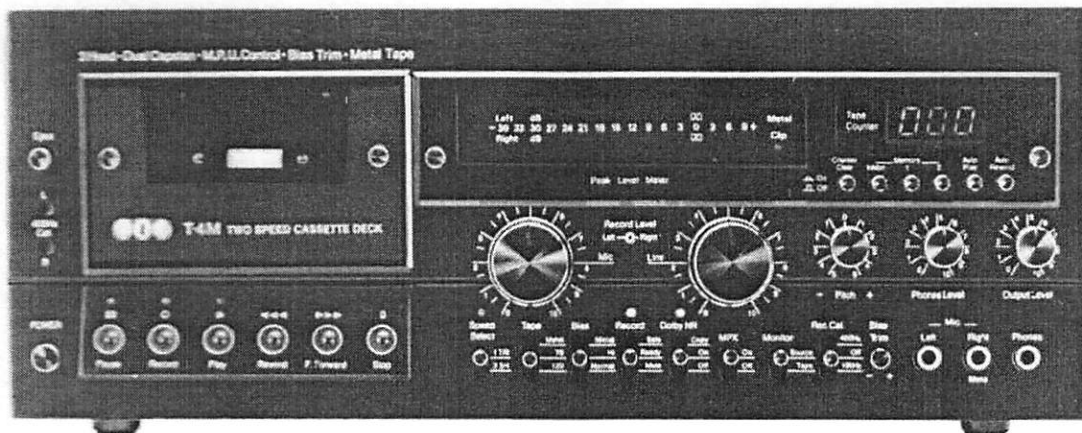


# Two Speed Cassette Deck T-4M

## 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.*



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THE PRODUCT SPECIFICATIONS SHOWN IN THIS MANUAL ARE IN ERROR. FOR THE CORRECT SPECIFICATIONS SEE THE OWNERS MANUAL OR THE DESCRIPTIVE LITERATURE.

# Specifications

Type	Front Loading Vertical Type
Power Requirements	105 to 132V AC 50/60 Hz
Input Power	40 Watts Maximum
Input	Line: 250mV, Mic: 3mV
Output	Line: 2.0V $\pm$ 2dB, Headphone: 200mV
Wow & Flutter	4.76cm $\pm$ 0.1% Max. (DIN WTD Playback Mode) 9.5cm $\pm$ 0.08% Max. (DIN WTD Playback Mode)
Tape Speed	4.76cm/sec. $\pm$ 2% 9.5cm/sec. $\pm$ 2%
Fast Forward & Rewind Time	47sec. Typical
Frequency Response	31.5 Hz to 14K Hz
Rec. Play Head	Two Gap One Housing Combination Ferrite Core
Erase Head	Double Gap Sen-Alloy Head
Capstan Motor	Two Speed Electrical Governor Controlled DC Type
Reel Motor	Mechanical Governor Controlled DC Type
Take Up Torque	30 to 60gcm (40gcm, Typical)
FF Rew Torque	70 to 120gcm
Back Tension	6 to 10gcm
Level Meter	45 dB Full Scale LED Peak Meter
Tape Counter	3 digits LED Digital Type
Dimensions	440 (W) x 164 (H) x 257 (D) mm 17-1/3(W) x 6-1/2(H) x 10-1/10(D) Inch
Weight	8.4 kgs (18.5 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

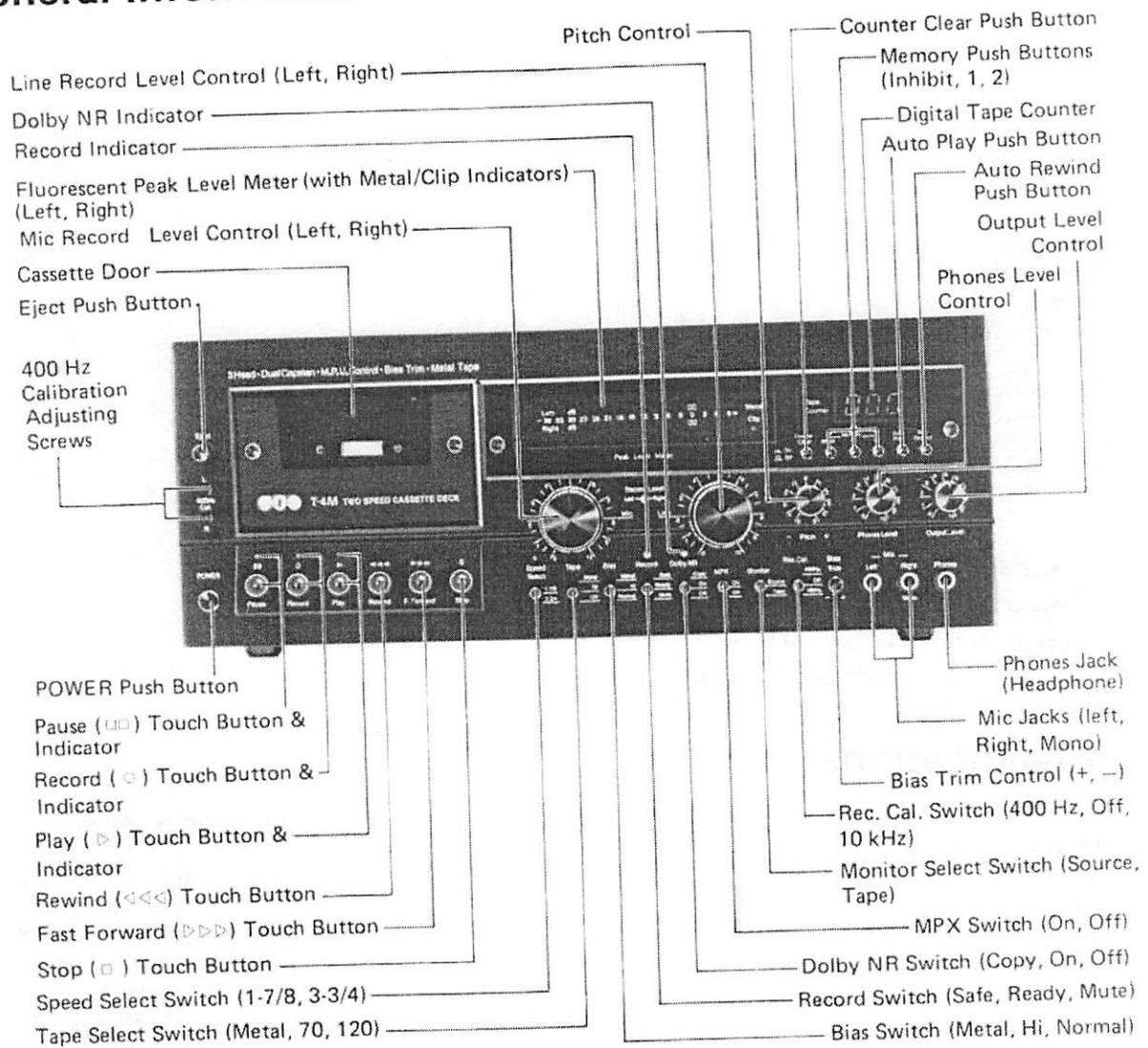


Figure 1

**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 Figure 2).

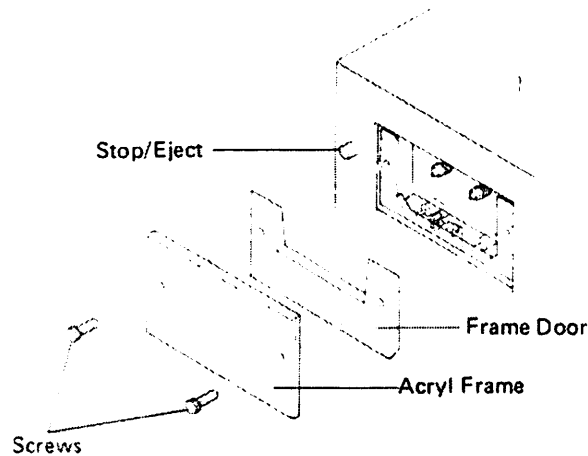


Figure 2

## 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.

## DESCRIPTION OF TAPE DECK CONTROL PROCESSOR ( $\mu$ PD546C)

This IC is a 4-bit micro-computer programmed for tape deck control. It controls display input and output as well as the drive input and output of solenoid controlled cassette deck.

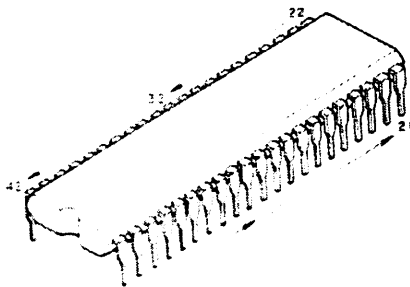


Figure 3

### 1. Functions

- (1) Controls inputs to cassette deck mode control keys and sets up the drive output of the solenoid and motor.
- (2) Controls inputs to auto-control keys and sets up the drive output.
- (3) Controls inputs to electronic counter and indicates the output.

### 2. Terminal Connections

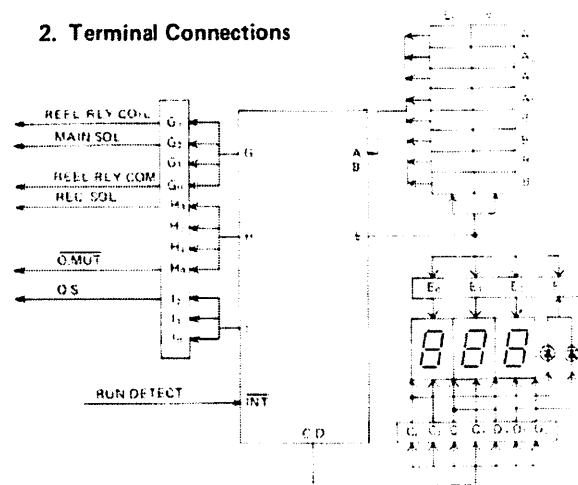


Figure 4

### 3. I/O Port

Port Name	Description
A <sub>0</sub> to A <sub>3</sub> B <sub>0</sub> to B <sub>3</sub>	Switch input with lock and none-lock.
C <sub>0</sub> to C <sub>3</sub> D <sub>0</sub> to D <sub>2</sub>	Data output of seven segments for display use. (See Figure 5)
E <sub>0</sub> to E <sub>3</sub>	Digit output.
G <sub>0</sub> , G <sub>2</sub> , G <sub>3</sub> H <sub>0</sub> , H <sub>3</sub> , I <sub>2</sub>	Drive output.
$\overline{\text{INT}}$	Run detect input.

Table 1

### 4. Key Arrangement

	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	B <sub>0</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>
E <sub>0</sub>	Auto Rew.	Auto Play	Memory Execution	Clear	Play	Rec.	Mute	Stop
E <sub>1</sub>	Counter Memory 1	Counter Memory 2	/	/	/	Pause	FF	Rew.

Table 2

### 5. LED of Seven Segments

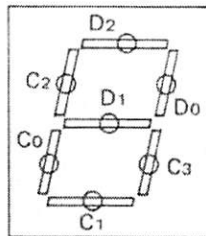


Figure 5

### 6. Drive Output Pattern

MODE \ PORT	G			H		I
	G <sub>3</sub>	G <sub>2</sub>	G <sub>0</sub>	H <sub>3</sub>	H <sub>0</sub>	I <sub>2</sub>
Rew.	/	0	/	0	0	△
FF	0	0	/	0	0	△
Play	0	/	/	0	/	△
Rec.	0	0	0	/	/	△
Rec./Play	0	/	/	/	/	△
Mute	0	/	/	/	/	△
Play/Pause	0	0	0	0	/	0
Rec./Pause	0	0	0	/	/	△
Rec./Play/Pause	0	0	0	/	/	0
Stop/Pause	0	0	0	0	0	0
Stop	0	0	0	0	0	0

Table 3

0 . . . . . Low  
/ . . . . . High  
△ . . . . . Fixed Time (0.2 sec.) High

### 7. Mode Change with Mode Control Key Operation

Key Input \ Mode at Present	Rew.	FF	Play	Rec.	Stop	Pause
Rew.	x	FF*	Play*	Rec.*	Stop	x
FF	Rew.*	x	Play*	Rec.*	Stop	x
Play	Rew.*	FF*	x	Rec.*	Stop	Play/Pause
Rec.	Rew.*	FF*	Play*	x	Stop	Rec./Pause
Rec./Play	Rew.*	FF*	Play*	x	Stop	Rec./Play/Pause
Play/Pause	Rew.	FF	x	Rec./Pause	Stop	Play
Rec./Pause	Rew.*	FF*	Rec./Play/Pause	x	Stop	Rec./Pause
Rec./Play/Pause	Rew.*	FF*	Play*/Pause	x	Stop	Rec./Play
Stop/Pause	Rew.	FF	Play/Pause	Rec./Pause	Stop	Stop
Stop	Rew.	FF	Play	Rec.	x	Stop/Pause

Table 4

Mode change to items marked with asterisk "\*" is made after 0.2 second of stop time. Items marked with "X" shows that the operation mode is not changed.

### 8. Lock Key Explanation

(1) Counter Memory 1, 2

High . . . . . Settable  
Low . . . . . Reset

With the counter operated, set the switch to ON and the indication is set. Mode changes are possible when the memory execution is ON. Memory is cleared when the switch is set to OFF.

(2) Auto Play, Rew

High . . . . . Mode change is possible.  
Low . . . . . Mode change is not possible.

Designate operating mode at the counter memory and the end of tape.

(3) Memory execution

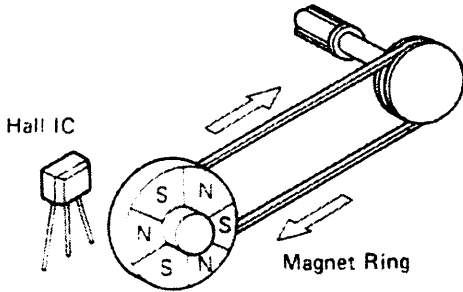
High . . . . . Counter memory 1, 2 available  
Low . . . . . Not available

Sets up the operation of counter memory 1 and 2. In the mechanical function, the operation mode is changed using the input as an execution signal (Rew. mode only).

\* Refer to Table 5 for the type of mode change.

### 9. Electronic Counter

The signal from RUN DETECT is counted into 6 pulses and is indicated in 3 digits on the 7-segment indicator (see Figure 6). Addition and subtraction are determined by the mode of tape operation. In addition, the counter functions "999 ⇒ 000" and in subtraction it functions "000 ⇒ 999". The counter can be set to "000" by the CLEAR key.



1 pulse corresponds to 1/3 turn of magnet ring.

Figure 6

### 10. Mode Change with Counter Memory

Mode at Present	Auto Play		Auto Rew.	
	On	Off	On	Off
Play			Rew.*	Stop
Rec./Play			Rew.*	Stop
FF	☆ Play*	Stop		
Rew.	Play*	Stop		

Table 5

\*: With memory execution.  
/: Present mode is not changed.

#### (1) Auto shut off (tape end)

The mode change in auto shut off is the same as that in the counter memory, except that, in FF (☆), tape is set in stop mode at the end of tape.

## Block Diagrams

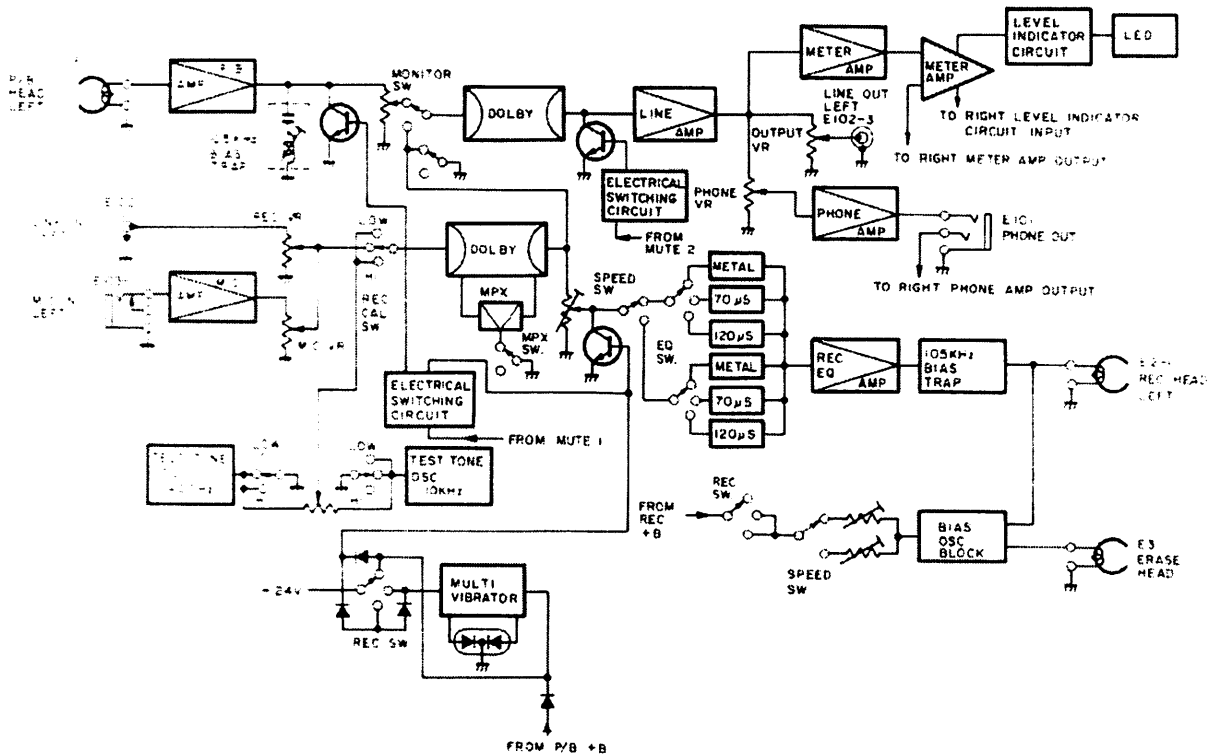


Figure 7

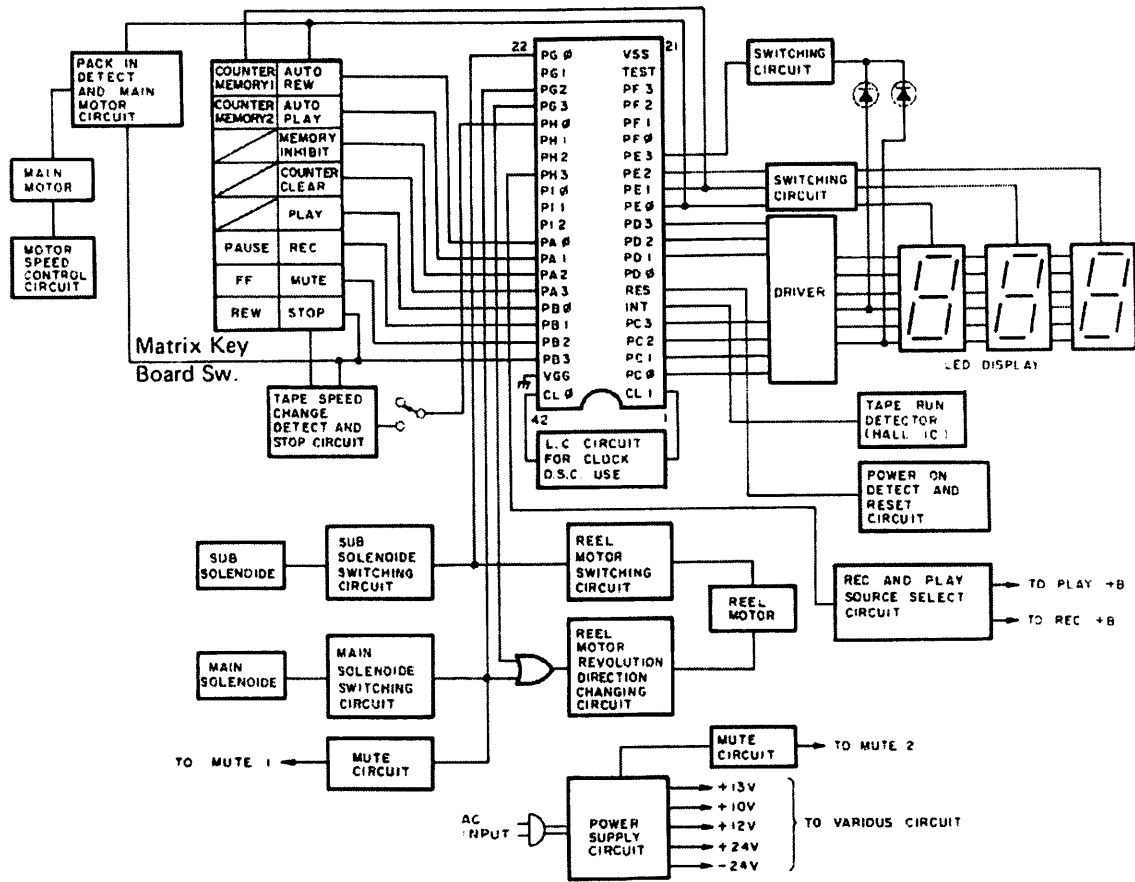


Figure 8

## Trouble Shooting Guide

SYMPTOMS AND POSSIBLE CAUSES	
<p><b>No power:</b></p> <ul style="list-style-type: none"> <li>(1) Defective power switch</li> <li>(2) Defective DC supply block</li> <li>(3) Defective power connections</li> </ul>	<ul style="list-style-type: none"> <li>(2) Defective cassette tape</li> <li>(3) Record/Play head magnetized</li> <li>(4) Record/Play head defective</li> </ul>
<p><b>No power to motor:</b></p> <ul style="list-style-type: none"> <li>(1) Defective motor</li> <li>(2) Defective servo</li> <li>(3) Defective start switch</li> </ul>	<p><b>High frequency deteriorated:</b></p> <ul 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> </ul>
<p><b>Distorted sound:</b></p> <ul style="list-style-type: none"> <li>(1) Record/Play head dirty</li> </ul>	



<p><b>Excessive Wow/Flutter:</b></p> <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>	<ol style="list-style-type: none"> <li>(6) Defective power connections</li> <li>(7) Cassette loaded incorrectly</li> <li>(8) Drive belt out of place</li> </ol>
<p><b>Signal to Noise Ratio deteriorated:</b></p> <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>	<p><b>Drive belt out of place:</b></p> <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>
<p><b>Loss of channel separation:</b></p> <ol style="list-style-type: none"> <li>(1) Improper tape travel</li> <li>(2) Record/Play head defective</li> </ol>	<p><b>Does not record:</b></p> <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>
<p><b>Level variation:</b></p> <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>	<p><b>Does not playback:</b></p> <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 pream output jack</li> </ol>
<p><b>Improper tape travel:</b></p> <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>	<p><b>Does not erase:</b></p> <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>
<p><b>Tape speed too fast/slow:</b></p> <ol style="list-style-type: none"> <li>(1) Defective cassette tape</li> <li>(2) Defective motor</li> <li>(3) Defective servo</li> </ol>	<p><b>Does not control:</b></p> <ol style="list-style-type: none"> <li>(1) Defective key board.</li> <li>(2) Defective control circuit.</li> <li>(3) Defective driver for reel motor or solenoids.</li> <li>(4) Defective reel motor or solenoids.</li> </ol>
<p><b>Tape does not move:</b></p> <ol style="list-style-type: none"> <li>(1) Defective cassette tape</li> <li>(2) Defective motor</li> <li>(3) Defective servo</li> <li>(4) Reel hub defective</li> <li>(5) Pinch roller not contacting capstan</li> </ol>	

<p><b>Auto shut off activated before tape end:</b></p> <ul 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> </ul>	
--	--

<b>CHECKS TO BE PERFORMED AFTER REPAIR</b>	
<p><b>Motor:</b></p> <ul style="list-style-type: none"> <li>(1) Tape speed</li> <li>(2) Wow/Flutter</li> <li>(3) Drive belt position</li> </ul>	<p><b>Pinch roller:</b></p> <ul 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> </ul>
<p><b>Drive belt:</b></p> <ul style="list-style-type: none"> <li>(1) Belt position</li> <li>(2) Tape speed</li> <li>(3) Wow/Flutter</li> </ul>	<p><b>Tape counter:</b></p> <ul style="list-style-type: none"> <li>(1) Tape speed</li> <li>(2) Wow/Flutter</li> </ul>
<p><b>Record/Play head:</b></p> <ul 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> </ul>	<p><b>Reel hub:</b></p> <ul style="list-style-type: none"> <li>(1) Torque check</li> <li>(2) Tape speed</li> <li>(3) Wow/Flutter</li> </ul>
<p><b>Flywheel:</b></p> <ul 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> </ul>	

# Disassembly Instructions

## 1. Removal of Wood Cabinet

- (1) Remove four screws from both sides of the wood cabinet as shown in Figure 9 and 10.
- (2) Lift up the wood cabinet in the direction of the arrow as shown in Figure 10.

## 2. Removal of Front Panel

- (1) After removing the wood cabinet, pull out five knobs from the front of the unit, as shown in Figure 10. (The large knobs are dual knob.)
- (2) Remove six screws from the top and bottom of the unit as shown in Figure 11 and 12.
- (3) Remove two special screws holding the cassette door as shown in Figure 10, and then remove the door.
- (4) Front panel can be removed from the main chassis in the direction of the arrow as shown in Figure 11.

## 3. Removal of LED Meter P.C. Board

- (1) Remove four screws as shown in Figure 14.
- (2) Disconnect all wires from the P.C. Board.

## 4. Removal of LED Counter P.C. Board

- (1) Remove two tacks as shown in Figure 14.
- (2) Disconnect all wires from the P.C. Board.



