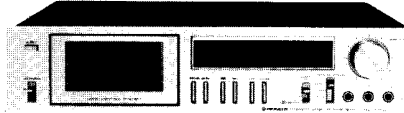


 **PIONEER®**

# Service Manual



**ORDER NO.  
ART-559-0**

**CASSETTE TAPE DECK**

# CT-200

**MODEL CT-200 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:**

Type	Voltage	Remarks
HE	220V and 240V (switchable)	Europe model
HB	220V and 240V (switchable)	U.K. model
HP	220V and 240V (switchable)	Australia model
KU	120V only	U.S.A. model
D	120V, 220V and 240V (switchable)	General export model

- This service manual is applicable to the CT-200/HE, HB and HP types.

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# 1. SPECIFICATIONS

Systems . . . . . Compact cassette, 2-channel stereo  
 Motor . . . . . DC servo motor x 1  
 Heads  
 . . . "Hard Permalloy" recording/playback head x 1  
 . . . "Ferrite" erasing head x 1  
 Fast Winding Time  
 . . . . . Approximately 100 seconds (C-60 tape)  
 Wow and Flutter . . . . . No more than 0.05% (WRMS)  
 . . . . . No more than 0.17% (DIN)

Frequency Response  
 -20dB recording:  
 Standard, LH tapes . . . . . 20 to 15,000Hz  
 (30 to 14,000 Hz  $\pm$ 3dB)  
 Chromium dioxide tape . . . . . 20 to 17,000Hz  
 (30 to 16,000Hz  $\pm$ 3dB)  
 Metal tape . . . . . 20 to 18,000Hz  
 (30 to 17,000Hz  $\pm$ 3dB)

0dB recording:  
 Chromium dioxide tape . . . . . 30 to 8,000Hz  $\pm$ 3dB  
 Metal tape . . . . . 30 to 12,500Hz  $\pm$ 3dB

Signal-to-Noise Ratio  
 Dolby NR OFF . . . . . More than 58dB  
 Dolby NR ON . . . . . More than 68dB (over 5kHz)  
 Harmonic Distortion . . . . . No more than 1.2 % (0dB)

Input  
 (Sensitivity/Maximum allowable input/Impedance)  
 MIC (L, R)  
 . . . . . 0.3mV/57mV/10k $\Omega$ , 6mm diam. jack  
 (Reference MIC impedance; 250 $\Omega$  to 10k $\Omega$ )  
 LINE (INPUT) . . . . . 50mV/25V/75k $\Omega$

Output (Reference level/Load impedance)  
 LINE (OUTPUT) . . . . . 450mV/50k $\Omega$   
 Headphones . . . . . 65mV/8 $\Omega$ , 6mm diam. jack

## Subfunctions

- Dolby NR system (ON/OFF)
- 3 position tape selector (NORM/CrO<sub>2</sub>/METAL)
- IC full logic control
- Air damp eject function
- Full automatic stop mechanism

## Miscellaneous

Power Requirements  
 D model . . . . . AC 120V/220V/240V (switchable)  
 50/60Hz  
 HE, HB, HP models . . . AC 220V/240V (switchable)  
 50/60Hz  
 Power Consumption . . . . . 19 watts

Dimensions  
 D model . . . . . 420(W) x 99(H) x 333(D)mm  
 16-9/16(W) x 3-7/8(H) x 13-1/8(D)in  
 HE, HB, HP models  
 . . . . . 420(W) x 99(H) x 327(D)mm  
 16-9/16(W) x 3-7/8(H) x 12-7/8(D)in  
 Weight (without package) . . . . . 4.7 kg (10 lb 6 oz)

## Furnished Parts

Operating instructions . . . . . D, HB and HP models; 1  
 HE model (English, German/French): 2

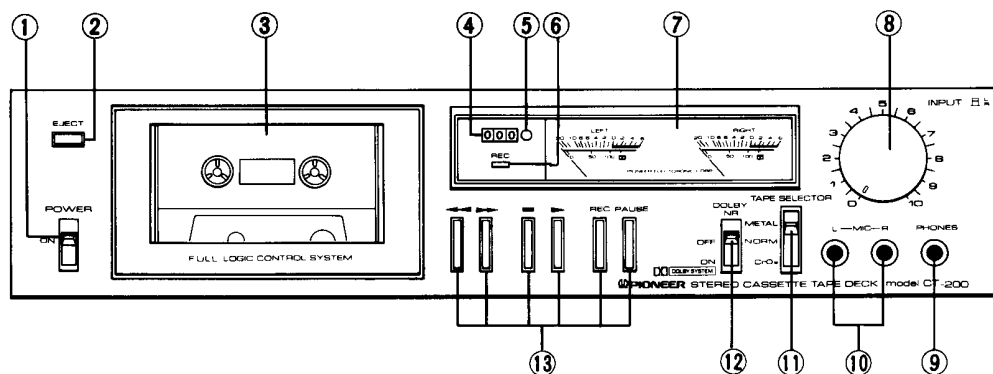
### NOTE:

*Specifications and the design subject to possible modifications without notice due to improvements.*

### NOTES:

1. Reference Tapes: Standard & LH: DIN 45513/BLATT6 or equiv.  
 : CrO<sub>2</sub> : DIN45513/BLATT7 (CrO<sub>2</sub>) or equiv.
2. Reference Recording Level: Meter 0dB indicating level (160 nwb/m magnetic level = Philips cassette reference level)
3. Reference Signal; 333Hz
4. Wow & Flutter: ● JIS [3kHz, with acoustic compensation (weighted), rms value] DIN [3,150Hz, with acoustic compensation (weighted) PEAK value] ; DIN45507
5. Frequency Response: ● Measured at -20dB level, DOLBY NR OFF, level deviation is  $\pm$ 6dB without indication.
6. Signal to Noise Ratio: ● Measured at the third harmonic distortion 3% level, weighted.
7. Sensitivity: Input level (mV) required for reference recording level with input (REC) controls set to maximum.
8. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier output waveform becomes clipped.
9. Reference Output Level: Playback output level when meter indicates 0dB.
10. This model doesn't employ a recording/playback connector (DIN-type).

## 2. FRONT PANEL FACILITIES



### ① POWER SWITCH

Set this switch to ON to supply power to the tape deck.

#### NOTE:

For about 4 seconds after the power has been switched on, the function buttons will not work even when depressed.

### ② EJECT BUTTON

When this switch is depressed, the cassette holder is jumped out.

### ③ CASSETTE HOLDER

### ④ TAPE COUNTER

### ⑤ COUNTER RESET BUTTON

Use this switch to reset the tape counter to "000".

### ⑥ REC (RECORDING) INDICATOR

### ⑦ LEVEL METERS

These indicate the input level during recording and the output level during playback.

### ⑧ INPUT (RECORDING LEVEL) CONTROLS

Use these to adjust the level of the input signals from the MIC jacks or rear panel INPUT jacks.

Turning these controls to the right increases the level. The controls are coupled to the left and right channels, but you can use them to adjust the right channel (back) and the left channel (front) independently by rotating the appropriate control and holding the other in position.

### ⑨ HEADPHONE JACK

This is the output jack for stereo headphones. Plug your headphones into this jack when you want to listen to a tape privately.

#### NOTES:

- Use low-impedance headphones. If you use a high-impedance model, you will not be able to obtain sufficient volume.
- Do not connect a microphone to this jack as the microphone may be damaged.

### ⑩ MIC JACKS

These are the input jacks for microphone recording. Plug the left channel microphone into the L jack and the right channel microphone into the R jack.

### ⑪ TAPE SELECTOR SWITCH

This selector allows the bias and equalizer characteristics to be selected during recording and the equalizer characteristics during playback in line with the type of tape you are using.

**METAL position:** For using metal tapes


**NORM position:** For using standard or LH tapes

**CrO<sub>2</sub> position:** For using chrome tapes

### ⑫ DOLBY\* NR SWITCH

Set this switch to ON for recording with the built-in Dolby noise reduction system and for playback of tapes which have been recorded using the Dolby NR system.

\*Manufactured under license from Dolby Laboratories.

\*Dolby and  are trademarks of Dolby Laboratories.

**⑬ OPERATING SWITCHES**

- ◀ (REW): Depress this switch to rewind the tape at high speed. (The tape will travel from right to left.)
- ▶▶ (FF): Depress this switch to send the tape forward at high speed. (The tape will travel from left to right.)
- (Stop): Depress this switch to stop the tape run and to release the operating mode.
- ▶ (Play): Depress this switch when playing back a tape. (The tape will travel from left to right.)

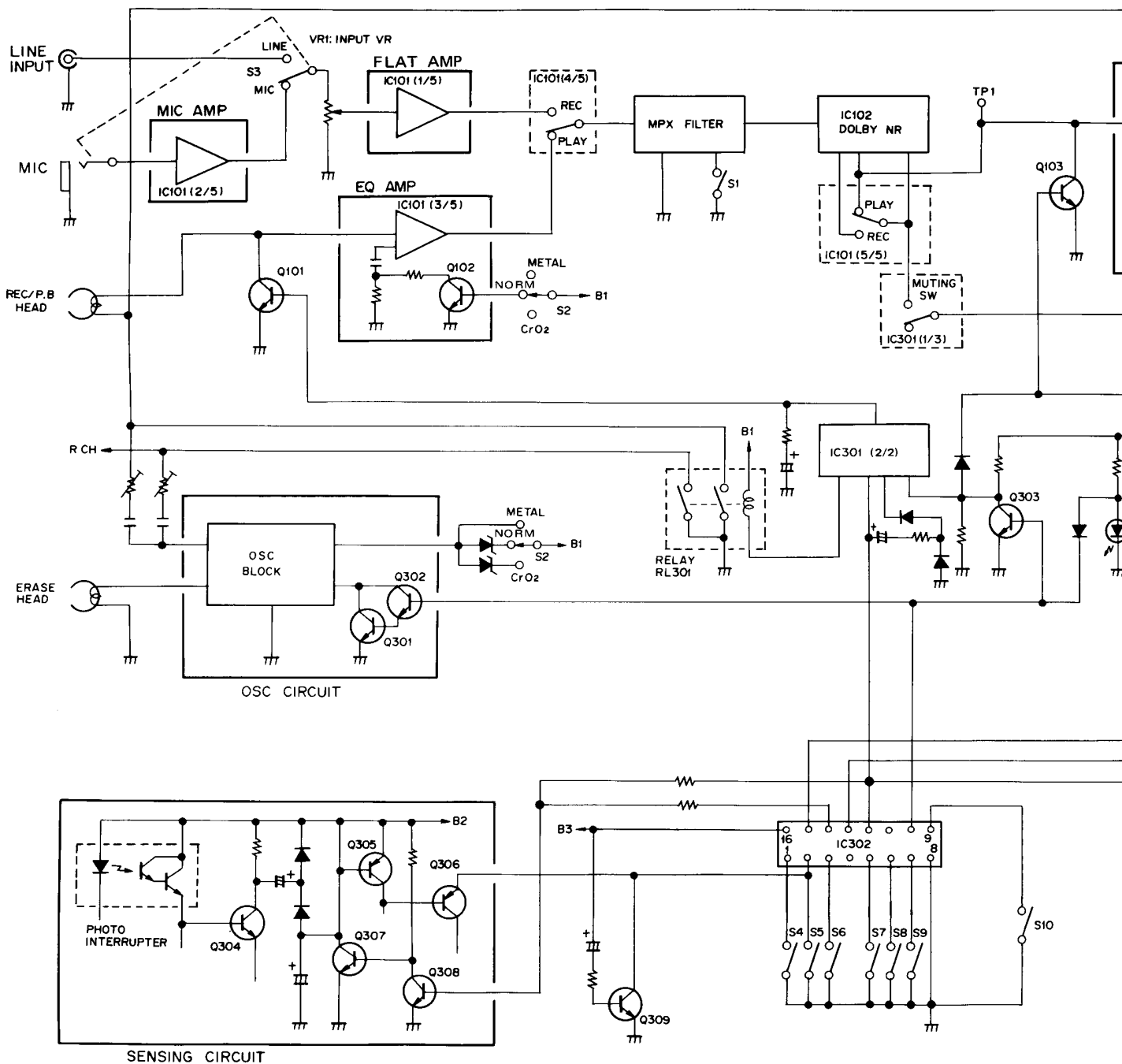
**REC:** Depress this switch together with the ▶ (Play) switch for recording. This switch will not work when a cassette is not loaded or when the erasure prevention tabs of a loaded cassette have been broken off.

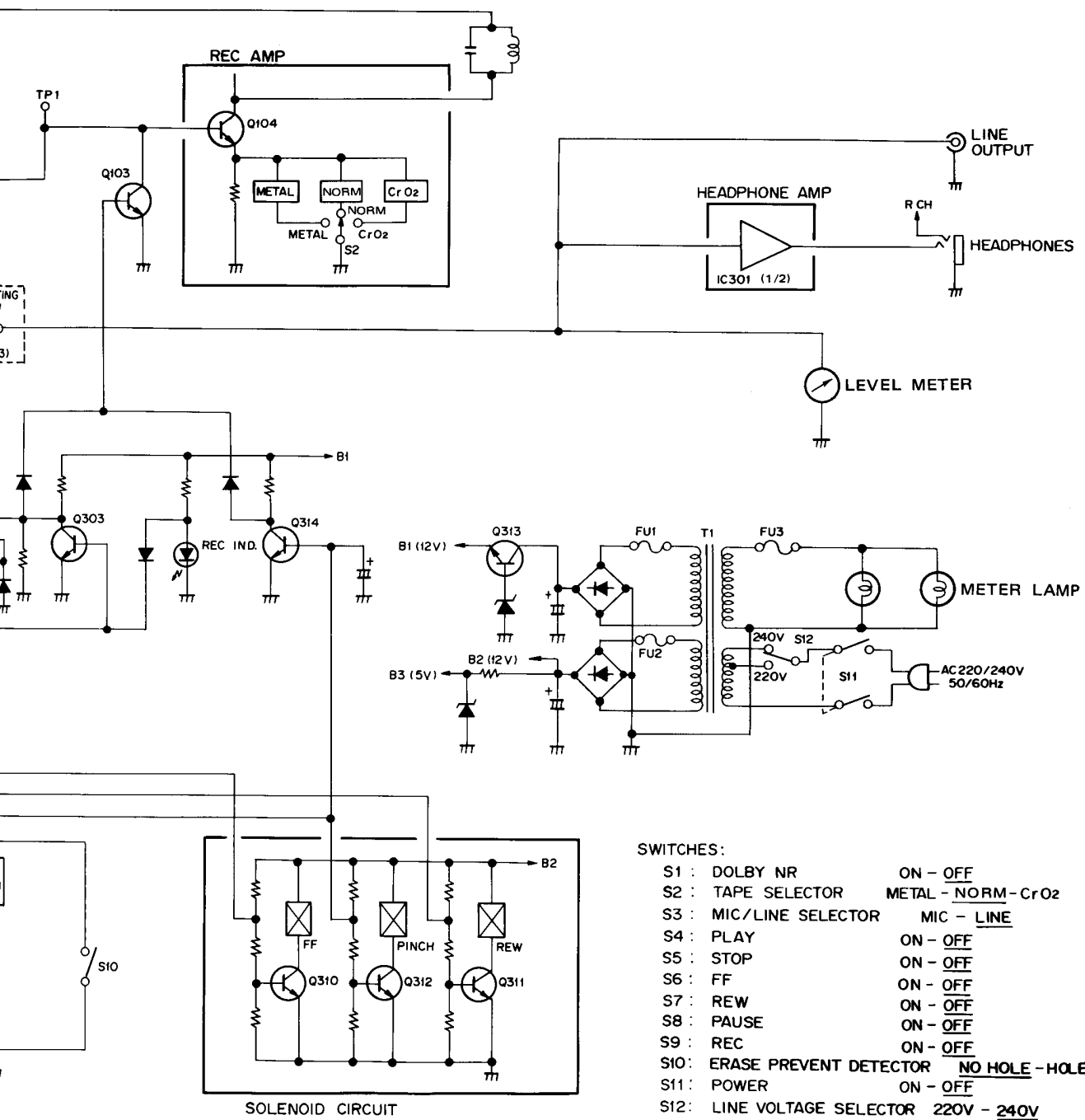
**PAUSE:** Depress this switch to stop the tape temporarily during recording or playback. Depress ▶ (Play) switch to allow the tape to continue to travel.

