

Service Manual

Stereo Cassette Deck

Cassette Deck

 DOLBY B-C NR HX PRO *1

RS-TR280

Colour

(K) : Black



Areas

Suffix for Model No.	Area	Colour
(PP)	U.S.A.	(K)

*1 : Dolby noise reduction and HX PRO headroom extension manufactured under license from Dolby Laboratories Licensing Corporation.
"Dolby", the double-D symbol and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

AR-2 MECHANISM SERIES Specifications (IHF '78)

■ Cassette Deck Section

Deck system	Stereo cassette deck
Track system	4-track, 2-channel
Recording system	AC bias
Bias frequency	80 kHz (approx.)
Erasing system	AC erase
Heads	
DECK 1	Playback head (Permalloy) × 1
DECK 2	Recording/Playback head (Permalloy) × 1
	Erasing head (Double-gap ferrite) × 1
Motors	
DECK 1	Capstan/Reel table drive (DC servo motor) × 1
DECK 2	Capstan/Reel table drive (DC servo motor) × 1
Tape speed	4.8 cm/sec. (1-7/8 ips)
Wow and flutter	0.18% (WRMS)
Fast forward and rewind times	Approx. 120 seconds with C-60 cassette tape
Frequency response (Dolby NR off)	
TYPE I (NORMAL)	40 Hz-14 kHz, ±3 dB 20 Hz-17 kHz
TYPE II (HIGH POSITION)	40 Hz-14 kHz, ±3 dB 20 Hz-17 kHz
TYPE IV (METAL)	40 Hz-15 kHz, ±3 dB 20 Hz-18 kHz

S/N (signal level = max recording level, TYPE II type tape)

NR off	54 dB (A weighted)
Dolby B NR on	64 dB (A weighted)
Dolby C NR on	72 dB (A weighted)

Input sensitivity and impedance

REC (IN)	320 mV/47 kΩ
----------	--------------

Output voltage and impedance

PLAY (OUT)	320 mV/500 Ω
------------	--------------

■ General

Power consumption	18 W
Power supply	AC 120 V, 60 Hz
Dimensions (W × H × D)	430 × 131 × 286 mm (16-15/16" × 5-5/32" × 11-1/4")
Weight	3.8 kg (8.9 lb)

Notes:

Specifications are subject to change without notice.
Weight and dimensions are approximate.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

© 1996 Matsushita Electric Industrial Co., Ltd.
All rights reserved. Unauthorized copying and distribution is a violation of law.

Contents

	Page		Page
Safety Precaution	2	Measurements and Adjustments	28 ~ 30
Front Panel Controls	3	Schematic Diagram	31 ~ 37
Listening to Tapes	4 ~ 7	Printed Circuit Board Diagram	38 ~ 41
Making a Recording	8, 9	Wiring Connection Diagram	42
Tape-to-Tape Recording	10, 11	Function of IC Terminals	43
To Erase Recorded Sound	11	Block Diagram	44 ~ 46
Service Mode Function of Cassette Mechanism	12, 13	Replacement Parts List	47 ~ 51, 58
Operation Check and		Mechanism Parts Location (Deck 1)	52, 53
Main Component Replacement Procedures	14 ~ 22	Mechanism Parts Location (Deck 2)	54, 55
EEPROM Data Write	23, 24	Cabinet Parts Location	56, 57
Adjusted Value Rewrite	25 ~ 27		

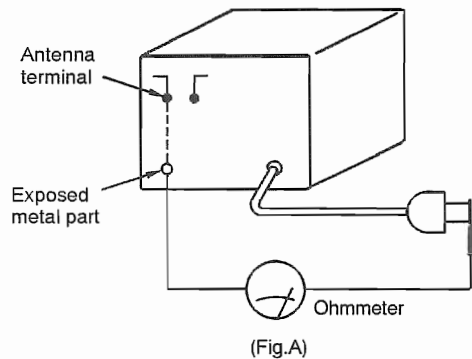
Safety Precaution

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

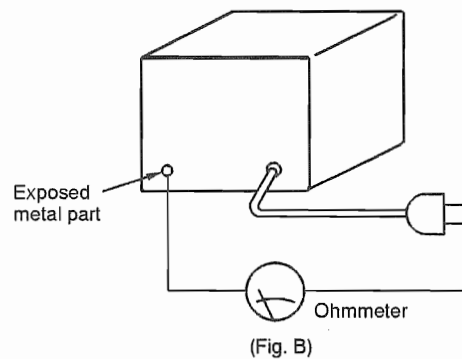
● INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3 MΩ and 5.2 MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



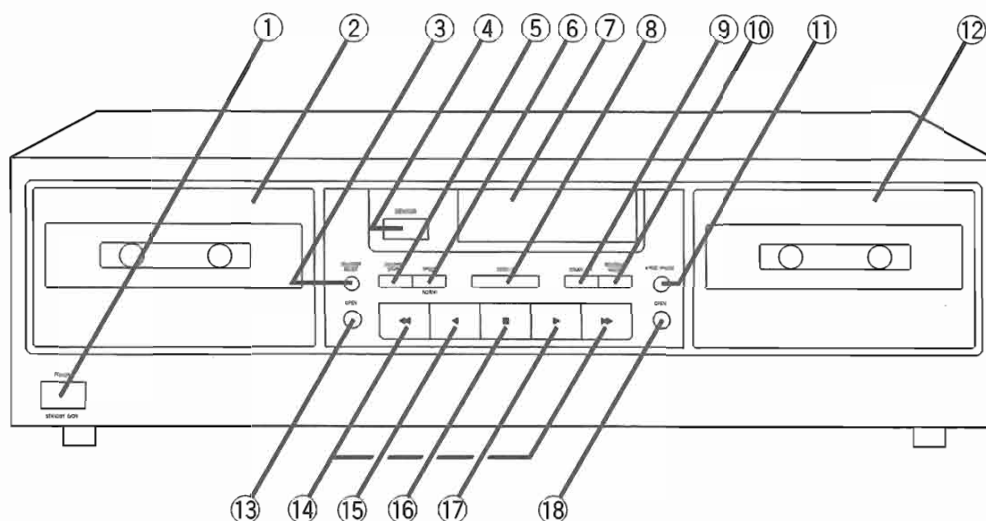
Resistance = 3 MΩ — 5.2 MΩ



Resistance = Approx. ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ Front Panel Controls



No.	Name
①	Power “STANDBY /ON” switch (POWER, STANDBY /ON) Press to switch the unit from on to standby mode or vice versa. In standby mode, the unit is still consuming a small amount of power.
②	Cassette holder for deck 1
③	Counter reset button (COUNTER RESET)
④	Remote control signal sensor (SENSOR)
⑤	Synchro-start button (SYNCHRO START)
⑥	Tape-to-tape recording-speed button (SPEED)
⑦	Display
⑧	Tape deck select button (DECK 1/2)
⑨	Dolby noise-reduction button (DOLBY NR)
⑩	Reverse-mode select button (REVERSE MODE)

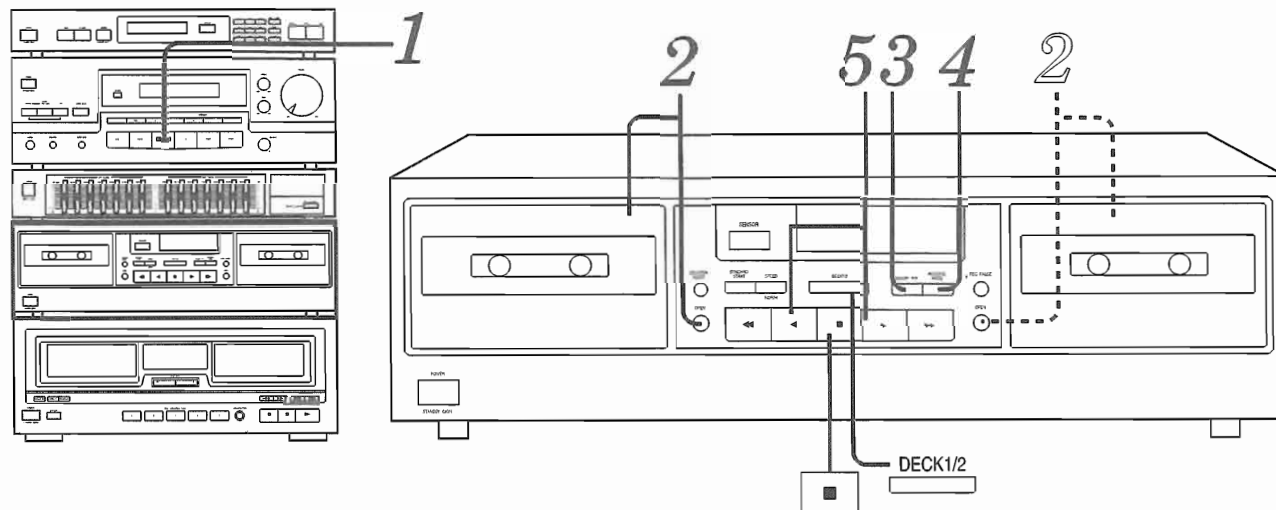
No.	Name
⑪	Rec pause button (● REC PAUSE)
⑫	Cassette holder for deck 2
⑬	Open button for deck 1 (▲ OPEN)
⑭	Rewind/fast-forward buttons (◀◀, ▶▶)
⑮	Reverse-side playback button (◀)
⑯	Stop button (■)
⑰	Forward-side playback button (▶)
⑱	Open button for deck 2 (▲ OPEN)

■ Listening to Tapes

Type of tape which can be played on this unit:

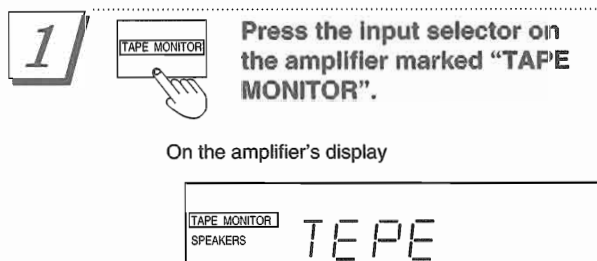
NORMAL POSITION/TYPE I	☐
HIGH POSITION/TYPE II	☐
Metal/TYPE IV	☐

The unit automatically identifies the type of tape.

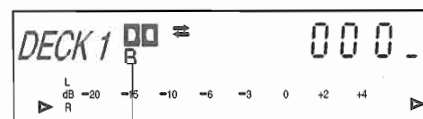


Have you performed the steps 1-2 of "Basic operations"?

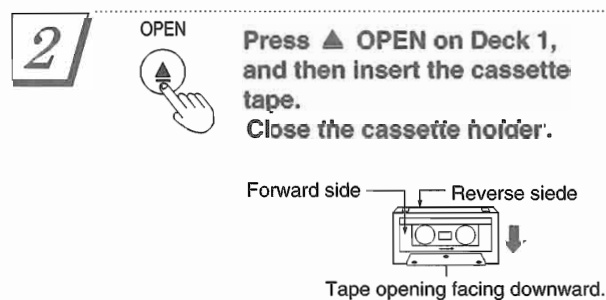
The procedures described below are an example of playback on Deck 1.



On the amplifier's display



Each time the button is pressed, the indicators will change in the order: B → C → off.

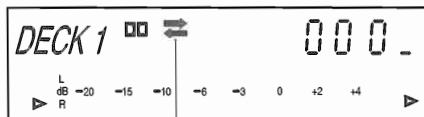


To play back on Deck 2, press the button (2) for Deck 2.

4 **REVERSE MODE**

Press REVERSE MODE to select the appropriate reverse mode.

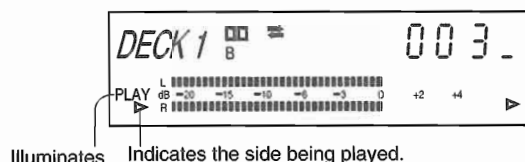
⇌ : One side only.
 ⇌⇌ : Both sides repeatedly (up to 8 times).
 ⇌⇌ : Both sides, once only.
 (Refer to the right side of the page.)



Each time the button is pressed, the indicator will change in the order: ⇌ → ⇌⇌ → ⇌⇌.

5 **Press ► (or ◀).**
(Playback will begin.)

► : To begin from the forward side.
 ◀ : To begin from the reverse side.



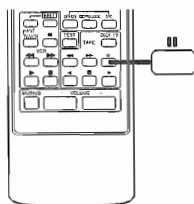
Illuminates Indicates the side being played.

To stop playback



Press ■.

To temporarily stop playback (Only available from the remote control.)



Press ||.

The play indicator will flash.
Press once again to resume playback.

To change the Deck to be used

DECK 1/2 **Press DECK 1/2 to select the Deck you want to play.**



Each time the button is pressed, the indicator will change: DECK 1 ⇌ DECK 2

Reverse function

The reverse function on this unit has three modes (⇌, ⇌⇌, ⇌⇌). Read the descriptions below and select the mode as desired.

Mode	Tape travel
⇌	Only one side of the tape (either the forward side or the reverse side) will be played, and operation will automatically stop when playback has been completed.
⇌⇌	Both sides of the tape will be played repeatedly eight times, and then operation will automatically stop. (If playback is begun from the reverse side, the forward side will be played seven times.)
⇌⇌	When there is a tape in only one of the decks Both sides of the tape will be played once, and then operation will automatically stop. (If playback is begun from the reverse side, the forward side will not be played.) When there is a tape in each of the decks The forward and reverse sides of the tape in Deck 1 will be played, followed by the forward and reverse sides of the tape in Deck 2, and after this operation is repeated eight times, operation will automatically stop. (If playback is begun from Deck 2, the tape in Deck 1 will be played seven times.)

Dolby noise-reduction system

The Dolby noise-reduction system is designed to effectively reduce the annoying high-frequency "hissing" noise which can occur with cassette tapes. During recording, the system functions to increase the high-frequency sound level, and then, during playback, that same portion is weakened to bring it back to the previous level.

Dolby B-type noise-reduction

Noise is reduced to about one-third.

Use this system when playing back tapes recorded by the Dolby-B noise-reduction system, such as prerecorded music tapes, etc.

Dolby C-type noise-reduction

Noise is reduced to about one-tenth.

Use this system for the recording and playback of sound sources that have a wide dynamic range and good tone quality, such as FM broadcasts of live performances, etc., and for playing back such tapes.

Dolby HX-Pro headroom extension system

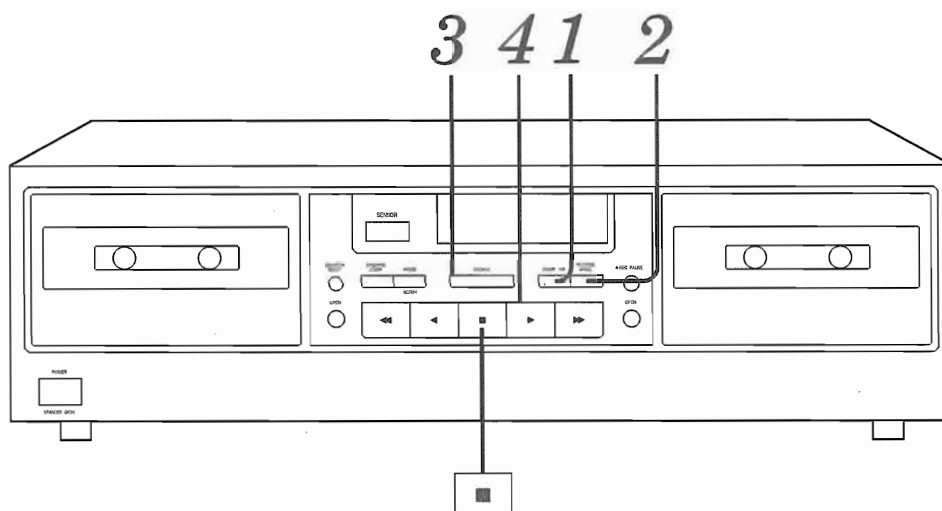
By functioning to improve the maximum output level of the tape's high-frequency range, this system permits recordings without a reduction in the level of the sound source's high-frequency range. In addition, by using the system in parallel with this unit's noise-reduction system, recording and playback with a greatly extended dynamic range is possible.

Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.

"DOLBY", the double-D symbol  and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

Series playback

Both sides of the tape in Deck 1 will be played, followed by both sides of the tape in Deck 2. (Repeated up to eight times.)



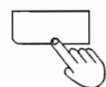
Preparation

Load the tapes to be played into Deck 1 and Deck 2.

Note that for series playback it is not possible to select different types of Dolby NR for Deck 1 and Deck 2. It is recommended that you use two tapes which were recorded using the same type of Dolby NR (or both recorded without Dolby NR).

1

DOLBY NR



Press DOLBY NR to select the appropriate noise-reduction system.

2

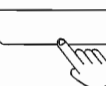
REVERSE MODE



Press REVERSE MODE to select the "⏮" mode.

3

DECK 1/2



Press DECK 1/2 to select the Deck 1.

4



Press ►.
(Series playback will begin from the forward side of the tape in Deck 1.)

For your reference:

It is also possible to begin series playback from the reverse side of the tape in Deck 1 or from Deck 2. (Refer to the tape travel table on page 5.)

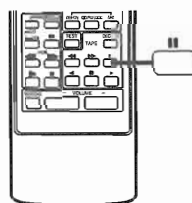
To stop playback



Press ■.

To temporarily stop playback

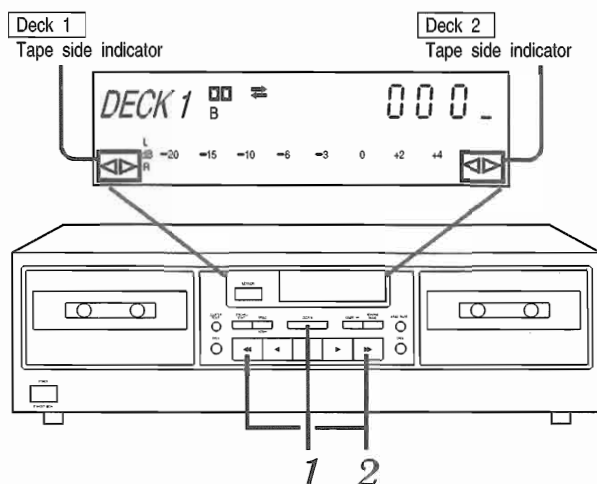
(Only available from the remote control.)



Press ⏸.

Press once again to resume playback.

To fast-forward or rewind the tape



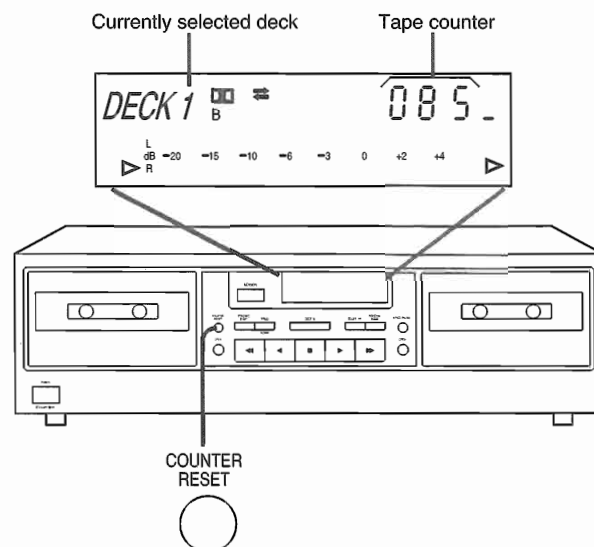
Because this unit is capable of playing back both sides of the tape, the operation changes in accordance with the direction of the tape side indicator.

Tape side indicator	Rewind	Fast forward
▶	◀◀	▶▶
◀	▶▶	◀◀

- Cassette tapes in Deck 1 and Deck 2 can be advanced or rewound at the same time.

Tape counter

The tape counter indicates the amount of tape travel as a numerical value based on the number of revolutions of the tape hub. As you switch between Deck 1 and Deck 2, the tape counter shown on the display changes too.



To reset the tape counter



Press COUNTER RESET.

The tape counter of the currently selected deck will revert back to "000", while that of the other deck will remain unchanged.

For your reference:

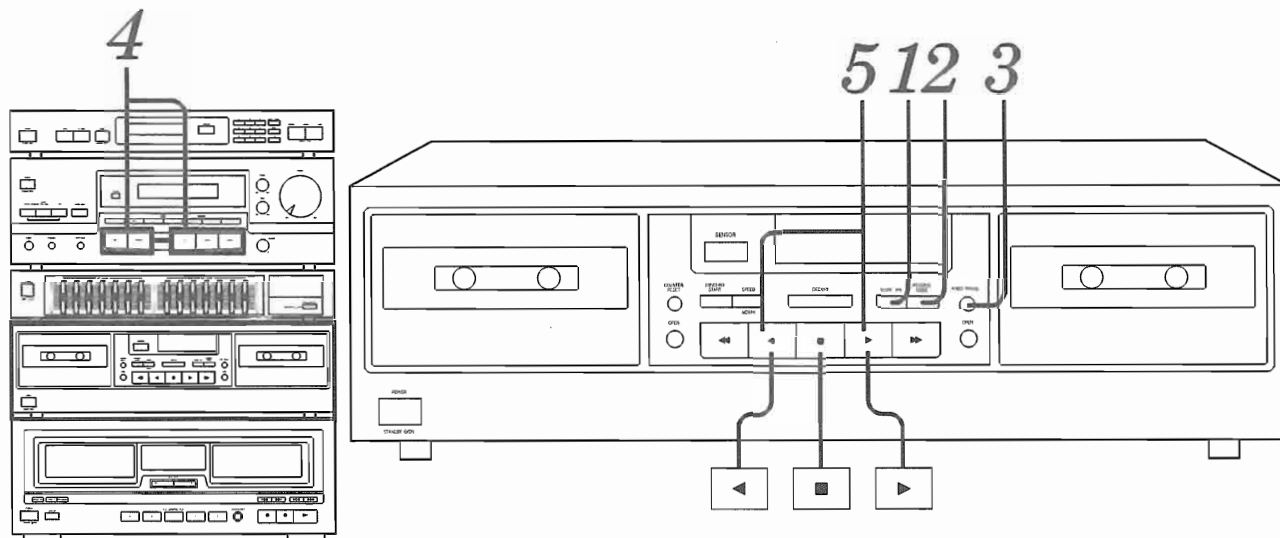
When the tape is travelling in the reverse direction, the value displayed on the tape counter will count down. After "000" is reached, the display will switch to "999" and will then continue counting down.

■ Making a Recording

Recording from the radio or external source

Type of tape which can be used for recording:

NORMAL POSITION/TYPE I	☐
HIGH POSITION/TYPE II	☐
Metal/TYPE IV	☐



Preparation

Load a tape which has been advanced to the end of the leader tape (the transparent part at both ends of the tape) into Deck 2.

1 **DOLBY NR** **Press DOLBY NR to select the appropriate noise-reduction system.**

Each time the button is pressed, the indicator will change in the order:

B → C → off.

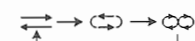
When recording a tape without using a Dolby NR system, press so that the indicators go off.

2 **REVERSE MODE**

Press REVERSE MODE to select the desired reverse mode.



Each time the button is pressed, the indicator will change in the order:



→ : Only one side will be recorded, and then operation will automatically stop.

↔, ↔ : Both sides (the forward side first, and then the reverse side) will be recorded, and then operation will automatically stop.

3 **REC PAUSE**

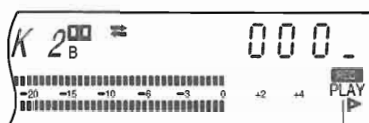
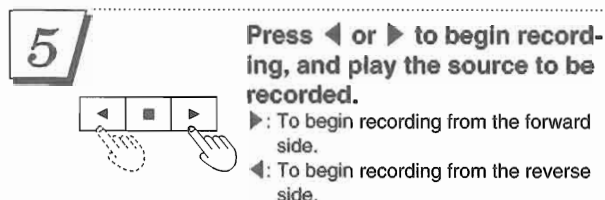
Press REC PAUSE.

(The unit will be in the recording standby mode.)



Illuminates

Flashes



Illuminates

Note

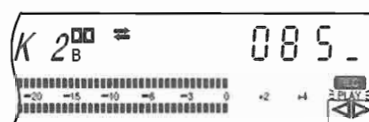
When recording on both sides of the tape, be sure to press the ▶ button.

To temporarily stop recording

● REC PAUSE

**Press ● REC PAUSE.**

To resume recording
Press either ◀ or ▶, corresponding to the side of the tape side indicator which is lit.



Tape side indicator

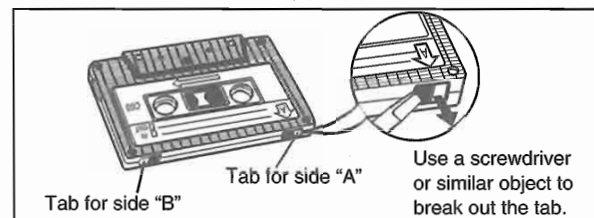
To stop recording**Press ■.****About the selection of the Dolby NR type**

The Dolby NR effect can be obtained by using the same type of Dolby NR during both recording and playback. Refer to the following table when selecting the type (either B or C).