Wood Cabinet Screws

Figure 9

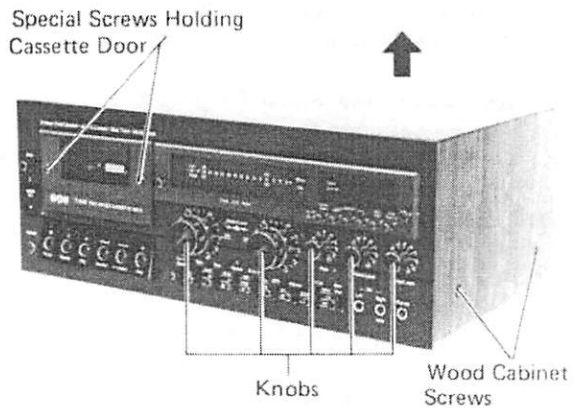


Figure 10

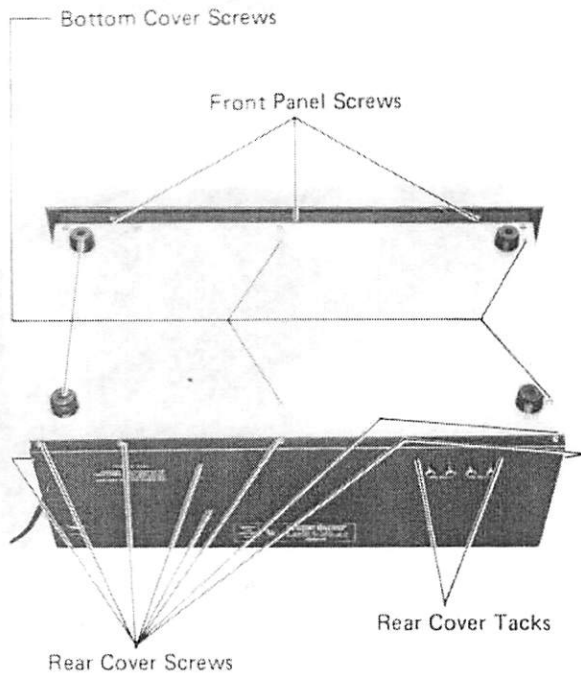


Figure 12

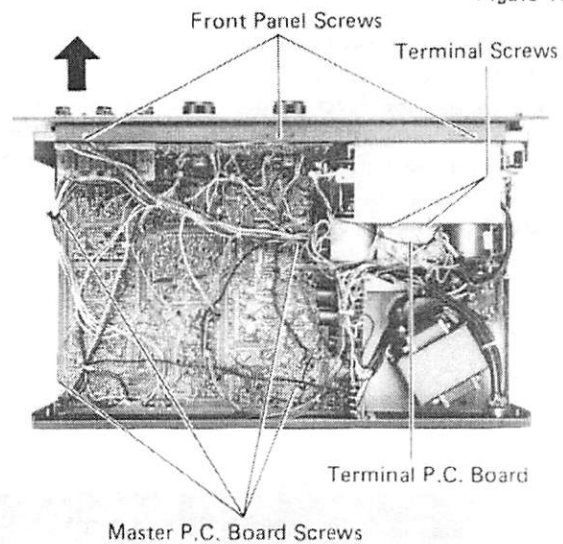


Figure 11

**5. Removal of Run Detect P.C. Board**

- (1) Remove two screws as shown in Figure 14.
- (2) Disconnect all wires from the P.C. Board.

**6. Removal of Select Switch P.C. Board**

- (1) Remove two screws as shown in Figure 13.
- (2) Disconnect all wires from the P.C. Board.

**7. Removal of Speed LED P.C. Board**

- (1) Remove one tack as shown in Figure 13.
- (2) Disconnect all wires from the P.C. Board.

**8. Removal of LED P.C. Board**

- (1) Remove one tack as shown in Figure 13.
- (2) Disconnect all wires from the P.C. Board.

**9. Removal of Power Switch P.C. Board**

- (1) Remove one screw as shown in Figure 15.
- (2) Detach the switch lever from the switch spacer as shown in Figure 15.
- (3) Disconnect all wires from the P.C. Board.

**10. Removal of Rec./Cal. P.C. Board**

- (1) Remove two screws as shown in Figure 15.
- (2) Disconnect all wires from the P.C. Board.

**11. Removal of Terminal P.C. Board**

- (1) Remove two screws as shown in Figure 11.
- (2) Disconnect all wires from the P.C. Board.

**12. Removal of Key Board Panel**

- (1) Remove five screws as shown in Figure 13.
- (2) Detach the function panel and the function key frame with the key Board P.C. Board to this side.
- (3) Turn the function key frame, remove four screws from the P.C. Board as shown in Figure 16.
- (4) Disconnect all wires from the P.C. Board.

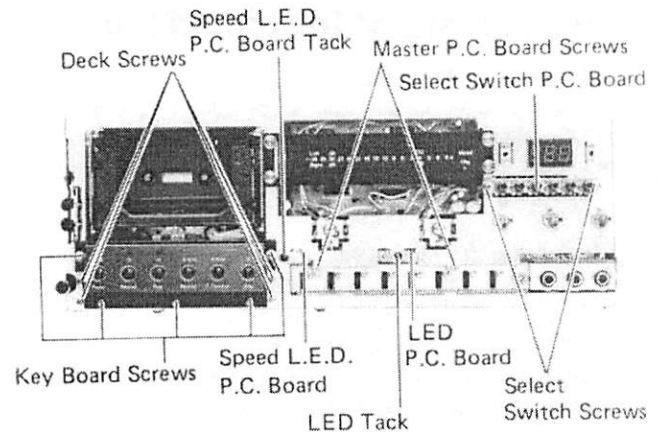


Figure 13

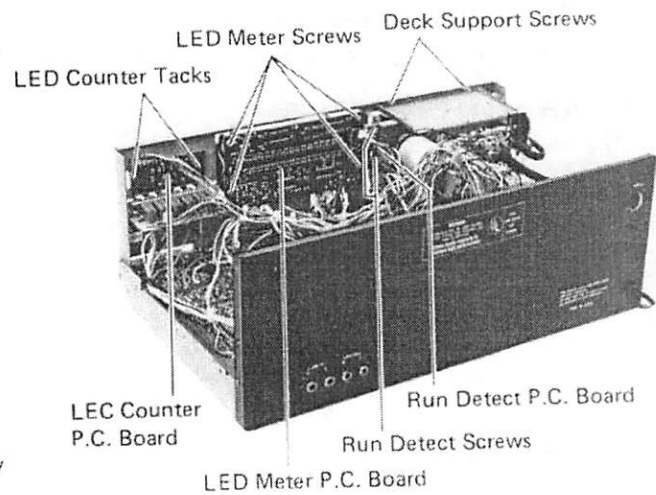


Figure 14

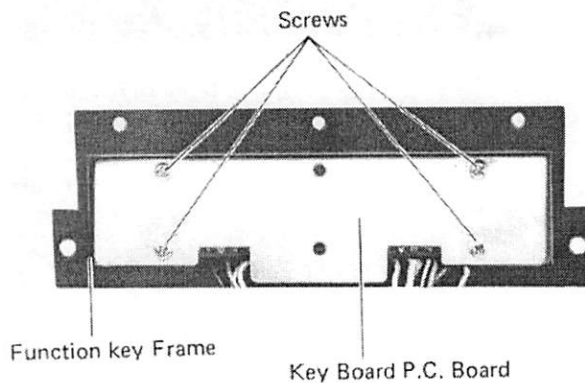


Figure 16

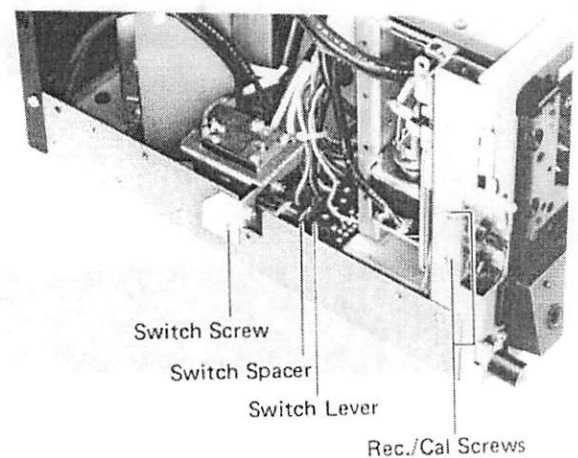


Figure 15

### 13. Removal of Master P.C. Board

- (1) Remove eight screws and two tacks from the rear cover as shown in Figure 12.
- (2) Detach the rear cover backward.
- (3) Remove six screws from the bottom cover as shown in Figure 12.
- (4) Remove the bottom cover.
- (5) Remove two screws as shown in Figure 13.
- (6) Remove four screws as shown in Figure 11.
- (7) Disconnect all wires from the P.C. Board.
- (8) The master P.C. Board can be completely removed backward from the chassis.

### 14. Removal of Power Supply P.C. Board

- (1) Remove two tacks as shown in Figure 17.
- (2) Disconnect all wires from the P.C. Board.

### 15. Removal of Cassette Deck

- (1) Remove two screws from the deck support as shown in Figure 14.
- (2) Remove four screws as shown in Figure 13.
- (3) The cassette deck with the control P.C. Board can be completely removed from the chassis.

### 16. Removal of Control P.C. Board

- (1) Turn the cassette deck upside down and remove four screws as shown in Figure 18.

### 17. Removal of Motor Belt & Sub Belt

- (1) Remove two springs from the door frame as shown in Figure 20.
- (2) Remove seven screws from the sub chassis as shown in Figure 19.
- (3) The sub chassis can be completely removed from the cassette chassis, and then remove the motor belt and sub belt.

### 18. Removal of Counter Belt

- (1) Remove two "C" washers and then remove the arm eject shaft in the direction of the arrow as shown in Figure 20.
- (2) Remove two screws as shown in Figure 20.
- (3) Lay down the chassis support to this side and remove the counter belt.

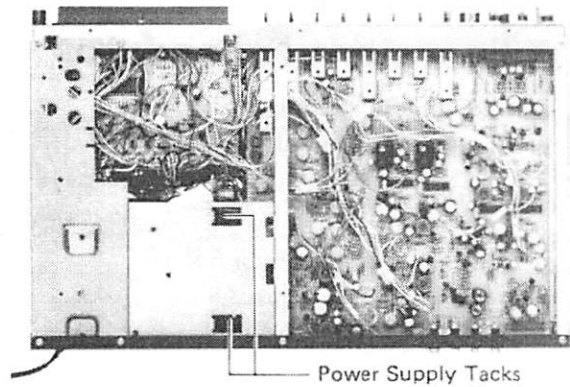


Figure 17

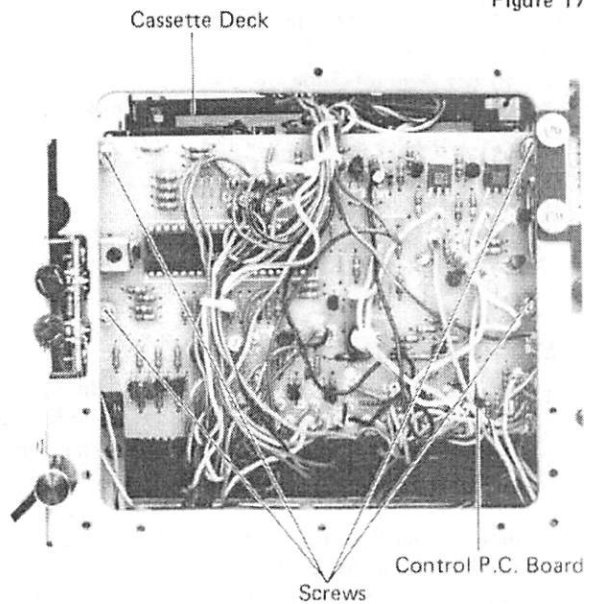


Figure 18

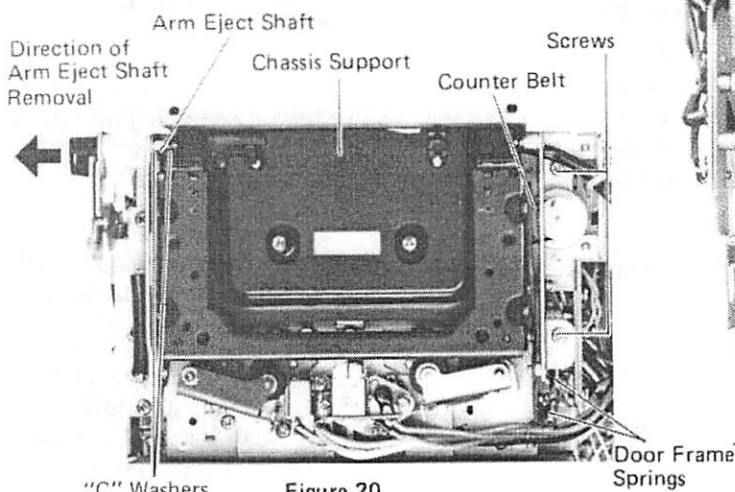


Figure 20

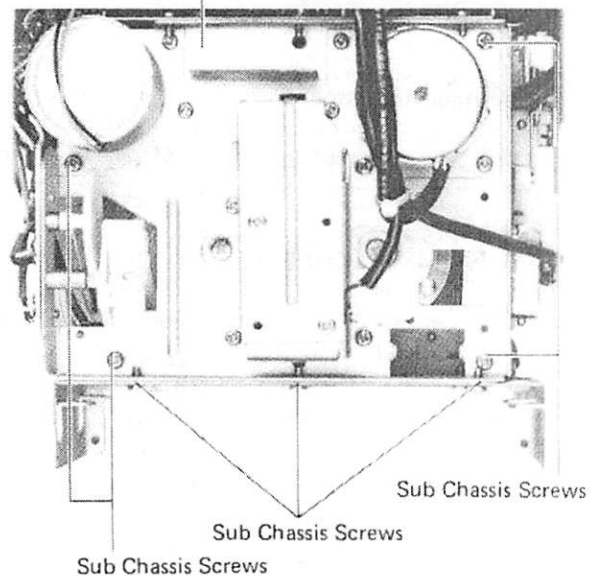


Figure 19

# Adjustment Procedures

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

## Test Cassettes

- |  |                                |
|--|--------------------------------|
| (1) Torque Cassette                                |                                |
| (2) 333 Hz Reference Tape 200nw/m                  | ..... MTT112B                  |
| (3) 3 kHz Wow/Flutter Tape                         | ..... MTT111 (-10 dB, 3 kHz)   |
| (4) 10 kHz Azimuth Tape                            | ..... MTT114 (-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) Dolby Level Tape                               | ..... MTT 150 or VTT 666       |
| (9) 120 $\mu$ s EQ Alignment                       | ..... MTT217G (12.5K/1K/40 Hz) |
| (10) 70 $\mu$ s EQ Alignment                       | ..... MTT317G (12.5K/1K/40 Hz) |

## Mechanical Adjustment

- 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.
- 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.
- 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 is not, change the hub assembly.

## Electrical Adjustment

Step	Description	Mode	Adjust Points	Test Points	Connection Instruction	Remarks	
1	Tape Speed Adjustment	1-7/8 ips	Playback NR: Off EQ: 120 Bias: Norm. Speed: 1-7/8	Variable Resistor in the Motor. (VR603)	Line Out	Figure 21	Test Tape: MTT-111 Adjust to 3015 $\pm$ 10 Hz
		3-3/4 ips	Playback NR: Off EQ: 120 Bias Norm. Speed: 3-3/4	VR602	Line Out	Figure 21	Test Tape: MTT-111 Adjust to 6030 $\pm$ 15 Hz (Twice of 1-7/8 ips)
		Rec. 1-7/8 ips	Record EQ: 120 Rec: Safe Speed: 1-7/8	VR601	Line Out	Figure 21	Test Tape: MTT-111 Adjust to 3015 $\pm$ 10 Hz Stick adhesive tapes to make a record mode.

Step	Description	Mode	Adjust Points	Test Points	Connection Instruction	Remarks	
2	Phase Adjustment		Head Azimuth Screw	Line Out	Figure 22	Test Tape MTT-114 Adjust for in phase display (Less than 15 degrees)	
3	Playback Level Adjustment	Playback EQ: 120 Monitor: Tape Speed: 1-7/8	VR105 VR106	T.P. 1 T.P. 2	Figure 23	Test Tape: MTT-150 Adjust Level to 580mV	
4	Playback EQ Adjustment	Playback EQ: 70 Speed: 3-3/4 Monitor: Tape	VR103 VR104	T.P. 5 T.P. 6	Figure 24	OSC Test Signal Reference Signal : 200 Hz Adjustment Signal : 12.5 kHz Set Adjustment Signal Level -30 dB from reference signal level. Affirmation change of other positions (in 20 kHz)	
5	Record Level Adjustment	Record NR: Off EQ: 70 Bias: Hi Rec: Ready Speed: 1-7/8	1	Line VR	T.P. 3 T.P. 4	Figure 25	Test Signal Input : 400 Hz, 250mV Adjust Level to 580mV
			2	VR107 VR108	T.P. 1 T.P. 2	Figure 25	Adjust level to 580mV
6	L.E.D. Meter Adjustment	Record NR: Off EQ: 70 Bias: Hi Rec: Ready Speed: 1-7/8	1	VR121 VR122	T.P. 7 T.P. 8	Figure 25	Test Signal Input : 400 Hz, 250mV Adjust Level to 2.1V
			2	VR501 VR502	L.E.D. Meter	Figure 25	Adjust light "0" dB of Level Meter
7	Record Calibration Adjustment	Rec. Cal. Sw. 400 Hz 10 kHz	1	VR132	T.P. 7 T.P. 8	Figure 25	Adjust VR132 to not difference 400 Hz and 10kHz.
			2	VR129 VR130	L.E.D. Meter	Figure 25	Adjust VR129 and VR130 to light "0" dB of L.E.D. Meter (400 Hz and 10 kHz)
8	Record/Peak Adjustment	Record EQ: 70 Speed: 1-7/8	L105 L106	T.P. 9 T.P. 10	Figure 25	Test Signal Input : 23 kHz, 250mV Adjust to Maximum After adjustment short circuit by the solder.	
9	Record/EQ Adjustment	Record Mic/Line: Line Monitor: Source Rec: Ready EQ: Metal Speed: 3-1/4	—————	T.P. 9 T.P. 10	Figure 24	Test Signal Line Input Reference Signal : 200 Hz, 250mV Adjustment Signal : 15 kHz, 250mV Set Adjustment signal level +12 dB from reference signal level. See chart below.	

Step	Description	Mode		Adjust Points		Test Points	Connection Instruction	Remarks		
		Speed	EQ	Bias	Adjust Points					
9	Checking									
	Typical Data	3-3/4	Metal	Metal	VR109, 110			15 kHz/200 Hz +12 dB		
		3-3/4	70	Hi	VR111, 112			15 kHz/200 Hz +14.5 dB		
		3-3/4	120	Norm.	VR113, 114			15 kHz/200 Hz +10.5 dB		
		1-7/8	Metal	Metal	VR115, 116			15 kHz/200 Hz +13.5 dB		
		1-7/8	70	Hi	VR117, 118			15 kHz/120 Hz +12.5 dB		
1-7/8	120	Norm.	VR119, 120			15 kHz/200 Hz +8 dB				
10	Bias Adjustment	Record Rec.: Ready EQ: 70 Bias: Metal Speed: 1-7/8		1.	VR133 VR134 VR123 ~ VR126			Mechanical Maximum		
				2.	VR127	T.P. 11	Figure 25	Adjust level to 210mV		
				3.	VR133 VR134	T.P. 9 T.P. 10	Figure 25	Adjust level to 11mV		
				4.	L109 L110	T.P. 9 T.P. 10	Figure 25	Adjust trap to Maximum		
				5.	L107 L108	T.P. 12 T.P. 13	Figure 25	Adjust trap to Minimum		
				*	Affirmation step (3) in Test Point.					
				6.	VR128	T.P. 11	Figure 25	Adjust level to 12.5mV (Tape Speed: 3-3/4)		
				When not coincide with 12.5mV affirmation step (3) and re-adjust.						
				7.	VR123 VR124	T.P. 9 T.P. 10	Figure 25	Adjust level to 6.8mV Tape Speed: 1-7/8 Bias: Hi		
8.	VR125 VR126	T.P. 9 T.P. 10	Figure 25	Adjust level to 5.0mV Tape Speed: 1-7/8 Bias: Norm.						
9.	Affirmation the change of Hi and Norm. in tape speed 3-3/4 ips.									
11	Record/Play Frequency Response Adjustment	<ul style="list-style-type: none"> <li>• Don't vary bias fundamentally, because of changing R/P level. Adjust bias by EQ/VR in each position.</li> <li>• When high area is down at 1-7/8 ips-70 EQ and 1-7/8 ips-120 EQ, remove dipping solder on Play EQ Peak Point (Point A, A').</li> <li>• You had better adjust to +1 dB nearby 10 kHz at 1-7/8 ips-70EQ.</li> </ul>								

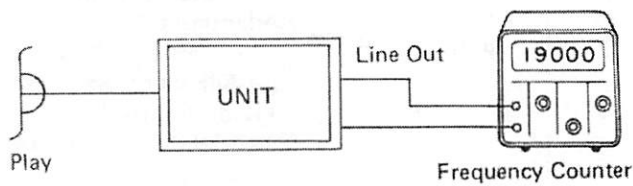


Figure 21

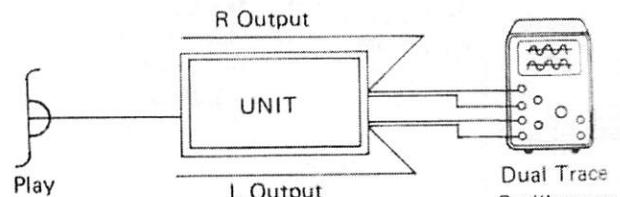


Figure 22



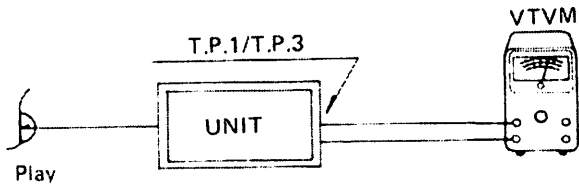


Figure 23

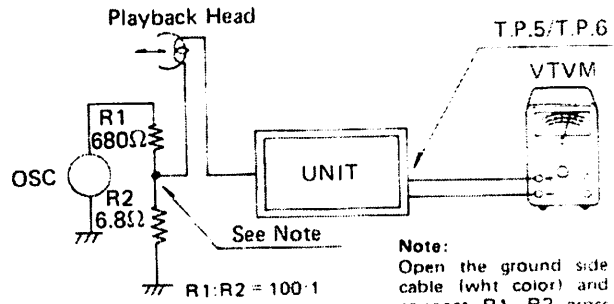


Figure 24

Note:  
Open the ground side cable (wht color) and connect R1, R2 cross point

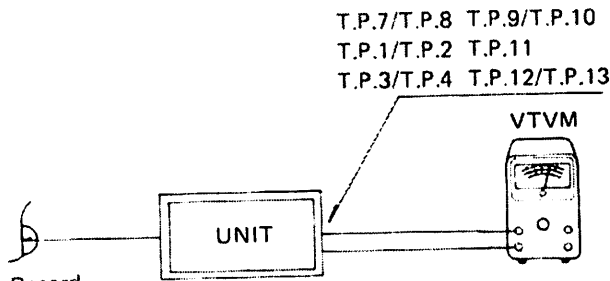
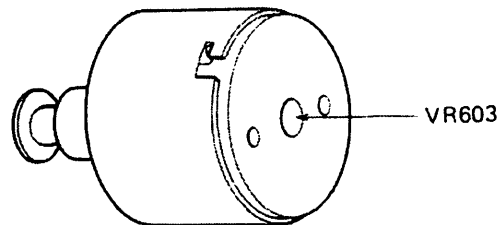
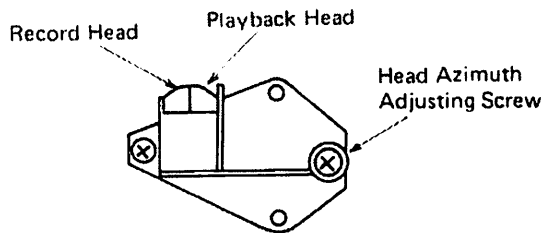
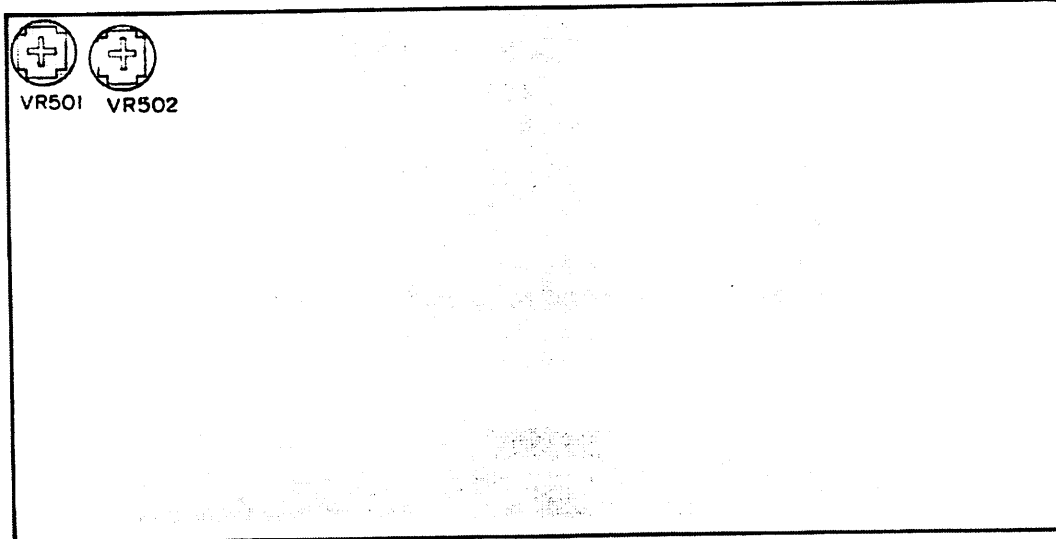


