

TOSHIBA

STEREO CASSETTE DECK

PC-D12



SPECIFICATIONS

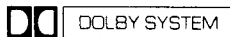
Heads:	Record/playback head: Super AP (super-hard permalloy) head x 1 Erase head: AF (2 gap ferrite) head x 1	Input Level:	MIC: 0.25mV (600 ohm – 10 k ohm)
Tape Transport:	Dual motor IC logic control	Output Level:	LINE: 70 mV (50 k ohm) LINE: 0.4V (50 k ohm) PHONES: 0.14mW (8 ohm)
Motor:	Capstan drive: DC servo motor x 1 Reel drive: DC motor x 1	Semiconductors:	ICs: 11 Transistors: 43 FETs: 4 Diodes: 47 LEDs: 25
Wow & Flutter:	0.04% WTD, RMS ±0.15% (DIN)	Power Supply:	AC 240V 50 Hz for Europe AC 240V 50 Hz for United Kingdom & Australia AC 115V/230V 50 Hz/60 Hz for Southeast Asia, South America and Middle East AC 120V 60Hz for U.S.A. and Canada
Rewind/fast forward Time:	Approximately 80 seconds (C-60)	Power Consumption:	22W
Frequency Response:	25 Hz – 18,000 Hz for metal tapes 25 Hz – 17,000 for chrome type tapes 25 Hz – 16,000 for normal tapes	Dimensions:	257(W) x 106(H) x 214(D) mm (including knobs and feet)
Signal-to-noise Ratio:	60 dB (Line in, Peak level, WTD)	Weight:	3.8 kg
Dolby NR Effect:	5 dB improvement at 1 KHz 10 dB improvement above 5 kHz	Accessories:	Audio cables x 2 Dustcover Head cleaner
Distortion:	0.7% (0 dB, 400 Hz)		

Specification are subject to change without notice

TA, TC, TE, TU, AY, VF

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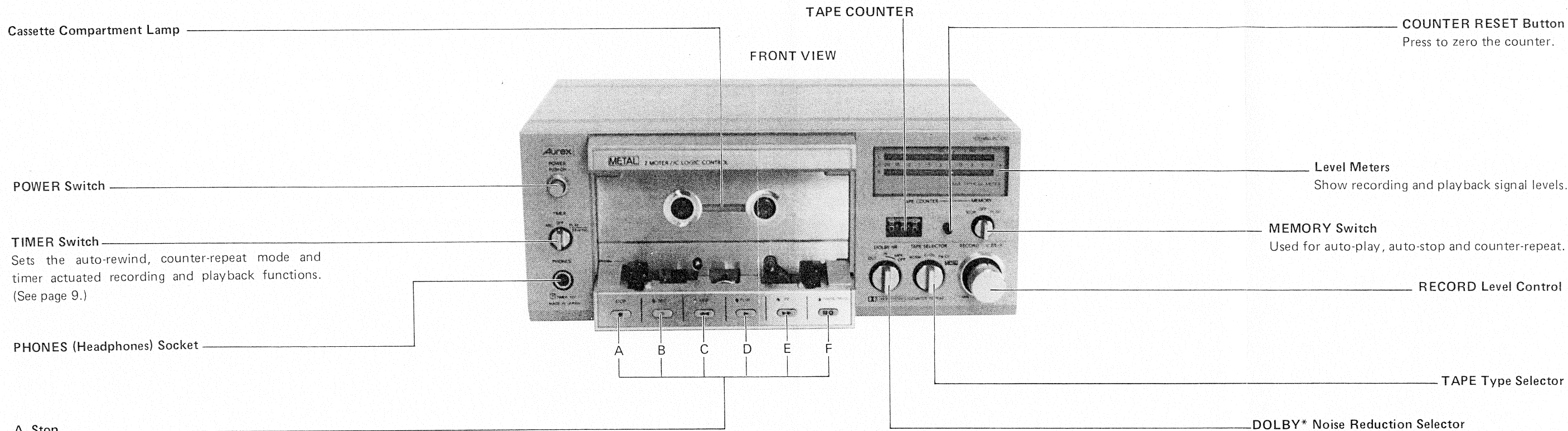


*Noise Reduction System is manufactured under license from Dolby Laboratories.
 "DOLBY" and the Double-D symbol are Trademarks of Dolby Laboratories Inc.

1. FEATURES

- Silent mechanism with two-motor IC logic controls:
 Light-touch, tape transport control buttons have integral LED indicators (except the STOP button).
 The dual-motor system has a DC servo motor for capstan drive and a DC motor for reel drive to ensure reliable, simple and silent operation.
- LED peak level meters:
 Unlike electromechanical meters, LED level meters have no moving parts, and respond quickly and accurately to every peak in the input signals. Red LEDs indicate signals above 0 dB, and green LEDs indicate signals below 0 dB.
- Memory counter feature:
 Auto stop, auto play, auto rewind, and counter repeat are provided as standard. Other features include unattended recording, alarm playback, and so forth.
- Four-position tape selector includes METAL position.
- METAL tape capability and super AP heads—the hyperbolic head surface assures stable tape contact for all tape types giving excellent recording/playback performance.
- Direct loading system—gives maximum tape visibility and easier tape loading/unloading.
- Dolby NR system with MPX ON/OFF feature.
- Remote control with optional remote control unit.

2. OPERATING CONTROLS



- A Stop
 - B Record
 - C Rewind
 - D Play
 - E Fast Forward Wind
 - F Pause Mute
- Interactive logic control button (See page 6.)

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Figure 1

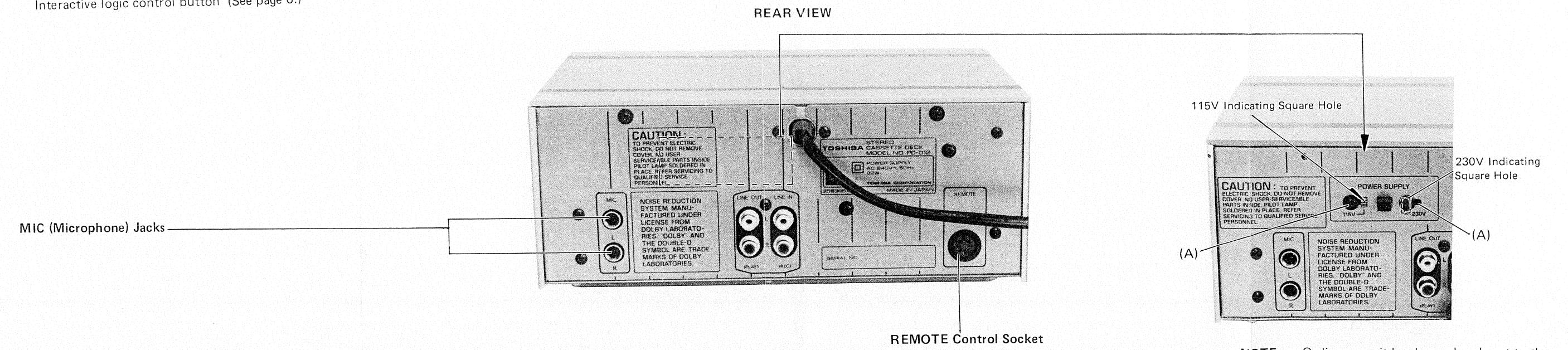


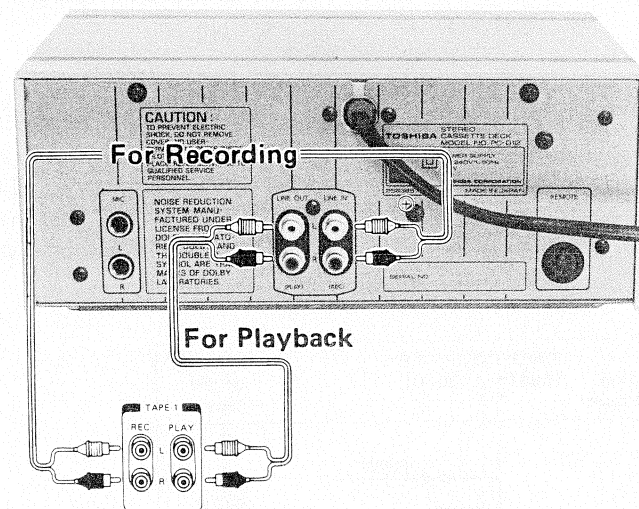
Figure 2

Figure 3

3. OPERATING INSTRUCTIONS

Setting up your PC-D12

<Rear Panel PC-D12>



<Stereo amplifier>

Figure 4

1. Disconnect all power from your hi-fi system by removing the plugs from the AC outlets. (Be sure to pull the plug itself, never the cable.)
2. Connection to a Stereo Amplifier or Stereo Radio Receiver.
 - Plug either of the supplied audio leads into the REC sockets on the back of the cassettes deck, and plug the other end of this lead into the REC or LINE IN sockets on your amplifier (or radio receiver)—use red plugs for the right channel.
 - Plug the other audio lead into the PLAY sockets on the back of the cassette deck, and plug the other end of this lead into the PLAY or LINE OUT sockets on your amplifier—red for the right channel.
 - Insert all the plugs fully to prevent noise.
 - If your amplifier has different type sockets, consult your dealer and your amplifier instruction manual. The Remote Control RM-15S (optional accessory) should be plugged into the remote control socket.
3. Insert the AC power plug.
4. Press the POWER switch on the front panel. The meters and cassette compartment lamp will light.

Connections for Tape Copying Direct from Another Tape Deck

If you are not using a stereo amplifier that has a tape copying or dubbing switch and you want to make tape copies direct from another tape deck, connect the two decks with one cable as shown below. The diagram shows playback on the PC-D12. To record on the PC-D12, reverse the connections.

- Use red plugs for the right channel. Insert the plugs fully.

Note: If hum noise generates, try to relocate the deck.

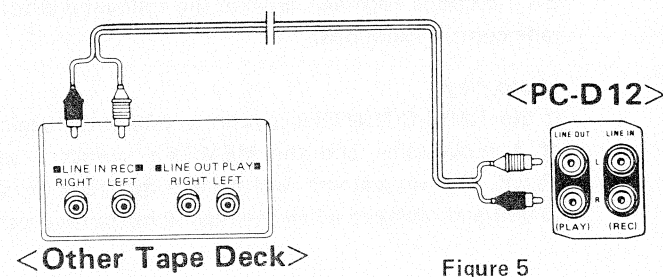


Figure 5

Cassette tapes

- The PC-D12 can record and play back cassette tapes with METAL, Chrome type, Normal (ferric) or Fe-Cr coatings. Select a tape type suited to your recording application, whether conversation, classical music, popular music, and so on.

Cassette Loading

1. Before loading a cassette, always take up any tape slack with your fingernail or a pencil to prevent the tape from entangling around the capstan.
2. Insert the cassette with the side you wish to record or play facing you, and the tape facing down.

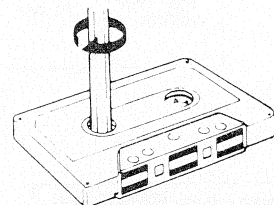


Figure 6

Erasure Prevention Tabs

This deck has an erasure safety device. To prevent accidental erasure of a recorded tape, remove the tab as illustrated. To enable recording of a tape after removal of these tabs, cover the holes with adhesive tape.

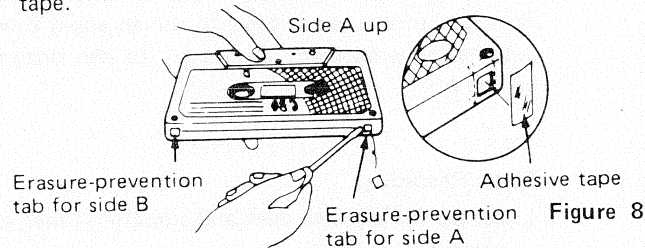
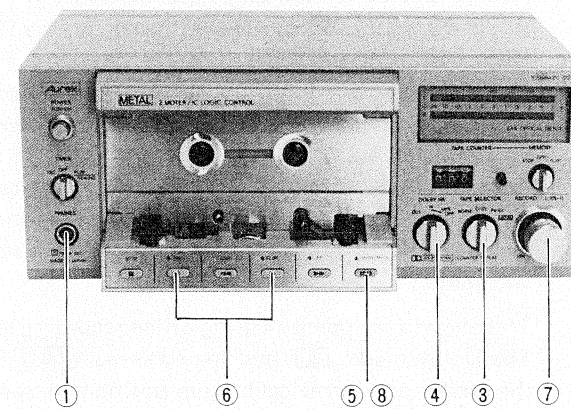


Figure 7

Figure 8

Recording

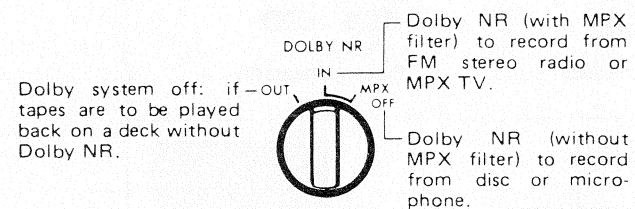
From Radio, Disc, Another Tape Unit, or TV
<Numbers refer to the steps below>



(PC-D12)

Figure 9

1. Set the TIMER switch to OFF.
2. Insert a cassette—with tab for the side you will record.
3. Set the TAPE selector to the tape type used: NORM, CrO₂, METAL or Fe-Cr.
4. Set the Dolby NR selector.
 - Dolby NR recording have reduced tape-hiss on playback.



5. Press the PAUSE/MUTE button to enter PAUSE mode.
6. Press the REC and PLAY buttons simultaneously.
7. Set the RECORD level control so that the peaks of the programme signal light the peak level meters as shown below.
8. Press the PC-D12 PAUSE/MUTE button momentarily. Recording will start.
9. To stop recording, press either the PAUSE/MUTE button momentarily, or the STOP button. Alternatively, the REW button can be pressed immediately to rewind the tape ready for playback.

Microphone Recording

For microphone recording, follow the recording steps given on the left after plugging the microphone(s) into the MIC jacks.

Fade-up Start

A professional-sounding fade-up start can be easily achieved. Note the exact position of the RECORD level control in step 7 and set the RECORD level control to zero. Just after pressing the PAUSE/MUTE button in step 8, smoothly turn the RECORD level control up to the correct position.

