ol style="list-style-type: none"> <li>1. Flywheel assembly defective</li> <li>2. Motor defective</li> <li>3. Defective Servo</li> <li>4. Drive belt defective</li> <li>5. Pinch roller assembly defective</li> <li>6. Slippage between tape and pinch roller</li> <li>7. Idler pulley defective</li> <li>8. No clearance between flywheel and thrust screw</li> <li>9. Tape counter defective</li> <li>10. Excessive back-tension</li> <li>11. Improper take-up torque</li> <li>12. Defective tape cassette</li> </ol>
Signal to Noise Ratio Deteriorated	<ol style="list-style-type: none"> <li>1. Record/Play head magnetized</li> <li>2. Record/Play head dirty</li> <li>3. Record/Play head defective</li> <li>4. Output amplifier defective</li> <li>5. Cassette tape defective</li> </ol>
Loss of channel separation	<ol style="list-style-type: none"> <li>1. Improper tape travel</li> <li>2. Record/Play head defective</li> </ol>
Level Variations	<ol style="list-style-type: none"> <li>1. Record/Play head dirty</li> <li>2. Record/Play head defective</li> <li>3. Record/Play head misaligned</li> <li>4. Cassette tape defective</li> </ol>
Improper tape travel	<ol style="list-style-type: none"> <li>1. Pinch roller misaligned</li> <li>2. Weak pinch roller pressure</li> <li>3. Capstan defective</li> <li>4. Pinch roller defective</li> <li>5. Record/Play head misadjusted</li> </ol>

Symptom	Possible Cause
Tape speed too fast/slow	<ol style="list-style-type: none"> <li>1. Defective cassette tape</li> <li>2. Defective motor</li> <li>3. Defective servo</li> </ol>
Tape does not move	<ol style="list-style-type: none"> <li>1. Defective cassette tape</li> <li>2. Defective motor</li> <li>3. Defective servo</li> <li>4. Drive belt off</li> <li>5. Reel hub defective</li> <li>6. Pinch roller not contacting capstan</li> <li>7. Defective power connections</li> <li>8. Cassette loaded incorrectly</li> <li>9. Drive belt out of place</li> </ol>
Drive Belt out of place	<ol style="list-style-type: none"> <li>1. Idler pulley misaligned</li> <li>2. Motor misaligned</li> <li>3. Drive belt defective</li> <li>4. Excessive clearance between flywheel and flywheel holder</li> </ol>
Does not record	<ol style="list-style-type: none"> <li>1. Record/Play head defective</li> <li>2. Record/Play head dirty</li> <li>3. Record amp defective</li> <li>4. Defective record interlock switch</li> <li>5. Cassette has safety tabs removed</li> <li>6. Broken head wire</li> <li>7. Bias oscillator defective</li> <li>8. Input jack defective</li> <li>9. Defective mute switch</li> </ol>
Does not playback	<ol style="list-style-type: none"> <li>1. Record/Play head dirty</li> <li>2. Record/Play head defective</li> <li>3. Defective playback amplifier</li> <li>4. Defective output buffer amplifier</li> <li>5. Defective tape output jack</li> <li>6. Defective mute switch</li> <li>7. Defective Dolby circuit</li> <li>8. Wire between Record/Play head and playback amplifier broken</li> <li>9. Improper tape travel</li> <li>10. Defective preamp output jack</li> </ol>
Does not erase  Auto shut off does not work at end of tape	<ol style="list-style-type: none"> <li>1. Defective erase head</li> <li>2. Erase head dirty</li> <li>3. Bias oscillator defective</li> <li>4. Broken wire on head</li> </ol> <ol style="list-style-type: none"> <li>1. Auto-shut off detector defective</li> <li>2. Auto-shut off driver defective</li> <li>3. Solenoid driver defective</li> <li>4. Defective Deck button</li> <li>5. Wire between solenoid and driver is broken</li> <li>6. Solenoid incorrectly adjusted</li> </ol>

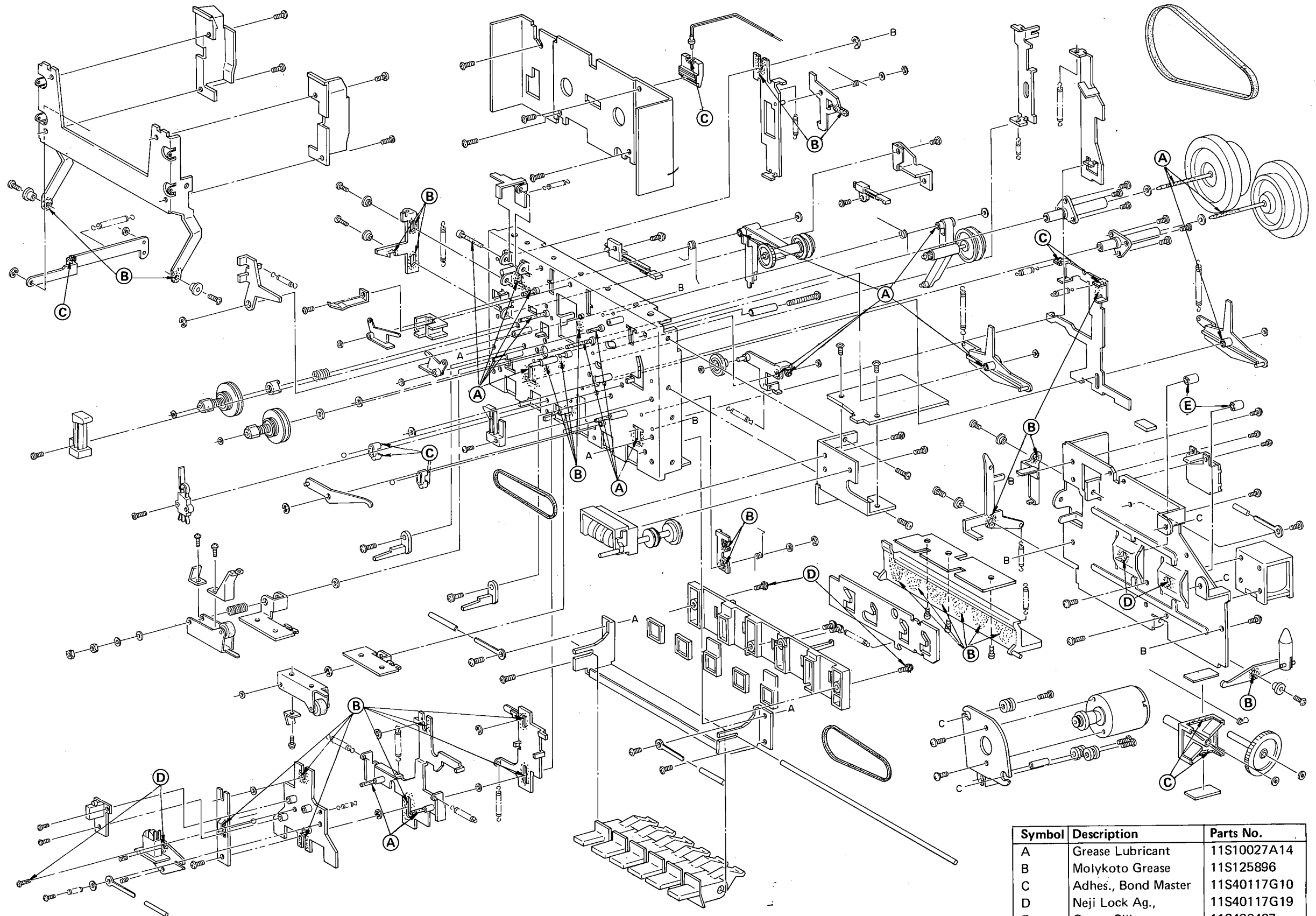
Symptom	Possible Cause
Auto shut off activates before tape end	<ol style="list-style-type: none"> <li>1. Auto-shut off detector defective</li> <li>2. Auto-shut off driver defective</li> <li>3. Solenoid driver defective</li> <li>4. Defective counter</li> <li>5. Defective counter belt</li> <li>6. Cassette tape defective</li> </ol>

### CHECKS TO BE PREFORMED AFTER REPAIR

Part Replaced	Check
Motor	<ol style="list-style-type: none"> <li>1. Tape speed</li> <li>2. Wow/Flutter</li> <li>3. Drive belt position</li> </ol>
Drive belt	<ol style="list-style-type: none"> <li>1. Belt position</li> <li>2. Tape speed</li> <li>3. Wow/Flutter</li> </ol>
Record/Play head	<ol style="list-style-type: none"> <li>1. Inclination of Record/Play head</li> <li>2. Azimuth/height</li> <li>3. Tape travel</li> <li>4. Playback output</li> <li>5. Playback frequency response</li> <li>6. Signal to Noise ratio</li> <li>7. Record/Play response</li> </ol>
Flywheel	<ol style="list-style-type: none"> <li>1. Clearance between flywheel and thrust screw</li> <li>2. Tape travel</li> <li>3. Azimuth/height</li> <li>4. Tape speed</li> </ol>
Pinch roller	<ol style="list-style-type: none"> <li>1. Tape travel</li> <li>2. Tape speed</li> <li>3. Azimuth/height</li> <li>4. Wow/flutter</li> </ol>
Tape counter	<ol style="list-style-type: none"> <li>1. Tape speed</li> <li>2. Auto-shut off</li> <li>3. Counter</li> <li>4. Wow/Flutter</li> </ol>
Reel Hub	<ol style="list-style-type: none"> <li>1. Torque check</li> <li>2. Tape speed</li> <li>3. Wow/Flutter</li> </ol>

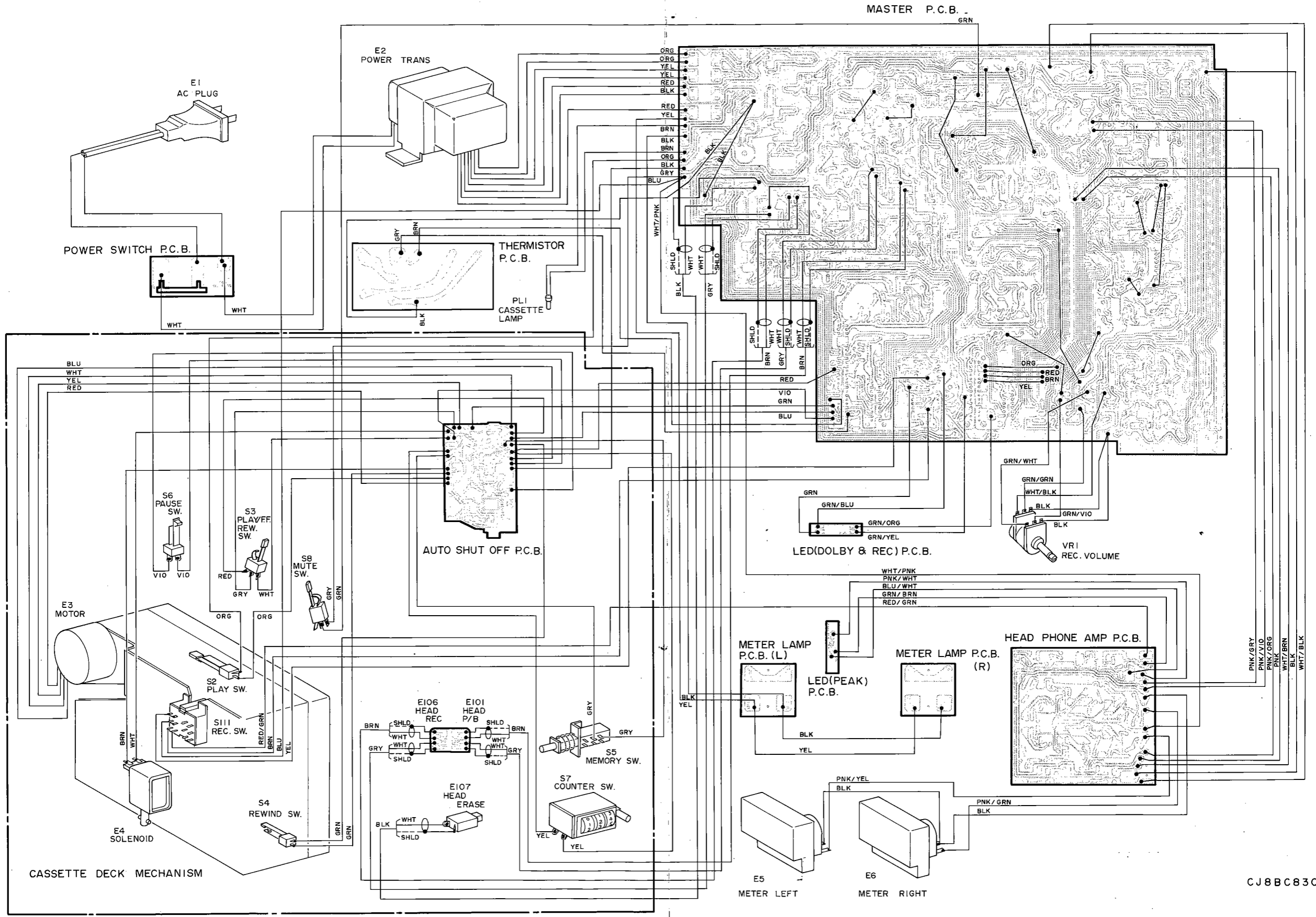


# Lubrication Points



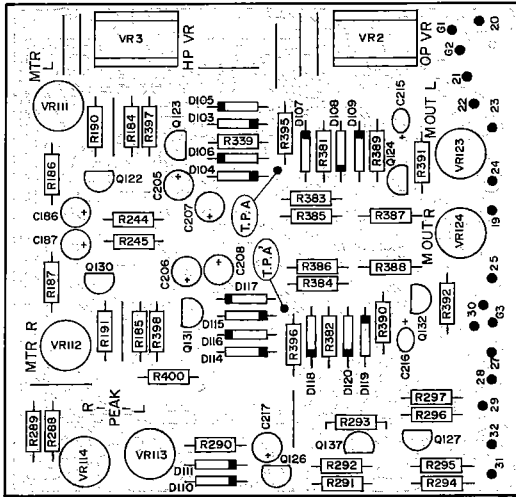
Symbol	Description	Parts No.
A	Grease Lubricant	11S10027A14
B	Molykoto Grease	11S125896
C	Adhes., Bond Master	11S40117G10
D	Neji Lock Ag.,	11S40117G19
E	Grease Silicon	11S490487