Figure 25

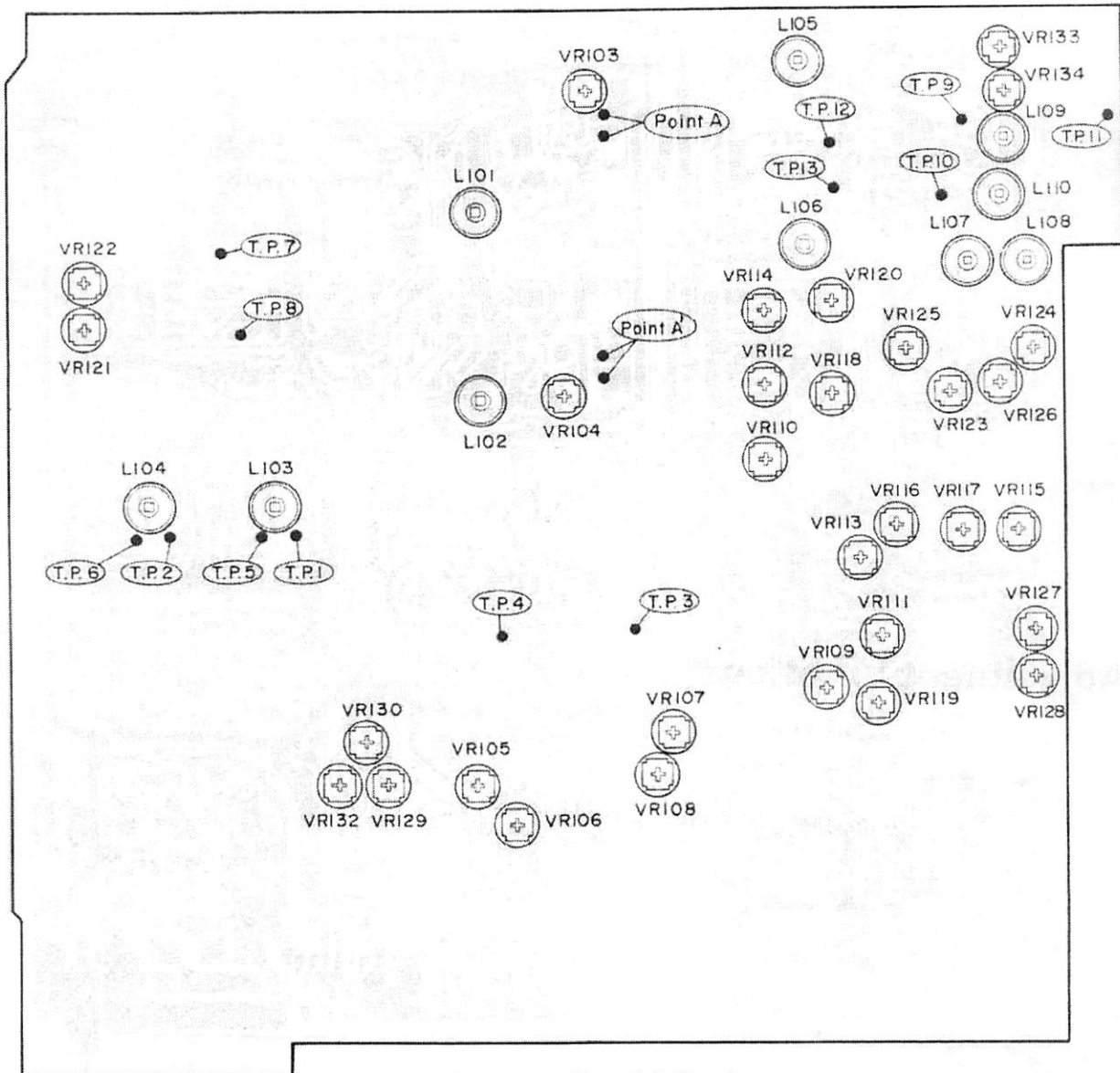
## Adjustment Locations



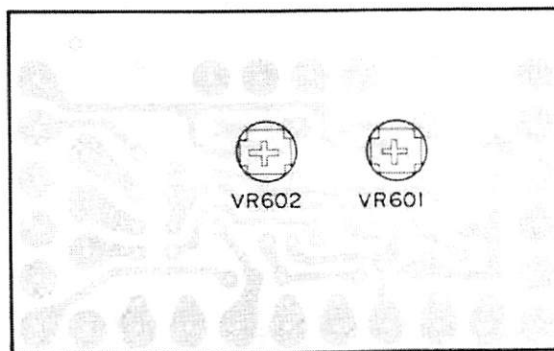
E6 Two Speed Motor



LED Meter P.C.Board

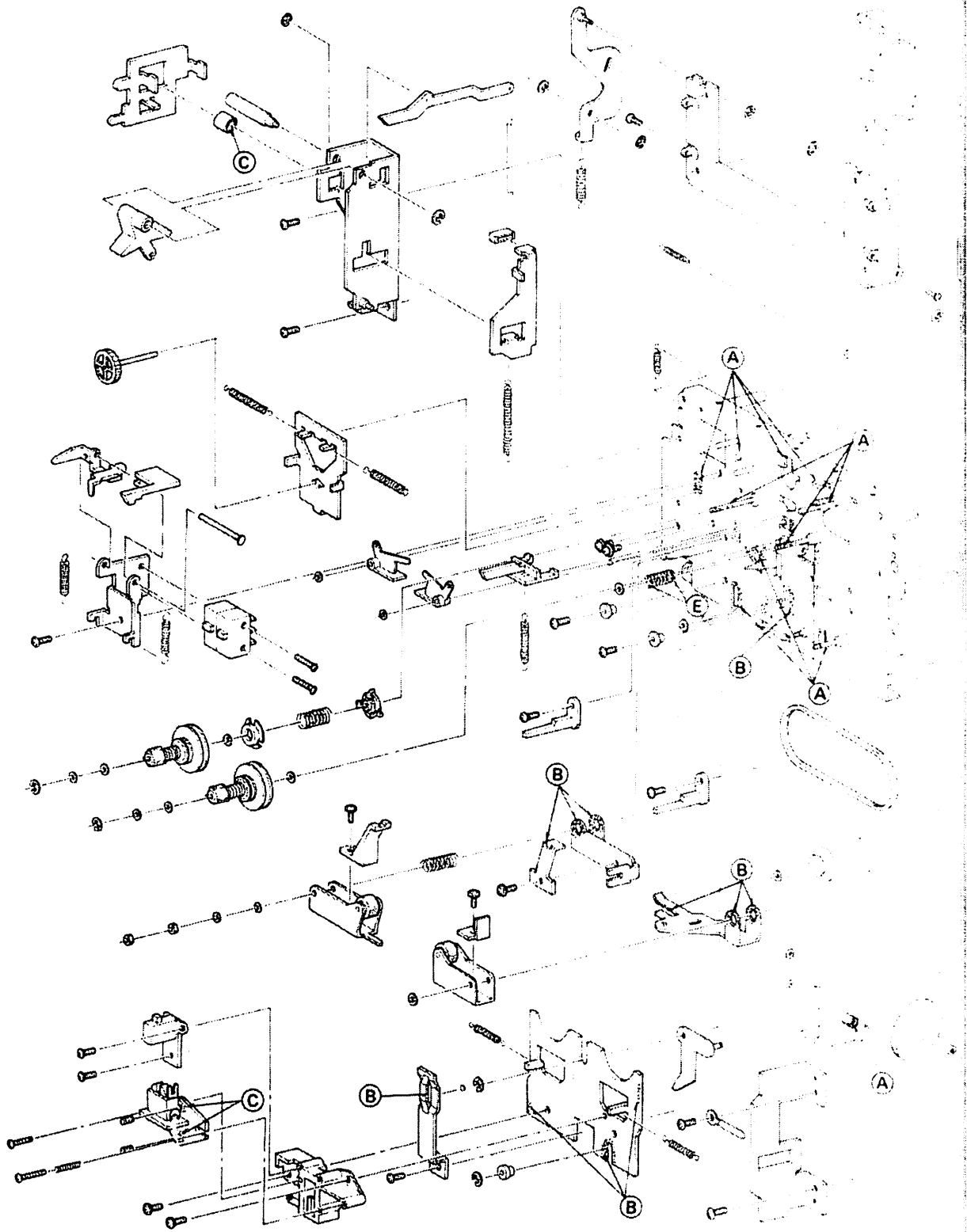


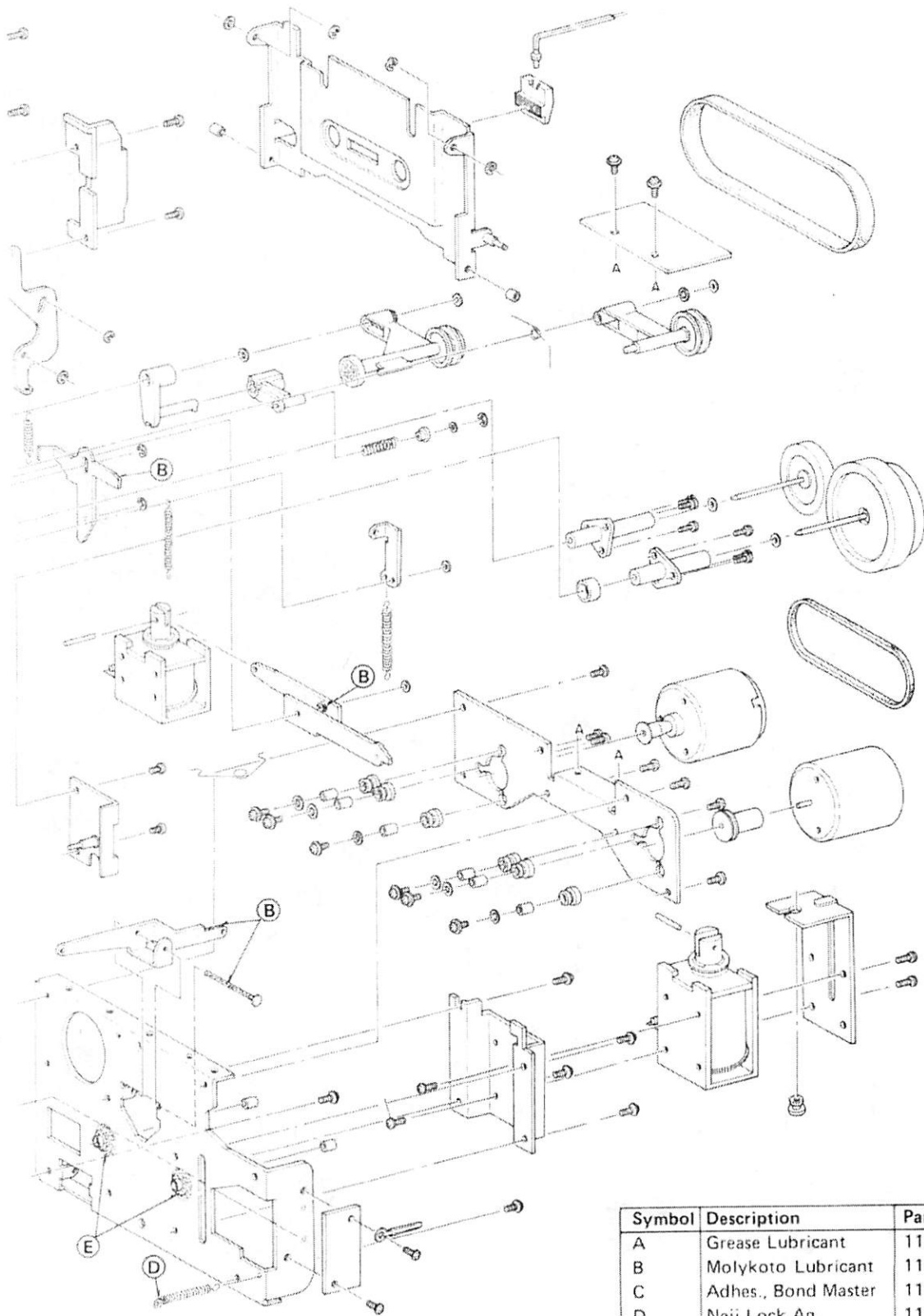
Master P.C. Board



Terminal P.C. Board

# Lubrication Points

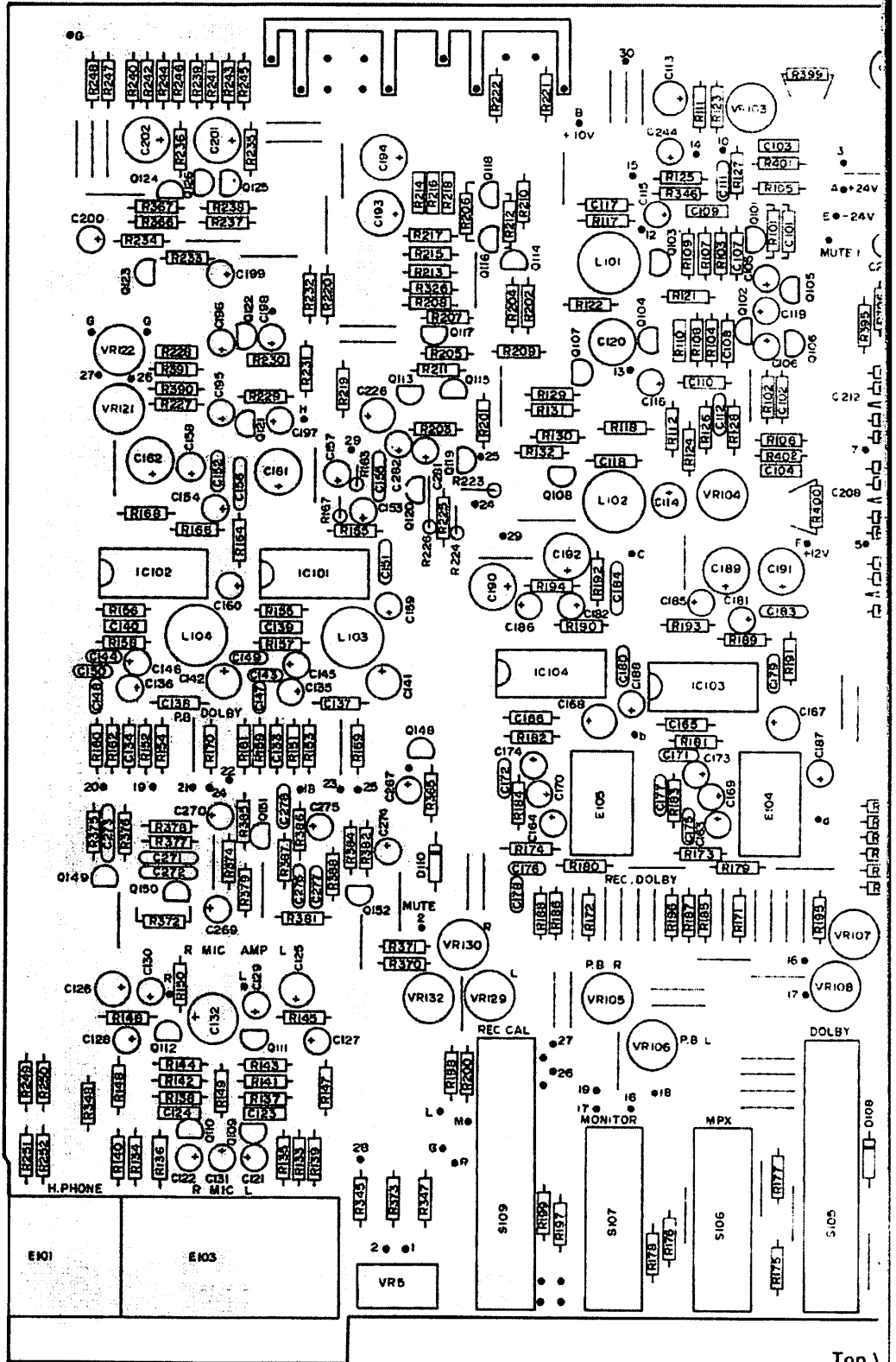




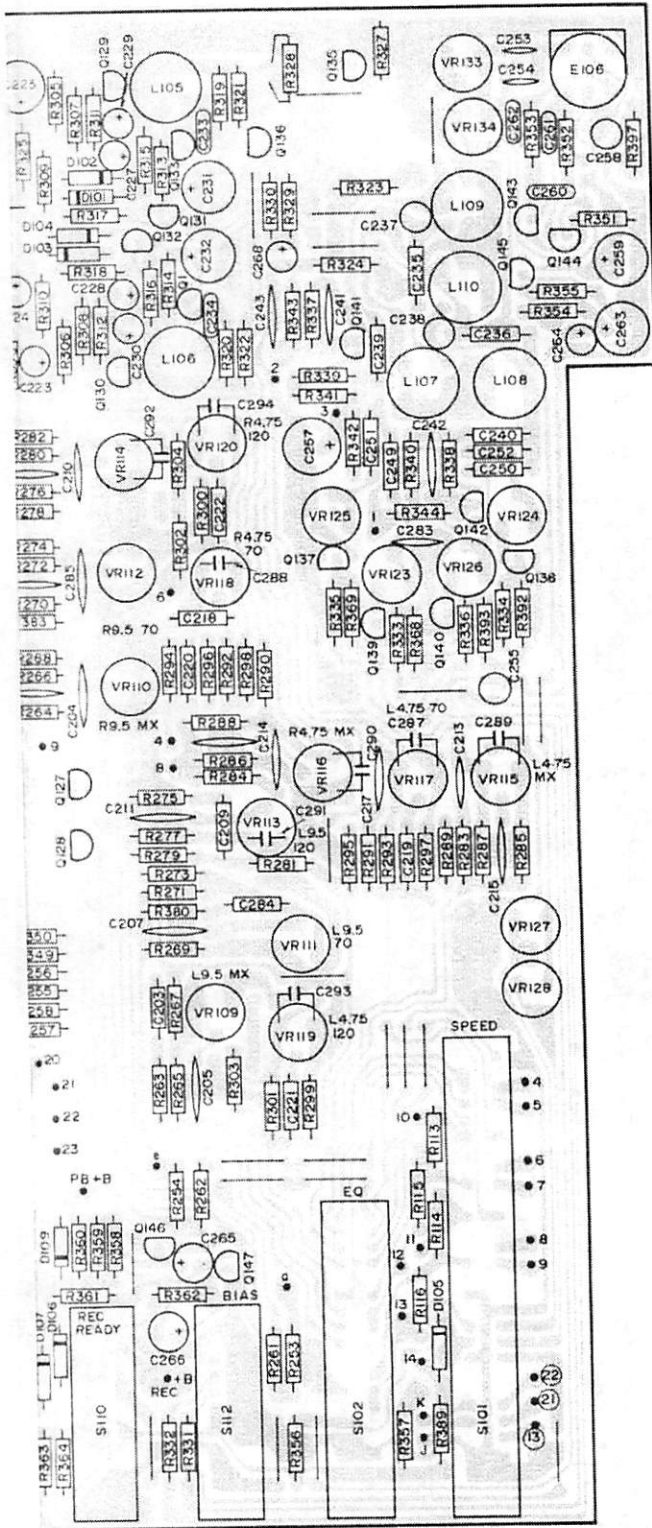
Symbol	Description	Parts No.
A	Grease Lubricant	11S10027A14
B	Molykoto Lubricant	11S125896
C	Adhes., Bond Master	11S40117G10
D	Neji Lock Ag.,	11S40117G19
E	Grease Silicon	11S490487

