SONY

DIGITAL VIDEOCASSETTE RECORDER

DSR-2000
DSR-2000P

i.LINK/DV INPUT/OUTPUT BOARD

DSBK-190

REMOTE CONTROL PANEL

DSBK-200

SERVICE MANUAL

Volume 1 1st Edition (Revised 1)

DVCAM™

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Für Kunden in Deutschland

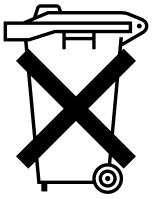
Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert “Batterie leer” oder nach längerer Gebrauchsdauer der Batterien “nicht mehr einwandfrei funktioniert”. Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

Voor de klanten in Nederland

Dit apparaat bevat een MnO_2-Li batterij voor memory back-up.

Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.

Gooi de batterij niet weg. maar lever hem in als KCA.



Bij dit produkt zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

Table of Contents

Manual Structure

1. Operating Instructions

2. Installation

3. Service Overview

4. Error Messages

5. Maintenance Menu

6. Periodic Inspection and Maintenance

7. Replacement of Mechanical Parts

8. Tape Path Alignment

9. Adjustment When Replacing Board

10. Electrical Alignment

Manual Structure

Purpose of this manual

This manual is the Service Manual Volume 1 for the digital videocassette recorder DSR-2000/2000P, the option boards i.LINK/DV Input/Output Board DSBK-190 and optional Remote Control Panel DSBK-200.
This manual contains the maintenance information of this equipment, and servicing information necessary for parts replacement and adjustments.

Related manuals

In addition to this Service Manual Volume 1, the following manuals are provided.

- **Operation Instructions**
  DSR-2000/2000P (Supplied with equipment)
  Part number: 3-867-754-12 (English; for UC, CE)
  3-867-754-22 (French; for UC, CE)
  3-867-754-32 (German; for CE)
  3-867-754-42 (Italian; for CE)

  DSBK-190 (Supplied with Model DSBK-190)
  Part number: 3-203-674-01

  DSBK-200 (Supplied with Model DSBK-200)
  Part number: 3-203-675-01

  DSBK-210 (Supplied with Model DSBK-210)
  Part number: 3-205-213-01 (1)

- **Service Manual Volume 2 (Not Supplied with equipment)**
  Contains the semiconductor pin assingnments, parts lists, block diagrams, board layouts and schematic diagrams.
  Part number: 9-955-186-22

- **DSBK-210**
  Service Manual (Not Supplied with equipment)
  Contains the maintenance information of the DSBK-210, and servicing information necessary for parts replacement and adjustments.
  Part number: 9-955-268-01

- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in B&P Company equipment.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the service manual for the corresponding unit. The service manual contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Contents

The following is a summary of all the sections for understanding the contents of this manual.

Section 1 Operating Instruction
Describes the contents of the operating instructions.

Section 2 Installation
This section is described in Installation Manual.

Section 3 Service Overview
Describes the replacement of the parts, the locations of the main parts and boards, notes and so on.

Section 4 Error Messages
Describes the alarms and countermeasures to be displayed when the unit detects abnormality.

Section 5 Maintenance Menu
Describes the maintenance menu.

Section 6 Periodic Inspection and Maintenance
Describes the periodic inspection and cleaning procedure.

Section 7 Replacement of Mechanical Parts
Describes the replacement procedures and adjustment after replacement.

Section 8 Tape Path Alignment
Describes the adjustment procedures of tape path system.

Section 9 Electrical Alignment After Replacement Boards
Describes the electrical adjustments after replacement boards.

Section 10 Electrical Alignment
Describes the electrical adjustment of each board.

Section 1
Operating Instructions

This section is extracted from operation manual.

1-1. DSR-2000

3-867-754-12(1)

SONY

Digital Videocassette Recorder

Operating Instructions
Before operating the unit, please read this manual thoroughly and retain it for future reference.

DVCAM

DSR-2000/2000P

I

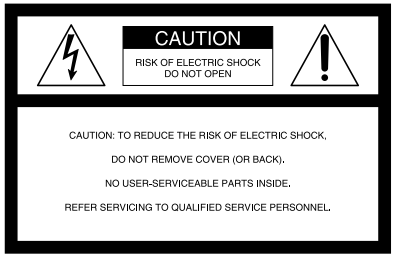
Owner's Record

The model and serial numbers are located in the rear. Record these numbers in the spaces provided below. Refer to them whenever you call upon your Sony dealer regarding this product.

Model No._____ Serial No._____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

Caution

Television programs, films, video tapes and other materials may be copyrighted.
Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

For the customers in Europe (DSR-2000P only)

This product with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.
Compliance with these directives implies conformity to the following European standards:
• EN60065: Product Safety
• EN55103-1: Electromagnetic Interference (Emission)
• EN55103-2: Electromagnetic Susceptibility (Immunity)
This product is intended for use in the following Electromagnetic Environment(s):
E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Table of Contents

Table of Contents

Chapter 4

Editing

Chapter 5

ClipLink Operation

Chapter 6

Setup Menu

Table of Contents

Chapter 1

Overview

Features

The DSR-2000/2000P is a 1/4-inch digital videocassette recorder using the DVCAM™ digital recording format. It uses a component video system, with separate luminance and chrominance signals and digital processing to realize a stable, high image quality.
This unit is equipped with a variety of functions needed for videocassette recorders and players used in video editing. By combining two units, you can easily assemble a cut editing system. It is also equipped with full-fledged analog and digital interfaces to support hybrid systems that combine conventional analog equipment with digital equipment. Furthermore, it supports the Sony-developed ClipLink™ function, improving operating efficiency when combined with a Sony EditStation™.
The following are the principal features of the unit.

DVCAM Format

DVCAM is a professional 1/4-inch digital recording format developed by Sony from the consumer DV component digital format (4:1:1 for DSR-2000/4:2:0 for DSR-2000P).

High image quality and high stability

The luminance and chrominance signals are encoded separately, with a 1/5 compression, giving a stable high quality video image.
Since this is a digital system, nth-generation copies created by repeated dubbing show virtually no loss in picture quality.

Wide track

The recording track width is 15 µm, 50% wider than the 10 µm of the DV format. This ensures adequate reliability for professional use.

PCM digital audio for high sound quality

The PCM encoding method yields a high audio quality, with wide dynamic range and high signal-to-noise ratio.
There are two recording modes: two-channel mode (48-kHz sampling and 16-bit quantization), which offers sound quality equivalent to the DAT (Digital Audio Tape) format, or four-channel (32-kHz sampling and 12-bit quantization).

Playback compatibility with DV and DVCPRO formats

A DV cassette recorded on a DV format VCR as well as a DVCPRO(25M) format recorded cassette can be played back on this unit.

Note

When playing back a tape recorded in DVCPRO (25M) format, the SDTI and i.LINK outputs (*see the section "Digital interfaces" on the next page*) of this unit are muted. Furthermore, it is not possible to playback the cue-audio track of the tape.

Features

Support for three cassette sizes

There are two sizes of DVCAM cassette: standard and mini. You can use either size with this unit.
The unit also accepts L and M sizes of DVCPRO cassette.
- The reel mechanism automatically adjusts to the size of cassette inserted.
- The capacity of a standard cassette is 184 minutes of recording/playback, and that of a mini cassette is 40 minutes.

Variety of Interfaces

Digital interfaces

The unit can use the following digital interfaces.
- **SDTI (QSDI)**[1]
  This interface allows video, audio and time code signals in SDTI (QSDI) format to be transferred at normal speed between this unit and the ES-7 EditStation. When this unit is connected to another DVCAM VCR, it is possible to copy compressed signals between the two VCRs.
- **SDI**[2]
  This interface allows the unit to input or output D1 (component) digital video and audio signals.
- **AES/EBU**
  This interface allows the unit to input or output digital audio signals in AES/EBU format.
- **i.LINK (DV)**[3] **(Optional DSBK-190 i.LINK/DV Input/Output Board)**
  When the unit is fitted with the optional DSBK-190 i.LINK/DV Input/Output Board using i.LINK technology, it can input and output digital video and audio signals in DV format.
- **SDTI-CP output (Optional DSBK-210 SDTI-CP Output Board)**
  This interface allows the unit to provide an output of I-frame pictures only (50/40/30 Mbps) complying to MPEG2 4:2:2 Profile @Main Level. You can connect the unit to an MPEG supporting device equipped with an SDTI-CP input.

Note
You cannot install both of the DSBK-190 and DSBK-210 on the unit at a time.

Analog interfaces

A wide range of analog interfaces is provided, allowing this unit to be connected to various video and audio devices.
- **Analog video:** Composite, component and S-video interfaces are provided.
- **Analog audio:** There are four input channels and four output channels. There is also support for microphone input.

Connection to external control devices

It is possible to connect a PVE-500, RM-450/450CE, FXE-100/100P/120/120P, BVE-900/910/2000/9000/9000P/9100/9100P or other editor equipped with an RS-422A interface, or a UVR-60/60P remote controller for the built-in digital video processor, and so forth.

Full Functionality for More Efficient Editing

This unit has a number of functions which assist in efficient and precise editing.
With two DSR-2000/2000P units together, you can carry out automatic or manual editing, using either assemble or insert editing.
The system also provides a powerful range of functions for setting and amending edit points, preview, review, and other aspects of efficient editing.

DMC (dynamic motion control) editing

You can save a varying speed, in the range –1 to +1 times normal speed[4], for an editing segment, and automatically edit with this varying speed.

Split editing

In insert editing, this allows the audio IN and OUT points to be set separately from the video IN and OUT points.

Preread editing

The audio or video on the tape can be read out using the preread heads. The signals then can be processed and rerecorded where they have been.

Cross-fade editing

For audio editing, you can select from cut-in editing, fade-in/fade-out editing, and cross-fade editing.

Support for ClipLink function

This unit accepts instructions from an EditStation, to transfer to the EditStation ClipLink log data held in the cassette memory or index pictures recorded on the tape. On the EditStation you can use these images and data to carry out editing operations efficiently.

- Displaying ClipLink log data
- Changing ClipLink log data OK/NG status
- Cuing up to Mark IN and cue points provided by ClipLink log data
- For cut editing, copying Mark IN data from ClipLink log data

For an overview of the ClipLink function, see the appendix "ClipLink Guide" (page 147).

Internal time code generator and reader

An internal timecode generator and reader enables timecode compliant with SMPTE/EBU format to be recorded and played back. This allows editing to single frame precision.
Outputting or inputting timecode (LTC) to or from an external device is also possible using the TIME CODE IN/OUT connectors.
The unit is also compatible with VITC.

High-speed search function

You can carry out a picture search while playing back in color within the range +60 to –60 times normal speed.
When controlling the unit in shuttle mode from an editor or remote control unit, you can search at any speed in the range +60 to –60 times normal speed. In jog mode a frame by frame search is possible. During playback in the range +10 to –10 times normal speed, high-speed audio playback is also possible.

Digital slow motion playback

Using the frame memory function, noiseless slow motion playback is possible at any speed in the range +1 to –1 times normal speed.

Digital jog sound function

When searching at speeds in the range +1 to $+^{1}/_{30}$ or $-^{1}/_{30}$ to –1 times normal speed, the digital jog sound function is enabled. The audio signal is saved in temporary memory, and replayed according to the search speed. This allows searching on the sound track.

Video process control

For analog video output and SDI-format video output, you can adjust the video output level, chroma signal output level, setup level (for DSR-2000), black level (for DSR-2000P), and chroma phase.

1) SDTI (QSDI): SDTI (Serial Data Transport Interface) is the name of a standard interface established as SMPTE 305M.
This unit uses SDTI to transmit DV data, and the input/output connectors are labled "SDTI(QSDI)".
In indicator and menu indications, however, the "SDTI(QSDI)" name is shortened to "SDTI".

2) SDI: Serial Digital Interface is used for transferring video signals in component digital format (D1).

3) i.LINK is a trademark of Sony Corporation and indicates that this product is in agreement with IEEE1394-1995 specifications and their revisions.

4) The positive direction refers to forward movement of the tape, and the negative direction to reverse movement.

Other Features

Menu operations for functions and operating settings

To make it easier to use this unit for any particular purpose, various functions and operating settings are provided in the menu system.

Superimposing function

Timecode, operating mode, error messages, and other text information, can be superimposed on the SDI video signal and analog composite video signal output.

Functions for easy maintenance

- **Self-diagnosis and alarm function:** This automatically detects incorrect operations or connections, operating faults, and so forth, and displays details of the problem, the cause, and the action to be taken, in the control panel display section.
- **Digital hours meter:** This keeps four cumulative counts of the powered on time, the drum rotation time, the tape transport time, and the number of tape threadings and unthreadings, and displays them in the control panal display section.

Compatible with wide screen aspect ratio (16:9)

The unit can record and play back aspect ratio information. When video accompanied by wide-screen aspect ratio information is recorded or played back, the unit can output the video signal also containing the aspect ratio information.

Rack mountable

Using the optional RMM-130 Rack Mount Kit, you can mount the unit in an EIA standard 19-inch rack (height: 4 units).

Options

DSBK-190 i.LINK/DV Input/Output Board

This board enables cut editing between two DSR-2000/2000P units. It also allows you to connect the unit to other equipment provided with a Sony DV connector to carry out editing or dubbing of digital video and audio signals.

DSBK-200 Control Panel

When connected to the unit, you can operate the unit remotely from the DSBK-200.

RMM-130 Rack Mount Kit

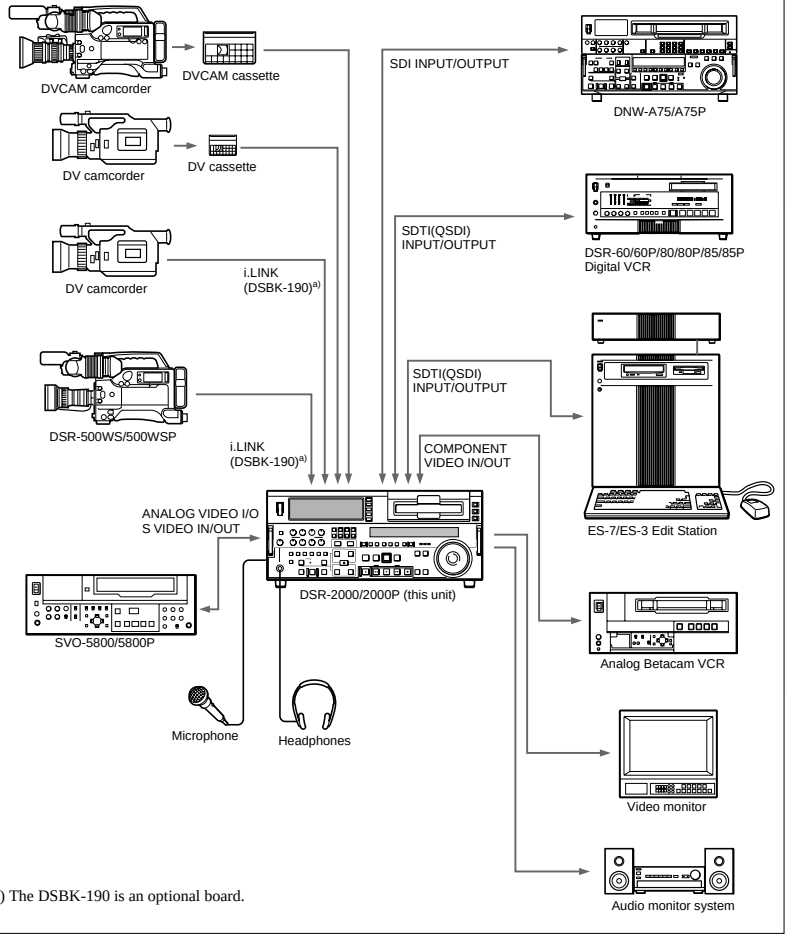
This kit can be used to mount the unit in an EIA-standard 19-inch rack.

DSBK-210 SDTI-CP Output Board

This board enables the unit to be connected to an MPEG supporting device (MSW-2000, MAV-555, and so on).

System Configuration

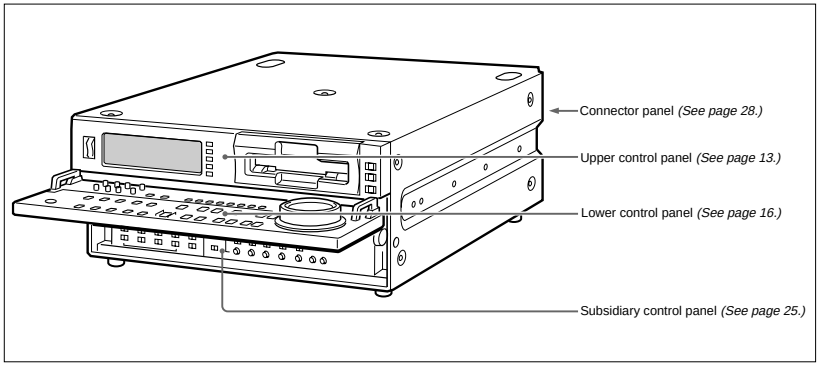
The figure below shows example equipment that can be connected to this unit.



a) The DSBK-190 is an optional board.

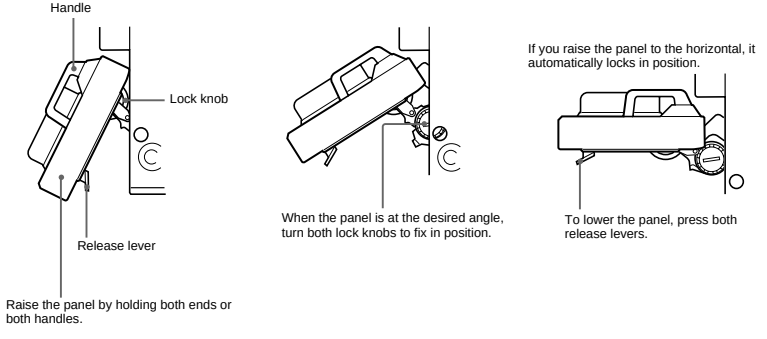
Location and Function of Parts

There are four control panels as shown in the figure below.



To adjust the position of the lower control panel

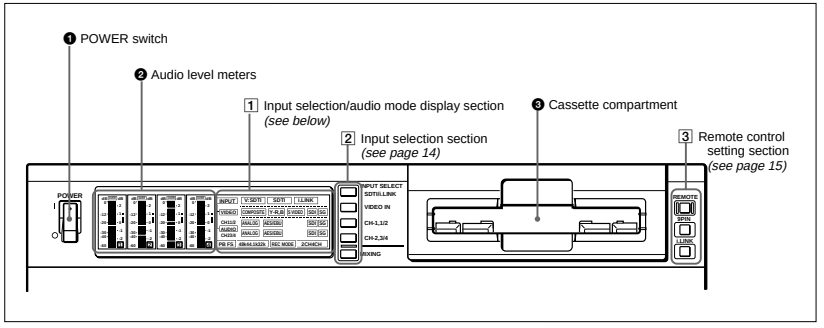
You can fix the lower control panel in any position between vertical and horizontal for ease of operation.



To fix the panel at an angle where the lock knobs are inaccessible

❶ First position the panel at the desired angle, then without tightening the lock knobs, press the release levers and raise the panel to the horizontal.
❷ With the panel horizontal, tighten the lock knobs, then press the release levers and return the panel to the desired position, where it will lock into place.

Upper Control Panel



❶ POWER switch

Press the "I" side to power the unit on. When the unit is powered on, the display windows in the upper and lower control panels light.
To power the unit off, press the "O"side of the switch.

❷ Audio level meters

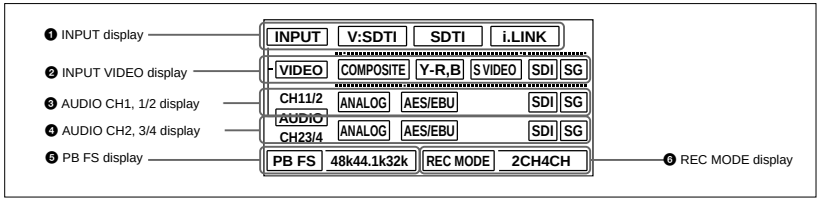
These show the audio levels of channels 1 to 4 (recording levels in recording mode or E-E mode[1] and playback level in playback mode).
There are two modes for audio level indications: FULL and FINE, selected by the METER FULL/FINE button on the lower control panel.

❸ Cassette compartment

Accepts DVCAM, DV and DVCPRO(25) videocassettes.

For details of usable cassettes, see page 33.

1 Input selection/audio mode display section



1) E-E mode: Abbreviation of "Electric-to-Electric mode". In this mode, video and audio signals input to the VCR are output after passing through internal electric circuits, but not through magnetic conversion circuits such as heads and tapes. This can be used to check input signals and for adjusting input signal levels.

❶ INPUT display
Indicates the input signal selected with the SDTI/i.LINK button in the input selection section.
V:SDTI: Digital video signal in SDTI(QSDI) format
In this mode, you can select any audio input, though the video signal is recorded with a delay of two frames with respect to the audio input.
SDTI: Digital video and audio signals in SDTI(QSDI) format
i.LINK: Digital video and audio signals in DV format, using i.LINK technology

❷ INPUT VIDEO display
Indicates the input video signal selected with the VIDEO IN button in the input selection section.
COMPOSITE: Composite video signal
Y-R, B: Y, R–Y and B–Y component video signals
S VIDEO: S-video signal
SDI: SDI video signal
SG: Video test signal

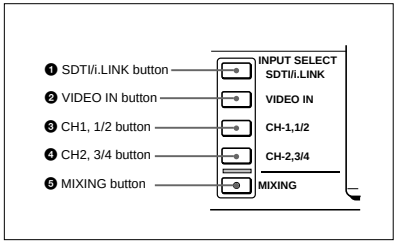
❸ AUDIO CH1, 1/2 display
Indicates the input audio signal selected with the CH1, 1/2 button in the input selection section.
ANALOG: Analog audio signal
AES/EBU: Digital audio signal in AES/EBU format
SDI: SDI audio signal
SG: Audio test signal

❹ AUDIO CH2, 3/4 display
Indicates the input audio signal selected with the CH2, 3/4 button in the input selection section. The indications available are the same as for the AUDIO CH1, 1/2 display described above.

❺ PB FS (playback audio sampling frequency) display
Indicates the sampling frequency (48 kHz, 44.1 kHz or 32 kHz) at which audio is recorded on tape.

❻ REC MODE (audio recording mode) display
Indicates the audio recording mode (2CH or 4CH) selected with extended menu item 818.

2 Input selection section



❶ SDTI/i.LINK (SDTI(QSDI) interface/i.LINK selection) button
Each press of this button cycles through the following input signal selection options.
- Digital video signal in SDTI(QSDI) format input to the SDTI(QSDI) INPUT connector
  When this is selected, use the CH1, 1/2 button and CH2, 3/4 button to select the required input audio signals.
- Digital video and audio signals in SDTI(QSDI) format input to the SDTI(QSDI) INPUT connector
- Digital video and audio signals in DV format, using i.LINK technology, input to the i.LINK connector (available when the optional DSBK-190 i.LINK/DV Input/Output Board is installed)

In the input selection/audio mode display section, the INPUT display shows the selection made with this button.

❷ VIDEO IN button
Each press of this button cycles through the following input video signal selection options.
- Composite video signal input to the VIDEO IN connectors.
- Component video signals input to the COMPONENT VIDEO Y/R–Y/B–Y IN connectors
- S-video signal input to the S VIDEO IN connector
- SDI video signal input to the SDI INPUT connector
- Video test signal (selected with extended menu item 710) generated by the internal signal generator

In the input selection/audio mode display section, the INPUT VIDEO display shows the selection made with this button.

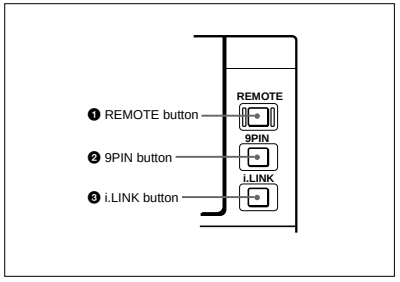
❸ CH1, 1/2 (audio channel 1 or 1/2) button
Each press of this button cycles through the following input audio signal selection options for audio channel 1 (when in 2-channel mode) or for audio channels 1 and 2 (when in 4-channel mode).
- Analog audio signal(s) input to the AUDIO IN CH-1 connector (when in 2-channel mode) or AUDIO IN CH-1 and CH-2 connectors (when in 4-channel mode).
- Digital audio signal in AES/EBU format input to the DIGITAL AUDIO (AES/EBU) CH-1/2 connector
- SDI audio signal input to the SDI INPUT connector
- Audio test signal (selected with extended menu item 808) generated by the internal signal generator

In the input selection/audio mode display section, the AUDIO CH1, 1/2 display shows the selection made with this button.

❹ CH2, 3/4 (audio channel 2 or 3/4) button
Each press of this button cycles through the input audio signal selection options for audio channel 2 (when in 2-channel mode) or for audio channels 3 and 4 (when in 4-channel mode) The input audio signal selection options corresponding to those for the CH1, 1/2 button described above are available.
In the input selection/audio mode display section, the AUDIO CH2, 3/4 display shows the selection made with this button.

❺ MIXING (mixing setting on/off) button
This enables (ON) or disables (OFF) the setting for audio input mixing made with extended menu item 819.
If the selected signal (except for analog audio) is not supplied to the appropriate connector, the corresponding indicator in the input selection/audio mode display section flashes.

3 Remote control setting section

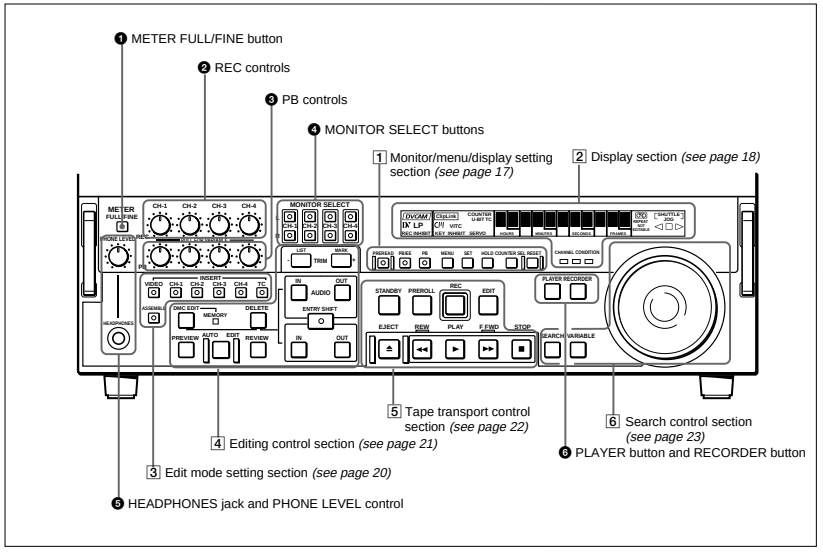


❶ REMOTE button
When remote-controlling this unit from the unit connected to the REMOTE-IN, REMOTE-OUT or i.LINK connector, press this button, turning it on.

❷ 9PIN button
When carrying out remote control between this unit and the unit connected to the REMOTE-IN or REMOTE-OUT connector, press this button, turning it on.

❸ i.LINK button
When carrying out remote control between this unit and the unit connected to the i.LINK connector, press this button, turning it on.
This button is effective only when the optional DSBK-190 i.LINK/DV Input/Output Board is installed.

Lower Control Panel



❶ METER FULL/FINE button
This switches the display mode of the audio level meters in the upper control panel as follows:

FULL: In this mode the segment of the display corresponding to the current audio level and all lower segments light. A marker indicating the reference level (set with extended menu item 811) also appears.

FINE: The display is enlarged, with a step of 0.25 dB with respect to the reference level of 0 dB. In this mode only the segment of the display corresponding to the current audio level lights. If the audio level exceeds the maximum display level, the top segment flashes, and if the audio level goes below the minimum display level, the bottom segment flashes.

❷ REC (recording) controls
These individually adjust the recording levels on channels 1 to 4.
To set the recording level, put the unit in E-E mode, pull out the control knobs and adjust the level while watching the level meters.
When the control knobs are pushed in, the recording levels return to the preset levels and cannot be adjusted.

For details of selecting the E-E mode, see the description of the REC button in the tape transport control section (see page 22) and the PB/EE button in the monitor/menu/display setting section (see page 17).

❸ PB (playback) controls
These adjust individually the playback levels on channels 1 to 4.
During playback, pull out the control knobs and adjust the level while watching the level meters.
When the control knobs are pushed in, the playback levels return to the preset levels, and cannot be adjusted.

❹ MONITOR SELECT buttons
There are four buttons CH-1 to CH-4 (channels 1 to 4) in each of the upper (L) and lower (R) rows. Use these buttons to select the channels for audio output via the HEADPHONES connector on the lower control panel and the MONITOR AUDIO connector on the connector panel.
The HEADPHONES connector outputs stereo sound (L and R) and the MONITOR AUDIO connector outputs monaural sound (L and R mixed).
You can select two or more channels in either row by pressing the buttons for the desired channels simultaneously. The sounds of the channels selected in the row are mixed.
In 2-channel audio recording mode (selected with extended menu item 818), it is possible to use the AUDIO OUT CH-3 and AUDIO OUT CH-4 connectors for monitor audio output for channels 1 and 2, respectively (use extended menu item 820).

❺ HEADPHONES jack and PHONE LEVEL control
Connect stereo headphones with an impedance of 8 ohms to monitor the sound during recording, playback and editing.
The PHONE LEVEL control knob adjusts the volume.

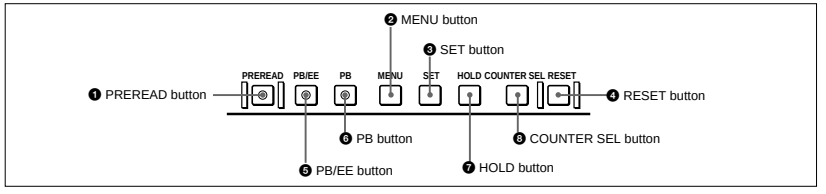
❻ PLAYER button and RECORDER button
When you carry out editing using a VCR connected to the REMOTE-IN or REMOTE-OUT connector as the player and this unit as the recorder, these buttons select which VCR the editing control buttons and tape transport buttons on this unit control.

PLAYER: The editing control buttons and tape transport buttons on this unit control the external player VCR.

RECORDER: The editing control buttons and tape transport buttons on this unit control the recorder (this unit).

When this unit is being used in standalone mode, neither button functions.

1 Monitor/menu/display setting section



❶ PREREAD button
When this is lit, a preread (read-before-write) is carried out in insert editing.

For details of preread editing, see the section "Preread Editing" (page 87).

❷ MENU button
Use this button for setup menu operations.
Pressing this button, turning it on, shows setup menus in the time counter display *(see page 18)*.
Press the button once more to exit from the menu display.

For details of setup menu operations, see Chapter 6 "Setup Menu" (page 107).

❸ SET button
Use this button for setting time code and user bit values and in setup menu operations.

For details of setting time code and user bit values see Chapter 2 "Setting/Displaying Time Data and Text Information" (page 35).

❹ RESET button
To reset a time counter value (COUNTER) shown in the time counter display, press this button.
Resetting the COUNTER value erases all edit points.
This button is also used for setting time code and user bit values and in setup menu operations.

❺ PB/EE (playback/E-E) button
To select E-E mode input signals for the video/audio signals output during fast forward, rewind, still, and standby, press this button, turning it on.
Either one of this button and the PB button is always lit.

❻ PB (playback) button
To select playback signals for the video/audio signals output during fast forward, rewind, still, and standby, press this button, turning it on.
Either one of this button and the PB/EE button is always lit.

❼ HOLD button
To stop updating of the time code or user bit value in the time counter display (that is, to hold the display), press this button, turning it on. To set a time code or user bit value, first press this button to hold the value.

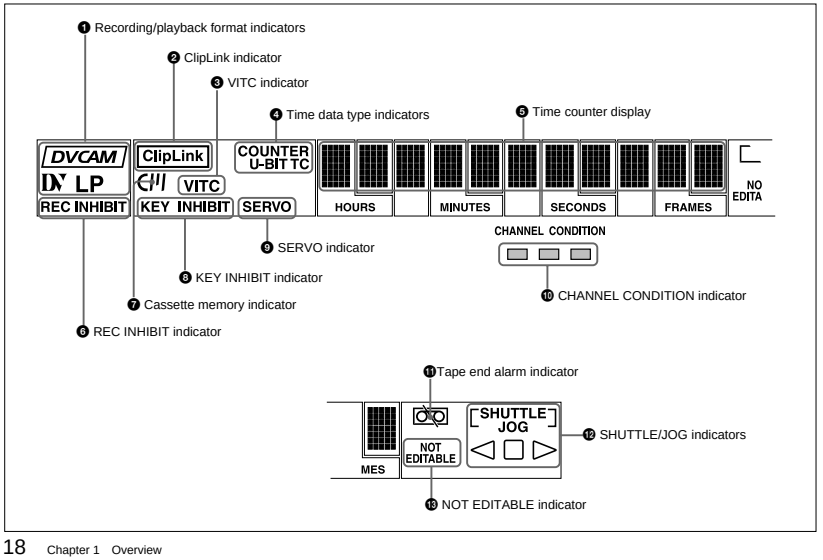
❽ COUNTER SEL (select) button
This switches the value shown in the time counter display in the following sequence: COUNTER, TC, U-BIT.

Time counter display selection

Selection	Value displayed
COUNTER	Tape running time (hours, minutes, seconds, frames)
TC	Playback time code read by the internal time code reader or time code being recorded.[a)]
U-BIT	User bit value inserted in the playback time code or time code being recorded.[a)]

a) The selection of TC or VITC is made by the TC SELECT switch on the subsidiary control panel.

2 Display section



❶ Recording/playback format indicators
DVCAM: This lights when a tape recorded in DVCAM format is played back.
DV: This lights when a tape recorded in consumer DV format is played back.
LP: This lights when a tape recorded in LP mode is played back.
When a tape recorded in DVCPRO (25) format or any other format than those mentioned above is played back, none of the above indicators lights.

❷ ClipLink indicator
Lights when a cassette is loaded on which ClipLink log data is stored in the cassette memory.

For details of ClipLink log data, see the appendix "ClipLink Guide" (page 147).

❸ VITC indicator
Regardless of the data shown in the time counter display, this indicator lights when VITC in the signal played back or in the input video signal (in E-E mode) is being read.

❹ Time data type indicators
One of the three indicators (COUNTER, U-BIT, and TC) lights to indicate the type of time data currently shown in the time counter display.
COUNTER: Count value of the time counter
U-BIT: User bit data
TC: SMPTE time code (DSR-2000) or EBU time code (DSR-2000P)

❺ Time counter display
Indicates the count value of the time counter, time code, or user bit data depending on the settings of the COUNTER SEL button in the monitor/menu/display setting section and the TC SELECT switch on the subsidiary control panel.
Also used to display edit point values, edit duration values, error messages and setup menu data.

❻ REC (recording) INHIBIT indicator
This indicator is on or off according to the combination of the setting of the REC INHIBIT switch on the subsidiary control panel and the REC/SAVE switch on the loaded cassette, as shown in the following table. When this indicator is on, recording on tape is prohibited.

REC INHIBIT indicator indications

REC INHIBIT switch position	State of the REC/SAVE switch on the cassette	REC INHIBIT indicator state
ON	SAVE/REC	Lit
OFF	SAVE	Lit[a)]
	REC	Off

a) It is possible to make a setting (extended menu item 107) so that in this case the indicator flashes.

❼ Cassette memory indicator
Lights when a cassette provided with a memory chip ("cassette memory") is loaded.

❽ KEY INHIBIT indicator
This indicator lights when the KEY INHIBIT switch on the subsidiary control panel is set to ON.
The buttons/switches to be operable even when this indicator is on can be determined using extended menu item 118.

❾ SERVO indicator
When the drum servo and capstan servo are locked[1)], this indicator lights.

❿ CHANNEL CONDITION indicator
This three-color indicator shows the state of the playback signal.
Green: The state of the playback signal is good.
Yellow: The playback signal is somewhat deteriorated, but playback is possible.
Red: The playback signal is deteriorated.
When the red indicator remains on, head cleaning or an internal inspection is necessary.

1) Servo lock: This refers to the synchronization of the phase of the drum rotation and the reference signal for the tape transport position, so that the video heads can trace the same pattern on the tape for playback or recording.

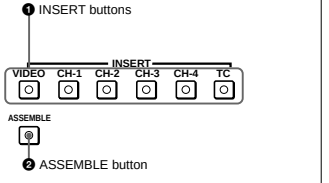
⓫ Tape end alarm indicator
Starts flashing when the remaining capacity of the tape is for about 2 minutes.

⓬ SHUTTLE/JOG indicators
When searching in shuttle or variable mode using the search dial, the SHUTTLE indicator lights, and when searching in jog mode using the search dial, the JOG indicator lights. When the search dial is turned clockwise causing playback to take place in the forward direction, the ▷ indicator lights. When the search dial is turned counterclockwise causing playback to take place in the reverse direction, the ◁ indicator lights. When the tape is stopped, the □ indicator lights.

For more information about the search dial, see page 23.

⓭ NOT EDITABLE indicator
Lights during playback of a tape that contains a recording in other than the DVCAM format. When this indicator is lit, the recordings contained in the tape can be used as source material for editing, but editing operations such as insert editing and assemble editing cannot be performed.
This indicator also lights when the audio recording mode selected on this unit does not coincides with that of the loaded tape.

3 Edit mode setting section



❶ INSERT buttons
Use these buttons to select the signals for insert editing[1].

VIDEO: To select the video signal, press this button, turning it on.

CH-1 to CH-4 (channel 1 to channel 4): To select audio channels 1 to 4, press these buttons, turning them on. You can select any number of the channels.

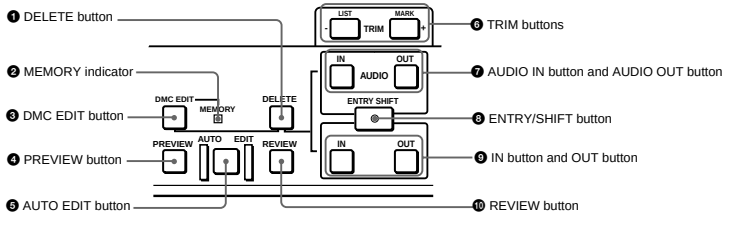
TC: To select time code, press this button, turning it on.

❷ ASSEMBLE button
Press this button, turning it on, to carry out assemble editing[2].
All signals (video signals, audio signals, time code signals, and so forth) are recorded together.

1) Insert editing: Editing in which new video/audio is added into the middle of existing recorded video/audio.

2) Assemble editing: Editing in which new video/audio is added in sequence to the end of existing recorded video/audio.

4 Editing control section



❶ DELETE button
This deletes an existing edit point.
Hold down this button and press the IN, OUT, AUDIO IN, or AUDIO OUT button which is lit, indicating an existing edit point. The button either goes off or flashes and the corresponding edit point is deleted.
When the button flashes, it is necessary to set the deleted edit point again.

❷ MEMORY indicator
When memorizing the playback speed using the DMC EDIT button, this indicator flashes as the playback speed is captured to memory, and lights continuously once the speed is captured.

❸ DMC EDIT button
Use this button to memorize the playback speed varied between ±1 times normal speed and carry out automatic playback or automatic editing using the memorized playback speed.

For information about how to carry out DMC playback or DMC editing using this button, see the section "Dynamic Motion Control (DMC) Playback" (page 55) and "DMC Editing" (page 84), respectively.

❹ PREVIEW button
After setting edit points, to preview the editing results before carrying out the edit, press this button, turning it on.
If the IN point is not set, the preview is carried out with the point where you pressed this button as the IN point.
During the preview the button is lit, and when the preview ends it flashes.

❺ AUTO (automatic) EDIT button
After setting edit points, to carry out automatic editing (recording), press this button, turning it on.
If the IN point is not set, the automatic editing is carried out with the point where you pressed this button as the IN point.
If you pressed the PREVIEW button to carry out a preview, when the preview ends this button flashes.

❻ TRIM buttons
Use these buttons to trim an edit point to single-frame precision.
Hold down the IN, OUT, AUDIO IN, or AUDIO OUT button, and press one of these buttons. The MARK/+ button advances the corresponding edit point by one frame, and the LIST/– button sets it back by one frame.
During playback, pressing one of these buttons while holding down the PLAY button adjusts the tape speed by +8% or –8%, correspondingly. (Capstan override function)
These buttons are also used for ClipLink operations and setup menu operations.

For more information about ClipLink operations and setup menu operations, see Chapter 5 "ClipLink Operation" (page 97) and Chapter 6 "Setup Menu" (page 107), respectively.

❼ AUDIO IN button and AUDIO OUT button
In insert editing, to set an audio IN point or audio OUT point separate from the corresponding video edit point, hold down the AUDIO IN button or AUDIO OUT button, and press the ENTRY/SHIFT button.
After you have made the setting, pressing the AUDIO IN button or AUDIO OUT button displays the audio IN point or audio OUT point set on the time counter display.

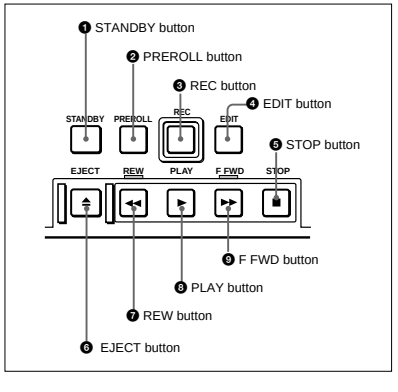
❽ ENTRY/SHIFT button
Use this button for setting edit points, carrying out ClipLink operations, and so forth.
- To set a video IN point or OUT point: Hold down the IN button or OUT button, and press this button.
- To set an audio IN point or OUT point: Hold down the AUDIO IN button or AUDIO OUT button, and press this button.

For more information about ClipLink operation, see Chapter 5 "ClipLink Operation" (page 97).

❾ IN button and OUT button
To set a video IN point or OUT point, hold down the IN button or OUT button, and press the ENTRY/SHIFT button.
After you have made the setting, pressing the IN button or OUT button displays the IN point or OUT point on the time counter display.

❿ REVIEW button
Use this button to carry out a review of the editing results after carrying out automatic editing.

5 Tape transport control section



❶ STANDBY button
When a cassette is inserted and this button is off, to put the VCR in standby mode, press the button, turning it on.
In standby mode, the drum is rotating and the tape is in contact with the drum. As a result, recording or playback can start immediately.
To end standby mode, press the STANDBY button, turning it off.
If a certain period of time (value can be varied using extended menu item 501) elapse in standby mode, the unit automatically switches out of standby mode to protect the tape.

❷ PREROLL button
Press this button to cue up to the preroll point (before the IN point by the time set as the preroll time) on the tape. You can change or select the preroll time and the state of the unit at the end of preroll (stop mode[1)] or still playback mode) using basic menu item 001 and extended menu item 401.

Cuing up to edit points
Hold down the IN, OUT, AUDIO IN, or AUDIO OUT button while pressing this button to cue up to the corresponding edit point.

❸ REC (record) button
To start recording, press this button together with the PLAY button, turning it on.

Monitoring in E-E mode
When the unit is in stop mode, pressing this button lights it, and you can monitor the video and audio in E-E mode. To return to the original state, press the STOP button.
During playback, search, fast forward, or rewind, holding down this button allows you to monitor the video and audio in E-E mode. In this case the button does not light.

❹ EDIT button
To carry out manual editing, press this button simultaneously with the PLAY button.

Monitoring in E-E mode
When the unit is in stop mode, pressing this button lights it, and you can monitor the input signal selected with the ASSEMBLE button or INSERT buttons in E-E mode. To return to the original state, press the STOP button. During playback, search, fast forward, or rewind, holding down this button allows you to monitor the video in E-E mode.

❺ STOP button
To stop recording or playback, press this button, turning it on.
When you stop playback, the unit switches either to still playback or to E-E mode according to setup menu settings, and the settings of the PB/EE button and PB button.

Fault display function
This button flashes when there is no external reference signal input or the input external reference signal is not synchronized to the input video signal. *(See the description of extended menu item 105.)*

❻ EJECT button
To eject the cassette, press this button. While the cassette is being ejected, this button lights.

❼ REW (rewind) button
To rewind the tape, press this button, turning it on.

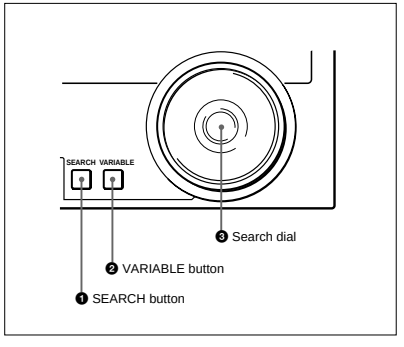
❽ PLAY button
To start playback, press this button, turning it on.

To operate in capstan override mode
Hold down this button, and turn the search dial.

For details of capstan override mode, see "❸ Search dial" on this page.

❾ F FWD (fast forward) button
To fast forward the tape, press this button, turning it on.

6 Search control section



❶ SEARCH button
To use the search dial for playback in shuttle or jog mode, press this button, turning it on. Pressing the dial toggles between shuttle and jog modes. In shuttle mode, the SHUTTLE indicator in the display section lights, and in jog mode, the JOG indicator in the display section lights.

❷ VARIABLE button
To use the search dial for playback in variable speed mode, press this button, turning it on. Pressing the dial toggles between variable speed mode and jog mode.

❸ Search dial
Turn this to carry out playback in the modes shown in the following table. Turning the dial clockwise lights the ▷ indicator in the display section and plays back in the forward direction. Turning the dial counterclockwise lights the ◁ indicator in the display section and plays back in the reverse direction. When the tape is stopped, the □ indicator in the display section lights.
Pressing this dial toggles between shuttle mode and jog mode (or between variable mode and jog mode). When playing back in shuttle or variable mode, the SHUTTLE indicator in the display section lights, and when playing back in jog mode, the JOG indicator lights.
You can carry out noiseless playback in the range of ± 1 times normal speed.

1) Stop mode: the state in which the device currently the subject of operation is stopped, and the STOP button is lit.

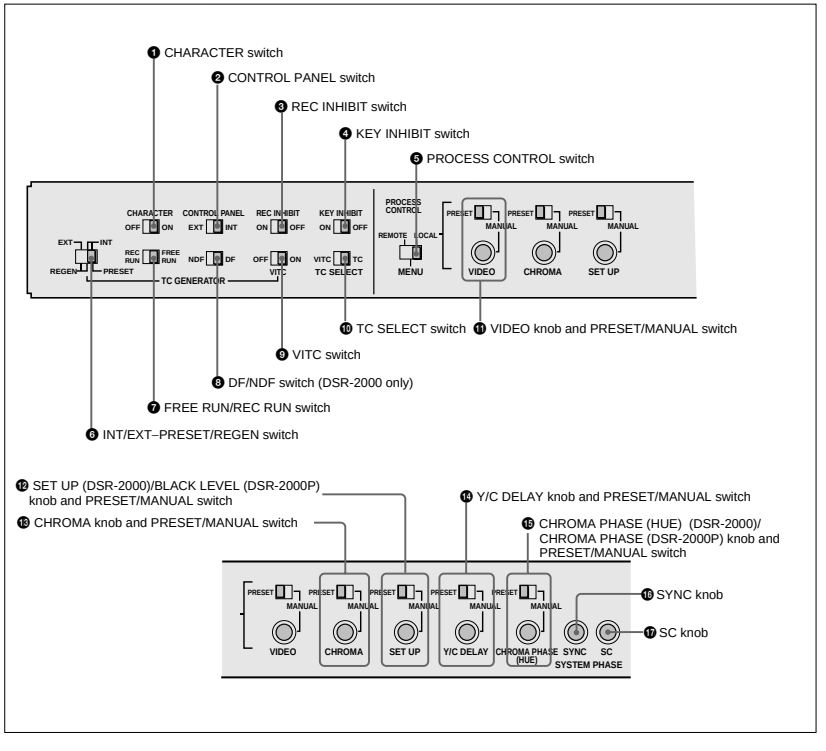
Location and Function of Parts

Playback modes using the search dial

Playback mode	Operations and functions
Shuttle	Press the SHUTTLE button or the search dial so that the SHUTTLE indicator in the display section lights, then turn the search dial. Playback is carried out at a speed determined by the position of the search dial. The maximum shuttle mode playback speed can be changed using extended menu item 102.
Jog	Press the SHUTTLE button or the search dial so that the JOG indicator in the display section lights, then turn the search dial. Playback is carried out at a speed determined by the speed of rotation of the search dial. The playback speed range is ±1 times normal speed. The search dial has no detents.
Variable speed	Press the VARIABLE button, turning it on, then turn the search dial. You can control the playback speed finely (61 steps) in the range of –1 to +2 times normal speed. The search dial has detents at the still position and at the normal speed position. The variable mode playback speed range can be changed using extended menu item 119. Noiseless playback is possible in the range of ±1 times normal speed.
Capstan override	Hold down the PLAY button and turn the search dial to adjust the playback speed in the range of ±15%. Use this for phase adjustment between this unit and an external device connected to this unit.

Changing the setting of extended menu item 101 enables you to select shuttle or jog mode just by turning the search dial without using the SEARCH or VARIABLE button.

Subsidiary Control Panel



❶ CHARACTER switch
Select whether or not to superimpose text information such as time code, menu settings, and alarm messages on the video signal output from the SDI OUTPUT 3 (SUPER) connector and VIDEO OUT 3 (SUPER) connector.
ON: Superimposed text
OFF: No superimposed text
The factory default setting is ON.

❷ CONTROL PANEL switch
Select the state of the control panel when this unit is operated.
INT: When operating this unit by its own control panel.
EXT: When operating this unit remotely by the optional DSBK-200 Control Panel connected to the CONTROL PANEL connector.
The factory default setting is INT.

❸ REC (record) INHIBIT switch
When this switch is set to ON, the REC INHIBIT indicator in the display section lights, and recording on tape is no longer possible. *(See the description of extended menu item 107.)*

❹ KEY INHIBIT switch
When this switch is set to ON, the KEY INHIBIT indicator in the display section lights, and the buttons in the upper control panel and lower control panel specified by the setting of extended menu item 118 are disabled.

❺ PROCESS CONTROL switch
This selects the method of control of the internal digital video processor.
REMOTE: Select this position to use an optional UVR-60/60P or BVR-50/50P Remote Control Unit for remote control of the internal digital video processor.
MENU: Select this position to use the setup menu to change the settings for the internal digital video processor.
LOCAL: Select this position to use the subsidiary control panel to change the settings for the internal digital video processor.

❻ INT/EXT–PRESET/REGEN (internal/external–preset/regenerated) switch
This switch is used to make selections relating to the time code and the internal time code generator.
(In this Operating Instructions, this switch may also be called simply as the INT/EXT switch or PRESET/REGEN switch depending on the contents of the description in which the switch is referred to.)

Selection of internal/external time code

Setting	Time code used
INT	The time code produced by the internal time code generator By setting the switch to INT–REGEN or INT–PRESET, you can select "PRESET" or "REGEN" for the internal time code generator *(see the next table).*
EXT	The external time code selected as follows. • When the TC SELECT switch is set to TC The external time code input to the TIME CODE IN connector • When the TC SELECT switch is set to VITC The VITC time code included in the input video signal In this case, for the internal time code generator, "REGEN" is always selected *(see the next table).*

Selection relating to the internal time code generator

Setting	Operation of the internal time code generator
PRESET	The initial value of the time code produced by the internal time code generator can be preset by a control panel operation or by remote control from a device connected to the REMOTE-IN or REMOTE-OUT connector.
REGEN	The internal time code reader is synchronized to the playback time code read by the internal time code reader.

❼ FREE RUN/REC RUN switch
This switch selects the time code run mode of the internal time code generator.
FREE RUN: Regardless of the operating mode of this unit, the time code value advances continuously while the power is on.
REC RUN: The time code value advances only during recording. When this mode is selected, set the INT/EXT–PRESET/REGEN switch to INT–PRESET.

❽ DF/NDF (drop-frame/non-drop-frame) switch (for the DSR-2000 only)
This switch selects the mode of advancing the time code generator and time counter.
DF: Drop-frame mode
NDF: Non-drop-frame mode

Note
When the PRESET/REGEN switch is set to REGEN, since the time code generator is synchronized to the playback time code, this switch has no effect.

❾ VITC switch
To record the time code produced by the internal time code generator as a VITC, set this switch to ON.
When this switch is set to OFF, internally generated time code is not recorded as VITC, but VITC present in the input video signal is recorded unchanged.

❿ TC (time code) SELECT switch
This switch selects the time code, TC or VITC, shown in the time counter display.

⓫ VIDEO knob and PRESET/MANUAL switch
The switch makes the selection described below.
When it is set to MANUAL, you can use the knob to adjust the video signal output level.
PRESET: Regardless of the position of the knob, the video signal output level is set to the reference value.
MANUAL: You can adjust the video signal output level in the range ±3 dB.
You can change the adjustment range using extended menu item 714.

⓬ SET UP (DSR-2000)/BLACK LEVEL (DSR-2000P) knob and PRESET/MANUAL switch
The switch makes the selection described below.
When it is set to MANUAL, you can use the knob to adjust the (black) setup level (DSR-2000) or black level (DSR-2000P).
PRESET: Regardless of the position of the knob, the setup level (DSR-2000) or black level (DSR-2000P) is set to the reference value.
MANUAL: You can adjust the setup level (DSR-2000) in the range ±30 IRE[1)], or the black level (DSR-2000P) in the range ±210 mV.

⓭ CHROMA (chrominance) knob and PRESET/MANUAL switch
The switch makes the selection described below.
When it is set to MANUAL, you can use the knob to adjust the chrominance signal output level.
PRESET: Regardless of the position of the knob, the chrominance signal output level is set to the reference value.
MANUAL: You can adjust the chrominance signal output level in the range ±3 dB.
You can change the adjustment range using extended menu item 714.

⓮ Y/C DELAY knob and PRESET/MANUAL switch
The switch makes the selection described below.
When it is set to MANUAL, you can use the knob to adjust the Y/C delay.
PRESET: Regardless of the position of the knob, the Y/C delay is set to the reference value.
MANUAL: You can adjust the Y/C delay in the range ±100 ns.

⓯ CHROMA PHASE (HUE) (DSR-2000)/ CHROMA PHASE (DSR-2000P) knob and PRESET/MANUAL switch
The switch makes the selection described below.
When it is set to MANUAL, you can use the knob to adjust the hue/chrominance phase (the phase difference from a burst signal).
PRESET: Regardless of the position of the knob, the hue/chrominance phase is set to the reference value.
MANUAL: You can adjust the hue/chrominance phase in the range ±30°.

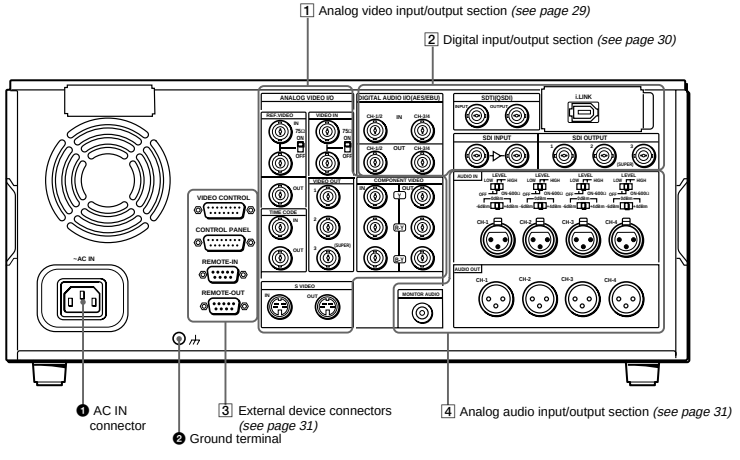
⓰ SYNC knob
This adjusts the output signal sync phase with respect to the input reference signal to this unit in the range ±3 µs.
Use this adjustment when the output phase of this unit is not accurately aligned with the reference signal phase, or when carrying out special effects editing with this unit and other VCRs connected to a switcher or other equipment.

⓱ SC (subcarrier) knob
This adjusts the output signal subcarrier phase with respect to the input reference signal to this unit in the range ±180°.
For editing with composite signals, use this adjustment when the output phase of this unit with respect to the phase of the reference signal is not accurately aligned with the subcarrier phase.

1) IRE: A unit for representing a video level laid down by the IRE (Institute of Radio Engineers). The IRE is now the IEEE (Institute of Electrical and Electronic Engineers).

Location and Function of Parts

Connector Panel

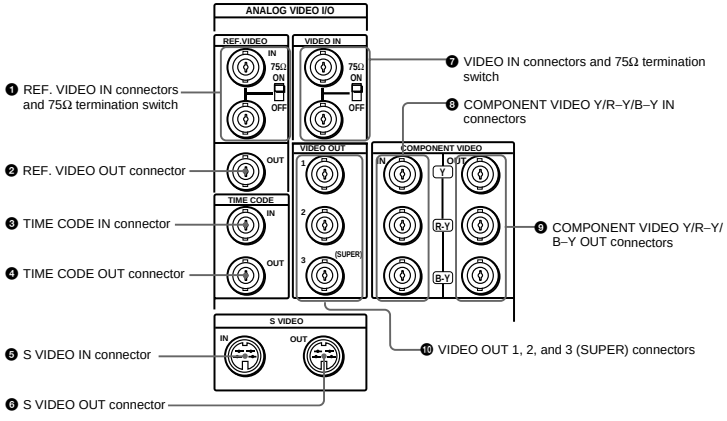


This figure shows the connector panel fitted with the optional DSBK-190 i.LINK/DV Input/Output Board.

❶ AC IN connector
Use the optional power cord to connect this to an AC outlet.

❷ Ground terminal
Connect this to ground.

1 Analog video input/output section



❶ REF. (reference) VIDEO IN connectors (BNC type) and 75Ω termination switch
Input a reference video signal to one of these connectors. The two connectors can be used for a loop-through connection. When making a loop-through connection, set the termination switch to OFF, and when not, set the switch to ON.

❷ REF. (reference) VIDEO OUT connector (BNC type)
This connector outputs a reference video signal, except when i.LINK is selected in the input selection section *(see page 14)*.

❸ TIME CODE IN connector (BNC type)
Input SMPTE time code (DSR-2000) or EBU time code (DSR-2000P) externally generated to this connector.

❹ TIME CODE OUT connector (BNC type)
This connector outputs a time code according to the operating state of the unit, as follows:
During playback: the playback time code
During recording: the time code generated by the internal time code generator or the time code input to the TIME CODE IN connector.

For more information about the time code output during recording, see extended setup menu item 611.

❺ S VIDEO IN connector (4-pin)
Input an S-video signal with separated Y (luminance) and C (chroma: 3.58 MHz for DSR-2000 or 4.43 MHz for DSR-2000P) components to this connector.

❻ S VIDEO OUT connector (4-pin)
This connector outputs an S-video signal with separated Y (luminance) and C (chroma: 3.58 MHz for DSR-2000 or 4.43 MHz for DSR-2000P) components.

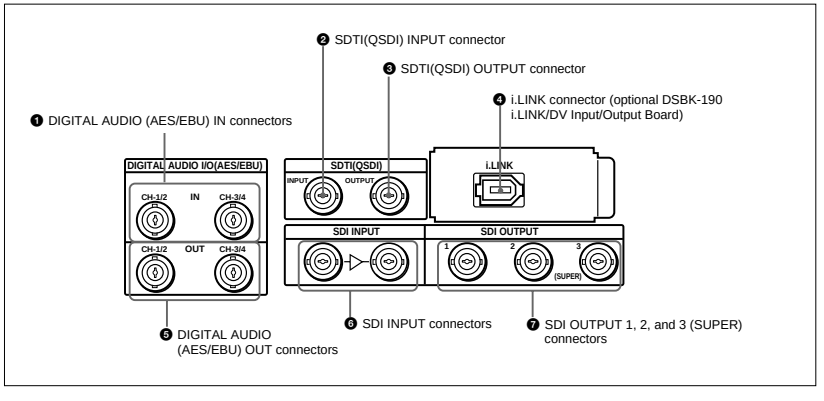
❼ VIDEO IN connectors (BNC type) and 75Ω termination switch
Input an analog composite video signal to one of these connectors. The two connectors can be used for a loop-through connection. When making a loop-through connection, set the 75Ω termination switch to OFF and when not, set the switch to ON.

❽ COMPONENT VIDEO Y/R–Y/B–Y IN connectors (BNC type)
Input analog component video signals (Y/R–Y/B–Y) to these connectors.

❾ COMPONENT VIDEO Y/R–Y/B–Y OUT connectors (BNC type)
These connectors output analog component video signals (Y/R–Y/B–Y).

❿ VIDEO OUT 1, 2, and 3 (SUPER) connectors (BNC type)
These connectors output analog composite video signals.
When the CHARACTER switch on the subsidiary control panel is set to ON, connector 3 (SUPER) outputs a signal with superimposed text information.

2 Digital input/output section



❶ DIGITAL AUDIO (AES/EBU) IN connectors (BNC type)
Input digital audio signals in AES/EBU format to these connectors.
The left-hand connector (CH-1/2) is for audio channels 1 and 2, and the right-hand connector (CH-3/4) is for audio channels 3 and 4.

❷ SDTI (QSDI) (Serial Data Transport Interface (QSDI)) INPUT connector (BNC type)
Input digital video and audio signals in SDTI (QSDI) format to this connector.

❸ SDTI (QSDI) (Serial Data Transport Interface (QSDI)) OUTPUT connector (BNC type)
This connector outputs digital video and audio signals in SDTI (QSDI) format.

Note
If you monitor the output signal from this connector on another device in E-E mode while making a search at speeds in the range +1 to $+^{1}/_{30}$ or $-^{1}/_{30}$ to –1 times normal speed, the signal may sound differently than it does on this unit.

❹ i.LINK connector (6-pin IEEE-1394)(optional DSBK-190 i.LINK/DV Input/Output Board)
This connector is available when the optional DSBK-190 i.LINK/DV Input/Output Board is fitted.
This connector inputs and outputs digital video and audio signals in DV format.

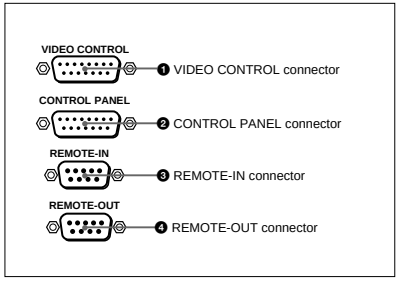
Note
If you monitor the output signal from this connector on another device in E-E mode while making a search at speeds in the range +1 to $+^{1}/_{30}$ or $-^{1}/_{30}$ to –1 times normal speed, the signal may sound differently than it does on this unit.

❺ DIGITAL AUDIO (AES/EBU) OUT connectors (BNC type)
These connectors output digital audio signals in AES/EBU format.
The left-hand connector (CH-1/2) is for audio channels 1 and 2, and the right-hand connector (CH-3/4) is for audio channels 3 and 4.
Digital audio signals are always output from this unit at a sampling frequency of 48 kHz.

❻ SDI (Serial Digital Interface) INPUT connectors (BNC type)
Input digital video and audio signals in SDI (D1) format to the left-hand connector. The right-hand connector is for an active-through connection.

❼ SDI (Serial Digital Interface) OUTPUT 1, 2 and 3 (SUPER) connectors (BNC type)
These connectors output digital video and audio signals in SDI (D1) format.
When the CHARACTER switch on the subsidiary control panel is set to ON, connector 3 (SUPER) outputs a signal with superimposed text information.
Digital audio signals are always output from this unit at a sampling frequency of 48 kHz.

3 External device connectors



❶ VIDEO CONTROL connector (D-sub 15-pin)
For remote control of the internal digital video processor, connect an optional remote control unit such as the UVR-60/60P or BVR-50/50P to this connector.

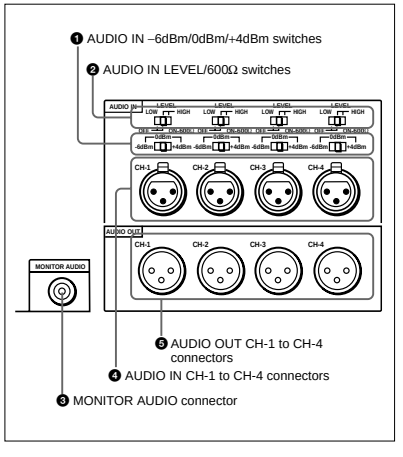
Note
Always power off this unit before connecting the remote control unit.

❷ CONTROL PANEL connector (D-sub 15-pin)
When using the optional DSBK-200 Control Panel to remotely control this unit, connect the DSBK-200 to this connector.

❸ REMOTE-IN connector (D-sub 9-pin)
When controlling this unit from an editing controller such as the ES-7, PVE-500, BVE-600/800/910, or RM-450/450CE, connect the unit to the editing controller via this connector using the supplied 9-pin remote control cable.
When controlling another VCR from this unit, connect the VCR to this connector.

❹ REMOTE-OUT connector (D-sub 9-pin)
This connector provides the loop-through output for remote control signals from the REMOTE-IN connector.

4 Analog audio input/output section



❶ AUDIO IN –6dBm/0dBm/+4dBm switches
Set these switches according to the audio input levels to the AUDIO IN CH-1 to CH-4 connectors.

❷ AUDIO IN LEVEL/600Ω switches
Set these switches for each channel as shown in the following table, according to the audio input levels to the AUDIO IN CH-1 to CH-4 connectors and the impedance.

Settings of the AUDIO IN LEVEL/600Ω switches

Audio input		Switch setting
Level	Impedance	
–60dBs (microphone input)	High impedance (about 20kΩ)	LOW-OFF (left position)
+4dBs/0dBs/–6dBs (line audio input)	High impedance (about 20kΩ)	HIGH-OFF (middle position)
+4dBm/0dBm/–6dBm (line audio input)	600Ω	HIGH-ON (right position)

❸ MONITOR AUDIO connector (RCA phono jack)
This connector outputs audio signals for monitoring. The audio signals to be output from this connector can be selected with the MONITOR SELECT buttons on the lower control panel.

❹ AUDIO IN CH-1 (channel 1) to CH-4 connectors (XLR 3-pin, female)
Use these connectors to connect separate channels of audio input from a player VCR or other external audio equipment.

❺ AUDIO OUT CH-1 (channel 1) to CH-4 connectors (XLR 3-pin, male)
These connectors output channel-1 to channel-4 audio signals, respectively.
In 2-channel audio recording mode (selected with extended menu item 818), it is possible to use the AUDIO OUT CH-3 and AUDIO OUT CH-4 connectors for monitor audio output for channels 1 and 2, respectively (use extended menu item 820).

Usable Cassettes

This unit can use the DVCAM cassettes listed below.

Model name	Size
PDV-64*/94*/124*/184*/34*	Standard size
PDVM-12*/22*/32*/40*	Mini size

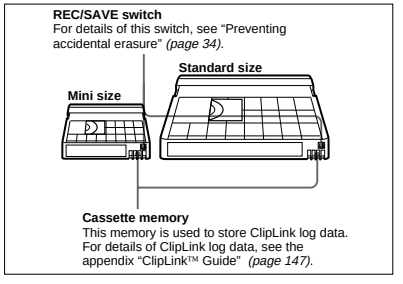
The * in each model name is actually “ME” (indicating that a cassette memory is contained), or “N” (indicating that no cassette memory is contained). The numbers in each model name indicate the maximum recording/playback time (in minutes) for each model. For example, the PDV-184ME has a maximum recording/playback time of 184 minutes.

Cassettes usable for playback only
L- and M-size DVCPRO (25M) cassettes are usable for playback only.

Notes
- If you insert an incorrect type of cassette, it will be automatically ejected.
- When operating this unit as a player, you can also use DV cassettes on the unit. However, it is the best choice to always use DVCAM cassettes because they are more reliable than DV cassettes whatever your purpose may be: playback, editing, or long-period storage of recordings.
- Cassettes that have been recorded by a DV-format recorder can be played back on this unit but cannot be used for recording at editing operation such as the setting of edit points. When you insert such a cassette into this unit, the NOT EDITABLE indicator lights up in the lower control panel display section.

DVCAM cassettes

The following figure illustrates the DVCAM cassette’s appearance.



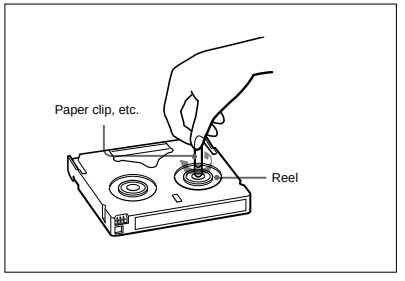
Notes on using cassettes

- Before storing the cassette, rewind the tape to the beginning and be sure to put the cassette in its storage case, preferably on end instead of flat on its side. The storage case of a DVCAM cassette is specially designed to ensure a long-period storage of the tape. Storing a cassette in any other condition (not rewound, out of its case, etc.) may cause the video and audio contents to become damaged over time.
- If the cassette memory connector (contact point) becomes dirty, connection problems may occur, causing a loss of functions. Remove any dust or dirt from this area before using the cassette.
- If the cassette is dropped on the floor or otherwise receives a hard impact, the tape may become slackened and may not record and/or play back correctly.

For information about how to check the tape for slack, see the next section.

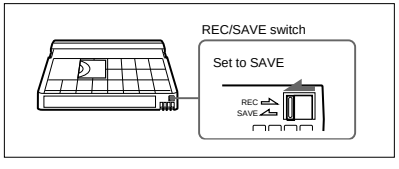
Checking the tape for slack

Using a paper clip or a similar object, turn the reel gently in the direction shown by the arrow. If the reel does not move, there is no slack. Insert the cassette into the cassette compartment, and after about 10 seconds take it out.



Preventing accidental erasure

Set the REC/SAVE switch on the cassette to SAVE to prevent accidental erasure of recorded contents.

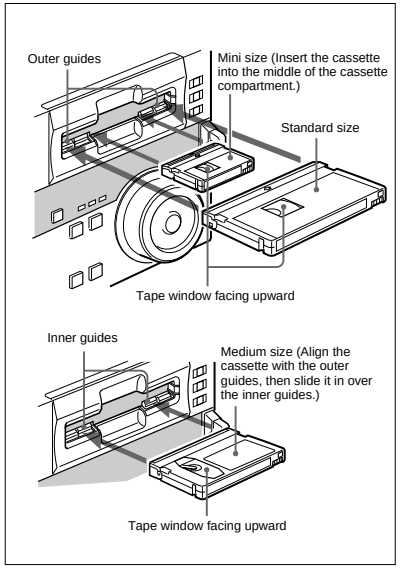


To enable re-recording
Set the cassette's REC/SAVE switch to REC.
When this switch is set to SAVE, the unit cannot record on the tape.

Inserting and Ejecting Cassettes

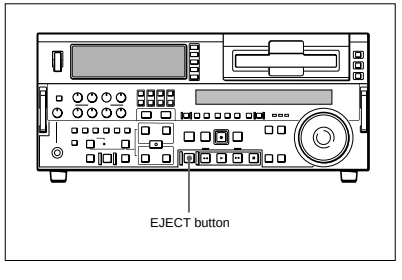
Inserting a cassette

This unit accepts three sizes of cassette: L (standard size), M (medium size: DVCPRO) and S (mini size). When inserting a cassette in the unit, make sure its tape window faces upward as shown in the following figure.



Ejecting a cassette

Press the EJECT button.



Chapter 2

Setting/Displaying Time Data and Text Information

Displaying Time Data and Unit's Operating Status– Superimposing Text Information

To display superimposed time data and text information about the operating status of the unit on the monitor, set the CHARACTER switch on the subsidiary control panel to ON.
When the CHARACTER switch is set to ON, the text information is superimposed on the output of the VIDEO OUT 3 (SUPER) connector and also of the SDI OUTPUT 3 (SUPER) connector.

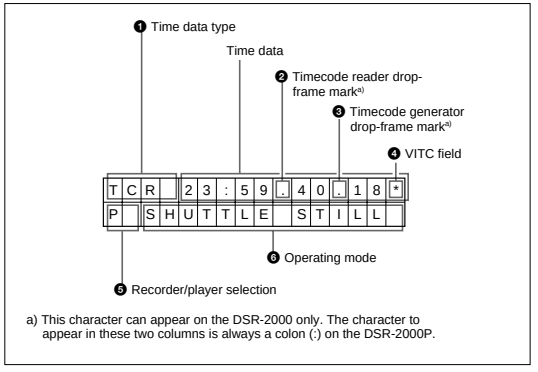
To adjust the displayed text
You can adjust the position, size, and type of superimposed information using setup menu items 002, 003, 009, and 011.

For details, see pages 108 and 109.

Displaying Time Data and Unit's Operating Status–Superimposing Text Information

Information displayed

The figure below shows the time data and operation status that can be superimposed.



a) This character can appear on the DSR-2000 only. The character to appear in these two columns is always a colon (:) on the DSR-2000P.

Note

The example above shows the factory default configuration.
You can use setup menu item 005 to display a different type of time data in the second line as well.

For details, see page 108.

❶ Time data type

Display	Meaning
CNT	Count value of the time counter (COUNTER)
TCR	Timecode reader timecode data
UBR	Timecode reader user bits data
TCR.	VITC reader time code data
UBR.	VITC reader user bits data
TCG	Timecode generator timecode data
UBG	Timecode generator user bits data
IN	IN point time data
OUT	OUT point time data
AI	Audio IN point time data
AO	Audio OUT point time data
DUR	The duration between any two of the four edit points (IN, OUT, AUDIO IN, AUDIO OUT)
T*R a)	Time code data from time code reader. The asterisk indicates an interpolation by the time code reader to make up for the time code data not correctly read from the tape.
U*R a)	User bit data from the time code reader. The asterisk indicates that last data is retained by the time code reader, as the new data has not been read correctly from the tape.

a) "*" appears when data has not been correctly read from tape.

❷ Time code reader drop-frame mark (for DSR-2000 only)

.	Drop frame mode (factory default setting)
:	Non-drop frame mode

❸ Time code generator drop-frame mark (for DSR-2000 only)

.	Drop frame mode (factory default setting)
:	Non-drop frame mode

❹ VITC field

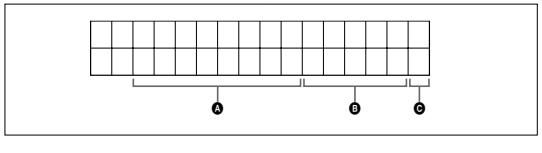
" " (blank): Fields 1 and 3
"*": Fields 2 and 4

❺ Recorder/player selection

The indication changes depending on the status of the RECORDER/PLAYER buttons.
No display: Neither of the RECORDER and PLAYER buttons is lit.
P: The PLAYER button is lit.
R: The RECORDER button is lit.

❻ Operation mode

The field is divided into three blocks, A, B and C.
- Block A displays the operation mode.
- Block B displays the servo lock status or tape speed.
- Block C displays a ■ mark to indicate an edit section during automatic editing.



Displaying Time Data and Unit's Operating Status–Superimposing Text Information

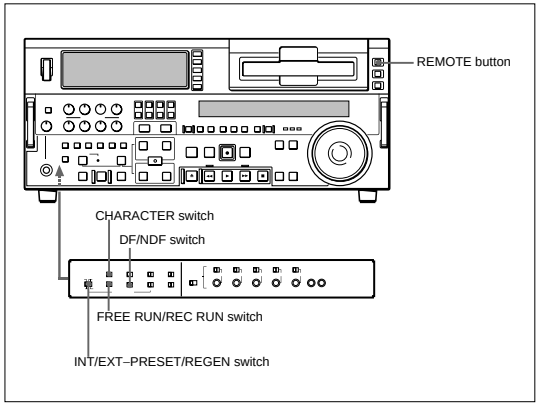
Display		Operation mode
Block A	**Block B**	
CASSETTE OUT		Cassette is not loaded
TAPE UNTHREAD		Tape has not been threaded
STANDBY OFF		Standby off mode
STOP		Stop mode
F.FWD		Fast forward mode
REW		Rewind mode
PREROLL		Preroll mode
PLAY		Playback mode (servo unlocked)
PLAY	LOCK	Playback mode (servo locked)
PLAY	Deviation from normal speed (%)	Capstan override mode
REC		Record mode (servo unlocked)
REC	LOCK	Record mode (servo locked)
EDIT		Edit mode (servo unlocked)
EDIT	LOCK	Edit mode (servo locked)
JOG	STILL	A still picture in jog mode
JOG	FWD	Jog mode in forward direction
JOG	REV	Jog mode in reverse direction
SHUTTLE	(Speed)	Shuttle mode
VAR	(Speed)	Variable mode
AUTO EDIT		Automatic editing mode
PREVIEW		Preview mode
REVIEW		Review mode
DMC	(Speed)[a)]	DMC playback speed
D-PREV	(Speed)[a)]	DMC editing preview mode
D-EDIT	(Speed)[a)]	DMC editing mode
DMC-SPD	(Speed)	DMC initial speed setting

a) Initial speed settings or stored speed settings

Setting Time Code and User Bits

Setting an initial time code value

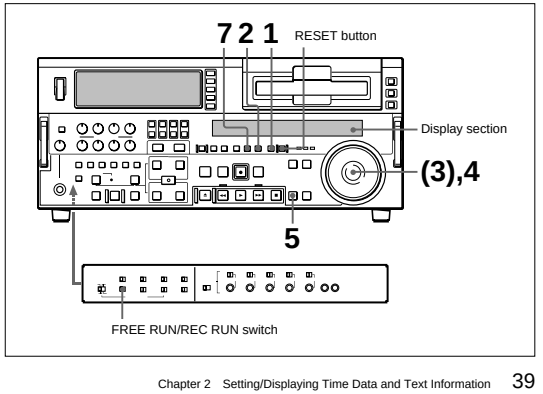
Set the buttons and switches as shown below.



Button/switch settings

Buttons/switches	Settings
REMOTE button	Off
CHARACTER switch	ON
INT/EXT–PRESET/REGEN switch	INT–PRESET
FREE RUN/REC RUN switch	As required
DF/NDF switch	As required

To set an initial time code value, use the following procedure.



Setting Time Code and User Bits

1 Press the COUNTER SEL button and select TC.

Time data type indicator TC lights in the display section of the lower control panel.

2 Press the HOLD button.

The first digit of the time counter display (hours:minutes:seconds:frames) in the display section begins to flash.

To set all digits to 0
Press the RESET button.

3 Confirm the JOG indicator in the display section is lit.
If not lit, press the search dial to select jog mode.

4 Select the digit to set by rotating the search dial.

The flashing digit changes to the digit on the right when you rotate the search dial clockwise, and to the digit on the left when you rotate it counterclockwise.

5 Set the value for the flashing digit by rotating the search dial while pressing the SEARCH button.

6 Repeat steps **4** and **5** until you finish setting all digits.

7 Press the SET button.

If the FREE RUN/REC RUN switch is set to FREE RUN, the time code starts to advance immediately.

To set time code to the current time

1 Set the FREE RUN/REC RUN switch and DF/NDF switch (for DSR-2000 only) on the subsidiary control panel to FREE RUN and DF, respectively.

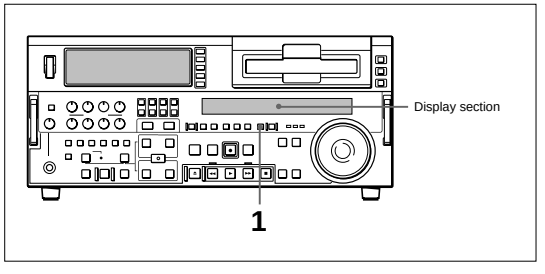
2 Carry out steps **1** to **6** of the previous section “Setting an initial time code value” to set the time code to a time slightly ahead of the current time.

3 Press the SET button at the instant when the current time matches the displayed time code.

To set user bits

You can record up to 8 hexadecimal digits of information (date, time, event number, etc.) in the time code track.

Proceed as follows.



1 Watching the time data type indicator in the display section, press the COUNTER SEL button and select U-BIT.

2 Carry out steps **2** to **7** of the section “Setting an initial time code value” *(page 39)*.

Settings are made in hexadecimal (0, 1, 2,... 8, 9, A, B,... E, F).

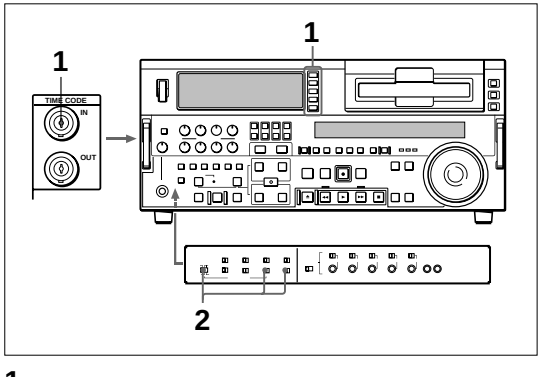
Synchronizing the Internal Time Code Generator With an External Signal—External Lock

You can synchronize the internal time code generator to an external time code signal (TC) input to this unit. Use this method to synchronize the time code generators of a number of VCRs, or to carry out recording maintaining the synchronization between the source video and time code. In this case, the settings of the FREE RUN/REC RUN switch and DF/NDF switch on the subsidiary control panel are ignored.
You can synchronize the internal time code generator to one of the following external time codes.

- The time code (TC) output of an external time code generator or external VCR connected to the TIME CODE IN connector
- The time code (VITC) present in a video signal input to the unit
- The time code (TC) input to the SDTI(QSDI) INPUT connector or i.LINK connector (when fitted with the optional DSBK-190) of the unit

To synchronize to an external time code signal

Proceed as follows.



1 • When synchronizing to an external time code
Connect the time code output of the external time code generator or external VCR to the TIME CODE IN connector.
• When synchronizing to the time code (VITC) in an input video signal
In the input selection section, select an input video signal containing VITC.

2 Set switches on the subsidiary control panel as follows.
TC SELECT switch: TC or VITC according as you are synchronizing to TC or VITC
INT/EXT–PRESET/REGEN switch: EXT–REGEN (left position)
VITC switch: ON (when recording VITC)

This starts the internal time code generator running in synchronization with the external time code generator.
Once the internal time code generator is synchronized with the external time code generator, even if the external time code generator connection is removed, the internal time code generator continues to run.

Note

When the input mode is V:SDTI, SDTI or i.LINK (the V:SDTI, SDTI or i.LINK indicator is lit in the input selection/audio mode display section), then setting the INT/EXT–PRESET/REGEN switch to EXT–REGEN automatically synchronizes the internal time code generator to the time code transferred through the SDTI(QSDI) INPUT connector or i.LINK connector (when fitted with the optional DSBK-190).

Note that when the INT/EXT–PRESET/REGEN switch is set to EXT–REGEN, the advance mode and frame count mode (DSR-2000 only) are automatically set as follows.
Advance mode: free running
Frame count mode (DSR-2000 only): the same as the external time code signal (drop frame or non-drop frame)

To check the synchronization to the external signal

Press the STOP button to stop this unit, then press the REC button.
Watch the time counter display, and check that the values displayed coincide with the external time code values.

Chapter 3

Recording and Playback

Recording

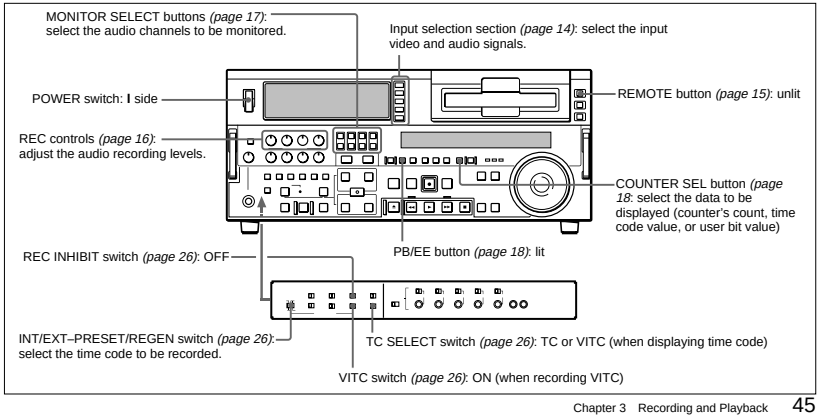
This section describes video and audio recording on the unit.

Preparations for Recording

Button/switch settings

Before beginning recording, make any necessary button/switch settings.

For details of the settings of each of the buttons/switches, see the pages indicated in parenthesis.



To change the number of audio channels to be recorded

Change the setting of extended menu item 818 between 2-channel (2CH) mode and 4-channel (4CH) mode.

Adjusting the audio recording levels

When carrying out audio recording at a reference level
Leave the REC controls pressed in. The audio signals will be recorded at a preset reference level.

Manually adjusting the recording levels
For each channel, pull out the REC control in the upper control panel, and adjust so that the audio level indication is 0 dB for an average volume. Carry out the adjustment in E-E mode.

For details of selecting the E-E mode, see the description of the REC button in the tape transport control section (page 22) and the PB/EE button in the monitor/ menu/display setting section (page 17).

To change the display range of the audio level meters

Press the METER FULL/FINE button *(see page 16)*.

Setting the reference level

The analog input reference level is determined by the settings of the AUDIO IN LEVEL/600 Ω switch *(see page 32)* and extended menu item 811. When, for example, the AUDIO IN LEVEL/600 Ω switch is set to +4 dBm (HIGH-ON) and extended menu item 811 to –20 dB, the reference level is set to –20 dB, causing +4 dBm analog input to be converted into a –20 dBFS digital signal.

Recording Time Code and User Bit Values

There are the following two ways of recording time code:
- Setting an initial value, then recording the output of the internal time code generator
- Recording the output of the internal time code generator synchronized to an external time code generator

To set an initial value then record the time code

Use the procedure described in the section “Setting an Initial Time Code Value” *(page 39)*, then carry out the recording operation *(see page 48)*.

Setting the time code value to the current time

See page 40.

Setting a user bit value

See page 41.

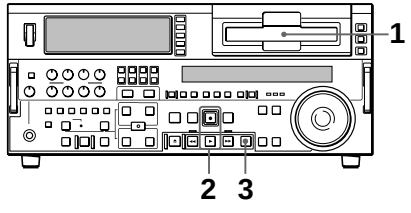
To synchronize the internal time code generator to an external signal

See page 42.

Recording

Recording Operation

To record, use the following procedure.



1 Insert a cassette.

For details, see the section "Inserting a cassette" (page 34).

2 Hold down the REC button, and press the PLAY button.

Recording starts, the servo locks, and the SERVO indicator in the display section lights.

3 To stop recording, press the STOP button.

If you record to the end of the tape
The tape is automatically rewound, and stops.
You can change the setting of extended menu item 125 so that the tape just stops without being automatically rewound when it is recorded to the end.

Playback

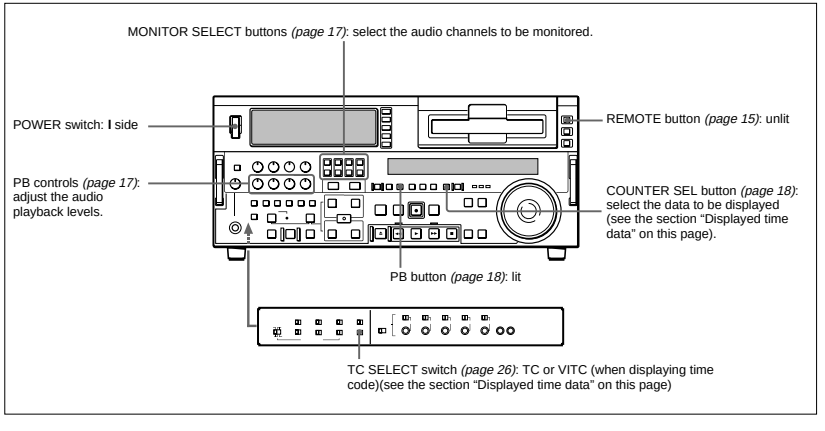
This section describes playback of video and audio.

Preparations for Playback

Button/switch settings

Before beginning playback, make any necessary button/switch settings.

For details of the settings of each of the buttons/switches, see the pages indicated in parenthesis.



Time data selection

Displayed time data
Use the COUNTER SEL button to select one of counter's count (COUNTER), time code (TC), and user bit values (U-BIT). When you select time code, the data displayed is determined by the setting (TC/VITC) of the TC SELECT switch on the subsidiary control panel as follows.

TC SELECT switch setting	Displayed data
TC	TC recorded on tape
VITC	VITC recorded on tape

Playback

Playback Operation

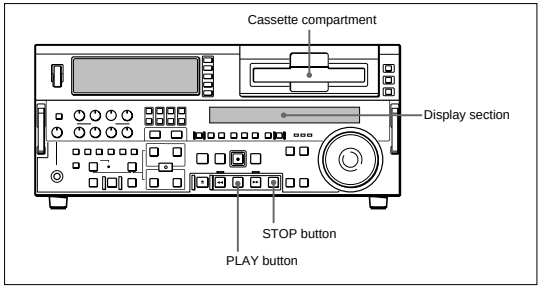
This section describes the following types of playback:

- Normal playback
  Playback at normal (×1) speed
- Playback in jog mode
  Variable speed playback, with the speed determined by the speed of turning the search dial
- Playback in shuttle mode
  Variable speed playback, with the speed determined by the angular position of the search dial
- Playback in variable mode
  Variable speed playback, with the speed finely determined by the angular position of the search dial
- Playback using the capstan override function
  The playback speed is adjusted temporarily according to the angular position of the search dial, to align the playback phase with that of another VCR.

Normal playback

First insert a cassette.

For details of how to insert a cassette, see the section "Inserting and Ejecting Cassettes" (page 34).



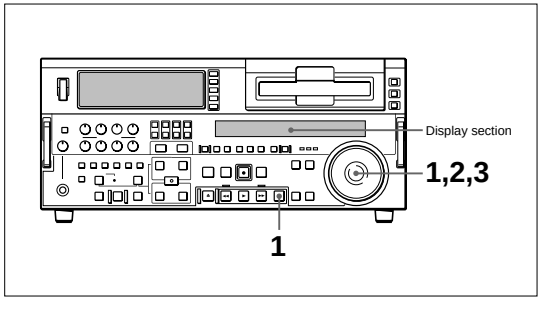
To start playback
Press the PLAY button.
Playback starts, the servo locks, and the SERVO indicator in the display section lights.