# Wiring Diagram

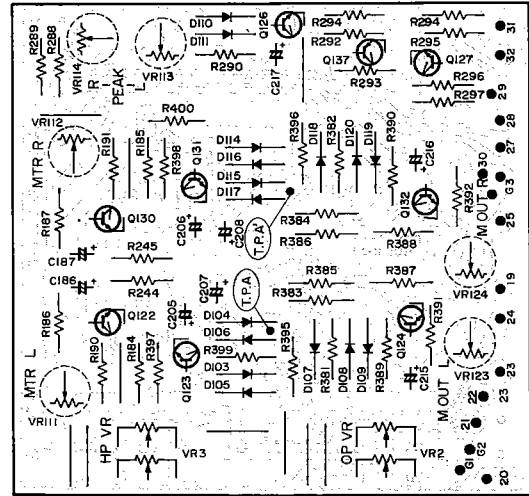


# Parts Layout on P.C. Board

## Headphone P.C. Board

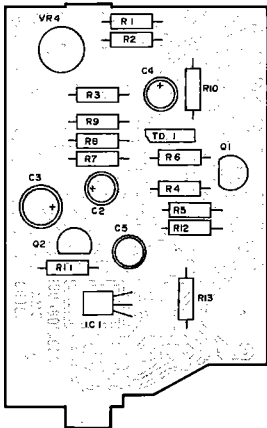


Top View

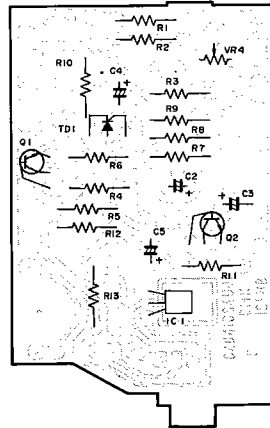


Bottom View

## Auto Shut Off P.C. Board

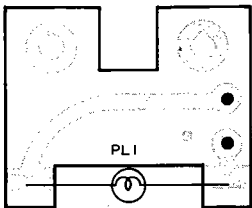


Top View

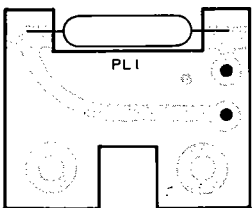


Bottom View

## Bulb Lamp P.C. Board

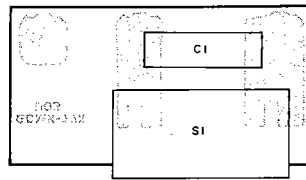


Top View

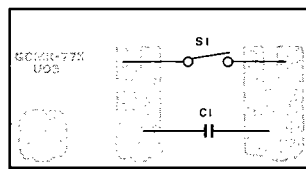


Bottom View

## Power Switch P.C. Board

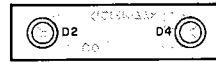


Top View

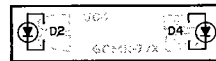


Bottom View

## LED (Dolby & Rec.) P.C. Board

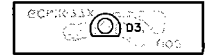


Top View

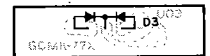


Bottom View

## LED (Peak) P.C. Board

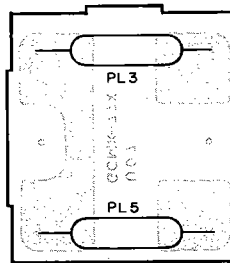


Top View

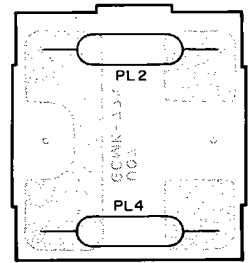


Bottom View

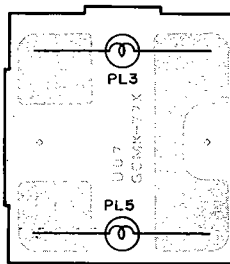
## Meter Lamp P.C. Boards (Right & Left)



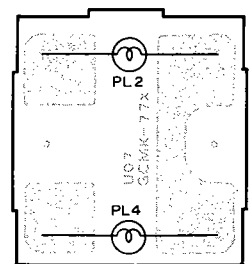
Top View (R)



Top View (L)



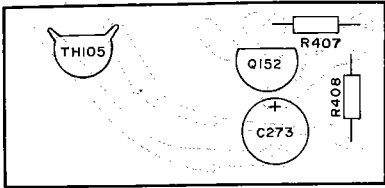
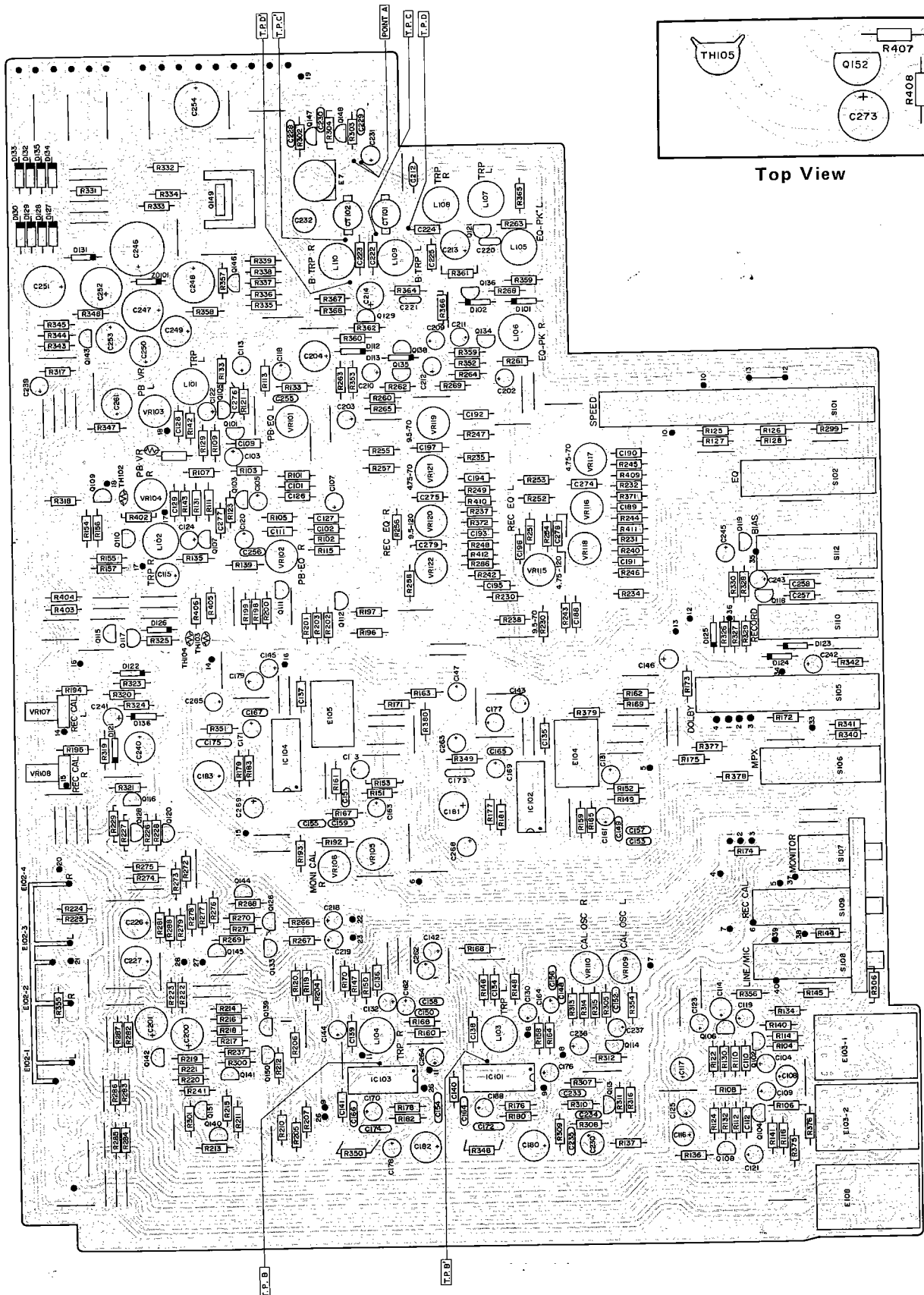
Bottom View (R)



Bottom View (L)

