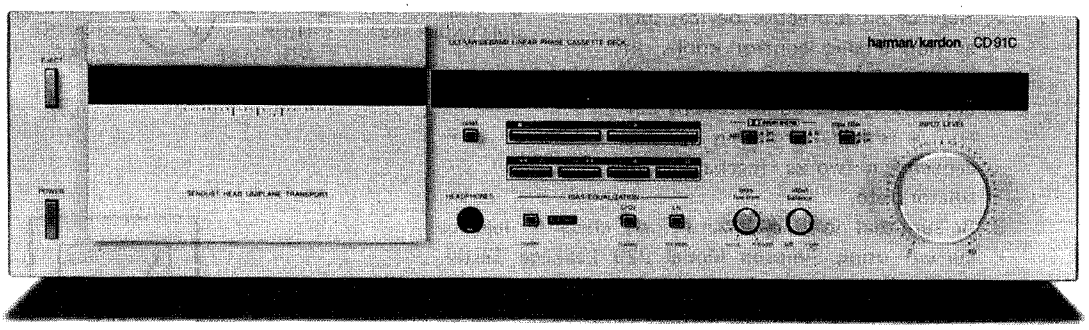
The Harman Kardon Model CD91C

Manual No. 57A

ULTRAWIDEBAND LINEAR PHASE CASSETTE DECK

Technical Manual



CD91C

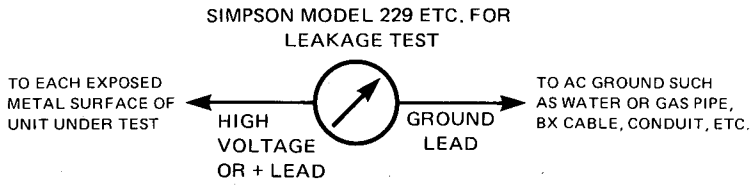
harman/kardon
240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797
1112-H15257A4 P-08833 400 PRINTED IN JAPAN

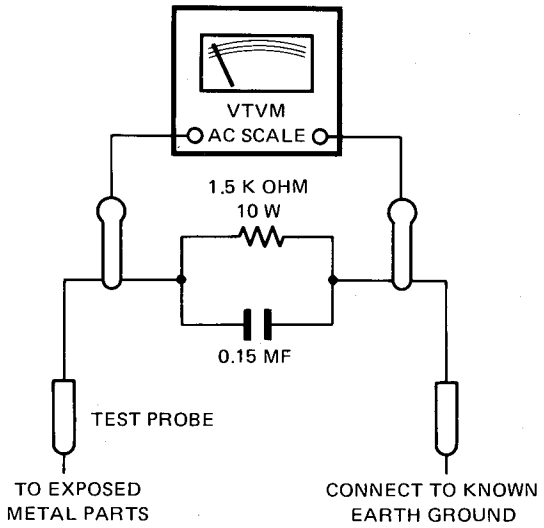
CONTENTS

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

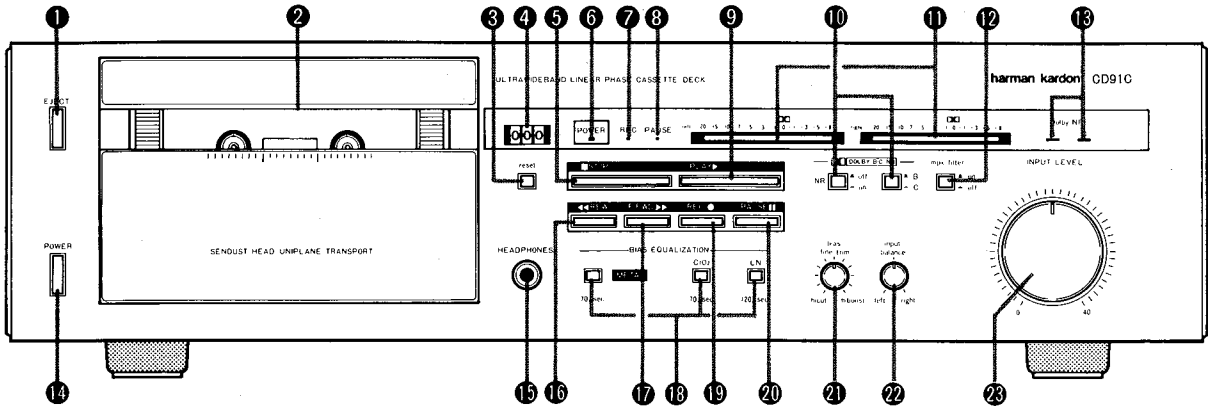
Before returning the unit to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Replace all protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows:
   Plug the AC line cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 ohm, 10-watt resistor paralleled by a 0.15mf capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 ohms per volt, or higher, sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)
   A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.





COMPONENTS AND THEIR FUNCTIONS



❶ EJECT BUTTON (EJECT)
For opening the cassette compartment door. The soft eject mechanism opens the door slowly when this button is pressed.
Caution: Never press this button while the tape is running. Be sure to press the STOP button before pressing the EJECT button.

❷ CASSETTE COMPARTMENT

❸ RESET BUTTON (reset)
For resetting the tape counter to "000". Press this button to reset the TAPE COUNTER to "000" when starting to record.

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

❺ STOP BUTTON (■ STOP)
For stopping each operation.
Pressing this button stops playback, recording, fast forwarding or rewinding of a tape. It also cancels the standby state of the PAUSE button operation.

❻ POWER INDICATOR (POWER)

❼ RECORD INDICATOR (REC)
To indicate that the tape is being recorded.

❽ PAUSE INDICATOR (PAUSE)
For indication that the "PAUSE" function has been activated.

❾ PLAY BUTTON (PLAY ▶)
For playback of a tape.
Press this button to start playback.

❿ DOLBY* NR SYSTEM SELECTORS (DOLBY B-C NR)
NR ON/OFF Selector:
For recording or playback using the Dolby NR (Noise Reduction) system.
Depress this switch to use the Dolby NR system. The green DOLBY NR INDICATOR (for B-type) or the yellow one (for C-type) illuminates according to the NR TYPE selector position. Release this switch to turn off the Dolby NR system.
NR TYPE Selector:
For selection of Dolby B- or C-type NR system.
Depress this switch to select the Dolby C-type NR system. Release it and the B-type is selected.

⓫ LED LEVEL DISPLAY
For an accurate indication of the recording or playback level.

⓬ MPX FILTER SWITCH (mpx filter)
The MPX filter is a high frequency filter that has very little effect below 16kHz, but has 30dB attenuation at 19kHz, the frequency of the FM Stereo pilot signal. This filter should be engaged (button out position) when recording from an FM Stereo tuner or receiver. However, to appreciate the ultrawideband frequency response of all Harman Kardon cassette decks, the MPX filter should be disengaged (button in position) when recording all other sources, such as phono, tape, microphone, etc.

⓭ DOLBY NR INDICATORS (Dolby NR B, C)
For indication that the Dolby B or C noise reduction is activated.

⓮ POWER SWITCH (POWER)
For turning power on and off.
When this switch is pressed with the power line cord plugged to an AC outlet, the POWER indicator illuminates.

⓯ HEADPHONES JACK (HEADPHONES)
For connection of stereo headphones.

⓰ REWIND BUTTON (◀◀ REW)
For rewinding of a tape at a high speed.
Rewind time is about 90 sec. with C-60 tape.

⓱ FAST FORWARD BUTTON (F.FWD ▶▶)
For fast forwarding of a tape.
Fast forward time is about 90 sec. with C-60 tape.

⓲ TAPE SELECTORS (BIAS/EQUALIZATION)
For selection of the record and playback circuitry that provides the lowest distortion and flattest frequency response for METAL, CrO_2 or LN tape.

⓳ RECORD BUTTON (REC●)
To record a tape, press this button and the PLAY button at the same time. The red RECORD INDICATOR illuminates to indicate that a recording is being made.
A RECORD STANDBY mode can be activated by pressing the RECORD button and the PAUSE button at the same time. The red RECORD and yellow PAUSE INDICATORS illuminate. This mode is useful for making input level adjustments prior to recording. To change from the RECORD STANDBY mode to the RECORD mode, press the PLAY button. To cancel the RECORD STANDBY mode, press the STOP button.

⓴ PAUSE BUTTON (PAUSE▮▮)
For temporarily stopping playback or recording. Also, press this button with the RECORD button to activate the RECORD STANDBY mode.

㉑ BIAS FINE TRIM KNOB (bias fine trim)
For precise adjustment of the bias used during recording.

㉒ BALANCE CONTROL (input balance)
For control of input level balance between the right and left channels.
Set the knob at the 12 o'clock position for normal operation. Use this feature to restore the input level balance when the levels of the right and left channels are extremely different or to deliberately upset the input level balance as you like. Turn this knob clockwise, and the recording level of left channel is decreased.
Turn counterclockwise, and the recording level of right channel is decreased.

㉓ INPUT LEVEL CONTROL (INPUT LEVEL)
For input level control during recording. The LED LEVEL DISPLAY shows the input level.

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

SPECIFICATIONS

Track Configuration: 4-track 2 channel Stereo Cassette Deck

- **MECHANICAL SECTION**

	Nominal	Limit
Tape Speed	4.75cm/sec.	± 1.5%
Wow and Flutter	0.05%	≤ 0.08%
F.F/REW Time for C-60 Cassette	90 sec.	≤ 100 sec.
Motor	DC Servomotor	
Take Up Torque	50 gr. cm	35 ~ 70 gr. cm
F.F Torque	100 gr. cm	70 ~ 150 gr. cm
REW Torque	100 gr. cm	70 ~ 150 gr. cm

- **HEAD SECTION**

Recording/Playback	Fe-Al-Si Alloy Core
Erase	Ferrite Core

- **AMPLIFIRE SECTION**

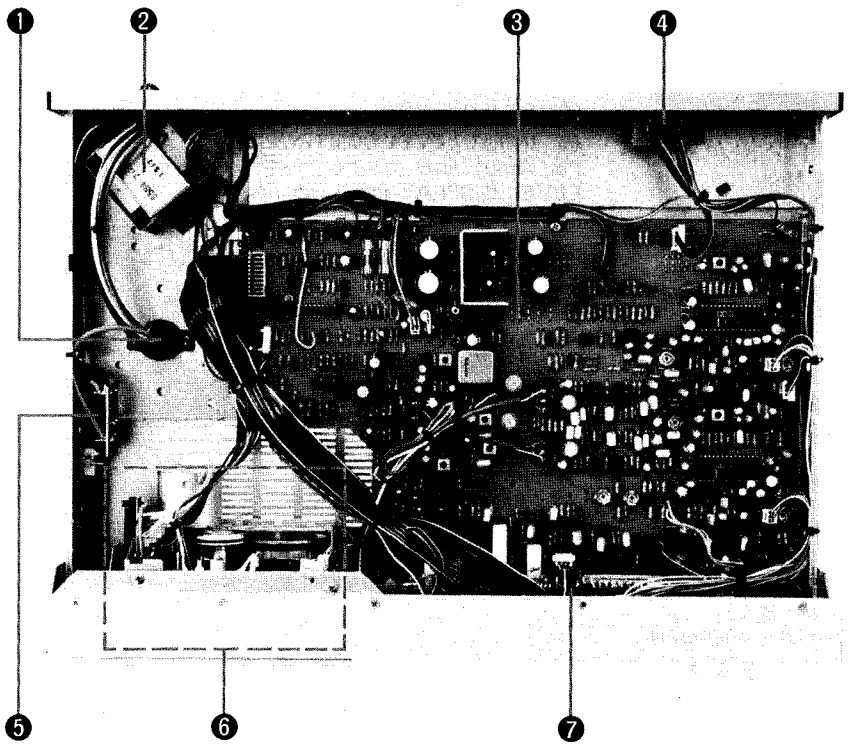
Input Sensitivity	55mV 40 (min) ~ 100 (max) mV
Input Impedance	22kΩ 15 (min) ~ 30 (max) kΩ

	Nominal	Limit
Signal-to-Noise Ratio (DOLBY B to ON)		
at MIC input	52dB	≥ 48dB
	(Input 1kHz, 1.5mV for normal tape)	
at LINE input	61dB	≥ 56dB
	(Input 1kHz, 100mV for normal tape)	
Erase Ratio	65dB	≥ 60dB
	(Input 80Hz for metal tape)	
Channel Separation	45dB	≥ 35dB
	(Input 1kHz)	
Crosstalk	72dB	≥ 60dB
	(Input 1kHz)	

- **DIMENSIONS (W x H x D)** 17-7/16"x 4-13/16"x 13-9/16" (443 x 123 x 345 mm)
- **WEIGHT** 13 lbs. 4 oz. (6 kg)
- **POWER SUPPLIES**
  - U.S. & Canadian models: AC 120V, 60Hz
  - General model: AC 100/120/220/240V, 50/60Hz
- **POWER CONSUMPTION** 27W

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

INTERNAL VIEW



1. VOLTAGE SELECTOR (General model only)
2. POWER TRANSFORMER
3. MAIN P.C. BOARD (PCB-1)
4. JACK P.C. BOARD (PCB-7)
5. POWER SWITCH
6. CASSETTE TAPE RECORDER MECHANICAL ASSEMBLY
7. CONTROL SWITCHES P.C. BOARD (PCB-2)

DISASSEMBLY PROCEDURES

[1] CABINET TOP REMOVAL

Remove the screws ❶ to ❻ in Fig. 1 and then remove the cabinet top.

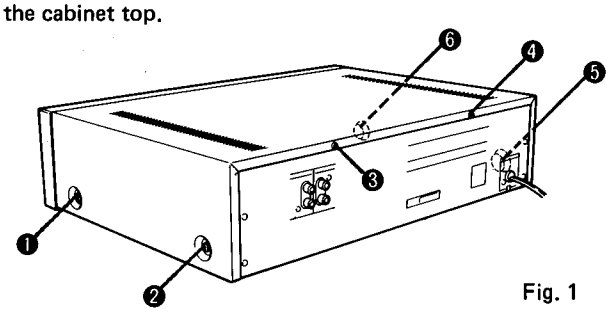


Fig. 1

[2] CABINET BOTTOM REMOVAL

Remove the screws ❶ to ⓮ in Fig. 2 and then remove the cabinet bottom.

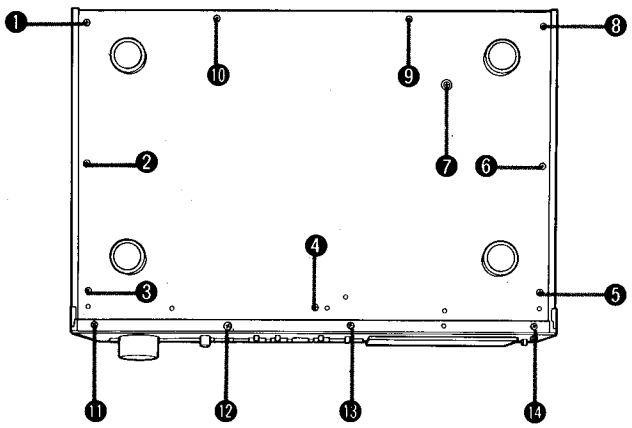
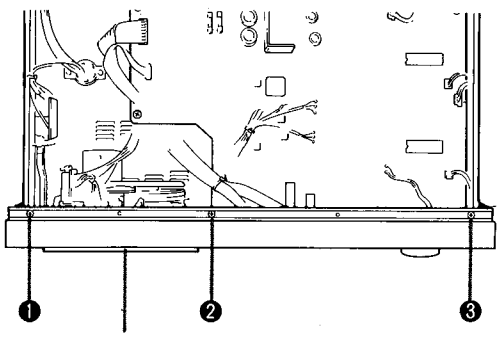


Fig. 2

[3] FRONT PANEL ASSEMBLY REMOVAL

1. Remove the cabinet top (Refer to step [1]).
2. Pull out the input level knob.
3. Remove the cassette door assembly.
4. Remove the screws ⓫ to ⓮ in Fig. 2 and ❶ to ❸ in Fig. 3 and then remove the front panel assembly.



CASSETTE DOOR ASSEMBLY

Fig. 3

[4] CONTROL SWITCHES P.C. BOARD REMOVAL

1. Remove the screw ❶ in Fig. 4 and then remove the dolby NR indicators P.C. board.
2. Disconnect connector with lead and jumper leads from connectors on the main P.C. board.
3. Remove screws ❷ and ❸ in Fig. 4 and then remove the control switches P.C. board.

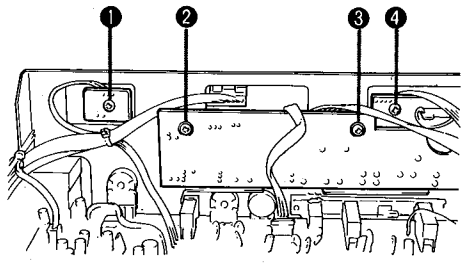


Fig. 4

[5] MAIN P.C. BOARD REMOVAL

1. Remove the front panel assembly (Refer to step [3]).
2. Pull out the bias fine trim and input balance knobs.
3. Unsolder the lead wires and disconnect the connectors which are connected to main P.C. board.
4. Remove screws ❶ and ❷ , and hexagonal nut ❹ to ❻ in Fig. 5.
5. Remove screws ❶ to ❹ in Fig. 6 and then pull out main P.C. board backward.

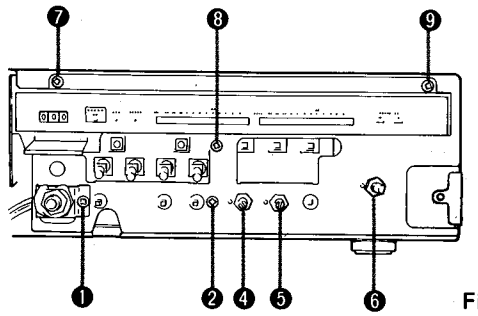


Fig. 5

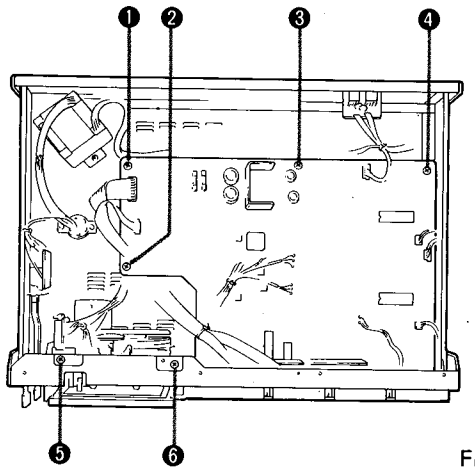


Fig. 6

[6] PLATE ASSEMBLY REMOVAL

1. Remove the front panel assembly and control switches P.C. board (Refer to steps [3] and [4]).
2. Remove screw ❹ in Fig. 4 and then remove the power, rec. and pause indicators P.C. board.
3. Disconnect connector with lead from connector on the LED level display assembly.
4. Unsolder the lead wires which are connected to reed switch P.C. board.
5. Remove the belt of the counter.
6. Remove the screws ❼ to ❾ in Fig. 5 and then remove the plate assembly.

[7] CASSETTE TAPE RECORDER MECHANICAL ASSEMBLY REMOVAL

1. Remove the cabinet bottom and front panel assembly (Refer to step [2] and [3]).
2. Unsolder the lead wires and disconnect the connecter which are connected to the cassette tape recorder mechanical assembly.
3. Remove the belt of the counter.
4. Remove the screws ❺ and ❻ in Fig. 6 and the screws ❶ and ❷ in Fig. 7 and then remove the cassette tape recorder mechanical assembly backward.

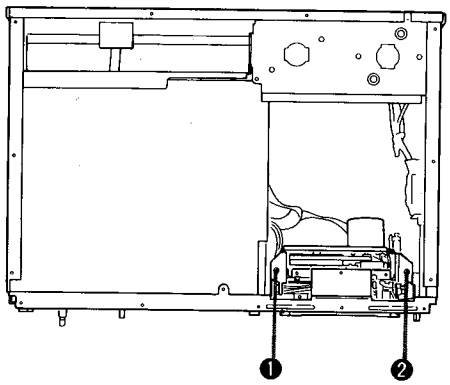


Fig. 7

[8] PLATE REMOVAL

1. Remove the cassette tape mechanical assembly (Refer to step [7]).
2. Remove the screws ❶ and ❷ in Fig. 8 and then remove the plate.

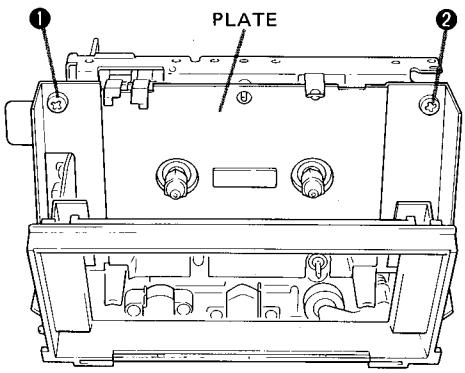


Fig. 8

[9] EJECT LOCK ARM REMOVAL

1. Remove the plate (Refer to step [8]).
2. Remove the springs ❶ and ❷ in Fig. 9 and remove the screw ❸ in Fig. 9 and then remove the eject lock arm.

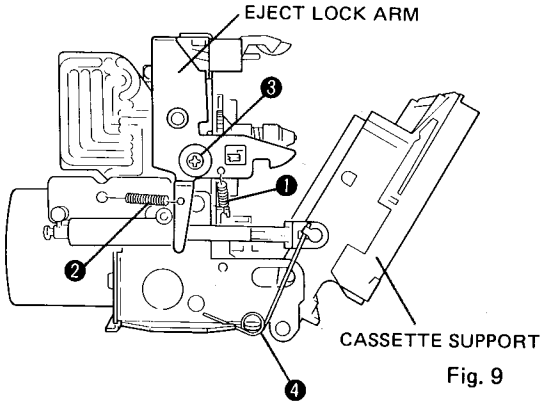


Fig. 9

[10] MICRO SWITCH REMOVAL

1. Remove the eject lock arm (Refer to step [9]).
2. Unsolder the lead wires which are connected to the micro switch.
3. Remove the screws ❷ and ❸ in Fig. 10 and then remove the micro switch.

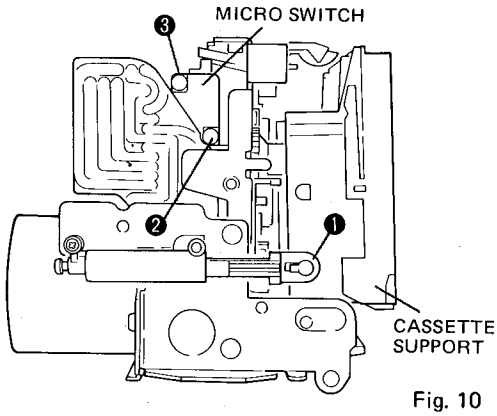


Fig. 10

[11] CASSETTE SUPPORT REMOVAL

1. Remove the eject lock arm (Refer to step [9]).
2. Remove the spring ❹ in Fig. 9 and remove the joint of damper ❶ in Fig. 10 from cassette support.
3. Remove the screws ❶ to ❸ in Fig. 11 and remove the bracket and then remove the cassette support.