# Parts Layout on P.C. Board

## Master P.C. Board

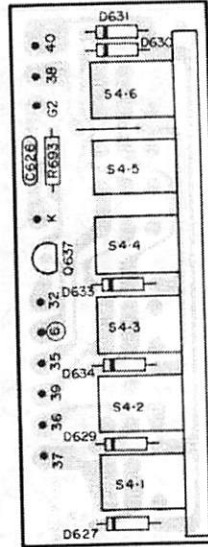


Top \



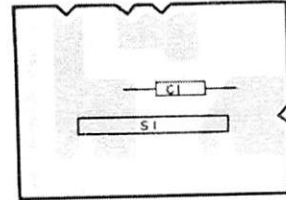
View

Select Switch P.C. Board



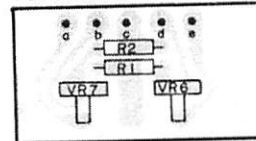
Top View

Power Switch P.C. Board



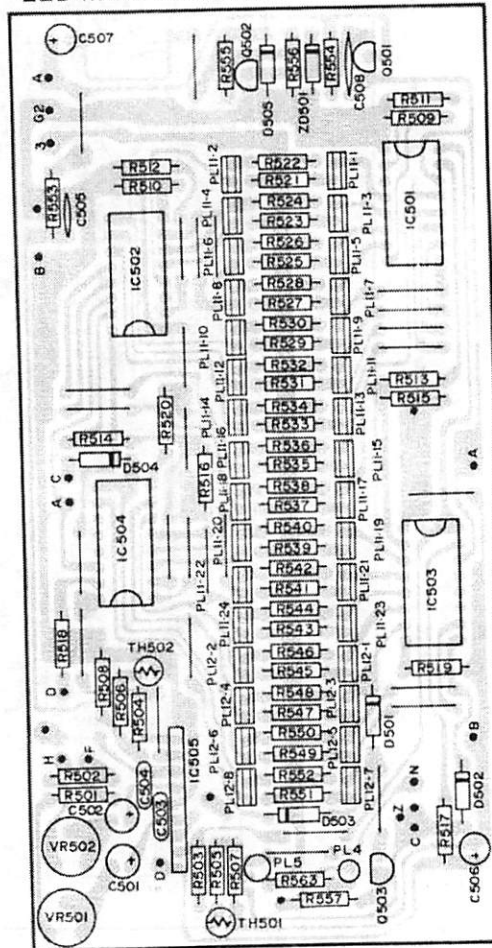
Top View

Record Calibration P.C. Board

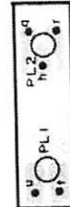


Top View

LED Meter P.C. Board

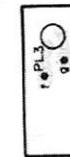


Dolby Record LED P.C. Board



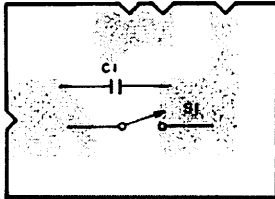
Top View

Speed LED P.C. Board



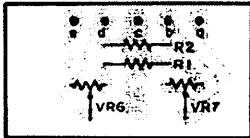
Top View

Power Switch P.C. Board



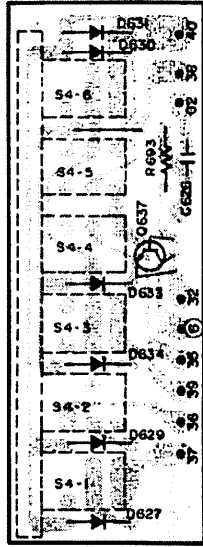
Bottom View

Record Calibration P.C. Board



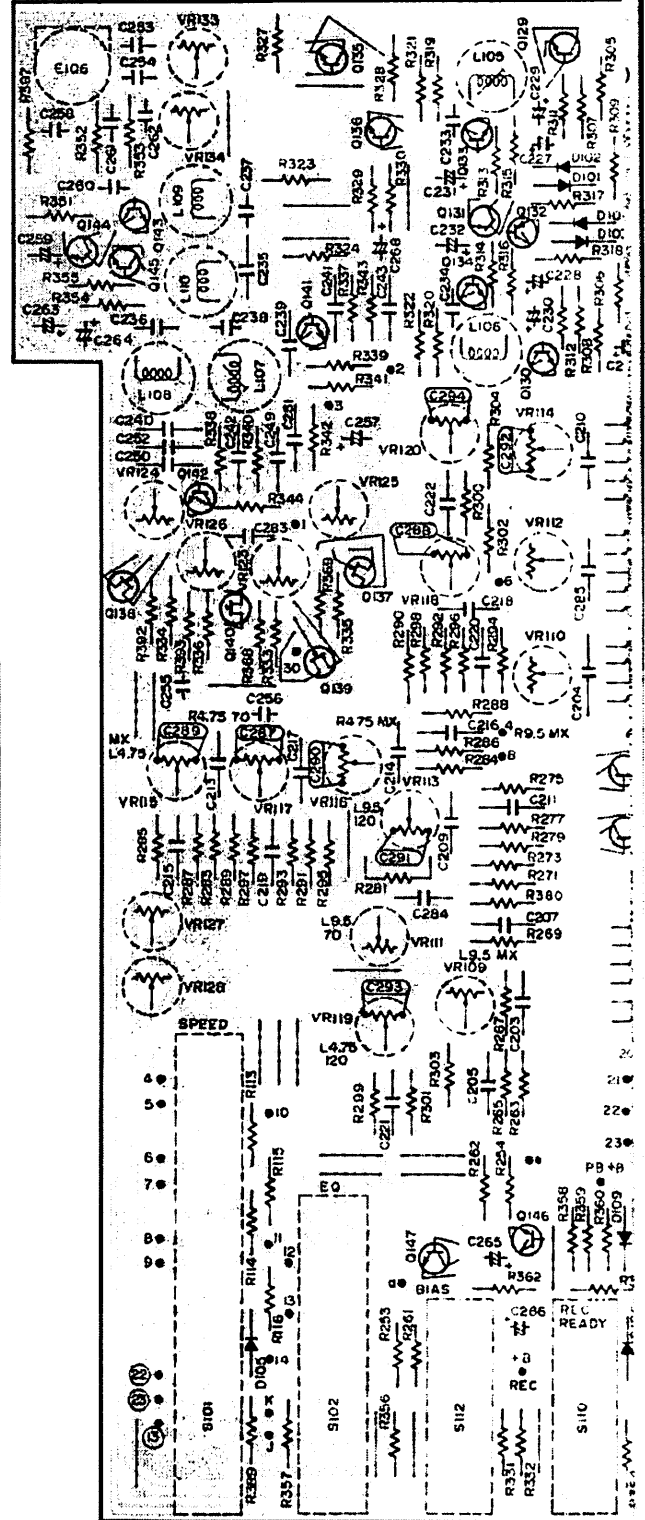
Bottom View

Select Switch P.C. Board



Bottom View

Master P.C. Board

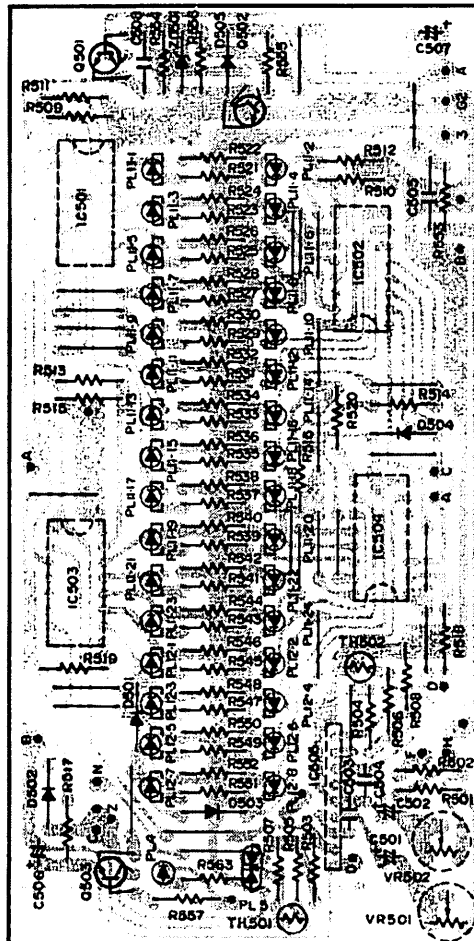


Dolby Record LED P.C. Board



Bottom View

LED Meter P.C. Board

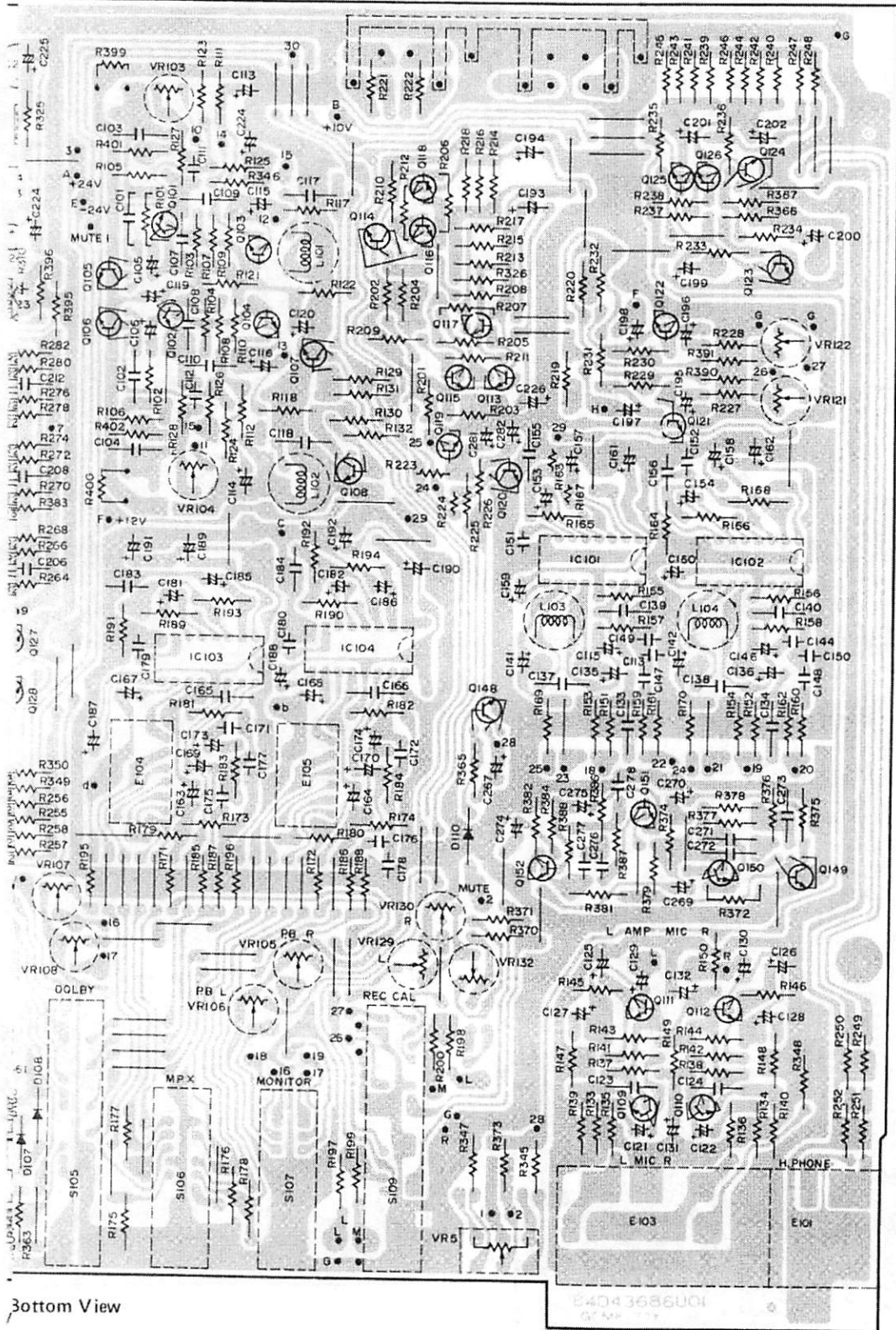


Bottom View

Speed LED P.C. Board



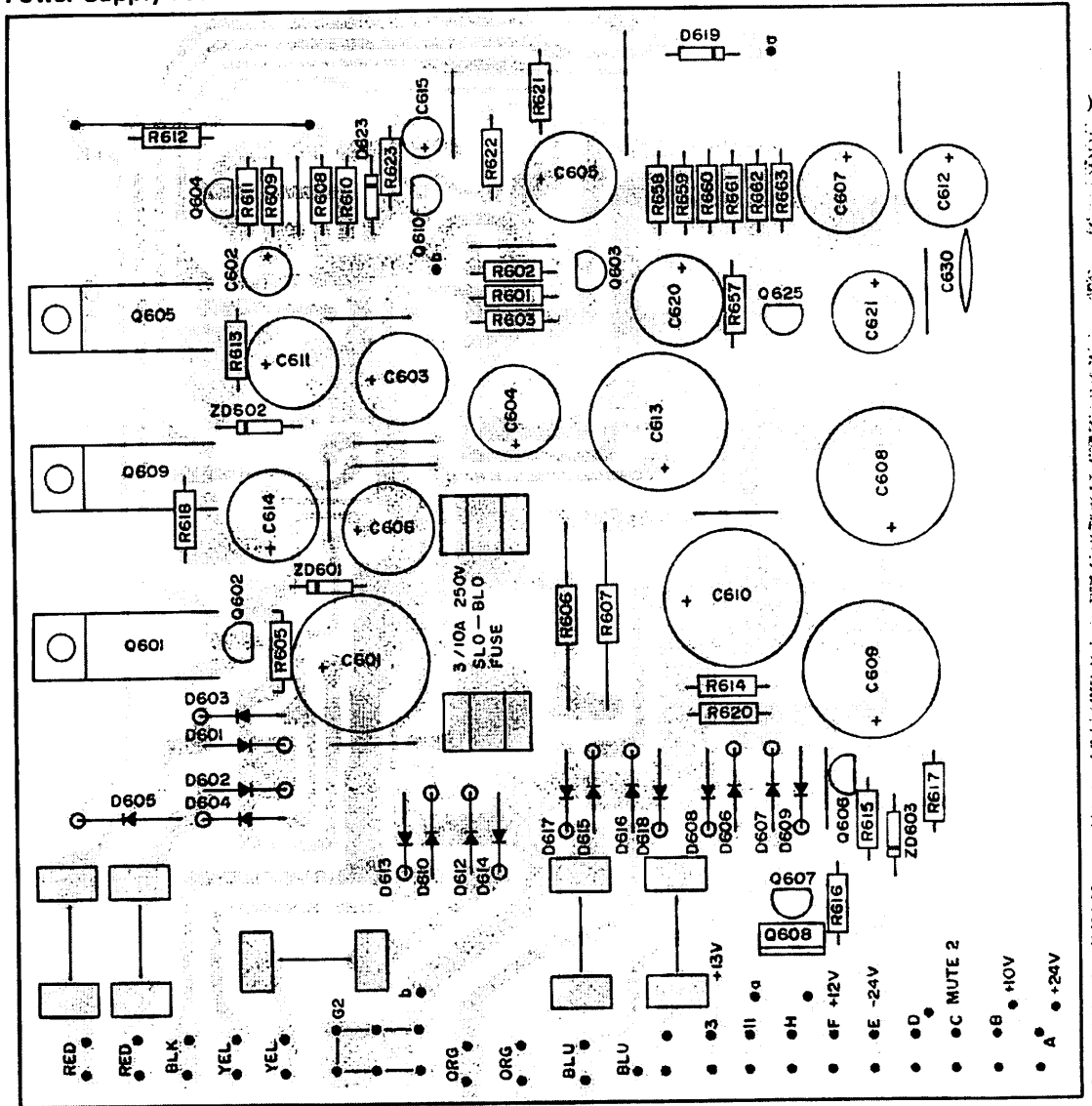
Bottom View



Bottom View

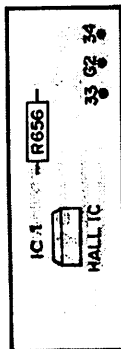


Power Supply P.C. Board



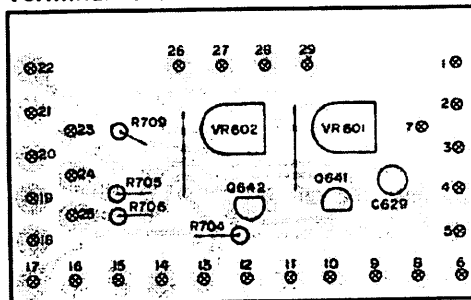
Top View

Auto Shut Off P.C. Board