To stop playback
Press the STOP button.

If you play back to the end of the tape
The tape is automatically rewound, and stops.
You can change the setting of extended menu item 125 so that the tape just stops without being automatically rewound when it is played back to the end.

Playback in jog mode

In jog mode, you can control the speed of playback by the speed of turning the search dial. The playback speed range is ±1 times normal speed (can be changed using extended menu item 116).
To carry out playback in jog mode, use the following procedure.



1 Press the SEARCH button or search dial so that the JOG indicator in the display section is lit.

Pressing the search dial toggles between jog mode and shuttle mode.

2 Turn the search dial in the desired direction, at the speed corresponding to the desired playback speed.

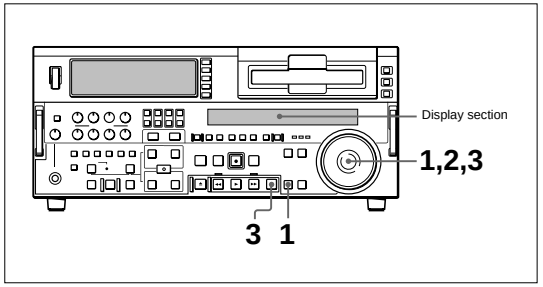
Playback in jog mode starts.

3 To stop playback in jog mode, stop turning the search dial.

Playback

Playback in shuttle mode

In shuttle mode, you can control the speed of playback by the angular position of the search dial. The range of playback speed is ±32 times normal speed (can be changed using menu item 102).
There are detents on the search dial at the still position and at ±10 times normal speed.
To carry out playback in shuttle mode, use the following procedure.



1 Press the SEARCH button or search dial so that the SHUTTLE indicator in the display section is lit.

Pressing the search dial toggles between jog mode and shuttle mode.

2 Turn the search dial to the desired angle corresponding to the desired playback speed.

Playback in shuttle mode starts.

3 To stop playback in shuttle mode, return the search dial to the center position, or press the STOP button.

To return to normal-speed playback

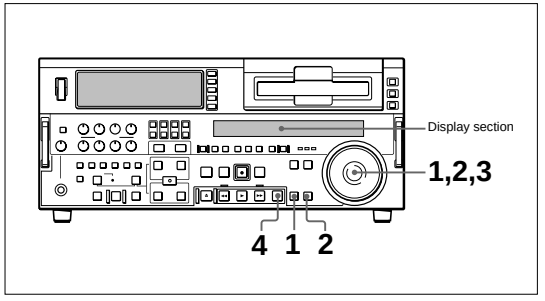
Press the PLAY button.

To alternate between normal-speed playback and shuttle mode playback

Set the search dial to the position corresponding to the desired shuttle playback speed, then switch between normal-speed playback and shuttle playback by pressing the PLAY and SEARCH buttons alternately.
For intermittent shuttle mode playback, press the STOP and SEARCH buttons alternately.

Playback in variable mode

In variable mode, you can finely control (61 steps) the speed of playback in the range of –1 to +2 times normal speed. Noiseless playback is possible in the range of ±1 times normal speed.
(The variable mode playback speed range can be changed using extended menu item 119.)
There are detents on the search dial at the still position and at ±1 times normal speed.
To carry out playback in variable mode, use the following procedure.



1 Press the VARIABLE button or search dial so that the SHUTTLE indicator in the display section is lit.

2 If the SEARCH button is lit, press the VARIABLE button, turning it on.

3 Turn the search dial to the desired angle corresponding to the desired playback speed.

Playback in variable mode starts.

4 To stop playback in variable mode, return the search dial to the center position, or press the STOP button.

To return to normal-speed playback

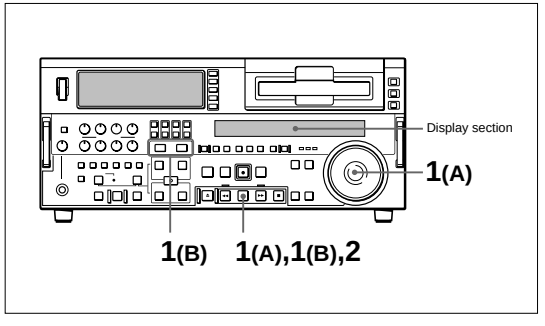
Press the PLAY button.

To alternate between normal-speed playback and variable mode playback

Set the search dial to the position corresponding to the desired variable playback speed, then switch between normal-speed playback and variable playback by pressing the PLAY and VARIABLE buttons alternately.
For intermittent variable mode playback, press the STOP and VARIABLE buttons alternately.

Playback using the capstan override function

You can use the capstan override function to adjust the playback speed temporarily. This function is convenient for playback phase synchronization with another VCR playing back the same program.



1 (A) Hold down the PLAY button, and turn the search dial in the desired direction to adjust the playback speed.
The range of speed adjustment is ±15% in steps of 1%.

(B) Hold down the PLAY button, and press the TRIM buttons to adjust the playback speed.
The playback speed can be adjusted to ±8% only.

The SERVO indicator in the display section goes off.

2 When the adjustment is completed, release the PLAY button.

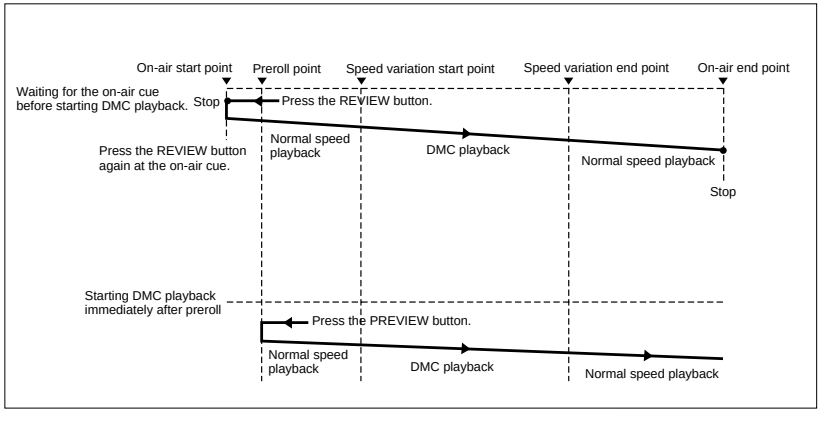
The tape transport returns to normal speed, and the SERVO indicator in the display section lights on again.

Dynamic Motion Control (DMC) Playback

Overview

DMC playback allows you to vary the playback speed for a certain section of a tape, in variable mode (from −1 to +1 times normal speed), and store the varying speed in memory for later playback at the same varying speed. For example, during a live broadcast of a sporting event you can set the start and end points of highlights while recording, and then provide immediate DMC playback of those highlights.

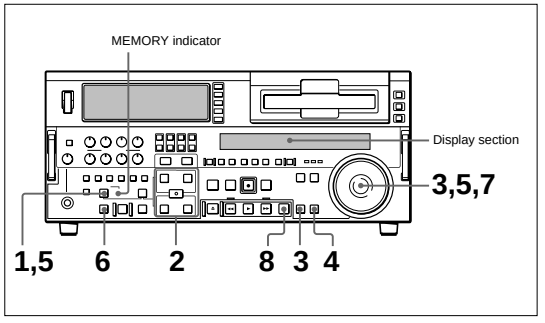
During DMC playback the tape moves as shown in the following figure.



Playback

Storing a varying playback speed in memory

To store the playback speed for DMC playback, use the following procedure.



1 Press the DMC EDIT button, turning it on.

2 Either while playing back the recorded tape, or during recording, press the ENTRY/SHIFT button and each of the following buttons simultaneously, to set the start and end points.
- **On-air start point:** AUDIO IN button
- **Speed variation start point:** IN button
- **Speed variation end point:** OUT button
- **On-air end point:** AUDIO OUT button

Each press turns the corresponding button on.

3 Press the SEARCH button or search dial so that the SHUTTLE indicator in the display section is lit.

4 If you want to use the variable mode to set the varying playback speed, press the VARIABLE button, turning it on.

5 Holding down the DMC EDIT button, turn the search dial, to set the initial speed at the speed variation start point.

The speed you set appears in the display section. During this period the tape does not move.

6 Press the PREVIEW button.

The tape is prerolled and played back at normal speed from the on-air start point to the speed variation start point. On passing the speed variation start point, the MEMORY indicator begins to flash, and playback begins at the speed set in step **5**.

7 Turn the search dial to vary the playback speed.

While the MEMORY indicator is flashing, the speed variations are stored in memory. On passing the speed variation end point, the MEMORY indicator changes from flashing to continuously lit, and the variable speed storing ends.

8 Press the STOP button to stop the tape.

If the MEMORY indicator lights continuously before the speed variation end point
This indicates that the memory became full at that point. It is therefore not possible to record more speed variation. The maximum capacity is a duration of 120 seconds.

To amend the stored speed variation
Press the PREVIEW button.
The interval between the speed variation start and end points is automatically played back at the stored speed. Operate the search dial as required, to adjust the playback speed.

Setting the initial speed to normal speed
In step **5**, press the PLAY button.

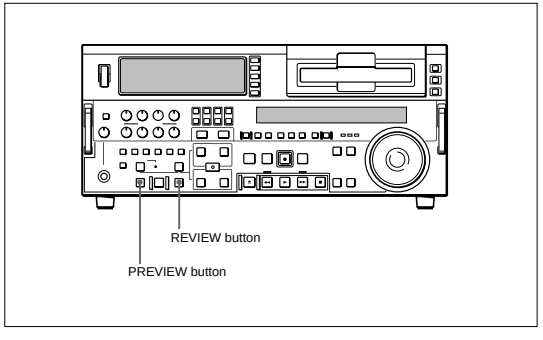
Executing DMC Playback

There are two methods of starting DMC playback.

- Starting playback at the on-air cue from the on-air start point
- Starting playback immediately after preroll

Notes
- To avoid operating mistakes we recommend that you use the VCR in standalone mode when carrying out DMC playback.
- When using two VCRs connected for editing, you can only use the recorder VCR for DMC playback, and only when both the RECORDER and PLAYER buttons are off.

You can start DMC playback using either the REVIEW button or PREVIEW button depending on which of the above two methods you use.



To start playback at the on-air cue from the on-air start point
Use the following procedure.

1 Press the REVIEW button.

The REVIEW button lights, and the tape is cued up to the on-air start point. After the tape is cued up, the REVIEW button flashes.

2 At the moment the on-air cue is given, press the REVIEW button once more.

The REVIEW button lights, and playback starts at normal speed. Between the speed variation start and end points, DMC playback is carried out at the stored speed, and then playback continues at normal speed and the tape stops at the on-air end point.

Starting playback immediately after preroll
Press the PREVIEW button.
The PREVIEW button lights, and after preroll, DMC playback is carried out for the section between the speed variation start and end points, then playback continues at normal speed from the speed variation end point.

Stopping the tape during DMC playback
Press the STOP button.

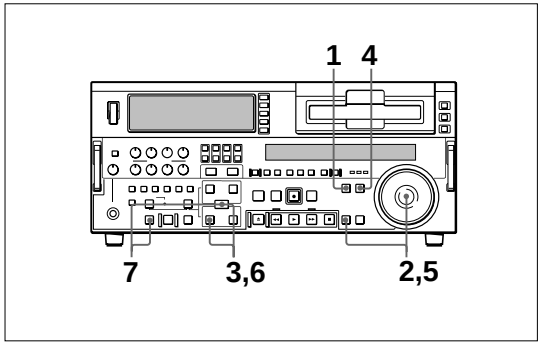
To exit DMC playback mode
Press the DMC EDIT button and the DELETE button simultaneously.

Synchronous Playback

Connecting two DSR-2000/2000P units and synchronizing their tape transport, you can carry out two-unit synchronous playback with an accuracy of ±0 frame.

For equipment/signal connections and basic settings, see the section "Connections for Two-Unit Synchronous Playback" (page 132).

Use the following procedure.
(In the following, the controlling unit is referred to as the recorder (this unit) and the controlled unit as the player.)



1 Press the PLAYER button, turning it on.

2 Cue up to the player tape position where to start playback.

3 Hold down the ENTRY/SHIFT button, and press the IN button.

The player IN point is set.

4 Press the RECORDER button, turning it on.

5 Cue up to the recorder tape position where to start synchronous playback.

6 Hold down the ENTRY/SHIFT button, and press the IN button.

The recorder IN point is set.

(Continued)

7 Hold down the ENTRY/SHIFT button, and press the PREVIEW button.

Both the recorder and player start preroll followed by synchronous playback by the two units.

When setup menu item 004 is set to ON and 305 set to ACCUR on the recorder side, the recorder and player tape transports are synchronized during the preroll allowing two-unit synchronous playback with ±0 frame accuracy to start at the player and recorder IN points.

To end synchronous playback while it is in progress
Press the STOP button.

Digitally Dubbing Signals in DVCAM Format (Optional DSBK-190 Required When Using i.LINK Interface)

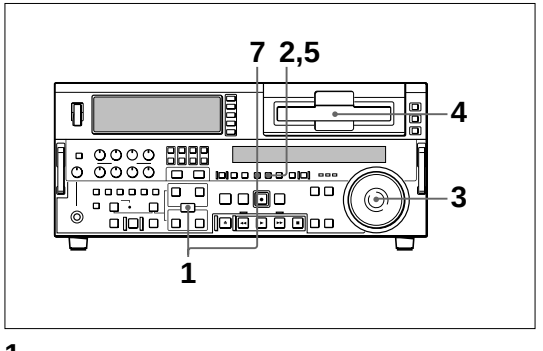
In addition to straightforward tape dubbing, you can also use this unit to digitally dub signals in DVCAM format automatically from the beginning of the tape to the end, through an i.LINK or SDTI(QSDI) interface.
When a tape recorded on a DSR-1/1P Digital Videocassette Recorder or DSR-300/300P Digital Camcorder is dubbed, the ClipLink log data held in the cassette memory is also copied.

For information about connections and basic settings, see the section "Connections for Digitally Dubbing Signals in DVCAM Format" (page 133).

Notes

- Use a tape which is recorded in the DVCAM format. A tape recorded in DV format cannot be used as a source tape for an dubbing operation using the AUTO FUNCTION menu.
- Regardless of the audio channel settings made in the input selection section of this unit, dubbing is performed with the original audio recording mode unchanged (two-channel mode (48 kHz) or four-channel mode (32 kHz)).
- Approximately the last 2 minutes of the tape may not be copied because of differences in tape lengths. (If an Index Picture is recorded in this portion, it may also not be copied.)
- A continuous recorded section of approximately 5 seconds is required before the recording start point. It is recommended to record beforehand color bars or a similar signal at the start point of the recording tape to be used on this unit.

Perform the following procedure.

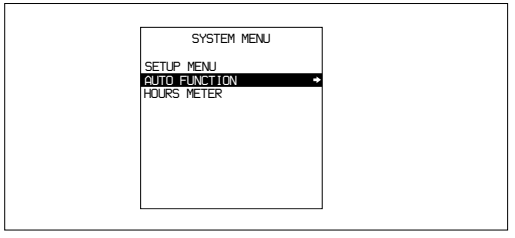


1 On the recorder, hold down the ENTRY/SHIFT button and press the MENU button.

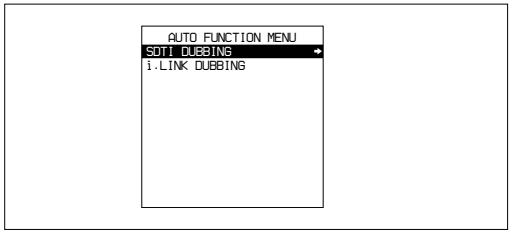
The SYSTEM MENU screen appears on the monitor connected to this unit.

(Continued)

Digitally Dubbing Signals in DVCAM Format (Optional DSBK-190 Required When Using i.LINK Interface)

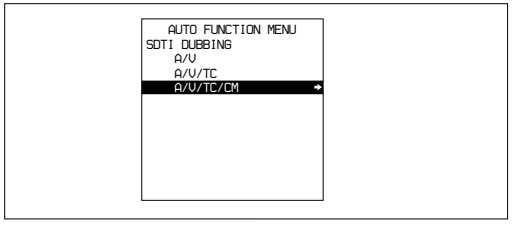


2 Using the search dial, select AUTO FUNCTION, then press the SET button.



3 Using the search dial in jog mode, select either SDTI DUBBING or i.LINK DUBBING, then press the SET button.

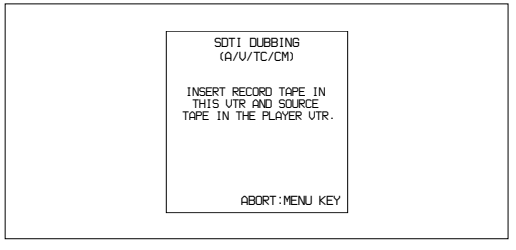
The screen changes as follows, allowing you to select a desired group of items for dubbing.
(In explaining the subsequent operating procedure, illustrations of screens shown when performing SDTI dubbing are used. You can follow the same operating procedure also when performing i.LINK dubbing.)



- **A/V:** Audio and video
- **A/V/TC:** Audio, video and timecode
- **A/V/TC/CM:** Audio, video, timecode, and cassette memory (ClipLink log data)

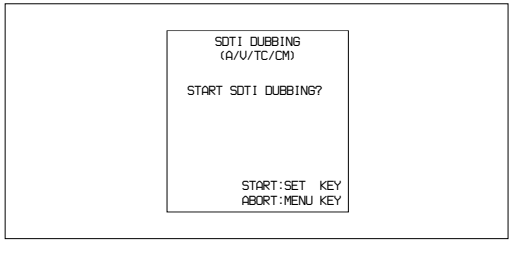
4 Using the search dial, select a desired group of items for dubbing, then press the SET button.

The menu screen changes as follows.
(Example: The screen displayed when A/V/TC/CM is selected.)



5 Insert the source tape in the player and the recording tape in this unit.

A message to make sure dubbing may be started appears.



If the cassette memory capacity is not sufficient
A message urging you to replace the recording tape by a tape with a larger cassette memory capacity appears.

For more information about this, see the section "If the cassette memory of the recording tape is not large enough" (page 65).

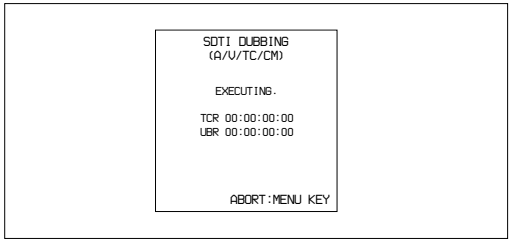
To cancel the dubbing operation
Press the MENU button.

(Continued)

Digitally Dubbing Signals in DVCAM Format (Optional DSBK-190 Required When Using i.LINK Interface)

6 Press the SET button.

The recording tape and source tape are both automatically wound back to the beginning, and dubbing starts. At the same time, the screen changes as follows.



To end the dubbing operation while it is in progress
Press the STOP button.
The dubbing operation stops and a message asking whether to copy the contents of the cassette memory appears.

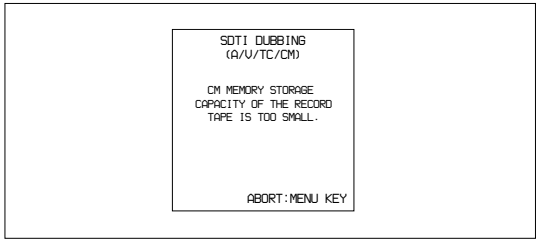
For more information about this, see the section "If you end dubbing while it is in progress" (page 65).

When dubbing is completed
① A message "COMPLETED" appears on the monitor.
② The source tape and recording tape are both automatically rewound to the beginning, and the cassettes ejected.
③ The unit returns to the state in step **4**.

7 To continue by dubbing another tape, repeat steps **5** and **6**.

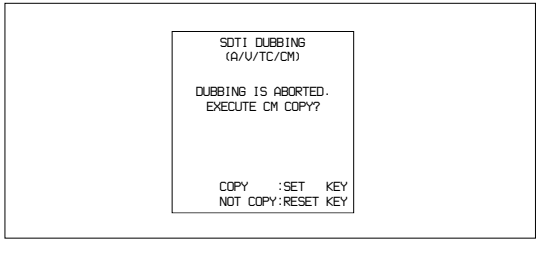
8 To end the dubbing operation and exit from the menu, press the MENU button.

If the cassette memory of the recording tape is not large enough
When you insert the recording tape and source tape in this unit and the player, respectively, with A/V/TC/CM selected as the items for dubbing, their cassette memory contents are checked automatically. If, as a result, the cassette memory capacity of the recording tape is found inadequate, the following message appears.



If this message appears, replace the recording tape by a tape with a larger cassette memory capacity.

If you end dubbing while it is in progress
If you end dubbing while it is in progress with A/V/TC/CM selected as the items for dubbing, the following message appears.



To copy the contents of the cassette memory, press the SET button.
If you do not wish to copy the contents of the cassette memory, press the RESET button. If you press the RESET button, however, the contents of the cassette memory may not agree with the material recorded on the tape.

Chapter 4

Editing

Automatic Editing

This section describes how to carry out automatic editing with this unit and another VCR connected to the REMOTE-IN or REMOTE-OUT connector.

Overview of Automatic Editing

With this unit, you can use the following two edit modes.
• Assemble edit mode
• Insert edit mode
(In this Operating Instructions, these two modes are also referred to simply as assemble mode and insert mode, respectively.)

Assemble edit mode
In assemble editing, you record video and audio materials in order from the start of the tape. In addition to video and audio, time code is also recorded. This edit mode is convenient when you are recording on a new tape.

Note
Before you begin assemble editing for the first time with a new tape, a video signal, e.g. a black signal, and time code must be recorded on the tape in advance of the recorder IN point for a length equal to or greater than the preroll time.

Insert edit mode

In insert editing, you insert video, audio, and time code at desired positions on an already recorded tape. You can insert all three types of data at the same time or insert one of the types separately.

Note

Before you use an unrecorded tape in insert editing, a video signal, e.g. a black signal, and time code must be recorded on all over the tape.

You can carry out DMC editing in both edit modes. In insert editing, split editing is also possible.

To record a video signal and time code on an unrecorded tape

When recording a video signal and time code on an unrecorded tape to use it as a recording tape in insert editing, you can use a test signal generated by the internal signal generator of the unit. An example procedure follows.

1 Insert an unrecorded cassette in the unit and rewind it.

2 Using the VIDEO IN button in the input selection section *(see page 14)*, select the video test signal (SG) as the input video signal.

3 Set switches on the subsidiary control panel *(see page 25)* as follow.
INT/EXT-PRESET/REGEN switch: INT–PRESET (right position)
FREE RUN/REC RUN switch: REC RUN
DF/NDF switch: Set as required.

4 Set an initial time code value *(see page 39)*

5 Carry out recording *(see page 48)*.

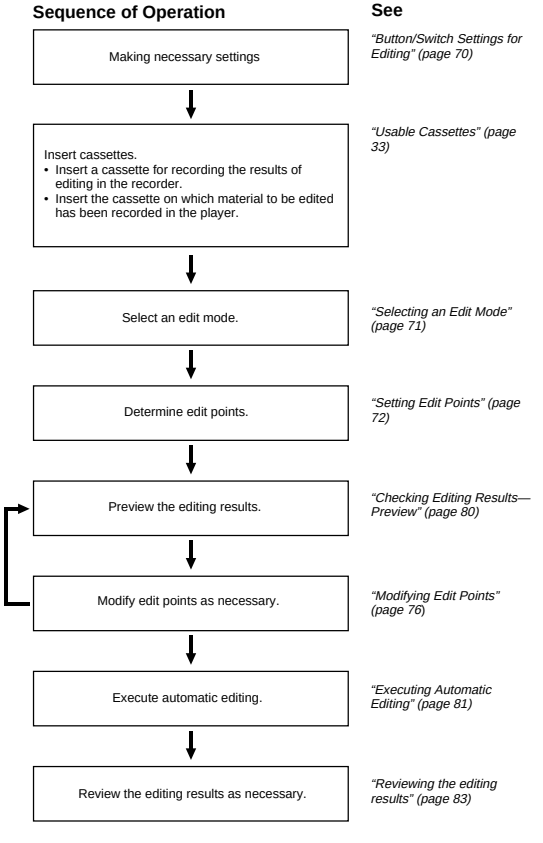
Recording time code

For automatic editing, regardless of the settings of the INT/EXT–PRESET/REGEN switch, time code is recorded continuously from the previous time code recorded on the tape.

Using extended menu item 610, it is also possible to record time code according to the settings on the control panels.

Sequence of editing operations

The following flowchart outlines the sequence of operations in automatic editing with two DSR-2000/2000P units.



Notes on video output to the monitor

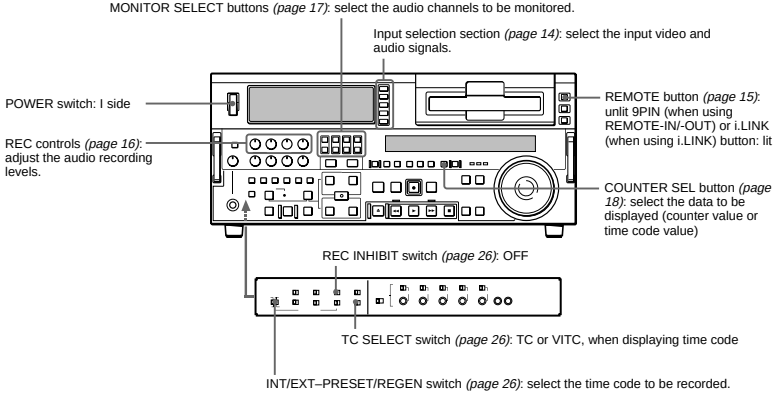
In E-E mode, the video output of the unit is delayed by the time for video circuit processing with respect to the input video signal (8H).
Unlike the playback operations described in Chapter 3, for playback to be carried out in edit mode with both the player and recorder specified, you can use extended menu item 701 to delay the V-SYNC phase by 8H.

Button/Switch Settings for Editing

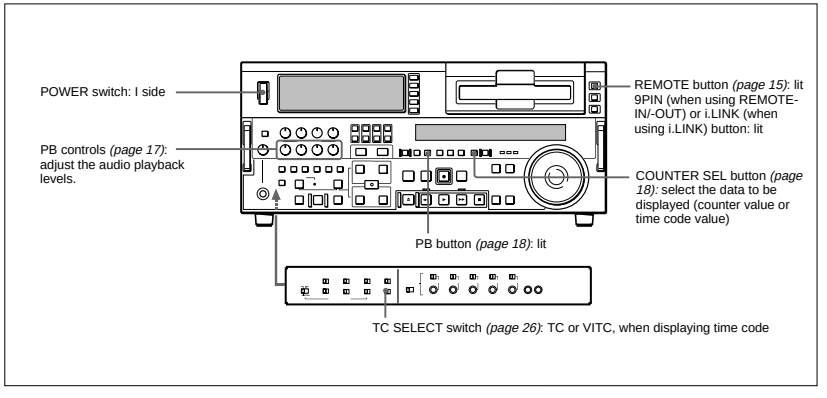
Before beginning editing, set buttons and switches on the recorder and player as follows.

For details of the settings of each of the buttons/switches, see the pages indicated in parenthesis.

Recorder settings



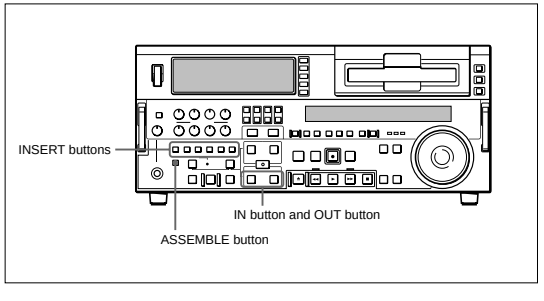
Player settings



(In the subsequent description, except where the player is explicitly mentioned, operations are all on the recorder.)

Selecting an Edit mode

Select either assemble mode or insert mode.



Depending on the desired edit mode, press the following button or buttons.
- For assemble editing: ASSEMBLE button
- For insert editing: the desired INSERT buttons (VIDEO, CH-1 to CH-4, TC)

When you select an edit mode, the IN and OUT buttons begin to flash, indicating that the edit points require setting.

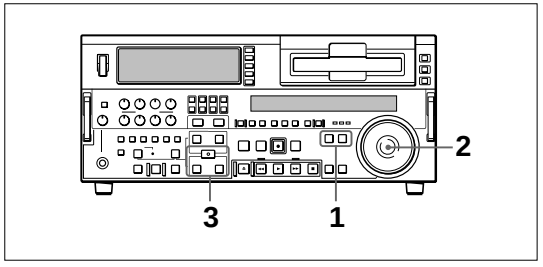
Automatic Editing

Setting Edit Points

Of the four edit points (recorder IN and OUT points, and player IN and OUT points) required, set any three. The last edit point is set automatically.
In insert mode, you can set the edit points for video and audio separately (split editing).

For details of setting split edit points, see the section "Setting split edit points" (page 73).

To set edit points



1 Press the RECORDER button or PLAYER button to select the VCR on which you will set edit points.

The button which you have pressed lights.

2 Turn the search dial in jog or shuttle mode, and position the tape at the required edit point.

For details of playback in jog or shuttle mode, see the sections "Playback in jog mode" (page 51) and "Playback in shuttle mode" (page 52).

3 At the point at which you wish to set the IN point or OUT point, hold down the ENTRY/SHIFT button and press the IN button or OUT button as the case may be.

When the IN point or OUT point is set, the IN button or OUT button correspondingly lights.

4 Repeat steps **1** to **3** until three of the four edit points (recorder IN and OUT points, and player IN and OUT points) are set.

When the IN points on both the recorder and player are set, the PREVIEW button and AUTO EDIT button flash, indicating that it is possible to carry out a preview or editing operation.

Notes

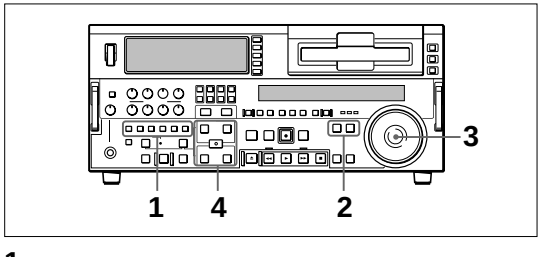
In the following cases, the DELETE button begins to flash and you cannot carry out automatic editing.
- The OUT point is before the IN point.
- All four of the recorder IN and OUT points and the player IN and OUT points have been set.

Use the DELETE button to delete a redundant edit point, or set the edit points correctly.

For details of deleting edit points, see the section "To delete an edit point" (page 77).

Setting split edit points

In split editing, you can set the edit points for audio and video independently. Set the audio edit points with the AUDIO IN/OUT buttons, and the video edit points with the IN/OUT buttons.
Note that split editing is only possible when the recorder is set for insert editing.



1 Press the appropriate INSERT button (VIDEO, CH-1 to CH-4, or TC).

The IN and OUT buttons flash.

2 Press the RECORDER or PLAYER button to select the VCR for which edit points are to be set.

The button you have pressed lights.

3 To find the edit point, rotate the search dial in jog or shuttle mode.

For details of jog/shuttle mode playback, see the sections "Playback in jog mode" (page 51) and "Playback in shuttle mode" (page 52).

4 Hold down the ENTRY/SHIFT button and press one of the IN, OUT, AUDIO IN, and AUDIO OUT buttons, to set the edit point.

(Continued)

5 Repeat steps **2** through **4** to set the required edit points.

As each edit point is set, the corresponding button changes from flashing to continuously lit.

Note

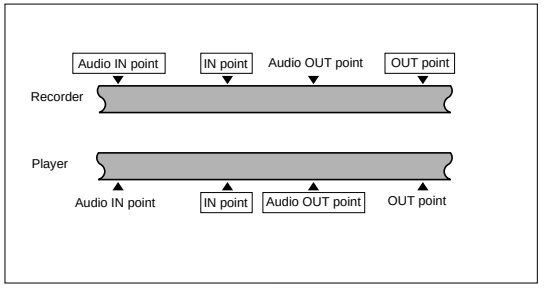
During split editing, if you set six or more edit points for the recorder and player, the DELETE button starts to flash, to indicate that editing cannot be executed. Delete all excess edit points, using the DELETE button.

For details of deleting edit points, see the section "To delete an edit point" (page 77).

Automatic setting of edit points in split editing

Split editing requires a total of eight edit points: four video edit points (player IN and OUT and recorder IN and OUT) and four audio edit points (player audio IN and OUT and recorder audio IN and OUT). However, as soon as you set five points, the system automatically calculates and sets the remaining three points. Specifically, once you have set three of the four video edit points and two audio edit points, the remaining three edit points are set automatically, regardless of whether these points are for the recorder or player.

In the figure below, the edit points shown within boxes are already set. The other edit points (recorder audio OUT point, and player audio IN and video OUT points) are set automatically.
Note that, regardless of whether it was set manually or automatically, any edit point can be deleted or corrected later.



You can set audio cut in, crossfade, fade in, and fade out effects using extended menu item 317.

When the audio IN point is not set for insert editing of audio only

As long as the audio OUT point is set, the VCR is ready for preview or editing. If the audio IN point has not been set, the current tape position is automatically used as the audio IN point.

Using a VCR without a split editing function as the player

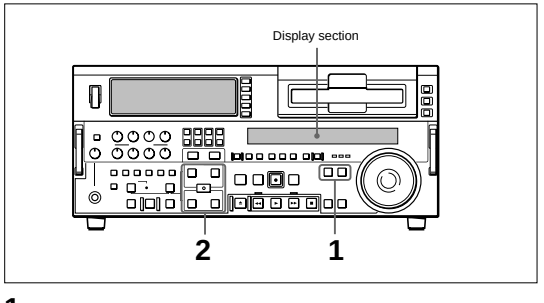
If it is not possible to set separate audio and video edit points on the VCR you are using as the player, by setting the audio IN and OUT points on the recorder (this unit), then setting three video edit points, split editing is possible.

Checking Edit Points

You can check the time value for an edit point and the duration between two edit points by displaying them in the display section.

To display the time value for an edit point

Use the following procedure.



1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to check the edit point.

The button you have pressed lights.

2 Hold down the IN, OUT, AUDIO IN, or AUDIO OUT button according to the edit point you wish to check.

While you hold down the button, the time value of the edit point is shown in the display section.

Automatic Editing

To display the duration between two edit points

1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to check the duration.

The button you have pressed lights.

2 Hold down any two of the four edit point buttons (recorder or player IN, OUT, audio IN, and audio OUT points).

While you hold down the buttons, the duration between the two edit points is shown in the display section.

When only one of the two selected edit points is set
The duration between the edit point and the current tape position is displayed.

When neither of the two selected edit points is set
The duration between the most recently set corresponding edit points is displayed.

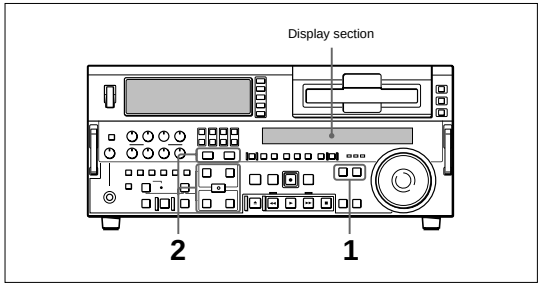
Modifying Edit Points

Once you set edit points, you can modify or delete them as required. When edit points have been set incorrectly, for example when an OUT point is located before an IN point or when the duration of editing segments on the player and recorder do not match, the DELETE button flashes to alert you that a preview or edit cannot be carried out. In this case, either modify the erroneous edit point, or first delete it and then enter it correctly.

To turn a flashing DELETE button off
The DELETE button goes off when the erroneous edit point is correct.

To modify an edit point

Use the following procedure.



1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to modify the edit point.

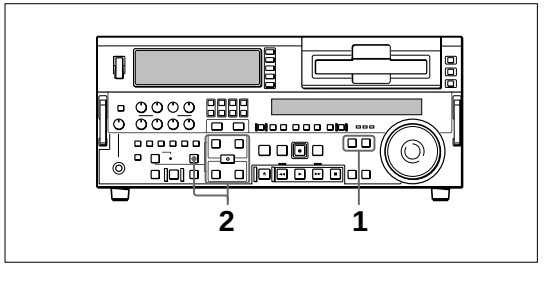
The button you have pressed lights.

2 Hold down the IN, OUT, AUDIO IN, or AUDIO OUT button corresponding to the edit point you wish to modify, and press the TRIM buttons (+ or –).

While you hold down the button, the time value for the edit point appears in the display section; pressing the +button increases the value by one frame, and pressing the –button decreases it by one frame.

To delete an edit point

To delete an edit point, use the following procedure. You can use the same procedure whether or not the DELETE button is flashing.



(Continued)

Automatic Editing

1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to delete the edit point.

The button you have pressed lights.

2 Hold down the DELETE button and press the IN, OUT, AUDIO IN, or AUDIO OUT button according to the edit point you wish to delete.

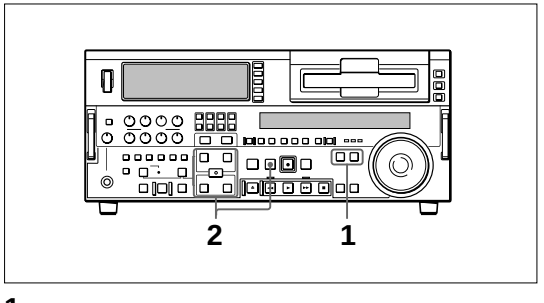
The edit point is deleted, and the DELETE button goes off.

Cuing Up to Edit Points

You can cue up to any edit point, or cue up to a position located a specified amount of time before the edit start point (preroll).

To cue up to an edit point

Use the following procedure.



1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to cue up to an edit point.

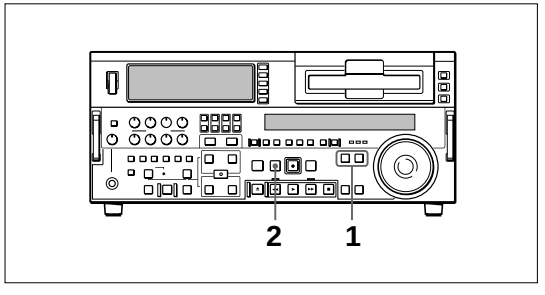
The button you have pressed lights.

2 Hold down the IN, OUT, AUDIO IN, or AUDIO OUT button according to the edit point to which you wish to cue up, and press the PREROLL button.

The edit point you have selected is cued up.

To preroll

Use the following procedure.



1 Press the RECORDER button or PLAYER button to select the VCR on which you wish to carry out a preroll.

The button you have pressed lights.

2 Press the PREROLL button.

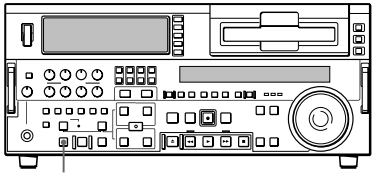
The tape is wound back to a position 5 seconds (factory default setting) before the edit IN point, and stops.

To change the preroll time

The factory default setting for the preroll time is 5 seconds, but you can use basic menu item 001 to change this to any value from 0 to 30 seconds. If you change the preroll time, make sure that the setting is not longer than the recording length before the edit IN point.
Note that for automatic editing, the preroll time setting on the recorder takes precedence.

Checking Edit Results—Preview

When you have set the edit points, the PREVIEW button flashes, indicating that you can carry out a preview.



To carry out a preview, press the PREVIEW button.
The PREVIEW button changes from flashing to continuously lit, and the preview is carried out.
At the end of the preview, the PREVIEW button flashes again.

To stop the preview
Press the STOP button.
The tape stops at the position where you pressed the button.

To return the tape to the preroll point
Press the PREROLL button.

To return the tape to the IN point or OUT point
Press the PREROLL button and the IN button or OUT button simultaneously.

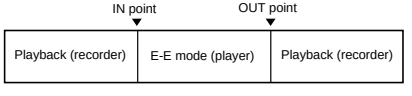
After the preview, make any necessary adjustments to the edit points, then repeat the preview.

For details of how to modify or delete edit points, see the section "Modifying Edit Points" (page 76).

Monitor output during a preview

During a preview, you can monitor the following video and audio on a monitor connected to the recorder.
- From the preroll point to the IN point, you can monitor the playback from the recorder.
- From the IN point to the OUT point, you can monitor the playback from the player through the recorder in E-E mode.
- From the OUT point to the postroll point, you can monitor the playback from the recorder.

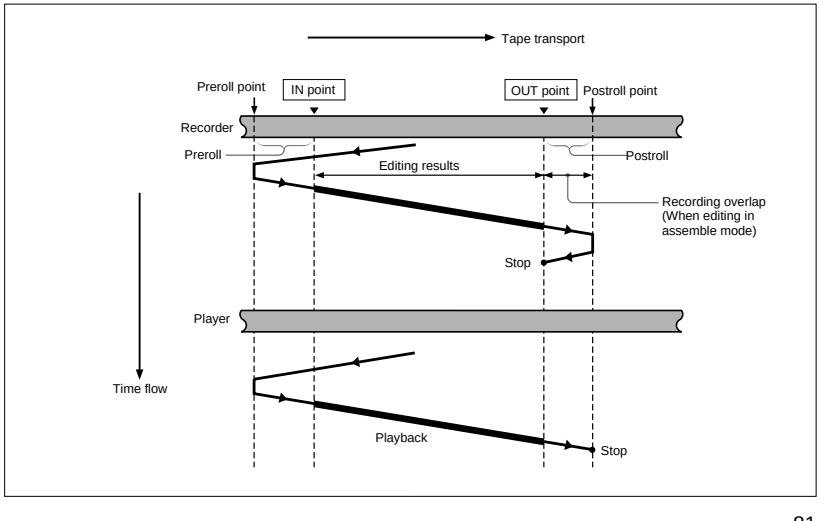
The following figure illustrates this.



Executing Automatic Editing

Overview of editing operations

The figure below shows how the recorder and player operate during editing.



Automatic Editing

Monitor output during an edit

During execution of an automatic edit, on a monitor connected to the recorder, you can monitor the same video and audio as during a preview *(see page 81)*.
However, during preread editing *(see page 87)*, only the playback from the recorder can be monitored.

Using a single monitor for video and audio on both player and recorder

For efficient editing if only one monitor is available, use the following method.

1 Connect the monitor to the recorder.

2 In the setup menus, set item 008 to "AUTO".

3 Press the PLAYER button on the recorder.

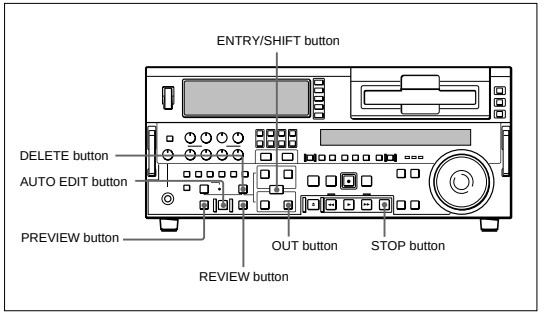
This forces the recorder to E-E mode, in which the player video and audio signals are output to the monitor.

Note

Continuous recording must exist on the recorder tape to be used in issert editing. It is not possible to carry out editing on a section of the tape with no signal recorded.

Starting automatic editing

When you have set the edit points, press the flashing AUTO EDIT button.
The AUTO EDIT button changes from flashing to continuously lit, and the automatic editing operation begins.
At the end of the editing operation, the AUTO EDIT button goes off.



To change the OUT point after starting automatic editing operation

After starting the automatic editing operation, to end the operation before the preset OUT point, hold down the ENTRY/SHIFT button and press the OUT button.
The position where you pressed the button becomes the OUT point, and editing ends.

To abandon automatic editing

Press the STOP button.
The automatic editing operation is abandoned. At the same time, the PREVIEW button and AUTO EDIT button start flashing, and the state before the editing was started is restored.
In this case, the IN and OUT points already set are preserved so that you can carry out a preview or automatic editing operation again by pressing the PREVIEW button or AUTO EDIT button.

Reviewing the editing results

After carrying out an editing operation, you can carry out a review, to check the editing results on the monitor.
To carry out a review, after carrying out the edit, and before you set any new edit points or make other settings, press the REVIEW button.
The REVIEW button lights, and the review is carried out.
At the end of the review the REVIEW button goes off, and the tape returns to the OUT point.

After automatic editing, to adjust the edit points and reexecute the edit

Hold down the DELETE button and press the ENTRY/SHIFT button to recall the edit points. After adjusting the edit points, press the AUTO EDIT button to carry out the edit again.

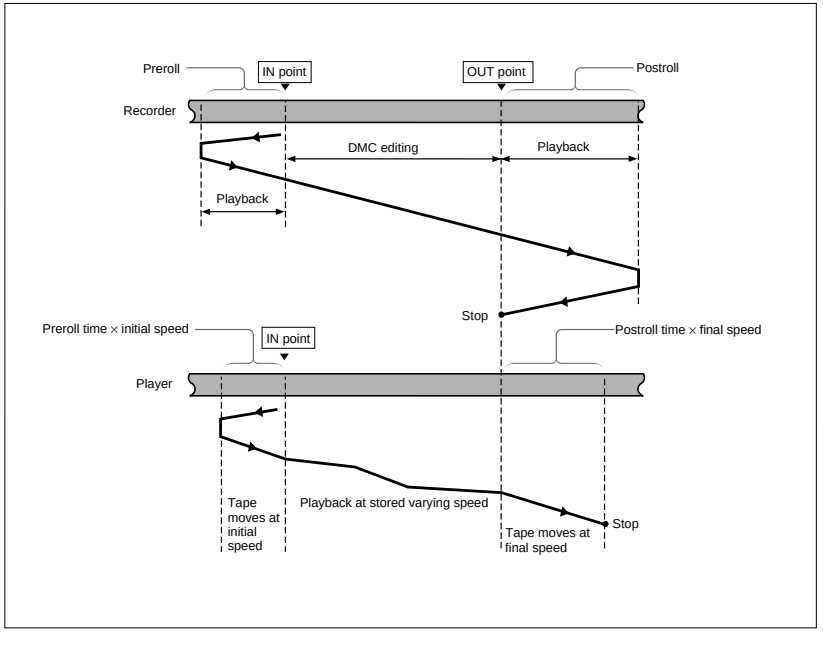
For details of how to adjust edit points, see the section "Modifying Edit Points" (page 76).

DMC Editing

You can carry out variable speed editing, controlling the player playback speed from the recorder.

Overview of DMC Editing

The following figure illustrates how the tapes move on both the player and recorder during DMC editing.

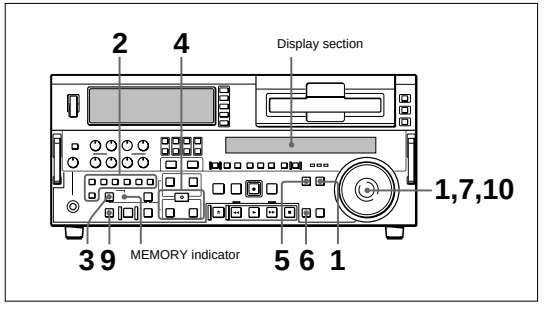


DMC editing can be used for insert or assemble editing, but cannot be used for audio split editing.
DMC editing cannot be carried out using the i.LINK connector.

Carrying Out DMC Editing

Setting the edit points and player speed

Use the following procedure.



1 Press the RECORDER button.

2 Press the ASSEMBLE button or INSERT button to select an edit mode.

3 Press the DMC EDIT button.

The unit switches to the DMC edit mode, and the DMC EDIT button lights.

4 Holding down the ENTRY/SHIFT button, press the IN or OUT button to set an edit point.

5 Press the PLAYER button, to set the player IN point.

Note
It is not possible to set the player OUT point.

6 Press the SEARCH button or search dial so that the SHUTTLE indicator in the display section is lit.

7 Holding down the DMC EDIT button, turn the search dial to set the initial speed.
To select normal speed as the initial speed, press the PLAY button.

The speed you set appears in the display section.

8 When the initial speed setting is complete, release the DMC EDIT button.

(Continued)

DMC Editing

9 Press the PREVIEW button.

The tape is prerolled and then the recorder starts operating at normal speed and the player at the set initial speed.

10 On passing the IN point, the MEMORY indicator begins to flash: turn the search dial to vary the playback speed.

While the MEMORY indicator is flashing, the speed variations are stored in memory. On passing the OUT point, the MEMORY indicator changes from flashing to continuously lit, and the variable speed storing ends.

If the MEMORY indicator lights continuously before the speed variation end point

This indicates that the memory became full at that point. Thus even before the OUT point is reached, it is not possible to record more speed variation. The maximum capacity is a duration of 120 seconds.

To quit the DMC edit mode

Hold down the DELETE button and press the DMC EDIT button.

To execute the DMC edit

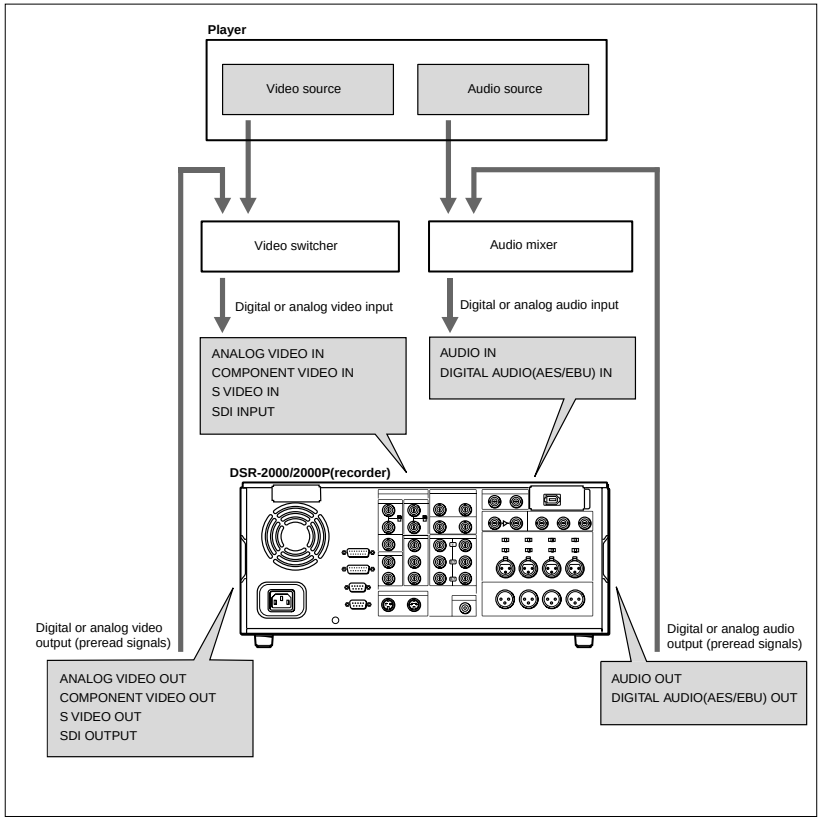
Press the AUTO EDIT button.
DMC editing is carried out at the stored varying speed.
Once the editing is carried out, the stored speed variation is lost from memory.

To check the editing results

Press the REVIEW button.

Preread Editing

Video and audio signals already recorded on the recorder tape can be used as an edit source for insert editing. This type of editing is called “preread editing”, as the VCR uses the preread heads to read the signals in advance from the tape.
The video signals read out by the preread heads can be sent to a video switcher, and combined with video signals from the player for recording.
The audio signals read out by the preread heads can be sent to an audio mixer for mixing with audio signals from the player for recording, and can be recorded either on the original channels or on other audio channels.

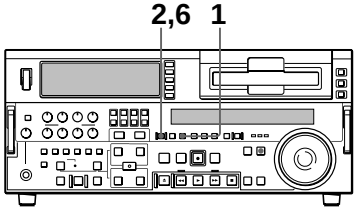


Preread Editing

Note

- You cannot carry out preread editing using SDTI or i.LINK signals.
- When the preread mode is selected (the PREREAD button is lit), to prevent feedback in the loop connection, no E-E video out is available, regardless of the operating mode of the unit. When preread mode is turned off after preread editing, however, if the same channel remains connected to both input and output, an E-E signal is output, and feedback will occur. To prevent this, select PB mode as in step **1** of the following procedure.
- As for a video switcher, use a model that is not provided with a frame memory.

To carry out preread editing, use the following procedure.



1 Press the PB button, turning it on.

2 Press the PREREAD button, turning it on.

3 Make the necessary connections for the preread editing. *(See the illustrations on the previous page and on page 129.)*

4 After selecting the desired insert edit mode, carry out the preread editing.

For details of how to select an edit mode, set edit points, etc., see Chapter 4 "Editing" (page 67).

5 When the preread editing is completed, remove the connections.

6 Press the PREREAD button, turning it off.

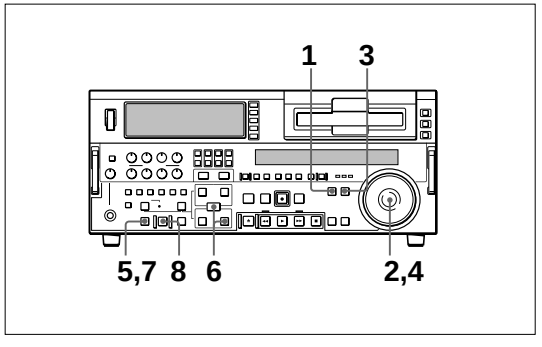
Special Editing Methods

This section describes the following editing methods.

- **Quick editing**
  After selecting an edit mode, you can save on editing time by setting the edit points and previewing (or executing) the edit at the same time.
- **Continuous editing**
  When you execute multiple edits in succession, you can edit from the second time on by setting the player IN and OUT points only.
- **Standalone editing**
  You can carry out editing using as the player an external device, for example a signal generator, which cannot be controlled remotely through the REMOTE-IN or REMOTE-OUT connector.
- **Manual editing**
  Without setting edit points in advance, you can carry out editing manually while watching the monitor screen.
- **Adding a narration (Sound-on-sound)**
  Using this unit alone, it is possible to carry out simple sound-on-sound editing (such as adding a narration).

Quick Editing

After selecting an edit mode, you can save on editing time by setting the edit points and previewing (or executing) the edit at the same time.



1 Press the PLAYER button, turning it on.

2 Stop the tape on the player at the position you wish to make the IN point.

3 Press the RECORDER button, turning it on.

4 Stop the tape on the recorder at the position you wish to make the IN point.

5 Press the PREVIEW button.

A preview starts.
The tape positions determined in steps **2** and **4** are set as the player IN point and recorder IN point, respectively.

6 Watching the editing on the monitor, at the position you wish to make the OUT point, hold down the ENTRY/SHIFT button and press the OUT button.

Both the player OUT point and recorder OUT point are set.

7 Carry out another preview and modify the edit points as required.

For details of how to modify edit points, see the section "Modifying Edit Points" (page 76).

8 Press the AUTO EDIT button.

The edit starts.
When the edit finishes, the recorder stops at the OUT point and the player stops about 2 seconds after the OUT point.

To edit even more quickly

By skipping the preview in the foregoing procedure, you can execute the edit even more quickly. To do so, proceed as follows.

1 Perform steps **1** through **4** of the foregoing procedure.

2 Press the AUTO EDIT button.

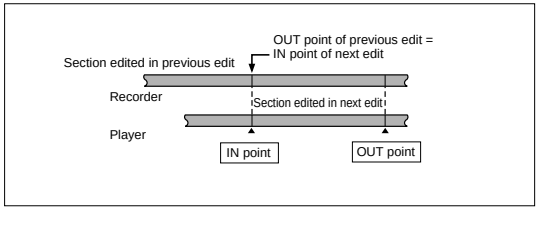
The edit starts.

3 Watching the editing on the monitor, at the position you wish to make the OUT point, hold down the ENTRY/SHIFT button and press the OUT button.

The edit ends.
The point where the edit started is set as the IN point, and the point where the edit ended is set as the OUT point.

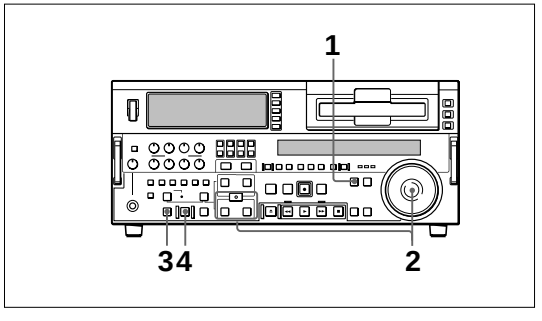
Continuous Editing

When you execute multiple edits in succession, you can edit from the second time on by setting the player IN and OUT points only.
After execution of an edit, the recorder returns automatically to the OUT point. Therefore, the recorder OUT point of the current edit becomes the IN point of the next edit.



Special Editing Methods

To carry out continuous editing, use the following procedure.



1 Press the PLAYER button, turning it on.

2 Set the player IN and OUT points.

For details of how to set IN and OUT points, see the section "Setting Edit Points" (page 72).

On the recorder, the OUT point for the previous edit becomes the new IN point.

3 Press the PREVIEW button to carry out a preview.

4 Press the AUTO EDIT button.

The edit starts.
When the edit finishes, the recorder stops at the OUT point and the player stops about 2 seconds after the OUT point.

To stop the edit
Press the ENTRY/SHIFT button together with the OUT button.
The edit ends, and the point where you pressed the buttons becomes the OUT point.

To abort the edit
Press the STOP button.

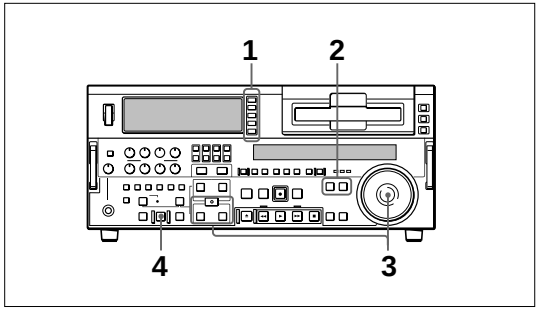
By repeating this process, you can carry out continuous editing.

With extended menu item 326, a setting can be made so that the preceding OUT point automatically becomes the new IN point.

Standalone Editing

This method allows you to use as the player an external device which cannot be controlled remotely through the REMOTE-IN or REMOTE-OUT connector. For example, you can record a color bar signal from a signal generator in the joints between the scenes of an already completed tape.

For standalone editing, use the following procedure.



1 In the input selection section, select the signal being generated by the signal generator connected to the unit.

For details of the input selection section, see page 14.

2 Press both the PLAYER button and RECORDER button, turning them off.

3 Set the IN point and, if necessary, also OUT point.

The AUTO EDIT button flashes.

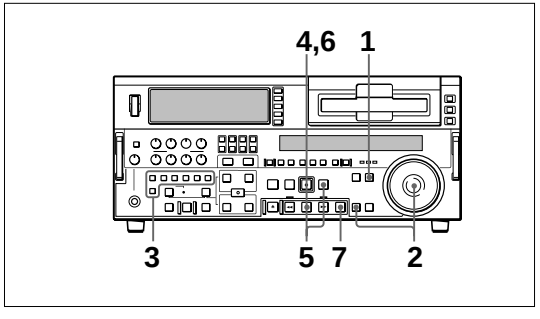
For details of how to set IN and OUT points, see the section "Setting Edit Points" (page 72).

4 Press the AUTO EDIT button.

The edit is carried out.

Manual Editing

To carry out manual editing, start playback on the player beforehand, then use the following procedure.



1 Press the RECORDER button, turning it on.

2 Use the search dial in jog or shuttle mode to find the edit start point (the recorder IN point), and stop the tape just before this point.

3 Select an edit mode.

For details of how to select an edit mode, see the section "Selecting an Edit Mode" (page 71).

4 Press the PLAY button.

The recorder begins playback.

Note

It takes about two seconds until the playback video stabilizes. For this reason, start the playback from before the segment of video you wish to use.

5 At the edit start point (the recorder IN point), press the EDIT button and PLAY button simultaneously.

The edit starts.

6 At the edit end point (the recorder OUT point), press the PLAY button.

The edit ends, and the recorder continues with playback.

7 Press the STOP button to stop the recorder playback.

Adding a Narration (Sound-on-Sound)

By means of preread editing with an audio mixer connected *(see page 87)*, you can mix in an audio signal with the existing recorded soundtrack, but extension menu item 819 provides a simple sound-on-sound editing function for adding a narration, using this unit alone.

To add a narration from microphone input

As an example, the following procedure describes how to record a narration mixed with audio channels 1 and 2 already recorded on the tape, when the microphone is connected to input audio channel 1.

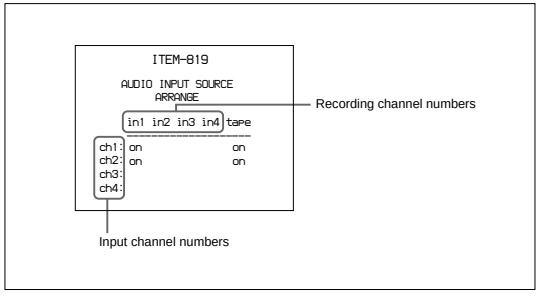
In this case, first connect the microphone to the AUDIO IN CH-1 connector, and set the audio input and editing mode as follows.

- In the input selection section *(see page 14)*, with the CH1, 1/2 button, select an analog audio signal.
- In the edit mode setting section *(see page 20)*, press the INSERT CH-1 and CH-2 buttons, turning them on.

After checking the above settings, use the following procedure.

1 Set extension menu item 819 as follows.

Extension menu item 819 settings (on monitor screen)



For details of extension menu item 819 settings, see page 123.

2 Press the MIXING button in the upper control panel, turning it on.

3 Carry out insert editing on audio channels 1 and 2 (CH-1 and CH-2) while reciting the narration into the microphone.

Chapter 5

ClipLink Operation

Overview of ClipLink Operation

The ClipLink function provides the following.
- Displaying ClipLink log data
- Cueing up to Mark IN/OUT points and cue points
- Rewriting ClipLink log data (reel numbers, Mark IN/OUT points, and OK/NG status only)
- Creating additional ClipLink log data and deleting ClipLink log data (Mark IN/OUT points only)
- Automatically creating new ClipLink log data (Mark IN/OUT points only)

When Mark IN/OUT points are created, the scene number and take number for them are fixed at 000 and 00, respectively.

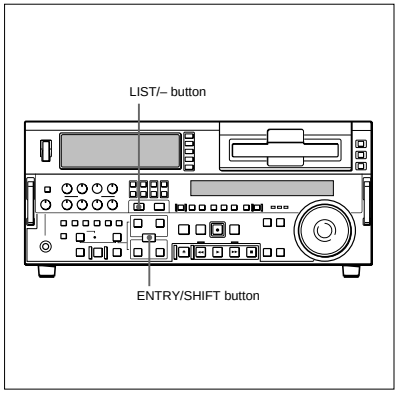
The above operations other than automatic creation of new ClipLink log data require the ClipLink log data list display.

Notes
- For a tape on which index pictures are already recorded, you cannot change any ClipLink log data other than the reel numbers and OK/NG status. (When index pictures are recorded on a tape, the ClipLink log data list for the tape shows an IP indication.)
- You cannot carry out ClipLink operation such as "Continue" on the DSR-1/1P or DSR-300/300P/500WS/500WSP for a tape whose ClipLink log data has been modified on this unit.

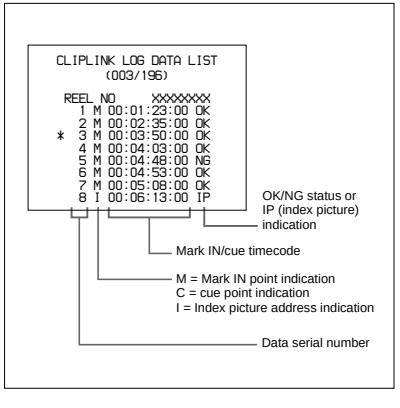
For an overview of the ClipLink function, see the appendix " ClipLink Guide" (page 147).

Displaying ClipLink Log Data

To display ClipLink log data, hold down the ENTRY/SHIFT button and press the LIST/– button.



The following ClipLink log data list appears in the monitor.

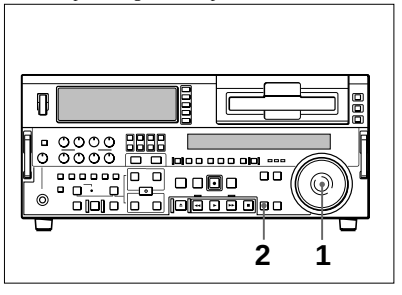


To return to the original monitor display

To exit from the ClipLink log data list and return to the original monitor display, hold down the ENTRY/SHIFT button and press the LIST/– button.

Detailed Data Display

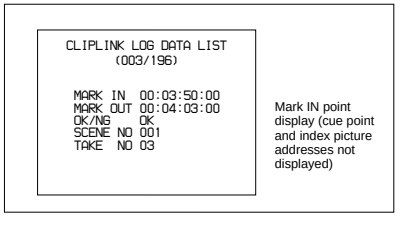
To check more details related to the data item selected on the ClipLink log data list, proceed as follows.



1 Using the search dial, move the selection mark (asterisk) to the data item for which you wish to display details.

2 Press the SEARCH button.

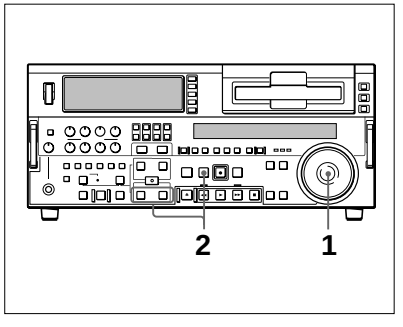
While you hold the SEARCH button down, the detailed data display appears.



Cuing Up to Mark IN/OUT and Cue Points

Cuing Up to Any Desired Position

To cue up to the point specified by the data item selected on the ClipLink log data list, proceed as follows.



1 Using the search dial, move the selection mark (asterisk) to the desired data item on the ClipLink log data list.

When the selected data item display contains "M" mark

The Mark IN point address is stored as the IN point and the Mark OUT point address is stored as the OUT point. At the same time, the IN button and the OUT button on the control panel light.

When the selected data item display contains "C" mark

The cue point address is stored as the IN point and the IN button on the control panel lights.

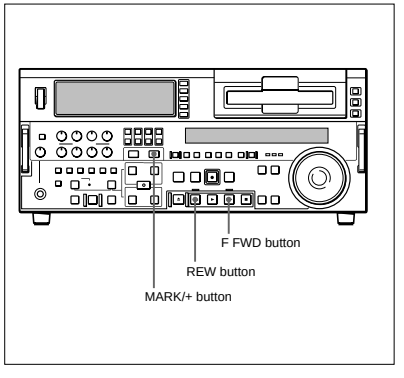
2 Operate as follows.

- **To cue up to the mark IN point or cue point**
  Holding down the IN button, press the PREROLL button.
- **To cue up to the mark OUT point**
  Holding down the OUT button, press the PREROLL button.

This exits from the ClipLink log data list and cues up to the selected position.

Cuing Up to Adjacent Mark IN/Cue Points

Once you select data on a ClipLink log data list, you can cue up to the point preceding or following the selected data with ease without reverting to the ClipLink log data list.



To cue up to the Mark IN point or cue point preceding the current point selected on the list

Holding down the MARK/+ button, press the REW button.
During the cue-up operation is in progress, the REW button flashes.

To cue up to the Mark IN point or cue point following the current point selected on the list

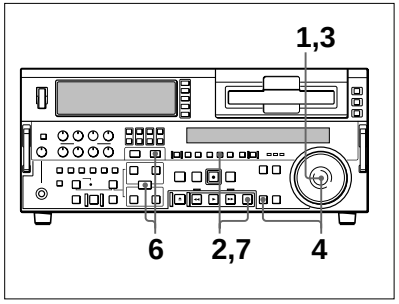
Holding down the MARK/+ button, press the F FWD button.
During the cue-up operation is in progress, the F FWD button flashes.

Rewriting ClipLink Log Data

You can rewrite the reel number, Mark IN/OUT points and OK/NG status included in the ClipLink log data.

Changing the Reel Number

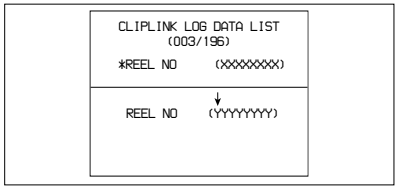
To change the reel number of the data item selected on the ClipLink log data list, proceed as follows.



1 Using the search dial, move the selection mark (asterisk) to the desired data item on the ClipLink log data list.

2 Hold down the STOP button and press the SET button.

The following setting screen appears.



3 Turn the search dial to select the digit to change.

Rotating the search dial clockwise moves the current digit position to the right, and counterclockwise moves it to the left.

4 Hold down the SEARCH button and turn the search dial to change the digit indicated by an arrow (↓).

5 Repeat steps **3** and **4** until the settings for all digits are complete.

6 When all digits have been set, hold down the ENTRY/SHIFT button and press the MARK/+ button.

The reel number changes.

7 Hold down the STOP button and press the SET button.

This returns to the original ClipLink log data list.

Note

If you carry out step **7** skipping step **6**, the original ClipLink log data list appears again on the monitor and, in this case, the reel number is not rewritten.

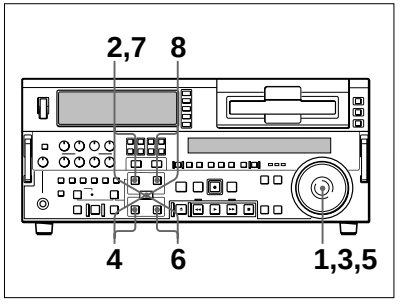
Changing Mark IN/OUT Points

To change Mark IN/OUT points selected on the ClipLink log data list, perform the following procedure.

When Mark IN/OUT points are rewritten to the cassette memory, the frame digits of the address data are processed as follows.

For Mark IN point: Any frame-digits value is counted as 1 second.

For Mark OUT point: Any frame-digits value is ignored.



1 Using the search dial, move the selection mark (asterisk) to the desired data item on the ClipLink log data list.

The Mark IN point address is stored as the IN point and the Mark OUT point address is stored as the OUT point. At the same time, the IN button and OUT button light and the ENTRY/SHIFT button starts flashing.

2 Perform either one of the following operations.
- Hold down the ENTRY/SHIFT button and press the LIST/– button, exiting from the ClipLink log data list.
- Cue up to the IN point or OUT point. *(See page 99.)*

3 Cue up to the tape position to be made the new Mark IN point. *(See page 72.)*

4 Holding down the IN button, press the ENTRY/SHIFT button.

The ENTRY/SHIFT button lights and the Mark IN point address changes.

5 Cue up to the tape position to be made the new Mark OUT point. *(See page 72.)*

6 Holding down the OUT button, press the ENTRY/SHIFT button.

The Mark OUT point address changes.

7 Holding down the ENTRY/SHIFT button, press the LIST/– button to display the ClipLink log data list, then make sure the selection mark (asterisk) is kept at the position of the desired data item selected in step **1**.

If the selection mark (asterisk) is at a wrong position

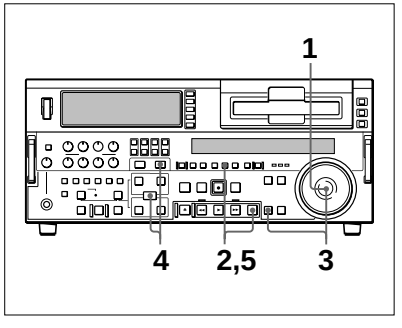
Using the search dial, return the selection mark to the desired data item.

8 Holding down the ENTRY/SHIFT button, press the MARK/+ button.

The ENTRY/SHIFT button goes out and the Mark IN point and Mark OUT point addresses are rewritten.

Changing the OK/NG Status

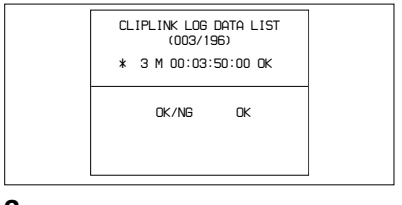
To change the OK/NG status of the data item selected on the ClipLink log data list, proceed as follows.



1 Using the serarch dial, move the selection mark (asterisk) to the desired data item on the ClipLink log data list.

2 Hold down the STOP button and press the SET button.

The following setting screen appears.



3 Hold down the SEARCH button and turn the search dial to change the setting to OK or NG as required.

4 Holding down the ENTRY/SHIFT button, press the MARK/+ button.

The OK/NG status is rewritten.

(Continued)

Rewriting ClipLink Log Data

5 Hold down the STOP button and press the SET button.

This returns to the original ClipLink log data list.

Note

If you carry out step **5** skipping step **4**, the original ClipLink log data list appears again on the monitor and, in this case, the OK/NG status is not rewritten.

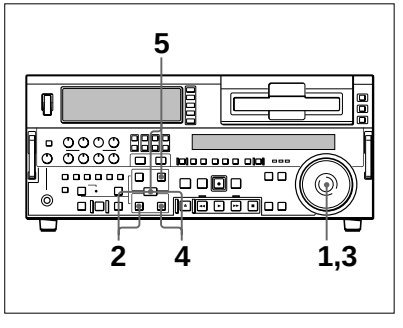
Adding to/Deleting From ClipLink Log Data

You can add new Mark IN/OUT point data to the ClipLink log data or delete Mark IN/OUT point data from the ClipLink log data.

Adding Mark IN/OUT Points

Set the setup menu item 129 (CLIPLINK) to ON beforehand, then proceed as follows.

For information about how to operate the setup menu, see Chapter 6 "Setup Menu" on page 107.



1 Cue up to the tape position you wish to make an additional Mark IN point. *(See page 72.)*

2 Holding down the IN button, press the ENTRY/SHIFT button.

The IN button lights, and the Mark IN point address is set.

3 Cue up to the tape position you wish to make an additional Mark OUT point. *(See page 72.)*

4 Holding down the OUT button, press the ENTRY/SHIFT button.

The OUT button and ENTRY/SHIFT button light, and the Mark OUT point address is set.

5 Holding down the ENTRY/SHIFT button, press the MARK/+ button.

The ENTRY/SHIFT button goes out, and the Mark IN point and Mark OUT point data is added to the end of the existing ClipLink log data.

Note

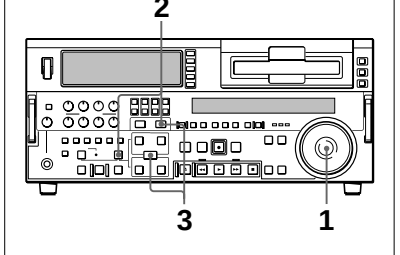
The volume of ClipLink log data that can be stored in a cassette memory depends on the cassette memory capacity as follows.

Cassette memory capacity	Storable volume of data
4K bits	45 pairs of Mark IN and Mark OUT points
16K bits	198 pairs of Mark IN and Mark OUT points

When adding to the existing ClipLink log data, carefully watch the ClipLink log data list not to allow the additional data to exceed the available cassette memory capacity.

Deleting Mark IN/OUT Points

After displaying the ClipLink log data, proceed as follows.



1 Using the search dial, move the selection mark (asterisk) to the desired data item on the ClipLink log data list.

(Continued)

Adding to/Deleting From ClipLink Log Data

2 Holding down the DELETE button, press the MARK/+ button.

The specified data disappears from the ClipLink log data list.

3 Holding down the ENTRY/SHIFT button, press the MARK/+ button.

Note

If you exit from the ClipLink log data list skipping step **3**, the previous data is restored. The data specified for deletion is not deleted.

Automatically Creating New ClipLink Log Data

When the setup menu item 129 (CLIPLINK) is set to ON, you can automatically create new Mark IN/OUT points during recording or editing operation.

For information about how to operate the setup menu, see Chapter 6 "Setup Menu" on page 107.

New Mark IN/OUT points are created as follows.

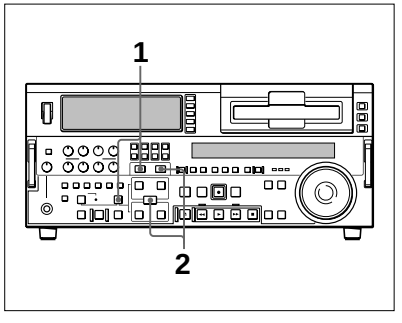
Operation	Automatic creation of Mark IN/OUT points
Recording	The recording starting point is made a Mark IN point and the recording ending point is made a Mark OUT point.
Editing	The edit IN point (the video IN point or audio IN point whichever coming first) is made a Mark IN point and the edit OUT point is made a Mark OUT point.

Notes

- If recording or editing is carried out when the setup menu item 129 (CLIPLINK) is set to OFF, the existing ClipLink log data is erased.
- If you carry out recording or editing on a tape on which index pictures are already recorded, the existing ClipLink log data for the tape is lost.
- The Mark IN/OUT point data automatically created during recording or editing operation for a tape on which no index pictures are recorded is added to the end of the existing ClipLink log data for the tape. In this case, if you carry out recording or editing on a tape position linked to the existing ClipLink log data, the link between them is lost. Therefore, when you start creating new ClipLink log data, where on the tape to start recording or editing must be determined very carefully. **If the existing ClipLink log data is no longer required, erase it beforehand.**

To erase ClipLink log data

After displaying the ClipLink log data list, proceed as follows.



1 Holding down the DELETE button, press the LIST/– button.

The data shown on the ClipLink log data list disappears.

2 Holding down the ENTRY/SHIFT button, press the MARK/+ button.

The message "NO CLIPLINK LOG DATA" appears on the screen and the ClipLink log data is completely erased.

Chapter 6

Setup Menu

Menu System Configuration

The setup menu system of this unit comprises the basic menu and extended menu.

• **Basic menu**
This menu is used to make settings relating, for example, to the following.
– the digital hours meter
– the preroll time
– the text information superimposed on the video output to the monitor
– the menu banks for retaining menu settings

For detailed information about menu operation relating to the digital hours meter, see “Digital hours meter” (page 136).

• **Extended menu**
This menu is used to make a wide range of settings relating to the functions of this unit, for example, the control panel functions, video and audio control, and digital data processing.

Basic Menu

Items in the Basic Menu

The basic menu items (excluding the items related to the digital hours meter) are listed in the following table.

In the “Settings” column of the table, the factory default settings are indicated by an enclosing box.

Basic Menu

Items in the basic menu

Item number	Item name	Settings
001	PREROLL TIME	**0S... 5S ...30S:** Set the preroll time to between 0 and 30 seconds in steps of 1 second. A preroll time of at least 5 seconds is recommended when using this unit for editing.
002 a)	CHARACTER H-POSITION	Adjust the horizontal screen position (as a hexadecimal value) of the text information output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector for superimposed display on the monitor. **00... 0A ...2A (DSR-2000) /00... 09 ...29 (DSR-2000P):** The hexadecimal value 00 is for the far left of the screen. Increasing the value moves the position of the characters to the right.
003 a)	CHARACTER V-POSITION	Adjust the vertical screen position (as a hexadecimal value) of the text information output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector for superimposed display on the monitor. **00... 2E ...38 (DSR-2000)/00... 37 ...43 (DSR-2000P):** The hexadecimal value 00 is for the top of the screen. Increasing the value lowers the position of the characters.
004	SYNCHRONIZE	When editing using this unit as a controller and an external VCR connected to this unit via a 9-pin remote control cable or i. LINK/DV cable, this item determines whether or not to operate the two units in phase synchronization. **ON:** Operate in phase synchronization. **OFF:** Do not operate in phase synchronization.
005	DISPLAY INFORMATION SELECT	Determine the kind of text information to be output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector when the CHARACTER switch on the subsidiary control panel is set to ON. **T&STA:** Time data and the units status. **T&UB:** Time data and user bit data. (When U-BIT is selected with the COUNTER SEL button, the user bit data and time data arranged in that order are displayed.) **T&CNT:** Time data and counter count. (When COUNTER is selected with the COUNTER SEL button, the counter count and time data arranged in that order are displayed.) **T&T:** Time data and time code (TC or VITC). **TIME:** Timecode (TC or VITC) only. **DATE:** Recording date and time.
006	LOCAL FUNCTION ENABLE	Determine which tape transport control buttons on the control panel are enabled when this unit is controlled from external equipment. **DIS:** All buttons and switches are disabled. **ST&EJ:** Only the STOP button and EJECT button are enabled. **ENA:** All buttons and switches except the RECORDER button and PLAYER button are enabled.
007	TAPE TIMER DISPLAY	Determine whether to display the counter in 12-hour mode or 24-hour mode. **+ –12H:** 12-hour mode **24H:** 24-hour mode
008	MONITORING SELECTION FOR VTR-TO-VTR EDIT	For editing with two DSR-2000/2000P units, determine whether the recorder unit is forced into E-E mode when the recorder PLAYER button is pressed to view the player playback signals on the monitor. **MANU:** Do not force the recorder into E-E mode. **AUTO:** Force the recorder into E-E mode.
009 a)	CHARACTER TYPE	Determine the type of characters such as time code output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector for superimposed display on the monitor. **WHITE:** White letters on a black background. **BLACK:** Black letters on a white background. **W/OUT:** White letters with black outline. **B/OUT:** Black letters with white outline.

a) When setting items 002, 003, and 009, watch the monitor screen, and adjust to the required state.

(Continued)

Items in the basic menu (continued)

Item number	Item name	Settings
011 a)	CHARACTER V-SIZE	Determine the vertical size of characters such as time code output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector for superimposed display on the monitor. **×1**: Standard size **×2**: 2 times standard size
015 a)	MENU DISPLAY	Determine the type of characters in menu text output from the VIDEO OUT 3 (SUPER) connector and SDI OUTPUT 3 (SUPER) connector for superimposed display on the monitor. **WHITE:** White letters on a black background. **BLACK:** Black letters on a white background. **W/OUT:** White letters with black outline. **B/OUT:** Black letters with white outline.
016	ALARM	Select whether or not to display alarm messages. **OFF:** No alarm messages. **LIMIT:** Display alarm messages only during recording or editing. **ON:** Display alarm messages.
017	SUB STATUS DISPLAY SELECT	Select supplementary status information superimposed on the output from the VIDEO OUT 3 connector and SDI OUT 3 connectors to the monitor. **OFF:** Nothing of supplementary status information **TIC MODE:** Indications of the operating mode of internal time code generator **AUDIO MIX MODE:** Indications of input audio mixing **TAPE REMAIN:** Remaining capacity of the tape
099	MENU GRADE	For setup menu operations, select whether to display the basic menu information only or both the basic menu information and the extended menu information. **BASIC:** Display the basic menu information only. **ENHAN:** Display both the basic menu information and the extended menu information.

a) When setting items 011 and 015, watch the monitor screen, and adjust to the required state.

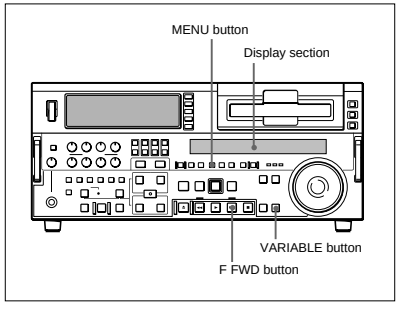
Item number	Item name	Settings
B01	RECALL BANK 1	Set to ON to recall menu settings from menu bank 1.
B02	RECALL BANK 2	Set to ON to recall menu settings from menu bank 2.
B03	RECALL BANK 3	Set to ON to recall menu settings from menu bank 3.
B04	RECALL BANK 4	Set to ON to recall menu settings from menu bank 4.
B11	SAVE BANK 1	Set to ON to save current menu settings to menu bank 1.
B12	SAVE BANK 2	Set to ON to save current menu settings to menu bank 2.
B13	SAVE BANK 3	Set to ON to save current menu settings to menu bank 3.
B14	SAVE BANK 4	Set to ON to save current menu settings to menu bank 4.

Basic Menu Operations

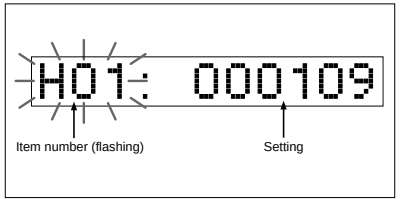
This section describes the basic menu display and how to change the settings.

For information about how to use items B01 to B14, see the section "Menu bank operations (menu items B01 to B14)" (page 112).

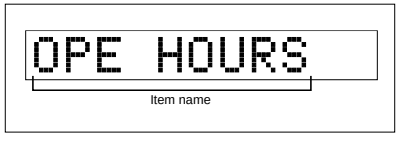
Displaying the menu



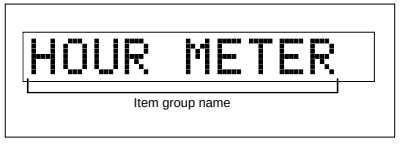
Press the MENU button.
The F FWD button and VARIABLE button light and the setting of the currently selected menu item appears in the display section of the lower control panel.



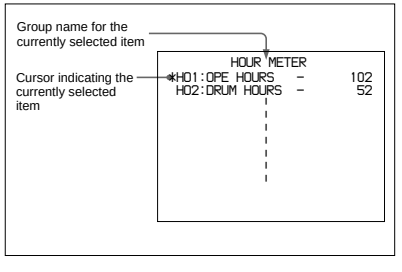
To display the full item name
Hold down the F FWD button.



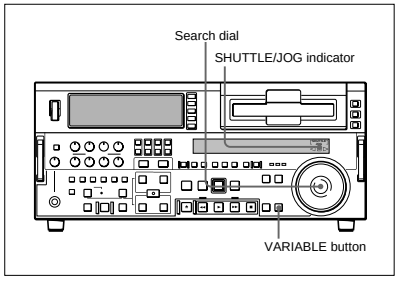
To display the item group name
Items in the menu are arranged in groups, by the 100's digit of the item number. To display the name of the group to which the currently selected item belongs, hold down the VARIABLE button.



To display menus on the monitor
Set the CHARACTER switch on the subsidiary control panel to ON, then press the MENU button.
You can now view the menu as shown in the following figure on a monitor connected to the VIDEO OUT 3 (SUPER) connector or SDI OUTPUT 3 (SUPER) connector.



Changing the currently displayed menu item

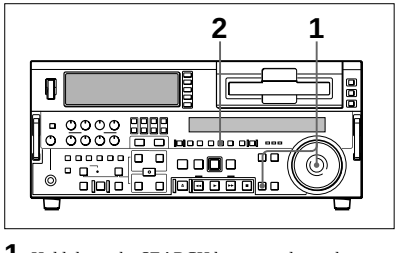


Turn the search dial.
Turning the search dial clockwise increments the item number, and turning it counterclockwise decrements the item number.
When you turn the search dial, the item number changes at a rate depending on the search dial position (when the SHUTTLE indicator is lit) or on the search dial rotation rate (when the JOG indicator is lit).

To skip from one item group to the next
Hold down the VARIABLE button, and turn the search dial.

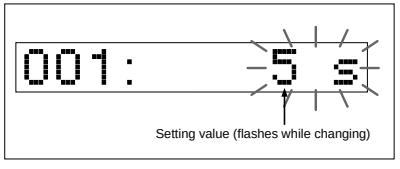
Changing a menu item setting value

To change the setting value of the currently displayed menu item, use the following procedure.



1 Hold down the SEARCH button, and turn the search dial.

The setting value changes at a rate depending on the search dial position (when the SHUTTLE indicator is lit) or on the search dial rotation rate (when the JOG indicator is lit).

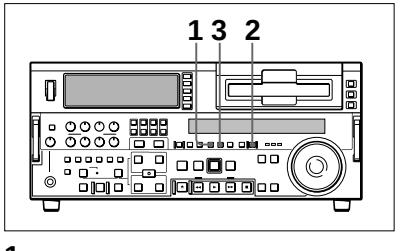


2 When the desired setting value is displayed, press the SET button.

This saves the new setting value, and the menu display disappears from the display section.

To abandon making a change
Press the MENU button before pressing the SET button.
The menu display disappears from the display section without the new setting value being saved.

Resetting the menu settings to their factory default values



1 Press the MENU button.

The menu appears in the display section.

2 Press the RESET button.

3 Press the SET button.

The menu settings are reset to their factory default settings.

Basic Menu

Menu bank operations (menu items B01 to B14)

This unit allows four different complete sets of menu settings to be saved in what are termed "menu banks" numbered 1 to 4. Saved sets of menu settings can be recalled for use as required.

To jump to menu item B01

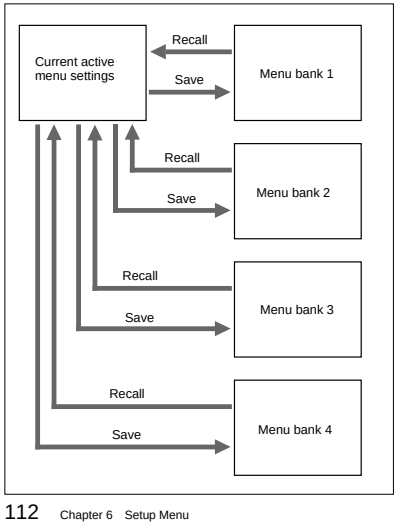
You can recall any required menu by turning the search dial after pressing the MENU button.
If you press the MENU button first, then the COUNTER SEL button, you can jump directly to menu item B1 or H01. The recalled menu item toggles between B01 and H01 every time you press the COUNTER SEL button.

Saving the current active menu settings

Set one of menu items B11 SAVE BANK 1 to B14 SAVE BANK 4 to ON, depending on which of the menu banks you wish to save in, then press the SET button.

Recalling settings from a menu bank

Set one of menu items B01 RECALL BANK 1 to B04 RECALL BANK 4 to ON, depending on which of the menu banks you wish to recall from, then press the SET button.



Extended Menu

Items in the Extended Menu

The extended menu contains the following items.
In the Settings column of the table, the factory default settings are indicated by an enclosing box.