Master P.C.Board

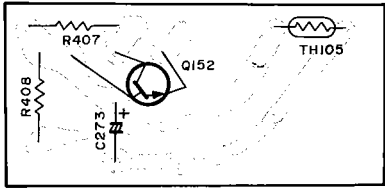
Thermist P.C.Board



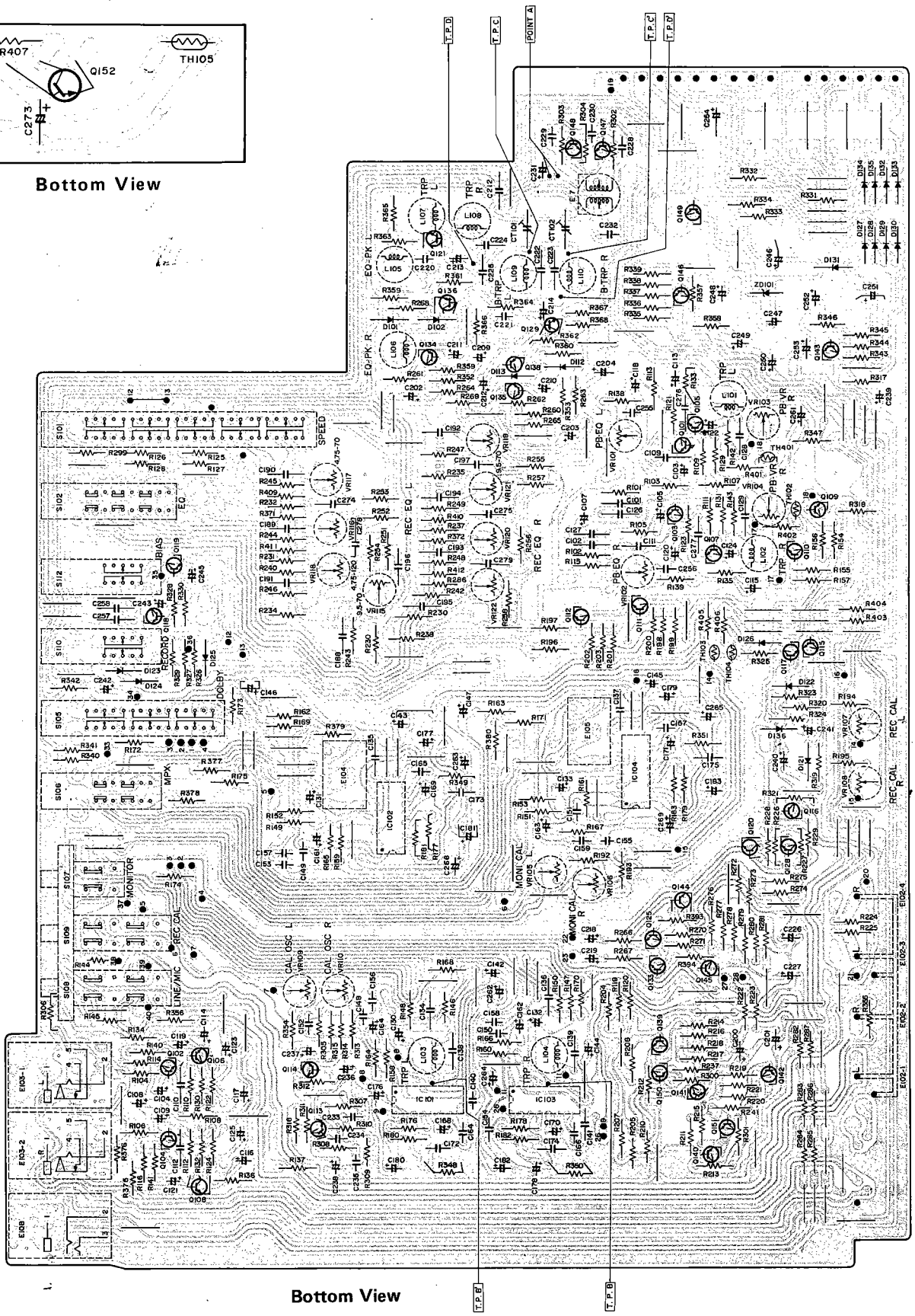
Top View

Top View

# Master P.C. Board

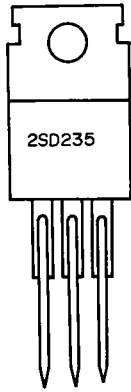


Bottom View

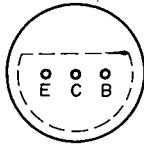
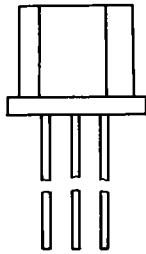


Bottom View

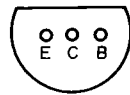
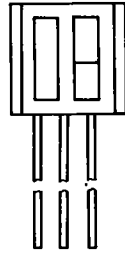
# Semiconductor Lead Identification



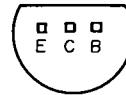
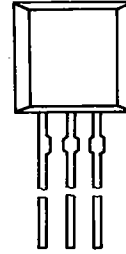
2SD235:Q149



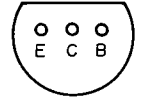
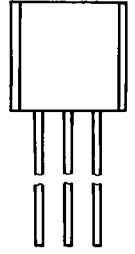
2SC733:(Q132)  
2SA842BL:Q136,  
(Q137),  
Q138



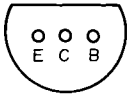
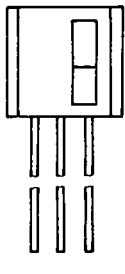
2SC900E:(Q132,Q133)  
2SC945L:(Q1,Q2),  
Q109 - Q128,  
Q130 - Q133  
2SC1222: Q134,Q135



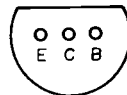
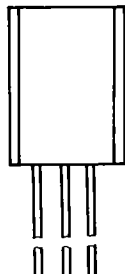
2SC1890:Q147,  
Q148



2SC828S:Q1,Q2  
2SC1327:Q105 - Q108  
2SC1980T:Q139,Q140,  
Q150,Q151  
2SC2263:Q101 - Q104



2SA733BL:(Q133,Q136),  
Q137(Q138)



2SA777S:Q141 - Q143



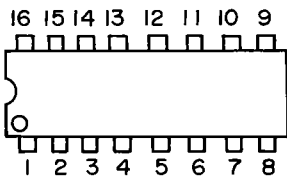
2SC509:Q144 - Q146



GL-32A(LED, Red):D2  
GL-3DG(LED, Green):D4



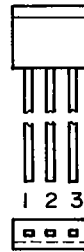
GL-40RG(LED,Green)  
:D3



LM1011N:IC101 - IC104



2P1M:TD1



DN6838:IC1



HZ24-1:DZ101  
HZ24-2:(DZ101)  
RD24E(B):(DZ101)

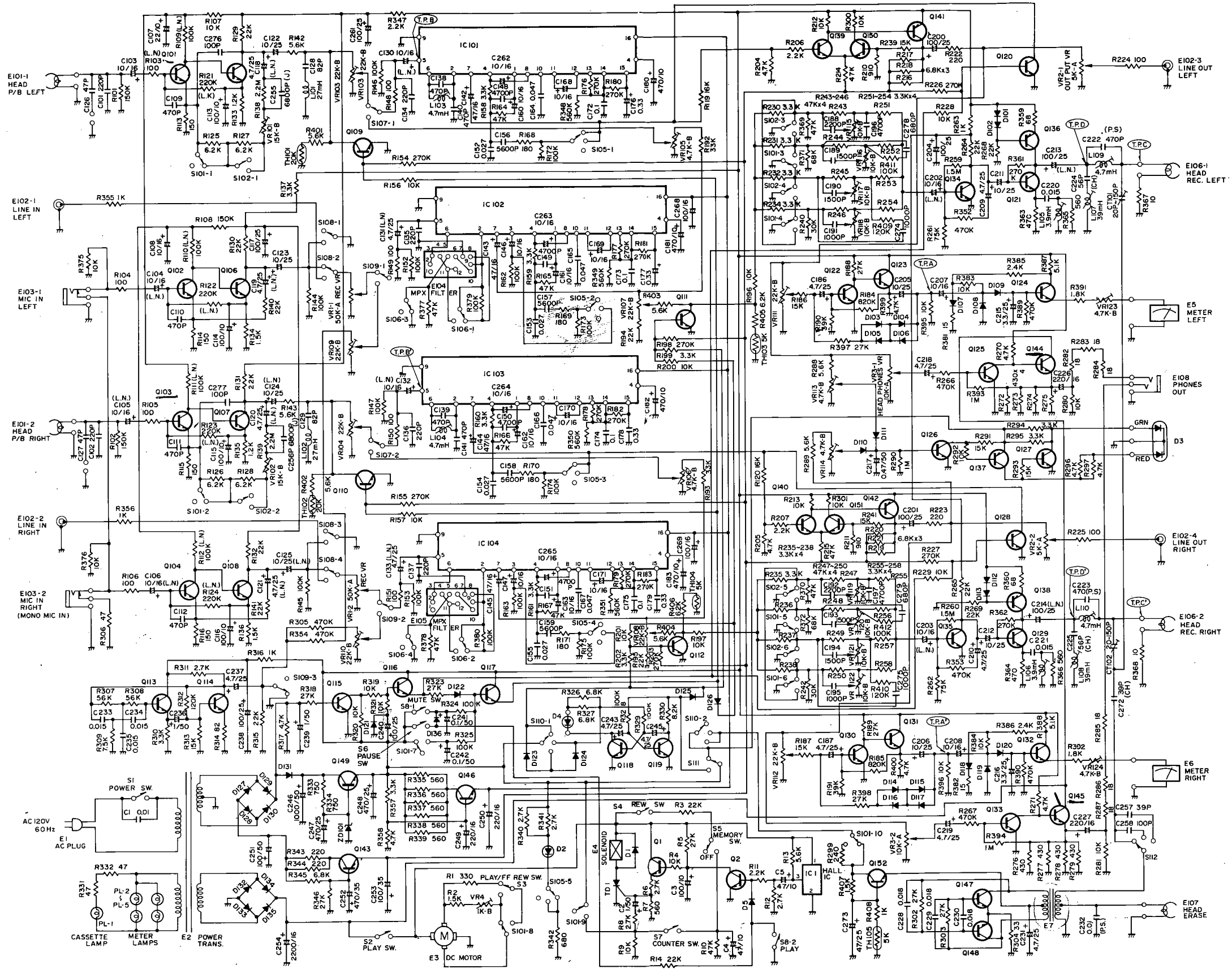


1S1555:D101 - D126

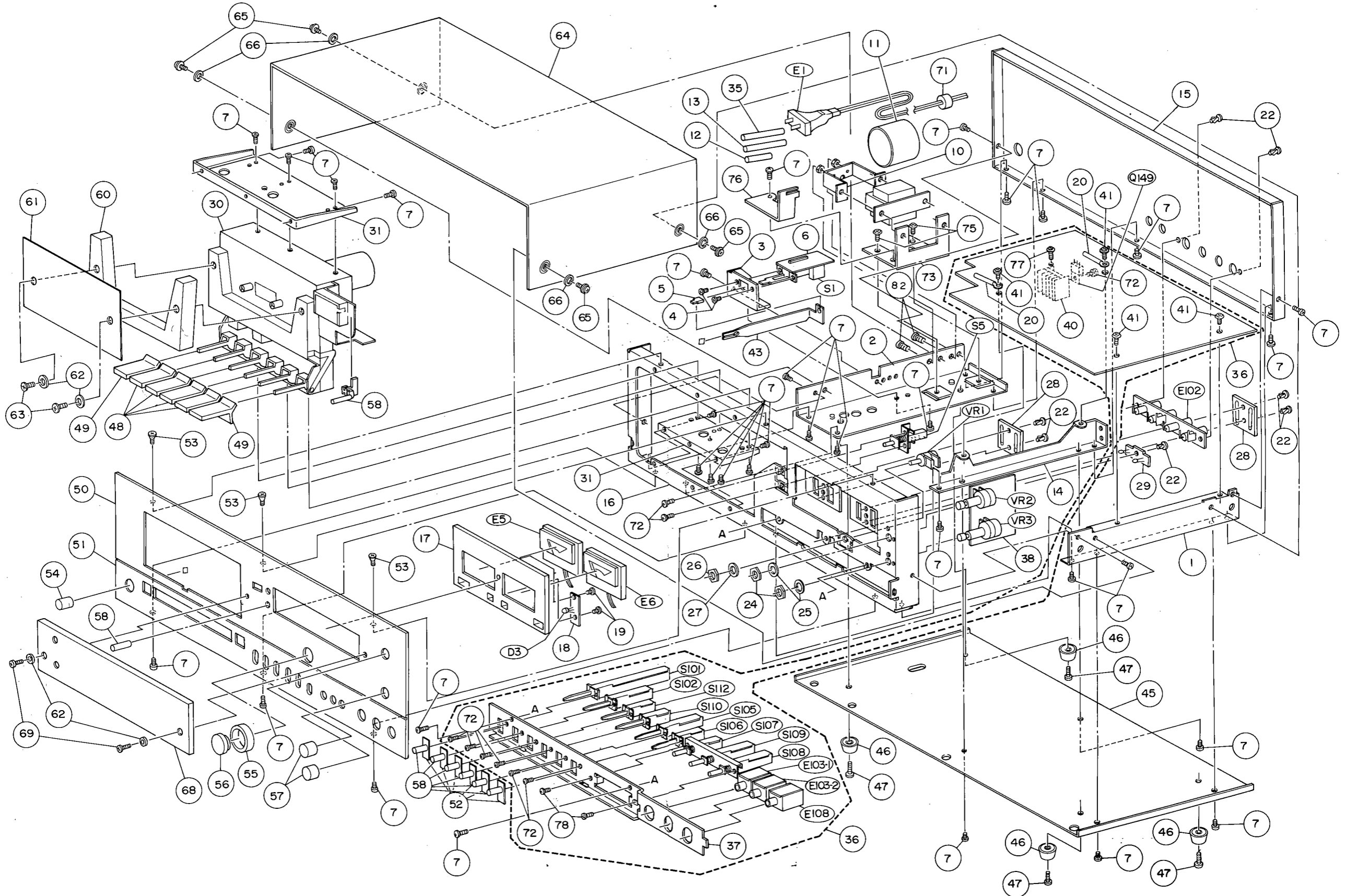


10E2:D127 - D135  
1N4003:(D135)