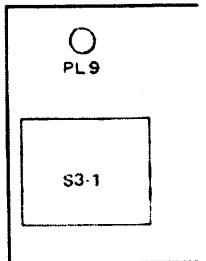
Top View

Terminal P.C. Board

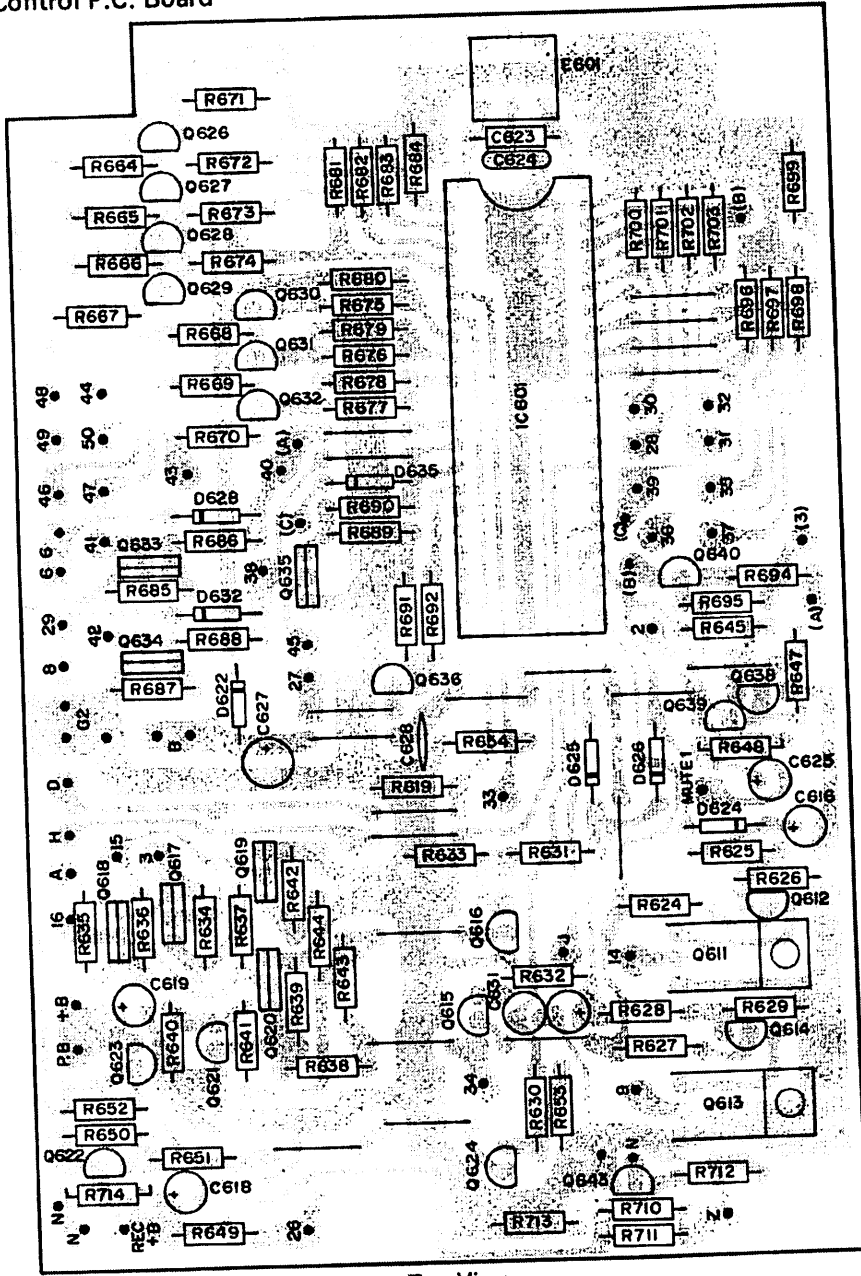


Top View

Key Board P.C. F

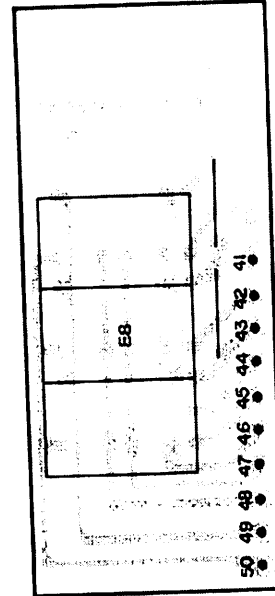


Control P.C. Board



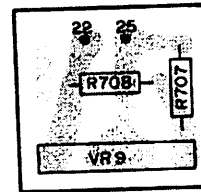
Top View

Counter LED P.C. Board



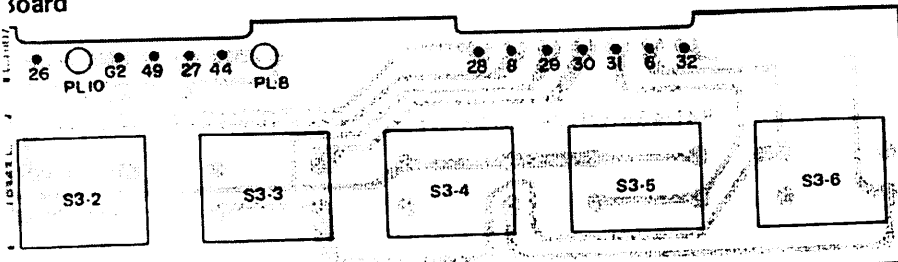
Top View

Pitch Control P.C. Board



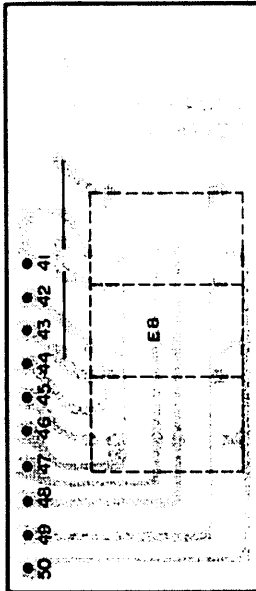
Top View

Board

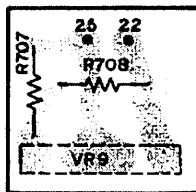


Top View

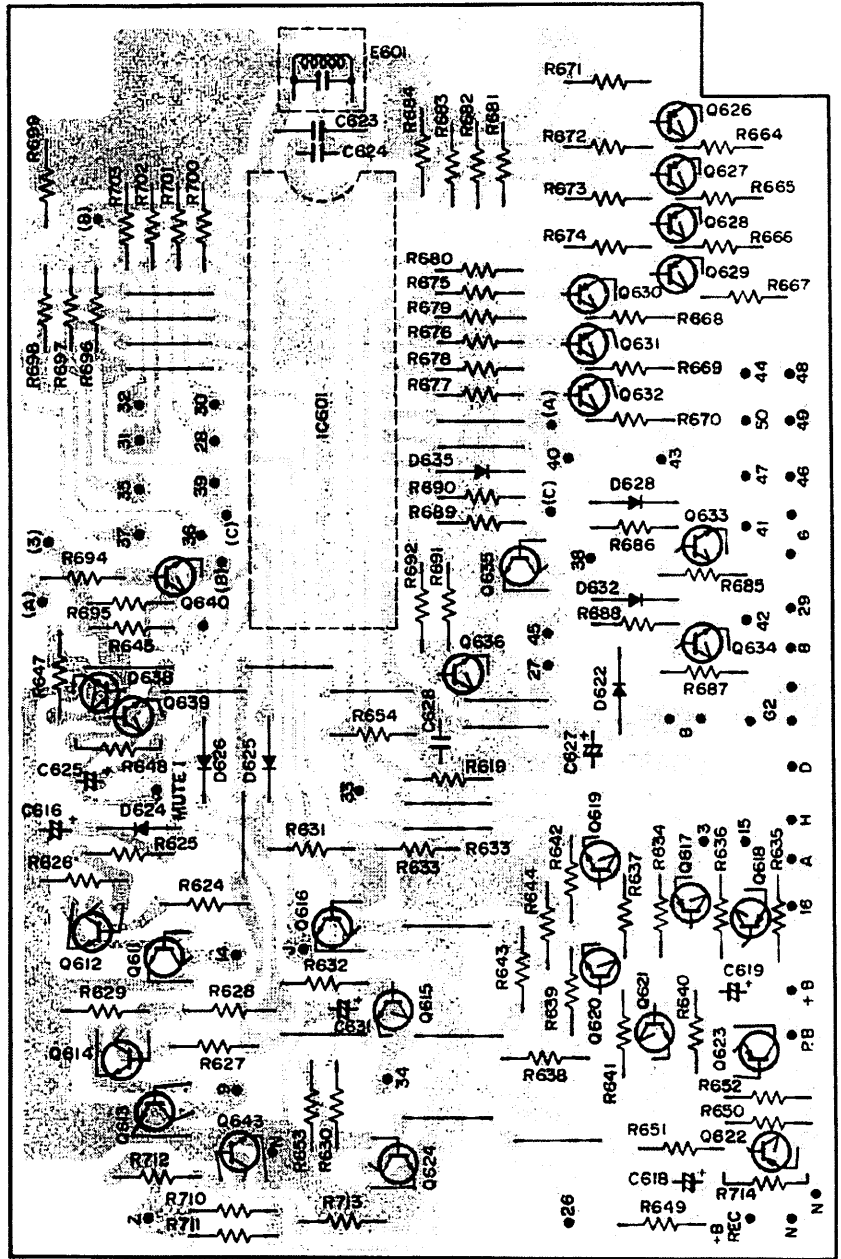
Counter LED P.C. Board



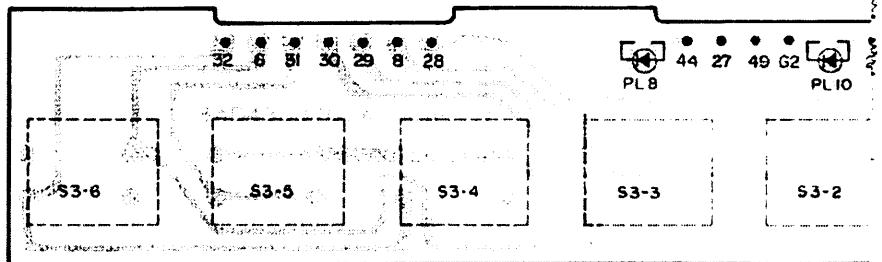
Pitch Control P.C. Board



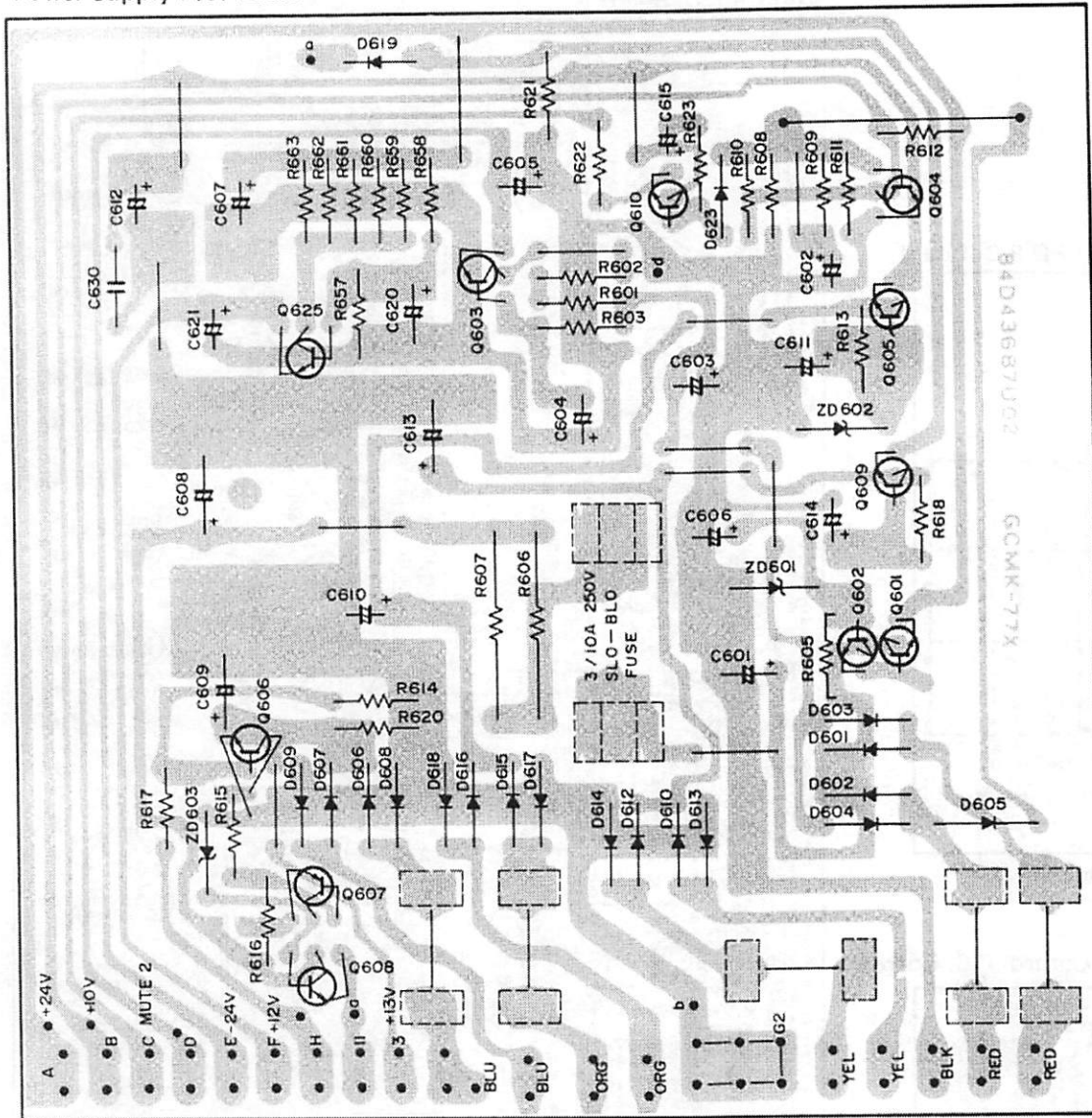
Control P.C. Board



Key Board P.C. Board

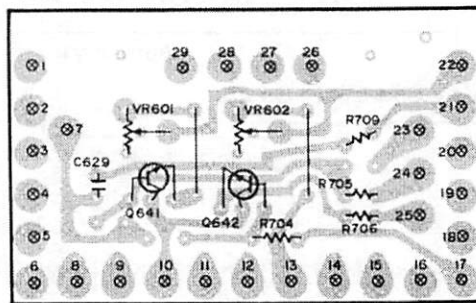


Power Supply P.C. Board



Bottom View

Terminal P.C. Board



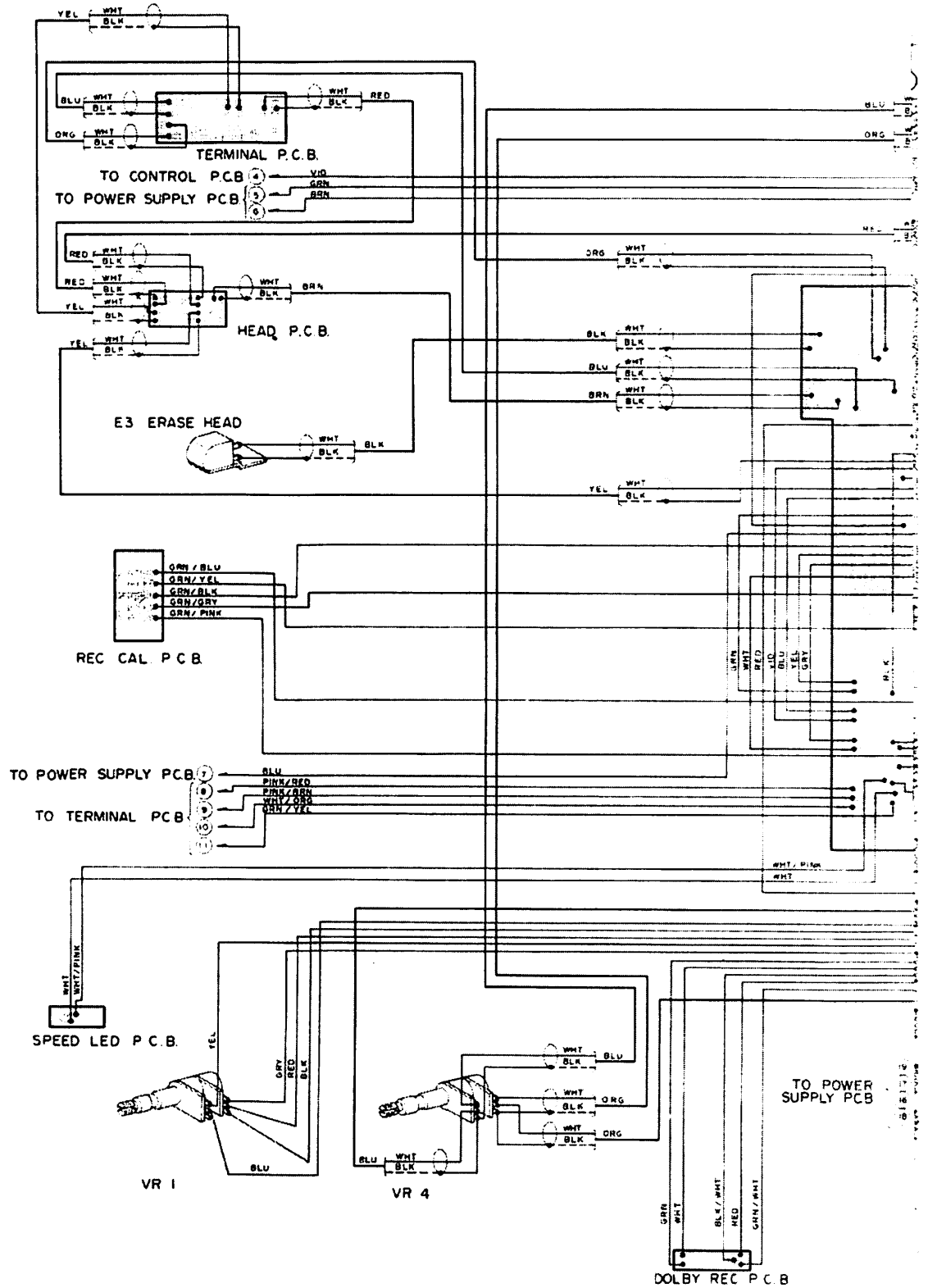
Bottom View

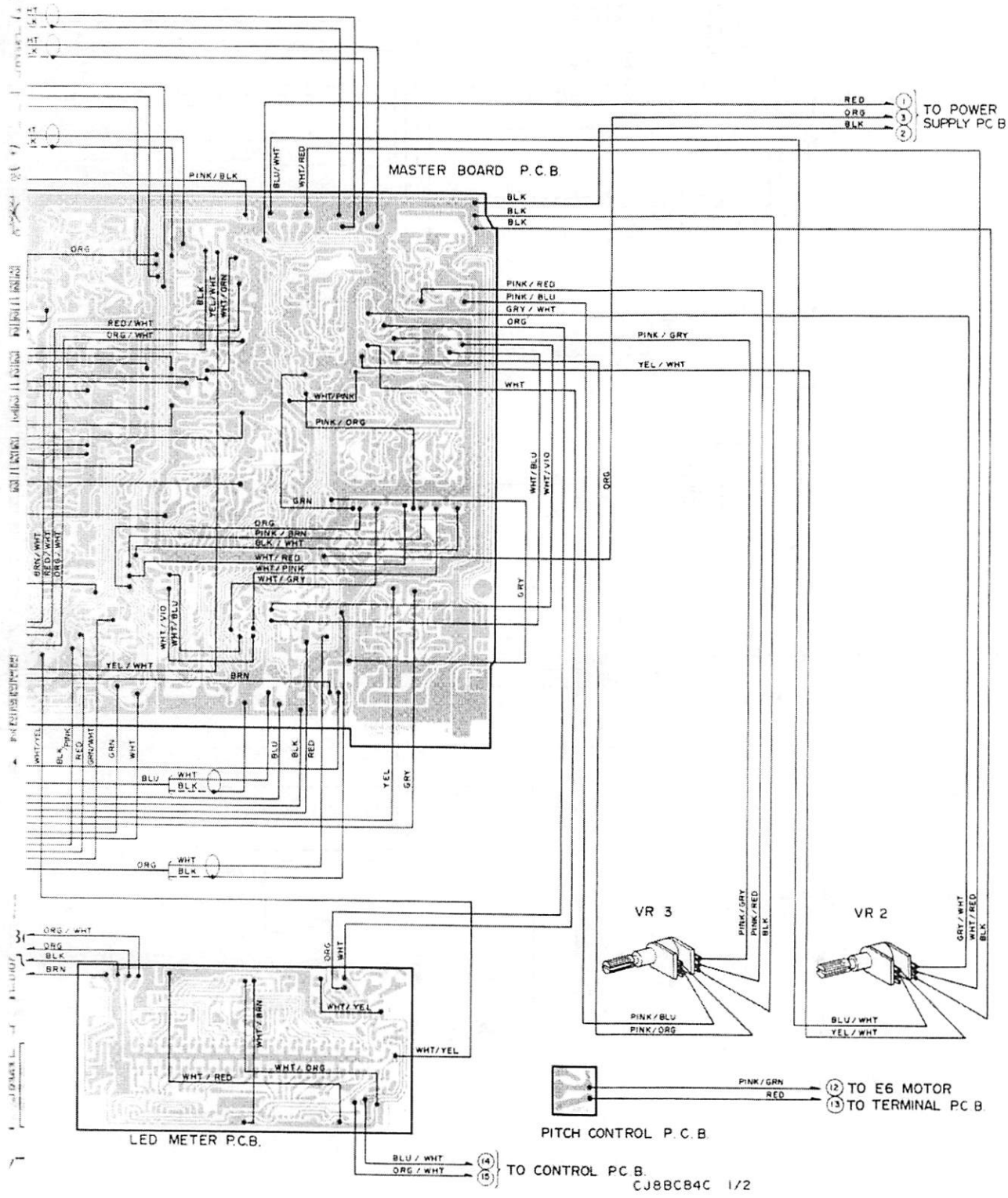
Auto Shut Off P.C. Board



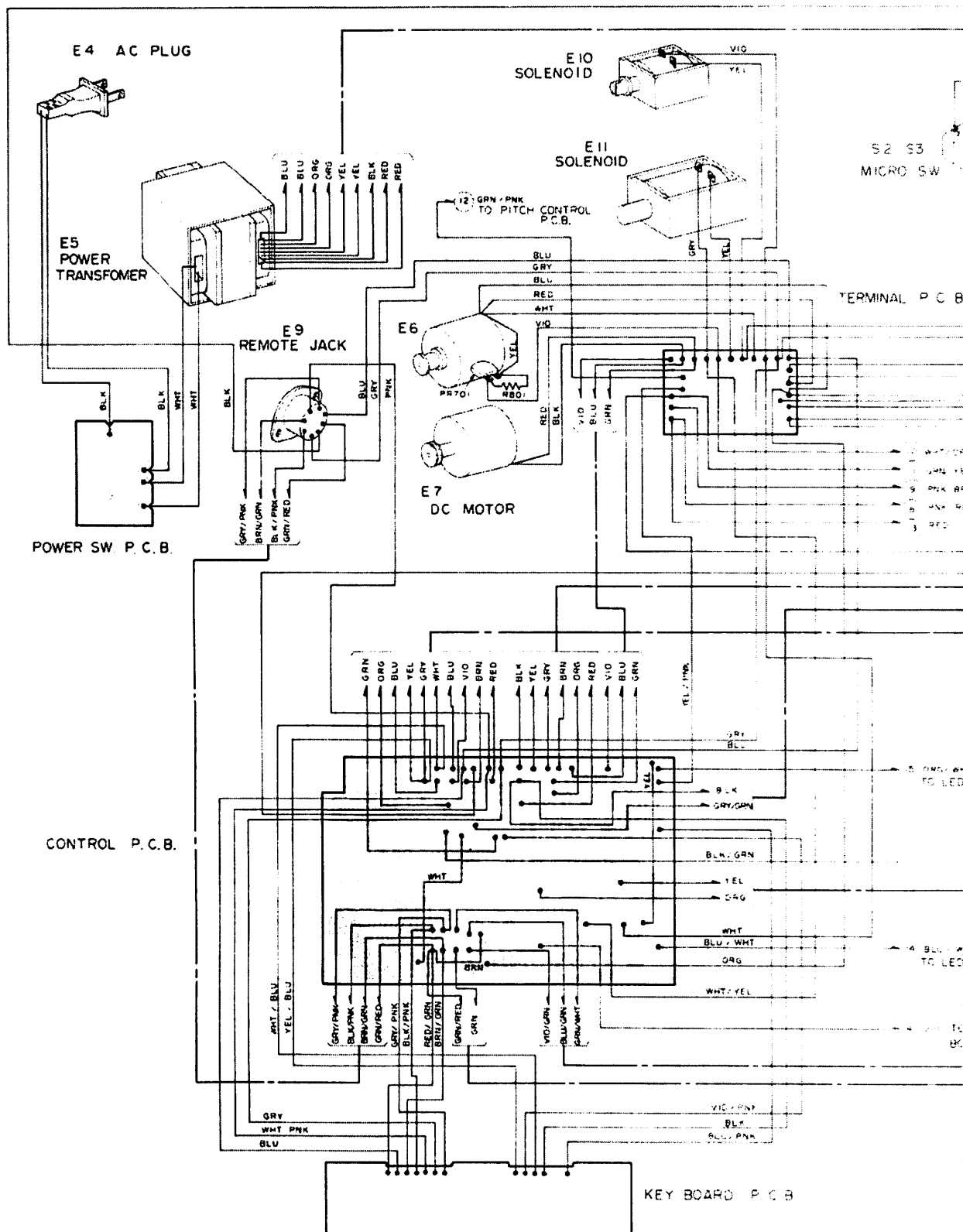
Bottom View

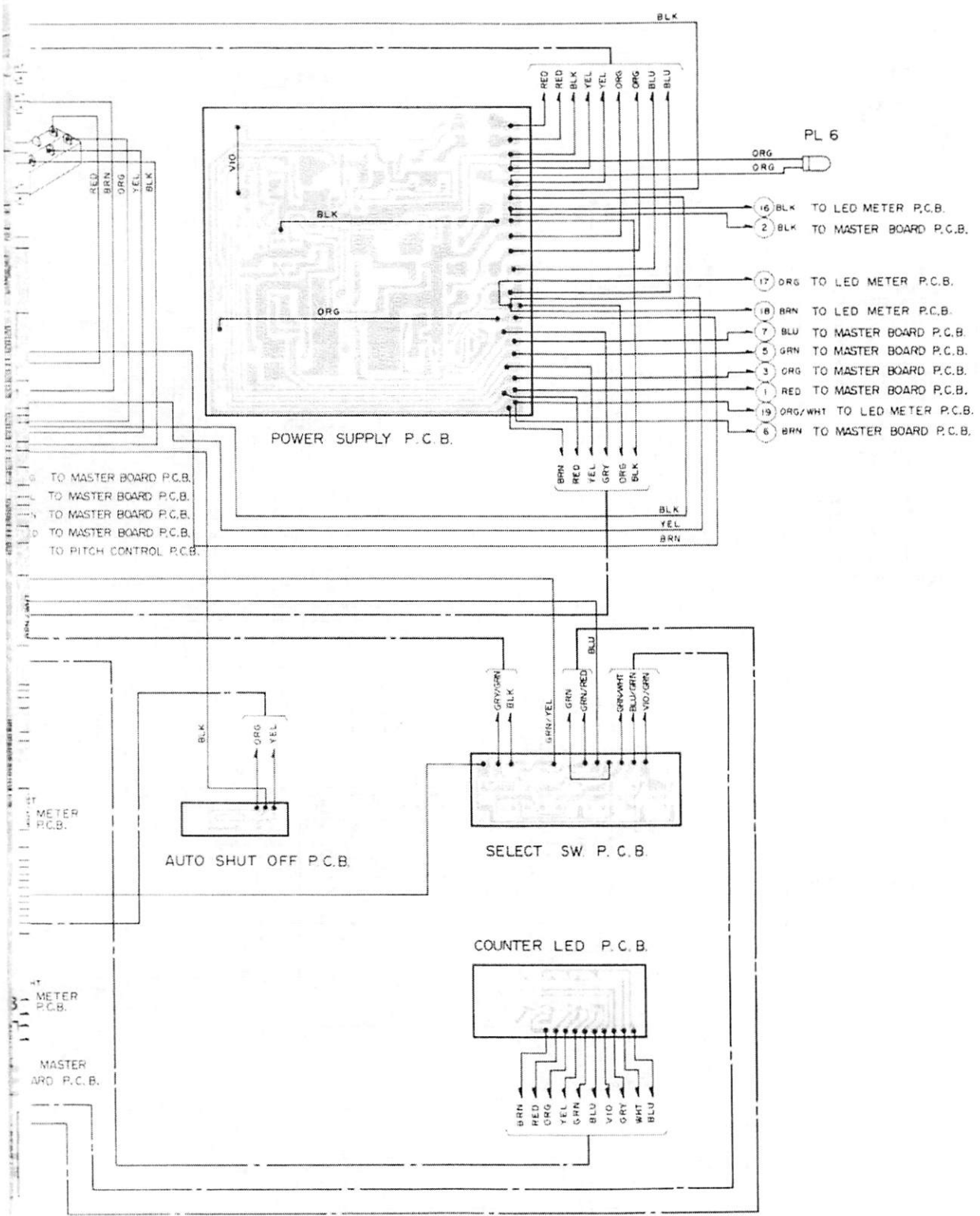
# Wiring Diagram (1/2)





# Wiring Diagram (2/2)

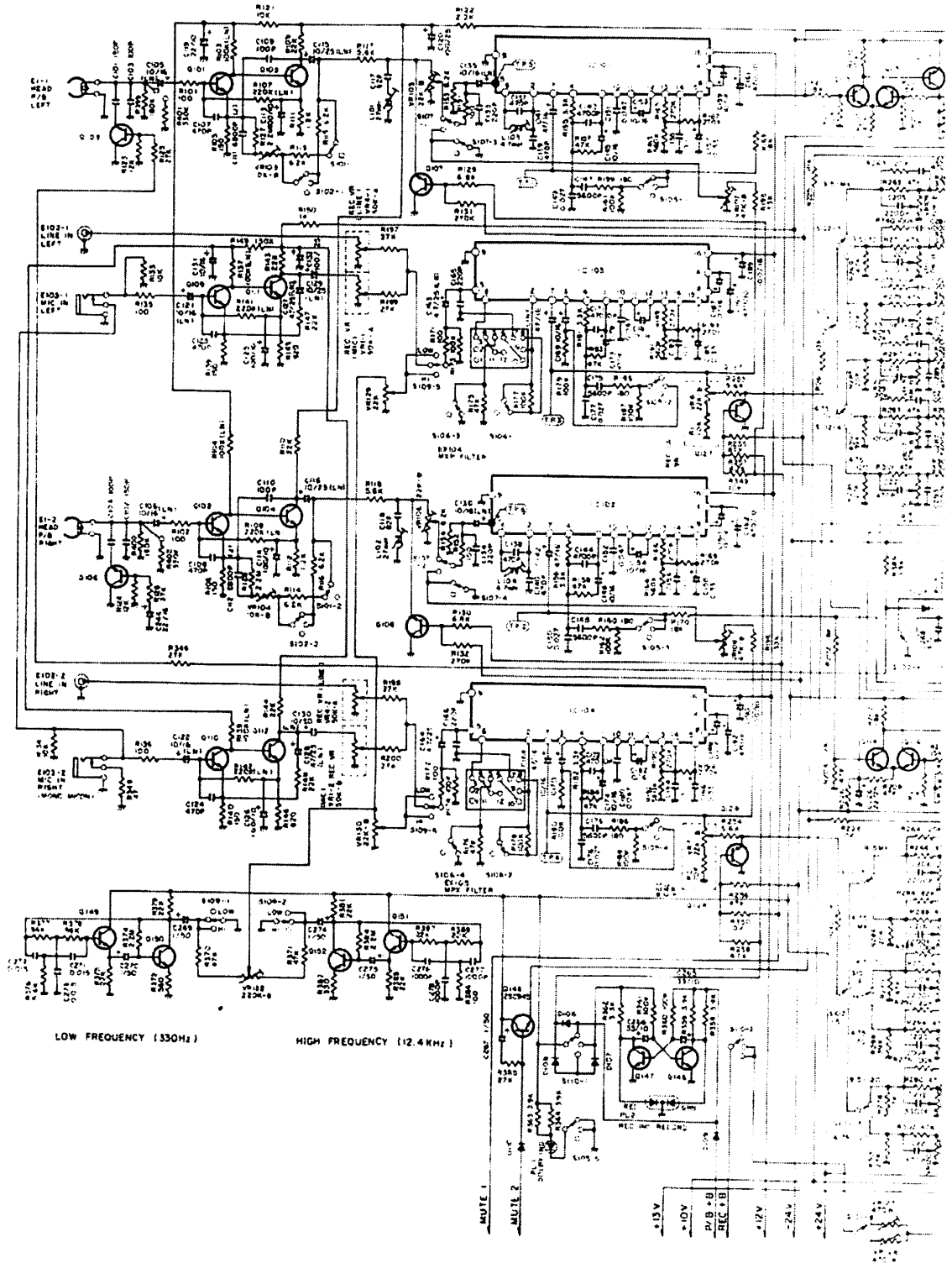


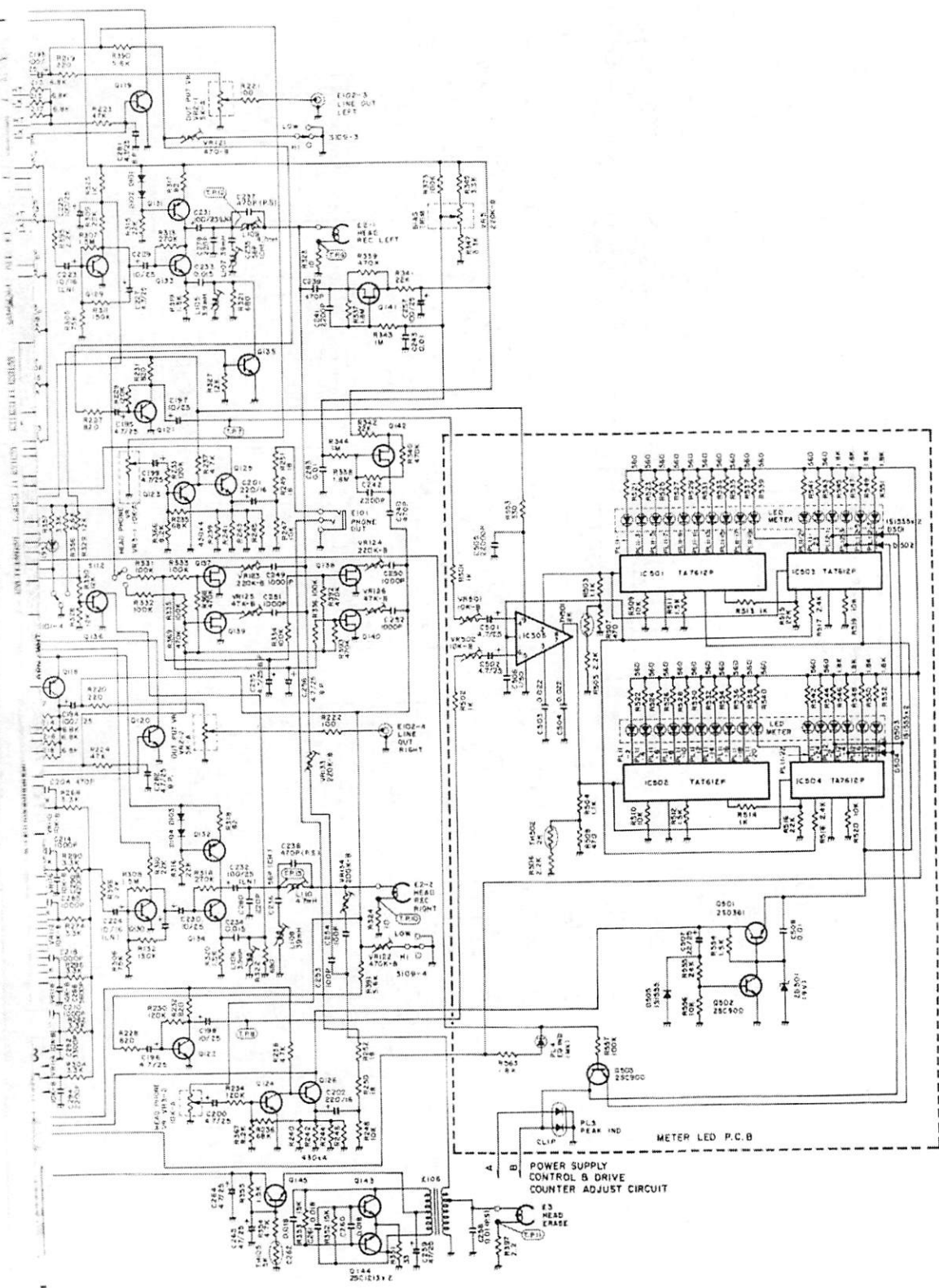


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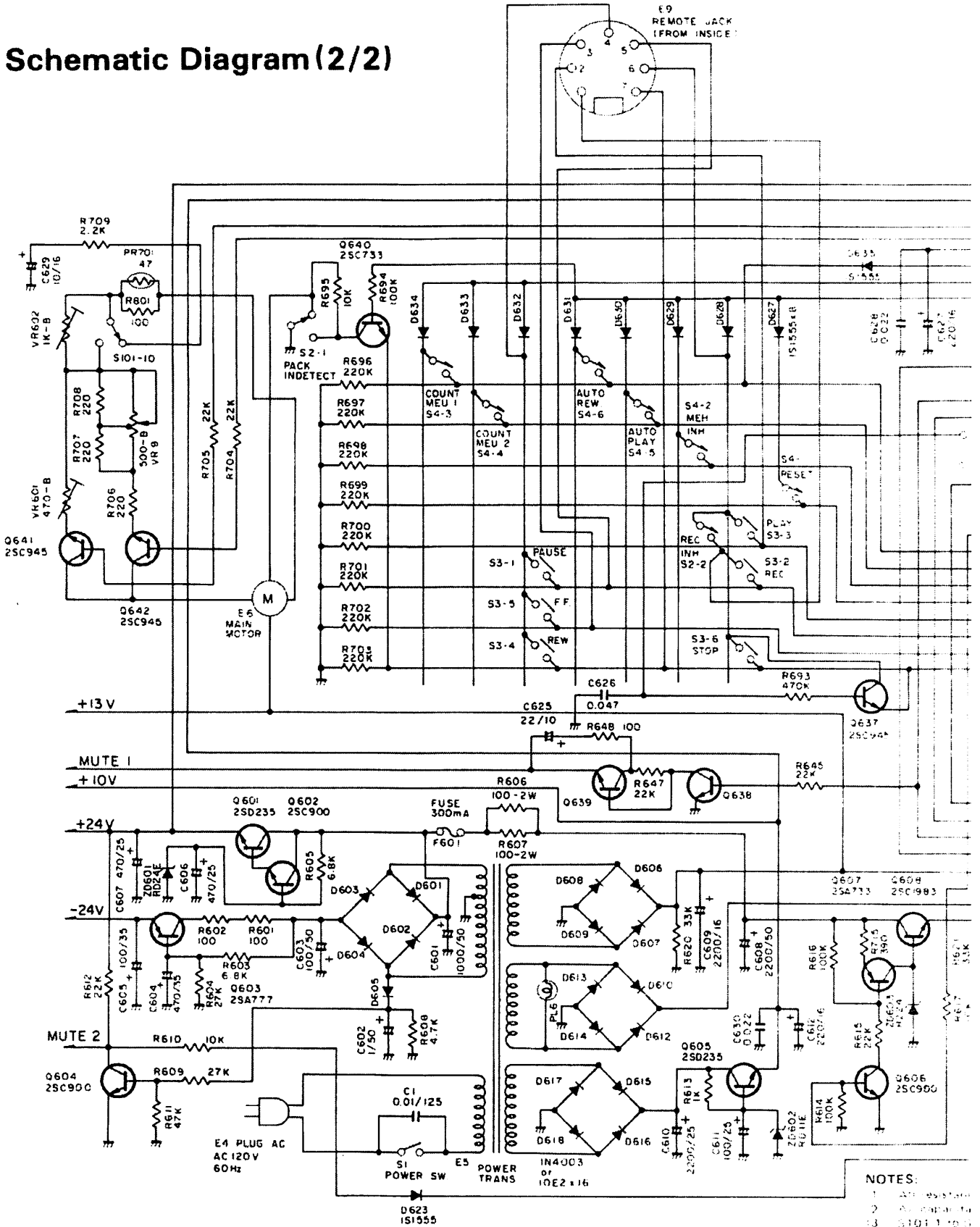
# Schematic Diagram (1/2)