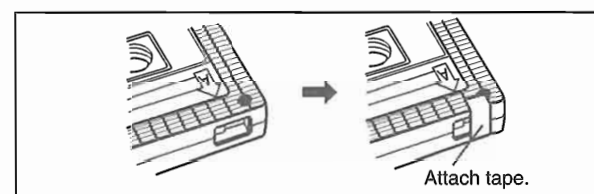
Type B	Use this type when the deck on which the tape will be played back is equipped with only type B Dolby NR.
Type C	Use this type when the deck on which the tape will be played back is equipped with type C Dolby NR. (for example, when this unit is also going to be used to play back the tape.)

Erasures prevention

Remove the tab(s).

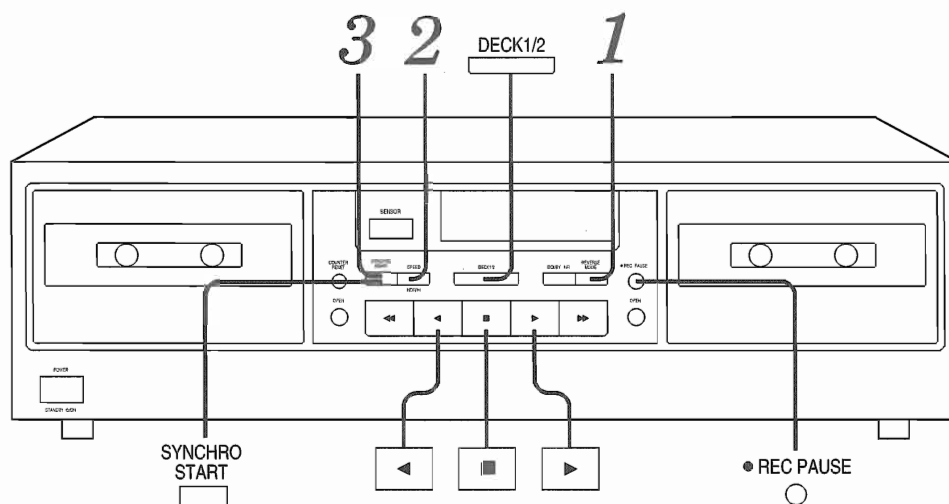
**To re-record on a protected cassette**

Cover the slot with adhesive tape.



Tape-to-Tape Recording

Use Deck 2 to record the sound being played back on Deck 1.



Preparation

Load tapes which have been advanced to the end of the leader tape into both decks.

Deck 1: For playback **Deck 2:** For recording

1 **REVERSE MODE**

Press **REVERSE MODE** to select the desired reverse mode.

Each time the button is pressed, the indicator will change in the order:

→ → → → →

→ : Only one side of the tape will be recorded, and then operation will automatically stop.

↔ : Both sides of the tape (first the forward side and then the reverse side) will be recorded, and then operation will automatically stop. If the recording tape is longer than the playback tape, the playback tape will be played repeatedly as many as eight times until the recording tape is finished.

↻ : Both sides of the tape (first the forward side and then the reverse side) will be recorded once, and then operation will automatically stop.

Note

To record on only one side of the tape, set the tape side indicators (< or >) on Deck 1 and Deck 2 in accordance with the tape sides to be played back and recorded.

To record on both sides of the tape, set the tape side indicators on both Deck 1 and Deck 2 to the forward side (>).

2 **SPEED**

Press **SPEED** to select the recording speed.

Each time the button is pressed, the indicators will change in the order:

NOR → HI → off.

NOR: normal speed
HI: approx. double speed

3 **SYNCHRO START**

Press **SYNCHRO START**.
(Recording will begin.)

To stop recording

1. Press **DECK 1/2** to select the Deck 2.
2. Press ■.

Note

In order to avoid operation errors later, be sure to switch off the **SPEED** button (the "NOR" and "HI" indicator will go out) after the tape-to-tape recording has finished.

To record selected tracks

- 1 **DECK 1/2** [During recording]
Press **DECK 1/2** to select the Deck 1.
- 2 **Press ■**
(Deck 1 will stop, and Deck 2 will record a 4-second silent interval and then enter the recording standby mode.)
- 3 **Operate Deck 1 to find the track you wish to record.**
It is also possible to change the playback tape at this time.
- 4 **SYNCHRO START** Press **SYNCHRO START**.
(Recording will resume.)

To cut unwanted parts during recording

- 1 **REC PAUSE** Press **● REC PAUSE** during recording.
Deck 2, which was recording, will enter the pause mode, and Deck 1 will continue playback.
(If you were recording at hi-speed, Deck 1 will change to normal speed while Deck 2 is on pause, but will return to hi-speed when you resume recording.)
- 2 [When Deck 1 reaches a part you wish to record]
Press either ◀ or ▶, corresponding to the side of the tape side indicator which is lit.
(Deck 2 will resume recording.)

For your reference:

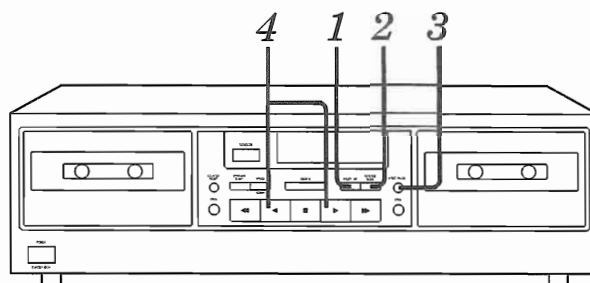
- The Dolby effect will be recorded as they are on the tape being played back.
- Because the signal being recorded from Deck 1 onto Deck 2 does not pass through the amplifier, it is possible to change the setting of the amplifier's input selector during recording in order to listen to some other sound source.

Note

When recording with the recording speed set to double speed, noise interference may be recorded onto the tape if there is a television set nearby, so make the recording in a location separated from the television set or switch off the television set during recording.

To Erase Recorded Sound

When new recordings are made on a pre-recorded tape, all sounds recorded on that portion of the tape are automatically erased. To erase a tape without making a new recording, follow the steps below.



Preparation

- Load the tape to be erased into Deck 2.
- Set the input source on the amplifier to "TAPE MONITOR" position.

- 1 **DOLBY NR** Press **DOLBY NR** so that the Dolby NR indicators ("B" and "C") are off.
- 2 **REVERSE MODE** Press **REVERSE MODE** to select the desired reverse mode.
 ◀▶ : To erase one side of the tape.
 ◀▶, ∞ : To erase both sides of the tape.
- 3 **REC PAUSE** Press **● REC PAUSE**.
(The unit will be in the recording standby mode.)
- 4 Press ◀ or ▶ to begin erasing the tape.
 ▶ : To erase the forward side of the tape.
 ◀ : To erase the reverse side of the tape.
Note
 To erase both sides of the tape, be sure to press the ▶ button.

■ Service Mode Function of Cassette Mechanism

This unit is equipped with a self-check mode of its cassette mechanisms using the display of diagnostic items. As the mode is capable of identifying the faults described below, make the most of it when servicing the unit.

● Cassette tapes to be prepared

Normal blank tape with only one erase-prevention tab intact (use middle portion of tape).

Normal blank tape with both erase-prevention tabs intact (use middle portion of tape).

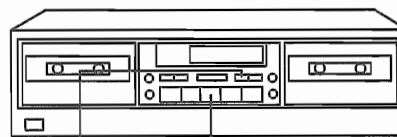
● Selecting Service Mode

Step 1 Turn on the power to the unit.

POWER



Step 2 Check that no tape is inserted in the cassette deck. Press the DOLBY NR button for about 2 seconds, and keep pressing it, also press the STOP button for about 2 seconds. (Wrong result is occurred if any tape is inserted. To clear it, press STOP button for more than 6 seconds.)

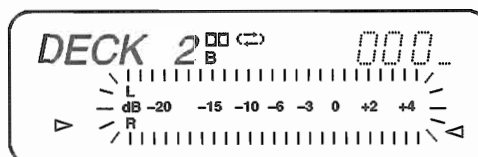


DOLBY NR

STOP



Step 3 The level meter changes from constantly lit to blinking, the service mode has been activated. [When activated, this mode checks that the following mechanism switches (MODE detect, REC prevention, Half detect, CrO2 tape detect, Metal tape detect) are OFF].



● Deck 1 Mechanism Check

Step 1 Press the DECK 1/2 button to display DECK 1. (If DECK 1 is already displayed, no selection is made.)

DECK 1/2



Step 2 Open the Deck 1 cassette holder. (OPEN button)

OPEN



Step 3 Load the DECK 1 cassette holder with a normal blank tape with only one erase-prevention tab intact and close it.



Step 4 Press the PLAY button. After about 2 seconds, then press the STOP button. (During this period, the mode checks the CrO2 and metal tape detect switches are ON and the REC prevention switch remains OFF.)



Step 5 Open the Deck 1 cassette holder. (OPEN button)

OPEN



To Step 6

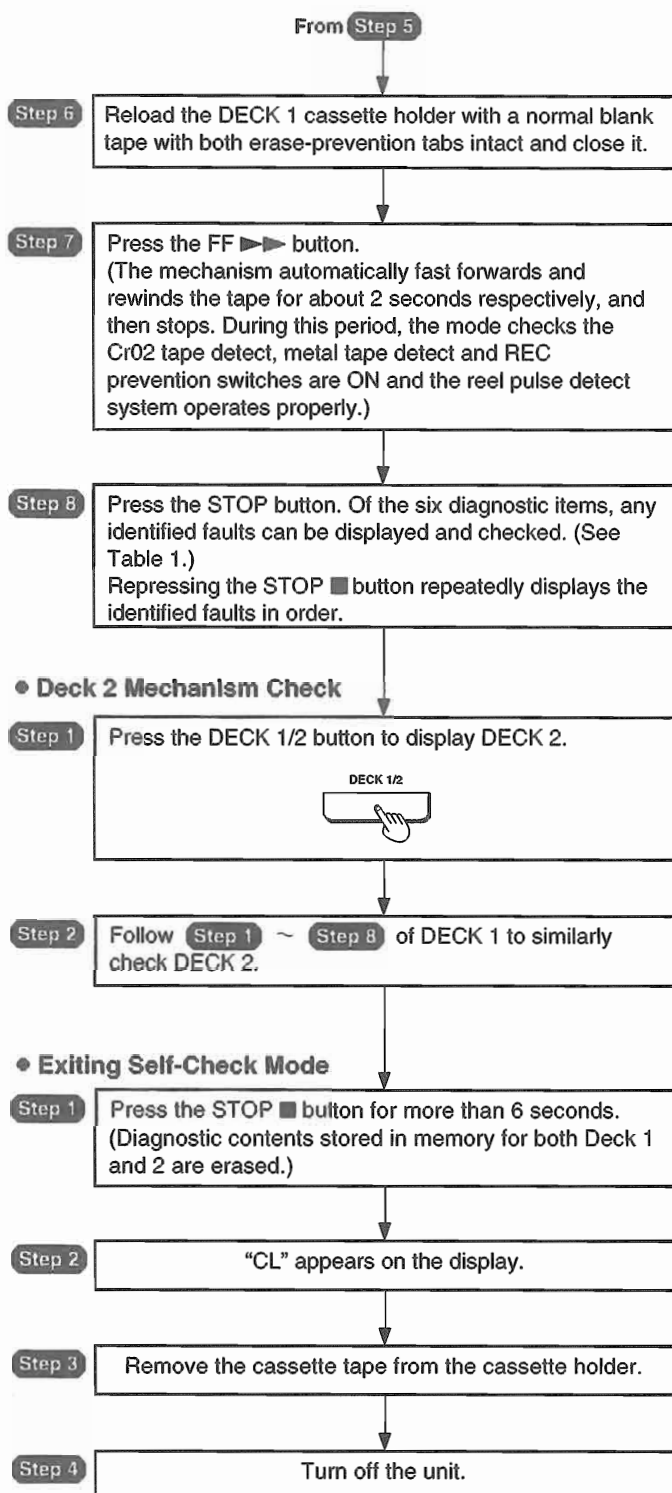
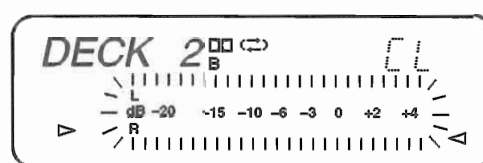


Table 1: Service Mode Diagnostic Items

No.	Display	Fault location
1.	H01	MODE detect switch
2.	H02	REC prevention switch
3.	H03	Half detect switch
4.	H06	CrO ₂ tape detect switch
5.	H07	Metal tape detect switch
6.	F01	Reel pulse detect system (Hall IC, etc.)

- When each diagnostic item is normal, its counter display remains unchanged.



■ OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

NOTE

1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.
3. Select items from the following index when checks or replacement are required.
4. Illustrated screws are equivalent to actual size.
5. Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.

● Contents

•Checking Procedure for each P.C.B.

Page.

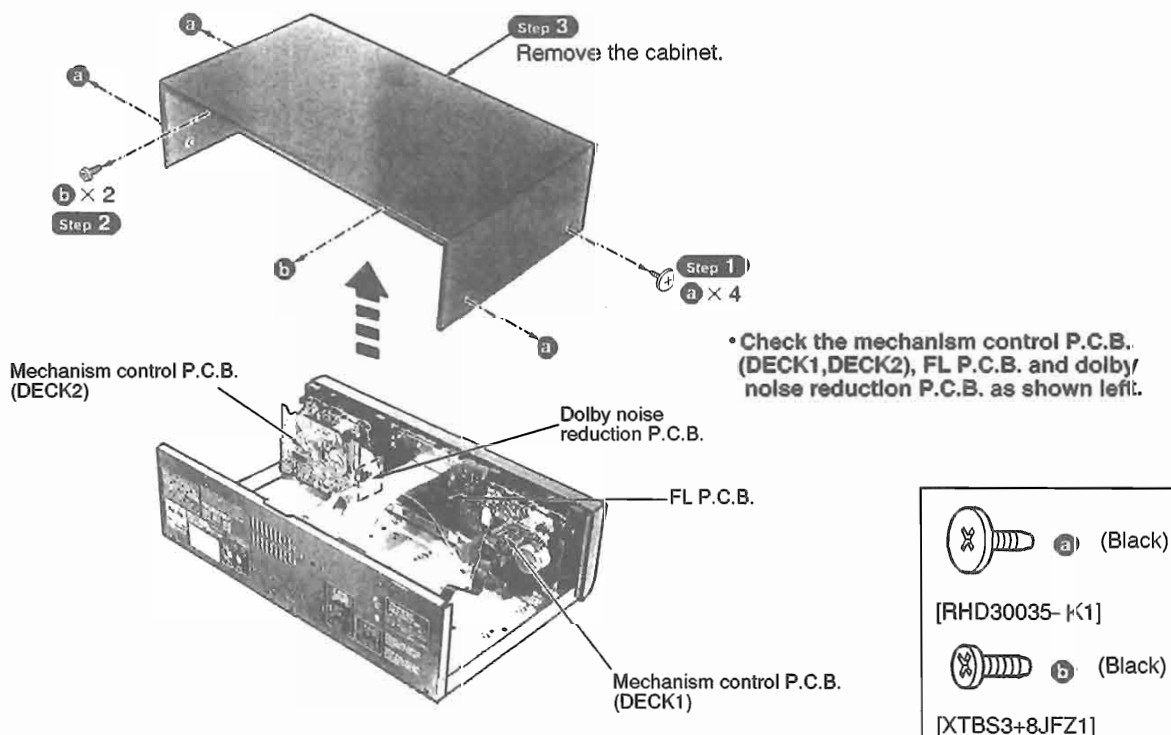
1. Checking for the mechanism control P.C.B., FL P.C.B., dolby noise reduction P.C.B. and main P.C.B.. 14,15.

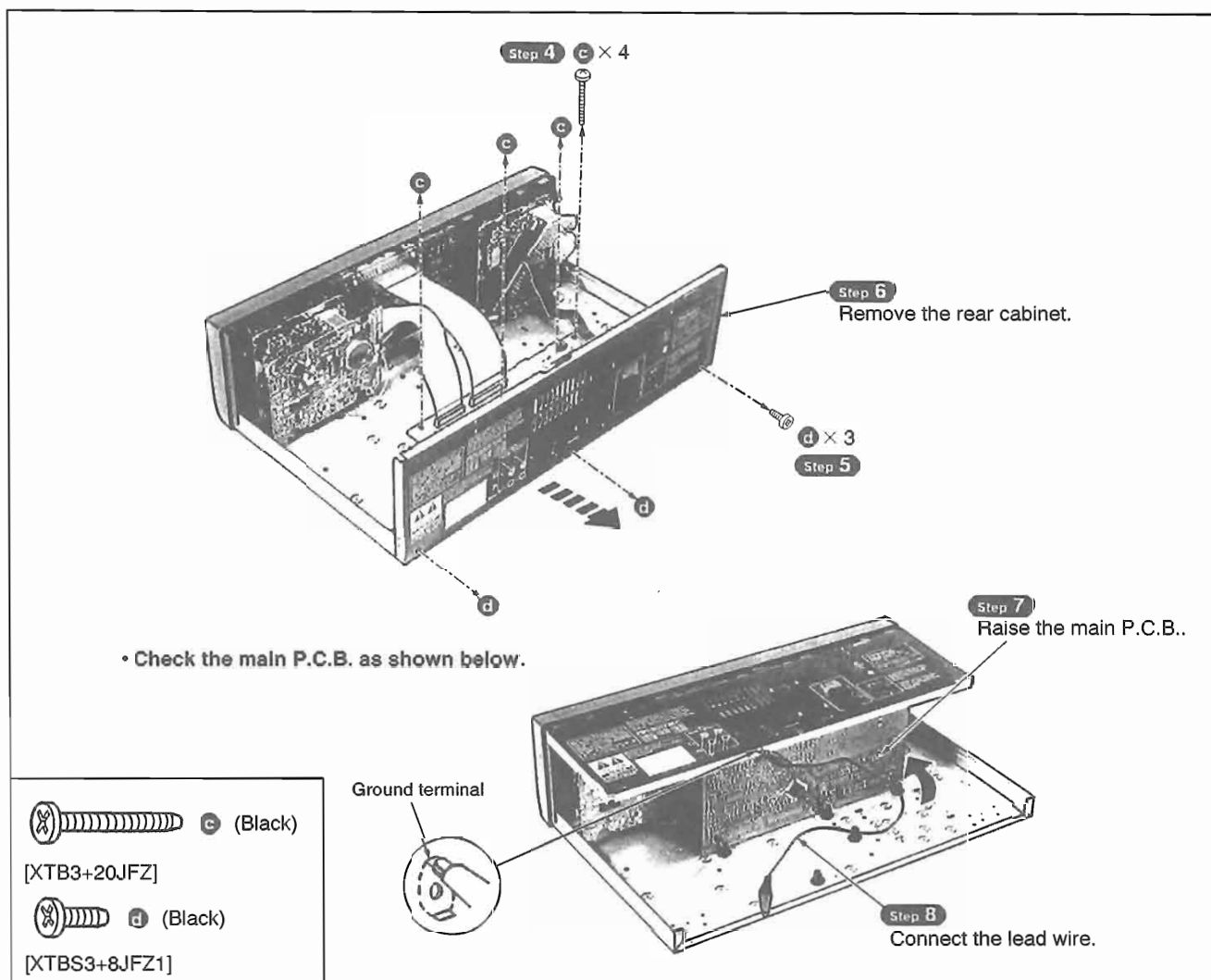
•Main Component Replacement Procedures

1. Replacement for the cassette lid. 15,16.
2. Replacement for the head block and pinch roller ass'y. 16~18.
3. Replacement for the motor ass'y, capstan belt and winding belt. 18~21.
4. Replacement for the plunger ass'y and the parts mounted on mechanism P.C.B.. . . . 21,22.
5. Replacement for the cassette holder. 22.

■ Checking Procedure for each P.C.B.

1. Checking for the mechanism control P.C.B., FL P.C.B., dolby noise reduction P.C.B. and main P.C.B.

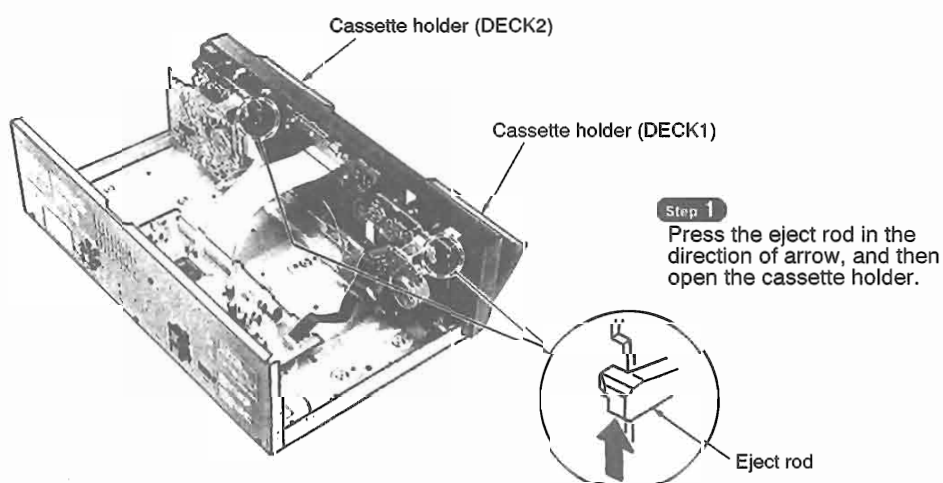


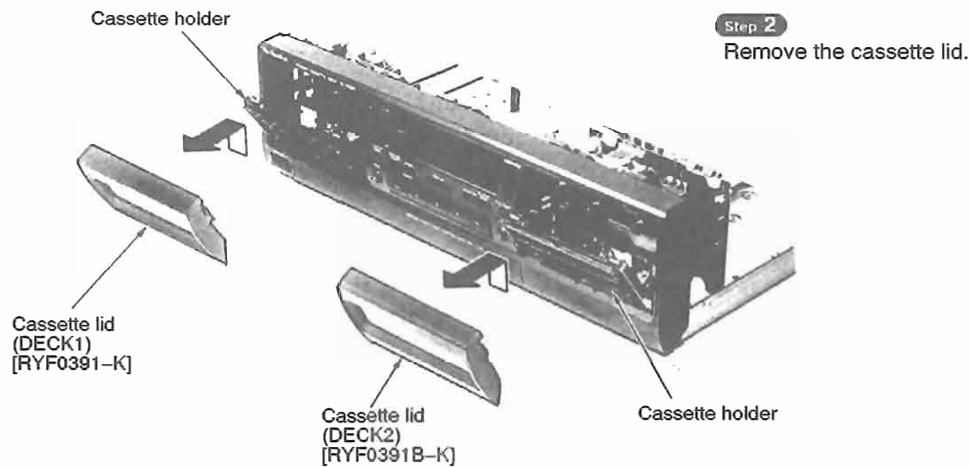


Main Component Replacement Procedures

1. Replacement for the cassette lid

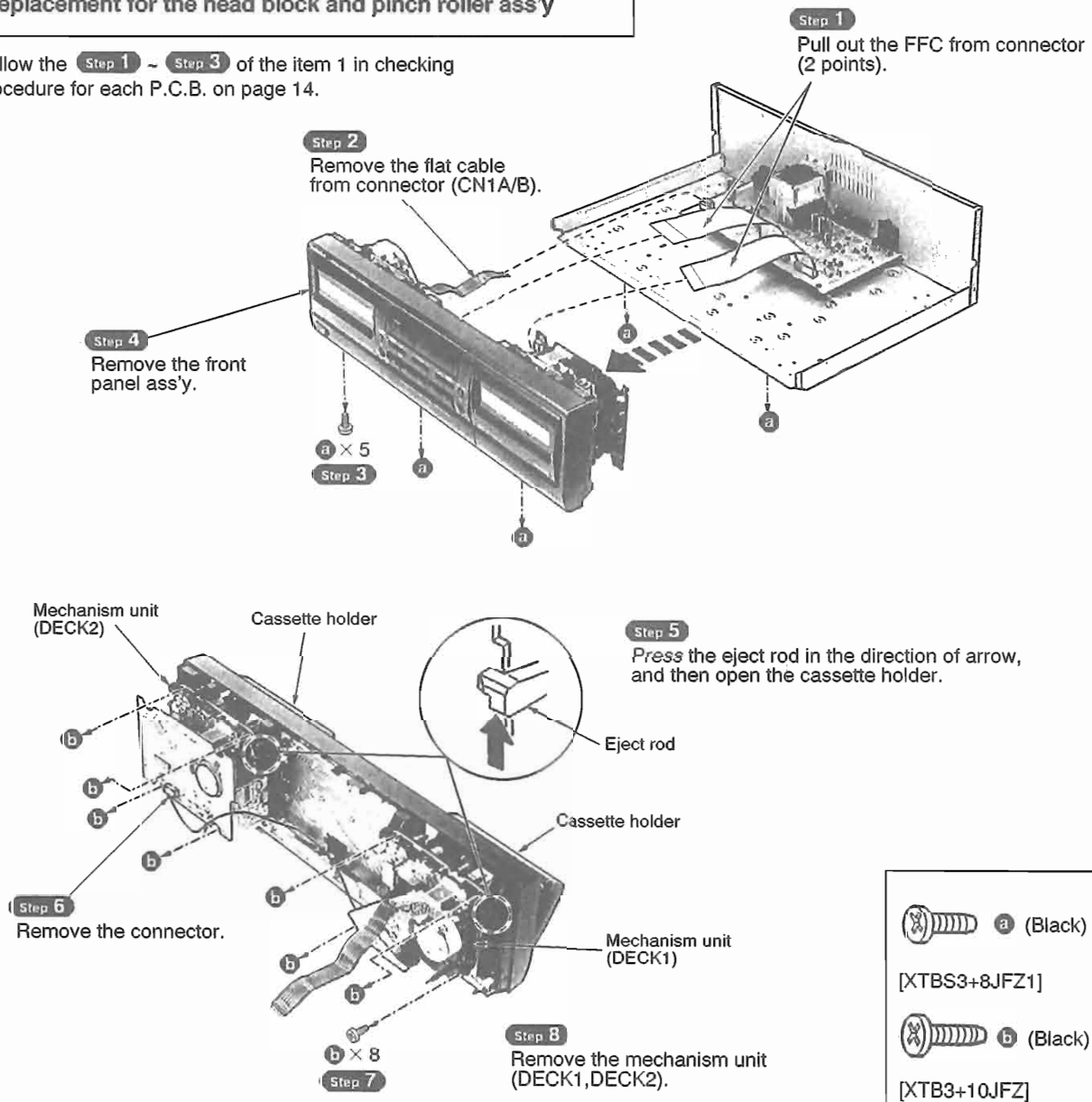
- Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B. on page 14.





