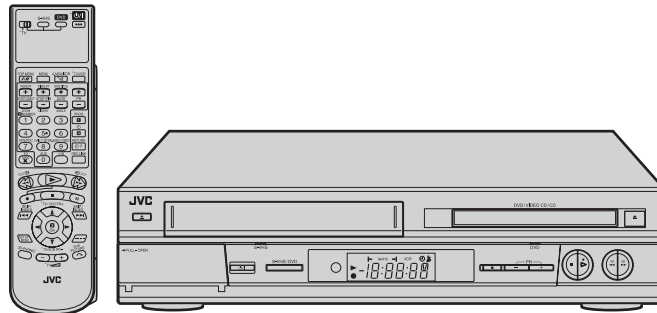


JVC

SERVICE MANUAL

DVD PLAYER & VIDEO CASSETTE RECORDER

HR-XVS20AA, HR-XVS20AG



For disassembling and assembling of MECHANISM ASSEMBLY, refer to the SERVICE MANUAL No.86700 (MECHANISM ASSEMBLY).

SPECIFICATION *(The specifications shown pertain specifically to the model HR-XVS20AA)*

GENERAL

Power requirement	AC 110 V - 240 V~, 50 Hz/60 Hz
Power consumption	
Power on	28 W
Power off	5.0 W
Temperature	
Operating	5°C to 40°C
Storage	-20°C to 60°C
Operating position	Horizontal only
Dimensions (W x H x D)	435 mm x 98 mm x 357 mm
Weight	4.8 kg
Format	S-VHS/VHS standard
Maximum recording time	
(SP)	240 min. with E-240 video cassette (PAL/MESECAM) 160 min. with T-160 video cassette (NTSC)
(LP)	480 min. with E-240 video cassette (PAL/MESECAM)
(EP)	480 min. with T-160 video cassette (NTSC)

VIDEO/AUDIO (S-VHS deck)

Signal system	PAL-type colour signal and CCIR monochrome signal, 625 lines 50 fields NTSC colour and EIA monochrome signal, 525 lines/60 fields
Recording system	DA4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	45 dB
Horizontal resolution	250 lines (PAL/MESECAM) 220 lines (NTSC)
Frequency range	70 Hz to 10,000 Hz (Normal audio) 20 Hz to 20,000 Hz (Hi-Fi audio)
Input/Output	RCA connectors: IN x 2, OUT x 1 S-Video connector: IN x 2, OUT x 1

VIDEO/AUDIO (DVD deck)

Signal system	PAL
Applicable disc	DVD (12 cm, 8 cm) CD (12 cm, 8 cm)
Audio characteristics	DVD (4 Hz-22 KHz) CD (4 Hz-20 KHz)
Frequency response	90 dB
S/N Ratio	0.1%
Harmonic distortion	Below Measurable Level
Wow and flutter	90 dB
Dynamic range	
Output	Component-Y (RCA) 1.0 Vp-p/75 ohm Component-PB/PR (RCA) 0.7 Vp-p/75 ohm Audio (RCA) 2Vrms, 1 Kohm Digital Audio 0.5Vp-p/75 ohm
Pickup	
CD	Wavelength 775-805 nm Maximum output power 0.5 mW
DVD	Wavelength 640-660 nm Maximum output power 1.0 mW

TUNER/TIMER (S-VHS deck)

TV channel storage capacity	99 positions (+AUX position)
Tuning system	Frequency synthesized tuner
Channel coverage	
VHF	(low) 42 MHz - 175 MHz (high) 175MHz - 470 MHz
UHF	470 MHz - 870 MHz
Aerial output	UHF channels E28 - E60 (Adjustable)
Memory backup time	Approx. 10 min.

ACCESSORIES

Provided accessories	: RF cable, S-Video cable, Infrared remote control unit, "R6" battery x 2
----------------------	---

Specifications shown are for SP mode unless otherwise specified.
E. & O.E. Design and specifications subject to change without notice.

HR-XVS20AA, HR-XVS20AG D2SP11

About Discs (HR-XVS20AA)

Playable Discs

You can use the discs with the following logos for playback only.

DVD VIDEO 	Video CD/Super Video CD    
Music CD  CD-DA files	CD-R  CD-DA/ JPEG/MP3 files
CD-RW  JPEG/ CD-DA/ MP3 files	CD-ROM  JPEG/MP3 files

- Discs other than the above cannot be played back.
- DVD video discs have a region number. Discs whose region number includes "ALL" or "4" can be played back on this unit.
- Operation and audio quality of this unit are not guaranteed for discs that do not conform to the Compact Disc specification (CD-DA).
Before you play back a CD, check for the CD logo and read the notes on the package to confirm that it conforms to the Compact Disc specification.
- Depending on the intentions of the author of the software, recording conditions of DVD discs and Video CD discs may be restricted. Since this unit plays back discs according to the intentions of the author of the software as indicated on the disc, some functions may not operate as commanded.
- When switching from the first layer to the second layer of double-layered DVD VIDEO discs, the image and sound may be momentarily distorted. This is not a malfunction.

- The following discs also cannot be played back.
- Discs which have a region number other than "4"
 - DVD+RW formatted discs
 - DVD-RW formatted discs
 - DVD-RAM









Region Number

The world is divided into 6 regions for DVD VIDEO discs. DVD VIDEO discs are assigned a region number to indicate which region they may be played back in. A disc cannot be played back on this unit unless the region number of the disc matches that of the unit. The region number for this unit is "4". Only discs whose region number includes "4" can be played back such as shown below.

Examples of DVD VIDEO labels which can be played back using this unit.



Marks of discs in this instruction manual

	Allows operation with a DVD VIDEO disc.		Allows operation with a CD-R/RW disc.
	Allows operation with a Video CD disc.		Allows operation with a SVCD disc.
	Allows operation with a disc including MP3 files.		Allows operation with a disc including JPEG files.
	Allows operation with a Audio CD disc.		Allows operation with a CD-ROM disc.

The following table indicates main different points between models HR-XVS20AA and HR-XVS20AG.

ITEM	MODEL	HR-XVS20AA	HR-XVS20AG
POWER PLUG		SAA	CEE
RF OUT CH/RF OUT SYSTEM [INITIAL]		28-60[36]/G, [H], K, I	28-60[36]/[G], H, K, I
OSD LANGUAGE		ENGLISH	ENGLISH, RUSSIAN
REGION NUMBER		REGION NUMBER 4	REGION NUMBER 3

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SECTION 1 PRECAUTIONS

1.1 SAFETY PRECAUTIONS

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

1.1.1 Precautions during Servicing

- (1) Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.
- (2) Parts identified by the  symbol and shaded () parts are critical for safety. Replace only with specified part numbers.

NOTE :

Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

- (3) Fuse replacement caution notice.
Caution for continued protection against fire hazard.
Replace only with same type and rated fuse(s) as specified.
- (4) Use specified internal wiring. Note especially:
 - Wires covered with PVC tubing
 - Double insulated wires
 - High voltage leads
- (5) Use specified insulating materials for hazardous live parts.
Note especially:
 - Insulation Tape
 - PVC tubing
 - Spacers
 - Insulation sheets for transistors
 - Barrier
- (6) When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

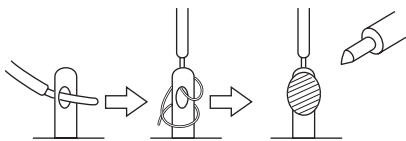


Fig.1-1-1

- (7) Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)
- (8) Check that replaced wires do not contact sharp edged or pointed parts.
- (9) When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

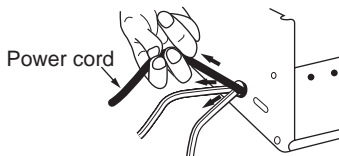


Fig.1-1-2

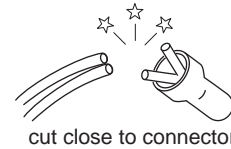
- (10) Also check areas surrounding repaired locations.
- (11) Products using cathode ray tubes (CRTs) In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Conse-

quently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

(12) Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

- **Connector part number** :E03830-001
- **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
- **Replacement procedure**
 - a) Remove the old connector by cutting the wires at a point close to the connector.
Important : Do not reuse a connector (discard it).



cut close to connector

Fig.1-1-3

- b) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

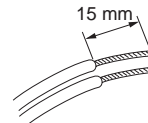


Fig.1-1-4

- c) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

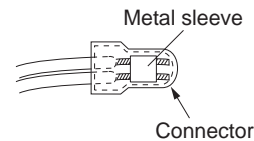


Fig.1-1-5

- d) As shown in Fig.1-1-6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

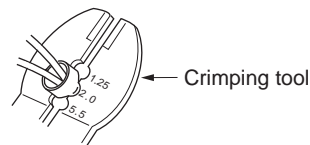


Fig.1-1-6

- e) Check the four points noted in Fig.1-1-7.

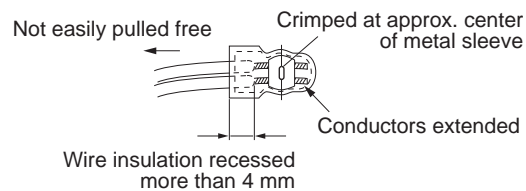


Fig.1-1-7

1.1.2 Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

(1) Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

See table 1 below.

(2) Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See Fig.1-1-11 below.

(3) Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See Fig.1-1-11 below.

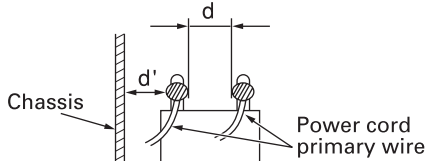


Fig.1-1-8

(4) Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig.1-1-9 and following Fig.1-1-12.

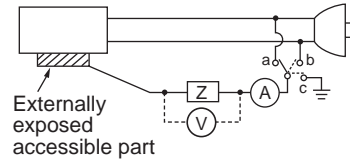


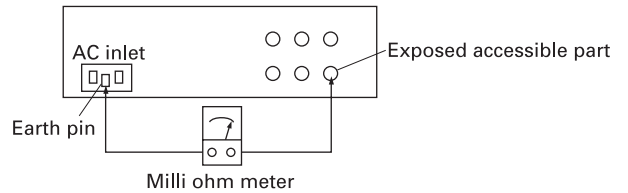
Fig.1-1-9

(5) Grounding (Class 1 model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See Fig.1-1-10 and grounding specifications.



Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

Fig.1-1-10

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$R \geq 1 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
100 to 240 V			AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	USA & Canada	$1 \text{ M}\Omega \leq R \leq 12 \text{ M}\Omega/500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3.2 \text{ mm}$
110 to 130 V 200 to 240 V	Europe & Australia	$R \geq 10 \text{ M}\Omega/500 \text{ V DC}$	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	$d \geq 4 \text{ mm}$ $d' \geq 8 \text{ mm}$ (Power cord) $d' \geq 6 \text{ mm}$ (Primary wire)

Fig.1-1-11

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan		$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada		$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia		$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
			$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Fig.1-1-12

NOTE :

These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

1.1.3 Preventing static electricity

Electrostatic discharge (ESD), which occurs when static electricity stored in the body, fabric, etc. is discharged, can destroy the laser diode in the traverse unit (optical pickup). Take care to prevent this when performing repairs.

1.1.3.1 Grounding to prevent damage by static electricity

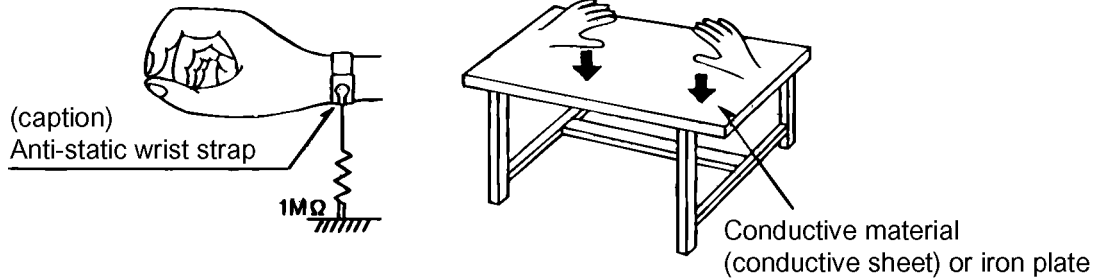
Static electricity in the work area can destroy the optical pickup (laser diode) in devices such as DVD players. Be careful to use proper grounding in the area where repairs are being performed.

(1) Ground the workbench

Ground the workbench by laying conductive material (such as a conductive sheet) or an iron plate over it before placing the traverse unit (optical pickup) on it.

(2) Ground yourself

Use an anti-static wrist strap to release any static electricity built up in your body.



(3) Handling the optical pickup

- In order to maintain quality during transport and before installation, both sides of the laser diode on the replacement optical pickup are shorted. After replacement, return the shorted parts to their original condition. (Refer to the text.)
- Do not use a tester to check the condition of the laser diode in the optical pickup. The tester's internal power source can easily destroy the laser diode.

1.1.4 Handling the traverse unit (optical pickup)

- (1) Do not subject the traverse unit (optical pickup) to strong shocks, as it is a sensitive, complex unit.
- (2) Cut off the shorted part of the flexible cable using nippers, etc. after replacing the optical pickup. For specific details, refer to the replacement procedure in the text. Remove the anti-static pin when replacing the traverse unit. Be careful not to take too long a time when attaching it to the connector.
- (3) Handle the flexible cable carefully as it may break when subjected to strong force.
- (4) It is not possible to adjust the semi-fixed resistor that adjusts the laser power. Do not turn it.

1.1.5 Important for laser products

- (1) CLASS 1 LASER PRODUCT
- (2) DANGER : Invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to beam.
- (3) CAUTION : There are no serviceable parts inside the Laser Unit. Do not disassemble the Laser Unit. Replace the complete Laser Unit if it malfunctions.
- (4) CAUTION : The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are defeated. It is dangerous to defeat the safety switches.

- (5) CAUTION : If safety switches malfunction, the laser is able to function.
- (6) CAUTION : Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

⚠CAUTION
Please use enough caution not to see the beam directly or touch it in case of an adjustment or operation check.

VARNING

Osynlig laserstrålning är denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.

VARO

Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.

ADVARSEL

Usynlig laserstrålning ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

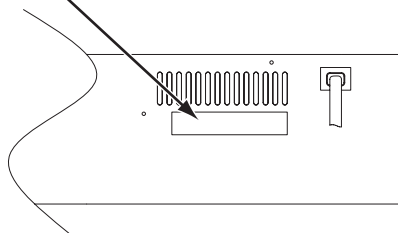
ADVARSEL

Usynlig laserstrålning ved åbning, når sikkerhedsbryteren er avslott. unngå utsettelse for stråling.

REPRODUCTION AND POSITION OF LABEL and PRINT

WARNING LABEL

<p>CAUTION : Visible and invisible laser radiation when open and interlock failed or defeated. AVOID DIRECT EXPOSURE TO BEAM. (e)</p>	<p>ADVARSEL : Synlig og usynlig laserstrålning når maskinen er åben eller interlocken fejler. Undgå direkte eksponering til stråling. (d)</p>	<p>VARNING : Synlig och osynlig laserstrålning när den öppnas och spärren är urkopplad. Betrakta ej strålen. (s)</p>	<p>VARO : Avattaessa ja suojalukitus ohitettuna tai viallisena olet alttiina näkyvälle ja näkymättömälle lasersäteilylle. Vältä säteen kohdistumista suoraan itseesi. (f)</p>
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1.1.6 Precautions for Service

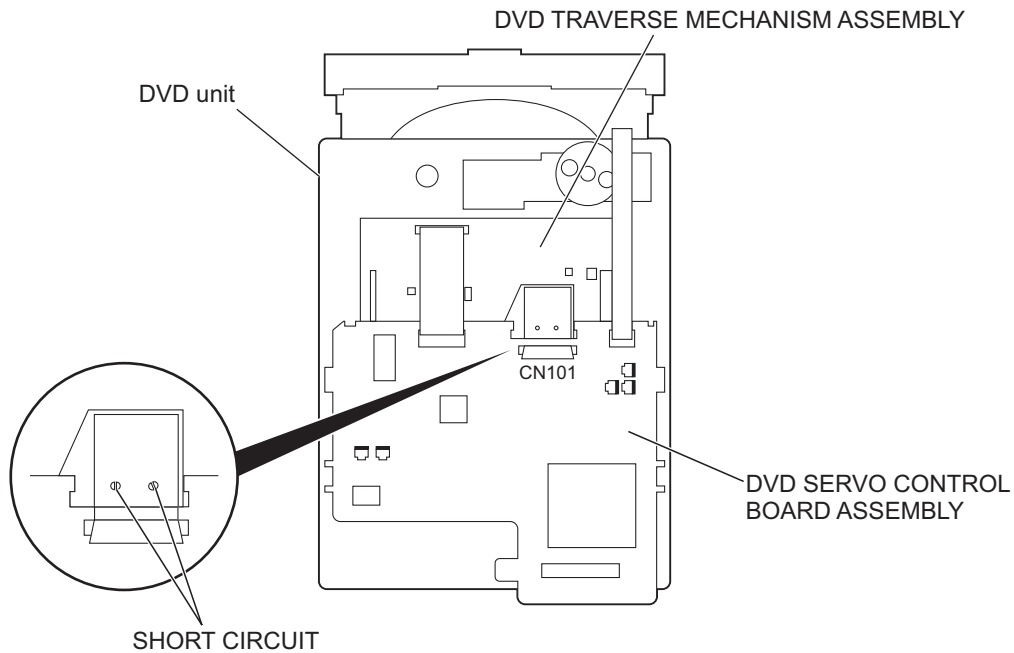
1.1.6.1 Handling of Traverse Unit and Laser Pickup

- (1) Do not touch any peripheral element of the pickup or the actuator.
- (2) The traverse unit and the pickup are precision devices and therefore must not be subjected to strong shock.
- (3) Do not use a tester to examine the laser diode. (The diode can easily be destroyed by the internal power supply of the tester.)
- (4) To replace the traverse unit, pull out the metal short pin for protection from charging.
- (5) When replacing the pickup, after mounting a new pickup, remove the solder on the short land which is provided at the center of the flexible wire to open the circuit.
- (6) Half-fixed resistors for laser power adjustment are adjusted in pairs at shipment to match the characteristics of the optical block. Do not change the setting of these half-fixed resistors for laser power adjustment.