- The Auto Shut Off (ASO) feature automatically disengages the tape transport when the end of the tape is reached in any transport mode (play, rewind, etc.).

Note:

- The tape transport controls become operable a few seconds after power is switched on.
- When the unit is turned off, it enters stop mode, irrespective of its current mode.
- If there is no cassette loaded, all the tape transport controls will remain inoperative.
- To load or remove a tape, first press the upper part of the cassette against the top of the cassette compartment.

Setting the Recording Level

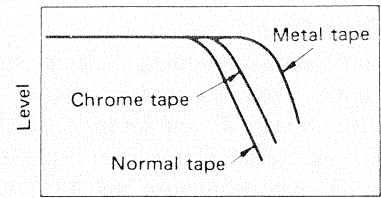
The correct recording level depends considerably on the type of tape used and the program material being recorded. The correct tape type and recording level should be selected to give the best frequency response yet lowest noise level.

For the following three tape types, the RECORD level control should be set so that the peak level meters light at the loudest passage of that programme selection:

Tape type	Peak level meters
NORMAL (ferric) tape	-6 dB or 0 dB
CHROME type tape	-3 dB or +3 dB
METAL alloy tape	0 dB or +5 dB

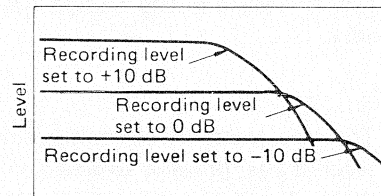
The high-frequency response, in particular, depends considerably on the type of tape and the recording level. Metal-alloy tape, for instance, provides better high-frequency response than normal tape, thus giving much better reproduction of higher pitched instruments and voices. This is illustrated in Fig. 10.

For the same tape type, at lower recording levels, there is better higher-frequency response as shown in Fig. 11. So, to record programme material which contains considerable high-frequency sound, set the recording level somewhat lower. The level meter on this deck is an electronic "digital" indicator, which displays the peaks of the signal, in red over 0 dB and in green below.



High-frequency Response (Hz)
Frequency Response Curves for
Different Types of Tape

Figure 10



High-frequency Response (Hz)
Frequency Response Curves at
Different Recording Levels

Figure 11

Mute Recording

After recording a piece of music, you may want to create a short silent space before further recording. The advanced-logic MUTE feature of this deck allows you to do this easily and professionally.

At the end of a recording, tape transport is normally stopped by pressing the STOP button or the PAUSE/MUTE button momentarily. If, however, the PAUSE/MUTE button is pressed and held in during recording, the tape continues to run but will be erased. When the button is released, the tape will stop in record standby made ready to continue recording. To start recording again press the PAUSE/MUTE button a second time; when the PAUSE/MUTE button is released, recording will start.

This allows very precise setting of the recording level. The Dolby mark $\square\square$ and the adres mark $\square AD$ indicate the Dolby and adres calibration positions, respectively. The adres mark is for use when the tape deck is connected to an adres unit. The adres system is Toshiba's new noise reduction and dynamic range expansion system.

The PAUSE/MUTE button therefore serves a dual purpose: record mute and pause. For proper operation follow the steps given in the table just below. This is illustrated below.

	① Making a non-recorded gap	② Releasing the pause mode
PAUSE/MUTE button operations	A non-recorded gap can be created by pressing and holding the PAUSE/MUTE button during recording. When the button is released, the tape stops in the pause mode. Press Release	To restart recording momentarily press the button again. Press momentarily
Tape transport and record mode	 Record mute starts. Tape transport stops.	 Recording starts again

• When the button is pressed during playback, only the pause function operates. The PAUSE/MUTE button is not effective in the fast-forward and rewind modes.

Figure 12

Playback

Normal Playback

(Numbers refer to the steps below)

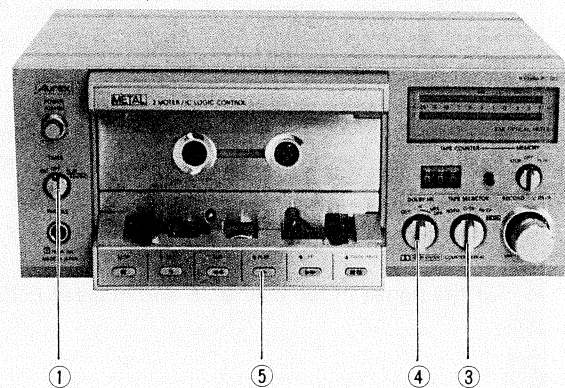


Figure 13

- Set the TIMER switch to OFF.
- Insert the cassette with the play side facing you.
- Set the TAPE selector for the tape type NORM, CrO₂, METAL or Fe-Cr.
- Set the Dolby NR switch to IN for tapes recorded with Dolby NR OUT for other tapes.
Note: The IN and MPX OFF positions give the same operation in play back.
- Press the PLAY button to start playback.
- To go from playback to another mode, the PAUSE/MUTE, REW, FF or STOP buttons may be pressed directly.
- At the end of the tape, playback will automatically stop.

Automatic Tape Control

The MEMORY switch, TIMER switch and TAPE COUNTER functions together provide the following automatic tape control functions.

[Auto Play]

If the TAPE COUNTER is reset to 000 at the beginning of a programme and the MEMORY switch is set to PLAY, the programme will be automatically rewound to 999 and replayed when the rewind button is pressed.

[Auto Rewind]

If the TIMER switch is set to PLAY/REW, the tape will automatically rewind to the beginning when the end of the tape is reached in the play or record modes. The MEMORY switch must be set to OFF to enable this TIMER function.

[Counter Repeat]

If the MEMORY switch is set to PLAY and the TIMER switch is set to PLAY/REW, the tape will replay repeatedly between tape location 999 and the end of the tape. If the TAPE COUNTER is reset to 000 at the head of a cassette tape, the entire side of the tape will be repeatedly replayed.

Function	Switch		the beginning of the tape	Tape Counter [999]	Tape Counter [000]	the end of the tape
	MEMORY	TIMER				
Auto-play	PLAY	OFF				REW → PLAY → STOP
Auto-rewind	OFF	PLAY/REW	STOP			PLAY/REC → REW
Counter-repeat	PLAY	PLAY/REW				PLAY/REC → REW

Figure 14

Timer Recording/Playback

When the end of a tape is reached during unattended recording or playback, the tape stops and the tape transport is automatically disengaged. However, the power to the deck and your stereo system will remain on, causing unnecessary power consumption and possible danger.

To avoid this, it is advisable to use an audio timer that automatically switches the power to the system both on and off.

Timer Recording

- Set up the cassette deck and amplifier, tuner, etc. for normal recording.
- Set the audio timer to the desired recording start time, and also set it to switch off the power to the system.
- Leave the PC-D12 POWER switch on.
- Set the TIMER switch to REC.

When the time preset on the audio timer is reached, the audio system power will be turned on, and automatic recording will start.

Note: Set the TIMER switch to OFF when automatic recording has been completed. If the TIMER switch is accidentally left in the REC position, a portion of a recorded tape may be unintentionally erased when the power is switched on.

Timer Playback

(for morning alarm, etc.)

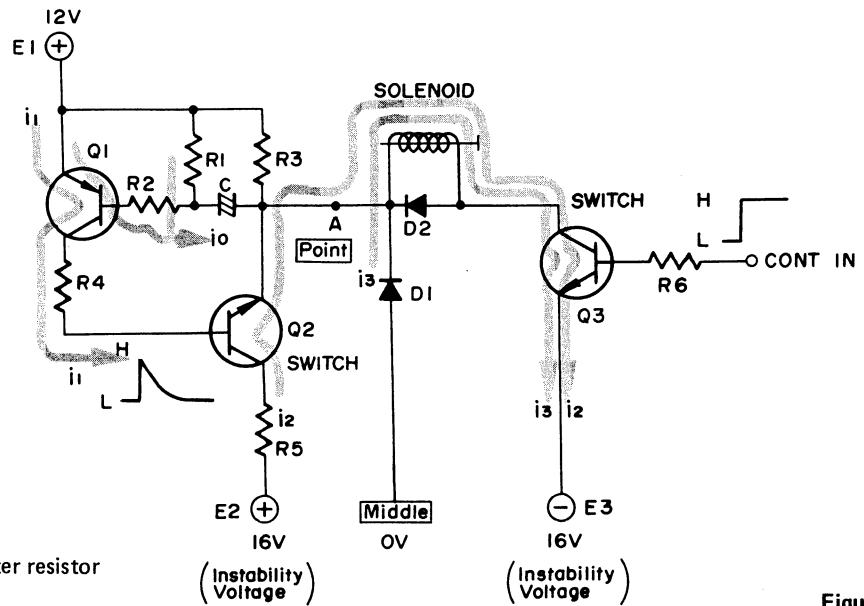
- Play the tape to be used for the morning alarm and adjust the amplifier volume control to a suitable volume level.
- Set the audio timer to the desired alarm time, and also set it to switch off the power to the system.
- Set the tape deck TIMER switch to the PLAY position.

When the preset alarm time is reached, the tape deck will automatically start playback.

4. TECHNICAL POINTS

Solenoid drive circuit

Stabilized Voltage



R2, R4, R6: Base current limiter resistor
 R1, C: Time constant circuit
 R5: Q2 protection resistor

Figure 15

- ① When an input of H-level enters into the CONT IN, the switch transistor Q3 turns on and the voltage at the point A, + 12V up to that time, lowers.
- ② When the voltage at the point A has lowered, the charging current i_0 flows in C through R1 and R2.
- ③ When the current i_0 flows in C, the switch Q1 turns on to let the current i_1 flow, and the switch Q2 turns on.
- ④ When the switch Q2 has turned on, the current i_2 flows and the voltage at the point A becomes positive.
- ⑤ After a certain time has elapsed, the charging current in C lowers to minimum and the current i_1 lowers also to zero. Then, the switch Q2 turns off.
- ⑥ When the switch Q2 has turned off, the current flowing in the solenoid lowers gradually to i_3 .

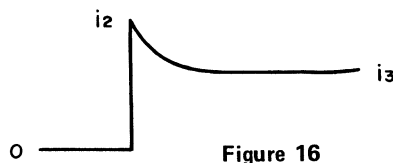


Figure 16

- ⑦ Voltage applied to the solenoid

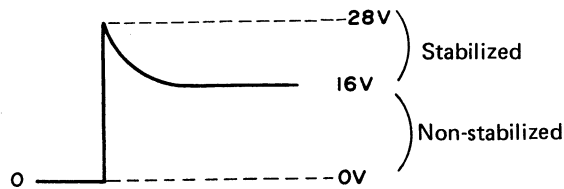


Figure 17

The voltage applied immediately after the switch turns on is half stabilized to suppress voltage fluctuation at the start time.

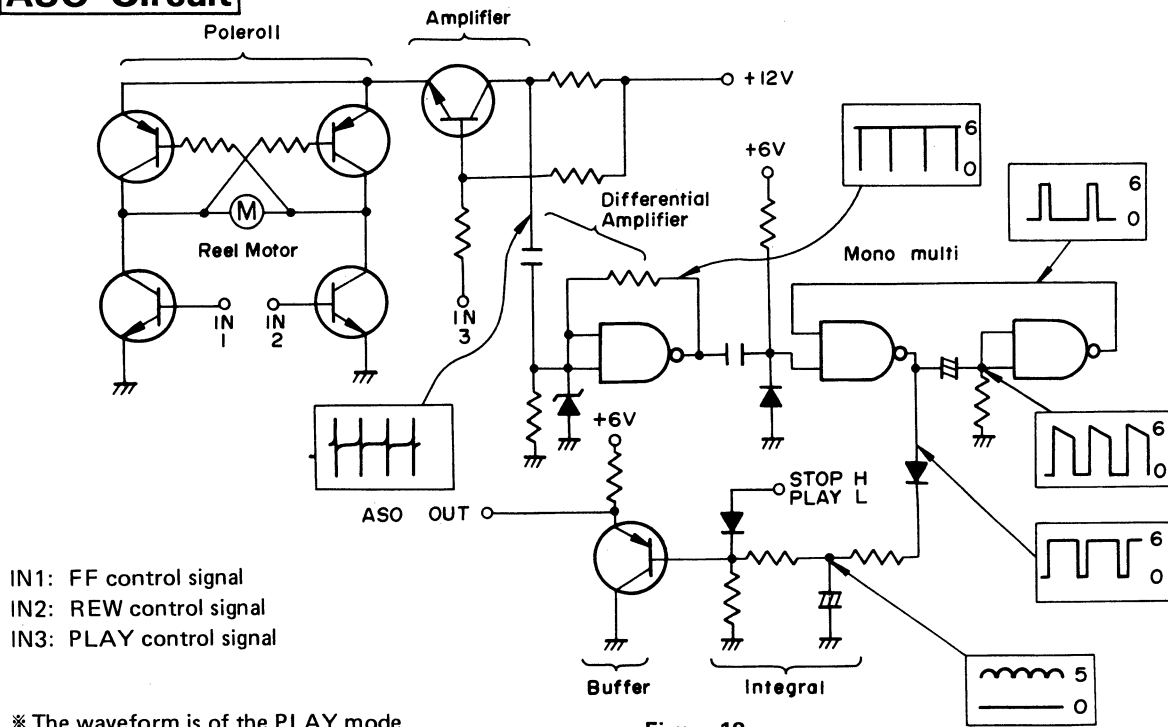
Purpose of this circuit

In a logic control tape deck, a solenoid is used to operate a head and pinchroller in the PLAY and REC modes.

The characteristic of a solenoid needs a large current for absorption, but doesn't need a large holding current after absorption.

The solenoid drive circuit stabilizes the voltage applied at the start time, and prevents lowering of the operating force when the voltage lowers.

ASO Circuit

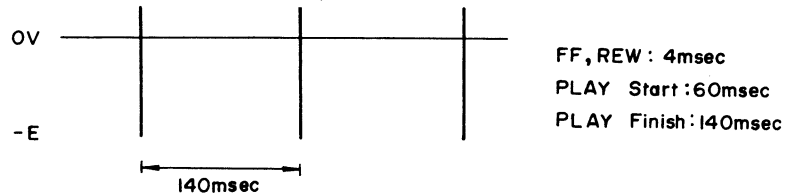


※ The waveform is of the PLAY mode.