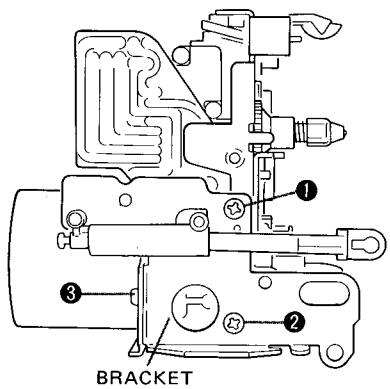


Fig. 11

12 PINCH ROLLER AND HEADS REMOVAL

1. Remove the cassette support (Refer to step 11).
2. Remove the lock washer ❶ in Fig. 12 and pull out the pinch roller by pushing the pinch roller spring ❻ in Fig. 12 with tweezers.
3. Remove the screws ❷ and ❸ in Fig. 12 and then remove the erase head.
4. Remove the screws ❹ and ❺ in Fig. 12 and then remove the record/playback head.
   * Be careful not to lose the spring which are attached to the screws ❷ and ❹ in Fig. 12.
   Always adjust the azimuth after replacing the record/playback head (Refer to alignment procedures).

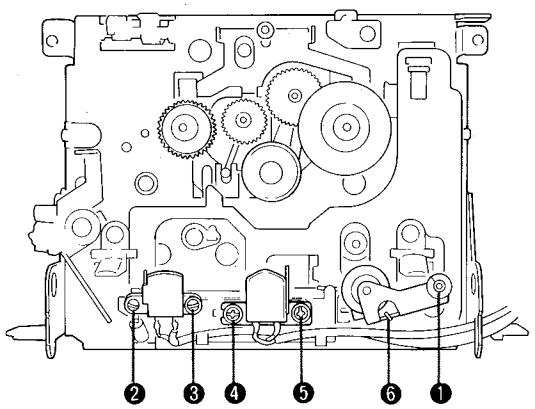


Fig. 12

13 MOTOR AND BELT REMOVAL

1. Remove the cassette tape recorder mechanical assembly (Refer to step 7).
2. Unsolder the lead wires which are connected to the motor.
3. Remove the screw ❶ in Fig. 13 and remove actuators ❷ and ❸ when pulling down the motor bracket and then remove the motor bracket and remove main and sub belts.
4. Remove the screws ❶ and ❷ in Fig. 14 and then remove the motor.

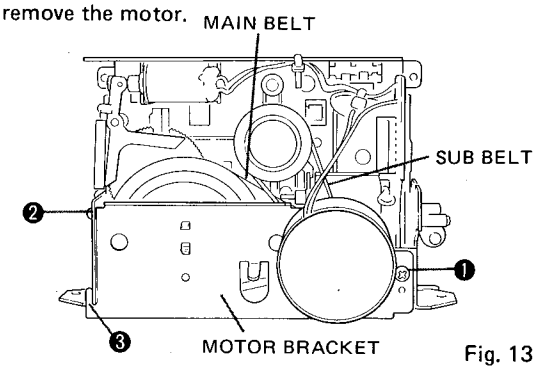


Fig. 13

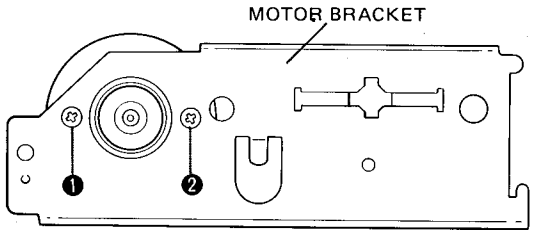
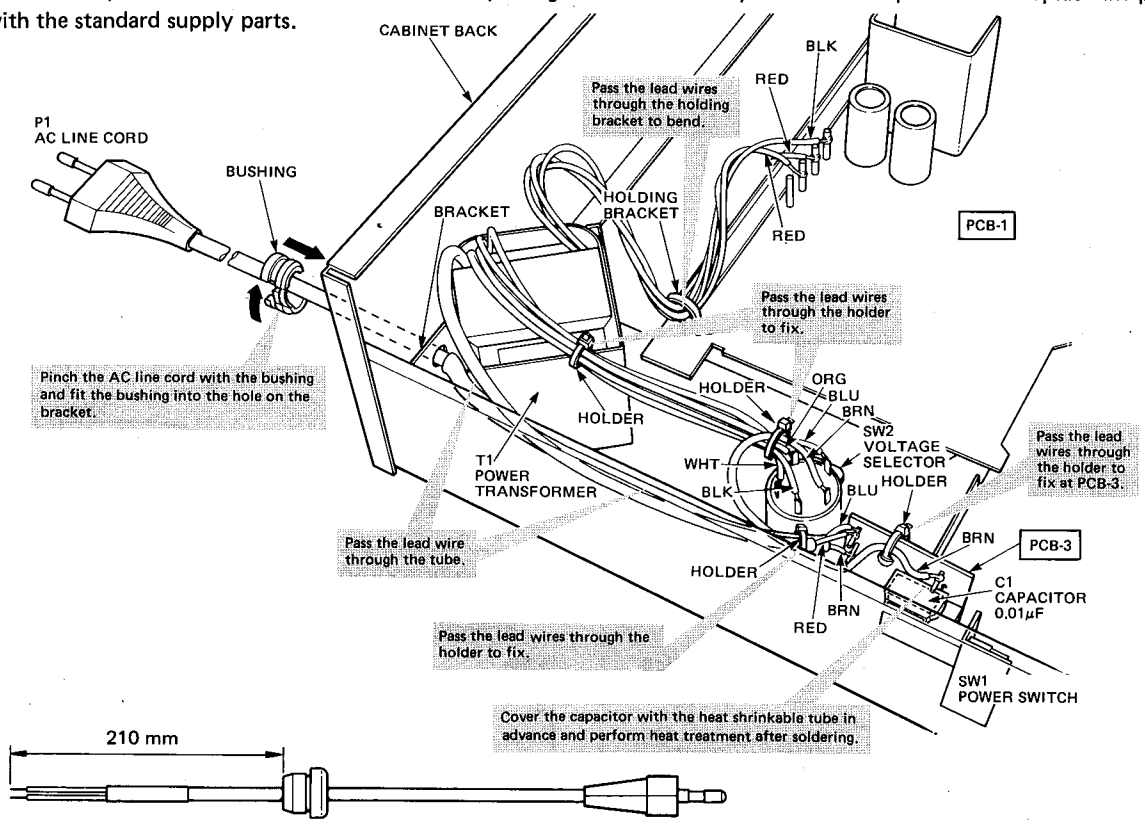


Fig. 14

AC LINE CORD REPLACEMENT
(FOR SERVICE ENGINEERS IN OTHER THAN NORTH AMERICA)

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



ALIGNMENT PROCEDURES

ELECTRICAL ADJUSTMENT AND CONFIRMATION

General conditions (unless otherwise noted)

CONTROLS AND SWITCHES	SETTINGS
Dolby NR	off
MPX Filter	off
Bias Fine Trim	center
Input Balance	center
Input Level	max

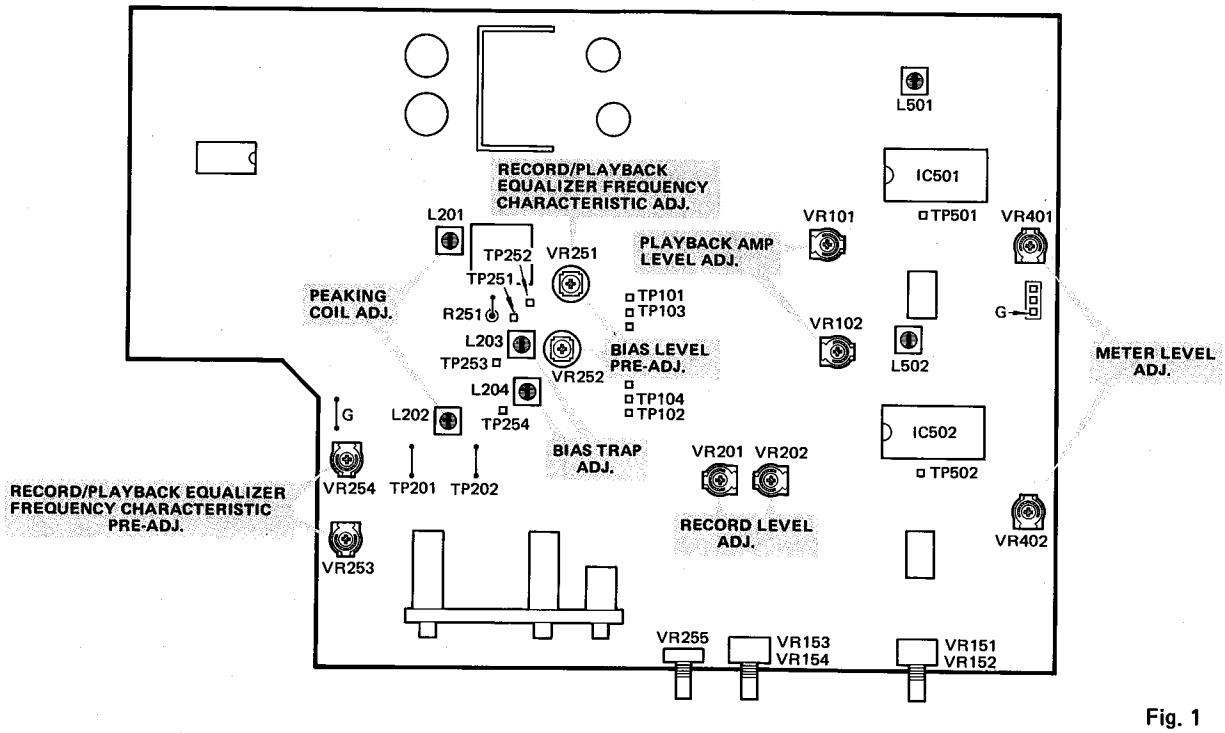


Fig. 1

PLAYBACK FREQUENCY RESPONSE

TEST TAPE

120μ Sec Position: TCC-162 or MTT-256μ
70μ Sec Position: TCC-262 or MTT-356μ

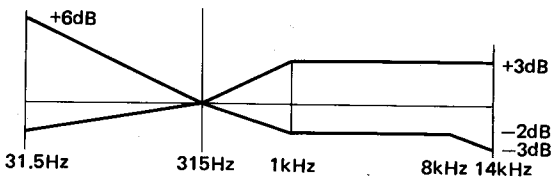


Fig. 3

RECORD/PLAYBACK FREQUENCY RESPONSE

DOLBY-OFF
RECORD LEVEL = DOLBY LEVEL −25dB

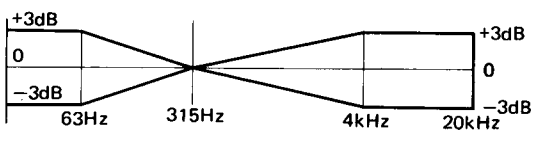


Fig. 4

RECORD/PLAYBACK FREQUENCY RESPONSE

DOLBY-B ON
RECORD LEVEL = DOLBY LEVEL −25dB

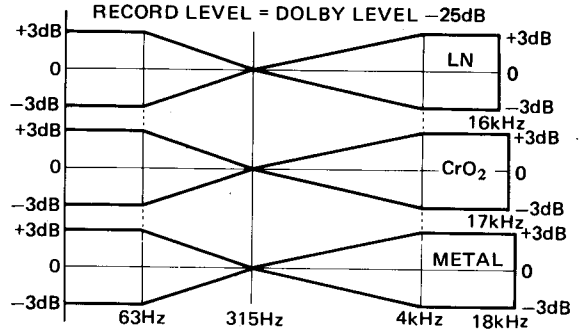


Fig. 5

RECORD/PLAYBACK FREQUENCY RESPONSE

DOLBY-C ON
RECORD LEVEL = DOLBY LEVEL −25dB

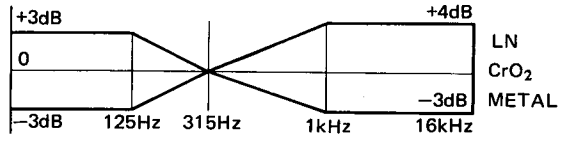


Fig. 6

***Azimuth adjustment**

When the maximum level point of R channel does not equal that of L channel, connect the oscilloscope as shown in Fig. 2 and proceed with azimuth adjustment so that L and R channels are in phase.

a) Connect L channel tape out to "X(or V)" and R channel to "Y(or H)". Observe the lissajouss waveform.

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

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

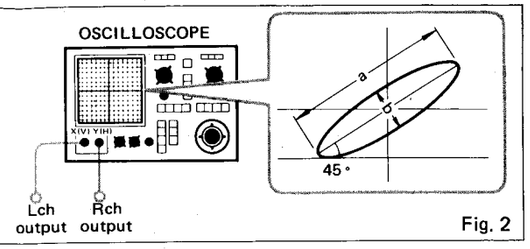


Fig. 2

STEP	ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
1	Tape speed	Frequency counter Test tape (MTT-111D)	PB		TP501 or TP502	VR built in motor	3kHz ±10Hz	
2	Wow flutter confirmation	Wow flutter meter Test tape (MTT-111D)	PB				Confirm that wow flutter is within the specification.	
3	Azimuth	VTVM Test tape (MTT-114)	PB		TP501 or TP502	Azimuth screw	Maximum output	Refer to *Azimuth adjustment.
4	Playback amp. level	VTVM Test tape (MTT-150)	PB		TP501 TP502	VR101 VR102	580 mV	
5	Playback frequency characteristic confirmation	VTVM Test tape (TCC-162 or MTT-256μ and TCC-262 or MTT-356μ)	PB		TAPE OUT		Confirm that frequency response is within the range as shown in Fig. 5.	
6	Bias trap	VTVM	REC-PAUSE		TP253 TP254	L203 L204	Minimum output	Tape selector is metal position.
7-1	Bias level (Pre-adjustment)	VTVM	REC-PAUSE		TP101, 103 TP102, 104	VR251 VR252	100 mV	Tape selector is metal position.
7-2					TP102, TP104	VR254	52 mV	Tape selector is CrO_2 position.
7-3					TP102, TP104	VR253	32 mV	Tape selector is LN position.
8	Bias frequency confirmation	Frequency counter	REC-PAUSE		R251 and TP251		105kHz ± 5kHz	Tape selector is metal position.
9	Record level (Pre-adjustment)	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502	VR201 VR202	580 mV	Tape selector is CrO_2 position.
10	Peaking coil (Pre-adjustment)	VTVM	REC	Apply 20kHz signal to LINE INPUT. Set INPUT LEVEL knob so that TP101 and TP102 voltage is 580mV −25dB when REC-PAUSE mode.	TP101 TP102	L201 L202	Maximum output.	Short the TP251 and TP252. Tape selector is metal position.
11	Record/playback equalizer frequency characteristic (Pre-adjustment)	VTVM Blank tape (AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT	VR251 VR252	So that the record/playback frequency response is flat.	Tape selector is metal position.
12-1	Record/playback equalizer frequency characteristic	VTVM Blank tapes (LN XL-1 CrO_2 AC-512 metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT	VR254 L202	So that the record/playback frequency response is flat (at least within the range in Fig. 4).	Tape selector is CrO_2 position.
12-2						VR251 L201		
12-3					TAPE OUT	VR253		Tape selector is LN position.
12-4					TAPE OUT		Confirm record/playback frequency response. If the frequency response is not within the range in Fig. 4, do the adjustment, over starting with step 11.	Tape selector is metal position.
12-5					TAPE OUT	VR251	Confirm record/playback frequency response. If frequency response is not the same as for step 12-4, adjust while watching the balance of the two.	Tape selector is LN position.
13	Record level	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502	VR201 VR202	580 mV	Tape selector is CrO_2 position.
14	Record level confirmation	VTVM Blank tapes (metal AC-711 LN XL-1)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502		580 mV ± 1dB	This confirmation should be done at each tape selector position.
15	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (LN XL-1 CrO_2 AC-512 metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT		Confirm that record/playback frequency response is within the range in Fig. 5 and 6. If it is not within the range in Fig. 5 and 6, redo the adjustments on steps 11 and 12.	This confirmation should be done at each tape selector position under each of the following conditions, Dolby B and Dolby C on.
16	Meter level	VTVM	REC-PAUSE	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−0.5dB when REC-PAUSE mode.		VR401 VR402	0 VU LED lights up.	

***Azimuth adjustment**

When the maximum level point of R channel does not equal that of L channel, connect the oscilloscope as shown in Fig. 2 and proceed with azimuth adjustment so that L and R channels are in phase.

a) Connect L channel tape out to "X(or V)" and R channel to "Y(or H)". Observe the lissajouss waveform.

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

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

STEP	ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	POINT CONN
1	Tape speed	Frequency counter Test tape (MTT-111D)	PB		TP TP
2	Wow flutter confirmation	Wow flutter meter Test tape (MTT-111D)	PB		
3	Azimuth	VTVM Test tape (MTT-114)	PB		TP TP
4	Playback amp. level	VTVM Test tape (MTT-150)	PB		TP TP
5	Playback frequency characteristic confirmation	VTVM Test tape (TCC-162 or MTT-256μ and TCC-262 or MTT-356μ)	PB		TA
6	Bias trap	VTVM	REC-PAUSE		TP TP
7-1	Bias level (Pre-adjustment)	VTVM	REC-PAUSE		TP TP
7-2					TP TP
7-3					TP TP
8	Bias frequency confirmation	Frequency counter	REC-PAUSE		R2 TP
9	Record level (Pre-adjustment)	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP TP
10	Peaking coil (Pre-adjustment)	VTVM	REC	Apply 20kHz signal to LINE INPUT. Set INPUT LEVEL knob so that TP101 and TP102 voltage is 580mV −25dB when REC-PAUSE mode.	TP TP
11	Record/playback equalizer frequency characteristic (Pre-adjustment)	VTVM Blank tape (AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TA
12-1	Record/playback equalizer frequency characteristic	VTVM Blank tapes (LN XL-1 CrO_2 AC-512 metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TA
12-2					
12-3					TA
12-4					TA
12-5					TA
13	Record level	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP TP
14	Record level confirmation	VTVM Blank tapes (metal AC-711 LN XL-1)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP TP
15	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (LN XL-1 CrO_2 AC-512 metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TA
16	Meter level	VTVM	REC-PAUSE	Apply 400Hz signal to LINE INPUT. Set INPUT LEVEL knob so that TP501 and TP502 voltage is 580 mV−0.5dB when REC-PAUSE mode.	

ertical
comes

f "a"
f "b"

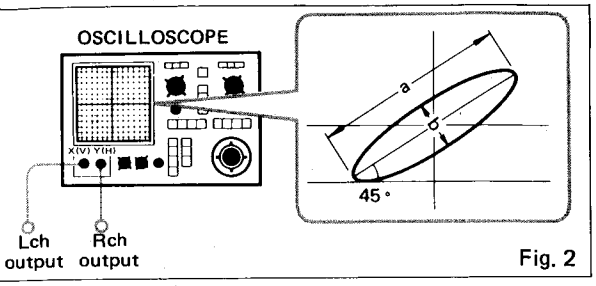


Fig. 2

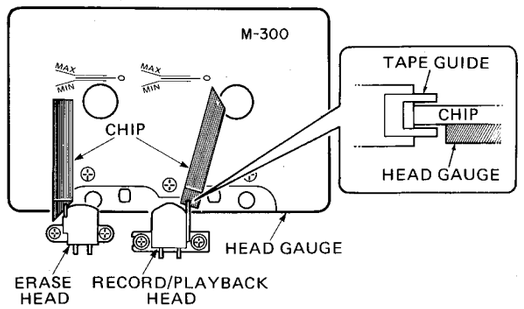
	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
	TP501 or TP502	VR built in motor	3kHz ±10Hz	
			Confirm that wow flutter is within the specification.	
	TP501 or TP502	Azimuth screw	Maximum output	Refer to *Azimuth adjustment.
	TP501 TP502	VR101 VR102	580 mV	
	TAPE OUT		Confirm that frequency response is within the range as shown in Fig. 5.	
	TP253 TP254	L203 L204	Minimum output	Tape selector is metal position.
	TP101, 103 TP102, 104	VR251 VR252	100 mV	Tape selector is metal position.
	TP102, TP104	VR254	52 mV	Tape selector is CrO_2 position.
	TP102, TP104	VR253	32 mV	Tape selector is LN position.
	R251 and TP251		105kHz ± 5kHz	Tape selector is metal position.
IPUT. t TP501 hen	TP501 TP502	VR201 VR202	580 mV	Tape selector is CrO_2 position.
IPUT. t TP101 25dB when	TP101 TP102	L201 L202	Maximum output.	Short the TP251 and TP252. Tape selector is metal position.
IPUT. t TP501 25dB when st with a	TAPE OUT	VR251 VR252	So that the record/playback frequency response is flat.	Tape selector is metal position.
	TAPE OUT	VR254 L202	So that the record/playback frequency response is flat (at least within the range in Fig. 4).	Tape selector is CrO_2 position.
		VR251 L201		
IPUT. t TP501 25dB when st with a	TAPE OUT	VR253		Tape selector is LN position.
	TAPE OUT		Confirm record/playback frequency response. If the frequency response is not within the range in Fig. 4, do the adjustment, over starting with step 11.	Tape selector is metal position.
	TAPE OUT	VR251	Confirm record/playback frequency response. If frequency response is not the same as for step 12-4, adjust while watching the balance of the two.	Tape selector is LN position.
NPUT. t TP501 and REC-PAUSE	TP501 TP502	VR201 VR202	580 mV	Tape selector is CrO_2 position.
NPUT. t TP501 and REC-PAUSE	TP501 TP502		580 mV ± 1dB	This confirmation should be done at each tape selector position.
NPUT. t TP501 and B when REC- h a 20Hz to	TAPE OUT		Confirm that record/playback frequency response is within the range in Fig. 5 and 6. If it is not within the range in Fig. 5 and 6, redo the adjustments on steps 11 and 12.	This confirmation should be done at each tape selector position under each of the following conditions, Dolby B and Dolby C on.
NPUT. t TP501 and IB when REC-		VR401 VR402	0 VU LED lights up.	

MECHANISM ADJUSTMENT AND CONFIRMATION

■ **HEAD**

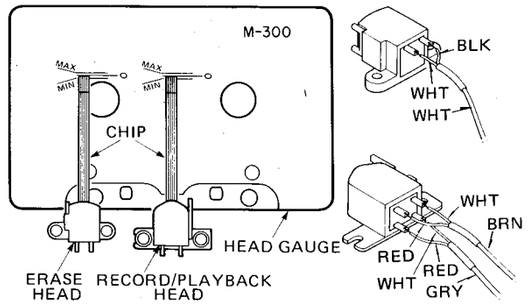
● **HEIGHT**

a) Attach the M-300 head gauge plate.
b) Inspect the height of the head with a adjustment chip attached to the gauge plate at playback mode.
c) The adjustment chip attached to the gauge plate should not hit the tape guide of record/playback and erase heads.



● **FRONT AND REAR POSITION**

a) Attach the M-300 head gauge plate.
b) Attach the adjustment chip attached to the gauge plate to the center of the head and read the scale on the plate.
c) The scale should be within MIN and MAX of the M-300 head gauge at both record/playback and erase heads.
d) If the scale is not within the specified range, adjust it by loosening the screw fixing each head.
e) After adjustment, apply screw lock paint.



■ **PINCH ROLLER**

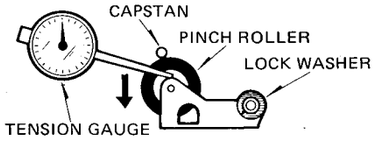
● **TAPE RUNNING**

a) Insert a mirror cassette tape and set to the playback mode.
b) The tape should not be curled at the tape guide of the record/playback and erase heads.