1.1.6.2 Destruction of Traverse Unit and Laser Pickup by Static Electricity

Laser diodes are easily destroyed by static electricity charged on clothing or the human body. Before repairing peripheral elements of the traverse unit or pickup, be sure to take the following electrostatic protection:

- (1) Wear an antistatic wrist wrap.
- (2) With a conductive sheet or a steel plate on the workbench on which the traverse unit or the pickup is to be repaired, ground the sheet or the plate.
- (3) After removing the flexible wire from the connector (CN101), short-circuit the flexible wire by the metal clip.
- (4) Short-circuit the laser diode by soldering the land which is provided at the center of the flexible wire for the pickup. After completing the repair, remove the solder to open the circuit.



SECTION 2 SPECIFIC SERVICE INSTRUCTIONS

2.1 Manually removing the cassette tape

If you cannot remove the cassette tape which is loaded because of any electrical or mechanical failures, manually remove it by taking the following steps.

- (1) Unplug the power cord plug from the power outlet.
- (2) Refer to the disassembly procedure of the VCR and perform the disassembly of the major parts before removing the mechanism assembly. (See Fig. 2-1a)

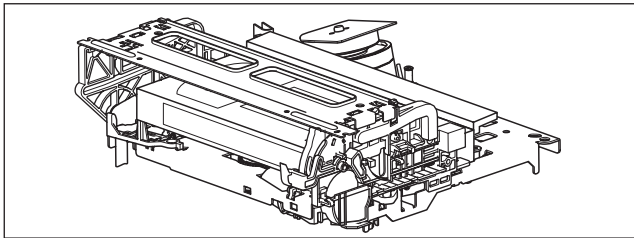


Fig.2-1a

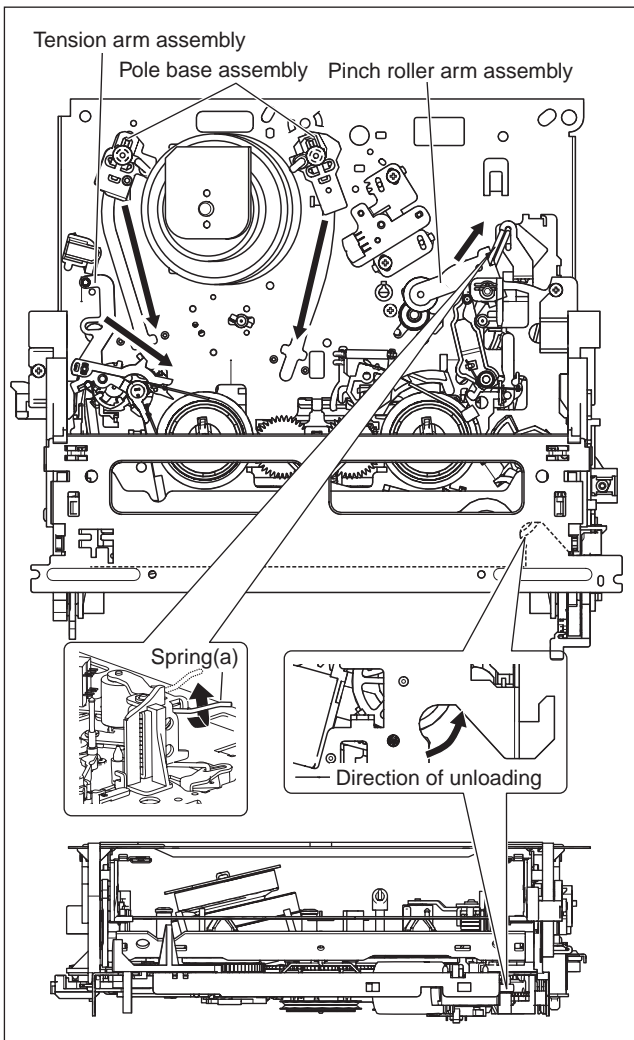


Fig.2-1b

- (3) Unload the pole base assembly by manually turning the gear of the loading motor until the pole base assembly is hidden behind the cassette lid. In doing so, hold the tape by the hand to keep the slack away from any grease. (See Fig.2-1b)

In case of mechanical failures, while keeping the tension arm assembly free from tension, pull out the tape on the pole base assembly. Take the spring(a) of the pinch roller arm assembly off the hook, and detach it from the tape.

- (4) Remove the screw (a) of the side frame (L/R).
- (5) Hold the slack tape and cassette cover together, lift the cassette tape, top frame, cassette holder and side frames (L, R) together from the rear and remove them by dis-engaging the hooks (a) and (b).

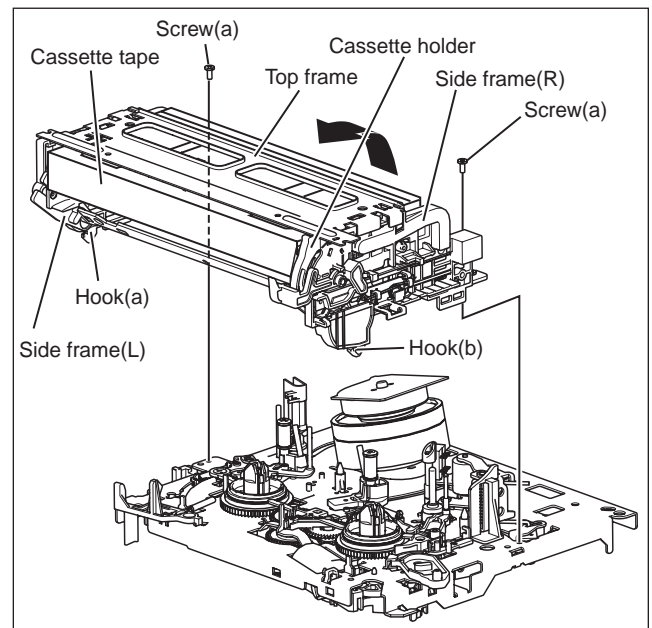


Fig.2-1c

- (6) Take up the slack of the tape into the cassette. This completes removal of the cassette tape.

2.2 Manually removing the disk(DVD/CD)

If you cannot remove the disk which is loaded because of any electrical or mechanical failures, manually remove it by taking the following steps.

- (1) Unplug the power cord plug from the power outlet.
- (2) Remove the top cover and front panel assembly. (Refer to the disassembly procedure and perform the disassembly of the major parts before removing)
- (3) Turn the motor on DVD Loading Motor board assembly by hand to open the disk tray. (See Fig. 2-2a)

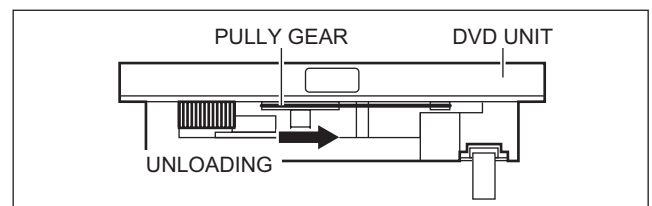


Fig.2-2a

2.3 Removing the major parts

2.3.1 How to read the procedure table

This table shows the steps for disassembly of the externally furnished parts and board assemblies. Reverse these steps when re-assembling them.

Step/ Loc.No.	Part Name	Fig. No.	Point	Note
[1]	Top cover	1-3a	4(S1a),(S1b),3(L1a), 2(SD1a),(P1a),(W1a), CN1(WR1a),	<Note 1a>
	Bracket		2(S1c)	

↑ (1) ↑ (2) ↑ (3) ↑ (4) ↑ (5)

(1) Order of steps in Procedure

When reassembling, perform the step(s) in the reverse order.

These numbers are also used as the identification (location) No. of parts Figures.

(2) Part name to be removed or installed.

(3) Fig. No. showing procedure or part location.

(4) Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped or unsoldered.

P= Spring, W= Washer, S= Screw, L= Locking tab, SD= Solder, CN**(WR**)= Remove the wire (WR**) from the connector (CN**).

Note:

- The bracketed () WR of the connector symbol are assigned nos. in priority order and do not correspond to those on the spare parts list.

(5) Adjustment information for installation

2.3.2 Disassembly procedure

Step/ Loc.No.	Part Name	Fig. No.	Point	Note
[1]	Top cover	2-3-2d	2(S1a), 4(S1b)	
[2]	Front panel assembly	2-3-2d 2-3-2e	3(L2a),5(L2b), CN8006(WR2a), CN7001(WR2b), CN7104(WR2c)	<Note 2a> <Note 3a>
	(Front boaed assembly)		5(S2b)	
	(S JACK boaed assembly)		2(S2c)	
[3]	Mechanism assembly	2-3-2d	CN2001(WR3a), 3(S3a),(S3b)	<Note 3a> <Note 3b>
	(Drum assembly)	2-3-2b	CN1(WR3b),	<Note 3c>
	(Inertia plate)	2-3-2c	(S3c),(S3d),(S3e)	<Note 3d>
	(Roller arm assembly)	2-3-2e	4(L3a)	
	(Head Cleaner assembly)		(P3a),(L3b)	
			2(L3c)	
[4]	Rear cover	2-3-2d	4(S4a),2(S4b),3(L4a)	
[5]	Main board assembly	2-3-2d 2-3-2e	CN7301(WR5a), CN7304(WR5b), CN3101(WR5c), CN5311(WR5d), CN7303(WR5e), 3(S5a)	
[6]	DVD unit	2-3-2d	3(S6a)	
[7]	DVD IF board assembly	2-3-2d 2-3-2e	CN8004(WR7a), 4(S7a)	
[8]	Switching regulator board assembly	2-3-2d	4(S8a)	

<Note 2a>

- When reattaching the Front panel assembly, make sure that the door opener of the Side frame (R) is lowered in position prior to the reinstallation.
- When reattaching the Front panel assembly, pay careful attention to the switch lever of the Front panel assembly not to make it touch the switch knob of the Main board assembly from the side.
- When reattaching the Front panel assembly, lift the Cassette door slightly.

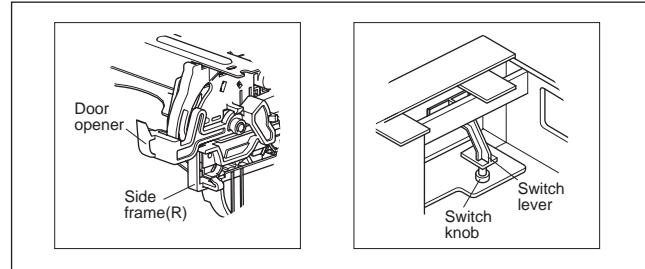


Fig.2-3-2a

<Note 3a>

- Be careful not to damage the connector and wire etc. during connection and disconnection.
- When connecting the flat wire to the connector, be careful with the flat wire direction.

<Note 3b>

- When reattaching the Mechanism assembly, secure the screws (S3a to S3b) in the order of 1,2,3,4.

<Note 3c>

- When reattaching the Mechanism assembly, be sure to align the phase of the Rotary encoder on the Main board assembly.
- When reattaching the Mechanism assembly, set the "Mechanism assembling mode". [See "MECHANISM ASSEMBLY SERVICE MANUAL (No. 86700)".]
- When reattaching the Mechanism assembly to the Main board assembly, take care not to damage the sensors and switch on the Main board assembly.

<Note 3d>

- When reattaching the Drum assembly, secure the screws (S3c to S3e) in the order of c, d, e.

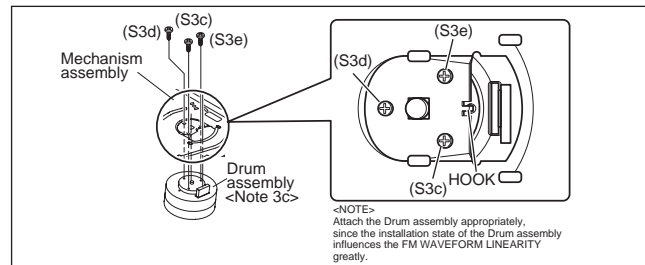


Fig.2-3-2b

- When handling the drum assembly alone, hold it by the motor or shaft. Be careful not to touch other parts, especially the video heads. Also take care not to damage the connectors.