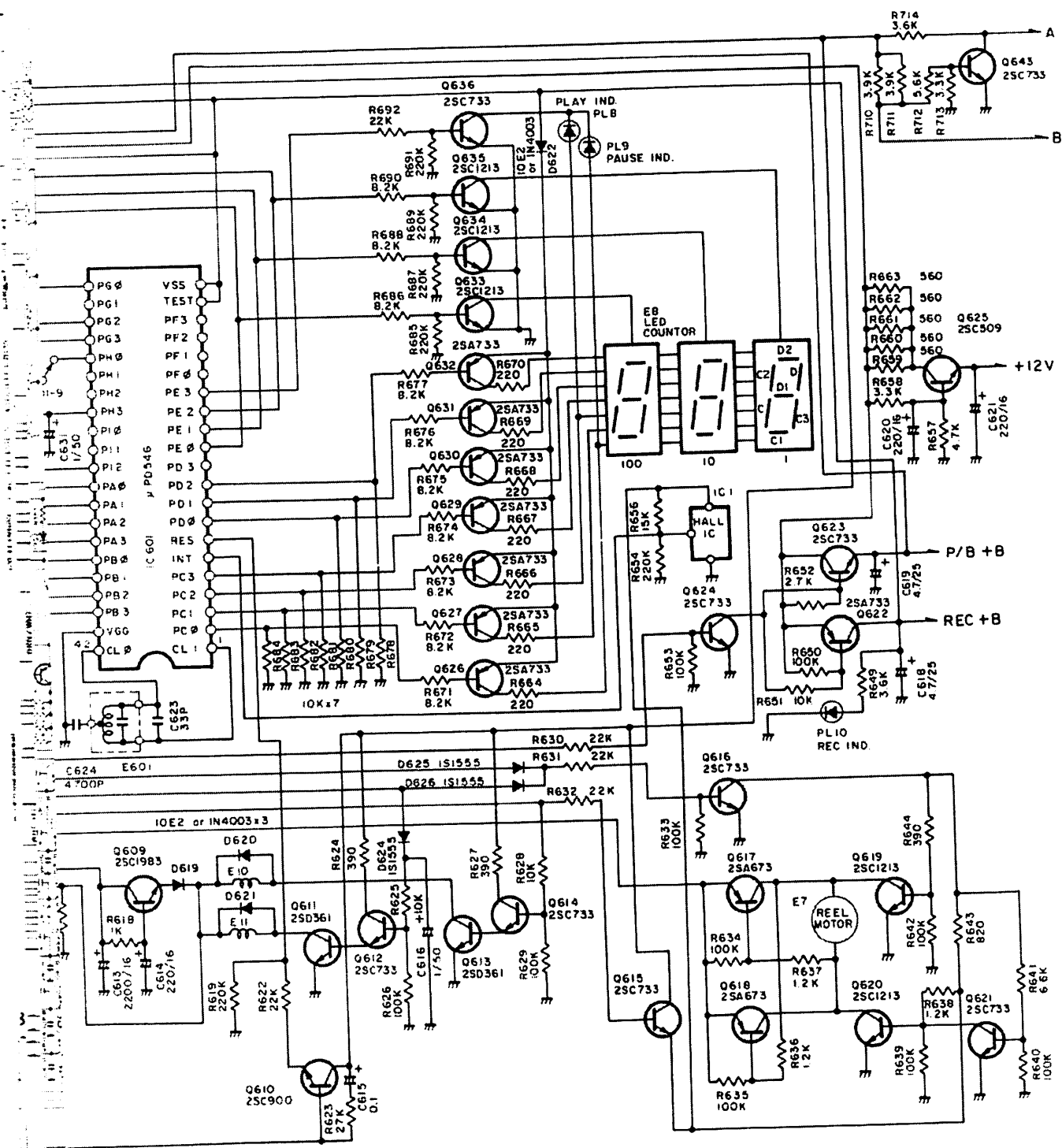


POWER SUPPLY  
CONTROL & DRIVE  
COUNTER ADJUST CIRCUIT

# Schematic Diagram (2/2)

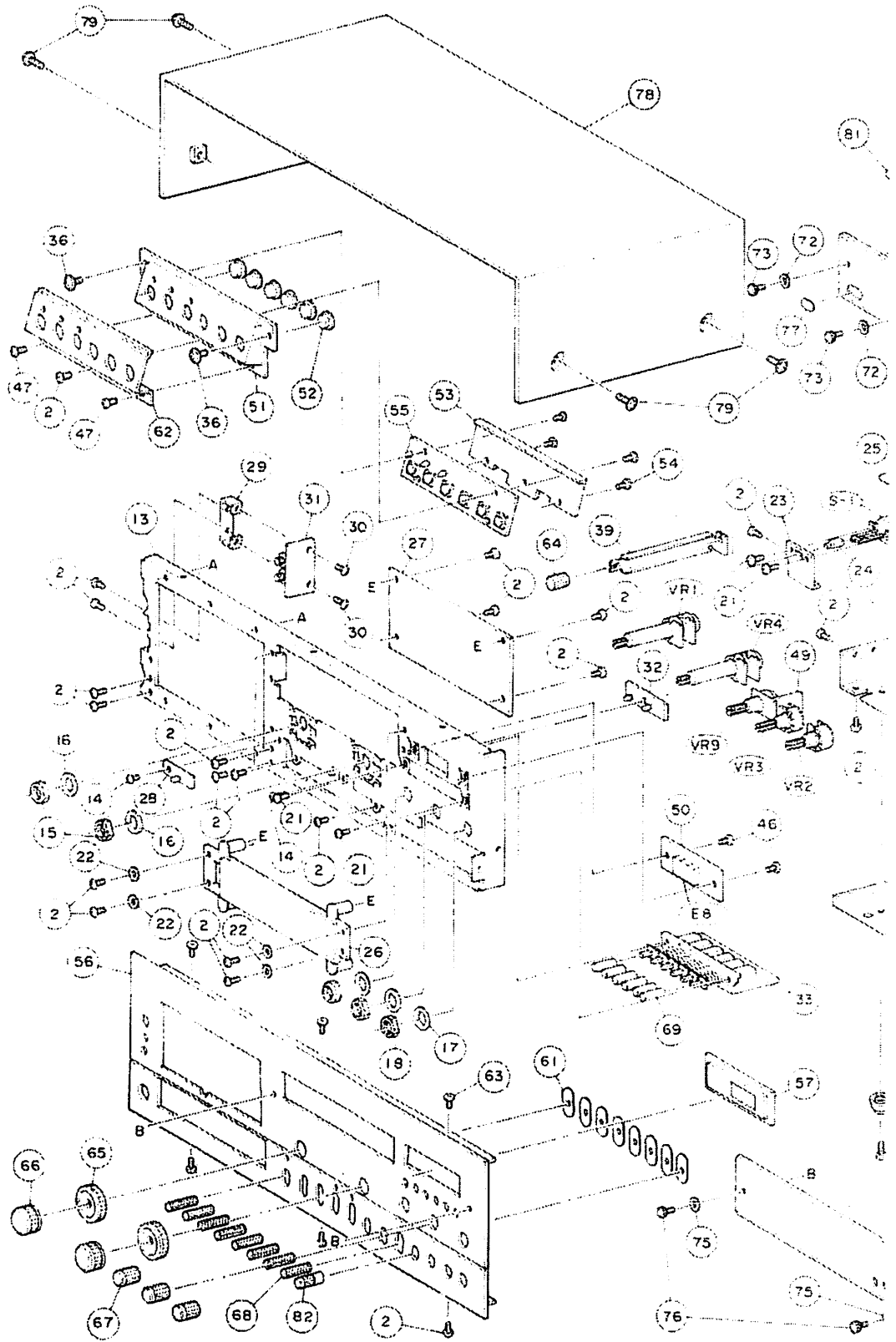


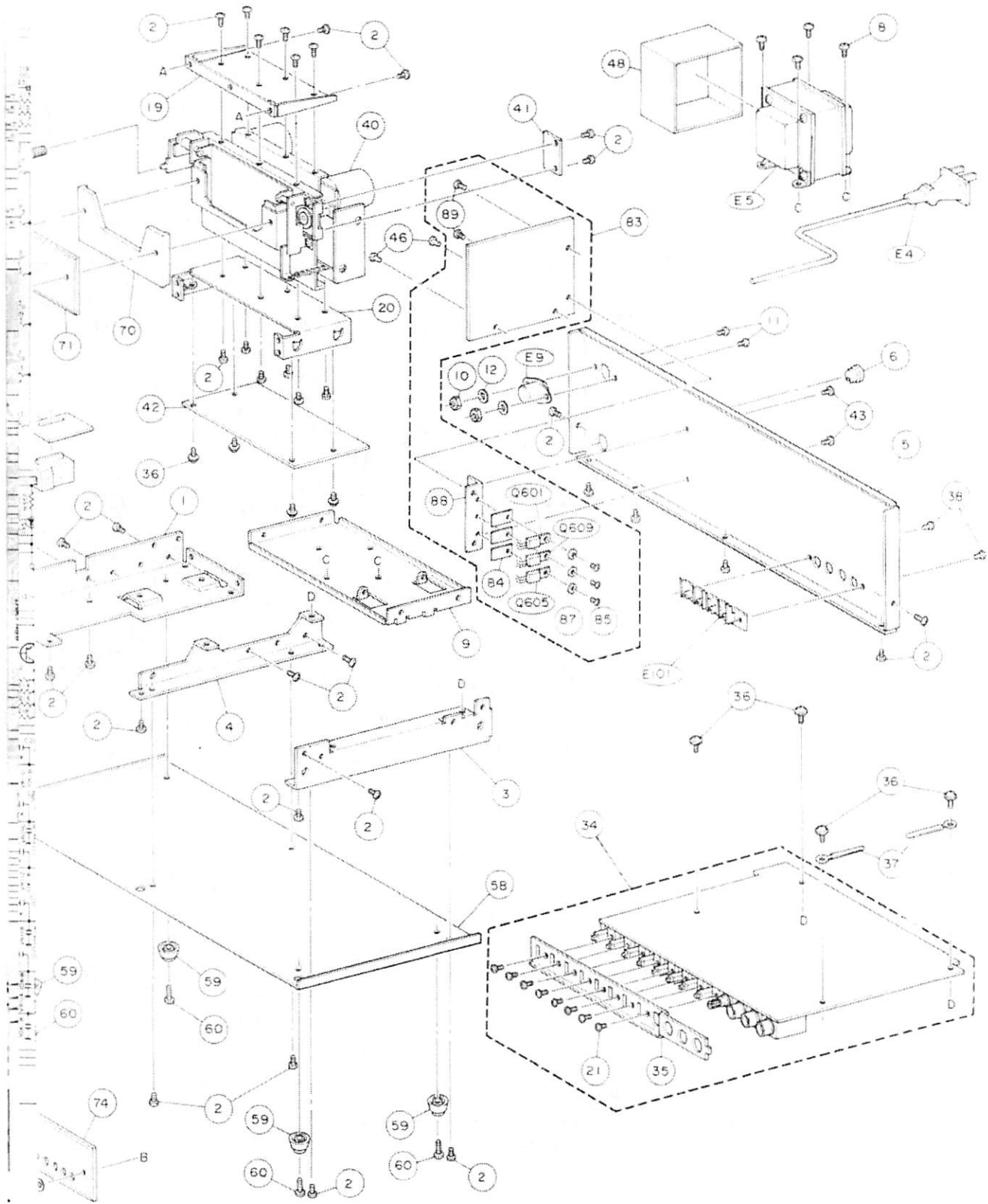
- NOTES:**
- 1) All resistors
  - 2) All capacitors
  - 3) S101 1.0 Ω
  - 4) S102 1.0 Ω
  - 5) S105 1.0 Ω
  - 6) S108 1.0 Ω
  - 7) S107 1.0 Ω
  - 8) S109 1.0 Ω
  - 9) S110 1.0 Ω
  - 10) S112 0.1 Ω



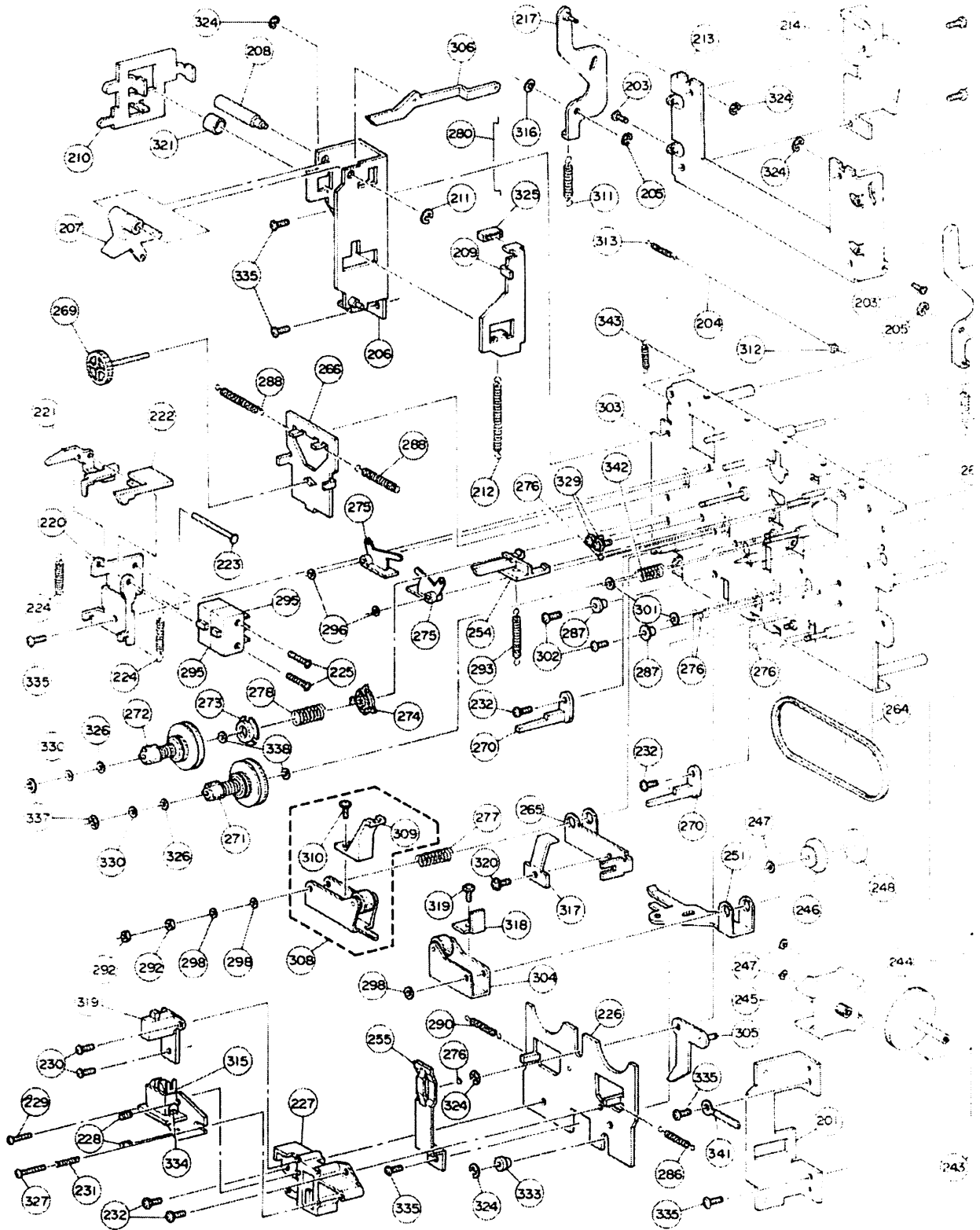
e values are in ohms K = 1,000  
 n values are in microfarads. P = 1/1,000,000  
 101 8 Speed Switch (1 7/8, 3 3/4) (3 3/4 Position)  
 102 6 EQ Switch (Mx 170uS, 120uS) (Mx Position)  
 105 5 Dolby NR Switch (Dolby Copy, On/Off) (Copy Position)  
 106 4 MPX Filter Switch (On/Off) (On Position)  
 107 4 Monitor Switch (Tape, Source) (Tape Position)  
 109 6 Rec Cal Switch (Low, Off, Hi) (Off Position)  
 110 2 Rec Switch (Safe, Ready, Mute) (Safe Position)  
 Switch (Mx High, High, Normal) (Mx High Position)

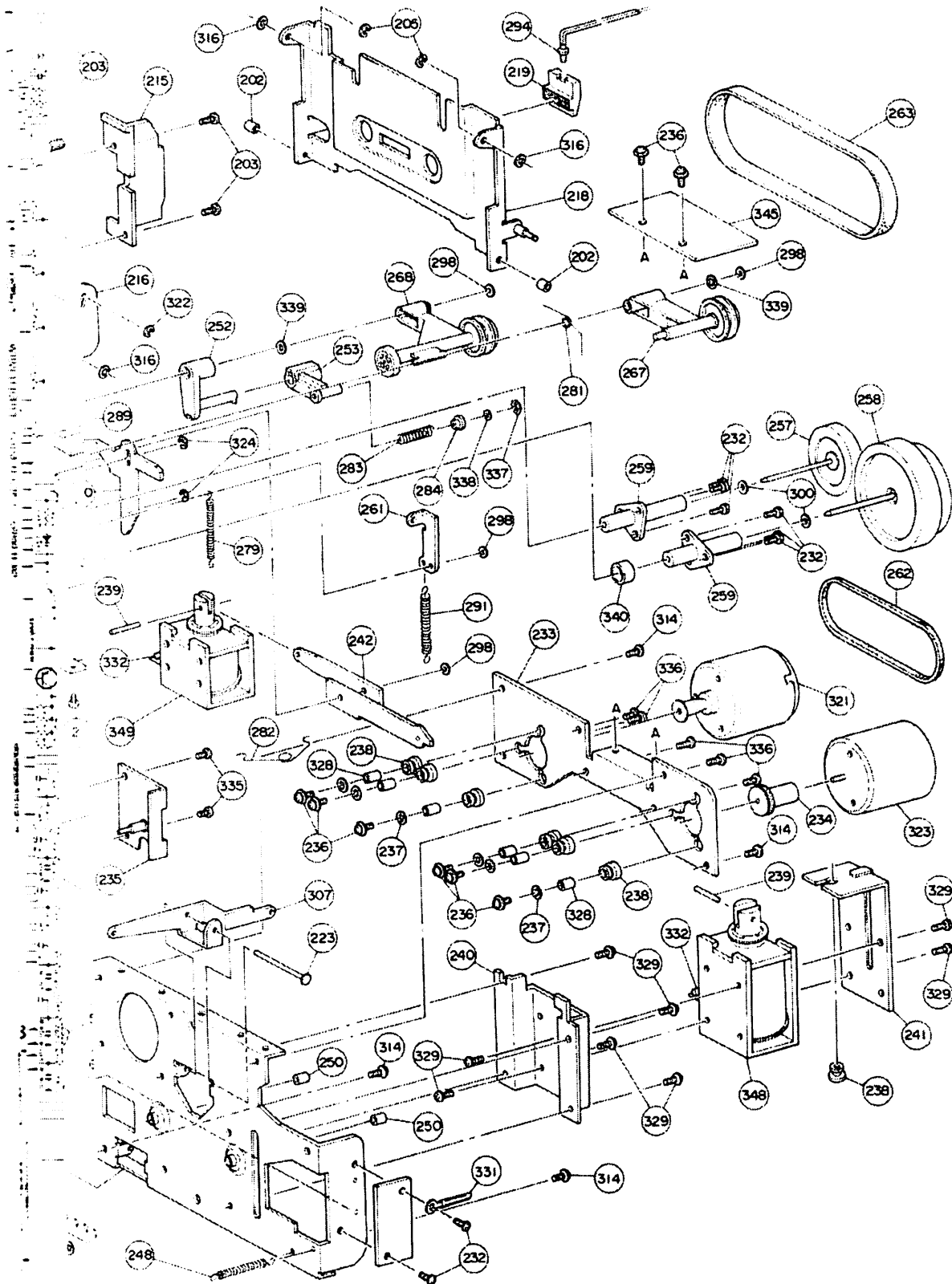
# Exploded View (General)





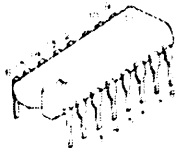
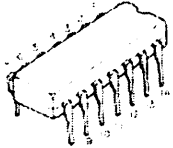
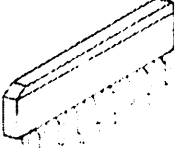




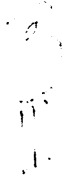

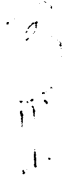







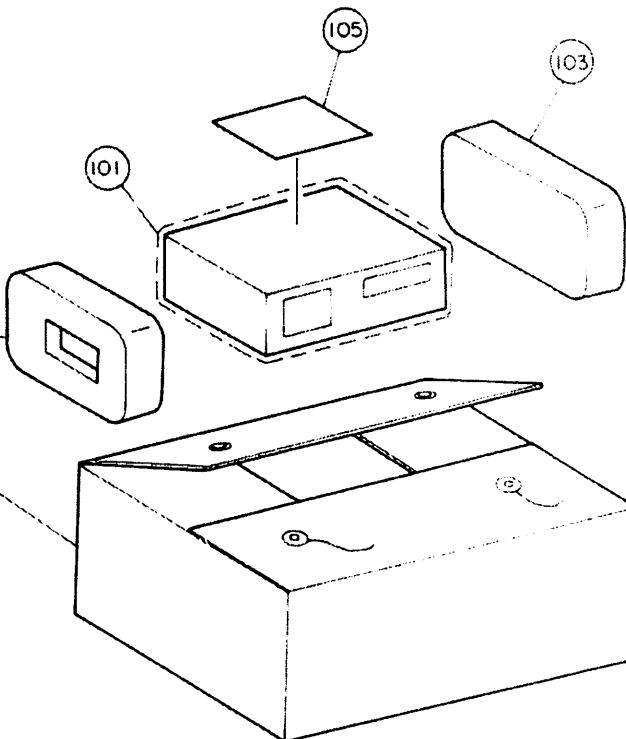
# Exploded View (Mechanism)







# Semiconductor Lead Identification

<p>NE645B: IC101 to IC104</p> 	<p>TA7612P: IC501 to IC504</p> 	<p>TA7318P-2: IC505</p> 	<p>APD546C: IC601</p> 
<p>Hall IC: IC1</p>  <p>1 Vcc 2 GND 3 OUT</p>	<p>2SC2263U: Q101, Q102, Q109, Q110 2SC1327U: Q103, Q104, Q111, Q112 2SC1980T: Q113 to Q116 2SA777S: Q117, Q118, Q603 2SC900E: Q105 to Q108, Q119, Q120, Q123, Q124, Q127, Q128, Q133 to Q136, Q146 to Q152, Q502, Q503, Q602, Q604, Q606, Q610, Q612, Q614 to Q616, Q621, Q623, Q624, Q636 to Q643 2SC733: Q105 to Q108, Q119, Q120, Q123, Q124, Q127, Q128, Q133 to Q136, Q146 to Q152, Q612, Q614 to Q616, Q621, Q623, Q624, Q636 to Q643</p>   	<p>2SD361 (D1, D2, E1, E2): 2SC1983: Q608, Q609, Q501, Q611, Q613</p>  	
<p>2SC509: Q121, Q122, Q125, Q126, Q145, Q625 2SC1213: Q143, Q144, Q619, Q620, Q633 to Q635</p> 	<p>2SA673(D): Q617, Q618</p> 	<p>2SA733(BL): Q131, Q132, Q607, Q622, Q626 to Q632</p> 	<p>2SC945L: Q105 to Q108, Q119, Q120, Q123, Q124, Q127, Q128, Q133 to Q136, Q146 to Q152, Q641, Q642 2SC1222: Q129, Q130</p> 
<p>2SD235(Y): Q601, Q605</p> 	<p>FET, 2SK127: Q137 to Q142</p> 	<p>2SA842 (BL): Q131, Q132</p> 	

## Packing Method

Note: The door cover (symbol No. 104) is held in the door of this unit.

Symbol No.	Part No.	Description	Q'ty
101	56B40442T02	Packing, Front Frame	1
102	56C40730T35	Carton, Packing	1
103	56D41052U01	Tray, Packing	2
104	15A41885U01	Cover, Door	1
105	1V44200J30	Assy., Kit	1

# Parts List

Symbol No.	Part No.	Description
<b>Master P.C. Board</b>		
<b>ICs</b>		
IC101	51T40113T02	IC, Dolby, NE 645B
IC102	51T40113T02	IC, Dolby, NE 645B
IC103	51T40113T02	IC, Dolby, NE 645B
IC104	51T40113T02	IC, Dolby, NE 645B
<b>Transistors &amp; FETs</b>		
Q101	48T41195U04	2SC2263U
Q102	48T41195U04	2SC2263U
Q103	48T40021U03	2SC1327U
Q104	48T40021U03	2SC1327U
Q105	48S44578J02	2SC945L
Q106	48S44578J02	2SC945L
Q107	48S44578J02	2SC945L
Q108	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
Q109	48T41195U04	2SC2263U
Q110	48T41195U04	2SC2263U
Q111	48T40021U03	2SC1327U
Q112	48T40021U03	2SC1327U
Q113	48T41196U03	2SC1980T
Q114	48T41196U03	2SC1980T
Q115	48T41196U03	2SC1980T
Q116	48T41196U03	2SC1980T
Q117	48T41197U04	2SA777S
Q118	48T41197U04	2SA777S
Q119	48S44578J02	2SC945L
Q120	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
Q121	48S43239G02	2SC509
Q122	48S43239G02	2SC509
Q123	48S44578J02	2SC945L
Q124	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
Q125	48S43239G02	2SC509
Q126	48S43239G02	2SC509
Q127	48S44578J02	2SC945L
Q128	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
Q129	48S40929P01	2SC1222
Q130	48S40929P01	2SC1222
Q131	48T40081T03 or 48T44983P02	2SA733BL 2SA842BL

Symbol No.	Part No.	Description
Q132	48T40081T03 or 48T44983P02	2SA733BL 2SA842BL
Q133	48S44578J02	2SC945L
Q134	48S44578J02	2SC945L
Q135	48S44578J02	2SC945L
Q136	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
Q137	48T42538U01	FET, 2SK127
Q138	48T42538U01	FET, 2SK127
Q139	48T42538U01	FET, 2SK127
Q140	48T42538U01	FET, 2SK127
Q141	48T42538U01	FET, 2SK127
Q142	48T42538U01	FET, 2SK127
Q143	48S42172J04	2SC1213
Q144	48S42172J04	2SC1213
Q145	48S43239G02	2SC509
Q146	48S44578J02	2SC945L
Q147	48S44578J02	2SC945L
Q148	48S44578J02	2SC945L
Q149	48S44578J02	2SC945L
Q150	48S44578J02	2SC945L
Q151	48S44578J02	2SC945L
Q152	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945L 2SC900E 2SC733
<b>Diodes</b>		
D101	48S134816	Silicon 1S1555
D102	48S134816	Silicon 1S1555
D103	48S134816	Silicon 1S1555
D104	48S134816	Silicon 1S1555
D105	48S134816	Silicon 1S1555
D106	48S134816	Silicon 1S1555
D107	48S134816	Silicon 1S1555
D108	48S134816	Silicon 1S1555
D109	48S134816	Silicon 1S1555
D110	48S134816	Silicon 1S1555
<b>Coils</b>		
L101	24S41199U18	Coil, 27mH
L102	24S41199U18	Coil, 27mH
L103	24S41199U09	Coil, 4.7mH
L104	24S41199U09	Coil, 4.7mH
L105	24S41199U08	Coil, 3.9mH
L106	24S41199U08	Coil, 3.9mH
L107	24S41199U20	Coil, 39mH
L108	24S41199U20	Coil, 39mH
L109	24S41199U09	Coil, 4.7mH
L110	24S41199U09	Coil, 4.7mH

Symbol No.	Part No.	Description
<b>Switches</b>		
S101	40T41186U01	Switch Lever (10C-2P)
S102	40T41188U01	Switch Lever (6C-3P)
S105	40T41188U01	Switch Lever (6C-3P)
S106	40T41281U01	Switch Lever (4C-2P)
S107	40T41281U01	Switch Lever (4C-2P)
S109	40T41233U01	Switch Lever
S110	40T40380F01	Switch Lever (3P-6C)
S112	40T41187U01	Switch Lever (2C-3P)
<b>Jacks, Filters &amp; Transformer</b>		
E101	9T41183U01	Jack, Headphone
E103	9T41182U02	Jack, Microphone
E104	51T41020U01	Filter, MPX
E105	51T41020U01	Filter, MPX
E106	25T44498P01	Transformer, OSC
<b>Capacitors</b>		
C101	8S44505P39	Ceramic 150 pF
C102	8S44505P39	Ceramic 150 pF
C103	8S44505P37	Ceramic 100 pF
C104	8S44505P37	Ceramic 100 pF
C105	23T40475U14	Electrolytic 10 $\mu$ F 16V
C106	23T40475U14	Electrolytic 10 $\mu$ F 16V
C107	8S44505P45	Ceramic 470 pF
C108	8S44505P45	Ceramic 470 pF
C109	8S44505P37	Ceramic 100 pF
C110	8S44505P37	Ceramic 100 pF
C111	8S44503P11	Mylar 0.0068 $\mu$ F 50V
C112	8S44503P11	Mylar 0.0068 $\mu$ F 50V
C113	23D44333G30	Electrolytic 100 $\mu$ F 10V
C114	23D44333G30	Electrolytic 100 $\mu$ F 10V
C115	23T40475U15	Electrolytic 10 $\mu$ F 25V
C116	23T40475U15	Electrolytic 10 $\mu$ F 25V
C117	8S44505P35	Ceramic 82 pF
C118	8S44505P35	Ceramic 82 pF
C119	23D44333G12	Electrolytic 22 $\mu$ F 10V
C120	23D44333G32	Electrolytic 100 $\mu$ F 25V
C121	23T40475U14	Electrolytic 10 $\mu$ F 16V
C122	23T40475U14	Electrolytic 10 $\mu$ F 16V
C123	8S44505P45	Ceramic 470 pF
C124	8S44505P45	Ceramic 470 pF
C125	23D44333G30	Electrolytic 100 $\mu$ F 10V
C126	23D44333G30	Electrolytic 100 $\mu$ F 10V
C127	23T40475U11	Electrolytic 4.7 $\mu$ F 25V
C128	23T40475U11	Electrolytic 4.7 $\mu$ F 25V
C129	23T40475U15	Electrolytic 10 $\mu$ F 25V