NOTES: Confirm that grease or foreign substance adhere to the rubber of the pinch roller, and that no flaw is on the pinch roller.

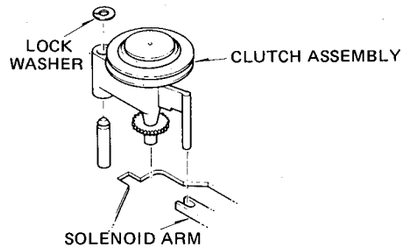
● **PINCH ROLLER PRESSURE**

a) With unit in playback mode, put a tension gauge as shown in the illustration and add the load to arrow direction and measure the value at which the rotation of the pinch roller stops.
b) Confirm that the load is between 250g and 350g when the pinch roller leaves the capstan.



■ **CLUTCH ASSEMBLY**

a) Confirm that clutch assembly operates smoothly after replacing.
b) Insert the C-60 tape and when stop button is depressed at fast forward/rewind, clutch assembly return to the neutral position.



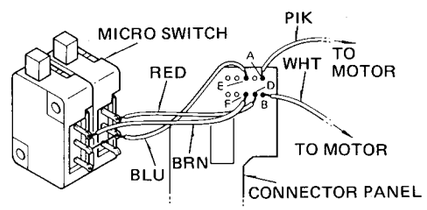
■ **MICRO SWITCH**

● **CASSETTE PACK DETECT SWITCH**

a) Confirm that the switch operates when the cassette pack (the cassette pack is measurement 63.5 mm or a MAZ-0184-C gauge) is set to the right position.
b) Confirm that the switch changes to off when you return the switch (SW. ARM) at on position slowly.

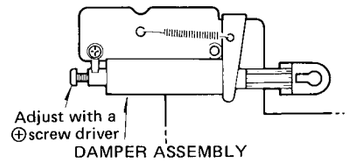
● **MIS-ERASE PROTECT SWITCH**

a) Confirm that the switch operates with a cassette tape which has an actuator for mis-erase protect (a tape which is measurement 62.9 mm or MAZ-0184-C gauge.)
b) Confirm that the switch changes to off when you return the switch (REC. ARM) at on position.



■ **AIR DAMPER**

a) Confirm that cassette lid opens smoothly and that no unusual sound is heard while opening or closing the cassette lid when the eject button is depressed.
b) Confirm that the eject lever does not touch the chassis or the damper, etc. and it operates smoothly.
c) Confirm that the eject button can't be depressed during playback.
d) Adjust the screw of the damper with a ⊕ screw driver so that the speed which is necessary for the cassette support to fully open with the eject lock arm becomes more than one second.



■ **BELT**

Confirm that the belt does not fall off when you force the fly wheel to stop with your hand while it is rotating.

TIMING CHART

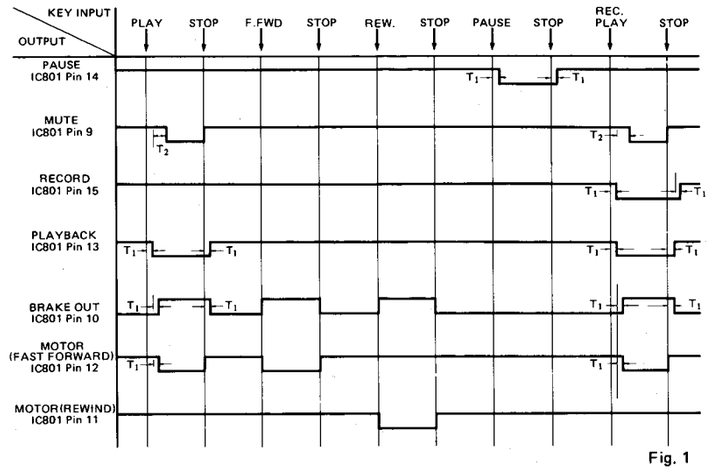


Fig. 1

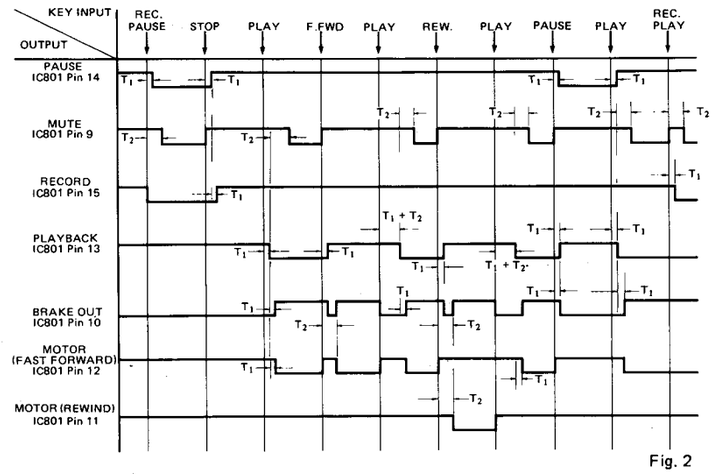


Fig. 2

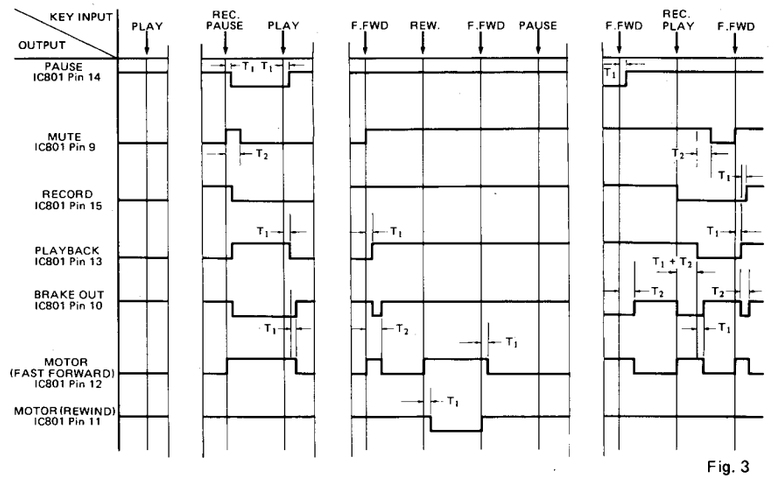


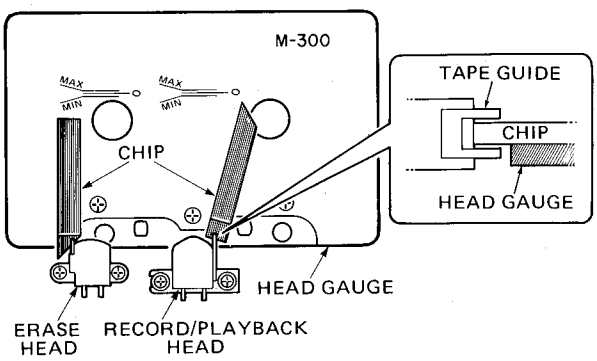
Fig. 3

MECHANISM ADJUSTMENT AND CONFIRMATION

■ HEAD

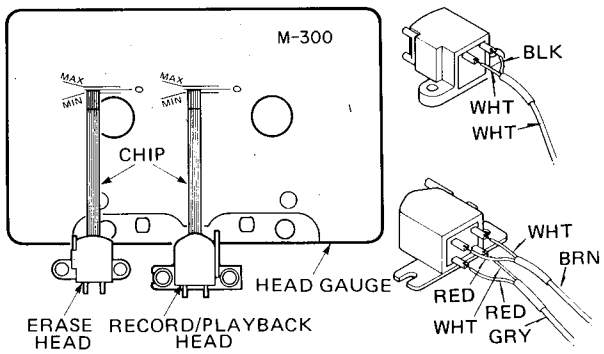
• HEIGHT

a) Attach the M-300 head gauge plate.
b) Inspect the height of the head with a adjustment chip attached to the gauge plate at playback mode.
c) The adjustment chip attached to the gauge plate should not hit the tape guide of record/playback and erase heads.



• FRONT AND REAR POSITION

a) Attach the M-300 head gauge plate.
b) Attach the adjustment chip attached to the gauge plate to the center of the head and read the scale on the plate.
c) The scale should be within MIN and MAX of the M-300 head gauge at both record/playback and erase heads.
d) If the scale is not within the specified range, adjust it by loosening the screw fixing each head.
e) After adjustment, apply screw lock paint.



■ PINCH ROLLER

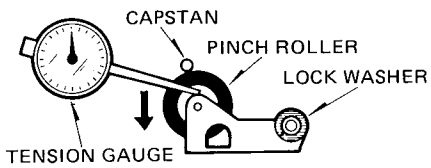
• TAPE RUNNING

a) Insert a mirror cassette tape and set to the playback mode.
b) The tape should not be curled at the tape guide of the record/playback and erase heads.

NOTES: Confirm that grease or foreign substance adhere to the rubber of the pinch roller, and that no flaw is on the pinch roller.

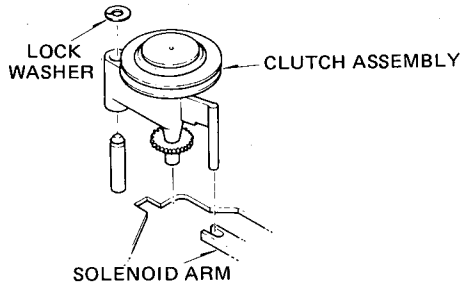
• PINCH ROLLER PRESSURE

a) With unit in playback mode, put a tension gauge as shown in the illustration and add the load to arrow direction and measure the value at which the rotation of the pinch roller stops.
b) Confirm that the load is between 250g and 350g when the pinch roller leaves the capstan.



■ CLUTCH ASSEMBLY

a) Confirm that clutch assembly operates smoothly after replacing.
b) Insert the C-60 tape and when stop button is depressed at fast forward/rewind, clutch assembly return to the neutral position.



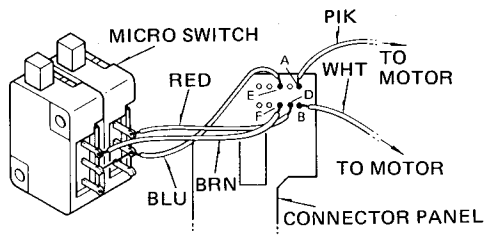
■ MICRO SWITCH

• CASSETTE PACK DETECT SWITCH

a) Confirm that the switch operates when the cassette pack (the cassette pack is measurement 63.5 mm or a MAZ-0184-C gauge) is set to the right position.
b) Confirm that the switch changes to off when you return the switch (SW. ARM) at on position slowly.

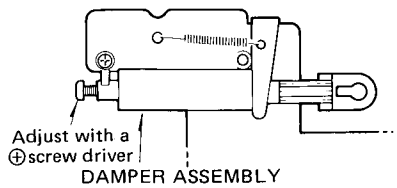
• MIS-ERASE PROTECT SWITCH

a) Confirm that the switch operates with a cassette tape which has an actuator for mis-erase protect (a tape which is measurement 62.9 mm or MAZ-0184-C gauge.)
b) Confirm that the switch changes to off when you return the switch (REC. ARM) at on position.



■ AIR DAMPER

a) Confirm that cassette lid opens smoothly and that no unusual sound is heard while opening or closing the cassette lid when the eject button is depressed.
b) Confirm that the eject lever does not touch the chassis or the damper, etc. and it operates smoothly.
c) Confirm that the eject button can't be depressed during playback.
d) Adjust the screw of the damper with a ⊕ screw driver so that the speed which is necessary for the cassette support to fully open with the eject lock arm becomes more than one second.



■ BELT

Confirm that the belt does not fall off when you force the fly wheel to stop with your hand while it is rotating.

TIMING CHART

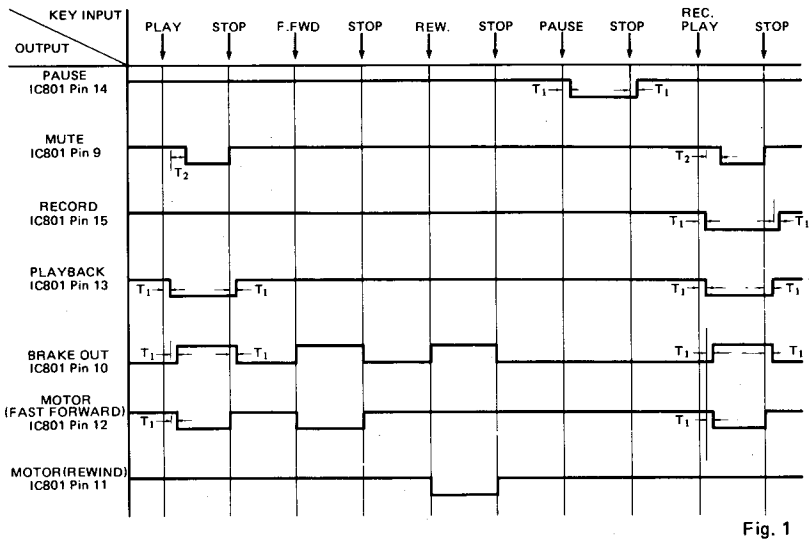


Fig. 1

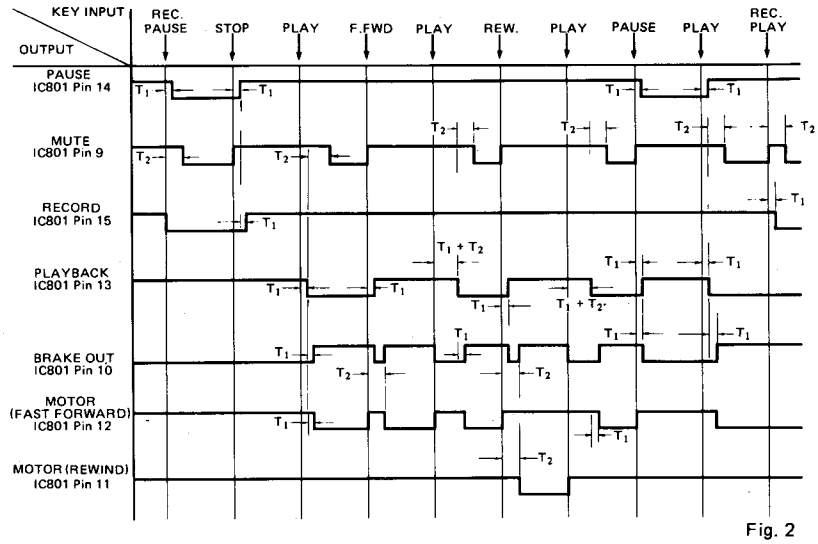


Fig. 2

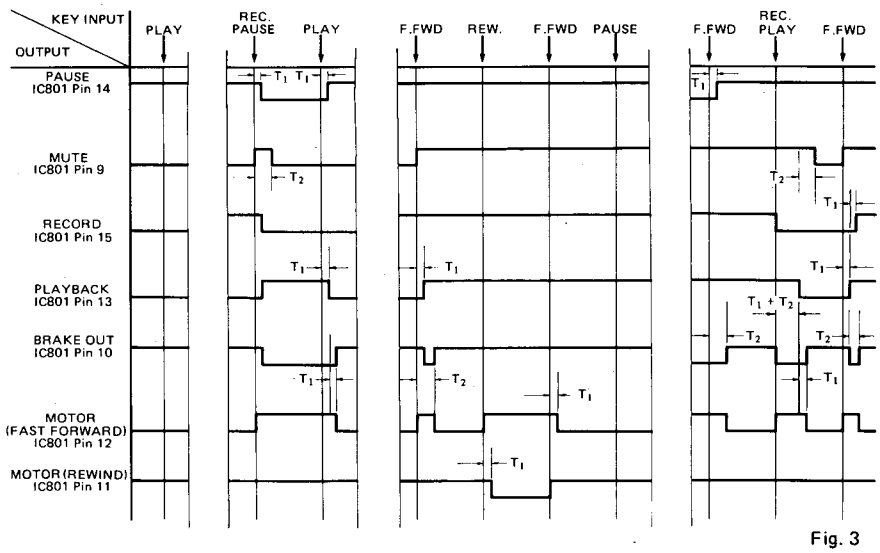


Fig. 3

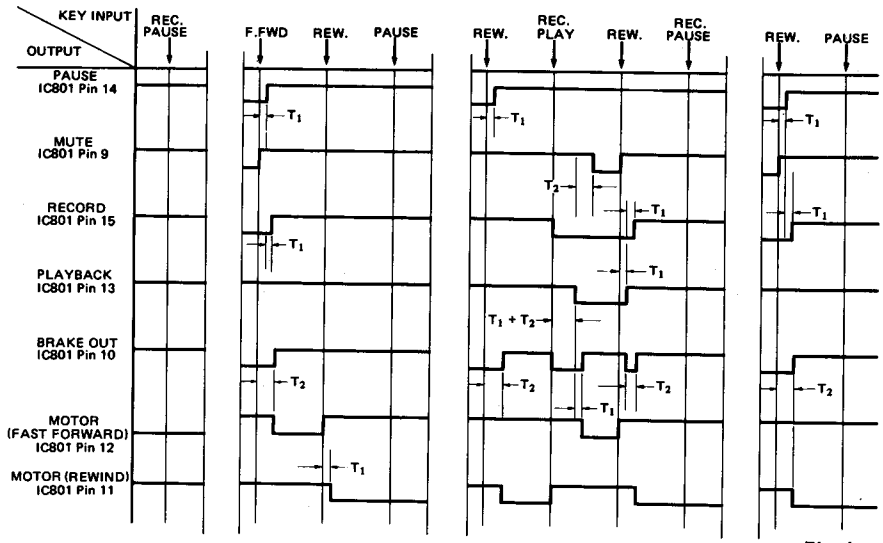


Fig. 4

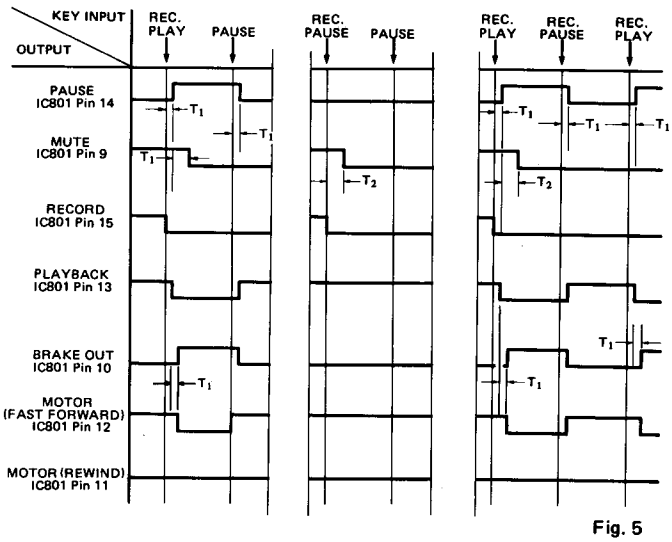
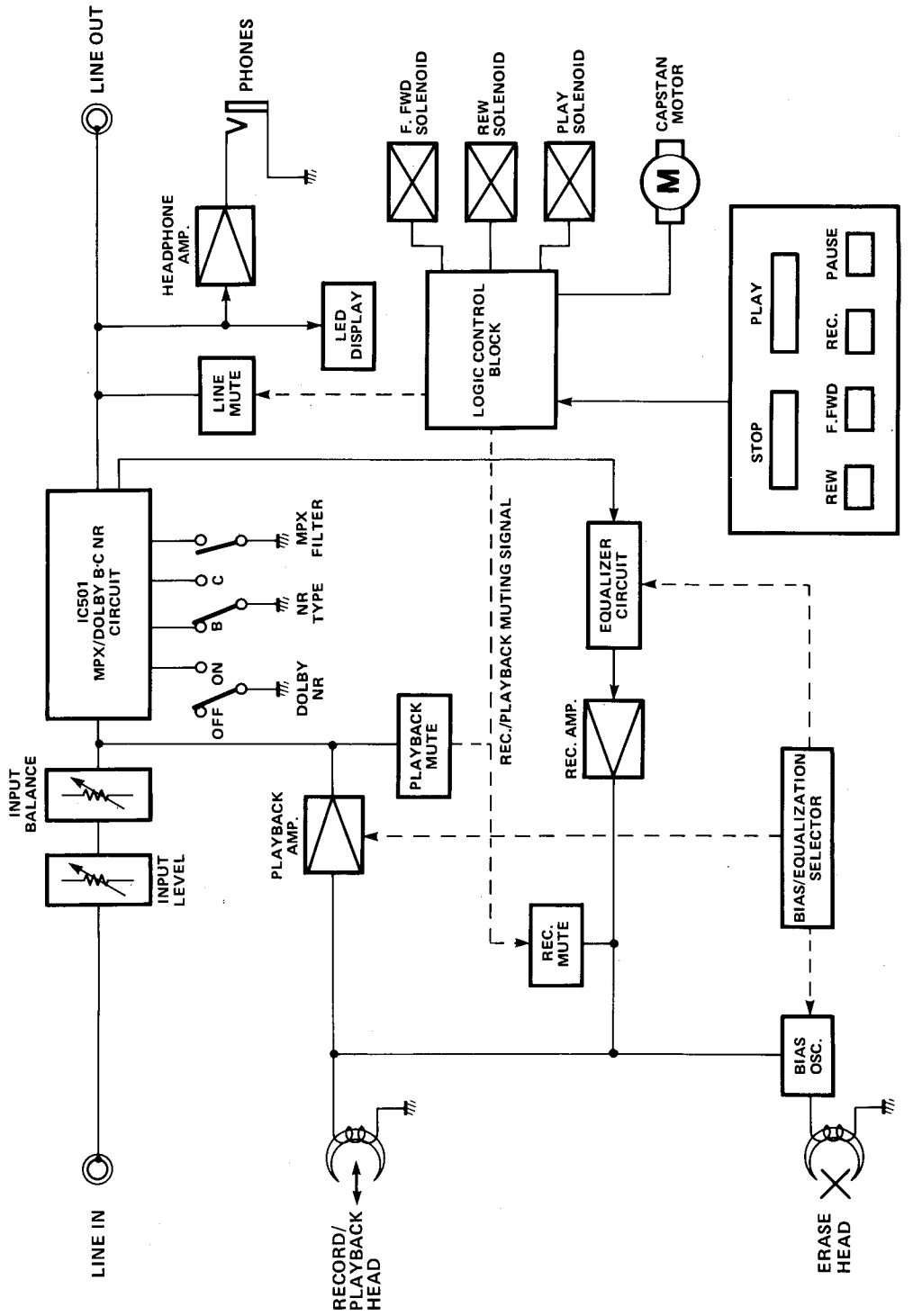


Fig. 5

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

T_1 = 61 (msec)
T_2 = 400 (msec)

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

- **PLAYBACK MODE (Rch)**

The signal from the playback head is amplified by the playback amplifier (Q102, Q104, Q106, Q108 and Q110), input to pin 4 of the MPX/dolby NR IC (IC502), then split into two parts after passing through the MPX/dolby NR circuit and being output from pin 24. One part is output from the output terminal, while the other is amplified by the headphones amplifier and output to the headphone jack. During playback, the bias/equalization selector is switched to equalization for the playback amplifier.

- **RECORDING MODE (Lch)**

The line input signal is adjusted by the input level and input balance controls, then input to pin 1 of the MPX/dolby NR IC (IC501). The signals are output from pin 14 after passing through the MPX/dolby NR circuit, then passed through the equalizer and the record amplifier (IC201). Finally, the signals modulate the bias current which is applied to the record head by the bias oscillator.