(Operation)

1. Amplify the commutator noise of the reel motor, and differentiate and amplify it to operate the mono-multi.
2. Integrate the above signal, and maintain the H-level during tape running.
3. When the tape has come to the end and the reel motor has stopped, the motor noise lowers to zero and the mono-multi becomes to the L-level. Then the integrated voltage lowers gradually to zero. Set the ASO OUT to the L-level through the buffer.
4. When the ASO OUT connected to the Z-input of the logic IC lowers to the L-level, the control circuit turns off.

Motor noise (Differential waveform)



Mono-multi output

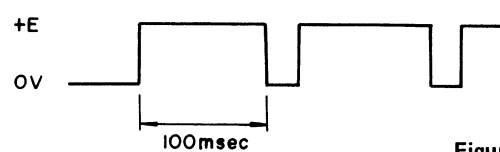


Figure 19

The mono-multi cycle is set almost the same as the maximum motor noise cycle value so that the duty ratio does not exceed 1:1;

Purpose of this circuit

The ASO circuit which detects the reel motor rotation by the rotation of the counter driven with a belt from the reel platform, is changed the detection method: detecting the reel motor rotation directly. Since this method does not require a rotation detecting element, the number of lead wires connected to the mechanism can be decreased.

5. DISASSEMBLY INSTRUCTIONS

FRONT PANEL REMOVAL

1. Remove two screws (1) (2.6φ x 6mm), then Key Box Assembly can be removed from the unit.
When replacing, set it at the end.
2. Remove two select knobs (2) as shown in Figure 20.
3. Remove two screws (3) (3φ x 6mm) holding bottom plate and panel from back side and two screws (4) (3φ x 6mm) holding jack plate and panel from back side as shown in Figure 20 and 21.

SIDE PANEL REMOVAL

1. Remove front panel.
2. Remove four screws (5) (2.6φ x 6mm) holding side plate and mounting bracket, then plate can be removed out to check both sides of P.C. Board easily.

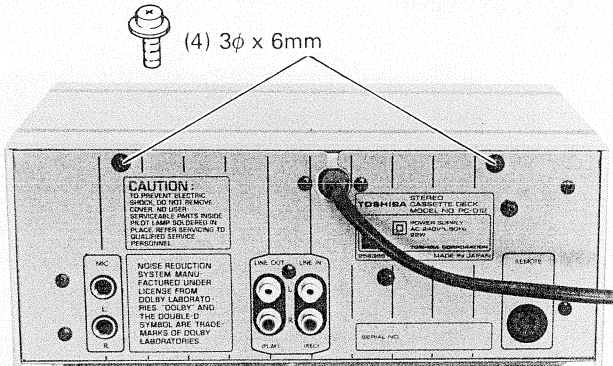


Figure 21

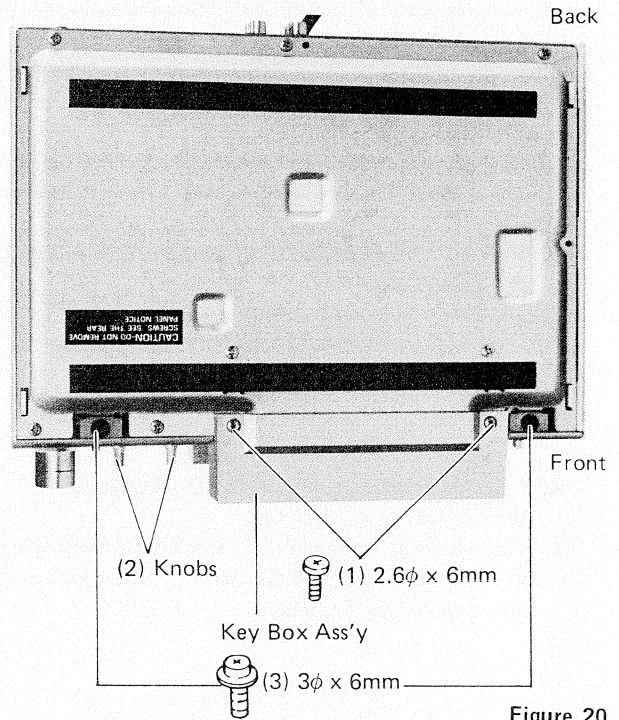


Figure 20

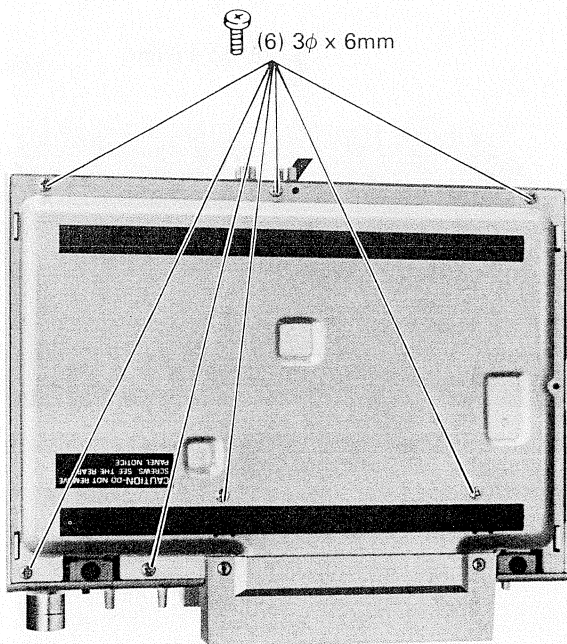


Figure 23

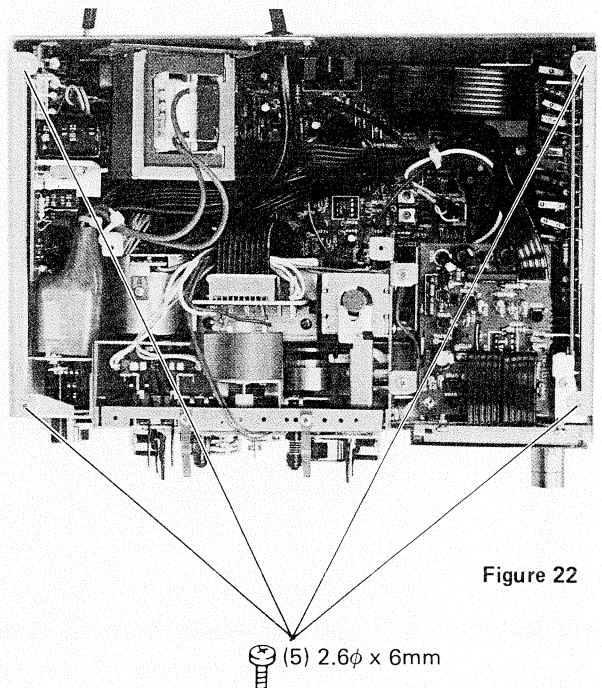


Figure 22

BOTTOM PLATE REMOVAL

1. Remove front panel.
2. Remove side plate.
3. Remove seven screws (6) ($3\phi \times 6\text{mm}$) holding bottom plate as shown in Figure 23.
4. After pushing power switch to position, remove two screws (7) ($3\phi \times 6\text{mm}$) holding mounting bracket as shown in Figure 24.
5. Remove two screws (8) ($3\phi \times 6\text{mm}$) holding Mechanism Assembly and bottom plate as shown in Figure 25.
6. Slide bottom plate forwards so that Main P.C. Board can be checked easily.

Caution: Mechanism Assembly should be carefully handed for it is holding all P.C. Boards.

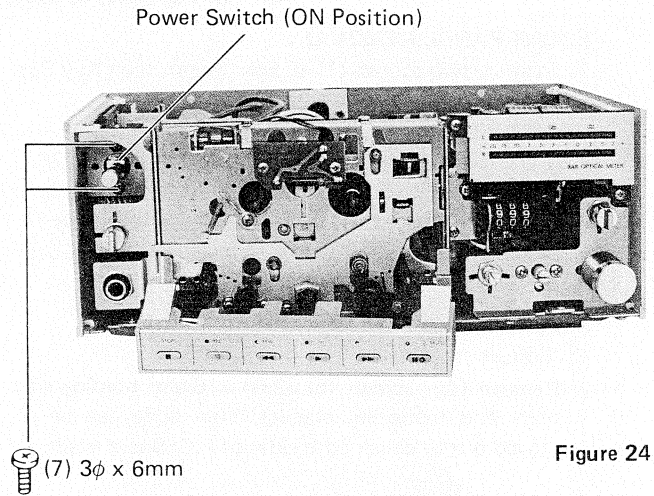


Figure 24

KEY BOARD SWITCH P.C. BOARD REMOVAL

1. Remove Key Box Assembly.
2. Remove three screws (9) ($1.7\phi \times 4\text{mm}$) holding P.C. Board, then Key Board Switch P.C. Board can be removed from box assembly.

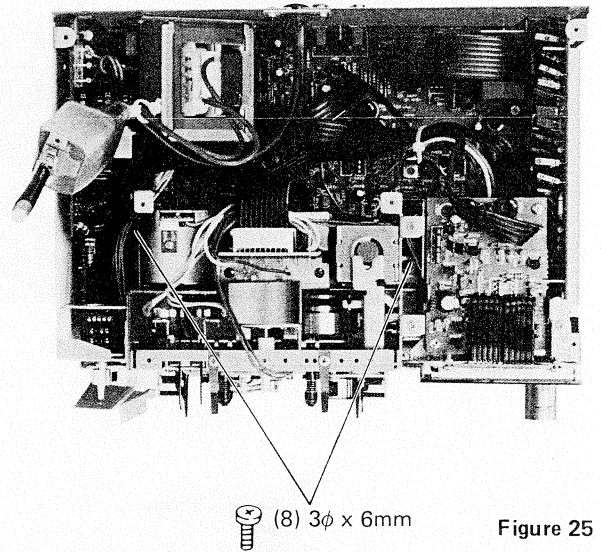


Figure 25

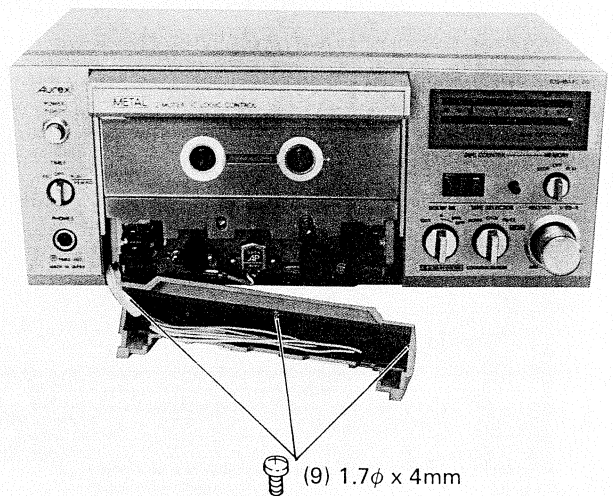


Figure 26

6. BLOCK DIAGRAM

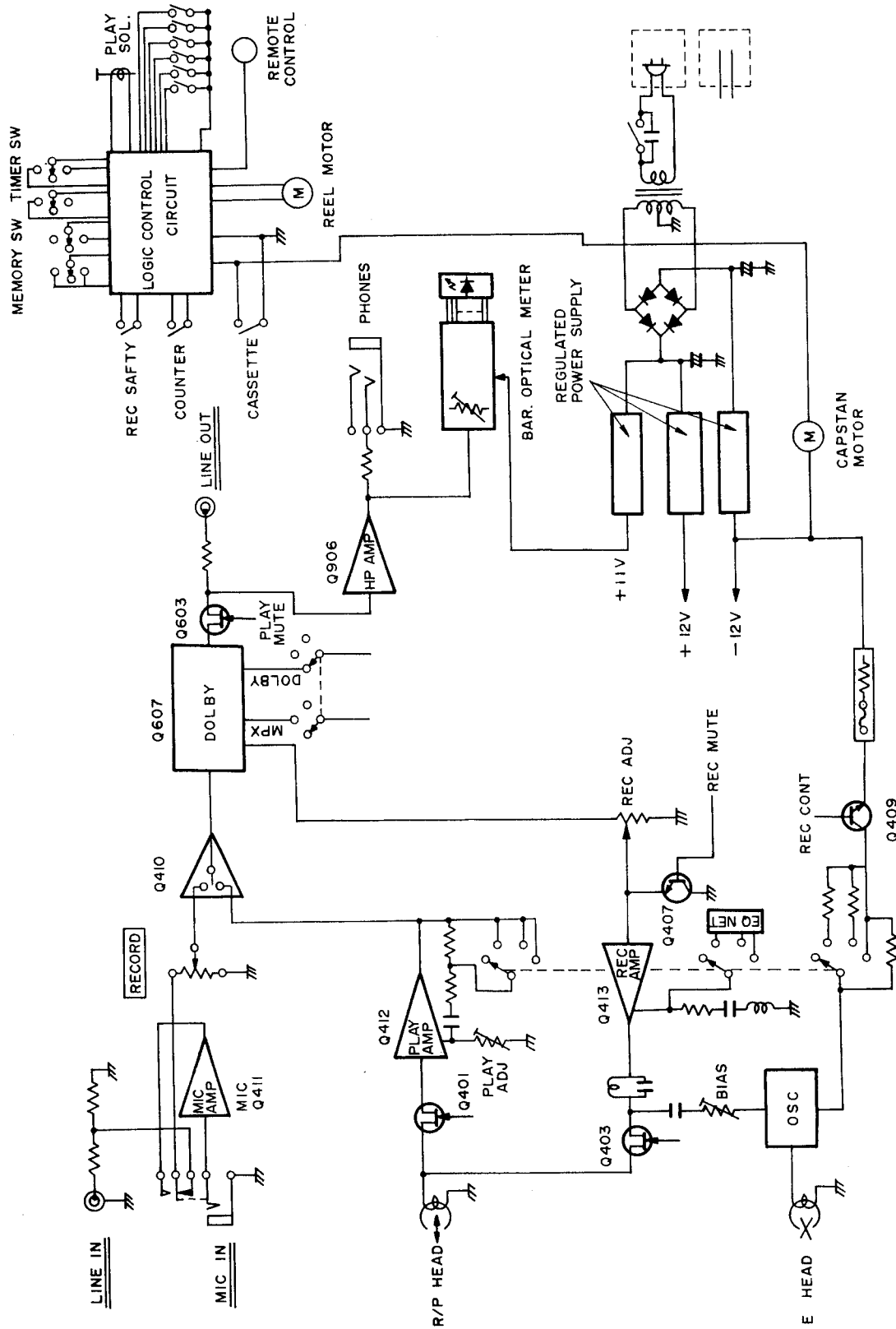
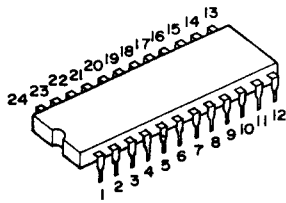