**NOTE:**

*If the POWER switch is set to the OFF position while the deck is operating (in any mode), all the operating mode will be released (shutdown mode).*

### 3. BLOCK DIAGRAM

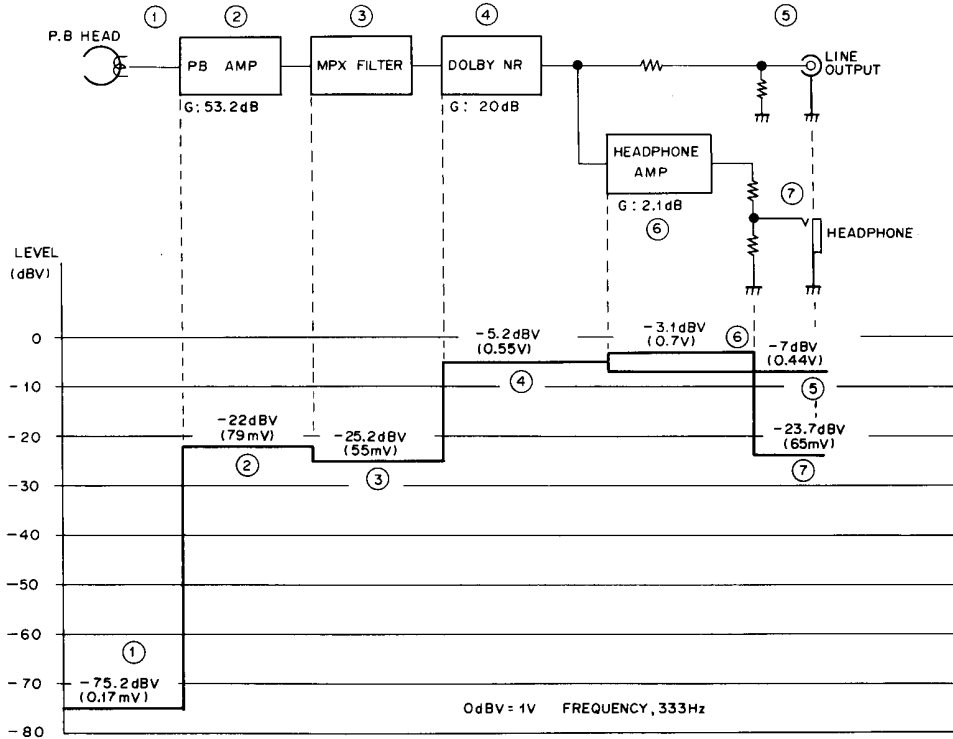




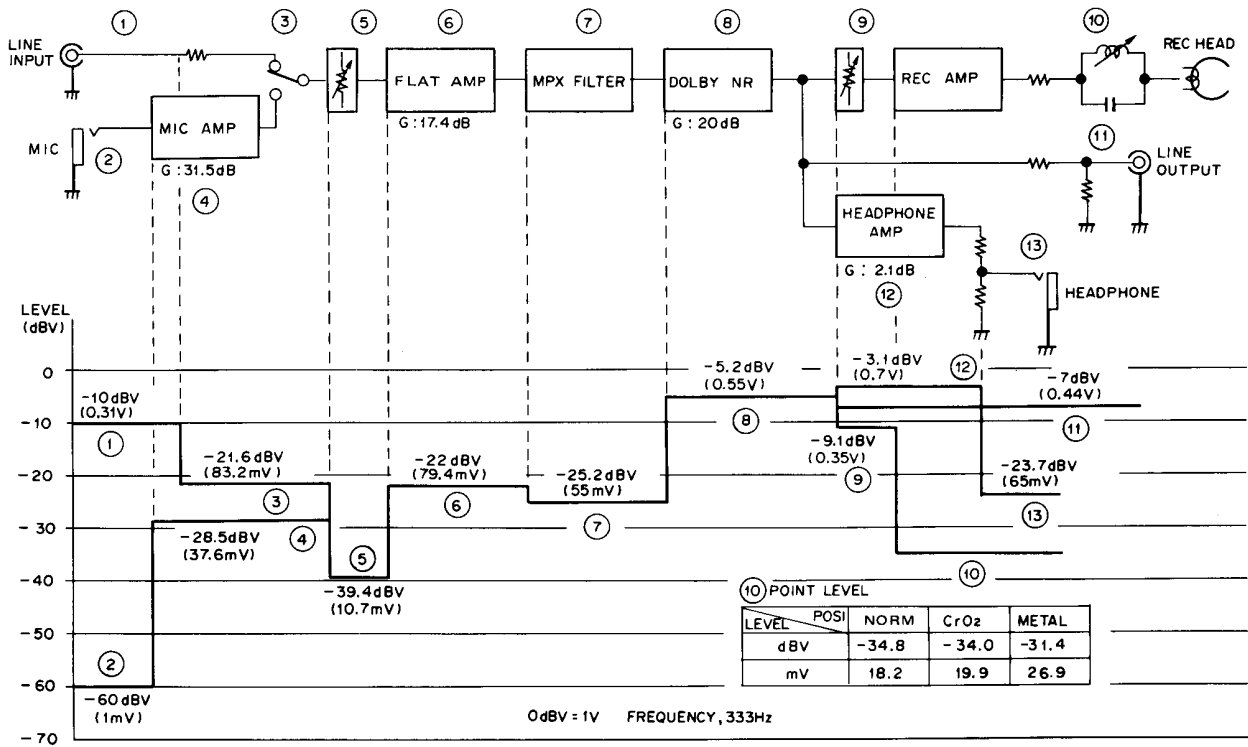
- SWITCHES:**
- S1 : DOLBY NR                    ON - OFF
  - S2 : TAPE SELECTOR        METAL - NORM - CrO2
  - S3 : MIC/LINE SELECTOR    MIC - LINE
  - S4 : PLAY                    ON - OFF
  - S5 : STOP                    ON - OFF
  - S6 : FF                      ON - OFF
  - S7 : REW                    ON - OFF
  - S8 : PAUSE                  ON - OFF
  - S9 : REC                     ON - OFF
  - S10 : ERASE PREVENT DETECTOR    NO HOLE - HOLE
  - S11 : POWER                ON - OFF
  - S12 : LINE VOLTAGE SELECTOR    220V - 240V
  - S13 : TIMER                    PLAY - STOP - REC/P.B

# 4. LEVEL DIAGRAM

## Playback Mode




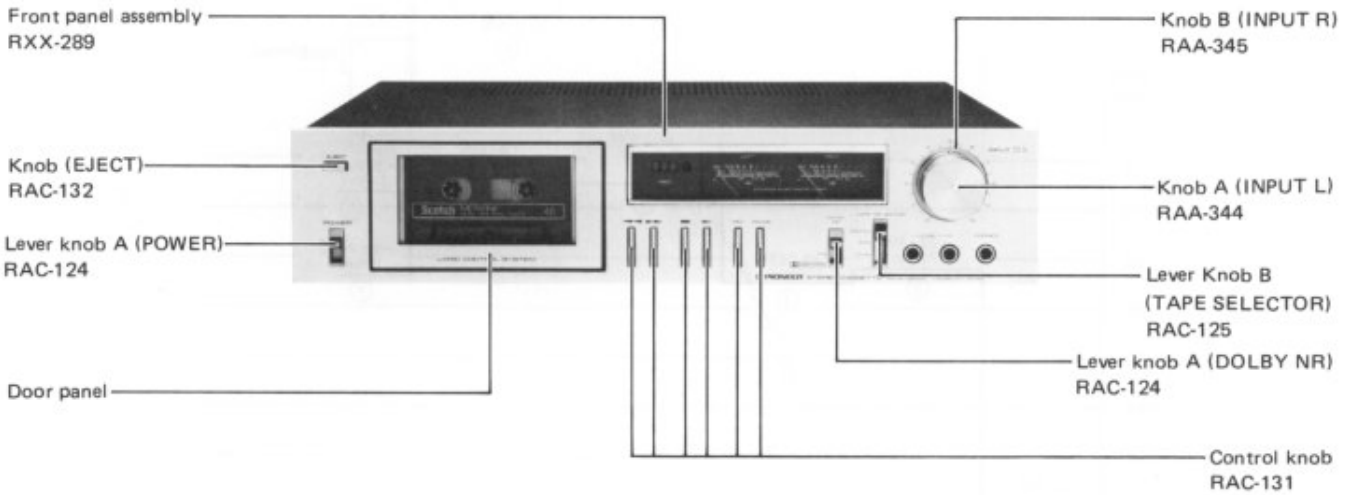
## Recording Mode



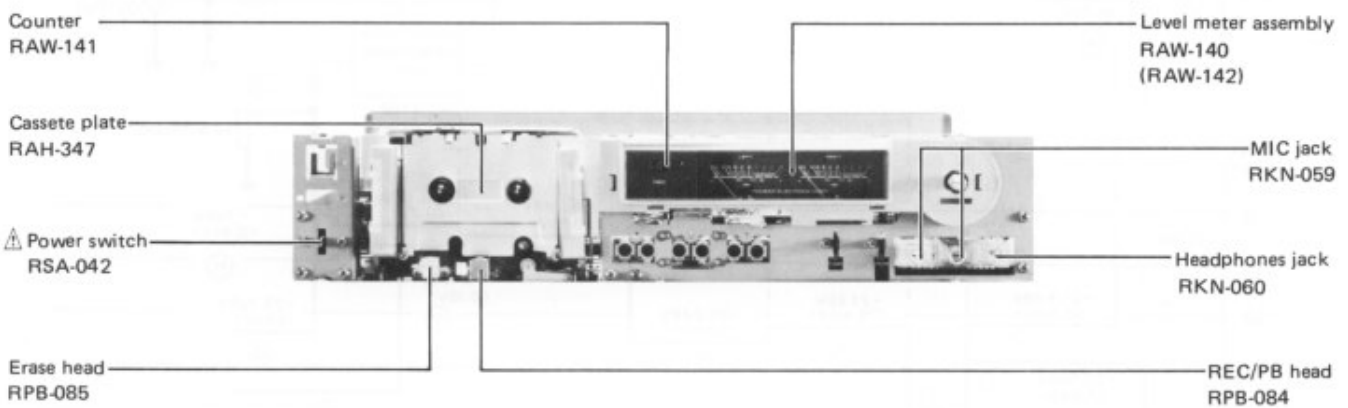
## 5. PARTS LOCATION

### Front Panel View

- The  mark found on some component parts indicates of the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

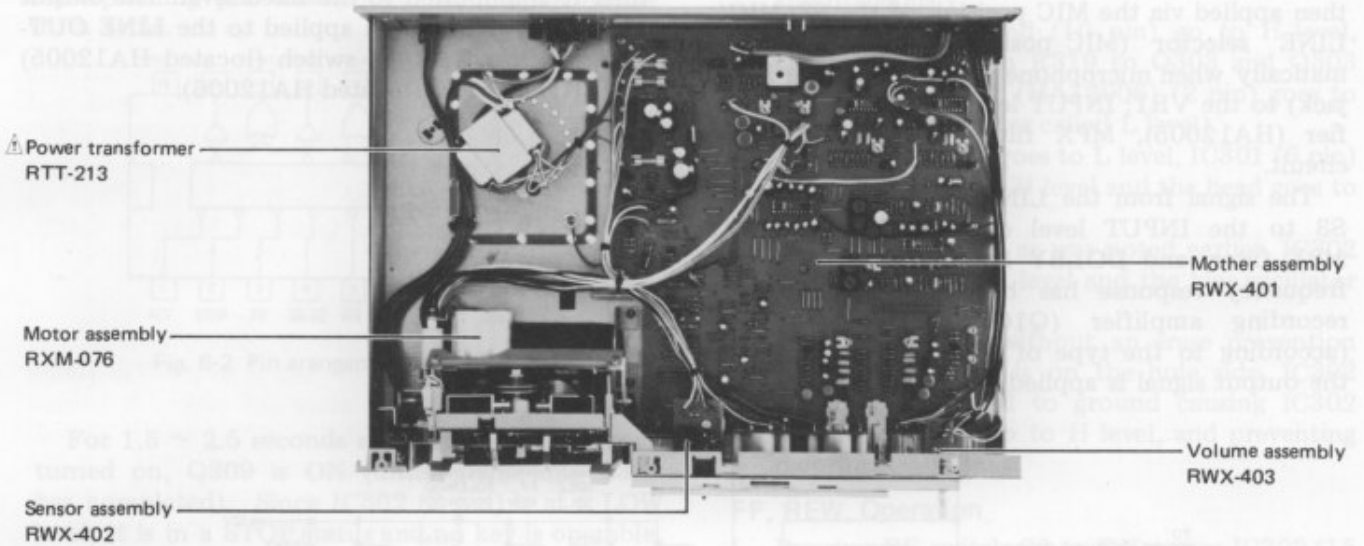


### Front View with Front Panel Removed





**Top View with Bonnet Removed**



**Rear Panel View**

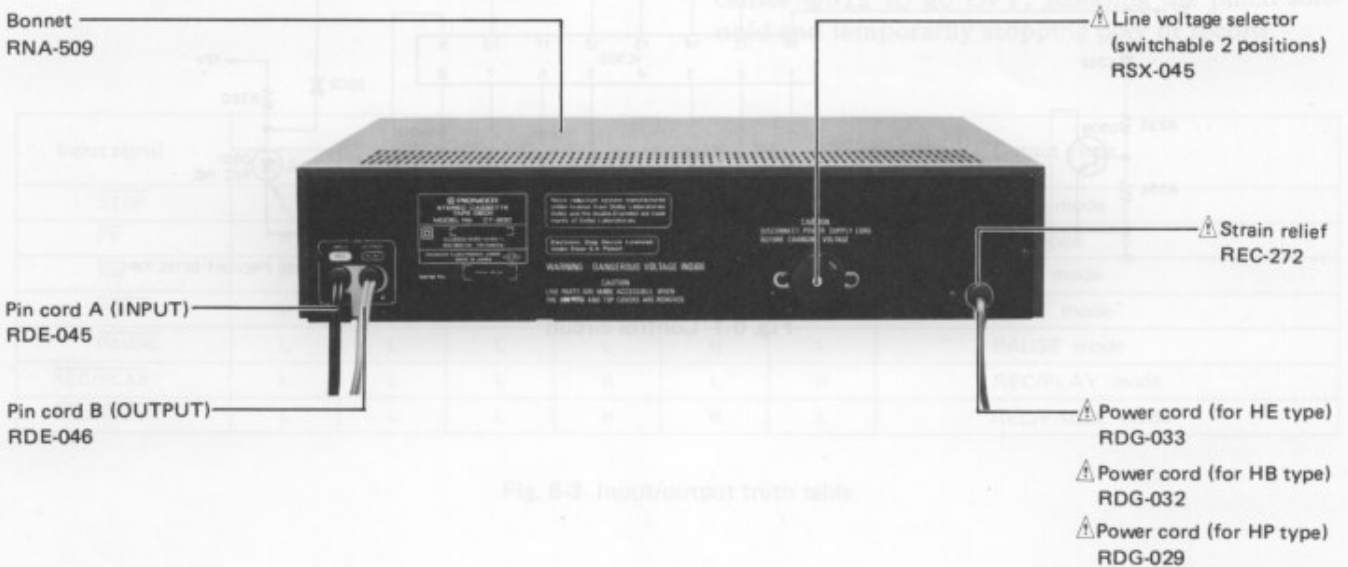


Fig. 5-3 Input/output truth table

## 6. CIRCUIT DESCRIPTIONS

### 6.1 SIGNAL PATHS

#### Recording Mode

The signal from MIC is first amplified to the fixed level by the MIC amplifier (HA12005) and then applied via the MIC position of the S3; MIC/LINE selector (MIC position switched in automatically when microphone plugged into the MIC jack) to the VR1; INPUT level control, flat amplifier (HA12005), MPX filter, and DOLBY NR circuit.