- **MPX/DOLBY NR CIRCUIT**

The MPX filter circuit is turned on and off by the MPX filter switch. When it is off, the signals bypass the circuit. The dolby circuit is turned on and off by the dolby NR switch, and selected B and C types by the dolby NR type selector. When the circuit is on and type selector is B position, B-type dolby equalization is applied so that the signal is compressed during recording and expanded during playback.

- **MUTING**

In the playback and record modes, the muting control signals are output from pins 9 (MUT) and 15 (REC) of the deck control IC (IC801) and applied to Q55 and Q713, which produce the muting signals for the playback and recording modes.

The line muting signal for the stop mode and for cutting out shock noise when the power is turned on or off is output by Q51.

1. RECORDING MUTE (PLAYBACK MODE)

When the play button is pressed, the muting signal for the playback mode (which cuts the recording signal) is output. This turns on Q714, which turns on Q711 (for the left channel) and Q712 (for the right channel) to mute the recording signal.

2. PLAYBACK MUTE (RECORDING MODE)

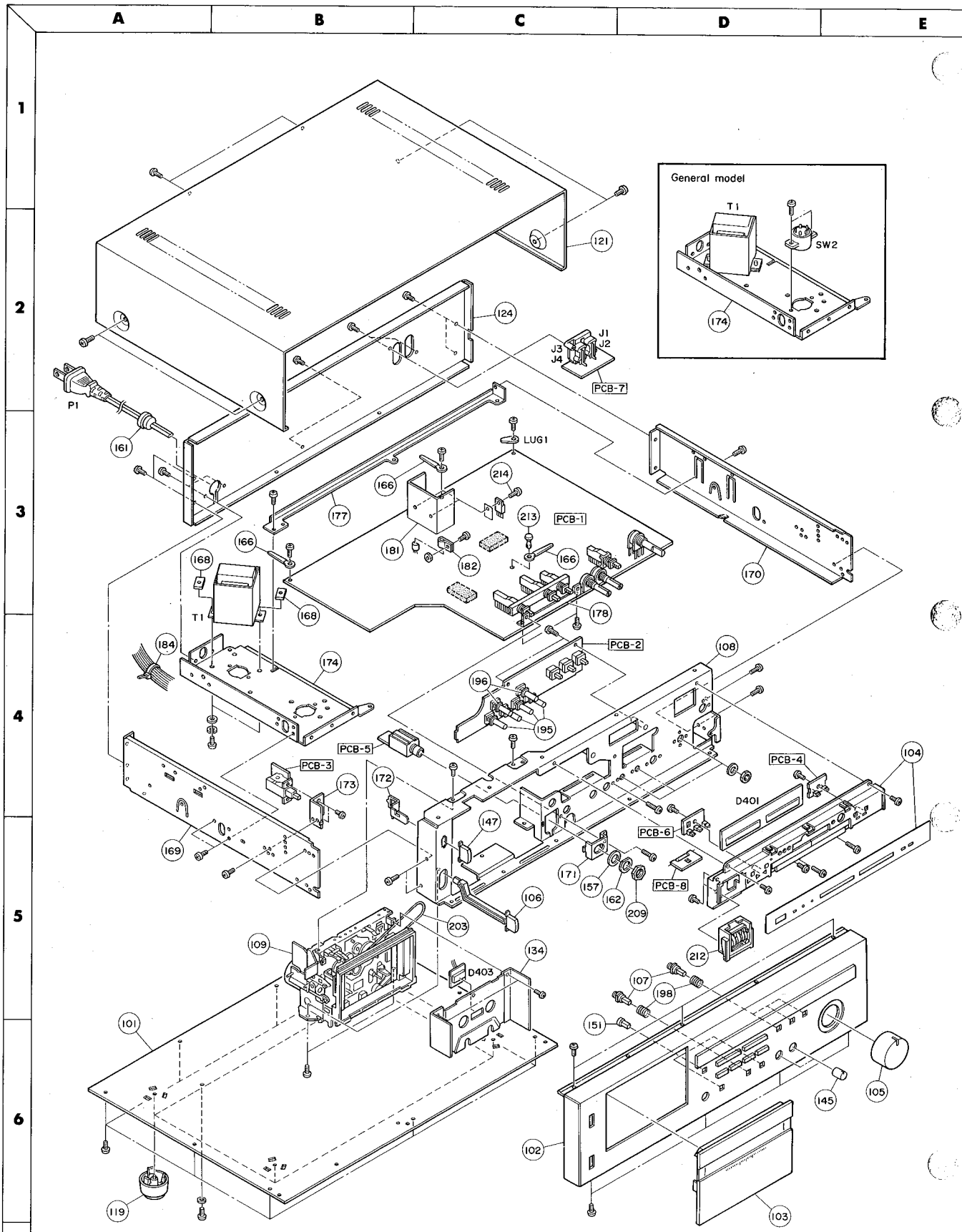
When the rec. button is pressed, the muting signal for the record mode (which cuts the playback signal) is output. This turns on Q715, causing Q701, Q703, Q705 and Q707 to go on to mute the playback signal on the left channel; and causing Q702, Q704, Q706, and Q708 to go on to mute the playback signal on the right channel.

At the same time, Q716 goes on to cut the bias current.

3. LINE MUTE (STOP MODE)

The line muting signal is output when the stop button is pressed or the power turned on or off. This signal causes Q53 (left channel) and Q54 (right channel) to go on, muting the line signal.

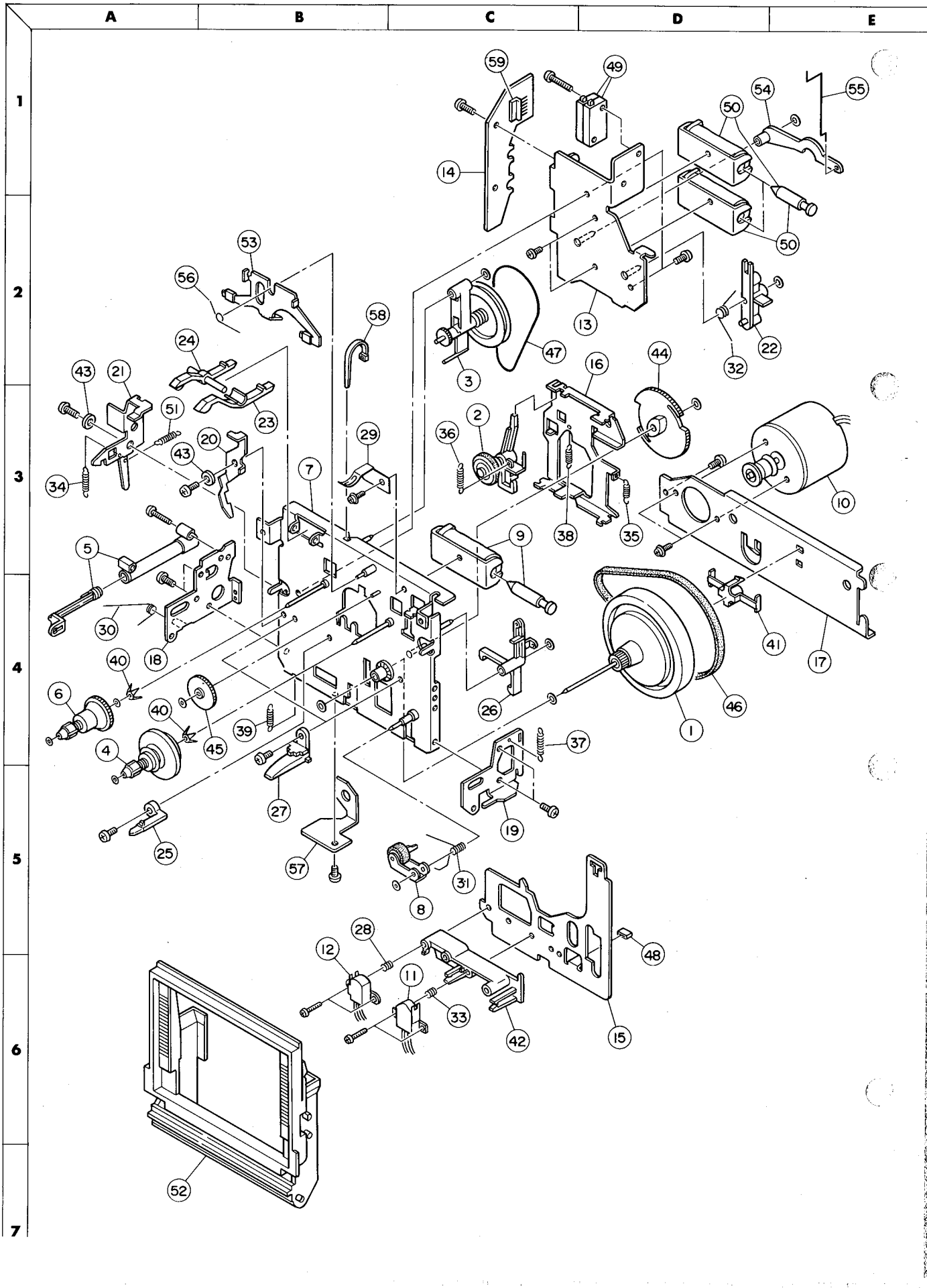
GENERAL UNIT EXPLODED VIEW



GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A423-CD91CA	Cabinet Bottom Assembly
102	A443-CD91CA	Front Panel Assembly (Includes: Cassette Control Buttons)
103	A452-CD91CA	Cassette Door Assembly
104	A514-CD91CA	Plate Assembly, LED Level Display
105	A630-CD91CA	Knob Assembly, Input Level
106	A662-CD91CB	Push Button Assembly, Power
107	A662-CD91CC	Push Button Assembly, Tape Selectors, Dolby NR System Selectors, MPX Filter
108	B211-CD91CA	Chassis Assembly, Front
109	3112-10802	Cassette Tape Recorder Mechanical Assembly
119	1319-0139	Foot
121	1414-01202	Cabinet Top
124	1424-07011	Cabinet Back (U.S. & Canadian models)
124	1424-07008	Cabinet Back (General model)
134	1514-08802	Dressing Plate
145	1634-02701	Knob, Bias Fine Trim, Input Balance
147	1662-05501VN	Push Button, Eject
151	1662-05401VN	Push Button, Reset
157	2111-1356	Felt, Headphones
161	2114-415027	Bushing, AC Line Cord
162	2114-72167	Bushing, Headphones
166	2218-7001	Holding Bracket, Lead Wires
168	2219-7091	Bracket, Power Transformer
169	2219-7655	Bracket, Left
170	2219-7813	Bracket, Right
171	2219-7809	Bracket, Headphones
172	2219-7810	Bracket, Eject
173	2219-7811	Bracket, Power Switch
174	2219-7812	Bracket, Power Transformer
177	2219-7821	Bracket, PCB-1 Mounting
178	2219-7899	Bracket, PCB-1 Mounting
181	2222-7146	Heat Sink, PCB-1
182	2222-7067	Heat Sink, PCB-1
184	2240-7120	Holder, Lead Wires
195	2601-7113	Shaft, Rew., F.FWD, Rec., Pause
196	2601-7112	Shaft, Stop, Play
198	2651-2101705	Spring, Tape Selectors, Dolby NR System Selectors, MPX Filter
203	2642-01444	Belt, Counter
209	2440-61	Special Nut, Headphones
212	3131-445001	Tape Counter
213	2459-3003511	Rivet, Holding Bracket
214	2320-7004	Special Screw, Transistors

CASSETTE MECHANISM EXPLODED VIEW



CASSETTE MECHANISM PARTS LIST

Ref. No.	Part No.	Description
1	FP467-12	Flywheel Assembly
2	FP469-12	Idler Assembly
3	FP470-11	Clutch Assembly
4	FR12N-11	Take-up Reel Assembly
5	FP472-11	Damper Assembly
6	FR12P-11	Supply Reel Assembly
7	F011-132	Chassis
8	F014-053	Pinch Roller
9	PKA16108	Solenoid
10	F064-093	Motor
11	F029-137	Head, Record/Playback
12	F030-059	Head, Erase
13	F214-015	Bracket, Solenoid
14	FP11N-11	Connector Panel
15	FR345-14	Head Base
16	FR346-11	Assist Base
17	FR347-13	Bracket, Motor
18	FR349-17	Bracket, Damper
19	FR350-15	Bracket, Door
20	FR352-11	Safety Lever
21	FC11H-14	Eject Lock Arm
22	FR355-14	FF Solenoid Arm
23	FR356-14	Switch Arm
24	FD17T-13	Record Arm
25	FR358-13	Reference Guide
26	FR359-12	Play Solenoid Arm
27	FR360-12	Cassette Guide
28	FK572-12	Spring, Azimuth
29	FK551-13	Spring, Cassette
30	FK568-11	Spring, Door
31	FK569-13	Spring, Pinch Roller
32	FK570-12	Spring, Solenoid Bracket
33	FK572-11	Spring, Azimuth
34	FK573-11	Spring, Eject Lock Arm
35	FK574-12	Spring, Assist Base
36	FK575-11	Spring, Play Idler
37	FK576-12	Spring, Play Solenoid Arm
38	FK577-12	Spring, Assist Base
39	FK578-13	Spring, Head Base Hold
40	FK579-14	Spring, Back Tension
41	FM281-12	Spacer, Flywheel
42	FM283-14	Spacer, Head
43	FM296-11	Spacer
44	FN153-11	Play Gear
45	FN154-14	Idler Gear
46	FP462-11	Main Belt
47	FP463-11	Sub Belt
48	FP464-11	Cushion
49	FE173-11	Micro Switch
50	PKA16106	Solenoid
51	FK11C-19	Spring, Eject Lock Arm
52	F027-054	Cassette Support
53	F028-025	Brake
54	FD12W-12	Brake Arm
55	FK11Y-13	Rod, Brake Arm
56	FK12A-12	Spring, Brake
57	FC25D-11	Belt Guide
58	FH126-11	Holder
59	KY130-11	Connector

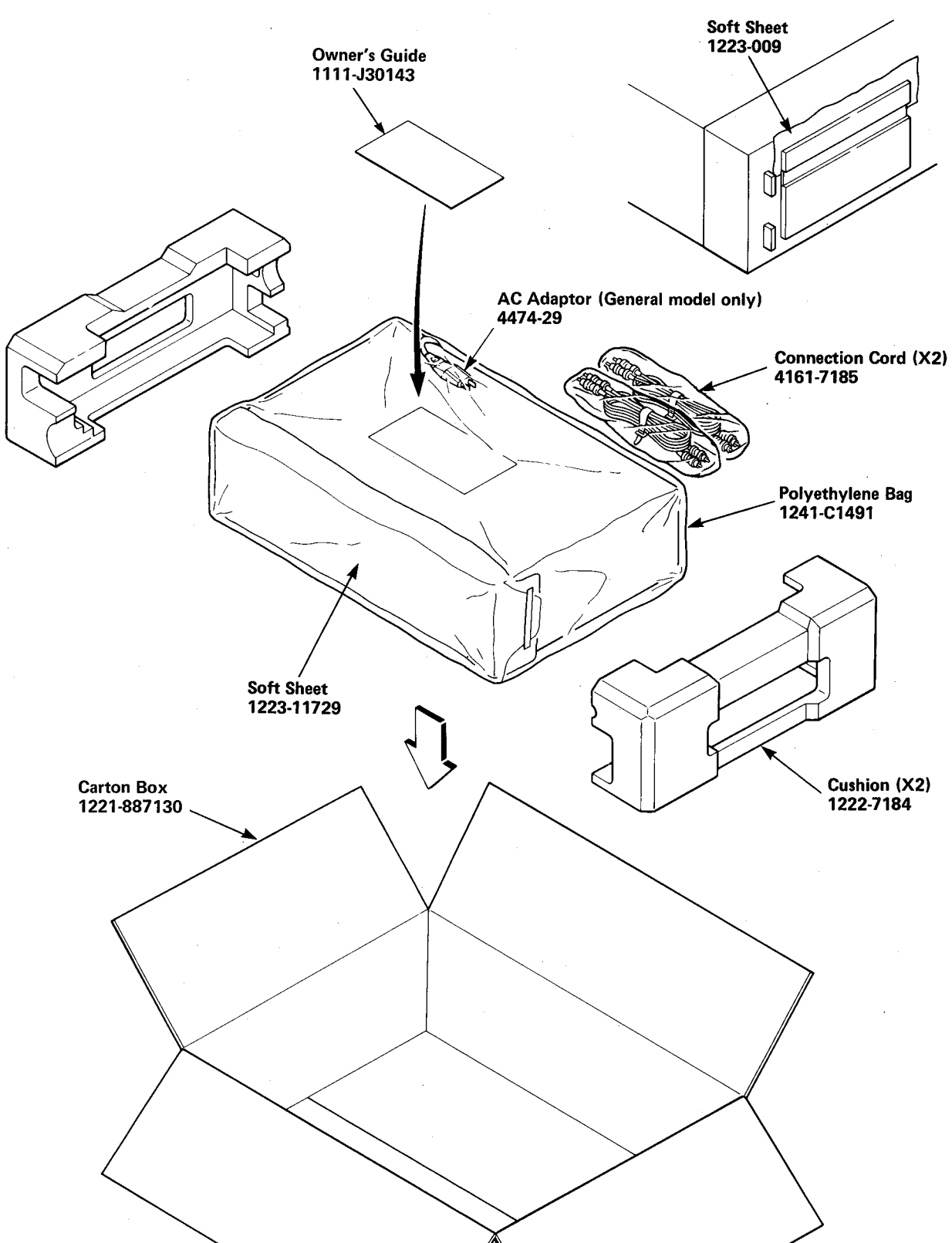
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	CHASSIS MISCELLANEOUS	
P1	4161-0487	AC Line Cord (U.S. & Canadian models)
P1	4161-7256	AC Line Cord (General model)
T1	5584-701376	Power Transformer (U.S. & Canadian models)
T1	5584-702392	Power Transformer (General model)
SW2	4411-104736	Rotary Switch, Voltage Selector (General model only)
F1, 2	5732-10202	Fuse, T1A, 250V (General model only)
D401	5623-LT1087	LED Display Assembly, Level Meter
D403	5637-SLF301C	L.E.D., SLF301C, Yellow, Cassette Illuminator
J401	4163-71065	Connector with Lead Wire, 8-Pin
J801	4163-103502	Connector with Lead Wire, 10-Pin
J802	4163-082002	Connector with Lead Wire, 8-Pin
JM151	4242-034602	Jumper Lead, 3-Wire
JM152, 501	4242-031307	Jumper Lead, 3-Wire
JM301	4242-035502	Jumper Lead, 3-Wire
JM502	4242-033007	Jumper Lead, 3-Wire
JM503	4242-031802	Jumper Lead, 3-Wire
JM803	4242-053507	Jumper Lead, 5-Wire
LUG1	4211-4	Lug Terminal
	PCB-1 MAIN P.C. BOARD	
	RESISTORS	
R13, 14, 16, 264	5102-4R74715	4.7Ω, ±2%, 1/4W, Fuse
R17	5102-2205114	22Ω, ±5%, 1/2W, Fuse
R117, 118, 119, 120	5174-822381	8.2kΩ, ±1%, 1/4W, Metal
R121, 122	5174-133381	13kΩ, ±1%, 1/4W, Metal
R317, 318, 319, 320, 839	5102-1004715	10Ω, ±2%, 1/4W, Fuse
R523, 524	5174-512381	5.1kΩ, ±1%, 1/4W, Metal
R525, 526	5174-153381	15kΩ, ±1%, 1/4W, Metal
R555, 556	5174-563381	56kΩ, ±1%, 1/4W, Metal
R733	5102-2204715	22Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR101, 102	5101-20371920	20kΩB
VR151, 152	5113-50380122	50kΩA, Input Level
VR153, 154	5113-10489122	100kΩMN, Input Balance
VR201, 202	5101-20271920	2kΩB
VR251, 252	5101-6838474	68kΩB
VR253, 254	5101-10371920	10kΩB
VR255	5113-1027921	1kΩB, Bias Fine Trim
VR401, 402	5101-30371920	30kΩB
	CAPACITORS	
C2, 3	5361-473ZF	0.047μF, +80% −20%, 50V, Ceramic
C4, 5	5345-228D041	2200μF, ±20%, 25V, Electrolytic
C6, 7, 10, 301, 302, 303, 304, 565, 566	5345-226C041	22μF, ±20%, 16V, Electrolytic
C8, 9	5345-108C041	1000μF, ±20%, 16V, Electrolytic
C51	5345-226F041	22μF, ±20%, 50V, Electrolytic
C52	5345-226D041	22μF, ±20%, 25V, Electrolytic
C53	5345-337D041	330μF, ±20%, 25V, Electrolytic
C54	5345-225F041	2.2μF, ±20%, 50V, Electrolytic
C55	5345-335F0951	3.3μF, ±20%, 50V, Electrolytic
C101, 102	5353-101534	100pF, ±5%, 500V, Mica
C103, 104	5345-226C0226	22μF, ±20%, 16V, Electrolytic
C105, 106	5345-227A0951	220μF, ±20%, 6.3V, Electrolytic
C107, 108, 109, 110	5359-3627851	3600pF, ±2%, 100V, Polypropylene
C111, 112	5345-106C0226	10μF, ±20%, 16V, Electrolytic
C113, 114, 225, 226, 515, 516, 567, 568, 702, 807	5345-107C041	100μF, ±20%, 16V, Electrolytic
C115, 116	5359-1815851	180pF, ±5%, 100V, Polypropylene
C117, 118	5359-3315851	330pF, ±5%, 100V, Polypropylene
C119, 120	5359-8215851	820pF, ±5%, 100V, Polypropylene