Menu items in the 100s, relating to the control panels

Item number	Item name	Settings
101	SELECTION FOR SEARCH DIAL ENABLE	Select how the unit enters the search mode. **DIAL:** Press the SEARCH or VARIABLE button or, except during recording/editing, turn the search dial. **KEY:** Press the SEARCH or VARIABLE button.
102	MAXIMUM TAPE SPEED Sub-item	Specify the maximum tape speed in search mode (shuttle) or F.FWD (fast forward)/ REW (rewind) mode.
	1 SHUTTLE	Specify the maximum tape speed in search mode (shuttle). **X16:** Maximum 16 times normal **X32:** Maximum 32 times normal **X60:** Maximum 60 times normal
	2 F.FWD/REW	Specify the maximum tape speed in F.FWD/REW mode. **X32:** Maximum 32 times normal **X60:** Maximum 60 times normal **X85:** Maximum 85 times normal **MAX:** No maximum tape speed is specified. **Note** When this item is set to MAX, the playback video signal is muted.
105	REFERENCE SYSTEM ALARM	Select whether or not to display a warning when the reference video signal is not supplied or is out of phase with the input video signal. **OFF:** No warning. **LIMIT:** Flash the STOP button as a warning only when the reference video signal is out of phase with the input video signal. **ON:** Flash the STOP button as a warning.
107	REC INHIBIT LAMP FLASHING	Select whether to keep lit or flash the REC INHIBIT indicator when recording is prevented with the REC INHIBIT switch on the subsidiary control panel set to OFF. **OFF:** Light the REC INHIBIT indicator. **ON:** Flash the REC INHIBIT indicator.
108	AUTO EE SELECT	When a cassette is inserted and the PB/EE button is lit,select the operation modes in which input video and audio signals are automatically handled in E-E mode. **S/F/R:** In STOP/F FWD (fast-forward)/REW (rewind) modes **STOP:** In STOP mode
109	FORCED EE WHEN TAPE UNTHREAD	During tape threading and unthreading, or when no cassette is inserted, select whether the PB/EE button controls the output signal PB/EE setting. **ON:** No control (the signal is always an E-E signal). **OFF:** Control.

(Continued)

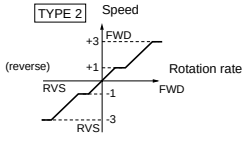
Extended Menu

Menu items in the 100s, relating to the control panels (continued)

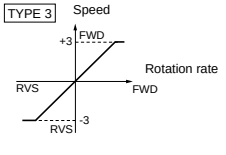
Item number	Item name	Settings
116	JOG DIAL RESPONSE	Select the tape speed characteristics for the search dial rotation rate in jog mode. **TYPE1: ** Tape speed varies linearly over the range –1 to +1. **TYPE2:** Tape speed varies stepwise as shown in the figure below[a] over the range –3 to +3. (Characterized by a zone around –1 and +1 where the tape speed is independent of the rotation rate) **TYPE3:** Tape speed varies linearly over the range –3 to +3, as shown in the figure below[b].
117	CONTROL PANEL SELECTION	Select the control panel function when the CONTROL PANEL switch on the subsidiary control panel is set to EXT. **SW: ** Only the control panel connected to the CONTROL PANEL control connector on the connector panel functions. **PARA:** Both the control panel connected to the CONTROL PANEL connector and the control panel of this unit function.
118	KEY INHIBIT SWITCH EFFECTIVE AREA	Select which switches and buttons can be operated when the KEY INHIBIT switch on the subsidiary control panel is set to ON. The following sub-items control different sets of switches and buttons independently.
	Sub-item	
	1 REMOTE SELECT	Select whether the REMOTE button on the upper control panel is enabled. **DIS: ** Disabled. **ENA:** Enabled.
	2 MON./ INPUT SEL	Select whether the buttons in the input selection section on the upper control panel and the MONITOR SELECT buttons on the lower control panel are enabled. **DIS: ** Disabled. **ENA:** Enabled.
	3 CONTROL PANEL	Select which switches and buttons on the control panel of this unit as well as the external control panel connected to this unit are enabled. **DIS: ** All switches and buttons are disabled. **EDIT:** All switches and buttons for editing operations are disabled. **ENA:** All switches and buttons are enabled.
119	VARIABLE SPEED LIMIT IN KEY PANEL CONTROL	Select the playback speed range when carrying out playback in variable mode from the control panel of this unit. **OFF: ** –1 to +2 times normal speed **ON:** 0 to +1 times normal speed.
125	AUTO REW	Select whether to rewind the tape automatically when recording or playback reaches the end of a tape. **DIS:** Do not rewind the tape automatically. **ENA: ** Rewind the tape automatically.

(Continued)

a)



b)



Menu items in the 100s, relating to the control panels (continued)

Item number	Item name	Settings
129	CLIPLINK	Select whether to create ClipLink log data. **OFF: ** Do not create. **ON**: Create. When recording, the recording starting point is made a Mark IN point and the recording ending point is made a Mark OUT point. When editing, the edit IN point (the video IN point or audio IN point whichever coming first) is made a Mark IN point and the edit OUT point (the video OUT point or audio OUT point whichever coming second) is made a Mark OUT point. **Note** If recording or editing is carried out when this item is set to OFF, the existing ClipLink log data is erased.
130	DISPLAY DIMMER CONTROL	Set the brightness of the audio level meters. **0 ...1...6 :** Set in this range. 0 is the brightest, and 6 the dimmest.

Menu items in the 200s, relating to the remote control interface

Item number	Item name	Settings
201	PARA RUN	Select whether or not to use synchronized operation for two or more VCRs. **DIS: ** No synchronized operation. **ENA:** Use synchronized operation. **Note** To use synchronized operation for two or more VCRs, set this item to ENA on all of the VCRs.

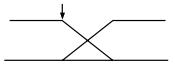
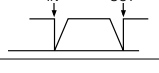
Menu items in the 300s, relating to editing operations

Item number	Item name	Settings
301	VAR SPEED RANGE FOR SYNCHRONIZATION	Select the playback speed range when carrying out playback in variable mode from a remote control unit connected to the REMOTE-IN connector or REMOTE-OUT connector. **–1~+1:** –1~+1 times normal speed. **–1.5 ~+2: ** –1.5 ~+2 times normal speed
305	SYNC GRADE	When editing in phase-synchronized mode with item 004 set to ON, select the target phase synchronization accuracy. **ACCUR: ** ±0 frame accuracy. **ROUGH:** ±1 frame accuracy.
306	DMC INITIAL SPEED	Select the initial speed automatically set when carrying out DMC editing. **MANUAL: ** The speed determined by the rotation of the search dial. **PLAY:** Normal playback speed. **STILL:** Stationary. **±0.03~±1:** Speed set in the range ±0.03 to ±1 (select from ±1, ±0.5, ±0.03, ±0.2, ±0.1.)

(Continued)

Extended Menu

Menu items in the 300s, relating to editing operations (continued)

Item number	Item name	Settings
307	AUTO-DELETION FOR INCONSISTENT DATA	Select what happens when an erroneous edit point is set. **MANU:** A warning is given by flashing the DELETE button on the lower control panel. The operator must manually delete the unnecessary edit point . **NEG&E:** When inconsistent edit points are set, such as when an OUT point is before an IN point, or an audio OUT point is before an audio IN point, or when too many edit points are specified, the previously set edit point is deleted. **NEG:** When inconsistent edit points are set, such as when an OUT point is before an IN point, or an audio OUT point is before an audio IN point, the previously set edit point is deleted. When too many edit points are specified, the DELETE button on the control panel flashes to give a warning. **Note** Pressing the button corresponding to an edit point to be deleted and the DELETE button simultaneously deletes the edit point. If an erroneous edit point is set (the DELETE button is flashing), editing is not executed.
308	SELECTION OF STD/NON-STD FOR ANALOG VIDEO IN	When no signal is input to the REF. VIDEO IN connector, select whether or not to synchronize the playback circuits with the input analog video signal. **STD:** Synchronize. Use this setting when a standard signal is always input (forced STD mode). **N-STD:** Do not synchronize. Use this setting when the input video signal is unstable (forced NON-STD mode). When using a VCR with no built-in time base corrector (e.g. a home-use VHS-system VCR), select N-STD.
311	ANALOG AUDIO EDIT PRESET REPLACE FOR CH1	Items 311 to 314: When using an editor (PVE-500, BVE-600, etc.) or a remote controller which cannot control digital audio edit preset, select how to activate edit preset of each digital audio channel on this unit using the analog audio edit preset function of the editor or remote controller. Set edit preset of each digital audio channel (channels 1 to 4) of this unit on or off according to the analog audio preset specified by the remote controller or editor. **NO DEFINITION** **ANALOG CH1:** Follow edit preset of analog channel 1. **ANALOG CH2:** Follow edit preset of analog channel 2. **ANALOG CH1+CH2:** Follow edit preset of analog channel 1 or 2. The default settings for each item are as follows: **311:** ANALOG CH1 **312:** ANALOG CH2 **313:** NO DEFINITION **314:** NO DEFINITION
312	ANALOG AUDIO EDIT PRESET REPLACE FOR CH2	
313	ANALOG AUDIO EDIT PRESET REPLACE FOR CH3	
314	ANALOG AUDIO EDIT PRESET REPLACE FOR CH4	
317	AUDIO EDIT MODE	Specify the type of editing for audio signals. **CUT:** Cut editing (discontinuity in audio signal may result at the editing point, causing noise during playback.) **CROSS FADE:** Cross-fade  **FADE:** Fade in and fade out 

(Continued)

Menu items in the 300s, relating to editing operations (continued)

Item number	Item name	Settings
318	EDIT RETRY	When editing with two DSR-2000/2000P units, select the operation if the recorder was not synchronized in time. (Make this setting on the recorder.) **OFF:** Editing is not carried out, and the unit stops. **ON:** The editing is automatically retried (up to twice).
319	PREREAD SELECT	Specify the preread editing operation. **A/V:** Preread for both audio and video. **AUDIO:** Preread for audio only. **VIDEO:** Preread for video only. The preread operation can be controlled with the PREREAD button on the control panel or from the 9-pin remote control interface.
326	AUTOMATIC IN ENTRY AFTER AUTO EDIT	Select whether or not to automatically set the OUT point of the previous edit as the next IN point at the end of an automatic edit. **OFF:** No automatic setting. **R:** Set recorder IN point automatically. **R & P:** Set recorder IN point automatically, and also player IN point in two-VCR editing.
327	AUDIO MODE CHANGE	Select whether to allow audio data recorded on tape in two-channel mode (or four-channel) to be re-recorded in four-channel (or two-channel mode). **OFF:** Do not allow re-recording in a different audio mode. **ON:** Allow re-recording in a different audio mode. When this item is set to ON, the type of editing for audio signals is always a cut editing.
335	OUT REFERENCE SELECT	When signals are input to both of the REF. VIDEO IN connector and the VIDEO IN connector, determine which input signal to use as the reference signal. **REF VIDEO:** Use the signal input to a REF. VIDEO IN connector as the reference video signal. The input video signal to be edited is required to be in synchronization with the reference video signal. **VIDEO INPUT:** Use the input video signal selected with the VIDEO INPUT button in the INIPUT SELECT section.

Menu items in the 400s, relating to preroll

Item number	Item name	Settings
401	FUNCTION MODE AFTER CUE-UP	Select the state that the unit goes into after a cuing-up operation. **STOP:** Stops (the STOP mode). **STILL:** Still playback (in search mode). **Note** When controlling this unit from the BVE-800 editor, set this item to STOP.
403	AUTOMATIC PREROLL REFERENCE ENTRY	Select whether or not the edit IN point is automatically set by pressing the PREROLL button when the IN point is not set before starting preroll. **DIS:** IN point is not set automatically. **ENA:** I N point is set automatically.

Extended Menu

Menu items in the 500s, relating to tape protection

Item number	Item name	Settings
501	STILL TIMER	Select the time delay from the tape transport stopping (either the "STOP" mode" or the still playback mode in search mode) until the unit automatically switches to the tape protection mode, in order to protect the rotary heads and the tape. **0.5S...**[1M]**..5M:** Set the value in the range 0.5 seconds to 5 minutes.
502	TAPE PROTECTION MODE FROM SEARCH	Select the operation of the protection mode to protect the rotary heads and tape when in the still playback mode in search (jog/shuttle) mode. [STEP]**:** Step forward at 1/30 normal speed at the time interval set with STILL TIMER. **STDBY:** Switch to Standby OFF mode (the unit not on standby).

Menu items in the 600s, relating to the time code generator

Item number	Item name	Settings
601	VITC POSITION SEL-1	**For DSR-2000** Select a line to insert the VITC in. **12H ...**[16H]**... 20H:** Select any line from 12 to 20. **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.
		For DSR-2000P Select a line to insert the VITC in. **9H ...**[19H]**... 22H:** Select any line from 9 to 22. **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.
602	VITC POSITION SEL-2	**For DSR-2000** Select a line to insert the VITC in. **12H ...**[18H]**... 20H:** Select any line from 12 to 20. **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.
		For DSR-2000P Select a line to insert the VITC in. **9H ...**[21H]**... 22H:** Select any line from 9 to 22. **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.

Menu items in the 600s, relating to the time code generator

Item number	Item name	Settings
605	TCG REGEN MODE	Select the signal to be regenerated when the time code generator is in the regeneration mode (i.e., when the PRESET/REGEN switch on the subsidiary control panel is set to REGEN, or the unit is in automatic edit mode). [TC&UB]**:** Both the time code and user bits are regenerated. **TC:** Only the time code is regenerated. **UB:** Only the user bits are regenerated.
607	U-BIT BINARY GROUP FLAG	Select the user bits to be used in the time code generated by the time code generator. [000]**:** Character set not specified. **001:** 8-bit characters compliant with ISO 646 and ISO 2022. **010:** Undefined. **011:** Undefined. **100:** Undefined. **101:** SMPTE 262M page/line multiplex system. **110:** Undefined. **111:** Undefined.
610	REGEN CONTROL MODE	When editing with two DSR-2000/2000P units, if you use the control panel for editing operation, select whether or not the time code is automatically regenerated. [AS&IN]**:** In editing with this unit as the recorder, regardless of the setting of the INT/EXT–PRESET/REGEN switch, in assemble and insert editing, the time code generator regenerates according to the time code on the tape. **ASSEM:** In editing with this unit as the recorder, regardless of the setting of the INT/EXT–PRESET/REGEN switch, in assemble editing only, the time code generator regenerates according to the time code on the tape. **MANU:** Regardless of whether this unit is the recorder or player, the time code generator operates in accordance with the PRESET/REGEN setting of the INT/EXT–PRESET/REGEN switch. **FULL:** Regardless of the REMOTE button setting, when any of the ASSEMBLE, VIDEO, CH-1 to CH-4 and TC buttons is lit, the time code generator regenerates according to the time code played back from the tape.
611	TC OUTPUT PHASE IN EE MODE	Select the time code output mode for output from the TIME CODE OUT connector in E-E mode. [MUTE]**:** Mute the output. **THRU:** Output the time code input to the TIME CODE IN connector as it is. **V-IN:** Output the time code with the same phase as the input video signal phase. **V-OUT:** Output the time code with the same phase as the output video signal phase.
612	TC OUTPUT MUTE IN SEARCH MODE	Select whether to mute the output from the TIME CODE OUT connector in search (jog/shuttle) mode. [ON]**:** Mute. **OFF:** Do not mute.
613	VITC OUTPUT	Select the time code to be output as VITC. **OFF:** Do not output VITC. **TC:** Output TC after converting it into VITC. [VITC]**:** Output VITC.

Extended Menu

Menu items in the 700s, relating to video control

Item number	Item name	Settings
701	SELECTION OF VIDEO/SYNC DELAY	An E-E video signal is output delayed with respect to the video input signal by the time for video circuit processing. With this item, select whether or not to delay the sync signal attached to the output video signal by an amount corresponding to the video signal delay. **SYNC:** Delay the sync signal by the corresponding amount before attaching it. **VIDEO:** Attach a sync signal with the same timing as the input signal.
705	EDGE SUBCARRIER REDUCER MODE	Select whether to enable the edge subcarrier reducer (ESR). **ON :** Enable. **OFF:** Do not enable. When playing back a composite signal, set this to ON.
708	CHROMA PHASE ROTATION MODE	Select the phase rotation mode for chroma phase control. The effect of this setting applies to the output levels of all of the composite video, S video, SDI and component video signals. **U/V:** Select this setting when observing the unit's composite video output level using a composite vectorscope. **PB/PR:** Select this setting when observing the unit's component video output level using a component vectorscope.
710	INTERNAL VIDEO SIGNAL GENERATOR	Select the test signal to be output from the internal test signal generator. **CB100 (DSR-2000P only):** 100% color bar signal **CB75:** 75% color bar signal **BB:** Black burst signal **Default setting:** CB100 (for DSR-2000P)/CB75 (for DSR-2000)
713	VIDEO SETUP REFERENCE (DSR-2000 only)	Select whether to remove the setup (7.5%) from the input analog video signals and whether to add the setup (7.5%) to the output analog video signals.
	Sub-item	
	1 INPUT LEVEL	Whether to remove the setup from the input. **0.0%:** Do not remove. **7.5%:** Remove.
	2 OUT PUT LEVEL	Whether to add the setup to the output. **0.0%:** Do not add. **7.5%:** Add.
714	VIDEO ADJUST RANGE	Select the variable range of the VIDEO and CHROMA knobs when the PROCESS CONTROL switch on the subsidiary control panel is set to PANEL. **–3–+3:** –3 dB to +3 dB **WIDE:** – ∞ to +3 dB

Items 715 to 720 : Settings for controlling the video processing system according to the menu settings.

Item number	Item name	Settings
715	VIDEO GAIN CONTROL	Adjust the video output level. 00H to 200H to 3FFH
716	CHROMA GAIN CONTROL	Adjust the chroma output level. 00H to 200H to 3FFH
717	CHROMA PHASE CONTROL	Adjust the chroma phase. 00H to 80H to FFH
718	SETUP LEVEL (DSR-2000)/ BLACK LEVEL (DSR-2000P)	Adjust the setup level (DSR-2000)/black level (DSR-2000P). 00H to 200H to 3FFH
720	SYSTEM PHASE SC	Adjust the subcarrier phase. 00H to 3FFH

Note

When you make settings for items 715 to 720, set the PROCESS CONTROL switch on the subsidiary control panel to MENU. When it is set to MENU, all controls on the subsidiary control panel are disabled.

Menu items in the 700s, relating to video control (continued)

Item number	Item name	Settings
723	INPUT VIDEO BLANK (DSR-2000P only)	Switching blanking on or off for the 335th line of the input video signal. Select the reference video signal to use.
	Sub-item	
	LINE335	**THROUGH:** Do not mute. **BLANK:** Mute.
729	CLOSED CAPTION BLANK (DSR-2000 only)	Select whether to mute the closed caption signal to be superimposed on the 1st and 2nd fields of the output video signal.
	Sub-item	
	1 FIELD 1	Select whether to mute the closed caption signal to be superimposed on the 1st field of the output video signal. **OFF:** Do not mute. **ON:** Mute.
	2 FIELD 2	Select whether to mute the closed caption signal to be superimposed on the 2nd field of the output video signal. **OFF:** Do not mute. **ON:** Mute.
731	WIDE MODE	Determine whether to retain wide-screen aspect ratio information accompanying video being recorded or played back. **AUTO:** When video being recorded or played back is accompanied by wide-screen aspect ratio information, retain the information. **ON:** Whenever recording or playing back video, retain wide-screen aspect ratio information. **OFF:** Ignore wide-screen aspect ration information.

Menu items in the 800s, relating to audio control

Item number	Item name	Settings
801	DIGITAL JOG SOUND	Select whether to adjust the audio playback speed during slow playback. **OFF:** Do not adjust the audio playback speed. **ON:** Adjust the audio playback speed.
802	DIGITAL AUDIO MUTE IN SHUTTLE MODE	Set the audio muting conditions during shuttle playback. **OFF:** Not muted. **CUEUP:** Muted during cue-up or preroll operations. **FULL:** Muted in shuttle mode.
807	AUDIO OUTPUT PHASE	Select the output timing of an audio playback signal. The reference position corresponds to a setting of 80H; when the setting is less than 80H, the output timing is advanced, and when it is higher than 80H, the output timing is delayed. (80H = 128 samples = approx. 2.7 ms, 1 sample = approx. 20 µs) **0 ...80... FF :** Setting in this range.

(Continued)

Menu items in the 800s, relating to audio controll (continued)

Item number	Item name	Settings
808	INTERNAL AUDIO SIGNAL GENERATOR	Select the operation of the internal audio test signal generator. SILNC: Silent signal. **1KHZ:** 1-kHz, –20 dB FS sine wave signal. When you select SG as the audio input in the input selection section of the upper control panel, the audio test signal generated by the internal audio test signal generator is input.
811	AUDIO REFERENCE LEVEL	Select the audio reference level (headroom) for recording on tape. **–12dB** **–16dB** **–18dB (factory default for DSR-2000P)** **–20dB (factory default for DSR-2000)**
812	AUDIO OUTPUT LEVEL	Select the analog audio output reference level. **+4dB:** Set the analog output level of the signal at the reference level to +4 dBm. **0dB:** Set the analog output level of the signal at the reference level to 0 dBm. **–6dB:** Set the analog output level of the signal at the reference level to –6 dBm.
813	PEAK HOLD TIME	Set the peak hold time for the audio level meter in the range of **OFF (no peak hold) to 1.5 seconds in 0.1 second steps.**
814	OVER RANGE DISPLAY HOLD	Select whether to hold the audio level meter OVER display. **OFF:** Do not hold. **ON:** Hold.
818	AUDIO REC MODE	Select the audio recording mode. **2CH:** 2ch, 48 kHz mode **4CH:** 4ch, 32 kHz mode
819	AUDIO INPUT SOURCE ARRANGE	Select the audio input signals to be mixed when the MIXING button is lit. *For details, see the section "Making settings for mixing an audio input signal (extension menu item 819)" (page 123).*
820	AUDIO OUTPUT CH3/CH4 SELECT	Select the signals to be output from the AUDIO OUT CH-3 and AUDIO OUT CH-4 connectors. **LINE:** Output the audio channel-3 and audio channel-4 signals from the AUDIO OUT CH-3 and AUDIO OUT CH-4 connectors as they are. **MONI:** Output the monitor audio L-channel (CH-1) and monitor audio R-channel (CH-2) signals from the AUDIO OUT CH-3 and AUDIO OUT CH-4 connectors, respectively.
821	AUDIO ATTENUATE WHEN DV TAPE PLAYBACK	When playing back a tape recorded in consumer DV format, select whether to attenuate the audio output level. **OFF:** Attenuate. **ON:** Do not attenuate.

Menu items in the 900s, relating to digital process

Item number	Item name	Settings
902	SYSTEM EE MODE	Select the bypass E-E mode or system E-E mode. **OFF:** Bypass E-E (ordinary setting) **ON:** System E-E When this item is set to ON, the output delays 3 frames with respect to the input (excluding the SDTI and i.LINK inputs/outputs).

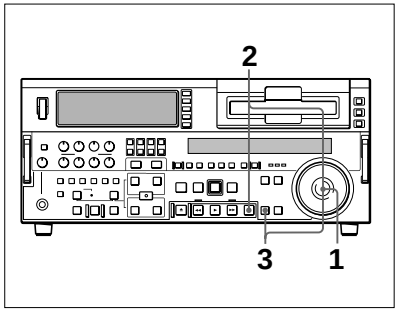
Extended Menu Operations

To use the extended menu, set basic menu item 099 MENU GRADE to ENHAN beforehand.

In the extended menu, you can carry out the same operations as in the basic menu except setting of sub-items.

To set sub-items

Operate as follows.



1 Turn the search dial to select the desired menu item.

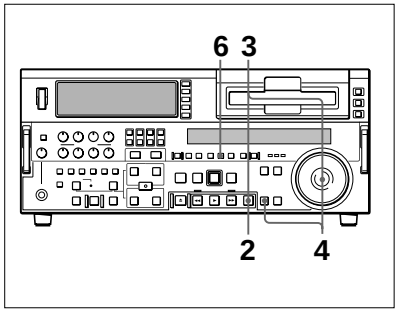
For information about how to select a menu item, see the section "Changing the currently displayed menu item" (page 111).

2 Holding down the STOP button, turn the search dial to select the desired sub-item.

3 Holding down the SEARCH button, turn the search dial to change the value for the selected sub-item.

Making settings for mixing an audio input signal (extension menu item 819)

Using extension menu item 819, you can mix audio input signals, dub an audio input signal over a channel previously recorded on the tape, or mix an audio input signal with an audio channel recorded on the tape (sound-on-sound).
To carry out the extension menu item 819 settings, use the following procedure.



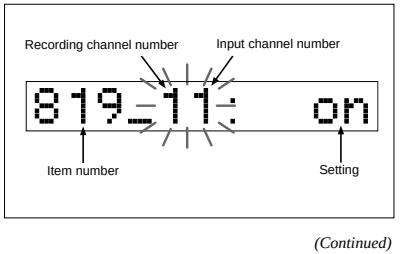
1 Select extension menu item 819.

For details of selecting a menu item, see the section, "Changing the currently displayed menu item" (page 111).

2 Press the STOP button.

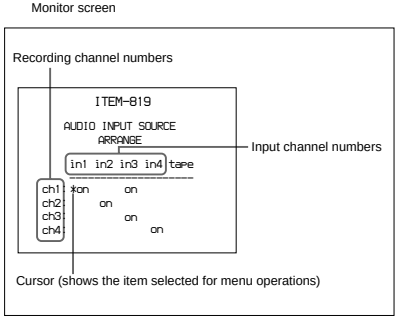
The following displays appear in the display section of the lower control panel and on a monitor connected to this unit.

Display section



(Continued)

Extended Menu



3 Holding down the STOP button, turn the search dial to move the cursor to select a combination of input and recording channels.

4 Holding down the SEARCH button, turn the search dial to set the channel selection made in step **3** to on or off.

To select an input channel for recording
For the selected recording channel, set the desired input channel to on.

To record, mixing more than one input signal
For the selected recording channel, set two or more of the input channels to on. All of the input channels set to on for each recording channel will be mixed for that channel.

To switch on the sound-on-sound setting
In addition to the selected input channel(s), set "tape" to "on."

5 Repeat steps **3** and **4** for each of the recording channels.

6 Press the SET button.

This saves the settings.

To enable the setting of extension menu item 819
Press the MIXING button in the upper control panel, turning it on.
When the MIXING button is off, the settings of extension menu item 819 are ignored, and the input channels and recording channels are recorded one-to-one. It is not possible to carry out mixing or channel switching.

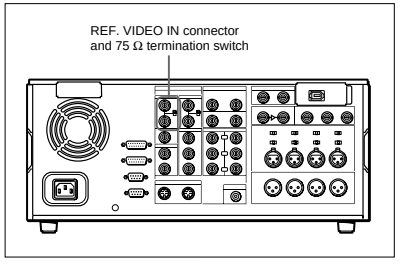
Note
When 2-channel mode (2CH) is selected for audio recording (*see extended menu item 818*), the settings made with this item for input channels 3 and 4 (in3 and in4) as well as recording channels 3 and 4 (ch3 and ch4) are invalid.
For example, when input channels 1 and 3 (in1 and in3) are set to on for recording channel 1 (ch1), in 2CH mode, only the signal from input channel 1 is recorded on recording channel 1.

Chapter 7

Connections and Settings

Reference Video Signals for Analog Signal Editing

In order to provide stable video and audio signals for analog editing, it is necessary to input a reference video signal synchronized with the video signal to the REF. VIDEO IN connector and set the REF. VIDEO IN 75 Ω termination switch to ON.

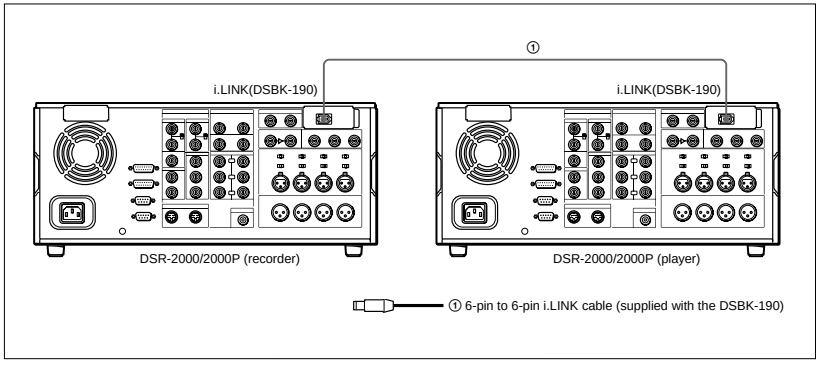


Connections for Cut Editing Using i.LINK Interface (Optional DSBK-190 Required)

Using two DSR-2000/2000P units, each fitted with the optional DSBK-190 board, as a pair of player and recorder, you can configure a cut editing system. You can use the same system also to digitally dub signals in DVCAM format through an i.LINK interface (*see page 61*).

It is also possible to use an i.LINK-compatible camcorder such as the DSR-500WS/500WSP as the player and carry out cut editing.

Connections for Cut Editing Using i.LINK Interface (Optional DSBK-190 Required)



DSR-2000/2000P (recorder and player) settings

Control	Setting (recorder)	Setting (player)
REMOTE button	Unlit	Lit
i.LINK button	Lit	Lit
SDTI/i.LINK button (input selection section)	i.LINK	

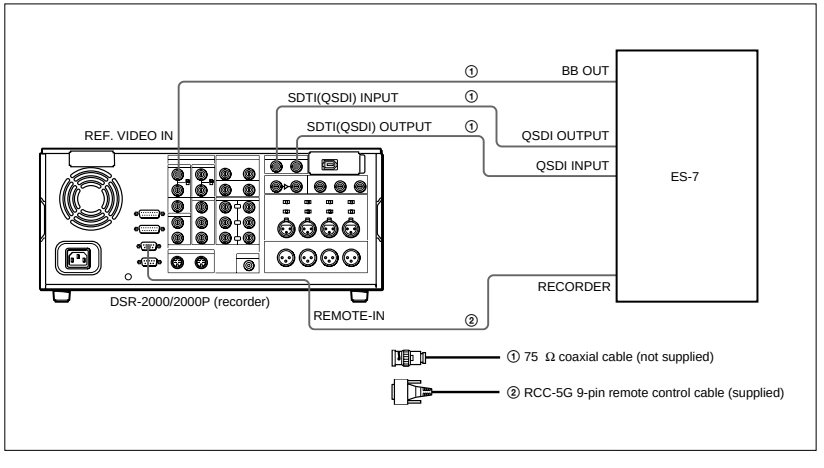
Connections for Digital Nonlinear Editing Using SDTI (QSDI) Interface

This unit can be connected to an ES-7 EditStation to configure a digital non-linear editing system. Using the SDTI (QSDI) interface, you can transfer video, audio, timecode, and other compressed data between this unit and the EditStation.
The unit supports ClipLink functions, enabling index pictures recorded on tape and ClipLink log data stored in cassette memory to be transferred to the EditStation in an instant.

For an overview of the ClipLink function, see the appendix "ClipLink Guide" (page 147).

The following is a connection diagram for digital non-linear editing system in which this unit serves as the recorder.

For connections of the EditStation's peripheral devices (the control panel, the disk unit, etc.) and the player, refer to your ES-7 Operating Instructions.

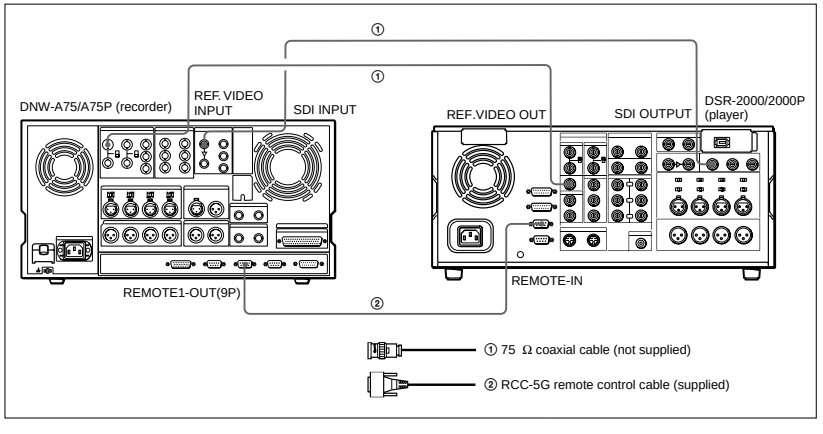


DSR-2000/2000P (recorder) settings

Control	Setting
REMOTE button	Lit
9PIN button	Lit
SDTI/i.LINK button (input selection section)	SDTI
REF.VIDEO IN 75Ω termination switch	ON

Connections for Cut Editing Using SDI Interface

For a cut editing system using this unit together with a DNW-A75/A75P Betacam SX VCR using an SDI connection, the following figure shows an example of the connections. In this example, the DNW-A75/A75P is used as the recorder and this unit is used as the player.



DNW-A75/A75P (recorder) settings

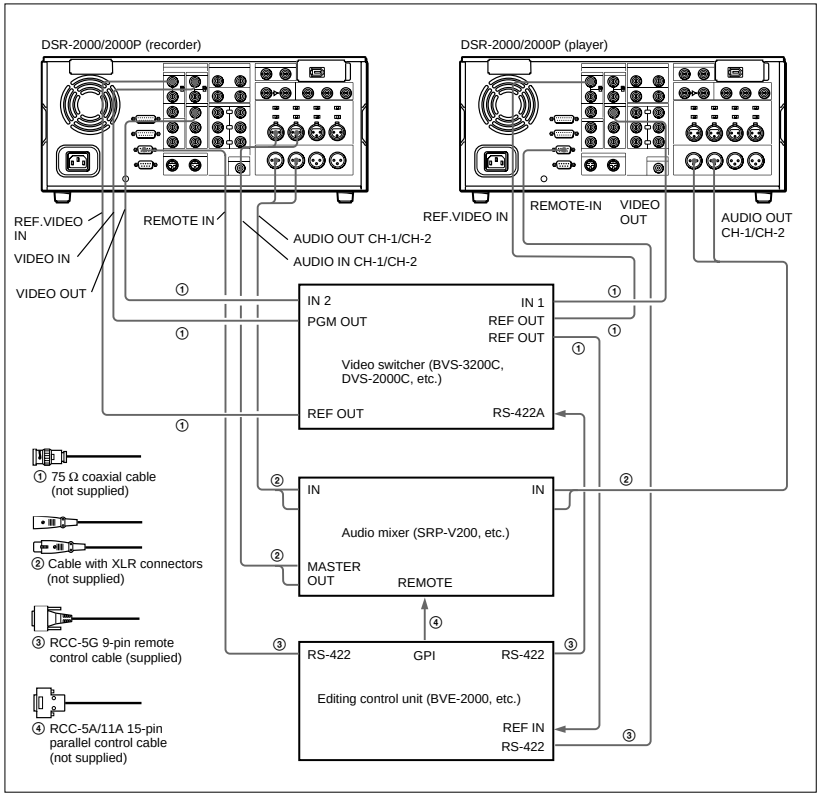
Control	Setting
REMOTE buttons	Unlit

DSR-2000/2000P (player) settings

Control	Setting
REMOTE button	Lit
9PIN button	Lit
REF.VIDEO IN 75Ω termination switch	ON

Connections for Preread Editing

For a preread editing system using two DSR-2000/2000P units together with a video switcher, audio mixer and editing control unit, the following figure shows an example of connections.



DSR-2000/2000P (recorder and player) settings

Control	Setting
REMOTE button	Lit
9PIN button	Lit

Settings Required When Connecting an External Editing Control Unit

When connecting an external editing control unit to this unit and using this unit as a recorder, make the following timecode settings on this unit and VCR constant and DIP switch settings on the editing control unit.

Timecode Settings on This Unit

Make the following time code settings for this unit.

Control	Setting
INT/EXT–PRESET/REGEN switch	INT–PRESET (right position)
FREE RUN/REC RUN switch	FREE RUN

Settings on Editing Control Units

Make the following settings according to the editor model.

For FXE-100/120 (NTSC)

Set the VCR constants as follows.

Byte No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Setting	80	14	00	96	05	05	03	80	0A	08	FE	00	80	5A	FF

For FXE-100P/120P (PAL)

Set the VCR constants as follows.

Byte No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Setting	81	14	00	7D	05	05	02	80	0A	07	FE	00	80	4C	FF

For BVE-910/2000

Set the VCR constants as follows.
• When using the DSR-2000 (NTSC)

Byte No.	Block 1								Block 2						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Setting	80	14	00	96	05	05	03	80	0A	08	FE	00	80	5A	FF

• When using the DSR-2000P (PAL)

Byte No.	Block 1								Block 2						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Setting	81	14	00	7D	05	05	02	80	0A	07	FE	00	80	4C	FF

For RM-450 (NTSC)

Set the VCR constants as follows.
• Left DIP switch

Switch No.	7	6	5	4	3	2	1	0
Setting	OFF	—	—	OFF	—	—	—	—

• Right DIP switch

Switch No.	7	6	5	4	3	2	1	0
Setting	OFF	—	OFF	ON	OFF	OFF	ON	ON

For RM-450CE (PAL)

Set the VCR constants as follows.
• Left DIP switch

Switch No.	7	6	5	4	3	2	1	0
Setting	OFF	—	—	OFF	—	—	—	—

• Right DIP switch

Switch No.	7	6	5	4	3	2	1	0
Setting	ON	—	OFF	ON	OFF	OFF	ON	ON

For BVE-800

Set the VCR constants as follows.

When using the DSR-2000 (NTSC)
• SW2

Switch No.	1	2	3	4	5	6	7	8
Setting	ON	OFF	ON	ON	—	ON	ON	—

• SW3

Switch No.	1	2	3	4	5	6	7	8
Setting	ON	ON	ON	OFF	—	ON	OFF	OFF

When using the DSR-2000P (PAL)
• SW2

Switch No.	1	2	3	4	5	6	7	8
Setting	ON	OFF	ON	ON	—	ON	ON	—

• SW3

Switch No.	1	2	3	4	5	6	7	8
Setting	OFF	OFF	OFF	ON	—	ON	OFF	OFF

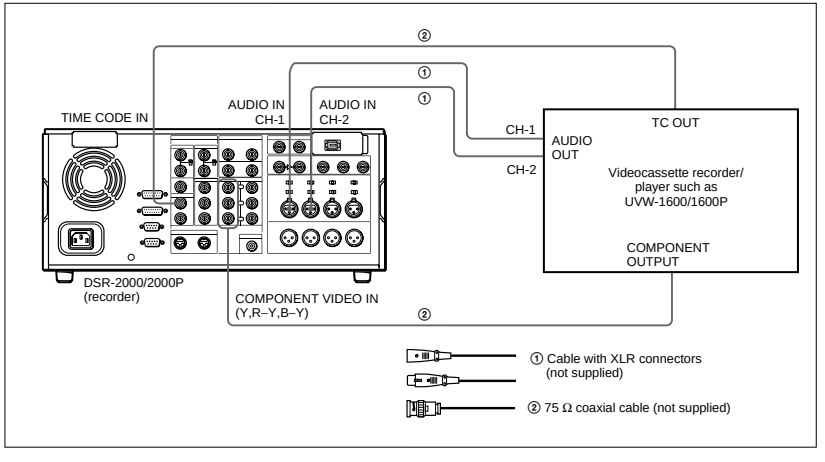
For PVE-500

Use the factory settings as they are.

Connections for Component Analog Recording

The following shows connections for a system in which analog playback signals from another recorder or player are recorded on the DSR-2000/2000P. In this system, the video signals are analog component signals and the audio signals are recorded from audio channels 1 and 2.

Note
In this case, the DSBK-170 Analog Component Iuput/Output Board is required.



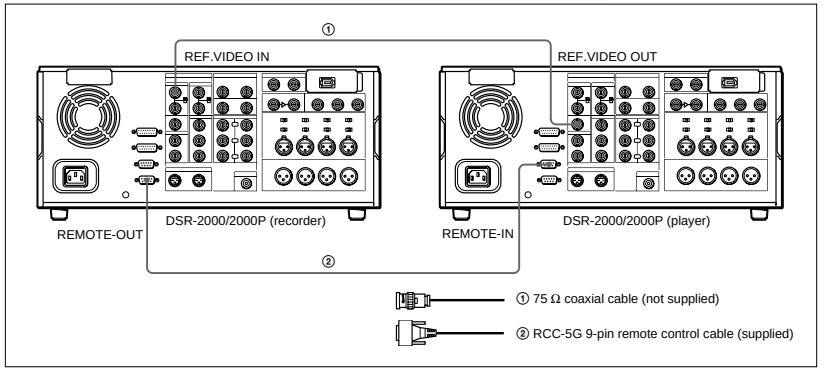
DSR-2000/2000P (recorder) settings

Control	Setting
REMOTE button	Unlit
VIDEO IN button (input selection section)	Y–R, B
CH1,1/2 button and CH2,3/4 button	ANALOG
AUDIO IN LEVEL/600Ω switch (connector panel)	Normally, +4 dBm, 600Ω (HIGH-ON)

Connections for Two-Unit Synchronous Playback

The following shows connections for synchronous playback using two DSR-2000/2000P units.
In the following, the controlling unit is referred to as the recorder and the controlled unit as the player.

For information about how to carry out two-unit synchronous playback, see the section "Synchronous Playback" on page 59.



DSR-2000/2000P (recorder) settings

Control	Setting
REMOTE button	Unlit
9PIN button	Lit
Setup menu item 004	ON (Synchronize.) OFF (Do not synchronize.)
Setup menu item 305 (When synchronizing, synchronization accuracy)	ACCUR (±0 frame) ROUGH (±1 frame)
REF. VIDEO IN 75 Ω termination switch	ON

DSR-2000/2000P (player) settings

Control	Setting
REMOTE button	Lit
9PIN button	Lit

Connections for Digitally Dubbing Signals in DVCAM Format (Optional DSBK-190 Required When Using i.LINK Interface)

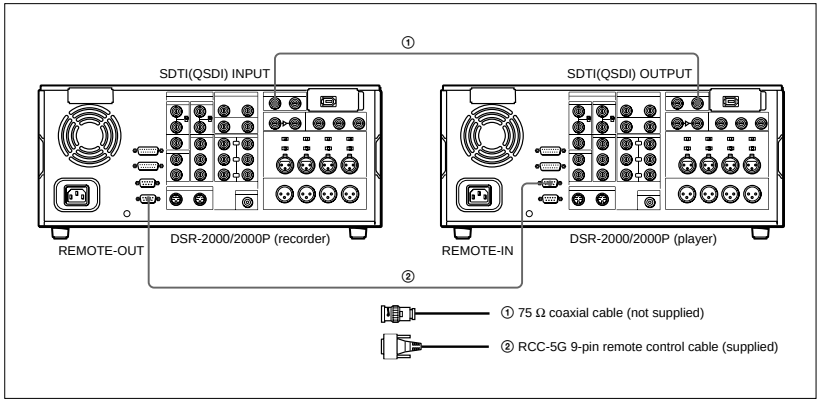
You can use this unit to digitally dub signals in DVCAM format automatically from the beginning of the tape to the end, through an i.LINK or SDTI(QSDI) interface.

For information about how to carry out digital dubbing, see the section "Digitally Dubbing Signals in DVCAM Format" (page 61).

Connecting two DSR-2000/2000P units using the i.LINK interface (DSBK-190 i.LINK/DV Input/Output Board)

Make the same connections and settings as described in the section "Connections for Cut Editing Using i.LINK Interface" *(page 125)*.

Connecting two DSR-2000/2000P units using the SDTI(QSDI) interface



DSR-2000/2000P (recorder) settings

Control	Setting
REMOTE button	Unlit
9PIN button	Lit
SDTI/i.LINK button (input selection section)	SDTI

DSR-2000/2000P (player) settings

Control	Setting
REMOTE button	Lit
9PIN button	Lit

When connecting this unit with a DSR-60/60P/80/80P/85/85P/1000-series/1000P-series unit using the SDTI(QSDI) interface

Replace the DSR-2000/2000P (player) shown in the above diagram with a DSR-60/60P/80/80P/85/85P/1000-series/1000P-series unit and make the same connections as shown above.
The SDTI(QSDI) interface connector of the DSR-60/60P/80/80P/85/85P is marked "QSDI(OUTPUT)".

Chapter 8

Maintenance and Troubleshooting

Condensation

If you move the unit suddenly from a cold to warm location, or if you use it in a very humid place, moisture from the air may condense on the head drum. This is called condensation, and if a tape is run in this state, the tape may stick to the drum and can be easily damaged. To lessen the risk of this occurring, this unit is equipped with a condensation detection system.

If condensation occurs while the unit is operating:
The alarm message “MOISTURE HAS BEEN DETECTED.” appears on the monitor screen, and the alarm message “HUMID!” in the display section of the lower control panel. At the same time the unit ejects the cassette automatically. If this happens, leave the unit’s power on and wait until the alarm messages disappear.

If the condensation alarm messages appear immediately after powering on:
Leave the unit powered on and wait until the alarm messages disappear. You cannot load a cassette into the unit while the alarm messages are being displayed Once the alarm messages disappear, the unit is ready for use.

Head Cleaning

Always use the DVM12CL (mini-size) or DV12CL (standard size) Cleaning Cassette to clean the video and audio heads. You can run the cleaning cassette for 10 seconds per cleaning operation. Follow the instructions for the cleaning cassette, as inappropriate use of the cleaning cassette can damage the heads.

To clean the heads
Insert the cleaning cassette. This automatically starts cleaning. You cannot operate any tape transport control buttons other than the EJECT button during the cleaning operation.
After about 10 seconds, the cleaning cassette will be automatically ejected.

Periodic Maintenance

Digital hours meter

The digital hours meter can provide seven items of information about the operational history of the unit. The information can be displayed in the display section of the lower control panel and also, by text superimposition, on the monitor connected to the unit. Use the information as a guide in scheduling periodic maintenance.

For periodic maintenance, cousult your Sony dearler.

Display modes of the digital hours meter

H01: OPERATION mode
Displays the total number of hours the unit has been powered on in units of 1 hour.

H02: DRUM RUNNING mode
Displays the total number of hours the drum has run with tape threaded in units of 1 hour.

H03: TAPE RUNNING mode
Displays the total number of hours the unit has been in fast forward, rewind, playback, search, recording or editing (except for stop and still) mode in units of 1 hour.

H04: THREADING mode
Display the total number of times tape has been threaded in the unit.

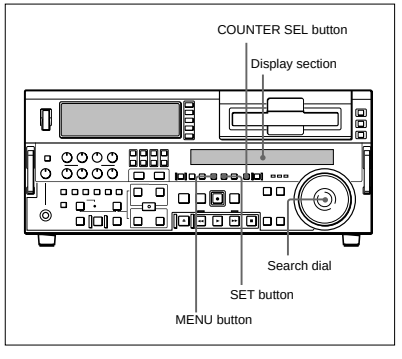
H12: DRUM RUNNING mode (resettable)
Same as H02 except that the count is resettable. This can be used as a guide in determining when to replace the drum.

H13: TAPE RUNNING mode (resettable)
Same as H03 except that the count is resettable. This can be used as a guide in determining when to replace such components as stationary heads and pinch roller.

H14: THREADING mode (resettable)
Same as H04 except that the count is resettable. This can be used as a guide in determining when to replace, for example, the threading motor.

To display the hours meter

Press the MENU button, then turn the search dial to display the required item in the display section and on the monitor connected to the unit.



To exit from the hours meter
Press the MENU button or SET button.

To jump to H01
Press the MENU button, then the COUNTER SEL button.
Every time you press the COUNTER SEL button, menu item H01 or B01 is recalled alternately.

Troubleshooting

If an alarm message appears in the display section or on the video monitor connected to this unit, or if the unit appears to be malfunctioning, please check the following before contacting your Sony dealer.

Operation problems

Symptom	Cause	Remedy
The unit's control buttons do not work.	The KEY INHIBIT switch on the subsidiary control panel is set to ON.	Set the KEY INHIBIT switch on the subsidiary control panel to OFF.
	The CONTROL PANEL switch on the subsidiary control panel is set to EXT.	• Set the CONTROL PANEL switch on the subsidiary control panel to INT. • Set extended menu item 117 to PARA.
The unit's transport control buttons (PLAY, F FWD, REW, etc.) do not work.	The REMOTE button is lit and menu item 006 (LOCAL FUNCTION ENABLE) is set to ST&EJ or DIS.[a)]	Turn off the REMOTE button and, on the subsidiary control panel, set the KEY INHIBIT switch and CONTROL PANEL switch to OFF and INT, respectively.
	No cassette is loaded.[a)]	Insert a cassette.

Tape problems

Symptom	Cause	Remedy
Recording is not possible.	The cassette's REC/SAVE switch is set to SAVE.[a)]	Set the REC/SAVE switch to REC, or use another cassette.
	The REC INHIBIT switch on the subsidiary control panel is set to ON.	Set the REC INHIBIT switch on the subsidiary control panel to OFF.
The NOT EDITABLE indication appears in the display section.	The recording mode selected on this unit does not coincide with that of the loaded tape.[a)]	• Set the unit for the same recording mode as with the tape. • When your current purpose is recording, you can use the tape currently loaded in the unit.
	The recording format of the currently loaded tape is DV or DVCPRO.	• You can use the currently loaded tape as a source tape for playback and editing. • You cannot use the tape as a recording tape for editing.

Time data problems

Symptom	Cause	Remedy
Cannot set the time data to an optional initial value.	The PRESET/REGEN switch on the subsidiary control panel is set to REGEN.[a)]	Set the PRESET/REGEN switch on the subsidiary control panel to PRESET.
	The counter value is selected as the time data for display (the COUNTER indicator is lit in the display section).[a)]	Press the COUNTER SEL button to light the TC (time code) or U-BIT (user bits) indicator in the display section (the counter value cannot be preset).
The tape is running, but the time data does not appear in the display section.	The HOLD button has been pressed.	Press the button once again to exit the time code preset mode.
	The U-BIT indicator is lit in the display section.[a)]	Press the COUNTER SEL button to light the COUNTER (counter value) or TC (time code) indicator in the display section.

a) In these states, alarm messages appear in the display section and on the monitor screen.

Input problems

Symptom	Cause	Remedy
It is not possible to record an SDTI signal.	No SDTI signal is input to the unit.[a)]	Connect an SDTI (QSDI) signal to the SDTI (QSDI) INPUT connector.

a) In this state, an alarm message appears in the display section and on the monitor screen.

Monitor problems

Symptom	Cause	Remedy
Data is not superimposed on the monitor screen.	The CHARACTER switch on the subsidiary control panel is set to OFF.	Set the CHARACTER switch on the subsidiary control panel to ON.
	The monitor is not connected to the VIDEO OUT 3 (SUPER) or SDI OUTPUT 3 (SUPER) connector of this unit.	Connect the monitor to the VIDEO OUT 3 (SUPER) or SDI OUTPUT 3 (SUPER) connector. (You must make this connection to display any type of text on the monitor.)
The image on the monitor screen is too bright.	The 75 Ω termination switch for video input on the monitor is in the OFF position or a 75 Ω terminator is not fitted to its video input connector.	Set the 75 Ω termination switch to ON or connect a terminator.
The image on the monitor screen is too dark.	In a video signal loop-through connection of video monitors, 75 Ω termination switches for video input on monitors other than the loop-end monitor are in the ON position.	Set the 75 Ω termination switches to OFF on all monitors other than the loop-end monitor .
The image is too dark when recording a composite video signal.		

Audio problems

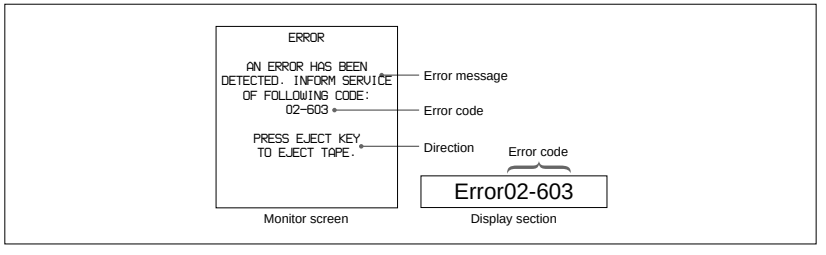
Symptom	Cause	Remedy
Turning the REC controls does not change the audio input levels.	The REC controls are pushed in.	Pull out the REC controls.
Turning the PB controls does not change the playback audio output levels.	The PB controls are pushed in.	Pull out the PB controls.

Error Messages

This unit is provided with a self-diagnostic function that detects internal abnormalities. When it detects an abnormality, it outputs an error message to the monitor connected to the unit and indicates an error code in the display section of the unit.

Note

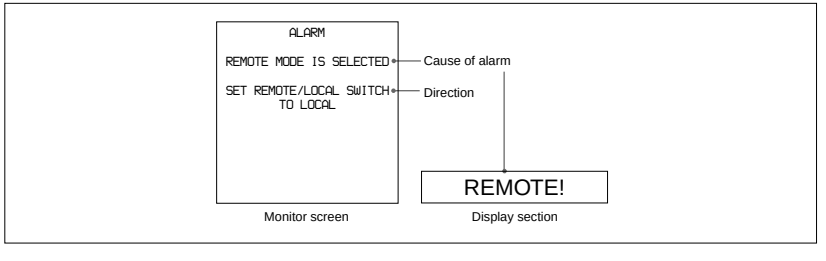
To display error messages on the monitor screen, set the CHARACTER switch on the subsidiary control panel to ON.



If an error message appears, follow the direction indicated under the message on the monitor screen.

Alarm Messages

An alarm message , for example, like the one shown below may appear on the monitor screen during operation of the unit.



If an alarm message appears, follow the direction indicated under the message on the monitor screen.

To display alarm messages on the monitor screen, set the CHARACTER switch on the subsidiary control panel to ON, and setup menu item 016 (ALARM) to ON or LIMIT.

For details of setup menu operations, see Chapter 6 "Setup Menu" (page 107).

Troubleshooting

Alarm messages and associated directions

Alarm message on monitor screen / Cause	Direction	Alarm message in the diaplay section
A cleaning tape has been inserted.	The tape will automatically be ejected after cleaning is completed.	Cleaning Tp
A non-standard signal is being used for input video.	Use a standard signal.	VIN NON-STD
A non-standard ref. signal is being used for REF. VIDEO.	Use a standard signal.	REF NON-STD
Abnormal settings selected in setup menu.	Correct the setup menu settings. Contact your Sony dealer if this alarm message appears again after making corrections.	ILL. SETUP
Audio mixing mode cannot be changed during recording.	—	REC mode!
Audio not editable on this tape.	Use a tape recorded in 2-channel (48 kHz) or 4-channel (32 kHz) mode.	2CH/32kHz!
		Fs 44.1kHz!
	Use a tape having audio signals recorded in locked mode.	UNLOCK mode
Audio REC mode selection different from audio on tape.	Select the same audio recording mode as that of the tape.	A mode err
Audio REC (recording) mode cannot be changed during recording.	—	REC mode!
Cassette adaptor not usable.	Use a tape without cassette adaptor.	Adaptor!
Counter mode is selected.	Use the COUNTER SEL button to light the TC or U-BIT indicator in the display section.	CNT mode!
Input selection cannot be changed in REC (recording) mode.	—	REC mode!
Input signal does not conform to DVCAM/DV format.	—	Unknown Sig
Input signal is 625/50. (For DSR-2000)	—	625/50 sig! (For DSR-2000)
Input signal is 525/60. (For DSR-2000P)	—	525/60 sig! (For DSR-2000P)
Input video is not detected.	Check the INPUT VIDEO indication in the input selection/audio mode display section and supply an appropriate video signal.	No INPUT!
Input video signal does not synchronize with REF. VIDEO signal.	Use a common reference signal or connect the recorder REF. VIDEO OUT connector to the player REF. VIDEO IN connector. **Note** When connecting the recorder REF. VIDEO OUT connector to the player REF. VIDEO IN connector, set extended menu item 308 to N-STD.	ILL. REF!
Key inhibit mode is selected.	Set the KEY INHIBIT switch on the subsidiary control panel to OFF.	KEY INHI.
Moisture has been detected.	Keep the power on and wait until this alarm message disappears.	HUMID!
No cassette in VTR.	Load a cassette.	No Cass.!
Rec inhibit mode is selected.	Set the REC INHIBIT switch on the subsidiary control panel to OFF.	REC INHI.!
Record inhibit plug on the cassette is set to inhibit.	Set the REC/SAVE switch on the cassette to REC.	REC INHI.!

(Continued)

Alarm messages and associated directions (Continued)

Alarm message on monitor screen / Cause	Direction	Alarm message in the display section
Remote mode is selected.	Turn off the REMOTE button.	REMOTE!
Tape cannot be replayed.	Use a tape recorded in 525/60 format. (For DSR-2000)	625/50 Tape (For DSR-2000)
	Use a tape recorded in 625/50 format. (For DSR-2000P)	525/60 Tape (For DSR-2000P)
Tape end has been detected.	Use a new cleaning tape.	Tape end!
Tape not editable.	Use a tape recorded in DVCAM format.	Not DVCAM!
	Use a tape recorded in 525/60 format. (For DSR-2000)	625/50 Tape (For DSR-2000)
	Use a tape recorded in 625/50 format. (For DSR-2000P)	525/60 Tape (For DSR-2000P)
Tape not recordable.	Use a DVCAM/DV ME tape.	REC INHI.!
Tape not usable.	Use DVCAM/DV/DVCPRO (25) tape.	ILL. Tape!
TC EXTERNAL is selected.	Set the INT/EXT switch on the subsidiary contol panel to INT.	TC EXT!
TCG REGEN mode is selected.	Set the PRESET/REGEN switch on the subsidiary control panel to PRESET.	REGEN mode!
TCG RUN mode is set to REC RUN.	Set the FREE RUN/REC RUN switch on the subsidiary control panel to FREE RUN.	REC RUN!

Appendixes

Notes on Use

Operation and storage locations
Avoid operation or storage in any of the following places.
- Location subject to extremes of temperature (operating temperature range 5°C to 40°C (41°F to 104°F))
- Location subject to direct sunlight for long periods, or close to heating appliances (Note that the interior of a car left in summer with the windows closed can exceed 50°C (122°F).)
- Damp or dusty places
- Location subject to severe vibrations
- Location near equipment generating strong electromagnetic emissions
- Location near transmitting stations generating strong radio waves

Operate the unit in a horizontal position
This unit is designed to be operated in a horizontal position. Do not operate it on its side, or tilted through an excessive angle (exceeding 20°).

Avoid violent impacts
Dropping the unit, or otherwise imparting a violent shock to it, is likely to cause it to malfunction.

Do not obstruct ventilation openings
To prevent the unit from overheating, do not obstruct ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

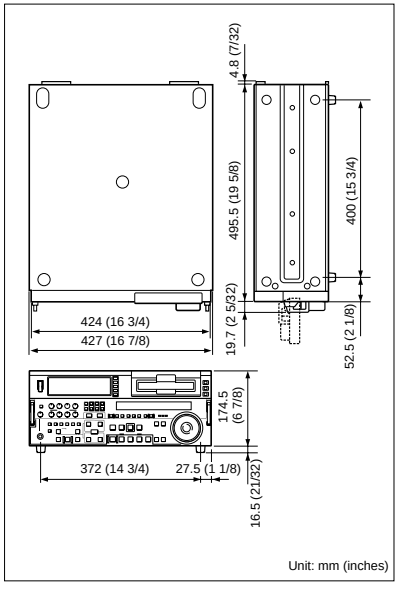
Care
If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of extreme dirt, use a cloth steeped in a natural detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinners, insecticides, or other volatile solvents may result in deforming the casing or damaging the finish.

Shipping
Pack the unit in its original carton or equivalent packing, and take care not to impart violent shocks in transit.
When transporting the unit, set the reel position to that for mini size cassettes.

Specifications

General

Power requirements
100 to 240 VAC, 50/60 Hz
Power consumption
120 W
Peak inrush current
(1) Power ON, current probe method: 65A (240V)
(2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 15A (230V)
Operating temperature
5˚C to 40˚C (41˚F to 104˚F)
Storage temperature
–20˚C to +60˚C (–4˚F to +140˚F)
Humidity Maximum 80% (Operating)
Maximum 90% (Storage)
Mass About 18 kg (39 lb 10 oz)
Dimensions (w/h/d)
427 × 174.5 × 495.5 mm
(16 7/8 × 6 7/8 × 19 5/8 inches)



Unit: mm (inches)

Tape transport control system

Tape speed 28.193 mm/s (DSR-2000)
28.221 mm/s (DSR-2000P)
Recording/playback time
Using PDV-184ME standard-size cassette: 184 minutes or less
Using PDVM-40ME mini-size cassette: 40 minutes or less
Fast forward/rewind time
Using PDV-184ME standard-size cassette: 3 minutes or less
Using PDVM-40ME mini-size cassette: 1 minute or less
Search speed Up to 60 times normal in both directions

Video performance

Band width
Composite (DSR-2000):
30 Hz to 4.2 MHz ±1.0 dB (Y)
Composite (DSR-2000P):
25 Hz to 4.8 MHz ±1.0 dB (Y)
S-Video (DSR-2000):
30 Hz to 5.0 MHz ±1.0dB (Y),
5.75 MHz +0/–3.0 dB (Y) (TM)
S-Video (DSR-2000P):
25 Hz to 5.0 MHz ±1.0dB (Y),
5.5 MHz +1.0/–2.0 dB (Y),
5.75 MHz +0/–3.0 dB (Y) (TM)
Component (DSR-2000):
30 Hz to 5.0 MHz ±1.0 dB (Y),
5.75 MHz +0/–3.0 dB (Y) (TM),
30 Hz to 1.3 MHz ±1.0 dB (C),
1.5 MHz +0/–5.0 dB (C)
Component (DSR-2000P):
25 Hz to 5.0 MHz ±1.0 dB (Y),
5.5 MHz +1.0/–2.0 dB (Y),
5.75 MHz +1.0/–3.0 dB (Y) (TM),
25 Hz to 1.5 MHz ±1.0 dB (C),
2.0 MHz +1.0/–2.0 dB (C)
S/N Composite I/O (Y):
53 dB or more
S-Video I/O (Y): 55 dB or more
Component I/O (Y):
55 dB or more
Y/C delay 30 ns or less
K-factor 2.0% or less (K2T, KPB)

Processor adjustment range

Video level ±3 dB/–∞ to 3 dB selectable
Chroma level ±3 dB/–∞ to 3 dB selectable
Setup/Black level
±30 IRE (±210 mV)
Chroma phase ±30˚
Y/C delay ±100 ns
System phase Sync: ±3µs
SC: ±180°

Audio performance

Frequency response
2 ch (48 kHz/16 bit):
20 Hz to 20 kHz +0.5/–1.0 dB
4 ch (32 kHz/12 bit):
20 Hz to 14.5 kHz +0.5/–1.0 dB
Dynamic range 90 dB or more (2CH, 48 kHz)
Distortion 0.05% or less (2CH, 48 kHz)

Input connectors

Digital input

i.LINk (When using DSBK-190 i.LINK/DV Input/ Output Board)
6-pin IEEE1394 connector ×1
SDTI (QSDI) INPUT
BNC type ×1, SDTI (QSDI) format (270Mbps), SMPTE 305M/322M
SDI INPUT BNC type ×2 (active-through), SMPTE 259M (DSR-2000)/ITU-R BT.656 (DSR-2000P), SDI format (270Mbps)

Analog video input

VIDEO IN BNC type ×2 (loop-through), composite, 1.0 Vp-p, 75 Ω, sync negative
REF. VIDEO IN BNC type ×2 (loop-through), black burst, 0.286 Vp-p (DSR-2000) or 0.3 Vp-p (DSR-2000P), 75 Ω, sync negative
S VIDEO IN DIN 4-pin ×1
Y: 1.0 Vp-p, 75 Ω, sync negative
C: 0.286 Vp-p (DSR-2000) or 0.3 Vp-p (DSR-2000P), 75 Ω (burst level)
COMPONENT VIDEO IN Y/R–Y/B–Y
BNC type ×3, component video
Y: 1.0 Vp-p, 75 Ω, sync negative
R–Y: 0.7 Vp-p, 75 Ω (75% for DSR -2000 or 100% for DSR-2000P)
B–Y: 0.7Vp-p, 75 Ω (75% for DSR -2000 or 100% for DSR-2000P)

Analog audio input

AUDIO IN XLR 3-pin (female) ×4, –6/0/+4 dBu, 600 Ω ON/OFF/–60 dBu, high impedance, balanced

Digital audio input

DIGITAL AUDIO (AES/EBU) IN CH-1/2, CH-3/4
BNC×2, complying with AES-3id-1995

Timecode input

TIME CODE IN BNC type ×1, SMPTE (DSR-2000)/EBU (DSR-2000P)
0.5 to 18 Vp-p, 3.3 kΩ, unbalanced

Output connectors

Digital output

i.LINK (When using DSBK-190 i.LINK/DV Input/ Output Board)
6-pin IEEE1394 connector ×1
SDTI (QSDI) OUTPUT
BNC type ×1, SDTI (QSDI) format (270Mbps), SMPTE 305M/322M
SDI OUTPUT 1, 2, 3 (SUPER)
BNC type ×3, SMPTE 259M (DSR-2000)/ITU-R BT.656 (DSR-2000P), SDI format (270Mbps)
SDTI-CP OUTPUT (When using DSBK-210)
BNC type ×3
SMPTE 305M, 326M

Analog video output

VIDEO OUT 1, 2, 3 (SUPER)
BNC type ×3, composite, 1.0 Vp-p, 75 Ω, sync negative
REF. VIDEO OUT
BNC type ×1, composite sync, 0.286 Vp-p (DSR-2000) or 0.3 Vp-p (DSR-2000P), 75 Ω, sync negative (with burst)

Specifications

S VIDEO OUT DIN 4-pin ×1
Y: 1.0 Vp-p, 75 Ω, sync negative
C: 0.286 Vp-p (DSR-2000) or 0.3 Vp-p (DSR-2000P), 75 Ω (burst level)

COMPONENT VIDEO OUT Y/R–Y/B–Y
BNC type ×3, component video
Y: 1.0 Vp-p, 75 Ω, sync negative
R–Y: 0.7 Vp-p, 75 Ω (75% for DSR-2000 or 100% for DSR-2000P)
B–Y: 0.7Vp-p, 75 Ω (75% for DSR-2000 or 100% for DSR-2000P)

Analog audio output

AUDIO OUT XLR 3-pin (male) ×4, +4/0/–6 dBu (selectable by menu setting), 600 Ω loaded, low impedance, balanced

MONITOR AUDIO
Phono jack ×1, –11 dBu, 47 kΩ load, unbalanced

Digital audio output

DIGITAL AUDIO (AES/EBU) OUT CH-1/2, CH-3/4
BNC×2, complying with AES-3id-1995

Headphone output

HEADPHONES Stereo phone jack ×1, –∞ to –13 dBu, 8 Ω, unbalanced

Timecode output

TIME CODE OUT
BNC type ×1, SMPTE (DSR-2000)/EBU (DSR-2000P)
2.2 Vp-p±3.0 dB, 600 Ω, unbalanced, (when 75 Ω terminated)

Control connectors

VIDEO CONTROL
D-sub 15-pin, male, for connection of optional UVR-60/60P or BVR-50/50P

CONTROL PANEL
D-sub 15-pin, female, for connection of optional DSBK-200

REMOTE-IN D-sub 9-pin, female, for connection of another DSR-2000/2000P unit or other editing controller, complying with RS-422A

REMOTE-OUT D-sub 9-pin, female, for loop-through output of signals from the REMOTE-IN connector

Accessories supplied

AC power cord (1)
Operating Instructions (1)
RCC-5G 9-pin remote control cable (1)

Accessories not supplied

DSBK-210 SDTI-CP Output Board
DSBK-190 i. LINK/DV Input/Output Board
RCC-5G 9-pin Remote Control Cable, 5 m (16 ft) long
DSBK-200 Control Panel
RMM-130 Rack Mount Kit
PDV-64ME/94ME/124ME/184ME Digital Video Cassette (standard size)
PDVM-12ME/22ME/32ME/40ME Digital Video Cassette (mini-size)
DV12CL Cleaning Cassette (standard size)
DVM12CL Cleaning Cassette (mini-size)

Design and specifications are subject to change without notice.

ClipLink™ Guide

What Is ClipLink?

The ClipLink™ function greatly improves the efficiency of the video production process as a whole by recording various editing-related data on tape when shooting. As such, ClipLink is a revolutionary function that transcends the conventional separation of shooting and editing.

How ClipLink Changes Video Production Techniques

The following describes various ways in which ClipLink[1)] video production differs from conventional video production.

Recording of ClipLink log data lightens the shooting workload

When you start shooting a scene, ClipLink log data such as the scene number and time code data are automatically recorded into the cassette memory. This eliminates the need for a conventional "shot list" compiled by someone using a stopwatch, clipboard and pencil. You can also designate unwanted scenes as "NG" (no good) and automatically skip all "NG" scenes when editing.

Recorded Index Pictures drastically cut editing time

The ClipLink function also features Index Pictures a time-saving tool for rough editing. Each Index Picture is a compressed image taken from the start of each scene, which is recorded onto the tape as a still picture. When editing, begin by transferring only the Index Pictures and the ClipLink log data to the EditStation's hard disk. You can also transfer OK scenes only ("NG" scenes are skipped).

Next, begin rough editing by viewing the Index Pictures on the EditStation's GUI display and rearranging them as you wish. This eliminates the difficult work of matching up a handwritten shot list with recorded scenes. After you have completed this rough editing, you can then transfer only the recordings needed for your video program.

High-speed transfer of recordings

It is also possible to transfer the editing material itself between the DSR-85/85P and ES-7 at four times normal speed. In other words, the transfer can be carried out in one fourth of the real time duration. It is of course possible to carry out a transfer at four times normal speed when backing up video and audio data recorded on the disk drive to the DSR-85/85P, or in the opposite direction when loading data backed up on the DSR-85/85P to the disk drive. Thus the time required is much shorter than with conventional equipment (for which, for example, transferring a 40-minute segment of video takes 40 minutes).

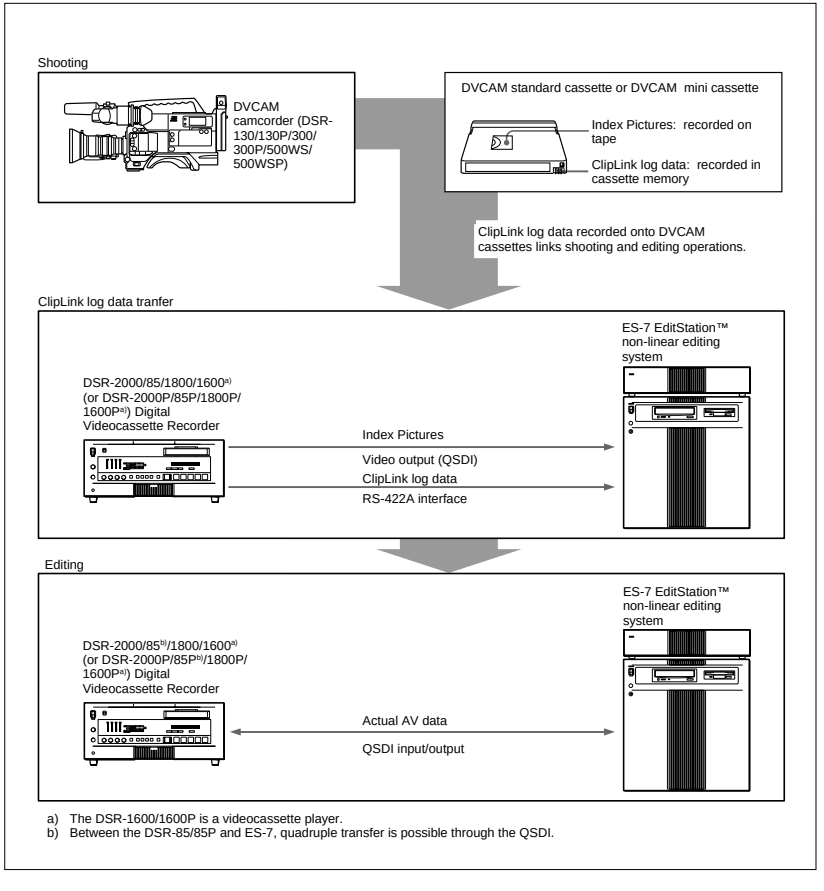
Note

To transfer digital signals (video, audio and time code) recorded on a tape on this unit from the DSR-85/85P to the ES-7 at four times normal speed requires a continuous recorded section of about 40 seconds before the IN point on the recorded tape.

1) The ClipLink system is a video production system which uses the cassette memory function.

Example System Configuration and Operation Flow

The following illustration shows an example system configuration for using the ClipLink function and a typical ClipLink operation flow.



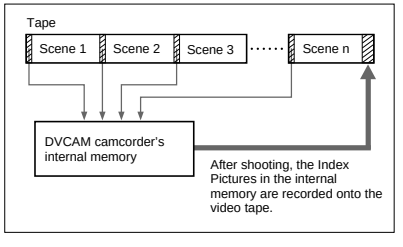
a) The DSR-1600/1600P is a videocassette player.
b) Between the DSR-85/85P and ES-7, quadruple transfer is possible through the QSDI.

Data Generated When Shooting

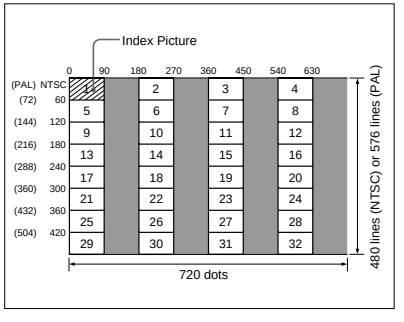
The following describes the kinds of data that is generated when using the ClipLink function.

Index Pictures

When shooting, a single-frame image from the Mark IN point at the start of each scene is recorded as a still picture into the DSR-1/1P's internal memory. These images are called "Index Pictures". When you finish shooting, the Index Pictures from all scenes are recorded onto the tape after the last scene.



Up to 32 Index Pictures can be recorded onto the tape space normally occupied by one frame, as shown below.



Seven frame spaces are reserved at the end of the last scene as a recording area for Index Pictures. (A cassette with 16 Kbits of cassette memory can record up to 198 Index Pictures, and a cassette with 4 Kbits of cassette memory can record up to 45 Index Pictures.)

ClipLink log data

ClipLink log data can be recorded automatically or manually into the cassette memory for use as a convenient alternative to the conventional "shot list". ClipLink log data includes the following items.

ClipLink log data	Description
Reel number (cassette number)	Data (maximum length: 8 digits) consisting of alphanumeric characters and/or symbols (This is left blank at shipping.)
Scene number	A three-digit number from 001 to 198 (starts at 001 and is automatically incremented with each scene).
Take number	This cannot be changed (set to "1" at shipping).
OK/NG	Indicates the OK/NG status of a particular scene. (In the OK case, nothing is recorded.)
Mark IN/OUT point time codes	These are the time codes that indicate the Mark IN and Mark OUT points for each scene (HH:MM:SS). These time codes are recorded when the camera has been set to MARK mode. The frame digit is incremented at each Mark IN point and is decremented at each Mark OUT point. (For details, see "Time codes recorded for Mark IN/OUT points" on page 151.)
Cue point time code	This is the time code that indicates the cue points (valid up to the frame digit). This time code is recorded when the camera has been set to CUE mode. When in this mode, the time codes at the start and end of a recording (the Rec IN and Rec OUT time codes) are automatically recorded as Mark IN/OUT points.

How to record ClipLink log data

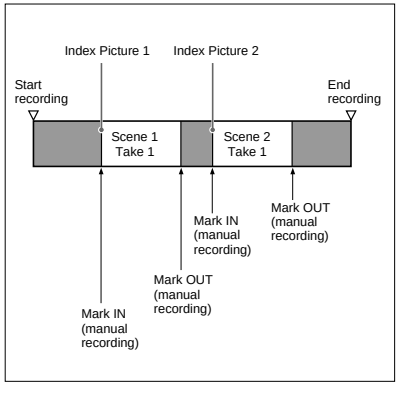
The following describes how to record the various ClipLink log data items.

OK/NG status

To designate a scene as “NG”, press the NG button on the camera while shooting the scene or at any time before you begin shooting the next scene.
All scenes that do not receive an “NG” designation are recorded as “OK” scenes.
(When you exit the VTR recording mode, changing the OK/NG status is no longer possible.)

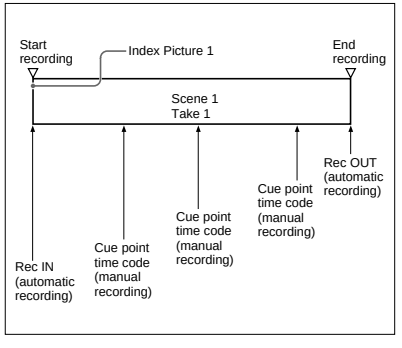
Mark IN/OUT points time codes

This data is especially useful when shooting a video program for which a scenario has been created.
Set the camera to MARK mode before you start shooting. While shooting, each time you press the camera’s TAKE button, Mark IN and Mark OUT time codes are recorded alternately.



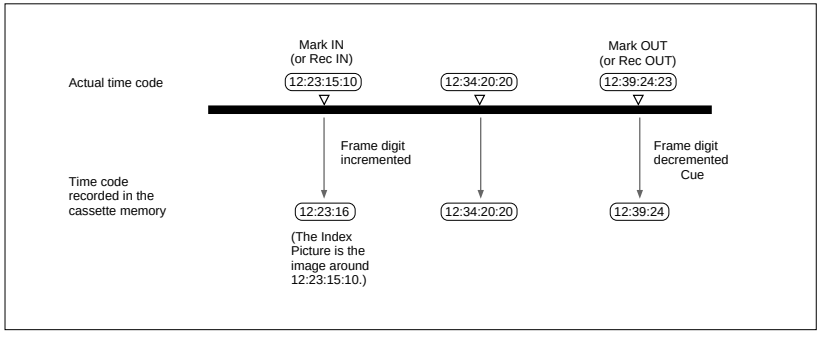
Cue point time codes

This type of data is especially useful when shooting scenes that may contain unexpected events, such as when shooting for sports coverage or documentaries.
Set the camera to CUE mode before you start to record. While recording, each time you press the camera’s TAKE button, the current time code is recorded as a cue point time code.



Time codes recorded for Mark IN/OUT points

There is a gap between actual time codes and Mark IN/OUT time codes recorded in the cassette memory, as shown in the figure below. The frame digit is incremented at each Mark IN point and is decremented at each Mark OUT point.



Recording capacity for Mark IN/OUT time codes and Cue point time codes

When in MARK mode, up to 198 pairs of Mark IN and Mark OUT points can be recorded (if using a cassette with 16 Kbits of cassette memory).
When in CUE mode, up to 396 time codes points (including all cue point time codes and all Mark (Rec) IN and Mark (Rec) OUT time codes) can be recorded (if using a cassette with 16 Kbits of cassette memory).

Glossary

AES/EBU format
A unified format for digital audio signals. It allows a single XLR connector to carry the signals for two channels.

Assemble editing
Editing in which new video/audio is added in sequence to the end of existing recorded video/audio. *See also "Insert editing".*

Bridge connection
A connection which allows a signal input to an input terminal to pass through the unit and exit from an output terminal as input to external equipment.

B–Y signal
One of the color difference signals, the B (blue) signal minus Y (luminance) signal.

C signal
See "Chrominance signal".

Capstan
A drive mechanism that moves the tape at a specified speed regardless of the direction (forward or reverse).

Chrominance signal
A signal which carries information about hue and saturation. Also called "C signal".

Condensation
Moisture which condensed on tape transport mechanisms. If there is condensation on the head drum, tape sticks to drum and the VCR may malfunction.

Component video signal
A signal that consists of a luminance signal (Y) and two chrominance signals (R–Y, B–Y).

Composite video signal
A signal that consists of video, sync and color burst signals.

Digital VCR
On a digital VCR, video and audio signals are recorded on magnetic tape and, unlike on an analog VCR, can be played back without any quality deterioration.

Drop frame mode
Time code runs at 30 frames/sec. The NTSC system, however, runs at about 29.97 frames/sec. Drop frame mode adjusts this difference. The timecode and video are synchronized by dropping the first two frames of the timecode every minute, except at the ten-minute marks.

Drum
See "Head drum".

E-E mode
Abbreviation of "Electric to Electric" mode. In this mode, video and audio signals input to the VCR are output after passing through internal electric circuits, but not through magnetic conversion circuits such as heads and tapes. This can be used to check input signals and for adjusting input signal levels.

Emphasis
The signal is emphasized at high frequencies. During playback, it is de-emphasized. This suppresses noise without affecting the original signal.

External lock/Gen-lock
Synchronizing one equipment (controlled or slave unit) to another (controlling or master unit). The signal and tape run of the VCRs used for editing, player and recorder, are usually synchronized.

Gen-lock (generator lock)
See "External lock".

Head drum
A metal cylinder to which a video head is attached. This drum is rotated at high speeds in synchronization with the sync signal during recording and playback.

Insert editing
Editing in which new video/audio is added into the middle of existing recorded video/audio. You can freely select both video and audio, video only, or audio only, for an insert editing. You cannot use a blank tape for an insert editing: it is necessary to record time code and for example color bar signals on your tape in advance. *See also "Assemble editing".*

IRE
A unit for representing a video level laid down by the IRE (Institute of Radio Engineers). The IRE is now the IEEE (Institute of Electric and Electronic Engineers).

Linear editing
Editing while playing back video and audio signals recorded on video tape. *See also "Non-linear editing".*

Loading
Also called "threading". To pull the tape out of the cassette case, thread it along the specified tape path, and wrap it on the drum in order to prepare it for recording or playback. The VCR automatically loads the cassette tape when you insert the cassette into the cassette compartment. There are two loading modes: standby-on mode and standby-off mode.

Loop-through connection
See "Bridge connection".

LTC
Abbreviation of "Longitudinal Time Code". This timecode is recorded on a longitudinal track on the tape. Reading is unreliable at low speeds, and not possible at all during still playback. See also "VITC".

Luminance signal
A signal that determined the brightness of the picture. Also called "Y signal".

Non-drop frame mode
The number of frames of the timecode and video run is not adjusted. When you use the timecode in non-drop frame mode, the real playback time will be about 86 seconds shorter per day than the timecode. If you edit frame by frame or if you determine the length of a shot by counting the timecode, use drop frame mode.

Non-linear editing
Editing while playing back video and audio signals recorded on hard disks. Video scenes stored on disk can be cued up quickly, for increased editing efficiency. *See also "Linear editing".*

PCM audio
This is an audio signal represented by pulse code modulation. The analog audio signal is first broken down into a sequence of pulses, and these are then represented digitally.

Preroll
Running of a video tape to a prior to an edit-start point to enable the tape to reach a steady speed and to be synchronized with other video tapes.

Reference video signal
A video signal which contains a sync signal or sync and burst signals, used as a reference for synchronization of video equipment.

R–Y signal
One of the color difference signals, the R (red) signal minus Y (luminance) signal.

Sampling frequency
The unit of time used when converting an analog signal with a continuously varying level to digital form by sampling the level at a fixed interval. In general, a higher sampling frequency makes it possible to digitize analog signals of a higher frequency.

SCH
Abbreviation of Sub Carrier to Horizontal. The phase of the subcarrier with respect to the phase of the horizontal synchronization signal. In editing of monochrome video, phase continuity is maintained by editing in units of frames (two fields), so that the continuity of the horizontal synchronization signal phase is maintained. Editing of color video must be done in units of two frames (four fields) to maintain subcarrier continuity. The SCH of a field can be checked to find out which of the four fields it represents. This allows edited video signals to be joined while maintaining subcarrier continuity.

Search
Viewing the picture or timecode by running the tape in fast forward or rewind mode, in order to search for a particular scene.

Servo
A mechanism that controls the number and phase of rotations of the head drum or capstan. Servo mechanism allows playback of the video signal without guard band noise. The reference signal of the servo control is normally a vertical sync signal.

Servo lock
This refers to the synchronization of the phase of the drum rotation and the reference signal for the tape transport position, so that the video heads can trace the same pattern on the tape for playback and recording.

Setup (for DSR-2000)
The difference between the reference black level and the blanking level of a composite signal.

SMPTE
Abbreviation of Society of Motion Picture and Television Engineers, a professional association established in the USA.

S/N
Signal-to-Noise ratio. The relation of the strength of the desired signal to the accompanying electronic interference, the noise. If S/N is high, sounds are reproduced with less noise and pictures are reproduced clearly without snow.

Standby-off mode
One of the stop modes. In this mode, head drum rotation is stopped and the tape tension is slackened. It is not possible to switch instantaneously from this mode to recording or playback mode. This mode is not harmful to the tape or heads.

Standby-on mode
One of the stop modes. In this mode, the head drum continues rotating and the tape remains wound onto the drum. This mode enables instantaneous switching to recording or playback mode. To prevent damage to the tape or heads, the device automatically switches from standby-on mode to standby-off mode after a certain period of time.

Subcarrier
Color information contained in a composite video signal. Its amplitude is for color saturation and its phase to color burst is for hue.

Superimpose
To put one picture (or characters) onto another so that both can be seen at the same time.

S-video
A singal format in which Y (luminance) and C (chrominance) signals are separated to reduce interference between them so that noiseless images are reproduced.

Sync
A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning patterns of the video camera and the monitor.

Synchronization
In video editing, alignment of the position and speed of player and recorder VCRs tapes. Carried out during preroll in order to increase editing precision.

Tape tension
The tension applied to a tape. For the tape to run properly while being wound on the drum, it must be pulled lightly in the opposite direction to the direction of transport. Improper adjustment of tape tension can cause deviations along the temporal signal axis. In analog VCRs, these deviations are evident as skew and distortion in the upper part of the screen.

TBC
Abbreviation of Time Base Corrector. Electronic circuits to electrically stabilize the playback signals by removing color variation and roll in the playback picture caused by irregularity in drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signals.

Threading
See "Loading".

Time code
The timecode is a tape position information signal that includes time and frame data that are recorded onto the tape so as to facilitate searching of editing points and recorded scenes when viewing or editing.
SMPTE timecode is applied to NTSC system, and EBU timecode is applied to PAL/SECAM systems. There are two kinds of signal recorded on tape. One is longitudinal timecode (LTC) recorded along the tape (the same way as audio and CTL signals). The other is vertical interval timecode (VITC). This code is inserted in the vertical blanking period and it is recorded on the tape with video signals.

Time data
This refers either to time data that is generated by a timecode generator or time data that is played back from a tape and read by a timecode reader.

Unloading
When the EJECT button is pressed, the VCR automatically winds the tape back into the cassette case. Also called "Unthreading".

Unthreading
See "Unloading".

Glossary

User bits
These are also referred to as “user’s bits”. The user bits are a 32-bit segment of the timecode recording area. The user can select what to record in this segment and how to use the recorded data. For example, it can be used to record date information in addition to the timecode data or ID numbers for tape reels or programs.

V (vertical)-blanking
The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in monitors are turned off so that they can return from the bottom of the screen to the top without showing tracks of movement on the screen. When the position of v-blanking is not adjusted correctly, a horizontal black bar appears on the screen.

Video gain
Amount of amplification for video signals, expressed in decibels (dB).

VITC
Abbreviation of “Vertical Interval Time Code”. This timecode is inserted in the vertical blanking interval and recorded on the video tracks. It can be read at low speeds and during still playback, but not during high-speed playback.
See also “LTC”.

Y signal
See “Luminance signal”.

Index

Index

http://www.world.sony.com/

Sony Corporation Printed in Japan

SONY

3-203-674-**01**(1)

English

i.LINK/DV Input/ Output Board

Installation Instructions

DSBK-190

DVCAM™

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For the customers in Canada

This Class A digital apparatus complies with Canadian ICES-003.

For the customers in Europe

This product with the CE marking complies with the EMC Directive (89/336/EEC) issued by the Commission of the European Community.
Compliance with this directive implies conformity to the following European standards:
• EN55103-1: Electromagnetic Interference (Emission)
• EN55103-2: Electromagnetic Susceptibility (Immunity)
This product is intended for use in the following Electromagnetic Environment(s):
E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Table of Contents

Overview

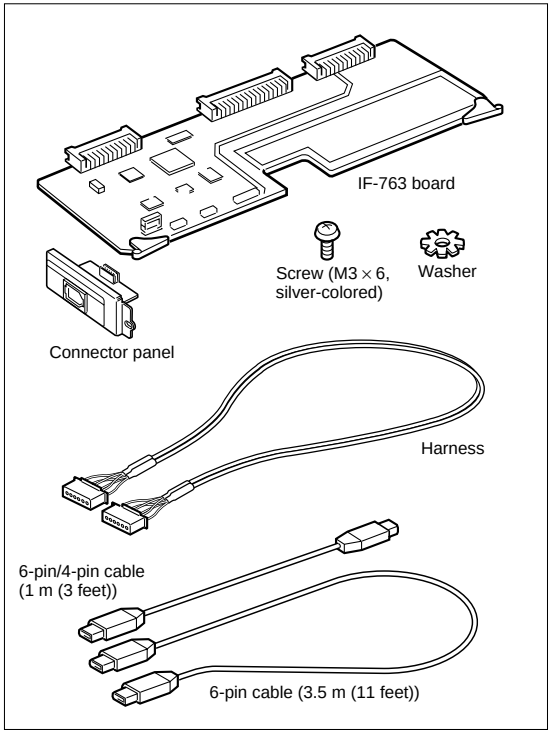
The DSBK-190 i.LINK/DV Input/Output Board is an optional board for the DSR-2000/2000P Sony Digital Videocassette Recorder. Installing this board in a DSR-2000/2000P allows two DSR-2000/2000P units to be connected with an i.LINK/DV [1)] cable to form a cut editing system. The board also allows the connection of a Sony consumer DV camera for direct recording and editing.

Refer to the DSR-2000/2000P Operating Instructions for information on connecting and operating the DSR-2000/2000P with the DSBK-190 installed.

1) i.LINK is a trademark of Sony Corporation, and indicates technology complying with the IEEE1394-1995 specification and extensions thereof.

Components of the DSBK-190

The DSBK-190 consists of the following items.