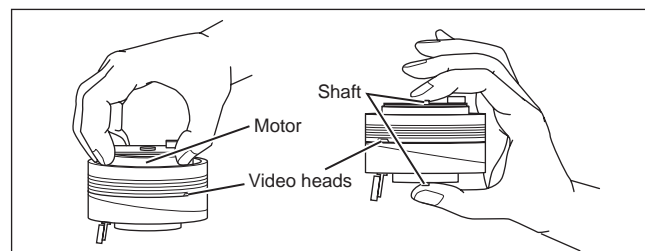


Fig.2-3-2c

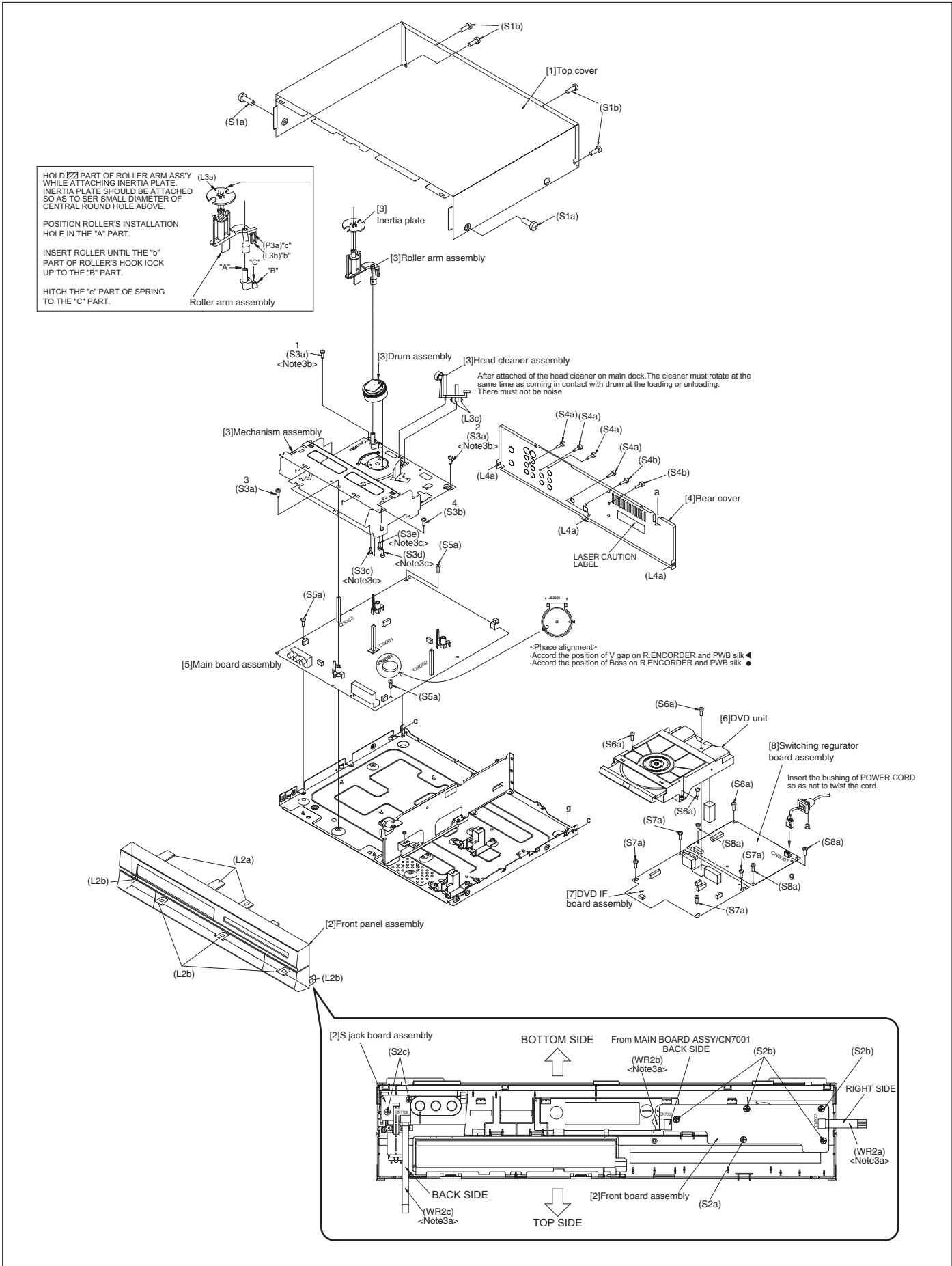


Fig.2-3-2d

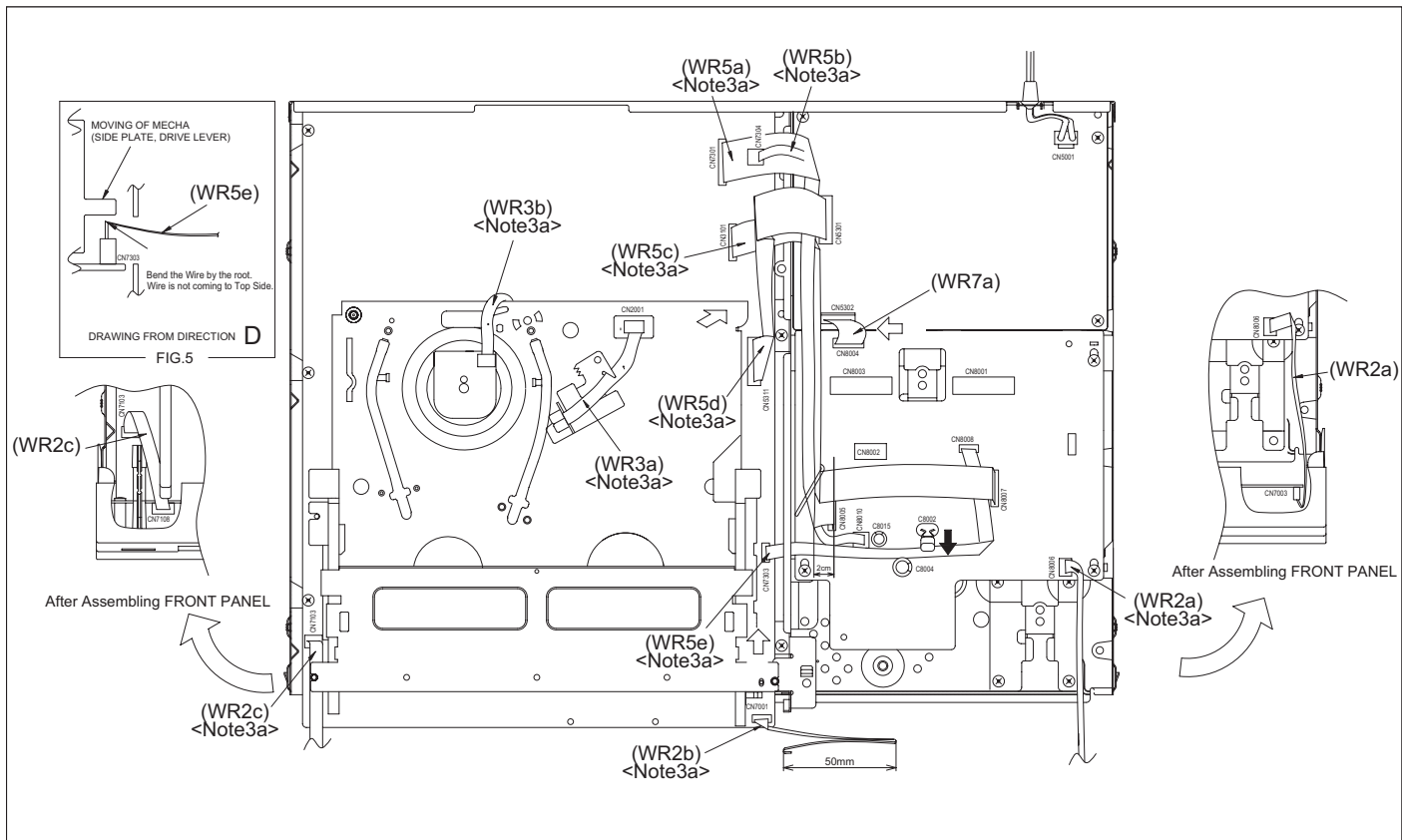


Fig.2-3-2e

2.4 DVD unit

2.4.1 Loading assembly section

2.4.1.1 Removing the clamber assembly (See Fig.2-4-1a)

- (1) Remove the four screws **A** attaching the clamber assembly.
- (2) Move the clamber in the direction of the arrow to release the two joints **a** on both sides.

ATTENTION:

When reattaching, fit the clamber to the two joints **a**.

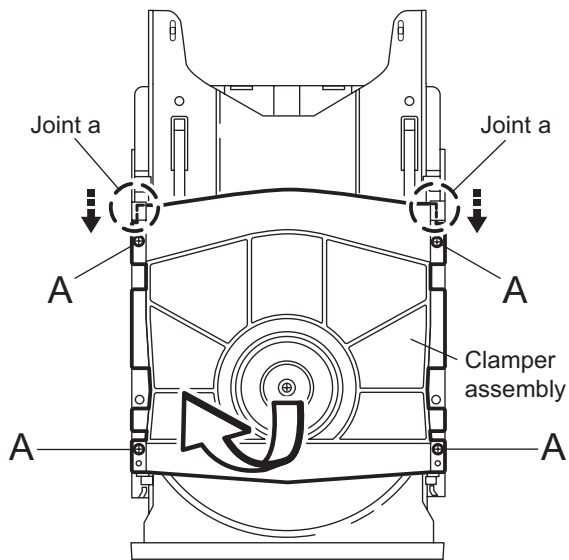


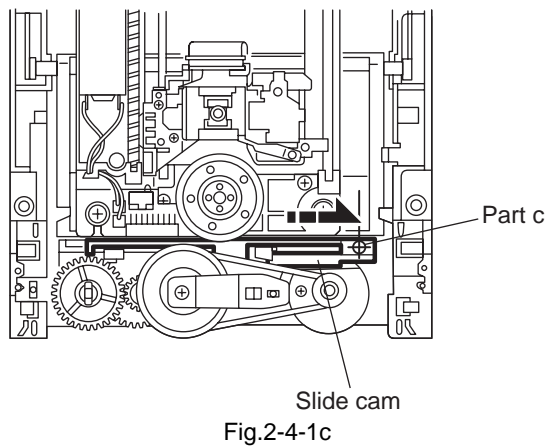
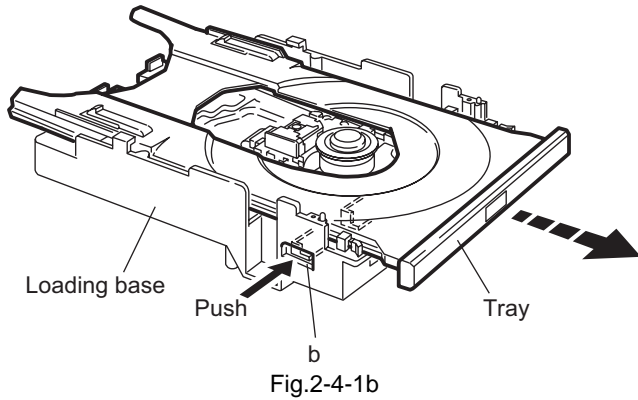
Fig.2-4-1a

**2.4.1.2 Removing the tray
(See Fig2-4-1b. and 2-4-1c)**

- Prior to performing the following procedure, remove the clamber assembly.
 - (1) Push **b** of the slide cam into the slot on the left side of the loading base until it stops.
 - (2) Draw out the tray toward the front.

ATTENTION:

Before reattaching the tray, slide the part **c** of the slide cam to the right as shown in Fig.2-4-1c.

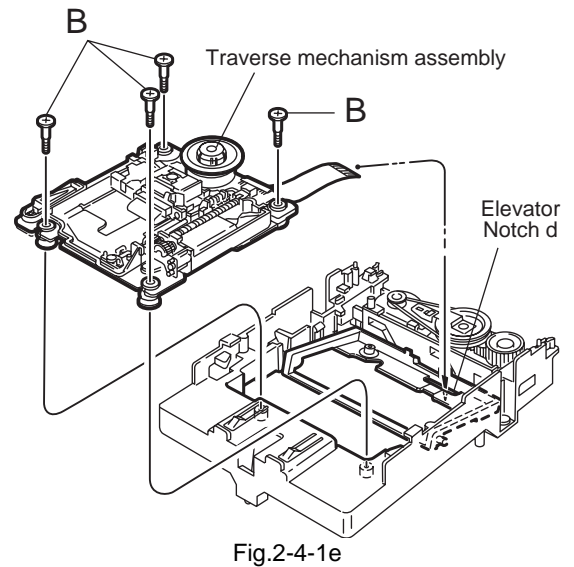
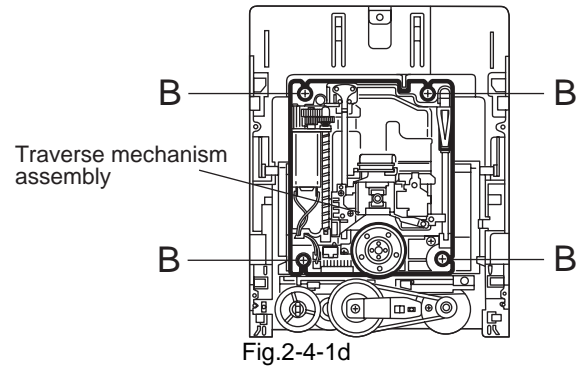


**2.4.1.3 Removing the traverse mechanism assembly
(See Fig.2-4-1d and 2-4-1e)**

- Prior to performing the following procedure, remove the clamber assembly and the tray.
 - (1) Remove the four screws **B** attaching the traverse mechanism assembly.

ATTENTION:

Before reattaching the traverse mechanism assembly, pass the card wire extending from the spindle motor board through the notch **d** of the elevator.



2.4.1.4 Removing the elevator
(See Fig.2-4-1f)

- Prior to performing the following procedure, remove the clammer assembly, the tray and the traverse mechanism assembly.
- (1) Extend each bar **e** inside of the loading base outward and detach the elevator shaft.

ATTENTION:

When reattaching, first fit the two shafts on the front of the elevator to the slots **f of the slide cam.**

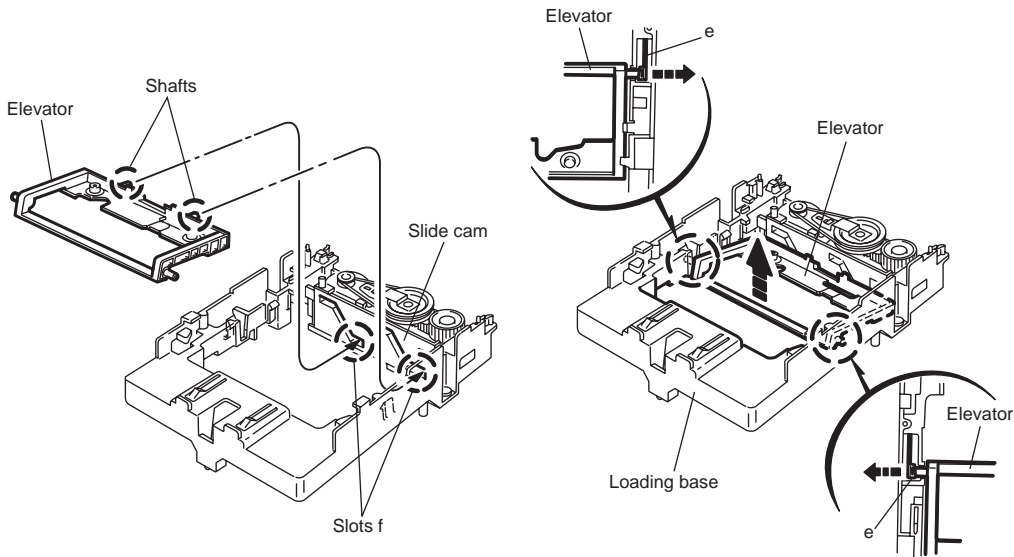


Fig.2-4-1f

2.4.1.5 Removing the motor assembly
(See Fig.2-4-1g and 2-4-1h)

- Prior to performing the following procedure, remove the clammer assembly, the tray, the traverse mechanism assembly and the elevator.
- (1) Remove the belt from the pulley.
- (2) Remove the screw **C** attaching the motor assembly.
- (3) Turn over the body and remove the screw **D** attaching the motor assembly.
- (4) Release the two tabs **g** retaining the motor board.

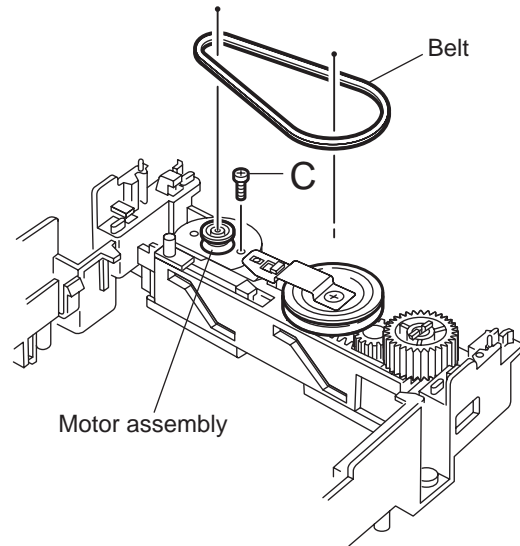


Fig.2-4-1g

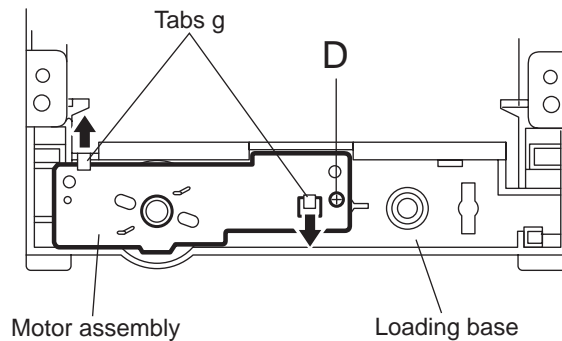


Fig.2-4-1h

2.4.1.6 Removing the Idle gear/pully gear/middle gear/slitecam (See Fig.2-4-1i to 2-4-1k)

- Prior to performing the following procedure,remove the clamber assembly,the tray,the traverse mechanism assembly,the elevator and the motor assembly.
 - (1) Press the two tabs **h** inward and pull out idle gear.
 - (2) Remove the screw **E** attaching the pulley gear bracket.
Slide the pulley gear bracket in the direction of the arrow and pull out the pulley gear.
 - (3) Slide the side cam in the direction of the arrow to release the two joints **i** and remove upward.
 - (4) Remove the middle gear.