# Schematic Diagram

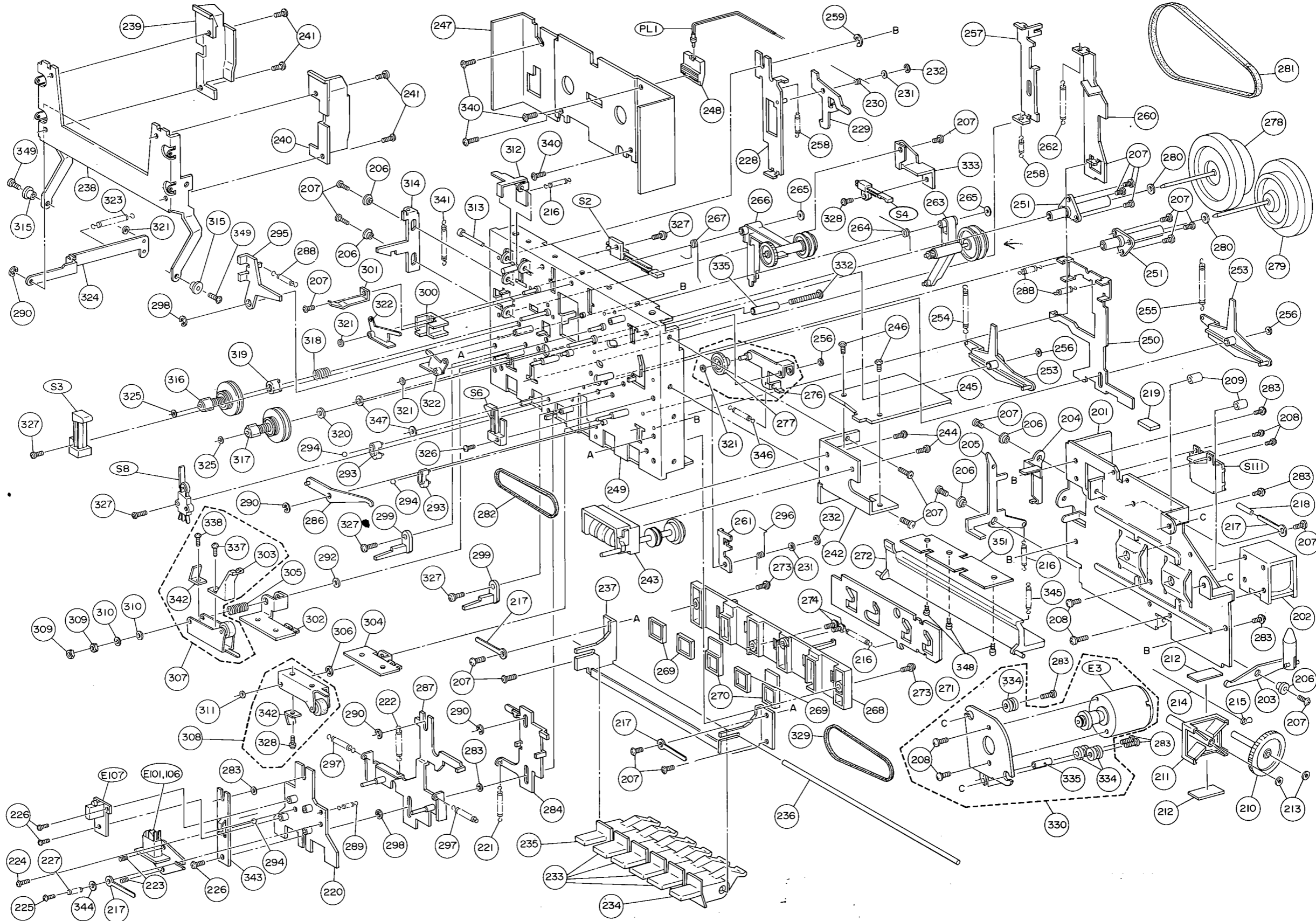


# Exploded View (General)

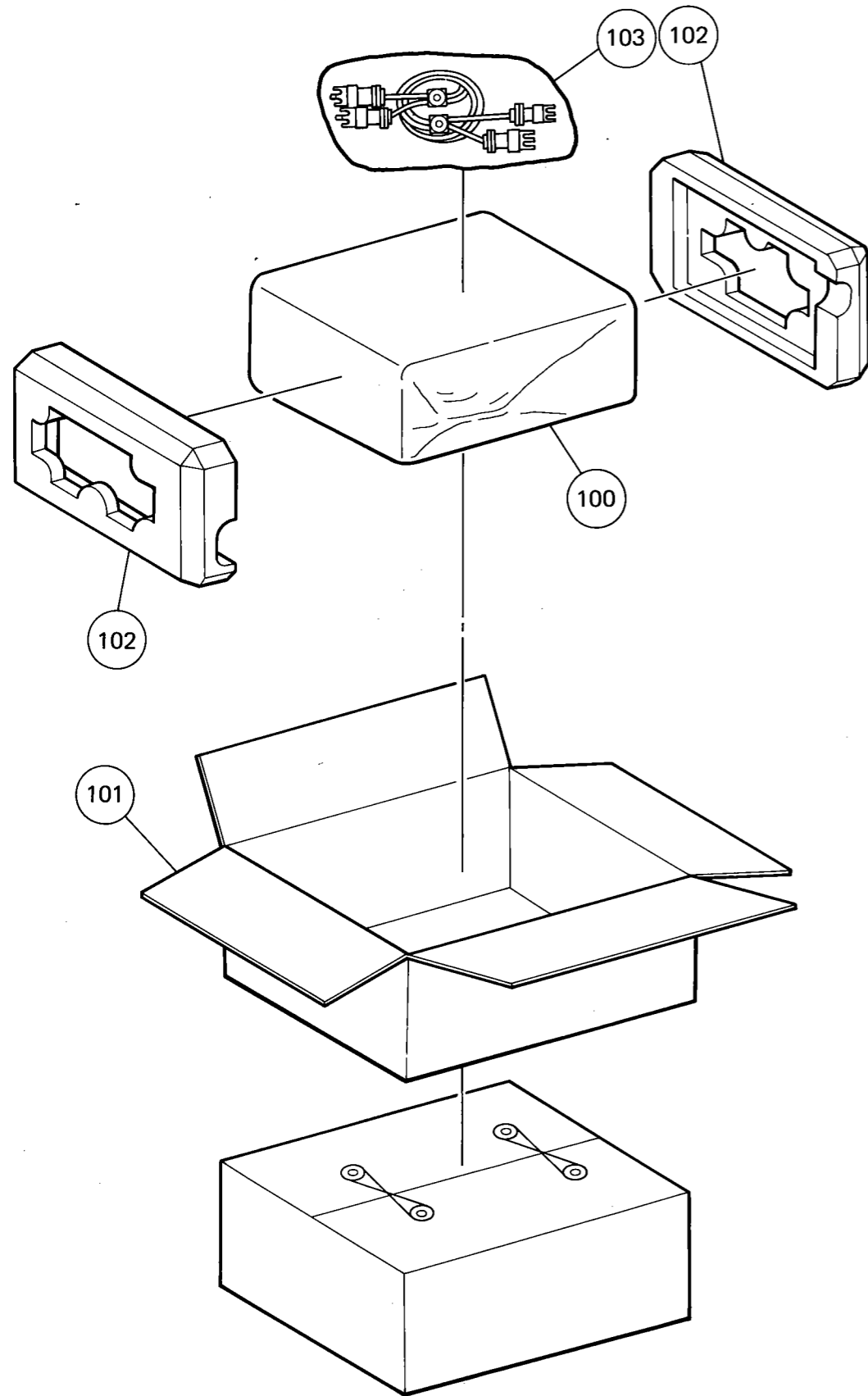




# Exploded View (Mechanism)



# Packing Method



# Parts List

Symbol No.	Part No.	Description
<b>MASTER P.C. BOARD</b>		
<b>Capacitors</b>		
C101	8-4505P41	Ceramic, 220pF
C102	8-4505P41	Ceramic, 220pF
C103	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C104	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C105	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C106	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C107	23-4333G12	Electrolytic, 22 $\mu$ F 10V
C108	23-4333G8	Electrolytic, 10 $\mu$ F 16V
C109	8-4505P45	Ceramic, 470pF
C110	8-4505P45	Ceramic, 470pF
C111	8-4505P45	Ceramic, 470pF
C112	8-4505P45	Ceramic, 470pF
C113	23-4333G30	Electrolytic, 100 $\mu$ F 10V
C114	23-4333G30	Electrolytic, 100 $\mu$ F 10V
C115	23-4333G30	Electrolytic, 100 $\mu$ F 10V
C116	23-4333G30	Electrolytic, 100 $\mu$ F 10V
C117	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C118	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C119	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C120	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C121	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C122	23-0475U15	Electrolytic, 10 $\mu$ F 25V
C123	23-0475U15	Electrolytic, 10 $\mu$ F 25V
C124	23-0475U15	Electrolytic, 10 $\mu$ F 25V
C125	23-0475U15	Electrolytic, 10 $\mu$ F 25V
C126	8-4505P29	Ceramic, 47pF
C127	8-4505P29	Ceramic, 47pF
C128	8-4505P35	Ceramic, 82pF
C129	8-4505P35	Ceramic, 82pF
C130	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C131	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C132	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C133	23-0475U11	Electrolytic, 4.7 $\mu$ F 25V
C134	8-4505P41	Ceramic, 220pF
C135	8-4505P41	Ceramic, 220pF
C136	8-4505P41	Ceramic, 220pF
C137	8-4505P41	Ceramic, 220pF
C138	8-4505P45	Ceramic, 470pF
C139	8-4505P45	Ceramic, 470pF
C140	8-2195G07	Cap Fix PS 470
C141	8-2195G07	Cap Fix PS 470
C142	23-4333G25	Electrolytic, 47 $\mu$ F 16V
C143	23-4333G25	Electrolytic, 47 $\mu$ F 16V
C144	23-4333G25	Electrolytic, 47 $\mu$ F 16V
C145	23-4333G25	Electrolytic, 47 $\mu$ F 16V
C146	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C147	23-4333G08	Electrolytic, 10 $\mu$ F 16V

Symbol No.	Part No.	Description
C148	8-4503P09	Mylar, 0.0047 $\mu$ F
C149	8-4503P09	Mylar, 0.0047 $\mu$ F
C150	8-4503P09	Mylar, 0.0047 $\mu$ F
C151	8-4503P09	Mylar, 0.0047 $\mu$ F
C152	8-4503P18	Mylar, 0.027 $\mu$ F
C153	8-4503P18	Mylar, 0.027 $\mu$ F
C154	8-4503P18	Mylar, 0.027 $\mu$ F
C155	8-4503P18	Mylar, 0.027 $\mu$ F
C156	8-4503P10	Mylar, 0.0056 $\mu$ F
C157	8-4503P10	Mylar, 0.0056 $\mu$ F
C158	8-4503P10	Mylar, 0.0056 $\mu$ F
C159	8-4503P10	Mylar, 0.0056 $\mu$ F
C160	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C161	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C162	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C163	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C164	8-4503P21	Mylar, 0.047 $\mu$ F
C165	8-4503P21	Mylar, 0.047 $\mu$ F
C166	8-4503P21	Mylar, 0.047 $\mu$ F
C167	8-4503P21	Mylar, 0.047 $\mu$ F
C168	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C169	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C170	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C171	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C172	8-4833J25	Mylar, 0.1 $\mu$ F
C173	8-4833J25	Mylar, 0.1 $\mu$ F
C174	8-4833J25	Mylar, 0.1 $\mu$ F
C175	8-4833J25	Mylar, 0.1 $\mu$ F
C176	23-2909J04	Electrolytic, 0.33 $\mu$ F 50V
C177	23-2909J04	Electrolytic, 0.33 $\mu$ F 50V
C178	23-2909J04	Electrolytic, 0.33 $\mu$ F 50V
C179	23-2909J04	Electrolytic, 0.33 $\mu$ F 50V
C180	23-4333G48	Electrolytic, 470 $\mu$ F 10V
C181	23-4333G48	Electrolytic, 470 $\mu$ F 10V
C182	23-4333G48	Electrolytic, 470 $\mu$ F 10V
C183	23-4333G48	Electrolytic, 470 $\mu$ F 10V
C184		- Not Used -
C185		- Not Used -
C186		} Used on Headphone } P.C.Board
C187		
C188	8-4505P53	Ceramic, 2200pF
C189	8-4505P48	Ceramic, 820pF
C190	8-4505P51	Ceramic, 1500pF
C191	8-4505P49	Ceramic, 1000pF
C192	8-4505P53	Ceramic, 2200pF
C193	8-4504P51	Ceramic, 1500pF
C194	8-4505P48	Ceramic, 820pF
C195	8-4505P49	Ceramic, 1000pF
C196	8-4505P57	Ceramic, 4700pF
C197	8-4505P57	Ceramic, 4700pF
C198		- Not Used -