The signal from the LINE INPUT is passed via S3 to the INPUT level control, flat amplifier, MPX filter, and DOLBY NR circuit. After the frequency response has been equalized by the recording amplifier (Q104) equalizer circuit (according to the type of tape being employed), the output signal is applied to the recording head.

#### Play Mode

The signal from the playback head is first equalized in the playback equalizer amplifier (HA12005) according to the type of tape being employed, and then it is amplified to the fixed level. The output of DOLBY NR is then applied to the LINE OUTPUT via the REC/PB switch (located HA12005) and MUTE switch (located HA12006).

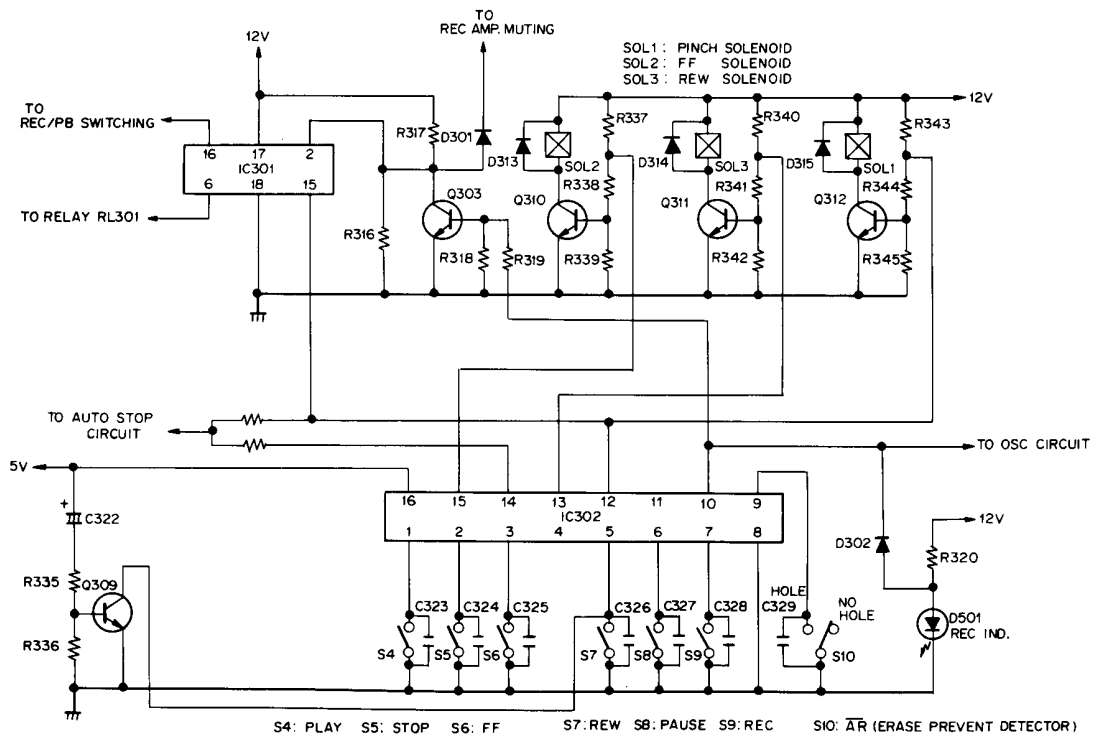


Fig. 6-1 Control circuit

### 6.2 CONTROL CIRCUIT

The control circuit employed in this tape deck IC302(BA843) for use in the electronic control of the switching. See Fig. 6-2 and Fig. 6-3 for the corresponding pin arrangement and input/output truth table.

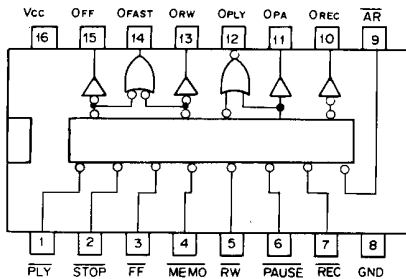


Fig. 6-2 Pin arrangement of BA843

For 1.5 ~ 2.5 seconds after the power has been turned on, Q309 is ON (until charge-amp C322 has completed). Since IC302 (2 pin) is at a LOW level, it is in a STOP status and no key is operable.

#### Play Operation

1. When play switch S4 is pressed ON, IC302 (12 pin) goes to a high level (hereafter called H level). This causes +B to flow through R343, R344, and Q312, turning Q312 ON.
2. The pinch solenoid (P.S.) is activated starting play operation.

#### Record Operation

1. Loading a cassette with an erase prevention detector ( $\overline{AR}$  SW S10 is on no hole side), press play switch S4 and record switch S9 simultaneously.
2. IC302 (12 pin) and (10 pin) go to H level, current flows from R319 to Q303 and Q303 comes ON. IC301 (HA12006) (2 pin) goes to a low level (hereafter called L level).
3. As IC301 (2 pin) goes to L level, IC301 (6 pin) and (16 pin) go to H level and the head goes to a record status.
4. At the same time, as was noted earlier, IC302 (10 pin) goes to H level and the bias oscillator comes ON.
5. When a cassette without an erase prevention detector,  $\overline{AR}$  SW is on the hole side, IC302 (9 pin) is shorted to ground causing IC302 (10 pin) not to go to H level, and preventing recording.

#### FF, REW, Operation

1. Pressing FF switch S6 to ON causes IC302 (15 pin) to go to H level. +B flows through R337, R338, and Q310 and Q310 comes ON.
2. FFS (Fast Forward Solenoid) becomes operative and FF operation begins.
3. Rewind operation is essentially the same as FF.

#### Pause Operation

When either in the play or record mode, pressing the pause switch S8 to ON causes IC302 (12 pin) to go from an H level to an L level. This causes Q312 to go OFF, releasing the pinch solenoid and temporarily stopping play or record.

Input signal	Output						Output mode
	0→FAST	0→FF	0→RW	0→REC	0→PAUSE	0→PLAY	
$\overline{STOP}$	L	L	L	L	L	L	STOP mode
$\overline{FF}$	H	H	L	L	L	L	FF mode
$\overline{RW}$	H	L	H	L	L	L	REW mode
$\overline{PLAY}$	L	L	L	L	L	H	PLAY mode
$\overline{PAUSE}$	L	L	L	L	H	L	PAUSE mode
$\overline{REC/PLAY}$	L	L	L	H	L	H	REC/PLAY mode
$\overline{REC/PAUSE}$	L	L	L	H	H	L	REC/PAUSE mode

Fig. 6-3 Input/output truth table

**Auto-stop Circuit**

When the tape has reached the end of its travel, the control IC goes into the STOP mode, stopping the mechanism. A photo-interruptor is used as the tape travel sensor. It is connected by belt to the take-up reel and uses fan blades to intercept the path of light.

1. During tape travel, the turning of the fan causes the photo-interruptor to generate a pulse signal. This causes Q304 to cycle ON-OFF and C321 repeats a charge-discharge cycle.
2. When tape travel stops, the signal from the photo-interruptor is lost, and Q304 stops its switching operation. +B charges C321 by route of R326 → R327 → C321. Along with the charging of C321, the potential at the base of Q305 rises and Q305 goes OFF. When Q305 goes OFF, Q306 goes ON, IC302 goes to STOP mode and operation ceases. This circuit is only effective during PLAY, FF and REW operations.

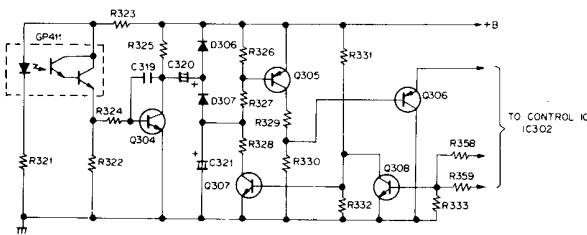


Fig. 6-4 Auto-stop circuit

**6.3 MUTING CIRCUIT**

This set uses an IC-HA12006 for line output muting. This IC (IC301) is only effective in muting when REC input (2 pin) is at H level at the same time PLAY input (15 pin) is at L level. [IC301 (12 pin) goes L level]

**FF/REW/STOP**

At FF, REW, and STOP, IC302 (10 pin) and (12 pin) are both at L level. When IC302 (12 pin) is at L level, IC301 (15 pin) is also at L level, and when IC302 (10 pin) is at L level, Q303 is OFF. This causes IC302 (2 pin) to go to H level, muting LINE OUT, and current to flow from IC301 (2 pin) through the route D301 → R154 → Q103, muting the record amp.

**Turning the Power Switch ON**

When the power switch is turned ON, as was mentioned previously, the set is in a STOP status for 1.5 ~ 2.5 seconds after the power is turned on, and LINE OUT and the record amp is muted. Also current flows through the route C334 → R360 → R161 → Q106 and Q106 goes ON. The meter is muted until C334 is charged up and Q106 goes to OFF.

**Going from STOP Status to PLAY**

When going from STOP to PLAY, IC302 (12 pin) goes from L level to H level and through C315 → R349 → D304, sends current to IC301 (1 pin), muting LINE OUT. Muting continues until C315 is charged up. (approx. 0.6 sec.)

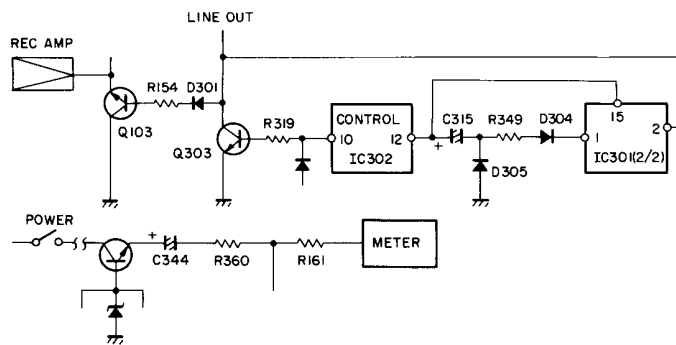
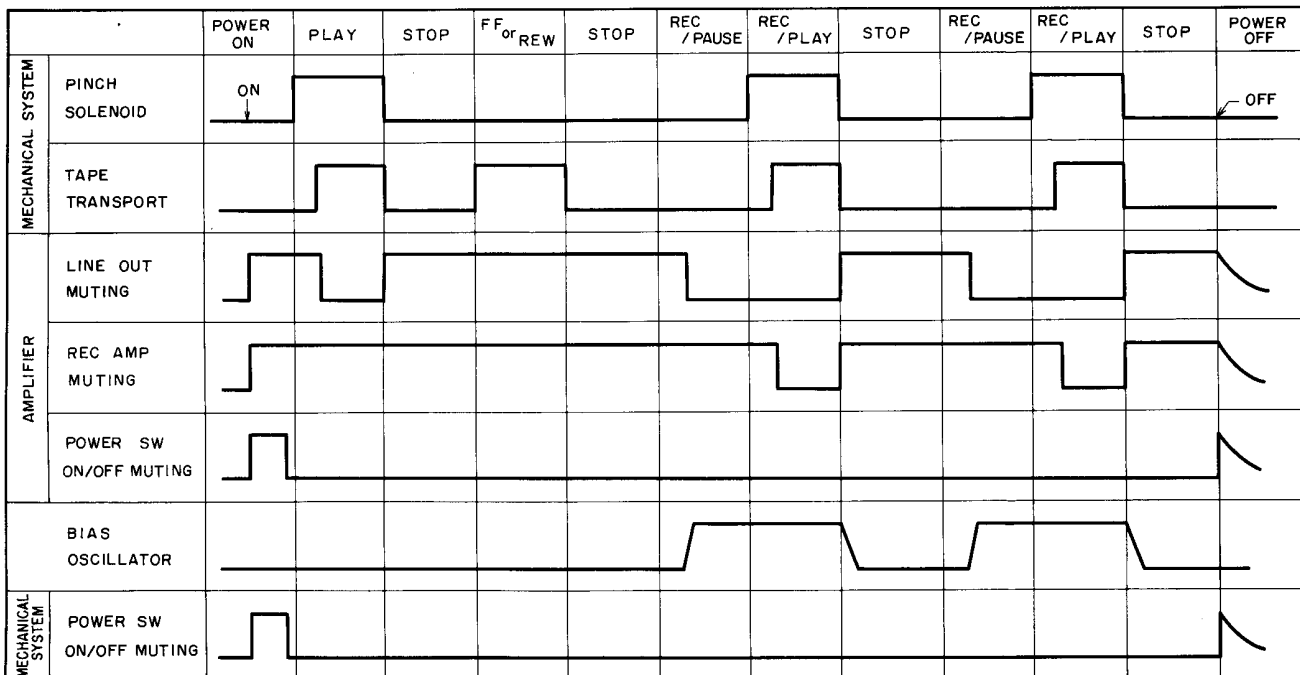


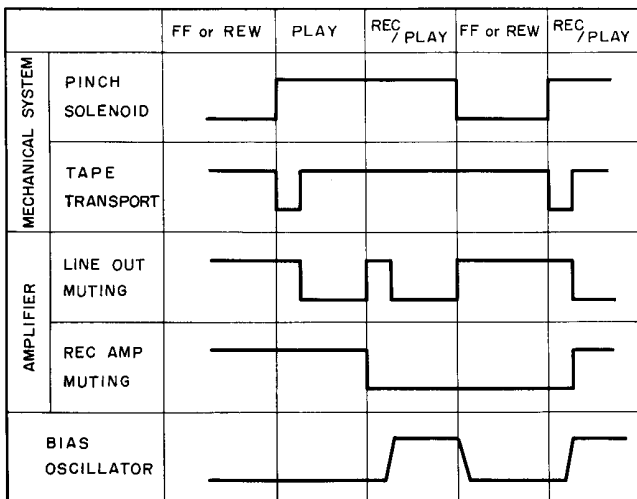
Fig. 6-5 Muting circuit

### 6.4 TIMING CHART

#### NORMAL OPERATION



#### DIRECT CHANGE



## 7. MECHANICAL ADJUSTMENTS

### 7.1 PINCH ROLLER PRESSURE ADJUSTMENT

1. Put the tape deck into the playback mode.
2. Gently push against the pinch roller arm with the tension gauge (Part No. CGK-047) and separate the pinch roller slightly from the capstan.
3. Then the pinch roller back onto the capstan, and read the value when the pinch roller starts to rotate. If the reading fails to lie within 350g ~ 550g, replace the pinch roller pressure spring (Part No. RBH-760).