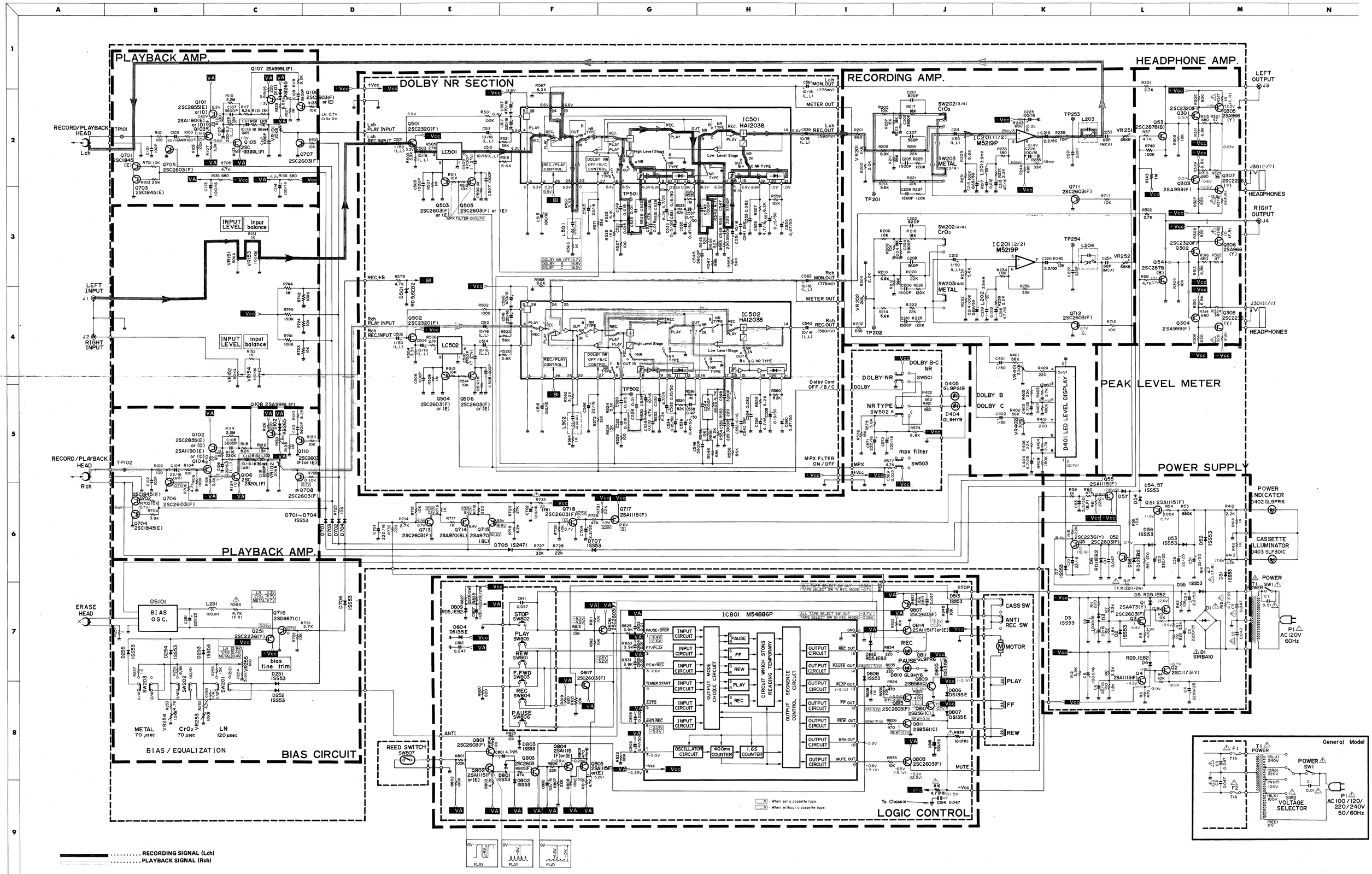
Ref. No.	Part No.	Description
C165, 166, 215, 216	5345-476C041	47μF, ±20%, 16V, Electrolytic
C201, 202	5359-3915851	390pF, ±5%, 100V, Polypropylene
C207, 208	5359-4315851	430pF, ±5%, 100V, Polypropylene
C211, 212, 213, 214, 501, 502	5345-105F0951	1μF, ±20%, 50V, Electrolytic
C219, 220	5342-225D0951	2.2μF, ±20%, 25V, Electrolytic
C221, 222	5359-2215851	220pF, ±5%, 100V, Polypropylene
C229, 230	5359-6815851	680pF, ±5%, 100V, Polypropylene
C251	5345-227D041	220μF, ±20%, 25V, Electrolytic
C253, 254	5353-680534	68pF, ±5%, 500V, Mica
C401, 402	5345-105-50	1μF, +75% −10%, 50V, Electrolytic
C503, 504, 511, 512, 513, 514, 539, 540, 561, 562	5345-106C0951	10μF, ±20%, 16V, Electrolytic
C507, 508	5359-1027851	1000pF, ±2%, 100V, Polypropylene
C509, 510	5359-4727851	4700pF, ±2%, 100V, Polypropylene
C517, 518, 701	5345-227C041	220μF, ±20%, 16V, Electrolytic
C519, 520, 521, 522	5359-153771	0.015μF, ±2%, 50V, Polypropylene
C523, 524, 551, 552, 563, 564	5345-L106M16	10μF, ±20%, 16V, Electrolytic
C529, 530, 555, 556, 801	5345-475D041	4.7μF, ±20%, 25V, Electrolytic
C531, 532, 533, 534, 557, 558	5345-L154M50	0.15μF, ±20%, 50V, Electrolytic
C535, 536, 537, 538, 559, 560	5345-L474M50	0.47μF, ±20%, 50V, Electrolytic
C547, 548	5359-3327851	3300pF, ±2%, 100V, Polypropylene
C549, 550	5359-3927851	3900pF, ±2%, 100V, Polypropylene
C704	5345-225F041	2.2μF, ±20%, 50V, Electrolytic
C802	5345-336C041	33μF, ±20%, 16V, Electrolytic
C806	5345-474F041	0.47μF, ±20%, 50V, Electrolytic
C815	5345-337C041	330μF, ±20%, 16V, Electrolytic
	INTEGRATED CIRCUITS	
IC201	5652-μPC4558C	μPC4558C
IC501, 502	5652-HA12038	HA12038
IC801	5654-M54886P	M54886P
	TRANSISTORS	
Q1	5611-473(Y)	2SA473(Y) (w/Insulator)
Q2	5613-1173(Y)	2SC1173(Y) (w/Insulator)
Q3, 52, 705, 706, 707, 708, 711, 712, 713, 718, 801, 803, 806, 807, 808, 813	5613-2603(F)	2SC2603(F)
Q4, 51, 55, 717	5611-1115(F)	2SA1115(F)
Q5, 251, 307, 308	5613-2236(Y)	2SC2236(Y)
Q53, 54	5613-2878(B)	2SC2878(B)
Q101, 102	5613-2855(E)	2SC2855(E) or 2SC2855(D)
Q103, 104	5611-1190(E)	2SA1190(E) or 2SA1190(D)
Q105, 106, 301, 302, 501, 502	5613-2320(F)	2SC2320(F)
Q107, 108, 303, 304	5611-999(F)	2SA999(F)
Q109, 110, 503, 504, 505, 506	5613-2603(F)	2SC2603(F) or 2SC2603(E)
Q305, 306	5611-966(Y)	2SA966(Y)
Q701, 702, 703, 704	5613-1845(E)	2SC1845(E)
Q714, 715	5611-970(BL)	2SA970(BL)
Q716	5614-667(C)	2SD667(C)
Q802, 804, 805, 814	5611-1115(F)	2SA1115(F) or 2SA1115(E)
Q809, 810, 811	5612-561(C)	2SB561(C)
	DIODES	
D1	5685-1F	Bridge Silicon, S1RBA10
D2, 3, 7, 51, 52, 53, 54, 55, 56, 57, 251, 252, 253, 254, 255, 701, 702, 703, 704, 706, 707, 801, 802, 803, 808, 813	5636-1SS53	1SS53
D4, 5	5635-RD9R1EB2	Zener, RD9.1EB2
D6	5635-RD11EB2	Zener, RD11EB2

Ref. No.	Part No.	Description
D58	5635-RD12EB2	Zener, RD12EB2
D101, 102	5641-KB265	Varistor, KB265
D501	5635-RD5R6EB2	Zener, RD5.6EB2
D705	5636-1S2471	1S2471
D804, 805, 806, 807	5632-DS135E	DS135E
D809, 812	5635-RD5R1EB2	Zener, RD5.1EB2
	COILS	
L201, 202	5932-70122	3.3mH
L203, 204	5932-70117	
L251	5995-101325	100μH
L501, 502	5932-70217	
	MISCELLANEOUS	
LC501, 502	5214-46	LC Components
OS101	6171-1201	Complex, Osc.
SW201, 202, 203	4431-03107151	Push Switch, Tape Selectors
P10	4443-027114	Connector, 2-Pin
P152, 501, 502	4443-030185	Connector, 3-Pin
P401, 402	4443-037114	Connector, 3-Pin
P801	4443-107114	Connector, 10-Pin
P803	4443-050185	Connector, 5-Pin
JM701	4242-031302	Jumper Lead, 3-Wire
	2132-7048	Spacer, D6
	2132-7049	Spacer, R17
	4472-414	Fuse Holder (x4) (General model only)
	PCB-2 CONTROL SWITCHES P.C. BOARD	
	CAPACITORS	
C403, 404	5345-475D041	4.7μF, ±20%, 25V, Electrolytic
C571, 572	5345-227C041	220μF, ±20%, 16V, Electrolytic
	MISCELLANEOUS	
SW501, 502, 503	4431-A027136	Push Switch, NR ON/OFF, NR Type, MPX Filter
SW801, 802, 803, 804, 805, 806	4431-01010170	Push Switch, Rew., Stop, F.FWD, Rec., Play, Pause
	PCB-3 POWER SWITCH P.C. BOARD	
C1	5361-1030419	Capacitor, 0.01μF, +100% −0%, AC125V, Ceramic (U.S. & Canadian models)
C1	5352-1030958	Capacitor, 0.01μF, ±20%, AC250V, Metalized Polyester (General model)
SW1	4431-A01056	Push Switch, Power
	PCB-4 DOLBY B·C NR INDICATORS P.C. BOARD	
D404	5637-GL9HY9	L.E.D., GL9HY9, Yellow, Dolby C
D405	5637-GL9PG19	L.E.D., GL9PG19, Green, Dolby B
	PCB-5 HEADPHONE JACK P.C. BOARD	
J301	4451-00141	Jack, Headphones
	PCB-6 POWER, REC AND PAUSE INDICATORS P.C. BOARD	
D402, 811	5637-GL9PR6	L.E.D., GL9PR6, Red, Power, Rec.
D810	5637-GL9HY6	L.E.D., GL9HY6, Yellow, Pause
	PCB-7 JACK P.C. BOARD	
J1, 2, 3, 4	4484-31	4-Pin Jack, Line Input, Line Output
	PCB-8 REED SWITCH P.C. BOARD	
SW807	4466-713	Reed Switch, Auto Stop

PACKAGE

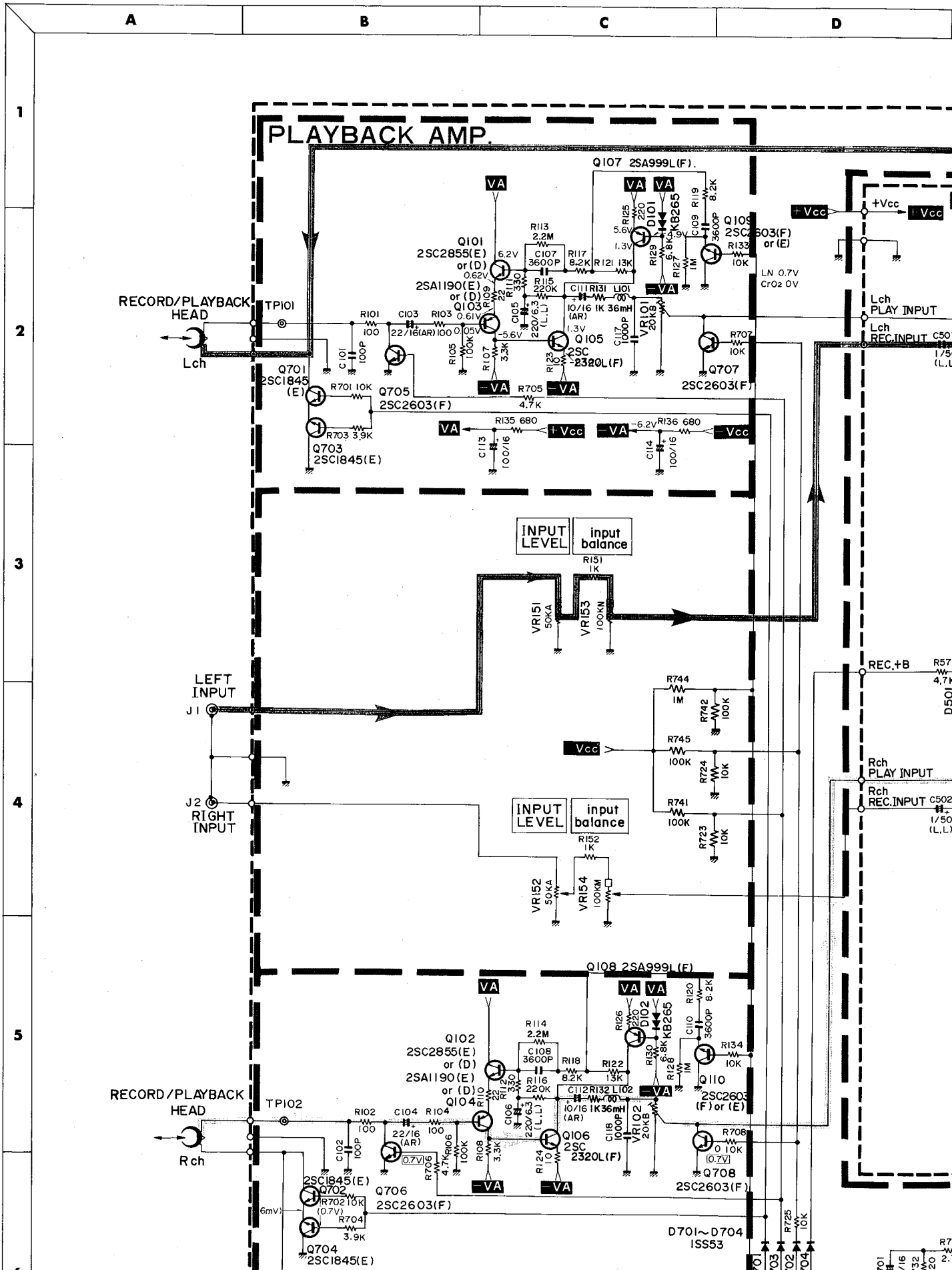

Owner's Guide
1111-J30143
Soft Sheet
1223-009
AC Adaptor (General model only)
4474-29
Connection Cord (X2)
4161-7185
Polyethylene Bag
1241-C1491
Soft Sheet
1223-11729
Cushion (X2)
1222-7184
Carton Box
1221-887130

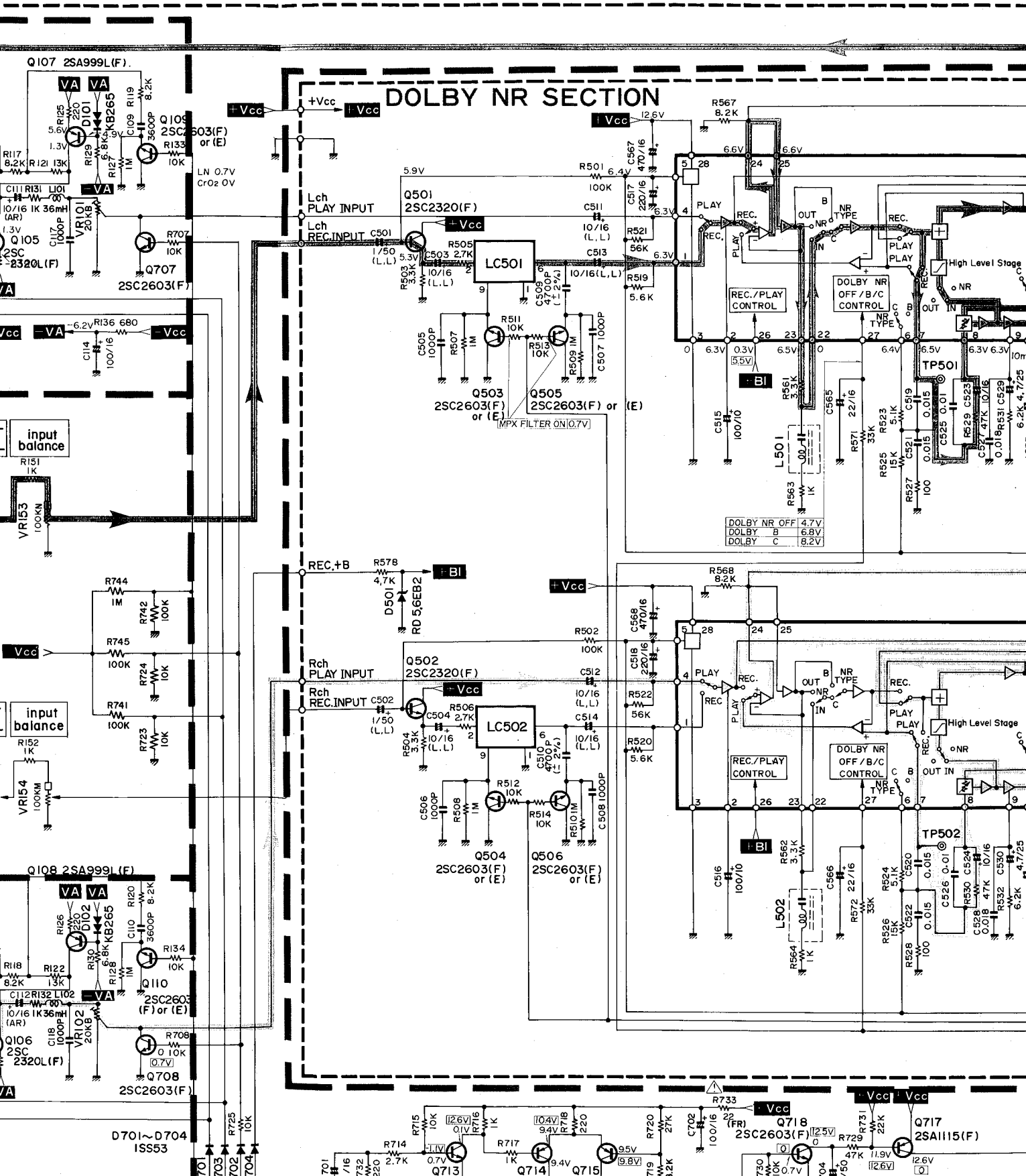
SCHEMATIC DIAGRAM

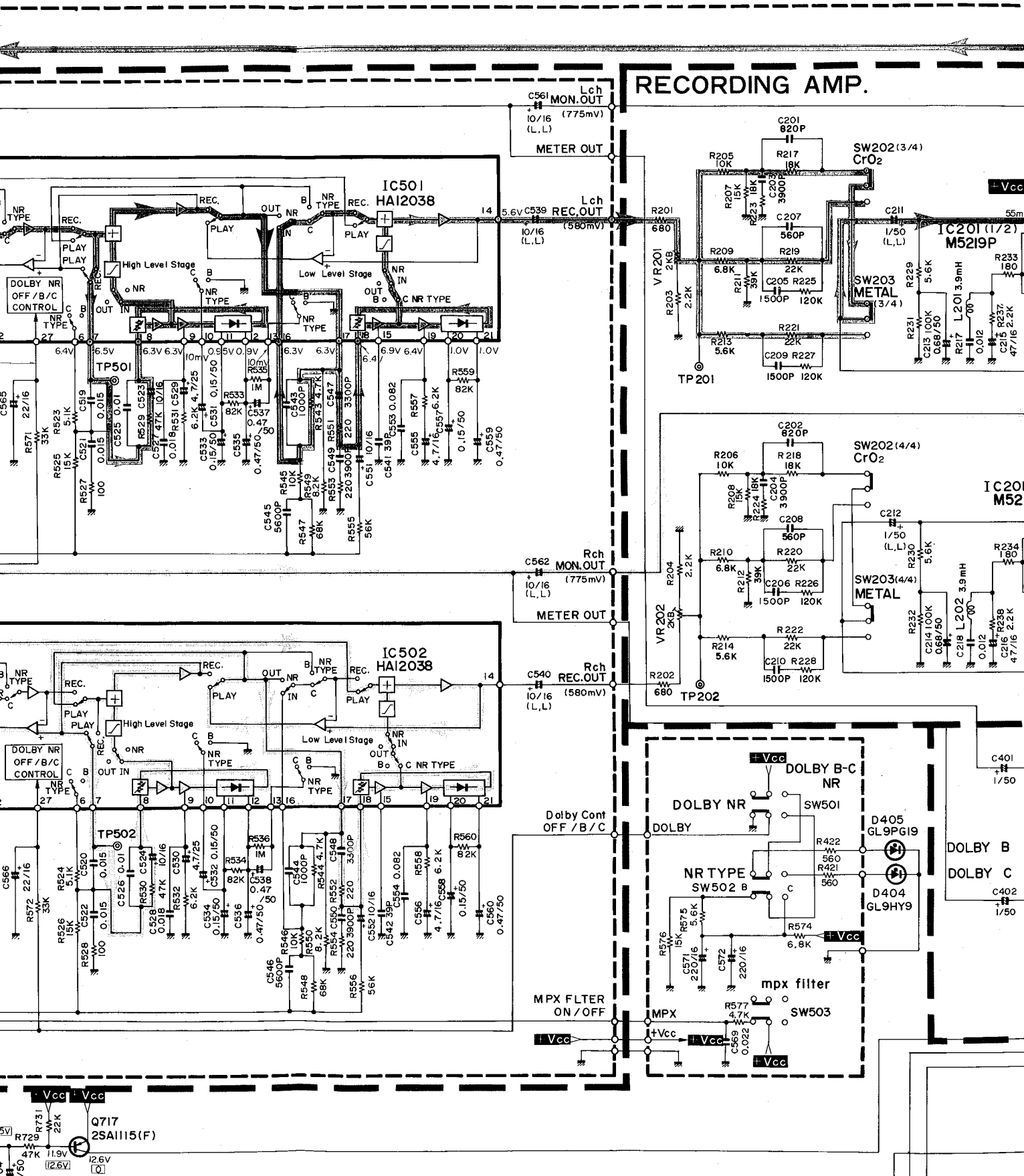


1. ALL RESISTANCES VALUES ARE IN Ω.
   kΩ = 1000Ω, MΩ = 1000 kΩ
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = μμF
4. V: DC VOLTAGE AT NO SIGNAL.
   . . . V STOP MODE
   (. . . V) PLAYBACK MODE
   [. . . V] RECORDING MODE
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