Symbol No.	Part No.	Description
C199		– Not Used –
C200	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C201	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C202	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C203	23-0475U14	Electrolytic, 10 $\mu$ F 16V
C204	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C205		} Used on Headphone P.C.Board
C206		
C207		
C208		
C209	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C210	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C211	23-4333G09	Electrolytic, 10 $\mu$ F 25V
C212	23-4333G09	Electrolytic, 10 $\mu$ F 25V
C213	23-0475U31	Electrolytic, 100 $\mu$ F 25V
C214	23-0475U31	Electrolytic, 100 $\mu$ F 25V
C215		} Used on Headphone P.C.Board
C216		
C217		
C218	23-4333G05	
C219	23-4333G05	Electrolytic, 47 $\mu$ F 25V
C220	8-4503P15	Mylar, 0.015 $\mu$ F 50V
C221	8-4503P15	Mylar, 0.015 $\mu$ F 50V
C222	8-4505P45	Ceramic, 470pF
C223	8-4505P45	Ceramic, 470pF
C224	21-1701J56	Ceramic, 56pF
C225	21-1701J56	Ceramic, 56pF
C226	23-4333G37	Electrolytic, 220 $\mu$ F 16V
C227	23-4333G37	Electrolytic, 220 $\mu$ F 16V
C228	8-4503P16	Mylar, 0.018 $\mu$ F
C229	8-4503P16	Mylar, 0.018 $\mu$ F
C230	8-4503P16	Mylar, 0.018 $\mu$ F
C231	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C232	8-2081U49	Mylar, 0.01 $\mu$ F
C233	8-4833J15	Mylar, 0.015 $\mu$ F
C234	8-4833J15	Mylar, 0.015 $\mu$ F
C235	8-4833J15	Mylar, 0.015 $\mu$ F
C236	23-4333G01	Electrolytic, 1 $\mu$ F 50V
C237	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C238	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C239	23-4333G01	Electrolytic, 1 $\mu$ F 50V
C240	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C241	23-2909J03	Electrolytic, 0.1 $\mu$ F 50V
C242	23-2909J03	Electrolytic, 0.1 $\mu$ F 50V
C243	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C244		– Not Used –
C245	23-4333G05	Electrolytic, 4.7 $\mu$ F 25V
C246	23-1191U01	Electrolytic, 1000 $\mu$ F 50V
C247	23-1198U57	Electrolytic, 470 $\mu$ F 25V
C248	23-1198U57	Electrolytic, 470 $\mu$ F 25V
C249	23-4333G37	Electrolytic, 220 $\mu$ F 16V

Symbol No.	Part No.	Description
C250	23-4333G37	Electrolytic, 220 $\mu$ F 16V
C251	23-4333G33	Electrolytic, 100 $\mu$ F 50V
C252	23-1198U58	Electrolytic, 470 $\mu$ F 35V
C253	23-4333G34	Electrolytic, 100 $\mu$ F 35V
C254	23-1198U71	Electrolytic, 2200 $\mu$ F 60V
C255	8-4503P11	Mylar, 0.0068 $\mu$ F
C256	8-4503P11	Mylar, 0.0068 $\mu$ F
C257	8-4505P27	Ceramic, 39pF
C258	8-4505P37	Ceramic, 100pF
C259		– Not Used –
C260		– Not Used –
C261	23-4333G32	Electrolytic, 100 $\mu$ F 25V
C262	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C263	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C264	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C265	23-4333G08	Electrolytic, 10 $\mu$ F 16V
C268	23-4333G31	Electrolytic, 100 $\mu$ F 16V
C269	23-4333G31	Electrolytic, 100 $\mu$ F 16V
C272	21-1701J76	Ceramic, 39pF
C274	8-4505P49	Ceramic, 1000pF
C275	8-4505P49	Ceramic, 1000pF
C278	8-4505P47	Ceramic, 680pF
C279	8-4505P47	Ceramic, 680pF
CT101	21-4502P01	Capacitor, Trimmer
CT102	21-4502P01	Capacitor, Trimmer
<b>Diodes</b>		
D101	48-34816	Diode, Silicon 1S1555
D102	48-34816	Diode, Silicon 1S1555
D103	48-34816	Diode, Silicon 1S1555
D104	48-34816	Diode, Silicon 1S1555
D105	48-34816	Diode, Silicon 1S1555
D106	48-34816	Diode, Silicon 1S1555
D107	48-34816	Diode, Silicon 1S1555
D108	48-34816	Diode, Silicon 1S1555
D109	48-34816	Diode, Silicon 1S1555
D110	48-34816	Diode, Silicon 1S1555
D111	48-34816	Diode, Silicon 1S1555
D112	48-34816	Diode, Silicon 1S1555
D113	48-34816	Diode, Silicon 1S1555
D114	48-34816	Diode, Silicon 1S1555
D115	48-34816	Diode, Silicon 1S1555
D116	48-34816	Diode, Silicon 1S1555
D117	48-34816	Diode, Silicon 1S1555
D118	48-34816	Diode, Silicon 1S1555
D119	48-34816	Diode, Silicon 1S1555
D120	48-34816	Diode, Silicon 1S1555
D121	48-34816	Diode, Silicon 1S1555
D122	48-34816	Diode, Silicon 1S1555
D123	48-34816	Diode, Silicon 1S1555

Symbol No.	Part No	Description
D124	48-34816	Diode, Silicon 1S1555
D125	48-34816	Diode, Silicon 1S1555
D126	48-34816	Diode, Silicon 1S1555
D127	48-0235G02	Diode, 10E2
D128	48-0235G02	Diode, 10E2
D129	48-0235G02	Diode, 10E2
D130	48-0235G02	Diode, 10E2
D131	48-0235G02	Diode, 10E2
D132	48-0235G02	Diode, 10E2
D133	48-0235G02	Diode, 10E2
D134	48-0235G02	Diode, 10E2
D135	48-0235G02 or 48-0477U01	Diode, 10E2 Diode, 1N4003
DZ101	48-0150U85 or 48-0150U86 or 48-4496P01	Diode, Zener HZ24-1 Diode, Zener HZ24-2 Diode, RD24E (B)

#### ICs & Transistors

IC101	51-0113T01	IC, LM1011N
IC102	51-0113T01	IC, LM1011N
IC103	51-0113T01	IC, LM1011N
IC104	51-0113T01	IC, LM1011N
Q101	48-1195U04	Transistor, 2SC2263
Q102	48-1195U04	Transistor, 2SC2263
Q103	48-1195U04	Transistor, 2SC2263
Q104	48-1195U04	Transistor, 2SC2263
Q105	48-0021U03	Transistor, 2SC1327
Q106	48-0021U03	Transistor, 2SC1327
Q107	48-0021U03	Transistor, 2SC1327
Q108	48-0021U03	Transistor, 2SC1327
Q109	48-4578J02	Transistor, 2SC945L
Q110	48-4578J02	Transistor, 2SC945L
Q111	48-4578J02	Transistor, 2SC945L
Q112	48-4578J02	Transistor, 2SC945L
Q113	48-4578J02	Transistor, 2SC945L
Q114	48-4578J02	Transistor, 2SC945L
Q115	48-4578J02	Transistor, 2SC945L
Q116	48-4578J02	Transistor, 2SC945L
Q117	48-4578J02	Transistor, 2SC945L
Q118	48-4578J02	Transistor, 2SC945L
Q119	48-4578J02	Transistor, 2SC945L
Q120	48-4578J02	Transistor, 2SC945L
Q121	48-4578J02	Transistor, 2SC945L
Q122		} Used on Headphone } P.C.Board
Q123		
Q124		
Q125	48-4578J02	Transistor, 2SC945L

Symbol No.	Part No.	Description
Q126		} Used on Headphone } P.C.Board
Q127		
Q128	48-4578J02	Transistor, 2SC945L
Q129	48-4578J02	Transistor, 2SC945L
Q130		} Used on Headphone } P.C.Board
Q131		
Q132		
Q133	48-4578J02 or 48-0149P01 or 48-0247G02	Transistor, 2SC945L Transistor, 2SC900E Transistor, 2SC733
Q134	48-0929P01	Transistor, 2SC1222
Q135	48-0929P01	Transistor, 2SC1222
Q136	48-4983P02 or 48-0081T03	Transistor, 2SA842BL Transistor, 2SA733BL
Q138	48-4983P02 or 48-0081T03	Transistor, 2SA842BL Transistor, 2SA733BL
Q139	48-1196U03	Transistor, 2SC1980T
Q140	48-1196U03	Transistor, 2SC1980T
Q141	48-1197U04	Transistor, 2SA777S
Q142	48-1197U04	Transistor, 2SA777S
Q143	48-1197U04	Transistor, 2SA777S
Q144	48-3239G02	Transistor, 2SC509
Q145	48-3239G02	Transistor, 2SC509
Q146	48-3239G02	Transistor, 2SC509
Q147	48-3394P01	Transistor, 2SC1890
Q148	48-3394P01	Transistor, 2SC1890
Q149	48-0662G04	Transistor, 2SD235
Q150	48-1196U03	Transistor, 2SC1980T
Q151	48-1196U03	Transistor, 2SC1980T

#### Switches

S101	40-1186U01	Switch, Lever 10C-2P
S102	40-1189U01	Switch, Lever 6C-2P
S103		
S104		
S105	40-1188U01	Switch, Lever 6C-3P
S106	40-1281U01	Switch, Lever 4C-2P
S107	40-1923U01	Switch, Push
S108	40-1923U01	Switch, Push
S109	40-1923U01	Switch, Push
S110	40-1233U01	Switch, Lever
S111		
S112	40-1187U01	Switch, Lever 2C-3P

Symbol No.	Part No.	Description
<b>Coils</b>		
L101	24-1199U18	Coil, Variable 27mH
L102	24-1199U18	Coil, Variable 27mH
L103	24-1199U09	Coil, Variable 4.7mH
L104	24-1199U09	Coil, Variable 4.7mH
L105	24-1199U08	Coil, Variable 3.9mH
L106	24-1199U08	Coil, Variable 3.9mH
L107	24-1199U20	Coil, Variable 39mH
L108	24-1199U20	Coil, Variable 39mH
L109	24-1199U09	Coil, Variable 4.7mH
L110	24-1199U09	Coil, Variable 4.7mH
<b>Transformer, Filters &amp; Jacks</b>		
E7	25-4498P01	OSC, Transformer
E104	51-1020U01	Filter, MPX
E105	51-1020U01	Filter, MPX
E103	9-1182U02	Jack, MIC
E108	9-1183U01	Jack, Head Phone
<b>Resistors</b>		
R101	6-4594P18	Carbon Film, 150K ohm ¼W
R102	6-4594P18	Carbon Film, 150K ohm ¼W
R103	6-4593P41	Carbon Film, 100 ohm ¼W
R104	6-4593P41	Carbon Film, 100 ohm ¼W
R105	6-4593P41	Carbon Film, 100 ohm ¼W
R106	6-4593P41	Carbon Film, 100 ohm ¼W
R107	6-4593P89	Carbon Film, 10K ohm ¼W
R108	6-4594P18	Carbon Film, 150K ohm ¼W
R109	6-0106T14	Carbon Film, 100K ohm ¼W
R110	6-0106T14	Carbon Film, 100K ohm ¼W
R111	6-0106T14	Carbon Film, 100K ohm ¼W
R112	6-0106T14	Carbon Film, 100K ohm ¼W
R113	6-4593P45	Carbon Film, 150 ohm ¼W
R114	6-4593P45	Carbon Film, 150 ohm ¼W
R115	6-4593P45	Carbon Film, 150 ohm ¼W
R116	6-4593P45	Carbon Film, 150 ohm ¼W
R117		– Not Used –
R118		– Not Used –
R119	6-4593P94	Carbon Film, 16K ohm ¼W
R120	6-4593P94	Carbon Film, 16K ohm ¼W
R121	6-0106T22	Carbon Film, 220K ohm ¼W
R122	6-0106T22	Carbon Film, 220K ohm ¼W
R123	6-0106T22	Carbon Film, 220K ohm ¼W
R124	6-0106T22	Carbon Film, 220K Ohm ¼W