Figure 27

7.IC BLOCK DIAGRAM



TC9121P

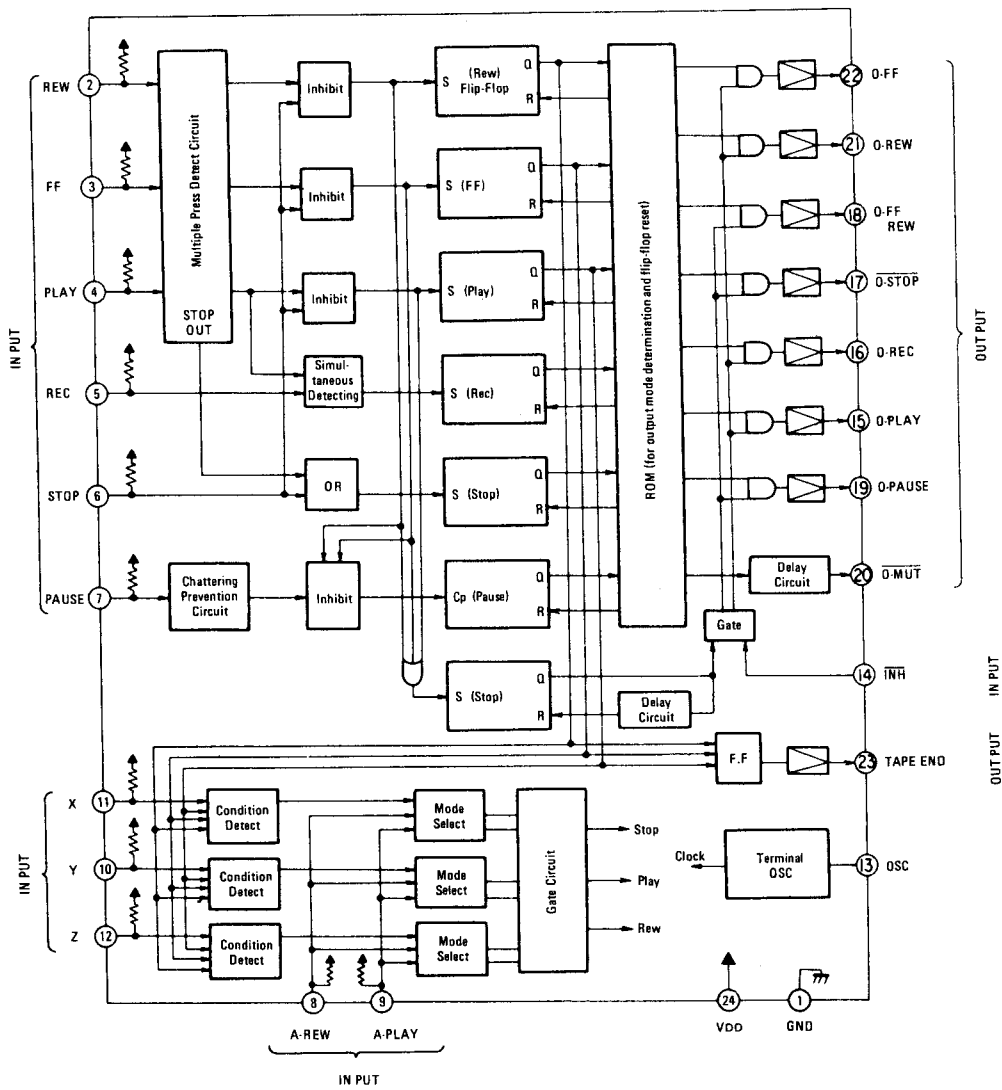
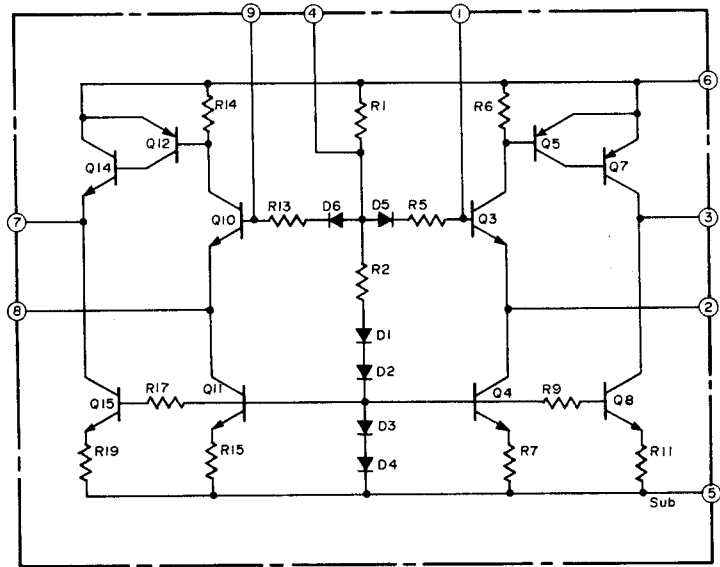
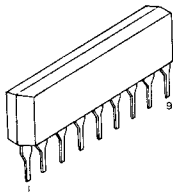
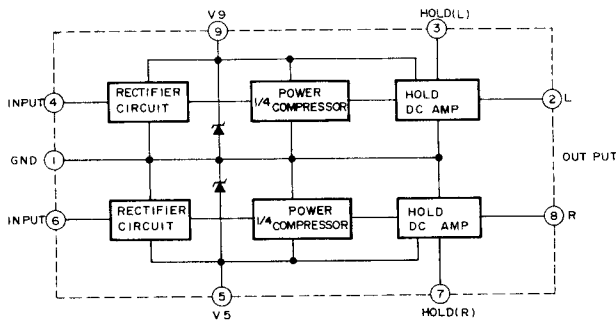
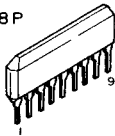


Figure 28

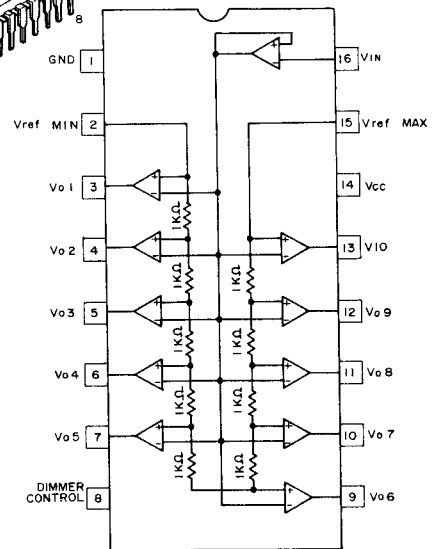
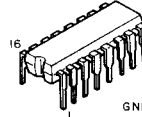
TA7312P



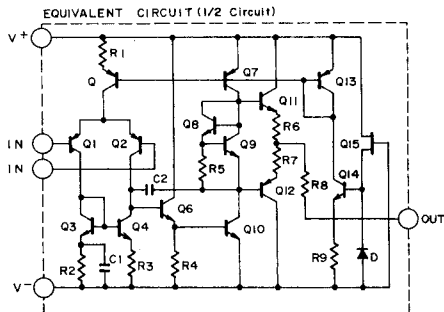
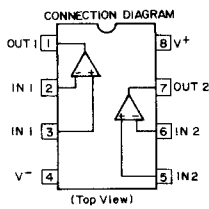
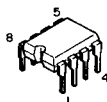
TA7318P



TA7612AP



NJM4558D



8. ELECTRICAL ADJUSTMENTS

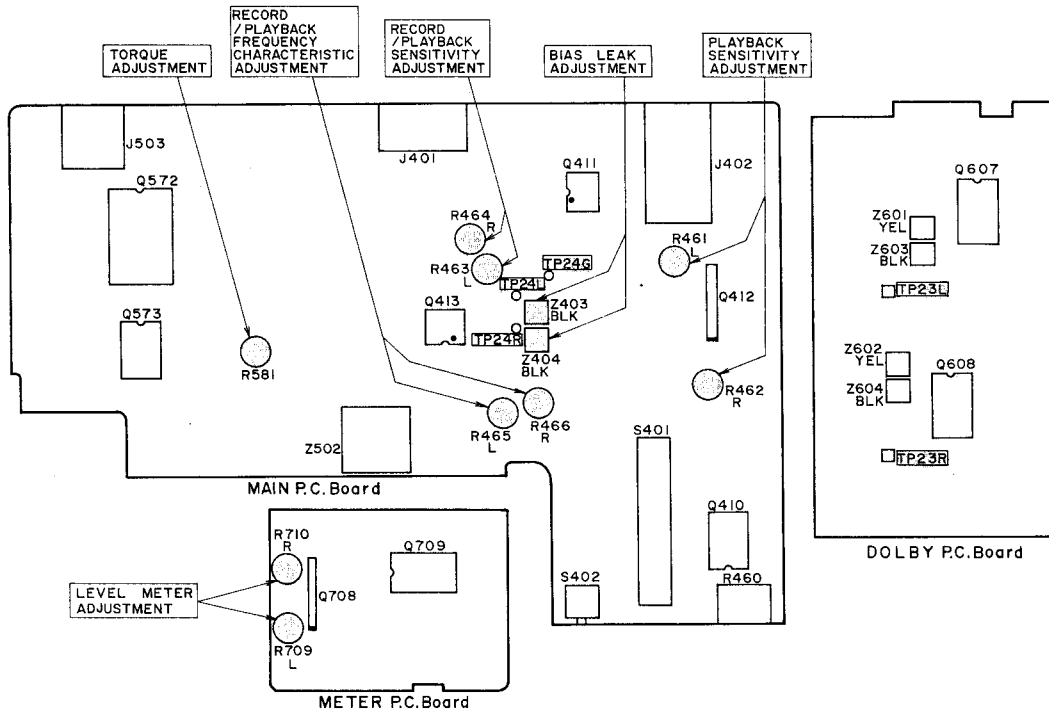


Figure 29

TEST EQUIPMENTS

1. VTVM (Vacuum Tube Voltmeter)
2. Signal Generator
3. Resistance Attenuator
4. Screwdriver

5. Test Tapes:
 MTT-111 (Speed 3 kHz)
 MTT-150 (Dolby 400 Hz Moduration)
 MTT-215C (Azimuth 400 Hz/10 kHz)
 AC-512 (Chrome Tape)

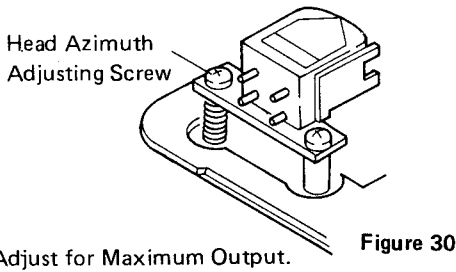


Figure 30

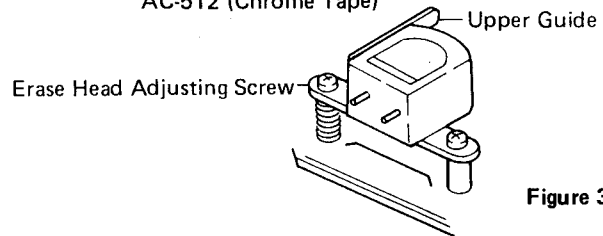


Figure 31

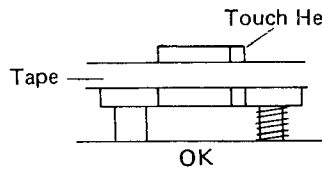


Figure 32

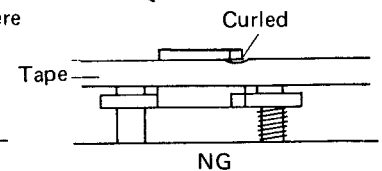


Figure 33

ERASE HEAD HEIGHT ADJUSTMENT

1. Temporally mount the rerase head so that it will be even by eye measurement.
2. Set in PLAY position with setting a mirrow cassette tape, MC-09C.
3. Adjust the height adjusting screw so that the upper edge of the tape will touch at the upper tape guide of the erase head. See figure 31.
4. Confirm whether the upper edge of the tape is not Curled.

5. Paint the adjusting screw with lock paint.
 P.S. When the mirror cassette is not available, please remodel a normal tape, type C-90 as shown below. See figure 34.