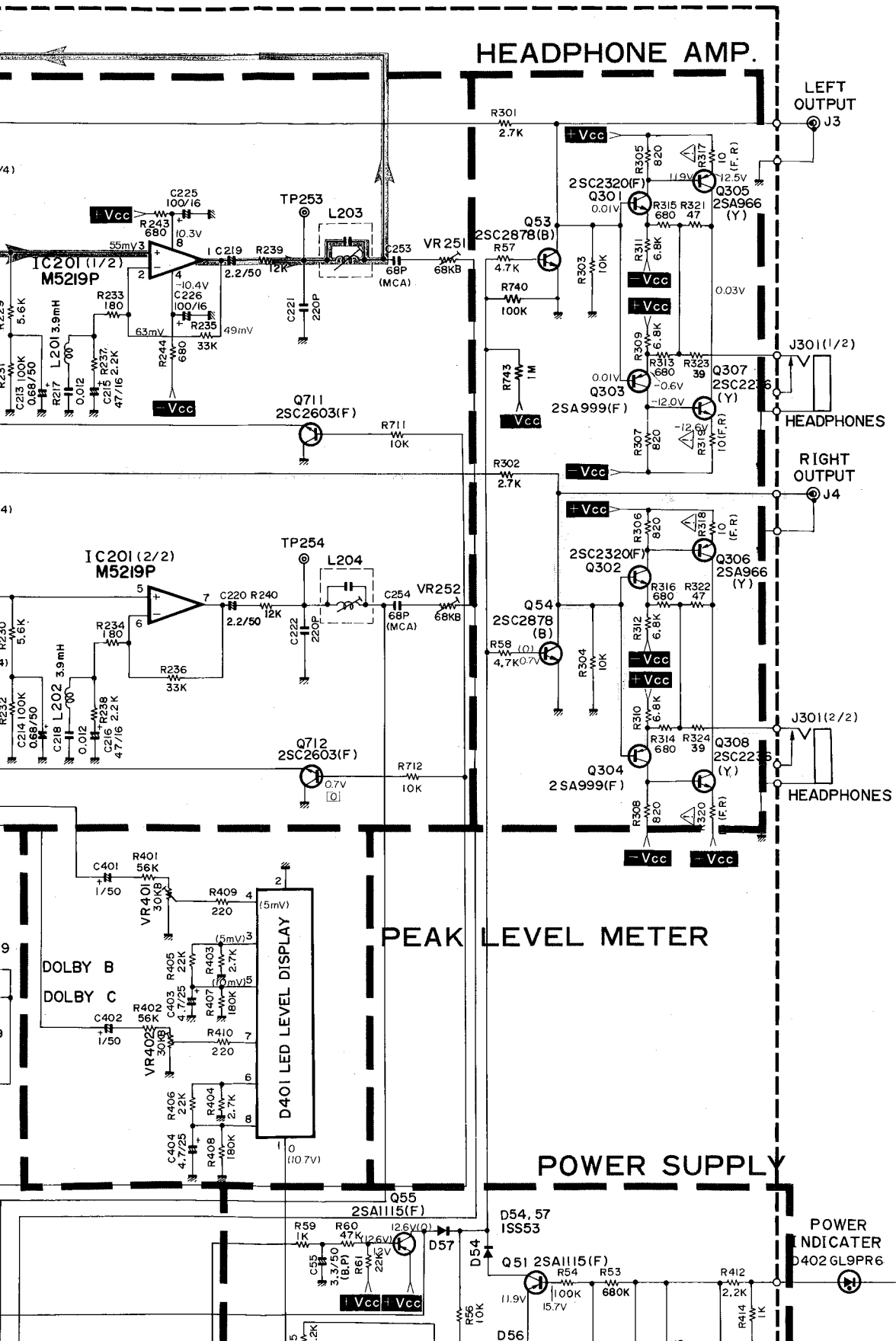
SCHEMATIC DIAGRAM

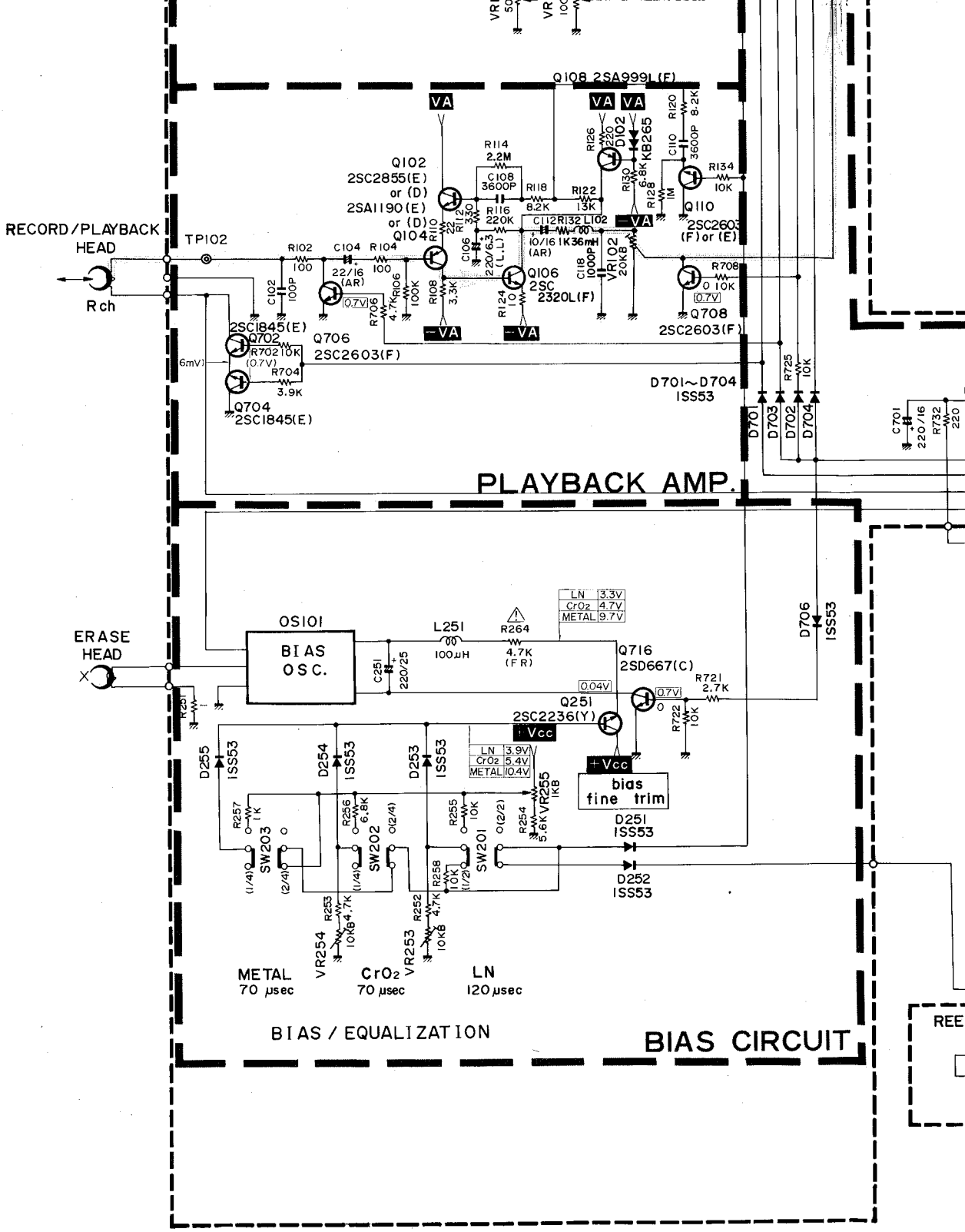



DOLBY NR SECTION
Q107 2SA999L(F)
Q109 2SC2603(F) or (E)
Q105 2SC 2320L(F)
Q707 2SC2603(F)
Q108 2SA999L(F)
Q110 2SC2603 (F) or (E)
Q106 2SC 2320L(F)
Q708 2SC2603(F)
D701~D704 1SS53
+Vcc
-VA
-Vcc
+B
Lch PLAY INPUT
Lch REC.INPUT
Rch PLAY INPUT
Rch REC.INPUT
REC.+B
Q501 2SC2320(F)
Q502 2SC2320(F)
Q503 2SC2603(F) or (E)
Q504 2SC2603(F) or (E)
Q505 2SC2603(F) or (E)
Q506 2SC2603(F) or (E)
LC501
LC502
L501
L502
TP501
TP502
MPX FILTER ON 0.7V
REC./PLAY CONTROL
DOLBY NR OFF/B/C CONTROL
High Level Stage
input balance
DOLBY NR OFF 4.7V
DOLBY B 6.8V
DOLBY C 8.2V
Q718 2SC2603(F)
Q717 2SA1115(F)
Q713
Q714
Q715

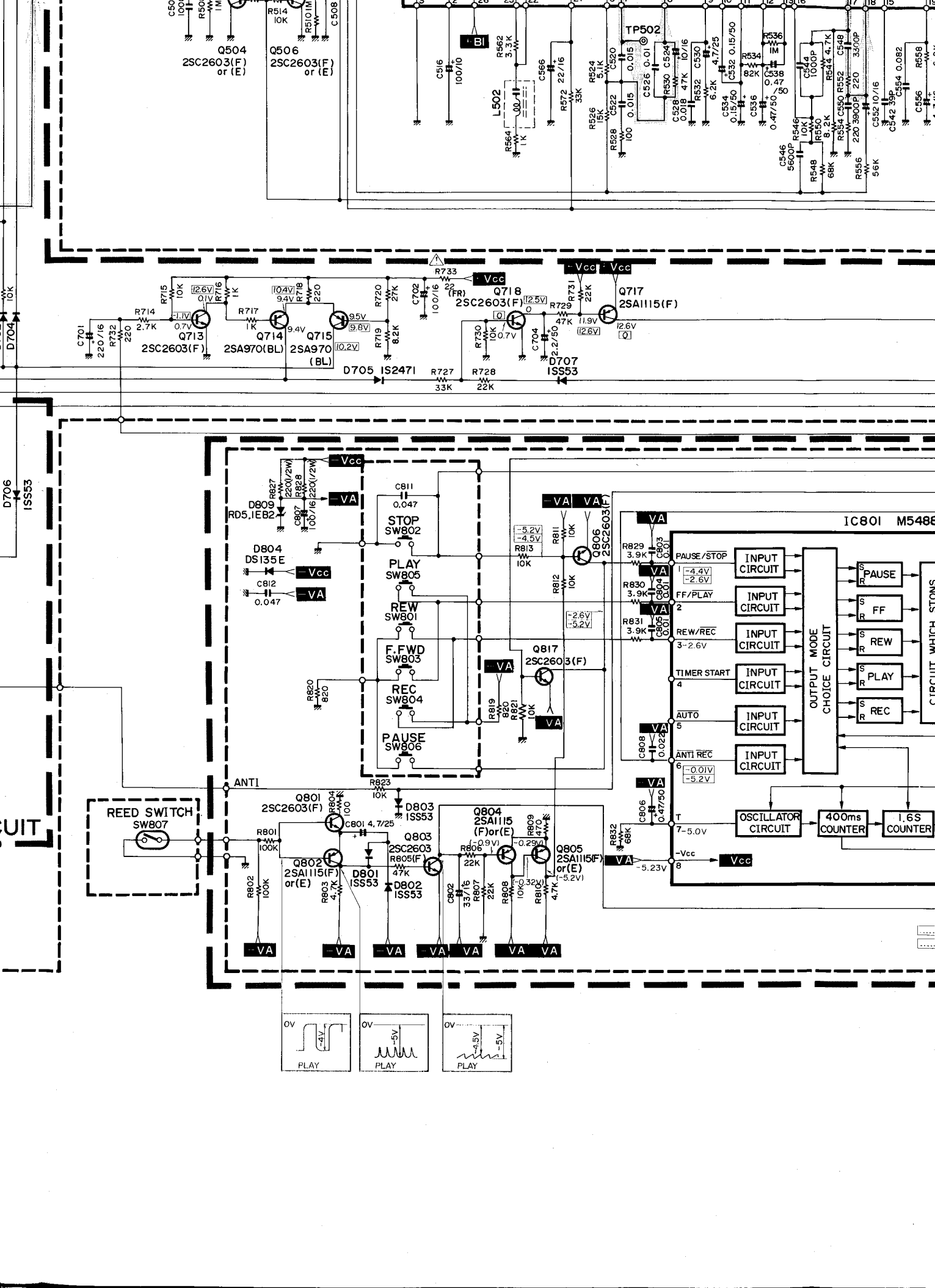

RECORDING AMP.
IC501 HA12038
IC502 HA12038
TP501
TP502
TP201
TP202
Lch MON.OUT (775mV)
Lch REC.OUT (580mV)
Rch MON.OUT (775mV)
Rch REC.OUT (580mV)
METER OUT
METER OUT
Dolby Cont OFF/B/C
MPX FLTER ON/OFF
DOLBY NR OFF/B/C CONTROL
High Level Stage
Low Level Stage
SW202(3/4) CrO2
SW202(4/4) CrO2
SW203 METAL (3/4)
SW203(4/4) METAL
IC201 (1/2) M5219P
DOLBY B-C NR
DOLBY NR
SW501
NR TYPE
SW502 B
D405 GL9PG19
D404 GL9HY9
DOLBY B
DOLBY C
mpx filter
SW503
Q717 2SA1115(F)
+Vcc

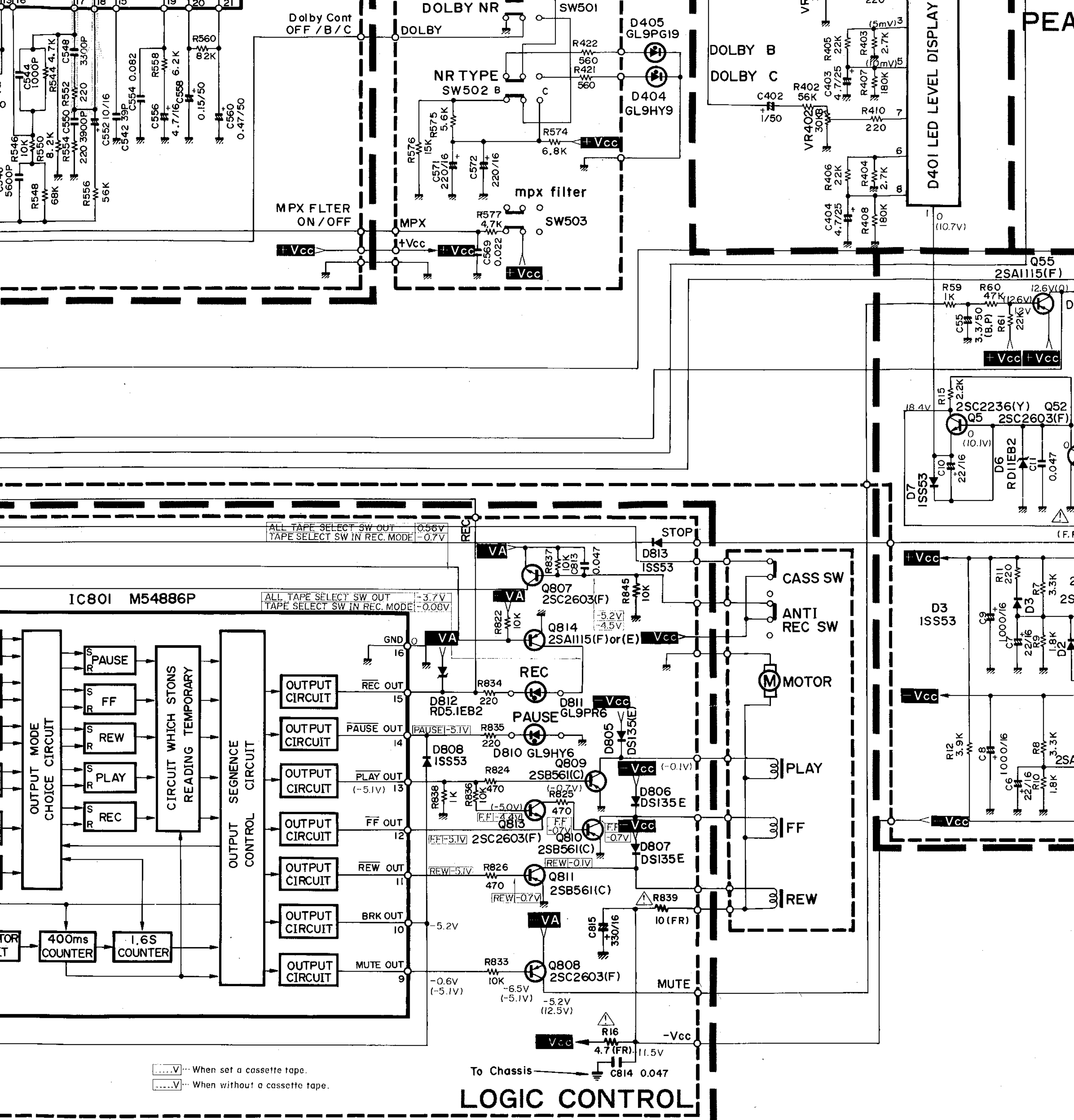
	K	L	M	N

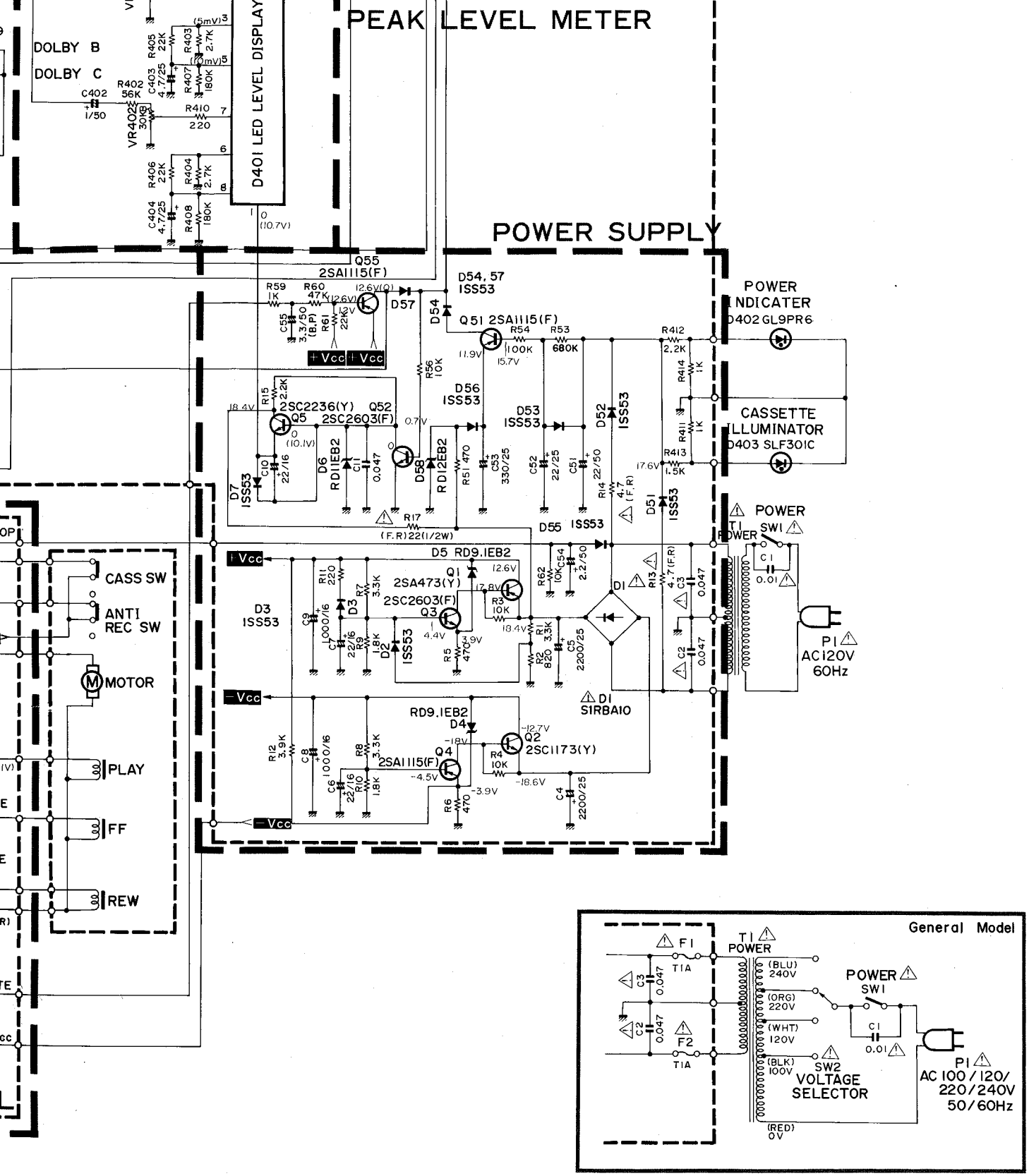

HEADPHONE AMP.
LEFT OUTPUT J3
RIGHT OUTPUT J4
J301(1/2)
J301(2/2)
HEADPHONES
HEADPHONES
IC201(1/2) M5219P
IC201(2/2) M5219P
TP253
TP254
L203
L204
VR251
VR252
Q301 2SC2320(F)
Q305 2SA966 (Y)
Q303 2SA999(F)
Q307 2SC2236 (Y)
Q302 2SC2320(F)
Q306 2SA966 (Y)
Q304 2SA999(F)
Q308 2SC2236 (Y)
Q53 2SC2878(B)
Q54 2SC2878 (B)
Q711 2SC2603(F)
Q712 2SC2603(F)
+Vcc
-Vcc
PEAK LEVEL METER
D401 LED LEVEL DISPLAY
DOLBY B
DOLBY C
POWER SUPPLY
Q55 2SA1115(F)
Q51 2SA1115(F)
D54, 57 ISS53
D57
D56
POWER INDICATER D402 GL9PR6



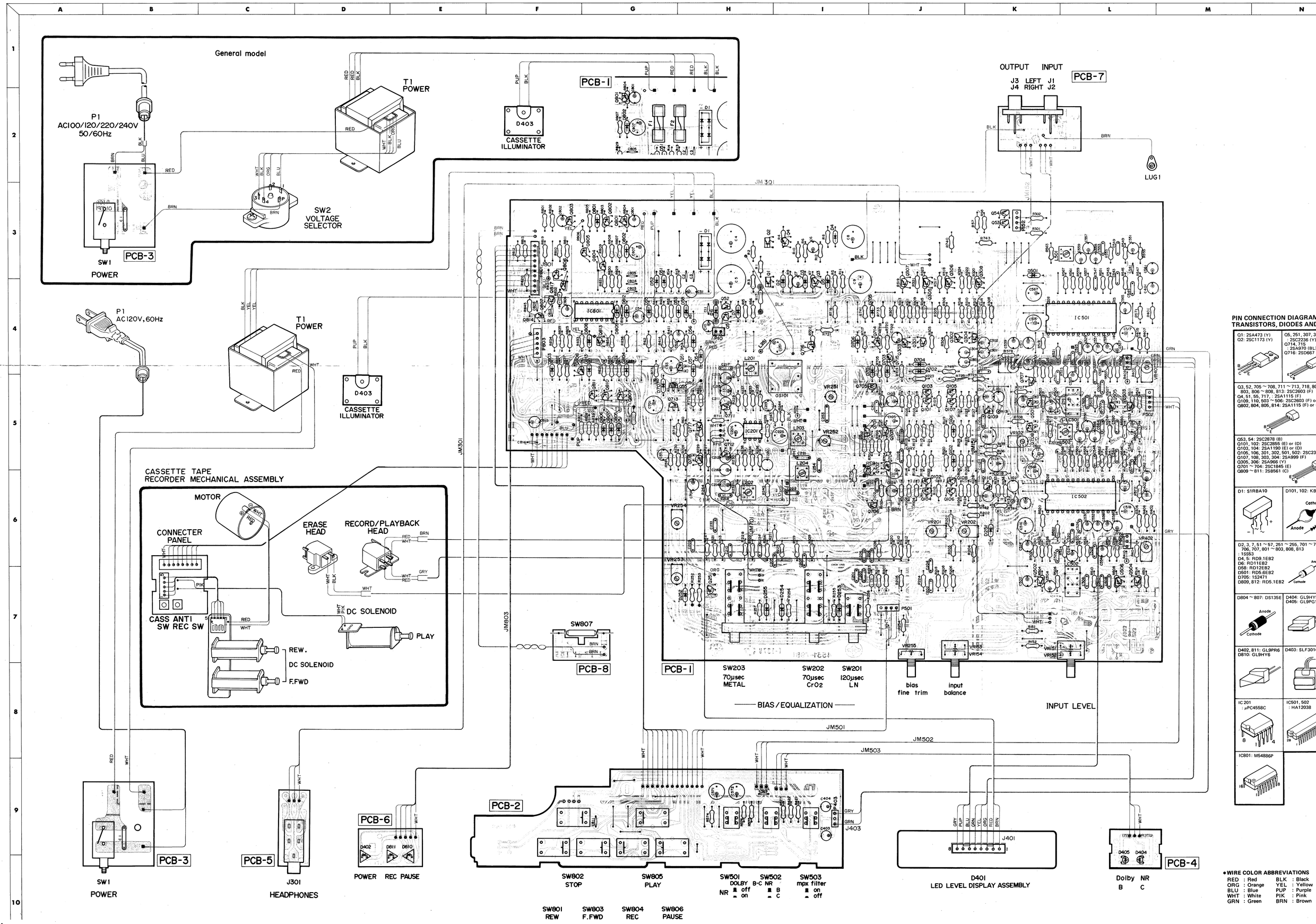
1. ALL RESISTANCES VALUES ARE IN Ω.
   kΩ = 1000Ω, MΩ = 1000 kΩ
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = μμF
4. V: DC VOLTAGE AT NO SIGNAL.
   ... V STOP MODE
   (...V) PLAYBACK MODE
   [...V] RECORDING MODE
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.