2. Replacement for the head block and pinch roller ass'y

- Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B. on page 14.



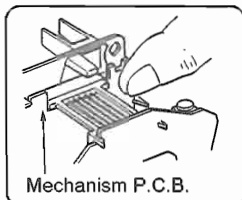
[Removal of the mechanism control P.C.B. (DECK1)]



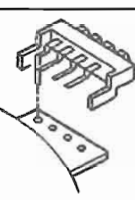
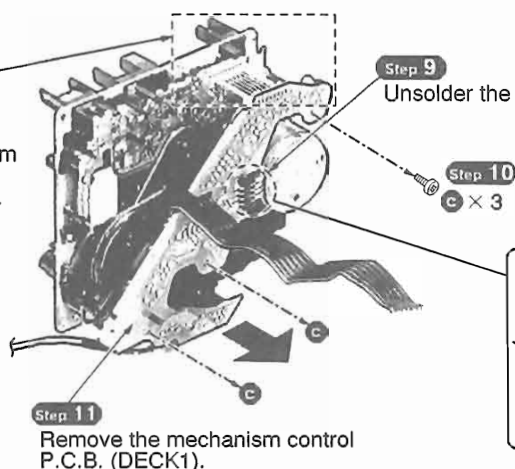
[XTBS26+8J]

NOTE

When removing the mechanism control P.C.B., remove it with holding the mechanism P.C.B. by finger.



Mechanism P.C.B.

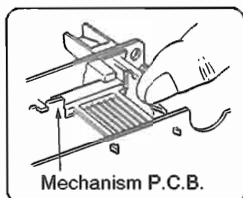
**NOTE**

Handle the connector with care so that the shape of terminal is different from others.

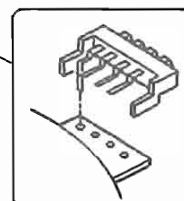
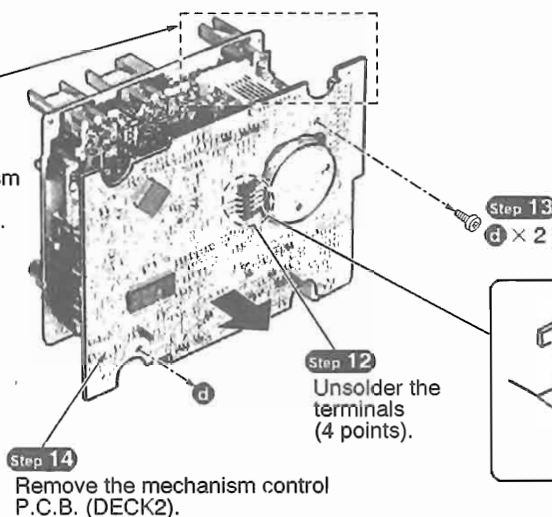
[Removal of the mechanism control P.C.B. (DECK2)]

NOTE

When removing the mechanism control P.C.B., remove it with holding the mechanism P.C.B. by finger.



Mechanism P.C.B.

**NOTE**

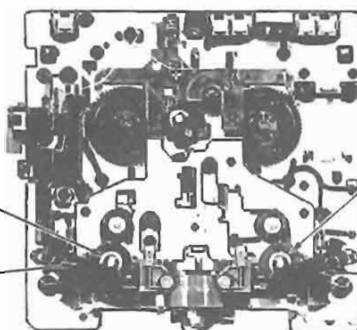
Handle the connector with care so that the shape of terminal is different from others.

NOTE

The illustration below shows DECK2 mechanism. For DECK1 mechanism, perform the same procedure as DECK2.

Pinch roller ass'y (R)
[RXL0125]

Claw

Pinch roller ass'y (F)
[RXL0124]

Claw

**Step 15**

Release the 2 claws, and then remove the pinch roller ass'y (R),(F).

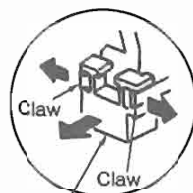


[XTW2+5L]

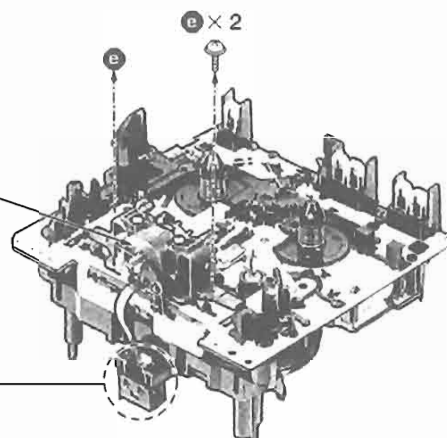
Head block
DECK1 : RED0038
DECK2 : RED0037

Step 16

Release the 2 claws,
and then remove the
head connector.



Head connector

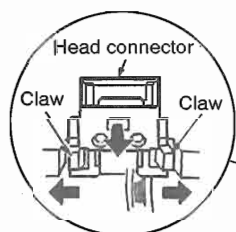


3. Replacement for the motor ass'y, capstan belt and winding belt

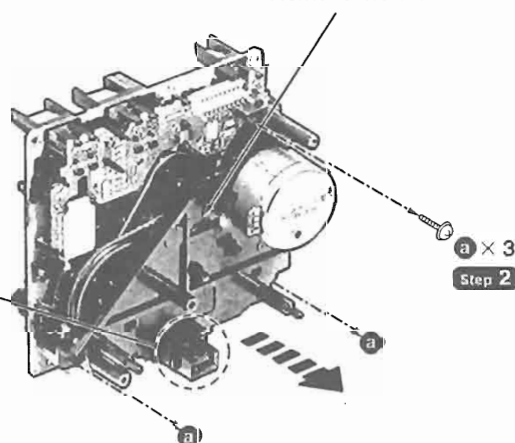
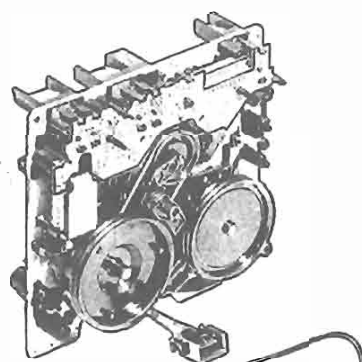
- Follow the **Step 1** ~ **Step 3** of the item 1 in checking procedure for each P.C.B. on page 14.
- Follow the **Step 1** ~ **Step 14** of the item 2 in main component replacement procedures on pages 16 and 17.

Step 1

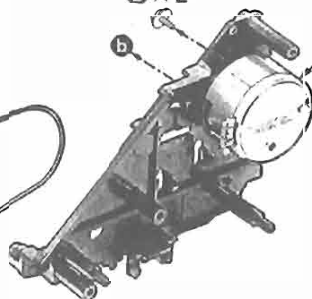
Release the 2 claws,
and then remove the
head connector.

**Step 3**

Remove the sub chassis.

**Step 2**Capstan belt
[RDV0034]**Step 4**

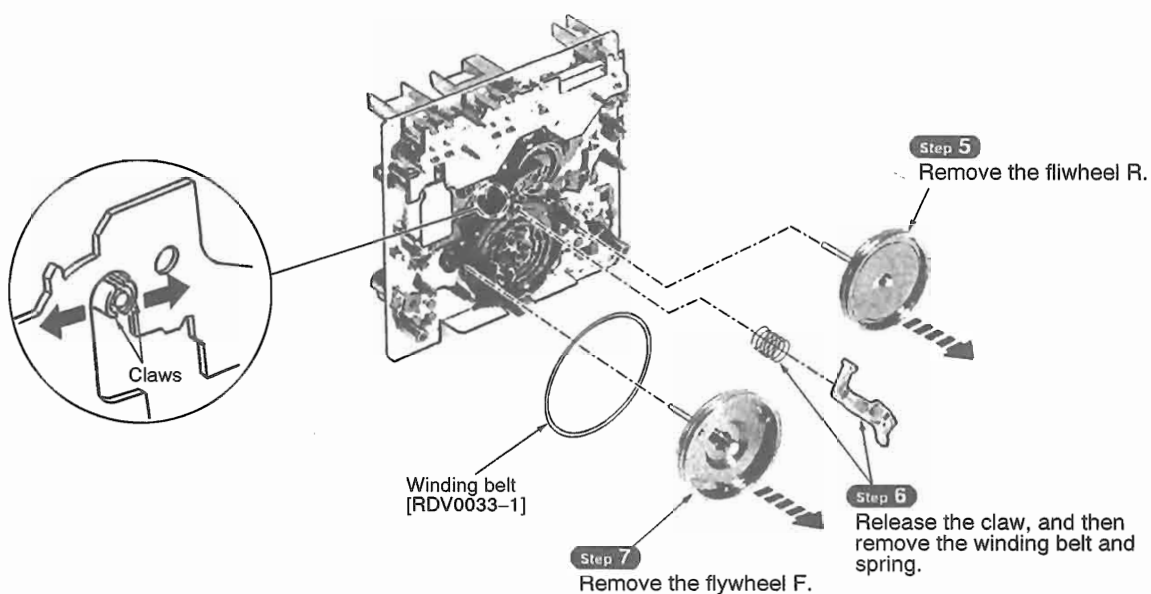
b × 2

Motor ass'y
[REM0055]

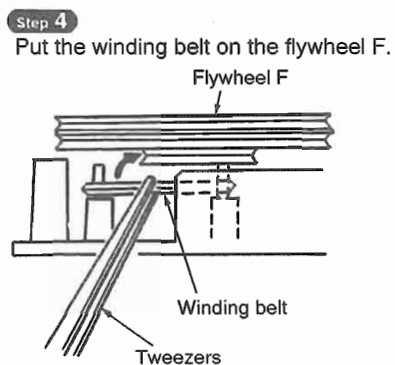
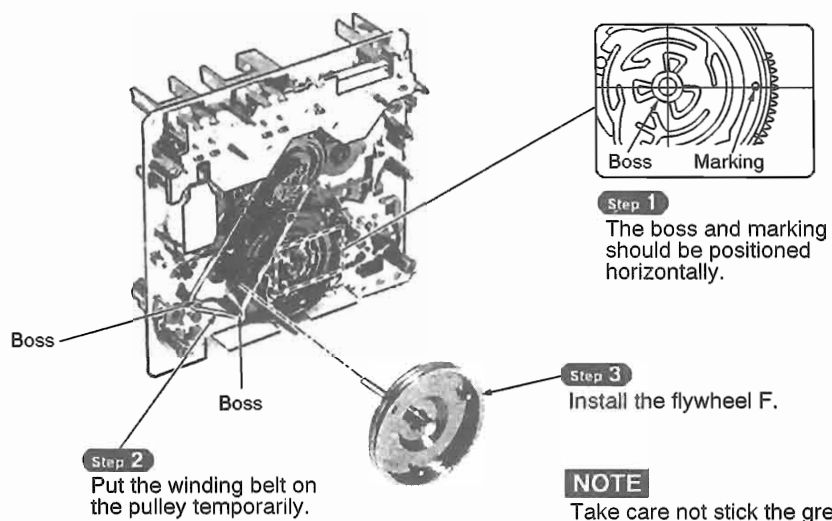
[XTW26+10S]



[RHD26022]

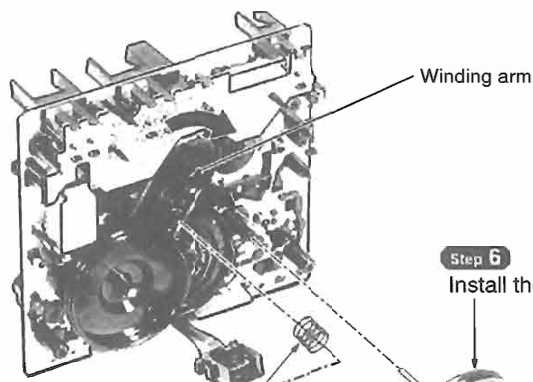
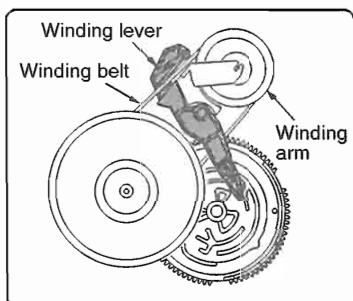


Installing the belt



NOTE

The winding lever should be positioned as shown below.

**Step 6**

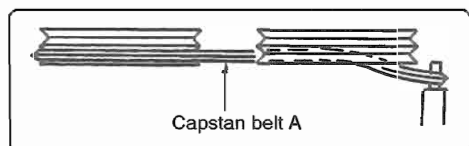
Install the flywheel R.

Step 5

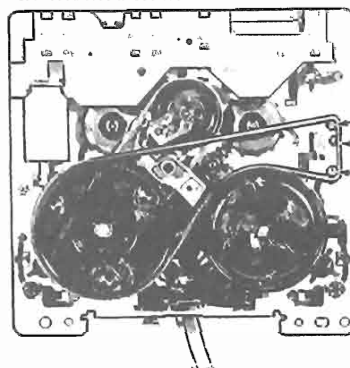
Install the winding lever and spring while pressing the winding arm in the direction of arrow.
(The winding lever must be inserted completely and latched with claws.)

Step 7

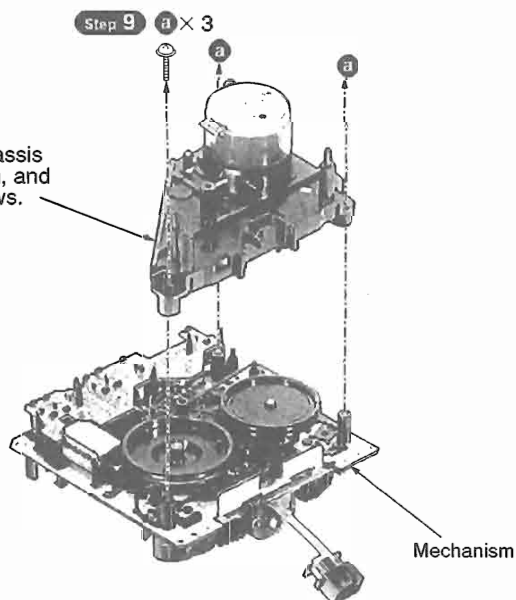
Put the capstan belt A temporarily as shown below.



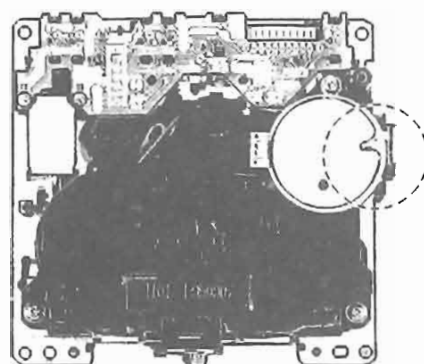
(Side view)

**Step 9** a × 3**Step 8**

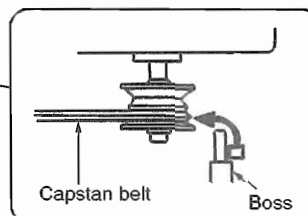
Install the sub chassis to the mechanism, and then tighten screws.



[XTW26+10S]

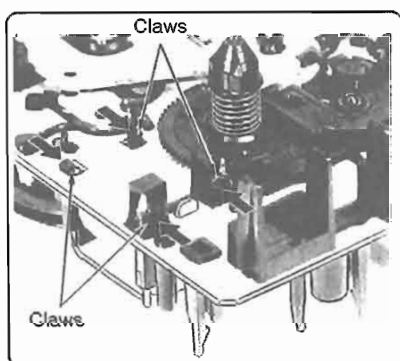
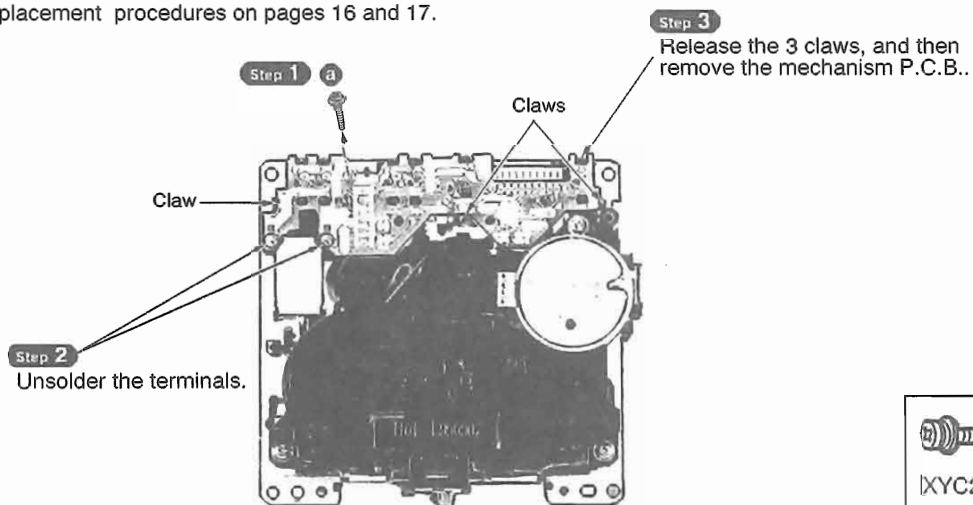
**Step 10**

Put the capstan belt on the motor ass'y pulley.

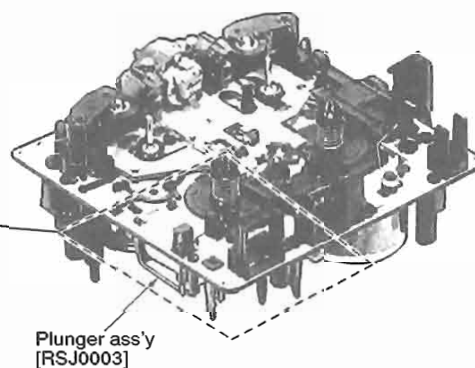


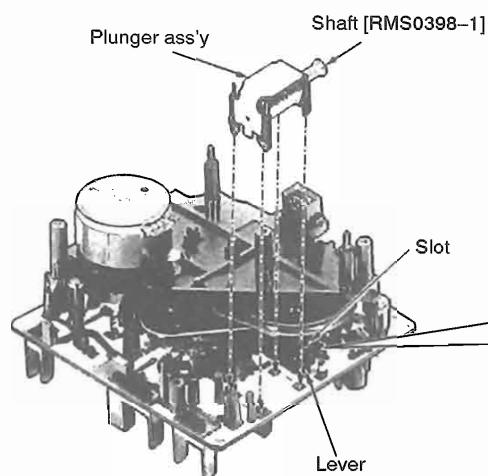
4. Replacement for the plunger ass'y and the parts mounted on mechanism P.C.B.

- Follow the **Step 1** ~ **Step 3** of the item 1 in checking procedure for each P.C.B. on page 14.
- Follow the **Step 1** ~ **Step 14** of the item 2 in main component replacement procedures on pages 16 and 17.

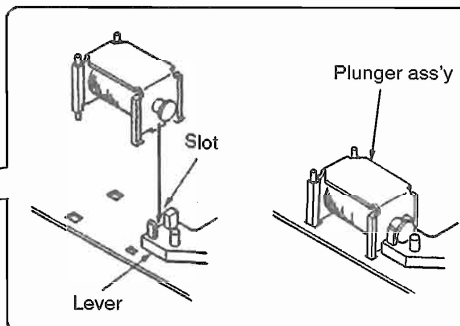
**Step 4**

Release the 4 claws.

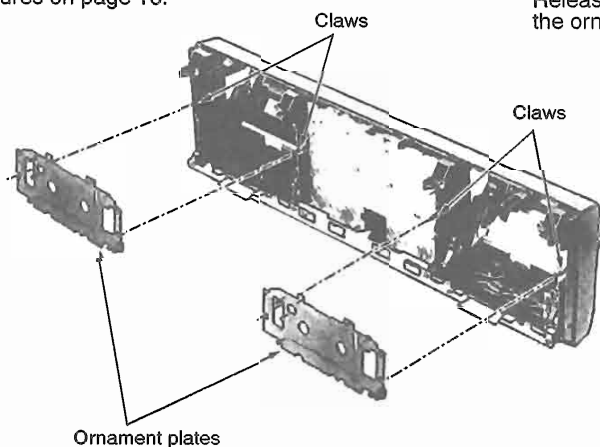


**NOTE**

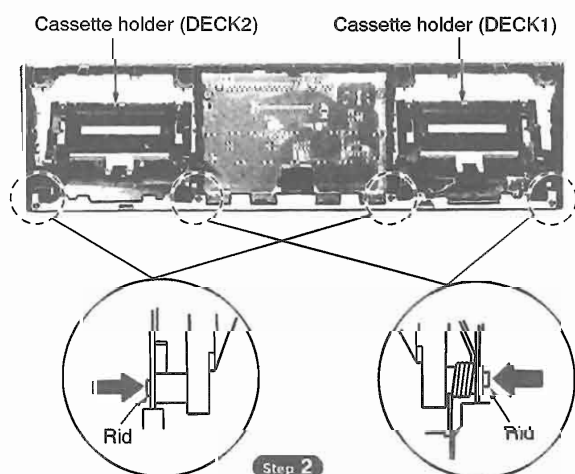
Notice for installing the plunger ass'y
 • The shaft of plunger ass'y should be aligned with the slot of lever.

**4. Replacement for the cassette holder.**

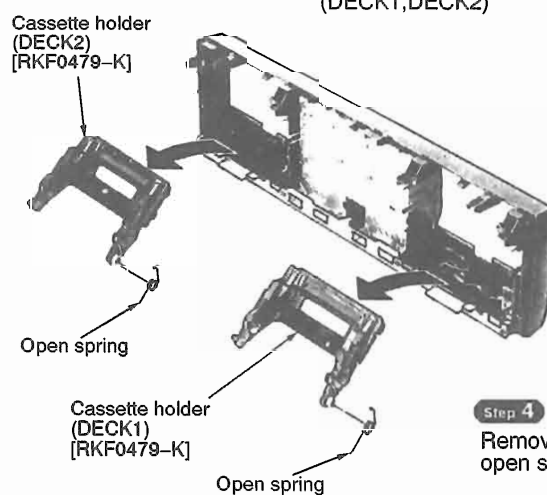
- Follow the **Step 1** ~ **Step 3** of the item 1 in checking procedure for each P.C.B. on page 14.
- Follow the **Step 1** ~ **Step 8** of the item 2 in main component replacement procedures on page 16.

**Step 1**

Release the 4 claws, and then remove the ornament plates.

**Step 2**

Release the 4 rids.

**Step 3**

Remove the cassette holder (DECK1, DECK2)

Step 4

Remove the open spring.

■ EEPROM Data Write

Various factory-preset data and adjusted values are stored in this unit's EEPROM (IC502). When the IC502 EEPROM is replaced, its data and adjusted values need to be written to a new EEPROM.

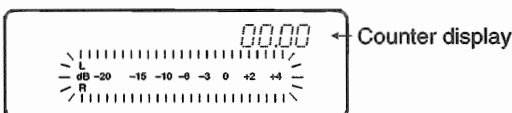
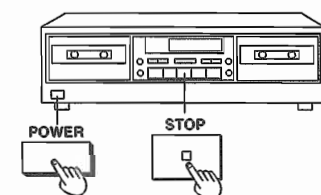
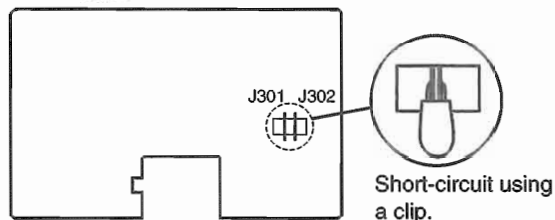
● EEPROM Write Procedure

Note:

Follow this procedure only when the IC502 EEPROM is replaced. No writing of EEPROM data and adjusted values is required for the replacement of any other component.