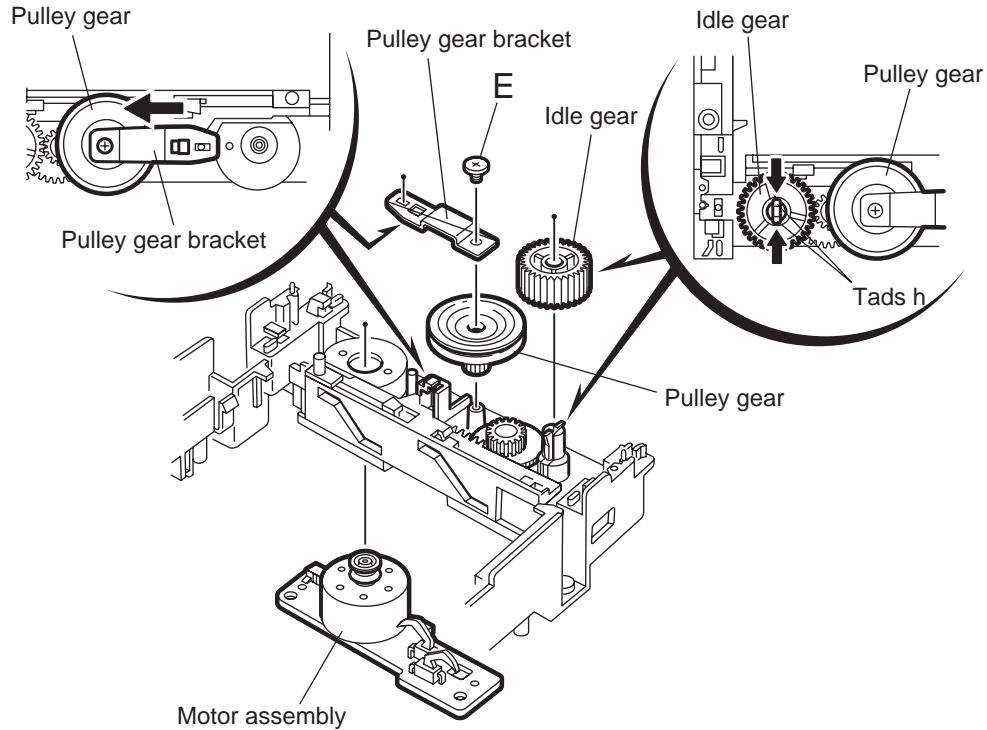


Fig.2-4-1i

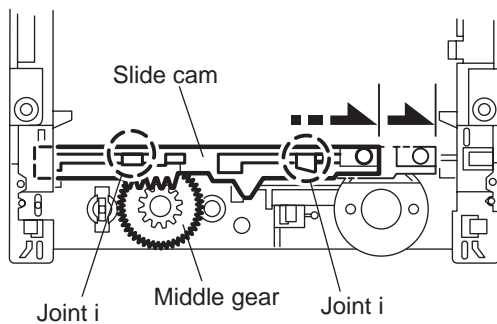


Fig.2-4-1j

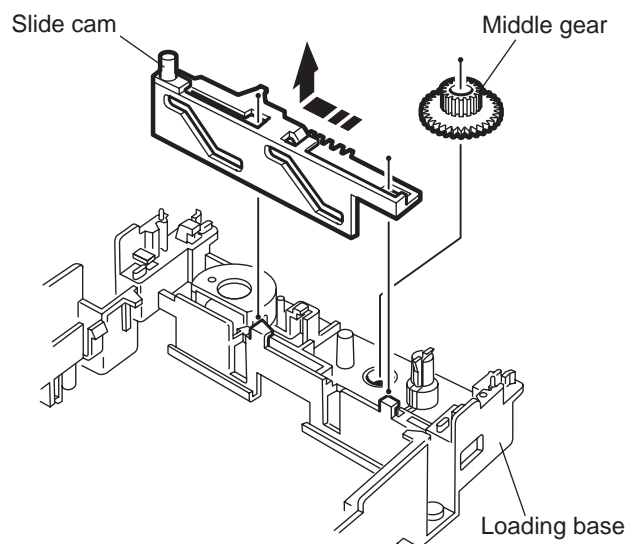
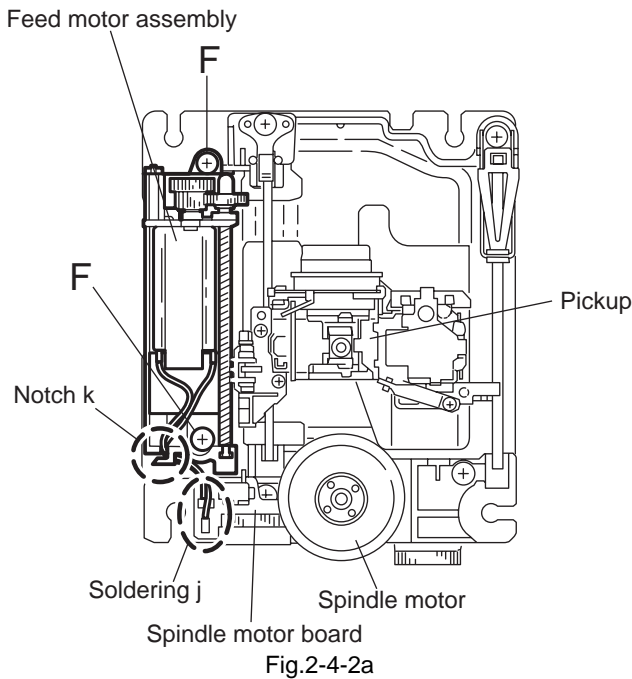


Fig.2-4-1k

2.4.2 Traverse mechanism assembly section

2.4.2.1 Removing the feed motor assembly (See Fig.2-4-2a)

- (1) Unsolder the two soldering j on the spindle motor board.
- (2) Remove the four screws F attaching the feed motor assembly.



2.4.2.2 Removing the feed motor (See Fig.2-4-2a to 2-4-2c)

- Prior to performing the following procedure, remove the feed motor assembly.

- (1) Remove the screw G attaching the thrust spring.

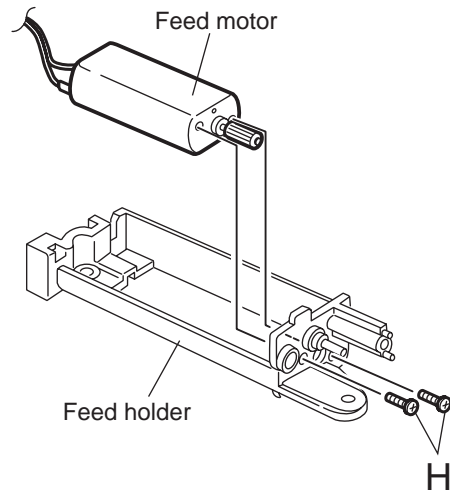
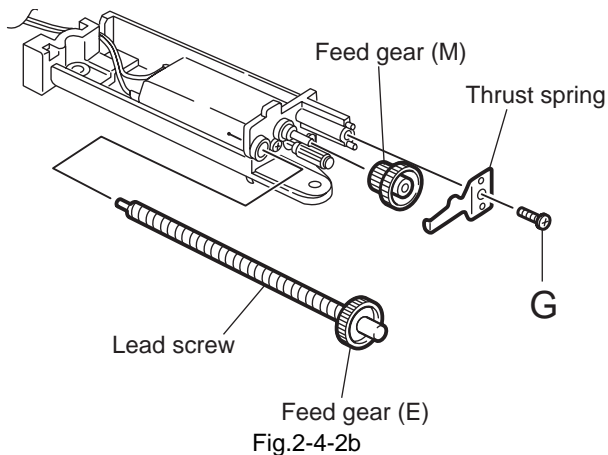
ATTENTION:

When reattaching the thrust spring, make sure that the thrust spring presses the feed gear (M) and the feed gear (E) reasonably.

- (2) Remove the feed gear (M).
- (3) Pull out the feed gear (E) and the lead screw.
- (4) Remove the two screws H attaching the feed motor.

ATTENTION:

When reattaching, pass the two cables extending from the feed motor through the notch k of the feed holder as shown in Fig.2-4-2b.



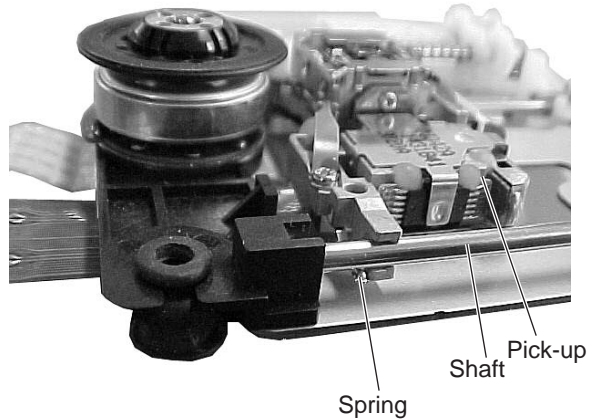
2.4.2.3 Removing the pickup (See Fig.2-4-2e and 2-4-2g)

- (1) Remove the screw I attaching the T spring (S) and the shaft holder. Remove also the plate.

ATTENTION:

When reattaching, make sure that the T spring (S) presses the shaft.

- (2) Pull out the part l of the shaft upward. Move the part m in the direction of the arrow and detach from the spindle base.
- (3) Disengage the joint n of the pickup and the shaft in the direction of the arrow.
- (4) Pull out the shaft from the pickup.
- (5) Remove the two screws J attaching the actuator.
- (6) Disengage the joint of the actuator and the lead spring. Pull out the lead spring.



The spring must be under the shaft when you install pick-up.

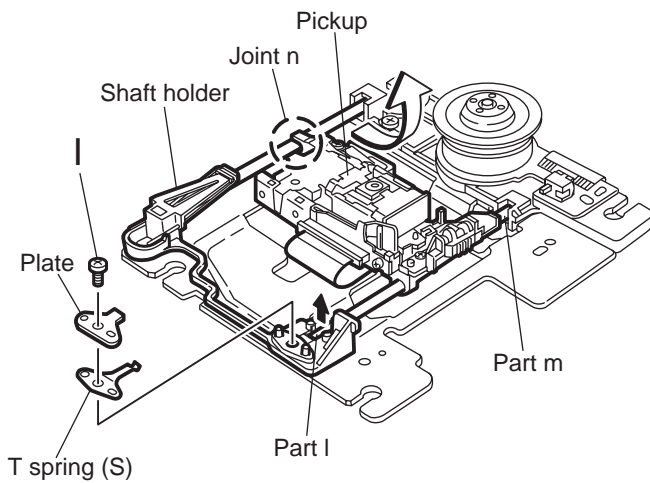


Fig.2-4-2e

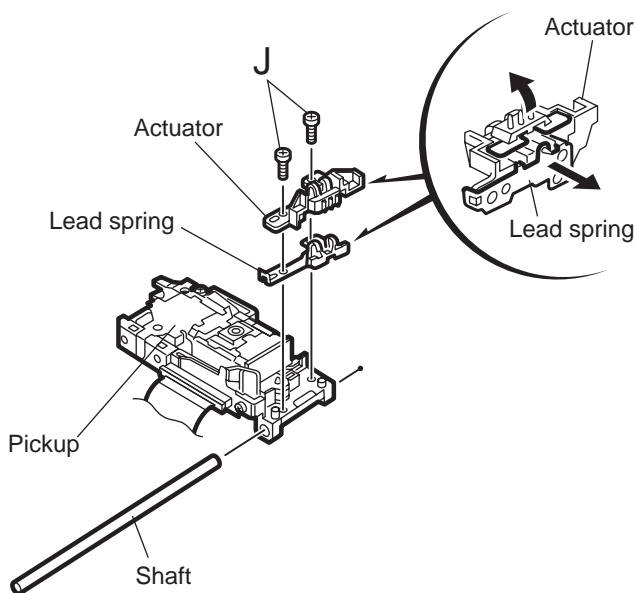


Fig.2-4-2f

**2.4.2.4 Removing the shaft holder / shaft
(See Fig.2-4-2g)**

- (1) Remove the screw **K** attaching the shaft holder.
- (2) Remove the shaft.

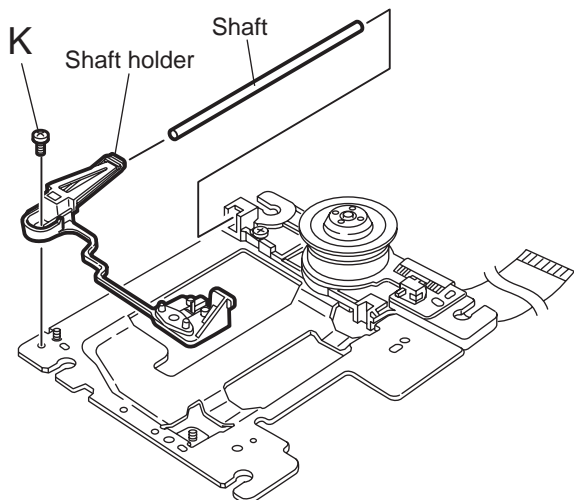


Fig.2-4-2g

**2.4.2.5 Removing the spindle motor assembly
(See Fig.2-4-2h to 2-4-2j)**

- (1) Remove the three screws **L** attaching the spindle motor on the bottom of the mechanism base.

ATTENTION:

When reattaching, pass the card wire extending from the spindle motor board through the notch of the spindle base.

- (2) Remove the three screws **M** attaching the spindle base.

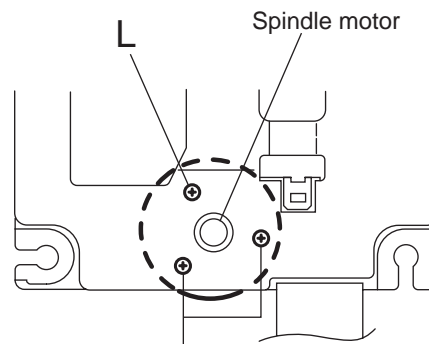


Fig.2-4-2h

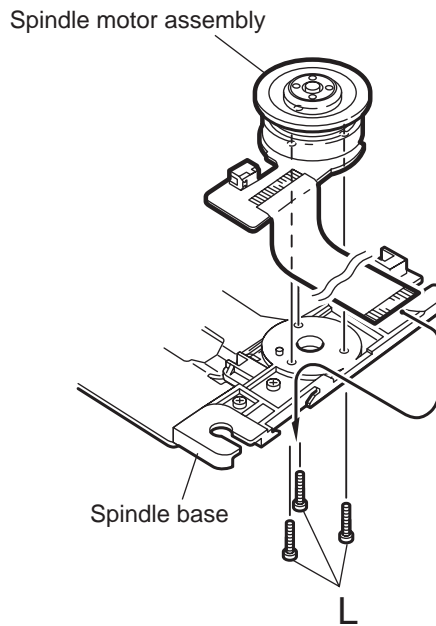


Fig.2-4-2i

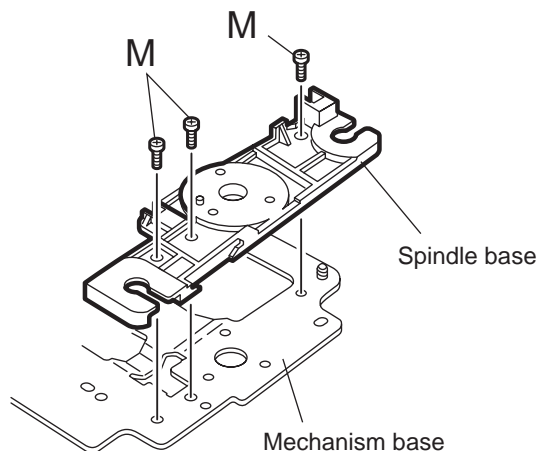


Fig.2-4-2j

2.5 Emergency display function

This unit saves details of the last two emergencies as the EMG history and allows the status of the VCR and the mechanism of each emergency to be shown both on the display and as OSD information.

When using the emergency function, it is required to set the VCR to the Jig RCU mode (Refer to 2.7 Jig RCU mode).