Q504
2SC2603(F)
or (E)
Q506
2SC2603(F)
or (E)
TP502
Q718
2SC2603(F)
Q717
2SA1115(F)
Q713
2SC2603(F)
Q714
2SA970(BL)
Q715
2SA970
(BL)
D705 IS2471
D707
ISS53
D706
ISS53
D704
D809
RD5.1EB2
D804
DS135E
STOP
SW802
PLAY
SW805
REW
SW801
F.FWD
SW803
REC
SW804
PAUSE
SW806
Q817
2SC2603(F)
Q806
2SC2603(F)
IC801 M5488
PAUSE/STOP
FF/PLAY
REW/REC
TIMER START
AUTO
ANTI REC
INPUT
CIRCUIT
OUTPUT MODE
CHOICE CIRCUIT
PAUSE
FF
REW
PLAY
REC
OSCILLATOR
CIRCUIT
400ms
COUNTER
1.6S
COUNTER
REED SWITCH
SW807
ANTI
Q801
2SC2603(F)
Q802
2SA1115(F)
or(E)
Q803
2SC2603
Q804
2SA1115
(F)or(E)
Q805
2SA1115(F)
or(E)
D801
ISS53
D802
ISS53
D803
ISS53
PLAY
PLAY
PLAY

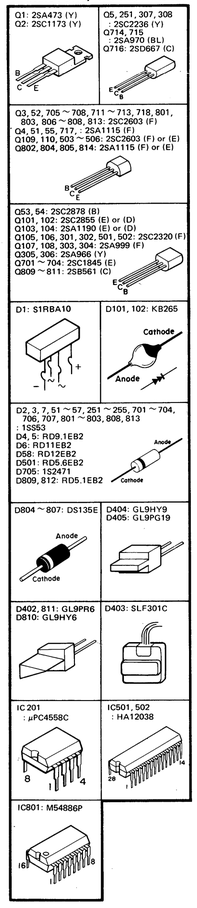

DOLBY NR
SW501
Dolby Cont
OFF / B / C
DOLBY
D405
GL9PG19
D404
GL9HY9
NR TYPE
SW502 B
R422 560
R421 560
R574 6.8K
+Vcc
mpx filter
SW503
MPX FLTER
ON / OFF
MPX
R577 4.7K
C569 0.022
DOLBY B
DOLBY C
C402 1/50
R402 56K
VR402 30KB
R410 220
D401 LED LEVEL DISPLAY
PEA
Q55
2SA1115(F)
R59 1K
R60 47K
C55 3.3/50 (B.P)
R61 22K
2SC2236(Y)
Q5
Q52
2SC2603(F)
D6 RD11EB2
D7 1SS53
ALL TAPE SELECT SW OUT
TAPE SELECT SW IN REC. MODE
REC
STOP
D813 1SS53
Q807
2SC2603(F)
R845 10K
Q814
2SA1115(F)or(E)
CASS SW
ANTI REC SW
MOTOR
D3 1SS53
IC801 M54886P
GND
OUTPUT MODE CHOICE CIRCUIT
CIRCUIT WHICH STONS READING TEMPORARY
OUTPUT SEGNENCE CONTROL CIRCUIT
PAUSE
FF
REW
PLAY
REC
OUTPUT CIRCUIT
REC OUT
PAUSE OUT
PLAY OUT
FF OUT
REW OUT
BRK OUT
MUTE OUT
D812 RD5.1EB2
R834 220
D811 GL9PR6
D805 DS135(E)
R835 220
D810 GL9HY6
D808 1SS53
Q809 2SB561(C)
D806 DS135E
Q813
2SC2603(F)
Q810
2SB561(C)
D807 DS135E
Q811
2SB561(C)
PLAY
FF
REW
R839 10 (FR)
C815 330/16
400ms COUNTER
1.6S COUNTER
Q808
2SC2603(F)
MUTE
-Vcc
R16 4.7 (FR)
C814 0.047
To Chassis
.....V ··· When set a cassette tape.
.....V ··· When without a cassette tape.
LOGIC CONTROL


PEAK LEVEL METER
D401 LED LEVEL DISPLAY
DOLBY B
DOLBY C
POWER SUPPLY
Q55 2SA1115(F)
D54, 57 ISS53
D57
Q51 2SA1115(F)
POWER INDICATER D402 GL9PR6
CASSETTE ILLUMINATOR D403 SLF301C
Q52 2SC2603(F)
Q5 2SC2236(Y)
D56 ISS53
D53 ISS53
D52 ISS53
D55 ISS53
D51 ISS53
D7 ISS53
D6 RD11EB2
D58 RD12EB2
D5 RD9.1EB2
D4 RD9.1EB2
Q1 2SA473(Y)
Q3 2SC2603(F)
Q4 2SA1115(F)
Q2 2SC1173(Y)
D3 ISS53
D2 ISS53
D1 S1RBA10
T1 POWER
POWER SW1
P1 AC120V 60Hz
+Vcc
-Vcc
CASS SW
ANTI REC SW
MOTOR
PLAY
FF
REW
General Model
F1 T1A
F2 T1A
(BLU) 240V
(ORG) 220V
(WHT) 120V
(BLK) 100V
(RED) 0V
SW2 VOLTAGE SELECTOR
P1 AC 100/120/220/240V 50/60Hz

WIRING DIAGRAM



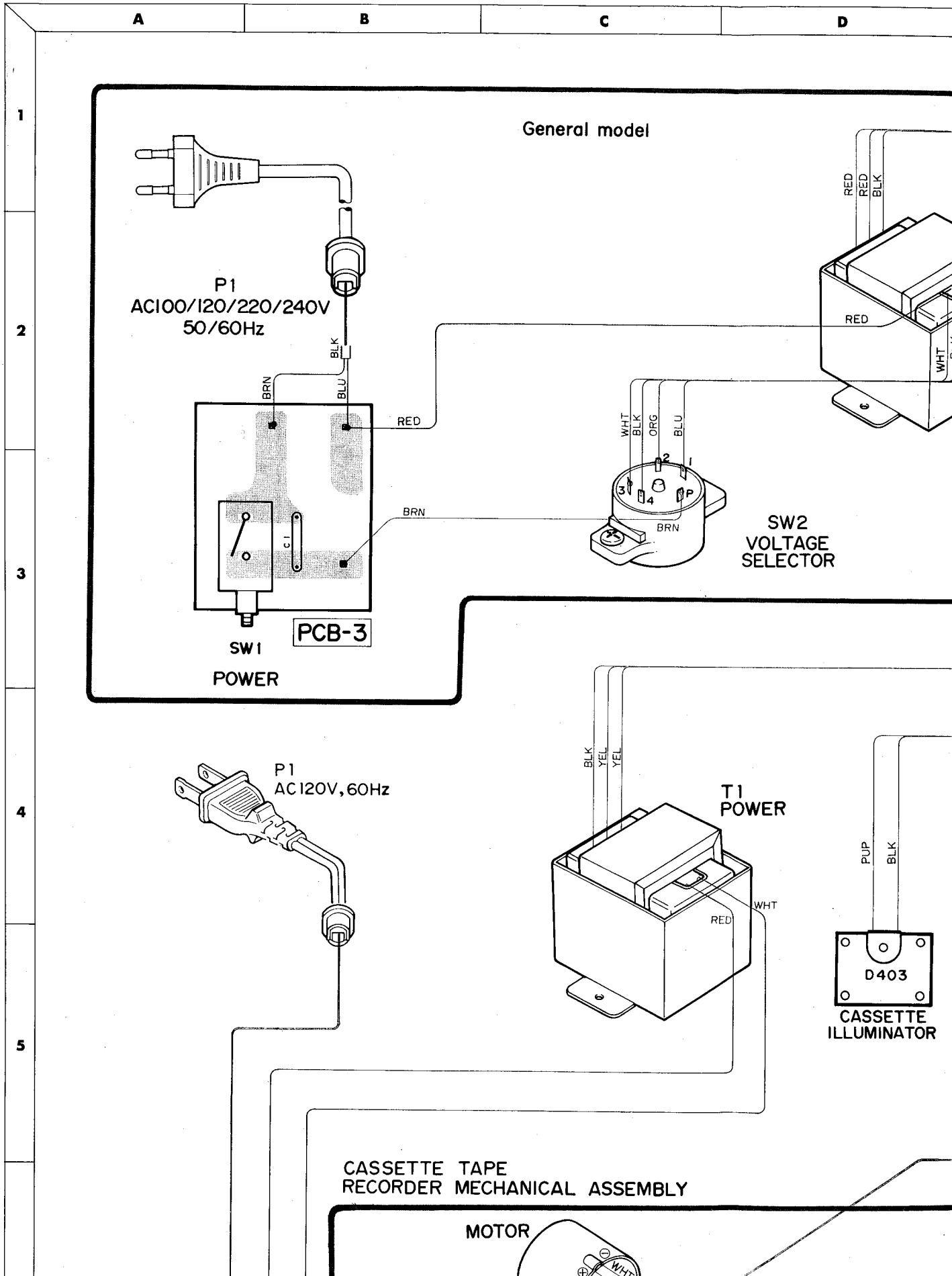
PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

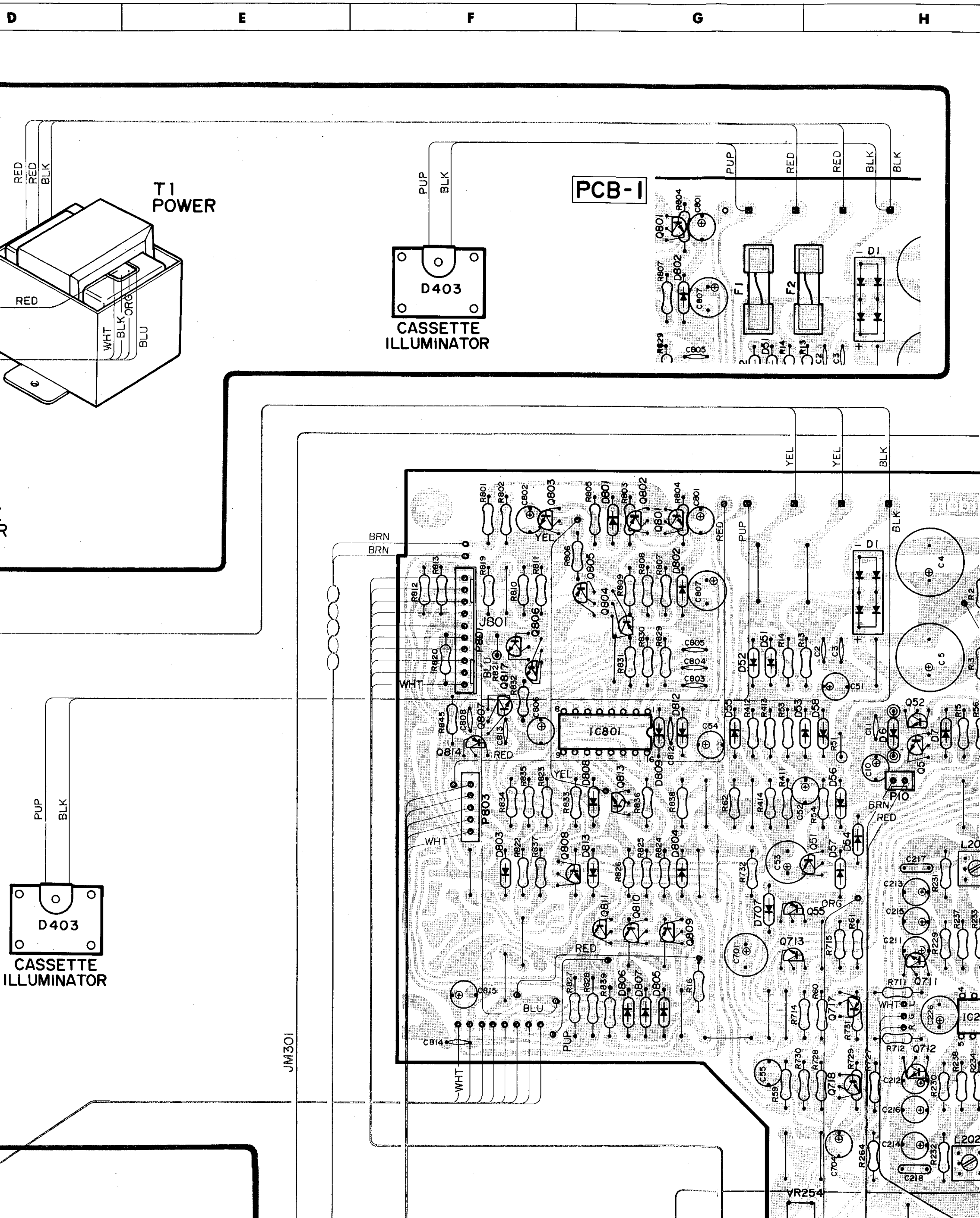


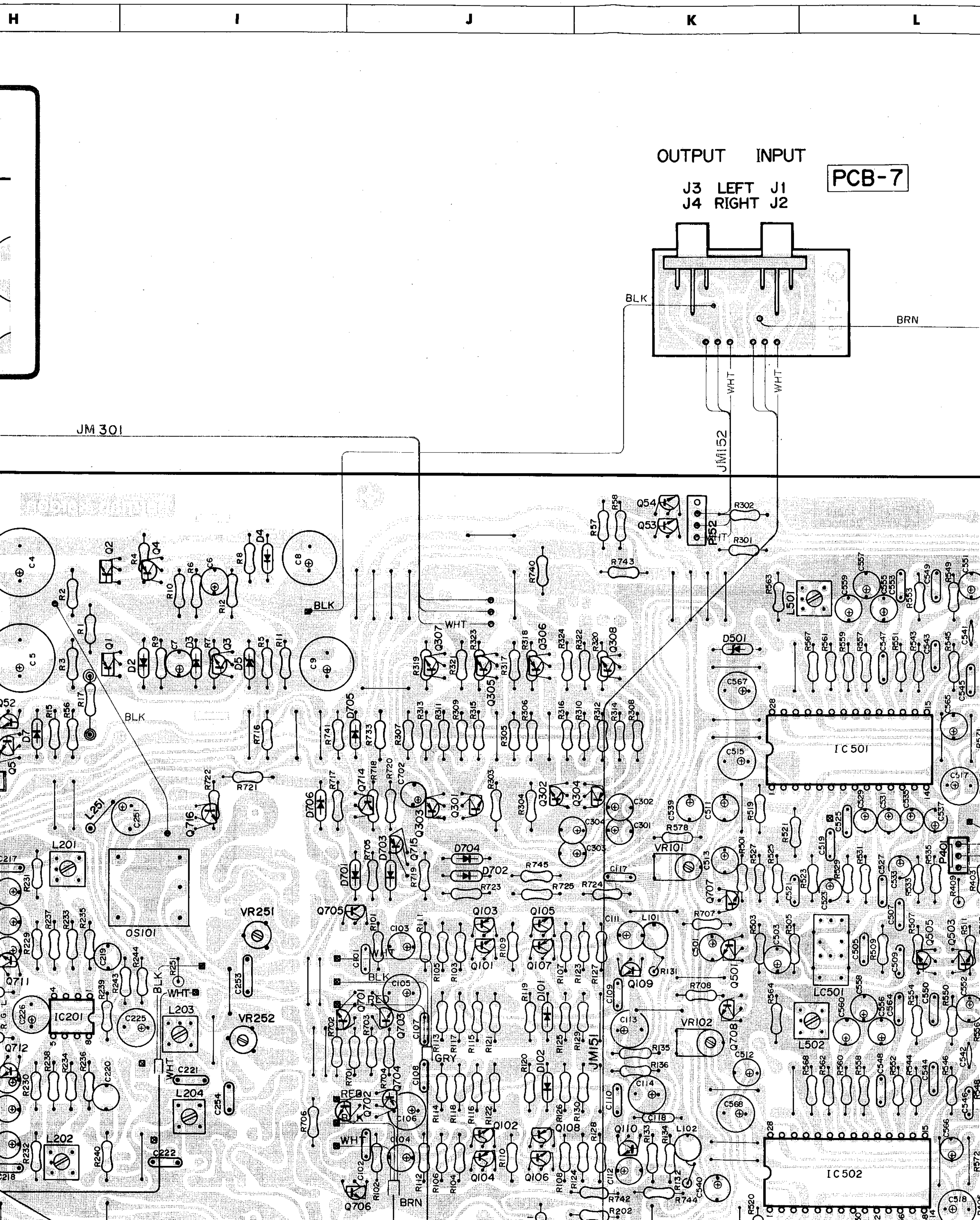
- **WIRE COLOR ABBREVIATIONS**

RED	: Red	BLK	: Black
ORG	: Orange	YEL	: Yellow
BLU	: Blue	PUP	: Purple
WHT	: White	PIK	: Pink
GRN	: Green	BRN	: Brown

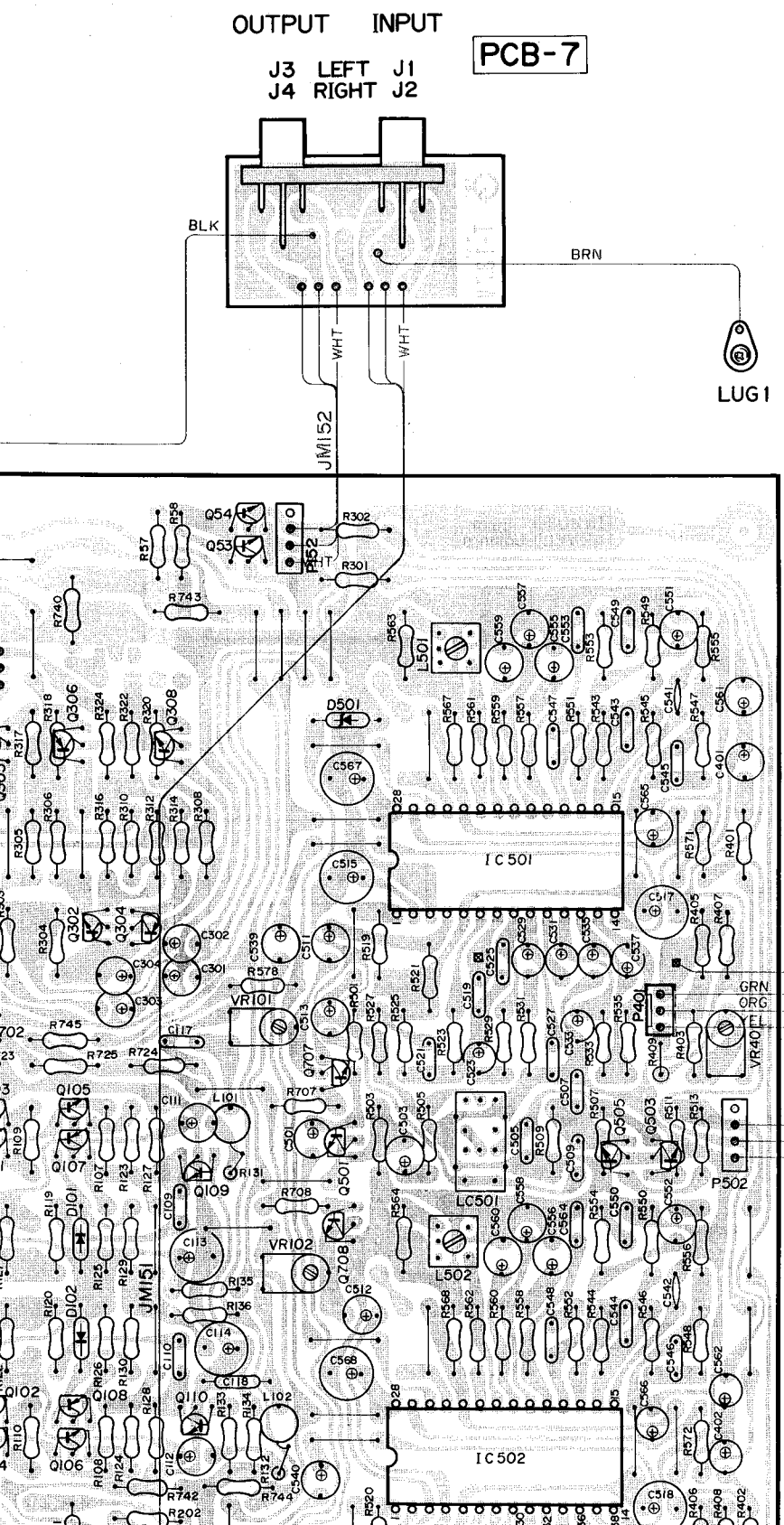
WIRING DIAGRAM




D
E
F
G
H
T1
POWER
RED
BLK
WHT
ORG
BLU
PUP
D403
CASSETTE
ILLUMINATOR
PCB-1
F1
F2
D1
YEL
BRN
J801
P803
IC801
P10
JM301
VR254

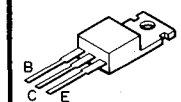


H
I
J
K
L
OUTPUT
INPUT
PCB-7
J3 LEFT J1
J4 RIGHT J2
BLK
BRN
WHT
JM 301
JM152
JM151
IC501
IC502
IC201
OS101
VR251
VR252
VR101
VR102
L201
L202
L203
L204
L501
L502
LC501
L101
L102
P152
P401

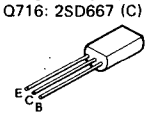


PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

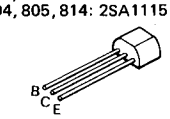
Q1: 2SA473 (Y)
Q2: 2SC1173 (Y)



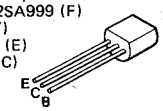
Q5, 251, 307, 308 : 2SC2236 (Y)
Q714, 715 : 2SA970 (BL)
Q716: 2SD667 (C)



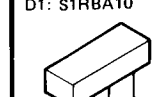
Q3, 52, 705 ~ 708, 711 ~ 713, 718, 801, 803, 806 ~ 808, 813: 2SC2603 (F)
Q4, 51, 55, 717, : 2SA1115 (F)
Q109, 110, 503 ~ 506: 2SC2603 (F) or (E)
Q802, 804, 805, 814: 2SA1115 (F) or (E)