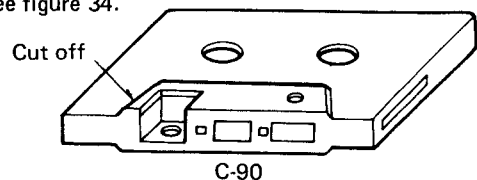


Figure 34

■ ADJUSTMENT PROCEDURES

No.	Description	Nominal Specs	Test Tape	Volume Control		Switch Position		Adjustment Points	Test Points	Test Freq. ATT	Remarks
				REC		TAPE	DOLBY				
1	Head Azimuth Adjustment	MAX.	MTT-111			NOR	OUT	Head Azimuth Adjustment Screw	LINE OUT		After Adjustment lock with screw point.
2	Tape Speed Measurement	3000 ±30 Hz	MTT-111			NOR	OUT	Semi-fixed resistor in the Motor	LINE OUT		
3	Playback Sensitivity Adjustment	580 ±10mV	MTT-150			NOR	OUT	R461 R462	LINE OUT		
4	Playback Frequency Response Measurement (Normal)	+3 dB -5	MTT-215C			NOR	OUT		LINE OUT		10 KHz Level difference for 315 Hz
5	Playback Frequency Response Measurement (Chrome)	-4 ±2 dB	MTT-215C			NOR	OUT		LINE OUT		Change for 10 KHz Normal tape
6	Output Noise Level	Under 2.5 mV	Blank Tape			NOR	OUT		LINE OUT		
7	Bias Leakage Adjustment	MIN.				NOR	OUT	Z403 Z404	T.P. 24L T.P. 24R		
8	Line Input Level Adjustment	580 ±10mV		Adjustment		CrO ₂	OUT	REC Volume	LINE OUT	400 Hz -17 dB	REC. Volume adjustment must be kept till frequency response adjustment
9	Meter Adjustment	Meter Ind. +3 dB				CrO ₂	OUT	R709, 710	LED Meter	400 Hz -17 dB	One square (Red LED) lights.
		Meter Ind. -3 dB				CrO ₂	OUT	R709, 710	LED Meter	400 Hz -23 dB	Four squares (Yellow LEDs) light.
10	Record Playback Frequency Response Adjustment	0 +2 -0 dB	AC-512			CrO ₂	OUT	R465 R466	LINE OUT	400 Hz to 10 KHz -40 dB	
11	Record/Playback Sensitivity Adjustment	580 ±10mV	AC-512			CrO ₂	OUT	R463 R464	LINE OUT	400 Hz -17 dB	

Measurement Condition Power Supply TE: 220V/TU, AY: 240V/VF: 115, 230V/TA, TC: 120V
 ● Input: 0 dB = 1V rms ● LINE IN (Input Impedance): 600 ohm ● LINE OUT (Load Impedance): 47 K ohm
 ● Test Point Load Impedance: No Load

(Playback Sencitivity Adjustm

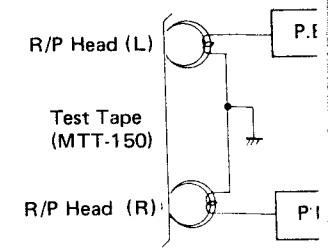
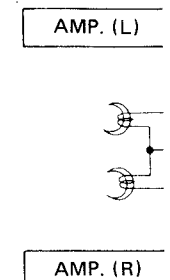


Figure 31

(Bias Leak Adjustment)



Fig

(Line Input Adjustment)

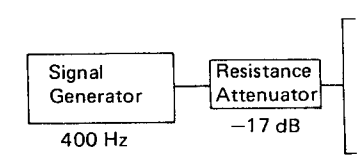


Figure 37

(Rec/Play Sensitivity Adjustmer

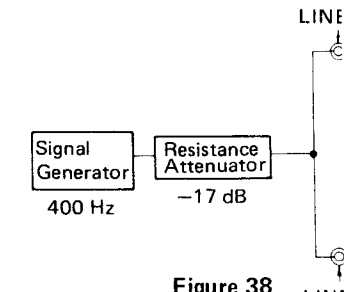
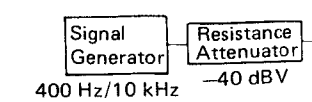


Figure 38

(Rec/Play Frequency Characteri

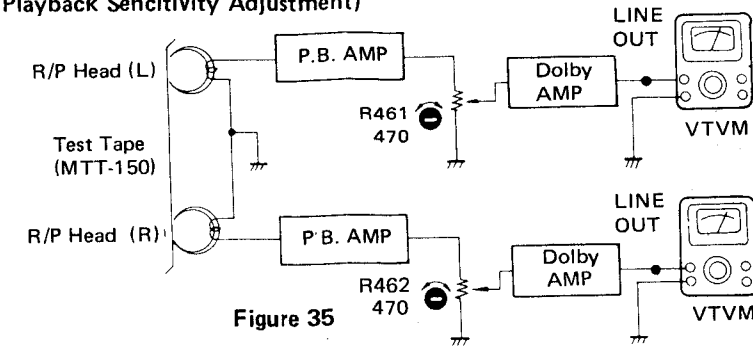


Figuer 39

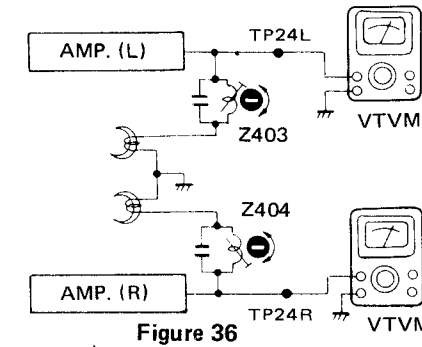
Test Tape	Volume Control		Switch Position		Adjustment Points	Test Points	Test Freq. ATT	Remarks
	REC		TAPE	DOLBY				
MTT-111			NOR	OUT	Head Azimuth Adjustment Screw	LINE OUT		After Adjustment lock with screw point.
MTT-111			NOR	OUT	Semi-fixed resistor in the Motor	LINE OUT		
MTT-150			NOR	OUT	R461 R462	LINE OUT		
MTT-215C			NOR	OUT		LINE OUT		10 KHz Level difference for 315 Hz
MTT-215C			NOR	OUT		LINE OUT		Change for 10 KHz Normal tape
Blank Tape			NOR	OUT		LINE OUT		
			NOR	OUT	Z403 Z404	T.P. 24L T.P. 24R		
	Adjustment		CrO ₂	OUT	REC Volume	LINE OUT	400 Hz -17 dB	REC. Volume adjustment must be kept till frequency response adjustment
			CrO ₂	OUT	R709, 710	LED Meter	400 Hz -17 dB	One square (Red LED) lights.
			CrO ₂	OUT	R709, 710	LED Meter	400 Hz -23 dB	Four squares (Yellow LEDs) light.
AC-512			CrO ₂	OUT	R465 R466	LINE OUT	400 Hz to 10 KHz -40 dB	
AC-512			CrO ₂	OUT	R463 R464	LINE OUT	400 Hz -17 dB	

Vf: 115, 230V/TA, TC: 120V
Impedance): 600 ohm • LINE OUT (Load Impedance): 47 K ohm

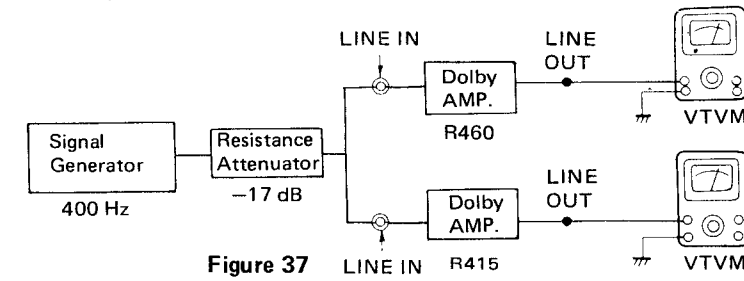
(Playback Sencitivity Adjustment)



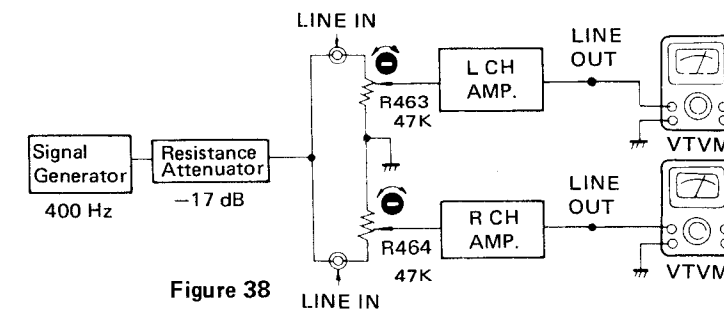
(Bias Leak Adjustment)



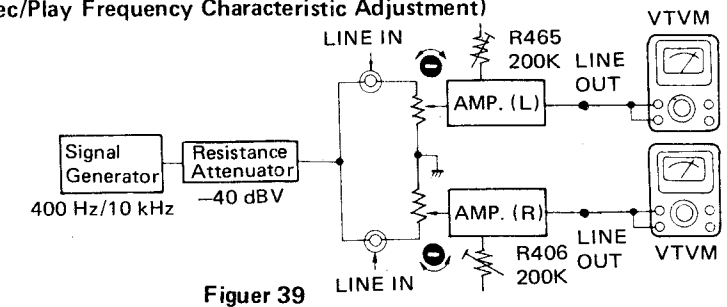
(Line Input Adjustment)



(Rec/Play Sensivity Adjustment)



(Rec/Play Frequency Characteristic Adjustment)



9. P.C BOARD PARTS LOCATIONS

VOLTAGE CHART (A)

Q552			
PLAY	E	C	B
PLAY/REC	4.4V	—	4V
Others	0.3V	-6.5V	0V

Q553			
REC	C	—	—
Others	11V	—	-6.5V

Q554			
REC	C	B	—
Others	0V	0.6V	—

Q555			
REC	C	B	—
Others	0V	0.6V	—

Q556			
PLAY	E	C	B
REC	3.5V	3V	—
Others	5.5V	5V	—

Q557			
REC	E	C	—
Others	0.1V	0.1V	—

Q558			
PLAY	E	C	B
REC	3.6V	3.5V	3V
REC/Pause	4.6V	5.5V	5V
Others	0.5V	—	—

Q559			
MOV	C	B	—
NO MOV	0V	0.6V	—
NO MOV	5.5V	0V	—

Q560			
MOV	C	B	—
NO MOV	10V	—	—
STOP	—	—	8.1V
FF/REC	—	—	—
PLAY/REC	—	—	4.2V

Q561			
PLAY/REC	E	C	B
FF/REW	3.6V	2.8V	—
STOP	7.3V	—	—
FF/REC	7.8V	—	—
FF	—	—	6.5V
REW/STOP	—	—	7.3V

Q562			
PLAY/REC	E	C	B
FF/STOP	3.6V	3.5V	—
REW/STOP	7.3V	—	—
STOP	—	—	6.5V
FF/REW	7.3V	—	—

Q563			
PLAY/REC	C	B	—
STOP/FF	3.4V	—	—
REW	7.3V	—	—
REW	0.1V	0.7V	—
Others	—	—	0.1V

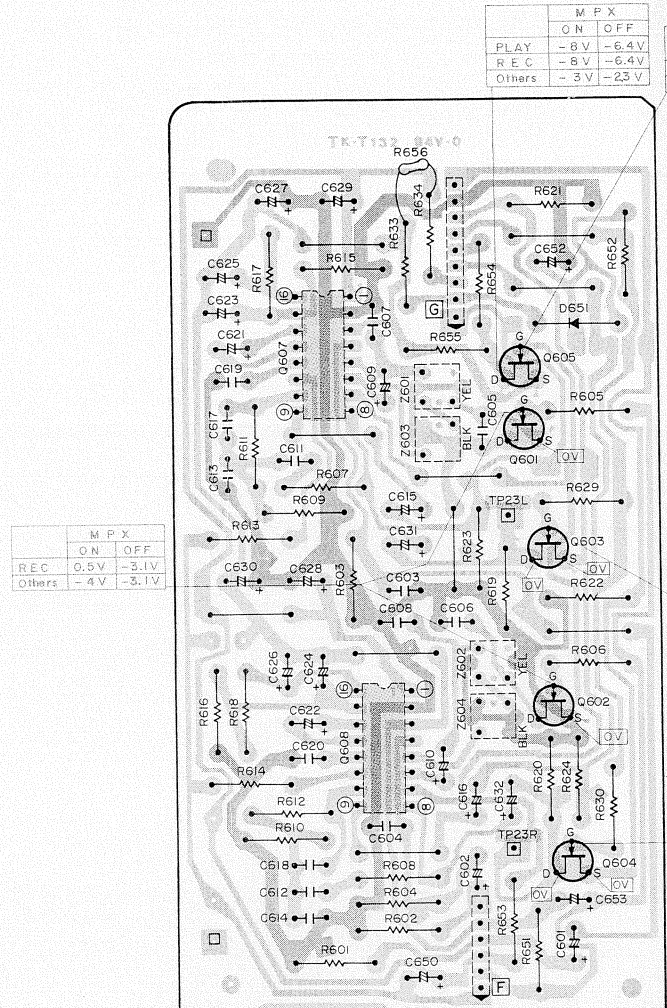
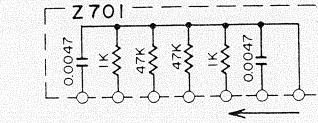
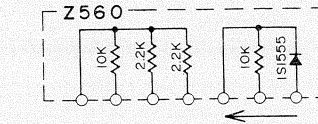
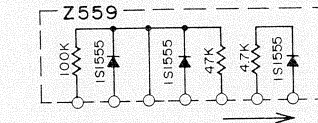
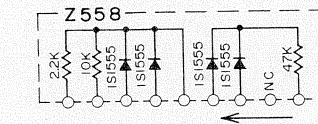
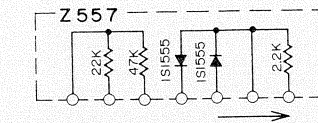
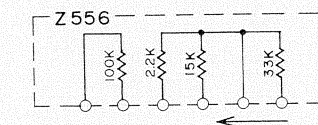
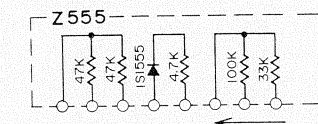
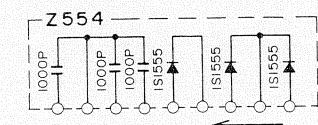
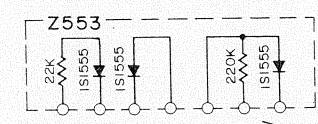
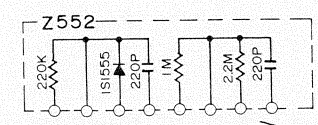
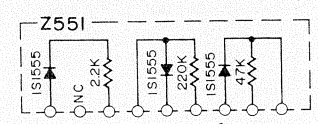
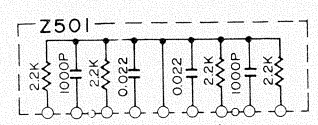
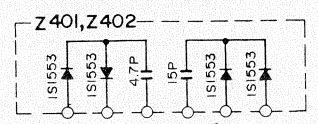
Q564			
REW/STOP	C	B	—
PLAY/REC	7.3V	—	—
REW	0.1V	—	—
PLAY/REC/FF	—	—	0.1V
Others	—	—	7.3V

VOLTAGE CHART (B)