- Step 1** Short-circuit the TEST mode terminal (J301⇔J302) using a clip.
- Step 2** Press the POWER button while keeping the STOP button pressed.
- Step 3** The display level meter blinks, with "00 00" appearing on the counter display.
(The unit enters the EEPROM write mode.)
The write data is set to "00 00."
- Step 4** Press the FF button to set the 2 left digits (Address) of the counter display to "01" but leave the two right-hand digits (Data) at "00."
The write data is set to "01 00."
- Step 5** Press the FF button to set the two left-hand digits (Address) of the counter display to "03" and press the F.PLAY button to set the 2 right digits (Data) to "5A."
The write data is set to "03 5A."
- Step 6** Similarly (set the two left-hand digits (Address) of the counter display using the FF and REW buttons and the two right-hand digits (Data) using the F.PLAY and R.PLAY buttons), write data at the columns in Table 1 up to "7F 00."
- Step 7** Press STOP button. (EEPROM write is completed, and the unit enters the adjustment mode.)
- Step 8** Follow Step 4 ~ Step 9 in the "Adjusted Value Rewrite Procedure" to rewrite the adjusted values.

FL P. C. B.



- The address is represented by the two left-hand digits of the counter display and the data by the two right-hand digits.

- When an address is changed, the previously set address and data are written.

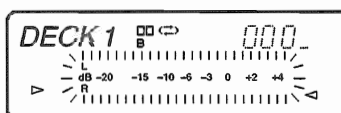
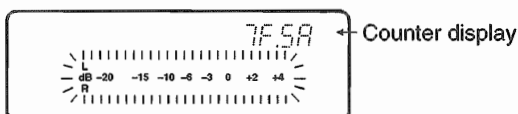
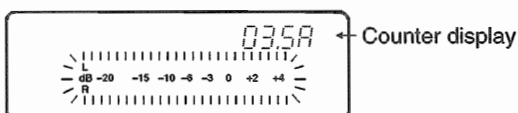
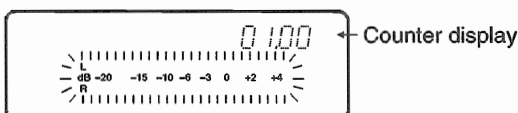


Table 1: EEPROM Address/Data map

Address	Data	Address	Data	Address	Data	Address	Data
00	00	20	B0	40	—	60	92
01	00	21	B0	41	—	61	A0
02	—	22	A0	42	—	62	89
03	5A	23	05	43	—	63	7C
04	—	24	—	44	—	64	60
05	—	25	—	45	—	65	60
06	—	26	—	46	—	66	40
07	—	27	—	47	—	67	56
08	—	28	—	48	—	68	79
09	—	29	—	49	—	69	70
0A	—	2A	78	4A	—	6A	28
0B	—	2B	71	4B	—	6B	40
0C	—	2C	4E	4C	—	6C	75
0D	—	2D	65	4D	—	6D	90
0E	—	2E	4F	4E	—	6E	—
0F	—	2F	5E	4F	—	6F	—
10	—	30	A0	50	78	70	BD
11	—	31	71	51	84	71	D0
12	—	32	44	52	6F	72	A3
13	—	33	47	53	65	73	94
14	—	34	4F	54	4C	74	57
15	—	35	5E	55	68	75	26
16	—	36	—	56	05	76	40
17	EC	37	—	57	56	77	58
18	80	38	—	58	90	78	A0
19	80	39	—	59	4D	79	60
1A	80	3A	—	5A	40	7A	40
1B	80	3B	—	5B	23	7B	50
1C	80	3C	—	5C	7C	7C	90
1D	80	3D	—	5D	90	7D	90
1E	80	3E	—	5E	—	7E	0A
1F	80	3F	—	5F	—	7F	00

Note: At an address with no data value indicated (e.g. 02 —), the EEPROM operates normally irrespective of the kind of the data supplied.

Adjusted Value Rewrite

Various factory-preset data and adjusted values are stored in the EEPROM (IC502) of this unit. Re-adjust the following components when replaced. Upon completion of the re-adjustments, the necessary data can be automatically rewritten.

Applicable components

- MECHANISM HEAD
- IC2: PLAY BACK AMP IC
- IC302: DOLBY HX PRO IC
- IC401: DOLBY BC IC
- Q301, Q302

Cassette tapes to be prepared

- Normal blank tape: QZZCRA
- Playback gain adjustment (315 Hz, 0 dB); QZZCFM

Measurement Condition

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature $20 \pm 5^{\circ}\text{C}$ ($68 \pm 9^{\circ}\text{F}$)

Measuring Instrument

- EVM (Electronic Voltmeter)
- AF oscillator
- Digital frequency counter
- Attenuator
- Resistor (600 Ω)

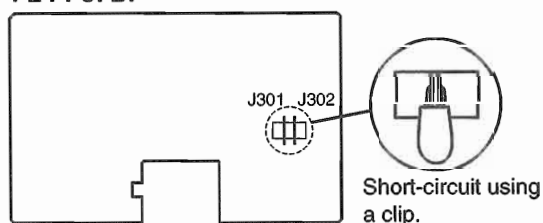
Adjusted Value Rewrite Procedure (Adjusted values can be automatically rewritten.)

Note: No rewriting of the adjusted values are needed even for the replacement of the system control IC (IC501).

Step 1

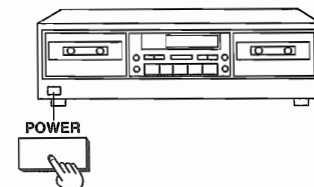
Short-circuit the TEST mode terminal (J301 $\leftrightarrow$ J302) using a clip.

FL P. C. B.



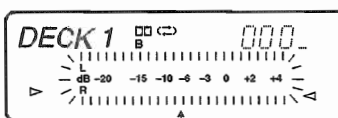
Step 2

Press the POWER button.



Step 3

The display level meter blinks. (The unit enters the adjustment mode.)

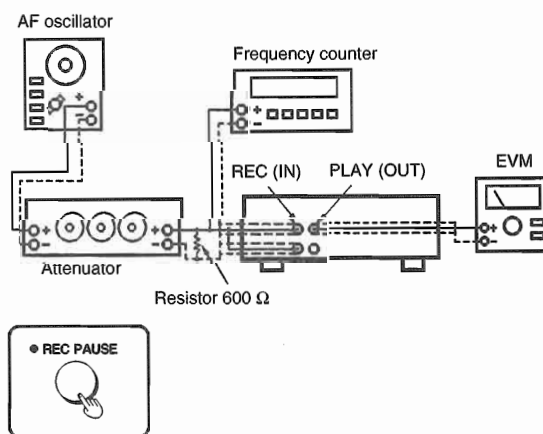


The level meter blinks.

Step 4

Setting Playback Gain Level

1. Load DECK 2 with the test tape (QZZCFM) (at the section with 315 Hz and 0 dB)
2. Apply an input signal at 315 Hz to the REC (IN) jack from the AF oscillator.
3. Leave the REC PAUSE button pressed.
4. Adjust the attenuator to bring an output signal from the PLAY (OUT) jack close to $320 \text{ mV} \pm 20 \text{ mV}$.
5. Release the REC PAUSE button.
6. Repeat 3 through 5 above (to reset the Auto Level Control circuit) and finally set the output signal from the PLAY (OUT) jack to $320 \text{ mV} \pm 20 \text{ mV}$.
7. When the output signal from the PLAY (OUT) jack is set to $320 \text{ mV} \pm 20 \text{ mV}$, release the REC PAUSE button after about 2 seconds.



To Step 5

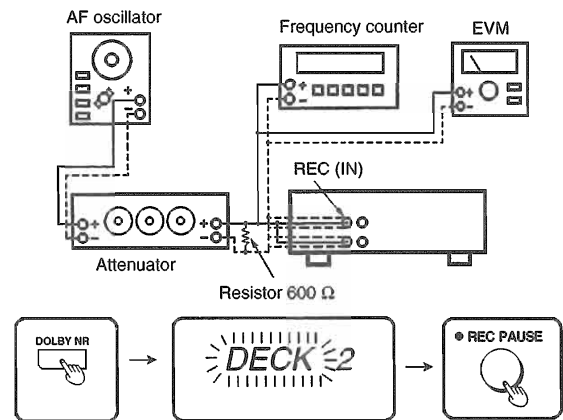
Step 5

Adjusting MPX

From Step 4

1. Apply an input signal at $19\text{ kHz} \pm 50\text{ Hz}$ and 320 mV to the REC (IN) jack from the AF oscillator.
2. Press the DOLBY NR button.
(The DECK display slowly blinks.)
3. Press the REC PAUSE button.
(No mechanism operates, but the DECK display disappears after several seconds.)

Note: If no proper adjustment is made, the DECK display quickly blinks. In this case, adjust the input level from the AF oscillator to within the range of $320\text{ mV} \pm 50\text{ mV}$ and repeat steps 2 and 3 above. Upon completion of the adjustment, the DECK display disappears.

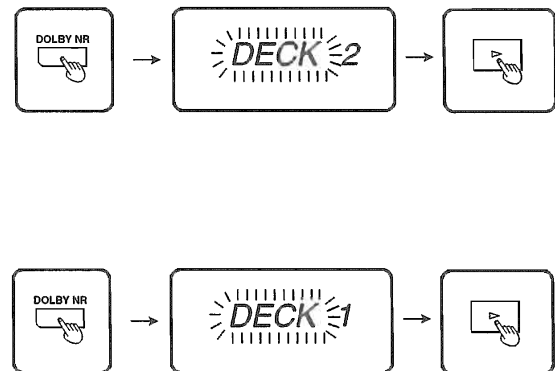


Step 6

Adjusting Playback Gain

1. Press the DOLBY NR button. (The DECK display slowly blinks.)
2. Press the F.PLAY ► button.
(The mechanism automatically runs for the FWD PLAY/REV PLAY and stops, and the DECK display disappears.)
3. Load DECK 1 with the test tape (QZZCFM)
(at the section with 315 Hz and 0 dB).
4. Press the DOLBY NR button.
(The DECK display slowly blinks.)
5. Press the F.PLAY ► button.
(The mechanism automatically runs for the FWD PLAY/REV PLAY and stops, and the DECK display disappears.)

Note: If no proper adjustment is made, the DECK display quickly blinks. In this case, repeat Step 4 and Step 6. Upon completion of the adjustment, the DECK display disappears.

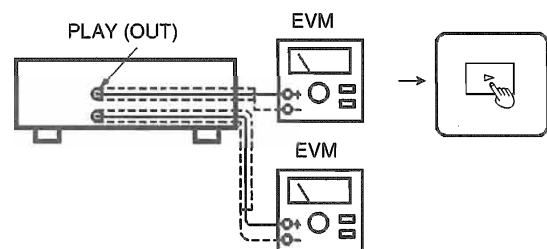


Step 7

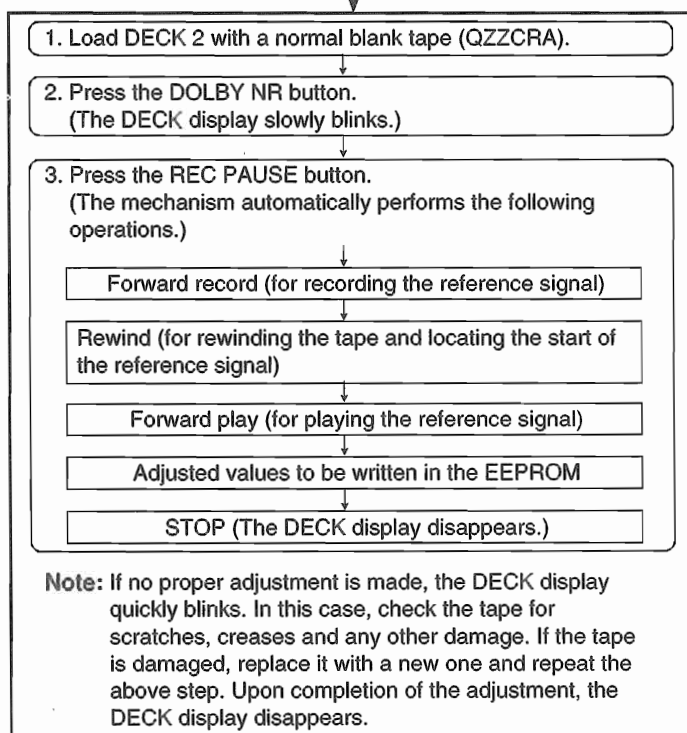
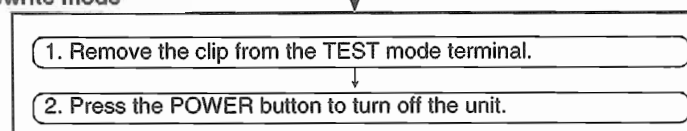
Checking Playback Gain

1. Press the F.PLAY ► button.
(Play the test tape (QZZCFM: 315 Hz, 0 dB) in DECK 1.)
2. Check the output stays within the standard value range.
Standard value range: 280 mV ~ 360 mV
3. Load DECK 2 with a test tape (QZZCFM).
(At the section with 315 Hz and 0 dB)
4. Press the F.PLAY ► button.
(Play the test tape (QZZCFM: 315 Hz, 0 dB) in DECK 2.)
5. Check the output stays within the standard value range.
Standard value range: 280 mV ~ 360 m

Note: If the output stays outside the standard value range, repeat Step 4, Step 6 and Step 7.



To Step 8

Step 8**Adjusting Overall Gain and Overall Frequency Characteristics**From **Step 7****Step 9****Clearing the Adjusted Value Rewrite mode**

■ Measurements and Adjustments

Measurement Condition

- Dolby NR switch; OFF
- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature $20 \pm 5^{\circ}\text{C}$ ($68 \pm 9^{\circ}\text{F}$)

Measuring Instrument

- EVM (Electronic Voltmeter)
- AF oscillator
- Digital frequency counter
- Attenuator
- Resistor ($600\ \Omega$)

Test Tape

- Head azimuth adjustment (8 kHz, -20 dB); QZZCFM
- Tape speed adjustment (3 kHz, -10 dB); QZZCWAT
- Playback gain adjustment (315 Hz, 0 dB); QZZCFM
- Recording/playback frequency response adjustment;
QZZCFM (315 Hz/0 dB, 315 Hz/-20 dB, 12.5 kHz~63 Hz/-20 dB)
QZZCRA (Normal blank Tape)
QZZCRX (CrO2 blank Tape)
QZZCRZ (Metal blank Tape)

● Adjustment Points

Deck 1 Mechanism Control P.C.B.

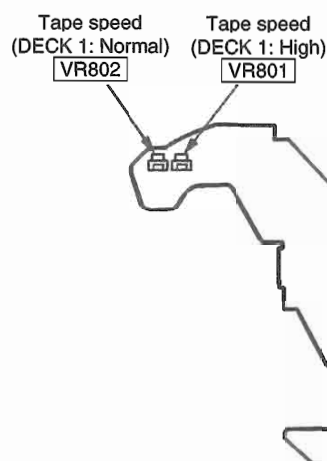


Fig. 1

Deck 2 Mechanism Control P.C.B.

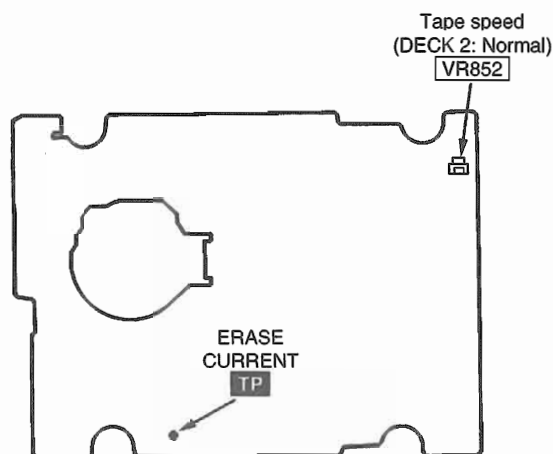


Fig. 2

FL P.C.B.

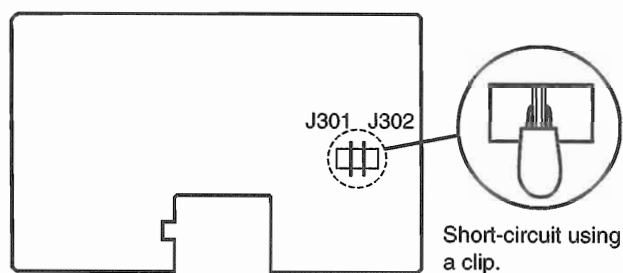


Fig. 3

Main P.C.B.

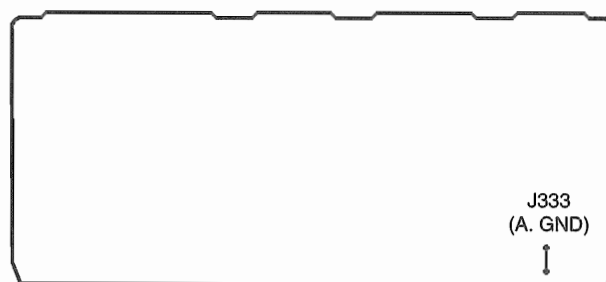


Fig. 4

Head Azimuth Adjustment (Decks 1 and 2)

1. Connect the measuring instruments as shown in Fig. 5.
2. Replace the azimuth adjustment screws (for both forward and reverse plays) with new ones.
At this point, remove the screw lock bond stuck to the area around the heads. If the screw lock bond remains in place, no fine adjustment can be made. (Azimuth adjustment screw supply model: RHD17015)
3. Forward play the azimuth adjusting portion (8 kHz, -20 dB) of a test tape (QZZCFM) and adjust the azimuth adjustment screw so the output at the left and right channels is at the maximum. (See Fig. 6.)
4. For the reverse play, make the azimuth adjustment in a similar manner.

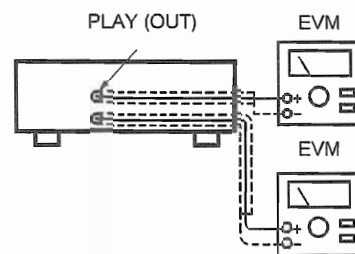


Fig. 5

Difference check between forward and reverse play levels

5. Play the playback gain adjusting portion (315 Hz, 0 dB) of the test tape (QZZCFM) and ensure the difference between the forward and reverse play levels remains within the range of 1.5 dB.
6. After completing the adjustment, lock the azimuth adjustment screws.

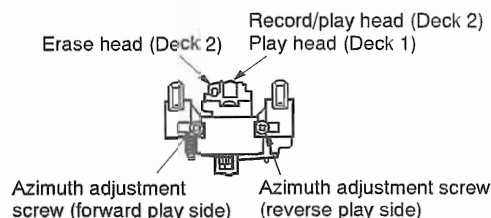


Fig. 6

Tape Speed Adjustment (Decks 1 and 2)

1. Turn on the power to the unit and short-circuit the TEST mode terminal (J301⇔J302) using a clip.

Normal speed adjustment (adjust in the FWD play mode)

Product specification value: 3,000 Hz ± 45 Hz

2. Connect the measuring instruments as shown in Fig. 7.
3. Press the SPEED button to set the tape speed to the Normal position.
4. Play the middle portion of the test tape (QZZCWAT).
5. Adjust VR802 for DECK 1 and VR852 for DECK 2 so their outputs have the following value.

Adjusted value: 3,000 Hz ± 15 Hz (Normal speed)

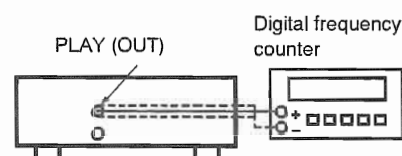


Fig. 7

High speed adjustment (Adjust in the FWD play mode.)

Product specification value: 3,000 Hz ± 45 Hz

6. Play the middle portion of the test tape (QZZCWAT).
7. Press the SPEED button to set the tape speed to the High position.
8. At this point, ensure the output of DECK 2 stays within the specification value.

DECK 2 specification value: 6,000 Hz ± 600 Hz (High speed)

9. Adjust VR801 for DECK 1 so its output frequency remains within ± 30 Hz of that of DECK 2.
10. Clear the short circuit of the TEST terminal.

Playback Gain Check (Decks 1 and 2)

1. Connect the measuring instruments as shown in Fig. 8.
2. Play the 315 Hz, 0 dB section of the test tape (QZZCFM).
3. Ensure the output stays within the standard value range.

Standard value range (Decks 1 and 2): 280 mV ~ 360 mV

Note: If the output is outside the standard value range, follow **Step 1** ~ **Step 4** in the "Adjusted Value Rewrite." (See page 25)

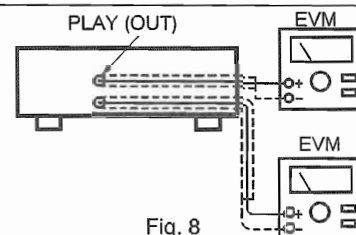


Fig. 8

Erase Current Check (Decks 1 and 2)

1. Connect the measuring instruments as shown in Fig. 9.
2. Load DECK 2 with a normal, CrO2 or metal tape.
3. Press the REC PAUSE button to pause the recording.
4. Ensure the measured erase current of the tape stays within the standard value.

Standard value	Measured value with EVM
Normal tape : 140 mA ± 25 mA	(140 mA ± 25 mV)
CrO2 tape : 140 mA ± 25 mA	(140 mA ± 25 mV)
Metal tape : 220 mA ± 25 mA	(220 mA ± 25 mV)

Note: If the measured value is outside the standard range, follow **Step 1** ~ **Step 9** in the "Adjusted Value Rewrite." (See pages 25, 26)



Fig. 9

Playback Frequency Characteristic Check (Decks 1 and 2)

1. Connect the measuring instruments as shown in Fig. 10.
2. Play the playback frequency characteristic check portions (315 Hz, 12.5 kHz ~ 63 Hz, -20 dB) of the test tape (QZZCFM).
3. With the output produced at 315 Hz as a standard, check the playback output levels (both L- and R-channels) at the individual frequencies stay within the range shown in Fig. 11.

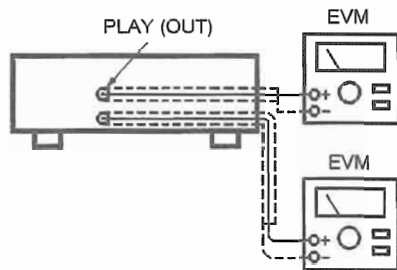


Fig. 10

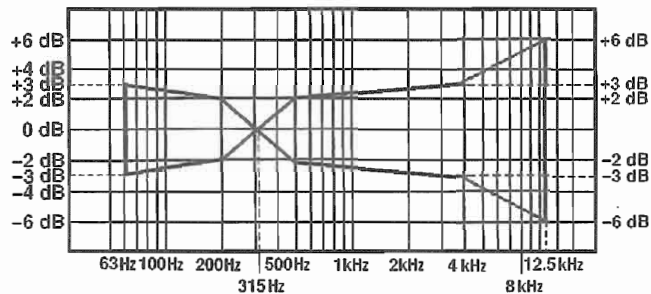


Fig. 11

Note: If these levels are outside the standard value range, follow **Step 1** - **Step 6** in the "Adjusted Value Rewrite." (See pages 25, 26)

Record/Playback Frequency Characteristic Check (Deck 2)

Normal tape check

1. Connect the measuring instruments as shown in Fig. 12.
2. Load DECK 2 with a test tape (QZZCRA: normal blank tape).
3. Press the DOLBY NR button to set it to the DOLBY OFF position.
4. Using an input level of 32 mV, record signals at 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 10 kHz and 12.5 kHz. (The recording time at each individual frequency is immaterial.)
5. Play the recorded signals.
6. With the output produced at 1 kHz as a standard, ensure the playback output levels (both left and right channels) at the individual frequencies stay within the range shown in Fig. 13.

CrO2/metal tape check

7. Load DECK 2 with a CrO2 or metal tape.
8. Follow the procedure for the "Normal Tape Check" and ensure the playback output levels stay within the range shown in Fig. 14.