Symbol No.	Part No.	Description
R125	6-4593P84	Carbon Film, 6.2K ohm ¼W
R126	6-4593P84	Carbon Film, 6.2K ohm ¼W
R127	6-4593P84	Carbon Film, 6.2K ohm ¼W
R128	6-4593P84	Carbon Film, 6.2K ohm ¼W
R129	6-4593P97	Carbon Film, 22K ohm ¼W
R130	6-4593P97	Carbon Film, 22K ohm ¼W
R131	6-4593P97	Carbon Film, 22K ohm ¼W
R132	6-4593P97	Carbon Film, 22K ohm ¼W
R133	6-4593P67	Carbon Film, 1.2K ohm ¼W
R134	6-4593P69	Carbon Film, 1.5K ohm ¼W
R135	6-4593P67	Carbon Film, 1.2K ohm ¼W
R136	6-4593P69	Carbon Film, 1.5K ohm ¼W
R137	6-4593P77	Carbon Film, 3.3K ohm ¼W
R138	6-4594P46	Carbon Film, 22K ohm ¼W
R139	6-4594P46	Carbon Film, 22K ohm ¼W
R140	6-4593P97	Carbon Film, 22K ohm ¼W
R141	6-4593P97	Carbon Film, 22K ohm ¼W
R142	6-4593P83	Carbon Film, 5.6K ohm ¼W
R143	6-4593P83	Carbon Film, 5.6K ohm ¼W
R144	6-4594P14	Carbon Film, 100K ohm ¼W
R145	6-4594P14	Carbon Film, 100K ohm ¼W
R146	6-4594P14	Carbon Film, 100K ohm ¼W
R147	6-4594P14	Carbon Film, 100K ohm ¼W
R148	6-4593P41	Carbon Film, 100 ohm ¼W
R149	6-4593P41	Carbon Film, 100 ohm ¼W
R150	6-4593P41	Carbon Film, 100 ohm ¼W
R151	6-4593P41	Carbon Film, 100 ohm ¼W
R152	6-4594P14	Carbon Film, 100K ohm ¼W
R153	6-4594P14	Carbon Film, 100K ohm ¼W
R154	6-4594P24	Carbon Film, 270K ohm ¼W
R155	6-4594P24	Carbon Film, 270K ohm ¼W
R156	6-4593P89	Carbon Film, 10K ohm ¼W
R157	6-4593P89	Carbon Film, 10K ohm ¼W
R158	6-4593P77	Carbon Film, 3.3K ohm ¼W
R159	6-4593P77	Carbon Film, 3.3K ohm ¼W
R160	6-4593P77	Carbon Film, 3.3K ohm ¼W
R161	6-4593P77	Carbon Film, 3.3K ohm ¼W
R162	6-4594P14	Carbon Film, 100K ohm ¼W
R163	6-4594P14	Carbon Film, 100K ohm ¼W
R164	6-4594P06	Carbon Film, 47K ohm ¼W
R165	6-4594P06	Carbon Film, 47K ohm ¼W
R166	6-4594P06	Carbon Film, 47K ohm ¼W
R167	6-4594P06	Carbon Film, 47K ohm ¼W
R168	6-4593P47	Carbon Film, 180K ohm ¼W
R169	6-4593P47	Carbon Film, 180K ohm ¼W
R170	6-4593P47	Carbon Film, 180K ohm ¼W
R171	6-4593P47	Carbon Film, 180K ohm ¼W
R172	6-4594P14	Carbon Film, 100K ohm ¼W
R173	6-4594P14	Carbon Film, 100K ohm ¼W
R174	6-4594P14	Carbon Film, 100K ohm ¼W
R175	6-4594P14	Carbon Film, 100K Ohm ¼W

Symbol No.	Part No.	Description
R176	6-4594P24	Carbon Film, 270K ohm ¼W
R177	6-4594P24	Carbon Film, 270K ohm ¼W
R178	6-4594P24	Carbon Film, 270K ohm ¼W
R179	6-4594P24	Carbon Film, 270K ohm ¼W
R180	6-4594P24	Carbon Film, 270K ohm ¼W
R181	6-4594P24	Carbon Film, 270K ohm ¼W
R182	6-4594P24	Carbon Film, 270K ohm ¼W
R183	6-4594P24	Carbon Film, 270K ohm ¼W
R184		Used on Headphone P.C.Board
R185		
R186		
R187		
R188		
R189		
R190		
R191		
R192	6-4594P02	Carbon Film, 33K ohm ¼W
R193	6-4594P02	Carbon Film, 33K ohm ¼W
R194	6-4593P97	Carbon Film, 22K ohm ¼W
R195	6-4593P97	Carbon Film, 22K ohm ¼W
R196	6-4593P89	Carbon Film, 10K ohm ¼W
R197	6-4593P89	Carbon Film, 10K ohm ¼W
R198	6-4594P24	Carbon Film, 270K ohm ¼W
R199	6-4593P77	Carbon Film, 3.3K ohm ¼W
R200	6-4593P89	Carbon Film, 10K ohm ¼W
R201	6-4593P89	Carbon Film, 10K ohm ¼W
R202	6-4593P77	Carbon Film, 3.3K ohm ¼W
R203	6-4594P24	Carbon Film, 270K ohm ¼W
R204	6-4593P81	Carbon Film, 4.7K ohm ¼W
R205	6-4593P81	Carbon Film, 4.7K ohm ¼W
R206	6-4593P73	Carbon Film, 2.2K ohm ¼W
R207	6-4593P73	Carbon Film, 2.2K ohm ¼W
R208		- Not Used -
R209		- Not Used -
R210	6-4593P64	Carbon Film, 910 ohm ¼W
R211	6-4593P64	Carbon Film, 910 ohm ¼W
R212	6-4593P89	Carbon Film, 10K ohm ¼W
R213	6-4593P89	Carbon Film, 10K ohm ¼W
R214	6-4594P06	Carbon Film, 47K ohm ¼W
R215	6-4594P06	Carbon Film, 47K ohm ¼W
R216	6-4593P85	Carbon Film, 6.8K ohm ¼W
R217	6-4593P85	Carbon Film, 6.8K ohm ¼W
R218	6-4593P85	Carbon Film, 6.8K ohm ¼W
R219	6-4593P85	Carbon Film, 6.8K ohm ¼W
R220	6-4593P85	Carbon Film, 6.8K ohm ¼W
R221	6-4593P85	Carbon Film, 6.8K ohm ¼W
R222	6-4593P49	Carbon Film, 220 ohm ¼W
R223	6-4593P49	Carbon Film, 220 ohm ¼W
R224	6-4593P41	Carbon Film, 100 ohm ¼W
R225	6-4593P41	Carbon Film, 100 ohm ¼W
R226	6-4594P24	Carbon Film, 270K ohm ¼W

Symbol No.	Part No.	Description
R227	6-4594P24	Carbon Film, 270K ohm ¼W
R228	6-4593P89	Carbon Film, 10K ohm ¼W
R229	6-4593P89	Carbon Film, 10K ohm ¼W
R230	6-4593P77	Carbon Film, 3.3K ohm ¼W
R231	6-4593P77	Carbon Film, 3.3K ohm ¼W
R232	6-4593P77	Carbon Film, 3.3K ohm ¼W
R233		- Not Used -
R234	6-4593P77	Carbon Film, 3.3K ohm ¼W
R235	6-4593P77	Carbon Film, 3.3K ohm ¼W
R236	6-4593P77	Carbon Film, 3.3K ohm ¼W
R237	6-4593P77	Carbon Film, 3.3K ohm ¼W
R238	6-4593P77	Carbon Film, 3.3K ohm ¼W
R239	6-4593P93	Carbon Film, 15K ohm ¼W
R240	6-4594P01	Carbon Film, 30K ohm ¼W
R241	6-4593P93	Carbon Film, 15K ohm ¼W
R242	6-4594P01	Carbon Film, 30K ohm ¼W
R243	6-4594P06	Carbon Film, 47K ohm ¼W
R244	6-4594P06	Carbon Film, 47K ohm ¼W
R245	6-4594P06	Carbon Film, 47K ohm ¼W
R246	6-4594P06	Carbon Film, 47K ohm ¼W
R247	6-4594P06	Carbon Film, 47K ohm ¼W
R248	6-4594P06	Carbon Film, 47K ohm ¼W
R249	6-4594P06	Carbon Film, 47K ohm ¼W
R250	6-4594P06	Carbon Film, 47K ohm ¼W
R251	6-4593P77	Carbon Film, 3.3K ohm ¼W
R252	6-4593P77	Carbon Film, 3.3K ohm ¼W
R253	6-4593P77	Carbon Film, 3.3K ohm ¼W
R254	6-4593P77	Carbon Film, 3.3K ohm ¼W
R255	6-4593P77	Carbon Film, 3.3K ohm ¼W
R256	6-4593P77	Carbon Film, 3.3K ohm ¼W
R257	6-4593P77	Carbon Film, 3.3K ohm ¼W
R258	6-4593P77	Carbon Film, 3.3K ohm ¼W
R259	6-4594P42	Carbon Film, 1.5M ohm ¼W
R260	6-4594P42	Carbon Film, 1.5M ohm ¼W
R261	6-4594P11	Carbon Film, 75K ohm ¼W
R262	6-4594P11	Carbon Film, 75K ohm ¼W
R263	6-4593P65	Carbon Film, 1K ohm ¼W
R264	6-4593P97	Carbon Film, 22K ohm ¼W
R265	6-4593P97	Carbon Film, 22K ohm ¼W
R266	6-4594P30	Carbon Film, 270K ohm ¼W
R267	6-4594P30	Carbon Film, 270K ohm ¼W
R268	6-4593P97	Carbon Film, 22K ohm ¼W
R269	6-4593P97	Carbon Film, 22K ohm ¼W
R270	6-4593P81	Carbon Film, 47K ohm ¼W
R271	6-4593P81	Carbon Film, 47K ohm ¼W
R272	6-4593P56	Carbon Film, 430 ohm ¼W
R273	6-4593P56	Carbon Film, 430 ohm ¼W
R274	6-4593P56	Carbon Film, 430 ohm ¼W
R275	6-4593P56	Carbon Film, 430 ohm ¼W
R276	6-4593P56	Carbon Film, 430 ohm ¼W
R277	6-4593P56	Carbon Film, 430 ohm ¼W

Symbol No.	Part No.	Description
R278	6-4593P56	Carbon Film, 430 ohm ¼W
R279	6-4593P56	Carbon Film, 430 ohm ¼W
R280	6-4593P89	Carbon Film, 10K ohm ¼W
R281	6-4593P89	Carbon Film, 10K ohm ¼W
R282	6-4593P23	Carbon Film, 18 ohm ¼W
R283	6-4593P23	Carbon Film, 18 ohm ¼W
R284	6-4593P23	Carbon Film, 18 ohm ¼W
R285	6-4593P23	Carbon Film, 18 ohm ¼W
R286	6-4593P23	Carbon Film, 18 ohm ¼W
R287	6-4593P23	Carbon Film, 18 ohm ¼W
R288	6-4593P83	Carbon Film, 5.6K ohm ¼W
R289	6-4593P83	Carbon Film, 5.6K ohm ¼W
R290		
R291		
R292		
R293		
R294		Used on Headphone
R295		P.C.Boat
R296		
R297		
R298		
R299	6-4593P59	Carbon Film, 560 ohm ¼W
R300	6-4593P89	Carbon Film, 10K ohm ¼W
R301	6-4593P89	Carbon Film, 10K ohm ¼W
R302	6-4593P99	Carbon Film, 27K ohm ¼W
R303	6-4593P99	Carbon Film, 27K ohm ¼W
R304	6-4593P29	Carbon Film, 33 ohm ¼W
R305	6-4594P30	Carbon Film, 470K ohm ¼W
R306	6-4593P33	Carbon Film, 47 ohm ¼W
R307	6-4594P08	Carbon Film, 56K ohm ¼W
R308	6-4594P08	Carbon Film, 56K ohm ¼W
R309	6-4593P86	Carbon Film, 7.5K ohm ¼W
R310	6-4593P77	Carbon Film, 3.3K ohm ¼W
R311	6-4593P75	Carbon Film, 2.7K ohm ¼W
R312	6-4594P16	Carbon Film, 120K ohm ¼W
R313	6-4593P93	Carbon Film, 15K ohm ¼W
R314	6-4593P39	Carbon Film, 82 ohm ¼W
R315	6-4593P97	Carbon Film, 22K ohm ¼W
R316	6-4594P65	Carbon Film, 1K ohm ¼W
R317	6-4593P81	Carbon Film, 4.7K ohm ¼W
R318	6-4593P99	Carbon Film, 27K ohm ¼W
R319	6-4593P89	Carbon Film, 10K ohm ¼W
R320	6-4593P89	Carbon Film, 10K ohm ¼W
R321	6-4593P89	Carbon Film, 10K ohm ¼W
R322		— Not Used —
R323	6-4593P99	Carbon Film, 27K ohm ¼W
R324	6-4594P14	Carbon Film, 100K ohm ¼W
R325	6-4594P14	Carbon Film, 100K ohm ¼W
R326	6-4593P85	Carbon Film, 6.8K ohm ¼W
R327	6-4593P85	Carbon Film, 6.8K ohm ¼W
R328	6-4594P14	Carbon Film, 100K ohm ¼W