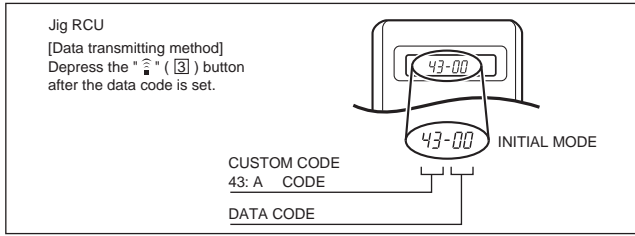


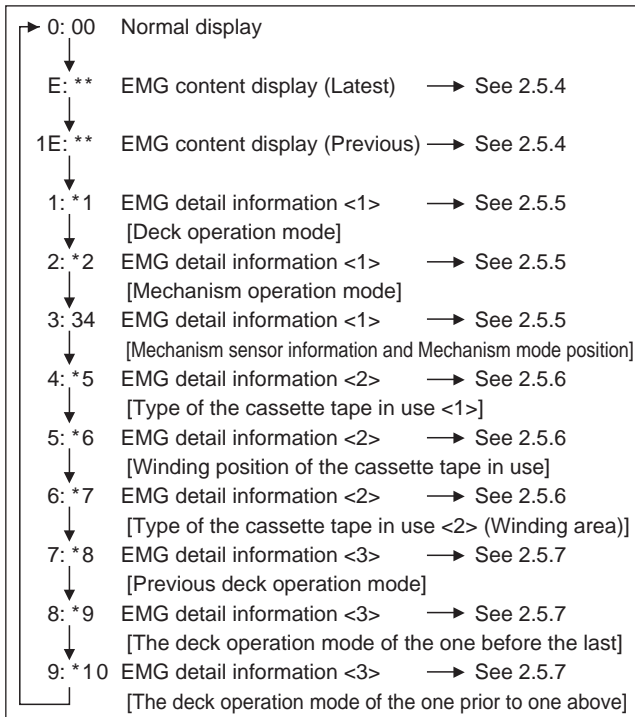
Fig.2-5a Jig RCU [PTU94023B]

2.5.1 Displaying the EMG information

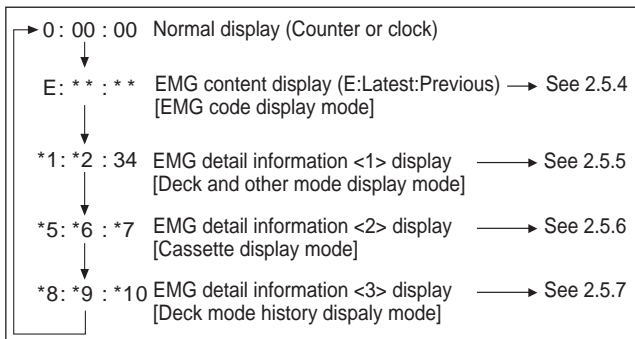
The EMG detail of information can be displayed by transmitting the code "59" from the Jig RCU.

Note:

- The EMG detail information <1><2> show the information on the latest EMG. It becomes " - - : - - : - - " when there is no latest EMG record.



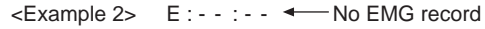
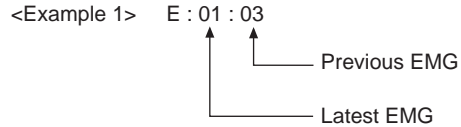
EMG display of 7segment LED display model
Fig.2-5-1b



EMG display of FDP display model
Fig.2-5-1c

<Reference> EMG display of FDP display mode

- (1) Transmit the code "59" from the Jig RCU. The FDP shows the EMG content in the form of "E:**:**".



- (2) Transmit the code "59" from the Jig RCU again. The FDP shows the EMG detail information <1> in the form of "*1: *2 : 34".
 - *1 : Deck operation mode at the moment of EMG
 - *2 : Mechanism operation mode at the moment of EMG
 - 3- : Mechanism sensor information at the moment of EMG
 - 4 : Mechanism mode position at the moment of EMG
- (3) Transmit the code "59" from the Jig RCU once again. The FDP shows the EMG detail information <2> in the form of "*5 : *6 : *7".
 - *5 : Type of the cassette tape in use <1> .
 - *6 : Winding position of the cassette tape in use
 - *7 : Type of the cassette tape in use <2> (Winding area)
- (4) Transmit the code "59" from the Jig RCU once again. The FDP shows the EMG detail information <3> in the form of "**8 : *9 : *10".
 - *8 : Previous deck operation mode at the moment of EMG
 - *9 : The deck operation mode of the one before the last at the moment of EMG
 - *10: The deck operation mode of the one prior to one above at the moment of EMG
- (5) Transmit the code "59" from the Jig RCU once again to reset the display.

2.5.2 Clearing the EMG history

- (1) Display the EMG history.
- (2) Transmit the code "36" from the Jig RCU.
- (3) Reset the EMG display.

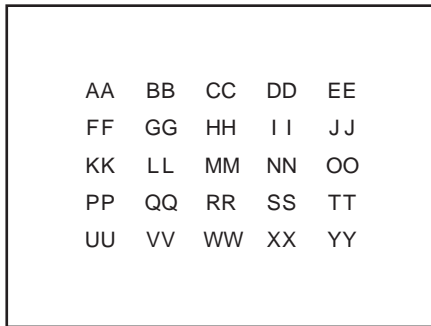
2.5.3 Details of the OSD display in the EMG display mode

During the EMG display, the OSD shows the data on the deck mode, etc. The details of the display contents are as follows.

Notes:

- The display is variable depending on the part No. of the System Control microcomputer (IC3001) built into the VCR. In the following, refer to the figure carrying the same two characters as the top two characters of the part number of your IC.
- The sensor information in the OSD display contents is partially different from the mechanism sensor information in EMG detail information <1>.

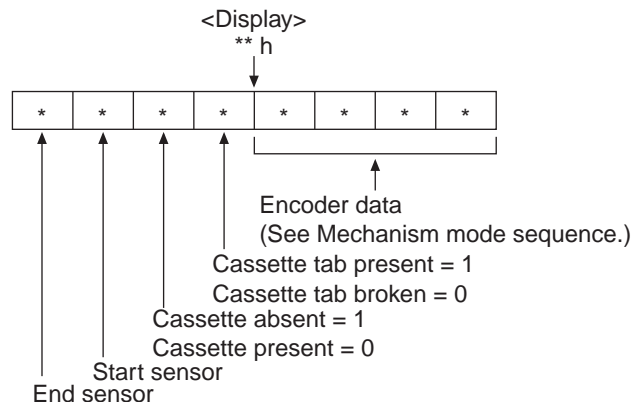
[For MN* only]



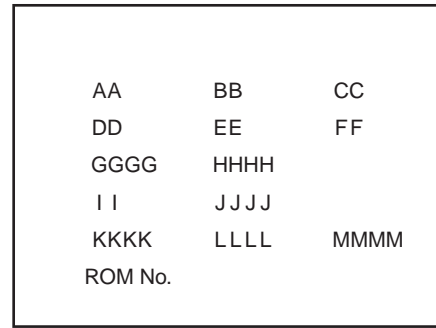
- AA : Deck operation mode (See EMG detail information <1>.)
- BB : Mechanism operation mode (See EMG detail of information <1>.)
- CC : Mechanism transition flag
- DD : Capstan motor control status
- EE : Loading motor control status
- FF : Sensor information (See sensor information details.)
- GG : Capstan motor speed
- HH : Key code (JVC code)
- II : Supply reel winding diameter data, higher 8 bits.
- JJ : Supply reel winding diameter data, lower 8 bits.
- KK : Mechanism sensor information & mechanism mode position (See EMG detail of information <1>.)
- LL : Tape speed data, higher 8 bits.
- MM : Tape speed data, lower 8 bits.
- NN : Cassette tape type <2>, higher 8 bits. (See EMG detail of information <2>.)
- OO : Cassette tape type <2>, lower 8 bits. (See EMG detail of information <2>.)
- PP : General data display area

YY: General data display area

*FF:Sensor information details

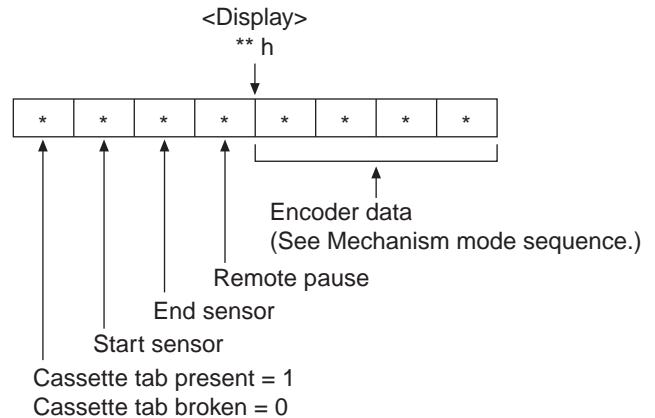


[For *HD only]



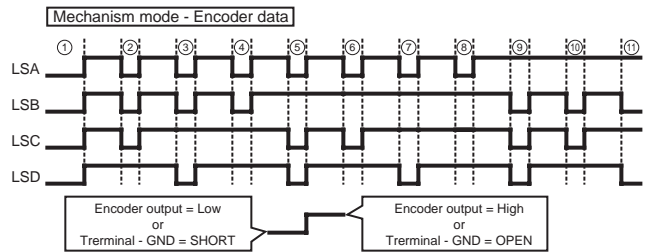
- AA : Key code (JVC code)
- BB : Deck operation mode (See EMG detail information <1>.)
- CC : Mechanism operation mode (See EMG detail information <1>.)
- DD : Sensor information (See sensor information details.)
- EE : Capstan motor speed (Search, double speed)
- FF : Tracking value
- GGGG : Cassette tape type <2>, 16 bits. (See EMG detail information <2>.)
- HHHH : Supply reel winding diameter data
- II : Capstan motor speed (FF/REW, double speed)
- JJJJ : Tape speed data, lower 8 bits.
- KKKK : General data display area
- LLLL : General data display area
- MMMM : General data display area

*DD:Sensor information details

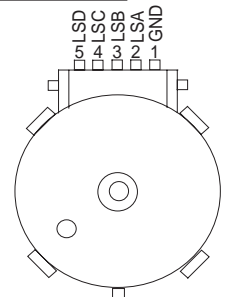


[For both MN*/HD*]

Mechanism mode sequence



No.	Position	Encoder data
①	EJECT	0 h = 0000
②	EJECT1	1 h = 0001
③	EJECT2	2 h = 0010
④	ULSTOP	3 h = 0011
⑤	UPPER	4 h = 0100
⑥	ONSTOP(PLAY)	5 h = 0101
⑦	FWD/SS	6 h = 0110
⑧	REV/SS	7 h = 0111
⑨	OFFSTOP	8 h = 1000
⑩	FFREW-BRAKE	9 h = 1001
⑪	FFREW	A h = 1010
⑫	MIDDLE	F h = 1111



2.5.4 EMG content description

Note:

EMG contents "E08/E09" are for the model with Dynamic Drum (DD).

FDP	CONTENT	CAUSE
E01: Loading EMG	If the mechanism does not change to the next mode within 4 seconds after the loading motor starts rotating in the loading direction, while the mechanism is in the after-loading position (with the tape up against the pole base), [E:01] is identified and the power is switched OFF. However, if the tape loading is not completed within 4 seconds after the loading motor starts rotating in the loading direction, the tape is simply unloaded and ejected. No EMG data is recorded in this case.	<ol style="list-style-type: none"> The mechanism is locked in the middle of the mode transition during a tape loading operation. The mechanism overruns during the tape loading operation because the SYSCON cannot recognize the mechanism mode normally. This problem is due to a cause such as a rotary encoder failure. Power is not supplied to the loading MDA. (M12V/Vcc/Vref/ICP are disconnected in the middle.)
E02: Unloading EMG	When the mechanism mode cannot be changed to another mode even when the loading motor has rotated for more than 4 seconds in the unloading direction, [E:02] is identified and the power is turned off.	<ol style="list-style-type: none"> The mechanism is locked in the middle of mode transition. Without an eject signal being sent from the SYSCON, unloading is attempted (i.e. Ejection is attempted while the tape is still inside the mechanism.) because the SYSCON cannot recognize the mechanism mode normally. This is due to a cause such as a rotary encoder failure. (Mechanism position: UPPER) Power is not supplied to the loading MDA. (M12V/Vcc/Vref/ICP are disconnected in the middle.)
E03: Take Up Reel Pulse EMG	When the falling edge of the take-up reel pulse has not been generated for more than 4 seconds in the capstan rotating mode, [E:03] is identified, the pinch rollers are turned off and stopped, and the power is turned off. In this case, however, the mechanism should be in position after tape loading. Note that the reel EMG is not detected during Slow/Frame advance operations.	<ol style="list-style-type: none"> The take-up reel pulse is not generated in the FWD transport modes (PLAY/FWD SEARCH/FF, etc.) because; <ol style="list-style-type: none"> The idler gear is not meshed with the take-up reel gear because the mechanism mal-functions for some reason. The idler gear is meshed with the take-up reel gear, but incapable of winding due to too large mechanical load (abnormal tension); The reel is rotating normally but an FG pulse is not generated due to the take-up reel sensor failure. The supply reel pulse is not generated in the REV transport modes (REV SEARCH/REW, etc.) because; <ol style="list-style-type: none"> The idler gear is not meshed with the supply reel gear because the mechanism mal-functions for some reason. The idler gear is meshed with the supply reel gear, but incapable of winding due to too large a mechanical load (abnormal tension); The reel rotates normally but the FG pulse is not generated due to a supply reel sensor failure. Power(SW5V) is not supplied to the reel sensor on the tape winding side.
E04: Drum FG EMG	When the drum FG pulse has not been input for more than 3 seconds in the drum rotating mode, [E:04] is identified, the pinch rollers are turned off and stopped, and the power is turned off.	<ol style="list-style-type: none"> The drum could not start or the drum rotation has stopped due to too large a load on the tape, because; <ol style="list-style-type: none"> The tape tension is abnormally high; The tape is damaged or a foreign object (grease, etc.) adheres to the tape. The drum FG pulse did not reach the System controller CPU because; <ol style="list-style-type: none"> The signal circuit is disconnected in the middle; The FG pulse generator (hall device) of the drum is faulty. The drum control voltage (DRUM CTL V) is not supplied to the MDA. Power (M12V) is not supplied to the drum MDA.
E05: Cassette Eject EMG	If the cassette does not reach the eject position within about 0.7 seconds after the cassette housing has started the cassette ejection operation, [E:05] is identified, the drive direction is reversed to load the tape, the mode is switched to STOP mode with the pinch roller OFF, and the power is switched OFF. During the cassette insertion process, the drive direction is reversed and the cassette is ejected if the tape is not up against the pole base within about 3 seconds after the start of the cassette pulling-in operation. If the cassette does not reach the eject position within about 0.7 seconds after the drive mode reversal operation, [E:05] is identified and the power is switched OFF immediately.	<ol style="list-style-type: none"> The cassette cannot be ejected due to a failure in the drive mechanism of the housing. When the housing load increases during ejection, the loading motor is stopped because of lack of headroom in its drive torque. Housing load increasing factors: Temperature environment (low temperature, etc.), mechanism wear or failure. The sensor/switch for detecting the end of ejection are not functioning normally. The loading motor drive voltage is lower than specified or power (M12V) is not supplied to the motor (MDA). When the user attempted to eject a cassette, a foreign object (or perhaps the user's hand) was caught in the opening of the housing.
E06: Capstan FG EMG	When the capstan FG pulse has not been generated for more than 1 second in the capstan rotating mode, [E:06] is identified, the pinch rollers are turned off and stopped, and the power is turned off. However, the capstan EMG is not detected in SLOW/STILL modes. Note that, if the part number of the System Control IC begins with "MN" or "M3", the capstan EMG is not detected even during the FF/REW operation.	<ol style="list-style-type: none"> The capstan could not start or the capstan rotation has stopped due to too large a load on the tape, because; <ol style="list-style-type: none"> The tape tension is abnormally high (mechanical lock); The tape is damaged or a foreign object (grease, etc.) is adhered to the tape (occurrence of tape entangling, etc.). The capstan FG pulse did not reach the System controller CPU because; <ol style="list-style-type: none"> The signal circuit is disconnected in the middle; The FG pulse generator (MR device) of the capstans is faulty. The capstan control voltage (CAPSTAN CTL V) is not supplied to the MDA. Power (M12V, SW5V) are not supplied to the capstan MDA.
E07: SW Power Short-Circuit EMG	When short-circuiting of the SW power supply with GND has lasted for 0.5 second or more, [E:07] is identified, all the motors are stopped and the power is turned off.	<ol style="list-style-type: none"> The SW 5 V power supply circuit is shorted with GND. The SW 12 V power supply circuit is shorted with GND.
E08: DD Initialized (Absolute Position Sensor) EMG	When DD tilting does not complete in 4 seconds, [E:08] is identified, the tilt motor is stopped and the power is turned off.	<ol style="list-style-type: none"> The absolute value sensor is defective. (The soldered parts have separated.) The pull-up resistor at the absolute sensor output is defective. (The soldered parts have separated.) Contact failure or soldering failure of the pins of the connector (board-to-board) to the absolute value sensor. The absolute value sensor data is not sent to the System Controller CPU.
E09: DD FG EMG	When the DD FG pulse is not generated within 2.5 seconds, [E:09] is identified, the tilt motor is stopped and the power is turned off.	<ol style="list-style-type: none"> The FG sensor is defective. (The soldered parts have separated.) The pull-up resistor at the FG sensor output is defective. (The soldered parts have separated.) Contact failure or soldering failure of the pins of the connector (board-to-board) to the FG sensor. The power (5V) to the sensor is not supplied. (Connection failure/soldering failure) The FG pulse is not sent to the System Controller CPU. The tilt motor is defective. (The soldered parts have separated.) The drive power to the tilt motor is not supplied. (Connection failure/soldering failure) The tilt motor drive MDA - IC is defective. Auto-recovery of the DD tilting cannot take place due to overrun.
E0A: Supply Reel Pulse EMG	When the falling edge of the supply reel pulse has not been generated for more than 10 seconds in the capstan rotating mode, [E:0A] is identified and the cassette is ejected (but the power is not turned off). In this case, however, the mechanism should be in the position after tape loading (with the tape up against the pole base). Also note that the reel EMG is not detected during Slow/Frame advance operations.	<ol style="list-style-type: none"> The supply reel pulse is not generated in the FWD transport mode (PLAY/FWD SEARCH/FF, etc.) because; <ol style="list-style-type: none"> PLAY/FWD or SEARCH/FF is started while the tape in the inserted cassette is cut in the middle; A mechanical factor caused tape slack inside and outside the supply reel side of the cassette shell. In this case, the supply reel will not rotate until the tape slack is removed by the FWD transport, so the pulse is not generated until then; The reel is rotating normally but the FG pulse is not generated due to a supply reel sensor failure. The take-up reel pulse is not generated in the REV transport mode (REV SEARCH/REW, etc.). <ol style="list-style-type: none"> REV SEARCH/REW is started when the tape in the inserted cassette has been cut in the middle; A mechanical factor caused tape slack inside and outside the take-up reel side of the cassette shell. In this case, the take up will not rotate until the tape slack is removed by the REV transport, so the pulse will not be generated until that time; The reel is rotating normally but the FG pulse is not generated due to a take-up reel sensor failure. The power (SW 5V) to a reel sensor is not supplied.
EU1: Head clog warning history	Presupposing the presence of the control pulse output in the PLAY mode, when the value obtained by mixing the two V.FM output channels (without regard to the A.FM output) has remained below a certain threshold level for more than 10 seconds, [E:U1] is identified and recorded in the emergency history. During the period in which the head clog is detected, the FDP shows "U:01" and the OSD repeats the "3 seconds of warning display" and the "7 seconds of noise picture display" alternately. EMG code : "E:C1" or "E:U1" / FDP : "U:01" / OSD : "Try cleaning tape." or "Use cleaning cassette." The head clog warning is reset when the above-mentioned threshold has been exceeded for more than 2 seconds or the mode is changed to another mode than PLAY.	