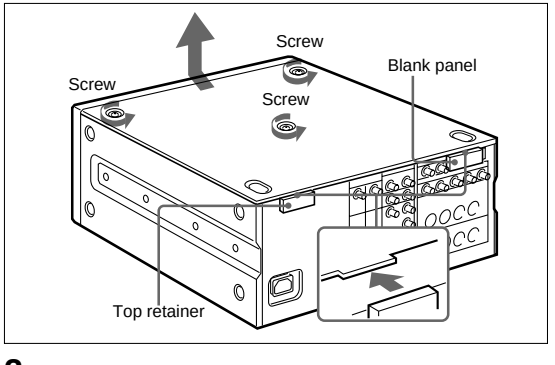
Installation

Caution

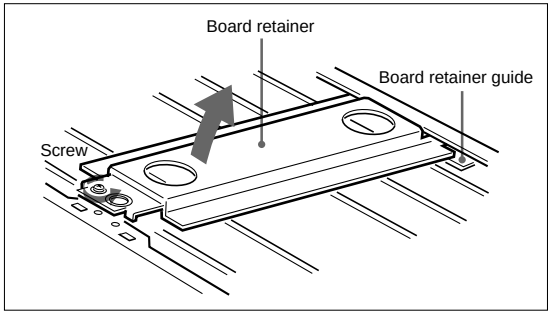
If this option is installed incorrectly, personal injury or damage to peripheral items may occur due to fire, shock, or other accidental circumstances. To avoid such risks, installation should be performed by qualified service personnel.

To install the DSBK-190 in the DSR-2000/2000P, proceed as follows.

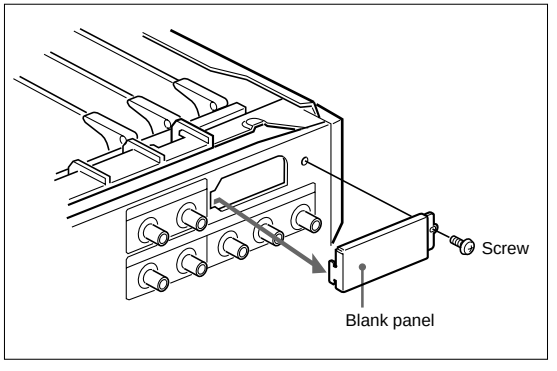
1 Remove the top cover of the DSR-2000/2000P.
Loosen the three screws, and slide the top cover away from the top retainer and blank panel.



2 Remove the board retainer.
Loosen the screw, then raise the board retainer and pull it out from the board retainer guide.



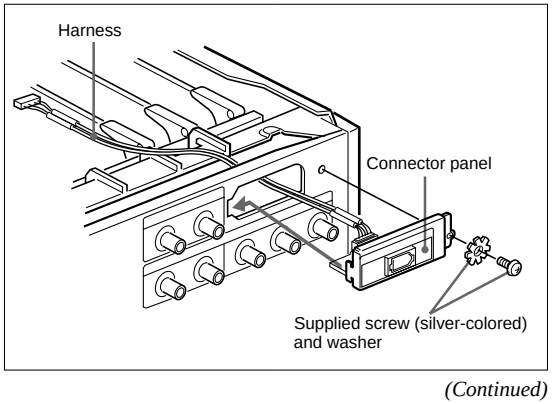
3 Remove the blank panel.



Notes

Keep the blank panel and screw in a safe place for future use.

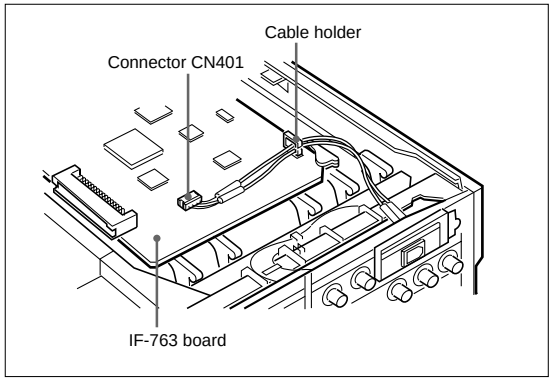
4 Pass the harness through the opening in which the connector panel fits and connect it to the connector panel; then fasten the connector panel to the DSR-2000/2000P with the screw.



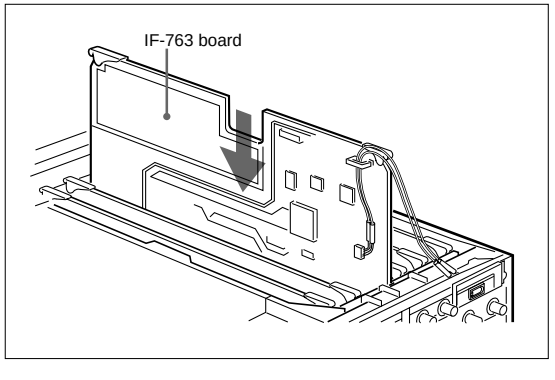
(Continued)

Installation

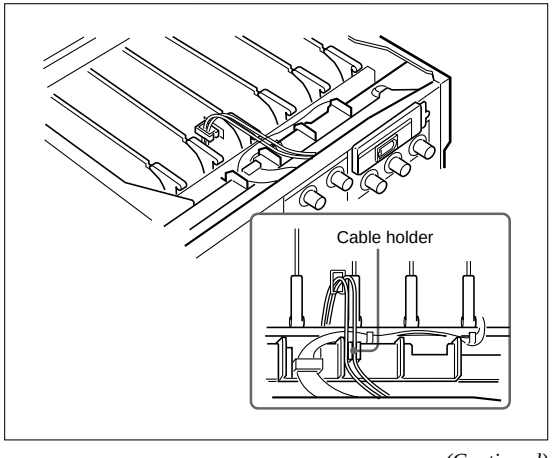
5 Pass the harness through the cable holder on the IF-763 board, and connect to connector CN401.



6 Insert the IF-763 board in the board slot (fourth from the outside).
Align the three connectors on the bottom of the board with the three connectors inside the unit, and push the board firmly into place.



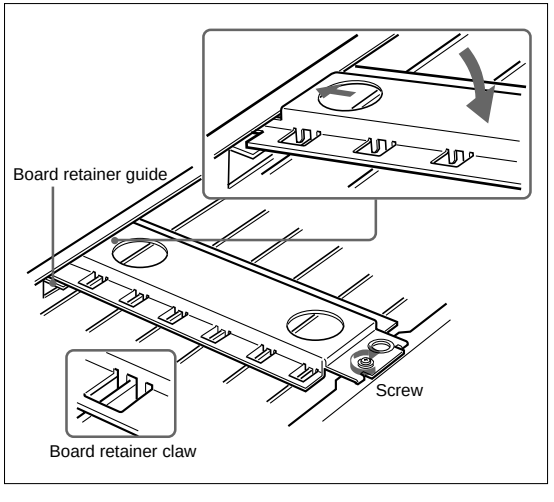
7 Fix the harness in the cable holder by the board slot.



(Continued)

Installation

8 Replace the board retainer which you removed in step **2**, in its original position.
Push the board retainer into the board retainer guide, and fasten the screw in the screw hole.
Check that the six claws on the underside of the board retainer engage with the boards in the slots to hold them in position.



9 Replace the DSR-2000/2000P top cover.

SONY

3-203-675-**01**(1)

English

Remote Control Panel

Installation Instructions

DSBK-200 DVCAM™

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For the customers in Canada

This Class A digital apparatus complies with Canadian ICES-003.

For the customers in Europe

This product with the CE marking complies with the EMC Directive (89/336/EEC) issued by the Commission of the European Community.
Compliance with this directive implies conformity to the following European standards:
• EN55103-1: Electromagnetic Interference (Emission)
• EN55103-2: Electromagnetic Susceptibility (Immunity)
This product is intended for use in the following Electromagnetic Environment(s):
E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Table of Contents

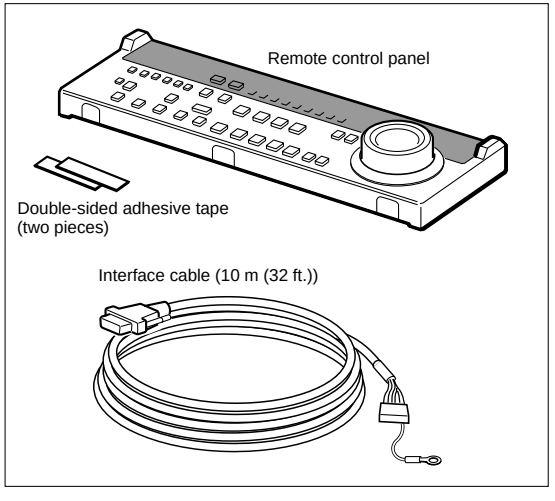
Overview

The DSBK-200 Remote Control Panel is an optional remote control panel for the DSR-2000/2000P Sony Digital Videocassette Recorder. Connecting this remote control panel to the DSR-2000/2000P allows the DSR-2000/2000P to be remotely controlled.
Normally, use this remote control panel installed in the optional BKNW-121 Control Panel Case.

For details of the functions of the buttons on this remote control panel, refer to the Operating Instructions for the DSR-2000/2000P.

Components of the DSBK-200

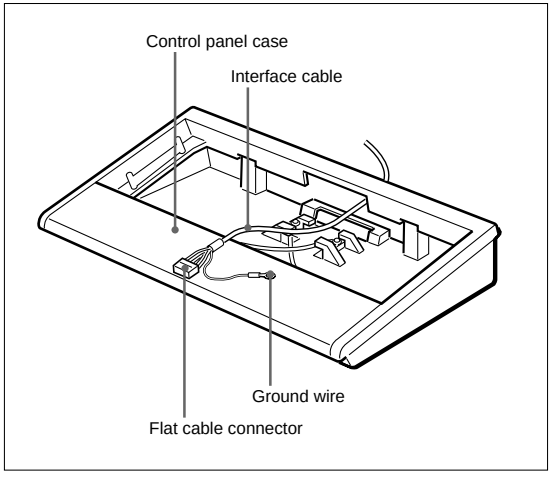
The DSBK-200 comprises the following items.



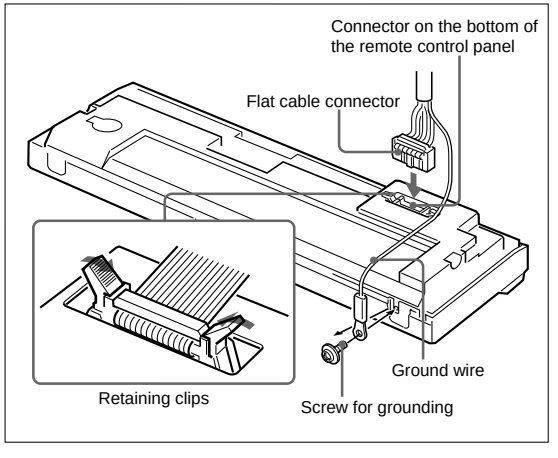
Installation

Use the following procedure to install the DSBK-200 Remote Control Panel in the optional BKNW-121 Control Panel Case.

1 Pass the flat cable connector and ground wire of the interface cable through the hole at the rear of the bottom of the control panel case, to the interior of the control panel case.



2 Connect the flat cable connector to the connector on the bottom of the remote control panel, then remove the screw for grounding and tighten it together with the ground wire. Fix the flat cable connector in place by fastening the retaining clips at each end of the connector on the remote control panel.



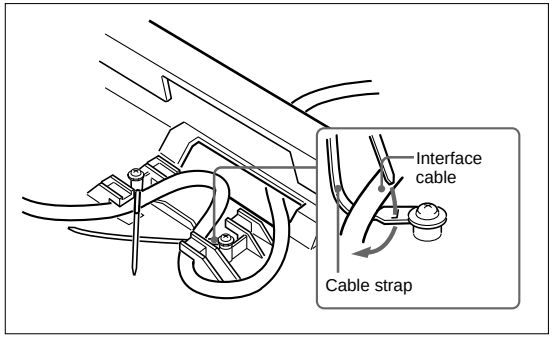
Note

Make sure that the projection on the underside of the connector matches the cutout on the control panel connector. The connector cannot be inserted upside down.

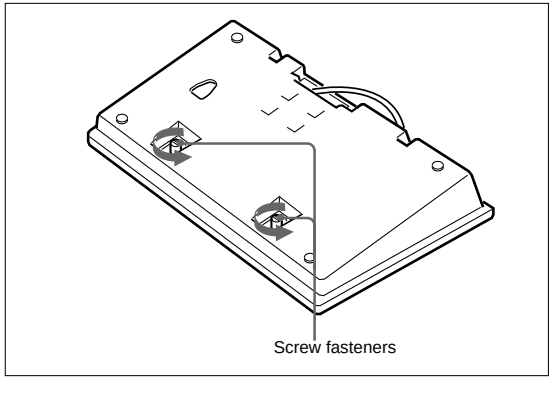
(Continued)

Installation

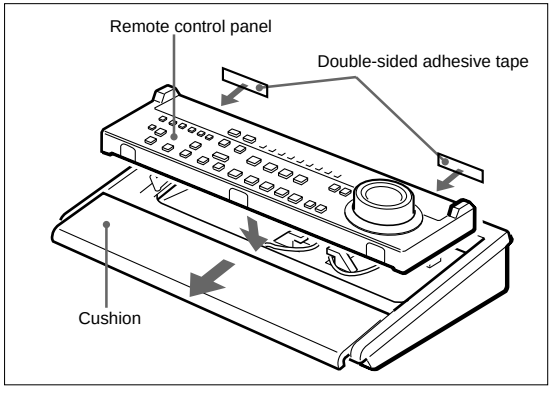
3 Use the cable straps on the base of the control panel case to hold the cable tidy, as required.



4 Slacken the two screw fasteners in the base of the control panel case.

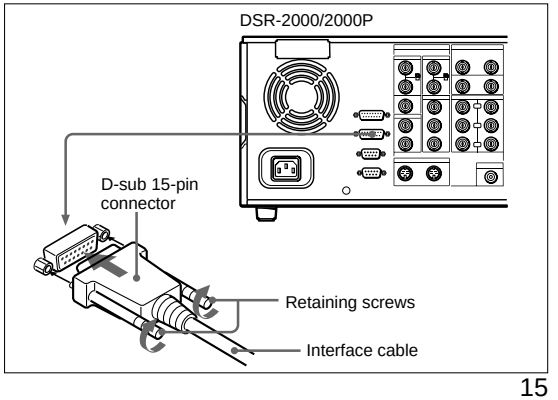


5 Attach the double-sided adhesive tape to the edge of the remote control panel as shown in the figure, then pull forward the cushion part of the control panel case, and insert the remote control panel.



6 Slide the cushion part of the control panel case back, to hold the remote control panel in place, then turn the screw fasteners in the base of the control panel case to hold the cushion part in position.

7 Connect the D-sub 15-pin connector of the interface cable to the CONTROL PANEL connector of the DSR-2000/2000P, and fasten the connector with the retaining screws.



Using the remote control panel

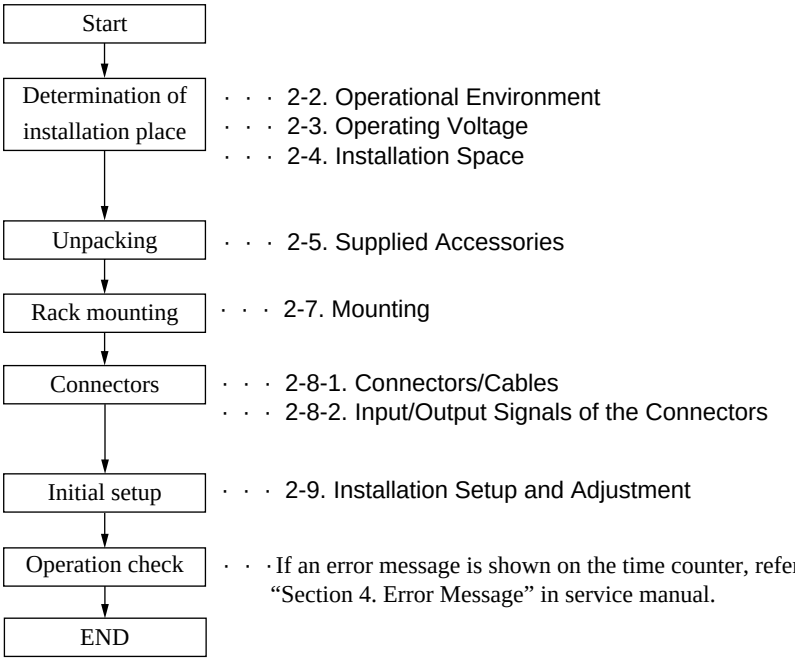
Power on the DSR-2000/2000P, and in the subsidiary control panel, set the CONTROL PANEL switch to EXT. This lights the ON LINE indicator of the remote control panel, indicating that it is ready for use.
If you set extension menu item 117 on the DSR-2000/2000P to PARA, you can use both this remote control panel and the DSR-2000/2000P control panel.

For more information about this, refer to the Operating Instructions for the DSR-2000/2000P.

Section 2
Installation

Be sure to install the DSR-2000/2000P in location satisfying the required operational environment described below to assure the DSR-2000/2000P superior performance and to maintain the excellent serviceability and accessibility.

2-1. Installation Procedure



2-2. Operational Environment

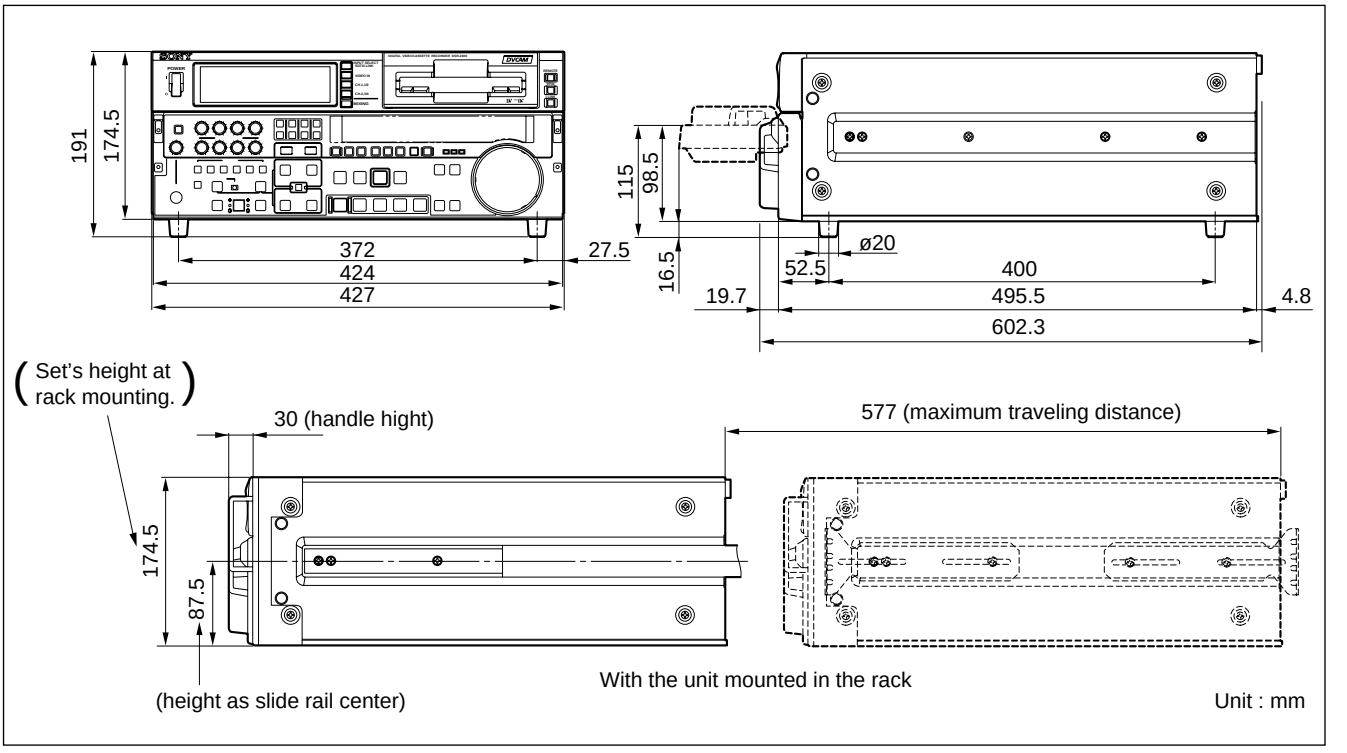
- Operating temperature : +5 ˚C to +40 ˚C
- Humidity : 80 % or less
- Storage temperature : −20 ˚C to +60 ˚C
- Locations to avoid :
  - Areas where the unit will be exposed to direct sunlight or any other strong lights.
  - Dusty areas or areas where it is subject to vibration.
  - Areas with strong electric or magnetic fields.
  - High-temperature environment.
    (Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation. Do not block the ventilation holes on the sides of the cabinet and the rear panel.)
- Horizontal condition : within ±30 °

2-3. Operating Voltage

- Power voltage : AC 100 V to 240 V
- Power frequency : 50/60 Hz
- Power consumption : 110 W

2-4. Installation Space

- The rear side must be at least 40 cm away from the walls for ventilation and maintenance.
- When the unit is operated on a desk or similar condition, assure that the clearance above the unit is at least 40 cm to provide accessibility to the printed circuit boards and other mechanical parts. Note that it is not necessary to provide the space when the unit is mounted in a rack since the printed circuit boards can be repaired after it is pulled out.



2-5. Supplied Accessories

- AC power cord : 1
- RCC-5G 9-pin remote cable : 1
- Operating instructions : 1

2-6. Optional Accessories

- i.LINK/DV input/output board : DSBK-190
- Extension control panel : DSBK-200
- TBC remote control unit : UVR-60/60P
- Rack mount Kit : RMM-130
  (The unit can be mounted in a 19-inch standard rack)
- Remote control cable : RCC-5G/10G/30G
- Cleaning cassette tape : DV12CL (Standard size), DVM12CL (Mini size)
- Digital video cassette (Mini size) : PDVM-12ME/22ME/32ME/40ME
- Digital video cassette (Standard size) : PDV-64ME/94ME/124ME/184ME

2-7. Rack Mounting

The unit can be mounted in a 19-inch standard rack.
It is recommended to use the following kit.

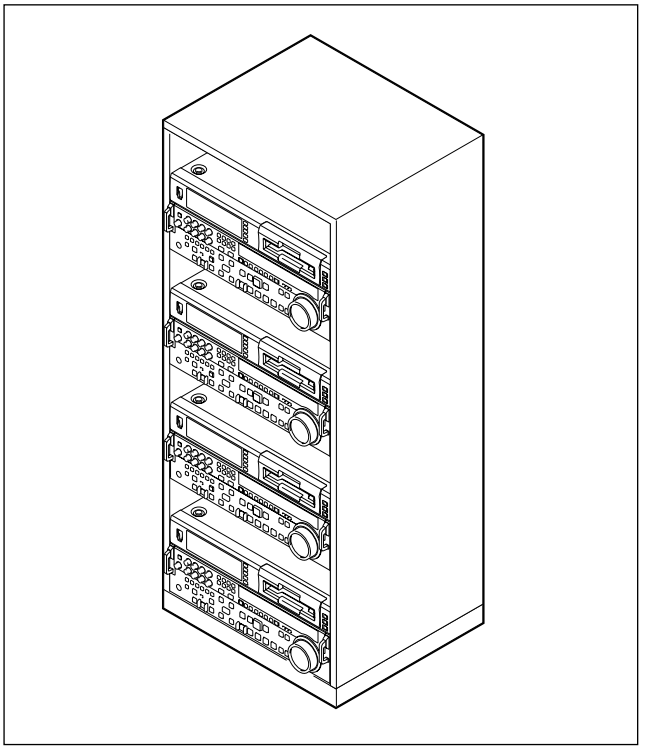
Rack Mount Kit : RMM-130
(optional accessory)

or

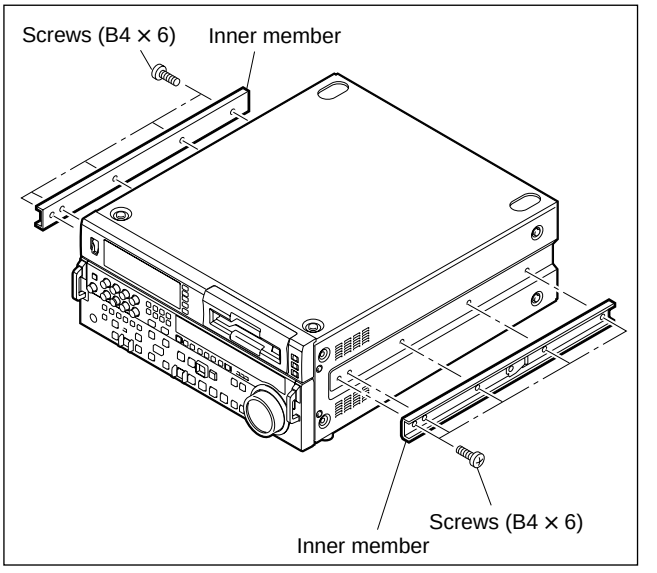
RACK-MOUNT SLIDES : MODEL 305 slide length 22 inch (ACCURIDE)

Note for rack mounting :

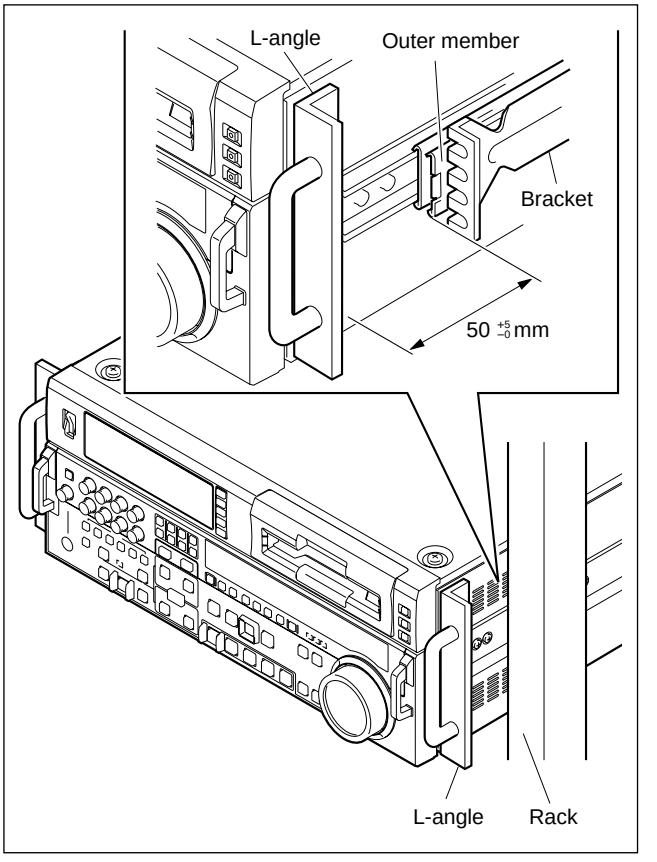
- When several VTRs are mounted in a rack, it is recommended to install a fan for ventilation. Good air circulation is essential to prevent internal heat build-up in a rack.
- The unit must be kept in an operating temperature range from +5 ˚ to +40 ˚C.
- Never remove an upper panel and lower panel during rack mounting.
- Be sure to secure the rack to the floor to avoid accidents when a unit is pulled out.
- Connect long enough cables on the connector panel, considering that the unit is pulled out.
- Maximum two units can be mounted in a stack. For three units of more, keep a space for one unit between the mounted units, using a rack. The space should be 44 mm or more in height.



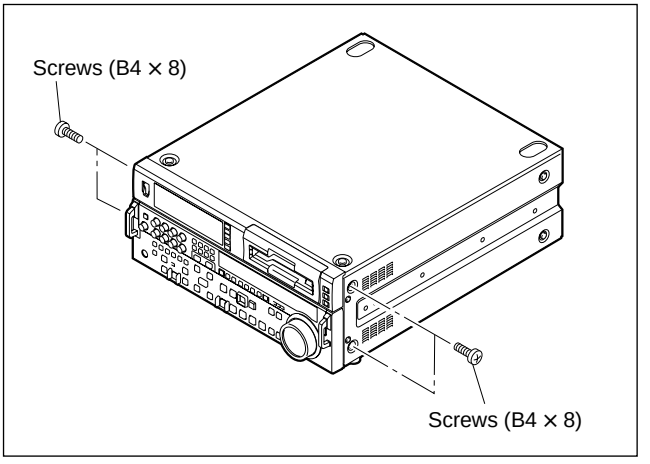
1. Remove the four screws on right and left side panels. And install the Inner Members of the rails to the right and left side panels with the screws removed.



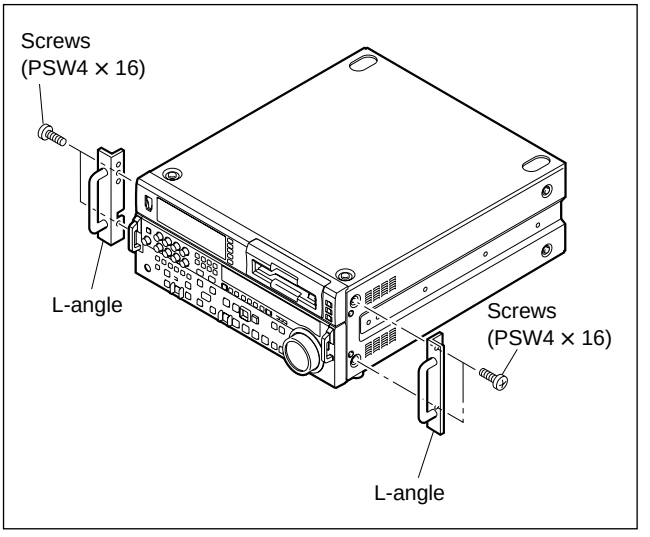
2. Install the Outer Member Brackets of the slide rails to the rack. Adjust the distance from the edge of the slide rail to the outside of the rack so that it meets the required specification.



3. Remove the two screws (B4 × 8) on the right and left side panels. (Be careful not to lose these four screws.)



4. Install the L-angles to the holes described in step 3 with the supplied screws (PSW4 × 16) in RMM-130 for these L-angles.



Note

Never use screws PSW4 × 16 to install the right and left side panels without L-angles. Be sure to use the screws B4 × 8 removed in step 3. Screws for L-angles are longer than ones for the side panels. Therefore, using the screws PSW4 × 16 may cause trouble in the unit.

2-8. Connectors

2-8-1. Connectors/Cables

When external cables are connected to the connector on a connector panel during maintenance, the following (or equivalents) must be used.

Connectors on DSR-2000/2000P Side	Connector/Cable	
Panel indication	**Designation**	**Sony Part No.**
ANALOG IN REF. VIDEO IN TIME CODE IN VIDEO IN COMPONENT VIDEO IN	BNC, MALE	1-560-069-11
S VIDEO IN	YC-15 V (1.5 m)	optional accessory
AUDIO IN CH-1/2/3/4	XLR 3P, MALE	1-508-084-11
ANALOG OUT REF. VIDEO OUT TIME CODE OUT VIDEO OUT COMPONENT VIDEO OUT	BNC, MALE	1-560-069-11
MONITOR AUDIO	PIN PLUG	Standard Product
S VIDEO OUT	YC-15 V (1.5 m)	optional accessory
AUDIO OUT CH-1/2/3/4	XLR 3P, FEMALE	1-508-083-11
i.LINK	IEEE1394 6P (1 m) IEEE1394 6P (3.5 m)	1-782-408-21 1-791-184-11
SDI INPUT	BNC, MALE	1-560-069-11
SDI OUTPUT	BNC, MALE	1-560-069-11
SDTI (QSDTI) INPUT	BNC, MALE	1-560-069-11
SDTI (QSDTI) OUTPUT	BNC, MALE	1-560-069-11
DIGITAL AUDIO (AES/EBU) INPUT CH-1/2, CH-3/4	BNC, MALE	1-560-069-11
OUTPUT CH-1/2, CH-3/4	BNC, MALE	1-560-069-11
VIDEO CONTROL	D-SUB 15P, FEMALE	1-561-610-21
CONTROL PANEL	D-SUB 15P, MALE	1-561-651-11
REMOTE-IN	D-SUB 9P, MALE	1-560-651-11
REMOTE-OUT	D-SUB 9P, MALE	1-560-651-11

2-8-2. Input/Output Signals of the Connectors

INPUT

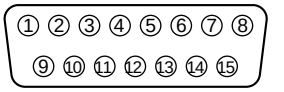
REF.VIDEO :	BNC ×2 (loop-through) NTSC black burst, 0.286 V p-p, 75 Ω, sync negative PAL black burst, 0.3 Vp-p , 75 Ω sync negative
VIDEO IN :	BNC ×2 (loop-through) Composite, 1.0 V p-p, 75 Ω, sync negative
COMPONENT VIDEO :	BNC ×3 Y : 1.0 V p-p, 75 Ω, sync negative R-Y/B-Y : 0.7 V p-p, 75 Ω (NTSC : 75 % PAL : 100 %)
S VIDEO :	DIN 4P ×1 Y : 1.0 V p-p, 75 Ω, sync negative C : NTSC 0.286 V p-p (burst level), 75 Ω PAL 0.3 V p-p (burst level), 75 Ω
SDI INPUT :	BNC ×2 (active-through) Serial digital interface format (270 Mbps), SMPTE 259M (NTSC)/ITU-R BT.656 (PAL)
SDTI (QSDI) :	BNC ×1 Serial data transport interface (DVCAM compression signal : Video + Audio + TC signal) SMPTE 305M/322M
AUDIO IN :	XLR 3P ×4 Reference level switchable (−6/0/+4 dBu), 600 Ω/10 kΩ switchable, balanced
DIGITAL AUDIO (AES/EBU) :	BNC ×2 (conformed with AES-3id-1995)
TIME CODE :	BNC ×1 SMPTE (NTSC)/EBU (PAL) 0.5 to 18 V p-p, 3 kΩ, unbalanced
i.LINK :	IEEE1394 connector 6P ×1

OUTPUT

REF.VIDEO :	BNC ×1
	NTSC composite sync, 0.286 V p-p, 75 Ω, sync negative (with burst signal)
	PAL composite sync, 0.3 V p-p, 75 Ω, sync negative (with burst signal)
VIDEO OUT1, 2, 3(SUPER) :	BNC ×3
	Composite, 1.0 V p-p, 75 Ω, sync negative
COMPONENT VIDEO :	BNC ×3
	Y : 1.0 V p-p, 75 Ω, sync negative
	R-Y/B-Y : 0.7 V p-p, 75 Ω (NTSC : 75 % PAL : 100 %)
S VIDEO :	DIN 4P ×1
	Y : 1.0 Vp-p, 75 Ω, sync negative
	C : NTSC 0.286 V p-p (burst level), 75 Ω
	PAL 0.3 V p-p (burst level), 75 Ω
SDI OUTPUT1, 2, 3(SUPER) :	BNC ×3
	Serial digital interface format (270 Mbps),
	SMPTE 259M (NTSC)/ITU-R BT.656 (PAL)
SDTI (QSDI) :	BNC ×1
	Serial data transport interface
	(DVCAM compression signal : Video + Audio + TC signal)
	SMPTE 305M/322M
AUDIO OUT :	XLR 3P ×4, MALE
	+4 dBu, 600 Ω load, balanced (low impedance)
MONITOR AUDIO :	PHONO JACK ×1
	−6 dBu, 47 kΩ load, unbalanced
DIGITAL AUDIO :	BNC ×2 (conformed with AES-3id-1995)
TIME CODE :	BNC ×1
	SMPTE (NTSC)/EBU (PAL)
	2.2 V p-p ±3.0 dB, 600 Ω, unbalanced
i.LINK :	IEEE1394 connector 6P ×1

VIDEO CONTROL (D-sub 15 pin : MALE)

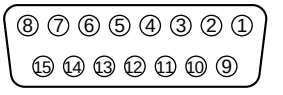
<external view>



Pin No.	Signal	Operating Voltage	IN/OUT
1	SYNC CONTROL	–5 V to +5 V	IN
2	HUE CONTROL	–5 V to +5 V	IN
3	SC CONTROL	–5 V to +5 V	IN
4	VIDEO LEVEL CONTROL	–5 V to +5 V	IN
5	SET UP CONTROL	–5 V to +5 V	IN
6	CHROMA LEVEL CONTROL	–5 V to +5 V	IN
7	–9 V SUPPLY	–9 V	OUT
8	GND		
9	FRAME GND		
10	–	–	–
11	–	–	–
12	–	–	–
13	Y/C DELAY CONTROL	–5 V to +5 V	IN
14		–	–
15	+9 V SUPPLY	+9 V	OUT

CONTROL PANEL (D-sub 15 pin : FEMALE)

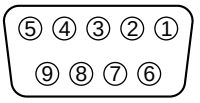
<external view>



Pin No.	Signal	Operating Voltage
1	SI	
2	SCK	
3	CS	
4	SO	
5	UNREG	+12 V
6	UNREG	+12 V
7	UNREG	+12 V
8	KY EXT	
9	GND	
10	GND	
11	GND	
12	GND	
13	UNREG GND	
14	UNREG GND	
15	UNREG GND	

REMOTE (D-sub 9 pin : MALE)

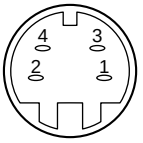
<external view>



Pin No.	Controlling Device	Controlled Device
1	FRAME GROUND	FRAME GROUND
2	RECEIVE A	TRANSMIT A
3	TRANSMIT B	RECEIVE B
4	TRANSMIT COMMON	RECEIVE COMMON
5	PRIORITY IN	PRIORITY OUT
6	RECEIVE COMMON	TRANSMIT COMMON
7	RECEIVE B	TRANSMIT B
8	TRANSMIT A	RECEIVE A
9	FRAME GROUND	FRAME GROUND

S VIDEO (Circular 4 pin)

<external view>



Pin No.	Output Signal
1	Y (G)
2	C (G)
3	Y (X)
4	C (X)

2-9. Installation Setup and Adjustment

2-9-1. Switch Settings on the Connector Panel

When the unit is installed, be sure to perform the following setup and adjustment. If the adjustment is not performed, the unit may not operate properly.
Refer to the operating instruction “Chapter 1 Overview” for setup and adjustment.

[Connector Panel]

(1) The setting of 75 Ω termination switch :
REF VIDEO 75 Ω ON/OFF
ON : When the line is terminated in this unit.
OFF : When another unit is connected with this unit.

(2) The setting of video input termination switch :
VIDEO INPUT 75 Ω ON/OFF
ON : When the line is terminated in this unit.
OFF : When another unit is connected with this unit.

(3) The setting of audio input level select switch :
+4 dBm : +4 dBu reference level on output side
0 dBm : 0 dBu reference level on output side
−6 dBm : −6 dBu reference level on output side

2-9-2. Front Panel Setting

[Control Panel]

(1) VIDEO INPUT select switch setting : COMPOSITE ; Ordinary video signal
S VIDEO ; Y/C separation type S Video signal
Y-R, B ; Component signal (Betacam)
SDI ; Component digital signal
SDTI/i.LINK ; DV compressed digital signal

(2) AUDIO INPUT SELECT : Analog/Digital (AES/EBU)/SDI

[SUB sidiary Control Panel]

(1) CHARACTER : Selects either the character information is superimposed in the video signal or not.

(2) CONTROL PANEL : Selects the status of the control panel when operating this unit.

(3) REC INHIBIT : Inhibits recording on a tape.

(4) KEY INHIBIT : Disables operation of the buttons specified on the upper/lower control panels.

(5) PROCESS CONTROL : Selects the control method and setting of the built-in digital video processor.

(6) INT/EXT-PRESET/REGEN : Selects internal time code/external time code, and preset the built-in time code generator.

(7) FREE RUN/REC RUN : Selects synchronous operation of the built-in time code generator.

(8) DF/NDF : Selects the synchronous operation of the time code generator and the counter.

(9) VITC : Sets ON to record the VITC generates in the built-in time code generator.

(10)TC SELECT : Selects the time code displayed on the time counter display block.

(11)VIDEO : Adjusts the output level of the video signal.

(12)SET UP : Adjusts the setup level.

(13)CHROMA : Adjusts the output level of the chroma signal.

(14)Y/C DELAY : Adjusts the amount of the Y/C delay.

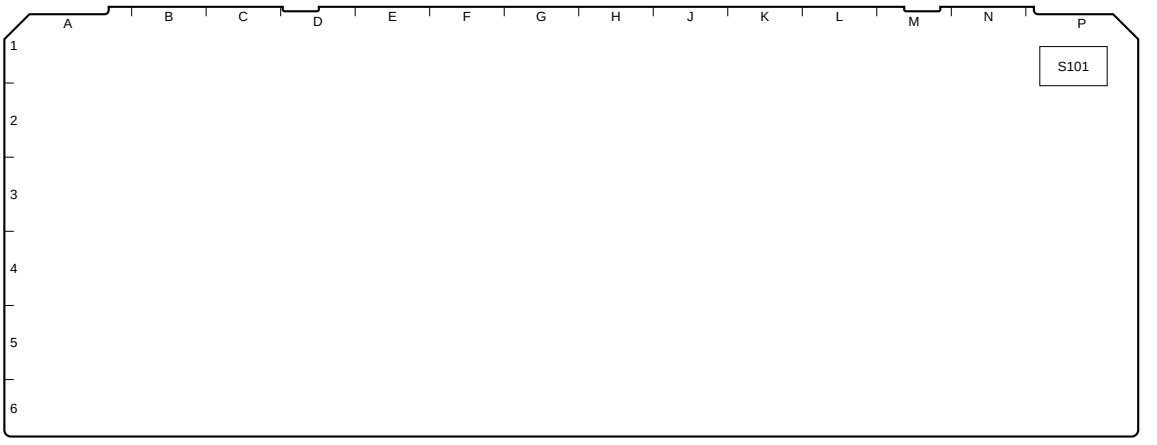
(15)CHROMA PHASE : Adjusts the chroma phase (the relative phase with the burst signal).

(16)SYNC : Adjusts the sync phase of the output signal.

(17)SC : Adjusts the phase of the subcarrier.

2-9-3. On-board Switch Setting

SV-212 board



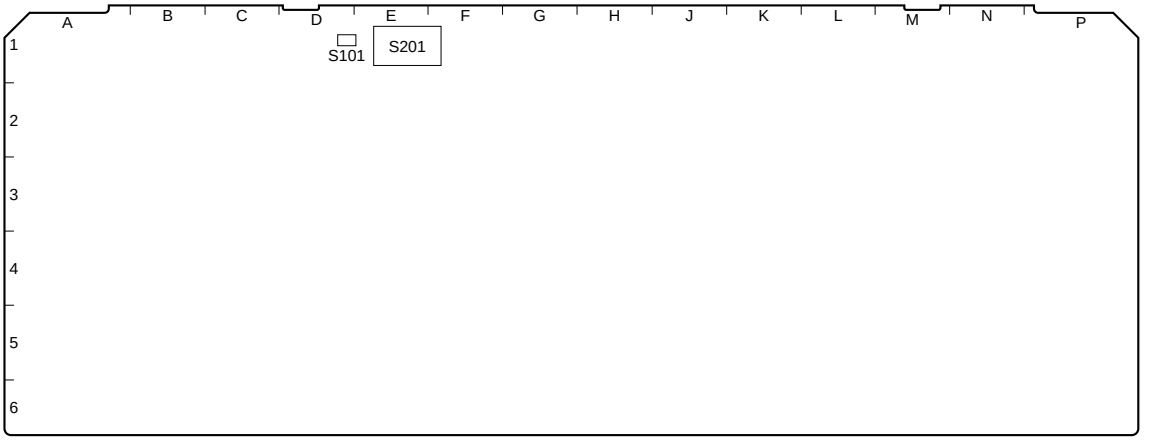
SV-212 BOARD (A SIDE)

Note

Do not change the setting of switches when the “factory use” is shown in the description.

Ref No.	Description	Factory Setting
S101-1	HOURS METER can enter reset mode.	OFF
S101-2	factory use	OFF
S101-3	Use this switch when operating the machine with cassette compartment removed.	OFF
S101-4	This defeats an error detection of mechanism and setvo system alignment.	OFF
S101-5	factory use	OFF
S101-6	factory use	OFF
S101-7	factory use	OFF
S101-8	factory use	OFF

SY-278 board



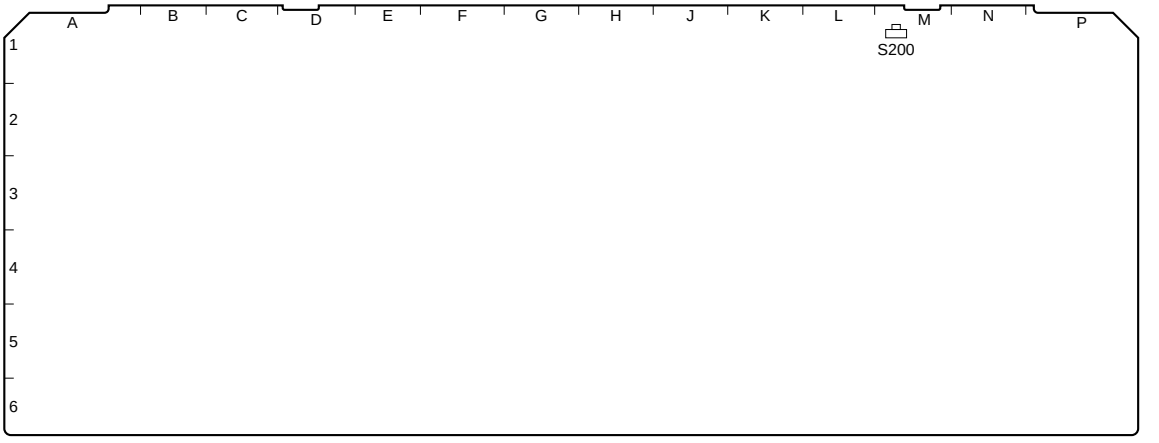
SY-278 BOARD (A SIDE)

Note

Do not change the setting of switches when the “factory use” is shown in the description.

Ref No.	Description				Factory Setting
S101	Push this switch when resetting the system control.				—
S201-1	factory use				OFF
S201-2	factory use				OFF
S201-3	factory use				OFF
S201-4	factory use				OFF
S201-5	factory use				OFF
S201-6	factory use				OFF
S201-7, 8	Destination setting	Destination	bit-7	bit-8	—
		UC	OFF	OFF	
		J	ON	OFF	
		CE	OFF	ON	

VPR-62 board



VPR-62 BOARD (A SIDE)

Ref No.	Name	Description	Factory Setting
S200	A/D LEVEL REF	• Use this switch when performing the A/D level adjustment. • When this switch is set to ON, the standard-level signal generated based on the internal data is output for adjusting the A/D level. Return the setting of the switch (S200) to OFF position. **Note** The switch (S200) on the VPR-62 board functions only when the switch (S101-1) on the SV-212 board is set to ON position	OFF

2-9-4. System Adjustment After Installation

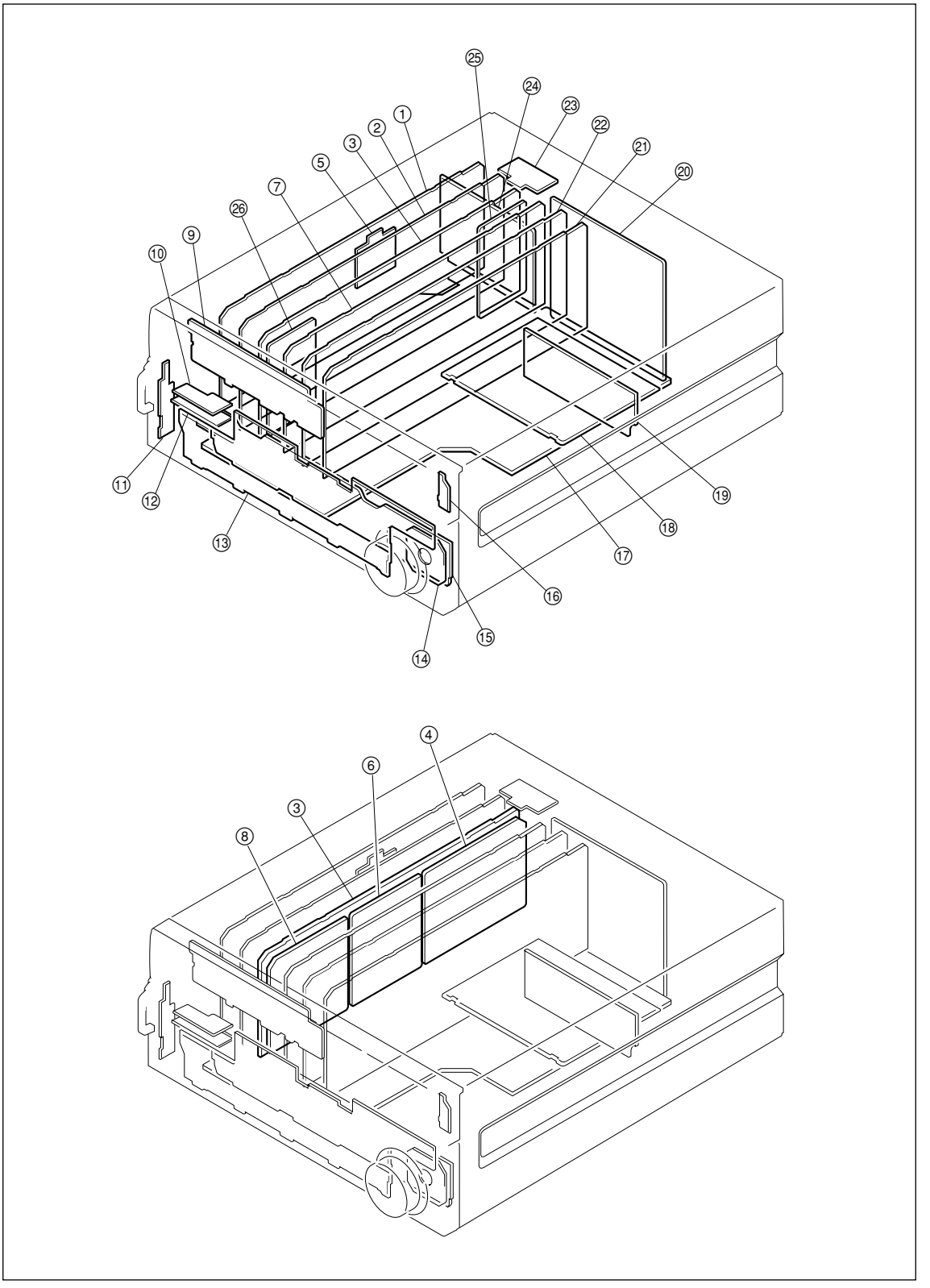
Observe the following precautions when this equipment is used for editing system.

- The REF. VIDEO INPUT requires video signal which is in comfomity with the RS-170A.
- Adjust the sync phase of this equipment to the system sync with [SYNC PHASE] control on the sub control panel.
- Adjust the SCH phase of this equipment to the system SCH with [SC PHASE] control on the sub control panel.
- When this unit is connected to a switcher that does not have the sync switching function, the SYNC/BURST level adjustment is required.

Section 3
Service Overview

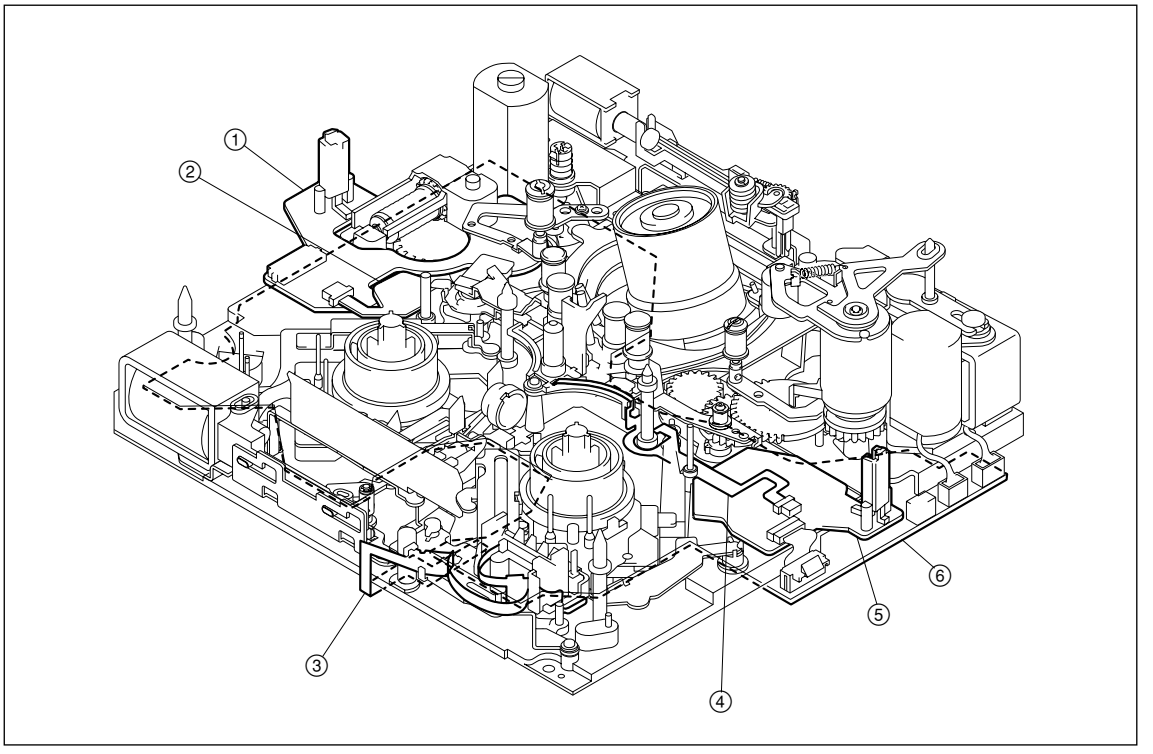
3-1. Location of Main Parts

3-1-1. Location of Printed Circuit Boards



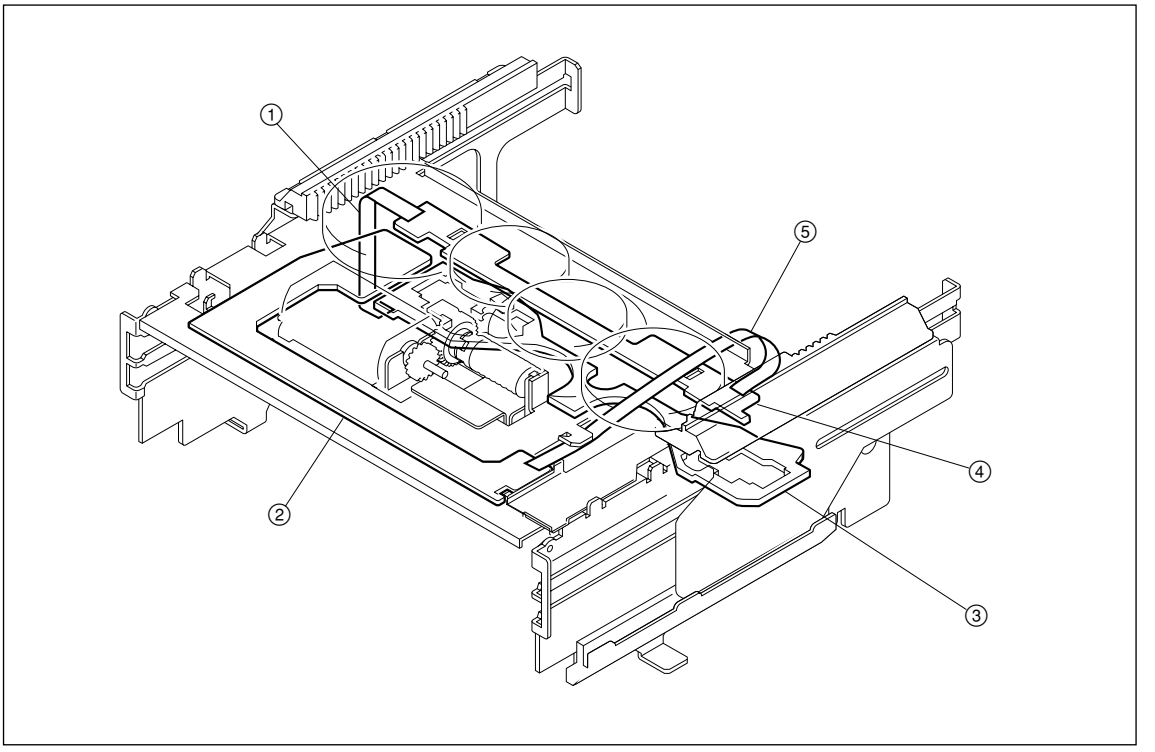
No.	Board Name	Circuit Configuration
①	APR-45	Audio process
②	VPR-62/62P	Analog video input・output process/reference
③	DPR-136	Digital process
④	DU-83 Serial No. 100001-100910: UC 400001-401550: CE	Digital process
⑤	DU-95 Serial No. 100001-100290: UC 400001-400300: CE	SDI character generator
⑥	DU-84 Serial No. 100001-101240: UC 400001-401550: CE	Digital process
⑦	IF-763	i.LINK interface board (Option: DSBK-190)
⑧	DU-89 Serial No. 100001-101240: UC 400001-401550: CE	Digital process
⑨	DY-15	Fluorescent display board/audio meter/input・output selection
⑩	VR-260	Audio REC volume control
⑪	HP-99	Headphone interface
⑫	VR-259	Audio PB volume control
⑬	KY-452	Operation panel
⑭	PTC-100	Search dial sensor
⑮	SW-11/11P	Switch
⑯	SW-17	Remote switch
⑰	MB-859	Mother board
⑱	RP-111	RF REC/PB, ATF detection
⑲	EX-752	Intermediate board
⑳	CP-341	Video/remote interface
㉑	SV-212	Servo/mechanism control
㉒	SY-278	System control
㉓	CN-1968	i.LINK connector board (Option: DSBK-190)
㉔	CP-342	Audio interface
㉕	FU-78P Serial No. 101241-: UC 401551-: CE	Digital process (PB)
㉖	FU-78R Serial No. 101241-: UC 401551-: CE	Digital process (REC)

Locations of Mechanism Deck



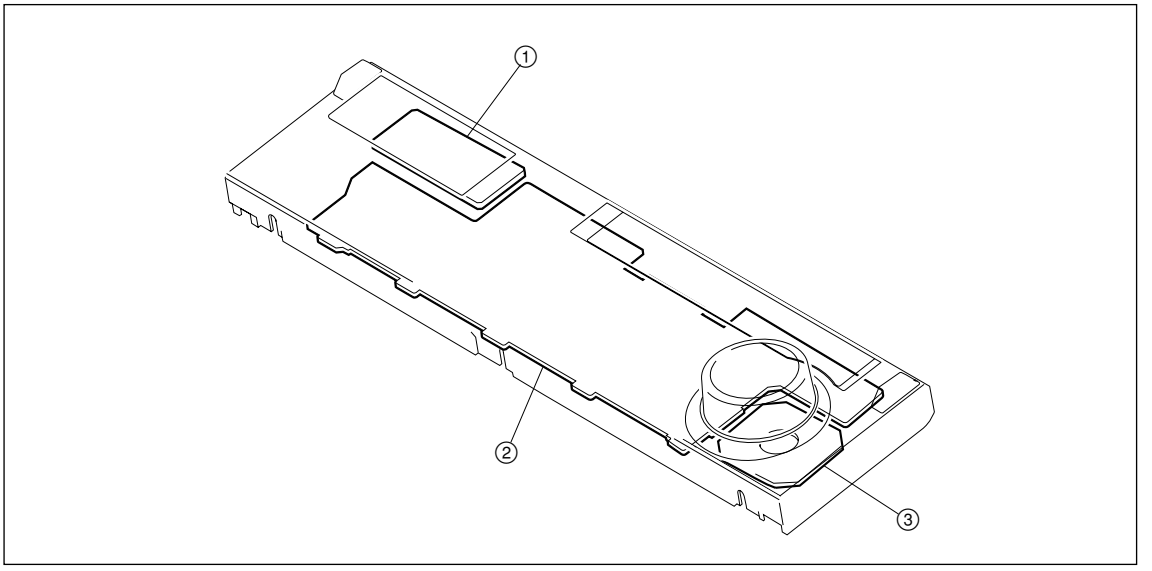
No.	Board Name	Circuit Configuration
①	SE-521	Mode sensor/tape end sensor/loading motor FG sensor
②	SE-538	Tension sensor
③	CN-1863	Sensor input/output board
④	SE-525	LED signal board
⑤	SE-522	Tape top sensor/reel position sensor (Mini/M/Standard)
⑥	MS-64	Servo/mechanism control

Locations of Cassette Compartment



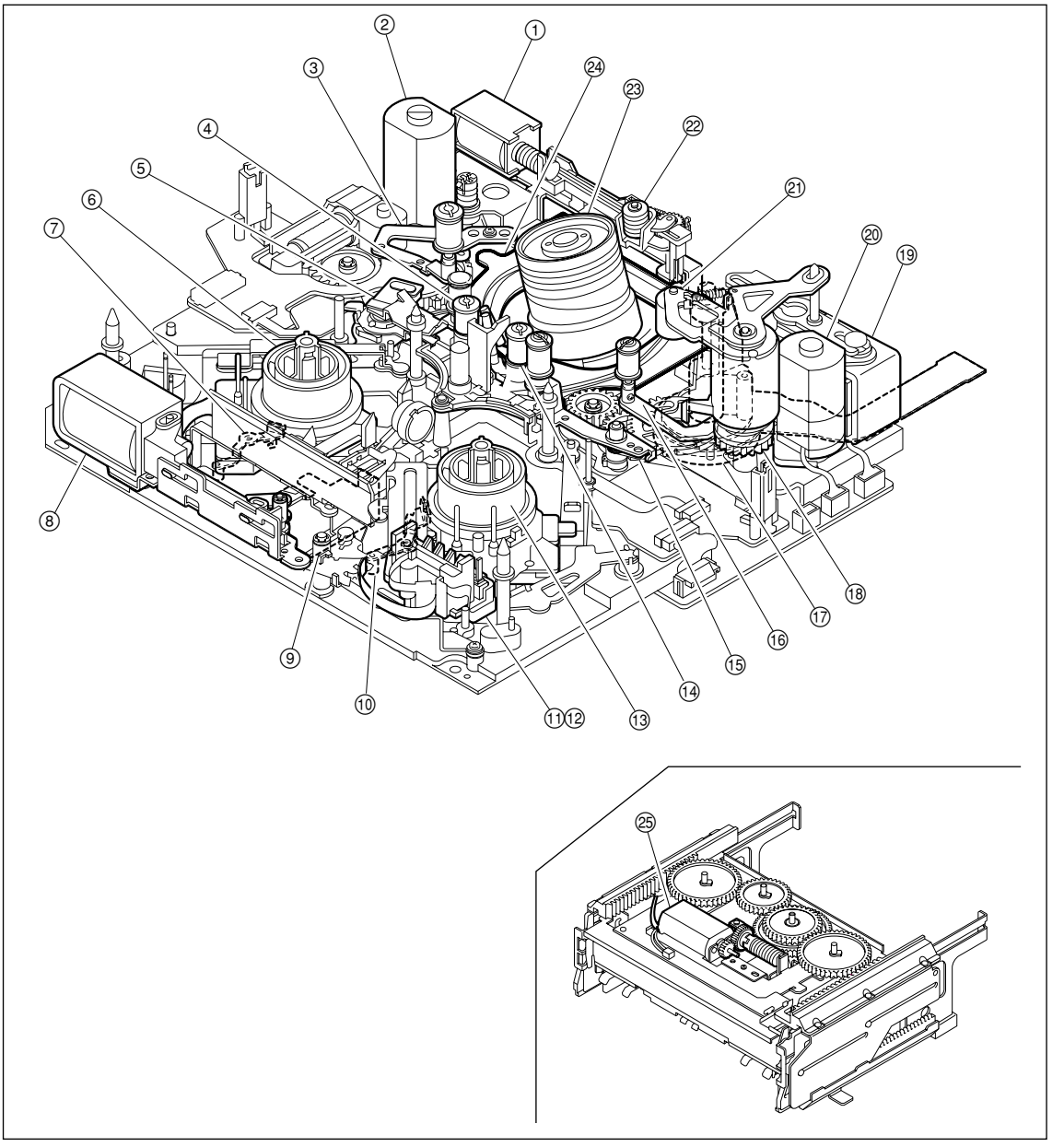
No.	Board Name	Circuit Configuration
①	CN-2021	Intermediate board between CC-84 and CC-83
②	CC-83	Cassette compartment mode detection/intermediate board
③	CC-85	Cassette compartment cassette in detection
④	CC-84	Cassette compartment cassette type detection
⑤	CN-2022	Intermediate board between CC-85 and CC-84

Locations of DSBK-2000 (Option)



No.	Board Name	Circuit Configuration
①	IF-778	Operation panel intermediate board (Option: DSBK-200)
②	KY-452A	Operation panel board (Option: DSBK-200)
③	PTC-100	Search dial sensor

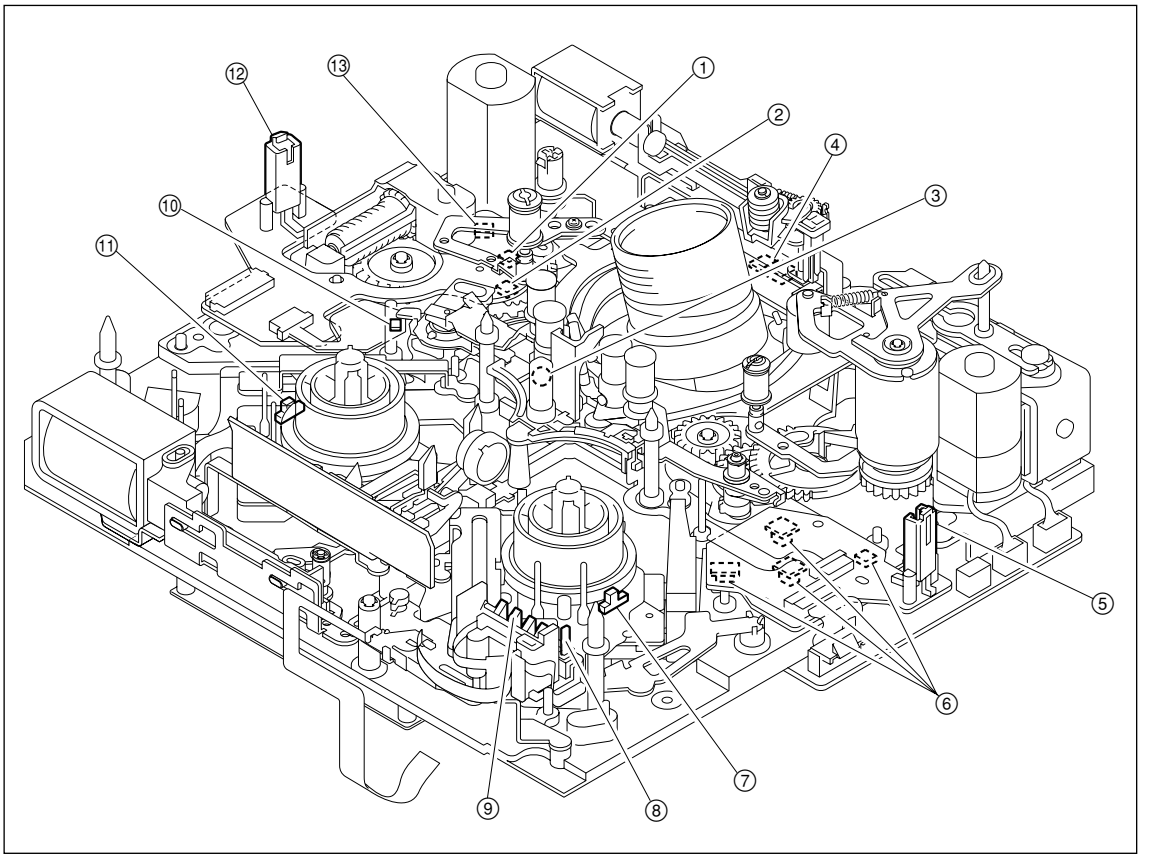
3-1-2. Location of Main Mechanical Parts



① Head cleaning solenoid
② Loading motor
③ TG1 arm assembly
④ Shuttle (left) assembly
⑤ S tension regulator assembly
⑥ S reel motor
⑦ S brake assembly
⑧ Brake solenoid
⑨ M stop solenoid assembly
⑩ T brake assembly
⑪ MIC assembly
⑫ MIC holder assembly
⑬ T reel motor
⑭ Shuttle (right) assembly
⑮ T drawer arm assembly
⑯ TG8 arm assembly
⑰ Capstan motor
⑱ Elevator cam
⑲ Pinch solenoid assembly
⑳ Reel shift motor
㉑ Pinch roller
㉒ HC roller assembly
㉓ Drum assembly
㉔ Rail assembly
㉕ Cassette compartment motor assembly

3-1-3. Location of Sensors

Sensor Location Diagram (1) ..... Mechanism Deck



①, ② Mode sensor
Detects the mechanism position during threading.

③ Tape top/end detect LED
Detects the top and end of a tape.

④ Condensation sensor
Detects condensation occurred in DSR-2000/2000P.

⑤ Tape top sensor
Detects the beginning of a tape that runs in the REV direction.

⑥ Reel position sensors (4 pieces) (Mini, M, Standard reel position)
Detects the reel table position at the each specified reel position according to the cassette type.

⑦ Reel FG sensor (Take-up side)
Detects rotation of the take-up reel table. The FG output of the sensor is sent to the servo circuit and used to control the rotating speed and torque of the reel motor.

⑧ Record proof sensor (common to standard, M and mini size cassettes)
Protects a tape from mis-recording.

⑨ Cassette memory terminal
Determines whether cassette memory is used, and reads and writes data to and from the cassette memory.

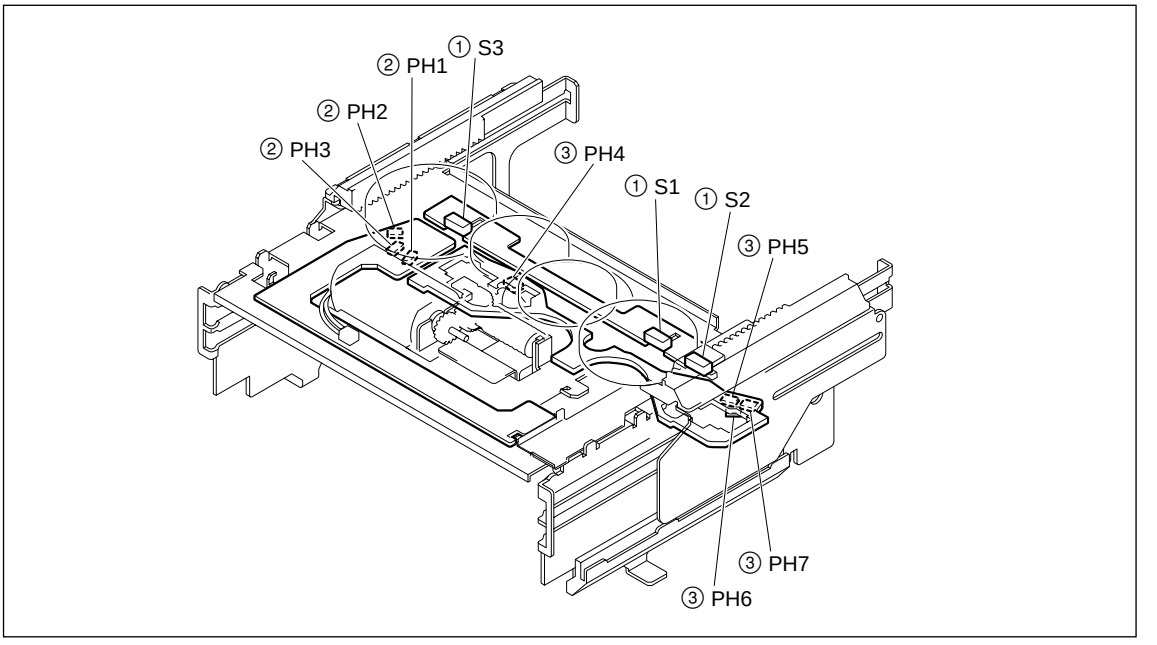
⑩ Tension sensor
The tension arm keeps the tension of a running tape constant during recording and playing. The tension sensor detects the mechanical position of the tension arm.

⑪ Reel FG sensor (Supply side)
Detects the rotation of the supply reel table. The PG output of the sensor is input to the servo circuit and controls the rotating speed and torque of the reel motor.

⑫ Tape end sensor
Detects the end of a tape that runs in the FWD direction.

⑬ Threading motor FG sensor
Detects the rotation speed of the gearbox motor. The FG output of the sensor is input to the servo circuit and controls the threading speed so that excessive force is not applied to the tape during threading.

Sensor Location Diagram (2) ..... Cassette compartment



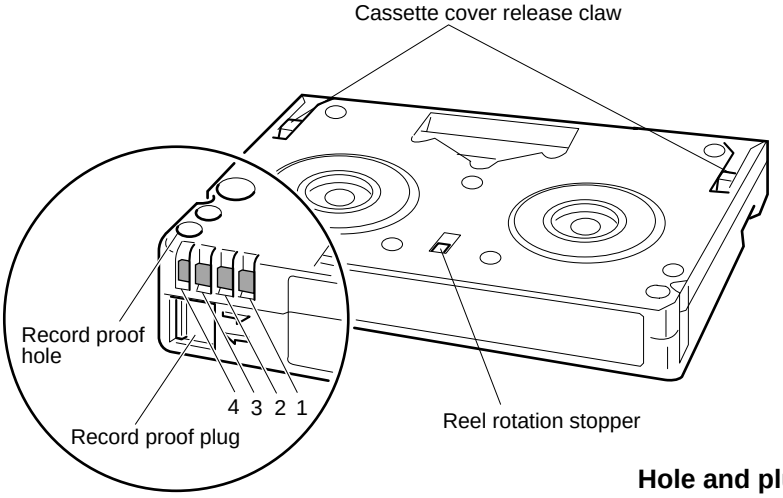
① The sensors S1, S2 and S3 discriminate the inserted cassette type among the mini, M, standard cassettes and the cassette adaptor for DVCPRO by on/off of the sensors.

② The sensors PH1, PH2 and PH3 detect the movement of a cassette compartment by their combination.

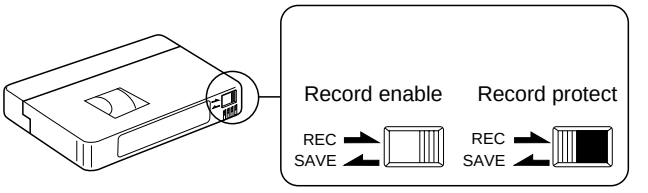
③ The sensors PH4 and PH5 detect that a mini cassette got inserted.
The sensors PH4 and PH6 detect that a M cassette got inserted.
The sensors PH4 and PH7 detect that a standard cassette got inserted.

3-2. Functions of Record Proof Hole and Record Proof Plug of Cassette

Standard cassette, M cassette

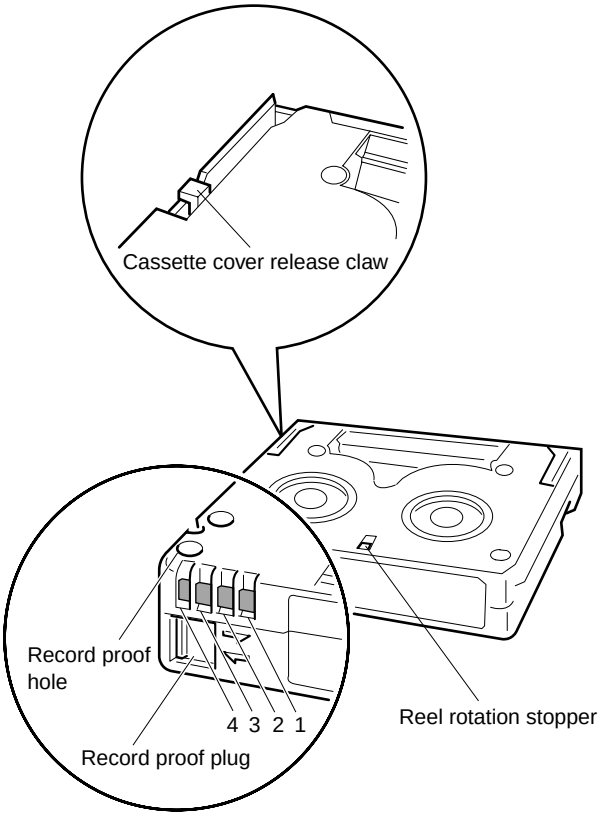


Hole and plug for record proof



- This plug controls the record proof switch according to open or close position.

Mini cassette

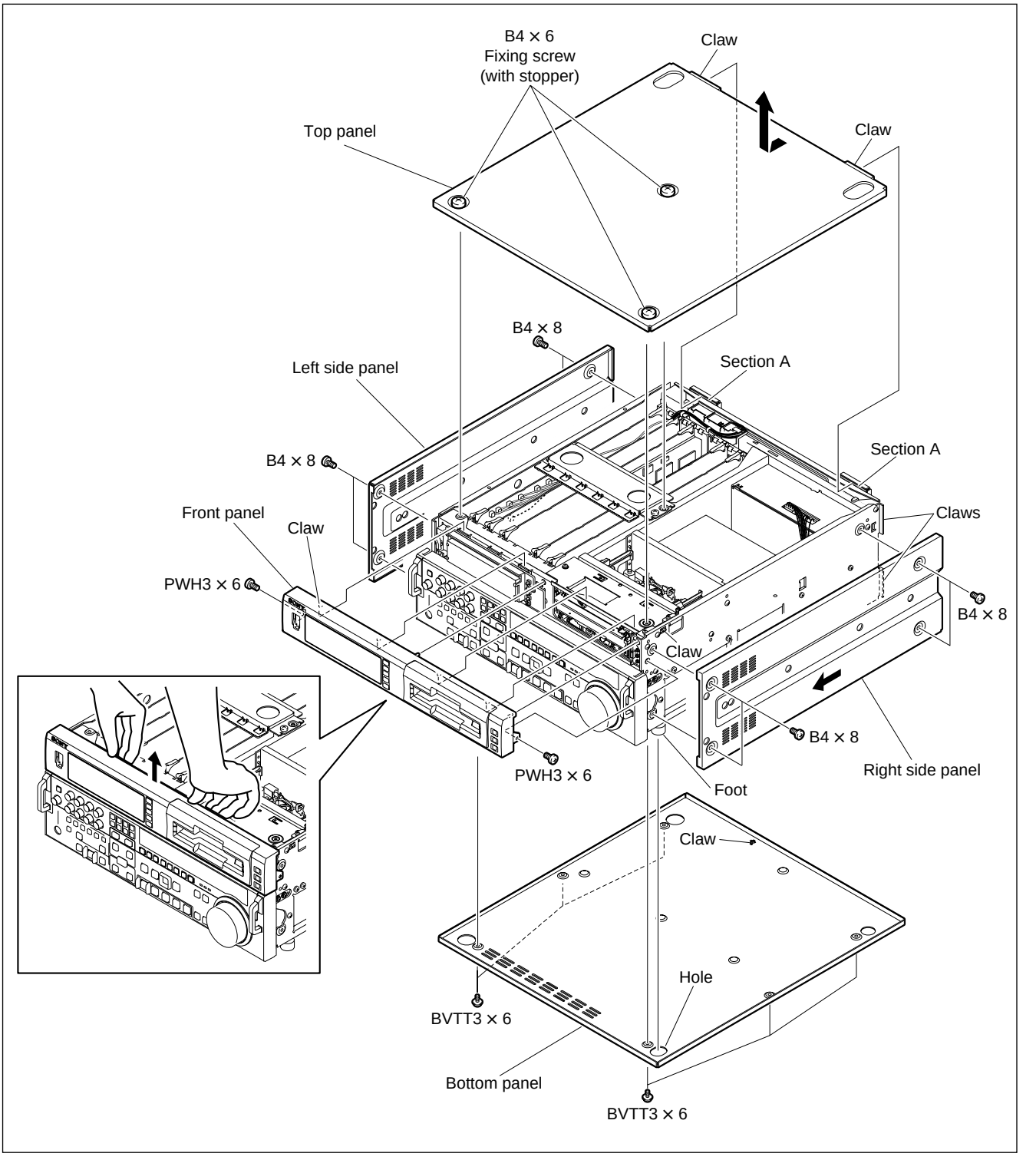


Pin No.	Function	
	Equipped with built-in memory	**Not equipped with built-in memory**
1	+DC	Detecting tape thickness
2	DATA	Detecting tape type (Example: ME/MP)
3	CLOCK	Detecting tape application (Example: consumer/professional)
4	GND	–

3-3. Removal/Installation of Cabinet

Note

Turn off the power of the unit before starting removal/installation.



Removal/Reattachment of the Top Panel

(1) Loose the three screws and remove the top panel in the arrow direction.

Note

The screws do not come off the top panel, because of a stopper attached to the screw.
Do not forcibly remove the screws from the top panel.

(2) Insert the two claws of the top panel in the section A shown in the figure, and tighten the three screws to reattach the top panel.

Removal/Reattachment of the Bottom Panel

(1) Place the unit with the right side panel facing down.
(2) Remove the six screws and remove the bottom panel.
(3) With the claw of the bottom panel positioning as shown in the figure, fit the four holes in the bottom panel on the feet.
(4) Tighten the six screws to reattach the bottom panel.

Removal/Reattachment of the right and left side panels

Reference

A same procedure is performed when removing/reattaching the right and left side panels.

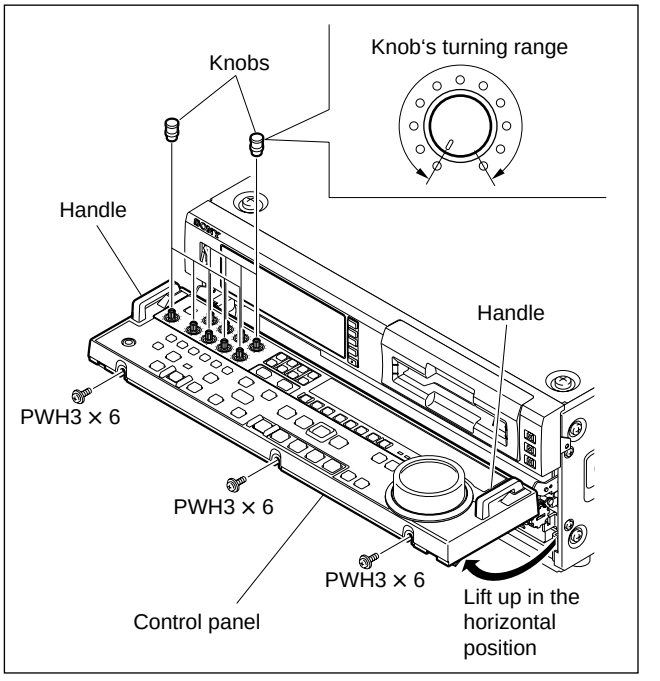
(1) Remove the four screws shown in the figure and remove the side panel.
(2) Hook the side panel at the three claws in the chassis, and while pulling the side panel in the arrow direction, tighten the four screws (B4 × 8).

Removal/Reattachment of the front panel

(1) Remove the top panel.
(2) Remove the two screws securing the front panel.
(3) Insert hands in the space between the front panel and the chassis and pick up the upper rim of the front panel, and then release the four claws of the front panel.
(4) Pull out the front panel to your side and detach it.
(5) While hooking the four claws of the front panel at the three crooks of the chassis and the crook of the cassette compartment holding assembly, insert the two protrusions to the notch and hole of the chassis.
(6) While pressing the front panel against the unit, fix the front panel with the two screws.

Removal/Reattachment of the control panel

(1) Remove the nine knobs.
(2) Hold the handles of the control panel and open the control panel. Lift up the control panel with the handles until it comes horizontally.
(3) Remove the three screws.



(4) While pressing the release lever, bring back the control panel to the original position until the angle between the control panel and the unit comes to about 45 degrees.
(5) Move the control panel in the arrow direction, and release the three claws to remove the control panel.

Reference

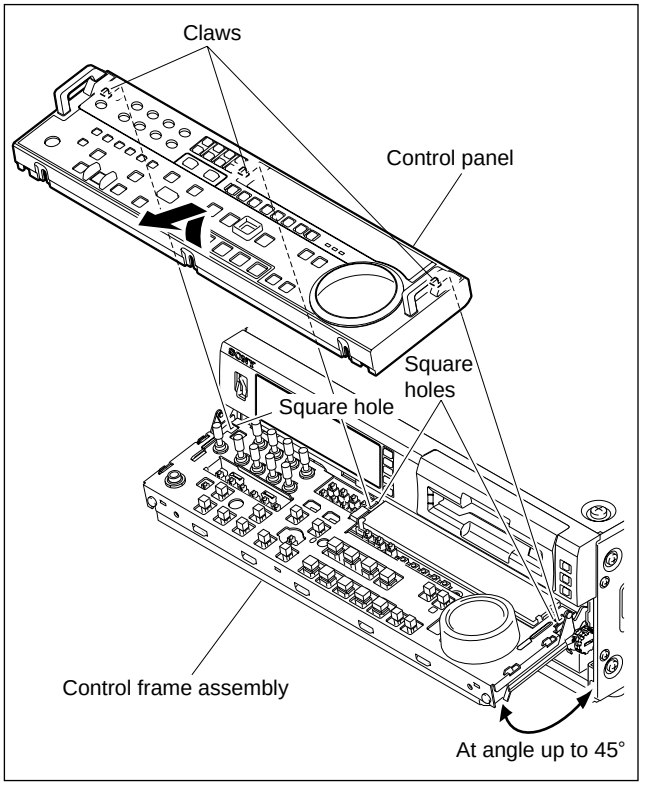
Applying the pulling downward force will make it easy to remove the control panel.

(6) Fit the three claws of the control panel into the three square holes of the control frame assembly.
(7) Bring the control panel to the position of Step (2), and while pressing it from the top, reattach it with the three screws.
(8) Turn the nine volume shafts fully counterclockwise.
(9) Align the nine knobs with the position holes of the control panel and thrust into as far as they will go.

Reference

If the knob easily comes off, widen the slot on the volume shaft using a flat tip screwdriver.

(10) Check that the knob's turning range is within the double-headed arrow shown in the figure by turning the nine knobs clockwise and counterclockwise.



3-4. Removal/Reattachment of the Cassette Compartment

Removing

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Disconnect the flexible card wire from the connector (CN1) of the CC-83 board.

Reference

Hanging the flexible card wire disconnected at the hook on the top of the PC guide B provides an easy performance to the succeeding steps.

(3) Unscrew the three screws and lift off the cassette compartment holding assembly in the arrow A direction.

Note

The screws do not come off the cassette compartment holding assembly, because of a stopper attached to the screw.
Do not forcibly remove the screws from the top panel

(4) Remove the cassette compartment in the arrow B direction.

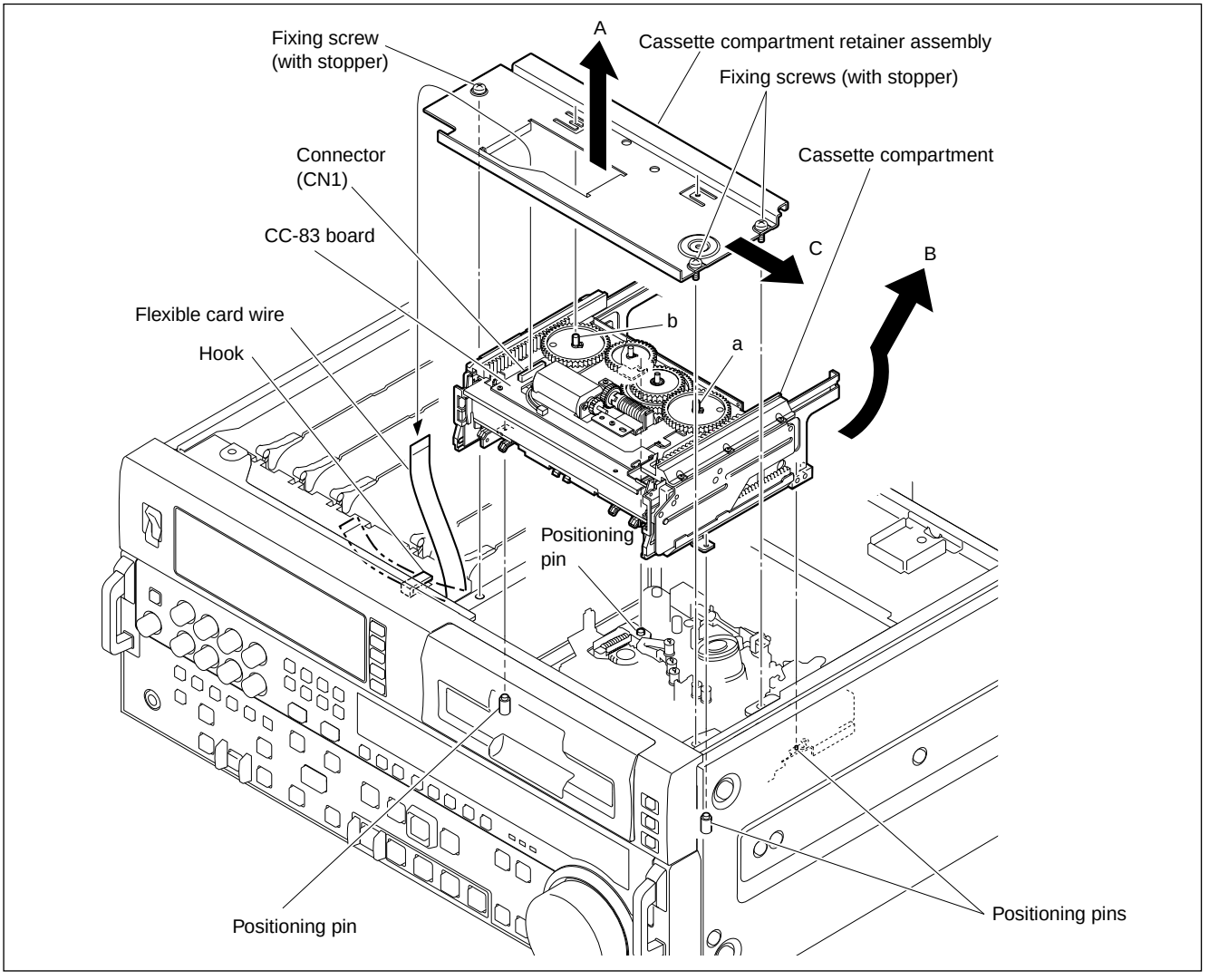
Reattaching

(1) Insert the cassette compartment in the reverse direction of arrow B and align the three holes and the notch of the cassette compartment with the four positioning pins of the chassis.