Symbol No.	Part No.	Description
C130	23T40475U15	Electrolytic 10 $\mu$ F 25V
C131	23D44333G08	Electrolytic 10 $\mu$ F 16V
C132	23D44333G32	Electrolytic 100 $\mu$ F 25V
C133	8S44505P41	Ceramic 220 pF
C134	8S44505P41	Ceramic 220 pF
C135	23T40475U14	Electrolytic 10 $\mu$ F 16V
C136	23T40475U14	Electrolytic 10 $\mu$ F 16V
C137	8S44505P45	Ceramic 470 pF
C138	8S44505P45	Ceramic 470 pF
C139	8S44505P45	Ceramic 470 pF
C140	8S44505P45	Ceramic 470 pF
C141	23D44333G25	Electrolytic 47 $\mu$ F 16V
C142	23D44333G25	Electrolytic 47 $\mu$ F 16V
C143	8S44503P09	Mylar 0.0047 $\mu$ F
C144	8S44503P09	Mylar 0.0047 $\mu$ F
C145	23D44333G08	Electrolytic 10 $\mu$ F 16V
C146	23D44333G08	Electrolytic 10 $\mu$ F 16V
C147	8S44503P10	Mylar 0.0056 $\mu$ F
C148	8S44503P10	Mylar 0.0056 $\mu$ F
C149	8S44503P18	Mylar 0.027 $\mu$ F 50V
C150	8S44503P18	Mylar 0.027 $\mu$ F 50V
C151	8S44503P21	Mylar 0.047 $\mu$ F
C152	8S44503P21	Mylar 0.047 $\mu$ F
C153	23D44333G08	Electrolytic 10 $\mu$ F 16V
C154	23D44333G08	Electrolytic 10 $\mu$ F 16V
C155	8C44833J25	Mylar 0.1 $\mu$ F
C156	8C44833J25	Mylar 0.1 $\mu$ F
C157	23C42909J04	Electrolytic 0.33 $\mu$ F 50V
C158	23C42909J04	Electrolytic 0.33 $\mu$ F 50V
C159	23D44333G08	Electrolytic 10 $\mu$ F 16V
C160	23D44333G08	Electrolytic 10 $\mu$ F 16V
C161	23D44333G48	Electrolytic 470 $\mu$ F 10V
C162	23D44333G48	Electrolytic 470 $\mu$ F 10V
C163	23T40475U11	Electrolytic 4.7 $\mu$ F 25V
C164	23T40475U11	Electrolytic 4.7 $\mu$ F 25V
C165	8S44505P41	Ceramic 220 pF
C166	8S44505P41	Ceramic 220 pF
C167	23D44333G25	Electrolytic 47 $\mu$ F 16V
C168	23D44333G25	Electrolytic 47 $\mu$ F 16V
C169	23D44333G08	Electrolytic 10 $\mu$ F 16V
C170	23D44333G08	Electrolytic 10 $\mu$ F 16V
C171	8S44503P09	Mylar 0.0047 $\mu$ F
C172	8S44503P09	Mylar 0.0047 $\mu$ F
C173	23D44333G08	Electrolytic 10 $\mu$ F 16V
C174	23D44333G08	Electrolytic 10 $\mu$ F 16V
C175	8S44503P10	Mylar 0.0056 $\mu$ F
C176	8S44503P10	Mylar 0.0056 $\mu$ F
C177	8S44503P18	Mylar 0.027 $\mu$ F 50V
C178	8S44503P18	Mylar 0.027 $\mu$ F 50V
C179	8S44503P21	Mylar 0.047 $\mu$ F
C180	8S44503P21	Mylar 0.047 $\mu$ F
C181	23D44333G08	Electrolytic 10 $\mu$ F 16V
C182	23D44333G08	Electrolytic 10 $\mu$ F 16V

Symbol No.	Part No.	Description
C183	8C44833J25	Mylar 0.1 $\mu$ F
C184	8C44833J25	Mylar 0.1 $\mu$ F
C185	23C42909J04	Electrolytic 0.33 $\mu$ F 50V
C186	23C42909J04	Electrolytic 0.33 $\mu$ F 50V
C187	23D44333G08	Electrolytic 10 $\mu$ F 16V
C188	23D44333G08	Electrolytic 10 $\mu$ F 16V
C189	23D44333G31	Electrolytic 100 $\mu$ F 16V
C190	23D44333G31	Electrolytic 100 $\mu$ F 16V
C191	23D44333G48	Electrolytic 470 $\mu$ F 10V
C192	23D44333G48	Electrolytic 470 $\mu$ F 10V
C193	23D44333G32	Electrolytic 100 $\mu$ F 25V
C194	23D44333G32	Electrolytic 100 $\mu$ F 25V
C195	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C196	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C197	23D44333G09	Electrolytic 10 $\mu$ F 25V
C198	23D44333G09	Electrolytic 10 $\mu$ F 25V
C199	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C200	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C201	23D44333G37	Electrolytic 220 $\mu$ F 16V
C202	23D44333G37	Electrolytic 220 $\mu$ F 16V
C203	8S44505P45	Ceramic 470pF
C204	8S44505P45	Ceramic 470pF
C205	8S44505P53	Ceramic 2200pF
C206	8S44505P53	Ceramic 2200pF
C207	8S44505P53	Ceramic 2200pF
C208	8S44505P53	Ceramic 2200pF
C209	8S44505P49	Ceramic 1000pF
C210	8S44505P49	Ceramic 1000pF
C211	8S44505P55	Ceramic 3300pF
C212	8S44505P55	Ceramic 3300pF
C213	8S44505P49	Ceramic 1000pF
C214	8S44505P49	Ceramic 1000pF
C215	8S44505P53	Ceramic 2200pF
C216	8S44505P53	Ceramic 2200pF
C217	8S44505P49	Ceramic 1000pF
C218	8S44505P49	Ceramic 1000pF
C219	8S44505P49	Ceramic 1000pF
C220	8S44505P49	Ceramic 1000pF
C221	8S44505P45	Ceramic 470pF
C222	8S44505P45	Ceramic 470pF
C223	23T40475U14	Electrolytic 10 $\mu$ F 16V
C224	23T40475U14	Electrolytic 10 $\mu$ F 16V
C225	23D44333G32	Electrolytic 100 $\mu$ F 25V
C226	23D44333G14	Electrolytic 22 $\mu$ F 25V
C227	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C228	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C229	23D44333G09	Electrolytic 10 $\mu$ F 25V
C230	23D44333G09	Electrolytic 10 $\mu$ F 25V
C231	23T40475U31	Electrolytic 100 $\mu$ F 25V
C232	23T40475U31	Electrolytic 100 $\mu$ F 25V
C233	8S44503P15	Mylar 0.015 $\mu$ F 50V
C234	8S44503P15	Mylar 0.015 $\mu$ F 50V

Symbol No.	Part No.	Description
C235	8S44505P31	Ceramic 56pF
C236	8S44505P31	Ceramic 56pF
C237	8C42195G07	Fixed PS 470pF
C238	8C42195G07	Fixed PS 470pF
C239	8S44505P45	Ceramic 470pF
C240	8S44505P45	Ceramic 470pF
C241	8S44505P53	Ceramic 2200pF
C242	8S44505P53	Ceramic 2200pF
C243	8S44505P61	Ceramic 10000pF
C244	23D44333G13	Electrolytic 22 $\mu$ F 16V
C249	8S44505P49	Ceramic 1000pF
C250	8S44505P49	Ceramic 1000pF
C251	8S44505P49	Ceramic 1000pF
C252	8S44505P49	Ceramic 1000pF
C253	21C40133G07	Ceramic, Disc 100pF
C254	21C40133G07	Ceramic, Disc 100pF
C255	23S41192U17	Electrolytic 4.7 $\mu$ F 25V
C256	23S41192U17	Electrolytic 4.7 $\mu$ F 25V
C257	23D44333G32	Electrolytic 100 $\mu$ F 25V
C258	8T42081U49	Polyethylene 0.01 $\mu$ F
C259	23D44333G26	Electrolytic 47 $\mu$ F 25V
C260	8S44503P16	Mylar 0.018 $\mu$ F 50V
C261	8S44503P16	Mylar 0.018 $\mu$ F 50V
C262	8S44503P16	Mylar 0.018 $\mu$ F 50V
C263	23D44333G26	Electrolytic 47 $\mu$ F 25V
C264	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C265	23D44333G18	Electrolytic 33 $\mu$ F 10V
C266	23D44333G18	Electrolytic 33 $\mu$ F 10V
C267	23D44333G01	Electrolytic 1 $\mu$ F 50V
C268	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C269	23D44333G01	Electrolytic 1 $\mu$ F 50V
C270	23D44333G01	Electrolytic 1 $\mu$ F 50V
C271	8S44503P15	Mylar 0.015 $\mu$ F 50V
C272	8S44503P15	Mylar 0.015 $\mu$ F 50V
C273	8S44503P15	Mylar 0.015 $\mu$ F 50V
C274	23D44333G01	Electrolytic 1 $\mu$ F 50V
C275	23D44333G01	Electrolytic 1 $\mu$ F 50V
C276	8S44503P01	Mylar 0.001 $\mu$ F
C277	8S44503P01	Mylar 0.001 $\mu$ F
C278	8S44503P01	Mylar 0.001 $\mu$ F
C279	8S44505P41	Ceramic 220pF
C280	8S44505P41	Ceramic 220pF
C281	23S41192U17	Electrolytic 4.7 $\mu$ F 25V
C282	23S41192U17	Electrolytic 4.7 $\mu$ F 25V
C283	8S44505P61	Ceramic 10000pF
C284	8S44505P49	Ceramic 1000pF
C285	8S44505P49	Ceramic 1000pF
C287	8S44503P10	Mylar 5600pF
C288	8S44503P10	Mylar 5600pF
C289	8S44503P09	Mylar 4700pF
C290	8S44503P09	Mylar 4700pF
C291	8S44503P07	Mylar 3300pF

Symbol No.	Part No.	Description
C292	8S44503P07	Mylar 3300pF
C293	8S44503P05	Mylar 2200pF
C294	8S44503P05	Mylar 2200pF
<b>Resistors</b> (All resistors are 1/4W, 5% carbon film unless otherwise noted.)		
R101	6S44593P41	100 ohm
R102	6S44593P41	100 ohm
R103	6S40106T14	100K ohm
R104	6S40106T14	100K ohm
R105	6S44593P45	150 ohm
R106	6S44593P45	150 ohm
R107	6S40106T22	220K ohm
R108	6S40106T22	220K ohm
R109	6S44593P97	22K ohm
R110	6S44593P97	22K ohm
R111	6S44593P67	1.2K ohm
R112	6S44593P67	1.2K ohm
R113	6S44593P84	6.2K ohm
R114	6S44593P84	6.2K ohm
R115	6S44593P84	6.2K ohm
R116	6S44593P84	6.2K ohm
R117	6S44593P83	5.6K ohm
R118	6S44593P83	5.6K ohm
R121	6S44593P89	10K ohm
R122	6S44593P73	2.2K ohm
R123	6S44593P91	12K ohm
R124	6S44593P91	12K ohm
R125	6S44593P99	27K ohm
R126	6S44593P99	27K ohm
R127	6S44594P46	2.2M ohm
R128	6S44594P46	2.2M ohm
R129	6S44593P85	6.8K ohm
R130	6S44593P85	6.8K ohm
R131	6S44594P24	270K ohm
R132	6S44594P24	270K ohm
R133	6S44593P89	10K ohm
R134	6S44593P89	10K ohm
R135	6S44593P41	100 ohm
R136	6S44593P41	100 ohm
R137	6S40106T14	100K ohm
R138	6S40106T14	100K ohm
R139	6S44593P45	150 ohm
R140	6S44593P45	150 ohm
R141	6S40106T22	220K ohm
R142	6S40106T22	220K ohm
R143	6S44593P97	22K ohm
R144	6S44593P97	22K ohm

Symbol No.	Part No.	Description
R145	6S44593P63	820 ohm
R146	6S44593P63	820 ohm
R147	6S44593P97	22K ohm
R148	6S44593P97	22K ohm
R149	6S44594P18	150K ohm
R150	6S44593P65	1K ohm
R151	6S44593P41	100 ohm
R152	6S44593P41	100 ohm
R153	6S44593P87	8.2K ohm
R154	6S44593P87	8.2K ohm
R155	6S44593P77	3.3K ohm
R156	6S44593P77	3.3K ohm
R157	6S44594P06	47K ohm
R158	6S44594P06	47K ohm
R159	6S44593P47	180 ohm
R160	6S44593P47	180 ohm
R161	6S44594P14	100K ohm
R162	6S44594P14	100K ohm
R163	6S41801P65	560K ohm
R164	6S44594P32	560K ohm
R165	6S44594P24	270K ohm
R166	6S44594P24	270K ohm
R167	6S41801P61	270K ohm
R168	6S44594P24	270K ohm
R169	6S44593P95	18K ohm
R170	6S44593P95	18K ohm
R171	6S44593P41	100 ohm
R172	6S44593P41	100 ohm
R173	6S44594P14	100K ohm
R174	6S44594P14	100K ohm
R175	6S44594P06	47K ohm
R176	6S44594P06	47K ohm
R177	6S44594P14	100K ohm
R178	6S44594P14	100K ohm
R179	6S44594P14	100K ohm
R180	6S44594P14	100K ohm
R181	6S44593P77	3.3K ohm
R182	6S44593P77	3.3K ohm
R183	6S44594P06	47K ohm
R184	6S44594P06	47K ohm
R185	6S44593P47	180 ohm
R186	6S44593P47	180 ohm
R187	6S44594P14	100K ohm
R188	6S44594P14	100K ohm
R189	6S44594P24	270K ohm
R190	6S44594P24	270K ohm
R191	6S44594P32	560K ohm
R192	6S44594P32	560K ohm
R193	6S44594P24	270K ohm
R194	6S44954P24	270K ohm
R195	6S44594P02	33K ohm
R196	6S44594P02	33K ohm
R197	6S44593P99	27K ohm
R198	6S44593P99	27K ohm

Symbol No.	Part No.	Description
R199	6S44593P99	27K ohm
R200	6S44593P99	27K ohm
R201	6S44593P95	18K ohm
R202	6S44593P95	18K ohm
R203	6S44593P91	12K ohm
R204	6S44593P91	12K ohm
R205	6S44593P89	10K ohm
R206	6S44593P89	10K ohm
R207	6S44594P06	47K ohm
R208	6S44594P06	47K ohm
R209	6S44593P65	1K ohm
R210	6S44593P65	1K ohm
R211	6S44593P93	15K ohm
R212	6S44593P93	15K ohm
R213	6S44593P85	6.8K ohm
R214	6S44593P85	6.8K ohm
R215	6S44593P85	6.8K ohm
R216	6S44593P85	6.8K ohm
R217	6S44593P85	6.8K ohm
R218	6S44593P85	6.8K ohm
R219	6S44593P49	220 ohm
R220	6S44593P49	220 ohm
R221	6S44593P41	100 ohm
R222	6S44593P41	100 ohm
R223	6S41801P52	47K ohm
R224	6S41801P52	47K ohm
R225	6S44593P89	10K ohm
R226	6S41801P44	10K ohm
R227	6S44593P63	820 ohm
R228	6S44593P63	820 ohm
R229	6S44594P16	120K ohm
R230	6S44594P16	120K ohm
R231	6S44593P63	820 ohm
R232	6S44593P63	820 ohm
R233	6S44594P16	120K ohm
R234	6S44594P16	120K ohm
R235	6S44594P10	68K ohm
R236	6S44594P10	68K ohm
R237	6S44593P81	4.7K ohm
R238	6S44593P81	4.7K ohm
R239	6S44593P56	430 ohm
R240	6S44593P56	430 ohm
R241	6S44593P56	430 ohm
R242	6S44593P56	430 ohm
R243	6S44593P56	430 ohm
R244	6S44593P56	430 ohm
R245	6S44593P56	430 ohm
R246	6S44593P56	430 ohm
R247	6S44593P89	10K ohm
R248	6S44593P89	10K ohm
R249	6S44593P23	18 ohm
R250	6S44593P23	18 ohm
R251	6S44593P23	18 ohm

Symbol No.	Part No.	Description
R252	6S44593P23	18 ohm
R253	6S44593P83	5.6K ohm
R254	6S44593P83	5.6K ohm
R255	6S44594P06	47K ohm
R256	6S44594P06	47K ohm
R257	6S44593P81	4.7K ohm
R258	6S44593P81	4.7K ohm
R261	6S44593P89	10K ohm
R262	6S44593P89	10K ohm
R263	6S44594P16	120K ohm
R264	6S44594P16	120K ohm
R265	6S44594P06	47K ohm
R266	6S44594P06	47K ohm
R267	6S44593P77	3.3K ohm
R268	6S44593P77	3.3K ohm
R269	6S44594P06	47K ohm
R270	6S44594P06	47K ohm
R271	6S44594P06	47K ohm
R272	6S44594P06	47K ohm
R273	6S44593P77	3.3K ohm
R274	6S44593P77	3.3K ohm
R275	6S44594P14	100K ohm
R276	6S44594P14	100K ohm
R277	6S44593P99	27K ohm
R278	6S44593P99	27K ohm
R279	6S44594P06	47K ohm
R280	6S44594P06	47K ohm
R281	6S44593P77	3.3K ohm
R282	6S44593P77	3.3K ohm
R283	6S44594P12	82K ohm
R284	6S44594P12	82K ohm
R285	6S44594P16	120K ohm
R286	6S44594P16	120K ohm
R287	6S44594P06	47K ohm
R288	6S44594P06	47K ohm
R289	6S44593P77	3.3K ohm
R290	6S44593P77	3.3K ohm
R291	6S44594P16	120K ohm
R292	6S44594P16	120K ohm
R293	6S44594P06	47K ohm
R294	6S44594P06	47K ohm
R295	6S44593P77	3.3K ohm
R296	6S44593P77	3.3K ohm
R297	6S44594P04	39K ohm
R298	6S44594P04	39K ohm
R299	6S44593P99	27K ohm
R300	6S44593P99	27K ohm
R301	6S44594P06	47K ohm
R302	6S44594P06	47K ohm
R303	6S44593P77	3.3K ohm
R304	6S44593P77	3.3K ohm

Symbol No.	Part No.	Description
R305	6S44594P11	75K ohm
R306	6S44594P11	75K ohm
R307	6S44594P42	1.5M ohm
R308	6S44594P42	1.5M ohm
R309	6S44593P97	22K ohm
R310	6S44593P97	22K ohm
R311	6S44594P18	150K ohm
R312	6S44594P18	150K ohm
R313	6S44594P24	270K ohm
R314	6S44594P24	270K ohm
R315	6S44593P97	22K ohm
R316	6S44593P97	22K ohm
R317	6S44593P39	82 ohm
R318	6S44593P39	82 ohm
R319	6S44593P69	1.5K ohm
R320	6S44593P69	1.5K ohm
R321	6S44593P61	680 ohm
R322	6S44593P61	680 ohm
R323	6S44593P17	10 ohm
R324	6S44593P17	10 ohm
R325	6S44593P65	1K ohm
R326	6S44594P06	47K ohm
R327	6S41801P45	12K ohm
R328	6S41801P45	12K ohm
R329	6S44593P91	12K ohm
R330	6S44593P91	12K ohm
R331	6S44594P14	100K ohm
R332	6S44594P14	100K ohm
R333	6S44594P14	100K ohm
R334	6S44594P14	100K ohm
R335	6S44594P14	100K ohm
R336	6S44594P14	100K ohm
R337	6S44594P44	1.8M ohm
R338	6S44594P44	1.8M ohm
R339	6S44594P30	470K ohm
R340	6S44594P30	470K ohm
R341	6S44593P97	22K ohm
R342	6S44593P97	22K ohm
R343	6S44594P38	1M ohm
R344	6S44594P38	1M ohm
R345	6S44593P77	3.3K ohm
R346	6S44593P99	27K ohm
R347	6S44593P77	3.3K ohm
R348	6S44593P33	47 ohm
R349	6S44593P89	10K ohm
R350	6S44593P89	10K ohm
R351	6S44593P29	33 ohm
R352	6S44593P93	15K ohm
R353	6S44593P93	15K ohm
R354	6S44593P81	4.7K ohm
R355	6S44593P69	1.5K ohm
R356	6S44593P83	5.6K ohm
R357	6S44593P77	3.3K ohm

Symbol No.	Part No.	Description
R358	6S44593P79	3.9K ohm
R359	6S44593P79	3.9K ohm
R360	6S44594P14	100K ohm
R361	6S44594P14	100K ohm
R362	6S44593P77	3.3K ohm
R363	6S44593P79	3.9K ohm
R364	6S44593P79	3.9K ohm
R365	6S44593P99	27K ohm
R366	6S44593P87	8.2K ohm
R367	6S44593P87	8.2K ohm
R368	6S44594P30	470K ohm
R369	6S44594P30	470K ohm
R370	6S44594P06	47K ohm
R371	6S44594P30	470K ohm
R372	6S44593P59	560 ohm
R373	6S44594P14	100K ohm
R374	6S44594P46	2.2M ohm
R375	6S44593P97	22K ohm
R376	6S44593P83	5.6K ohm
R377	6S44594P08	56K ohm
R378	6S44594P08	56K ohm
R379	6S44593P97	22K ohm
R380	6S44594P14	100K ohm
R381	6S44593P97	22K ohm
R382	6S44593P53	330 ohm
R383	6S44594P14	100K ohm
R384	6S44594P46	2.2M ohm
R385	6S44593P97	22K ohm
R386	6S44593P41	100 ohm
R387	6S44593P97	22K ohm
R388	6S44593P97	22K ohm
R389	6S44593P79	3.9K ohm
R390	6S44593P83	5.6K ohm
R391	6S44593P83	5.6K ohm
R392	6S44594P30	470K ohm
R393	6S44594P30	470K ohm
R395	6S44593P73	2.2K ohm
R396	6S44593P73	2.2K ohm
R397	6S44593P01	2.2 ohm
R399	6S41801P59	180K ohm
R400	6S41801P59	180K ohm
R401	6S44594P26	330K ohm
R402	6S44594P26	330K ohm

Symbol No.	Part No.	Description
<b>Variable Resistors</b>		
VR5	18T40078F01	Volume, Rotary (Bias) 220K ohm
VR103	18C41732G06	Solid, 10K ohm (B)
VR104	18C41732G06	Solid, 10K ohm (B)
VR105	18C41732G08	Solid, 22K ohm (B)
VR106	18C41732G08	Solid, 22K ohm (B)
VR107	18C41732G03	Solid, 4.7K ohm (B)
VR108	18C41732G03	Solid, 4.7K ohm (B)
VR109	18C41732G06	Solid, 10K ohm (B)
VR110	18C41732G06	Solid, 10K ohm (B)
VR111	18C41732G06	Solid, 10K ohm (B)
VR112	18C41732G06	Solid, 10K ohm (B)
VR113	18C41732G06	Solid, 10K ohm (B)
VR114	18C41732G06	Solid, 10K ohm (B)
VR115	18C41732G06	Solid, 10K ohm (B)
VR116	18C41732G06	Solid, 10K ohm (B)
VR117	18C41732G06	Solid, 10K ohm (B)
VR118	18C41732G06	Solid, 10K ohm (B)
VR119	18C41732G06	Solid, 10K ohm (B)
VR120	18C41732G06	Solid, 10K ohm (B)
VR121	18C41732G10	Solid, 470 ohm (B)
VR122	18C41732G10	Solid, 470 ohm (B)
VR123	18C41732G01	Solid, 220K ohm (B)
VR124	18C41732G01	Solid, 220K ohm (B)
VR125	18C41732G09	Solid, 47K ohm
VR126	18C41732G09	Solid, 47K ohm
VR127	18B44064J01	470 ohm (B), 1/2W
VR128	18B44064J01	470 ohm (B), 1/2W
VR129	18C41732G08	Solid, 22K ohm (B)
VR130	18C41732G08	Solid, 22K ohm (B)
VR132	18C41732G01	Solid, 220K ohm (B)
VR133	18T43406P01	ADFOR, 220K ohm (B) 1/2W
VR134	18T43406P01	ADFOR, 220K ohm (B) 1/2W
<b>LED Meter P.C. Board</b>		
<b>IC's</b>		
IC501	51T40949T01	TA7612P
IC502	51T40949T01	TA7612P
IC503	51T40949T01	TA7612P
IC504	51T40949T01	TA7612P
IC505	51T41803U01	TA7318AP-2

Symbol No.	Part No.	Description
<b>Transistors &amp; Thermistors</b>		
Q501	48T42516U05 or 48T42516U06	Transistor, 2SD361 (E1) Transistor, 2SD361 (E2)
Q502	48S40149P01	Transistor, 2SC900E
Q503	48S40149P01	Transistor, 2SC900E
TH501	48S42931U61	Thermistor
TH502	48S42931U61	Thermistor
<b>Diodes</b>		
D501	48S134816	Silicon, 1S1555
D502	48S134816	Silicon, 1S1555
D503	48S134816	Silicon, 1S1555
D504	48S134816	Silicon, 1S1555
D505	48S134816	Silicon, 1S1555
ZD501	48T40150U98	Zener
PL11	48T42674U01	LED, Green
PL12	48T42674U02	LED, Red
PL4	48T40585F01	LED, LN38GP-A
PL5	48S42667P08	LED, Green
<b>Capacitors</b>		
C501	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C502	23D44333G05	Electrolytic 4.7 $\mu$ F 25V
C503	8S44503P17	Mylar 0.022 $\mu$ F 50V
C504	8S44503P17	Mylar 0.022 $\mu$ F 50V
C505	21C45322G32	Ceramic 22000 pF 50V Z
C506	23D44333G01	Electrolytic 1 $\mu$ F 50V
C507	23D44333G14	Electrolytic 22 $\mu$ F 25V
C508	8S44505P61	Ceramic 10000 pF
<b>Resistors</b>		
R501	6S44593P65	1K ohm
R502	6S44593P65	1K ohm
R503	6S44593P66	1.1K ohm
R504	6S44593P66	1.1K ohm
R505	6S44593P73	2.2K ohm
R506	6S44593P73	2.2K ohm
R507	6S44593P57	470 ohm
R508	6S44593P57	470 ohm
R509	6S44593P89	10K ohm
R510	6S44593P89	10K ohm
R511	6S44593P69	1.5K ohm
R512	6S44593P69	1.5K ohm
R513	6S44593P65	1K ohm
R514	6S44593P65	1K ohm



Symbol No.	Part No.	Description
R515	6S44593P97	22K ohm
R516	6S44593P97	22K ohm
R517	6S44593P74	2.4K ohm
R518	6S44593P74	2.4K ohm
R519	6S44593P89	10K ohm
R520	6S44593P89	10K ohm
R521	6S44593P59	560 ohm
R522	6S44593P59	560 ohm
R523	6S44593P59	560 ohm
R524	6S44593P59	560 ohm
R525	6S44593P59	560 ohm
R526	6S44593P59	560 ohm
R527	6S44593P59	560 ohm
R528	6S44593P59	560 ohm
R529	6S44593P59	560 ohm
R530	6S44593P59	560 ohm
R531	6S44593P59	560 ohm
R532	6S44593P59	560 ohm
R533	6S44593P59	560 ohm
R534	6S44593P59	560 ohm
R535	6S44593P59	560 ohm
R536	6S44593P59	560 ohm
R537	6S44593P59	560 ohm
R538	6S44593P59	560 ohm
R539	6S44593P59	560 ohm
R540	6S44593P59	560 ohm
R541	6S44593P59	560 ohm
R542	6S44593P59	560 ohm
R543	6S44593P59	560 ohm
R544	6S44593P59	560 ohm
R545	6S44593P71	1.8K ohm
R546	6S44593P71	1.8K ohm
R547	6S44593P71	1.8K ohm
R548	6S44593P71	1.8K ohm
R549	6S44593P71	1.8K ohm
R550	6S44593P71	1.8K ohm
R551	6S44593P71	1.8K ohm
R552	6S44593P71	1.8K ohm
R553	6S44593P53	330 ohm
R554	6S44593P69	1.5K ohm
R555	6S44593P98	24K ohm
R556	6S44593P89	10K ohm
R557	6S44594P14	100K ohm
R563	6S44593P71	1.8K ohm