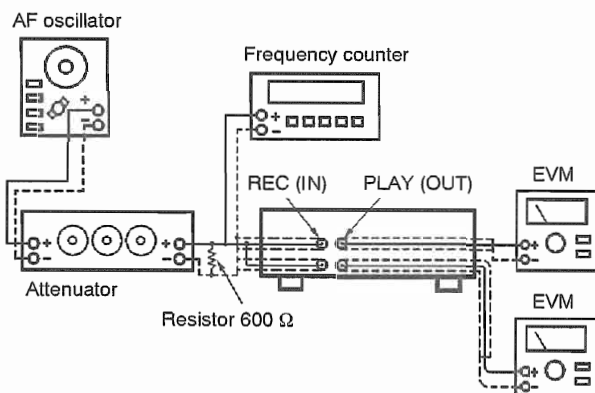


Fig. 12

Normal tape overall frequency characteristics (DOLBY NR: OFF)

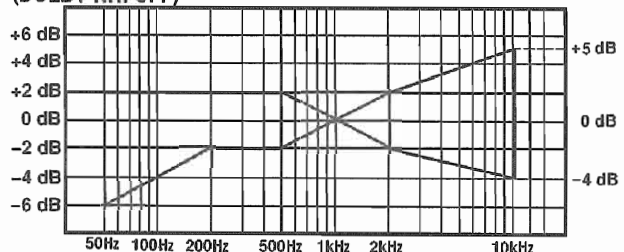


Fig. 13

CrO2/metal tape overall frequency characteristics (DOLBY NR: OFF)

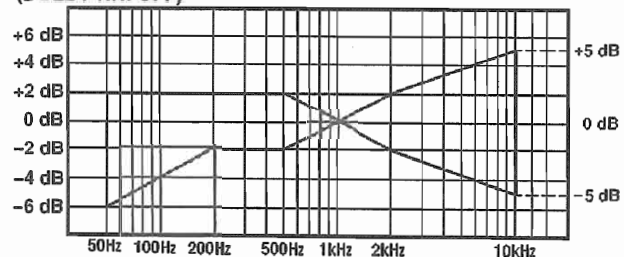


Fig. 14

Note: If the outputs stay outside the standard value range, follow **Step 1** - **Step 9** in the "Adjusted Value Rewrite." (See pages 25 ~ 27)

■ Schematic Diagram

	Page
A MAIN CIRCUIT	32, 33
B MECHANISM CONTROL CIRCUIT (DECK 2)	34~36
C DOLBY NOISE REDUCTION CIRCUIT	34
D MECHANISM CIRCUIT (DECK 2)	35
E FL CIRCUIT	37
F POWER SWITCH CIRCUIT	37
G MECHANISM CIRCUIT (DECK 1)	37
H MECHANISM CONTROL CIRCUIT (DECK 1)	34, 37

• This schematic diagram may be modified at any time with the development of new technology.

Notes:

- S701 : Power switch (STAND BY /ON)
- S707 : DECK 1 cassette holder open switch ( OPEN)
- S708 : Dolby noise-reduction switch (DOLBY NR)
- S709 : Reverse-mode select switch (REVERSE MODE)
- S710 : Synchro-start switch (SYNCHRO START)
- S711 : Tape-to-tape recording-speed switch (SPEED)
- S714 : Stop switch ()
- S715 : Forward-side playback switch ()
- S716 : Reverse-side playback switch ()
- S717 : Fast forward switch ()
- S718 : Rewind switch ()
- S719 : DECK 2 cassette holder open switch ( OPEN)
- S720 : Record pause switch (• REC PAUSE)
- S721 : Tape deck select switch (DECK 1/2)
- S723 : Counter reset (COUNTER RESET)
- S951 : DECK 1 mode detect switch
- S952 : DECK 1 half detect switch
- S953 : DECK 1 CrO₂ tape detect switch
- S971 : DECK 2 mode detect switch
- S972 : DECK 2 half detect switch
- S973 : DECK 2 CrO₂ tape detect switch
- S974 : DECK 2 reverse side record prevention tab detect switch
- S975 : DECK 2 forward side record prevention tab detect switch
- S976 : DECK 2 METAL tape detect switch

• Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark : Playback () : Recording

• Important safety notice:

Components identified by  mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

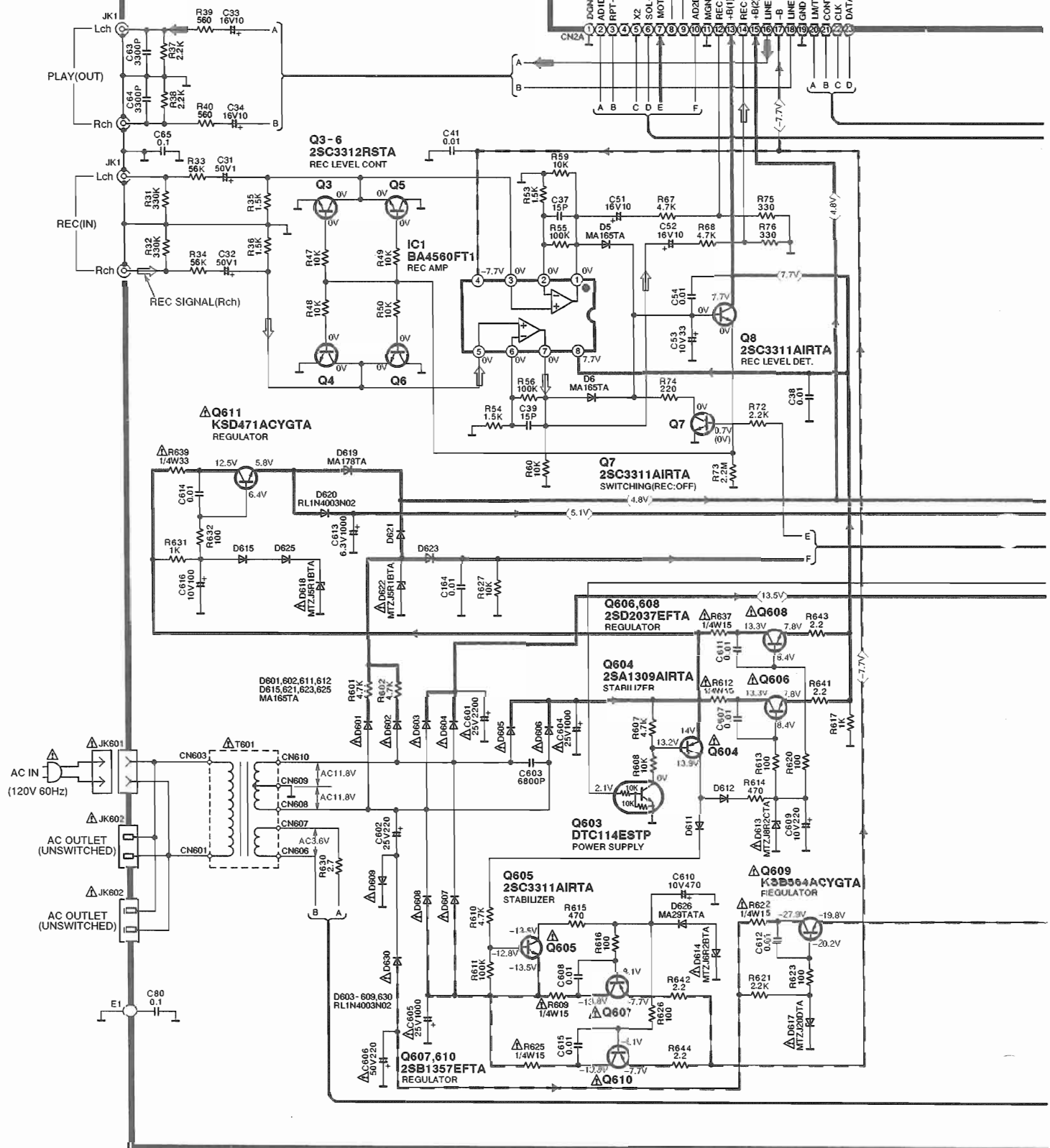
• Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
Cover the parts boxes made of plastics with aluminum foil.
Ground the soldering iron.
Put a conductive mat on the work table.
Do not touch the legs of IC or LSI with the fingers directly.

• Voltage and signal line

-  : Positive voltage line
-  : Negative voltage line
-  : Playback signal Line
-  : Recording signal Line

A MAIN CIRCUIT (P.C.Board on page 39)

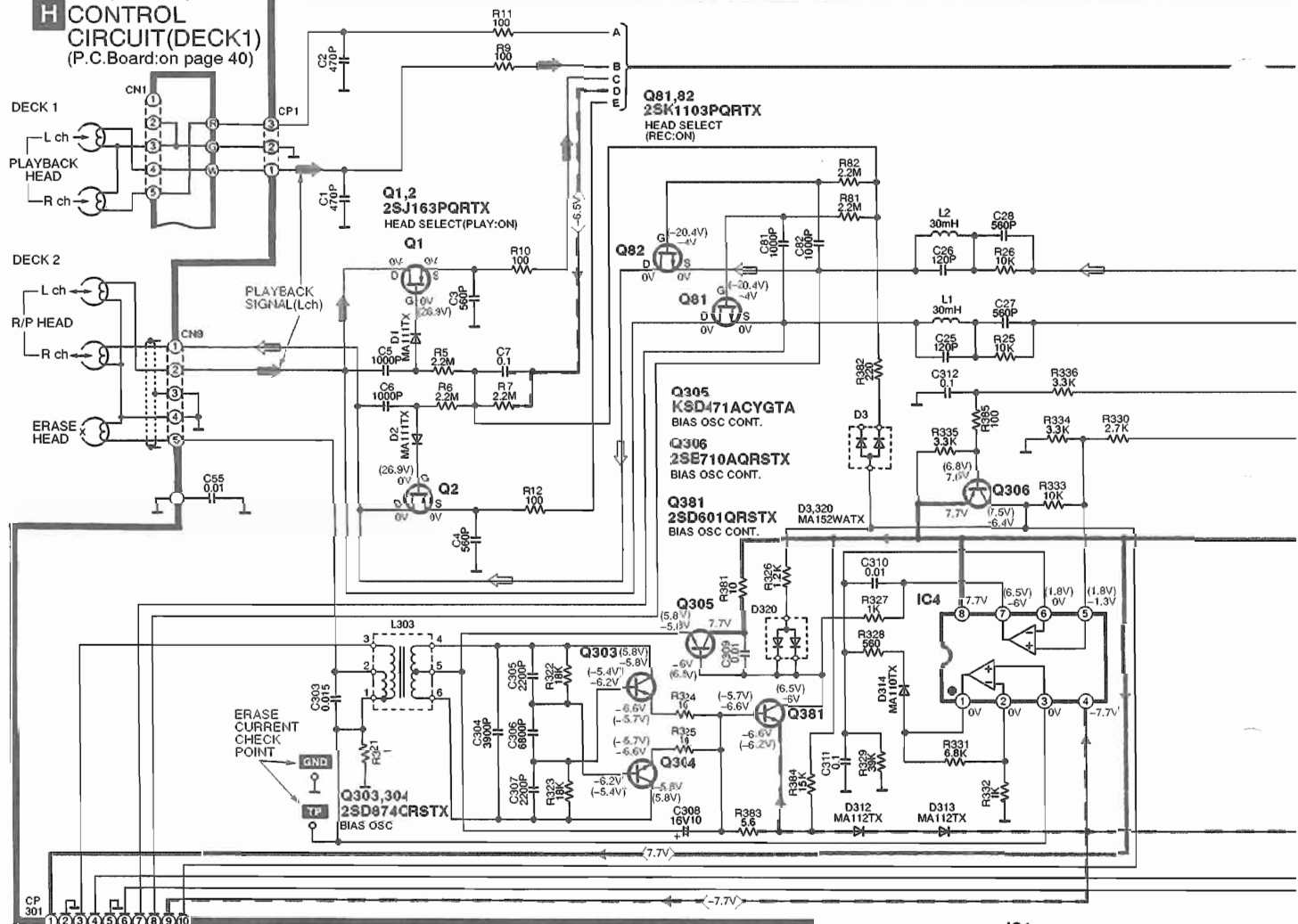
To B MECHANISM CONTROL
CIRCUIT (DECK2) (CN2B) on page 36

To **E** FL CIRCUIT (CN3B) on page 37

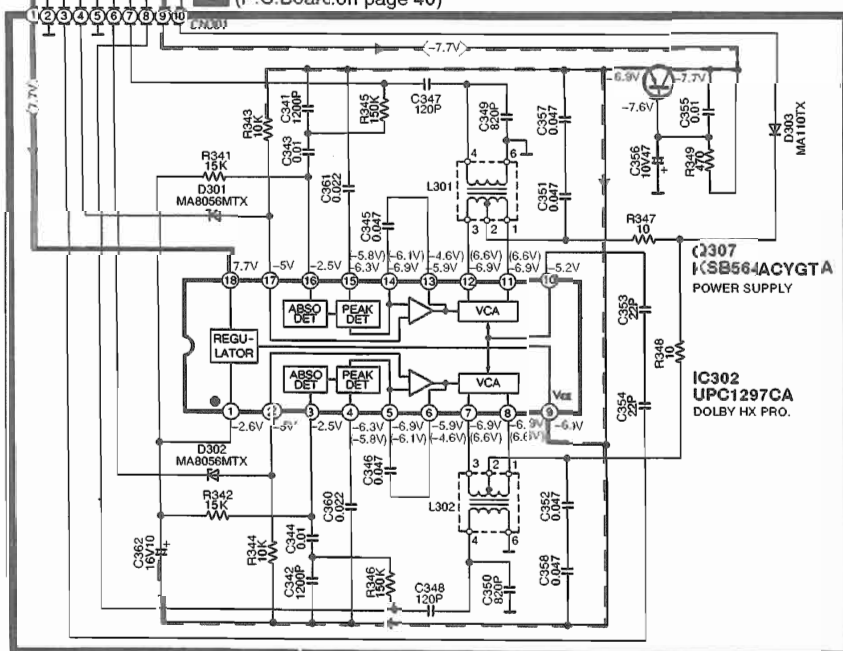


B MECHANISM CONTROL CIRCUIT(DECK2) (P.C.Board: on page 38)

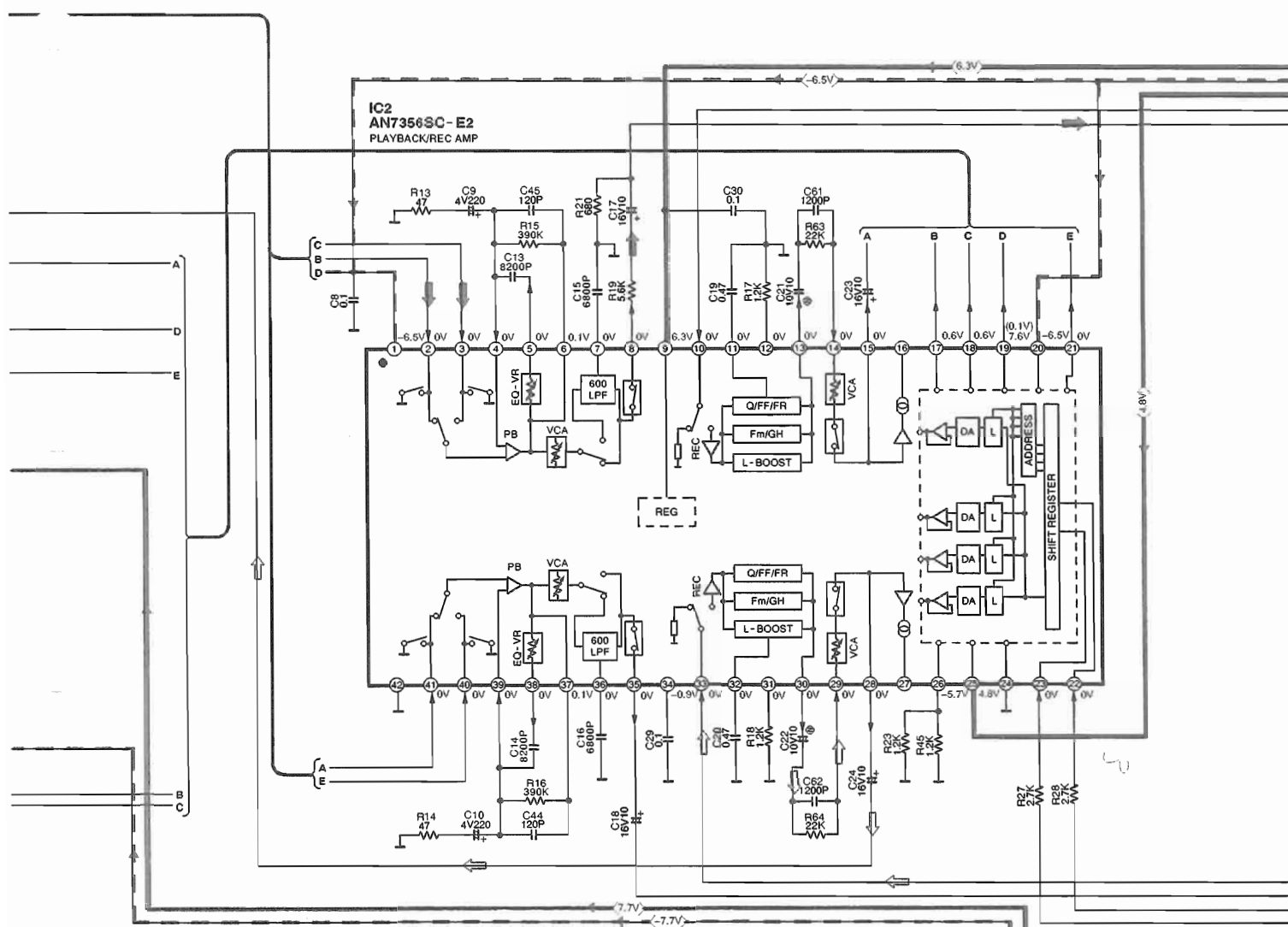
H MECHANISM CONTROL CIRCUIT(DECK1) (P.C.Board: on page 40)



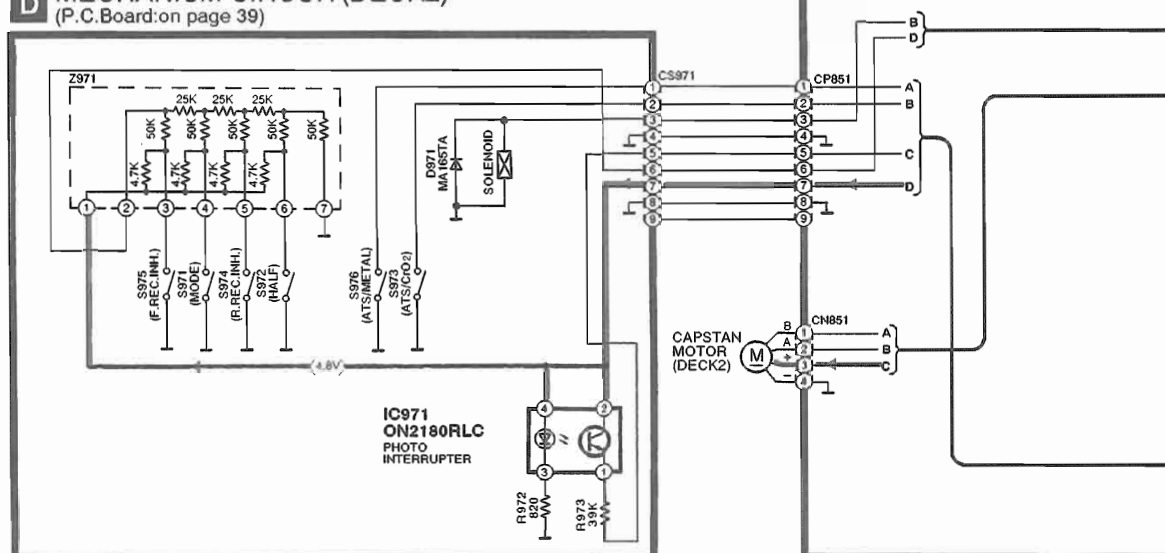
C DOLBY NOISE REDUCTION CIRCUIT (P.C.Board: on page 40)



————— : Positive voltage line
 ————— : Negative voltage line
 ————— : Playback signal Line
 ————— : Recording signal Line



D MECHANISM CIRCUIT(DECK2) (P.C. Board: on page 39)



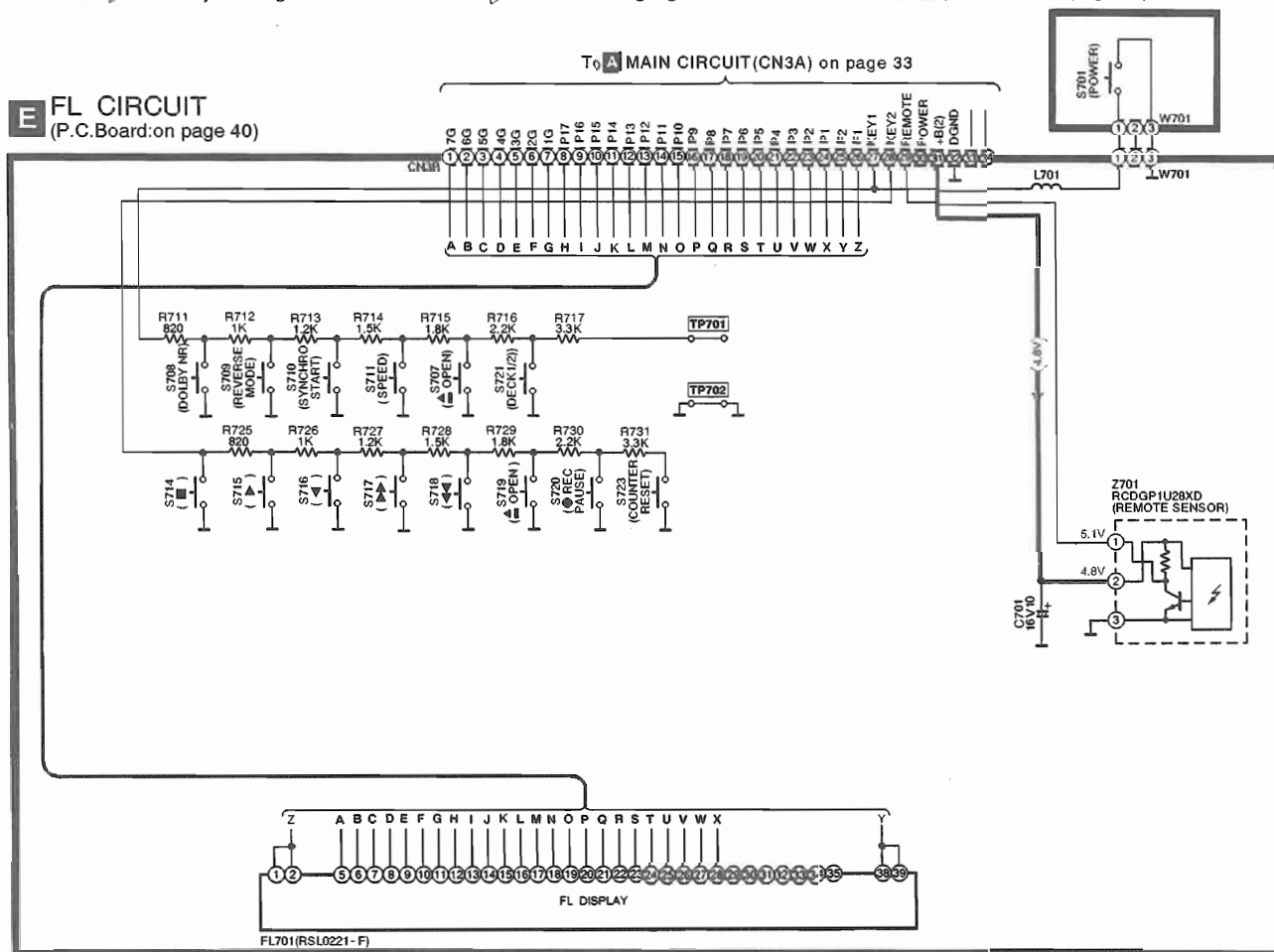


→ : Positive voltage line
→ : Playback signal Line

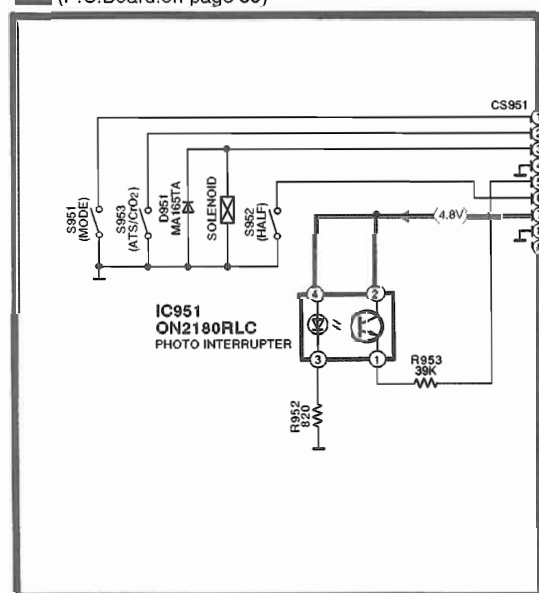
---→ : Negative voltage line
→ : Recording signal Line

F POWER SWITCH CIRCUIT (P.C.Board: on page 40)