Symbol No.	Part No.	Description
R329	6-4594P14	Carbon Film, 100K ohm ¼W
R330	6-4593P87	Carbon Film, 8.2K ohm ¼W
R331	6-4593P33	Carbon Film, 47 ohm ¼W
R332	6-4593P33	Carbon Film, 47 ohm ¼W
R333	6-4593P62	Carbon Film, 750 ohm ¼W
R334	6-4593P62	Carbon Film, 750 ohm ¼W
R335	6-4593P59	Carbon Film, 560 ohm ¼W
R336	6-4593P59	Carbon Film, 560 ohm ¼W
R337	6-4593P59	Carbon Film, 560 ohm ¼W
R338	6-4593P59	Carbon Film, 560 ohm ¼W
R339	6-4593P59	Carbon Film, 560 ohm ¼W
R340	6-4593P75	Carbon Film, 2.7K ohm ¼W
R341	6-4593P75	Carbon Film, 2.7K ohm ¼W
R342	6-4593P61	Carbon Film, 680 ohm ¼W
R343	6-4593P49	Carbon Film, 220 ohm ¼W
R344	6-4593P49	Carbon Film, 220 ohm ¼W
R345	6-4593P85	Carbon Film, 6.8K ohm ¼W
R346	6-4593P99	Carbon Film, 27K ohm ¼W
R347	6-4593P73	Carbon Film, 2.2K ohm ¼W
R348	6-4594P32	Carbon Film, 560K ohm ¼W
R349	6-4594P32	Carbon Film, 560K ohm ¼W
R350	6-4594P32	Carbon Film, 560K ohm ¼W
R351	6-4594P32	Carbon Film, 560K ohm ¼W
R352	6-4594P30	Carbon Film, 470K ohm ¼W
R353	6-4594P30	Carbon Film, 470K ohm ¼W
R354	6-4594P30	Carbon Film, 470K ohm ¼W
R355	6-4593P65	Carbon Film, 1K ohm ¼W
R356	6-4593P65	Carbon Film, 1K ohm ¼W
R357	6-4593P77	Carbon Film, 3.3K ohm ¼W
R358	6-4593P81	Carbon Film, 4.7K ohm ¼W
R359	6-4593P37	Carbon Film, 68 ohm ¼W
R360	6-4593P37	Carbon Film, 68 ohm ¼W
R361	6-4594P24	Carbon Film, 270K ohm ¼W
R362	6-4594P24	Carbon Film, 270K ohm ¼W
R363	6-4593P57	Carbon Film, 470 ohm ¼W
R364	6-4593P57	Carbon Film, 470 ohm ¼W
R365	6-4593P59	Carbon Film, 560K ohm ¼W
R366	6-4593P59	Carbon Film, 560K ohm ¼W
R367	6-4593P17	Carbon Film, 10 ohm ¼W
R368	6-4593P17	Carbon Film, 10 ohm ¼W
R369	6-4594P06	Carbon Film, 47K ohm ¼W
R370	6-4594P06	Carbon Film, 47K ohm ¼W
R371	6-4594P10	Carbon Film, 68K ohm ¼W
R372	6-4594P10	Carbon Film, 68K ohm ¼W
R373		— Not used —
R374		— Not used —
R375	6-4593P89	Carbon Film, 10K ohm ¼W
R376	6-4593P89	Carbon Film, 10K ohm ¼W
R377	6-4594P06	Carbon Film, 47K ohm ¼W
R378	6-4594P06	Carbon Film, 47K ohm ¼W
R379	6-4594P14	Carbon Film, 100K ohm ¼W

Symbol No.	Part No.	Description
R380	6-4594P14	Carbon Film, 100K ohm ¼W
R393	6-4593P38	Carbon Film, 1 M ohm ¼W
R394	6-4593P38	Carbon Film, 1 M ohm ¼W
R403	6-4593P83	Carbon Film, 5.6K ohm ¼W
R404	6-4593P83	Carbon Film, 5.6K ohm ¼W
R409	6-1801P56	Carbon Film, 100K ohm ¼W
R410	6-1801P56	Carbon Film, 100K ohm ¼W
R411	6-4594P14	Carbon Film, 100K ohm ¼W
R412	6-4594P14	Carbon Film, 100K ohm ¼W
VR101	18-1732G13	Variable, 15KB
VR102	18-1732G13	Variable, 15KB
VR103	18-1732G08	Variable, 22KB
VR104	18-1732G08	Variable, 22KB
VR105	18-1732G03	Variable, 4.7KB
VR106	18-1732G03	Variable, 4.7KB
VR107	18-0603T01	Volume, 22KB
VR108	18-0603T01	Volume, 22KB
VR109	18-1732G08	Variable, 22KB
VR110	18-1732G08	Variable, 22KB
VR111	18-1732G08	Variable, 22KB
VR112	18-1732G08	Variable, 22KB
VR113	18-1732G03	Variable, 4.7KB
VR114	18-1732G03	Variable, 4.7KB
VR115	18-1732G06	Variable, 10KB
VR116	18-1732G06	Variable, 10KB
VR117	18-1732G08	Variable, 10KB
VR118	18-1732G06	Variable, 10KB
VR119	18-1732G06	Variable, 10KB
VR120	18-1732G06	Variable, 10KB
VR121	18-1732G06	Variable, 10KB
VR122	18-1732G06	Variable, 10KB
<b>HEAD PHONE P.C. BOARD</b>		
<b>Capacitors</b>		
C186	23-4333G05	Electrolytic, 4.7µ F 25V
C187	23-4333G05	Electrolytic, 4.7µ F 25V
C205	23-4333G09	Electrolytic, 10µ F 25V
C206	23-4333G09	Electrolytic, 10µ F 25V
C207	23-4333G08	Electrolytic, 10µ F 16V
C208	23-4333G08	Electrolytic, 10µ F 16V
C215	23-1059P14	Tantalum, 3.3µ F 16V
C216	23-1059P14	Tantalum, 3.3µ F 16V
C217	23-2909J02	Electrolytic, 0.47µ F
<b>Diodes</b>		
D103	48-34816	Silicon, 1S1555
D104	48-34816	Silicon, 1S1555
D105	48-34816	Silicon, 1S1555
D106	48-34816	Silicon, 1S1555
D107	48-34816	Silicon, 1S1555
D108	48-34816	Silicon, 1S1555

Symbol No.	Part No.	Description
D109	48-34816	Silicon, 1S1555
D110	48-34816	Silicon, 1S1555
D111	48-34816	Silicon, 1S1555
D112	48-34816	Silicon, 1S1555
D113	48-34816	Silicon, 1S1555
D114	48-34816	Silicon, 1S1555
D115	48-34816	Silicon, 1S1555
D116	48-34816	Silicon, 1S1555
D117	48-34816	Silicon, 1S1555
D118	48-34816	Silicon, 1S1555
D119	48-34816	Silicon, 1S1555
D120	48-34816	Silicon, 1S1555
<b>Transistors</b>		
Q122	48-4578J02	Transistor, 2SC945L
Q123	48-4578J02	Transistor, 2SC945L
Q124	48-4578J02	Transistor, 2SC945L
Q126	48-4578J02	Transistor, 2SC945L
Q127	48-4578J02	Transistor, 2SC945L
Q130	48-4578J02	Transistor, 2SC945L
Q131	48-4578J02	Transistor, 2SC945L
Q132	48-4578J02 or 48-0149P01 or 48-0247G02	Transistor, 2SC945L Transistor, 2SC900E Transistor, 2SC733
Q137	48-0081J03 or 48-4983P02	Transistor, 2SA733BL Transistor, 2SA842BL
<b>Resistors</b>		
R184	6-4594P36	Carbon Film, 820K ohm ¼W
R185	6-4594P36	Carbon Film, 820K ohm ¼W
R186	6-4593P93	Carbon Film, 15K ohm ¼W
R187	6-4593P93	Carbon Film, 15K ohm ¼W
R188	6-4594P99	Carbon Film, 27K ohm ¼W
R189	6-4594P99	Carbon Film, 27K ohm ¼W
R190	6-4594P04	Carbon Film, 39K ohm ¼W
R191	6-4594P04	Carbon Film, 39K ohm ¼W
R288	6-4593P83	Carbon Film, 5.6K ohm ¼W
R289	6-4593P83	Carbon Film, 5.6K ohm ¼W
R290	6-4593P38	Carbon Film, 1 M ohm ¼W
R291	6-4593P93	Carbon Film, 15K ohm ¼W
R292	6-4593P89	Carbon Film, 10K ohm ¼W
R293	6-4593P93	Carbon Film, 15K ohm ¼W
R294	6-4593P77	Carbon Film, 3.3K ohm ¼W
R295	6-4593P77	Carbon Film, 3.3K ohm ¼W
R296	6-4593P81	Carbon Film, 4.7K ohm ¼W
R297	6-4593P81	Carbon Film, 4.7K ohm ¼W
R381	6-4593P21	Carbon Film, 15 ohm ¼W
R382	6-4593P21	Carbon Film, 15 ohm ¼W
R383	6-4593P89	Carbon Film, 10K ohm ¼W
R384	6-4593P89	Carbon Film, 10K ohm ¼W



Symbol No.	Part No.	Description
R385	6-4593P74	Carbon Film, 2.4K ohm ¼W
R386	6-4593P74	Carbon Film, 2.4K ohm ¼W
R387	6-4593P82	Carbon Film, 5.1K ohm ¼W
R388	6-4593P82	Carbon Film, 5.1K ohm ¼W
R389	6-4594P30	Carbon Film, 470K ohm ¼W
R390	6-4593P30	Carbon Film, 470K ohm ¼W
R391	6-4593P71	Carbon Film, 1.8K ohm ¼W
R392	6-4593P71	Carbon Film, 1.8K ohm ¼W
R395	6-4593P89	Carbon Film, 10K ohm ¼W
R396	6-4593P89	Carbon Film, 10K ohm ¼W
R397	6-4593P99	Carbon Film, 27K ohm ¼W
R398	6-4593P99	Carbon Film, 27K ohm ¼W
R399	6-4593P81	Carbon Film, 4.7K ohm ¼W
R400	6-4593P81	Carbon Film, 4.7K ohm ¼W
VR3-1	18-4715P02	10KAX2
VR3-2	18-4715P02	10KAX2
VR2-1	18-4715P01	5KAX2
VR2-2	18-4715P01	5KAX2
VR111	18-1732G08	Variable, 22KB
VR112	18-1732G08	Variable, 22KB
VR113	18-1732G03	Variable, 4.7KB
VR114	18-1732G03	Variable, 4.7KB
VR123	18-1732G03	Variable, 4.7KB
VR124	18-1732G03	Variable, 4.7KB
<b>AUTO STOP P.C. BOARD</b>		
<b>Capacitor</b>		
C2	23-4333G01	Electrolytic, 1µ F 50V
C3	23-4333G30	Electrolytic, 100µ F 10V
C4	23-4333G05	Electrolytic, 100µ F 25V
C5	23-4333G24	Electrolytic, 47µ F 10V
<b>IC, Transistors &amp; Thyristor</b>		
IC1	51-1430L01	IC, Hall DN6838
Q1	48-4885G01or 48-4578J02 or 48-0170G01	Transistor, 2SC828-S Transistor, 2SC945-L Transistor, 2SC373
Q2	48-4885G01or 48-4578J02 or 48-0170G01	Transistor, 2SC828-S Transistor, 2SC945-L Transistor, 2SC373
TD1	48-4640P01or 48-4571J01	Thyristor, 2P1M Thyristor, SF1R3B41
<b>Resistors</b>		
R1	6-4593P53	Carbon Film, 330 ohm ¼W
R2	6-4593P69	Carbon Film, 1.5K ohm ¼W
R3	6-4593P97	Carbon Film, 22K ohm ¼W
R4	6-4593P89	Carbon Film, 10K ohm ¼W
R5	6-4593P99	Carbon Film, 27K ohm ¼W