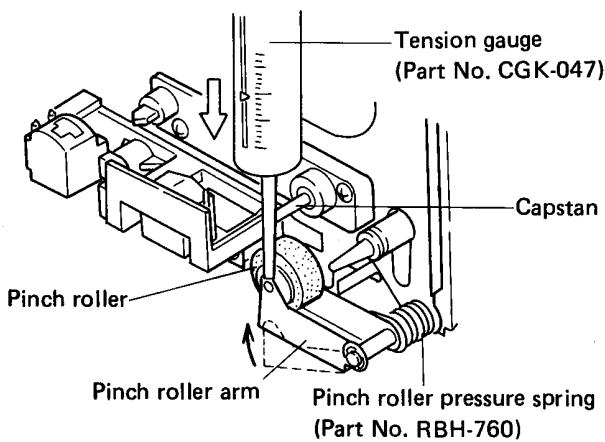


Fig. 7-1 Pinch roller pressure adjustment

### 7.2 REEL BASE TORQUE ADJUSTMENT

#### Prior to adjustment

Clean the both reel base, the capstan and the pinch roller with an alcohol moistened swab.

#### Adjustment

Measure the torque with the torque meter during playback, fast forward (FF) and rewind (REW) modes. The measured values should normally lie within the allowable ranges listed in the table 1.

If the measured values lie outside the relevant ranges, replace the TU (take-up) reel base assembly and/or supply reel base assembly (Part No. RXB-377), or driving arm full assembly (Part No. RXB-376).

#### Torque meter

Part No.	Description	Remarks
STD-605	Cassette test tape	FF/REW torque adjustment

Table 1

	TU reel base	Supply reel base
Playback mode	35~50g.cm	* 2 ~ 5g.cm
FF mode	72~110g.cm	* 2 ~ 5g.cm
REW mode	* 2~5g.cm	72 ~ 110g.cm

### 7.3 TAPE SPEED ADJUSTMENT

1. Connect the frequency counter to the OUTPUT terminals (to pin code).
2. Playback the 3kHz portion of the STD-301 test tape. At the beginning, the frequency should be lie within the 2995Hz ~ 3010Hz range, and may be adjusted by turning the semi-fixed resistor located in the capstan motor adjustment hole as shown in Fig. 7-2.

*Tape speed is increased by turning the semi-fixed resistor clockwise, and decreased by turning counter-clockwise.*

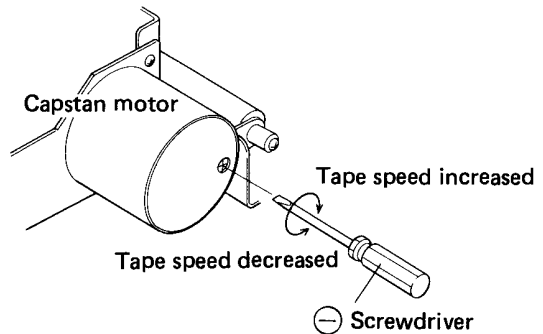


Fig. 7-2 Tape speed adjustment

### 7.4 REC DETECTOR SWITCH ADJUSTMENT

Adjust the tang (⊕) shown in Fig. 7-3 by the arrow to a position where when a cassette with an erase prevention detector is loaded into the holder, the lever switch is ON, and when a cassette without the detector is loaded, the switch is OFF.

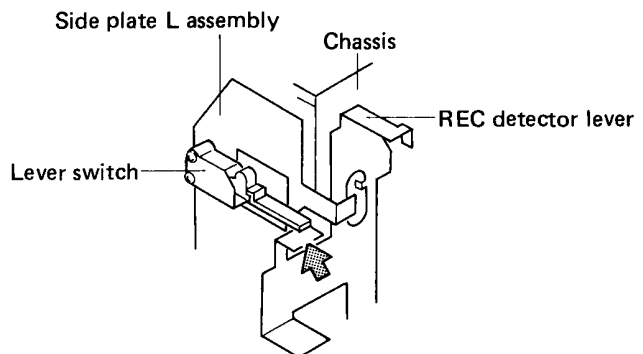


Fig. 7-3 REC detector switch adjustment

**7.5 FF SOLENOID ADJUSTMENT**

1. Put the deck into FF mode.
2. Loosen screws ❶ and adjust the FF solenoid mounting position so that the square hole of the reel base full assembly is flush against the boss of the driving arm full assembly (i.e. 0 separation) as shown in Fig. 7-4.

**7.6 REW SOLENOID ADJUSTMENT**

1. Put the deck into REW mode.
2. Loosen screws ❷ and adjust the REW solenoid mounting position so that the square hole of the reel base full assembly is flush against the boss of the driving arm full assembly (i.e. 0 separation) as shown in Fig. 7-4.

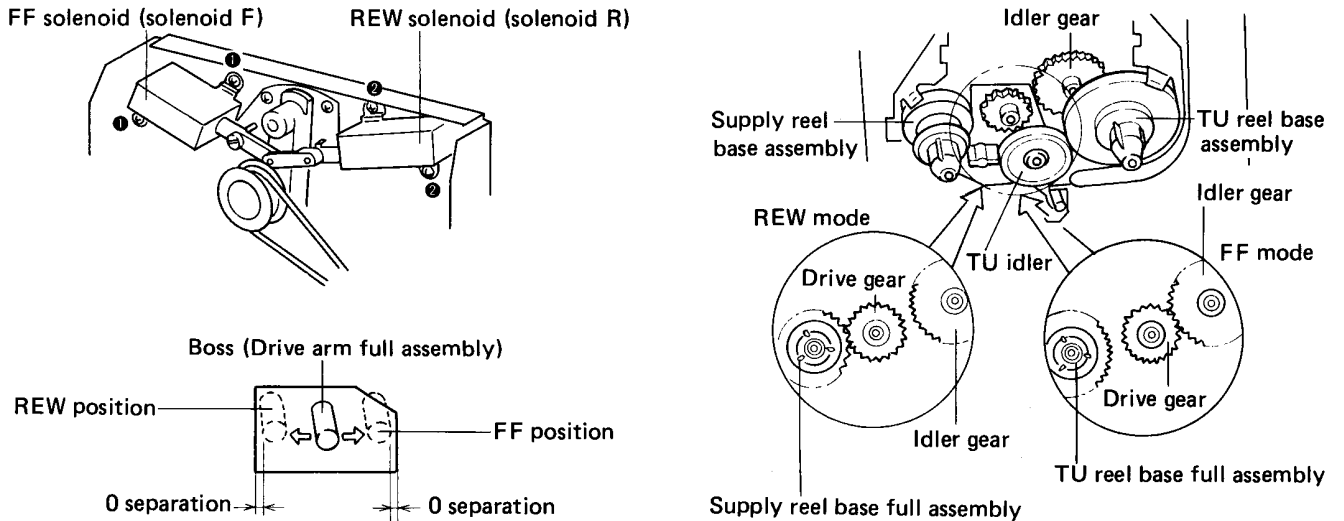


Fig. 7-4 FF (REW) solenoid adjustment

## 8. ELECTRICAL ADJUSTMENTS

### Precaution

1. Mechanical adjustment should be completed.
2. Clean the following parts with an alcohol moistened swab: Record/Playback head, Pinch roller, Erase head, Rubber belts and Capstan.
3. Demagnetize record/playback head with a head demagnetizer.
4. Do not use magnetized screwdriver for adjustments.
5. Adjustments and measurements should be performed for both L-ch and R-ch with rated power supply voltage.
6. Adjustments should be performed in the order given in this service manual. Altering the order can hinder proper adjustments, resulting in loss of performance.
7. Level during measurements are based on 0dBv=1V. Connect a 50kΩ dummy resistor across the OUTPUT terminals.
8. Let the CT-200 warm up (aging) for a few minutes before proceeding with the adjustment.
9. Set the DOLBY NR switch OFF unless directed otherwise.

### Test Equipment/Tools Required;

1. Test tape  
 STD-331A ..... for general playback purpose  
 STD-341A ..... for playback adjustment  
 STD-601 ..... NORMAL blank tape  
 STD-603 ..... CrO<sub>2</sub> blank tape  
 STD-604 ..... METAL blank tape
2. Audio oscillator
3. AC millivoltmeter (AC mV)
4. Attenuator
5. Oscilloscope
6. Resistor 50kΩ (1/4W)

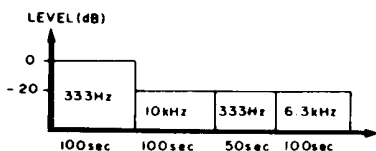


Fig. 8-1 Contents of the test tape STD-341A

### 8.1 HEAD AZIMUTH ADJUSTMENT

#### Setting:

- MODE ..... Playback  
 TAPE SELECTOR ..... NORM  
 VR101, VR201..... Max.  
 TEST TAPE ..... STD-341A  
 AC mV meter ..... OUTPUT terminals

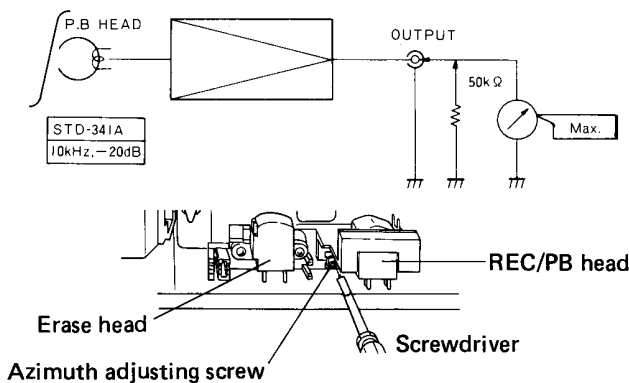


Fig. 8-2 Head azimuth adjustment

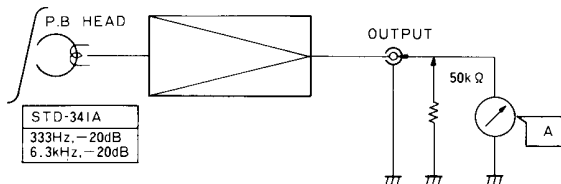
#### Procedure:

Adjust the azimuth adjusting screw for maximum AC mV meter readings for both L and R channels.

### 8.2 PLAYBACK EQUALIZER CHECK

#### Setting:

- MODE ..... Playback  
 TAPE SELECTOR ..... NORM, METAL (or CrO<sub>2</sub>)  
 TEST TAPE ..... STD-341A  
 AC mV meter ..... OUTPUT terminals



	Position	A
1	NORM	333Hz level-6,3kHz level=+0.5dB±1dB
2	METAL	333Hz level-6,3kHz level=-3.5dB±1dB



**Procedure:**

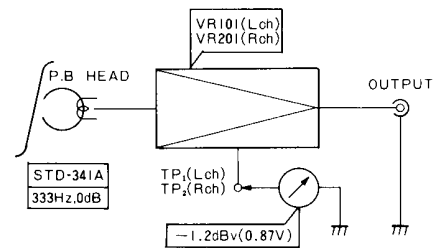
1. Set the TAPE SELECTOR to the NORM position. Playback the 333Hz and 6.3kHz portions of the STD-341A test tape, and check that the difference in output level between two is  $+0.5\text{dB} \pm 1\text{dB}$ .
2. Next set the TAPE SELECTOR to the METAL (or CrO<sub>2</sub>) position. Playback the 333Hz and 6.3kHz portions of the STD-341A test tape, and check that the difference in output level between two is  $-3.5\text{dB} \pm 1\text{dB}$ .

**8.3 PLAYBACK LEVEL ADJUSTMENT**

Since this adjustment determines the DOLBY NR level during playback, it should be performed precisely.

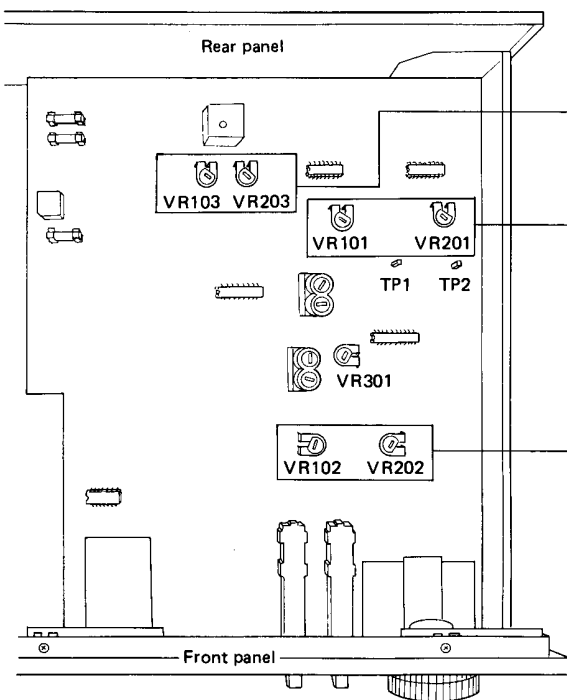
**Setting:**

- MODE ..... Playback  
 TAPE SELECTOR ..... NORM  
 TEST TAPE ..... STD-341A  
 AC mV meter ..... TP1(Lch) and TP2(Rch) of the mother assembly



**Procedure:**

Adjust the VR101 (Lch) and VR201 (Rch) so that the AC mV meter reads  $-1.2\text{dBv}$  (0.87V).



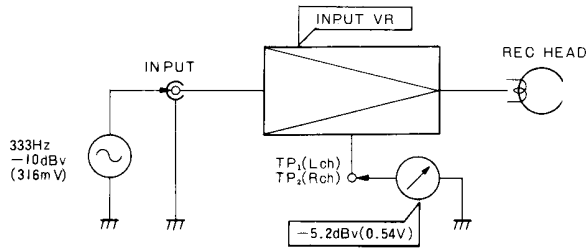
ITEM	ADJ. POINT
8.5 RECORDING/PLAYBACK FREQUENCY RESPONSE ADJUSTMENT	VR103 (L ch), VR203 (R ch)
8.3 PLAYBACK LEVEL ADJUSTMENT	VR101 (L ch), VR201 (R ch)
8.6 RECORDING LEVEL ADJUSTMENT	VR102 (L ch), VR202 (R ch)

Fig. 8-3 Adjustment points

### 8.4 LEVEL METER CHECK

#### Setting:

MODE ..... Record  
 Input signal (INPUT) ... 333Hz, -10dBv (316mV)  
 AC mV meter ..... TP1(Lch) and TP2(Rch)  
 of the mother assembly



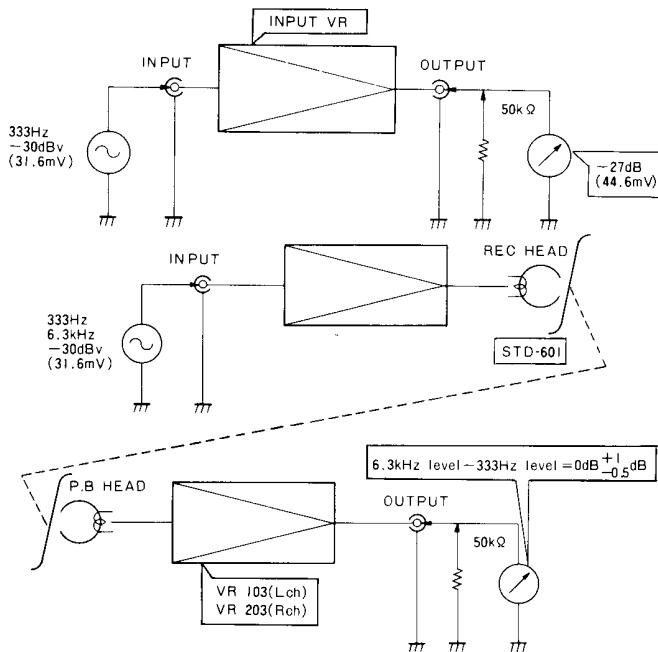
#### Procedure:

Adjust the INPUT level control so that the AC mV meter reads -5.2dBv (0.54V). Then check the level meter reads 0dB ± 1dB.