Note

Use care not to involve a lead wire of the reel shift motor when reattaching the cassette compartment.

(2) Insert the cassette compartment holding assembly in the reverse direction of arrow A.
Fit the hole and notch of the assembly on the shafts **a** and **b** of the cassette compartment respectively and fix it using the three screws while drawing the cassette compartment holding assembly in the C direction.
(3) Reconnect the flexible card wire to the connector (CN1) of the CC-83 board.
(4) Reattach the top panel. (Refer to Section 3-3.)



3-5. Removal/Reattachment of the Boards

Note

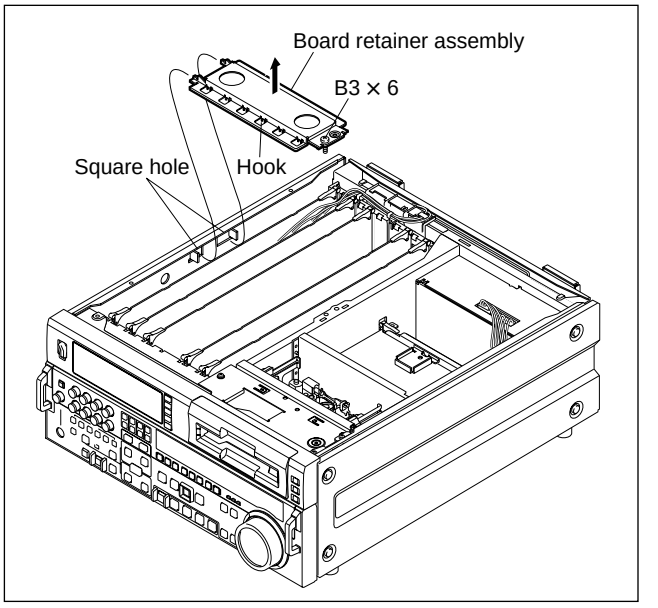
Be sure to remove the board after turning off the power.

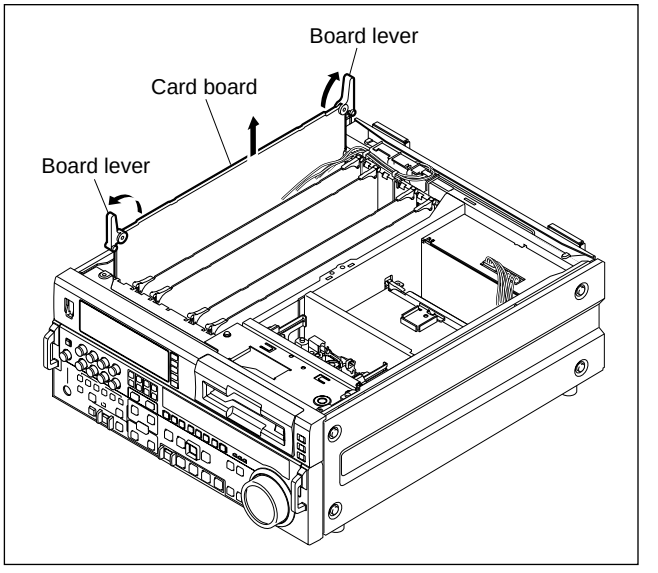
3-5-1. Removal/Reattachment of the Card Boards

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Loosen the screw shown in the figure and remove the board retainer assembly.
  • The screw has a drop-protector so that it cannot fall out of the board retainer assembly.
(3) Push up the board lever in the arrow direction and raise it upwards.
(4) Reattach the board in the reverse order of the removing steps (1) to (3).

Notes

  • Insert the board along the board guide rails until it connects firmly with the connector of the motherboard.
  • Set the board to claws of board retainer firmly.





3-5-2. Extension Board

An optional extension board is supplied to check and adjust the card boards. Attach the extension board to this unit and attach the board to be checked and adjusted to the top of the extension board.

Extension board connected	Card boards which can be
DJ-493 (Part No.: J-6444-930-A)	APR-45, DPR-136, IF-763 (DSBK-190), SV-212, SY-278, VPR-62/62P

3-5-3. Removal/Reattachment of the Boards

Note

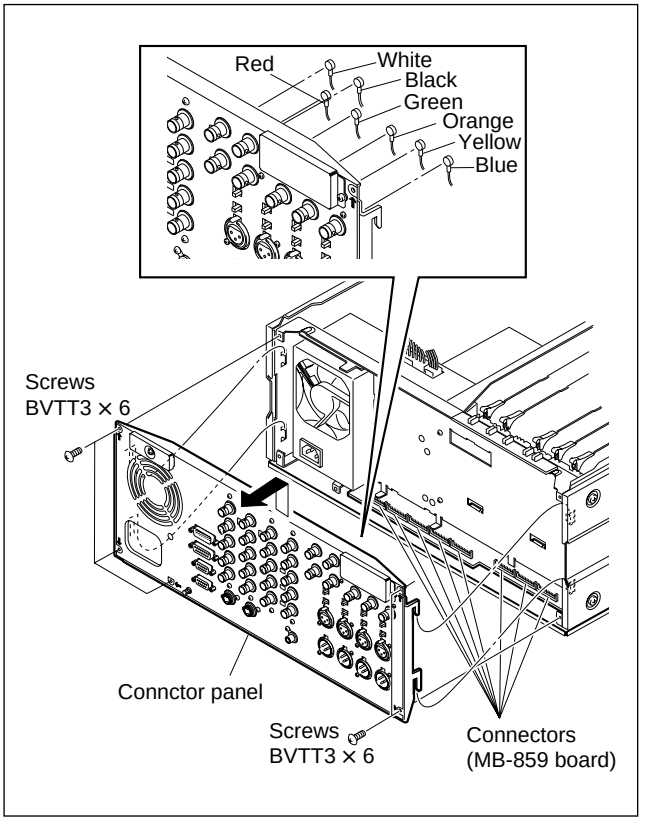
Turn off the power of the unit before removing.

Tools

- Torque screwdriver's bit (for M3) : J-6325-110-A
- Torque screwdriver (3kg) : J-6325-400-A
- Locking compound : 7-432-114-11
- Tweezers

Removal/Reattachment of the CP-341 board

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the seven connectors (blue, yellow, orange, green, red, black, and white) on the rear panel with tweezers.
(3) Remove the five screws (BVTT3 × 6) and remove the rear panel in the arrow direction.

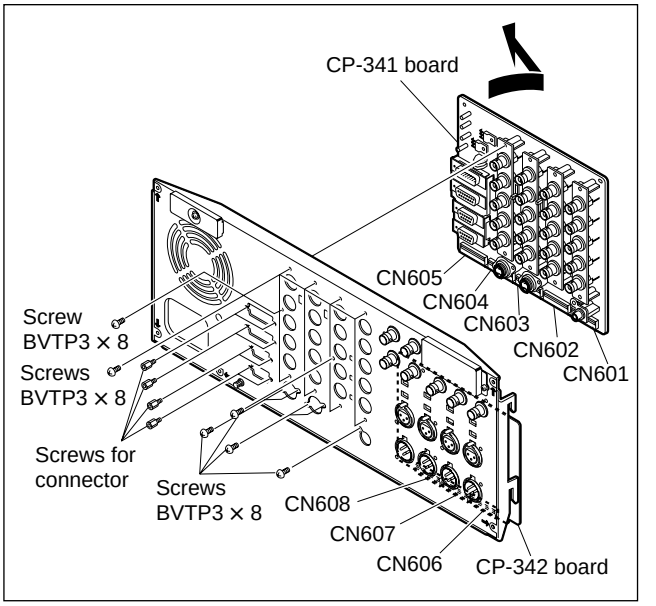


(4) Remove the fifteen screws (BVTP3 × 8) and eight screws for connector and detach the CP-341 board by opening the board in the arrow direction.

Note

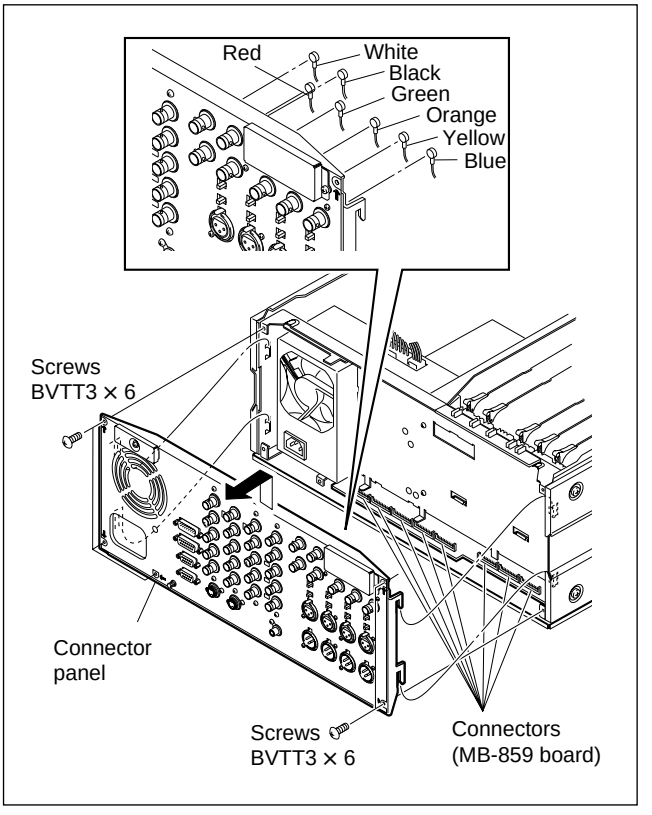
Use care not to break the terminals of capacitors, etc. when removing the CP-341 board.

(5) Set the CP-341 board in the reverse direction of the arrow and fix temporally it to the rear panel with the fifteen screws.
(6) Apply a half-drop size of screw-locking compound to each screw for connector, and tighten securely the eight screws for connector together with the fifteen screws.
(7) Reconnect the seven connectors disconnected in Step 2 with tweezers, using care to set the right color in the right place.
(8) Reattach the rear panel to the unit by connecting securely the five connectors of the CP-341 board (CN601, CN602, CN603, CN604, and CN605) and the three connectors of the CP-342 board (CN606, CN607, and CN608) to the eight connectors of the MB-859 board.
(9) Fix the rear panel with the unit with the five screws.

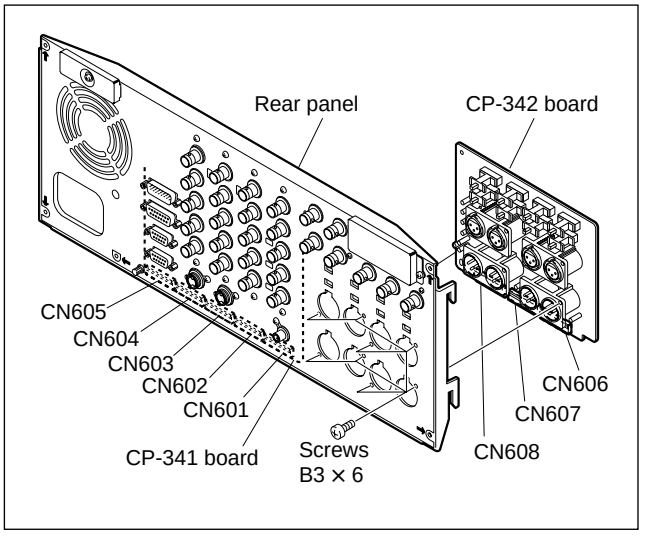


Removal/Reattachment of the CP-342 board

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the seven connectors (blue, yellow, orange, green, red, black, and white) on the rear panel with tweezers.
(3) Remove the five screws (BVTT3 × 6) and remove the rear panel in the arrow direction

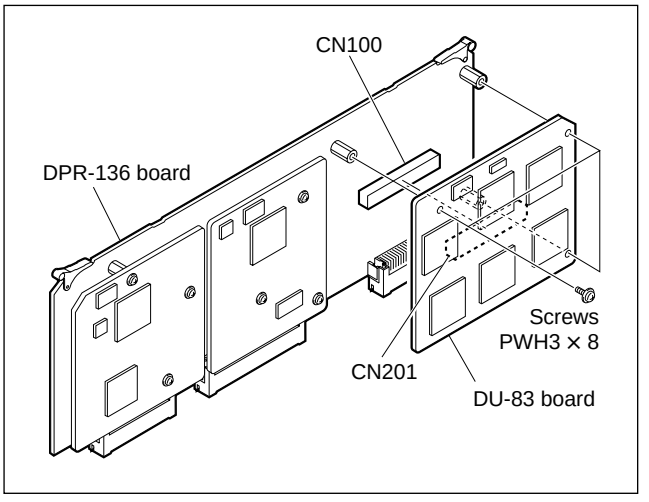


(4) Remove the eight screws while supporting the CP-342 board from the rear side, and remove the CP-342 board.
(5) Fix temporally the CP-342 board to the rear panel with the eight screws (B3 × 6).
(6) Tighten the eight screws (B3 × 6) securely and reconnect the seven connectors disconnected in Step 2 with tweezers, using care to set the right color in the right place.
(7) Reattach the rear panel to the unit by connecting securely the five connectors of the CP-341 board (CN601, CN602, CN603, CN604, and CN605) and the three connectors of the CP-342 board (CN606, CN607, and CN608) to the eight connectors of the MB-859 board.
(8) Fix the rear panel with the unit using the five screws.



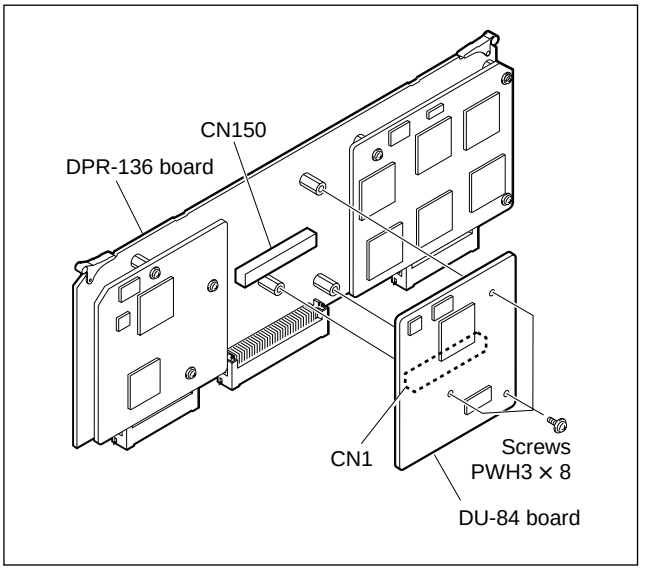
Removal/Reattachment of the DU-83 board
Serial No. 100001-100910: UC
400001-401550: CE

(1) Remove the DPR-136 board from the unit. (Refer to Section 3-5-1.)
(2) Remove the DU-83 board by removing the three screws (PWH3 × 6).
(3) Reconnect the connector (CN201) of the DU-83 board to the connector (CN100) of the DPR-136 board and fix the board with the three screws.
(4) Reattach the DPR-136 board to the unit. (Refer to Section 3-5-1.)



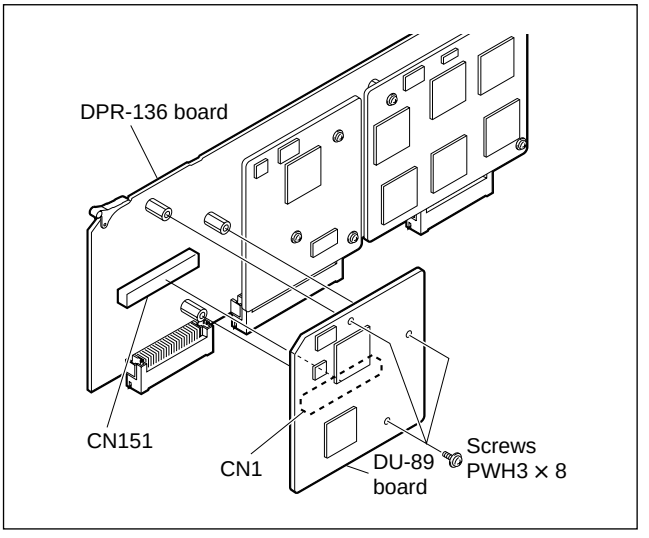
Removal/Reattachment of the DU-84 board
Serial No. 100001-101240: UC
400001-401550: CE

(1) Remove the DPR-136 board from the unit. (Refer to Section 3-5-1.)
(2) Remove the DU-84 board by removing the three screws (PWH3 × 6).
(3) Reconnect the connector (CN1) of the DU-84 board to the connector (CN150) of the DPR-136 board and fix the board with the three screws.
(4) Reattach the DPR-136 board to the unit. (Refer to Section 3-5-1.)



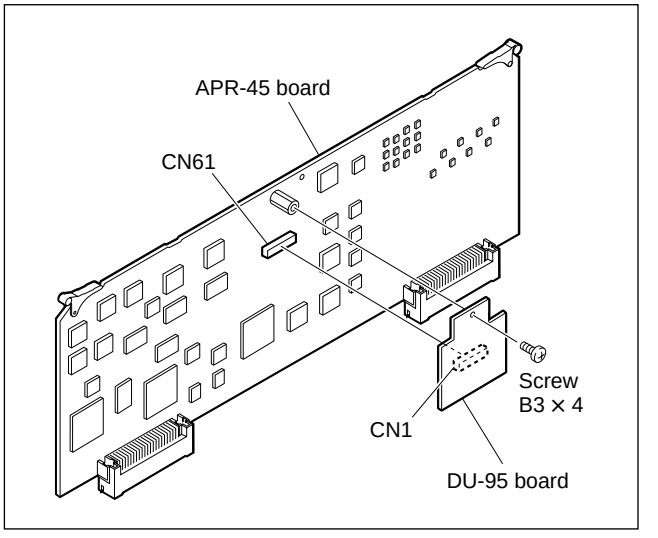
Removal/Reattachment of the DU-89 board
Serial No. 100001-101240: UC
400001-401550: CE

(1) Remove the DPR-136 board from the unit.
(Refer to Section 3-5-1.)
(2) Remove the DU-89 board by removing the three screws (PWH3 × 6).
(3) Reconnect the connector (CN1) of the DU-89 board to the connector (CN151) of the DPR-136 board and fix them with the three screws.
(4) Reattach the DPR-136 board to the unit.
(Refer to Section 3-5-1.)



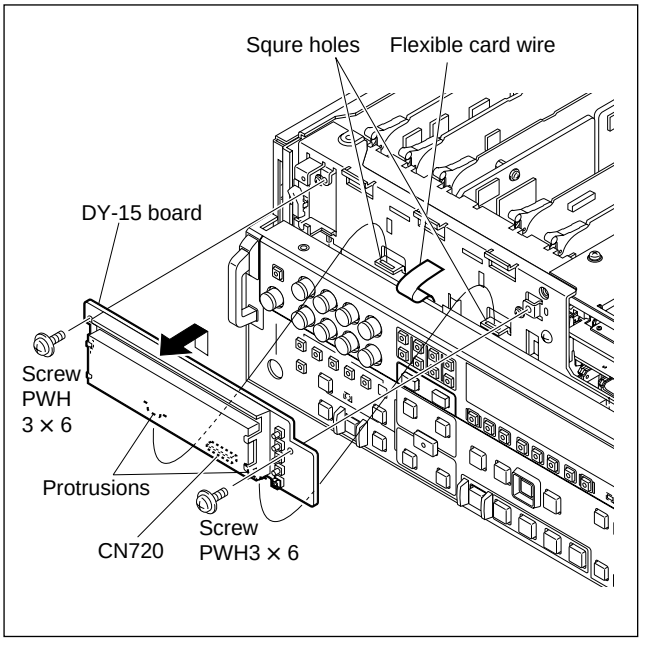
Removal/Reattachment of the DU-95 board
Serial No. 100001-100290: UC
400001-400300: CE

(1) Remove the APR-45 board form the unit.
(Refer to Section 3-5-1.)
(2) Remove the DU-95 board by removing the screw (B3 × 4).
(3) Reconnect the connector (CN1) of the DU-95 board to the connector (CN61) of the APR-45 board and fix them with the screw (B3 × 4).
(4) Reattach the APR-45 board to the unit.
(Refer to Section 3-5-1.)



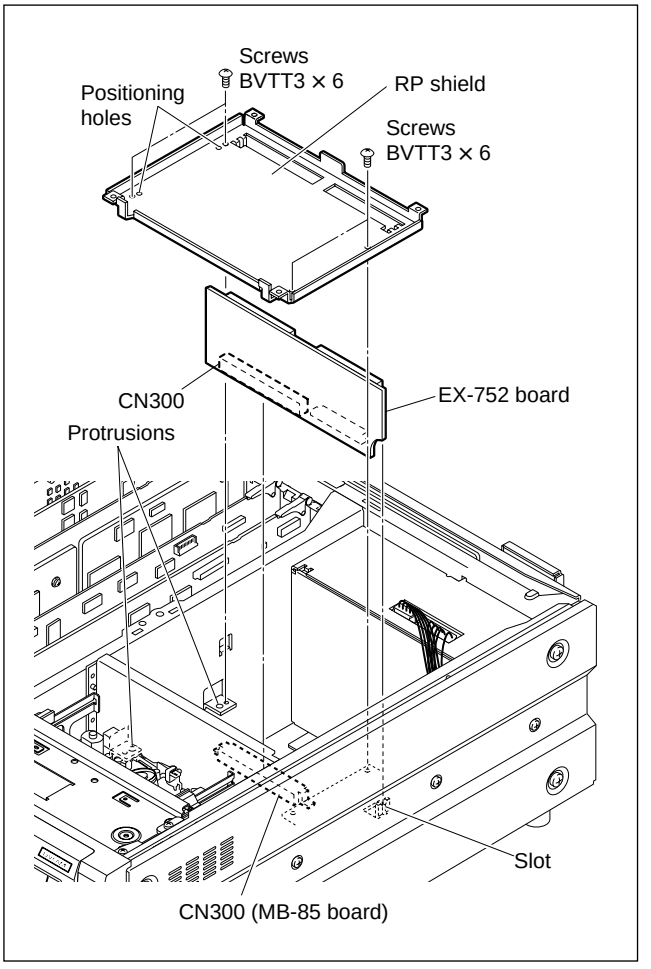
Removal/Reattachment of the DY-15 board

(1) Remove the front panel. (Refer to Section 3-3.)
(2) Disconnect the flexible card wire from the connector (CN720) of the DY-15 board,.
(3) Remove the two screws (PWH3 × 6) and remove the DY-15 board upward.
(4) Insert the two protrusions of the DY-15 board in the two square holes in the chassis and fix them with the two screws.
(5) Reconnect the flexible card wire disconnected in Step (2).
(6) Reattach the front panel.



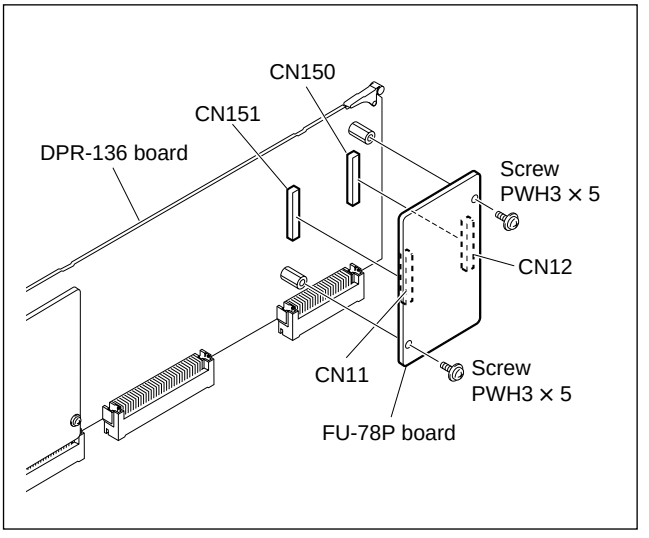
Removal/Reattachment of the EX-752 board

(1) Remove the RP-111 board from the unit. (Refer to this section Removal/Reattachment of RP-111.)
(2) Remove the RP shield by removing the four screws (BVTT3 × 6).
(3) Remove the EX-752 board upward.
(4) Fit the notch of the EX-752 board in the slot in the chassis and reconnect the connector (CN300) of the EX-752 board to the connector (CN300) of the MB-859 board.
(5) Fit the two positioning holes of RP shield onto the two protrusions on the chassis and fix the board with four screws (BVTT3 × 6).
(6) Reattach the RP-111 board. (Refer to this section Removal/Reattachment of the RP-111 board.)



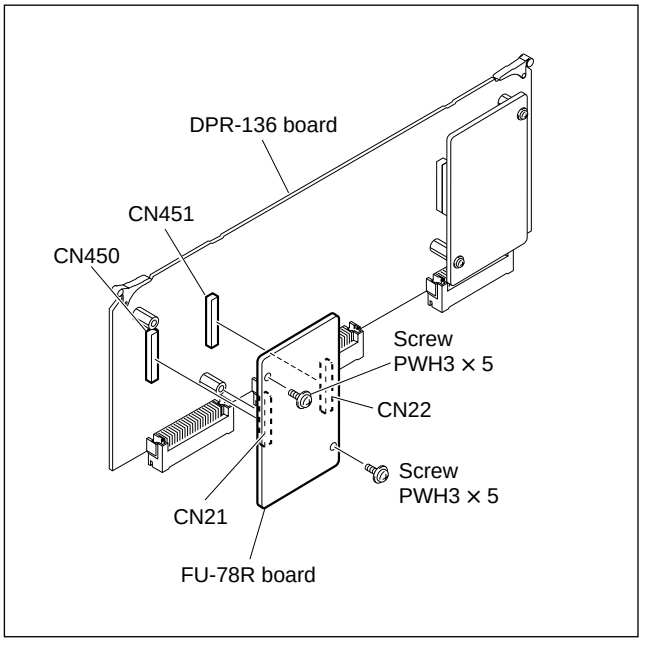
Removal/Reattachment of the FU-78P board
Serial No. 101241-: UC
401551-: CE

(1) Remove the DPR-136 board from the unit. (Refer to section 3-5-1.)
(2) Remove the FU-78P board by removing the two screws (PWH3 × 5).
(3) Reconnect the connector (CN11, CN12) of the FU-78P board to the connector (CN150, CN151) of the DPR-136 board and fix the board with the two screws.



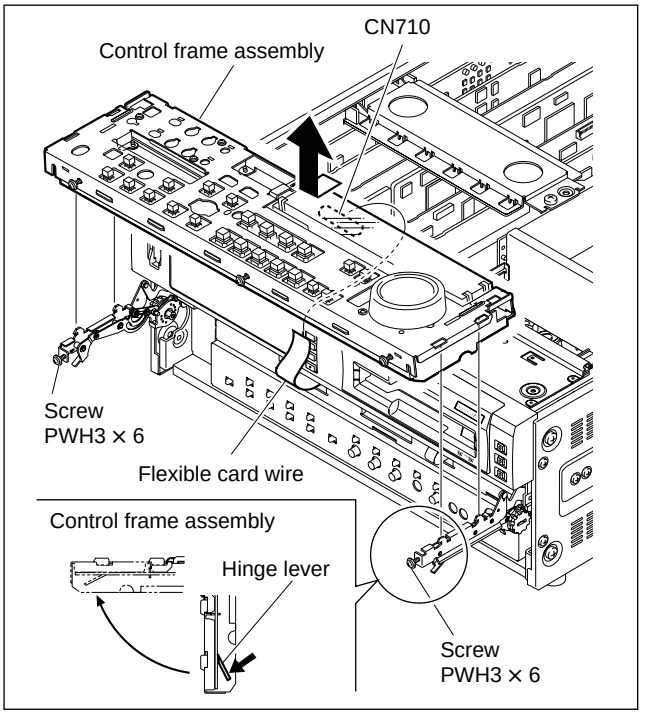
Removal/Reattachment of the FU-78R board
Serial No. 101241-: UC
401551-: CE

(1) Remove the DPR-136 board from the unit. (Refer to section 3-5-1.)
(2) Remove the FU-78R board by removing the two screws (PWH3 × 5).
(3) Reconnect the connector (CN21, CN22) of the FU-78P board to the connector (CN450, CN451) of the DPR-136 board and fix the board with the two screws.



Removal/Reattachment of the HP-99 board

(1) Remove the control panel. (Refer to Section 3-3.)
(2) Lift up the right/left hinge levers in the arrow direction and bring the control frame assembly to the lateral position, then loosen the two screws (PWH3 × 6).
(3) Disconnect the flexible card wire form the connector (CN710) of the KY-452 board.

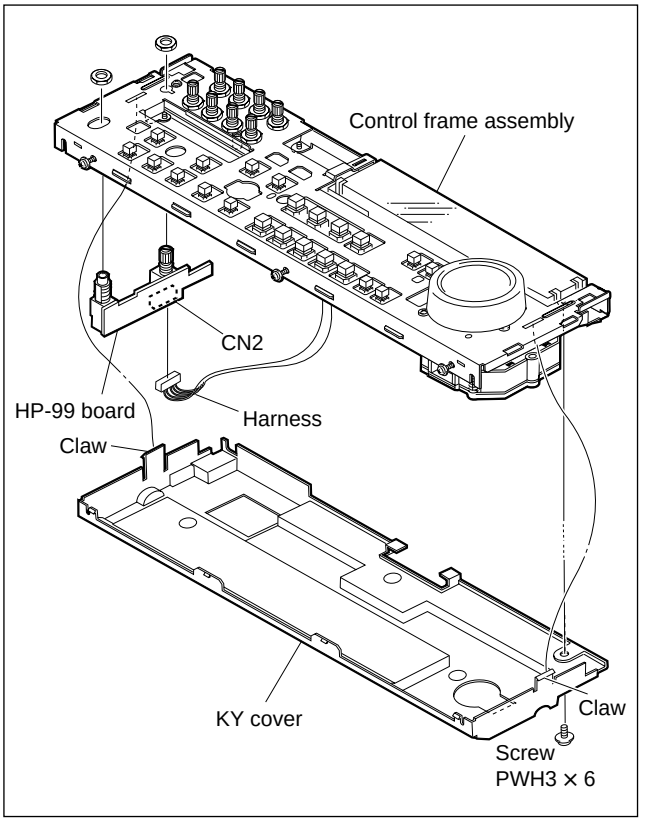


(4) Slide the control frame assembly in the arrow direction to remove it.
(5) Remove the screw and release the two claws form the rear side of the assembly and remove the KY cover.
(6) Disconnect the harness from the connector (CN2) of the HP-99 board.
(7) Remove the two nuts to remove the HP-99 board.

Note

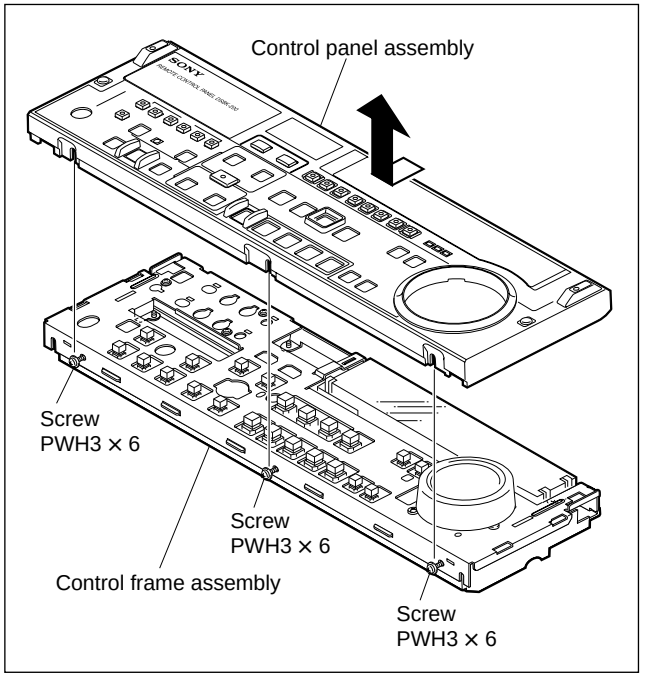
Support the HP-99 board from the rear side when removing the nuts.

(8) Reattach the HP-99 board in the reverse order of the removing steps (1) to (7).

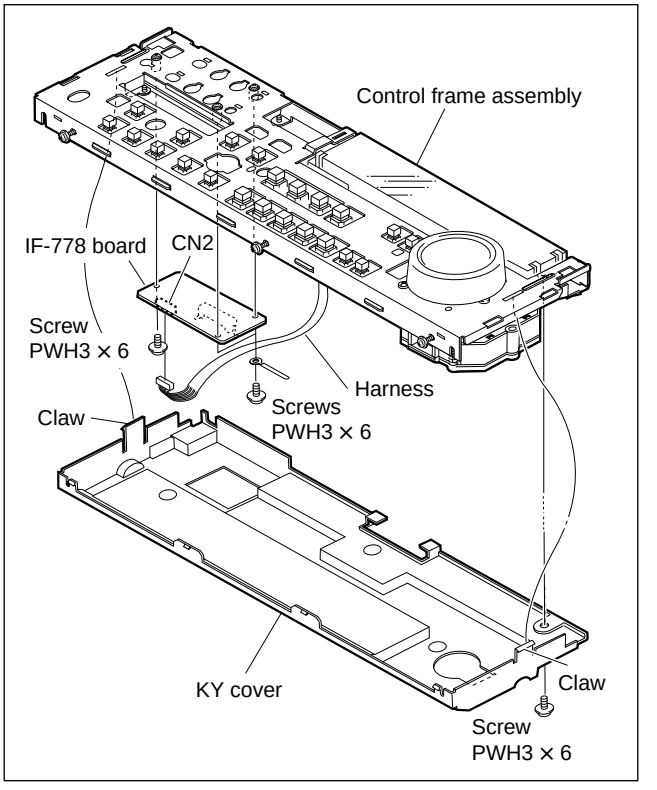


Removal/Reattachment of the IF-778 board (DSBK-200)

(1) Remove the three screws (PWH3 × 6) of the control frame assembly and remove the control panel assembly in the arrow direction.

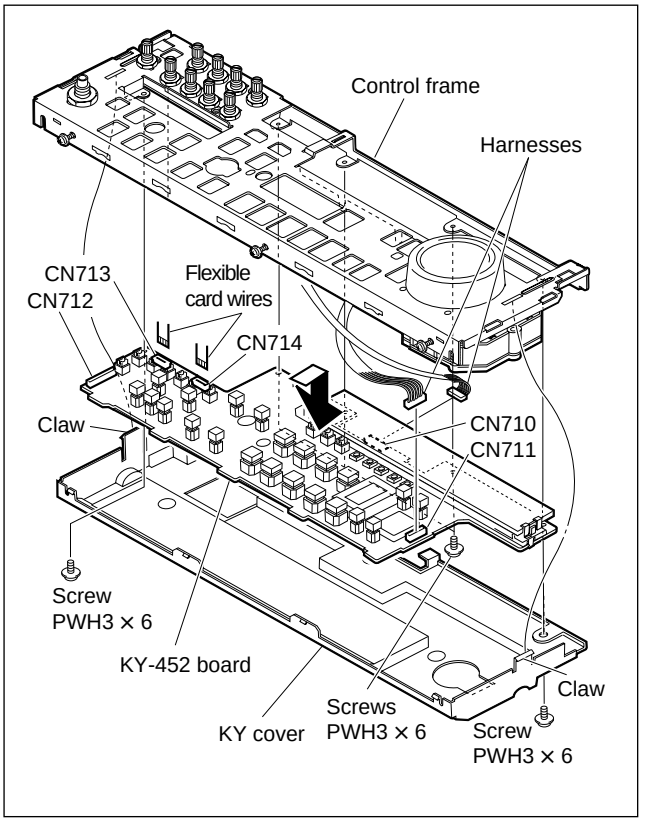


(2) Remove the screw (PWH3 × 6) and release the two claws from the rear side and remove the KY cover.
(3) Disconnect the harness from the connector (CN2) of the IF-778 board.
(4) Remove the three screws (PWH3 × 6) to remove the IF-778 board.
(5) Reattach the IF-778 board in the reverse order of the removing steps (1) to (4).



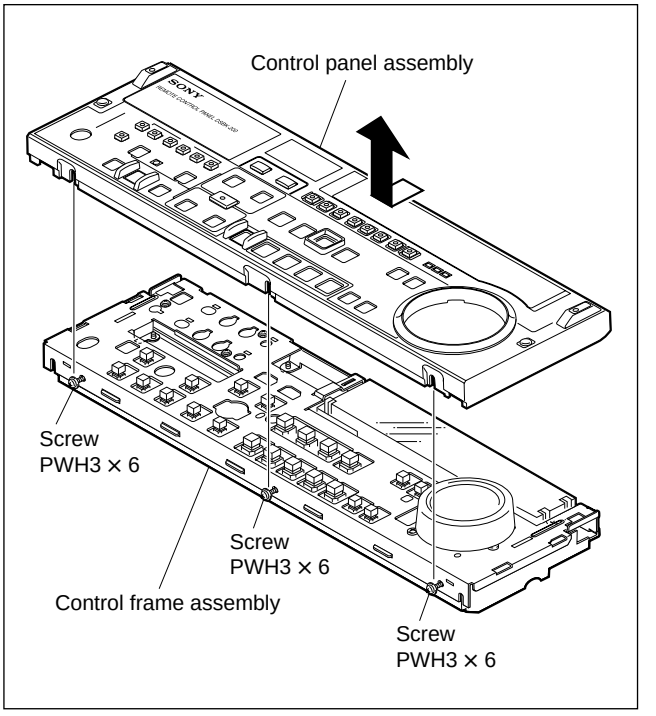
Removal/Reattachment of the KY-452 board

(1) Remove the control frame assembly. Refer to this section Removal/Reattachment of the HP-99 board, steps (1) to (4).
(2) Remove the screw (PWH3 × 6) from the rear side and remove the KY cover.
(3) Disconnect the two flexible card wires from the connectors (CN714 and CN713) of the KY-452 board and also the two flexible card wires from the connectors (CN710 and CN711) of the KY-452 board with tweezers.
(5) Remove the four screws securing the KY-452 board.
(6) Disconnect the harness from the connector (CN712) while lifting the KY-452 board.
(7) Reattach the KY-452 board in the reverse order of the removing steps (1) to (6).

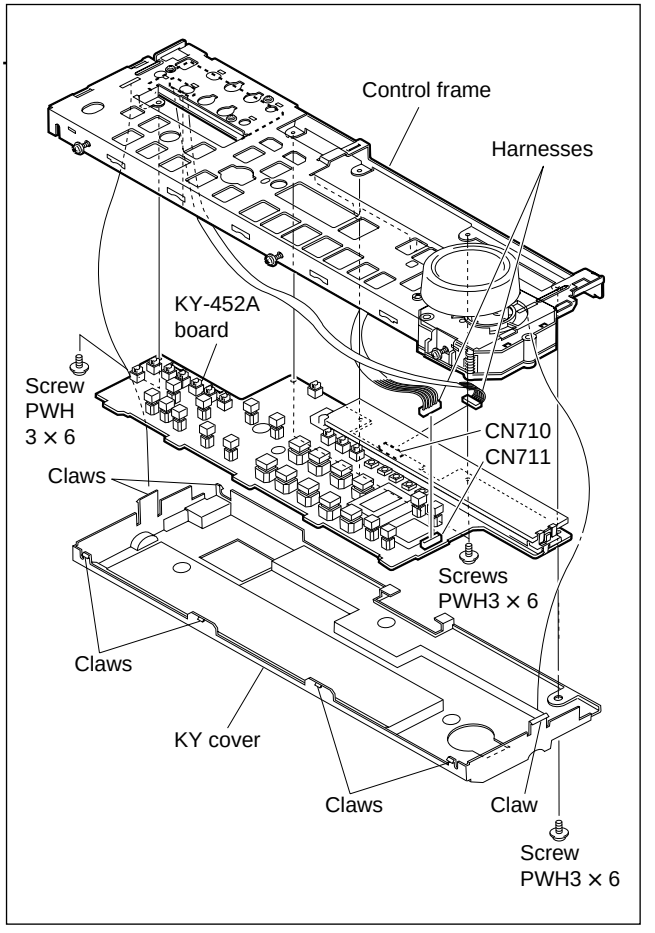


Removal/Reattachment of the KY-452A board (DSBK-200)

(1) Remove the three screws of the control frame assembly (PWH3 × 6) to remove the control panel assembly.



(2) Remove the screw (PWH3 × 6) and release the seven claws from the rear side and remove the KY cover.
(3) Disconnect the harnesses from the connectors (CN710 and CN711) of the KY-452A board with tweezers.
(4) Remove the four screws (PWH3 × 6) securing the KY-452A board.
(5) Remove the KY-452A board in the arrow direction.
(6) Reattach the KY-452A board in the reverse order of the removing steps (1) to (5).



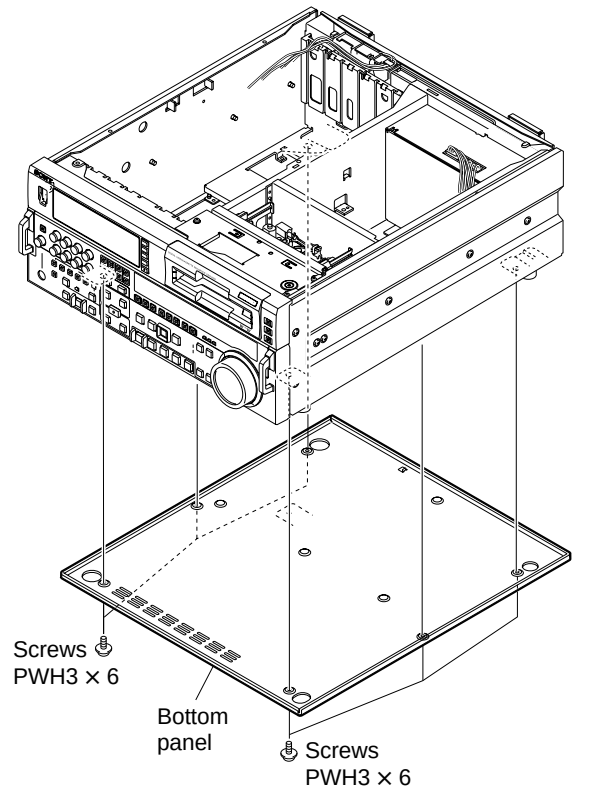
Removal/Reattachment of the MB-859

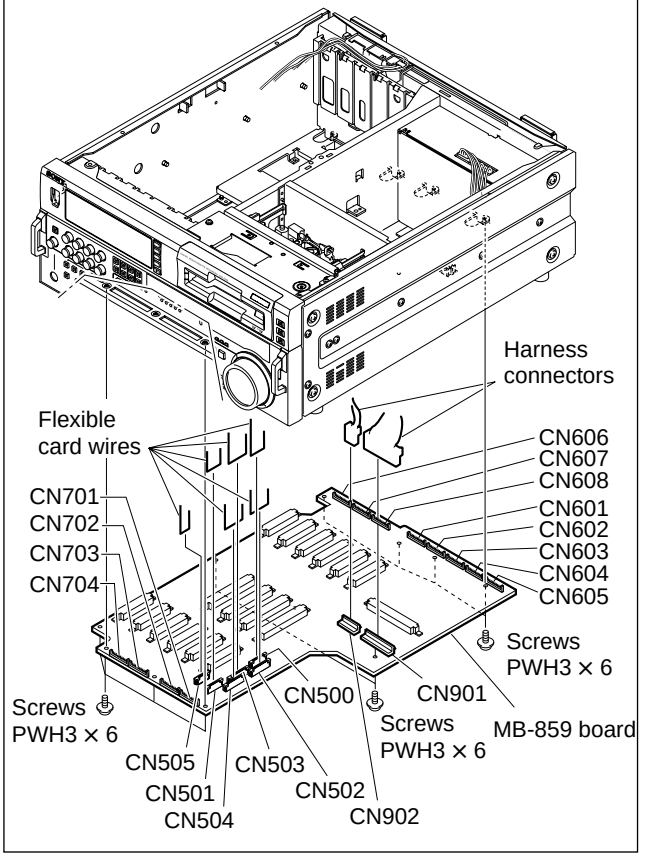
(1) Remove the APR-45 board, VPR-62/62P board, DPR-136 board, SY-278 board and SV-212 board. (Refer to Section 3-5-1.)
(2) Remove the EX-752 board. (Refer to this section Removal/ Reattachment of the EX-752 board.)
(3) Disconnect the harnesses from the two connectors (CN901 and CN902) of the MB-859 board and also disconnect the flexible card wire from the connector (CN505).
(4) Remove the bottom panel. (Refer to Section 3-3.)
(5) Disconnect the three flexible card wires from the connectors (CN500, CN501, CN502, CN503 and CN504) of the MB-859 board.
(6) Remove the 10 screws to remove the MB-859 board.
(7) Reset the MB-859 board to the unit aligning properly the connectors of the MB-859 board (CN601, CN602, CN603, CN604, CN605, CN606, CN608, CN701, CN702, CN703 and CN704) to the correspondent connectors on the unit.

Note

Use care not to bend the connector pins.

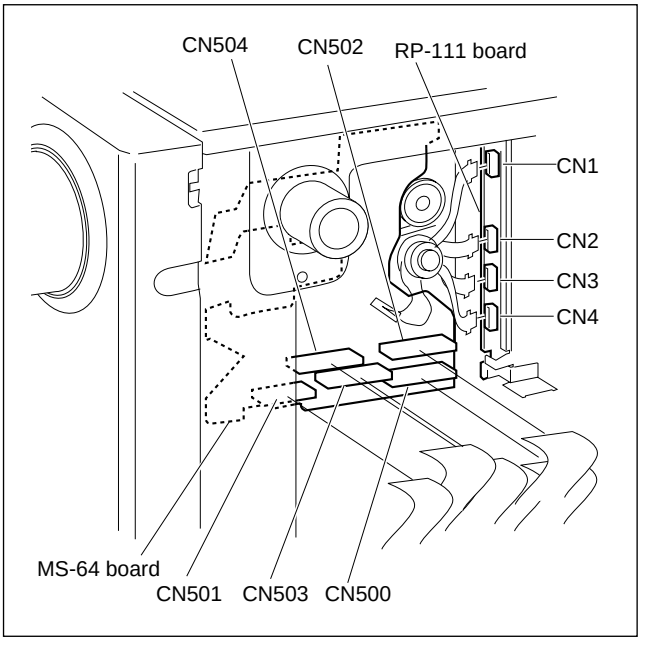
(8) Reattach the MB-859 board in the reverse order of the removing steps (1) to (6).



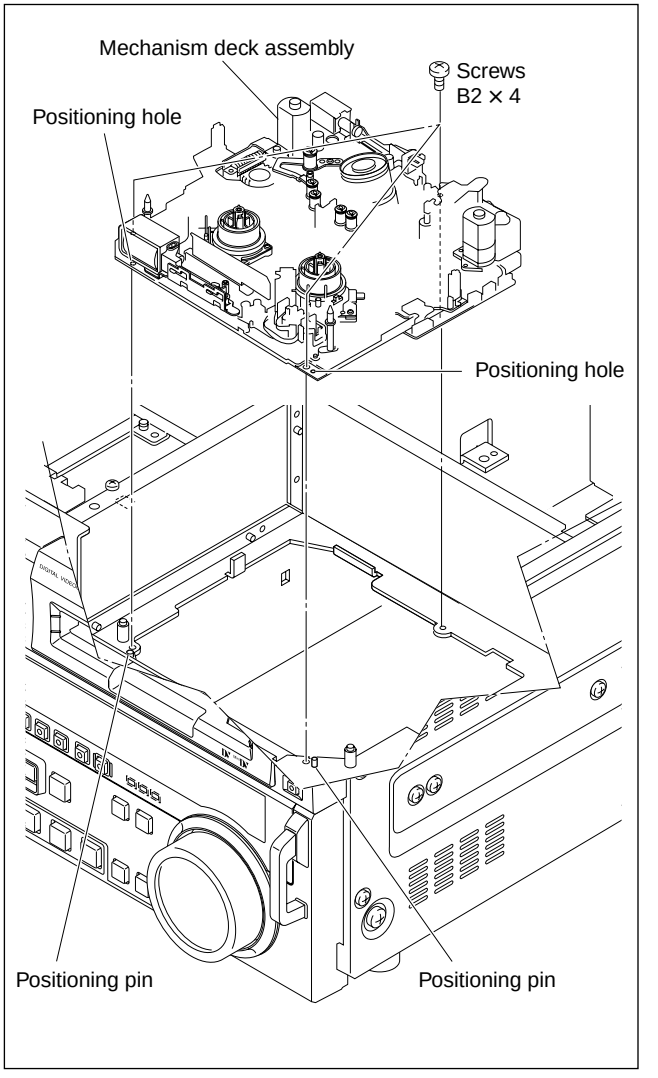


Removal/Reattachment of the MS-64 board

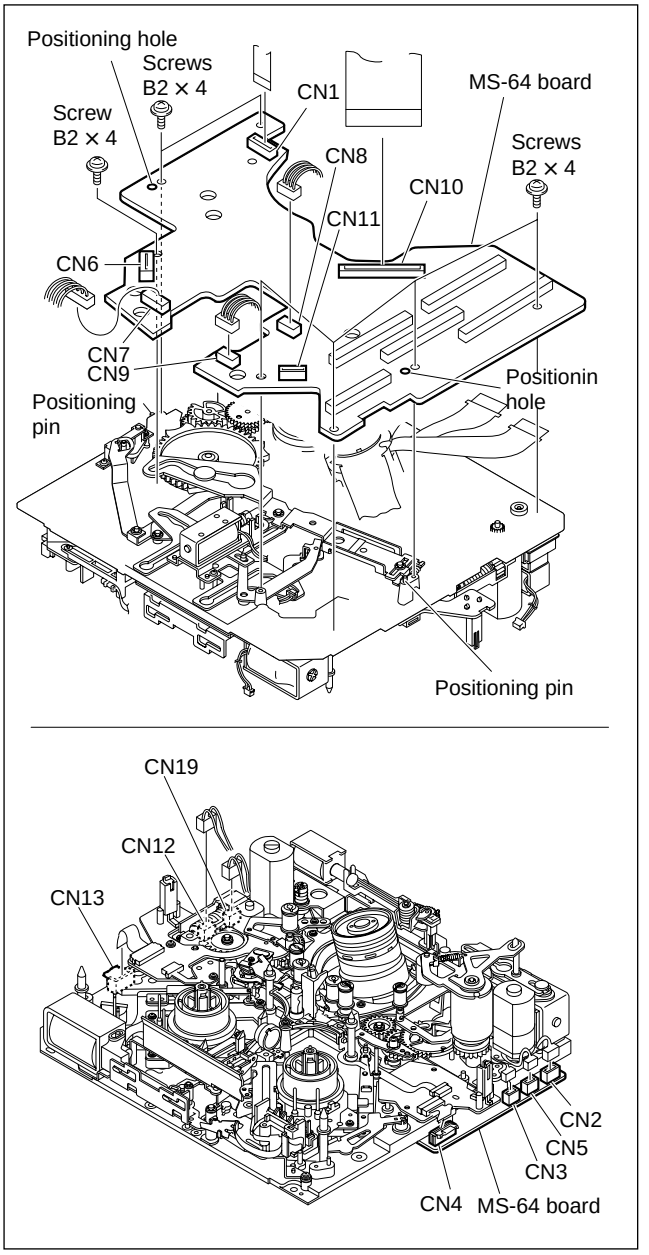
(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the cassette compartment. (Refer to Section 3-4.)
(3) Remove the bottom plate. (Refer to Section 3-3.)
(4) Remove the MD cover. (Refer to Section 7-2)
(5) Disconnect the four flexible card wires from the connectors (CN1, CN2, CN3 and CN4) of the RP-111 board.
(6) Disconnect the five flexible card wires from the connectors (CN500, CN501, CN502, CN503 and CN504) of the MS-64 board.



(7) Remove the three screws (B2 × 4) to remove the mechanism deck from the unit

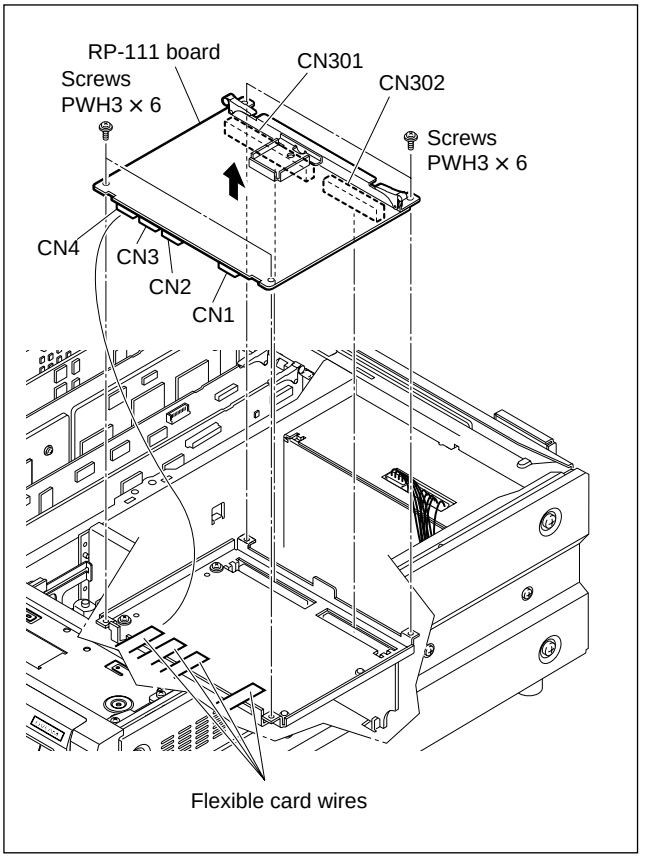


(8) Release the connection of connectors on the MS-64 board (CN1, CN2, CN3, CN4, CN5, CN6, CN7, CN8, CN9, CN10, CN11, CN12, CN13 and CN19).
(9) Remove the seven screws (B2 × 4) to remove the MS-64 board.
(10) Fit the two positioning holes of the MS-64 board on the positioning pins on the MD chassis respectively and fix the board with the seven screws.
(11) Reattach the MS-64 board in the reverse of the removing steps (1) to (9).



Removal/Reattachment of the RP-111 board

(1) Remove the top and bottom panels. (Refer to Section 3-3.)
(2) Disconnect the four flexible card wires from the connectors of the RP-111 board (CN1, CN2, CN3, and CN4).
(3) Remove the four screws (PWH3 × 6).
(4) Release the connection of the two connectors (CN301, CN302) on RP-111 board to remove the RP-111 board.
(5) Reattach the RP-111 board in the reverse order of removing steps (1) to (4).



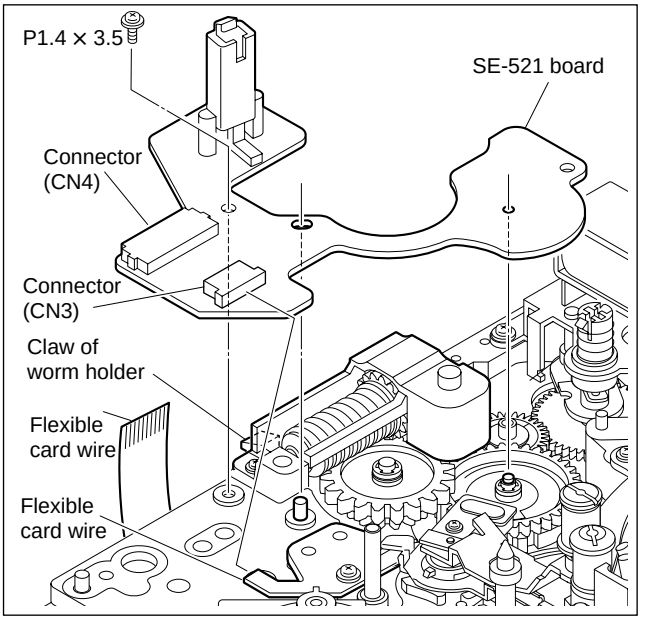
Removal/Reattachment of the SE-521 board

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the cassette compartment.
(Refer to Section 3-4.)
(3) Remove the TG1 arm assembly. (Ref to Section 7-13.)
(4) Remove the loading motor assembly.
(Refer to Section 7-18.)
(5) Disconnect the flexible card wire from the connector (CN3) of the SE-521 board.
(6) Disconnect the flexible card wire from the connector (CN4) of the SE-521 board.
(7) Remove the screw to remove the SE-521 board.
(8) Fit the hole and the slotted hole of the SE-521 board on the two shafts of the MD chassis and fix it with the screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}

Note

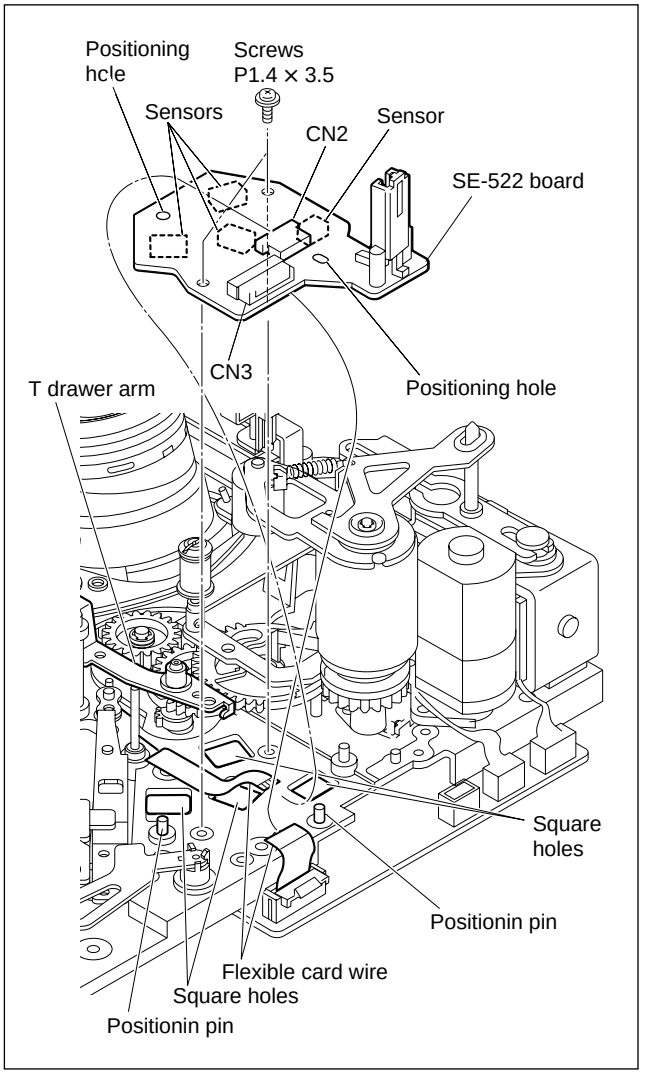
Use care not to pinch the tip of the flexible card wire of the S tension regulator assembly between the SE-521 board and the chassis.
Place the SE-521 board under the claw of the worm holder.

(9) Reconnect the flexible card wire to the connector (CN4) of the SE-521 board.
(10) Reconnect the flexible card wire of the S tension regulator assembly to the connector (CN3) of the SE-521 board.
(11) Reinstall the loading motor assembly.
(Refer to Section 7-18.)
(12) Reattach the TG1 arm assembly.
(Refer to Section 7-13.)



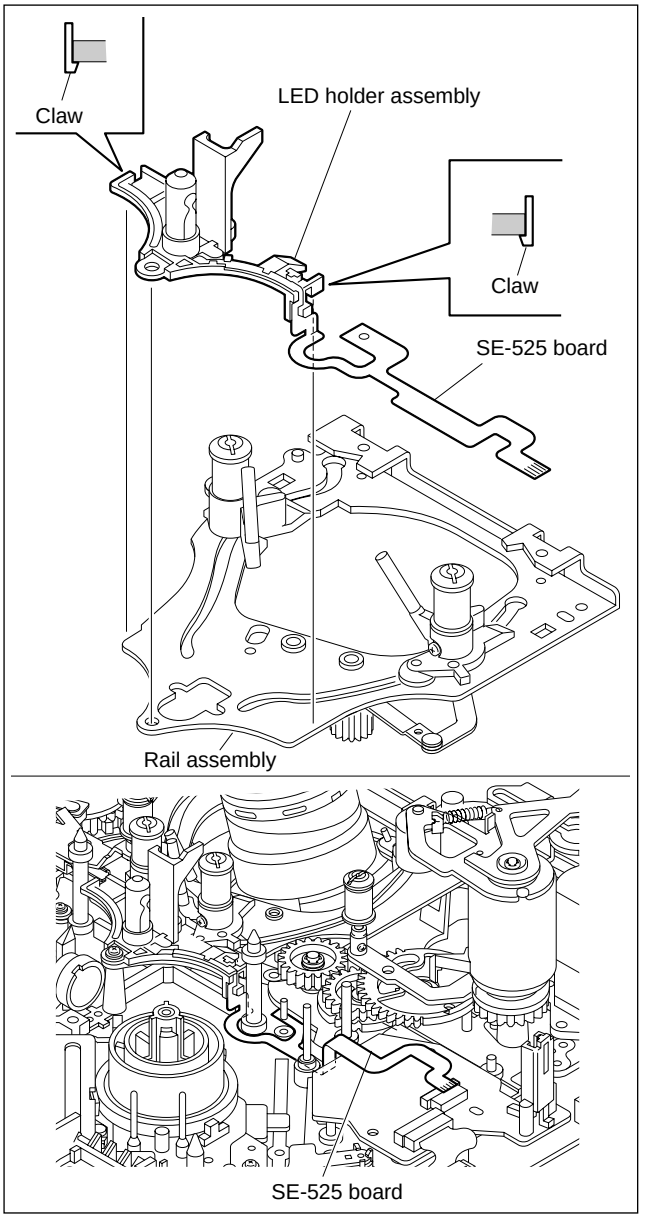
Removal/Reattachment of the SE-522 board

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the cassette compartment.
(Refer to Section 3-4.)
(3) Disconnect the two flexible cable wires from the connectors (CN2, CN3) of the SE-522 board.
(4) Remove the two screws (P1.4 × 3.5) and remove the SE-522 board avoiding any contacts to the T drawer arm assembly.
(5) Fit the two positioning holes of the SE-522 board on the positioning pins of the MD chassis, and insert the sensors (PH1, PH2, and PH3) of the SE-522 board in the square holes in the MD chassis.
(6) Reattach the SE-522 board in the reverse order of the removing steps (1) to (5).
Tightening Torque : 0.1 N•m {1 kgf•cm}



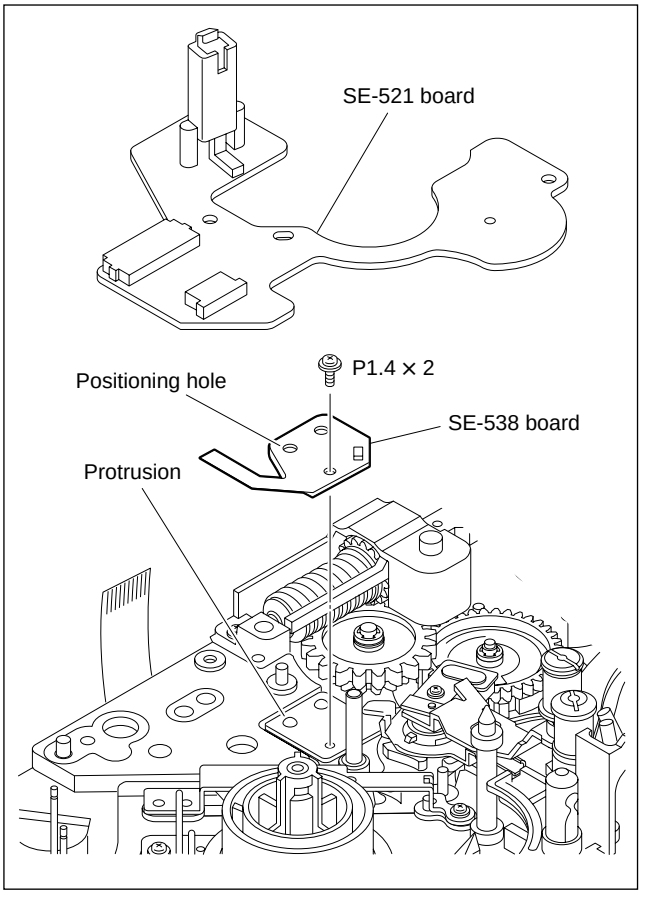
Removal/Reattachment of the SE-525 board (LED holder assembly)

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Remove the cassette compartment.
(Refer to Section 3-4.)
(3) Remove the RMP (T1) holding assembly.
(Refer to Section 7-8.)
(4) Remove the rail assembly. (Refer to Section 7-15.)
(5) Remove the LED holder assembly from the rail assembly.
(6) Reattach the LED holder assembly to the rail assembly.
(7) Reattach the SE-525 board in the reverse order of the removing steps (1) to (4).
Tightening Torque : 0.1 N•m {1 kgf•cm}



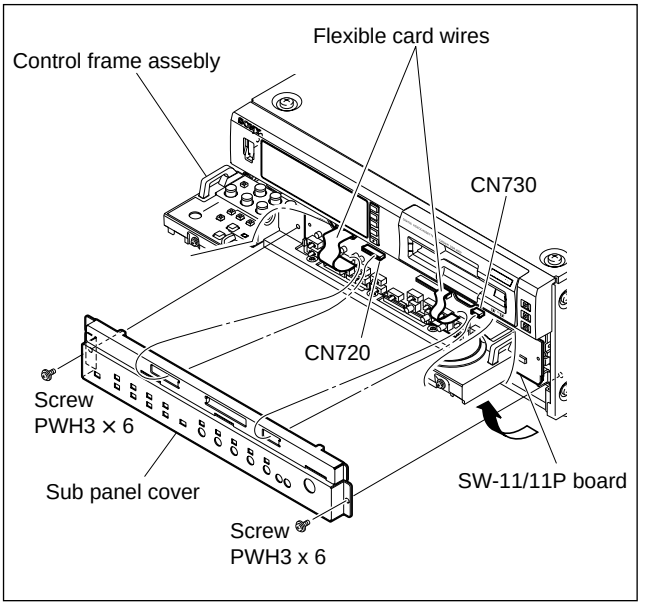
Removal/Reattachment of the SE-538 board

(1) Remove the SE-521 board. (Refer to this section Removal/Reattachment of the SE-521board.)
(2) Remove the screw to remove the SE-538 board.
(3) Reattach the SE-538 board in the reverse order of the removing steps (1) and (2).
Tightening Torque : 0.1 N•m {1 kgf•cm}

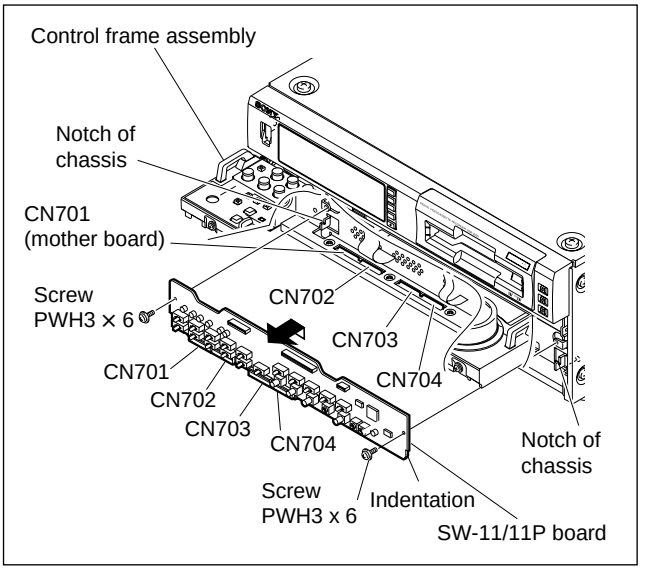


Removal/Reattachment of the SW-11/11P board

(1) Disconnect the two flexible card wires from the connectors (CN720, CN730) of the SW-11/11P board with the control panel brought to the lateral position.
(2) Remove the two screws (PWH 3 × 6) to remove the sub panel cover.

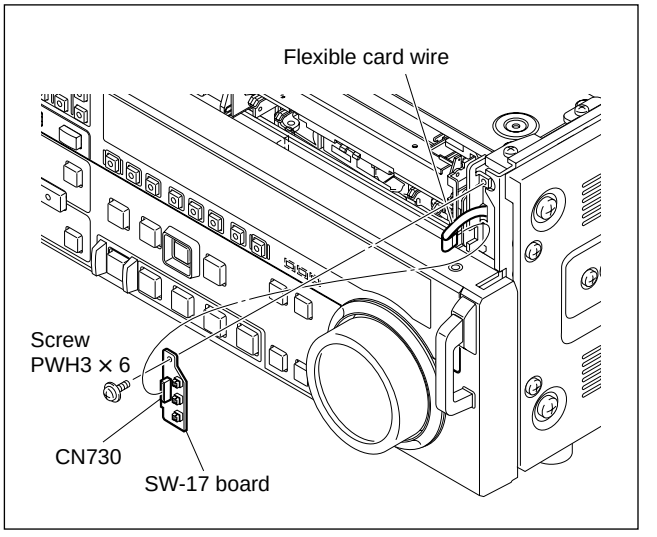


(3) Remove the two screws (PWH 3 × 6) and remove the SW-11/11P board upward.
(4) Fit the indentation of the SW-11/11P board with the notch of the chassis so as to connect the connectors of SW-11/11P board (CN701, CN702, CN703 and CN704) to the connectors of the motherboard (CN701, CN702, CN703 and CN704).
(5) Reattach the SW-11/11P board in the reverse order of the removing steps (1) to (3).



Removal/Reattachment of the SW-17 board

(1) Remove the front panel. (Refer to Section 3-3.)
(2) Disconnect the flexible card wire from the connector (CN730) of the SW-17 board.
(3) Remove the screw to remove the SW-17 board.
(4) Reattach the SW-17 board in the reverse order of the removing steps (1) to (3).



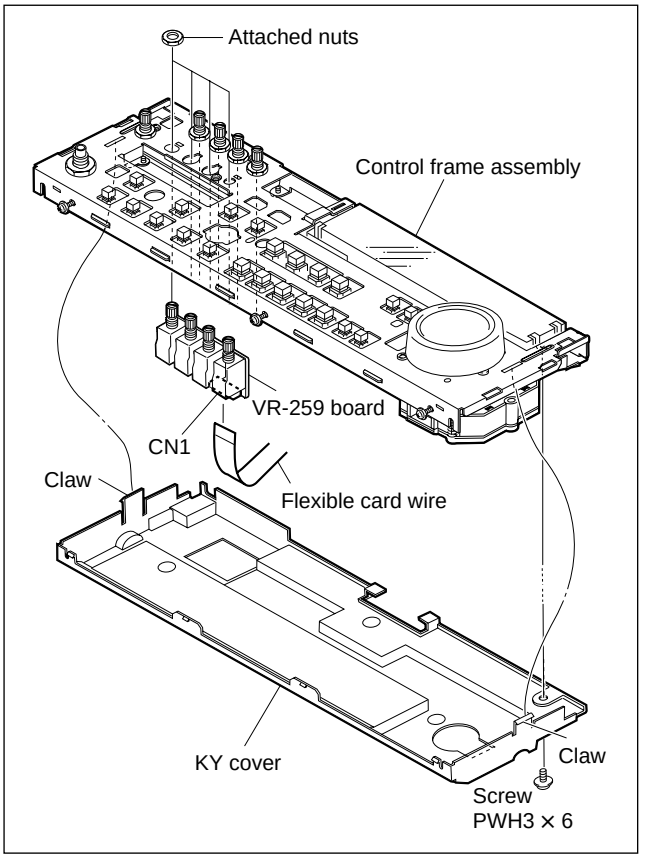
Removal/Reattachment of the VR-259 board

(1) Remove the control frame assembly. Refer to this section Removal/Reattachment of the HP-99 board, steps (1) to (4).
(2) Remove the screw (PWH3 × 6) and release the two claws from the rear side, and remove the KY cover.
(3) Disconnect the flexible card wire from the connector (CN1) of the VR-259 board.
(4) Remove the four nuts to remove the VR-259 board.

Note

Support the VR-259 board from the rear side when removing the nuts.

(5) Reattach the VR-259 board in the reverse order of the removing steps (1) to (4).



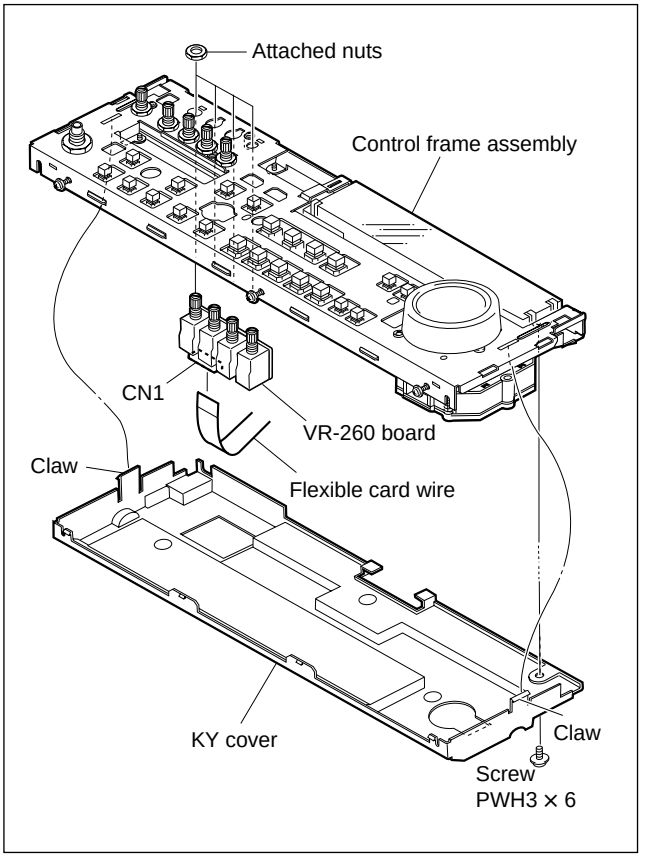
Removal/Reattachment of the VR-260

(1) Remove the control frame assembly. Refer to this section Removal/Reattachment of the HP-99 board, steps (1) to (4).
(2) Remove the screw (PWH3 × 6) and release the claws from the rear side and remove the KY cover.
(3) Disconnect the flexible card wire from the connector (CN1) of the VR-260 board.
(4) Remove the four nuts to remove the VR-260 board.

Note

Support the VR-260 board form the rear side when removing the nuts.

(5) Reattach the VR-260 in the reverse order of the removing steps (1) to (4).



3-6. Notes on Repair Parts

3-6-1. Flexible Card Wire Replacement

The following six types of flexible card wire are used in the DSR-2000/2000P.

Note

Take utmost care when handling the flexible card wires because their life is extremely shortened by folding.

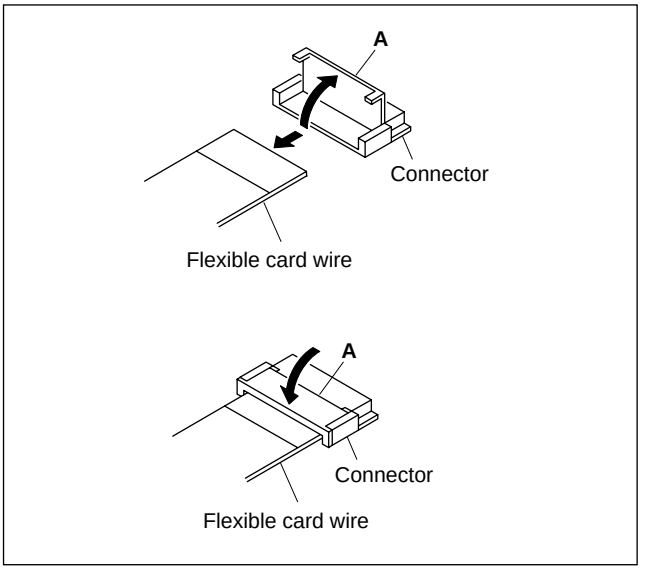
< Type A >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

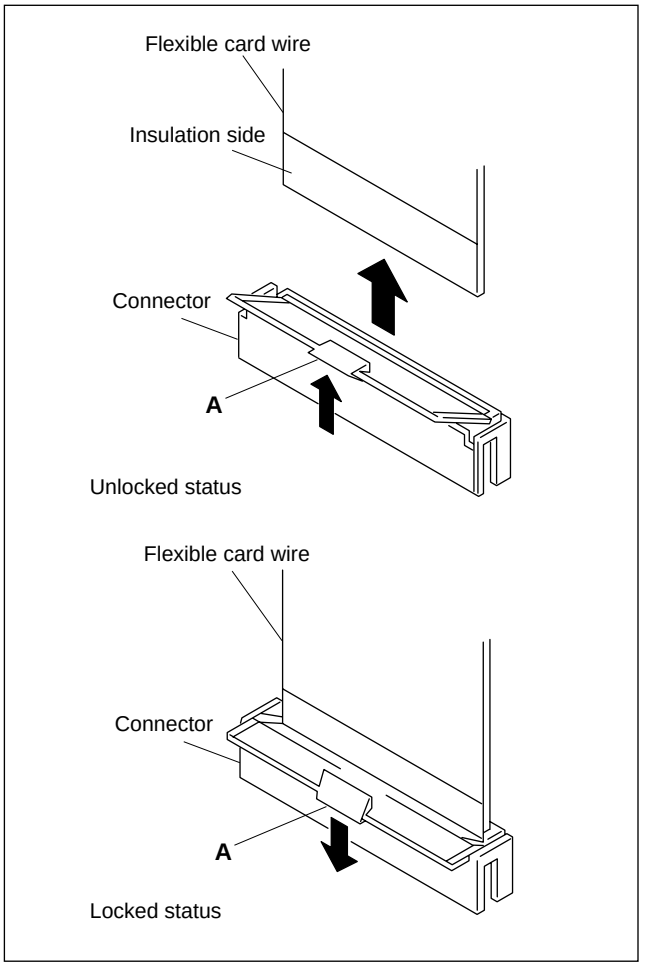
< Type B >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

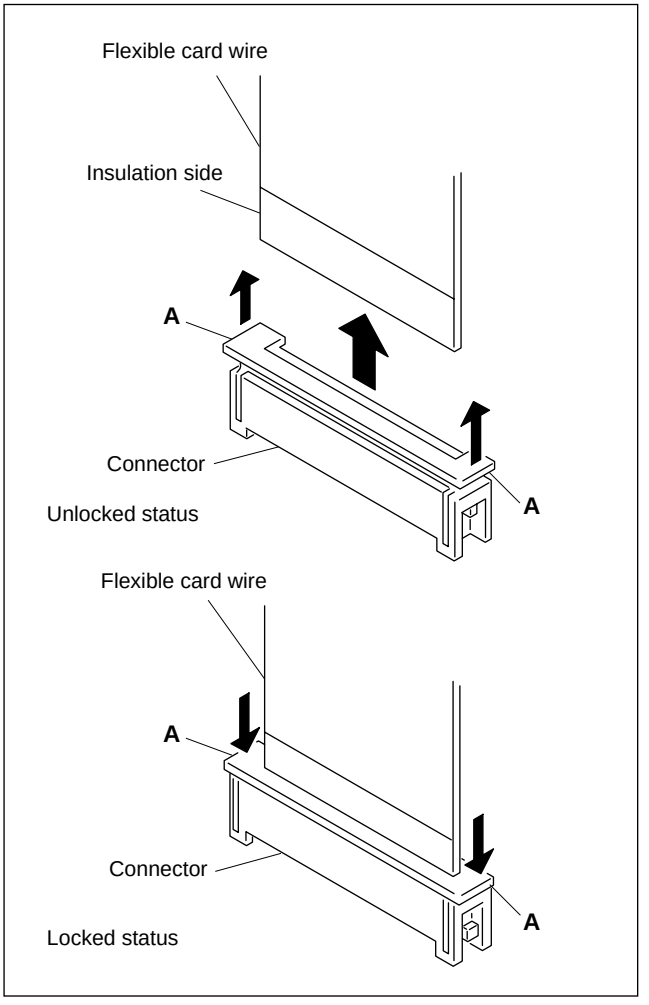
< Type C >

Removing method

Raise the portion marked "**A**" of the connector and release the lock. Pull out the flexible card wire.

Insertion method

Insert the flexible card wire fully up to the marked line and push up the portion marked "**A**" of the connector.



Note

The flexible card wire has the conduction side and the insulation side. Connect the flexible card wire after checking for the correct side as shown.
If the condition side and the insulation side are connected in the wrong direction, the circuit will not operate.

< Type D >

Removing method

Note

Do not pull the flexible card wire before releasing the lock.

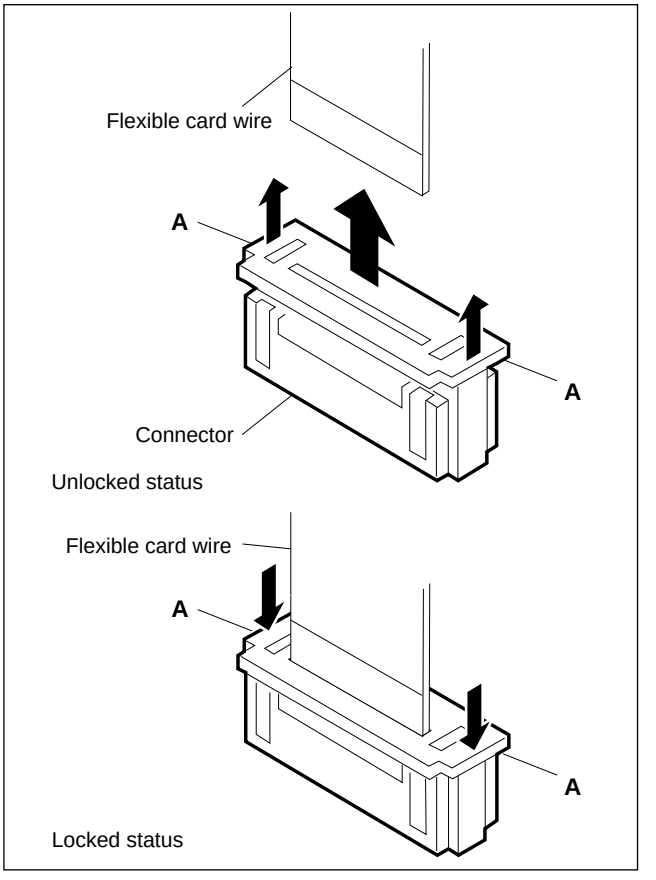
1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

Insertion method

Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before connection.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



< Type E >

Removing method

Note

Do not pull the flexible card wire before releasing the lock.

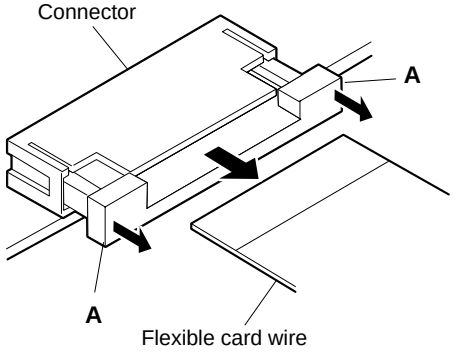
1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

Insertion method

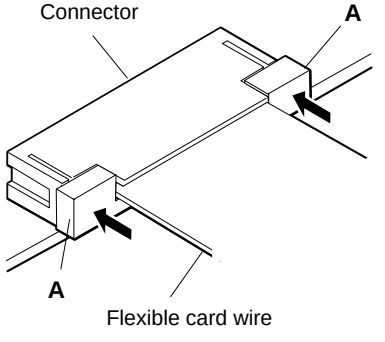
Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before connection.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



Unlocked status



Locked status

< Type F >

Removing method

Note

Do not pull the flexible card wire before releasing the lock.

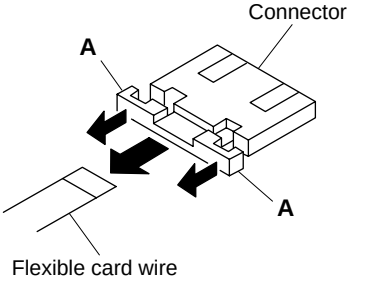
1. Move the portion "**A**" of the connector in the direction of the arrow A to release the lock. Remove the flexible card wire.

Insertion method

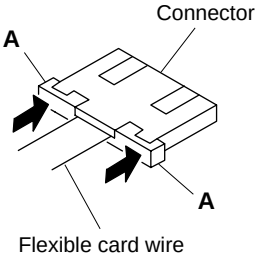
Notes

- Confirm that the contacting surface of the flexible card wire is free from stain and dust.
- Confirm that the lock of the connector is already released.
- The flexible card wire has the conduction side and the insulation side. Check the conduction side and the insulation side before connection.

1. Insert the flexible card wire securely to the deep end.
2. Push in the portion marked "**A**" of the connector in the direction of the arrow to lock the connector. Be careful that the flexible card wire is not slanted with respect to the connector.



Unlocked status

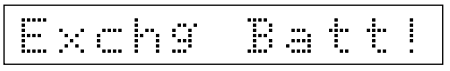


Locked status

3-7. Replacement of Lithium Battery

The SY-278 board has the built-in lithium battery as the countermeasure for power failure. The lithium battery is attached on top of IC212 (E-5). Life of the lithium battery is about six years.
Time to exchange the battery is displayed in the time counter display block and on the monitor display. Replace the battery when the following message appears.

Time counter display block



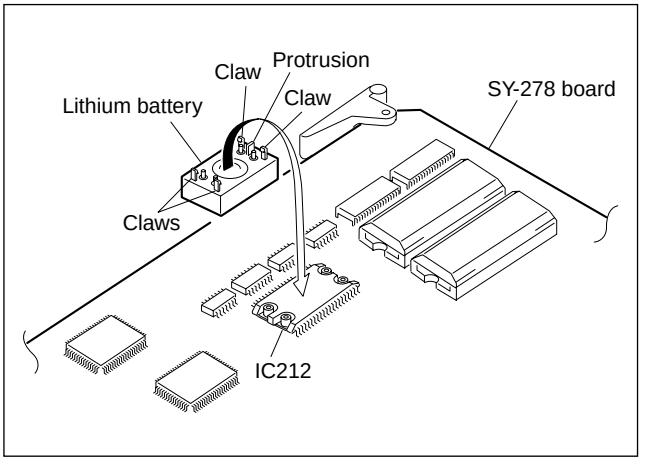
Sony part number : ⚠1-528-749-11
Type : M4Z28BR00SH1

Backup battery replacement procedure

Note

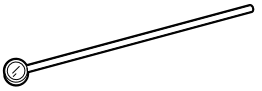
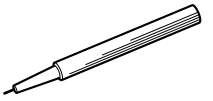
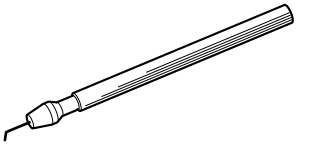
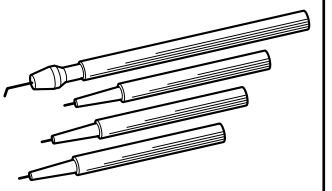
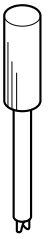
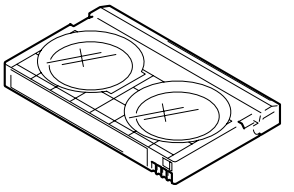
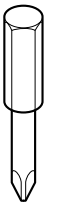
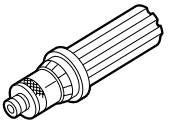
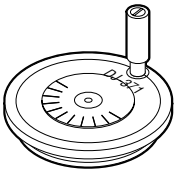
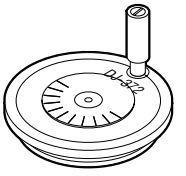
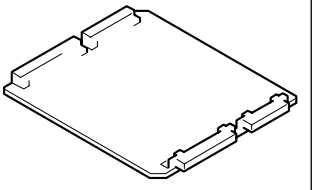
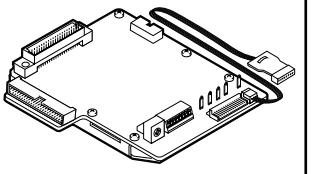
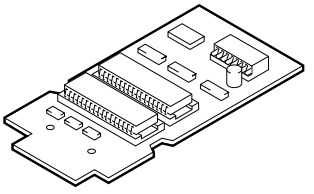
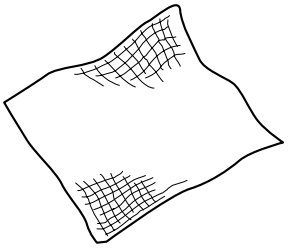
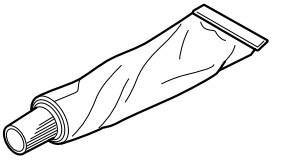
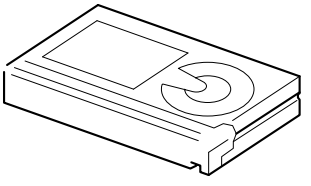
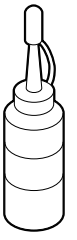
When replacing the battery, insert the replacement battery with the "+" and "−" ends correctly oriented. If the battery's positive (+) and negative (−) terminals are backward, physical injury or damage to peripheral equipment can be result due to explosion and or leakage of internal materials.