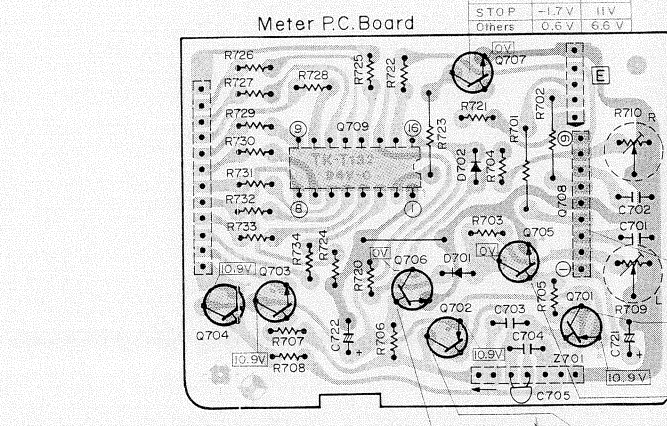
Q401, Q402(G)			
REC	NORMAL	-22V	—
	CR02	-28V	—
	FeCr	-24V	—
Others	METAL	-40V	—
	Others	0V	—

Q403, Q404(G)			
REC	NORMAL	-20V	—
	CR02	-23V	—
	FeCr	-21V	—
Others	METAL	-26V	—
	Others	0V	—

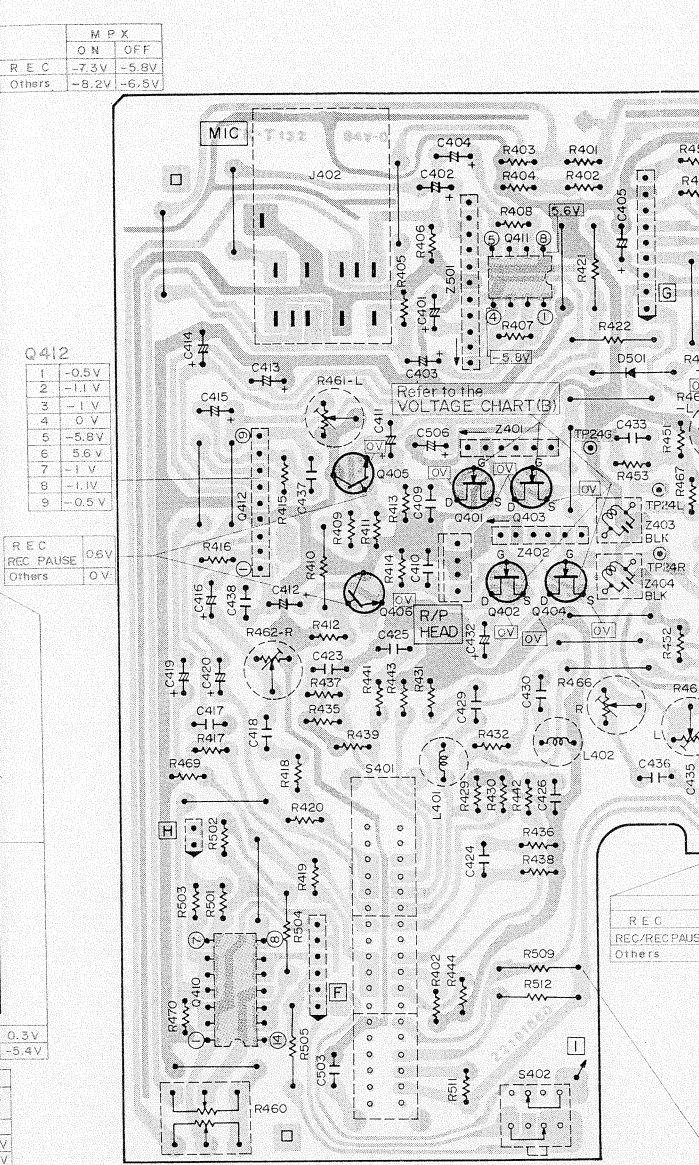
Composite parts Circuit diagram



Dolby P.C. Board			
PLAY, REC	0.3V	—	—
Others	-5.4V	—	—

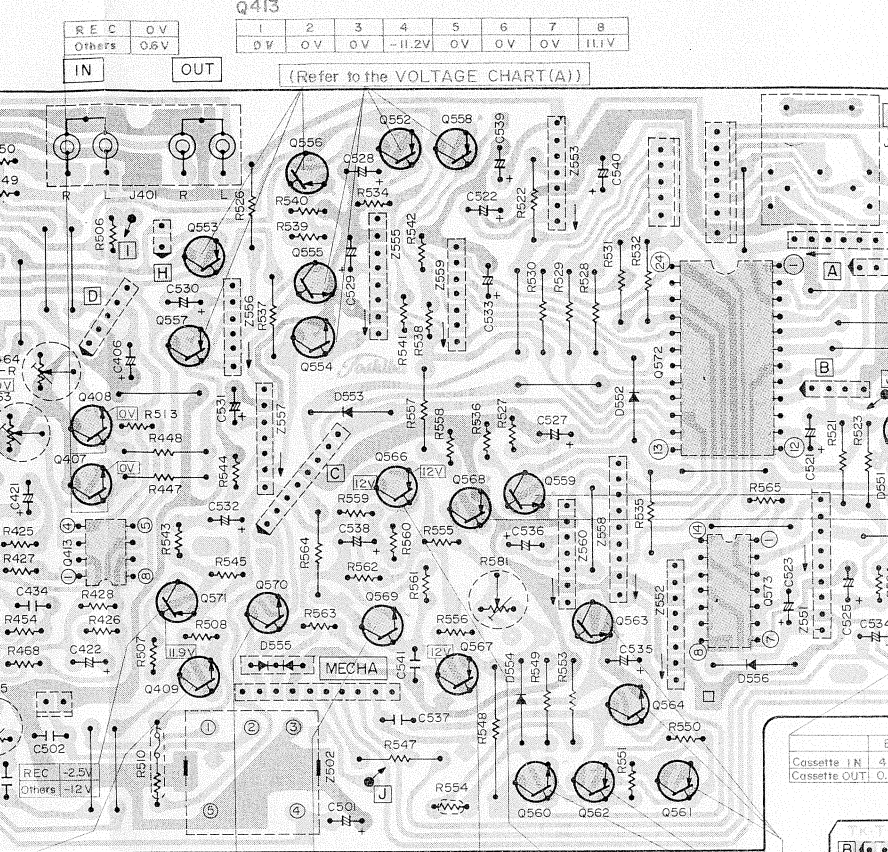


Meter P.C. Board			
STOP	B	C	—
Others	-1.7V	1.1V	—
	0.6V	6.6V	—

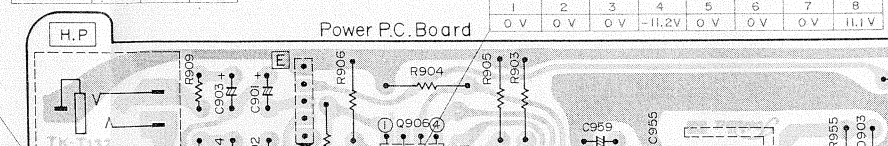


Q410			
1	2	3	4
0V	0V	0V	0V
5	6	7	8
PLAY	4.4V	-6.7V	—
Others	-6.2V	6.5V	—

Q709			
1	2	3	4
3.8V	0V	2.4V	2.4V
5	6	7	8
0V	2.4V	2.4V	0V
9	10	11	12
9V	9V	9V	9V
13	14	15	16
STOP	10.5V	—	—
Others	6.5V	0V	—



Main P.C. Board			
REC	E	C	B
REC/REC PAUSE	-11.8V	-11.5V	—
Others	12V	0V	-12V



Power P.C. Board			
PLAY/REC	E	C	B
REC/REC PAUSE	-11.8V	-11.5V	—
Others	12V	0V	-12V

Q572 (TC9121P)			
1	2	3	4
0V	0V	0V	0V
5	6	7	8
0V	0V	0V	0V
9	10	11	12
0V	0V	0V	0V
13	14	15	16
0V	0V	0V	0V
17	18	19	20
0V	0V	0V	0V
21	22	23	24
0V	0V	0V	0V