2.5.5 EMG detail information <1>

The status (electrical operation mode) of the VCR and the status (mechanism operation mode/sensor information) of the mechanism in the latest EMG can be confirmed based on the figure in EMG detail information <1> .

[FDP/OSD display] *1 : *2 : 34

- *1 : Deck operation mode at the moment of EMG
- *2 : Mechanism operation mode at the moment of EMG
- 3- : Mechanism sensor information at the moment of EMG
- 4 : Mechanism mode position at the moment of EMG

Note:

- For EMG detailed information <1>, the content of the code that is shown on the display (or OSD) differs depending on the parts number of the system control microprocessor (IC3001) of the VCR. The system control microprocessor parts number starts with two letters, refer these to the corresponding table.

*1 : Deck operation mode

[Common table of MN* and HD]

Display		Deck operation mode
MN*	HD*	
00	-	Mechanism being initialized
01	00	STOP with pinch roller pressure off (or tape present with P.OFF)
02	01	STOP with pinch roller pressure on
03	-	POWER OFF as a result of EMG
04	04	PLAY (Normal playback)
0C	0E	REC
10	11	Cassette ejected
20	22	FF
21	-	Tape fully loaded, START sensor ON, short FF
22	-	Cassette identification FWD SEARCH before transition to FF (SPx7-speed)
24	26	FWD SEARCH (variable speed) including x2-speed
2C	2E	INSERT REC
40	43	REW
42	-	Cassette identification REV SEARCH before transition to REW (SPx7-speed)
44	47	REV SEARCH (variable speed)
4C	4C	AUDIO DUB
6C	6E	INSERT REC (VIDEO + AUDIO)
84	84	FWD STILL / SLOW
85	85	REV STILL / SLOW
8C	8F	REC PAUSE
8D	-	Back spacing
8E	-	Forward spacing (FWD transport mode with BEST function)
AC	AF	INSERT REC PAUSE
AD	-	INSERT REC back spacing
CC	CD	AUDIO DUB PAUSE
CD	-	AUDIO DUB back spacing
EC	EF	INSERT REC (VIDEO + AUDIO) PAUSE
ED	-	INSERT REC (VIDEO + AUDIO) back spacing

*2 : Mechanism operation mode

[Table of MN*]

Display	Mechanism operation mode
00	Command standby (No command to be executed)
01	Immediate Power OFF after EMG occurrence
02	Loading from an intermediate position during mechanism initialization
03	Unloading due to EMG occurrence during mechanism initialization
04	Ejecting cassette (ULSTOP to EJECT)
05	Inserting cassette (EJECT to ULSTOP)
06	Loading tape (ULSTOP to PLAY)
07	Unloading tape (PLAY to ULSTOP)
08	Transition from pinch roller ON to STOP
09	Transition from pinch roller OFF to STOP (PLAY to OFFSTOP)
0A	Transition from pinch roller OFF to STOP at power OFF
0B	Transition from pinch roller ON to STOP at power ON
0C	Transition to PLAY
0D	Transition to Search FF
0E	Transition to REC
0F	Transition to FWD STILL/SLOW
10	Transition to REV STILL/SLOW
11	Transition to Search REV
12	Transition from FF/REW to STOP
13	Transition to FF
14	Transition to REW
15	Tape end detection processing during loading
16	Short FWD/REV at tape sensor ON during unloading
17	Transition to FF/REW brake mode

[Table of HD*]

Display	Mechanism operation mode
00	STOP with pinch roller pressure off
01	STOP with pinch roller pressure on
02	U/L STOP (or tape being loaded)
04	PLAY (Normal playback)
05	PLAY (x1-speed playback using JOG)
0E	REC
11	Cassette ejected
22	FF
26	FWD SEARCH (variable speed) including x2-speed
2E	INSERT REC
43	REW
47	REV SEARCH
4C	AUDIO DUB
6E	INSERT REC (VIDEO + AUDIO)
84	FWD STILL/SLOW
85	REV STILL/SLOW
8F	REC PAUSE
AF	INSERT REC PAUSE
C7	REV SEARCH (x1-speed reverse playback using JOG)
CD	AUDIO DUB PAUSE
EF	INSERT REC (VIDEO + AUDIO) PAUSE
F0	Mechanism being initialized
F1	POWER OFF as a result of EMG
F2	Cassette being inserted
F3	Cassette being ejected
F4	Transition from STOP with pinch roller pressure on to STOP with pinch roller pressure off
F5	Transition from STOP with pinch roller pressure on to PLAY
F6	Transition from STOP with pinch roller pressure on to REC
F7	Cassette type detection SEARCH before FF/REW is being executed
F8	Tape being unloaded
F9	Transition from STOP with pinch roller pressure off to STOP with pinch roller pressure on
FA	Transition from STOP with pinch roller pressure off to FF/REW
FB	Transition from STOP with pinch roller pressure off to REC.P (T.REC, etc.)
FC	Transition from STOP with pinch roller pressure off to cassette type detection SEARCH
FD	Short REV being executed after END sensor on during unloading
FE	Tension loosening being executed after tape loading (STOP with pinch roller pressure on)
FF	Tape being unloaded

3 : Mechanism sensor information

[Common table of MN* and HD*]

Display	Mechanism sensor information			
	REC safety SW	Start sensor	End sensor	Mechanism position sensor
0-	Tab broken	ON	ON	ON
1-	Tab broken	ON	ON	OFF
2-	Tab broken	ON	OFF	ON
3-	Tab broken	ON	OFF	OFF
4-	Tab present	OFF	ON	ON
5-	Tab present	OFF	ON	OFF
6-	Tab present	OFF	OFF	ON
7-	Tab present	OFF	OFF	OFF
8-	Tab broken	ON	ON	ON
9-	Tab broken	ON	ON	OFF
A-	Tab broken	ON	OFF	ON
B-	Tab broken	ON	OFF	OFF
C-	Tab present	OFF	ON	ON
D-	Tab present	OFF	ON	OFF
E-	Tab present	OFF	OFF	ON
F-	Tab present	OFF	OFF	OFF

Tab broken = 0 Sensor ON = 0 Sensor ON = 0
 Tab present = 1 sensor OFF = 1 Sensor OFF = 1

-4 : Mechanism mode position

[Common table of MN* and HD*]

Mechanism sensor information	Display	Deck operation mode	
Even number (0, 2, 4, 6, 8, A, C, E)	-0	Not established	
	-1	EJECT	EJECT position
	-2	EJECT-EJECT1	Intermodal position
	-3	EJECT1	EJECT1 position
	-4	EJECT1-EJECT2	Intermodal position
	-5	EJECT2	EJECT2 position
	-6	EJECT2-ULSTOP	Intermodal position
	-7	ULSTOP	ULSTOP position
	-8	ULSTOP-UPPER	Intermodal position
	-9	UPPER	Loading (unloading) tape
	-A	UPPER-ONSTOP	Intermodal position
	-B	ONSTOP	PLAY position
	-C	PLAY-FWD/SS	Intermodal position
	-D	FWD/SS	FWD (FWD Still/Slow) position
	-E	FWD/SS-REV	Intermodal position
	-F	REV	REV (REV Still/Slow) position
Odd number (1, 3, 5, 7, 9, B, D, F)	-0	REV-OFFSTOP	Intermodal position
	-1	OFFSTOP	Pinch roller OFF position
	-2	OFFSTOP-FFREWB	Intermodal position
	-3	FFREWB	FF/REW Brake position
	-4	FFREWB-FFREW	Intermodal position
	-5	FFREW	FF/REW position

2.5.6 EMG detail information <2>

The type of the cassette tape and the cassette tape winding position can be confirmed based on the figure in EMG detail information <2> .

Note:

- EMG detail information <2> is the reference information stored using the remaining tape detection function of the cassette tape. As a result, it may not identify cassette correctly when a special cassette tape is used or when the tape has variable thickness.

*5 : Cassette tape type <1>

Display	Cassette tape type <1>
00	Cassette type not identified
16	Large reel/small reel (T-0 to T-15/T-130 to T-210) not classified
82	Small reel, thick tape (T-120) identified/thin tape (T-140) identified
84	Large reel (T-0 to T-60) identified
92	Small reel, thick tape (T-130) identified/thin tape (T-160 to T-210) identified
93	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) not classified
C3	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) being classified
D3	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) being classified
E1	C cassette, thick tape (TC-10 to TC-20) identified
E2	Small reel, thick tape (T-0 to T-100) identified
E9	C cassette, thin tape (TC-30 to TC-40) identified
F1	C cassette, thick tape/thin tape (TC-10 to TC-40) not classified

Notes:

- Cassette tape type <1> is identified a few times during mode transition and the identification count is variable depending on the cassette tape type. If an EMG occurs in the middle of identification, the cassette tape type may not be able to be identified.
- If other value than those listed in the above table is displayed, the cassette tape type is not identified.

*6 : Cassette tape winding position

The cassette tape winding position at the moment of EMG is displayed by dividing the entire tape (from the beginning to the end) in 21 sections using a hex number from "00" to "14".

"00" : End of winding

"14" : Beginning of winding

"FF" : Tape position not identified

*7 : Cassette tape type <2> (Winding area)

Display	Cassette tape type <2>	(Reference) Word data (Beginning) (End)
00	Cassette type not identified	
04 - 08	C cassette, thick tape TC-10	(0497 - 0506) (0732 - 0858)
05 - 06	Small reel, thick tape T-20	(05A9 - 0661)
05 - 0C	C cassette, thick tape TC-20P	(0599 - 05FF) (0AA1 - 0C07)
06 - 0C	C cassette, thin tape TC-40	(0623 - 063D) (0C41 - 0CC3)
06 - 0C	C cassette, thin tape TC-30	(0611 - 0638) (0C0C - 0CB2)
07 - 08	Small reel, thick tape T-40	(07CC - 08E5)
09 - 0B	Small reel, thick tape T-60	(09FD - 0B78)
0C - 0D	Small reel, thick tape T-80(DF-160)	(0C20 - 0DFC)
0D - 0F	Small reel, thick tape T-90(DF-180)	(0D31 - 0F3E)
0E - 10	Small reel, thick tape T-100	(0E43 - 107F)
10 - 12	Small reel, thin tape T-140	(10E1 - 120C)
10 - 13	Small reel, thick tape T-120(DF-240)	(1073 - 1313)
11 - 14	Small reel, thick tape T-130	(1185 - 1429)
12 - 14	Small reel, thin tape T-160	(12D3 - 141F)
13 - 14	Small reel, thin tape T-210(DF-420)	(1373 - 14C3)
13 - 14	Small reel, thin tape T-180(DF-360)	(1357 - 14C0)
13 - 14	Small reel, thin tape T-168	(1395 - 14EE)
13 - 14	Small reel, thick tape DF-300	(13A8 - 14CE)
15 - 16	Large reel T-20	(1536 - 1618)
16 - 17	Large reel T-30	(1647 - 175A)
17 - 18	Large reel T-40	(1759 - 189C)
19 - 1B	Large reel T-60	(1989 - 1B2F)

Note:

- The values of cassette tape type <2> in the above table are typical values with representative cassette tapes.

2.5.7 EMG detail information <3>

Three deck operation modes preceding the deck operation mode in which the EMG occurs may be confirmed based on the figures in the EMG information detail <3>. For the contents of the displayed information, see the table "Deck operation mode" in section "2.5.6 EMG detail information <1>".

2.6 Service position (VHS)

This unit has been designed so that the Mechanism and Main board assemblies can be removed together from the chassis assembly. Before diagnosing or servicing the circuit boards, take out the major parts from the chassis assembly.

2.6.1 How to set the "Service position"

- (1) Refer to the disassembly procedure and perform the disassembly of the major parts before removing the Mechanism assembly.
- (2) Remove the screws that fix the Mechanism assembly to the Chassis assembly. If any other screws are used to fix the boards, remove them also.
- (3) Remove the combined Mechanism and Main board assemblies.
- (4) If any other major parts are used, remove them also.
- (5) Connect the wires and connectors of the major parts that have been removed in steps (1) to (4). (Refer to Fig. 2-6-1a.)
- (6) Place the combined Mechanism, Main board and other board assemblies upside down.
- (7) Insert the power cord plug into the power outlet and then proceed with the diagnostics and servicing of the board assembly.

Notes:

- Before inserting the power cord plug into the power outlet, make sure that none of the electrical parts are able to short-circuit between the workbench and the board assembly.
- For the disassembly procedure of the major parts and details of the precautions to be taken, see "2.3 Removing the major parts".
- If there are wire connections from the Main board and Mechanism assemblies to the other major parts, be sure to remove them (including wires connected to the major parts) first before performing step (2).
- When carrying out diagnosis and repair of the Main board assembly in the "Service position", be sure to ground both the Main board and Mechanism assemblies. If they are improperly grounded, there may be noise on the playback picture or FDP counter display may move even when the mechanism is kept in an inoperative status.
- In order to diagnose the playback or recording of the cassette tape, set the Mechanism assembly to the required mode before placing it upside down. If the mechanism mode is changed (including ejection) while it is in an upside down position the tape inside may be damaged.
- For some models, the mechanism and board assemblies are attached by connectors only. When carrying out a diagnosis or repair of the boards in the "Service position", make sure that the connectors are not disconnected.