Symbol No.	Part No.	Description
R6	6-4593P75	Carbon Film, 2.7K ohm ¼W
R7	6-4593P59	Carbon Film, 560 ohm ¼W
R8	6-4593P75	Carbon Film, 2.7K ohm ¼W
R9	6-4593P89	Carbon Film, 10K ohm ¼W
R10	6-4594P06	Carbon Film, 47K ohm ¼W
R11	6-4593P73	Carbon Film, 2.2K ohm ¼W
R12	6-4593P75	Carbon Film, 2.7K ohm ¼W
VR4	18-1732G07-L	Resistor, SoL V 1K-B
<b>THERMIST P.C. BOARD</b>		
1	84-2911U01	Panel Thermist
2	23-1192U57	Cap, Ely, 47-25V
3	48-3239G02	Transistor, 2SC509
4	6-4593P65	Resistor F.C 1K
5	6-4593P69	Resistor F.C 1.5K
<b>MISCELLANEOUS PARTS</b>		
C1	8-2962P07	Cap., MET 0.001µ-125V
D1	48-0235G02or 48-0477U01	Diode 10EZ Diode 1N4003
D2	48-3688P01	LED (Red) GL-32AR
D3	48-2667P08	LED GL-40RG
D4	48-3818P01	LED (Grn) GL-3PG1
E1	28-0916U01	Plug AC Cord
E2	25-0509U02	Transformer Power
E3	59-1184U02	Motor, 2 Speed V-Servo
E5	72-3108P08	Meter Level
E6	72-3108P08	Meter Level
E101	88-1139U01.	Head, R, And, P, COMB1
E102	9-4393P01	Plate Phone
E106	88-1139U01	Head, R, And, P, COMB1
E107	88-1140U01	Head, Erase
PL1	65-2954P01	Lamp Pilot 6V-65
PL2	65-0767T01	Lamp
PL3	65-0767T01	Lamp
PL4	65-0767T01	Lamp
PL5	65-0767T01	Lamp
S1	40-4487P01	Switch Power
S2	40-1630U01	Switch Leaf
S3	40-0370P01	Double Leaf
S4	40-1631U01	Switch Leaf
S5	40-4755P01	Switch Push (Memory)
S6	40-0707J01	Switch Leaf
S8	40-2001U01	Switch Skeleton
S111	40-1772U01	Switch 4-2
VR1	18-1227U01	Res., Variable Rotary 50KAX2

Symbol No.	Part No.	Description
<b>CABINET ASSEMBLY PARTS</b>		
1	7-0993U01	Bracket, Side "R"
2	7-0992U01	Bracket, Side "L"
3	7-0962U01	Bracket, Power Switch
4	3-0014G04	Screw, Machine (M3x0.5x6)
5	36-4465P01	Spacer, Switch
6	84-1687U05	Panel R/P Amp. (Power Switch)
7	3-4205G01	Screw, Tape Tite (M3x6)
8		- Not Used -
9		- Not Used -
10	7-2655U01	Support, Transformer
11	26-1056G02	Shield, Magnetic
12	37-4468G20-80	Tube, UL
13	37-4468G20-140	Tube, UL
14	7-0994U01	Bracket, Center
15	15-0996U01	Cover, Rear
16	27-0995U01	Chassis, Front
17	7-0980U01	Frame, Meter
18	84-1687U03	Panel, R/P Amp.(Peak LED)
19	3-0012G03	Screw, Tapping (M3x6)
20	29-1045P02	Lug, Wrap Around
21		- Not Used -
22	5-1635J02	Rivet, Push
23		- Not Used -
24	2-0000G10-002	Nut (M7x0.75)
25	4-0070G14-002	Washer
26	2-0000G15-002	Nut (M9x0.75)
27	4-0070G28-002	Washer
28	84-0975T01	Panel, Etched Meter Lamp
29	84-1687U04	Panel, R/P Amp. (Dolby & Record)
30	1-0000U11	Cassette Tape Deck
31	7-0999U01	Support, Tape Deck
32		- Not Used -
33		- Not Used -
34		- Not Used -
35	37-4468G20-150	Tube, UL
36	1-1100U34	Assembly, Master Board
37	7-1001U07	Bracket, Switch
38	1-1100U35	Assembly, Head Phone
39		- Not Used -
40	7-1193U01	Heat Sink
41	3-0018G01	Screw, Tapping
42		- Not Used -
43	7-0998U01	Level, Switch
44		- Not Used -
45	15-0997U01	Cover, Bottom
46	75-4394P01	Pad, Trannleg
47	3-4205G15	Screw, Tap Tite (M4x12)

Symbol No.	Part No.	Description
48	36-1003U01	Knob, Function Assembly
49	36-0985U01	Knob, Pause Assembly
50	64-1005U01	Panel, Front
51		- Not Used -
52	14-0987U01	Insulator, Switch
53	3-4205G16	Screw, Tap Tite (M3x6) Flat
54	36-4389P06	Assembly, Power Knob
55	36-0975U01	Knob, Control "L"
56	36-0976U01	Knob, Control "R"
57	36-0977U01	Knob, Control
58	36-0972U01	Knob, Counter & Lever
59	36-0971U01	Knob, Memory
60	7-1004U01	Frame, Door
61	7-1660U01	Frame, Acryl (Door)
62	4-1014U01	Washer, Rubber
63	3-0978U03	Screw, Special
64	16-1662U01	Cabinet, Wood
65	3-4205G26	Screw, Tap Tite (M4x0.7x12) Blk.
66	4-0070G40	Washer, Flat Blk.
67		- Not Used -
68	7-1661U01	Frame, Acryl (Meter)
69	3-0987U01	Screw, Special
70	36-0974U01	Knob, Push Switch
71	43-1625J01	Stopper, Cord
72	3-0014G04	Screw, Machine (M3x0.5x6)
73	7-1737U01	Bracket, Transformer
74	3-4205G09	Screw, Tapping (M4x0.7)
75	3-4205G17	Screw, Tapping (M4x0.7x6) Blk.
76	7-1981U01	Bracket, Amp.
77	3-0036U02	Screw, Tap Tite (M3x8)
78	3-0011G70	Screw, Machine
79	1-1900U51	Assy., Panel Thermist
80	14-0472G02	Insulator Transistor
81	3-4642J02	Scr., Scr, Tap tite
82	3-4205G03	Scr., Tap tite H3x8
<b>PACKING ASSEMBLY PARTS</b>		
100	56-0442T02	Packing, Front Frame
101	56-0730T16	Carton, Packing
102	56-1052U01	Tray, Packing
103	1-4200J30	Assembly, Kit
103-1	56-0230G16	Sack, Polyethylene
103-2	28-2374J02	Cord, Output
103-3	15-1885U01	Cover, Door

Symbol No.	Part No.	Description
<b>TAPE MECHANISM PARTS</b>		
201	1-1444U01	Assembly, Rivet Sub Chassis
202	80-1704U01	Solenoid, DC
203	1-2130U01	Assembly, Plunger Arm
204	45-1143U01	Rec, Arm Rec.
205	45-1145U01	Arm, Unlock
206	43-4283P01	Spacer Arm
207	3-4205G01	Screw, Tapping (M3x0.5x6)
208	3-0014G12	Screw, Machine (M2.6W)
209	3-1166U01	Screw, Bearing
210	44-0208T01	Gear, Drive
211	44-0207T01	Gear, Drive
212	7-0675T01	Bracket, Poise
213	4-1345P01	Washer, Lock
214	30-3803G05	Cord, Dial
215	41-0120T01	Cord, Spring
216	41-1492U01	Spring, Pull
217	29-37272	Lug, Wrap Around
218	37-4468G05	Tube, Vinyle
219	26-0656U02	Shield Sheet
220	1-1436U01	Assembly, Rivet Head Base
221	41-1492U04	Spring, Pull
222	41-1492U09	Spring, Pull
223	3-2155U01	Screw, Set (-)
224	3-0019G08	Screw, (M2x0.4x10)
225	3-0011G75	Screw, Machine (M2x0.4x14)
226	3-0014G07	Screw, Machine (M2x0.4)
227	41-1490U01	Spring, Azimuth
228	1-1441U01	Assembly, Rivet Eject
229	45-1150U01	Arm, Double Action
230	41-1494U01	Spring, Arm
231	4-0070G01	Washer (3.3x6x0.5)
232	4-2091G11	Washer "C"
233	45-1123U01	Lever, Function
234	45-1507U01	Lever, Pause
235	45-1508U01	Lever, Stop
236	47-1169U01	Shaft, Function
237	1-2126U01	Assembly, Bracket Function
238	1-1452U01	Assembly, Rivet Frame
239	15-1130U01	Holder, Chassis
240	15-1130U02	Holder, Chassis
241	3-4205G04	Screw, Tapping (M3x0.5x5)
242	7-1162U01	Bracket, Counter
243	72-1308U01	Tape, Counter
244	3-0014G09	Screw, Machine
245	1-1700U26	Assembly, Auto Shut off
246	3-0036U05	Screw, Tap Tite (M3x6)
247	64-1164U01	Plate, Dust Cover
248	61-1165U01	Lens, Back Light
249	1-1434U01	Assembly, Rivet Chassis

Symbol No.	Part No.	Description
250	45-1160U01	Lever, Brake
251	15-1099U01	Housing Capstan
252	3-4205G05	Screw, Tapping
253	45-1137U01	Arm, Fast Forward
254	41-1490U01	Spring, Pull
255	41-1492U11	Spring, Pull
256	4-1345P03	Washer, Lock
257	45-1158U01	Lever, Record
258	41-1492U07	Spring, Pull
259	4-2091G08	Washer, C 5
260	1-1442U01	Assembly, Rivet Pause
261	45-0546J01	Cam, Pause
262	41-1492U08	Spring, Pull
263	45-1527U01	Clutch, Play
264	41-4148U01	Spring, Play Clutch
265	4-1345P05	Washer, Lock
266	45-1528U01	Clutch, Fast Forward
267	41-1488U01	Spring, Fast Forward Clutch
268	15-1127U01	Housing, Slider
269	45-1128U01	Slider, Function
270	45-1128U02	Slider, Function
271	64-1125U01	Plate, Lock
272	46-1124U01	Stopper, Function
273	3-0014G04	Screw, Machine (M3x0.5)
274	3-0014G04	Screw, Machine
275		- Not Used -
276	1-1439U01	Assembly, FF Idler
277	49-1122U01	Idler, Fast Forward
278	49-1101U02	Flywheel
279	49-1101U01	Flywheel
280	4-0075G09	Washer (S.T.W.)
281	42-1129U01	Belt, Main
282	42-1136U01	Belt, Sub
283	3-0019G32	Screw, F-Locks (M3x6)
284	45-1141U01	Lever, Play
285		- Not Used -
286	1-1440U01	Assembly, Rivet Pause Arm
287	1-1435U01	Assembly, Rivet Timing
288	41-1492U03	Spring, Pull
289	41-1492U02	Spring, Pull
290	4-2091G04	Washer, "C"
291		- Not Used -
292	4-0075G33	Washer, (S.T.W.)
293	15-1163U01	Holder, Ball
294	43-1182P02	Ball, Steel
295	45-1161U01	Link, Record Stopper
296	41-1486U01	Spring, Pause Cam
297	41-1492U06	Spring, Pull
298	4-2091G04	Washer, "C"
299	43-1096U01	Guide, Cassette
300	46-1167U01	Stopper, Cassette

Symbol No.	Part No.	Description
301	41-1148U01	Spring, Hold
302	7-1135U01	Bracket, Pinch Spring
303	43-1097U01	Tape, Guide
304	7-1135U02	Bracket, Pinch Spring
305	41-1491U01	Spring, Push
306	4-2091G03	Washer, "C"
307	1-1516U01	Assembly, Pinch (L)
308	1-1517U01	Assembly, Pinch (R)
309	2-0000G12	Nut (M3x0.5)
310	4-0075G13	Washer (S.T.W.)
311	4-1345P03	Washer, Lock
312	7-1147U01	Bracket, Record Sensor
313	47-1173U01	Shaft, Record Sensor
314	45-1154U01	Lever, Door Stopper
315	43-4283P02	Spacer, Arm
316	49-1447U01	Reel, Take Up
317	49-1448U01	Reel, Supply
318	41-1491U02	Spring, Push
319	49-1115U01	Wheel, Tension
320	4-0075G06	Washer, (S.T.W.)
321	4-1345P02	Washer
322	45-1095U01	Arm, Brake
323	41-1492U05	Spring, Pull
324	1-1445U01	Assembly, Rivet Door
325	4-2091G06	Washer "C"
326	3-0121T04	Screw, Machine (M2.6x7)
327	3-0014G15	Screw, Machine
328	3-0014G02	Screw, Machine (M2x0.4)
329	42-1387U01	Belt, Counter
330	1-1200U82	Assembly, Motor Bracket
331	43-1289U04	Sleeve, Cushion
332	3-0011G37	Screw, Machine
333	7-1168U01	Bracket, Rewind Switch
334	75-1685U01	Cushion, Motor
335	43-1289U02	Sleeve, Cushion
336		- Not Used -
337	3-0019G03	Screw, F-Lock
338	3-0019G01	Screw, F-Lock
339		-Not Used -
340	3-3997P17	Screw, Tapping (M2.6x6)
341	41-1492P14	Spring, Pull
342	41-2351U01	Spring, Pinch Roller Bracket "A"
343	41-1146U01	Spring, Ball
344	4-0070G33	Washer, Flat Metal
345	41-4327P07	Spring, Pull
346	41-1492U15	Spring, Pull
347	43-4303P01	Washer, Oil Shield
348	3-0014G05	Scr., Mch M3x5
349	3-0121T03	Screw
350	75-2725U01	Pad, Cushion
351	7-2686U01	Bkt., Stopper Function