### 8.5 RECORDING/PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

#### Setting:

MODE ..... Record  
 TAPE SELECTOR ..... NORM  
 INPUT SIGNAL (INPUT) 333Hz, -30dBv (31mV)  
 TEST TAPE ..... STD-601  
 AC mV meter ..... OUTPUT terminals

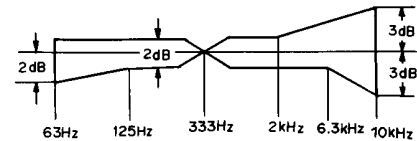


#### Procedure:

1. Set the TAPE SELECTOR to the NORM position. Apply the 333Hz, -30dBv (31mV) signal to the INPUT terminals, and adjust the INPUT level control so that the AC mV meter reads -27dBv (44.6mV).
2. Record the 333Hz and 6.3kHz signals onto the STD-601 test tape. Playback the tape and adjust the VR103 (Lch) and VR203 (Rch) so that the AC mV meter reads 0dB. Then confirm that the playback output deviation of the 6.3kHz signal is within 0dB ± 0.5 dB of the 333Hz signal.

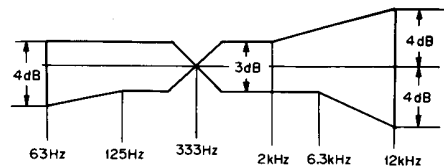
#### Frequency Response

Using STD-331A and the TAPE SELECTOR NORM position, with DOLBY NR OFF  
 However, the right channel is compensated by -1dB at 63Hz, and -0.5dB at 125Hz because of the insulation effect.

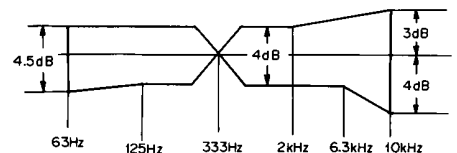


#### Overall Frequency Response

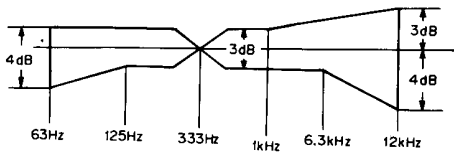
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR OFF



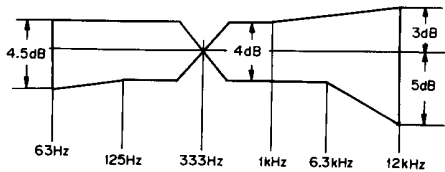
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR ON



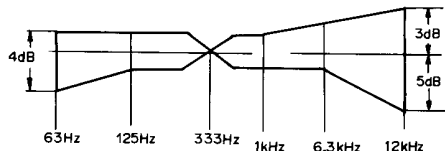
Using STD-603 and TAPE SELECTOR CrO<sub>2</sub> position, with DOLBY NR OFF



Using STD-603 and TAPE SELECTOR CrO<sub>2</sub> position, with DOLBY NR ON



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR OFF



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR ON

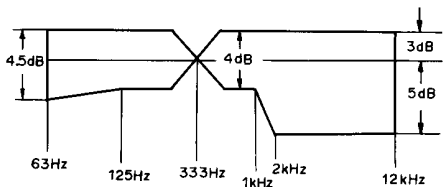


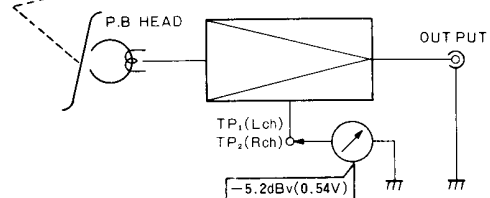
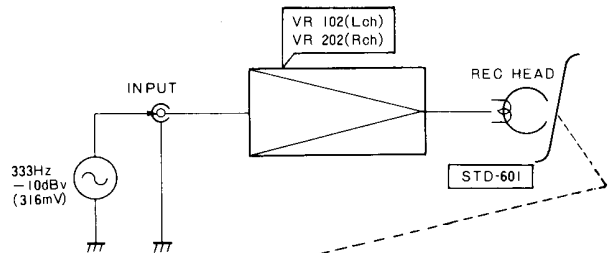
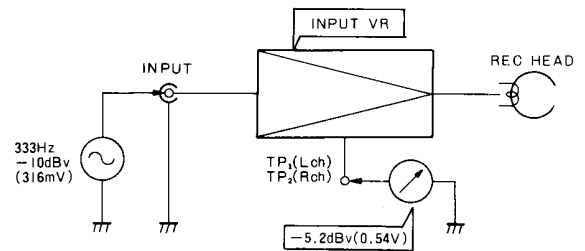
Fig. 8-4 Frequency response

## 8.6 RECORDING LEVEL ADJUSTMENT

Since this adjustment determines the DOLBY NR level during recording, it should be performed precisely.

### Setting:

MODE ..... Record  
 TAPE SELECTOR ..... NORM, CrO<sub>2</sub>, METAL  
 INPUT SIGNAL (INPUT) 333Hz, -10dBv(316mV)  
 TEST TAPE ..... STD-601, STD-603,  
 STD-604  
 AC mV meter ..... TP1(Lch) and TP2(Rch)  
 of the mother assembly  
 DOLBY NR SWITCH ... OFF → ON



### Procedure:

1. Set the TAPE SELECTOR to the NORM and DOLBY NR switch to the OFF position. Apply the 333Hz signal to the INPUT terminals, and adjust the INPUT level control so that the AC mV meter reads -5.2dBv (0.54V).
2. Next the DOLBY NR switch to the ON position and record the 333Hz signal onto the STD-601 test tape. Playback the signal and adjust the VR102 (Lch) and VR202 (Rch) so that the AC mV meter reads -5.2dBv (0.54V).
3. Set the TAPE SELECTOR to the CrO<sub>2</sub> position and record the 333Hz signal onto the STD-603 test tape. Playback signal and check that the AC mV meter reads -5.2dBv (0.54V) ±1.5dB.
4. Set the TAPE SELECTOR to the METAL position and record the 333Hz signal onto the STD-604 test tape. Playback signal and check that the AC mV meter reads -6.2dBv (0.48V) ±1.5dB.

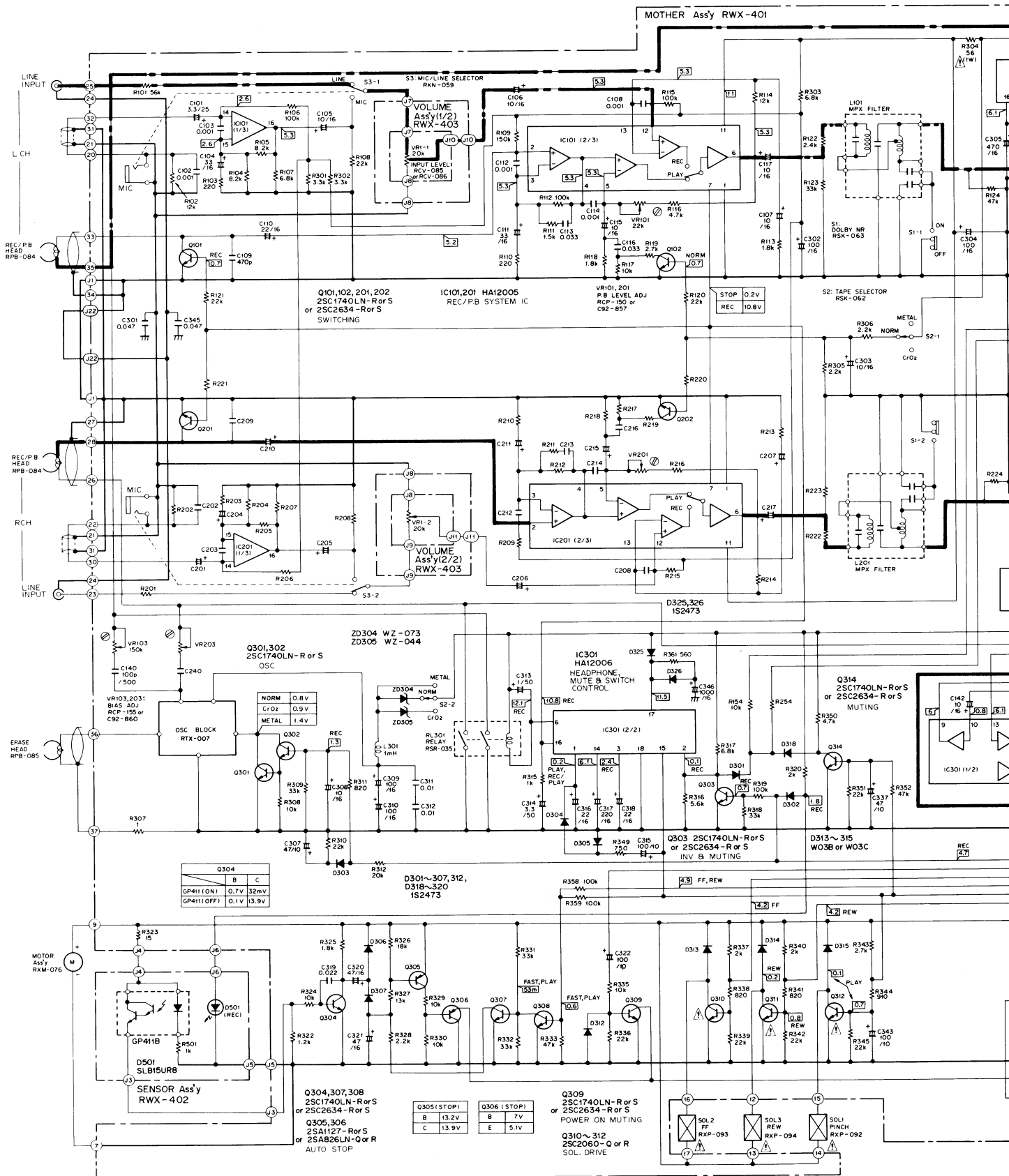
# 9. SCHEMATIC DIAGRAM

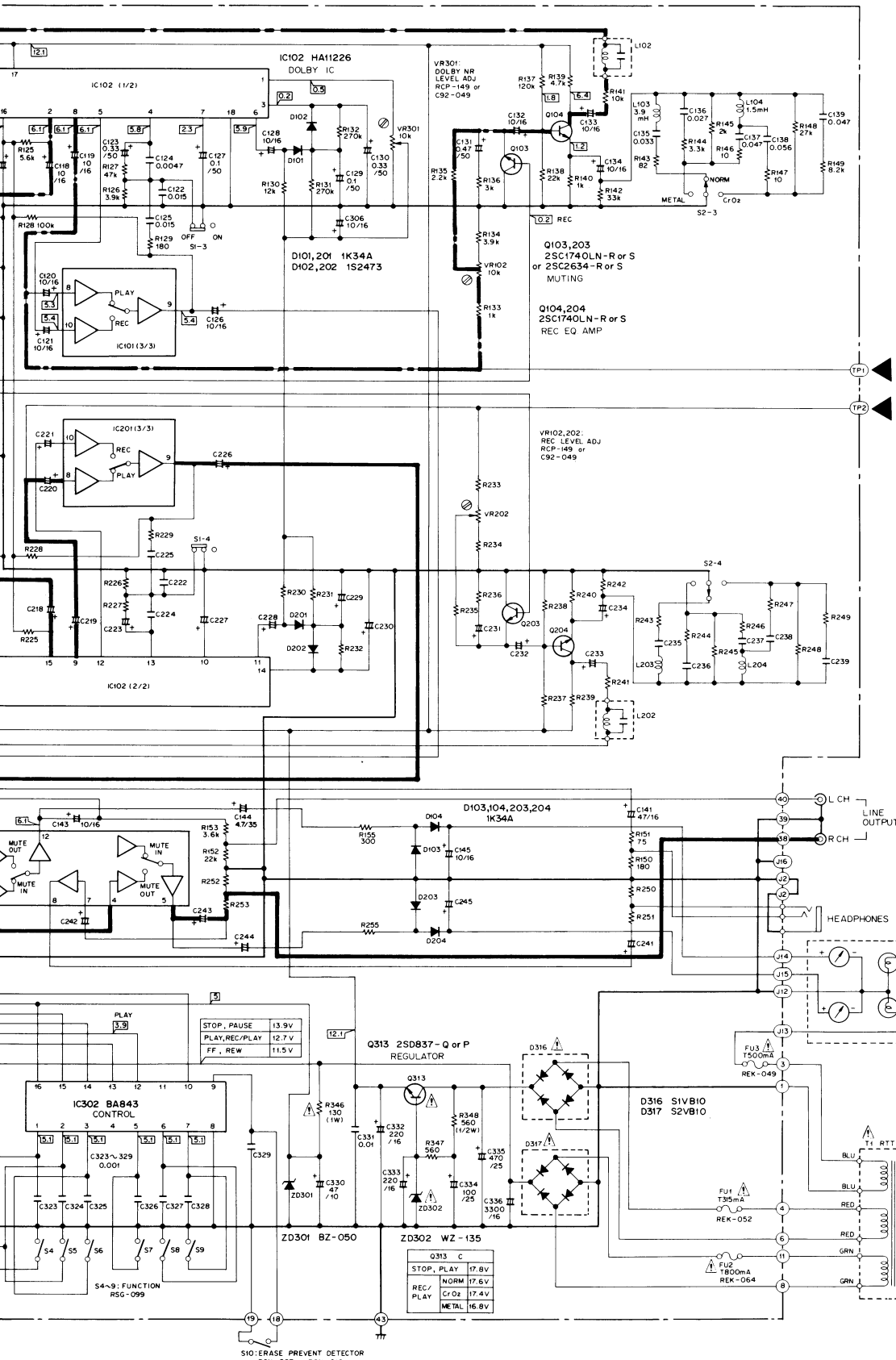
A

B

C

D





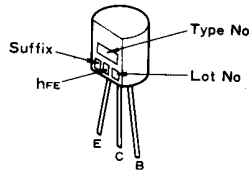
- 1. RESISTORS:  
Indicated in Ω, kΩ, MΩ, (F) : 1%, (G) : 2%, (K) : 10% tolerance
- 2. CAPACITORS:  
Indicated in capacity (p, n, μF) voltage (V) unless otherwise noted p : pF  
Indication without voltage is 50V except electrolytic capacitor.
- 3. VOLTAGE  
□ DC voltage (V) at no input signal
- 4. OTHERS  
⊗ Adjusting point  
The ▲ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- SWITCHES:  
S1 : DOLBY NR ON - OFF  
S2 : TAPE SELECTOR METAL - NORM - CrO<sub>2</sub>  
S3 : MIC/LINE SELECTOR MIC - LINE  
S4 : PLAY ON - OFF  
S5 : STOP ON - OFF  
S6 : FF ON - OFF  
S7 : REW ON - OFF  
S8 : PAUSE ON - OFF  
S9 : REC ON - OFF  
S10 : ERASE PREVENT DETECTOR NO HOLE - HOLE  
S11 : POWER ON - OFF  
S12 : LINE VOLTAGE SELECTOR 220V - 240V