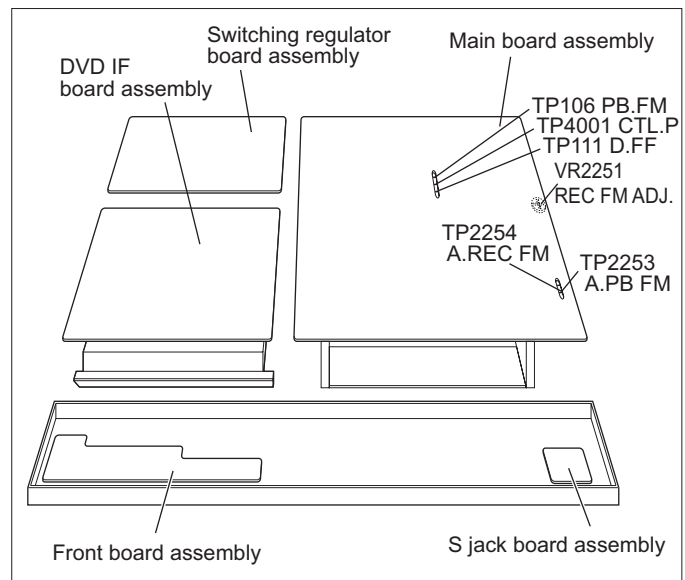


Fig.2-6-1a

2.7 Jig RCU mode

This unit uses the following two modes for receiving remote control codes.

- (1) User RCU mode: Ordinary mode for use by the user.

(2) Jig RCU mode: Mode for use in production and servicing. When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). As both of the above two modes are stored in the EEPROM, it is required to set the VCR back to the User RCU mode each time that an adjustment is made or to check that the necessary operations have been completed. These modes can be set by the operations described below.

Note:

- Confirm the RCU mode when exchanged parts. Since some SERVICE PARTS sets the VCR to the Jig RCU mode as initial setting.

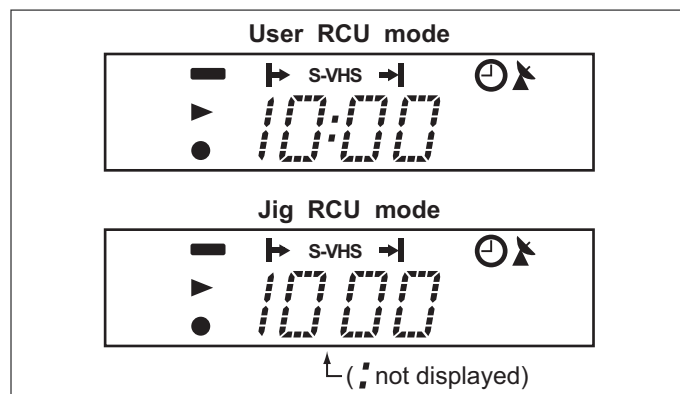


Fig.2-7-1a User/Jig RCU mode

2.7.1 Setting the Jig RCU mode

- (1) Turn on the power.
- (2) Press the following remote keys continuously within 2 seconds "SET UP MENU" --> "2" --> "8" --> "OK". When the VCR is set to the Jig RCU mode, the symbols (":") in the time display of the FDP are turned off. (Refer to Fig.2-7-1a)

2.7.2 Setting the User RCU mode

- (1) Turn off the power.
- (2) Press the "REC" and "PAUSE" buttons of the VCR simultaneously. Alternatively, transmit the code "80" from the Jig RCU.

2.8 Mechanism service mode

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "Mechanism service mode".

2.8.1 How to set the "Mechanism service mode"

- (1) Set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received)
- (2) Transmit the code "E5" from the Jig RCU.
- (3) Release the lug of the Cassette holder and then slide the Cassette holder toward the direction where the Cassette holder is loaded by manually.
- (4) The cassette holder lowers and, when the loading has completed, the mechanism enters the desired mode.
When the VCR is set to the Mechanism service mode, the symbols ("Timer") in the FDP (LED) are blinked.

2.8.2 How to exit from the "Mechanism service mode"

- (1) Unplug the power cord plug from the power outlet.

2.9 Maintenance and inspection

2.9.1 Cleaning

Regular cleaning of the transport system parts is desirable but practically impossible. So make it a rule to carry out cleaning of the tape transport system whenever the machine is serviced. When the video head, tape guide and/or brush get soiled, the playback picture may appear inferior or at worst disappear, resulting in possible tape damage.

Note:

- **Absolutely avoid sweeping the upper drum vertically as this will cause damage to the video head.**
- (1) When cleaning the upper drum (especially the video head), soak a piece of closely woven cloth with alcohol and while holding the cloth onto the upper drum by the fingers, turn the upper drum counterclockwise.
 - (2) To clean the parts of the tape transport system other than the upper drum, use a piece of closely woven cloth or a cotton swab soaked with alcohol.
 - (3) After cleaning, make sure that the cleaned parts are completely dry before using the cassette tape.

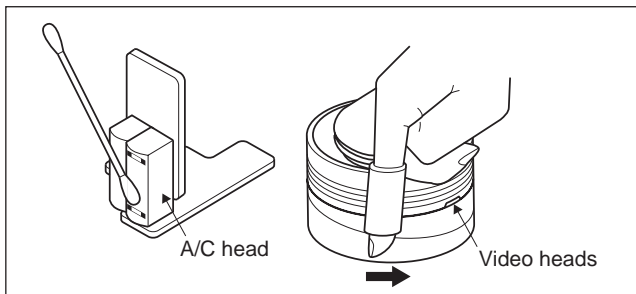


Fig.2-9-1a

2.9.2 Lubrication

With no need for periodical lubrication, you have only to lubricate new parts after replacement. If any oil or grease on contact parts is soiled, wipe it off and newly lubricate the parts.

Note:

- **See the "mechanism assembly" diagram of the "parts list" for the lubricating or greasing spots, and for the types of oil or grease to be used.**

2.9.3 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time, even if the set is not used.

System	Parts name	Operation hours	
		1000H	2000H
Tape transport	Drum assembly	C,X	X
	A/C head	C,X	C,X
	Pinch roller arm assembly	C	C
	Full erase head	C	C
	Tension arm assembly	C	C
	Capstan motor (Shaft)	C	C
	Guide arm assembly	C	C
Drive	Capstan motor		X
	Capstan brake assembly		X
	Main brake assembly		X
	Belt (Capstan)	X	X
	Loading motor		X
	Clutch unit		X
	Worm gear		X
	Control plate		X
Other	Rotary encoder		X

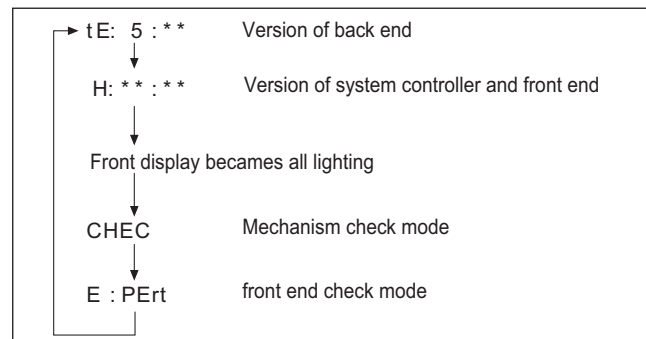
C : Cleaning

X : Inspection or Replacement if necessary

2.10 Test mode (DVD)

2.10.1 How to set the "Test mode"

- (1) Set the Jig RCU mode.(Refer to 2.7 Jig RCU mode)
- (2) Press S-VHS/DVD button so that the DVD indicator lights up.
- (3) Transmit the code "FA" from the Jog RCU.
- (4) The version number of back end is displayed on the upper left of a opening screen and front display.
- (5) Each pressing of "SET UP MENU" key of the remote controller in test mode changes the mode as follows.



2.10.2 How to exit the "Test mode"

- (1) Transmit the code "FB" from the Jig RCU.
- (2) Set the User RCU mode.(Refer to 2.7 Jig RCU mode)

SECTION 3 ADJUSTMENT

3.1 Before adjustment

3.1.1 Precaution

- The adjustments of this unit include the mechanism compatibility and electrical adjustments. During the performance of this work, be sure to observe the precautions for each type of adjustment.
- If there is a reference to a signal input method in the signal column of the adjustment chart, "Ext. S-input" means the Y/C separated video signal and "Ext. input" means the composite video signal input.
- Unless otherwise specified, all measuring points and adjustment parts are located on the Main board.

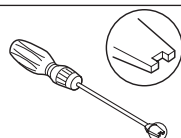
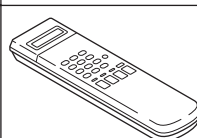
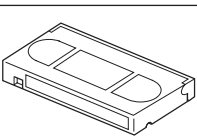
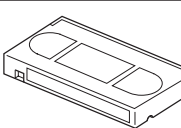
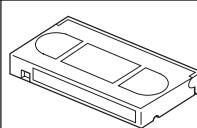
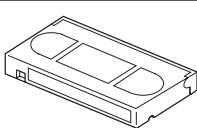
3.1.2 Required test equipments

- Color (colour) television or monitor
- Oscilloscope: wide-band, dual-trace, triggered delayed sweep
- Signal generator: RF / IF sweep / marker
- Signal generator: stairstep, color (colour) bar [PAL/SECAM]
- Recording tape
- Digit-key remote controller(provided)

3.1.3 Required adjustment tools

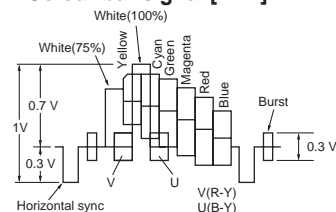
○ : Used --- : Not used

	Mechanism compatibility adjustment	Electrical adjustment
Roller driver	○	---
Jig RCU	---	○
Back tension cassette gauge	○	---
Alignment tape(MHPE)	○	---
Alignment tape(MHPE-L)	○	○
Alignment tape(MHP-L)	---	○

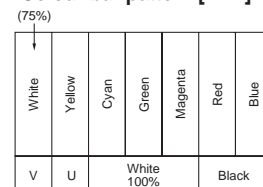
Roller driver PTU94002	Jig RCU PTU94023B	Back tension cassette gauge PUJ48076-2
		
Alignment tape (SP, stairstep, PAL) MHPE	Alignment tape (LP, stairstep, PAL) MHPE-L	Alignment tape (EP, stairstep, NTSC) MHP-L
		

3.1.4 Color (colour) bar signal,Color (colour) bar pattern

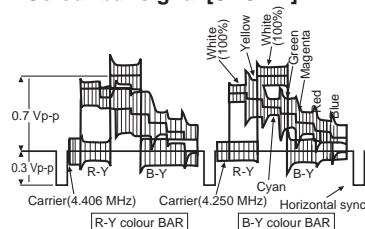
• Colour bar signal [PAL]



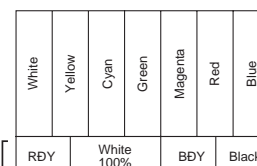
• Colour bar pattern [PAL]



• Colour bar signal [SECAM]



• Colour bar pattern [SECAM]



3.1.5 Switch settings

When adjusting this unit, set the VCR mode and switches as described below.

- When using the Jig RCU, it is required to set the VCR to the Jig RCU mode. (Refer to 2.7 Jig RCU mode.)

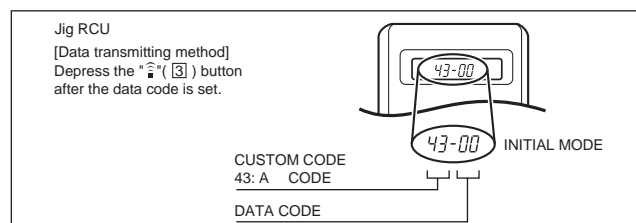


Fig.3-1-5a Jig RCU [PTU94023B]

- Set the switches as shown below unless otherwise specified on the relevant adjustment chart. The switches that are not listed below can be set as desired. If the VCR is not equipped with the functions detailed below, setup is not required.

AUTO PICTURE/VIDEO CALIBRATION/ B.E.S.T./D.S.P.C.	OFF
PICTURE CONTROL/SMART PICTURE	NORMAL/NATURAL
VIDEO STABILIZER	OFF
TBC	ON
Digital 3R	ON
VIDEO NAVIGATION/TAPE MANAGER	OFF
BLUE BACK	OFF

3.1.6 Manual tracking mode (Auto tracking ON/OFF) setting

- (1) In order to set to the manual tracking mode during tape playback, press the "SP/EP(LP)" button on the remote control unit.
 - Each press of the button switches the auto tracking ON or OFF.
 - When the manual tracking mode is set, the tracking is placed at the center position.
- (2) Press "channel +/-" to adjust the tracking manually.

3.1.7 EVR Adjustment

Some of the electrical adjustments require the adjustment performed by the EVR system. The main unit have EEPROMs for storing the EVR adjustment data and user setups.

Notes:

- In the EVR adjustment mode, the value is varied with the channel buttons (+, -). The adjusted data is stored when the setting mode changes (from PB to STOP, when the tape speed is changed, etc.). Take care to identify the current mode of each adjustment item when making an adjustment.
- When changing the address setting in the EVR adjustment mode, use the Jig RCU or the remote controller having numeric keypad with which a numeric code can be directly input.

The remote control code of the Jig RCU corresponds to each of the digit keys on the remote controller as follows.

Digit-key	0	1	2	3	4	5	6	7	8	9
Code	20	21	22	23	24	25	26	27	28	29

- As the counter indication and remaining tape indication are not displayed FDP during the EVR adjustment mode, check them on the TV monitor screen.
- When performing the EVR adjustment, confirm that the FDP indication is changed to the EVR mode, as shown below.

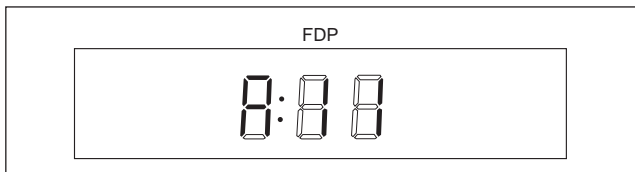


Fig.3-1-7a EVR mode

3.2 Mechanism compatibility adjustment

Notes:

- Although compatibility adjustment is very important, it is not necessary to perform this as part of the normal servicing work. It will be required when you have replaced the A/C head, drum assembly or any part of the tape transport system.
- To prevent damaging the alignment tape in the compatibility adjustment, prepare a cassette tape (for self-recording/playback), perform a test on it by transporting it and making sure that the tape is not bent by the tape transport mechanisms such as in the guide rollers.(See Fig.3-2-2a.)

3.2.1 Tension pole position

Notes:

- This adjustment must be performed every time the tension band is replaced.

Signal (A)	• Back tension cassette gauge [PUJ48076-2]
Mode (B1) (B2)	• PB • Eject end
Adjustment part (F)	• Adjust pin [Mechansim assembly]
Specified value (G)	• 25 - 51 gfcm (2.45 - 5 x 10 ⁻³ Nm)

- (1) Play back the back tension cassette gauge (A).
- (2) Check that the indicated value on the left side gauge is within the specified value (G).
- (3) If the indicated value is not within the specified value (G), perform the adjustment in a following procedure.(See Fig.3-2-1a.)
 - a) Remove the top frame, cassette holder and side frames (L/R) all together. (refer to the SERVICE MANUAL No.86700 [MECHANISM ASSEMBLY].)
 - b) Rotate the loading motor gear to move the control plate so that the triangular stamping to the left of the "P" stamping is aligned with the stamping (a) on the main deck. This positioning is mode (B1).
 - c) Adjust by turning the adjustment pin so that the tip of the tension arm is aligned with the stamping (b) on the main deck.
 - d) Rotate the reel disk (S) by about one turn clockwise and make sure that the round hole of the adjustment pin is located in the "OK" range. If it is outside this range, restart the adjustment from the beginning.

After completion of the adjustment, rotate the loading gear motor to return it to the mode (B2) position.

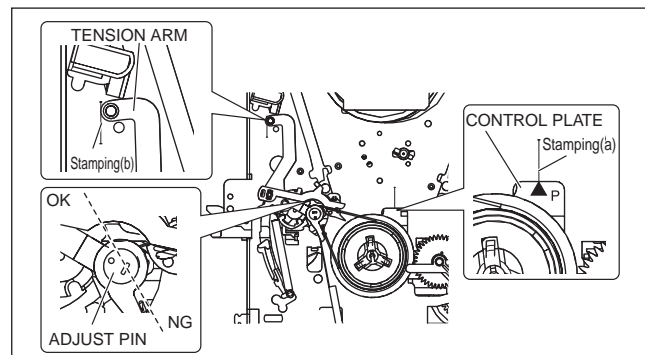


Fig.3-2-1a

3.2.2 FM waveform linearity

Signal	(A1) (A2)	• Alignment tape(SP, stairstep, PAL) [MHPE] • Alignment tape(LP, stairstep, PAL) [MHPE-L]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• Guide roller [Mechanism assembly]
Specified value	(G)	• Flat V.PB FM waveform
Adjustment tool	(H)	• Roller driver [PTU94002]

- (1) Play back the alignment tape (A1).
- (2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
- (3) Set the VCR to the manual tracking mode.
- (4) Make sure that there is no significant level drop of the V.PB FM waveform caused by the tracking operation, with its generally parallel and linear variation ensured. Perform the following adjustments when required. (See Fig. 3-2-2b.)
- (5) Reduce the V.PB FM waveform by the tracking operation. If a drop in level is found on the left side, turn the guide roller of the pole base assembly (supply side) with the roller driver to make the V.PB FM waveform linear. If a drop in level is on the right side, likewise turn the guide roller of the pole base assembly (take-up side) with the roller driver to make it linear. (See Fig. 3-2-2b.)
- (6) Make sure that the V.PB FM waveform varies in parallel and linearly with the tracking operation again. When required, perform fine-adjustment of the guide roller of the pole base assembly (supply or take-up side).
- (7) Unload the cassette tape once, play back the alignment tape (A1) again and confirm the V.PB FM waveform.
- (8) After adjustment, confirm that the tape wrinkling does not occur at the roller upper or lower limits. (See Fig. 3-2-2a.) [Perform adjustment step (9) only for the models equipped with SP mode and EP (or LP) mode.]