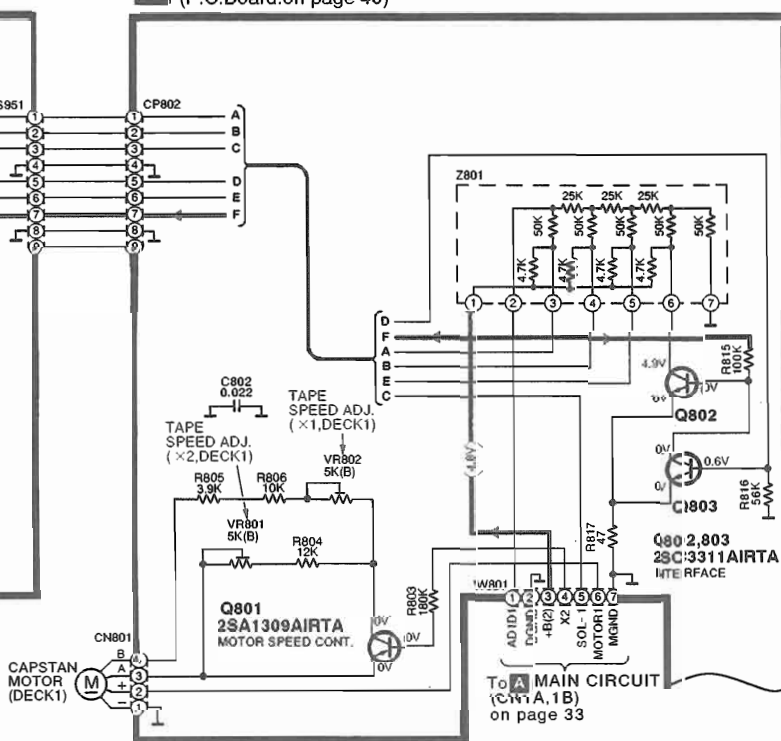
E FL CIRCUIT (P.C.Board: on page 40)



G MECHANISM CIRCUIT(DECK1) (P.C.Board: on page 39)



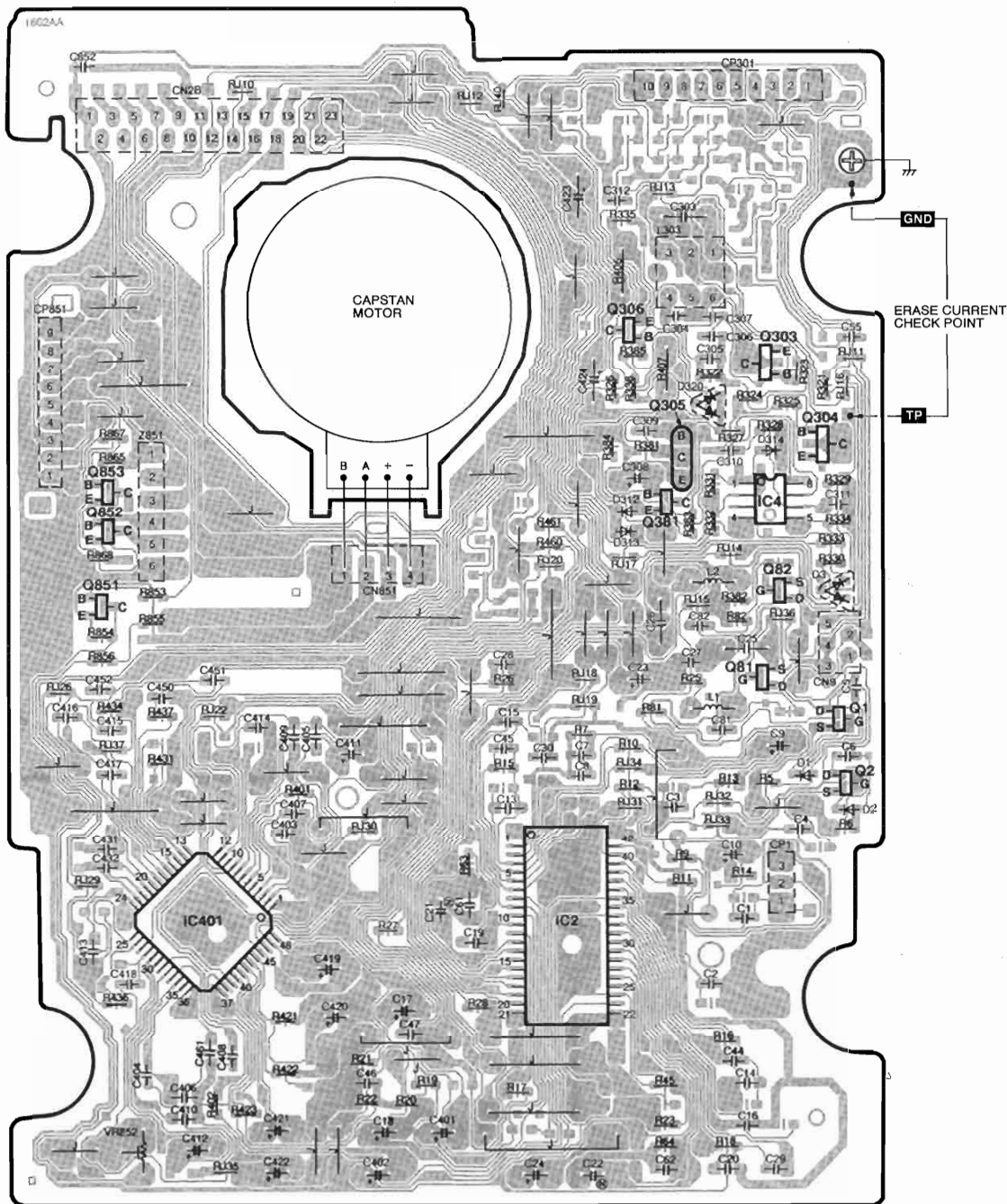
H MECHANISM CONTROL CIRCUIT(DECK1) (P.C.Board: on page 40)

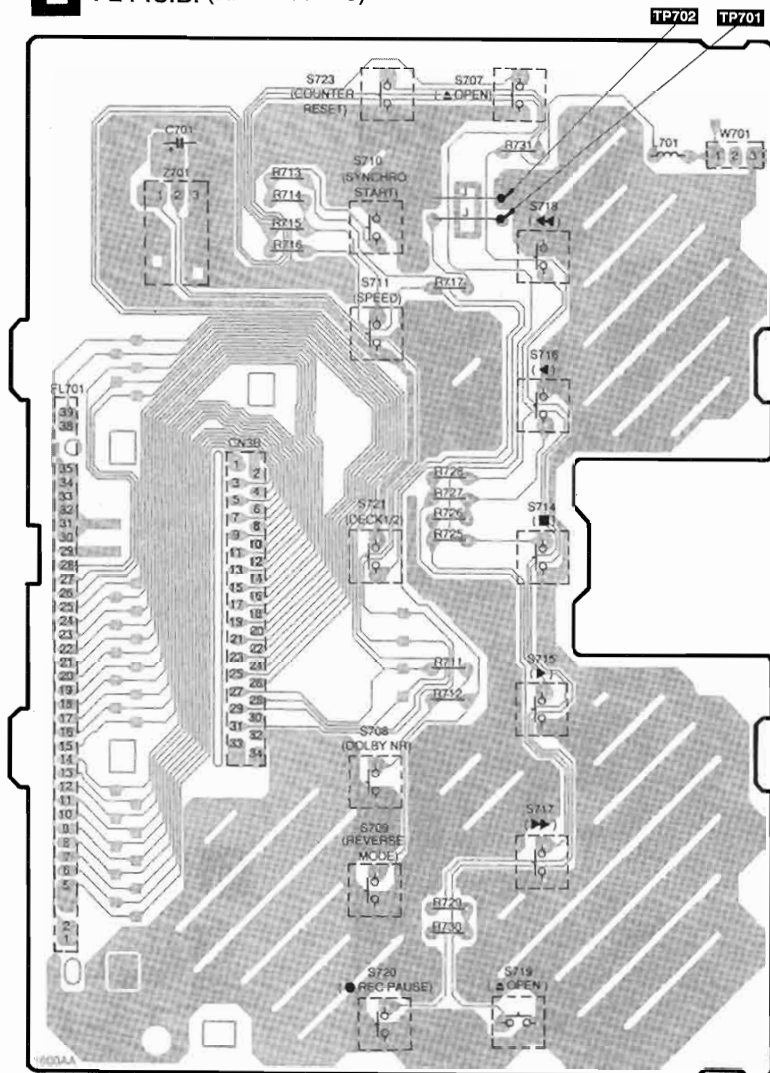
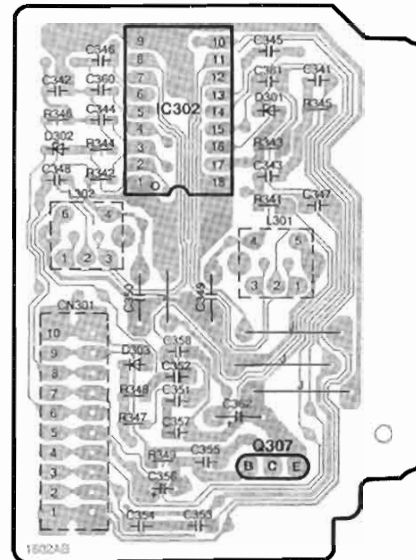
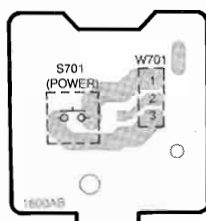
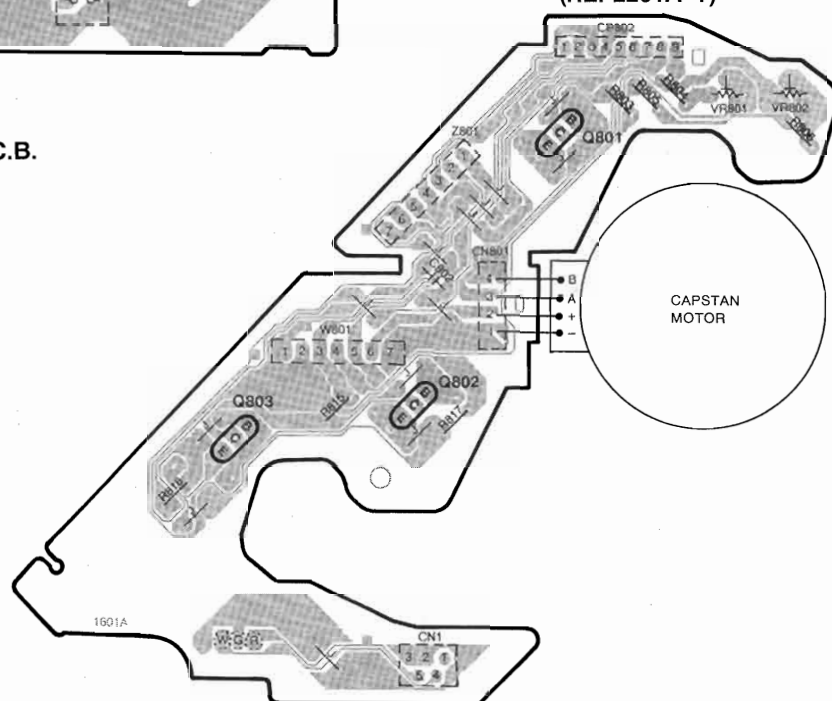


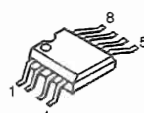
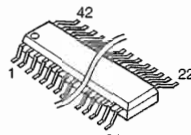
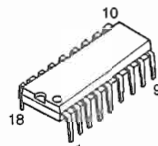
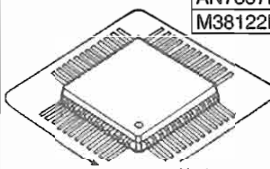
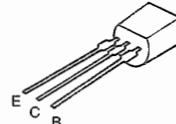
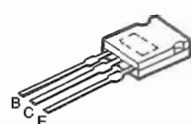
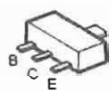
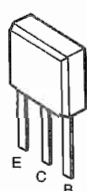
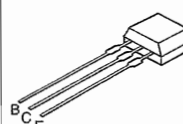
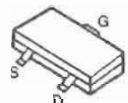
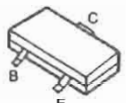
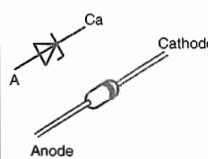
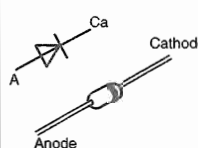
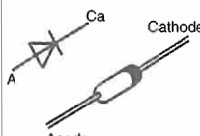
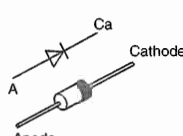
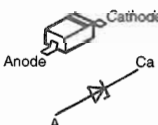
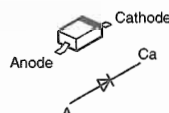
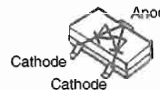
■ Printed Circuit Board Diagram

- This circuit board diagram may be modified at any time with the development of new technology.

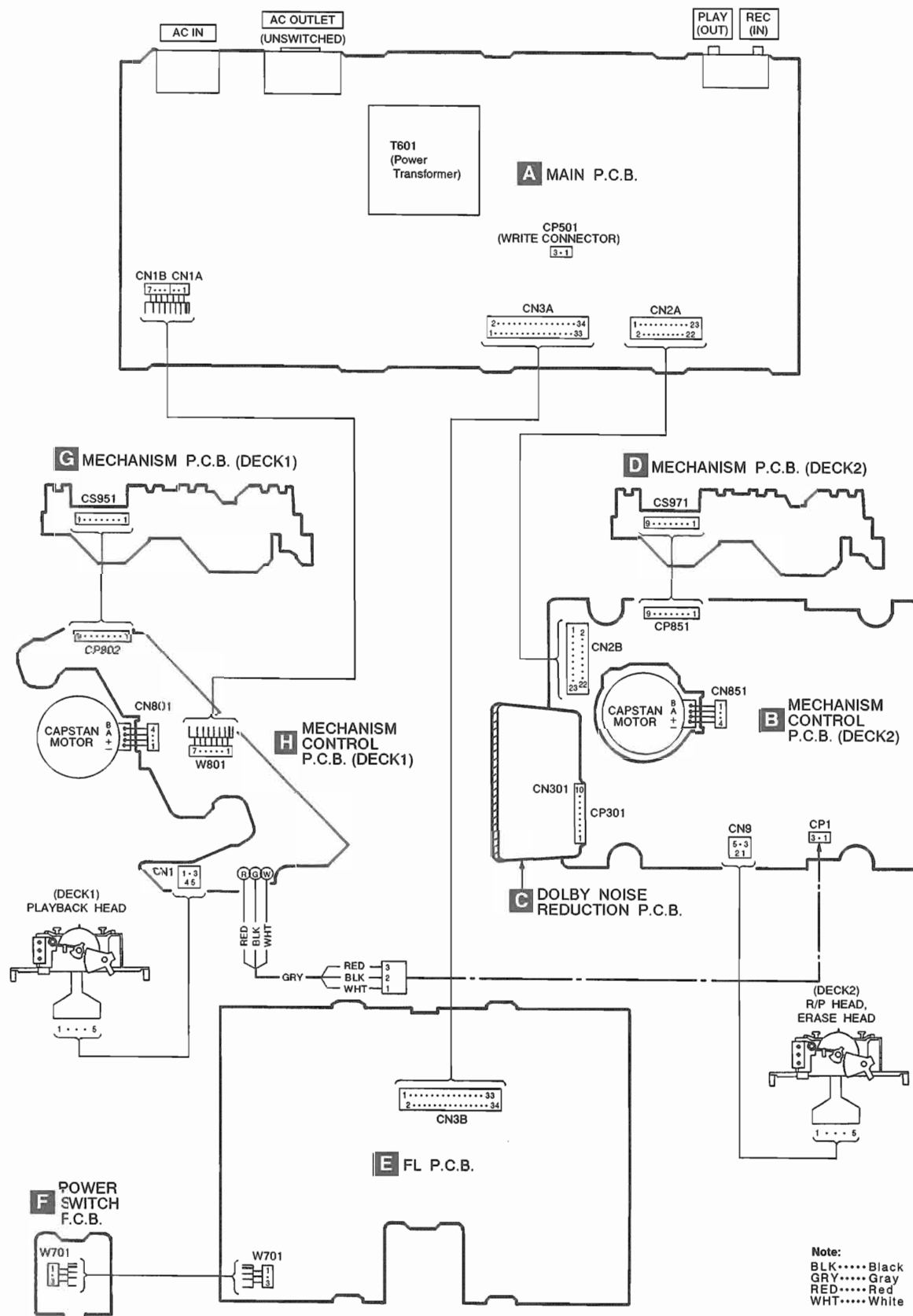
B MECHANISM CONTROL P.C.B.(DECK2) (REP2262B-T)



E FL P.C.B. (REP2260A-S)**C** DOLBY NOISE REDUCTION P.C.B. (REP2262B-T)**F** POWER SWITCH P.C.B. (REP2260A-S)**H** MECHANISM CONTROL P.C.B.(DECK1) (REP2261A-T)

SVIBA4560FT1 XLJ93LC46AFE 	AN7356SC-E2 	UPC1297CA 	AN7357FB-V 48PIN M38122M3352F 64PIN 	ON2180RLC 
KSB564ACYGTA KSD471ACYGTA 	2SB1357EFTA 2SD2037EFTA 	2SD874QRSTX 	 2SA1309AIRTA 2SC3311AIRTA 2SC3312RSTA	DTC114ESTP 
2SJ163PQRTX 2SK1103PQRTX 	2SB709QRSTX 2SB710AQRSTX 2SD601QRSTX 	MTZJ10ATA MTZJ20DTA MTZJ5R1BTA MTZJ6R2BTA MTZJ8R2CTA 		MA165 
MA29TATA 		RL1N4003N02 	MA8056MTX 	MA110TX MA111TX MA112TX 
			MA152WATX 	

Wiring Connection Diagram



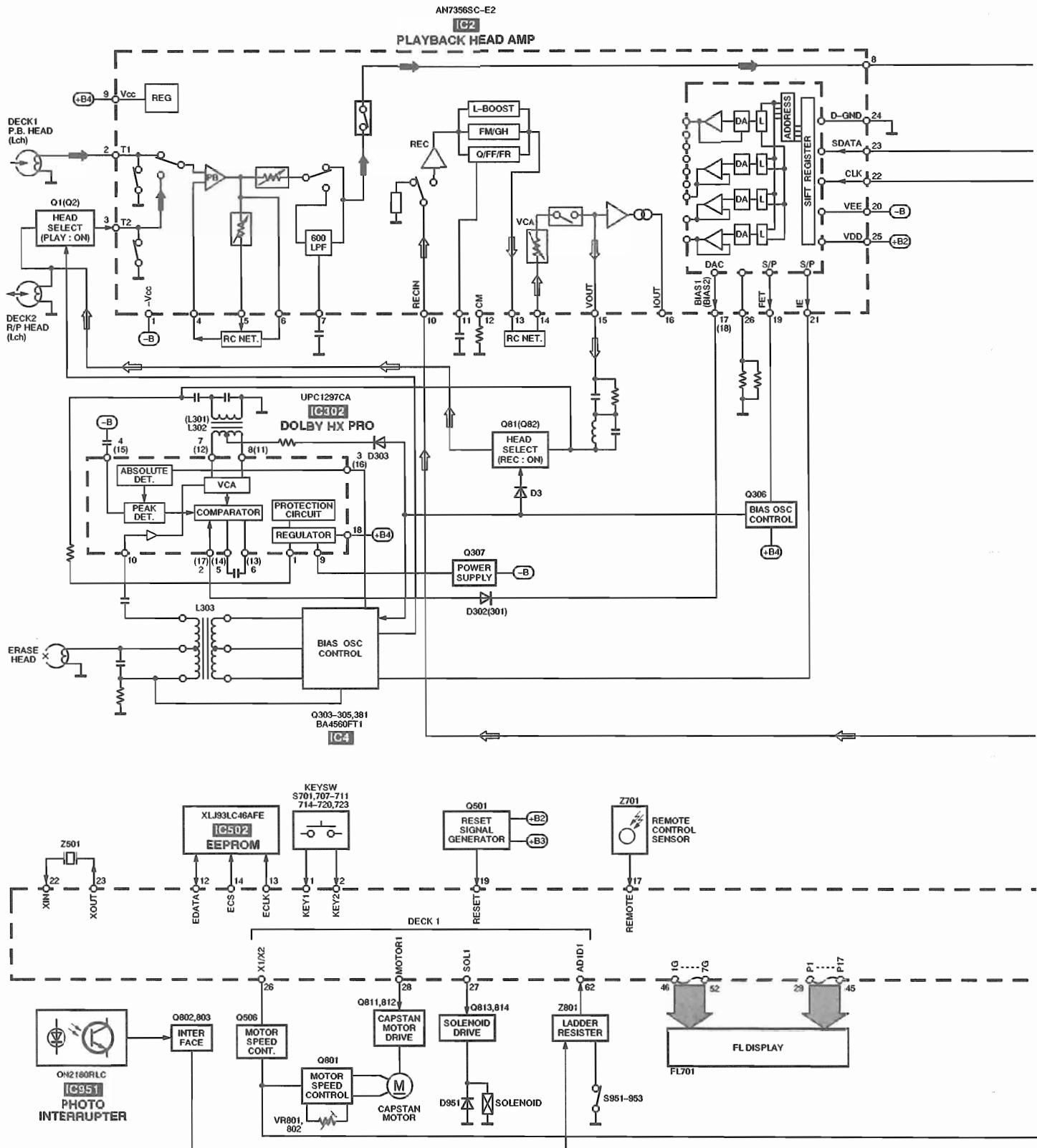
■ Function of IC Terminals

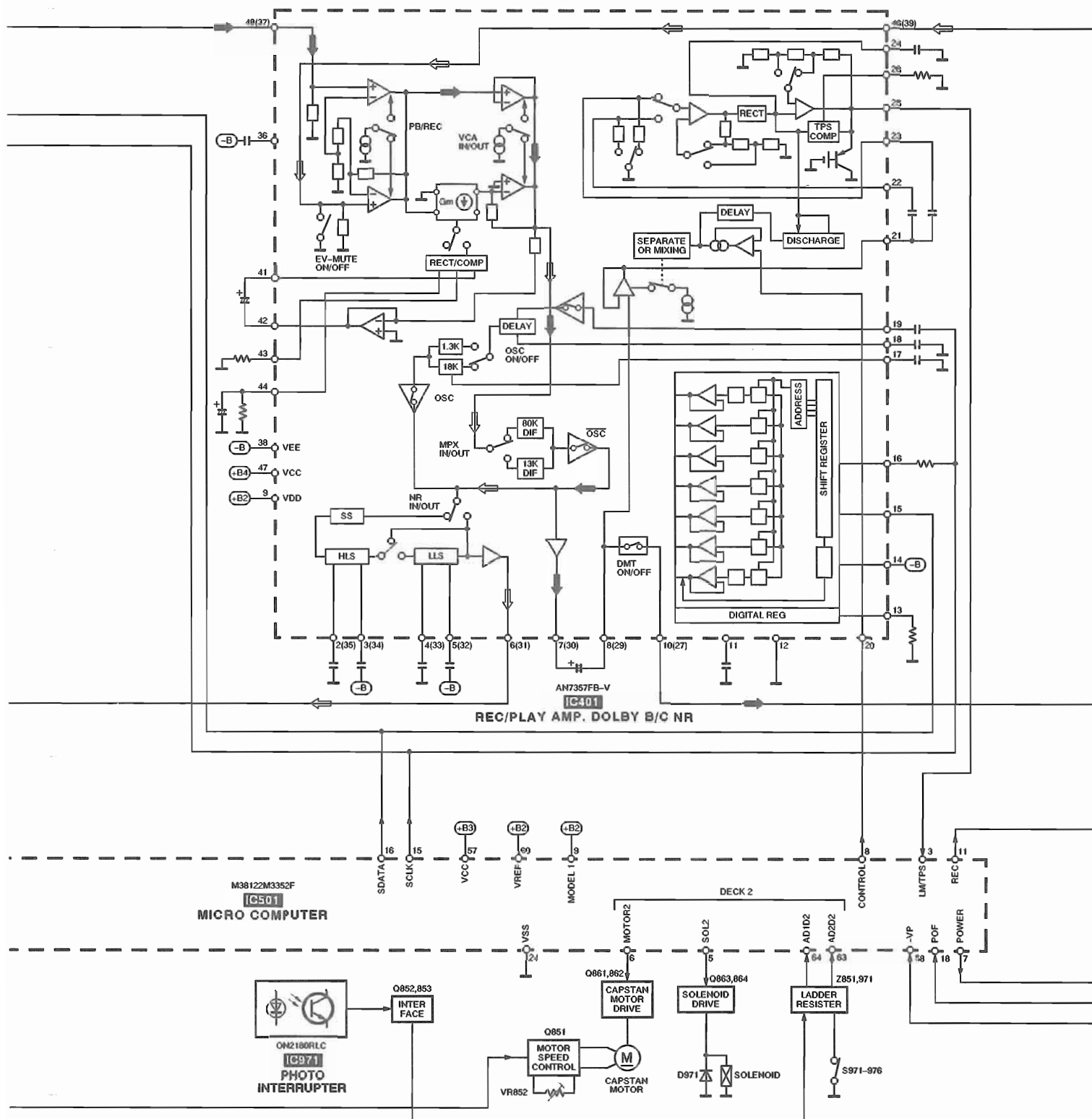
● IC501 (M38122M3352F)