The underlined indicates the switch position.  
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

*Note;*  
Playback signal route  
Recording signal route

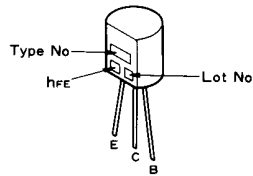
External Appearance of Transistors and ICs

2SA826LN  
2SC1740LN

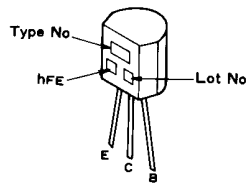


A

2SA1127  
2SC2634

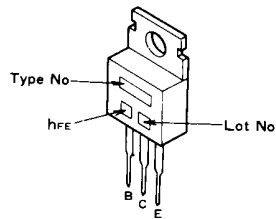


2SC2060

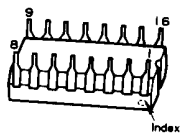


B

2SD837

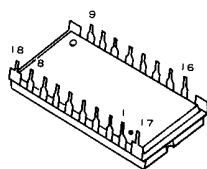


HA12005  
HA12019  
BA843



C

HA11226  
HA12006



D

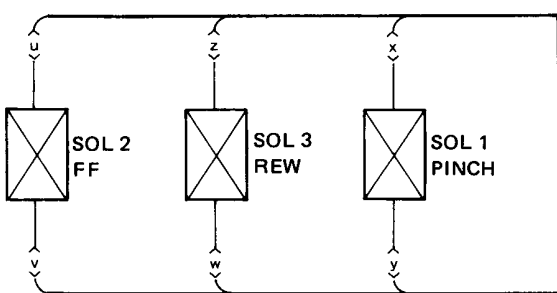
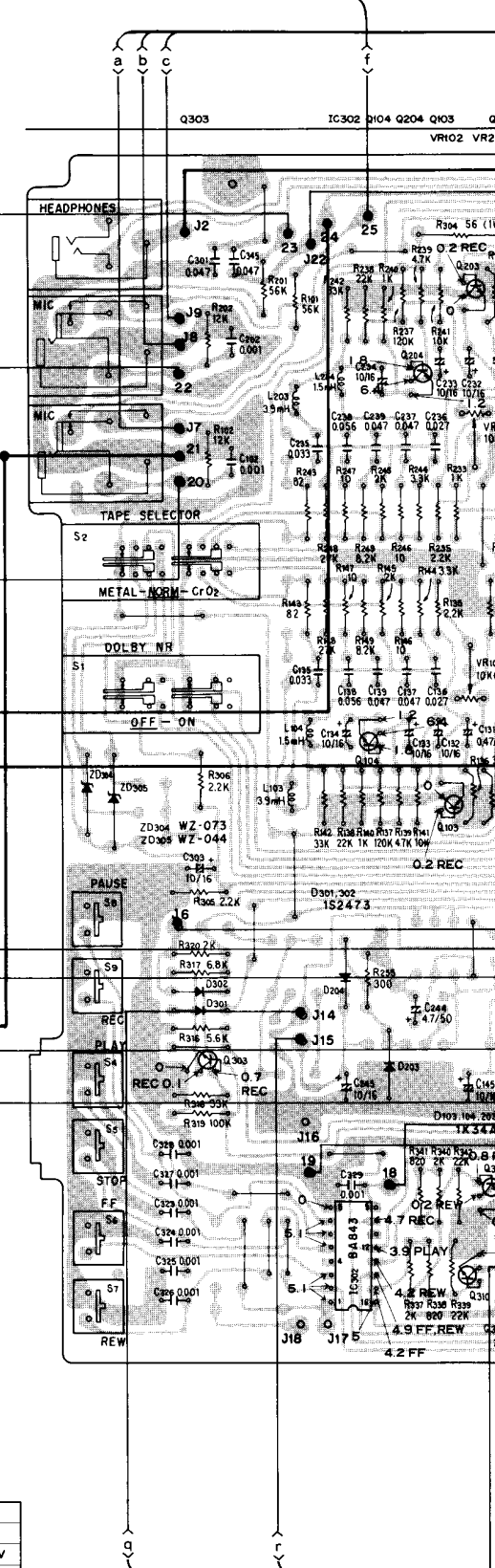
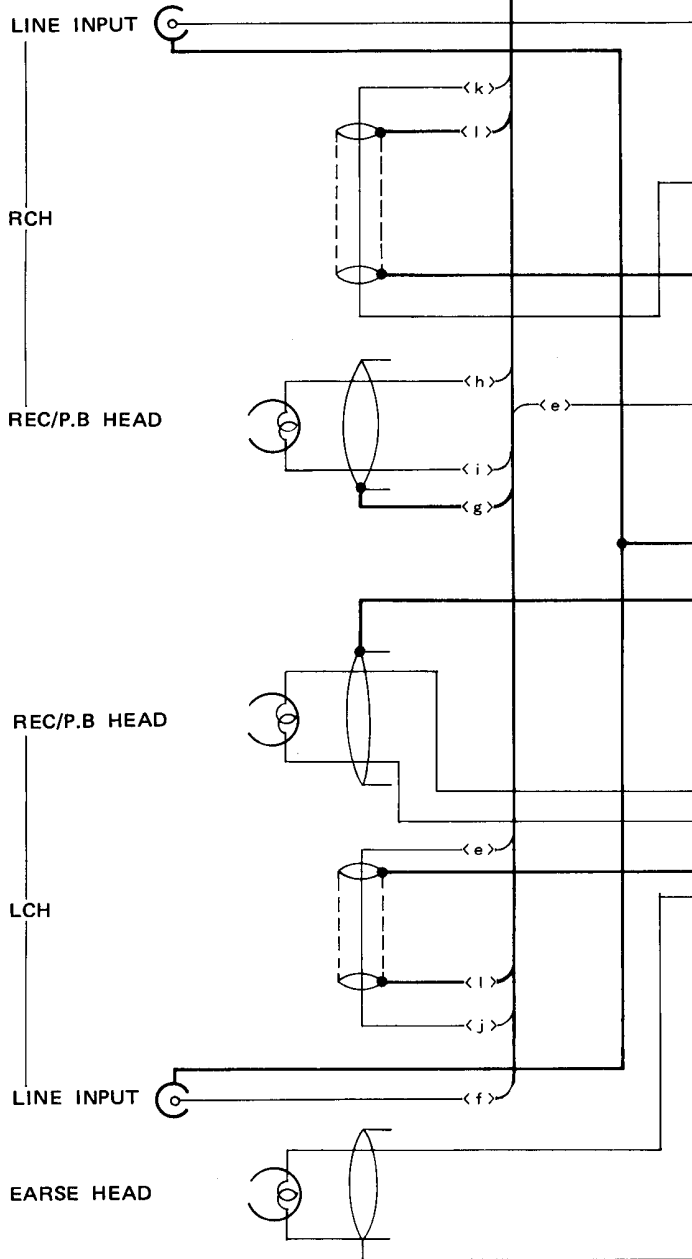
# 10. P.C. BOARD CONNECTION DIAGRAM

A

B

C

D



Q340		
	B	C
GP411 (ON)	0.7	32mV
GP411 (OFF)	0.1	13.9

1

2

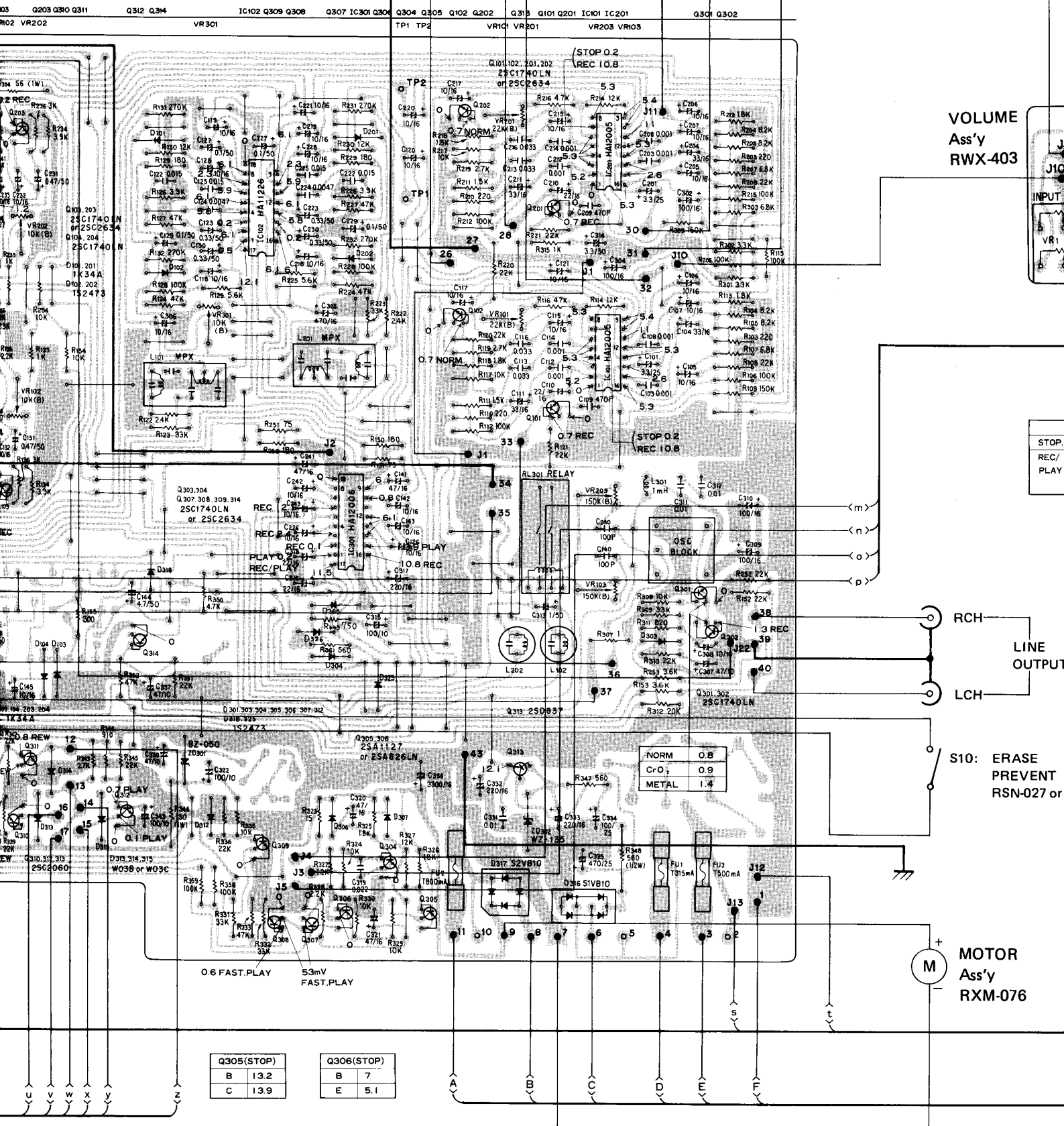
3

1

2

3

MOTHER Ass'y RWX-401



VOLUME Ass'y RWX-403



STOP REC/PLAY

RCH  
LCH  
LINE OUTPUT

S10: ERASE PREVENT RSN-027 or

MOTOR Ass'y RXM-076

Q305(STOP)	
B	13.2
C	13.9

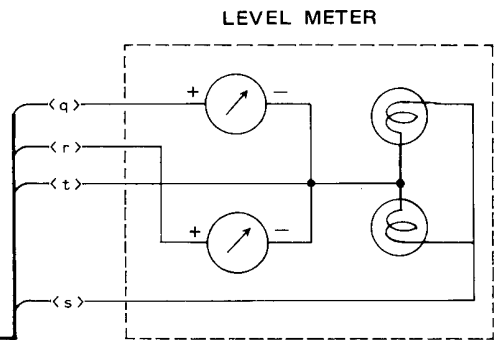
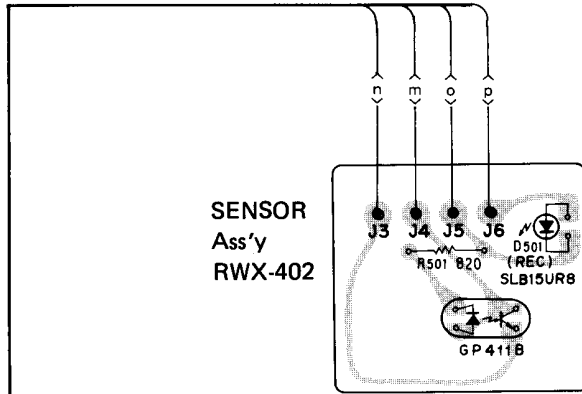
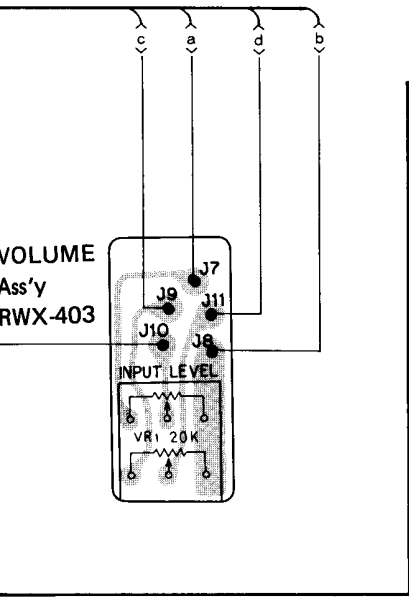
Q306(STOP)	
B	7
E	5.1



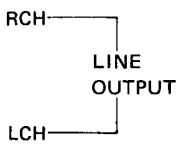
7

8

9

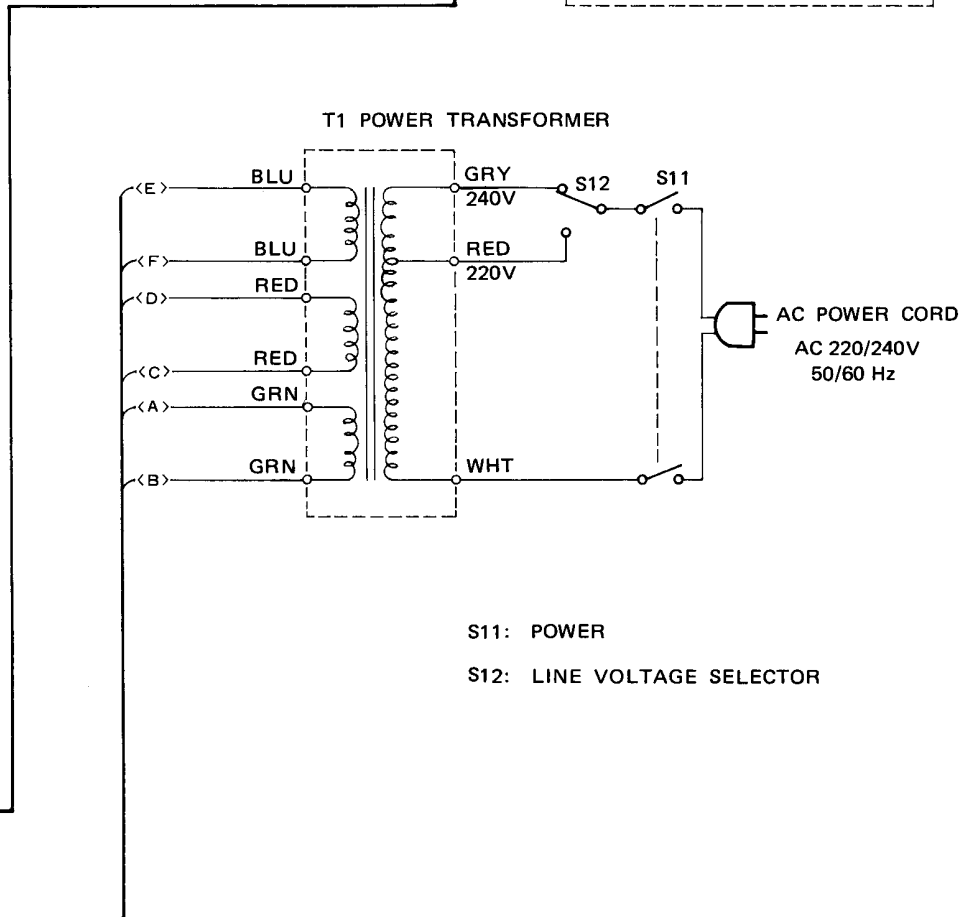


Q313 C		
STOP,PLAY		17.8
REC/PLAY	NORM	17.6
	Cr-O <sub>2</sub>	17.4
	METAL	16.8



S10: ERASE PREVENT DETECTOR  
RSN-027 or RSN-010

MOTOR Ass'y  
RXM-076



S11: POWER

S12: LINE VOLTAGE SELECTOR

7

8

9

# 11. PARTS LIST

**NOTE:**

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω — 56 × 10<sup>1</sup> — 561 . . . . . RD¼PS 561 J  
 47kΩ — 47 × 10<sup>3</sup> — 473 . . . . . RD¼PS 473 J  
 0.5Ω — 0R5 . . . . . RN2H 0R5 K  
 1Ω — 010 . . . . . RS1P 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10<sup>1</sup> 5621 . . . . . RN¼SR 5621 F