1. Remove the SY-278 board. (Refer to section 3-5-1.)
2. Insert tip of a flat head (−) screwdriver in between the battery and IC212, and remove the battery.
3. Attach the replacement lithium battery so that the protrusion of the lithium battery is directed in the arrow direction as shown, and the battery is firmly secured by the four claws.



3-8. Fixtures and Tools list

Fig.	Part No.	Description	Uses
①	J-6080-029-A	Small adjustment mirror	Video tracking adjustment
②	J-6082-231-A	Washer mounting fixture (ø1.5)	Parts replacement
③	J-6082-232-A	Washer mounting fixture (ø1.2)	Parts replacement
④	J-6082-233-A	Washer mounting fixture (ø0.8)	Parts replacement
⑤	J-6082-234-A	Washer extracting fixture A	Parts replacement
⑥	J-6082-236-A	Washer fixture kit	Parts replacement (Set of No.2 to No.5)
⑦	J-6082-362-A	Tape guide adjustment driver	Tape guide height adjustment
⑧	J-6082-373-A	Torque cassette	FWD/REV winding torque adjustment
⑨	J-6325-110-A	Torque screwdriver‘s bit (M1.4)	Parts replacement
⑩	J-6325-380-A	Torque screwdriver’s bit (M2)	Parts replacement
⑪	J-6325-400-A	Torque screwdriver (3 kg)	Tightening screws
⑫	J-6443-710-A (CCW)	Brake torque gauge (CCW) (DJ-371)	Brake torque adjustment
⑬	J-6443-720-A (CW)	Brake torque gauge (CW) (DJ-372)	Brake torque adjustment
⑭	J-6444-930-A	Extension board (DJ-493)	Extension board for DSR-2000
⑮	J-6444-610-B	Path Adjustment Board (DJ-461)	For tape path adjustment RF envelope detector fixture
⑯	J-6443-760-A	System control/Servo download tool board (DJ-376)	Software version-up
⑰	3-184-527-01	Cleaning cloth	Cleaning
⑱	7-432-114-11	Locking compound	Locking compound
⑲	7-662-001-39	Grease SG-941(20g)	Parts replacement
⑳	8-967-999-02	Alignment tape XH2-1AST	Tape path alignment (NTSC & PAL)
㉑	8-967-999-22	Alignment tape XH5-1A2 (NTSC)	Audio/video alignment (DVCAM)
	8-967-999-26	Alignment tape XH5-1AP2 (PAL)	Audio/video alignment (DVCAM for PAL)
㉒	8-967-999-31	Alignment tape XH4-1A (NTSC)	Audio/video alignment (DV)
㉓	9-919-573-01	Cleaning fluid	Cleaning

① 	② ③ ④ 	⑤ 	⑥ 
⑦ 	⑧ 	⑨ ⑩ 	⑪ 
⑫ 	⑬ 	⑭ 	⑮ 
⑯ 	⑰ 	⑱ 	⑲ 
⑳ ㉑ ㉒ 	㉓ 		

3-9. Upgrading the System/Servo CPU Program Version

The DSR-2000/2000P mounts the CPU for SY and SP on the SY-278 board, CPU for SV on the SV-212 board and uses flash ROMs for stored this program.
For re-writing flash ROMs, two methods are provided.
(1) Use the fixture (DJ-376 : J-6443-760-A).
(2) Download softwares from a PC through RS-422.

3-9-1. Version Upgrade using the DJ-376

Setting of DJ-376

Write softwares into PROMs below.
Use the fixture : J-6443-760-A (DJ-376)
ROMs to be used on the fixture DJ-376:
SY/SV CPU MX27C2000DC-12 (8-759-477-94) or equivalent
SP CPU M27C1001-70F1 (F8) (8-759-583-91) or equivalent
As these CPUs employ 16 bits data bus, 2 pieces of PROMs are required for one CPU.
Write softwares into PROMs in the 8 bit split mode. A PROM at even address side is for CN102.
A PROM at odd address side is for CN101.

(1) Insert the PROMs, in which softwares are written, into the socket on the fixture DJ-376.
(2) Set bit 1 of S101 on the fixture DJ-376 to OPEN (upper side) and the rest of bits to the board side (lower side).

How to upgrade

(1) Remove the top panel. (Refer to Section 3-3.)
(2) Connect the fixture DJ-376, on which PROMs are installed, as follows.

CPU	Connect to DJ-376
SY CPU (IC102/SY-278)	CN1/SY-278
SP CPU (IC302/SY-278)	CN2/SY-278
SV CPU (IC119/SV-212)	CN2/SV-212

(3) Turn on the power to the set, Then, writing starts.
While writing is being executed, the LEDs of the fixture DJ-376 show the status shown below.
D102 lights: ERASE is being executed.
D102 and D104 light: BLANK CHECK is being executed
D103 lights: COPY is being executed.
D104 lights: VERIFY is being executed.
(4) Only D105 (a green LED next to three red LEDs) lights, Then, writing is finished.
D105 lights: Normal
D101 lights: Abnormal
In an event of abnormally, suspect the cause judging from status of LEDs.
(5) Power down the set. And remove the fixture DJ-376.
(6) Turn on the power to the set, and confirm the version of upgraded CPU in the MAINTENANCE MENU.

3-9-2. Version Upgrade from a PC through RS-422

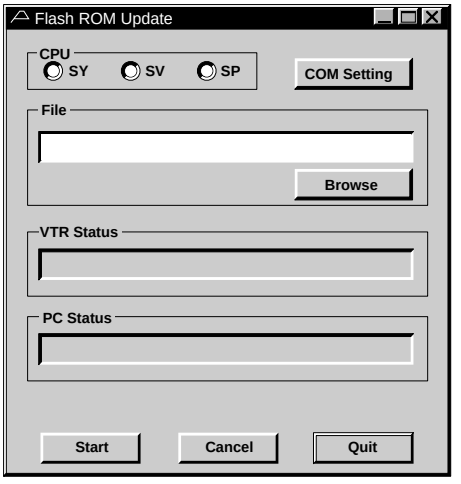
Preparation

To convert the RS-232C of a PC to RS-422 (9 pin), use a conversion box or conversion board available on the market.

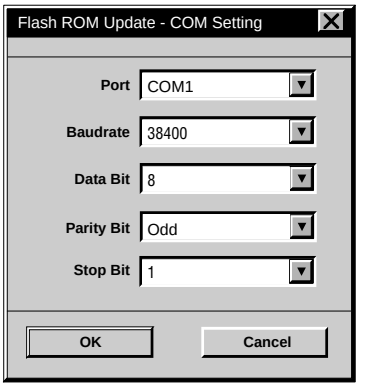
Install the version upgrade application software (fup.exe) on the PC on which Windows95 or 98 is installed.
Download the version upgrade software of CPUs to be upgrade.

How to use Fup.exe

Start up the fup.exe and then the main dialogue menu shown below appears.



Main Dialogue



Communication Setting Dialogue

CPU :	Select one of SY and SV. (Designate a target CPU to be transferred.)
COM Setting :	The communication setting dialogue appears. (DO NOT assign items other than Port.)
File :	Enter a hex filename to be transferred in this field. When a filename is selected using Browse, the selected filename appears. Drag & Drop is supported.
Browse :	The file selection menu appears.
VTR Status :	The message from a VTR appears in this field.
PC Status :	This field shows a status such as “FINISH”,
Start :	The file transfer to a VTR is started. (Unless a filename is designated, it is invalid.)
Cancel :	The file transfer to a VTR is stopped.
Quit :	The application is terminated.

Operation

Operate in the order of “Select CPU.” → “ Designate hex.filename to be transferred.” → “Press Start button.”.

During transferring, the status is displayed in between “PC Status” and “ Start, Cancel and Quit buttons”.
The progress bar and the remaining time are displayed.

Message

VTR Status

Erasing flash memory.	
Writing flash memory.	
Completed download.	
Unable to access to flash memory.	Flash ROM device error, Writing error
Unable to erase of flash memory.	Flash ROM erasure error
Verify Error occurs.	Verify-error in writing into flash memory
Checksum error occurs.	Checksum error in data received from a PC
Communication error occurs in VTR and PC	Overrun, flaming, parity error

PC Status

Trying communication with a PC.	Starts at the pressing the Start button and ends until VTR starts to erase flash memory.
Communication with a VTR is stopped.	A user pressed Cancel button.

Message Box

No response from a VTR	
Can’t set a VTR to remote mode.	
Can’t set a VTR to adjustment mode.	
Can’t set a VTR to download mode.	
File not found.	When Start button is pressed, if a file is not found.
Can’t open a port.	When Start button is pressed, RS-232C COM does not open.
A VTR interrupts communication.	Before transfer finishes, a VTR finishes.

VFD Display

loading XX (XX : SY, SV, SP)	Now loading
complete!	Download is completed without fail.
incomplete!	Download is abnormally terminated
Error91-130	SY flash ROM is abnormal. (Valid only in download mode.)
Error91-430	SP flash ROM is abnormal. (Valid only in download mode.)
Error91-215	Waiting for data sent from a PC (Communication error between SY and KY) Power down a VTR once.

Monitor

ALARM Now upgrading After version upgrade power down once.

After the version upgrade is completed, turn off and on the power of the VTR.
(In case of upgrading the same CPU or other CPU, it is not necessary to power down.)

If properly finished, confirm that CPU versions written in the MAINTENANCE MENU are correct.

Section 4
Error Messages

4-1. Alarm Display

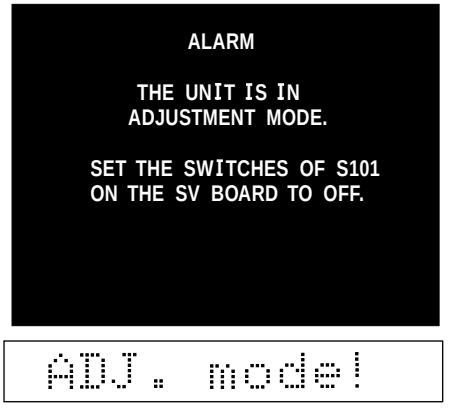
This unit has an alarm display function.
When a problem is detected, an alarm is displayed immediately in the timer counter block. The alarm and a message describing the countermeasure are displayed on a video monitor connected to the VIDEO OUT 3 (SUPER) or the SDI OUTPUT 3 (SUPER) connector.
This unit has two types of alarms : one is for operators while the other is for service persons. This manual describes only the alarms for service persons. For details of alarms for operators, refer to the operating instruction or overview in this manual. Activating the alarm display may influence the system, such as when the reference video signal is not used. Therefore, you can select whether or not to display the alarm from the Setup menu selection. As for Setup menu, refer to Section 1 of this manual or to the operating instruction. However, the alarms for service persons are displayed regardless of the Setup menu setting.

4-1-1. Alarm Display when the Main Power is Turned On

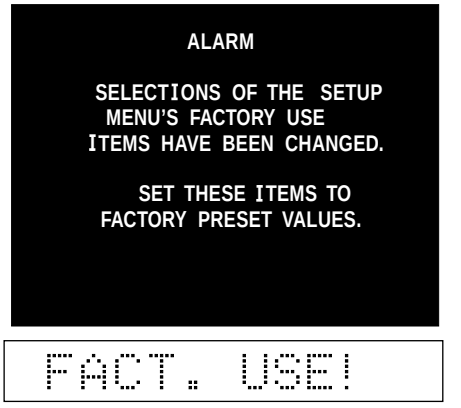
Detection : Checks the settings of switch S201 on the SY-278 board and the contents of non-volatile memory (EEPROM).
Operation after detection : None
Display : The alarm is displayed until any key is pressed.

Detection : Checks the version of the Setup menu.
Operation after detection : The Setup menu operates using the factory settings. The contents of the non-volatile memory (EEPROM) remain unchanged. Therefore, if the setting of the Setup menu is not changed, the same alarm will appear when the main power is turned on.
Display : The alarm is displayed until any key is pressed.

Detection : Checks that switch S101 on the SV-212 board is set to ON.
Operation after detection : None
Display : The alarm is displayed until any key is pressed.



Detection : Checks that the FACTORY USE item of the Setup menu is changed.
Operation after detection : None
Display : The alarm is displayed until any key is pressed.

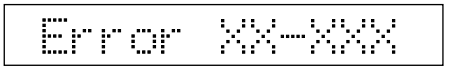


4-2. Error Codes

This unit has a self diagnostics function which detects internal abnormalities. When a problem is detected, an error code is displayed immediately in the time counter block, and details of the error appear on the video monitor connected to the VIDEO OUT 3 (SUPER) or the SDI OUTPUT (SUPER) connector.

Note

An error code appears in the column shown by XX-XXX on the display.



When detected, some errors turn the unit to AUTO OFF. (Refer to Section "4-2-3. Error Codes," excluding error code 08-032.)
This error is kept in memory even after the main power of this unit is turned off. In other words, the error code or the contents of the detected error appear even when the main power of this unit is turned off and then back on again, so this unit enters AUTO OFF mode again.

This unit enters the emergency EJECT mode when the EJECT key is pressed at this moment.

Reference

In the emergency EJECT mode, the tape is ejected gently by usable motor assuming that the tape is slack or a device may be faulty.

The following message appears on the video monitor connected to the VIDEO OUT 3 (SUPER) or the SDI OUTPUT (SUPER) connector when this unit enters the emergency EJECT mode.
The error code is displayed on the time counter.

The message shown to the right appears on the video monitor connected to the VIDEO OUT 3 (SUPER) or the SDI OUTPUT (SUPER) connector when a cassette tape is ejected in the emergency EJECT mode.
The error code is displayed on the time counter.

The message shown to the right appears on the video monitor connected to the VIDEO OUT 3 (SUPER) or the SDI OUTPUT (SUPER) connector when a cassette tape cannot be ejected with the emergency EJECT mode.
The error code is displayed on the time counter.

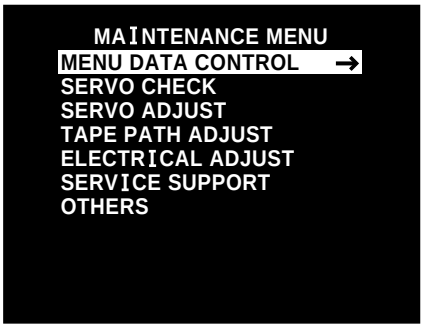
Perform Section “4-3-1. How to Take Out the Cassette Whose Tape is Slacked (MANUAL EJECT) ” when a cassette tape cannot be ejected with the emergency EJECT mode.

4-2-1. Display of Previously Detected Error Codes

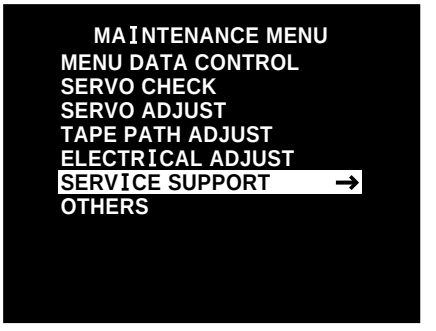
When the DSR-2000/2000P detects an internal abnormality, the error code is memorized in EEPROM. (Excluding error code 9X-XXX)
A maximum of 8 error codes detected previously, starting from the latest error code, can be displayed.

How to display the error code

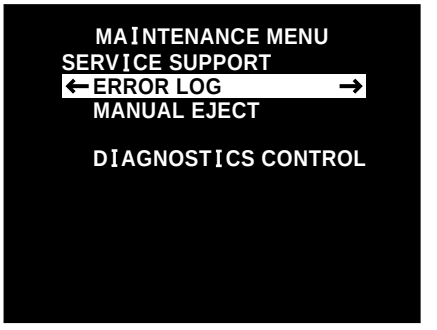
1. While pressing the DELETE, +, and TRIM + keys, press the MENU key.

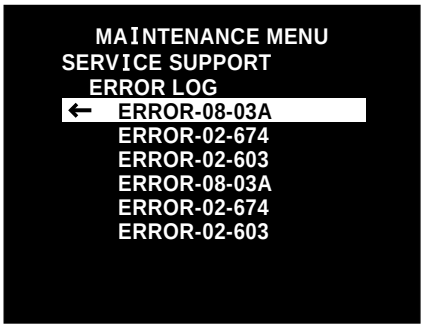


2. Move the cursor to SERVICE SUPPORT so that the letters are highlighted using the AUDIO IN, VIDEO IN keys, then press the ENTRY key.



3. Move the cursor to ERROR LOG so that the letters are highlighted using the AUDIO IN, VIDEO IN keys, then press the ENTERY key.
   The display changes as shown to the right, and the error log appears.





4-2-2. Main Codes and Sub Codes

Main codes

The main code is a two-digit number that indicates the system which sensed the error.

Main code 0X : Servo and tape path system error
Main code 2X : Mechanism control system error
Main code 3X : Sensor error
Main code 91 : Communication system and interface system error
Main code 92 to 94 : Sync. system error
Main code 95 : Digital signal process system error and communication error with ICs

Sub codes

The sub code is a three-digit number. Each digit has the following meaning.

When the main code is 0X or 2X :

X X X
| | |
| | Third digit : Abnormal symptom
| Second digit : Device which senses abnormality
First digit : Mode which senses abnormality.

First digit : Mode which senses abnormality.

0 : Mode cannot be identified, or mode identification is not necessary.
1 : Cassette down mode
2 : Threading mode
3 : STOP mode
4 : F. FWD or REW mode
5 : SEARCH mode
6 : PLAY or RECORD mode
7 : STANDBY-OFF mode
8 : Unthreading mode
9 : Cassette up mode
A : Cassette out mode
(State that a cassette is ejected.)

Second digit : Device which senses abnormality

0 : Device cannot be identified, or device identification is not necessary.
1 : Cassette up/down motor/sensor
2 : Threading motor/FG/sensor
3 : Drum motor/FG
4 : Capstan motor/FG
5 : Supply reel motor/FG
6 : Supply reel brake solenoid
7 : Takeup reel motor/FG
8 : Takeup reel brake solenoid
9 : Supply and takeup reel motor/FG
A : Tension regulator
B : Pinch solenoid
C : Reel position motor/sensor
D : Head cleaning solenoid
E : M stop solenoid

Third digit : Abnormal symptom

0 : Abnormal symptom identification is not necessary.
1 : Operation could not be completed within the specified time.
2 : Abnormal speed detected.
3 : Tape slack detected.
4 : FG cannot be detected.
5 : FG detected.
6 : Rotating direction error detected.
7 : Excessive tension detected.
8 : Abnormal current detected.
9 : The full top or full end of a tape cannot be released.
A : Retry in progress
(Unthreading and re-threading)

When the main code is 3X :

All sub codes are 000.

When the main code is 91 :

X X X

Third digit : Abnormal symptom

Second digit : CPU (microprocessor) or IC of the communication counterpart.

First digit : CPU (microprocessor) or IC which detects the abnormality.

First and second digits : CPU (microprocessor) code.

1 : System control main CPU (SY-278, IC101)
2 : Keyboard u-COM (KY-452, IC5)
3 : Memory
4 : Servo main CPU (SV-212, IC1)
5 : Servo sub u-COM (DR-364, IC1)
7 : SPCON main CPU (SY-278, IC301)
8 : TC IC (SY-278, IC508)
9 : Keyboard sub u-COM (SW-11, IC204)
A : External keyboard u-COM (KY-452A, IC5)
D : DV I/F u-COM (IF-763, IC2)
E : Digital I/F u-COM (APR-45, IC651)

Third digit : Abnormal symptom (when the communication counterpart is other than memory)

1 : Abnormal checksum
2 : Abnormality of overrun
3 : Abnormal parity
4 : Abnormal framing
5 : Communication could not be completed in the specified time.

Third digit : Abnormal symptom (when the communication counterpart is memory)

0 : Abnormality of ROM
1 : Abnormality in the external memory area
2 : Abnormality in the internal memory area
3 : Abnormality in the common memory-1 area
4 : Abnormality in the common memory-2 area
5 : Abnormality in the external serial memory-1 area
6 : Abnormality in the external serial memory-2 area
7 : Abnormality in the external serial memory-3 area
8 : Abnormality in the external serial memory-4 area
9 : Abnormality in the EEPROM area
A : Abnormality in the NVRAM area
B : Abnormality in the Hours Meter area
F : Abnormality of MIC

When the main code is from 92 to 94 :

X X X

Third digit : Abnormal signal

Second digit : IC to which the signal is input

First digit : CPU (microprocessor) which detects the abnormality

. . . . . Same as the main code 91

Third digit : Abnormal signal

1 : Reference frame pulse of the output signal (NSG OE)
2 : Reference track pulse of the playback side (P-TRKT)
3 : Reference frame pulse of the playback side (P-FLTT)
4 : Reference track pulse of the record side (R-TRKT)
5 : Reference frame pulse of the record side (R-FLTT)
6 : Reference track pulse of the playback side (P-TRKD)
7: Reference frame pulse of the playback side (P-FLTD)
8: Reference track pulse of the record side (R-TRKD)
9: Reference frame pulse of the record side (R-FLTD)

When the main code is 95 :

X X X

Second and third digits :
IC of the communication counterpart.
(The second digit indicates the communication line number and the third digit indicates the CS number.)

First digit : CPU (microprocessor) or IC which detects the abnormality.

. . . . . Same as the main code 91

4-2-3. Error Codes

Main code 0X : abnormality of servo and tape path system

① Main code 02

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
058	Detected an abnormal current in the S reel motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
068	Detected an abnormality of reel brake plunger solenoid.			
078	Detected an abnormal current in the T reel motor.			
0B8	Detected an abnormality of pinch plunger solenoid.	Cassette tape insertion and unthreading are prohibited until the error is solved.		Displayed until the error is solved.
154	Failed to detect the S reel FG by the FG check during cassette tape insertion.	Cassette tape will be ejected.	–	Displayed until the next cassette tape is inserted.
174	Failed to detect the T reel FG by the FG check during cassette tape insertion.			
194	Failed to detect both S and T reel FGs by the FG check during cassette tape insertion.			
254	Failed to detect the S reel FG during threading.	AUTO OFF	EJECT (Emergency EJECT)	
255	Detected the S reel FG during threading.			
275	Detected the T reel FG during threading.			
291	Failed to complete winding a tape.			
355	Detected the S reel FG during STOP and STILL.			
375	Detected the T reel FG during STOP and STILL.			
395	Detected both S and T reel FGs during STOP and STILL.			
402	Detected an abnormal tape speed during F. FWD and REW.	STOP	The machine operates normally after the error is solved.	Displayed until any key is pressed.
403	Detected slack tape during F. FWD and REW.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
454	Failed to detect the S reel FG during F. FWD and REW.			
474	Failed to detect the T reel FG during F. FWD and REW.			
494	Failed to detect both S and T reel FGs during F. FWD and REW.			
496	Detected the abnormal direction of S and T reel rotation during F. FWD and REW.			
503	Detected slack tape during search.			
554	Failed to detect the S reel FG during search.			
574	Failed to detect the T reel FG during search.			
594	Failed to detect the S and T reel FGs during search.			
596	Detected the abnormal direction of S and T reel rotation during search.			
603	Detected slack tape during PLAY and REC.			

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
654	Failed to detect the S reel FG during PLAY and REC.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
674	Failed to detect the T reel FG during PLAY and REC.			
694	Failed to detect both S and T reel FGs during PLAY and REC.			
696	Detected the abnormal direction of S and T reel rotation during PLAY and REC.			
803	Detected slack tape during unthreading.			
854	Failed to detect the S reel FG during unthreading.			
855	Detected the S reel FG during unthreading.			
875	Detected the T reel FG during unthreading.			
A55	Detected the S reel FG during cassette eject.	Insertion of a cassette is inhibited until the error is solved.		
A75	Detected the T reel FG during cassette eject.			
A95	Detected both S and T reel FGs during cassette eject.			

② Main code 06

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
3A7	Detected abnomal tape tension during STOP.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette tape is inserted.
4A7	Detected abnomal tape tension during F.FWD/REW.			
5A7	Detected abnomal tape tension during SEARCH.			
6A7	Detected the abnormal tape tension during PLAY and RECORD.	The mode at the time of detection is kept continued. (If the mode is PLAY, PLAY continues.) If mode is changed to other than PLAY and RECORD, machine enters AUTO OFF.	The machine operates normally after the error is solved. The PLAY and RECORD modes continue but other modes are changed to STOP then EJECT (Emergency EJECT).	Displayed until the error is solved and any key is pressed.

③ Main code 07

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
042	Detected the abnormal capstan speed.	STOP	The machine operates normally after the error is solved.	Displayed until any key is pressed.
144	Failed to detect the capstan FG by the FG check during cassette tape insertion.	Cassette tape will be ejected.	–	Displayed until the next cassette is inserted.

④ Main code 08

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
03A	Detected the abnormal drum speed. **Video monitor display** 	Retry (The mechanism unthreads once then threads again.)	EJECT	Displayed until the error is solved.
032	The abnormal drum speed error is not solved.	AUTO OFF	EJECT	Displayed until the next cassette is inserted.

⑤ Main code 09

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
010	Detected abnomal position of cassette compartment.	Cassette tape insertion and unthreading are prohibited until the error is solved.		Displayed until the error is solved.
020	Detected an abnormality of threading position sensor.			
028	Detected an abnormal current of threading motor.			
221	Failed to complete threading within the specified time	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
224	Failed to detect the threading FG during threading.			
821	Failed to complete unthreading within the specified time			
824	Failed to detect the threading FG during unthreading.			

• Main code 2X : Abnormality related to the mechanism control

① Main code 20

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
018	Detected the abnormal current in the cassette up/down motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
111	Failed to complete the cassette down motion within the specified time.			
911	Failed to complete the cassette up motion within the specified time.			

② Main code 21

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
0C8	Detected the abnormal current in the reel position motor.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.
OE8	Detected the abnormal current of M stop plunger solenoid.			
1C1	Failed to complete the reel position movement within the specified time.	Cassette tape will be ejected.		

③ Main code 22

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
0D8	Detected an abnormal current of cleaning plunger solenoid.	AUTO OFF	EJECT (Emergency EJECT)	Displayed until the next cassette is inserted.

• Main code 3X : Sensor trouble

Sub codes are all 000.

Sub code	Detected contents	Operation after detecting an abnormality	Operable mode	Display period
31	Failed to release the tape top.	STOP	PLAY, FF, EJECT	Displayed until the error is solved and any key is pressed.
32	Failed to release the tape end.	STOP	PLAY, REW, EJECT	
33	Detected an abnormal current of reel shift sensor LED.	Insertion of cassette tape is inhibited.	–	
34	Detected an abnormality of threading sensor.	Cassette tape insertion and unthreading are prohibited until the error is solved.		
35	Detected an abnormality of cassette compartment position sensor.			
36	Detected an abnormality of fan motor.	Only error is displayed.	–	
39	Detected an abnormality of cassette top/end sensor LED.	STOP	PLAY, EJECT	
3A	Detected an abnormality of tension sensor.	AUTO OFF	EJECT (Emergency EJECT)	

Main code 91 : Abnormality of communication system or interface system

Main code	Sub code	Detected contents
91	125	Communication error between system control and keyboard (detected by SY).
	130	System control detected abnormality of ROM.
	131	System control detected abnormality of external memory.
	132	System control detected abnormality of internal memory.
	133	System control detected abnormality of common memory for SERVO.
	134	System control detected abnormality of common memory for SPCON.
	139	System control detected abnormality of EEPROM (IC1 on the SE-463 board).
	13A	Detected abnormality in NVRAM.
	13B	Detected abnormality in Resetable Hour Meter.
	13C	Detected abnormality in Volume adjustment data area.
	13F	Communication error to MIC.
	145	Communication error between system control and servo.
	175	Communication error between system control and SPCON.
	195	Communication error between system control and the SW microprocessor.
	1A5	Communication error between system control and external keyboard.
	1D5	Communication error between system control and the DV microprocessor.
	1E5	Communication error between system control and the DIF microprocessor.
	215	Communication error between system control and keyboard (detected by KY).
	430	Servo main detect abnormality of ROM.
	431	Servo detected abnormality of external memory.
	439	Detected abnormality in the servo adjustment data area.
	43B	Detected abnormality in Unresetable Hours Meter.
	455	Communication error between servo main and servo sub microprocessors.
	539	Detected abnormality in the EQ data area.
	730	SPCON detected abnormality of ROM.
	731	SPCON detected abnormality of external RAM (IC313 and IC314 on the SY-278 board).
	732	SPCON detected abnormality of internal RAM.
	733	SPCON detected abnormality of the communication IC (IC208 on the SY-278 board) with SY.
	734	SPCON detected communication error (SV-212, IC303) with SV.

Main code 92 to 94 : Abnormality of sync system

Main code	Sub code	Detected contents
92	101	System control detected abnormality in NSG OE.
	702	SPCON detected abnormality in P-TRKT.
	703	SPCON detected abnormality in P-FLTT.
	704	SPCON detected abnormality in R-TRKT.
	705	SPCON detected abnormality in R-FLTT.
93	407	The servo main microprocessor detected abnormality of P-FLTD.
	506	The servo sub microprocessor detected abnormality of P-TRKD.
94	409	The servo main microprocessor detected abnormality of R-FLTD.
	508	The servo sub microprocessor detected abnormality of R-TRKD.

Main code 95 : Communication error with digital process system IC

Main code	Sub code	Detected contents
95	120	Communication error between system control and C1R MOD.
	122	Communication error between system control and C1P MOD.
	12A	Communication error between system control and NSG.
	12C	Communication error between system control and VPRAD.
	415	Communication error between servo and D1R.
	416	Communication error between servo and HIF.
	423	Communication error between servo and D1M.
	424	Communication error between servo and D1S.
	511	Communication error between drum and M1.
	710	Frame communication error between SPCON and D1M.
	711	Track pair communication error between SPCON and D1M.
	712	Communication error between SPCON and V2P.
	713	Communication error between SPCON and F1P.
	714	Communication error between SPCON and SIFR (P).
	715	Communication error between SPCON and SIFP.
	720	Communication error between SPCON and AIFP.
	730	Frame communication error between SPCON and D1R.
	731	Track pair communication error between SPCON and D1R.
	732	Communication error between SPCON and V2R.
	733	Communication error between SPCON and F1R.
	734	Communication error between SPCON and SIFR (R).
	740	Frame communication error between SPCON and A1R Front.
	741	Track pair communication error between SPCON and A1R Front.
	742	Frame communication error between SPCON and A1R Rear.
	743	Track pair communication error between SPCON and A1R Rear.
	744	Communication error between SPCON and AIF-INDI.
	745	Communication error between SPCON and ACTL.
	750	Communication error between SPCON and IN-DSP.
	751	Communication error between SPCON and REC-DSP.
	752	Communication error between SPCON and PB-DSP.
	753	Communication error between SPCON and OUT-DSP.

4-2-4. Possible Causes of Errors

Possible causes of errors

Main code	02												06
Sub code / Possible causes	403 503 603	574 674 803	554 654	402 454 474	355 375	058 078	154 174 194 255 275 875 A55 A75 A95	254 854	594 694	494	395	496 596 696	3A7 4A7 5A7 6A7
1. Tape is stuck to the tape running mechanism.	O	O	O	O				O		O			O
2. Tape is loosely wound in the cassette.	O	O	O	O	O						O	O	
3. Cassette tape is not confined properly. (Cassette compartment is unlocked.)	O	O	O	O				O	O	O	O	O	
4. Reel motor does not generate the correct torque.	O	O	O	O	O	O	O	O	O	O	O	O	O
5. Abnormality of reel FG	O	O	O	O	O		O	O	O	O	O	O	O
6. Tension regulator is defective.	O												
7. Cut-and-spliced tape is used.		O	O		O				O		O	O	
8. Top detector and end detector are defective.			O	O					O	O			O
9. Pinch roller has insufficient pressure against capstan.									O			O	

Check procedure for the possible causes, and the related circuit boards and devices

Possible causes	Check items and check procedure	Related circuit boards and devices
1. Tape is stuck to the tape running mechanism. • Tape is dirty. • Tape run mechanism is dirty. • Humidity or condensation	• Check if tape is stuck to tape guides or drum. • Check if foreign material is adhered to tape. • Check if tape is damaged. • Check if foreign material is adhered to tape run mechanism and drum.	
2. Tape is loosely wound in the cassette. • A tape which has been used for many times, is used. • A damaged tape is used.	• Check if tape has severe non-uniform winding.	
3. Cassette tape is not confined properly. (Cassette compartment is unlocked.)	Check that the four pins of the cassette compartment are inserted into the holes of the slant table. Check that the cassette compartment retainer is securely fastened. ↓ If a cassette compartment is unlocked when a cassette compartment is inserted, exchange the cassette compartment. ↓ When a cassette compartment is lock after it is exchanged, the trouble is caused by the cassette compartment. Otherwise the trouble is caused by the defective drive circuit.	cassette compartment SV-212 board

Possible causes	Check items and check procedure	Related circuit boards and devices
4. Reel motor does not generate the correct torque. • Reel brake has mechanical defect. • Reel brake solenoid is open. • Reel brake solenoid drive IC is defective. • Reel motor is defective. • Reel motor drive circuit is defective. • Harness is defective.	• When the S and T reel brakes are considered to be the cause of trouble : Check the S and T reel brakes. Check that the S and T reel brakes are released. • When the S and T reel motors are considered to be the cause of trouble : Perform the servo adjustment. Confirm that the servo adjustment is completed as intended.	When the reel brake is considered to be the cause of trouble : SV-212 board, reel brake solenoid When the S and T reel motor or the S and T reel FG is considered to be the cause of trouble : SV-212 board, S and Treel motor
5. Abnormality of reel FG • S and T reel motor is defective. • S and T reel FG amp is defective.	Perform the S and T reel adjustment. Confirm that the reel FG adjustment is completed as intended.	
6. Tension regulator is defective.	Replace the tension regulator assembly. Confirm that OK appears on display.	SV-212 board, MS-64 board, SE-538 board
7. Cut-and-spliced tape is used.		
8. Top detector and end detector are defective.	Check the tape top and tape end. The top and end sensor must turn on and off correctly.	When the tape top sensor is considered to be the cause of trouble : SE-522 board, SV-212 board, tape top sensor LED When the tape end sensor is considered to be the cause of trouble : SE-521 board, SV-212 board, tape end sensor LED
9. Pinch roller has insufficient pressure against capstan. • Pinch roller has mechanical defect. • Pinch solenoid is open. • Pinch solenoid drive IC is defective.	Check the pinch roller. Pinch roller must be pressed against the capstan shaft correctly.	SV-212 board, pinch solenoid

4-3. Countermeasure in an Emergency

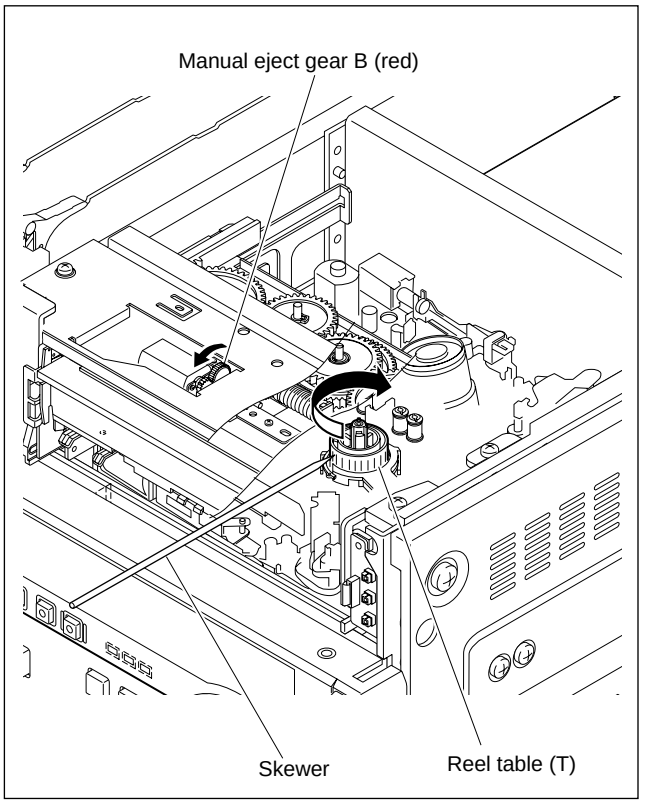
4-3-1. How to Take Out the Cassette Whose Tape is Slacked (MANUAL EJECT)

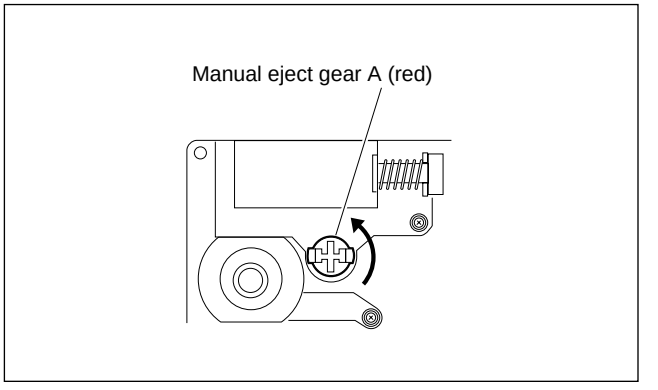
(1) Turn the power off.
(2) Remove the top panel. (Refer to Section 3-3.)
(3) Remove the front panel. (Refer to Section 3-3.)
(4) Turn the manual eject gear A (red) in the arrow direction with a phillips screwdriver while pressing the gear. When the tape comes to slack, turn the reel table from the front side utilizing a skewer and wind the tape.

Notes

- In a case of standard cassette and M cassette :
  Turn the reel table (T)
- In a case of mini cassette :
  Turn the reel table (S)

(5) Repeat step (4) until each guide comes to the unthreading end position and furthermore the tape completely returns into the cassette.
(6) Turn the manual eject gear B (red) in the arrow direction until the cassette compartment completely comes into cassette out state.





4-3-2. Head Cleaning when Head Clogging Occurs

Clean the video head as follows when the video head gets dirty.

Procedure to use the cleaning cassette

Note

Use only the cleaning cassette tape as follows.
If another cleaning cassette tape is used, abnormal abrasion or breakage of the video head could occur.

Cleaning cassette tapes :

DV12CL (Standard)
DVM12CL (Mini)

1. Insert the specific cleaning cassette tape in this unit. The unit is automatically set in the PLAY mode and the cleaning tape starts running.
   Confirm that the PLAY key lights and the display appears.

2. The cleaning cassette tape is automatically ejected after running for 10 seconds.
   Note
   Do not rewind the cleaning cassette tape to use it again.

3. Make sure that the head is no longer dirty.
   If the video head is still dirty after step 2 above, clean the video head as follows.

Procedure to use the cleaning cloth

1. Soak the cleaning cloth with cleaning liquid and bring it into contact lightly with the video head.
2. Turn the upper drum slowly by hand in the rotating direction of the head (counterclockwise when viewed from the top) to clean the video head.

Notes

- Never move the cleaning cloth in the vertical direction against the video head because it may break the head.
- Turn the power switch off when cleaning the video head.

4-3-3. Operating the VTR without A Cassette Tape

The VTR can be operated without a cassette tape by the following switch setting.

Switch setting

1. Remove the cassette compartment from this unit.
2. Turn on switches S101-3 and 4 of the SV-212 board.
3. Then turn on the main power.

Operating method

Threading

While pressing the S/T reel motors, press the STOP key.
The upper drum rotates, threading ring rotates. The unit enters the threading mode.
The tension arm and the threading ring move to the specified position, then the threading is completed.
This condition in which the threading is completed is referred to as the STOP status.

PLAY

Press the PLAY key.
The pinch roller is pressed against the capstan shaft to enter the PLAY status.
When the PLAY key is pressed during threading, the pinch roller is pressed against the capstan shaft to enter the PLAY status after the threading has completed.

FF

Press the F FWD key.
The pinch roller is pressed against the capstan shaft to set the FWD.SEARCH to five-times speed.

REW

Press the REW key.
The pinch roller is pressed against the capstan shaft to set REV.SEARCH to five-times speed.

REC

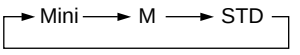
While pressing the record proof sensor on the right side of the T side reel table, press both the PLAY key and the REC key.
The pinch roller is pressed against the capstan shaft to enter REC status.
When the record proof sensor is released, the REC status is released and the recorder returns to PLAY status.

Unthreading

Press the EJECT key.
Each guide moves to the specified position to complete the unthreading.

Reel position selection

Press the STANDBY key on the control panel.
Reel position will be changed as shown below in accordance with the number of pressing the STANDBY switch.



Note

Make sure to turn off switches S101-3 and 4 on the SV-212 board after the adjustment.

Section 5
Maintenance Menu

5-1. Menu Structure

This unit has a maintenance menu which is used for maintenance.
The maintenance menu has a layered structure through which you move to perform the various checks, settings and adjustments using the specified menu items. Contents of the maintenance menu are displayed on the video monitor connected to the VIDEO OUT 3 (SUPER) connector or the SDI OUTPUT 3 (SUPER) connector and the time counter of DSR-2000/2000P.

Values in parenthesis ( ) are time counter display.

MENU, First layer	MENU, Second layer	MENU, Third layer
MENU DATA CONTROL (MENU CNT)	MENU STATUS DISPLAY (>MENU STA) SAVE MENU DATA (>Save MENU) LOAD MENU DATA (>Load MENU)	
SERVO CHECK (SV Check)	SENSOR CHECK (>Sensor)	CASS-COMPARTMENT (>>Cass-COM) TAPE TOP/END (>>Top/End) HUMID [MOISTURE] (>>HUMID) REC INHIBIT (>>REC INHI.)
	MOTOR CHECK (>Motor)	S-REEL (>>S-Reel) T-REEL (>>T-Reel) THREADING (>>Threading) CASS-COMPARTMENT (>>Cass-COM) CAPSTAN (>> Capstan) DRUM (>>Drum) REEL POSITION (>>Reel POS.)
	PLUNGER CHECK (>Plunger)	PINCH (>>Pinch) REEL BRAKE (>>R-Brake) M PLUNGER (>>M Plunger) HEAD CLEANER (>>H. Cleaner)
SERVO ADJUST (SV Adjust)	S/T-REEL & CAPSTAN (>Reel & Cap.) S-REEL ONLY (>S-Reel) T-REEL ONLY (>T-Reel) CAPSTAN ONLY (>Capstan) TENSION (>Tension)	
TAPE PATH ADJUST (TP Adjust)	TRACKING ADJUST (>Tracking)	
	RF SWITCHING POSITION (>Switching)	

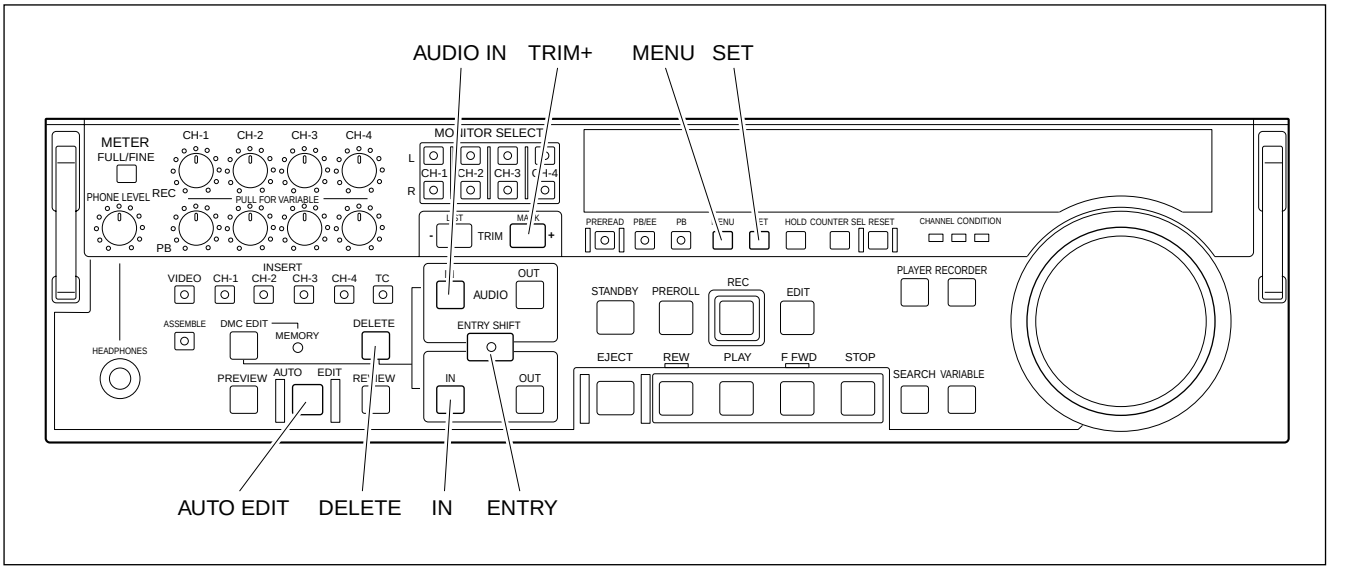
Values in parenthesis ( ) are time counter display.

MENU, First layer	MENU, Second layer	MENU, Third layer
ELECTRICAL ADJUST (EL Adjust)	PLL F0 (>PLL f0)	
	EQ AUTO (>EQ auto)	DVCAM (>>DVCAM) DV (>>DV)
	EQ MANUAL ADJ (>EQ manual)	DVCAM (>>DVCAM) DV (>>DV) DV LP (>>DV LP) DVCPRO (>>DVCPRO)
	REC CURRENT (>REC cur) FE CHECK (>FE check) VOLUME ADJUST (>Vol adj)	
	PROCESS CHECK : OFF (>Proc check)	OFF (>>off) DPR (>>dpr) MAIN (>>main) SUB (>>sub) PRE (>>pre)
	REF CHECK : OFF (>REF check)	OFF (>>off) NON-STD (>>Non-STD) STD (>>STD)
	RP DATA INITIALIZE	
SERVICE SUPPORT (Support)	ERROR LOG (>Error LOG) MANUAL EJECT (>Manu. Eject)	
	DIAGNOSTICS CONTROL (>DIAG CNT)	CLEAR ERROR LOG (>>Clear LOG)
OTHERS (Others)	SOFTWARE VERSION (>Version) KEYBOARD CHECK (>KY Check)	
	MEMORY DISPLAY (>MEM Check)	SY MEMORY DISPLAY (>> SY MEM.) SV MEMORY DISPLAY (>> SV MEM.) SP MEMORY DISPLAY (>> SP MEM.) KY MEMORY DISPLAY (>> KY MEM.) CM DISPLAY (>> CM DISP.)
	DATA DISPLAY (>Data Check)	SP DATA DISPLAY (>>SP DATA)

5-2. How to Operate Maintenance Menu

5-2-1. Location and Function of Switches

Use MENU, SET, ENTRY, AUTO EDIT, IN and OUT switches on the control panel shown below to perform the maintenance menu.



The maintenance menu has a layered structure through which you move to select the desired item.

[AUDIO IN] KEY : Use this key to move in the direction of ↑ within the same layer.
[IN] KEY : Use this key to move in the direction of ↓ within the same layer.
[DELETE] KEY : Use this key to move in the direction of ← to higher layers.
[ENTRY] KEY : Use this key to move in the direction of → to lower layers. (It is inoperative if there is no lower layer.)

To indicate depth of layer, the displayed menu items are indented on the video monitor and ">" is added to the top on the time counter.

5-2-2. How to Enter the Maintenance Menu

1. While pressing the [DELETE] (←) key and [TRIM+] key , press the [MENU] key. The DSR-2000/2000P enters the maintenance menu. The maintenance menu appears on the video monitor.
2. Select the desired item using the [AUDIO IN] (↑) key and the [IN] (↓) key. The cursor shown with a white background moves to the selected item.
3. After the desired item is selected, press the [ENTRY] (→) key to designate the selected item.

5-2-3. How to Exit the Maintenance Menu

Press the [MENU] key to exit the maintenance menu.

5-3. Contents of Maintenance Menu

5-3-1. Menu Data Control

The MENU DATA CONTROL item provides a SETUP MENU data display and saving and loading the SET UP MENU data.
This item is used to return the settings to their original values after maintenance is complete or ROM upgrading is complete.

Operating procedure

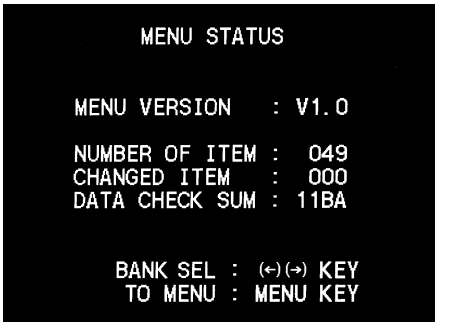
1. Enter the maintenance menu.
2. Move the cursor to “MENU DATA CONTROL” which is displayed with a white background, using the AUDIO IN (↑), IN (↓) keys.

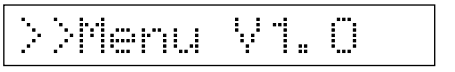
3. Press the ENTRY (→) key.
“MENU DATA CONTROL” is selected and its lower layer submenu appears.

4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.
5. When an item is selected, press the ENTRY (→) key. The contents of the selected item appear.
6. Press the DELETE (←) key to exit MENU DATA CONTROL and return to the main menu.
7. Press the MENU key to exit the maintenance menu.

(1) MENU STATUS DISPLAY

Displays the current status of the SET UP MENU data.



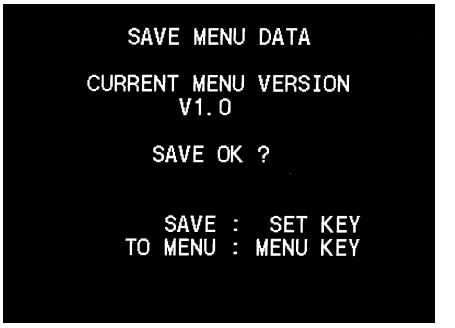


MENU VERSION :	Version number of the SET UP MENU
NUMBER OF ITEM :	Numbers of the SET UP MENU items
CHANGED ITEM :	Numbers of the items which were changed from the factory default settings
DATA CHECK SUM :	Data check sum

Pressing [ENTRY] (→) key displays the status of the SET UP MENU stored in the menu bank 1 to 4.

(2) SAVE MENU DATA

This is used to temporarily save the user's setup menu data. A temporary saved data can be reset later.



1. The version of the current setup menu is displayed, and it is waiting to press the [SET] key.
   * Pressing the [MENU] key returns to the main menu.

2. Press the [SET] key.
   The SET UP MENU data is stored in EEPROM.
   Confirm that [COMPLETE] appears and data saving is complete.

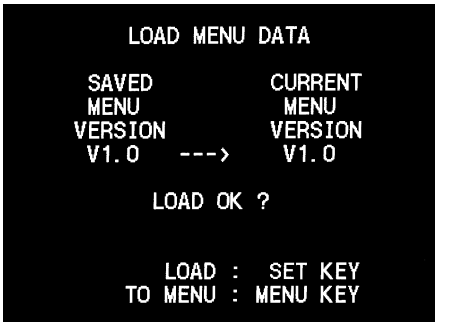
Notes

- Data which has once been saved will not be deleted by turning the main power on and off, or by upgrading the ROM version. However, the saved data is deleted when the MS-64 board or the EEPROM is replaced because the data is saved in the EEPROM in the MS-64 board.
- When the SET UP MENU is upgraded by ROM's version upgrade, an alarm message appears after the ROM is replaced. Either initialize the SET UP MENU or execute "LOAD MENU DATA" when the alarm appears.

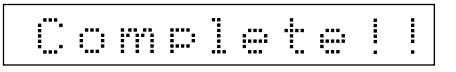
(3) LOAD MENU DATA

The saved data is stored as ordinary SET UP MENU data when it is loaded.

1. The version number of the current SET UP MENU and that of the SET UP MENU to be loaded are displayed, and it is waiting to press the [SET] key.
   * Pressing the [MENU] key returns to the main menu.



2. Press the [SET] key.
   The SET UP MENU data is stored in EEPROM.
   Confirm that [COMPLETE] appears and data saving is complete.



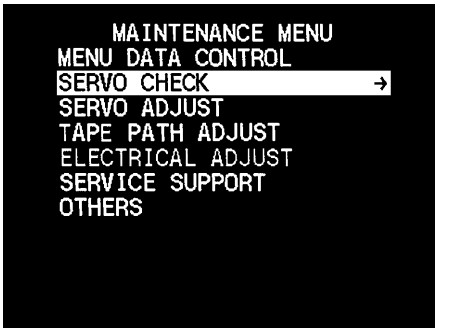
In the case of trouble :
Loading of the data will not start if SET UP MENU data has not been saved or the saved SET UP MENU data contains an error.

5-3-2. Servo Check

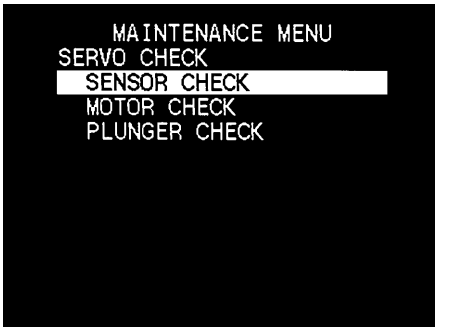
Checks the servo system automatically or semi-automatically.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “SERVO CHECK” which is displayed with a white background using the AUDIO IN (↑), IN (↓) keys.



3. Press the ENTRY (→) key.
   “SERVO CHECK” is selected and its lower layer submenu appears.
4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.



5. Press the ENTRY (→) key.
   The lower layer submenu appears.
6. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.
7. Press the ENTRY (→) key to select the desired item.
8. Press the SET key to execute the selected item.
9. After completing the check, press the MENU key to return to the main menu.
10. To check other menus and submenus, repeat steps 4 to 9.
11. Press the MENU key to exit the maintenance menu.

Note

If the MENU key is pressed while the check is in progress, the check operation is forcibly ended and the display returns to the main menu.

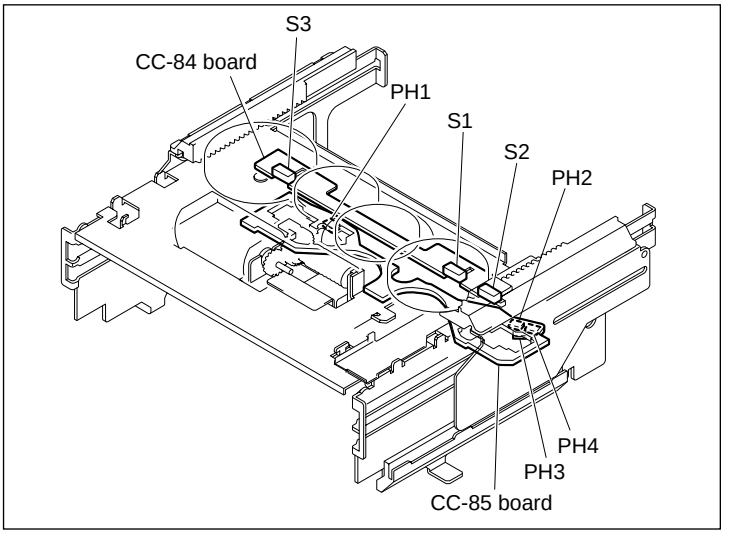
1. SENSOR CHECK

The respective items of “SENSOR CHECK” are described below :

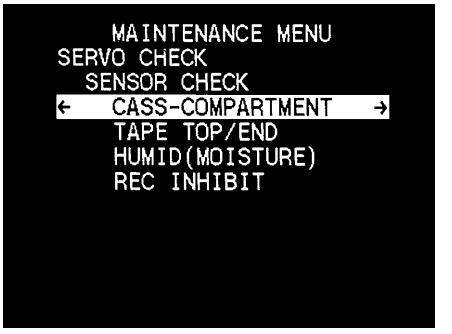
① CASS-COMPARTMENT

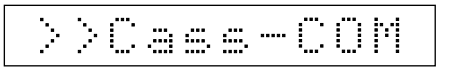
Checks the respective switches of the cassette compartment.

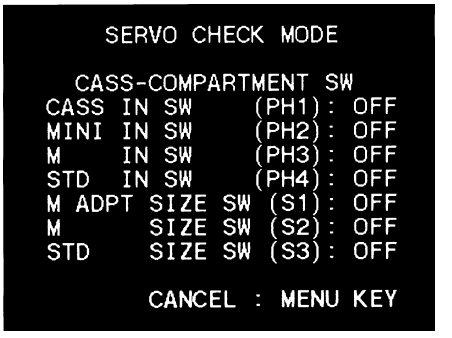
SW/Sensor	Applicable board
PH1 PH2 PH3 PH4	CC-85
S1 S2 S3	CC-84



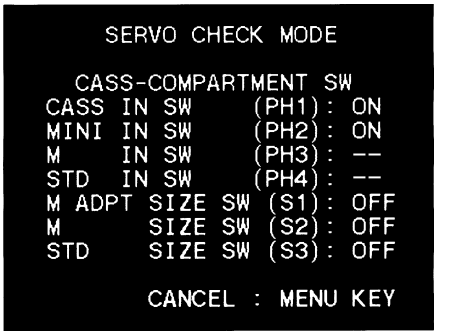
1. Execute the CASS-COMPARTMENT.
2. Confirm that the sensors are all OFF with no cassette inserted.



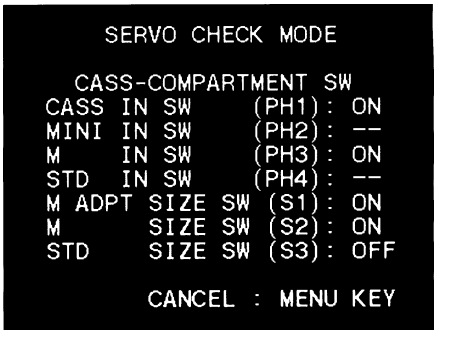




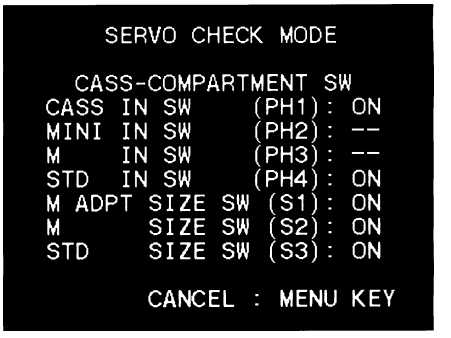
3. Insert the mini-cassette and confirm that the status of the sensor is the monitor display shown right.



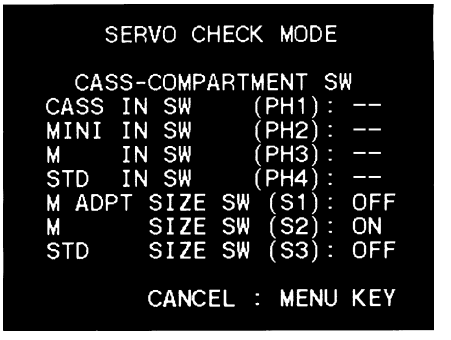
4. Insert the M-cassette and confirm that the status of the sensor is the monitor display shown right.



5. Insert the standard cassette and confirm that the status of the sensor is the monitor display shown right.



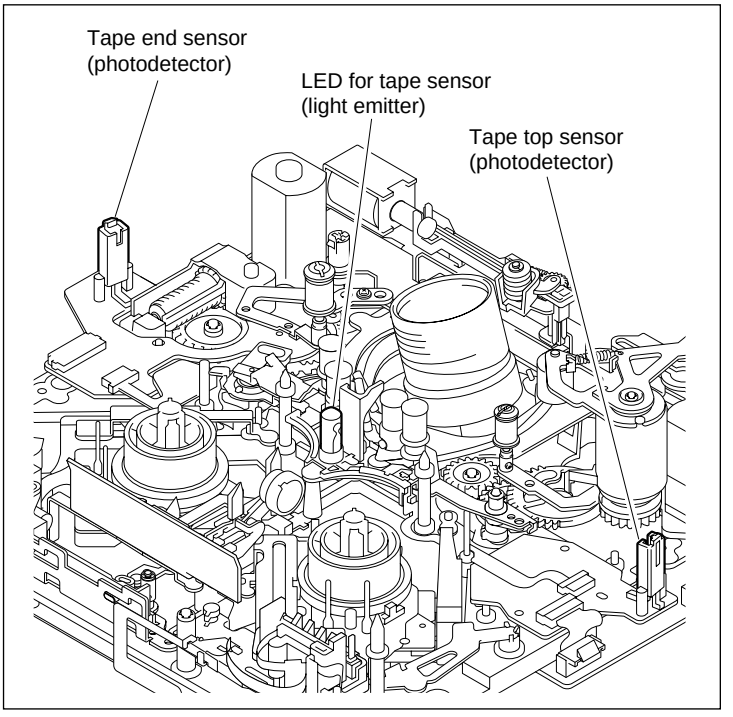
6. Insert the M-ADPT (Cassette adaptor for DVCPRO) and confirm that the status of the sensor is the monitor display shown right.

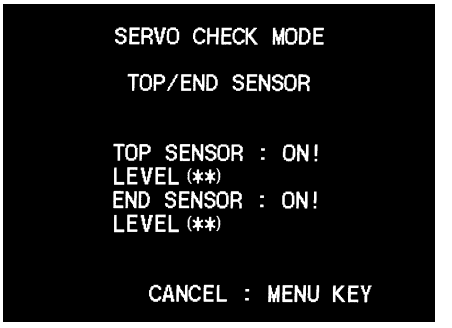


∗ − − : not care

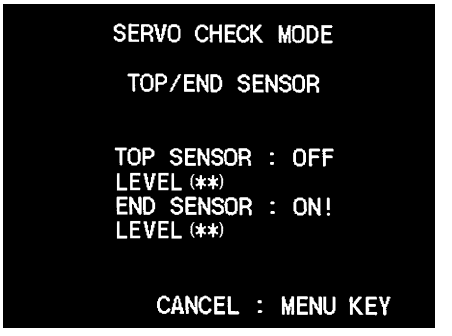
② TAPE TOP/END

Checks the tape-top and tape-end sensors.

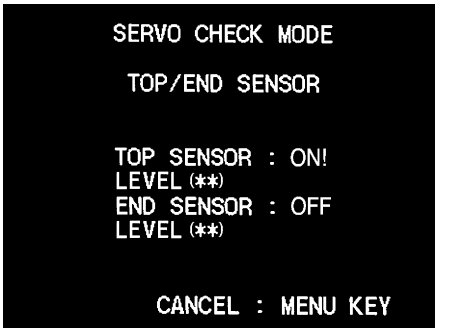




1. Execute the TAPE TOP/END.
2. Confirm that both TOP SENSOR and END SENSOR are [ON!].
3. Interrupt between the LED for the tape sensor (light emitter) and the tape-top sensor (photodetector) by inserting a finger or the like.
   Confirm that the TOP SENSOR display changes from [ON!] to [OFF] on the monitor display.



4. Interrupt between the LED for the tape sensor (light emitter) and the tape-end sensor (photodetector) by inserting a finger or the like.
   Confirm that the END SENSOR display changes from [ON!] to [OFF] on the monitor display.

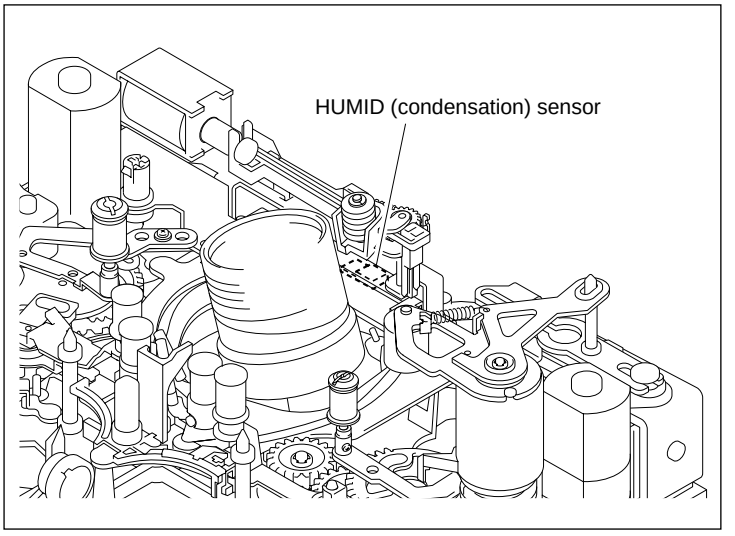


In the case of trouble :

If the display does not change check whether the tape-top sensor or the tape-end sensor itself is defective.
Check also the tape-top/tape-end sensor circuit (MS-64, SE-521/522 board).

③ HUMID (MOISTURE)

Checks the HUMID (condensation) sensor.



1. Execute the HUMID (MOISTURE).
2. Bring a cotton swab moistened with water in contact with the HUMID sensor.
   Confirm that [DRY] changes to [WET!] on the monitor display.

3. Blow wind onto the HUMID sensor to evaporate any water.
   Confirm that the display changes to [DRY] on the monitor 30 minutes later.

   Note

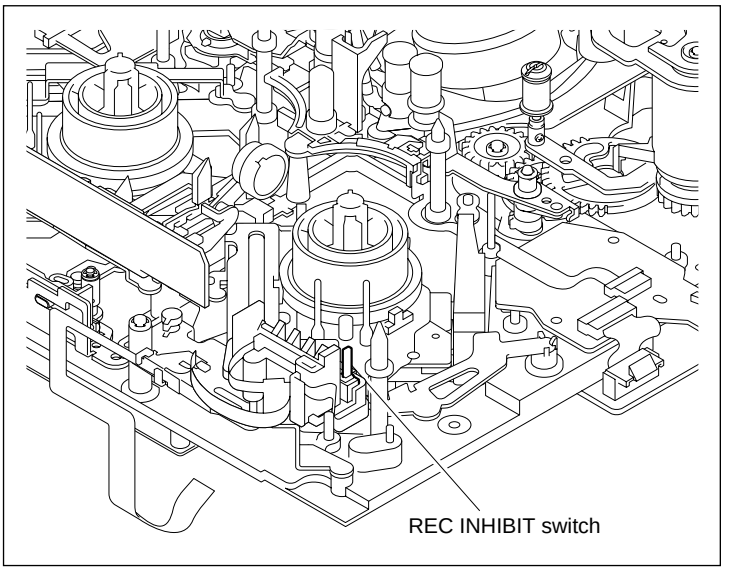
   Once the HUMID sensor detects [WET!], even if make it dry immediately, it takes 30 minutes to detect [DRY].

In the case of trouble :

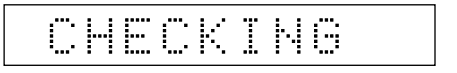
If the display does not change from DRY to WET!, check whether the HUMID sensor itself is defective.
Check also the HUMID sensor amplifier (MS-64 board).

④ REC INHIBIT

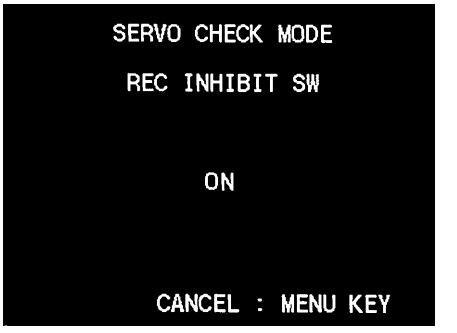
Checks the REC INHIBIT switch.



1. Execute the REC INHIBIT.
2. Confirm the monitor display is as shown right.



3. Press the REC INHIBIT switch.
   Confirm that ON is displayed on the monitor display.

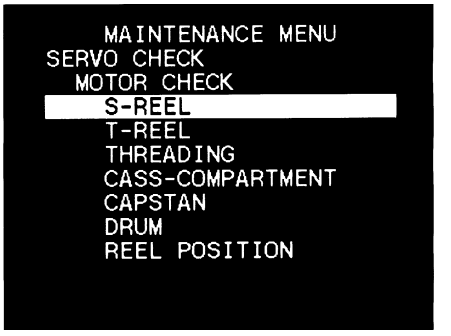


In the case of trouble :

If OFF is not displayed, check the sensor on the MIC arm.

2. MOTOR CHECK

The respective items of “MOTOR CHECK” are described below :



① S-REEL

Checks the S-reel motor.

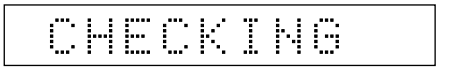
1. Execute the S-REEL.
2. Press and hold the AUDIO IN (↑), then IN (↓) keys for one to two seconds, and release the reel brake by activating the brake solenoid. Confirm that the S reel motor rotates clockwise and counterclockwise respectively during pressing the AUDIO IN (↑) key and IN (↓) key.

In the case of trouble :
If the brake solenoid does not emit the operating sound and the S reel motor does not rotate in the specified direction even though pressing the AUDIO IN (↑) and IN (↓) keys, check the S reel motor assembly and reel motor driver circuit (SV-212 and MS-64).

② T-REEL

Checks the T-reel motor.

1. Execute the T-REEL.
2. Press and hold the AUDIO IN (↑), then IN (↓) keys for one to two seconds, and release the reel brake by activating the brake solenoid. Confirm that the T reel motor rotates clockwise and counterclockwise respectively during pressing the AUDIO IN (↑) key and IN (↓) key.

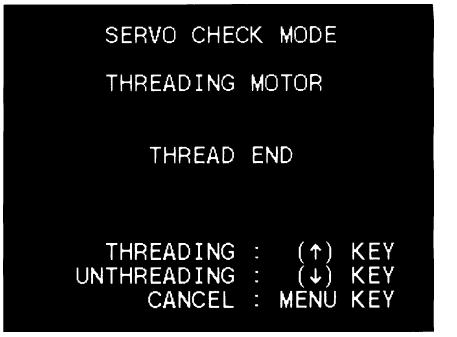


In the case of trouble :
If the brake solenoid does not emit the operating sound and the T reel motor does not rotate in the specified direction even though pressing the AUDIO IN (↑) and IN (↓) keys, check the T reel motor assembly and reel motor driver circuit (SV-212 and MS-64).

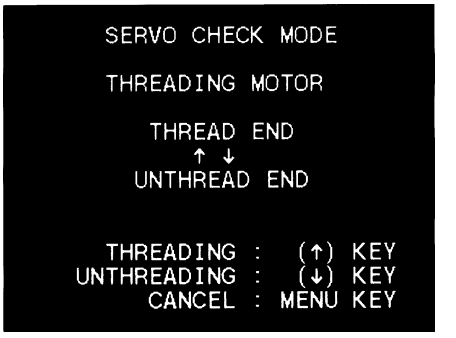
③ THREADING

Checks the threading motor, the thread-end sensor, unthread-end sensor and the cassette compartment.

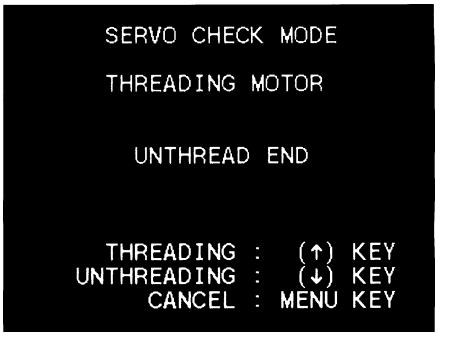
1. Execute the THREADING.



2. Press and hold the AUDIO IN (↑) key.
   Confirm that the threading ring completes threading and the message “THREAD END” appears on the monitor display.



3. Press and hold the IN (↓) key.
   Confirm that the threading ring completes unthreading and “UNTHREAD END” appears on the monitor display.



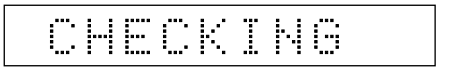
In the case of trouble :

If the threading motor does not rotate, or if the message “THREAD END” does not appear even though threading is complete, or if the message “UNTHREAD END” does not appear on the monitor even though the unthreading is complete, check the threading motor, the cassette compartment, the SV-212 board. Check also the MS-64 board (the driver circuit and the threading FG amplifier circuit) and the SE-512 board (the sensor).

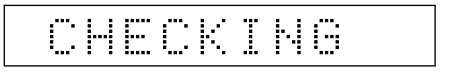
④ CASS-COMPARTMENT

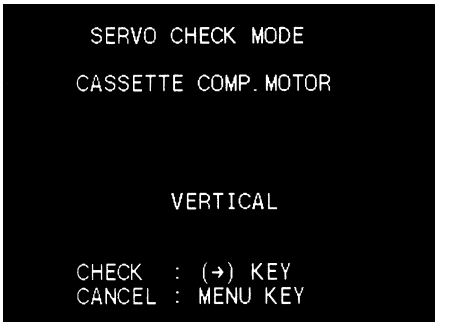
Check the cassette compartment motor.

1. Execute the CASS-COMPARTMENT.



2. Press the ENTRY (→) key.
   Confirm that the cassette compartment moves down.
3. Press the ENTRY (→) key again, and confirm that the cassette compartment moves up.
   (The monitor display changes in the reverse order of the steps for moving down the cassette compartment.)





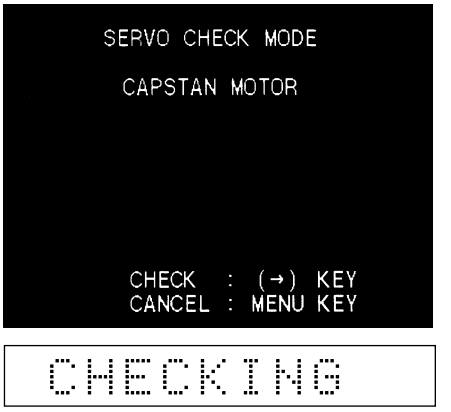
In the case of trouble :

If the monitor display does not change, check the cassette compartment motor, the SV-212 board (the sensor input circuit) and the CC-83 board (the sensor).

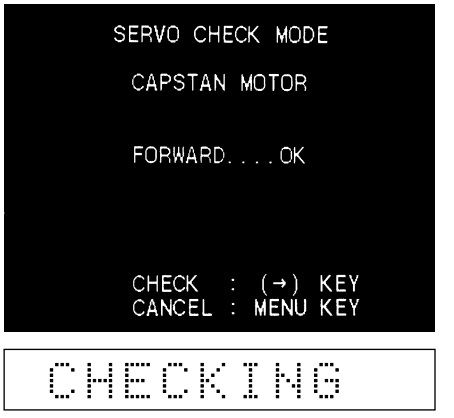
⑤ CAPSTAN

Checks the capstan motor.

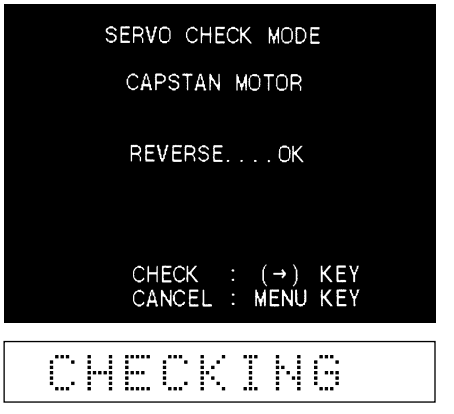
1. Execute the CAPSTAN.



2. Press the ENTRY (→) key.
   Confirm that [FORWARD ... OK] appears on the monitor display.



3. Press the ENTRY (→) key again.
   Confirm that [REVERSE ... OK] appears on the monitor display.

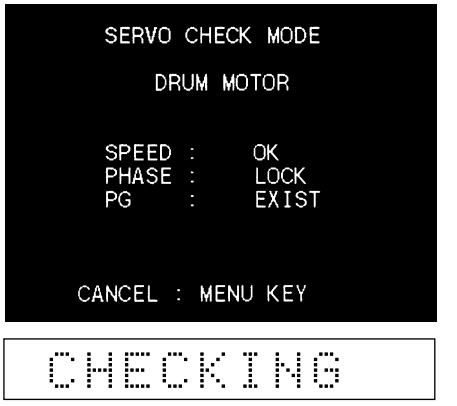


In the case of trouble :
If the monitor display does not change, check the capstan motor and the capstan motor driver circuits (the SV-212 board, MS-64 board)

⑥ DRUM

Checks the drum motor.

1. Execute the DRUM.
2. Confirm the monitor display is as follows.
   SPEED : [OK]
   PHASE : [LOCK]
   PG : [EXIST]

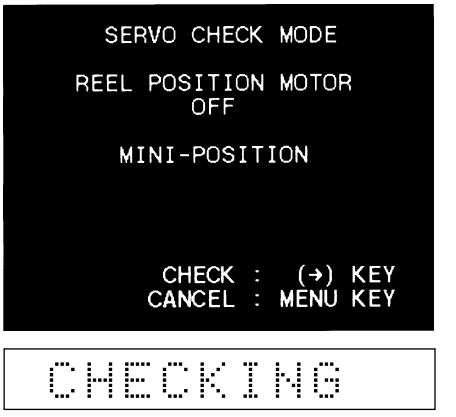


In the case of trouble :
If the monitor display does not change, check the drum motor, the SV-212 board (the drum motor driver circuit, the drum FG amp circuit and the drum PG amp circuit).

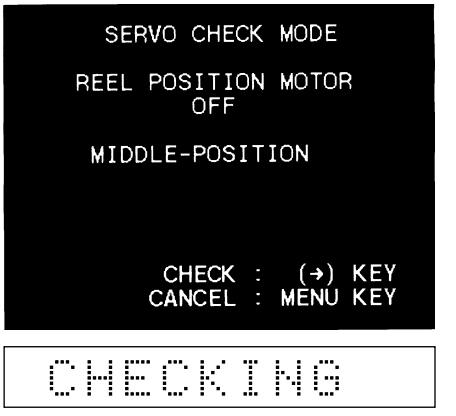
⑦ REEL POSITION

Checks the reel position motor and the reel MINI/M/STD position sensor.

1. Execute the REEL POSITION.



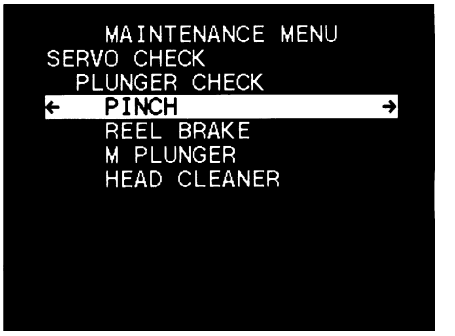
2. Confirm that the reel table moves in the order of the MINI position → the M position → the STD position then returning to the MINI position each time pressing the ENTRY (→) key and the monitor display changes in accordance with the move.



In the case of trouble :
If the reel table does not move or the monitor display does not change, check the reel position motor, the reel MINI/M/STD position sensor (the SE-522 and MS-64 boards) and reel position motor driver circuit (the SV-212 board).

3. PLUNGER CHECK

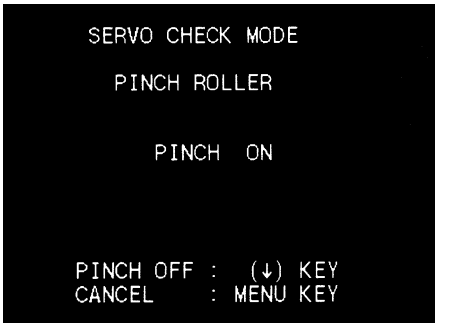
The respective items of “PLUNGER CHECK” are described below.

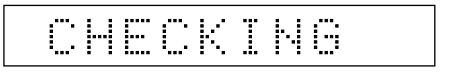


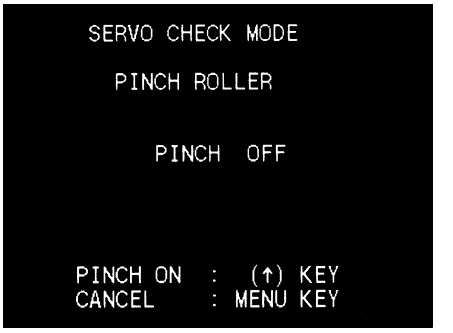
① PINCH

Checks the pinch roller solenoid.

1. Execute the PINCH and confirm that the pinch solenoid operates when the threading starts.
2. Press the AUDIO IN (↑) and IN (↓) keys to confirm that the PINCH comes to ON/OFF.
3. Press the MENU key to release the pinch solenoid and to bring to the unthreading.
   Doing so, the monitor display returns to the main menu.







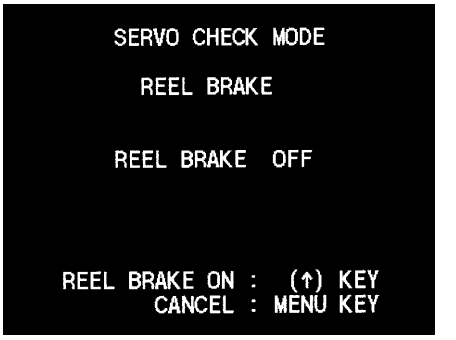
In the case of trouble :

If the pinch solenoid does not operate, check the pinch solenoid and the driver circuit (the SV-212 board).

② REEL BRAKE

Checks the reel brake solenoid.

1. Execute the REEL BRAKE and confirm that the reel brake solenoid operates.
2. Press the AUDIO IN (↑) and IN (↓) keys to confirm that the REEL BRAKE comes to ON/OFF.
3. Press the MENU key to release the reel brake solenoid. Doing so, the monitor display returns to the main menu.



In the case of trouble :
If the reel brake solenoid does not operate, check the reel brake solenoid and its driver circuit (the SV-212 board).

③ M PLUNGER

Checks the M plunger solenoid.

1. Execute the M PLUNGER.
2. Press the AUDIO IN (↑) and IN (↓) keys to confirm that the M PLUNGER comes to ON/OFF.
3. Press the MENU key to release the M plunger solenoid. Doing so, the monitor display returns to the main menu.

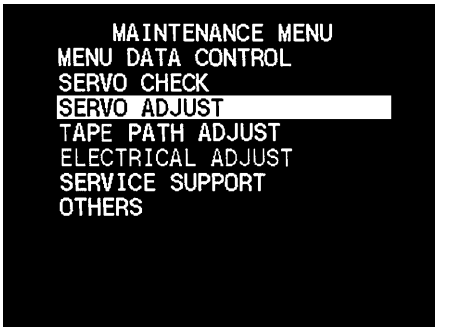
In the case of trouble :
If the M plunger solenoid does not operate, check the M plunger solenoid and its driver circuit (the SV-212 board).

5-3-3. Servo Adjust

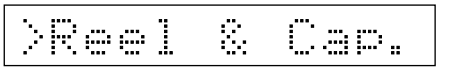
Checks the servo system automatically or semi-automatically.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “SERVO ADJUST” which is displayed with a white background using the AUDIO IN (↑), IN (↓) keys.



3. Press the ENTRY (→) key.
   “SERVO ADJUST” is selected and its lower-layer submenu appears.



4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.
5. Press the ENTRY (→) key to select the desired item. (Refer to the respective menu description for the adjustment procedure.)
6. Press the SET key to execute the selected menu.
7. After completing the adjustment, press the DELETE (←) key to return to the main menu.
8. To check other menus and submenus, repeat steps 4 to 7.
9. Press the MENU key to exit the maintenance menu.

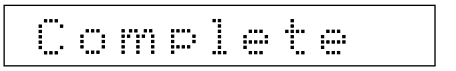
Note

If the MENU key is pressed while the adjustment is in progress, the adjustment operation is forcibly ended and the display returns to the main menu.

(1) S/T REEL & CAPSTAN

Executes the automatic adjustment of the S and T reels and, capstan systems.

1. Execute the S/T REEL & CAPSTAN.
2. After completing adjustment, confirm that “COMPLETE” appears.



Adjustment items

s reel fg adjust
s reel offset/friction
s reel torque
t reel fg adjust
t reel offset /friction
t reel torque
capstan fg adjust

In the case of trouble :

When “ADJUST INCOMPLETE” appears on the monitor display, check the SV-212 and MS-64 boards (the reeel FG amplifier circuit, reel motor driver circuit, capstan FG circuit and motor driver cicuit) Check also the respective motors.

(2) S-REEL ONLY

Executes the automatic adjustment of the S reel only.

1. Execute the S-REEL ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.

Adjustment items

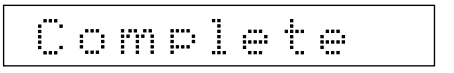
s reel fg adjust
s reel offset/friction
s reel torque

In the case of trouble :

When “ADJUST INCOMPLETE” appears on the monitor display, check the SV-212 and MS-64 boards (the reel FG amplifier circuit, the reel motor driver circuit) and the S-reel motor.

(3) T-REEL ONLY

Executes the automatic adjustment of the T reel only.



1. Execute the T-REEL ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.

Adjustment items

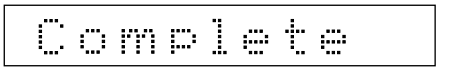
t reel fg adjust
t reel offset/friction
t reel torque

In the case of trouble :

When “ADJUST INCOMPLETE” appears on the monitor display, check the SV-212 and MS-64 boards (the reel FG amplifier circuit, the reel motor driver circuit) and the T-reel motor.

(4) CAPSTAN ONLY

Executes the automatic adjustment of the capstan FG only.



1. Execute the CAPSTAN ONLY.
2. After completing adjustment, confirm that “COMPLETE” appears.

Adjustment item

capstan fg adjust

In the case of trouble :

When “ADJUST INCOMPLETE” appears on monitor display, check the SV-212 and MS-64 boards (the capstan motor driver circuit, the capstan FG amplifier circuit) and the capstan motor.

(5) TENSION

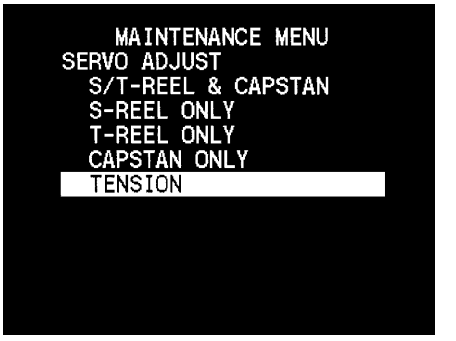
Executes the adjustment of the tape tension.

Mode
PLAY mode

Tools
DV torque cassette : J-6082-373-A

1. Remove the cassette compartment.
2. Turn on the main power and press the [EJECT] key.
   Note
   Make sure that the cassette compartment connection cable is not shorted to chassis when the main power is turned on.

3. Enter "MAINTENANCE MENU" and select "TENSION" from "SERVO ADJUST" using the [AUDIO IN] (↑), [IN] (↓) keys.
4. Press the [ENTRY] (→) key to move to the next display.



5. When the display appears, press the [SET] key to start the adjustment.

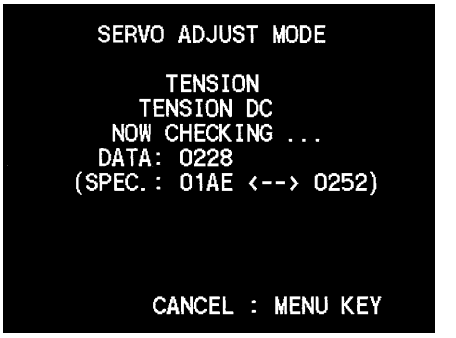
6. Wait until display changes and the menu appears as shown in the right.

7. Set the DV torque cassette and place a weight of about 300 g on it. Press the [STOP] key.

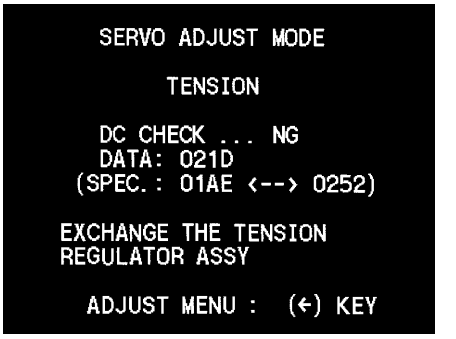
8. Keep pressing the [AUDIO IN] (↑), [IN] (↓) keys until the DV torque cassette reading agrees with the specification value on display.
9. When adjustment is completed, press the [ENTRY] (→) key.

Specification is as indicated on the display.

10. The display changes as shown in the right, and the DSR-2000/2000P enters the tension regulator magnet position check mode.



11. If the check is completed unsatisfactorily, the display changes as shown in the right.
12. Replace the tension regulator assembly in accordance with message on the display.



13. If the check is completed satisfactorily, the display changes as shown in the right.
14. Keep pressing the AUDIO IN (↑), IN (↓) keys until the DV torque cassette reading agrees with the specification value on the display.
15. When adjustment is completed, press the ENTRY (→) key.
16. Repeat steps 14 and 15 to readjust the DV torque cassette reading.

Specification is as indicated on the display.

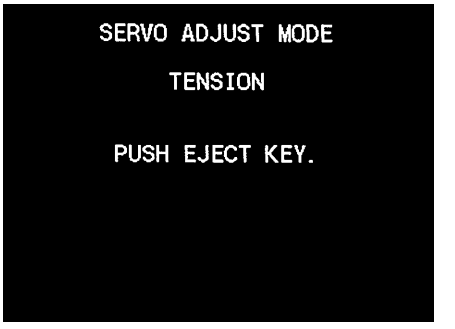
17. Confirm that the DV torque cassette reading agrees with the specification value on the display.
18. After completing step 17, press the ENTRY (→) key and the DSR-2000/2000P enters the REV mode automatically.

Specification is as indicated on the display.

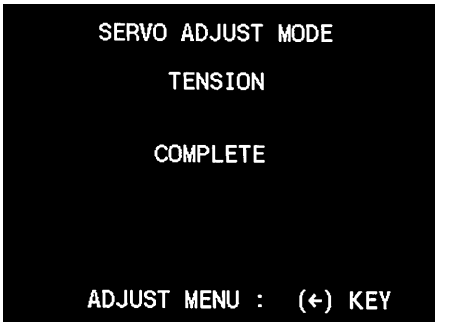
18. Keep pressing the AUDIO IN (↑), IN (↓) keys until the DV torque cassette reading agrees with the specification value on the display.
19. When adjustment is completed, press the ENTRY (→) key.

Specification is as indicated on the display.

20. Press the EJECT key and remove the DV torque cassette.



21. Confirm that the message “COMPLETE” appears on the display.



* Press the EJECT key to return to the ADJUST menu.
* When adjustment is complete, attach the cassette compartment.

5-3-4. Tape Path Adjust

Executes the adjustment of the tape path.