[Perform adjustment step (9) only for the models equipped with SP mode and EP (or LP) mode.]

- (9) Repeat steps (1) to (8) by using the alignment tape (A2).

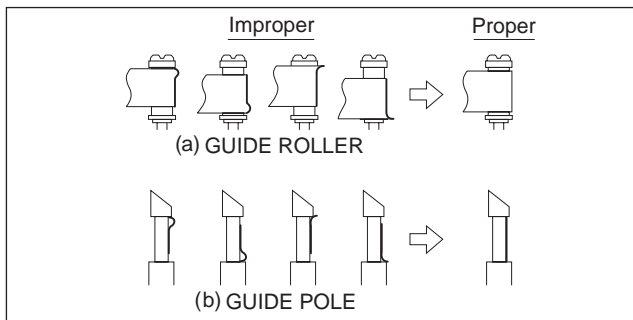


Fig.3-2-2a

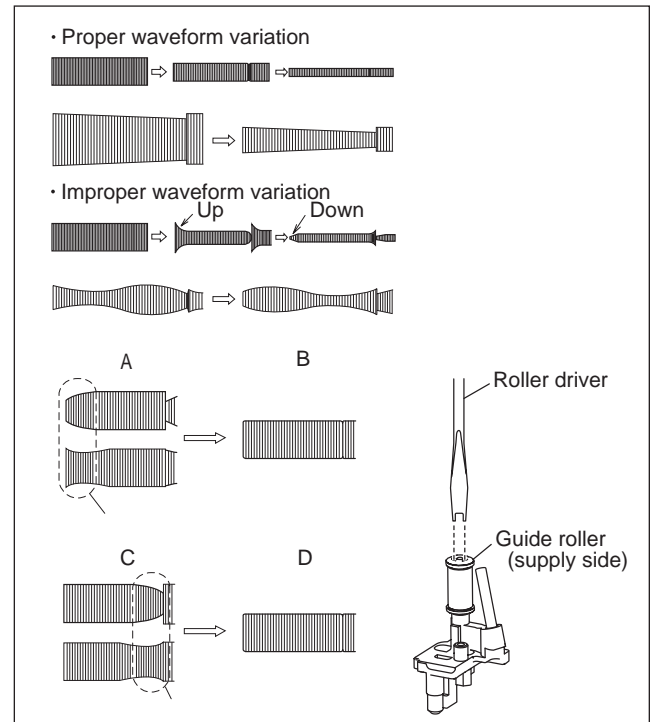


Fig.3-2-2b

3.2.3 Height and tilt of the A/C head

Note:

- **Set a temporary level of the height of the A/C head in advance to make the adjustment easier after the A/C head has been replaced. (Refer to the SERVICE MANUAL No.86700 [MECHANISM ASSEMBLY].)**

Signal	(A)	• Alignment tape(SP, stairstep, PAL) [MHPE]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D1) (D2)	• AUDIO OUT terminal • TP4001 (CTL. P)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• A/C head [Mechanism assembly]
Specified value	(G)	• Maximum waveform

- (1) Play back the alignment tape (A).
- (2) Apply the external trigger signal to D.FF (E), to observe the AUDIO OUT waveform and Control pulse waveform at the measuring points (D1) and (D2) in the ALT mode.
- (3) Set the VCR to the manual tracking mode.
- (4) Adjust the AUDIO OUT waveform and Control pulse waveform by turning the screws (1), (2) and (3) little by little until both waveforms reach maximum. The screw (1) and (3) are for adjustment of tilt and the screw (2) for azimuth.

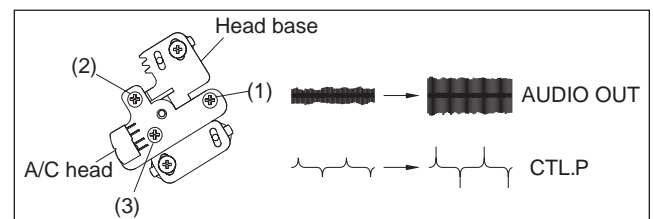


Fig.3-2-3a

3.2.4 A/C head phase (X-value)

Signal	(A1) (A2)	• Alignment tape(SP, stairstep, PAL) [MHPE] • Alignment tape(LP,stairstep,PAL) [MHPE-L]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB, FM)
External trigger	(E)	• TP111 (D,FF)
Adjustment part	(F)	• A/C head base [Mechanism assembly]
Specified value	(G)	• Flat V.PB FM waveform
Adjustment tool	(H)	• Roller driver [PTU94002]

- Play back the alignment tape (A1).
- Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
- Set the VCR to the manual tracking mode.
- Loosen the screws (4) and (5), then set the Roller driver to the innermost projected part of the A/C head. (See Fig. 3-2-4a.)
- Rotate the roller driver so that the A/C head comes closest to the capstan. From there, move the A/C head back gradually toward the drum until the point where the FM waveform is maximized for the second time, and then tighten the screws (4) and (5) temporarily.
- Play an alignment tape (A2) and set to the manual-tracking mode.
- Fine-adjust A/C head base position to maximize the FM waveform, and then tighten the screws (4) and (5) firmly.
- Play alignment tapes (A1) and (A2) and confirm that the FM waveforms are maximized when the tracking is at the center position.

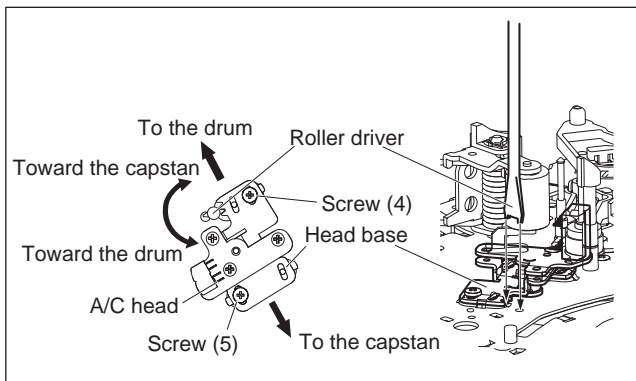


Fig.3-2-4a

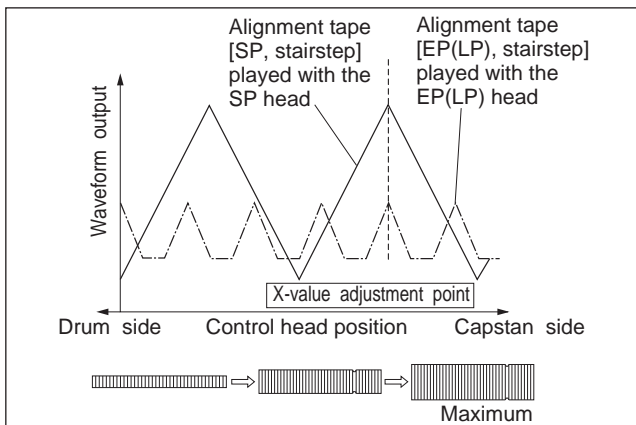


Fig.3-2-4b

3.3 Electrical adjustment

Note:

The following adjustment procedures are not only necessary after replacement of consumable mechanical parts or board assemblies, but are also provided as references to be referred to when servicing the electrical circuitry.

In case of trouble with the electrical circuitry, always begin a service by identifying the defective points by using the measuring instruments as described in the following electrical adjustment procedures. After this, proceed to the repair, replacement and/or adjustment. If the required measuring instruments are not available in the field, do not change the adjustment parts (variable resistor, etc.) carelessly.

3.3.1 Servo circuit

3.3.1.1 Switching point

Signal	(A1) (A2)	• Stairstep signal • Alignment tape(LP,stairstep,PAL) [MHPE-L]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• VIDEO OUT terminal (75 ohm terminated) • TP106 (PB, FM)
External trigger	(E)	• TP111 (D,FF)
Adjustment part	(F)	• Jig RCU: Code "5A"
Specified value	(G)	• $7.5 \pm 0.5H$
Adjustment tool	(H)	• Jig RCU [PTU94023B]

- Play back the signal (A1) of the alignment tape (A2).
- Apply the external trigger signal to D.FF (E) to observe the VIDEO OUT waveform and V.PB FM waveform at the measuring points (D1) and (D2).
- Set the VCR to the manual tracking mode.
- Adjust tracking so that the V.PB FM waveform becomes maximum.
- Set the VCR to the Auto adjust mode by transmitting the code (F) from the Jig RCU. When the VCR enters the stop mode, the adjustment is completed.
- If the VCR enters the eject mode, repeat steps (1) to (5) again.
- Play back the alignment tape (A2) again, confirm that the switching point is the specified value (G).

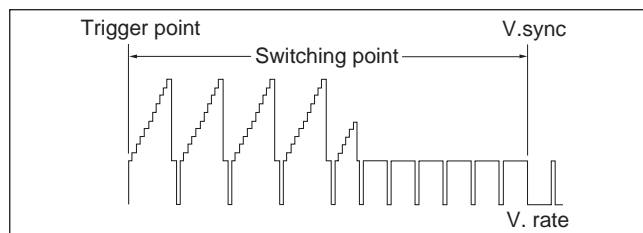


Fig.3-3-1a Switching point

3.3.1.2 Slow tracking preset

Signal	(A1) (A2) (A3)	• Ext. input • Color (colour) bar signal [PAL] • Color (colour) bar signal [NTSC]
Mode	(B1) (B2)	• S-VHS SP • S-VHS LP/EP
Measuring point	(D)	• TV-Monitor
Adjustment part	(F)	• Jig RCU: Code "71" or "72"
Specified value	(G)	• minimum noise
Adjustment tool	(H)	• Jig RCU [PTU94023B]

- (1) Record the signal (A2) in the mode (B1), and play back the recorded signal.
- (2) Set the VCR to the manual tracking mode.
- (3) Set the VCR to the FWD slow (+1/6x) mode.
- (4) Transmit the code (F) from the Jig RCU to adjust so that the noise bar becomes the specified value (G) on the TV monitor in the slow mode.
- (5) Set the VCR to the Stop mode.
- (6) Confirm that the noise bar is (G) on the TV monitor in the slow mode.
- (7) Repeat steps (3) to (6) in the REV slow (-1/6x) mode.
- (8) Repeat steps (1) to (7) in the mode (B2).
- (9) Repeat steps (1) to (8) in the signal (A3).

Note:

- For FWD slow (+1/6x) playback, transmit the code “08” from the Jig RCU to enter the slow playback mode, and transmit the code “D0” for REV slow (-1/6x) mode.

3.3.2 Video circuit

3.3.2.1 EE Y/PB Y (S-VHS/VHS) level

Signal	(A1) (A2) (A3)	• Ext. S-input • Ext. input • Color (colour) bar signal [PAL]
Mode	(B1) (B2) (B3)	• EE SP • S-VHS SP • VHS SP
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• Y OUT terminal
EVR mode	(F1)	• Jig code “57”
EVR address	(F2) (F3) (F4)	• A : 11 • Jig code “21” twice • Jig code “18” or “19” (Channel +/-)
Specified value	(G)	• 1.00 ± 0.05 Vp-p (75 ohm terminated)
Adjustment tool	(H)	• Jig RCU [PTU94023B]

- (1) Input the signal (A3) from the input point (A1).
- (2) Set the VCR to the mode (B1).
- (3) Observe the Y OUT waveform at the measuring point (D).
- (4) Set the VCR to the EVR mode by transmitting the code (F1) from the Jig RCU.
- (5) Set the EVR address to (F2) by transmitting the code (F3) from the Jig RCU.
- (6) Transmit the code (F4) from the Jig RCU to adjust so that the Y level of the Y OUT waveform becomes the specified value (G).
- (7) Release the EVR mode of the VCR by transmitting the code (F1) from the Jig RCU again. (When the EVR mode is released, the adjusted data is memorized.)
- (8) Input the signal (A3) from the input point (A2).
- (9) Repeat steps (3) to (7) in the mode (B1).
- (10) Record the signal (A3) in the mode (B2), and play back the recorded signal.
- (11) Set the VCR to the manual tracking mode.
- (12) Repeat steps (3) to (7) in the mode (B2).
- (13) Record the signal (A3) in the mode (B3), and play back the recorded signal.
- (14) Set the VCR to the manual tracking mode.
- (15) Repeat steps (3) to (7) in the mode (B3).

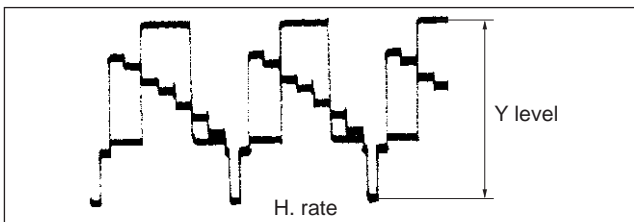


Fig.3-3-2a EE Y/PB Y level

3.3.3 Syscon circuit [EK/EX MODEL]

Notes:

- When perform this adjustment, remove the Mechanism assembly.

3.3.3.1 Timer clock

Signal	(A1)	• No signal
Mode	(B)	• EE
Equipment	(C)	• Frequency counter
Measuring point	(D1) (D2) (D3)	• IC3001 pin 44 • IC3001 pin 103 • C3054 + and -
Adjustment part	(F)	• C3025 (TIMER CLOCK)
Specified value	(G1)	• 1024.008 ± 0.001 Hz (976.5549 ± 0.0010 usec)

- (1) Connect the frequency counter to the measuring point (D1).
- (2) Connect the short wire between the short point (D2) and Vcc (5V).
- (3) Short the leads of capacitor (D3) once in order to reset the microprocessor of the Syscon.
- (4) Disconnect the short wire between the short point (D2) and Vcc then connect it again.
- (5) Adjust the Adjustment part (F) so that the output frequency becomes the specified value (G).

3.3.4 Audio circuit

Notes:

- GND (Ground) should be taken from the Tuner shield case.

3.3.4.1 Audio REC FM

Signal	(A1) (A2) (A3)	• Ext. input • Audio: No signal • Video: Color (colour) bar signal [PAL]
Mode	(B)	• S-VHS LP
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP2253 (A. PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(H)	• VR2251
Specified value	(G1) (G2)	• 600 ± 100 mVp-p • More than 400 mVp-p

- (1) Apply the external trigger signal to D.FF (E) to observe the Audio PB FM waveform at the measuring point (D).
- (2) Record the signal (A3) with no audio signal input in the mode (B), and play back the recorded signal.
- (3) Set the VCR to the manual tracking mode.
- (4) If the A.PB FM level is not within the specified value (G1), perform the adjustment in a following procedure.
- (5) Adjust the adjustment part(F) so that the A. PB FM level of the higher channel level becomes the specified value(G1). (Adjust before recording, then confirm it by playing back.)
- (6) If specified value(G1) is not obtained, adjust the Adjust-ment part(F) so that the waveform level of the lower chan-nel level becomes the specified value(G2).(Adjust before recording, then confirm it by playing back.)

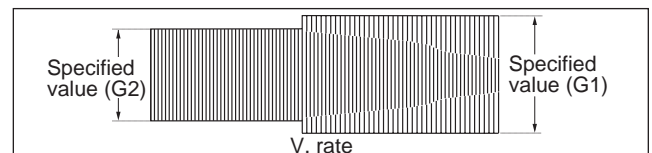


Fig.3-3-4a Audio REC FM

JVC

VICTOR COMPANY OF JAPAN, LIMITED

AV & MULTIMEDIA COMPANY VIDEO RECORDER CATEGORY 12, 3-chome, Moriya-cho, kanagawa-ku, Yokohama, kanagawa-prefecture, 221-8528, Japan

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