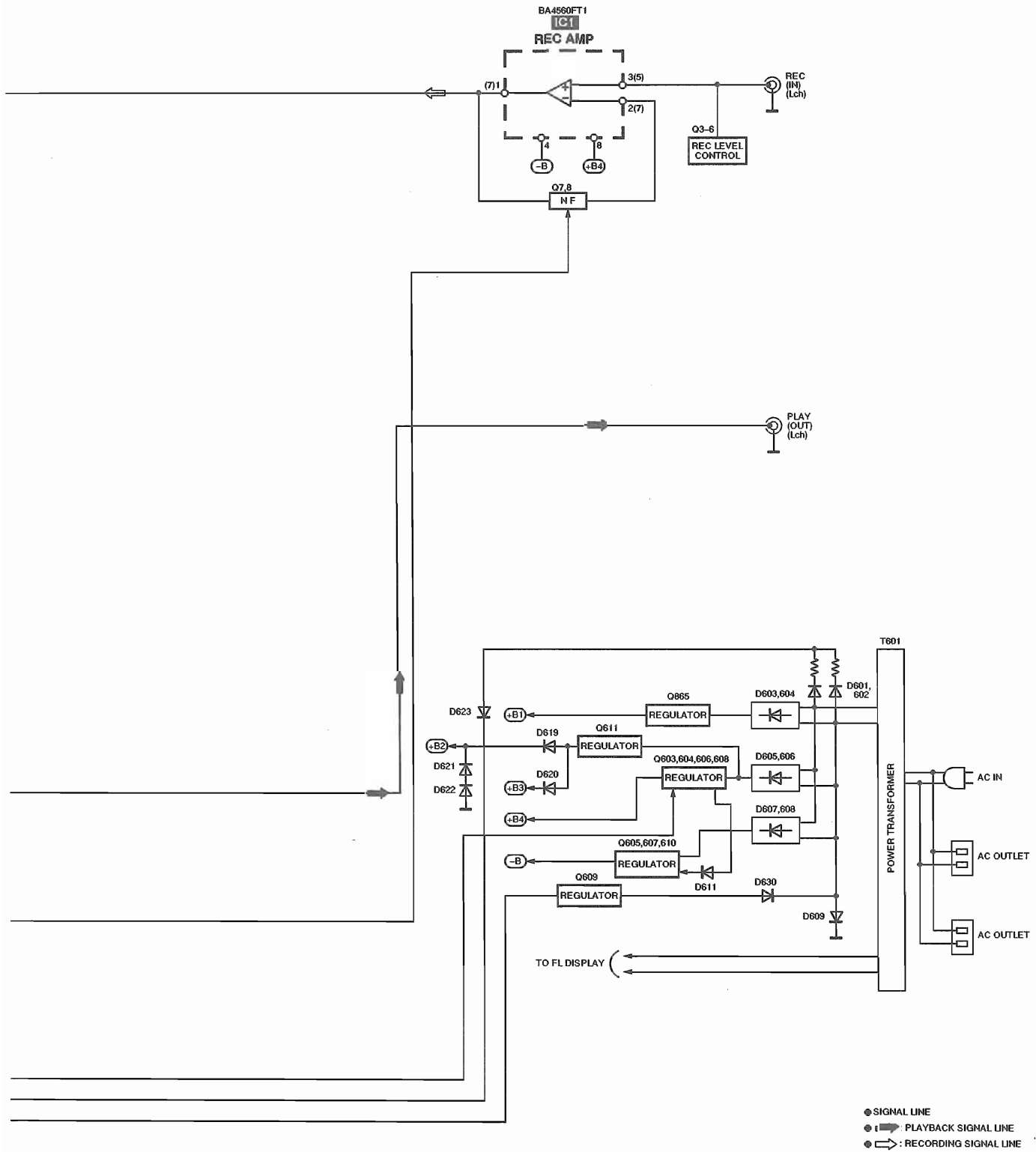
Pin No.	Terminal Name	I/O	Function
1	KEY1	I	Operation switch (S701, S707, S708, S709, S710, S711, S721) signal input
2	KEY2	I	Operation switch (S714, S715, S716, S717, S718, S719, S720, S723) signal input
3	LM/MSP	I	Level meter signal input
4	RPS 2	O	Not used
5	SOL2	O	DECK 2 solenoid drive signal output
6	MOTOR2	O	DECK 2 motor drive signal output
7	POWER	O	Power control signal output
8	CONTROL	O	Level meter (Lch/Rch) select signal output
9	MODEL 1	I	Model select terminal
10	MODEL 2	I	
11	REC-L	O	Auto level control circuit drive signal output
12	EDATA	I/O	EEPROM (IC502) serial data input/output
13	ECLK	O	EEPROM (IC502) clock signal output
14	ECS	I/O	EEPROM (IC502) chip select signal output
15	SCLK	O	Audio adjustment signal output
16	SDATA	O	Audio IC (IC2) serial data output
17	REMOTE	I	Remote control signal input
18	POF	I	Power off detection signal input
19	RESET	I	Reset signal input
20	P71	I	Not used
21	P70	I	
22	XIN	I	Clock signal (6 MHz) input
23	XOUT	O	Clock signal (6 MHz) output
24	VSS	—	GND terminal
25	P27	I	Not used
26	X1/X2	O	Motor speed control signal output

Pin No.	Terminal Name	I/O	Function
27	SOL1	O	DECK 1 solenoid drive signal output
28	MOTOR1	O	DECK 1 motor drive signal output
29~45	P1~P17	O	Segment signal output
46~52	G1~G7	O	Grid signal output
53~56	P33~P30	O	Not used
57	VCC	—	Power supply (+5 V)
58	VEE	—	FL meter pull down voltage input terminal
59	AVSS	—	GND terminal for A/D converter
60	VREF	—	Reference voltage input terminal for A/D converter (+5 V)
61	AN7	I	Not used
62	AD1D1	I	DECK 1 mechanism switch signal input (Half, Mode, CrO2, Reel pulse)
63	AD2D2	I	DECK 2 mechanism switch signal input (Half, Mode, F. REC INH., R. REC INH.)
64	AD1D2	I	DECK 1 mechanism switch signal input (Metal, CrO2, Reel pulse)

Block Diagram







■ Replacement Parts List

Notes: *Important safety notice:

Components identified by Δ mark have special characteristics important for safety.

Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.

When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.

*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)

Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		Q864	DTC114ESTP	TRANSISTOR	
				Q865	2SD2037EFTA	TRANSISTOR	Δ
						DIODE(S)	
IC1	BA4560FT1	I. C. REC AMP		D1, 2	MA111TX	DIODE	
IC2	AN7356SC-E2	I. C. PLAY BACK/REC AMP		D3	MA152WATX	DIODE	
IC4	BA4560FT1	I. C. ERASE CURRENT ADJ. CONT		D5, 6	MA165	DIODE	
IC302	UPC1297CA	I. C. DOLBY HX PRO		D301, 302	MA8056MTX	DIODE	
IC401	AN7357FB-V	I. C. R/P AMP DOLBY B/C NR		D303	MA110TX	DIODE	
IC501	M38122M3352F	I. C. MICRO COMPUTER		D312, 313	MA112TX	DIODE	
IC502	XLJ93LC46AFE	I. C. EEPROM		D314	MA110TX	DIODE	
IC951	ON2180RLC	I. C. PHOTO INTERRUPTER		D320	MA152WATX	DIODE	
IC971	ON2180RLC	I. C. PHOTO INTERRUPTER		D501, 502	MA165	DIODE	
		TRANSISTOR(S)		D601, 602	MA165	DIODE	Δ
Q1, 2	2SJ163PQRTX	TRANSISTOR		D603-609	RL1N4003N02	DIODE	Δ
Q3-6	2SC3312RSTA	TRANSISTOR		D611, 612	MA165	DIODE	
Q7, 8	2SC3311AIRTA	TRANSISTOR		D613	MTZJ8R2CTA	DIODE	Δ
Q81, 82	2SK1103PQRTX	TRANSISTOR		D614	MTZJ6R2BTA	DIODE	Δ
Q303, 304	2SD874QRSTX	TRANSISTOR		D615	MA165	DIODE	
Q305	KSD471ACYGTA	TRANSISTOR		D617	MTZJ20DTA	DIODE	Δ
Q306	2SB710AQRSTX	TRANSISTOR		D618	MTZJ5R1BTA	DIODE	Δ
Q307	KSB564ACYGTA	TRANSISTOR		D619	MA178TA	DIODE	
Q381	2SD601QRSTX	TRANSISTOR		D620	RL1N4003N02	DIODE	
Q501	2SC3311AIRTA	TRANSISTOR		D621	MA165	DIODE	
Q506	DTC114ESTP	TRANSISTOR		D622	MTZJ5R1BTA	DIODE	Δ
Q603	DTC114ESTP	TRANSISTOR		D623	MA165	DIODE	
Q604	2SA1309AIRTA	TRANSISTOR	Δ	D625	MA165	DIODE	
Q605	2SC3311AIRTA	TRANSISTOR	Δ	D626	MA29TATA	DIODE	
Q606	2SD2037EFTA	TRANSISTOR	Δ	D630	RL1N4003N02	DIODE	Δ
Q607	2SB1357EFTA	TRANSISTOR	Δ	D851	MTZJ10ATA	DIODE	Δ
Q608	2SD2037EFTA	TRANSISTOR	Δ	D951	MA165TA	DIODE	
Q609	KSB564ACYGTA	TRANSISTOR	Δ	D971	MA165TA	DIODE	
Q610	2SB1357EFTA	TRANSISTOR	Δ				
Q611	KSD471ACYGTA	TRANSISTOR	Δ			VARIABLE RESISTOR(S)	
Q801	2SA1309AIRTA	TRANSISTOR					
Q802, 803	2SC3311AIRTA	TRANSISTOR		VR801, 802	EVND1AA00B53	V. R. TAPE SPEED ADJ.	
Q811	KSB564ACYGTA	TRANSISTOR		VR852	EVNDCAA03B53	V. R. TAPE SPEED ADJ.	
Q812	DTC114ESTP	TRANSISTOR					
Q813	KSB564ACYGTA	TRANSISTOR				COMPONENT COMBINATION(S)	
Q814	DTC114ESTP	TRANSISTOR					
Q851	2SB709QRSTX	TRANSISTOR		Z501	EFOEC6004T4	CERAMIC OSCILLATOR(6MHZ)	
Q852, 853	2SD601QRSTX	TRANSISTOR		Z701	RCDBG1U28XD	REMOTE SENSOR	
Q861	KSB564ACYGTA	TRANSISTOR		Z801	EXBF7L355SVV	COMPONENT COMBINATION	
Q862	DTC114ESTP	TRANSISTOR		Z851	EXBF6L306SVV	COMPONENT COMBINATION	
Q863	KSB564ACYGTA	TRANSISTOR		Z971	EXBF7L355SVV	COMPONENT COMBINATION	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		COIL (S)		CN851	RJR0113	CONNECTOR (4P)	
				CN1A	RJS1A1703	CONNECTOR (3P)	
				CN2A	RJS1A6823	CONNECTOR (23P)	
L1, 2	RLQX303JT-K	COIL		CN3A	RJS1A6834	CONNECTOR (34P)	
L301, 302	SL09B1-Z	COIL		CN1B	RJS1A1704	SOCKET (4P)	
L303	SL09B4-K	COIL		CN2B	RJS1A6723	CONNECTOR (23P)	
L701	RLQZP100KT-Y	COIL		CN3B	RJS1A6234-1	CONNECTOR (34P)	
		POWER TRANSFORMER (S)		CP1	RJP3G172A	CONNECTOR (3P)	
				CP301	RJT057W010-1	CONNECTOR (10P)	
T601	RTP1K4C022-V	POWER TRANSFORMER	△	CP501	RJT029W03VT	CONNECTOR (3P)	
		DISPLAY TUBE		CP802	RJT071H09A	CONNECTOR (9P)	
				CP851	RJT071H09A	CONNECTOR (9P)	
FL701	RSL0221-F	DISPLAY TUBE		CS951	RJU071H09M	CONNECTOR (9P)	
		SWITCH (ES)		CS971	RJU071H09M	CONNECTOR (9P)	
						GND PART (S)	
S701	EVQ21405R	SW, POWER		E1	SNE1004-2	GND PLATE	
S707	EVQ21405R	SW, OPEN/CLOSE				JACK (S)	
S708	EVQ21405R	SW, DOLBY NR					
S709	EVQ21405R	SW, REVERSE MODE		JK1	SJF3069-5N	JACK, PLAY & REC	
S710	EVQ21405R	SW, SYNCHRO START		JK601	SJSD16-1	AC INLET	△
S711	EVQ21405R	SW, SPEED		JK602	RJS2A0102-1S	AC OUTLET	△
S714	EVQ21405R	SW, STOP					
S715	EVQ21405R	SW, F. PLAY					
S716	EVQ21405R	SW, R. PLAY					
S717	EVQ21405R	SW, FF					
S718	EVQ21405R	SW, REW					
S719	EVQ21405R	SW, OPEN/CLOSE					
S720	EVQ21405R	SW, REC PAUSE					
S721	EVQ21405R	SW, DECK1/2					
S723	EVQ21405R	SW, COUNTER RESET					
S951	RSH1A018-1U	SW, MODE (DECK1)					
S952	RSH1A019-2U	SW, HALF (DECK1)					
S953	RSH1A019-2U	SW, ATS/CrO2 (DECK1)					
S971	RSH1A018-1U	SW, MODE (DECK2)					
S972	RSH1A019-2U	SW, HALF (DECK2)					
S973	RSH1A019-2U	SW, ATS/CrO2 (DECK2)					
S974	RSH1A019-2U	SW, R. REC. 1NH (DECK2)					
S975	RSH1A019-2U	SW, F. REC. 1NH (DECK2)					
S976	RSH1A019-2U	SW, ATS/METAL (DECK2)					
		CONNECTOR (S)					
CN1	RJS2A0205-2S	CONNECTOR (5P)					
CN9	RJS2A0205-2S	CONNECTOR (5P)					
CN301	RJU057W010	SOCKET (10P)					
CN601	RJS1A1101T1	CONNECTOR (1P)					
CN603	RJS1A1101T1	CONNECTOR (1P)					
CN606-610	RJS1A1101T1	CONNECTOR (1P)					
CN801	RJR0113	CONNECTOR (4P)					

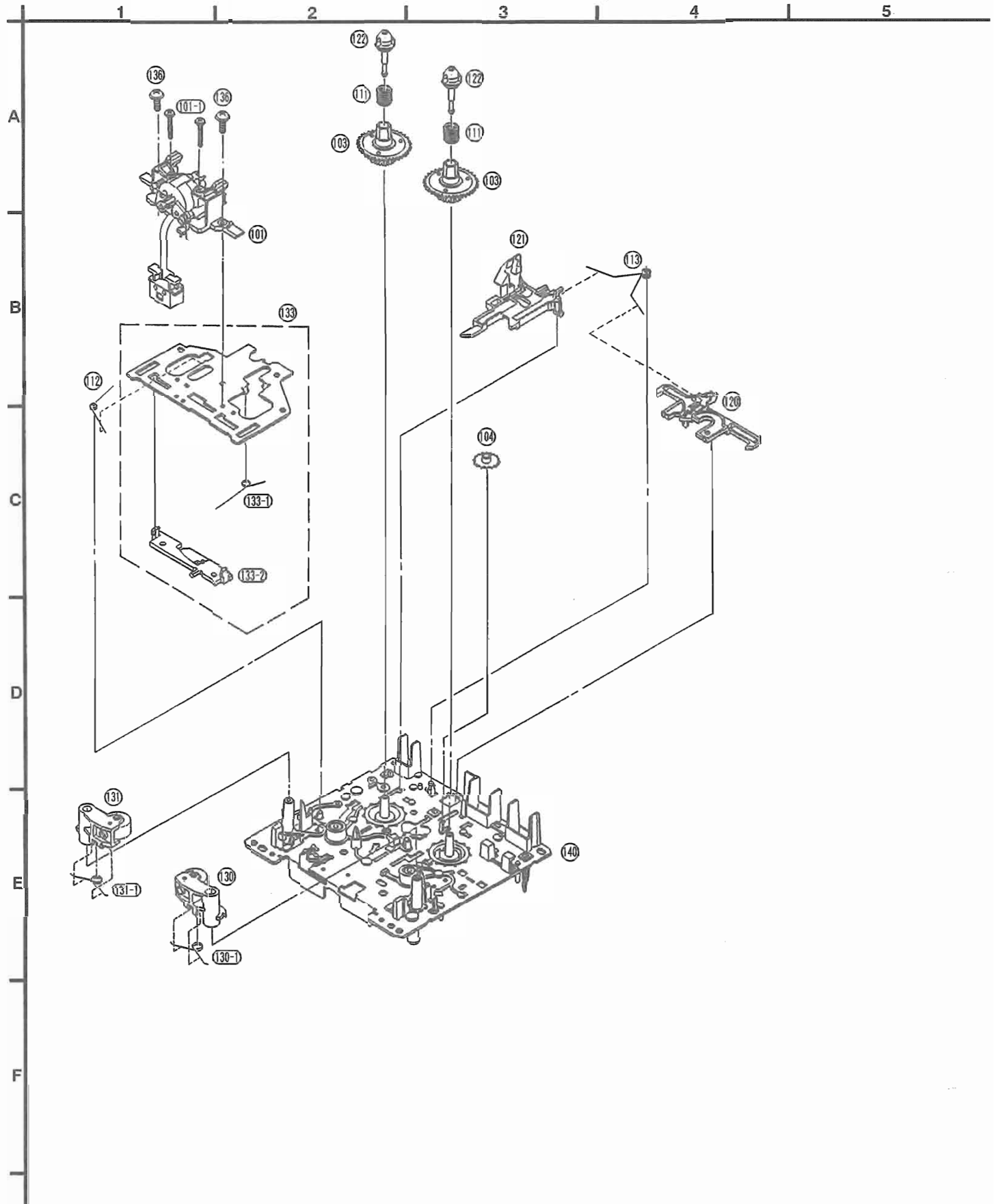
Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
 * Resistance values are in ohms, unless specified otherwise, 1K=1,000 (01M) , 1M=1,000k (01M)

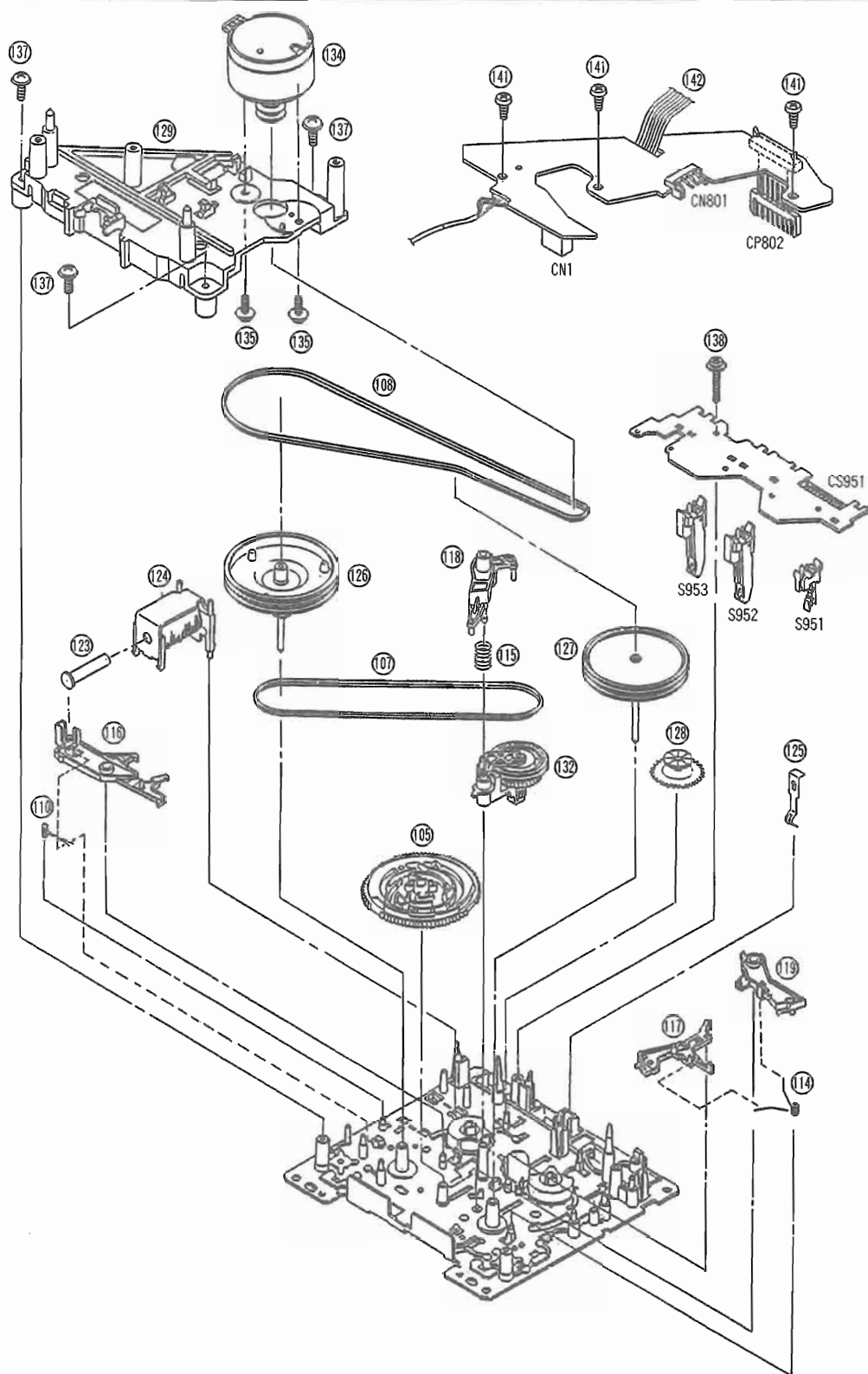
Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R382	ERJ6GEYJ221V	1/10W 220	R637△	ERD2FCVG150T	1/4W 15
			R383	ERJ6GEYJ5R6V	1/10W 5.6	R639△	ERD2FCVG330T	1/4W 33
			R384	ERJ6GEYJ153V	1/10W 15K	R641-644	ERDS2TJ2R2T	1/4W 2.2
R5-7	ERJ6GEYJ225V	1/10W 2.2M	R385	ERJ6GEYJ101V	1/10W 100	R711	ERDS2TJ821	1/4W 820
R9	ERJ6GEYJ101V	1/10W 100	R401, 402	ERJ6GEYJ103V	1/10W 10K	R712	ERDS2TJ102	1/4W 1K
R10-12	ERJ6GEYJ101V	1/10W 100	R406△	ERD2FCVG270T	1/4W 27	R713	ERDS2TJ122	1/4W 1.2K
R13, 14	ERJ6GEYJ470V	1/10W 47	R407△	ERD2FCVG180T	1/4W 18	R714	ERDS2TJ152	1/4W 1.5K
R15, 16	ERJ6GEYJ394V	1/10W 390K	R421	ERJ6GEYJ105	1/10W 1M	R715	ERDS2TJ182	1/4W 1.8K
R17, 18	ERJ6GEYJ122V	1/10W 1.2K	R422	ERJ6GEYJ123V	1/10W 12K	R716	ERDS2TJ222	1/4W 2.2K
R19, 20	ERJ6GEYJ562V	1/10W 5.6K	R423	ERJ6GEYJ223V	1/10W 22K	R717	ERDS2TJ332	1/4W 3.3K
R21, 22	ERJ6GEYJ681V	1/10W 680	R431	ERJ6GEYJ222V	1/10W 2.2K	R725	ERDS2TJ821	1/4W 820
R23	ERJ6GEYJ122V	1/10W 1.2K	R434	ERJ6GEYJ272V	1/10W 2.7K	R726	ERDS2TJ102	1/4W 1K
R25, 26	ERJ6GEYJ103V	1/10W 10K	R436	ERJ6GEYJ473V	1/10W 47K	R727	ERDS2TJ122	1/4W 1.2K
R27, 28	ERJ6GEYJ272V	1/10W 2.7K	R437	ERJ6GEYJ272V	1/10W 2.7K	R728	ERDS2TJ152	1/4W 1.5K
R31, 32	ERDS2TJ334	1/4W 330K	R460, 461	ERJ6GEYJ472V	1/10W 4.7K	R729	ERDS2TJ182	1/4W 1.8K
R33, 34	ERDS2TJ563	1/4W 56K	R501-504	ERDS2TJ473	1/4W 47K	R730	ERDS2TJ222	1/4W 2.2K
R35, 36	ERDS2TJ152	1/4W 1.5K	R505, 506	ERDS2TJ103	1/4W 10K	R731	ERDS2TJ332	1/4W 3.3K
R37, 38	ERDS2TJ222	1/4W 2.2K	R511	ERDS2TJ103	1/4W 10K	R803	ERDS2TJ184T	1/4W 180K
R39, 40	ERDS2TJ561	1/4W 560	R512	ERDS2TJ471	1/4W 470	R804	ERDS2TJ123	1/4W 12K
R45	ERJ6GEYJ122V	1/10W 1.2K	R513	ERDS2TJ103	1/4W 10K	R805	ERDS2TJ392T	1/4W 3.9K
R47-50	ERDS2TJ103T	1/4W 10K	R514, 515	ERDS2TJ223	1/4W 22K	R806	ERDS2TJ103	1/4W 10K
R53, 54	ERDS2TJ152	1/4W 1.5K	R516	ERDS2TJ472	1/4W 4.7K	R811	ERDS2TJ223	1/4W 22K
R55, 56	ERDS2TJ104	1/4W 100K	R517	ERDS2TJ223	1/4W 22K	R812	ERDS2TJ102	1/4W 1K
R59, 60	ERDS2TJ103	1/4W 10K	R526, 527	ERDS2TJ331	1/4W 330	R813	ERDS2TJ223	1/4W 22K
R63, 64	ERJ6GEYJ223V	1/10W 22K	R555	ERDS2TJ103	1/4W 10K	R814	ERDS2TJ102	1/4W 1K
R67, 68	ERDS2TJ472	1/4W 4.7K	R556-559	ERDS2TJ223	1/4W 22K	R815	ERDS2TJ104	1/4W 100K
R72	ERDS2TJ222	1/4W 2.2K	R562	ERDS2TJ103	1/4W 10K	R816	ERDS2TJ563	1/4W 56K
R73	ERDS2TJ225	1/4W 2.2M	R571-574	ERDS2TJ223	1/4W 22K	R817	ERDS2TJ470	1/4W 47
R74	ERDS2TJ221	1/4W 220	R601, 602	ERDS2TJ472	1/4W 4.7K	R853	ERJ6GEYJ184V	1/10W 180K
R75, 76	ERDS2TJ331	1/4W 330	R607	ERDS2TJ472	1/4W 4.7K	R854	ERJ6GEYJ153V	1/10W 15K
R81, 82	ERJ6GEYJ225V	1/10W 2.2M	R608	ERDS2TJ103	1/4W 10K	R855	ERJ6GEYJ392V	1/10W 3.9K
R321	ERJ6GEYJ1R0V	1/10W 1.0	R609△	ERD2FCVG150T	1/4W 15	R856	ERJ6GEYJ103V	1/10W 10K
R322, 323	ERJ6GEYJ183V	1/10W 18K	R610	ERDS2TJ472	1/4W 4.7K	R861	ERDS2TJ223	1/4W 22K
R324, 325	ERJ6GEYJ100	1/10W 10	R611	ERDS2TJ104	1/4W 100K	R862	ERDS2TJ102	1/4W 1K
R326	ERJ6GEYJ122V	1/10W 1.2K	R612△	ERD2FCVG150T	1/4W 15	R863	ERDS2TJ223	1/4W 22K
R327	ERJ6GEYJ102V	1/10W 1K	R613	ERDS2TJ101	1/4W 100	R864	ERDS2TJ102	1/4W 1K
R328	ERJ6GEYJ561V	1/10W 560	R614, 615	ERDS2TJ471	1/4W 470	R865A	ERDS2TJ470	1/4W 47
R329	ERJ6GEYJ393V	1/10W 39K	R616	ERDS2TJ101	1/4W 100	R865	ERJ6GEYJ104V	1/10W 100K
R330	ERJ6GEYJ272V	1/10W 2.7K	R617	ERDS2TJ102	1/4W 1K	R866	ERDS2TJ221	1/4W 220
R331	ERJ6GEYJ682V	1/10W 6.8K	R620	ERDS2TJ101	1/4W 100	R867	ERJ6GEYJ563V	1/10W 56K
R332	ERJ6GEYJ102V	1/10W 1K	R621	ERDS2TJ222	1/4W 2.2K	R868	ERJ6GEYJ470V	1/10W 47
R333	ERJ6GEYJ103V	1/10W 10K	R622△	ERD2FCVG150T	1/4W 15	R952	ERDS2TJ821	1/4W 820
R334-336	ERJ6GEYJ332V	1/10W 3.3K	R623	ERDS2TJ101	1/4W 100	R953	ERDS2TJ393	1/4W 39K
R341, 342	ERJ6GEYJ153V	1/10W 15K	R625△	ERD2FCVG150T	1/4W 15	R972	ERDS2TJ821	1/4W 820
R343, 344	ERJ6GEYJ103V	1/10W 10K	R626	ERDS2TJ101	1/4W 100	R973	ERDS2TJ393	1/4W 39K
R345, 346	ERJ6GEYJ154V	1/10W 150K	R627	ERDS2TJ103	1/4W 10K			
R347, 348	ERJ6GEYJ100	1/10W 10	R630	ERDS2TJ2R7T	1/4W 2.7			CHIP JUMPER(S)
R349	ERJ6GEYJ471V	1/10W 470	R631	ERDS2TJ102	1/4W 1K			
R381	ERJ6GEYJ100	1/10W 10	R632	ERDS2TJ101	1/4W 100	RJ10-20	ERJ6GEYOR00V	CHIP JUMPER