Figure 40

Figure 41

9. P.C BOARD PARTS LOCATIONS

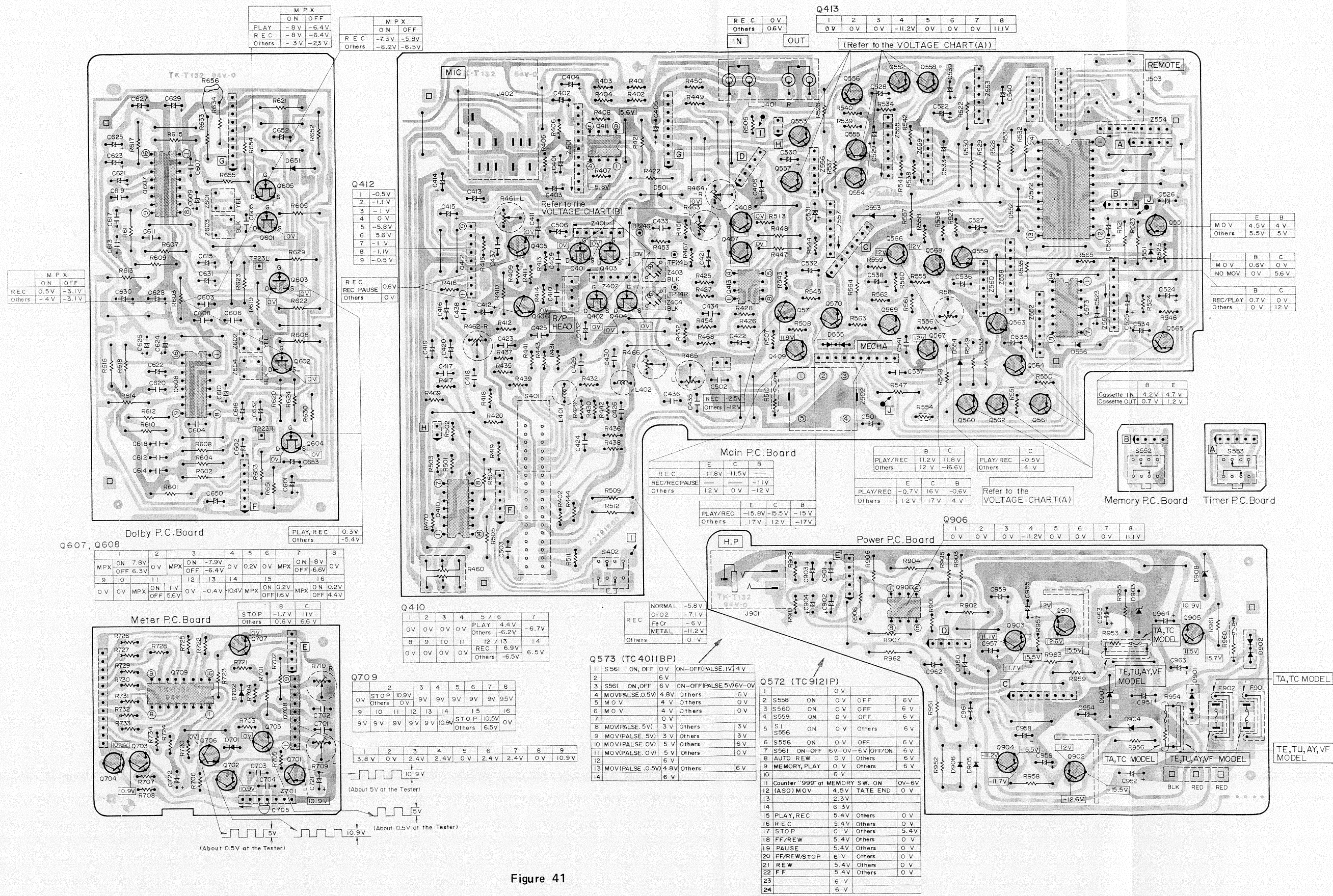


Figure 41

10. SCHEMATIC DIAGRAM

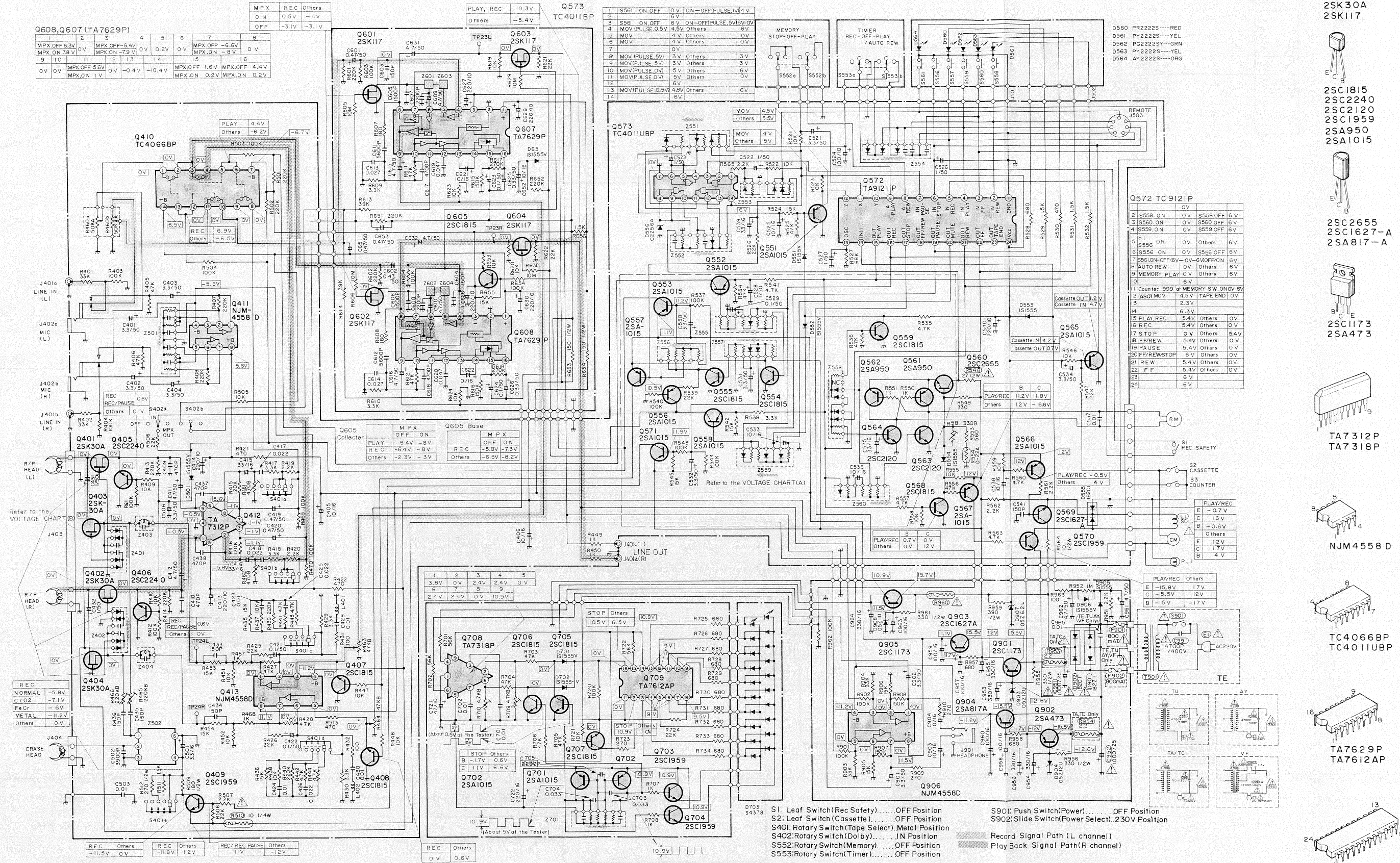
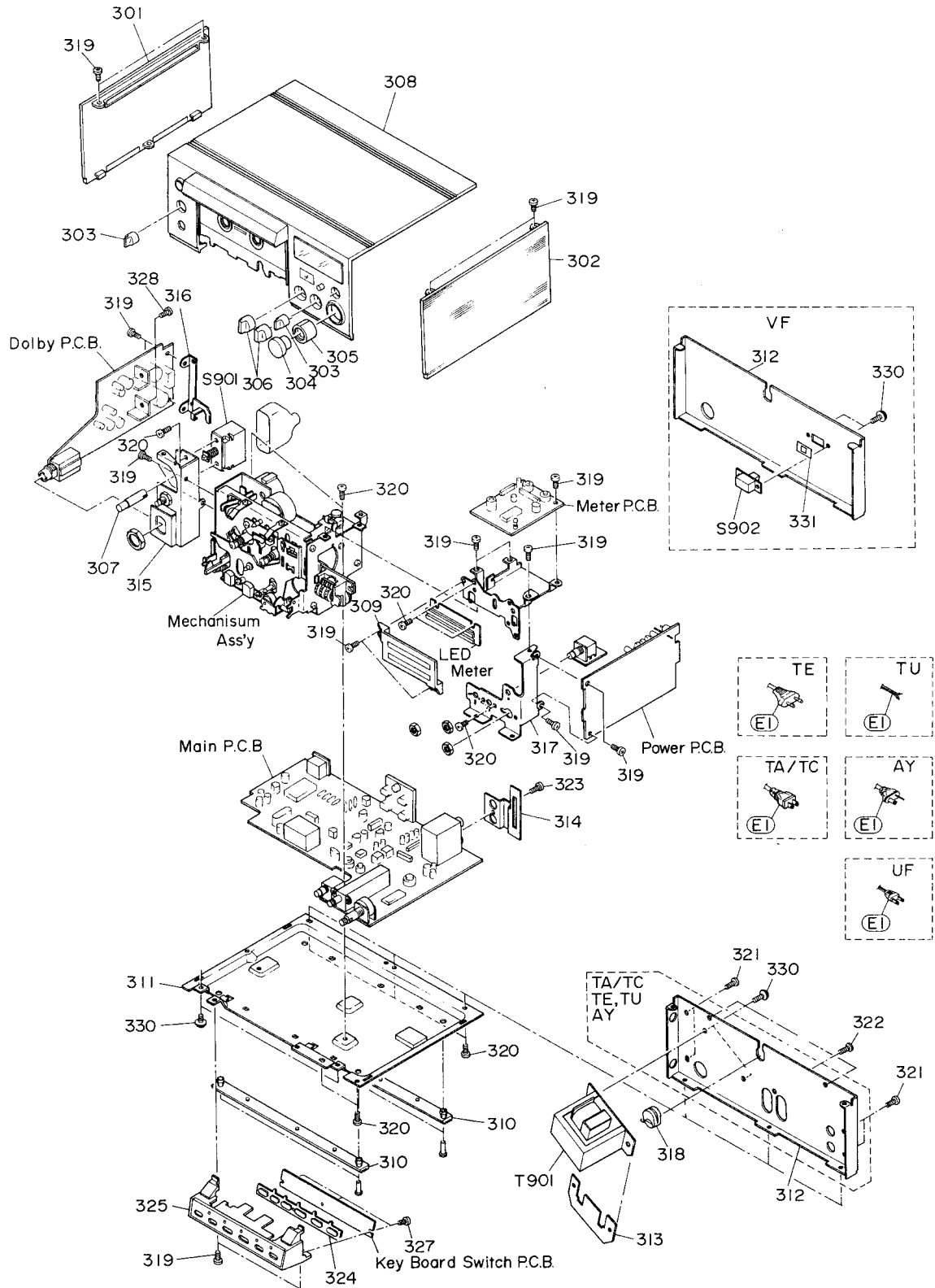


Figure 42

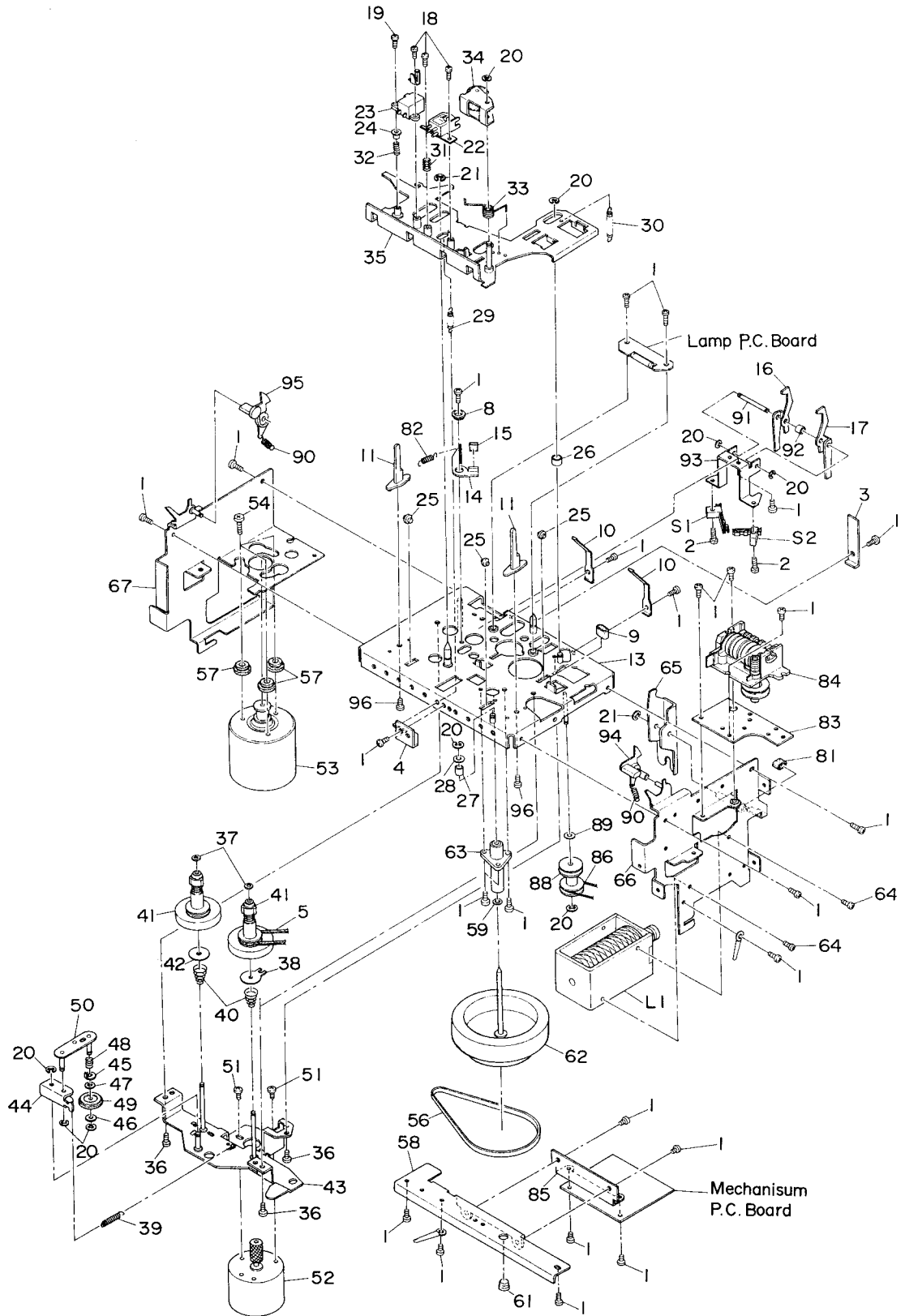
CAUTION:
 The Δ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

12. EXPLODED VIEW (CABINET)



NOTE: Parts excluded in the Parts List are not available as replacement parts.

13. EXPLODED VIEW (MECHANISM)



NOTE: Parts excluded in the Parts List are not available as replacement parts

- 21 - Figure 45

14. PARTS LIST

CAUTION:

The \triangle mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
MECHANICAL PARTS					
1	22707735	Screw, DT BID, 2.6 ϕ x 5mm	57	25761238	Cushion
2	22707169	Screw, BID, 2.6 ϕ x 10mm	59	25764398	Washer, 2.5 ϕ
5	25755398	Belt, Counter	61	25783219	Screw, Thrust
8	25724420	Bush	62	25717451	Flywheel Ass'y
9	25761400	Stopper, Head Chassis	63	25718158	Holder Ass'y, Capstan
11	25783205	Guide, A	64	22707452	Screw, BID, 3 ϕ x 6mm
15	25762384	Felt, Fric	81	25761354	Arm Cushion
18	22707451	Screw, BID, 2 ϕ x 5mm	82	25771898	Spring
19	22707505	Screw, BID, 2 ϕ x 6mm	84	25873234	Counter
20	22703118	E Washer, 2 ϕ	86	25755342	Belt
21	22703279	E Washer, 3 ϕ	88	25756237	Pulley, Center
22	22217357	Head, R/PB, HRPT-77	89	22703306	Washer
23	22218223	Head, Erase, HET-50	90	25771963	Spring
24	25726489	Sleeve, Erase Head	91	25724827	Bush
25	25753325	Roller	92	25724833	Roller
26	25753347	Roller, H	94	25782257	Holder, Cassette, Right
27	25753348	Roller, HL	95	25782292	Holder, Cassette, Left
28	25764400	Washer, 3 ϕ	96	22707461	Screw, BID Tapping, 2.6 ϕ x 6mm
29	25771704	Spring	CABINET PARTS		
30	25771951	Spring	301	25829387	Plate, Side, Left
31	25772240	Spring, Head	302	25829388	Plate, Side, Right
32	25772438	Spring, Erase Head	303	25837494	Knob, Select
33	25773469	Spring, Pinch Lever	304	25837513	Knob, Volume, Left
34	25717457	Roller Ass'y, Pinch	305	25837514	Knob, Volume, Right
35	25791268	Chassis Ass'y, Head	306	25837515	Knob, Select
36	22707494	Screw, DT BID, 2.6 ϕ x 4mm	307	25816562	Knob, Power
37	25764549	Washer, 1.7 ϕ	308	25819460	Front Panel Ass'y (TA)
38	25766019	Washer, Back Tension	308	25819461	Front Panel Ass'y (TC)
39	25771586	Spring	308	25819462	Front Panel Ass'y (TE, TU, AY, VF)
40	25772254	Spring, Back Tension	309	25832456	Meter Indicator
41	25712360	Reel Drum Ass'y	310	25835408	Leg
42	25764570	Washer, 2.1 ϕ	312	25838569	Jack Plate (TA, TC)
43	25791269	Reel Mount Ass'y	312	25838568	Jack Plate (TE)
45	25735246	Retainer, Spring	312	25838570	Jack Plate (TU, AY)
46	25735252	Washer, Stopper	312	25838577	Jack Plate (VF)
47	25762401	Felt, FF	\triangle 318	25845120	Bush, Nylon (TA, TC, VF)
48	25777041	Spring, Idler FF	\triangle 318	25845528	Bush, Nylon (TE, TU, AY)
49	25713543	Idler Ass'y, FF	319	22707366	Screw, DT BID, 2.6 ϕ x 6mm
50	25791141	Plate B Ass'y, Idler	320	22707445	Screw, DT BID, 3 ϕ x 6mm
51	22701389	Screw, BID, 2.6 ϕ x 3mm	321	22707446	Screw, DT BID, 3 ϕ x 6mm
52	22791284	Motor, Ass'y Reel	322	22701326	Screw, BID, Tapping, 3 ϕ x 8mm
53	25791215	Motor Ass'y, Main	323	22701482	Screw, PAN, 3 ϕ x 6mm
54	22707429	Screw, Motor	324	22751190	Rubber, Point
56	25755448	Belt, Main	325	25819466	Key Box Ass'y