**Miscellaneous Parts List**

**P.C. BOARD ASSEMBLIES**

Part No.	Symbol & Description
RWX-401	Mother assembly
RWX-402	Sensor assembly
RWX-403	Volume assembly

**OTHERS**

Part No.	Symbol & Description
△ RTT-213	T1 Power transformer
△ RDG-033	Power cord (for HE type)
△ RDG-032	Power cord (for HB type)
△ RDG-029	Power cord (for HP type)
△ REC-272	Strain relief

**SWITCHES**

Part No.	Symbol & Description
△ RSA-042	S11 Power switch
△ RSX-045	S12 Line voltage selector (switchable 2 positions)

RXX-289	Front panel assembly
RAW-140 (RAW-142)	Level assembly

**MOTHER Assembly (RWX-401)**

**SWITCHES**

Part No.	Symbol & Description
RSK-063	S1 Lever switch B (DOLBY NR)
RSK-062	S2 Lever switch A (TAPE SELECTOR)
RKN-059	S3 Mic jack
RSG-099	S4-S9 Push switch
RKN-060	Headphones jack

**CAPACITORS**

Part No.	Symbol & Description
CEANL 3R3M 25	C101,C201
CEANL 220M 16	C110,C210
CEA OR10M 50	C127,C129,C227,C229
CEA OR33M 50	C123,C130,C223,C230
CEA OR47M 50	C131,C231
CEA 3R3M 50	C314
CEA 010M 50	C313
CEA 471M 25	C335
CEA 101M 25	C334
CEA 332M 16	C336
CEA 102M 16	C346
CEA 471M 16	C305
CEA 221M 16	C317,C332,C333
CEA 101M 16	C302,C304,C309,C310
CEA 470M 16	C141,C241,C320,C321
CEA 330M 16	C104,C111,C204,C211
CEA 4R7M 35	C144,C244

**OILS AND TRANSFORMER**

Part No.	Symbol & Description
RTX-007	OSC block
RSR-035	RL301 Lead relay
RTF-083	L101,L201 MPX filter block
RTF-084	L102,L202 Trap coil
RTF-085	L103,L203 Peaking coil (3.9mH)
RTF-086	L104,L204 Peaking coil (1.5mH)
RTF-057	L301 Line coil

Part No.	Symbol & Description
CEA 220M 16	C316,C318
CEA 100M 16	C105-C107, C115, C117-C121, C126, C128, C132-C134, C142-C145, C205-C207, C215, C217-C221, C226, C228, C232-C234, C242,C243,C245,C303,C306, C308
CEA 470M 10	C330, C337
CEA 101M 10	C315, C343
CQMA 563J 50	C138, C238
CQMA 473J 50	C137,C139,C237,C239
CQMA 333J 50	C135,C235
CQMA 273J 50	C136,C236
CQMA 153K 50	C122,C125,C222,C225
CQMA 472K 50	C124,C224
CQMA 102K 50	C102, C103, C108, C112, C114, C202, C203, C208, C212, C214
CQMA 333K 50	C113,C116,C213,C216
CQMA 223K 50	C319
CKDYF 473Z 50	C301,C345
CKDYF 103Z 50	C311,C312,C331
CKDYF 102Z 50	C323-C329
CCDSL 101L 500	C140,C240
CQSA 471K 50	C109,C209

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

### RESISTORS

Part No.	Symbol & Description
RCP-150 (C92-857)	VR101,VR201 Semi-fixed 22k-B
RCP-149 (C92-049)	VR102,VR202,VR301 Semi-fixed 10k-B
RCP-155 (C92-860)	VR103,VR203 Semi-fixed 150k-B
△RS1PF□□□J	R304,R346
RD½PSF□□□J	R348
RD¼PM□□□J	R101-R155, R201-R255, R301-R303, R305-R312, R315-R320, R322-R333, R335-R345, R347, R349-R352, R358, R359,R361

### SEMICONDUCTORS

Part No.	Symbol & Description
HA12005	IC101,IC201
HA11226	IC102
HA12006	IC301
BA843	IC302
2SC1740LN (2SC2634)	Q101-Q103, Q201-Q203, Q303, Q304, Q307-Q309, Q314
2SC1740LN	Q104,Q204,Q301,Q302
2SA1127 (2SA826LN)	Q305,Q306

Part No.	Symbol & Description
△2SC2060	Q310-Q312
△2SD837	Q313
BZ-050	ZD301
△WZ-135	ZD302
1K34A	D101, D103, D104, D201, D203, D204
1S2473	D102, D202, D301-D307, D312, D318, D325,D326
W03B (W03C)	D313-D315
△S1VB10	D316
△S2VB10F	D317
WZ-073	ZD304
WZ-044	ZD305

### OTHERS

Part No.	Symbol & Description
△REK-052	FU1 Fuse T315mA
△REK-064	FU2 Fuse T800mA
△REK-049	FU3 Fuse T500mA
RBF-041	Tube

### Sensor Assembly (RWX-402)

Part No.	Symbol & Description
RD¼PM102J	R501 Resistor
GP-411B	Photointerruptor
SLB15UR8	D501 LED

### Volume Assembly (RWX-403)

Part No.	Symbol & Description
RCV-085 (RCV-086)	VR1 Variable (INPUT)

## 12. EXPLODED VIEWS

### NOTES:

- Parts without part number cannot be supplied.
- The  $\triangle$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

### Parts List

Key No.	Part No.	Description	Key No.	Part No.	Description
1.	RNA-509	Bonnet	38.	RWX-403	Volume assembly
2.		Mechanism assembly	39.		Panel stay
3.		Sub panel stay	40.	RAC-124	Lever knob A (DOLBY NR)
4.	RAC-124	Lever knob A (POWER)	41.	RAC-125	Lever knob B (TAPE SELECTOR)
$\triangle$ 5.	RSA-042	Power switch	42.		Rear panel
6.	RAW-141	Counter	43.	RWX-401	Mother assembly
7.	REB-417	Counter belt	$\triangle$ 44.	REK-064	Fuse (T 800mA)
8.	RWX-402	Sensor assembly	$\triangle$ 45.	REK-049	Fuse (T 500mA)
9.		Counter holder	$\triangle$ 46.	REK-052	Fuse (T 315mA)
10.	SLB15UR8	LED	47.		Switch holder
11.		Sensor p.c.b	48.	RSG-099	Push switch
12.	GP-411B	Photo interruptor	49.	RSK-063	Lever switch B (DOLBY NR)
13.	RNL-073	Escutcheon	50.	RSK-062	Lever switch A (TAPE SELECTOR)
14.	RBH-750	Eject spring	51.	RKN-059	MIC jack
15.		Eject plate	52.	RKN-060	Headphones jack
16.	RAC-132	Knob (EJECT)	53.		Mother p.c.b.
17.	RXX-289	Front panel assembly	54.		P.C.B. holder
18.	RNL-078	Knob guide	55.	RDE-046	Pin cord B (OUTPUT)
19.		Front panel	56.	RDE-045	Pin cord A (INPUT)
20.	RNL-076	Escutcheon S	57.		Side frame
21.	RNL-082	Knob holder	58.		Bottom plate
22.	RAC-131	Control knob	59.	REC-355	Sliding stopper
23.	RNL-077	Escutcheon W	60.		Caution label
24.	RBH-751	Earth spring	61.	ATZ40P080FZK	Screw
25.	RAA-344	Knob A (INPUT L)	62.	VCZ30P060FMC	Screw
26.	RAA-345	Knob B (INPUT R)	63.	VCZ30P100FMC	Screw
$\triangle$ 27.	RTT-213	Power transformer	64.	PMA30P060FMC	Screw
28.		UL cord clamper	65.	CMZ30P060FMC	Screw
29.		Chassis	66.	PBZ30P120FMC	Screw
30.	REC-356	Foot	67.	PBZ26P060FMC	Screw
$\triangle$ 31.	RSX-045	Line voltage selector	68.	CBZ26P060FMC	Screw
$\triangle$ 32.	REC-272	Strain relief	69.	VCT30P960FZK	Screw
$\triangle$ 33.	RDG-033	Power cord (for HE type)	70.	ATZ40P080FMC	Screw
$\triangle$	RDG-032	Power cord (for HB type)	71.	VB30P080FMC	Screw
$\triangle$	RDG-029	Power cord (for HP type)	72.	VCZ30P060FZK	Screw
34.		Terminal (GND)			
35.		Bottom cover			
36.	RAW-140 (RAW-142)	Level meter assembly			
37.	REL-086	Meter lamp			