Symbol No.	Part No.	Description
<b>Control P.C. Board</b>		
<b>IC</b>		
IC601	51T42906U01	Micon, $\mu$ PD546C
<b>Transistors</b>		
Q611	48T42516U03 or 48T42516U04 or 48T42516U05 or 48T42516U06	2SD361(D1) 2SD361(D2) 2SD361(E1) 2SD361(E2)
Q612	48S40149P01 or 48S40247G02	2SC900E 2SC733
Q613	48T42561U03 or 48T42516U04 or 48T42516U05 or 48T42516U06	2SD361(D1) 2SD361(D2) 2SD361(E1) 2SD361(E2)
Q614	48S40149P01	2SC900E
Q615	48S40149P01	2SC900E
Q616	48S40149P01 or 48S40247G02	2SC900E 2SC733
Q617	48T40338U02	2SA673(D)
Q618	48T40338U02	2SA673(D)
Q619	48S42172J04	2SC1213
Q620	48S42172J04	2SC1213
Q621	48S40149P01 or 48S40247G02	2SC900E 2SC733
Q622	48T40081T03	2SA733(BL)
Q623	48S40149P01	2SC900E
Q624	48S40149P01 or 48S40247G02	2SC900E 2SC733
Q626	48T40081T03	2SA733(BL)
Q627	48T40081T03	2SA733(BL)
Q628	48T40081T03	2SA733(BL)
Q629	48T40081T03	2SA733(BL)
Q630	48T40081T03	2SA733(BL)
Q631	48T40081T03	2SA733(BL)
Q632	48T40081T03	2SA733(BL)
Q633	48S42172J04	2SC1213
Q634	48S41172J04	2SC1213
Q635	48S42172J04	2SC1213
Q636	48S40149P01	2SC900E
Q638	48S40149P01	2SC900E
Q639	48S40149P01	2SC900E
Q640	48S40149P01	2SC900E
Q643	48S40149P01 or 48S40247G02	2SC900E 2SC733

Symbol No.	Part No.	Description
<b>Diodes</b>		
D622	48C40235G02 or 48T40477U01	10E2 IN4003
D624	48S134816	Silicon, 1S1555
D625	48S134816	Silicon, 1S1555
D626	48S134816	Silicon, 1S1555
D628	48S134816	Silicon, 1S1555
D632	48S134816	Silicon, 1S1555
D635	48S134816	Silicon, 1S1555
<b>Coil</b>		
E601	24T42908U01	Coil, IF
<b>Capacitors</b>		
C616	23D44333G01	Electrolytic 1uF 50V
C618	23D44333G05	Electrolytic 4.7uF 25V
C619	23D44333G05	Electrolytic 4.7uF 25V
C623	8C44505P25	Ceramic 33pF
C624	8C44833J09	Mylar 0.0047uF
C625	23D44333G12	Electrolytic 22uF 10V
C627	23S41198U41	Electrolytic 220uF 16V
C628	21C45322G32	Ceramic 22000pF 50V
C631	23D44333G01	Electrolytic 1uF 50V
<b>Resistors</b> (All resistors are 1/4W, 5% , carbon film unless otherwise noted.)		
R619	6S44594P22	220K ohm
R624	6S44593P55	390 ohm
R625	6S44593P89	10K ohm
R626	6S44594P14	100K ohm
R627	6S44593P55	390 ohm
R628	6S44593P89	10K ohm
R629	6S44594P14	100K ohm
R630	6S44593P97	22K ohm
R631	6S44593P97	22K ohm
R632	6S44593P97	22K ohm
R633	6S44594P14	100K ohm
R634	6S44594P14	100K ohm
R635	6S44594P14	100K ohm
R636	6S44593P67	1.2K ohm
R637	6S44593P67	1.2K ohm
R638	6S44593P67	1.2K ohm
R639	6S44594P14	100K ohm
R640	6S44594P14	100K ohm
R641	6S44593P83	5.6K ohm

Symbol No.	Part No.	Description
R642	6S44594P14	100K ohm
R643	6S44593P63	820 ohm
R644	6S44593P55	390 ohm
R645	6S44593P97	22K ohm
R647	6S44593P97	22K ohm
R648	6S44593P41	100 ohm
R649	6S44593P78	3.6K ohm
R650	6S44594P14	100K ohm
R651	6S44593P89	10K ohm
R652	6S44593P75	2.7K ohm
R653	6S44594P14	100K ohm
R654	6S44594P22	220K ohm
R664	6S44593P49	220 ohm
R665	6S44593P49	220 ohm
R666	6S44593P49	220 ohm
R667	6S44593P49	220 ohm
R668	6S44593P49	220 ohm
R669	6S44593P49	220 ohm
R670	6S44593P49	220 ohm
R671	6S44593P87	8.2K ohm
R672	6S44593P87	8.2K ohm
R673	6S44593P87	8.2K ohm
R674	6S44593P87	8.2K ohm
R675	6S44593P87	8.2K ohm
R676	6S44593P87	8.2K ohm
R677	6S44593P87	8.2K ohm
R678	6S44593P89	10K ohm
R679	6S44593P89	10K ohm
R680	6S44593P89	10K ohm
R681	6S44593P89	10K ohm
R682	6S44593P89	10K ohm
R683	6S44593P89	10K ohm
R684	6S44593P89	10K ohm
R685	6S44594P22	220K ohm
R686	6S44593P87	8.2K ohm
R687	6S44594P22	220K ohm
R688	6S44593P87	8.2K ohm
R689	6S44594P22	220K ohm
R690	6S44593P87	8.2K ohm
R691	6S44594P22	220K ohm
R692	6S44593P97	22K ohm
R694	6S44594P14	100K ohm
R695	6S44593P89	10K ohm
R696	6S44594P22	220K ohm
R697	6S44594P22	220K ohm
R698	6S44594P22	220K ohm
R699	6S44594P22	220K ohm
R670	6S44594P22	220K ohm
R701	6S44594P22	220K ohm
R702	6S44594P22	220K ohm
R703	6S44594P22	220K ohm
R710	6S44593P79	3.9K ohm
R711	6S44593P79	3.9K ohm

Symbol No.	Part No.	Description
R712	6S44593P83	5.6K ohm
R713	6S44593P77	3.3K ohm
R714	6S44593P78	3.6K ohm
<b>Power Supply P.C. Board</b>		
<b>Transistors</b>		
Q601	48S40662G05	2SD235Y
Q602	48S40149P01	2SC900E
Q603	48T41197U04	2SA777S
Q604	48S40149P01	2SC900E
Q605	48S40662G05	2SD235Y
Q606	48S40149P01	2SC900E
Q607	48T40081T03	2SA733
Q608	48T40469U01	2SC1983
Q609	48T40469U01	2SC1983
Q610	48S40149P01	2SC900E
Q625	48S43239G02	2SC509
<b>Diodes &amp; Fuse</b>		
D601	48C40235G02	10E2
D602	48C40235G02	10E2
D603	48C40235G02	10E2
D604	48C40235G02	10E2
D605	48C40235G02	10E2
D606	48C40235G02	10E2
D607	48C40235G02	10E2
D608	48C40235G02	10E2
D609	48C40235G02	10E2
D610	48C40235G02	10E2
D612	48C40235G02	10E2
D613	48C40235G02	10E2
D614	48C40235G02	10E2
D615	48C40235G02	10E2
D616	48C40235G02	10E2
D617	48C40235G02	10E2
D618	48C40235G02 or 48T40477U01	10E2 1N4003
D619	48C40235G02 or 48T40477U01	10E2 1N4003
D623	48S134816	IS1555
ZD601	48T40150U85 or 48T40150U86	Zener, HZ24-1 Zener, HZ24-2
ZD602	48S41873J04	Zener, RD-11E
ZD603	48T40150U85 or 48T40150U86	Zener, HZ24-1 Zener, HZ24-2
F601	65B44794G15	Fuse, Slow Blown 300mA

Symbol No.	Part No.	Description
<b>Capacitors</b>		
C601	23T41191U01	Electrolytic 1000 $\mu$ F 50V
C602	23D44333G01	Electrolytic 1 $\mu$ F 50V
C603	23D44333G34	Electrolytic 100 $\mu$ F 50V
C604	23S41198U58	Electrolytic 470 $\mu$ F 35V
C605	23D44333G33	Electrolytic 100 $\mu$ F 35V
C606	23S41198U57	Electrolytic 470 $\mu$ F 25V
C607	23S41198U57	Electrolytic 470 $\mu$ F 25V
C608	23T40429U03	Electrolytic 2200 $\mu$ F 50V
C609	23S41198U71	Electrolytic 2200 $\mu$ F 16V
C610	23S41198U72	Electrolytic 2200 $\mu$ F 25V
C611	23D44333G32	Electrolytic 100 $\mu$ F 25V
C612	23D44333G37	Electrolytic 220 $\mu$ F 16V
C613	23S41198U71	Electrolytic 2200 $\mu$ F 16V
C614	23D44333G37	Electrolytic 220 $\mu$ F 16V
C615	23C42909J03	Electrolytic 0.1 $\mu$ F 50V
C620	23D44333G37	Electrolytic 220 $\mu$ F 16V
C621	23D44333G37	Electrolytic 220 $\mu$ F 16V
C630	21C45332G32	Ceramic 22000pF 50V
<b>Resistors</b> (All resistors are 1/4W, 5% , carbon film unless otherwise noted.)		
R601	6S44593P41	100 ohm
R602	6S44593P41	100 ohm
R603	6S44593P85	6.8K ohm
R604	6S44593P99	27K ohm
R605	6S44593P85	6.8K ohm
R606	6C44652G24	Metal Film 100 ohm 2W
R607	6C44652G24	Metal Film 100 ohm 2W
R608	6S44593P81	4.7K ohm
R609	6S44593P99	27K ohm
R610	6S44593P89	10K ohm
R611	6S44594P06	47K ohm
R612	6S44593P97	22K ohm
R613	6S44593P65	1K ohm
R614	6S44594P14	100K ohm
R615	6S44593P97	22K ohm
R616	6S44594P14	100K ohm
R617	6S44593P89	10K ohm
R618	6S44593P65	1K ohm
R620	6S44594P02	33K ohm
R621	6S44594P02	33K ohm
R622	6S44593P97	22K ohm
R623	6S44593P99	27K ohm
R657	6S44593P81	4.7K ohm
R658	6S44593P77	3.3K ohm
R659	6S44593P59	560 ohm
R660	6S44593P59	560 ohm
R661	6S44593P59	560 ohm
R662	6S44593P59	560 ohm
R663	6S44593P59	560 ohm

Symbol No.	Part No.	Description
<b>Select Switch P.C. Board</b>		
<b>Transistor &amp; Diodes</b>		
Q637	48S40149P01	Transistor, 2SC900E
D627	48S134816	Diode, Silicon 1S1555
D629	48S134816	Diode, Silicon 1S1555
D630	48S134816	Diode, Silicon 1S1555
D631	48S134816	Diode, Silicon 1S1555
D632	48S134816	Diode, Silicon 1S1555
D633	48S134816	Diode, Silicon 1S1555
D634	48S134816	Diode, Silicon 1S1555
<b>Switches</b>		
S4	40T42903U01	Switch, Push SUE61
<b>Capacitor &amp; Resistor</b>		
C626	8S44503P21	Cap., Mylar 0.047 $\mu$ F
R693	6S44594P30	Res., Carbon Film 470K ohm
<b>Terminal P.C. Board</b>		
<b>Transistors</b>		
Q641	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945(L) 2SC900(E) 2SC733
Q642	48S44578J02 or 48S40149P01 or 48S40247G02	2SC945(L) 2SC900(E) 2SC733
<b>Capacitor</b>		
C629	23D44333G08	Electrolytic 10 $\mu$ F 16V
<b>Resistors &amp; Posistor</b>		
R704	6S40150T73	Carbon Film 22K ohm
R705	6S40150T73	Carbon Film 22K ohm
R706	6S40150T49	Carbon Film 220 ohm
VR601	18C41732G10	Variable, Solid 470 ohm
VR602	18C41732G07	Variable, Solid 1K ohm (B)
R709	6S40150T73	Carbon Film 2.2K ohm
R801	6S40150T41	Carbon Film 100 ohm
PR701	48T40412F01	Posistor, 47

Symbol No.	Part No.	Description
<b>Auto Shut Off P.C. Board</b>		
<b>IC &amp; Resistor</b>		
IC1	51T41430U01	Hall IC
R656	6S44593P93	Resistor, Carbon Film 15K ohm $\frac{1}{4}$ W
<b>Key Board Switch P.C. Board</b>		
<b>L.E.D.s</b>		
PL8	48T40585F01	L.E.D., LN38GP-A
PL9	48T40584F01	L.E.D., LN28RP
PL10	48T40584F01	L.E.D., LN28RP
<b>Switches</b>		
S3-1	40T42904U01	Sw, AKC8S
S3-2	40T42904U01	Sw, AKC8S
S3-3	40T42904U01	Sw, AKC8S
S3-4	40T42904U01	Sw, AKC8S
S3-5	40T42904U01	Sw, AKC8S
S3-6	40T42904U01	Sw, AKC8S
<b>Miscellaneous Parts</b>		
C1	8C42962P07	Cap., Metal 0.01 $\mu$ 125V
E4	28T40916U01	Plug, AC Cord
E5	25T42879U01	Transformer
E9	9T40347F01	Connector, DIN
E102	9B44393P01	Plate, Phono
PL1	48T40585F01	LED, LN38GP-A
PL2	48S42667P08	Lamp LED (Green)
PL3	48T40584F01	LED, LN28RP
E8-1	48T42907U01	LED, 7 Segment
E8-2	48T42907U01	LED, 7 Segment
E8-3	48S42907U01	LED, 7 Segment
R1	6S44593P89	Carbon Film 10K ohm
R2	6S44593P89	Carbon Film 10K ohm
R707	6S40150T49	Carbon Film 220 ohm
R708	6S40150T49	Carbon Film 220 ohm
S1	40T43485U01	Switch, Power
VR1	18T41227U01	Res., Variable 50KAx2
VR2	18T44715P01	Res., Variable 5KAx2
VR3	18T44715P02	Res., Variable 10KAx2
VR4	18T41227U01	Res., Variable 50KAx2

Symbol No.	Part No.	Description
VR6	18T40603T03	Volume, Rotary 22K-B
VR7	18T40603T03	Volume, Rotary 22K-B
VR9	18T42905U01	Volume, Rotary

**Cabinet Parts**

1	7C40992U03	Bkt. Side (L)
2	3S44205G01	Scr., Tpg. (M3 x 0.5 x 6)
3	7B40993U01	Bkt. Side (R)
4	7B40994U01	Bkt. Center
5	15C40996U02	Cover, Rear
6	43B41625J01	Stopper, Cord
7		Not Used --
8	3S44205G17	Scr. (M4 x 0.7 x 6, Blk.)
9	7B42165U01	Support, Chassis
10	2S40000G12	Nut, Hex (M3 x 0.5)
11	3S40011G93	Scr. Mch. (M3 x 0.5 x 8)
12	4S40070G05	Washer (3.3 x 8 x 0.5)
13	27D42168U01	Chassis, Front
14	5B41635J02	Rivet, Push
15	2S40000G15	Nut
16	4S40070G28	Washer (9.1 x 14 x 0.5)
17	2S40000G10	Nut, Hex. (M7 x 0.75)
18	4S40070G14	Washer (7.2 x 12 x 0.5)
19	7B42163U01	Bkt., Tape Deck (Top)
20	7B42164U01	Bkt., Tape Deck (Bottom)
21	3C40014G04	Scr., Mch. (M3 x 0.5)
22	43A40541J07	Spacer
23	7A40962U01	Bkt., Power Sw.
24	36A44465P01	Spacer, Sw.
25	84D43686U05	Panel, Power Sw.
26	7C43682U01	Frame, Meter
27	1V42200U89	Assy., LED Meter
28	84D43686U07	Panel, Speed LED
29	7A42162U01	Bkt., Volume
30	3S40012G03	Scr., Tpg. (M3 x 6)
31	84D43686U04	Panel, Record/Calibration
32	84D43686U06	Panel, Dolby Record
33	1V42200U80	Assy., Select Sw.
34	1V42200U82	Assy., Master Board
35	7B44293U01	Bkt., Sw.
36	3S40018G01	Scr., Tpg. (M3 x 6)
37	29C41045P02	Lug, Wrap Around
38	5B41635J02	Rivet, Push
39	7A40998U01	Lever, Power Sw.
40	1U42000U06	Cassette Tape Deck
41	1V43200U23	Assy., Auto Shut Off Panel
42	1V42200U83	Assy., Control Panel
43	3S40011G17	Scr., Mch. (M3 x 0.5 x 6)
44		Not Used --
45		Not Used --

Symbol No.	Part No.	Description
46	5B41635J02	Rivet, Push
47	3S40036U02	Scr., Tap Tite (M3 x 8)
48	26A40450F01	Shield, Magnetic
49	84D43687U05	Panel, Pitch Control
50	84D43687U03	Panel, Counter LED
51	7C42171U01	Frame, Function Key
52	36A42167U01	Knob, Push
53	26A42166U01	Shield, Sw.
54	3S40012G03	Scr., Tpg. (M3 x 6)
55	1V42200U72	Assy., Key Board Sw.
56	64D42169U01	Panel, Front
57	7A42177U01	Frame, LED
58	15C40997U01	Cover, Bottom
59	75A44394P01	Pad, Trannleg
60	3S44205G15	Scr., Tap Tite (M4 x 12)
61	14A40987U01	Insulator, Sw.
62	64B42170U01	Panel, Function
63	3S44205G16	Scr., Tap Tite
64	36A44389P06	Ass., Power Knob
65	36A40975U01	Knob, Control (L)
66	36A40976U01	Knob, Control (R)
67	36A40977U01	Knob, Control
68	36A40972U01	Knob, Counter Lever
69	36A40971U01	Knob, Memory
70	7C41004U02	Frame, Door
71	7B41660U01	Frame, Acryl
72	4A41014U01	Washer, Rubber
73	3A40978U03	Scr., Special
74	7B42178U01	Frame, Acryl Meter
75	4A41014U01	Washer, Rubber
76	3A40978U01	Scr., Special
77	33A41102U01	Plate, Name
78	16D41662U01	Cabinet, Wood
79	3S40036U08	Scr., Tap Tite (M4 x 16)
80		Not Used --
81	36A42912U01	Knob, Push
82	36A44418U01	Knob, Control (A)
83	1V42200U84	Sssy., Power Supply
84	14A40472G02	Insulator, Transistor
85	3S40011G30	Scr., Mch. (M2 x 0.4 x 6)
86		Not Used --
87	43A41691G01	Spacer
88	7A43683U01	Bkt., Heat Sink
89	3S40011G17	Scr., Mch. (M3 x 0.5 x 6)

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
<b>Packing Parts</b>					
101	56B40442T02	Packing, Front Frame	241	46A41940U01	Stopper, Plunger
102	56C40730T35	Carton, Packing	242	1A42050U01	Assy., Riv. Solenoid Lever
103	56D41052U01	Tray, Packing	243	1B42042U01	Assy., Riv. Sub Chassis
104	15A41885U01	Cover, Door	244	44B40208T01	Gear, Drive
105	1V44200J30	Assy., Kit	245	44B40207T01	Gear, Drive
105-1	28C42374J02	Cord, Output	246	49A42173U01	Pulley, Magnet
105-2	56B40230G16	Sack, Polyethylene	247	4A41345P01	Washer, Lock
<b>Tape Mechanism Parts</b>					
201	1A42045U01	Ass., Riv. Bkt., Door	248	59T42189U01	Link, Magnet
202	43A42035U01	Spacer, Door	249		- Not Used -
203	3S44205G04	Scr., Tpg. (M3 x 0.5 x 5)	250	3A41166U01	Scr., Bearing
204	30S43803G05	Dial Cord	251	7A41936U01	Bkt., Pinch Roller
205	4C42091G05	Washer, "C"	252	45A41938U01	Arm, Idler (A)
206	1A42044U01	Assy., Riv. Bkt. Door (L)	253	45A41939U01	Arm, Idler (B)
207	45A41933U01	Arm, Eject	254	45A41946U01	Arm, Chassis Holder
208	47A42031U01	Shaft, Arm Eject	255	41A41947U01	Spring, Head Base
209	64A41931U01	Plate, Door Lock	256		- Not Used -
210	45A43813U01	Lever, Eject	257	49A41954U01	Flywheel, Capstan (L)
211	4C42091G04	Washer, "C"	258	49B41955U01	Flywheel, Capstan (R)
212	41B41497U13	Spring, Pull	259	15A41956U01	Housing, Capstan
213	1A42054U01	Assy., Frame Door	260	45A41958U01	Cam, Clutch Idler
214	15C41130U01	Holder, Chassis	261	45A41959U01	Link, Forward
215	15C41130U02	Holder, Chassis	262	42A41960U01	Belt, Motor
216	1B42046U01	Assy., Riv. Arm Door	263	42A41961U01	Belt, Sub
217	1B42046U02	Assy., Riv. Arm Door	264	42A41962U01	Belt, Counter
218	1A42043U02	Assy., Riv. Support Chassis	265	7A41963U01	Bkt., Pinch Roller
219	61A41165U01	Lens, Back Light	266	45B41935U01	Lever, Brake
220	7A41942U01	Bkt., Micro Sw.	267	45T41964U01	Clutch, Play
221	7A41944U01	Bkt., Record Sencor	268	45T41967U01	Clutch, FF
222	45B42011U01	Arm, Sw.	269	49T41970U01	Pulley, FF Idler
223	47A41173U02	Shaft, Record Sensor	270	43A41096U01	Guide, Cassette
224	41B41492U12	Spring, Pull	271	49T41629F01	Reel, Take-up
225	3S40011G85	Scr., Mch. (M2 x 0.4 x 15)	272	49T41448U01	Reel, Supply
226	1A42047U01	Assy., Riv. Head Base	273	49A42898U01	Wheel, Tension (A)
227	46B41972U01	Bkt., Head	274	49B42899U01	Wheel, Tension (B)
228	3S42155U01	Scr., Set (-)	275	45A41095U01	Arm, Brake
229	3S40019G08	Scr., (M2 x 0.4 x 10)	276	43A41182P02	Ball, Steel
230	3C40014G07	Scr., Mch. (M2 x 0.4 x 4)	277	41A42895U02	Spring, Push
231	41A41490U01	Spring, Azimuth	278	41A41491U02	Spring, Push
232	3C40014G04	Scr., Mch. (M3 x 0.5)	279	41A42109U01	Spring, Clutch Cam
233	7A41971U01	Bkt., Motor	280	47A42110U01	Rod, Link
234	49A42715U01	Pulley, Motor	281	41A42111U01	Spring, Clutch
235	1A44162U01	Assy., Bkt. Pulley	282	41A42112U01	Spring, Arm Idler
236	3C40121T04	Scr., Mch. (M2.6 x 7)	283	41A42114U01	Spring, Pulley Idler
237	43A41289U02	Sleeve, Cushion	284	43A42040U01	Sleeve, Idler Shaft
238	75A41685U01	Cushion, Motor	285	43A42023U01	Sleeve
239	22B40232G02	Pin, Spring	286	41B43676U02	Spring, Pull
240	7A41950U01	Bkt., Solenoid (M)	287	43A42115U01	Spacer, Head Base
			288	41B41492U03	Spring, Pull
			289	41B41492U05	Spring, Pull
			290	41B43676U06	Spring, Pull
			291	41B43676U01	Spring, Pull
			292	2S40000G12	Nut, Hex. (M3 x 0.5)
			293	41B44327P07	Spring, Pull

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
294	65C42544U02	Lamp, Pilot	347	15A41630F01	Cover, Sensor
295	40C43472J01	Sw., Micro	348	1T42117U01 or	Assy., Solenoid
296	4A41345P02	Washer, Lock		1T42752U01	Assy., Solenoid
297	4A41345P03	Washer, Lock	349	1T42119U01 or	Assy., Solenoid
298	4A41345P05	Washer, Lock		1T42754U01	Assy., Solenoid
299	4S40075G07	Washer, Polyester			
300	4S40075G10	Washer, Polyester			
301	43A44303P01	Washer, Oil Shield			
302	3S44205G03	Scr., Tap Tite (M3 x 8)			
303	1C42041U01	Assy., Riv. Chassis			
304	1A41990U01	Assy., Bkt. Pinch Roller			
305	1A42048U01	Assy., Riv. Cam			
306	1A42049U01	Assy., Riv. Stopper Eject			
307	1A42051U01	Assy., Riv. Main Solenoid z Lever			
308	1A41516U01	Assy., Pinch Roller			
309	43B43738U01	Guide, Tape.			
310	3S40019G03	Scr., F-Lock			
311	41B43676U03	Spring, Pull			
312	41A43688U01	Spring, Cord			
313	41A43685U01	Spring, Dumper			
314	3S40019G32	Scr., F-Lock			
315	88T41139U02	Head, R/P Combination			
316	4S40075G18	Washer, S.T.W.			
317	41A43675U01	Spring, (Pinch Roller)			
318	41A42351U02	Spring, Pinch Roller Bkt.			
319	88T44524U01	Head, Erase			
320	3S40019G01	Scr., F-Lock			
321	59T41184U03	Motor, 2 Speed			
322	4S40075G12	Washer (3.1 x 5.4)			
323	59T42145U01	Motor, DC			
324	4C42091G05	Washer, "C"			
325	75A42964U01	Pad, Brake			
326	4S40075G05	Washer (2.1 x 4 x 0.13)			
327	4S40011G75	Scr., Mch. (M2 x 0.4 x 14)			
328	4S40075G19	Washer (4.1 x 6.5 x 0.5)			
329	3S40019G29	Scr., F-Lock			
330	4S40075G13	Washer, S.T.W.			
331	29A737272	Lug, Wrap Around			
332	48C40235U01	Diode, 10E1			
333	43A43689U01	Sleeve, Idler Shaft			
334	48S42931U23	Thermistor			
335	3S44205G01	Scr., Tpg. (M3 x 0.5 x 6)			
336	3S44205G12	Scr., Tpg. (M3 x 4)			
337	4C42091G06	Washer "C"			
338	4S40075G06	Washer, S.T.W.			
339	4S40075G24	Washer			
340	75A44231U01	Cushion, Head Base			
341	42A44230U01	Lug, Wrap Through			
342	41A44528U01	Spring, Flywheel			
343	41A40594F01	Spring, Eject Lever			
344		-- Not Used --			
345	1V42700U84	Assy., Terminal Panel			
346		-- Not Used --			