Symbol No.	Part No.	Description
327	22707651	Screw, PAN, Tapping, 1.7φ x 4mm
328	22701313	Screw, BID, 3φ x 4mm
329	22707521	Screw, DT BID, 3φ x 6mm
330	22707456	Screw, FL DT, 3φ x 8mm
331	22950753	Label, Voltage (VF)
TRANSISTORS, DIODES AND ICS		
Q401, 402	22114470	Transistor, 2SK30A-TM-GR-Y
Q403, 404		Transistor, 2SC2240NEW-GR
Q405, 406		Transistor, 2SC1815NEW-GR
Q407, 408		Transistor, 2SC1959NEW-Y
Q409		IC, TC4066BP
Q410		IC, NJM4558D-A
Q411		IC, TA7312P-N, JA
Q412		NJM4558D-A
Q413		Transistor, 2SA1015-GR
Q551		Transistor, 2SA1015-GR
Q552		Transistor, 2SA1015-GR
Q553		Transistor, 2SC1815NEW-GR
Q554		Transistor, 2SC1815NEW-GR
Q555	Transistor, 2SA1015-GR	
Q556	Transistor, 2SA1015-GR	
Q557	Transistor, 2SA1015-GR	
Q558	Transistor, 2SC1815NEW-GR	
Q559	Transistor, 2SC2655-Y-O/Y	
Q560	Transistor, 2SA950-Y	
Q561	Transistor, 2SA950-Y	
Q562	Transistor, 2SC2120-Y	
Q563	Transistor, 2SC2120-Y	
Q564	Transistor, 2SA1015-GR	
Q565	Transistor, 2SA1015-GR	
Q566	Transistor, 2SA1015-GR	
Q567	Transistor, 2SC1815NEW-GR	
Q568	Transistor, 2SC1627A-Y	
Q569	Transistor, 2SC1959NEW-Y	
Q570	Transistor, 2SA1015-GR	
Q571	IC, TA9121P	
Q572	IC, TC4011UBP	
Q573	Transistor, 2SK117-BL	
Q601, 602	22114470	Transistor, 2SC1815NEW-GR
Q603, 604		IC, TA7629P
Q605		Transistor, 2SA1015-GR
Q607, 608		Transistor, 2SC1959NEW-Y
Q701, 702	22114470	Transistor, 2SC1815NEW-GR
Q703, 704		Transistor, 2SA1015-GR
Q705, 706		Transistor, 2SC1959NEW-Y
Q707		Transistor, 2SC1815NEW-GR

Symbol No.	Part No.	Description
Q708	22114470	IC, TA7318P-2
Q709		IC, TA7612AP
Q901		Transistor, 2SC1173-Y
Q902		Transistor, 2SA473-Y
Q903		Transistor, 2SC1627A-Y
Q904		Transistor, 2SA817A-Y
Q905	Transistor, 2SC1173-Y	
Q906	IC, NJM4558D-A	
D501		Diode, 1S1555V
D551, 552		Diode, 1S1555V
D553, 554		
D555		Diode, 1B2C1
D556		Diode, 0Z25.6A
D560	22115658	Diode, PR2222S-RED
D561	22115659	Diode, PY2222S-YEL
D562	22115660	Diode, PG2222SY-GRN
D563	22115659	Diode, PY2222S-YEL
D564	22115661	Diode, AY2222S-ORG
D651		Diode, 1S1555V
D701, 702		Diode, 1S1555V
D703		Diode, S4378
△ D901		Diode, 1B2Z1
△ D902		Diode, 1B2C1
D903, 904		Diode, 05Z12U
D905		Diode, 1S1553V
D906		Diode, 1S1555V
D907		Diode, 05Z6.2L
D908		Diode, 05Z11U
ELECTRICAL PARTS		
△ T901	22223841	Transformer, Power (TA, TC)
△ T901	22223842	Transformer, Power (TE)
△ T901	22223843	Transformer, Power (TU, AY)
△ T901	22223887	Transformer, Power (VF)
J401	22163759	Jack, US 4P
J402	22163675	Jack, Microphone, 6.5φ
J503	22167893	Jack, DIN, Remote Control
J901	22163777	Jack, Headphone

Symbol No.	Part No.	Description
S1	22195199	Switch, Leaf, Record Safety
S2	22195199	Switch, Leaf, Cassette
S401	22195680	Switch, Rotary, Tape Select
S402	22195326	Switch, Rotary, Dolby
S552	22195220	Switch, Rotary, Memory
S553	22195220	Switch, Rotary, Timer
△ S901	22195226	Switch, Push, Power (TA, TC)
△ S901	22195378	Switch, Push, Power (TE, TU, AY, VF)
△ S902	22146186	Switch, Slide Power Select (VF)
PL1	22113484	Lamp, 50mA/14V
△ L1	22147227	Solenoid
L401, 402	22211264	Coil, 5.6mH
△ F901, 902	22144387	Fuse, 800mA (TE, TU, AY, VF)
Z401, 402	22130588	Composite Parts SW A
Z403, 404	22153158	Filter Block
Z501	22130593	Composite Parts, Microphone
Z502	22132530	Unit, Bias OSC
Z551	22130585	Composite Parts, Logic E
Z552	22130584	Composite Parts, Logic D
Z553	22130586	Composite Parts, Logic F
Z554	22130583	Composite Parts, Logic C
Z555	22130595	Composite Parts, SW C
Z556	22130591	Composite Parts, SW D
Z557	22130592	Composite Parts, SW E
Z558	22130580	Composite Parts, Logic A
Z559	22130594	Composite Parts, SW B
Z560	22130582	Composite Parts, Logic B
Z601, 602	22153157	Filter, Block, Bias
Z603, 604	22153158	Filter, Block, MPX
△	22176573	Cord, Power (TA, TC)
△	22176286	Cord, Power (TE)
△	22176536	Cord, Power (TU)
△	22176588	Cord, Power (AY)
△	22176125	Cord, Power (VF)
CAPACITORS		
J = ±5%, K = ±10%, P = 0 + 100%, Z = -20 + 80%		
ABBREVIATIONS: EL = Electrolytic, CD = Ceramic Disk, MY = Mylar		
C401, 402	22488339	EL, 3.3mfd, 50V
C403, 404	22488339	EL, 3.3mfd, 50V
C405, 406	22485100	EL, 10mfd, 16V
C409, 410	22349471	CD, 470pF, 50V, K
C411, 412	22488479	EL, 4.7mfd, 50V
C413, 414	22483221	EL, 220mfd, 10V

Symbol No.	Part No.	Description
C415, 416	22485330	EL, 33mfd, 16V
C417, 418	22371223	MY, 0.022mfd, 50V, J
C419, 420	22488478	EL, 0.47mfd, 50V
C421, 422	22480003	EL, 0.1mfd, 50V
C423, 424	22371103	MY, 0.01mfd, 50V, J
C425, 426	22371223	MY, 0.022mfd, 50V, J
C429, 430	22371103	MY, 0.01mfd, 50V, J
C431, 432	22488109	EL, 1mfd, 50V
C433, 434	22349151	CD, 150pF, 50V, K
C435, 436	22349151	CD, 150pF, 50V, K
C437, 438	22349471	CD, 470pF, 50V, K
C501	22485330	EL, 33mfd, 16V
C502	22371392	MY, 3900pF, 50V, J
C503	22342103	CD, 0.01mfd, 50V, Z
C506	22488339	EL, 3.3mfd, 50V
C521	22488339	EL, 3.3mfd, 50V
C522	22488109	EL, 1mfd, 50V
C523	22488109	EL, 1mfd, 50V
C524	22485101	EL, 100mfd, 10V
C525	22485100	EL, 10mfd, 16V
C526	22488109	EL, 1mfd, 50V
C527	22488109	EL, 1mfd, 50V
C528	22488109	EL, 1mfd, 50V
C529	22480003	EL, 0.1mfd, 50V
C530	22488339	EL, 3.3mfd, 50V
C531	22488339	EL, 3.3mfd, 50V
C532	22488339	EL, 3.3mfd, 50V
C533	22485100	EL, 10mfd, 16V
C534	22488339	EL, 3.3mfd, 50V
C535	22485330	EI, 33mfd, 16V
C536	22485100	EL, 10mfd, 16V
C537	22371103	MY, 0.01mfd, 50V, J
C538	22485100	EL, 10mfd, 16V
C539	22485330	EL, 33mfd, 16V
C540	22483221	EL, 220mfd, 10V
C541	22349151	CD, 150pF, 50V, K
C701, 702	22372103	MY, 0.01mfd, 50V, J
C703, 704	22372333	MY, 0.033mfd, 50V, J
C705	22349222	CD, 2200pF, 50V, K
C721	22483470	EL, 47mfd, 10V
C722	22485221	EL, 220mfd, 16V
C901, 902	22488339	EL, 3.3mfd, 50V
C903, 904	22485100	EL, 10mfd, 16V
△ C951, 952	22486102	EL, 1000mfd, 25V

Symbol No.	Part No.	Description
C953, 954	22485331	EL, 330mfd, 16V
C955, 956	22485331	EL, 330mfd, 16V
C957, 958	22485101	EL, 100mfd, 16V
C952, 960	22485101	EL, 100mfd, 16V
C961, 962	22488479	EL, 4.7mfd, 50V
C963	22485101	EL, 100mfd, 16V
C964	22485331	EL, 330mfd, 16V
C965	22342103	CD, 0.01mfd, 50V, Z (TE, TU, AY, VF)
△ C991	22340140	CD, 0.01mfd, 125V, P (TA, TC)
△ C991	22340150	CD, 4700pF, 400V, M (TE, TU, AY, VF)
RESISTORS		
All resistors are carbon film ¼W, ±5%, unless otherwise noted.		
R401, 402	22555333	33K ohm
R403, 404	22555104	100K ohm
R405, 406	22555473	47K ohm
R407, 408	22555224	220K ohm
R409, 410	22555103	10K ohm
R411, 412	22555104	100K ohm
R413, 414	22555224	220K ohm
R415, 416	22555124	120K ohm
R417, 418	22555332	3.3K ohm
R419, 420	22555222	2.2K ohm
R421, 422	22545471	470 ohm
R425, 426	22555223	22K ohm
R427, 428	22555472	4.7K ohm
R429, 430	22555332	3.3K ohm
R431, 432	22555101	100 ohm
R435, 436	22555153	15K ohm
R437, 438	22555103	10K ohm
R439, 440	22555224	220K ohm
R441, 442	22555472	4.7K ohm
R443, 444	22555472	4.7K ohm
R447, 448	22545103	10K ohm
R449, 450	22555102	1K ohm
R451, 452	22555103	10K ohm
R453, 454	22555153	15K ohm
R460	22655432	50K ohm, A, Variable
R461, 462	22658556	470 ohm, B, Semi-fixed
R463, 464	22658560	47K ohm, B, Semi-fixed
R465, 466	22658560	47K ohm, B, Semi-fixed
R467, 468	22555102	1K ohm
R469, 470	22555104	100K ohm

Symbol No.	Part No.	Description
R501, 502	22555224	220K ohm
R503, 504	22555104	100K ohm
R505	22545103	10K ohm
R506	22555223	22K ohm
R507	22555222	2.2K ohm
R508	22555223	22K ohm
R509	22547181	180 ohm, ½W
△ R510	22500130	10 ohm, Fusible
R511	22555152	1.5K ohm
R512	22547271	270 ohm, ½W
R513	22555471	470 ohm
R521	22545103	10K ohm
R522	22545103	10K ohm
R523	22545103	10K ohm
R524	22555153	15K ohm
R525	22555473	47K ohm
R526	22545223	22K ohm
R527	22555683	68K ohm
R528	22545681	680 ohm
R529	22545152	1.5K ohm
R530	22545471	470 ohm
R531	22545152	1.5K ohm
R532	22545152	1.5K ohm
R534	22555473	47K ohm
R535	22555472	4.7K ohm
R536	22555473	47K ohm
R537	22545104	100K ohm
R538	22555332	3.3K ohm
R539	22555223	22K ohm
R540	22555104	100K ohm
R541	22555472	4.7K ohm
R542	22555153	15K ohm
R543	22555104	100K ohm
R544	22555104	100K ohm
R545	22555153	15K ohm
R546	22555103	10K ohm
R547	22545223	22K ohm
△ R548	22570300	27 ohm, 2W
R549	22545330	330 ohm
R550	22555102	1K ohm
R551	22555102	1K ohm
R553	22545561	560 ohm
R554		Termister, D22A
R555	22555103	10K ohm
R556	22555473	47K ohm
R557	22545472	4.7K ohm
R558	22555103	10K ohm
R559	22555103	10K ohm
R560	22555472	4.7K ohm
R561	22555222	2.2K ohm
R562	22555222	2.2K ohm

Symbol No.	Part No.	Description
R563	22555472	4.7K ohm
R564	22547100	10 ohm, ½W
R565	22555222	2.2K ohm
R581	22658555	330 ohm, B, Semi-fixed
R601, 602	22545224	220K ohm
R603, 604	22545104	100K ohm
R605, 606	22545105	10M ohm
R607, 608	22545181	180 ohm
R609, 610	22545332	3.3K ohm
R611, 612	22545473	47K ohm
R613, 614	22545393	39K ohm
R615, 616	22545154	150K ohm
R617, 618	22545274	270K ohm
R619, 620	22545103	10K ohm
R621, 622	22545223	22K ohm
R623, 624	22545103	10K ohm
R629, 630	22545105	10M ohm
R633, 634	22547151	150 ohm, ½W
R651	22545224	220K ohm
R652	22545224	220K ohm
R653	22545103	10K ohm
R654	22545104	100K ohm
R655	22545153	15K ohm
R656	22545152	1.5K ohm
R701, 702	22545563	56K ohm
R703, 704	22555473	47K ohm
R705, 706	22555473	47K ohm
R707, 708	22555102	1K ohm
R709, 710	22658558	4.7K ohm, B, Semi-fixed
R720	22555104	100K ohm
R721	22555103	10K ohm
R722	22555563	56K ohm
R723	22545271	270 ohm
R724	22555223	22K ohm
R725, 726	22555681	680 ohm
R727, 728	22555681	680 ohm
R729, 730		
R731, 732		
R733, 734		
R901, 902	22545104	100K ohm
R903, 904	22555333	33K ohm
R905, 906	22545153	15K ohm
R907, 908	22545154	150K ohm
R909, 910	22555271	270 ohm

Symbol No.	Part No.	Description
R951	22545222	2.2K ohm
R952	22545105	1M ohm
△ R953, 954	22500167	2.2 ohm, Fusible (TA, TC)
R955, 956	22547331	330 ohm, ½W
R957, 958	22555681	680 ohm
R959	22547391	390 ohm, ½W
△ R960	22500130	10 ohm, Fusible
R961	22547331	330 ohm, ½W
R962	22545104	100K ohm
R963	22545101	100 ohm

ACCESSORIES

22164775	Cord, Joint
22881047	Cover, Dust
22990756	Cleaner, Head
22902842	Owner's Manual (TA, TC)
22902843	Owner's Manual (TE, TU, AY)
22902845	Owner's Manual (VF)