Exterior

1

2

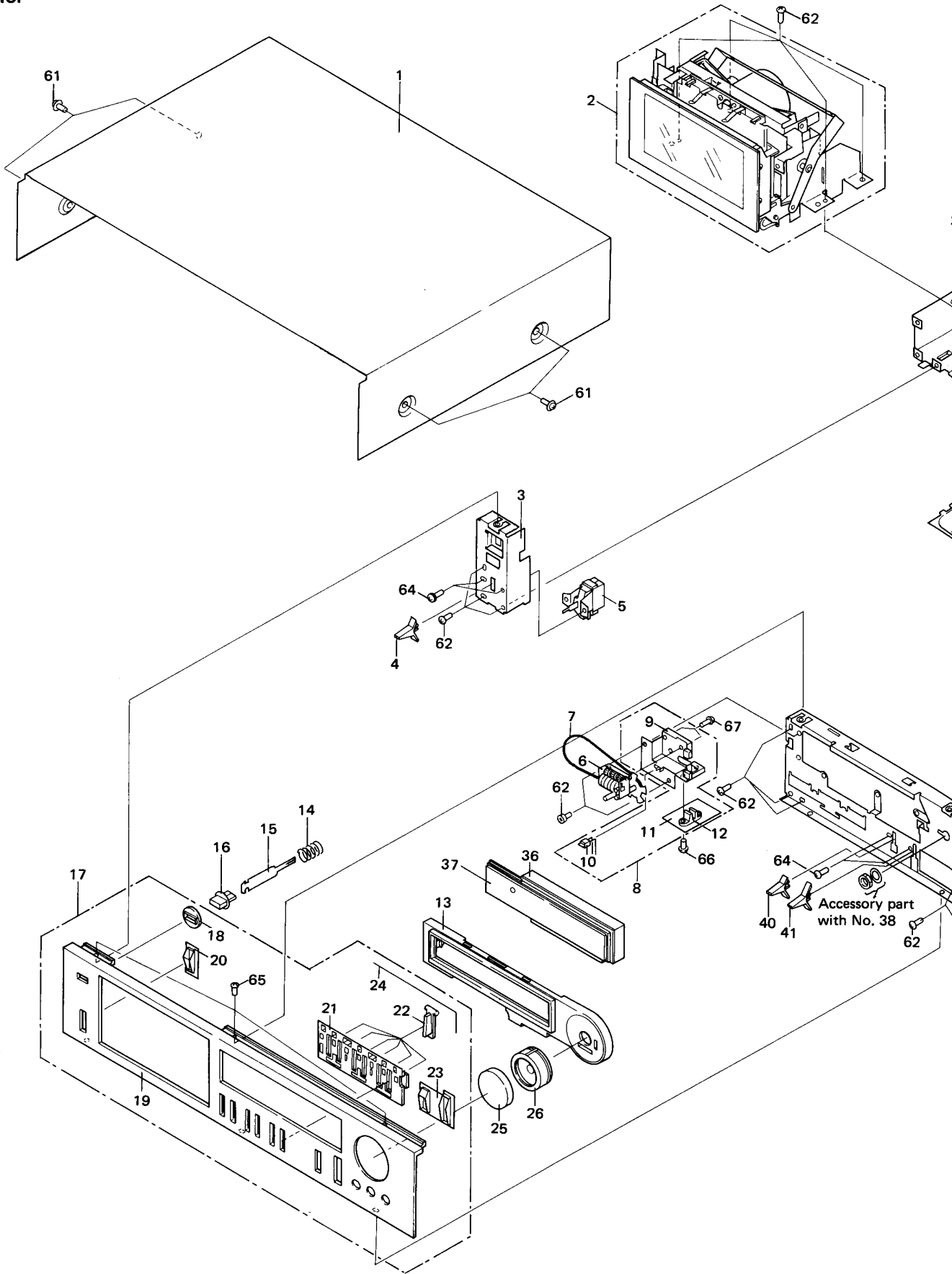
3

A

B

C

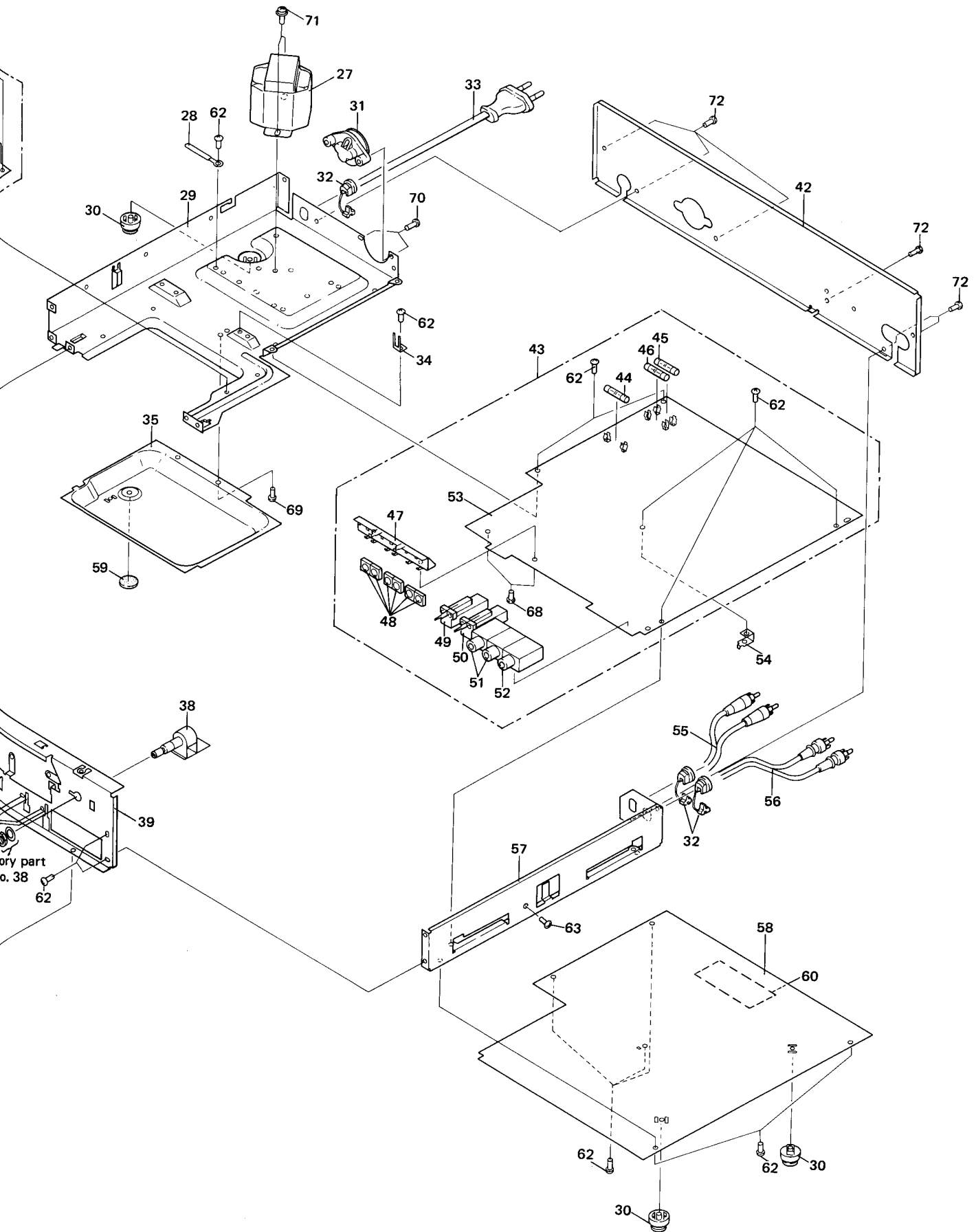
D



4

5

6



A

B

C

D

ory part  
o. 38

4

5

6

30

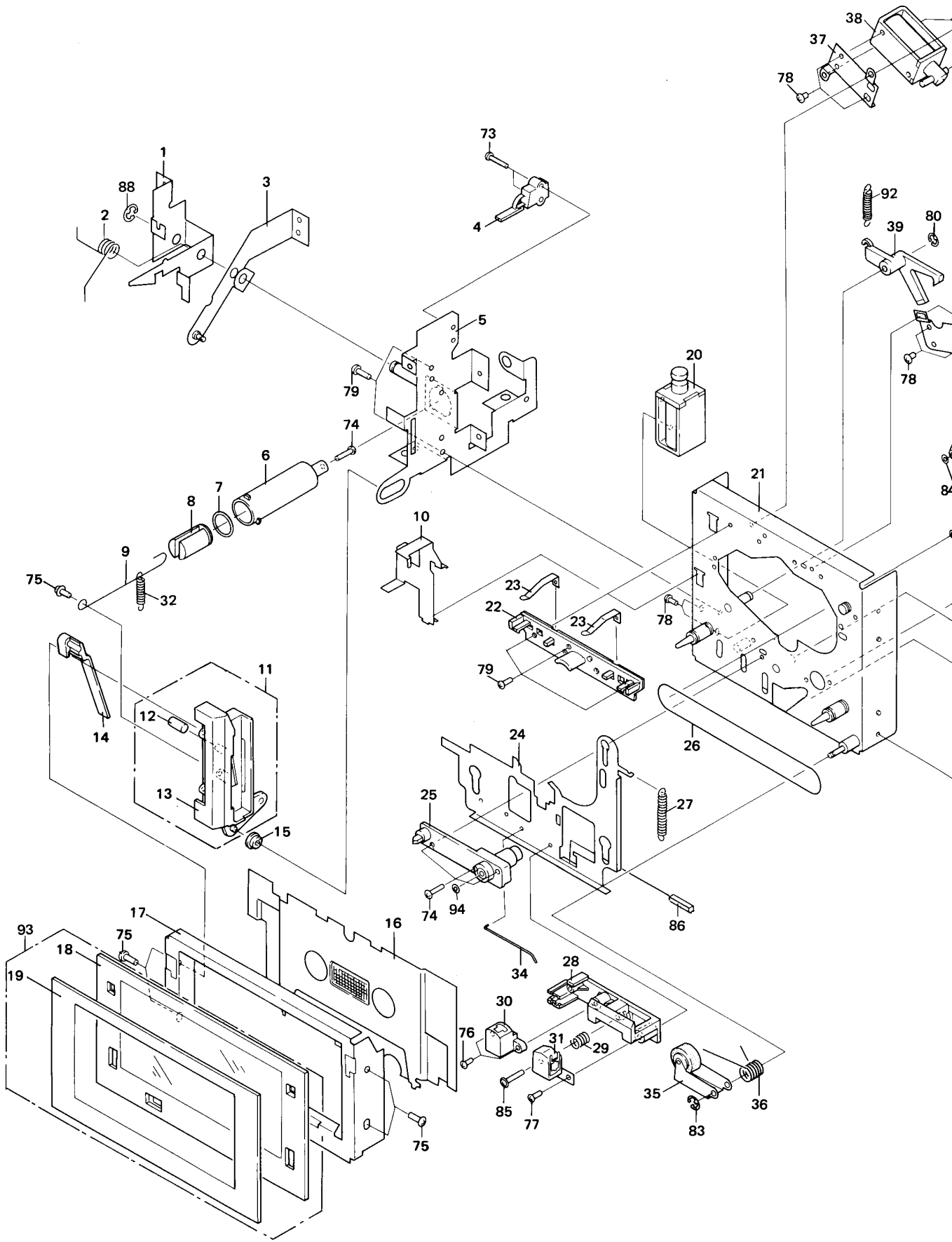
Mechanism Assembly

A

B

C

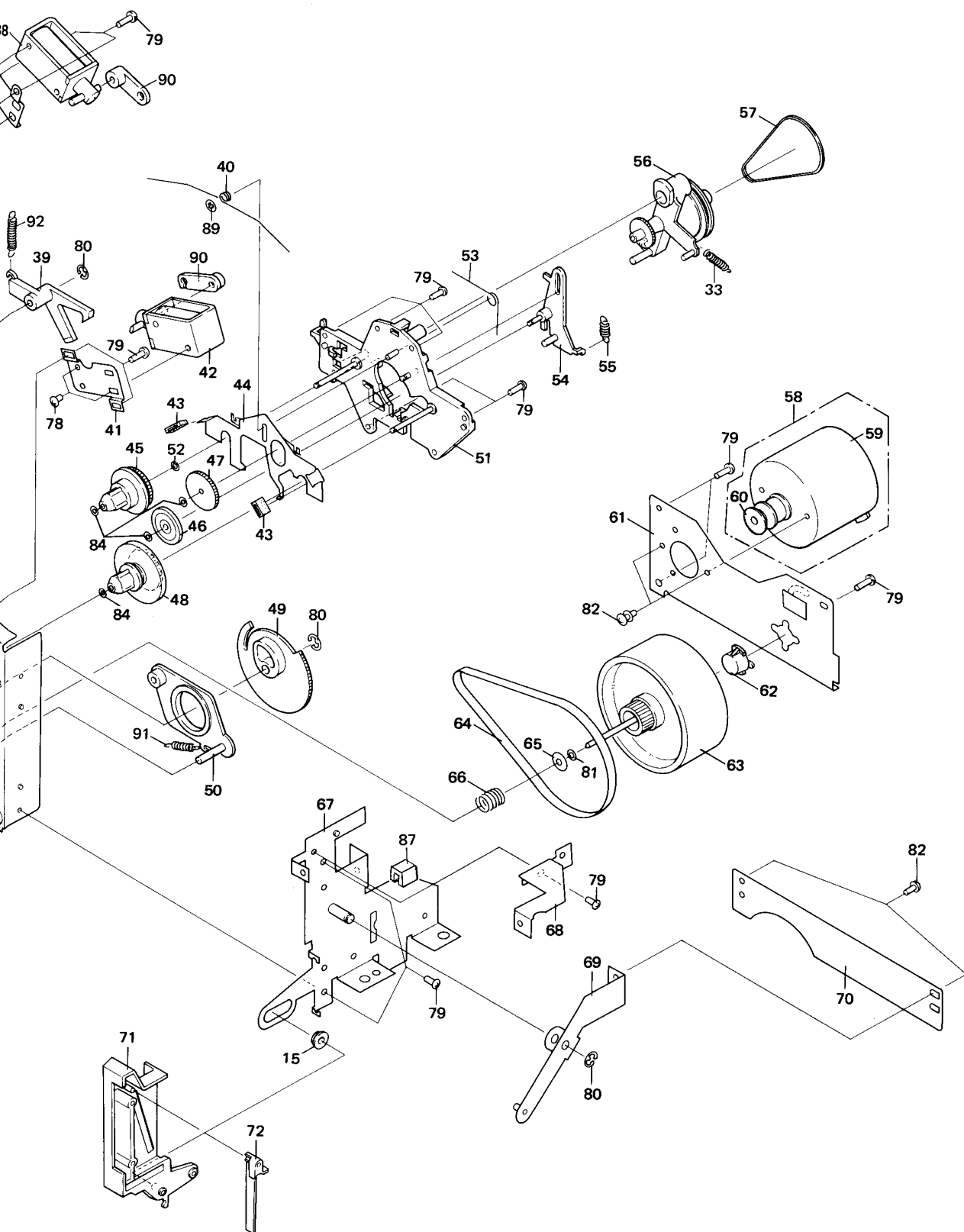
D



4

5

6



A

B

C

D

4

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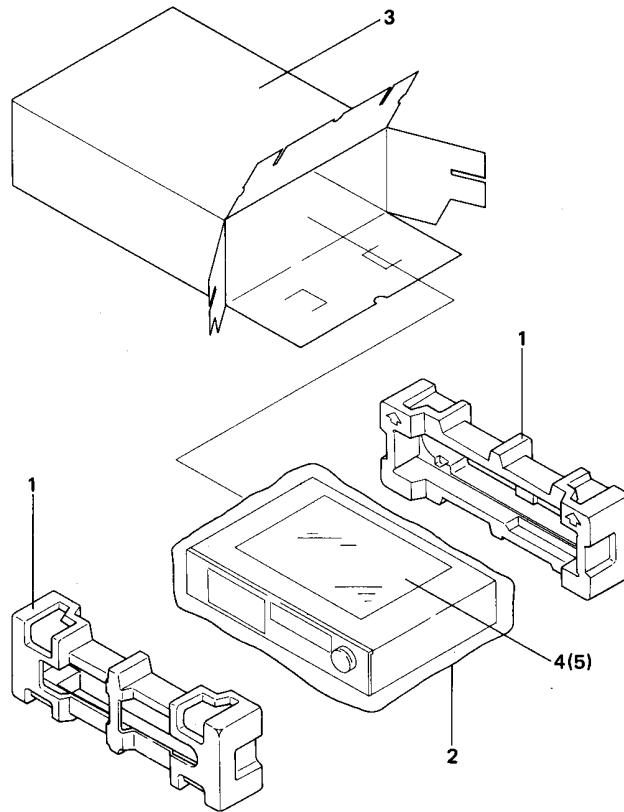
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## Parts List

Key No.	Part No.	Description	Key No.	Part No.	Description
1.		Eject lever	51.	RXB-378	Reel base assembly
2.	RBH-743	Eject lever spring	52.	WA21D040D025	Washer
3.		Side arm L assembly	53.	RBH-725	FR spring
4.	RSN-027	Lever switch	54.	RXB-374	Idler arm assembly
5.		Side plate L assembly	55.	RBH-724	Idler pressure spring
6.	RNK-995	Cylinder	56.	RXB-376	Driving arm full assembly
7.	REB-323	O ring	57.	REB-413	Drive belt
8.	RNL-053	Piston	58.	RXM-076	Motor assembly
9.	RBH-726	Connection rod	59.		Motor
10.		REC prevent lever	60.		Motor pulley
11.	RXB-405	Pocket L assembly	61.		Flywheel holder
12.		Bush	62.		Thrust receptacle
13.		Pocket L	63.	RXB-358	Flywheel assembly
14.	RNL-057	Pocket spring L	64.	REB-411	Capstan belt
15.	RNK-994	Guide roller	65.	RBF-051	Washer
16.	RAH-347	Cassette plate	66.	RBH-721	Flywheel spring
17.		Pocket frame	67.		Side plate R assembly
18.		Door	68.		Mounting plate
19.		Door panel	69.		Side arm R-assembly
△ 20.	RXP-092	Solenoid P	70.		Connection plate
21.		Chassis assembly	71.	RNL-049	Pocket R
22.	RNL-042	Half receptacle	72.	RNL-058	Pocket spring R
23.	RNF-895	Half spring	73.	PMZ20P080FMC	Screw
24.		Head base	74.	VCZ26P090FMC	Screw
25.	RXB-359	Bearing holder assembly	75.	ATZ260060FZK	Screw
26.	REB-417	Counter belt	76.	PMZ20P130FMC	Screw
27.	RBH-741	HB return spring	77.	PMZ20P120FCM	Screw
28.	RNL-050	Sub head base	78.	PMZ26P030FMC	Screw
29.	RBH-723	Head adjust spring	79.	VCZ26P060MFC	Screw
30.	RPB-085	Erase head	80.	YE30FUC	Washer
31.	RPB-084	REC/PB head	81.	WA21D040D25	Washer
32.	RBH-761	Earth spring	82.	PMA26P040FMC	Screw
33.	RBH-758	FF spring	83.	YE20FUC	Washer
34.	RBH-759	HB drive spring	84.	WA17D032D025	Washer
35.	RXB-414	Pinch arm assembly	85.	IMZ20Y120FMC	Screw
36.	RBH-742	Pinch pressure spring	86.		Stopper
37.		Solenoid bracket L	87.		Plate stopper
△ 38.	RXP-094	Solenoid R	88.	YE40FUC	Washer
39.	RNL-051	Gear lever	89.	YS20FBT	Washer
40.	RBH-727	Brake spring	90.	RNL-047	Solenoid arm
41.		Solenoid bracket R	91.	RBH-744	Lever spring
△ 42.	RXP-093	Solenoid F	92.	RBH-722	Gear lever spring
43.	REB-187	Brake shoe	93.	RXX-290	Door assembly
44.		Brake plate	94.	RBF-050	Oil stop washer
45.	RXB-377	Supply reel base assembly			
46.	RNK-999	TU idler			
47.	RNK-998	Idler gear			
48.	RXB-360	TU reel base assembly			
49.	RNL-059	Cam gear			
50.	RXB-387	Lever assembly			

### 13. PACKING



#### Parts List

Key No.	Part No.	Description
1.	RHA-220	Pad
2.	RHX-031	Sheet C
3.	RHG-359	Packing case
4.	RRB-135	Operating instructions (English)
(5).	RRD-045	*Operating instructions (German/ French)

\*The operating instructions (German/French) is provided with HE type only.