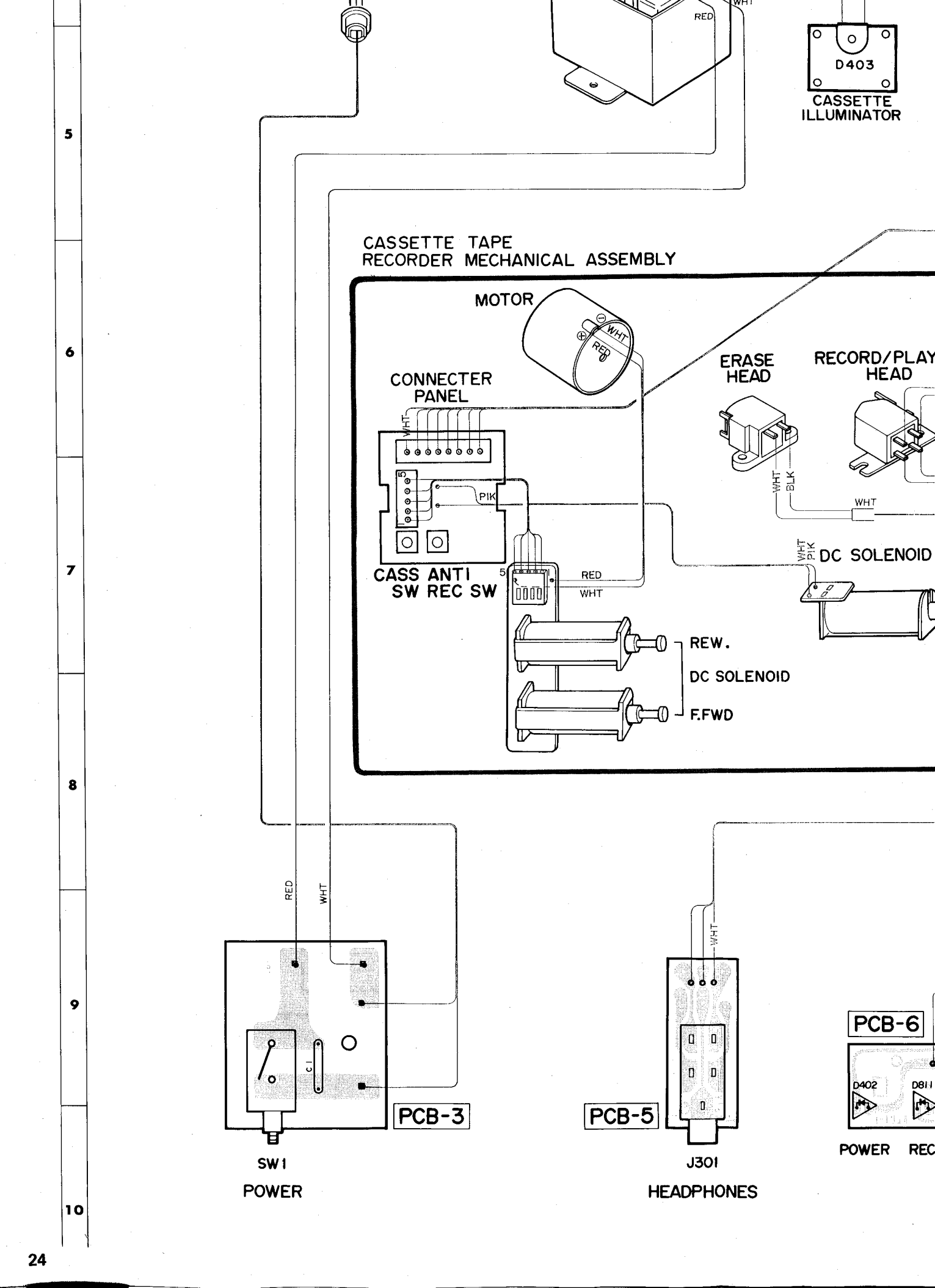
Q53, 54: 2SC2878 (B)
Q101, 102: 2SC2855 (E) or (D)
Q103, 104: 2SA1190 (E) or (D)
Q105, 106, 301, 302, 501, 502: 2SC2320 (F)
Q107, 108, 303, 304: 2SA999 (F)
Q305, 306: 2SA966 (Y)
Q701 ~ 704: 2SC1845 (E)
Q809 ~ 811: 2SB561 (C)

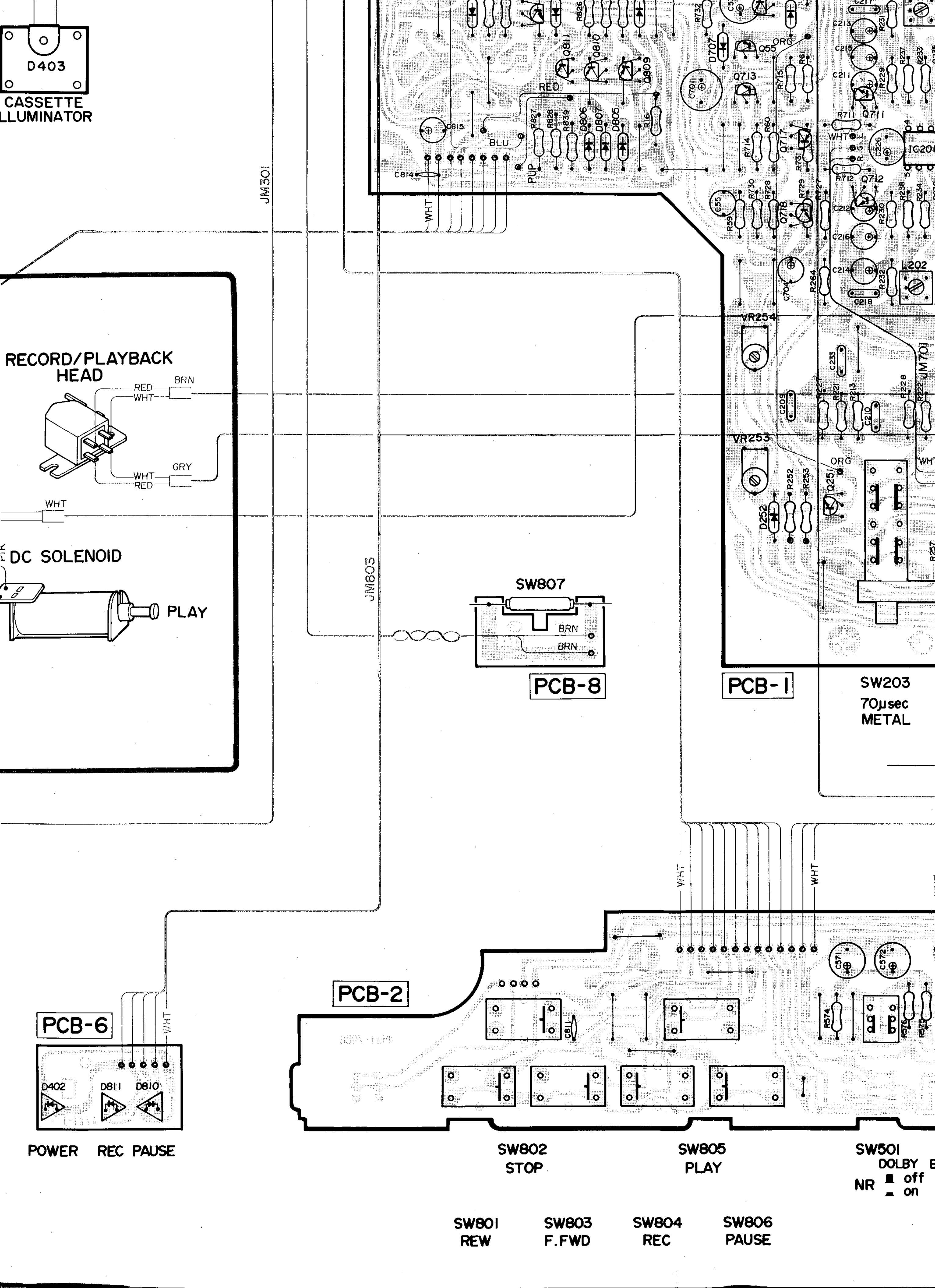


D1: S1RBA10

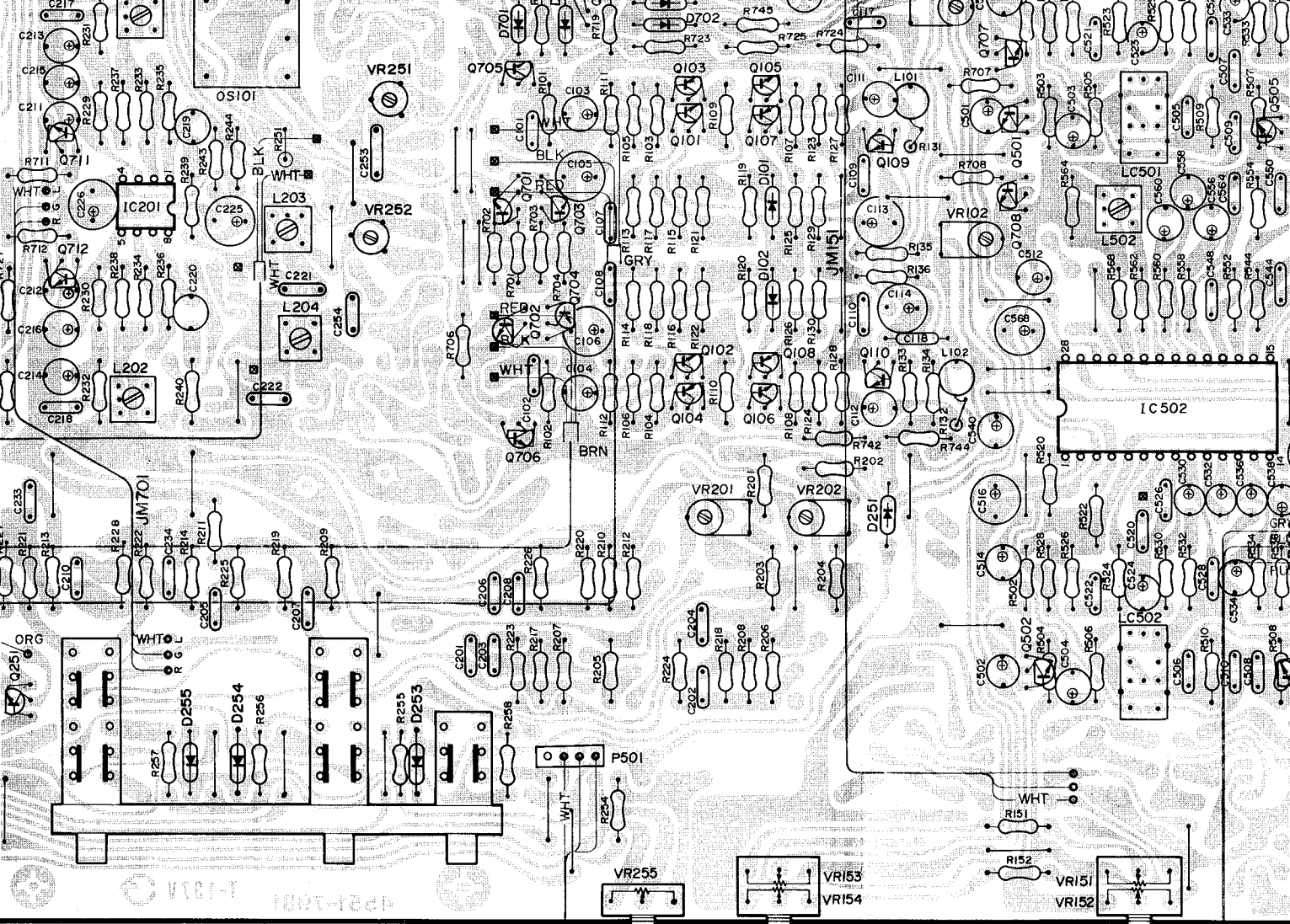


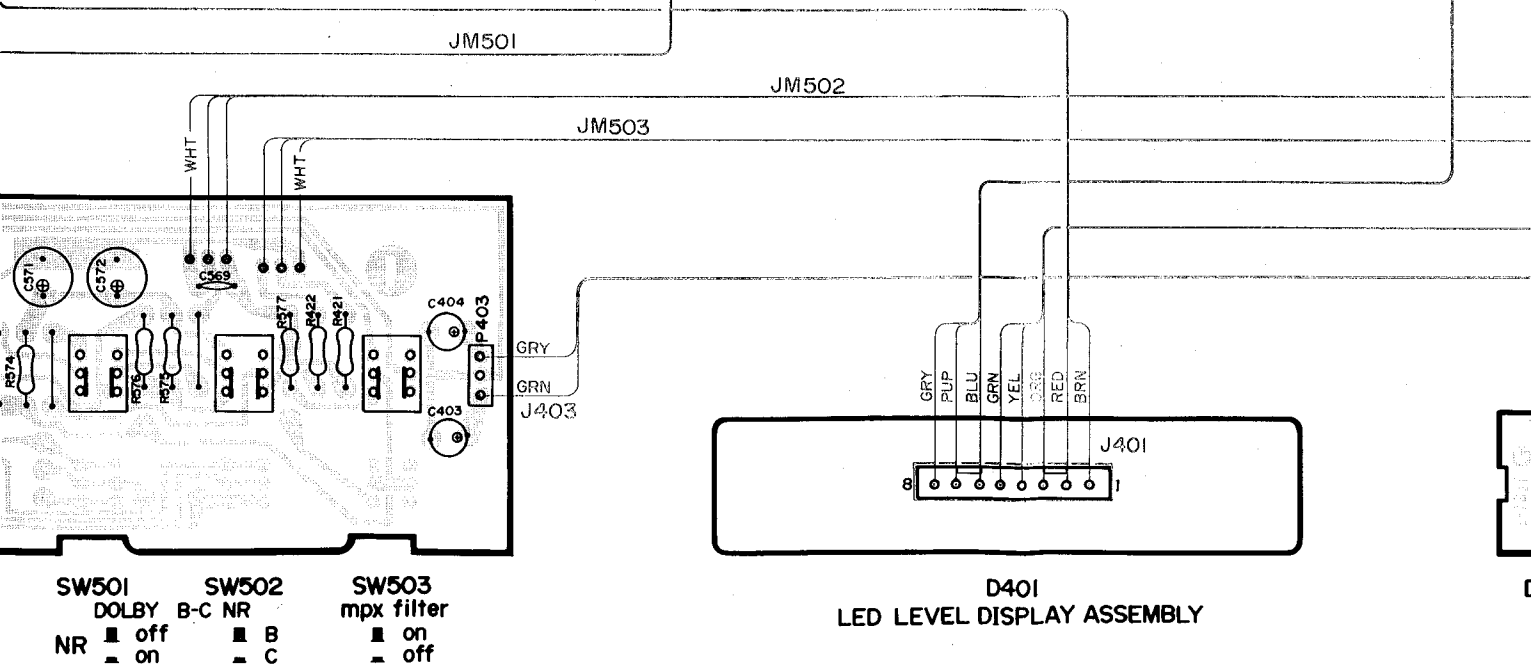
D101, 102: KB265


RED
WHT
D403
CASSETTE
ILLUMINATOR
CASSETTE TAPE
RECORDER MECHANICAL ASSEMBLY
MOTOR
WHT
RED
CONNECTER
PANEL
WHT
5
PIK
CASS ANTI
SW REC SW
5
RED
WHT
ERASE
HEAD
RECORD/PLAY
HEAD
WHT
BLK
WHT
WHT
PIK
DC SOLENOID
REW.
DC SOLENOID
F.FWD
RED
WHT
C.I
PCB-3
SW1
POWER
WHT
PCB-5
J301
HEADPHONES
PCB-6
D402
POWER
REC



D403
CASSETTE
ILLUMINATOR
JM301
RECORD/PLAYBACK
HEAD
RED
WHT
BRN
GRY
DC SOLENOID
PLAY
JM803
SW807
PCB-8
PCB-1
SW203
70μsec
METAL
VR254
VR253
JM701
IC201
PCB-2
PCB-6
D402
D811
D810
POWER
REC PAUSE
SW802
STOP
SW805
PLAY
SW501
DOLBY
NR
off
on
SW801
REW
SW803
F.FWD
SW804
REC
SW806
PAUSE



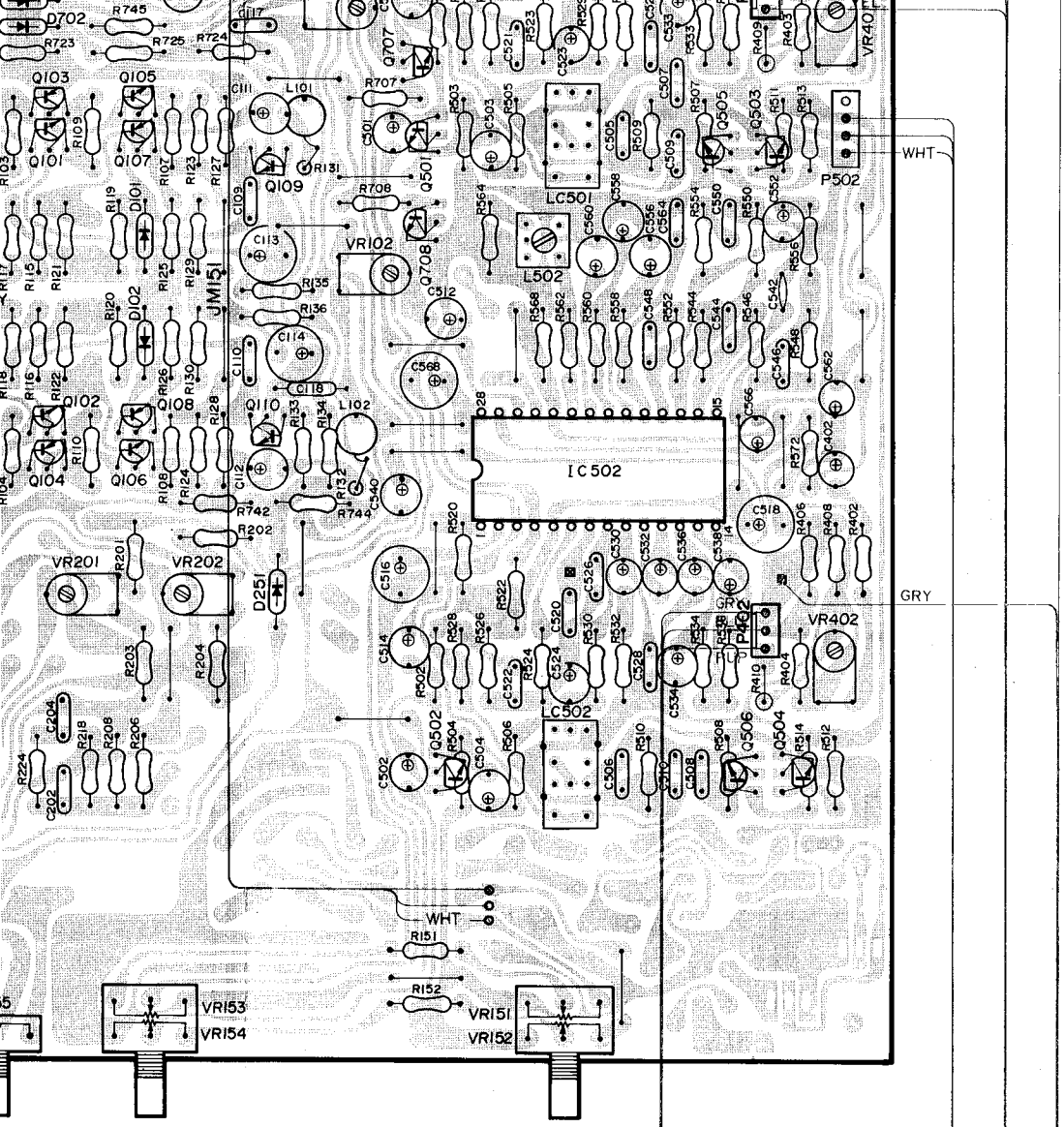


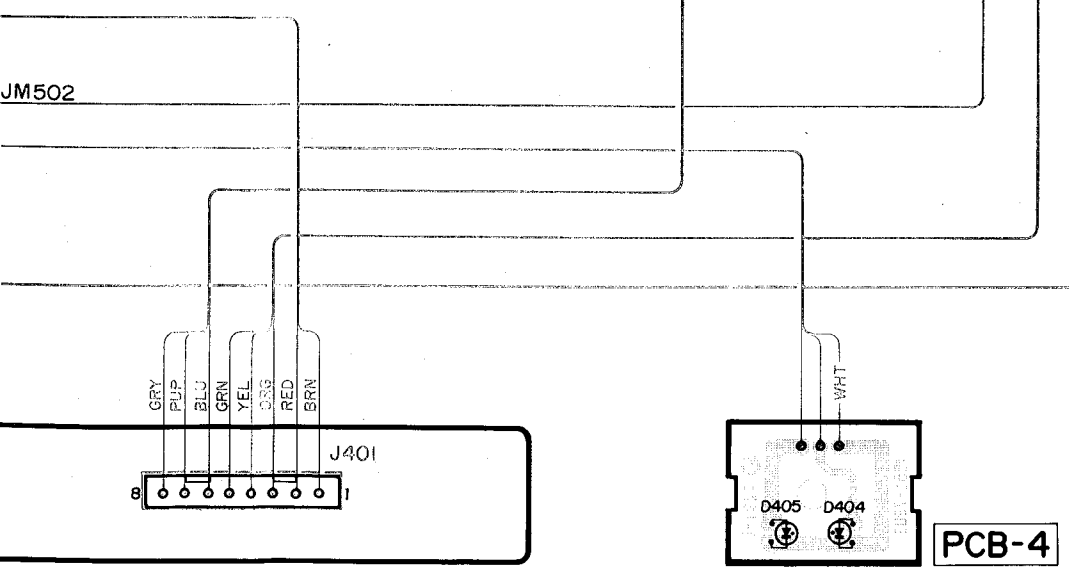
SW501
DOLBY B-C NR
NR ■ off
▬ on

SW502
■ B
▬ C

SW503
mpx filter
■ on
▬ off

D401
LED LEVEL DISPLAY ASSEMBLY



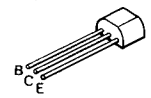


PCB-4

D401
LED LEVEL DISPLAY ASSEMBLY

Dolby NR
B C

Q3, 52, 705 ~ 708, 711 ~ 713, 718, 801, 803, 806 ~ 808, 813: 2SC2603 (F)
Q4, 51, 55, 717, : 2SA1115 (F)
Q109, 110, 503 ~ 506: 2SC2603 (F) or (E)
Q802, 804, 805, 814: 2SA1115 (F) or (E)



Q53, 54: 2SC2878 (B)
Q101, 102: 2SC2855 (E) or (D)
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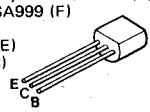
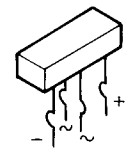
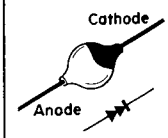
Q105, 106, 301, 302, 501, 502: 2SC2320 (F)
Q107, 108, 303, 304: 2SA999 (F)
Q305, 306: 2SA966 (Y)
Q701 ~ 704: 2SC1845 (E)
Q809 ~ 811: 2SB561 (C)



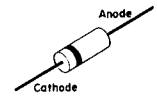
D1: S1RBA10



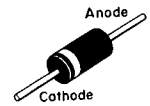
D101, 102: KB265



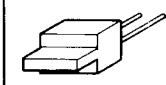
D2, 3, 7, 51 ~ 57, 251 ~ 255, 701 ~ 704, 706, 707, 801 ~ 803, 808, 813 : 1SS53
D4, 5: RD9.1EB2
D6: RD11EB2
D58: RD12EB2
D501: RD5.6EB2
D705: 1S2471
D809, 812: RD5.1EB2



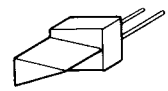
D804 ~ 807: DS135E



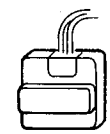
D404: GL9HY9
D405: GL9PG19



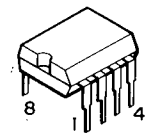
D402, 811: GL9PR6
D810: GL9HY6



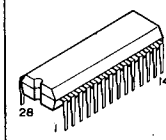
D403: SLF301C



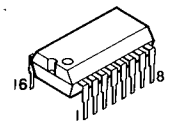
IC201
: μPC4558C



IC501, 502
: HA12038



IC801: M54886P



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