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks			
RJ22	ERJ6GEY0R00V	CHIP JUMPER	C349, 350	ECKR2H821KB5	500V 820P			
RJ26	ERJ6GEY0R00V	CHIP JUMPER	C351, 352	ECUV1E473ZFN	25V 0.047U			
RJ29-37	ERJ6GEY0R00V	CHIP JUMPER	C353, 354	ECUV1H220KCN	50V 22P			
RJ40	ERJ6GEY0R00V	CHIP JUMPER	C355	ECUV1H103ZFN	50V 0.01U			
			C356	ECEA1AKS470	10V 47U			
		CAPACITORS	C357, 358	ECUV1E473ZFN	25V 0.047U			
			C360, 361	ECUV1E223KBN	25V 0.022U			
C1, 2	ECUV1H471KBN	50V 470P	C362	RCE1CKA100BG	16V 10U			
C3, 4	ECUV1H561KBN	50V 560P	C401, 402	ECEA1CKS100I	16V 10U			
C5, 6	ECUV1H102KBN	50V 1000P	C403, 404	ECUV1H152KBN	50V 1500P			
C7, 8	ECUVNE104ZFN	25V 0.1U	C405, 406	ECUVNC474KBM	16V 0.47U			
C9	RCE0GKS221IG	4V 220U	C407, 408	ECUV1H152KBN	50V 1500P			
C10	RCE0GKS221IG	4V 220U	C409, 410	ECUVNC474KBM	16V 0.47U			
C13, 14	ECUV1H822KBN	50V 8200P	C411, 412	ECEA1HKS2R2I	50V 2.2U			
C15, 16	ECUV1H682KBN	50V 6800P	C413	ECUVNC474KBM	16V 0.47U			
C17, 18	ECEA1CKS100I	16V 10U	C414	ECUVNE104ZFN	25V 0.1U			
C19, 20	ECUVNC474KBM	16V 0.47U	C415	ECUV1H272KBN	50V 2700P			
C21, 22	ECEA1ASN100I	10V 10U	C416	ECUV1H392KBN	50V 3900P			
C23, 24	ECEA1CKS100I	16V 10U	C417	ECUVNE104ZFN	25V 0.1U			
C25, 26	ECKR2H121KB5	500V 120P	C418	ECUVNC105ZFN	16V 1U			
C27, 28	ECUV1H561KBN	50V 560P	C419, 420	ECEA1CKS100I	16V 10U			
C29, 30	ECUVNE104ZFN	25V 0.1U	C421	ECEA1HKS010	50V 1U			
C31, 32	ECEA1HKA010B	50V 1U	C422	ECEA1CKS100I	16V 10U			
C33, 34	RCE1CKA100BG	16V 10U	C423, 424	RCE1AM102BV	10V 1000U			
C37	ECBT1H150J5	50V 15P	C431	ECUV1C474ZFN	16V 0.47U			
C38	ECBT1E103ZF	25V 0.01U	C432	ECUV1H152KBN	50V 1500P			
C39	ECBT1H150J5	50V 15P	C450-452	ECUV1H101KCN	50V 100P			
C41	ECBT1E103ZF	25V 0.01U	C461	ECUVNC225ZFM	16V 2.2U			
C44, 45	ECUV1H121KCN	50V 120P	C501	ECEA1HKA010B	50V 1U			
C46, 47	ECUV1H332KBN	50V 3300P	C502	ECEA1EKA4R7B	25V 4.7U			
C51, 52	RCE1CKA100BG	16V 10U	C504, 505	RCE1CKA100BG	16V 10U			
C53	RCE1AKA330BG	10V 33U	C601△	ECA1EM222B	25V 2200U			
C54	ECBT1E103ZF	25V 0.01U	C602	ECA1EM221B	25V 220U			
C55	ECUV1H103ZFN	50V 0.01U	C603	ECKR2H682PE	500V 6800P			
C61, 62	ECUV1H122KBN	50V 1200P	C604, 605△	ECA1EM102B	25V 1000U			
C63, 64	ECBT1C332KR5	16V 3300P	C606△	RCE1HM221BV	50V 220U			
C65	ECBT1H104ZF5	50V 0.1U	C607, 608	ECBT1E103ZF	25V 0.01U			
C80	ECBT1H104ZF5	50V 0.1U	C609	ECEA1AKA221B	10V 220U			
C81, 82	ECUV1H102KBN	50V 1000P	C610	ECA1AM71B	10V 470U			
C164	ECBT1E103ZF	25V 0.01U	C611, 612	ECBT1E103ZF	25V 0.01U			
C303	ECQP1153JZ	100V 0.015U	C613	ECA0JM102B	6.3V 1000U			
C304	ECUV1H392KBN	50V 3900P	C614, 615	ECBT1E103ZF	25V 0.01U			
C305	ECUV1H222KBN	50V 2200P	C616	RCE1AKA101BG	10V 100U			
C306	ECUV1H682KBN	50V 6800P	C701	RCE1CKA100BG	16V 10U			
C307	ECUV1H222KBN	50V 2200P	C802	ECBT1E223ZF	25V 0.022U			
C308	ECEA1CKS100I	16V 10U	C851	ECBT1E103ZF	25V 0.01U			
C309, 310	ECUV1H103ZFN	50V 0.01U	C852	ECUV1H103ZFN	50V 0.01U			
C311, 312	ECUVNE104ZFN	25V 0.1U						
C341, 342	ECUV1H122KBN	50V 1200P						
C343, 344	ECUV1H103KBN	50V 0.01U						
C345, 346	ECUV1E473KBN	25V 0.047U						
C347, 348	ECUV1H121KCN	50V 120P						

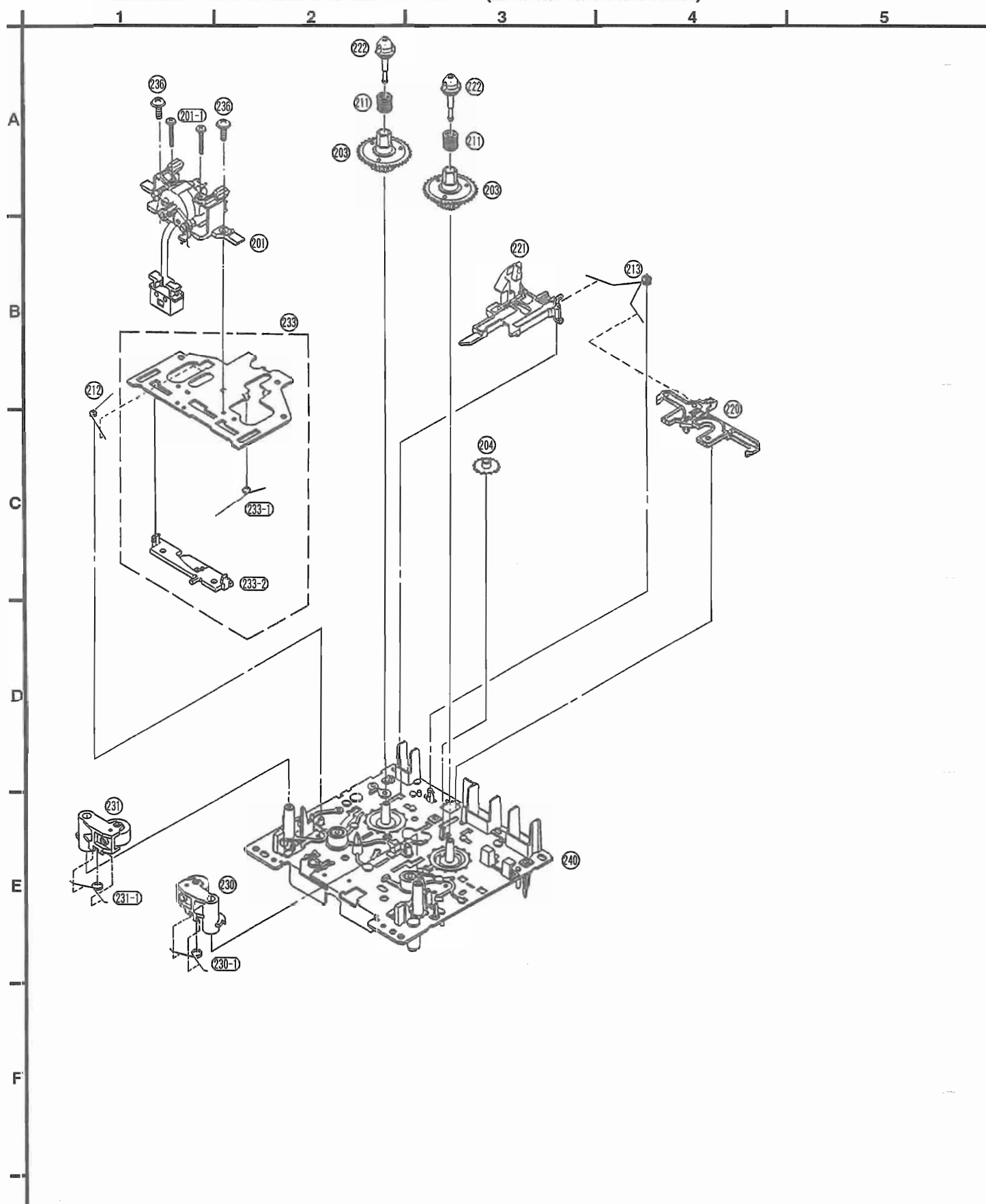
[illegible]

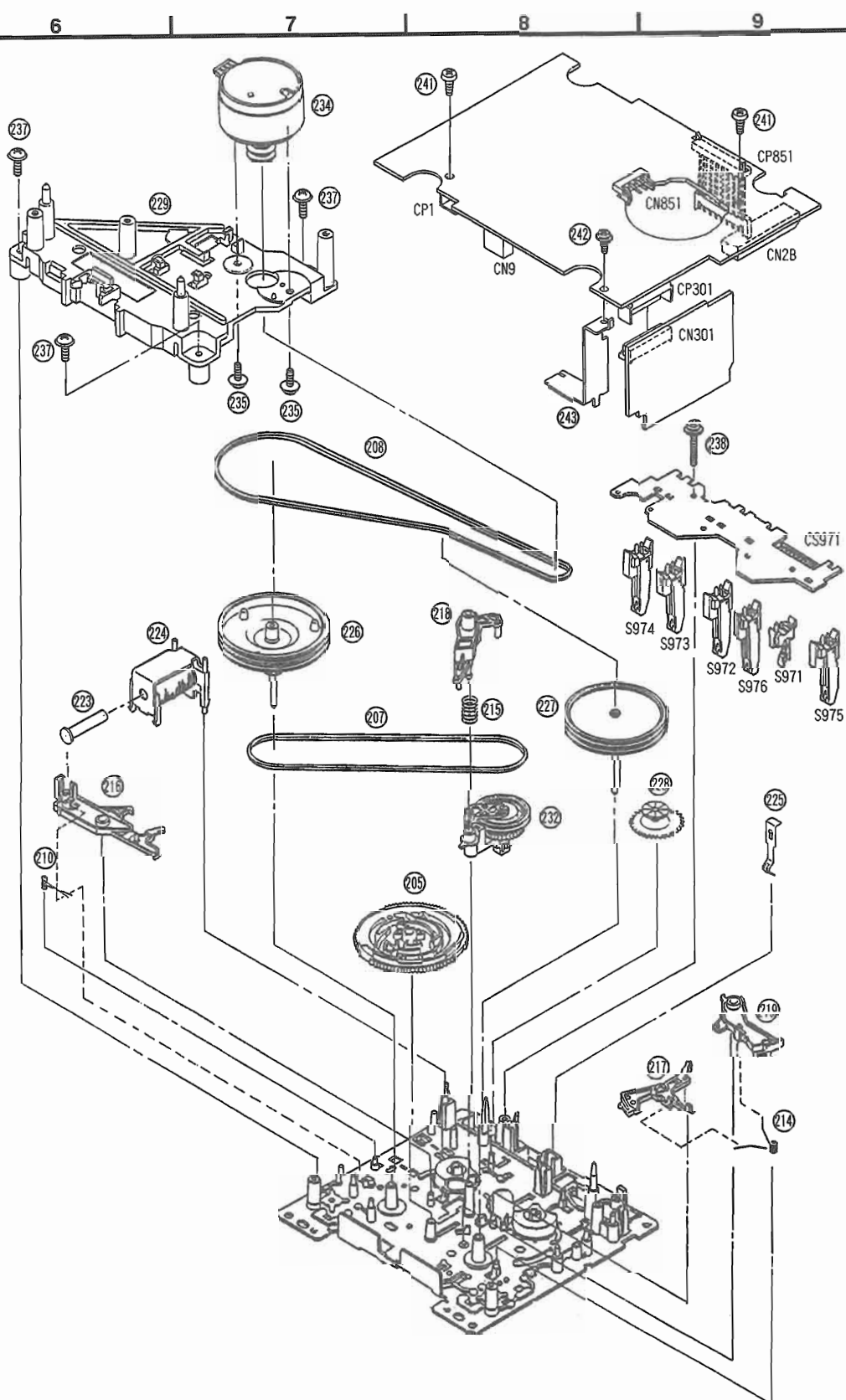
Mechanism Parts Location • DECK 1 (PLAYBACK)



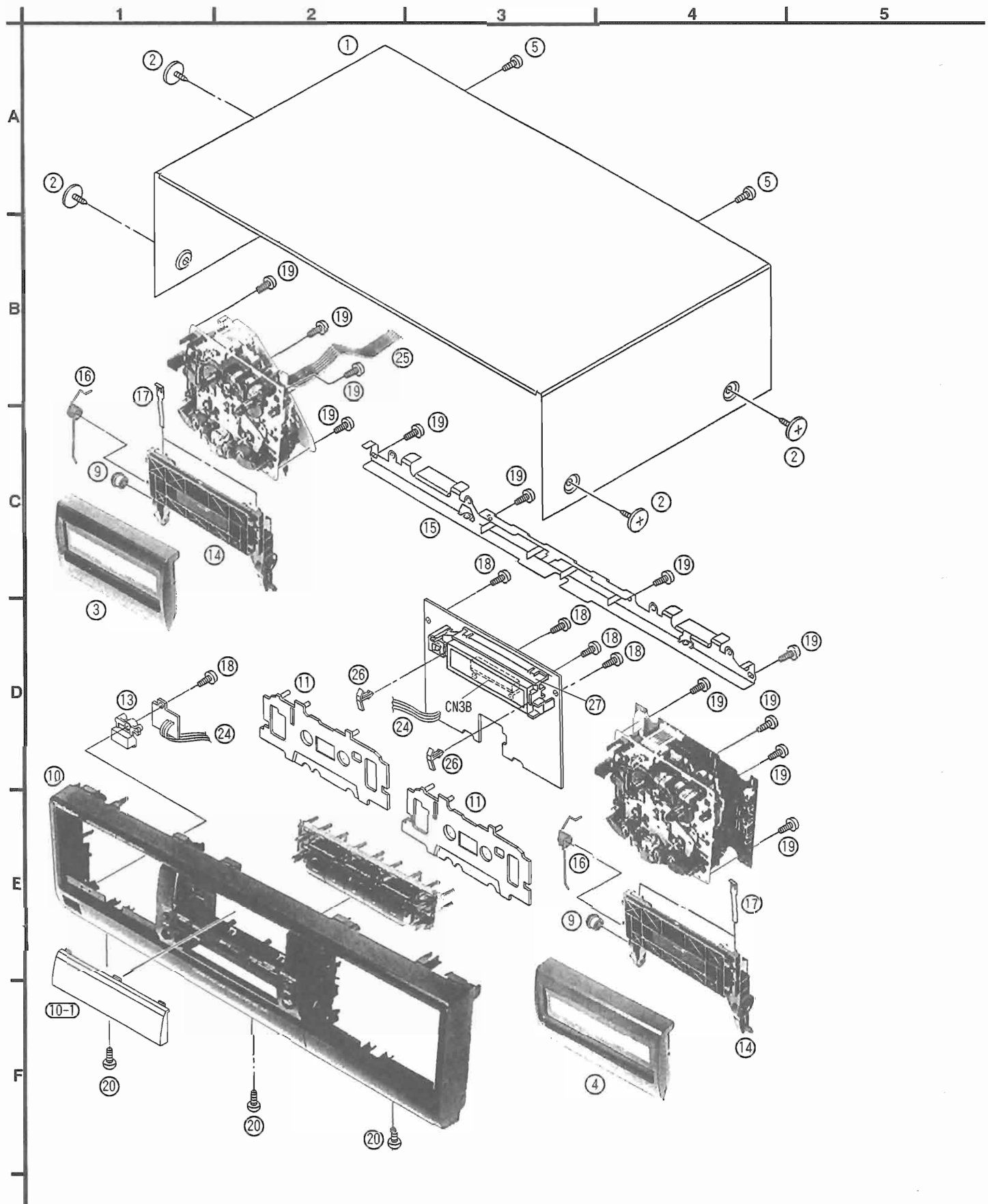


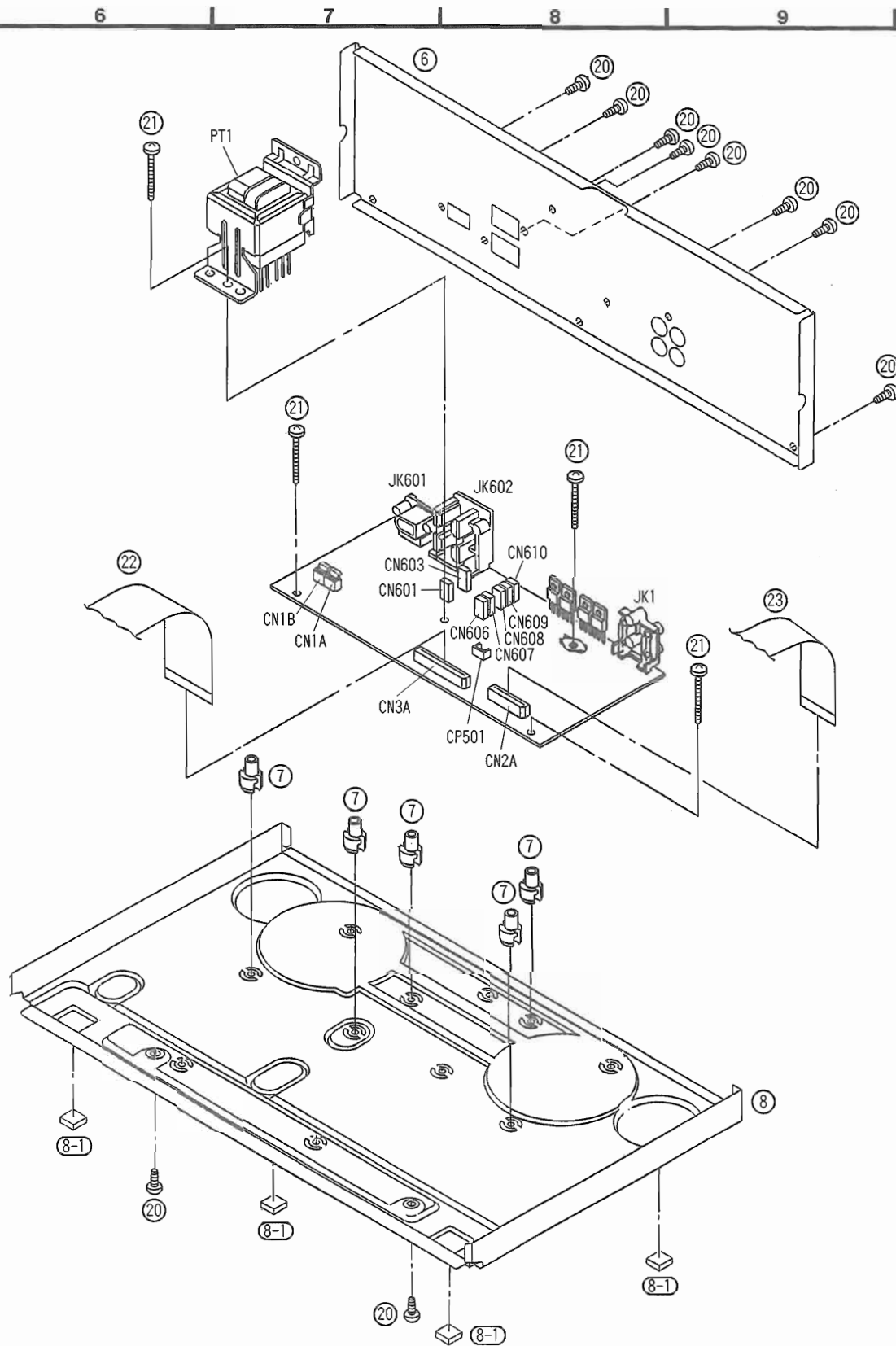
Mechanism Parts Location • DECK 2 (RECORD/PLAYBACK)





Cabinet Parts Location





[illegible]