(1) TRACKING ADJUST

For adjustment of “TRACKING ADJUST”, refer to section 8-1, 8-2, 8-4, 8-5, 8-6, 8-7, and 8-8.

(2) RF SWITCHING POSITION

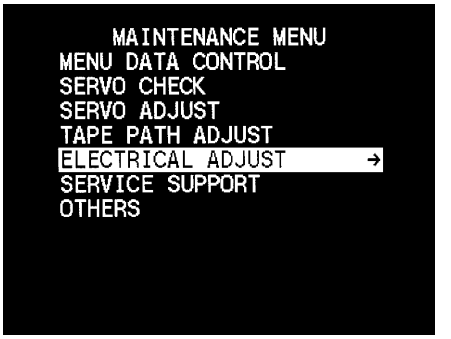
For adjustment of “RF SWITCHING POSITION”, refer to section 8-3.

5-3-5. Electrical Adjust

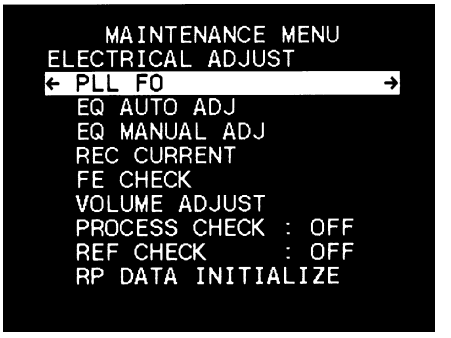
Executes the electrical adjustment.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “ELECTRICAL ADJUST” which is displayed with a white background using the AUDIO IN (↑), IN (↓) keys.



3. Press the ENTRY (→) key.
   “ELECTRICAL ADJUST” is selected and its lower-layer submenu appears.



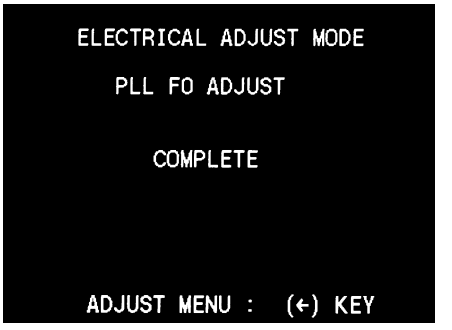
4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑) and IN (↓) keys.
5. Press the ENTRY (→) key to select the desired item.

1. PLL F0

The PLL adjustment is described below :

1. Select “PLL F0” and the PLL adjustment is performed automatically.

2. After completing the adjustment, confirm that “COMPLETE” appears.
3. Press the DELETE (←) key to return to the ADJUST menu.
4. Press the MENU key to exit the maintenance menu.



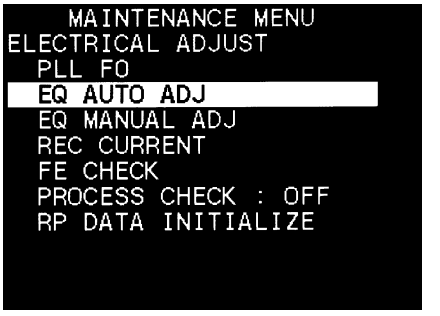
In the case of trouble :
If “INCOMPLETE” appears on the monitor display, check the RP-111 board (the PLL circuit).

2. EQ AUTO ADJ

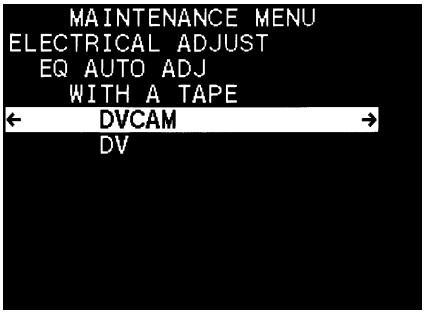
The EQ AUTO adjustment is described below:

① DVCAM

1. Select the EQ AUTO ADJ.



2. Move the cursor displayed with a white background to the DVCAM using the AUDIO IN (↑) and IN (↓) keys and press the ENTRY (→) key.



3. After the monitor display comes out as shown right, insert the XH5-1A2 (for NTSC) or XH5-1AP2 (for PAL) into the unit.
4. Press the PLAY key.
5. Confirm "COMPLETE" is displayed on the monitor.

To return to step 2, press the DELETE (←) key once.
To return to step 1, press the DELETE (←) key twice.
To return to the main menu, press the DELETE (←) key three times.

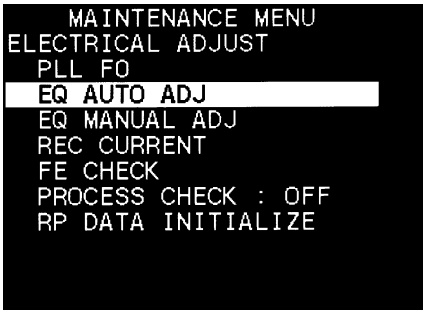
In the case of trouble :

If "INCOMLETE" is displayed on the monitor;

① Send the small length of the tape forward and repeat step 2 again.
② If "INCOMLETE" is still displayed after performing ①, check the RP-111 board (the EQ circuit).

② DV

1. Select the EQ AUTO ADJ.



2. Move the cursor displayed with a white background to the DV using the AUDIO IN (↑) and IN (↓) keys and press the ENTRY (→) key.

3. After the monitor display comes out as shown right, insert the XH4-1A into the unit.
4. Press the PLAY key.
5. Confirm "COMPLETE" is displayed on the monitor.

To return to step 2, press the DELETE (←) key once.
To return to step 1, press the DELETE (←) key twice.
To return to the main menu, press the DELETE (←) key three times.

In the case of trouble :

If "INCOMLETE" is displayed on the monitor;

① Send the small length of the tape forward and repeat step 2 again.
② If "INCOMLETE" is still displayed after performing ①, check the RP-111 board (the EQ circuit).

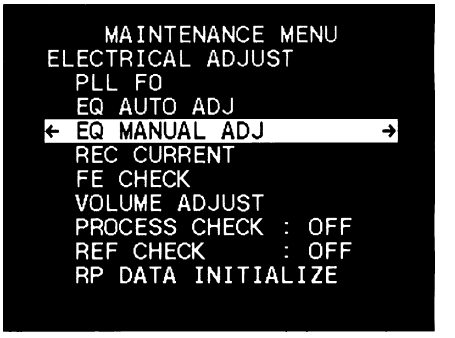
3. EQ MANUAL ADJ

The EQ MANUAL ADJUSTMENT is described below:

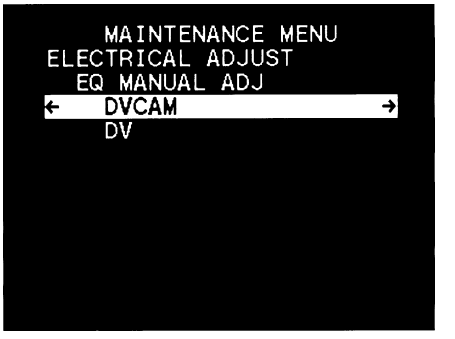
Reference

If any errors are found in the played back picture and audio, or if "INCOMPLETE" is displayed after completing the EQ AUTO ADJ in the previous section, this adjustment enables to check the status of the RF of each HEAD.

1. Select the EQ MANUAL ADJ.



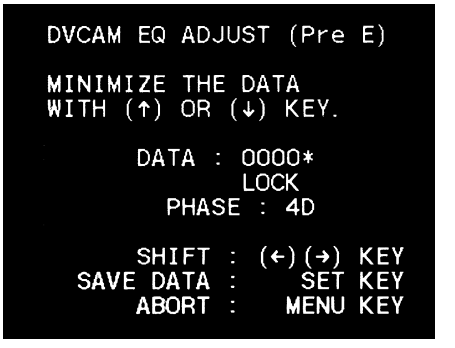
2. Select the mode desired to check using the AUDIO IN (↑) and IN (↓) keys, and press the ENTRY (→) key.
3. Insert the cassette of which mode you desire to check into the unit.
   DVCAM : 15 μ ADJ cassette
   DV : 10 μ ADJ cassette



4. Press the PLAY key.
5. Press the RESET key to display asterisk mark "*" to the right side of the DATA: 0000.
6. Select the HEAD for checking with the ENTRY (→) key.
   Reference
   The HEAD selected is displayed in the ( ) on the top of the monitor display.

   In the case of DVCAM :
   Pre E → Pre O → Main E → Main O → Sub E → Sub O → Rec E → Rec O

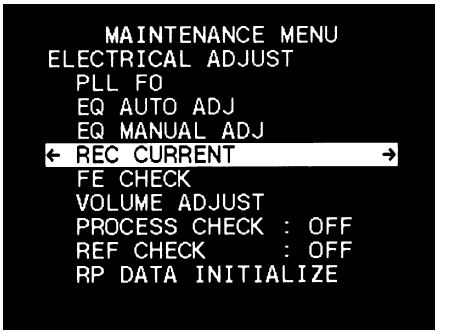
   In the case of DV :
   Main E → Main O → Sub E → Sub O



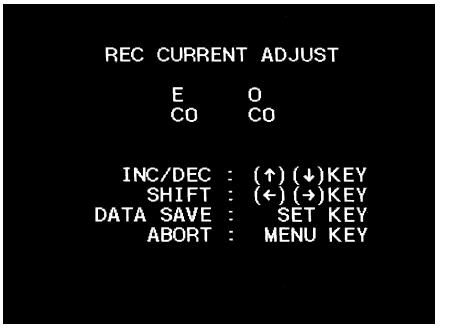
7. Confirm that the DATA on the screen is 0000* through 000F*.
   Note
   If press the SET key during confirmation, perform the EQ AUTO adjustment.

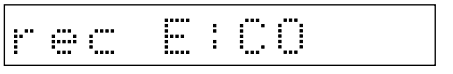
4. REC CURRENT

1. Selected the REC CURRENT.



2. Press the AUDIO IN (↑), IN (↓) keys and the DELETE (←), ENTRY (→) keys to adjust the data to “C0”.



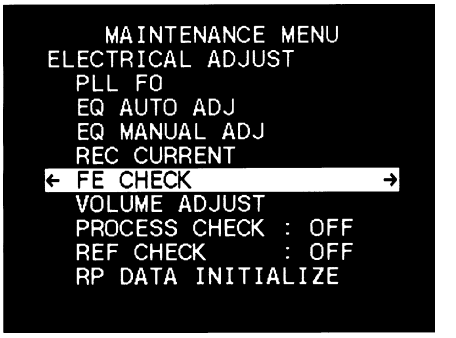


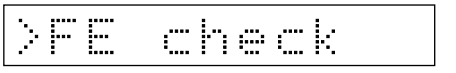
or

3. Press the SET key to save the data.

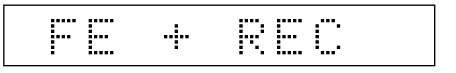
5. FE CHECK

1. Insert a blank tape.
   (Press the keys in this order : HOLD, RESET and SET keys, to set the time counter to 00, which facilitates the operation.)
2. Connect an oscilloscope as follows :
   Check : TP404 & TP504/RP-111 board
   GND : E401 & E501
   TRIG : TP403
3. Select the FE CHECK.

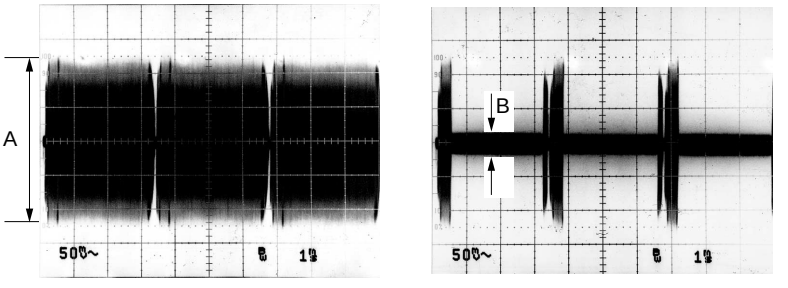




4. Select REC using the AUDIO IN (↑) key. Press the PLAY and REC keys.
   After recording for 30 to 60 seconds (time counter reading), press the STOP key.
5. Playback the recorded segment and note down the waveform level.



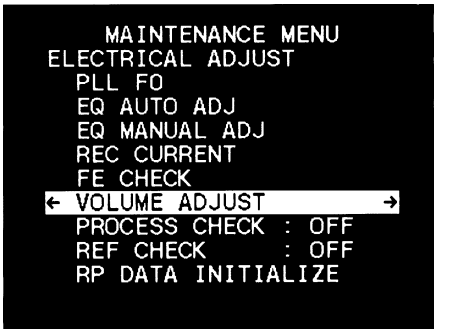
6. Select FE ONLY using the AUDIO IN (↑) key. Press the VIDEO key to select VIDEO INS. Locate the tape segment that is recorded in step "4", and press the PLAY and EDIT keys to record (i.e., erase) the recorded segment for about 30 seconds.
7. Playback the segment recorded (erased) in step 6. and confirm that the waveform level is 30% or less.



$B \leqq A \times 0.3$

6. VOLUME ADJUST

1. Select the VOLUME ADJUST.



2. Press down all 8 AUDIO REC/PB volumes on the control panel of the unit.
3. Set the PROCESS CONTROL SW on the sub-panel to REMOTE and disconnect the cable from the VIDEO REMOTE on the rear panel.
4. Press the SET key to start the adjustment.
5. After completing the adjustment, the display returns automatically to the maintenance menu.

7. PROCESS CHECK

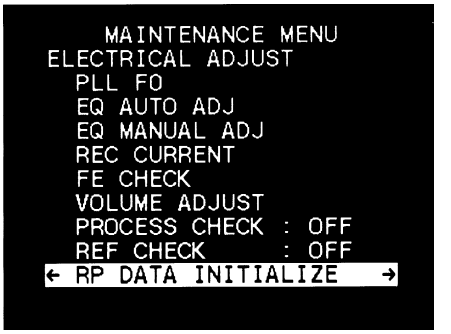
* This menu is for the factory use only.

8. REF CHECK

* This menu is for the factory use only.

9. RP DATA INITIALIZE

1. Select the RP DATA INITIALIZE.

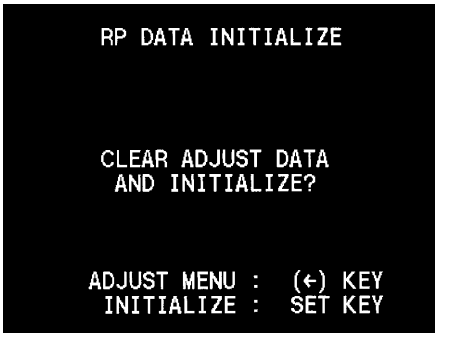


2. As “RP DATA INITIALIZE” will be displayed on the screen, press the SET key when initializing the adjusted data.

Note

After initialization, be sure to perform the following three adjustments in Section “5-3-5. Electrical Adjust.”

1. PLL F0
2. EQ AUTO ADJ
4. REC CURRENT

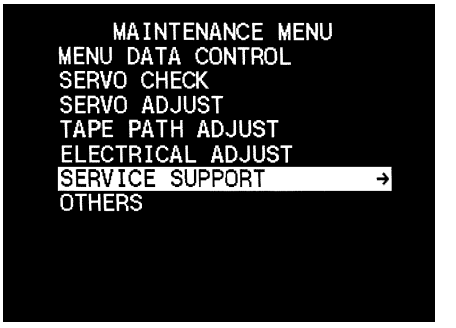


5-3-6. Service Support

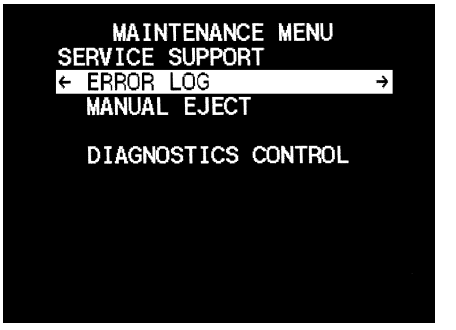
Displays the error codes and error contents which occurred in the past and provides the diagnosis.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “SERVICE SUPPORT” which is displayed with a white background using the AUDIO IN (↑), IN (↓) keys.



3. Press the ENTRY (→) key.
   “SERVICE SUPPORT” is selected and its lower layer sub-menu appears.



4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.
5. Press the ENTRY (→) key to select the desired item. (Refer to the respective menu description for the check procedure.)
6. After completing the check, press the MENU key to return to the main menu.
7. To check other menus and submenus, repeat steps 4 to 6.
8. Press the MENU key to exit the maintenance menu.

1. ERROR LOG

The errors which occurred in the past are displayed.
(The latest eight maximum errors are displayed.)

* The latest error is displayed on the top.

Note

The servo system errors only are stored here. The ERROR-91, 92, 93, 94 and 95 are not stored.

2. MANUAL EJECT

For the operating procedure of how to take out a tape when the EJECT is inoperable, refer to section 4-3.

3. DIAGNOSTICS CONTROL

① CLEAR ERROR LOG

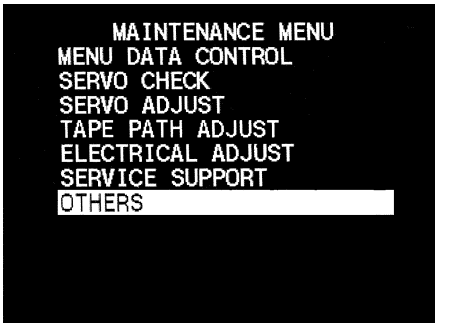
Clears the error history from the ERROR LOG.

5-3-7. Others

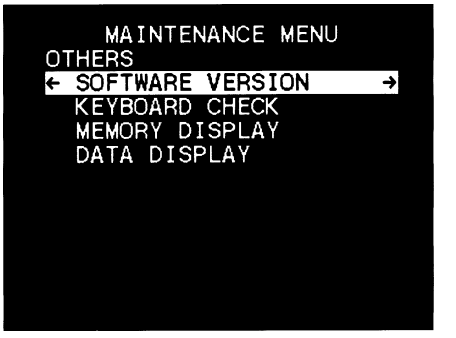
Enables to check the software version, keyboard and others.

Operating procedure

1. Enter the maintenance menu.
2. Move the cursor to “OTHERS” which is displayed with a white background using the AUDIO IN (↑), IN (↓) keys.



3. Press the ENTRY (→) key.
   “OTHERS” is selected and its lower layer submenu appears.



4. Move the cursor displayed with a white background to a desired item using the AUDIO IN (↑), IN (↓) keys.
5. Press the ENTRY (→) key to select the desired item. (Refer to the respective menu description for the check procedure after execution.)
6. After completing the check, press the MENU key to return to the main menu.
7. To check other menus and submenus, repeat steps 4 to 6.
8. Press the MENU key to exit the maintenance menu.

(1) SOFTWARE VERSION

Displays the model information and software version numbers.

SY : Version of IC102 on the SY-278 board.
SP : Version of IC302 on the SY-278 board.
SV : Version of IC119 on the SV-212 board.
DR : Version of IC301 on the SV-212 board.
KY : Version of IC5 on the KY-452 board.
SW : Version of IC204 on the SW-11 board.
EXT : Version of IC5 on the KY-452A board. (When DSBK-200 is installed.)
DVIO : Version of IC2 on the IF-763 board. (When DSBK-190 is installed.)
DIF : Version of IC651 on the APR-45 board.
MENU : Version of the setup menu.

Press the [ENTRY] key to display the version below.

V2 : Version of the DU-84 and DU-89 boards on the DPR-136 board.
NSG : Version of IC1013 on the VR-62 board.
AIF : Version of the DU-83 board on the DPR-136 board.
SIFP : Version of IC70 and IC71 on the DPR-136 board.
SIFR : Version of IC655, IC700, IC701, IC750 and IC751 on the DPR-136 board.
ACTL : Version of IC62 on the APR-45 board.

* The message NONE appears for the EXT and DVIO when the optional board is not installed in the DSR-2000/2000P.
* Contents which are shown in the time counter display can be changed using the [AUDIO IN] (↑), [IN] (↓) keys.
* Press the [DELETE] (←) key or the [MENU] key to return to the maintenance menu.

(2) MEMORY DISPLAY

* Factory use only.

(3) DATA DISPLAY

* Factory use only.

Section 6
Periodic Inspection and Maintenance

6-1. Periodic Inspection List

The following table shows the reference parts replacement time which is not the warranty time of parts.
Refer to the following table to establish the periodic inspection schedule which realizes the full performance and function of a unit and to extend life of a tape. The actual parts replacement period depend on the operating environment and conditions of a unit.

☆ : Part replace ◇ : Check (Adjustment) O : Cleaning

Inspection items			Hours meter	Inspection time (Hours)			
Item	**Part No.**	**Name**	**Menu No.**	**2000**	**4000**	**6000**	**8000**
Drum assembly	A-8323-775-A	DEH-16A-R	H02	☆	☆	☆	☆
Tape drive system blocks							
Pinch solenoid	A-8279-203-	Pinch Solenoid assembly	H02	–	–	–	◇
Brake solenoid	1-454-930-21	Solenoid plunger	H02	–	–	–	◇
Reel motor (T)	8-835-636-51	DC motor (SRD14A/J-RP)	H02	◇	◇	◇	◇
Reel motor (S)	8-835-637-51	DC motor (SRD15A/J-RP)	H02	◇	◇	◇	◇
Loading motor	A-8279-202-	LD Motor assembly	H02	–	◇	–	◇
Reel sift motor	A-8279-204-	RS motor assembly	H02	–	◇	–	◇
T reel brake shoe	A-8324-480-	Brake (T) assembly	H02	◇	◇	◇	◇
S reel brake shoe	A-8324-481-	Brake (S) assembly	H02	◇	◇	◇	◇
Head cleaner solenoid	1-454-942-31	Plunger solenoid	H02	–	–	–	◇
M stop solenoid	1-454-932-11	Plunger solenoid	H02	–	–	–	◇
Tape path system blocks							
Capstan motor	8-835-619-51	DC motor (SCD16A/J-RP)	H02	◇O	◇O	◇O	◇O
Pinch roller	A-8279-044-	Pinch limiter assembly	H02	☆	☆	☆	☆
Guide roller T2	A-8279-024-	Shuttle (R) assembly	H02	◇O	◇O	◇O	◇O
Guide roller T3	A-8279-026-	T drawer arm assembly	H02	O	O	O	◇O
Guide roller T4	A-8279-400-	TG-8 arm assembly	H02	O	O	O	◇O
Guide roller S2	A-8279-023-	Shuttle (L) assembly	H02	◇O	◇O	◇O	◇O
Guide roller S3	A-8323-655-	Tension regulator assembly	H02	O	O	O	◇O
Guide roller S4	A-8279-399-	TG-1 arm assembly	H02	O	O	O	◇O
Tape running surface (including tape cleaner)	——	——	——	O	O	O	O
Head cleaner	X-3605-655-1	HC roller assembly		☆	☆	☆	☆
Others							
Cassette memory terminal	A-8323-659-	MIC holder assembly	H02	◇O	◇O	◇O	◇O

H01: OPERATION HOURS H02 : DRUM RUNNING HOURS H03 : TAPE RUNNING HOURS

6-2. Hours Meter

The hours meter data is displayed on the video monitor and time counter display area. Periodic inspection and part replacement are recommended to be performed using the hours meter reading.

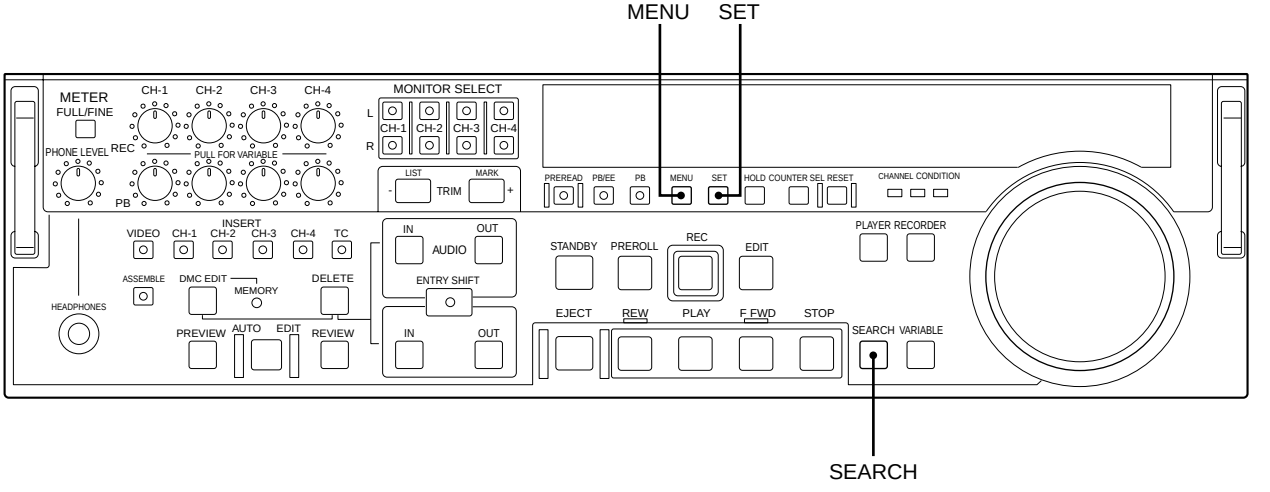
1. Hours Meter Display Contents

Menu number	Item	Contents
H01	OPERATION HOURS	Accumulated hours of power on
H02	DRUM RUNNING HOURS	Accumulated hours of drum rotation
H03	TAPE RUNNING HOURS	Accumulated hours of tape running
H04	THREADING COUNTER	Number of times of threading
H12	DRUM RUNNING HOURS	Accumulated hours of drum rotation (reset enabled)
H13	TAPE RUNNING HOURS	Accumulated hours of power on (reset enabled)
H14	THREADING COUNTER	Number of times of threading (reset enabled)

2. How to Display Hours Meter Information

(1) Press the MENU key on the control panel.
The menu list and contents as shown above appear.

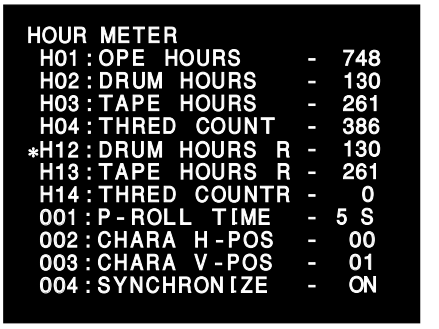
(2) Press the MENU key again to exit the menu display.



3. How to Reset Hours Meter

The menus H12, H13 and H14 can be reset by the following procedure.

(1) Set the switch S101-1 on the SV-212 board to ON (upper).
(2) Press the MENU key on the control panel. The menu list appears.



(3) Turn the JOG dial to move the asterisk (*) mark and select either H12 or H13 or H14. (Display example on right side shows H12 selected.)

(4) While pressing the SEARCH key, turn the JOG dial to set "0 HOURS".

(5) Press the SET key on the control panel to save the reset data.

(6) Set the switch S101-1 on the SV-212 board to OFF (lower).

6-3. Maintenance upon Completion of Repair

Perform the following maintenance work regardless of the operating hours of the unit, after repairing it.

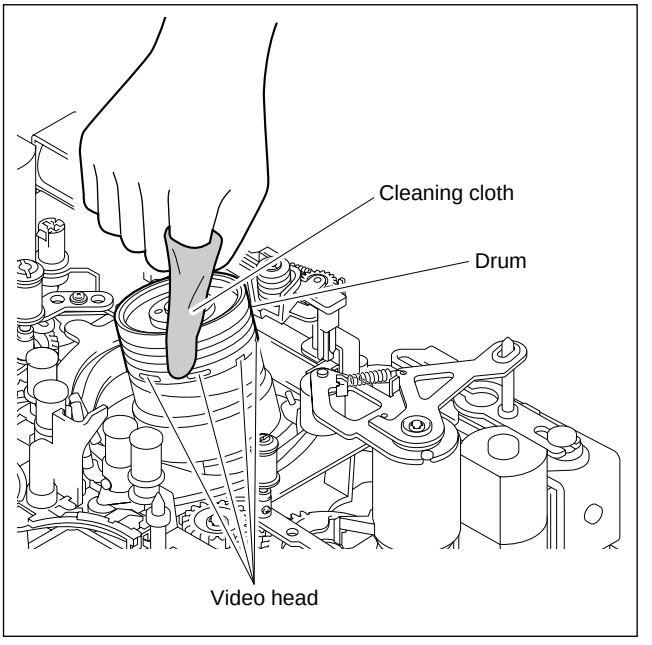
1. Video head cleaning
   (Refer to section 6-3-1 for cleaning procedure.)
2. Tape running path cleaning
   (Refer to section 6-3-2 for cleaning procedure.)

Note

After a unit is cleaned, insert a cassette after cleaning fluid is dried completely.

6-3-1. Video Head Cleaning Procedure

Bring a cleaning cloth moistened with cleaning fluid in contact with the head tip gently, and rotate the drum slowly with hand for cleaning.



Notes

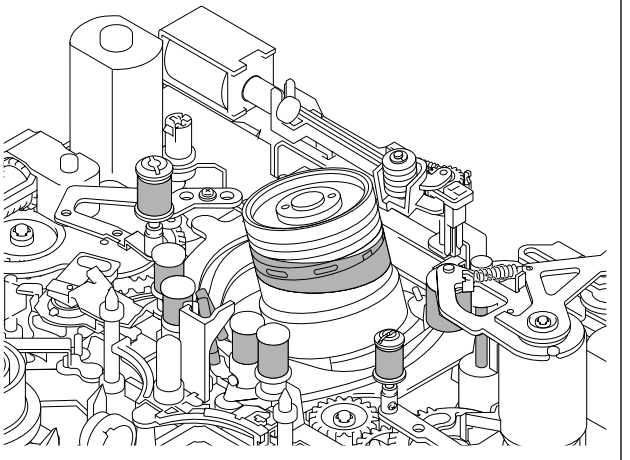
- Never move the cleaning cloth in vertical direction with respect to the drum rotation (up and down with respect to the drum) during cleaning.
- After cleaning, wipe off moisture using a dry cleaning cloth.
- Turn off the main power before cleaning a unit.

6-3-2. Tape Running Path Cleaning

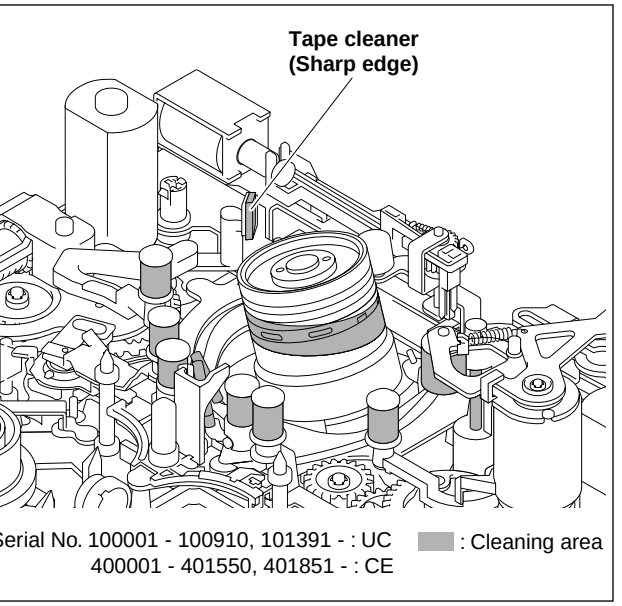
Clean the tape guide, drum, capstan, pinch roller, tape cleaner and other parts which contact with video tape, with cleaning cloth moistened with cleaning fluid.

Notes

- Be careful of the tape cleaner during cleaning because it has sharp edge.
- After cleaning, wipe off moisture using a dry cleaning cloth.
- **The tape cleaner is not used for Serial No.**
  100911 - 101390 : UC
  401551 - 401850 : CE
  The set of above serial number, provided ARM ASSY, TG1 (A-8279-399-C) for repair parts to stabilize the tape path.



Serial No. 100911 - 101390: UC
401551 - 401850: CE
: Cleaning area



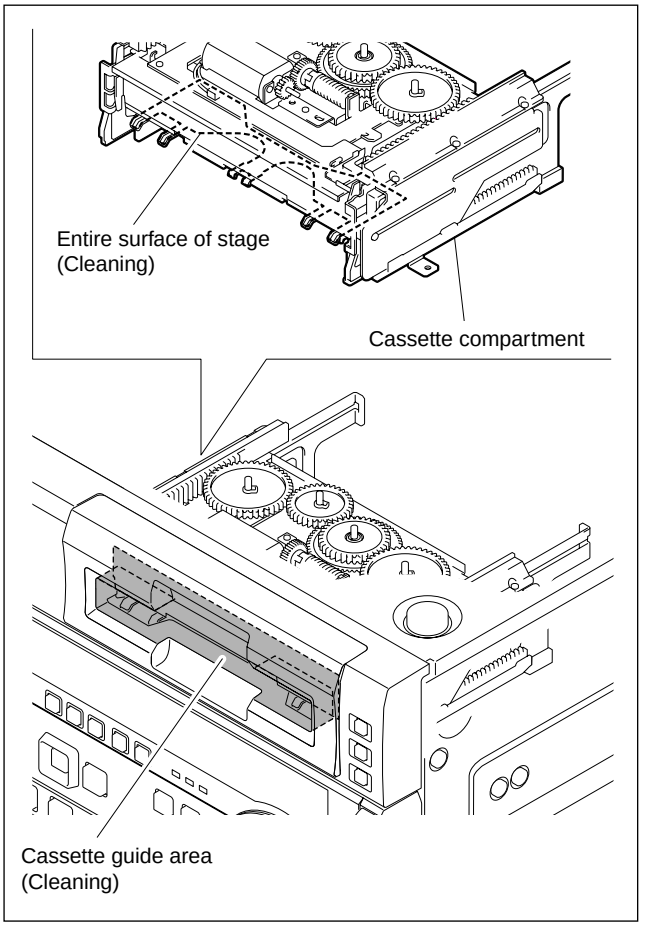
Serial No. 100001 - 100910, 101391 - : UC
400001 - 401550, 401851 - : CE
: Cleaning area

6-3-3. Cassette Compartment Entrance Cleaning

Clean the area around the cassette guide of the front panel and entire surface of the stage of the cassette compartment as shown using cleaning cloth moistened with cleaning fluid.

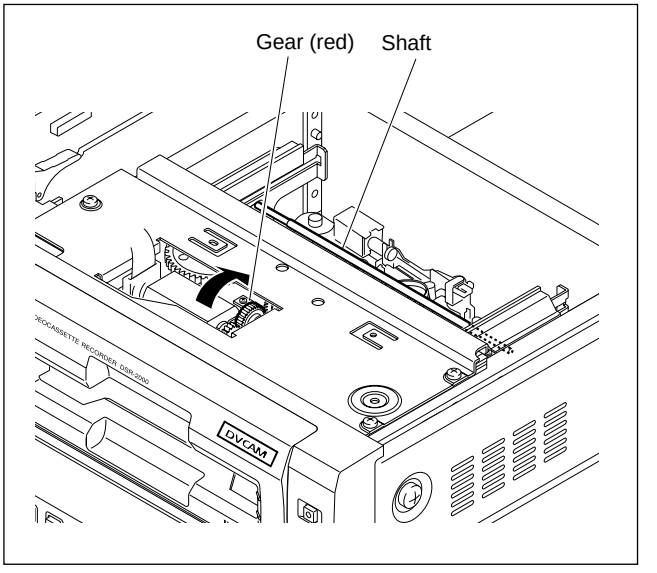
Note

Remove the cassette compartment when cleaning a unit to prevent foreign materials from dropping into a unit.



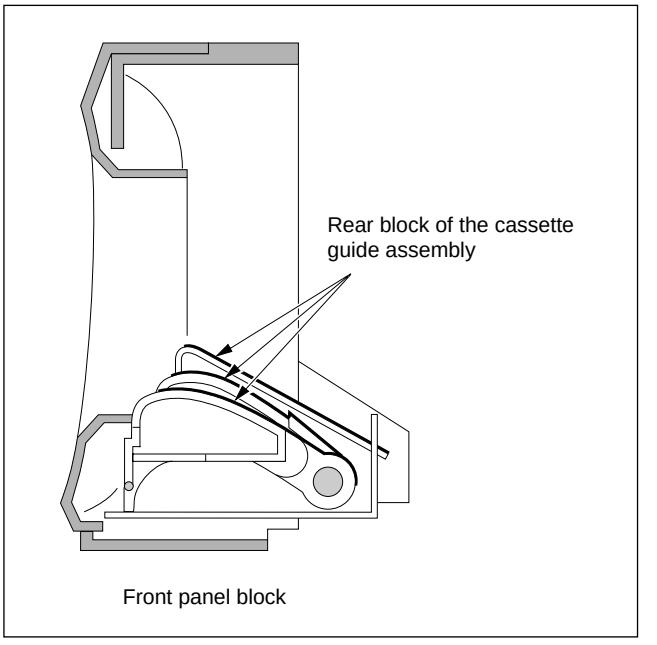
6-3-4. Cassette Compartment Shaft Cleaning

Turn the gear (red) in the arrow direction until you can see the shaft. Clean the shaft with a cleaning cloth moistened with a cleaning fluid.



6-3-5. Cassette Guide Assembly Cleaning

Clean the rear block of the cassette guide assembly with a cleaning cloth moistened with a cleaning fluid.



Section 7
Replacement of Mechanical Parts

7-1. General Information on Parts Replacement and Adjustment

7-1-1. Preparation Before Starting Parts Replacement

- Remove the ornamental parts as needed.
- When replacing parts or performing mechanical adjustment, remove the cassette compartment from the DSR-2000/2000P not so far as specified. (Refer to section 3-4.)
- When the connector of the cassette compartment is removed, the protection circuit starts functioning. Refer to section “4-3-3. Operating the VTR without a Cassette Tape.” to operate the DSR-2000/2000P without the cassette compartment.

7-1-2. Drum Assembly

- The drum assembly is a periodic replacement part. The drum should be replaced in accordance with the periodic replacement list.
- The drum assembly must be replaced in the following cases :

(1) When the video heads are worn out so that the proper tape-to-head contact is lost and recording and playback cannot be performed correctly;
(2) When the rabbet guide of the lower drum is worn out so that the correct RF envelope cannot be obtained even after adjusting the tape path to optimize the tracking.
(3) When the rabbet guide or tape running surface of the lower drum is damaged;
(4) If the drum rotation is abnormal and the VTR does not work properly due to noise or jitter.

7-1-3. Grease

Be sure to use only the authorized grease.
If grease other than the authorized one is used, major malfunctions may result due to differences in grease viscosity and its ingredients.
If grease containing dirt is used, the shafts and bearings may be damaged and major malfunctions may result.

Use the following grease for the DSR-2000/2000P :

Grease (SG941 (20 g)) : 7-662-001-39

- Do not apply grease to any parts other than the specified parts.
- Apply just enough grease to cover a coating on the surface.
  Wipe off any grease that oozes out into the surrounding parts with gauze or a soft cloth.

7-1-4. Tightening Torque and Handling of Washers

1. Screwdrivers and Tightening Torque of Screws

Many M1.4 and M2 screws are used in the DSR-2000/2000P.
Be sure to use the authorized tools to loosen and tighten them.
In addition, use a torque screwdriver to tighten the screws with the specified tightening torque.

Torque screwdriver bit (for M 1.4) :	J-6325-110-A
Torque screwdriver bit (for M 2) :	J-6325-380-A
Hexagon bit (for torque screwdriver) :	J-6326-120-A
Torque screwdriver (for 3 kgf•cm) :	J-6325-400-A

Tightening torque

For M1.4 screw :	0.1 N•m (1.0 kgf•cm)
For M2 screw :	0.2 N•m (2.0 kgf•cm)

Reference

The DSR-2000/2000P uses many small screws that easily fall inside the machine when removing and re-assembling parts. To avoid this risk, magnetize the screwdriver bit slightly enough to prevent small screws from falling into the machine. However, when installing the drum assembly, never use a magnetized screwdriver.

2. Stop Washer and E ring

Do not use old stop washers and E rings that have been removed.
Always use new stop washers and E ring to attach the parts.

Stop washer (1.5) :	3-669-465-01
Stop washer (2.3) :	3-669-596-01
E ring (2.3) :	7-624-105-04
Cotter polyethylene washer :	3-321-813-01
Polyslider washer (Ø2.0) :	3-701-437-01

How to Remove the Stop Washers and E ring

(a) Use the following fixtures to remove stop washers and E ring.
Washer extracting fixture (A) : J-6082-234-A

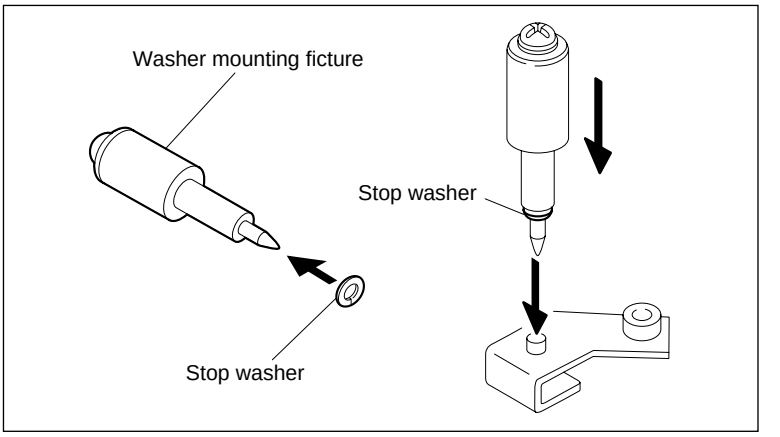
Note

- Be careful not to drop the stop washers and E ring inside the DSR-2000/2000P.
- Be careful not to let tools touch other parts, especially the drum.

How to Attach the Stop Washers

Use the following tools to attach stop washers :
Washer mounting fixture Ø1.5 : J-6082-231-A
Washer mounting fixture Ø1.2 : J-6082-232-A
Washer mounting fixture Ø0.8 : J-6082-233-A

(a) Insert a stop washer to the tip of the washer mounting fixture.
(b) Set the thin tip of the mounting fixture perpendicularly to the top of the shaft to which the stop washer is to be installed.
(c) Press the thick portion of the fixture downward to install the stop washer onto the shaft.



7-2. Drum Replacement

Outline

Replacement

Removing the MD cover
Disconnecting the connectors
Removing the head cleaner assembly
Replacing the drum assembly
Reattaching the head cleaner assembly
Reconnecting the connectors
Reattaching the MD cover
Cleaning the heads and tape running surface

Adjustment after replacement

Tape path adjustment
RF switching position adjustment
EQ adjustment

Note

Take care not to damage the tape guides around the drum assembly, tape running surface on the drum, video heads of the drum assembly and so on when replacing the drum assembly.

Basic knowledge

Besides the periodic replacement, replace the drum assembly in the following cases.

- When no proper RF waveform can be obtained even if tracking adjustment is performed.
- When the damaged tape running surface on the drum cannot be recovered.

Preparations

1. Set the unit into the unthreading end status.
2. Power off the unit.
3. Remove the top plate. (Refer to Section 3-3.)
4. Remove the bottom plate. (Refer to Section 3-3.)
5. Remove the right side plate. (Refer to Section 3-3.)
6. Remove the cassette compartment assembly. (Refer to Section 3-4.)

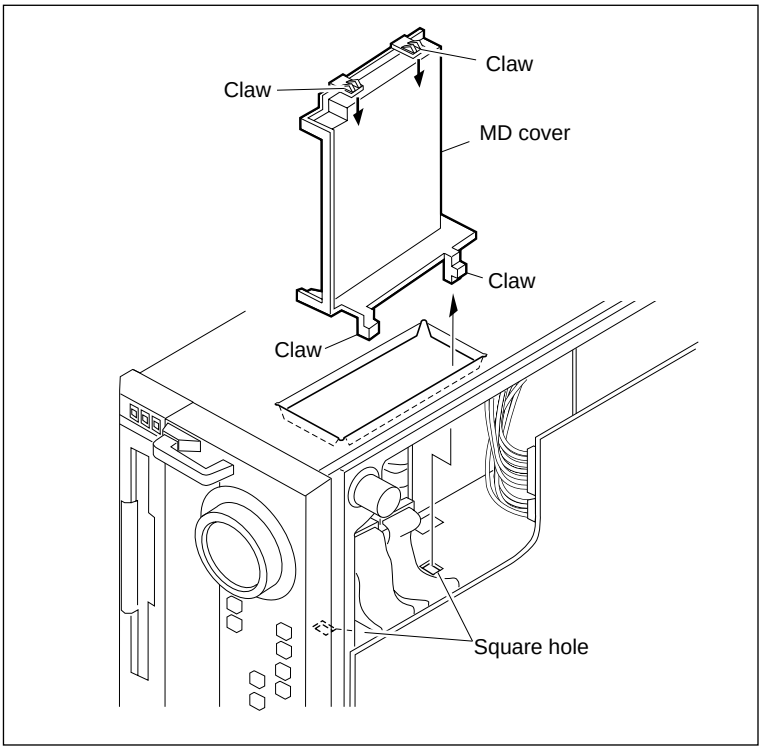
Tool

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Torque screwdriver bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A

Replacement

1. Removing the MD cover

(1) Put the unit left side facing down.
(2) Push the two claws on the upper side of the MD cover in the direction of the arrow as shown in the figure to remove the lock.
(3) While removing the two claws on the lower side of the MD cover from the square holes on the chassis, remove the MD cover from the square hole on the right side chassis.

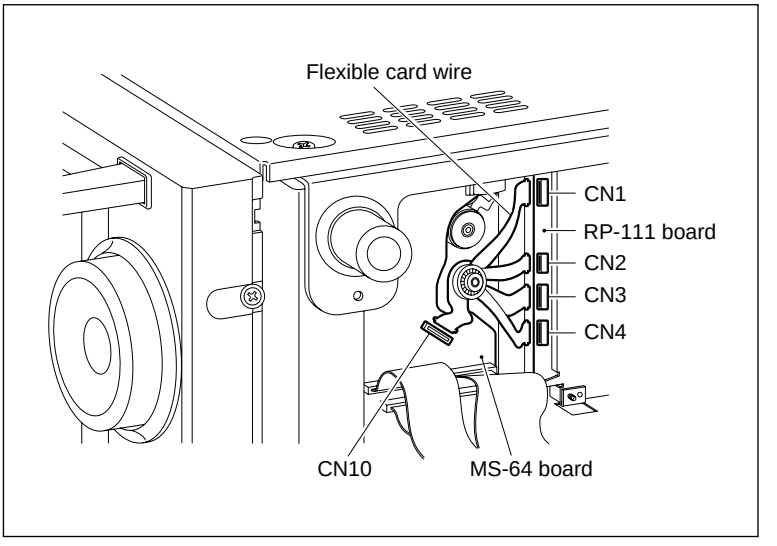


2. Disconnecting the connectors

Disconnect the five flexible card wires from the connector (CN10) on the MS-64 board and four connectors (CN1, CN2, CN3 and CN4) on the RP-111 board located on the rear side of the chassis.

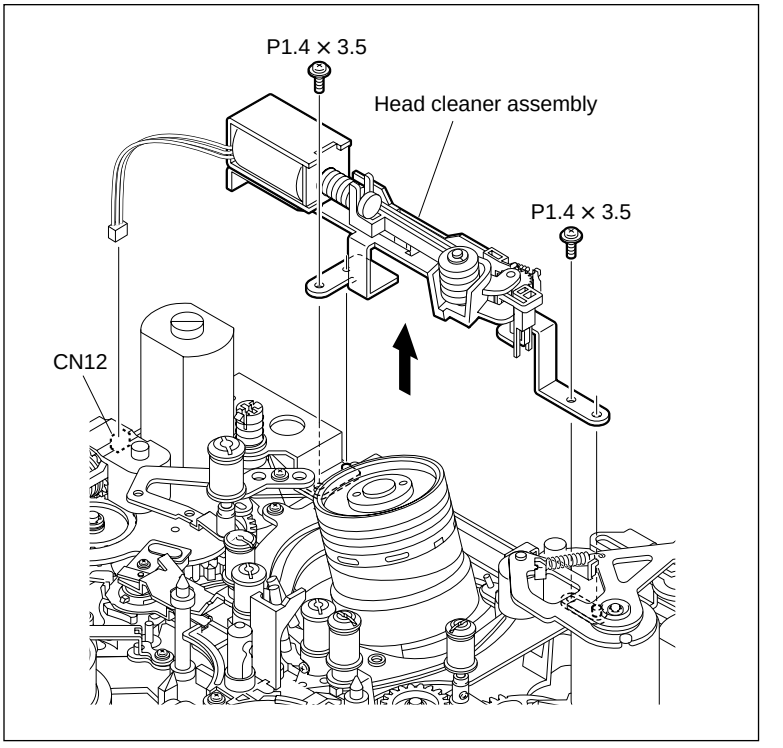
Note

Be careful not to suffer injury at hand by chassis during the disconnection.



3. Removing the head cleaner assembly

(1) Disconnect the harness connector from the connector (CN12) on the MS-64 board with tweezers.
(2) Remove the two screws, and remove the head cleaner assembly in the direction of the arrow.



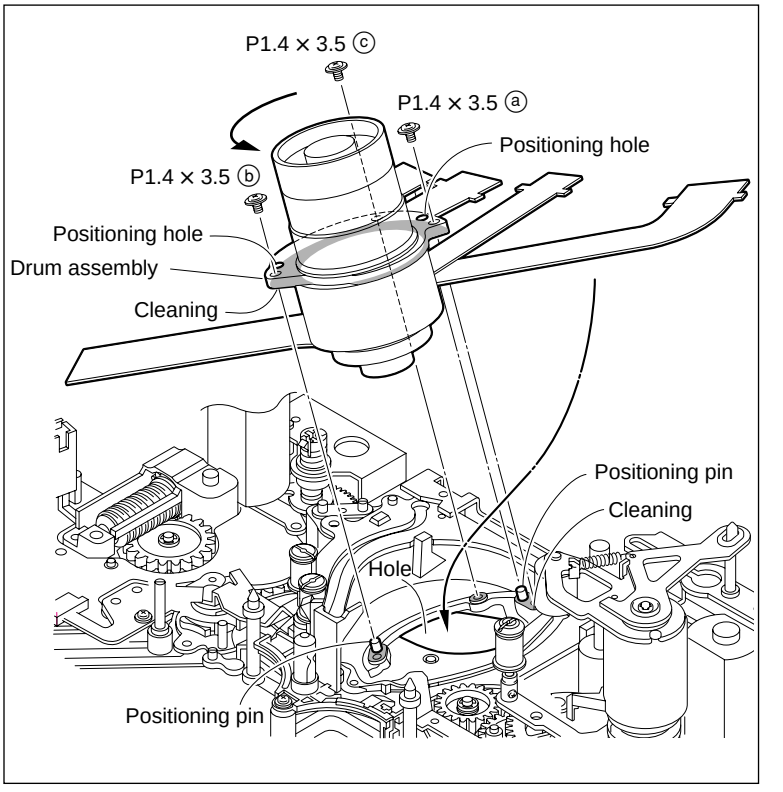
4. Replacing the drum assembly

(1) Remove the three screws, and remove the drum assembly from the MD chassis.

Note

Take care not to contact the drum assembly to the peripheral tape guides.

(2) Clean the installation surfaces of a new drum assembly and MD chassis with a cleaning cloth moistened with cleaning fluid.
(3) Put the five flexible card wires into the hole on the MD chassis, and align the two positioning pins on the MD chassis with the holes of the drum assembly.
(4) While moving the drum assembly in the direction of the arrow (counterclockwise direction), tighten the three screws in the order of ⓐ, ⓑ, ⓒ.
Tightening torque : 0.1 N•m {1 kgf•cm}



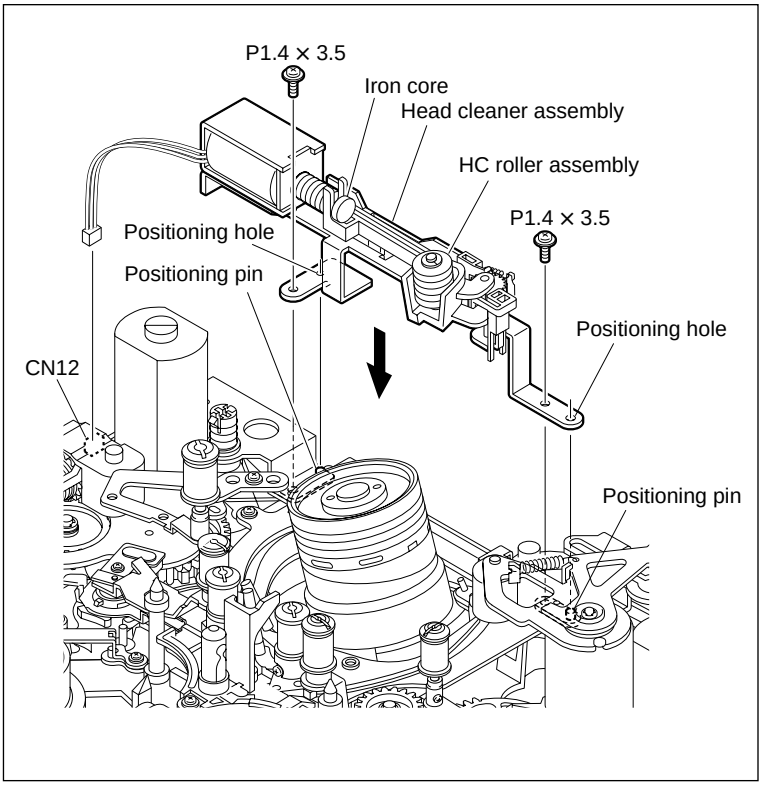
5. Reattaching the head cleaner assembly

(1) Align the positioning hole of the head cleaner assembly with the positioning pin on the MD chassis, and reattach it with the two screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

(2) Reconnect the harness to the connector (CN12) on the MS-64 board.

Note

- Use care not to contact the head cleaner assembly with the tape running surface on the drum.
- Do avoid touching the HC roller assembly with bave hands.

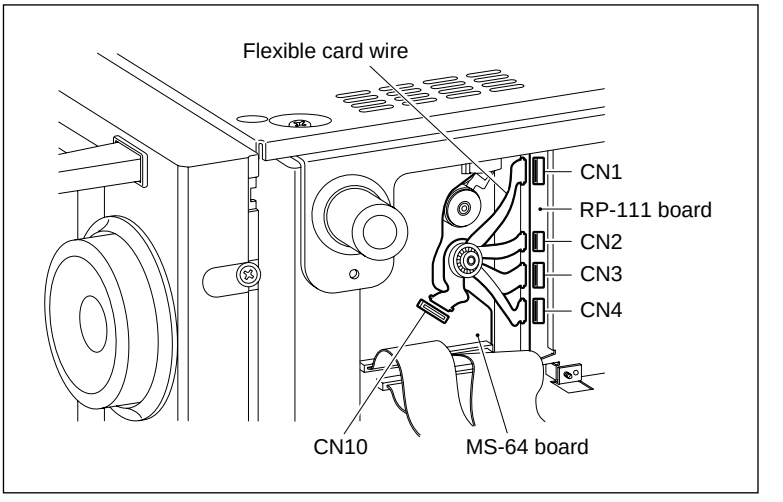


6. Reconnecting the connectors

Reconnect the flexible card wires to the connector (CN10) on the MS-64 board, and four flexible card wires to the connectors (CN1, CN2, CN3 and CN4) on the RP-111 board.

Notes

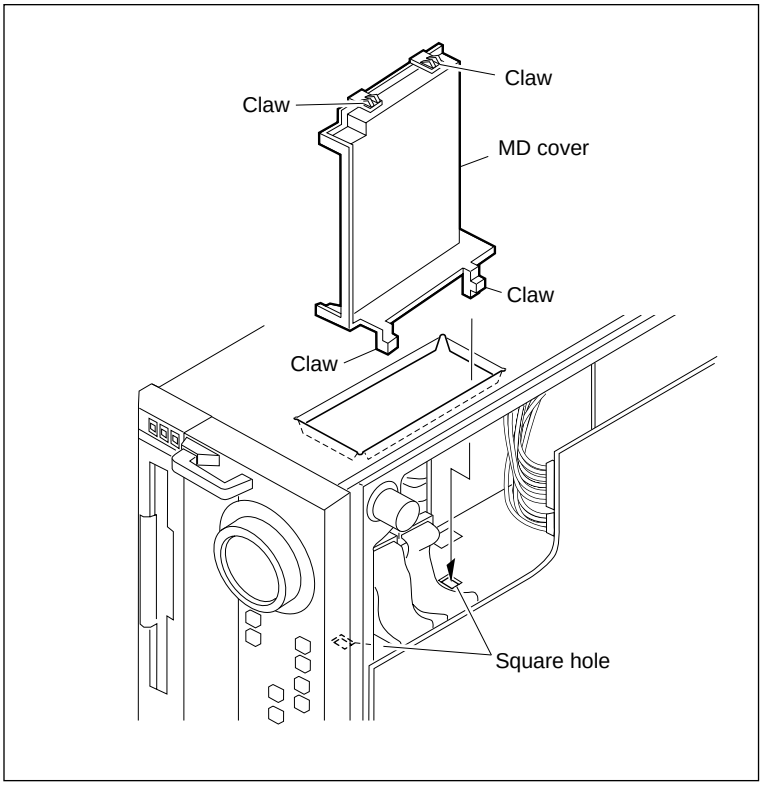
- Be careful not to insert the flexible card wire obliquely.
- Do insert the flexible card wire straight and securely as far as it will go.
- Take care not to fold the flexible card wire. This shortens the life of the flexible card wire.



7. Reattaching the MD cover

(1) Insert the MD cover into the unit through the big square hole of the right side panel of the chassis.

(2) Fit the two claws in the lower side of the MD cover in the square holes and let the two upper-side claws catch the side panel to fix the MD cover in the unit.



8. Cleaning the heads and tape running surface

Clean the tape running surfaces of the drum and video heads with cleaning cloth moistened with cleaning fluid.

Adjustment after replacement

9. Tape path adjustment

(Refer to Section 8-2.)

10. RF switching position adjustment

(Refer to Section 8-3.)

11. EQ adjustment

(Refer to Section 5-3-5.)

7-3. S/T Brake Assembly Replacement

Outline

Replacement

Removing the MD cover.
Moving the S/T reel tables
Removing the L push plate (only when replacing the T-side brake assembly)
Removing the MIC assembly (only when replacing the T-side brake assembly)
Removing the reel cover
Replacing the brake assembly
Checking and adjusting the brake torque
Reattaching the reel cover
Reattaching the MIC assembly (only when replacing the T-side brake assembly)
Reattaching the L push plate (only when replacing the T-side brake assembly)
Reattaching the MD cover

Note

- Prepare a new cotter polyethylene washer when replacing the brake assembly.
  Cotter polyethylene washer (1.5) : 3-321-813-01
- Be careful not to lose the polyslider washer between the base plate and the MIC assembly.
- When replacing the T-side brake assembly, prepare a new stop washer for mounting the MIC assembly.
  Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the MIC assembly)

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottom panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Brake torque gauge (CCW) : J-6443-710-A
- Brake torque gauge (CW) : J-6443-720-A
- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Removing the MD cover

Remove the MD cover. (Refer to Section 7-2.)

2. Moving the S/T reel tables

Turn the reel shift motor gear by a finger to bring the S/T reel tables to the standard cassette position.
(Refer to Section 7-19.)

3. Removing the L push plate (only when replacing the T-side brake assembly)

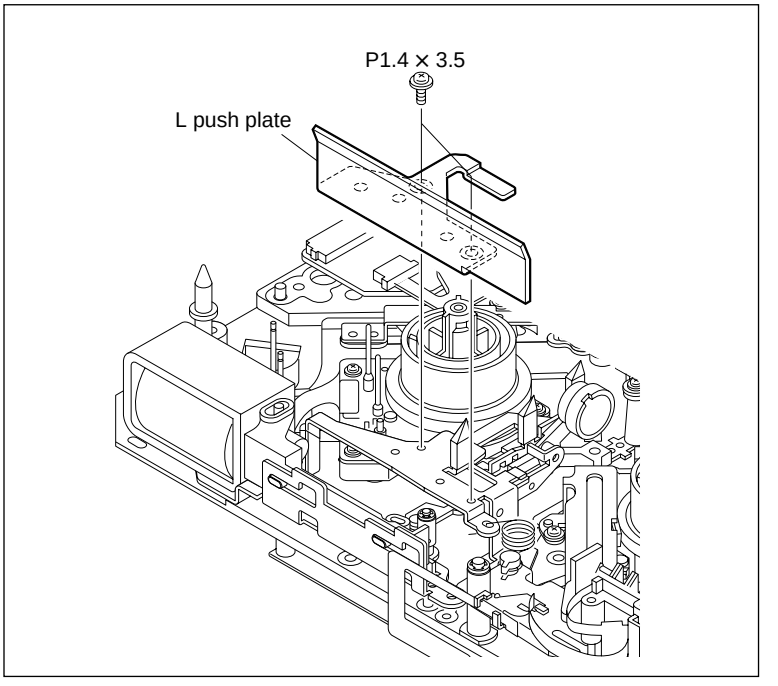
Remove the two screws to remove the L push plate.

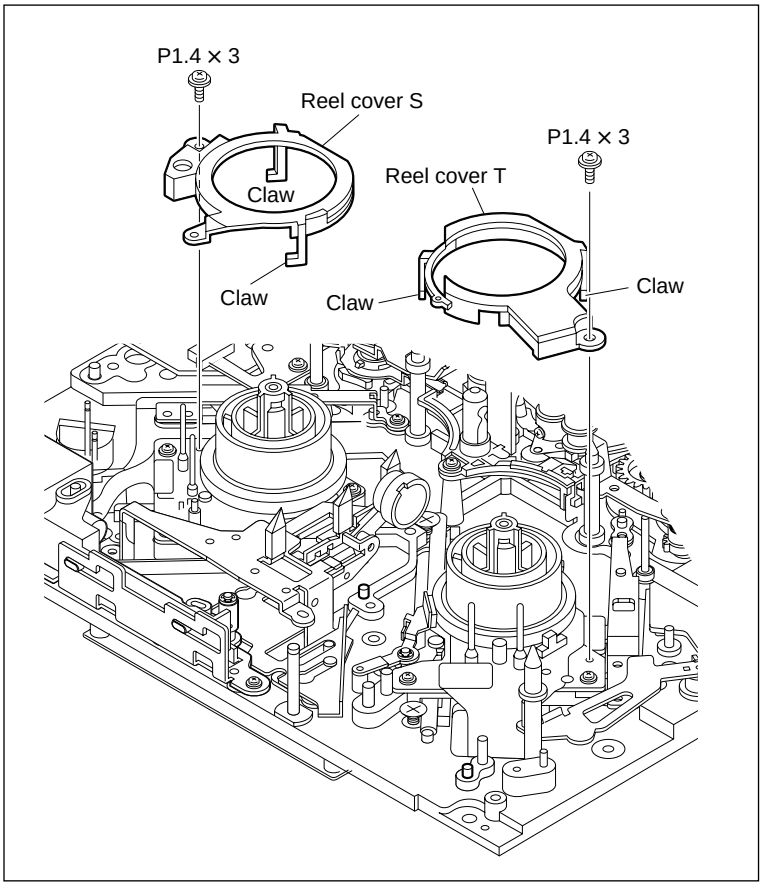
4. Removing the MIC assembly (only when replacing the T-side brake assembly)

Remove the MIC assembly.
(Refer to Section 7-19.)

5. Removing the reel cover

Remove the screw, and then release the two claws to remove the reel cover S or T.





6. Replacing the brake assembly

(1) Remove the cotter polyethylene washer and remove the brake assembly and the brake springs S/T.

Note

Use care to prevent the brake spring from flying off when removing.
The polyslider washer located under the brake spring may come off together with the brake spring, therefore be careful not to lose it.
If it comes off, return it in place.

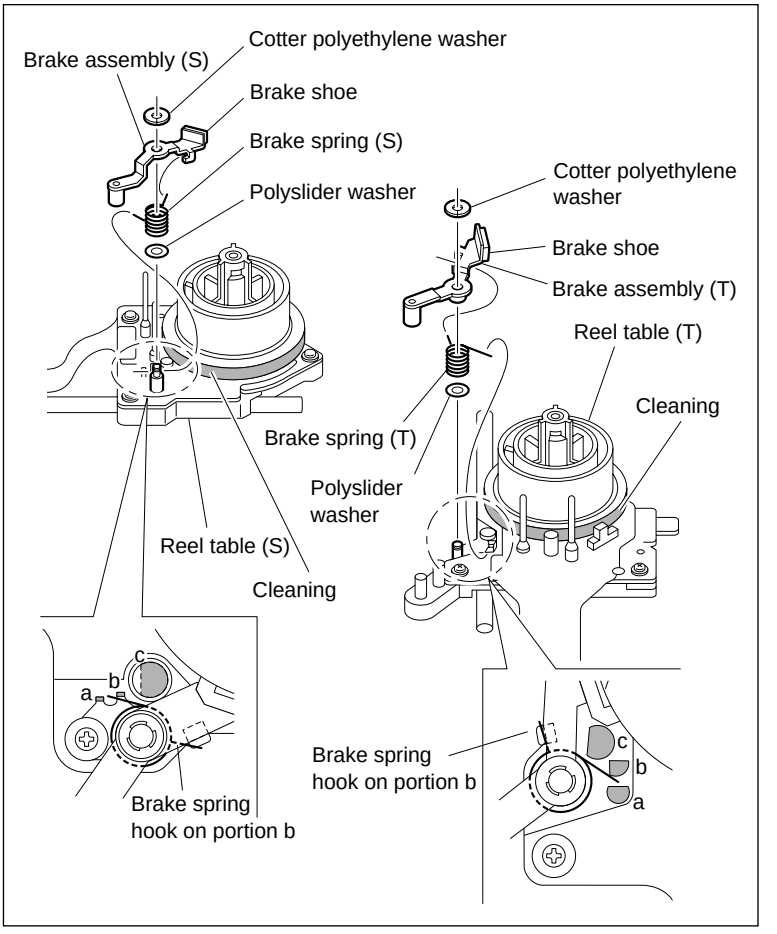
(2) Wipe the contact surface on the reel table against the brake assembly with a cleaning cloth moistened with cleaning fluid.

(3) Join the brake spring to a new brake assembly as shown in the figure and fit it on the reel motor shaft.

Note

Avoid touching the brake shoe when replacing.

(4) Attach a new cotter polyethylene washer

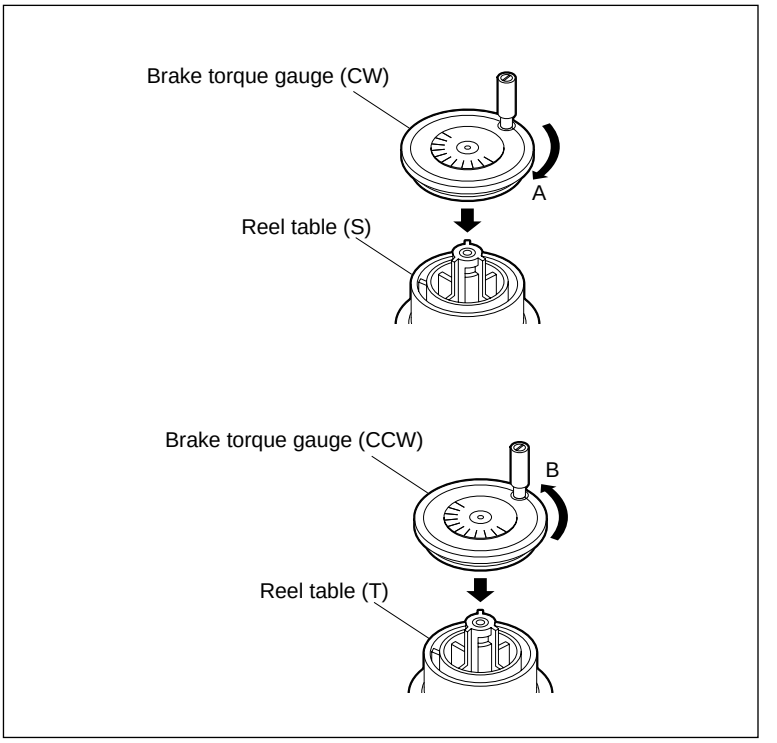


7. Checking and adjusting the brake torque

(1) S reel brake torque
Check the S reel brake torque meets the specification below by turning the knob of the brake torque gauge (CW) in the A direction a turn in 1 to 3 seconds.
Tightening Torque : 7.5 ±0.5 m N•m
{75 ± 5 gf•cm}

(2) T reel brake torque
Check the T reel brake torque meets the specification below by turning the knob of the brake torque gauge (CCW) in the B direction a turn in 1 to 3 seconds.
Tightening Torque : 7.5 ±0.5 m N•m
{75 ± 5 gf•cm}

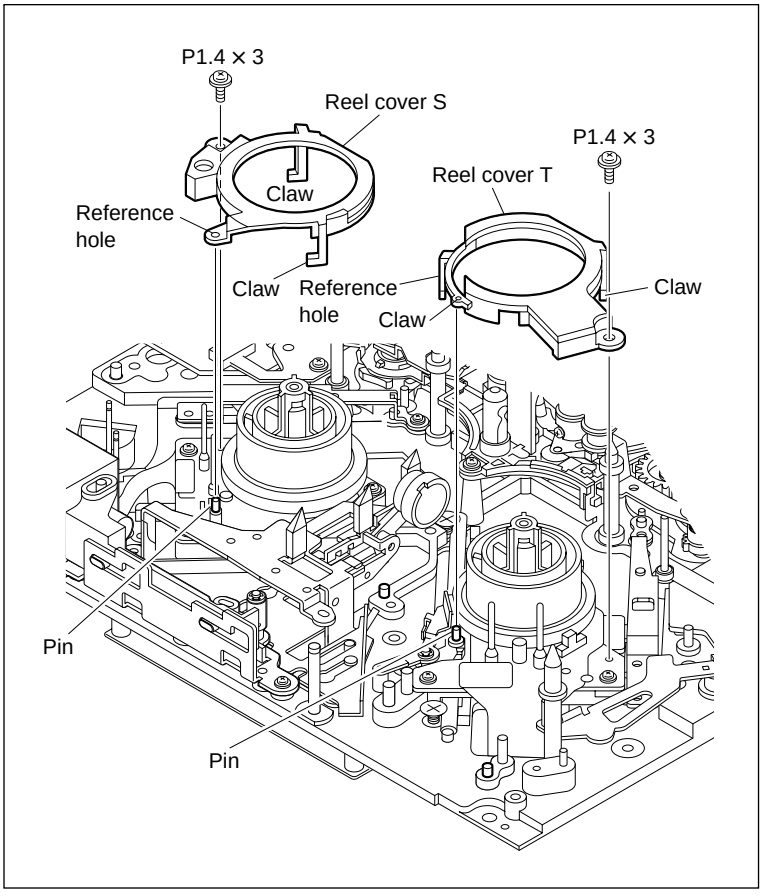
(3) Failing satisfaction of the specification, readjust by changing the positon that the brake spring hooks on.
- If the torque is high, hook the brake spring on the c portion.
- If the torque is low, hook the brake spring on the a portion.



8. Reattaching the reel cover

(1) Align the reference hole in the reel cover with the pin in the reel motor, and hook the two claws.

(2) Fix the reel cover S or T with the screw. After fixing, apply screw locking compound. Tightening Torque : 0.1 N•m {1 kgf•cm}

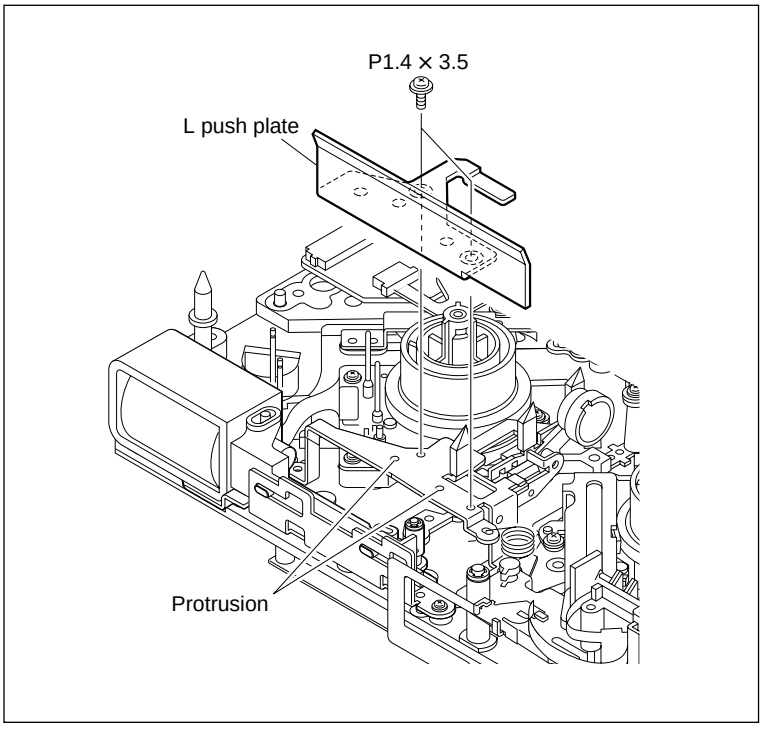


9. Reattaching the MIC assembly (only when replacing the T-side brake assembly)

Reattach the MIC assembly.
(Refer to Section 7-19.)

10. Reattaching the L push plate (only when replacing the T-side brake assembly)

Reattach the L-push plate with the two screws with the two holes in the L push plate aligned with the two protrusions on the RLR assembly.
Tightening Torque : 0.1 N•m {1 kgf•cm}



11. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)

7-4. Brake Solenoid Replacement

Outline

Replacement

Removing the MD cover
Disconnecting the connector
Removing the brake assembly
Replacing the brake solenoid
Reattaching the brake assembly
Reconnecting the connector
Reattaching the MD cover
Checking the performance

Note

Prepare a new stop washer when replacing the brake solenoid.
Stop washer (1.5) : 3-669-465-01 × 1

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottom panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

Replacement

1. Removing the MD cover

Remove the MD cover. (Refer to Section 7-2.)

2. Disconnecting the connector

Disconnect the harness from the connector (CN9) on the MS-64 board located on the back side of the MD chassis with tweezers.

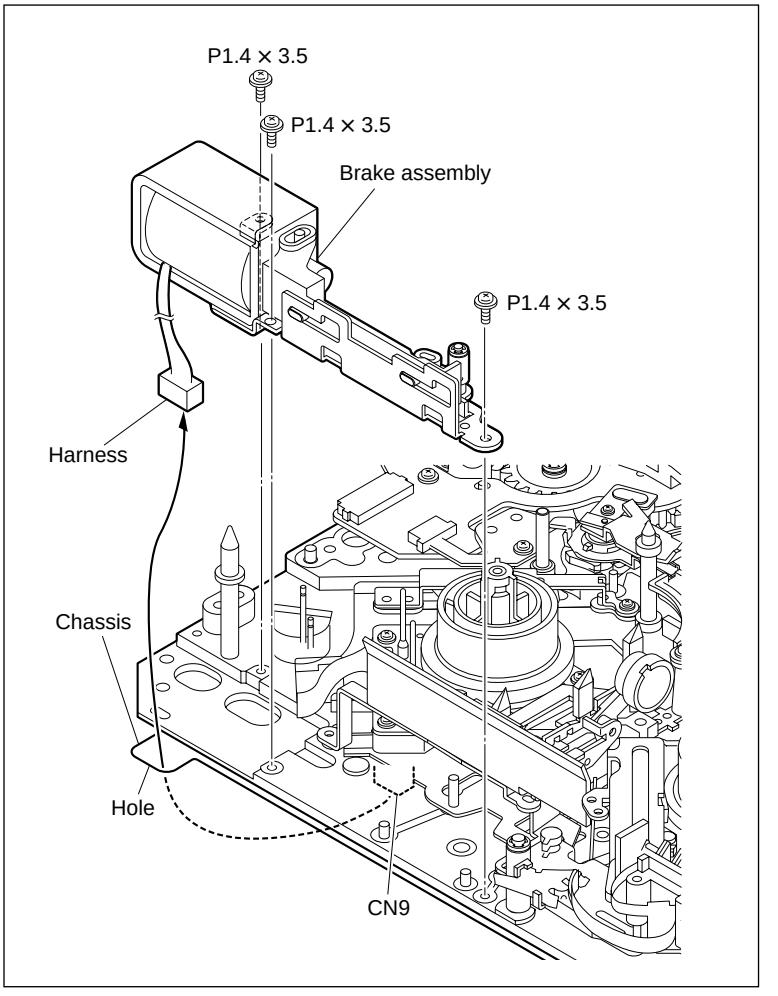
Note

Be careful not to suffer injury at hand by chassis during the disconnection.

3. Removing the brake assembly

(1) Remove the three screws securing the brake assembly.

(2) Pull out the harness of the solenoid from the square hole in the left side of the chassis with the brake assembly lifted up.

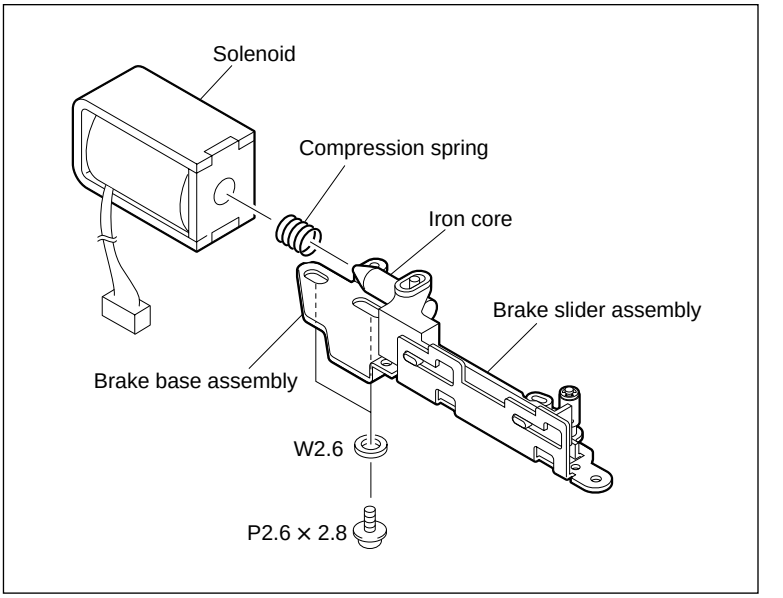


4. Replacing the brake solenoid
Serial No. 100911-: UC
401551-: CE

(1) Remove the two screws and remove the solenoid from the brake base assembly.

Note

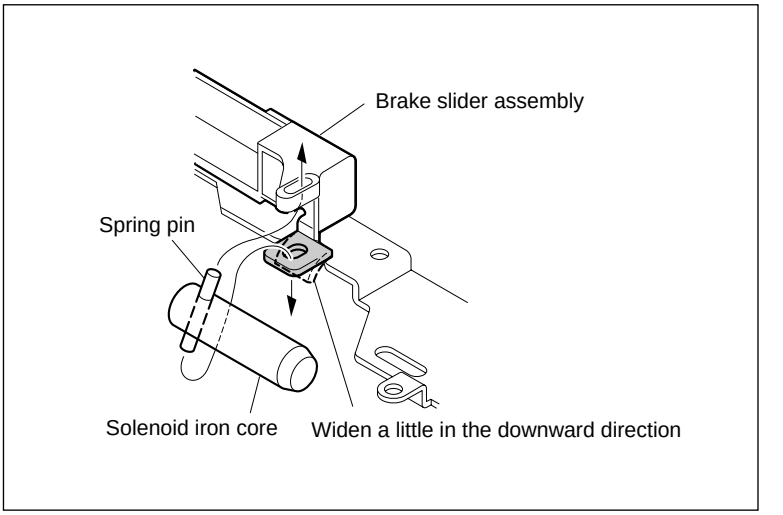
During this operation, the two washers come off together with the two screws, and further the compressed coil spring comes off from the iron core of the solenoid. Be careful not to lose them.



(2) Widen slightly the clearance shown in the brake slider assembly figure by a finger to remove the iron core of the solenoid.

Note

Applying an excessive force may cause deformation of the brake slider assembly.



(3) Reattach an iron core pin of a new solenoid to the brake slider assembly following the same step (2).

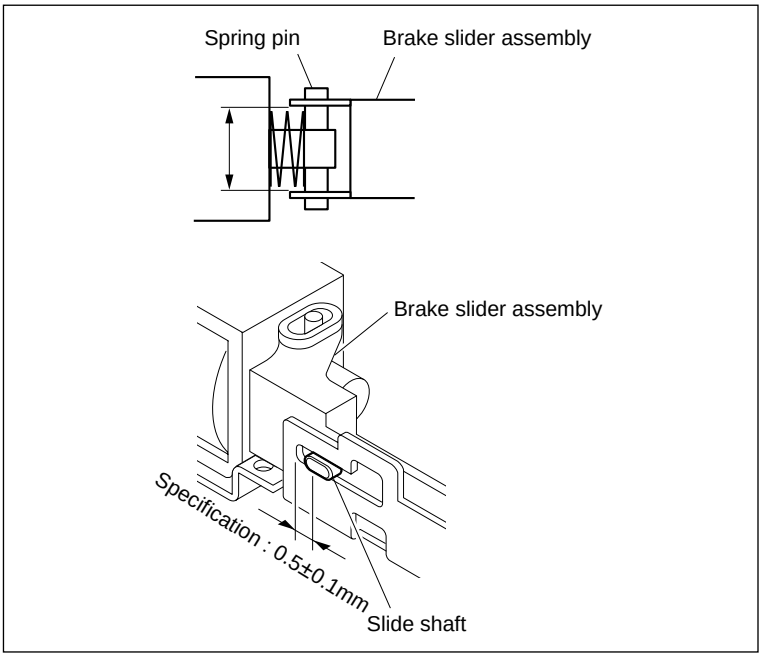
(4) After fitting the compressed coil spring removed in step (1) on the iron core, insert the iron core in a new solenoid.

(5) Fix temporally the solenoid positioning as shown in the figure to the brake base assembly with the two screws and two washers.

(6) Ensure that the compressed coil spring is placed between the upper and lower plates of the brake slider assembly (within the double headed arrow) as shown in the figure.

(7) Adjust the solenoid position to satisfy the specification of the clearance between the slide shaft and the slotted hole in the brake base assembly under the condition that the iron core is fully pulled in, and tighten securely the two screws.
Tightening Torque : 0.5 N•m {5 kgf•cm}

(8) Reattach the brake slider assembly to the brake base assembly with a new stop washer.

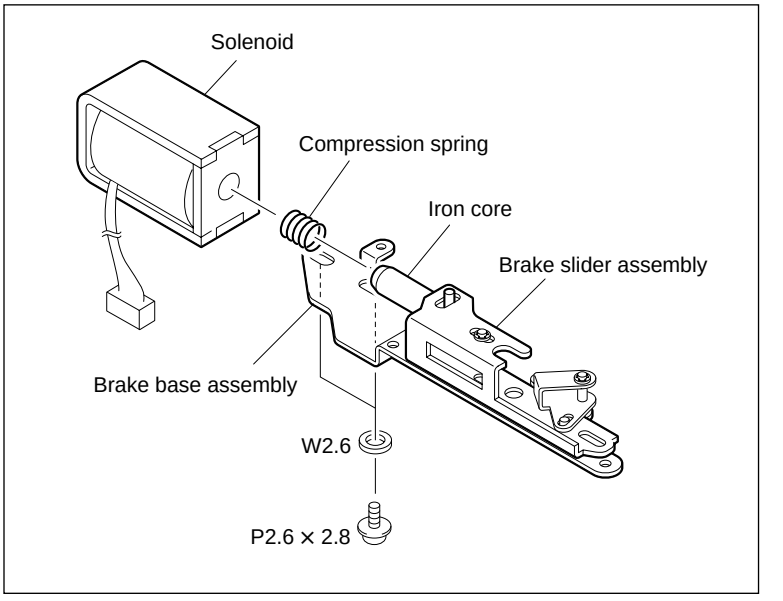


4. Replacing the brake solenoid
Serial No. 100001-100910: UC
400001-401550: CE

(1) Remove the two screws and remove the solenoid from the brake base assembly.

Note

During this operation, the two washers come off together with the two screws, and further the compressed coil spring comes off from the iron core of the solenoid. Be careful not to lose them.

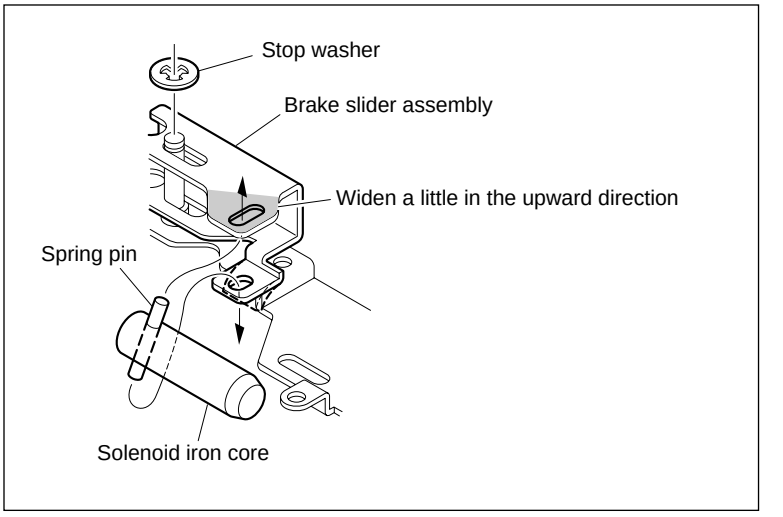


(2) Remove the stop washer shown in the brake slider assembly figure.

(3) Widen slightly the clearance shown in the brake slider assembly figure by a finger to remove the iron core of the solenoid.

Note

Applying an excessive force may cause deformation of the brake slider assembly.



(4) Reattach an iron core pin of a new solenoid to the brake slider assembly following the same step (3).

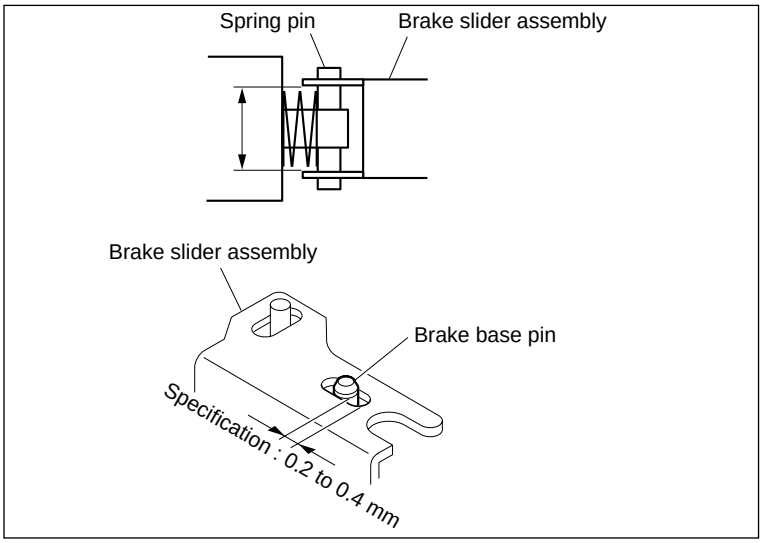
(5) After fitting the compressed coil spring removed in step (1) on the iron core, insert the iron core in a new solenoid.

(6) Fix temporally the solenoid positioning as shown in the figure to the brake base assembly with the two screws and two washers.

(7) Ensure that the compressed coil spring is placed between the upper and lower plates of the brake slider assembly (within the double headed arrow) as shown in the figure.

(8) Adjust the solenoid position to satisfy the specification of the clearance between the pin of the solenoid iron core and the slotted hole in the brake base assembly under the condition that the iron core is fully pulled in, and tighten securely the two screws.
Tightening Torque : 0.5 N•m {5 kgf•cm}

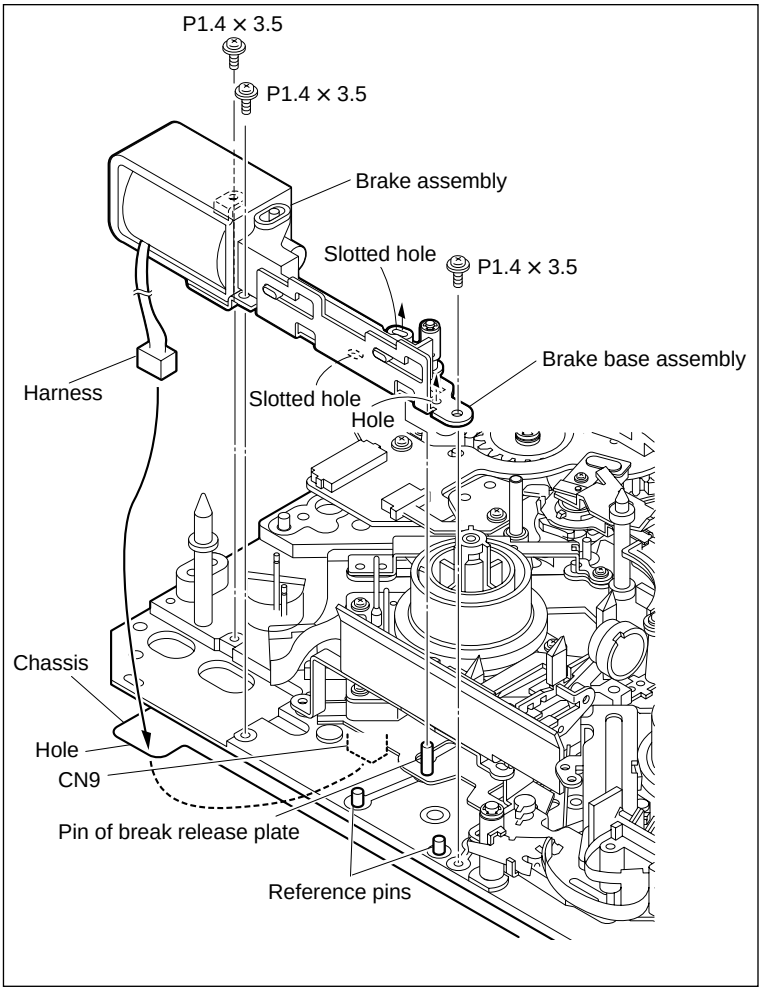
(9) Reattach the brake slider assembly to the brake base assembly with a new stop washer.



5. Reattaching the brake assembly

(1) Insert the harness of the brake assembly in a square hole on the left side of the chassis to bring it to the back side of the unit.

(2) Fit the slotted hole shown in the brake assembly figure on the pin on the brake release plate and further more fit the hole and slotted hole in the brake base assembly on the two reference pins of the MD chassis respectively, and fix it with the three screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}



6. Reconnecting the connector

(1) Draw out the harness of the brake solenoid to bring it to the back side of the unit with tweezers.

(2) Reconnect the harness to the connector (CN9) on the MS-64 board.

7. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)

8. Checking the performance

(1) Power on the unit and press the [DEL], [TRIM+], [MENU] keys simultaneously to activate the maintenance menu.

(2) Following the pop-up menu in the maintenance menu, enter SERVO CHECK, PLUNGER CHECK, REEL BRAKE in order and select REEL BRAKE.

(3) Check that the brake solenoid ON/OFF switches smoothly by presing the [AUDIO IN] key and the [IN] key.

7-5. Pinch Roller Replacement

Outline

Replacement

Removing the pinch limiter assembly.
Reattaching the pinch limiter assembly.

Adjustment after replacement

Checking the tape path adjustment

Note

- The pinch roller is a part of the pinch limiter assembly, therefore replace the pinch limiter assembly itself when the pinch roller needs to be replaced.
- Prepare a new stop washer when replacing the pinch roller assembly.
  Stop washer (1.5) : 3-669-465-01

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
. Grease (SG-941) : 7-662-001-39
- Tweezers

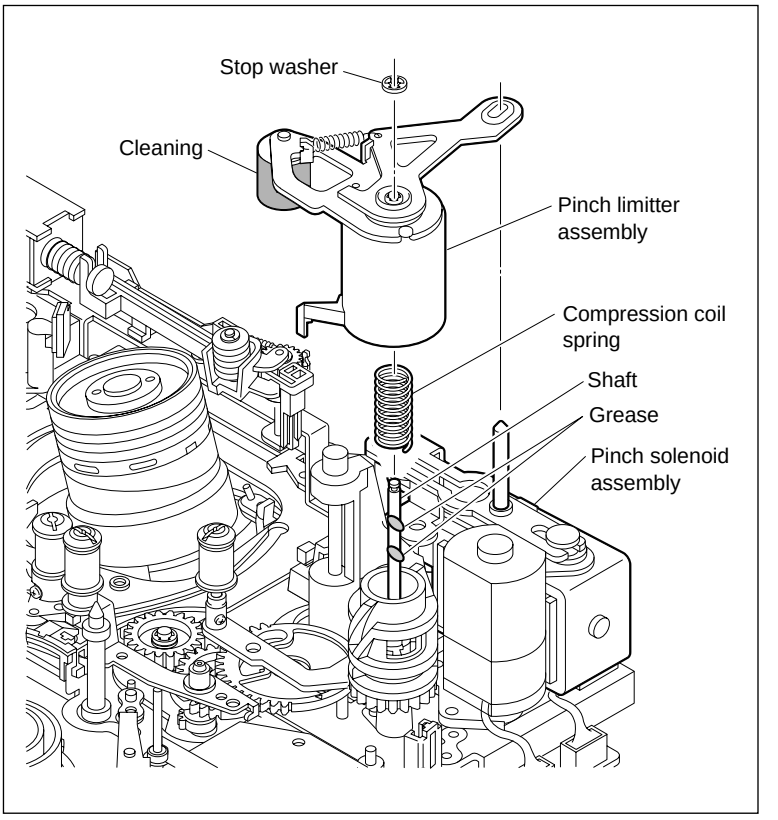
Replacement

1. Removing the pinch limiter assembly

Remove the stop washer and remove the pinch limiter assembly.

Note

During this operation, if the compressed coil spring comes off together with the assembly, return the spring in place.



2. Reattaching the pinch limiter assembly

(1) Wipe a pinch roller in a new pinch limiter assembly with a cleaning cloth moistened with cleaning fluid.
(2) Wipe the shaft on the MD chassis with a cleaning cloth moistened with cleaning fluid.
(3) Apply grease about the quarter size of a tip of a cotton swab, to two portions of the shaft marked in the figure.
(4) Fit the hole in the pinch limiter assembly on the shaft on the MD chassis, while fitting the slotted hole in the pinch limiter assembly on the shaft on the pinch solenoid assembly, and fix it with a new stop washer (1.5).

Adjustment after replacement

3. Checking the tape path adjustment

(Refer to Section 8-4.)

7-6. Elevator Cam Replacement

Outline

Replacement

Removing the pinch limiter assembly
Replacing the elevator cam
Reattaching the pinch limiter assembly

Adjustment after replacement

Chacking the tape path adjustment

Note

Prepare two kinds of new stop washers when replacing the elevator cam.
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the pinch limiter assembly)
Stop washer (2.3) : 3-669-596-01 × 1 (for mounting the elevator cam)

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Grease (SGL-941) : 7-662-001-39
- Tweezers

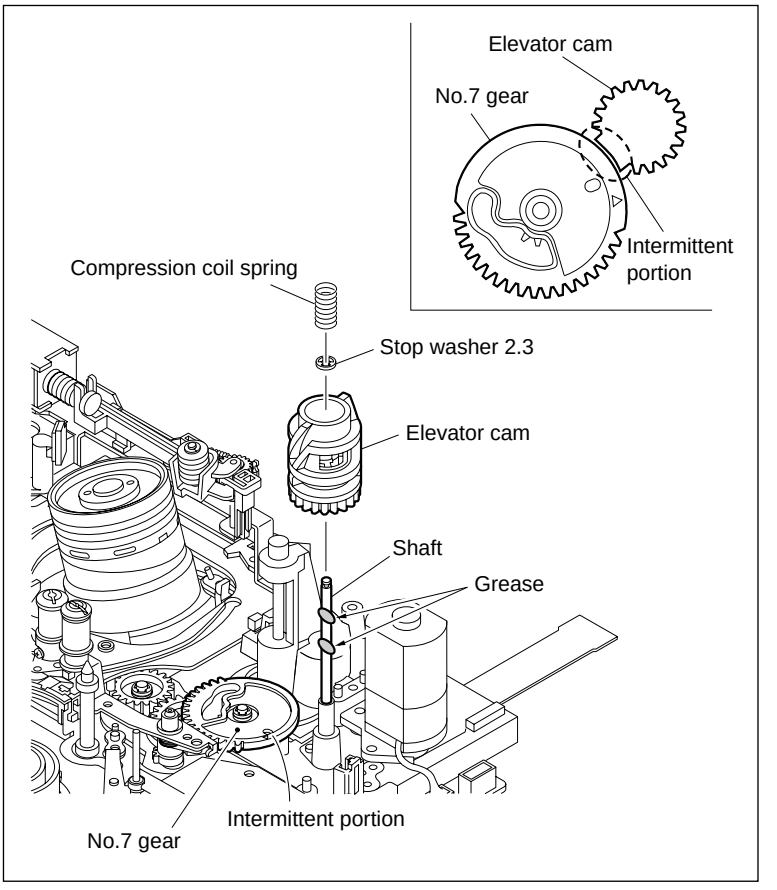
Replacement

1. Removing the pinch limiter assembly

Remove the pinch limiter assembly.
(Refer to Section 7-5.)

2. Replacing the elevator cam

(1) Lift off the compressed coil spring from the shaft on the MD chassis.
(2) Remove the stop washer and remove the elevator cam.
(3) Wipe the shaft on the MD chassis with a cleaning cloth moistened with cleaning fluid.
(4) Fit the elevator cam on the shaft on the chassis with the intermittent portion of the elevator cam joined to the intermittent portion of the No.7 gear as shown in the figure.
(5) Apply grease about the quarter size of a tip of a cotton swab, to two portions of the shaft shown in the figure.
(6) Reattach the elevator cam with a new stop washer (2.3).
(7) Fit the compressed coil spring on the shaft.



3. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 7-5.)

Adjustment after replacement

4. Checking the tape path adjustment.

(Refer to Section 8-4.)

7-7. Pinch Solenoid Assembly Replacement

Outline

Replacement

Removing the pinch limiter assembly.
Disconnecting the connector.
Replacing the pinch solenoid assembly.
Reconnecting the connector.
Reattaching the pinch limiter assembly.

Adjustment after replacement

Checking the tape path adjustment

Note

Without removal/reattachment of the pinch limiter assembly, the pinch solenoid assembly cannot be replaced.
Therefore prepare a new stop washer for replacing the pinch limiter assembly.
Stop washer (1.5) : 3-669-465-01 × 1

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

Replacement

1. Removing the pinch limiter assembly

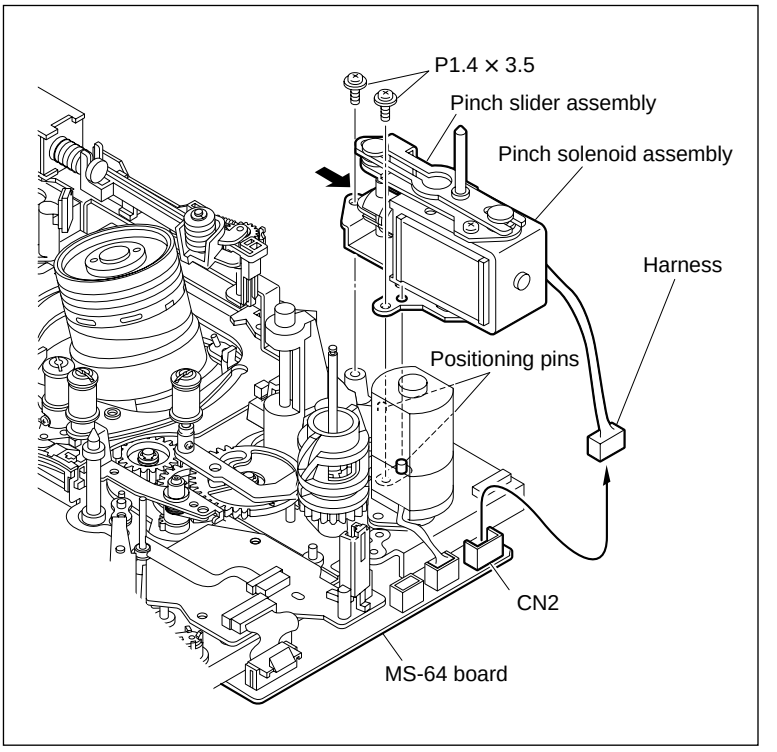
Remove the pinch limiter assembly.
(Refer to Section 7-5.)

2. Disconnecting the connectors

Disconnect the harness from the connector (CN2) on the MS-64 board with tweezers.

3. Replacing the pinch solenoid assembly

(1) Remove the two screws with the pinch slider assembly drawn into the arrow direction and lift off the pinch solenoid assembly.
(2) Align two holes in a new pinch solenoid assembly with the two positioning pins on the MD chassis respectively.
(3) Reattach the pinch solenoid utilizing the two screws with the pinch slider assembly drawn in the arrow direction.
Tightening Torque : 0.1 N•m {1 kgf•cm}



4. Reconnecting the connector

Reconnect the harness to the connector (CN2) on the MS-64 board with tweezers.

5. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 7-5.)

Adjustment after replacement

6. Checking the tape path adjustment

(Refer to Section 8-4.)

7-8. Reel Motor (T) Assembly Replacement

Outline

Replacement

Removing the MD cover
Disconnecting the connector
Moving the S/T reel tables
Removing the L push plate
Removing the MIC assembly
Removing the RMP (T1) retainer assembly
Replacing the reel motor (T) assembly
Reattaching the RMP (T1) retainer assembly
Reattaching the MIC assembly
Reattaching the L push plate
Reconnecting the connector
Checking the performance
Reattaching the MD cover

Adjustment after replacement

T-REEL ONLY adjustment
TENSION adjustment
Tape path adjustment

Note

Without removal/reattachment of the MIC assembly, the reel motor (T) assembly cannot be replaced. Prepare a new stop washer when reattaching the MIC assembly.
Stop washer (1.5) : 3-669-465-01 × 1
Use care not to lose the polyethylene washer between the base plate and the MIC assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottom panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Removing the MD cover

Remove the MD cover. (Refer to Section 7-2.)

2. Disconnecting the connector

Disconnect the flexible card wire from the connector (CN6) on the MS-64 board located on the back side of the MD chassis.

3. Moving the S/T reel tables

Turn the reel shift motor gear by a finger and bring the S/T reel tables to the standard cassette position.
(Refer to Section 7-19.)

4. Removing the L push plate

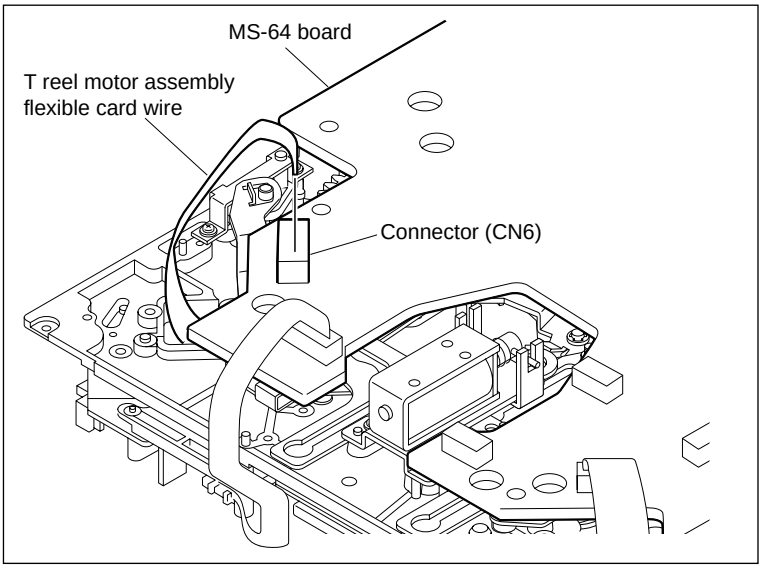
Remove the L push plate. (Refer to Section 7-3.)

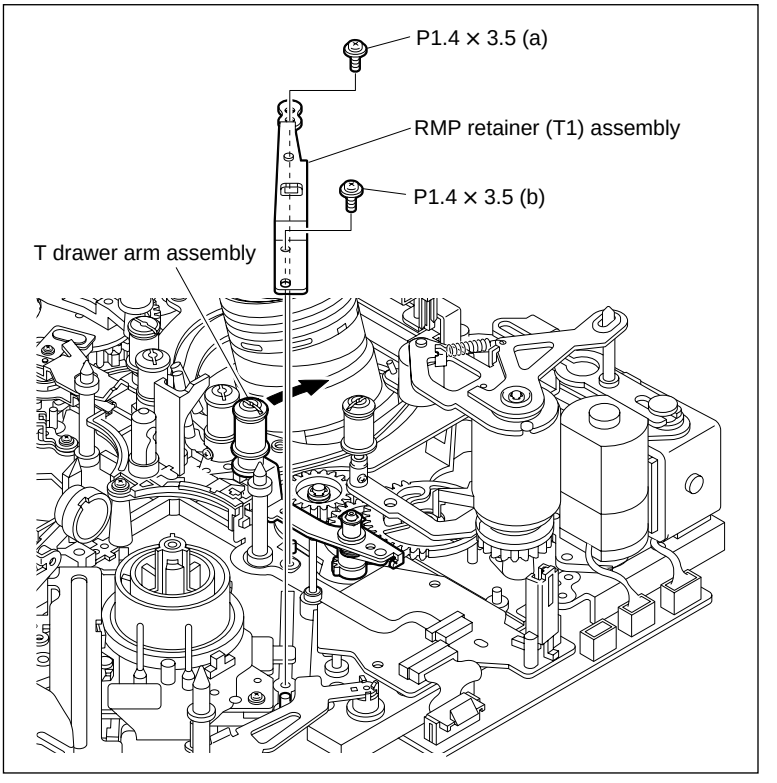
5. Removing the MIC assembly

Remove the MIC assembly.
(Refer to Section 7-19.)

6. Removing the RMP (T1) retainer assembly

(1) Remove the screw (a) with the T-drawer arm assembly drawn lightly in the arrow direction.
(2) Remove the screw (b) and remove the RMP (T1) retainer assembly.





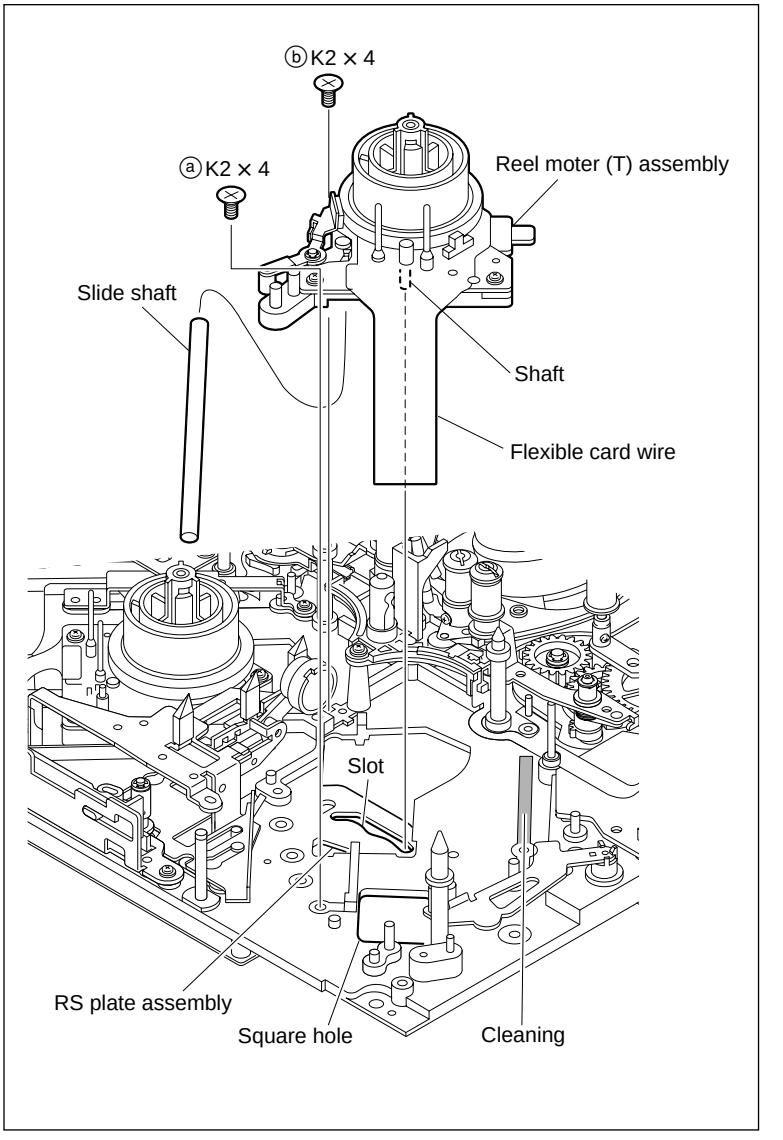
7. Replacing the reel motor (T) assembly

(1) Remove the two screws (ⓐ, ⓑ) securing the slide shaft and remove the reel motor (T) assembly.
(2) Extract the slide shaft from the reel motor (T) assembly.
(3) Wipe the shaded portion in the figure with a cleaning cloth moistened with cleaning fluid.
(4) Apply grease about the quarter size of a tip of a cotton swab, to the center of the shaded portion.
(5) Wipe the slide shaft with dry cloth such as gauze, and then insert it in a hole of a new reel motor T assembly.

Note

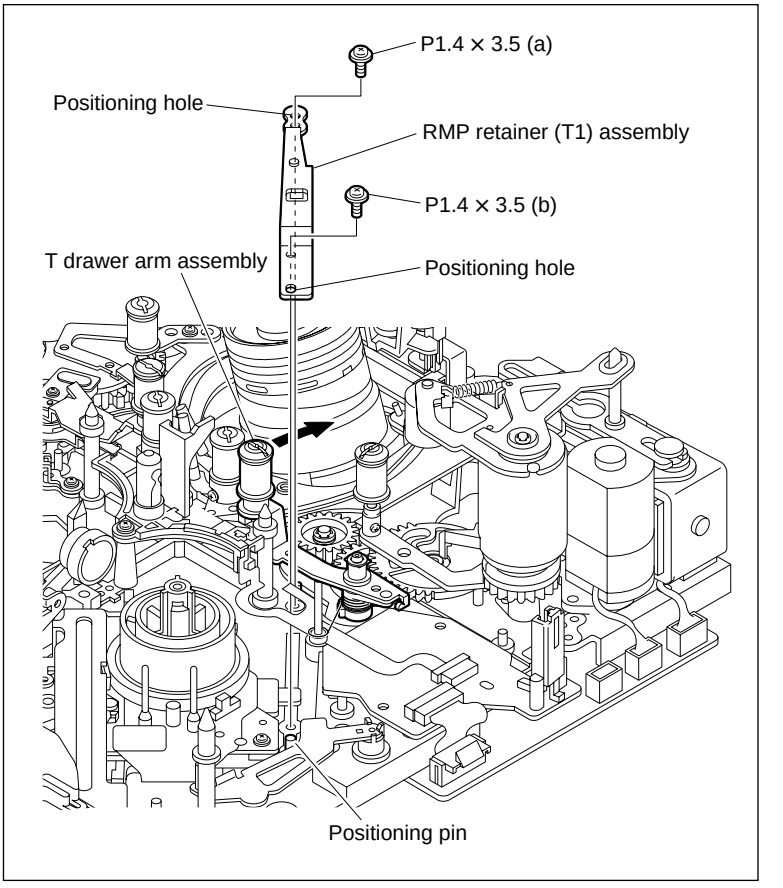
Use extreme care not to scratch the shaft and hole during extracting and inserting operation.

(6) Insert a shaft located on the back side of the reel motor (T) assembly in the slot in the RS plate assembly.
(7) Insert the flexible card wire in the square hole in the MD chassis.
(8) Tighten the screw ⓐ and next ⓑ to reattach the slide shaft.
Tightening Torque : 0.1 N•m {1 kgf•cm}



8. Reattaching the RMP (T1) retainer assembly

(1) Fit the two positioning holes in the RMP (T1) retainer assembly on the two positioning pins on the MD chassis.
(2) Tighten the two screws to fix the RMP (T1) retainer assembly while drawing lightly the T drawer arm assembly in the arrow direction.



9. Reattaching the MIC assembly

Reattach the MIC assembly.
(Refer to Section 7-19.)

10. Reattaching the L push plate

Reattach the L push plate. (Refer to Section 7-3.)

11. Reconnecting the connector

Reconnect the flexible card wire to the connector (CN6) on the MS-64 board located on the back side of the MD chassis.

Notes

- Be careful not to insert the flexible card wire obliquely.
- Do insert the flexible card wire straight and securely as far as it will go.
- Take care not to fold the flexible card wire. This shortens the life of the flexible card wire.

12. Checking the performance

Check the S/T reel tables move smoothly by turning the reel shift motor gear by a finger.

13. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)

Adjustment after replacement

14. T-REEL ONLY adjustment

(Refer to Section 5-3-3.)

15. TENSION adjustment

(Refer to Section 5-3-3.)

16. Tape path adjustment

(Refer to Section 8-2.)

7-9. Reel Motor (S) Assembly Replacement

Outline

Replacement

Removing the MD cover
Disconnecting the connector
Moving the S/T reel tables
Removing the RMP (S1) retainer assembly
Replacing the reel motor (S) assembly
Reattaching the RMP (S1) retainer assembly
Reconnecting the connector
Checking the performance
Reattaching the MD cover

Adjustment after replacement

S-RELL ONLY adjustment
TENSION adjustment
Tape path adjustment

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottom panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Removing the MD cover

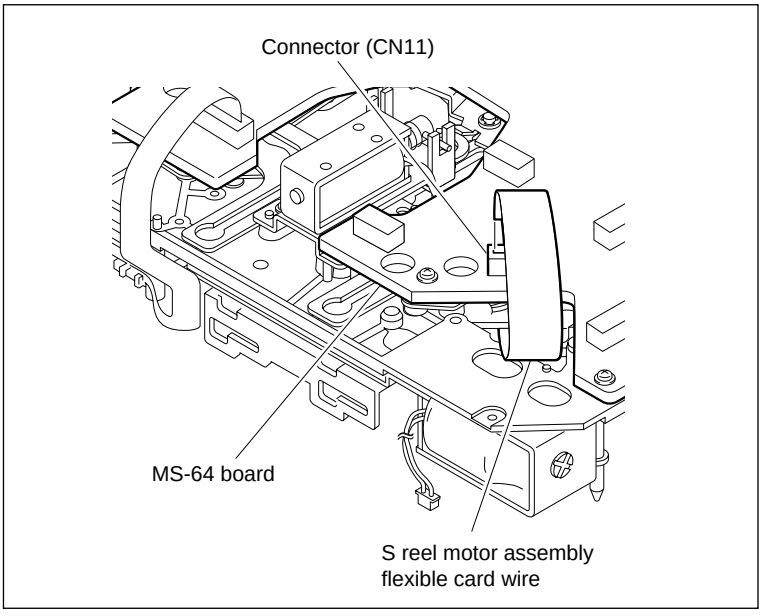
Remove the MD cover. (Refer to Section 7-2.)

2. Disconnecting the connector

Disconnect the flexible card wire from the connector (CN11) on the MS-64 board located on the back side of the MD chassis.

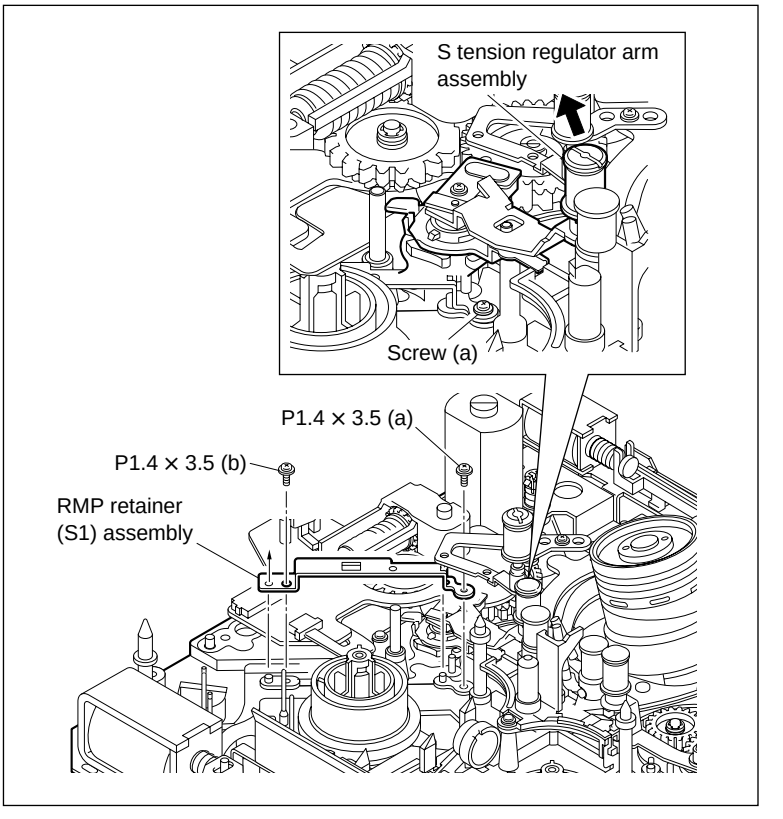
3. Moving the S/T reel tables

Turn the reel shift motor gear by a finger and bring the S/T reel tables to the standard cassette position. (Refer to Section 7-19.)



4. Removing the RMP (S1) retainer assembly

(1) Remove the screw (a) with the S tension regulator arm assembly drawn lightly in the arrow direction.
(2) Remove the screw (b), then remove the RMP (S1) retainer assembly.



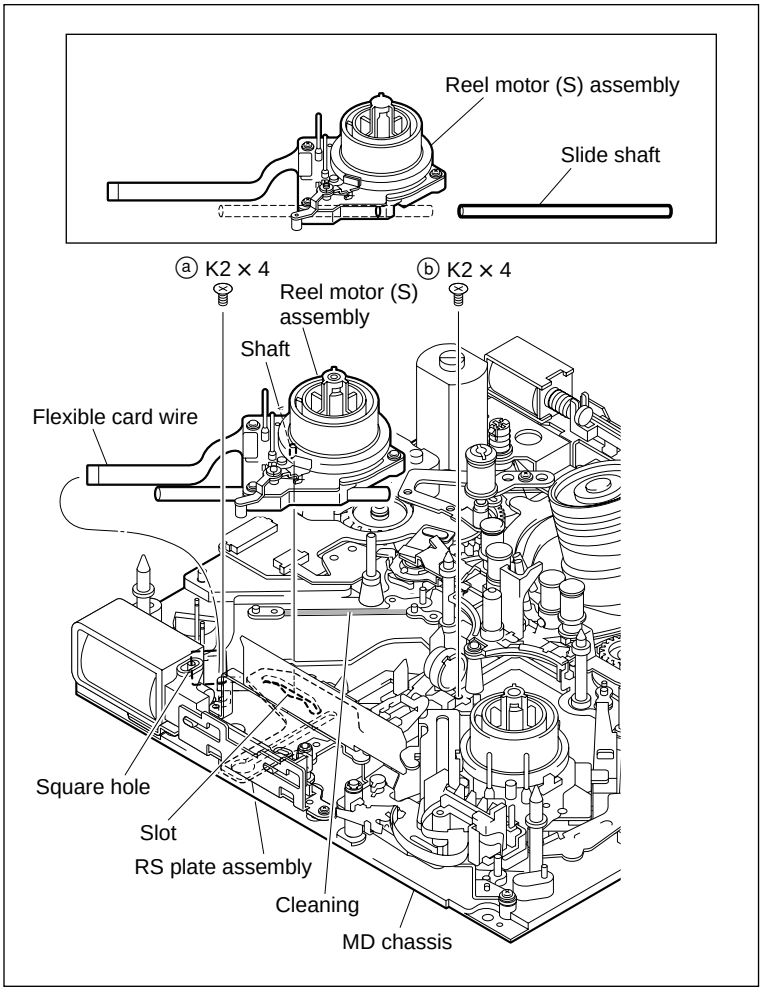
5. Replacing the reel motor (S) assembly

(1) Remove the two screws (ⓐ, ⓑ) securing the slide shaft and remove the reel motor (S) assembly.
(2) Extract the slide shaft from the reel motor (S) assembly.
(3) Wipe the shaded portion in the figure with a cleaning cloth moistened with cleaning fluid.
(4) Apply grease about the quarter size of a tip of a cotton swab, to the center of the shaded portion.
(5) Wipe the slide shaft with dry cloth such as gauze, and then insert it in a hole of a new reel motor S assembly.

Note

Use extreme care not to scratch the shaft and hole during extracting and inserting operation.

(6) Insert a shaft located on the back side of the reel motor (S) assembly in the slot in the RS plate assembly.
(7) Insert the flexible card wire in the square hole in the MD chassis.
(8) Tighten the screw ⓐ and next ⓑ to reattach the slide shaft.
Tightening Torque : 0.1 N•m {1 kgf•cm}



6. Reattaching the RMP (S1) retainer assembly

(1) Fit the two positioning holes in the RMP (S1) retainer assembly on the two positioning pins on the MD chassis.
(2) Tighten the two screws to fix the RMP (S1) retainer assembly while drawing lightly the S tension regulator arm assembly in the arrow direction.

7. Reconnecting the connector

Reconnect the flexible card wire to the connector (CN11) on the MS-64 board located on the back side of the MD chassis.

Notes

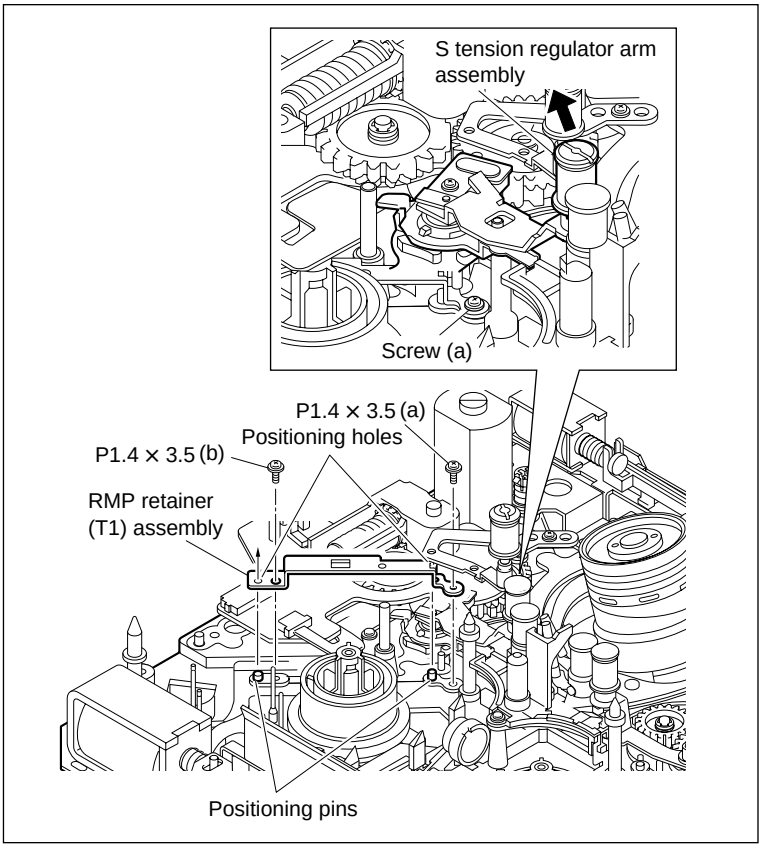
- Be careful not to insert the flexible card wire obliquely.
- Do insert the flexible card wire straight and securely as far as it will go.
- Take care not to fold the flexible card wire. This shortens the life of the flexible card wire.

8. Checking the performance

Check the S/T reel tables move smoothly by turning the reel shift motor gear by a finger.

9. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2)



Adjustment after replacement

10. S-REEL ONLY alignment

(Refer to Section 5-3-3.)

11. TENSION alignment

(Refer to Section 5-3-3.)

12. Tape path adjustment

(Refer to Section 8-2.)

7-10. M Stop Solenoid Assembly Replacement

Outline

Replacement

Removing the MD cover
Removing the stopper driving plate (M) assembly
Replacing the M stop solenoid assembly
Reattaching the stopper driving plate (M) assembly
Reattaching the MD cover

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the bottom panel. (Refer to Section 3-3.)
4. Remove the right side panel. (Refer to Section 3-3.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Screw locking compound : 7-432-114-11

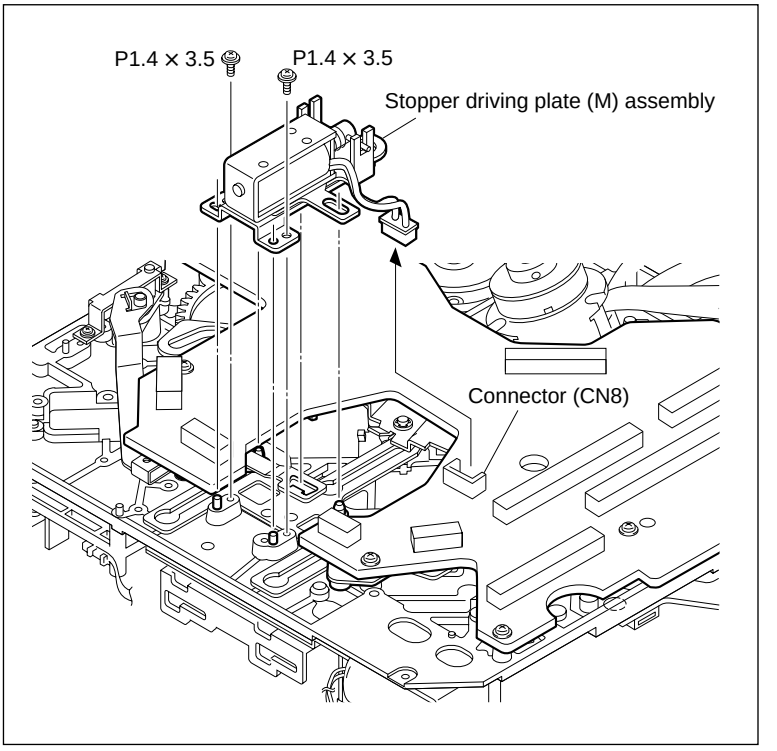
Replacement

1. Removing the MD cover.

Remove the MD cover. (Refer to Section 7-2.)

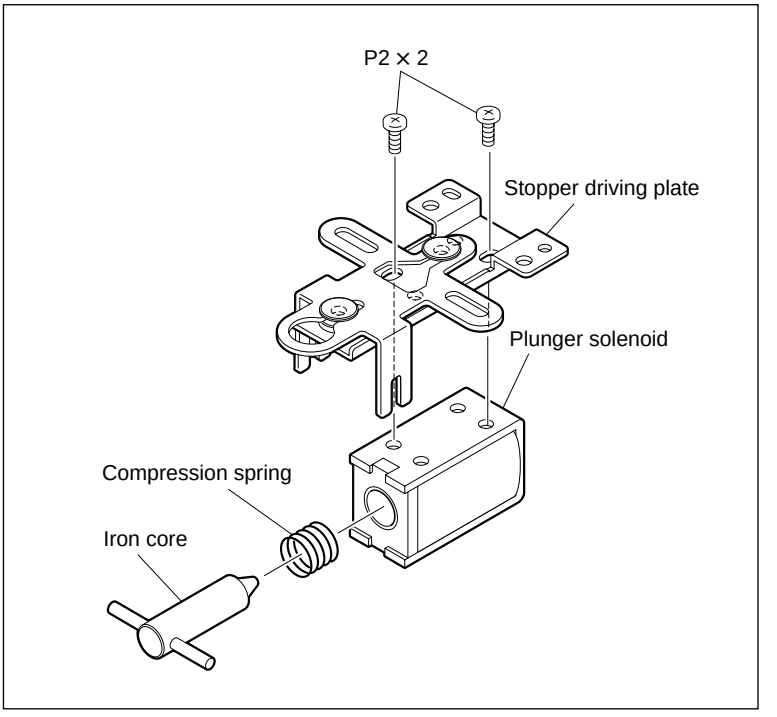
2. Removing the stopper driving plate (M) assembly

(1) Disconnect the harness of the M stop solenoid assembly from the connector (CN8) on the MS-64 board.
(2) Remove the two screws and remove the stopper driving plate (M) assembly.

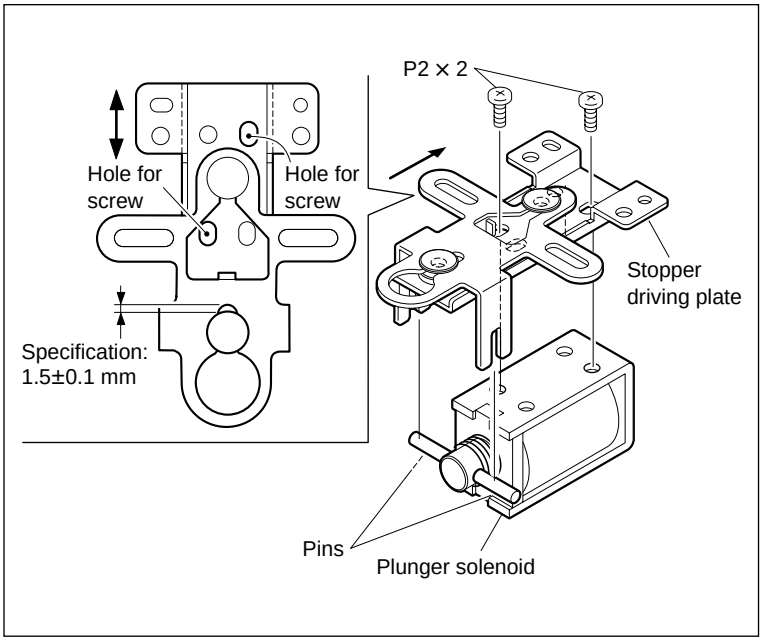


3. Replacing the M stop solenoid assembly

(1) Remove the two screws to remove the stopper driving plate (M) assembly.
(2) Extract the compressed coil spring from the iron core of the plunger solenoid removed in step (2) and fit the spring on a new solenoid iron core.



(3) Fit the two notches of the stopper driving plate on both ends of the iron-core pin, then temporary reattached the stopper driving plate to the plunger solenoid by the two screws.
(4) In a state of plunger solenoid current is on, slide the stopper driving plate to satisfy the speficication. And tighten securely the two screws.
Tightening Torque : 0.2 N•m {2 kgf•cm}
(5) Ensure the stopper driving plate returns to the original position after being pressed in the arrow direction and released.

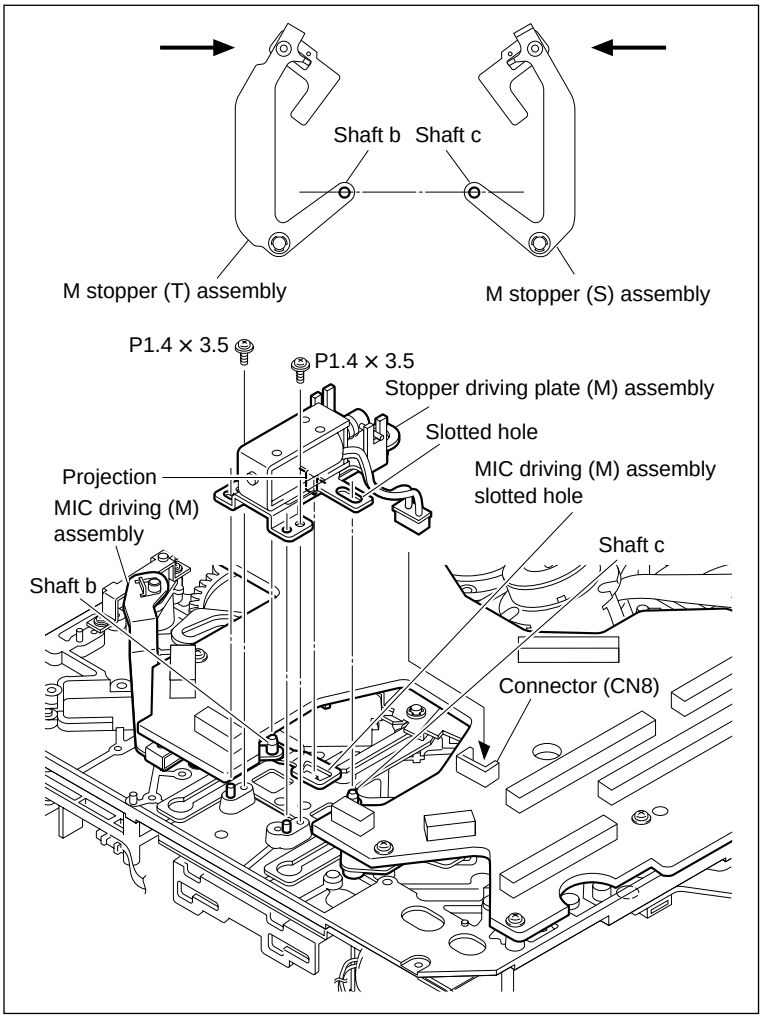


4. Reattaching the stopper driving plate (M) assembly

(1) Move the shaft b on the M stopper (T) assembly and the shaft c on the M stopper (S) assembly toward the drum by a finger.
(2) Insert the projection located on the back side of the stopper driving plate (M) assembly in the slotted hole in the MIC drive (M) assembly. Fit the two slotted holes in the stopper driving plate (M) assembly shown in the figure on the shafts on M stopper (T) and (S) assemblies, and then fix it on the MD chassis with the two screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}
(3) Ensure that the M stopper (T) and (S) assemblies and MIC drive (M) assembly move smoothly with the iron core of the solenoid drawn in the pulled-in direction.
(4) Reconnect the harness of the M stop solenoid to the connector (CN8) on the MS-64 board.

5. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)



7-11. S Tension Regulator Assembly Replacement

Outline

Replacement

Removing the TG1 arm assembly
Removing the loading motor assembly
Removing the SE-521 board
Replacing the S tension regulator assembly
Reattaching the SE-521 board
Reattaching the loading motor assembly
Reattaching the TG1 arm assembly
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Tape path adjustment

Notes

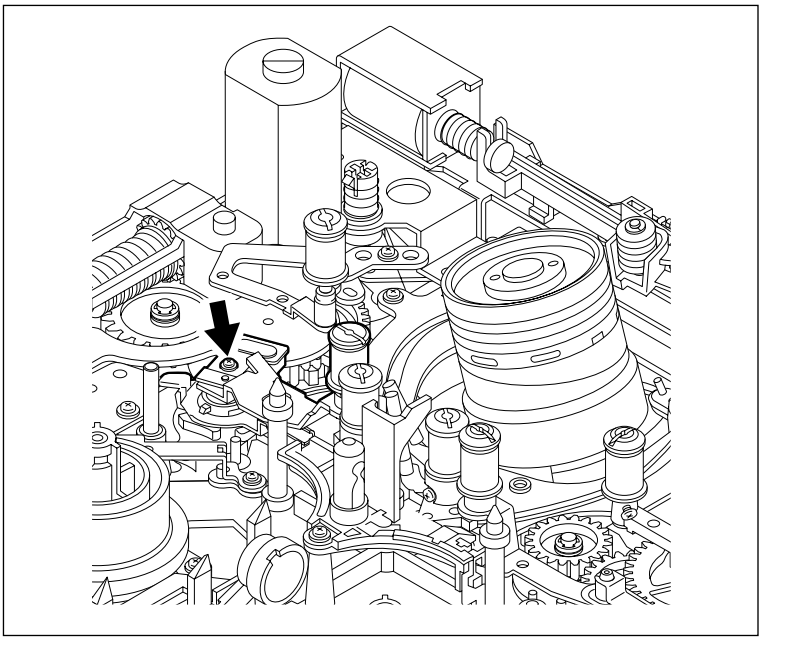
Use extreme care not to scratch the drum when replacing the S tension regulator assembly.
Never loosen the screw shown in the figure. If the screw is loosened, replace the S tension regulator with a new one.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque driver's bit (for M1.4) : J-6325-110-A
- Torque driver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers



Replacement

1. Removing the TG1 arm assembly

Remove the TG1 arm assembly.
(Refer to Section 7-13.)

2. Removing the loading motor assembly

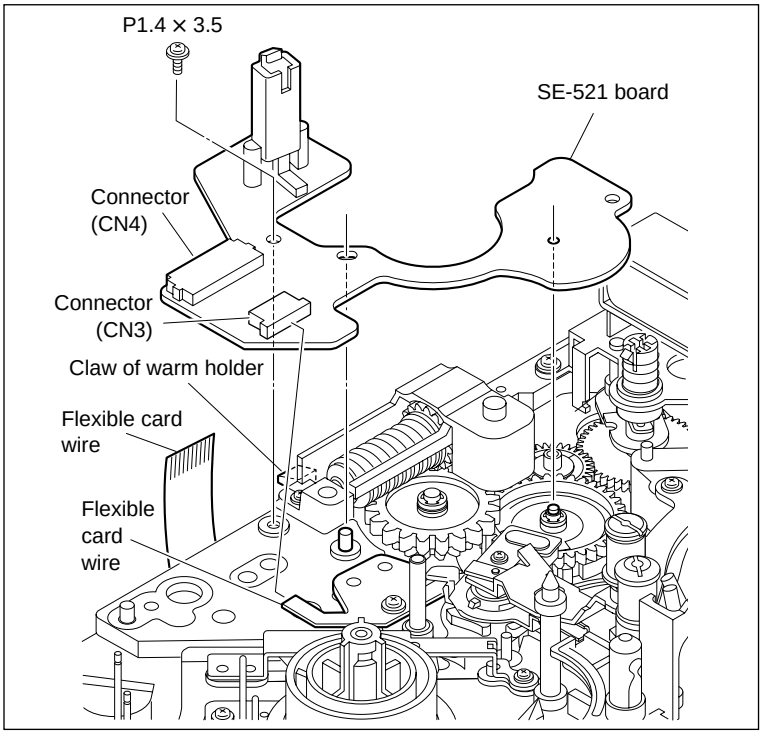
Remove the loading motor assembly.
(Refer to Section 7-17.)

3. Removing the SE-521 board

(1) Disconnect the flexible card wire from the connector (CN3) on the SE-521 board.
(2) Disconnect the flexible card wire from the connector (CN4) on the SE-521 board.
(3) Remove the screw and remove the SE-521 board.

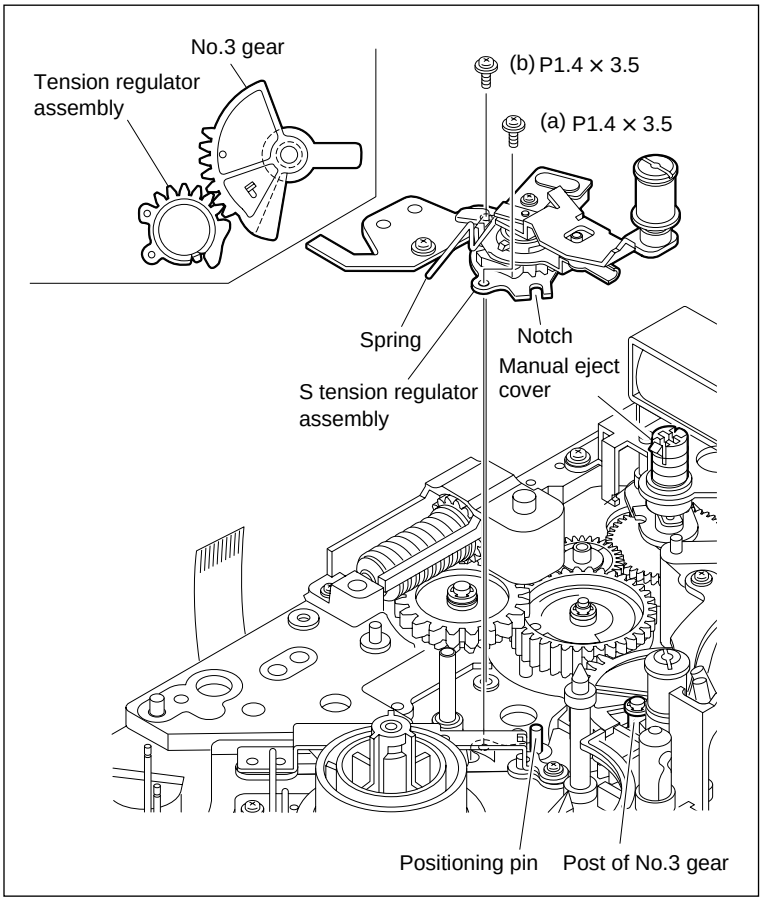
Note

Use care about the claw of the worm holder.



4. Replacing the S tension regulator assembly

(1) Remove the S tension regulator assembly by removing the two screws.
(2) Turn the manual eject cover clockwise until No.3 gear comes to the position shown in the figure.
(3) Engage a gear on a new S tension regulator assembly with No.3 gear as shown in the figure, and align the notch of the S tension regulator with the positioning pin on the chassis, then attach the new assembly to the chassis with the screw (a).
(4) Turn the manual eject cover counterclockwise to bring to the unthreading end position.
(5) Reattach the S tension regulator assembly to the MD chassis with the screw (b).
Tightening Torque : 0.1 N•m {1 kgf•cm}
(6) Turn the manual eject cover clockwise to enter the threading condition. At this operation, check the two points below.
The spring of the S tension regulator assembly shown in the figure do not contact the post of No.3 gear.
The column pushes the spring under unthreading end status.
Unless satisfy these conditions, perform the step (2) and after.
(7) Turn the manual eject cover counterclockwise to bring to the unthreading end position.



5. Reattaching the SE-521 board

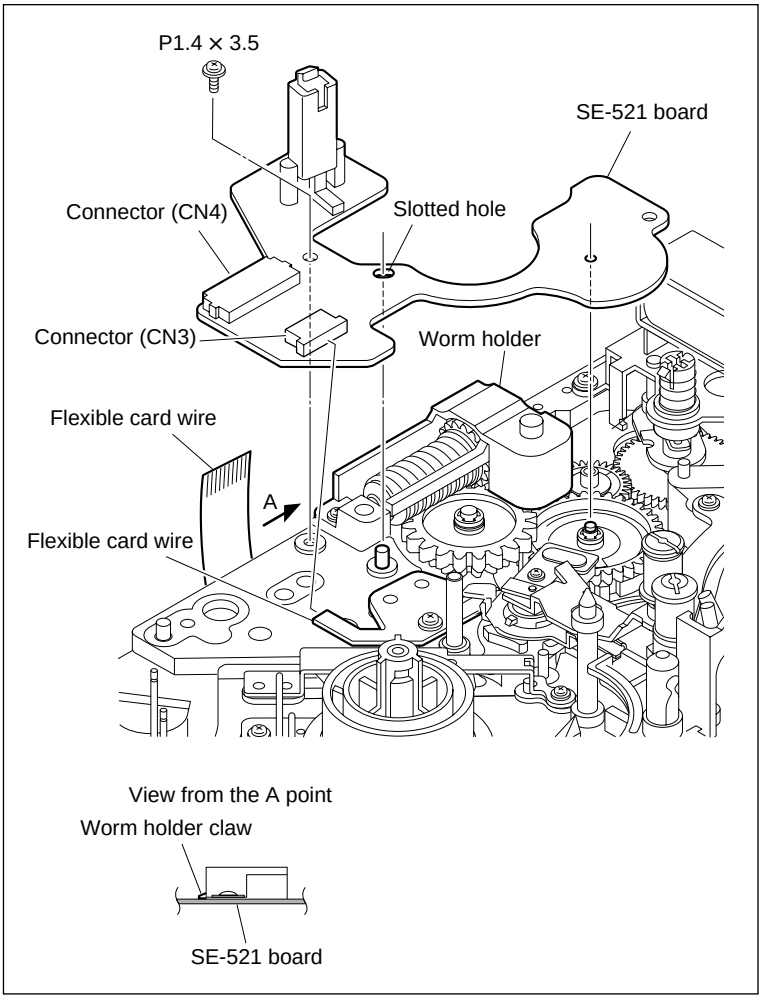
(1) Fit the hole and slotted hole on the SE-521 board on the two shafts on the MD chassis respectively and fix it with the screw.

Notes

- At this operation, be careful not to pinch the tip of the flexible card wire of the S tension regulator assembly between the SE-521 board and the chassis.
- Insert the SE-521 board under the claw of the worm holder.

(2) Reconnect the flexible card wire to the connector (CN4) on the SE-521 board.

(3) Reconnect the flexible card wire of the S tension regulator assembly to the connector (CN3) on the SE-521 board.



6. Reattaching the loading motor assembly

Reattach the loading motor assembly.
(Refer to Section 7-17.)

7. Reattaching the TG1 arm assembly

Reattach the TG1 arm assembly.
(Refer to Section 7-13.)

8. Cleaning the tape guide

Wipe the tape guides of the S tension regulator and the TG1 arm assemblies with a cleaning cloth moistened with cleaning fluid.

Adjustment after replacement

9. TENSION adjustment

(Refer to Section 5-3-3.)

10. Tape path adjustment

(Refer to Section 8-2.)

7-12. T Drawer Arm Assembly Replacement

Outline

Replacement

Removing the T drawer arm assembly
Checking the mounting position of the T gear
Reattaching the T drawer arm assembly
Cleaning the tape guide

Adjustment after replacement

Checking the tape path adjustment

Note

Use extreme care no to scratch the drum when replacing the T drawer arm assembly.

Preparation

1. Let the unit into the unthreading position.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Removing the T drawer arm assembly

(1) Remove the stop washer from the shaft on the MD chassis and remove the T drawer arm assembly.
(2) Remove the portion “a” of the T spring shown in the figure from the notch in the T drawer arm assembly with tweezers.
(3) Remove the T drawer arm assembly.

2. Checking the mounting position of the T gear

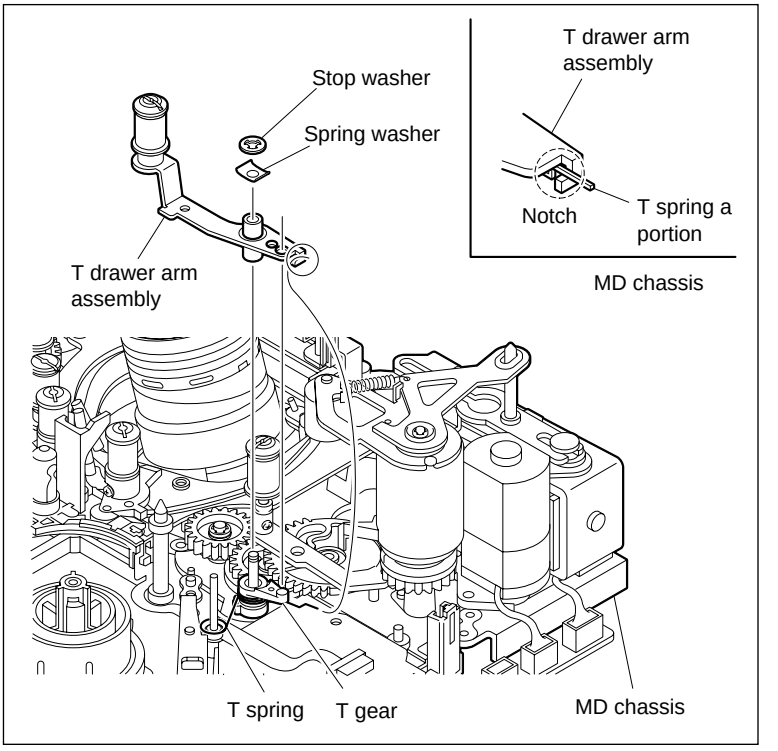
Check that the engagement between the T gear and No. 6 gear is in the position shown in the figure.

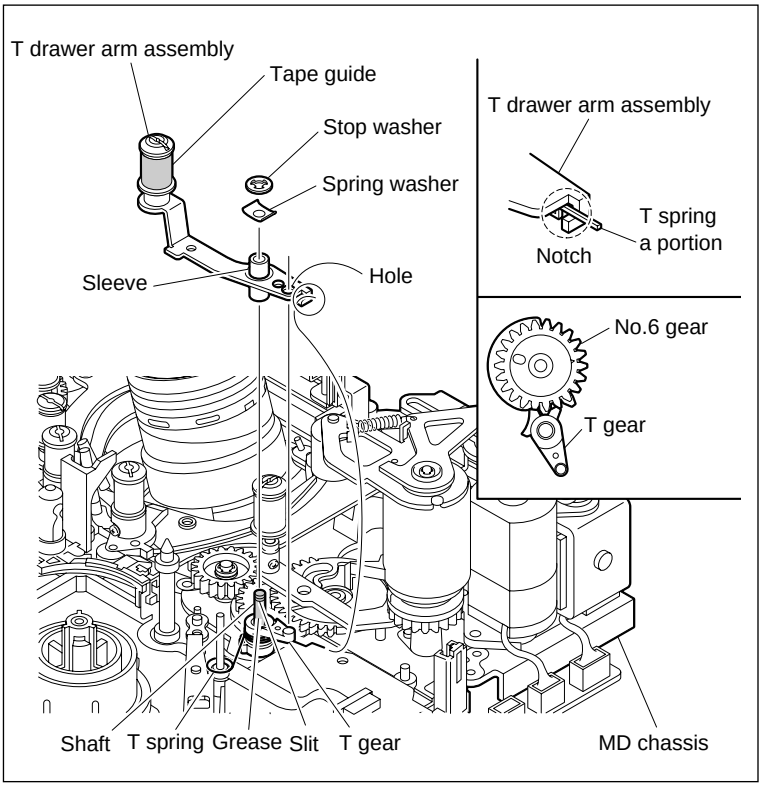
3. Reattaching the T drawer arm assembly

(1) Apply grease above 1/3 size of a tip of a cotton swab, to the shaft on the MD chassis.
(2) Fit a new T drawer arm assembly on the shaft and fit the hole in the T drawer arm assembly on the protrusion on the T gear.
(3) Hook again the portion “a” of the T spring unhooked in step 1- (2) on the notch in the T drawer arm assembly with tweezers.
(4) Fit the spring washer on the shaft on the MD chassis and fix it with the stop washer.

4. Cleaning the tape guide

Wipe the tape guide on the T drawer arm assembly with a cleaning cloth moistened with cleaning fluid.





Adjustment after cleaning

5. Checking the tape path adjustment

(Refer to Section 8-4.)

7-13. TG1 Arm Assembly Replacement

Outline

Replacement

Replacing the TG1 arm assembly
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Checking the tape path adjustment

Note

Do avoid touching with bare hands to the tape cleaner a part of in TG1 arm assembly. Sharpness of the edge on the tape cleaner may cause a hand cut, therefore use extreme care when replacing the TG1 arm assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Replacing the TG1 arm assembly

(1) Remove the screw and remove the TG1 arm assembly from the MD chassis.
(2) Fit two holes in a new TG1 arm assembly on the two pins on the MD chassis respectively and fix the assembly with the screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}

2. Cleaning the tape guide

Wipe the tape guide on the TG1 arm assembly and the tape cleaner with a cleaning cloth moistened with cleaning fluid.

Note

The tape cleaner is not used for Serial No.
100911 - 101390 : UC
401551 - 401850 : CE
The set of above serial number, provided ARM ASSY, TG1 (A-8279-399-C) for repair parts to stabilize the tape path.
(Refer to Fig. 1 and Fig. 2)

Adjustment after replacement

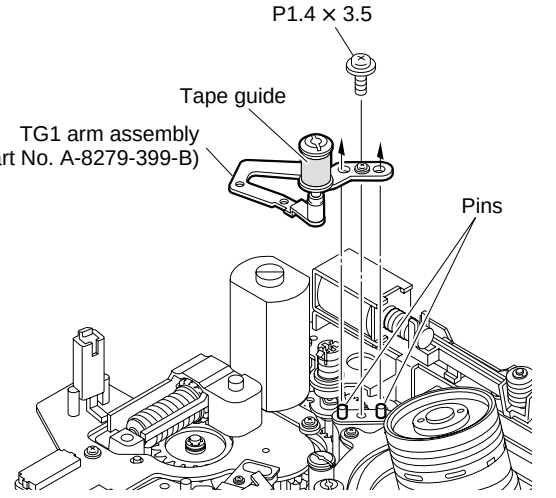
3. TENSION adjustment

(Refer to Section 5-3-3.)

4. Checking the tape path adjustment

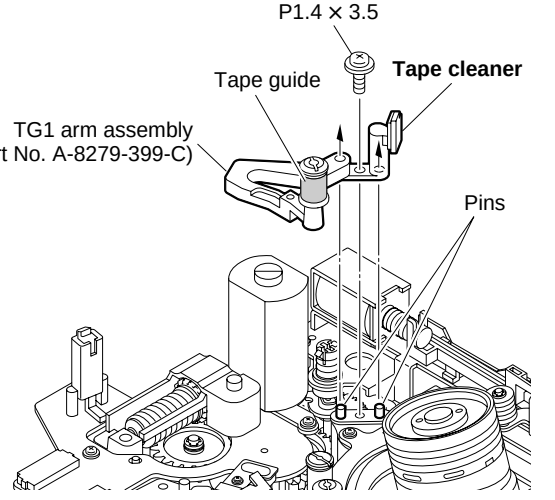
(Refer to Section 8-4.)

Fig. 1



Serial No, 100911 - 101390 : UC
401551 - 401850 : CE

Fig. 2



Serial No, 100001 - 100910, 101391 - : UC
400001 - 401550, 401851 - : CE

7-14. TG8 Arm Assembly Replacement

Outline

Replacement

Replacing the TG8 arm assembly
Cleaning the tape guide

Adjustment after replacement

Checking the tape path adjustment

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

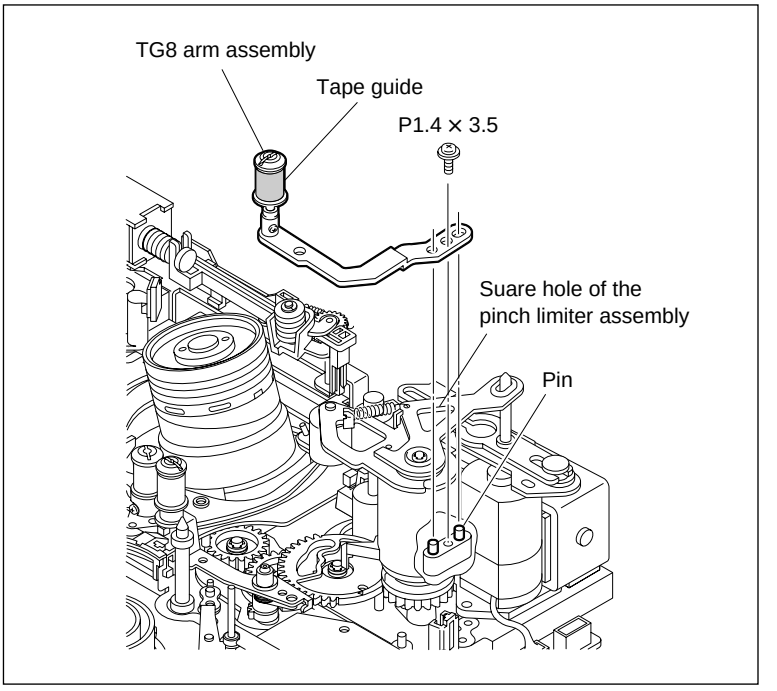
- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Replacing the TG8 arm assembly

(1) Insert a torque screwdriver through the square hole of the pinch limiter assembly to access the screw securing TG8 arm assembly. Remove the screw to remove the TG8 arm assembly.

(2) Fit a hole and a slotted hole in a new TG8 arm assembly on the two pins on the MD chassis and fix it with the screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}



2. Cleaning the tape guide

Wipe the tape guide on the TG8 arm assembly with a cleaning cloth moistened with cleaning fluid.

Adjustment after replacement

3. Adjustment after replacement

Checking the tape path adjustment
(Refer to Section 8-4.)

7-15. Rail Assembly Replacement

Outline

Replacement

Moving the S/T reel tables
Removing the S tension regulator assembly
Removing the T drawer arm assembly
Removing the RMP retainer (T1) assembly
Removing the head cleaner assembly
Removing the rail assembly
Reattaching the rail assembly
Reattaching the head cleaner assembly
Reattaching the RMP retainer (T1) assembly
Reattaching the T drawer arm assembly
Reattaching the S tension regulator assembly
Checking the threading/unthreading performance
Cleaning the tape guide

Adjustment after replacement

TENSION adjustment
Tape path adjustment

Note

Use extreme care not to scratch the drum and the tape guide when replacing the rail assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

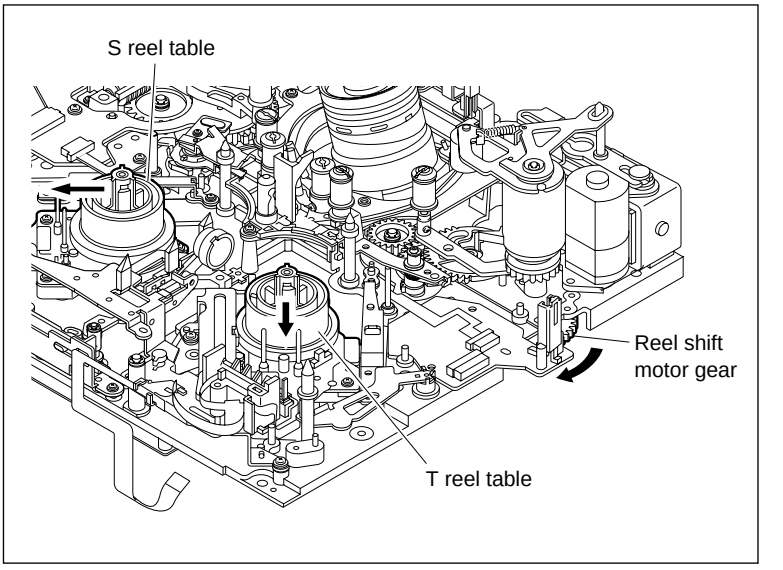
Replacement

1. Moving the S/T reel tables

Bring the S/T reel tables to the L cassette position (the most front side) by turning the reel shift motor gear in the arrow direction by a finger.

Reference

This provides easy operation of succeeding tasks.



2. Removing the S tension regulator assembly

Remove the S tension regulator assembly. (Refer to Section 7-11.)

3. Removing the T drawer arm assembly

Remove the T drawer arm assembly. (Refer to Section 7-12.)

4. Removing the RMP retainer (T1) assembly

Remove the two screws and remove the RMP retainer (T1) assembly.

5. Removing the head cleaner

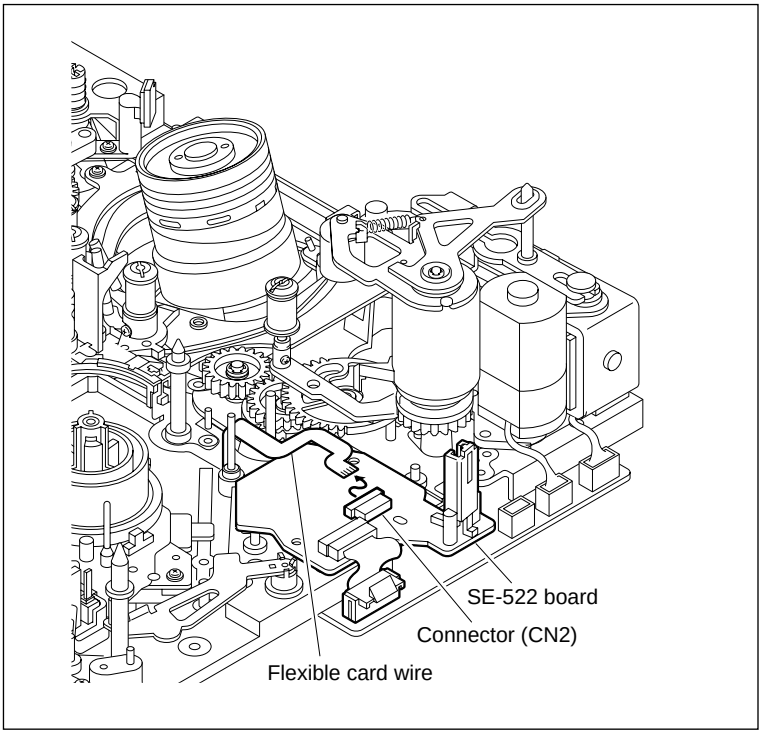
Remove the head cleaner. (Refer to Section 7-21.)

6. Removing the rail assembly

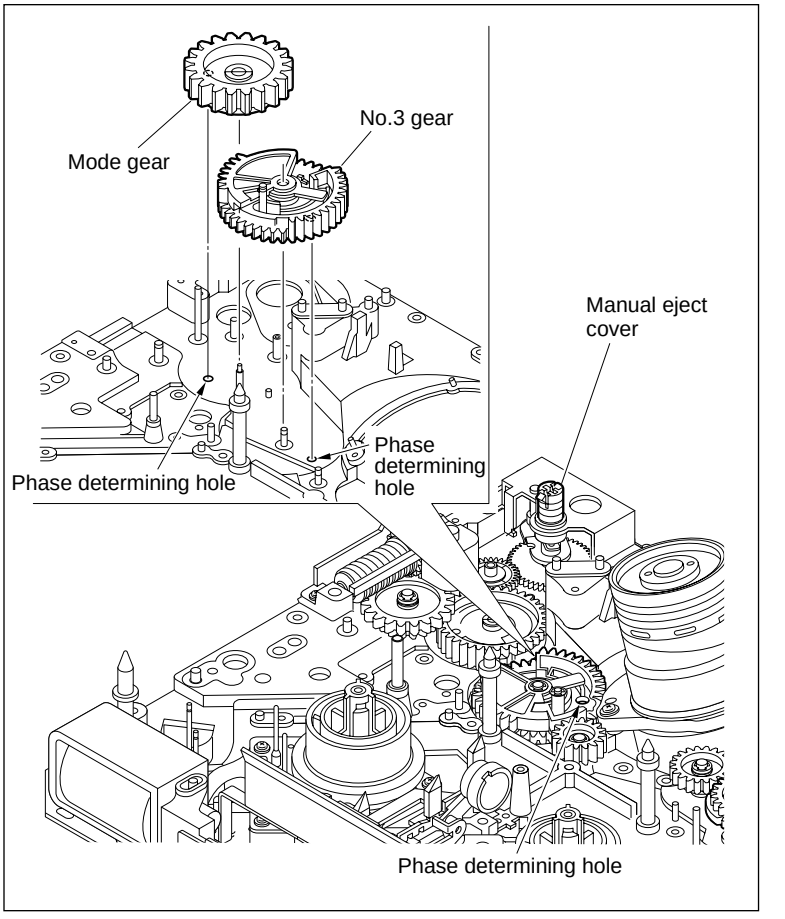
(1) Disconnect the flexible card wire from the connector (CN2) on the SE-522 board.

Note

Use extreme care not to fold and not to scratch the flexible card wire when disconnecting.



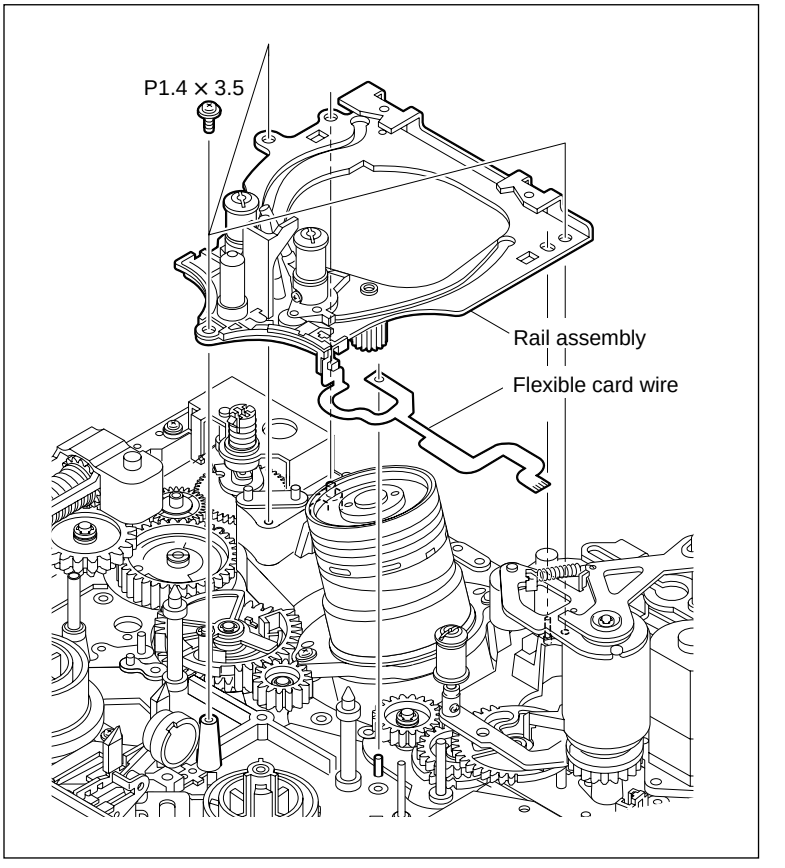
(2) Turn the manual eject cover clockwise and align the two phase determining holes in the mode gear assembly and in No.3 gear.



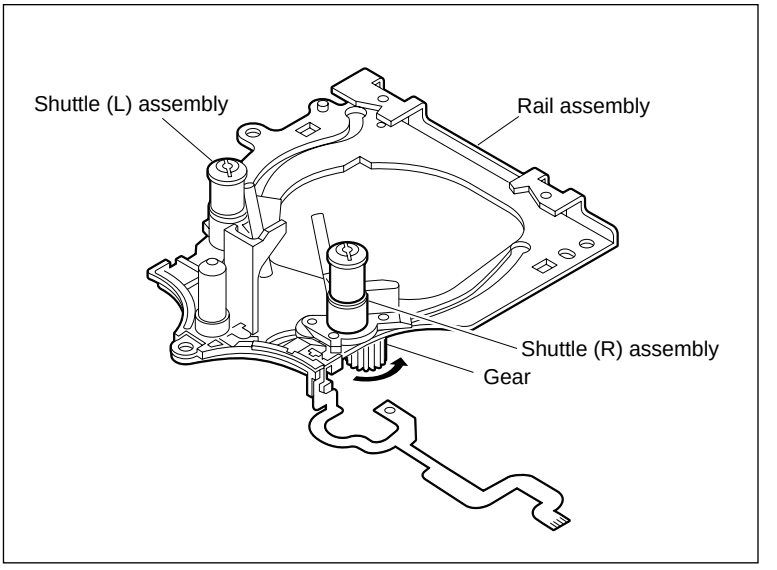
(3) Remove the three screws and remove the rail assembly.

Note

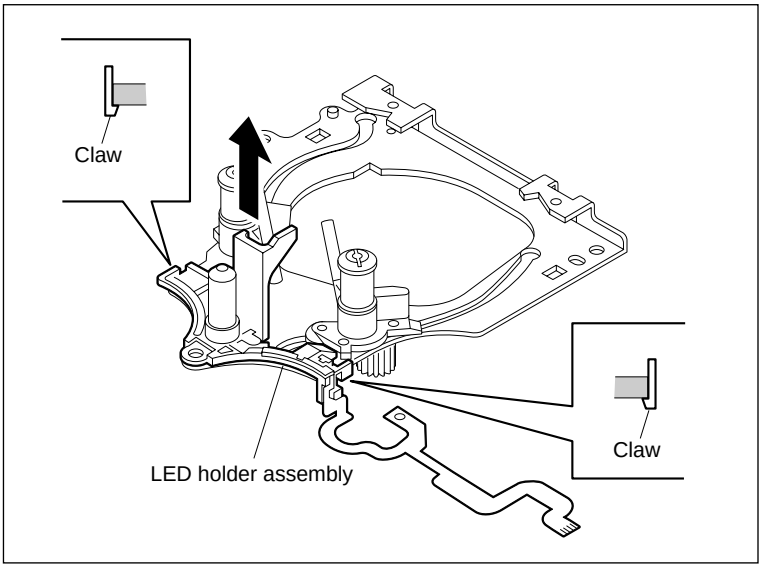
Use extreme care not to scratch the drum and the tape guide when removing. Also great care should be taken; not to fold and not to scratch the flexible card wire of the LED holder assembly when disconnecting.



(4) Bring both shuttle (R) and shuttle (L) assemblies to the threading position shown in the figure, by turning the gear on the back side of the rail assembly by a finger



(5) Unlock each two claws located on the left, right and middle side of the LED holder assembly with tweezers, and remove the LED holder assembly from the rail assembly.

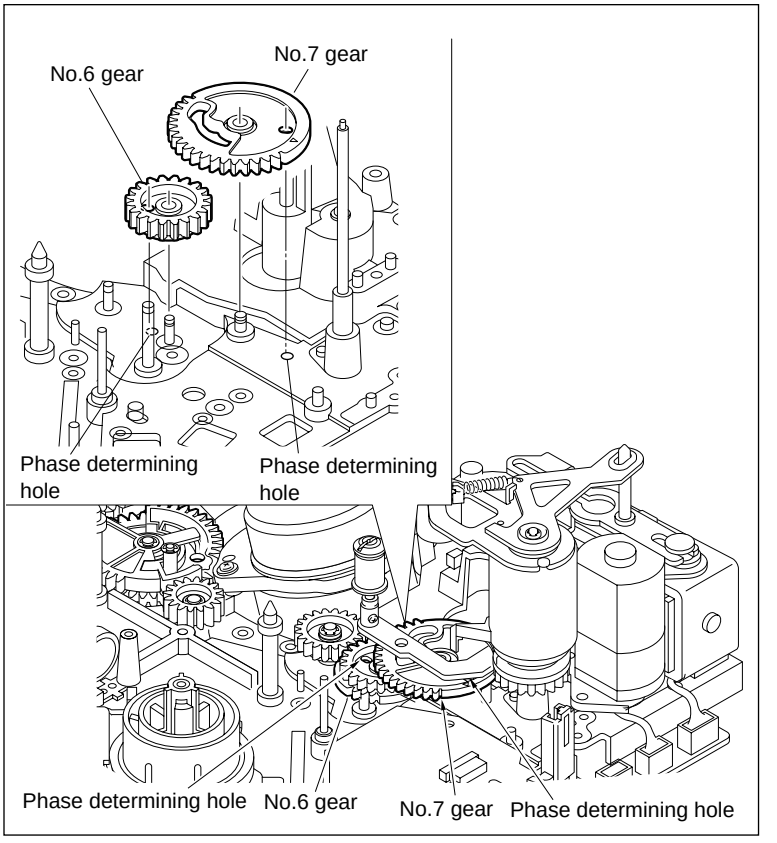


7. Reattaching the rail assembly

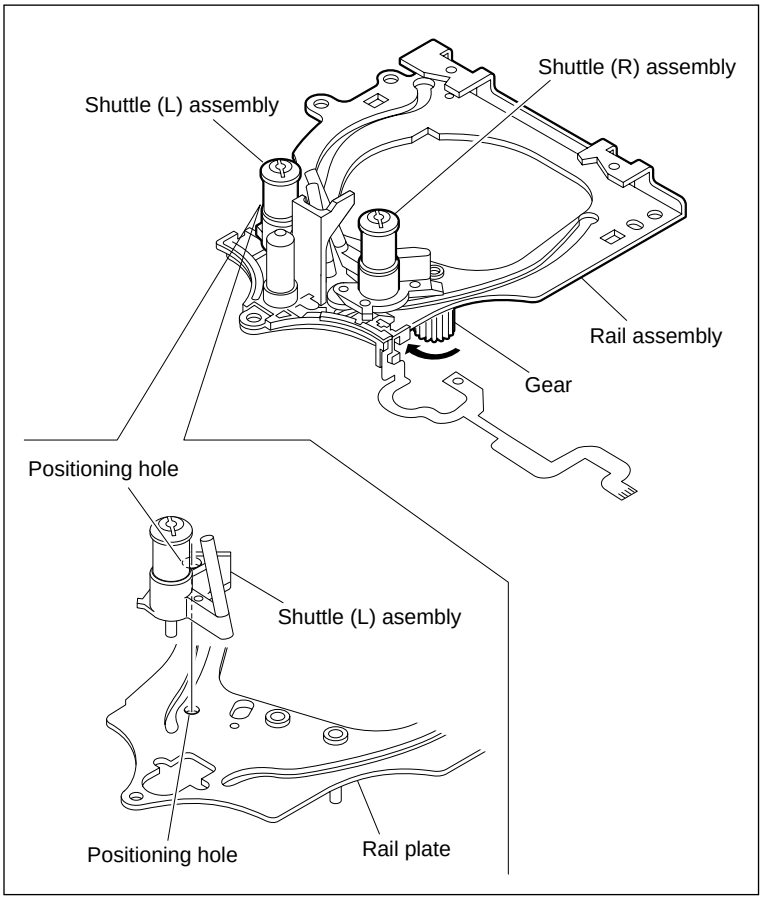
(1) Reattach a new rail assembly to the LED holder assembly.

(2) Ensure that the two phase determining holes in the mode gear assembly and in No.3 gear, which are already aligned in step 7- (2), are respectively aligned with the two holes in the MD chassis underneath each gear.

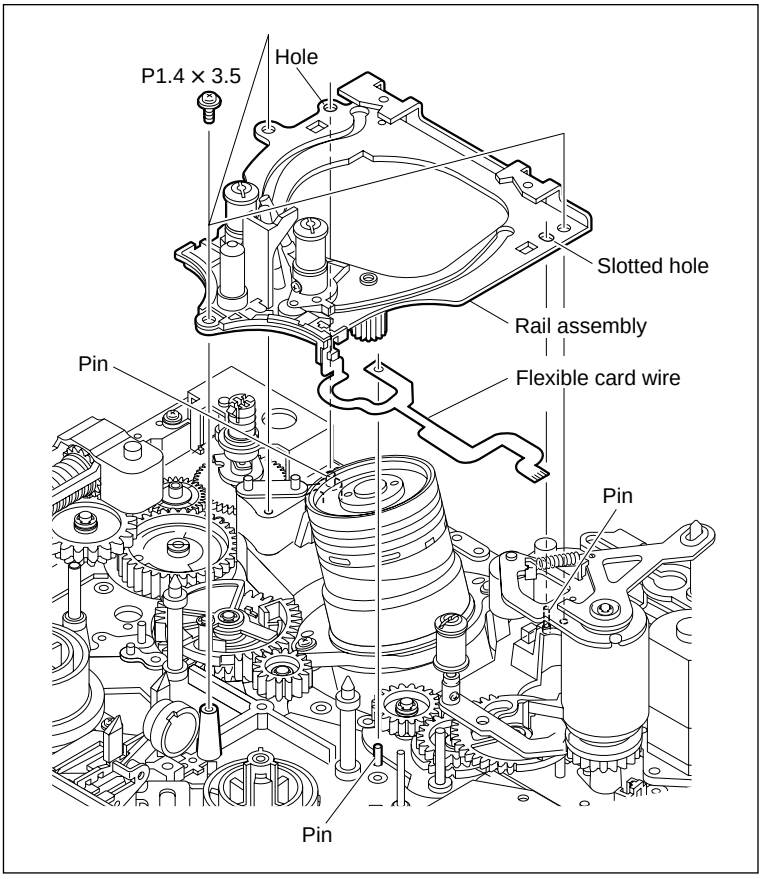
(3) Adjust the two phases determining holes in No.6 and No.7 gears to align respectively with the two holes in the MD chassis underneath each gear by turning No.7 gear by a finger.



(4) Turn the gear on the back side of the rail assembly until the shuttle (R) and shuttle (L) assemblies push the LED holder assembly as far as it will go, and align the positioning hole of the shuttle (L) assembly with the positioning hole of the rail assembly.



(5) Keeping the state in step (4) and further more holding the gear phase between S side and T side, fit the hole and slotted hole in the rail assembly on the two pins on the MD chassis respectively.
(6) Fit the hole in the flexible card wire of LED holder assembly on the pin on the MD chassis.
(7) Fix the rail assembly with the three screws. Tightening Torque : 0.1 N•m {1 kgf•cm}
(8) Reconnect the flexible card wire to the connector (CN2) on the SE-522 board.



8. Reattaching the head cleaner

Reattach the head cleaner. (Refer to Section 7-21.)

9. Reattaching the RMP retainer (T1) assembly

Fit the hole and slotted hole in the RMP retainer (T1) assembly on the pins on the MD chassis respectively, then fix it with the two screws.

10. Reattaching the T drawer arm assembly

Reattach the T drawer arm assembly.
(Refer to Section 7-12.)

11. Reattaching the S tension regulator assembly

Reattach the S tension regulator assembly.
(Refer to Section 7-11.)

12. Checking the threading/unthreading performance

Check the threading/unthreading is performed smoothly by turning the manual eject cover.

13. Cleaning the tape guide

Wipe the tape guides placed in followings with a cleaning cloth moistened with cleaning fluid.

- T drawer arm assembly
- S tension regulator assembly
- Shuttle (R) assembly
- Shuttle (L) assembly

Adjustment after replacement

14. TENSION adjustment

(Refer to Section 5-3-3.)

15. Tape path adjustment

(Refer to Section 8-2.)

7-16. Capstan Motor Replacement

Outline

Replacement

Removing the MD cover
Replacing the capstan motor
Reattaching the MD cover
Cleaning the capstan shaft

Adjustment after replacement

CAPSTAN ONLY adjustment
Checking the tape path adjustment

Preparation

1. Set the unit in to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottom panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Replacement

1. Removing the MD cover.

Remove the MD cover. (Refer to Section 7-2.)

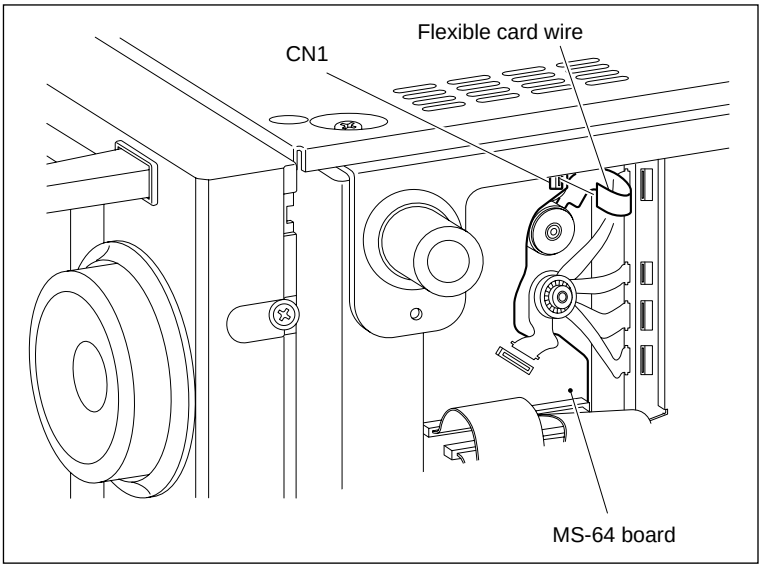
2. Replacing the capstan motor

(1) Disconnect the flexible card wire from the connector (CN1) on the MS-64 board.
(2) While supporting the capstan motor by hand from the back side of the MD chassis, remove the two screws in the upper side of the chassis to remove the capstan motor.
(3) Wipe the mounting surfaces of a new capstan motor and the MD chassis with a cleaning cloth moistened with cleaning fluid.
(4) Insert the new capstan motor into the hole in the MD chassis positioning as shown in the figure and fix it with the two screws.
Tightening torque : 0.1 N•m {1 kgf•cm}

Note

Use care not to scratch the capstan motor pivot when inserting the capstan motor.

(5) Reconnect the flexible card wire of the capstan motor on the back side of the unit to the connector (CN1) on the MS-64 board.

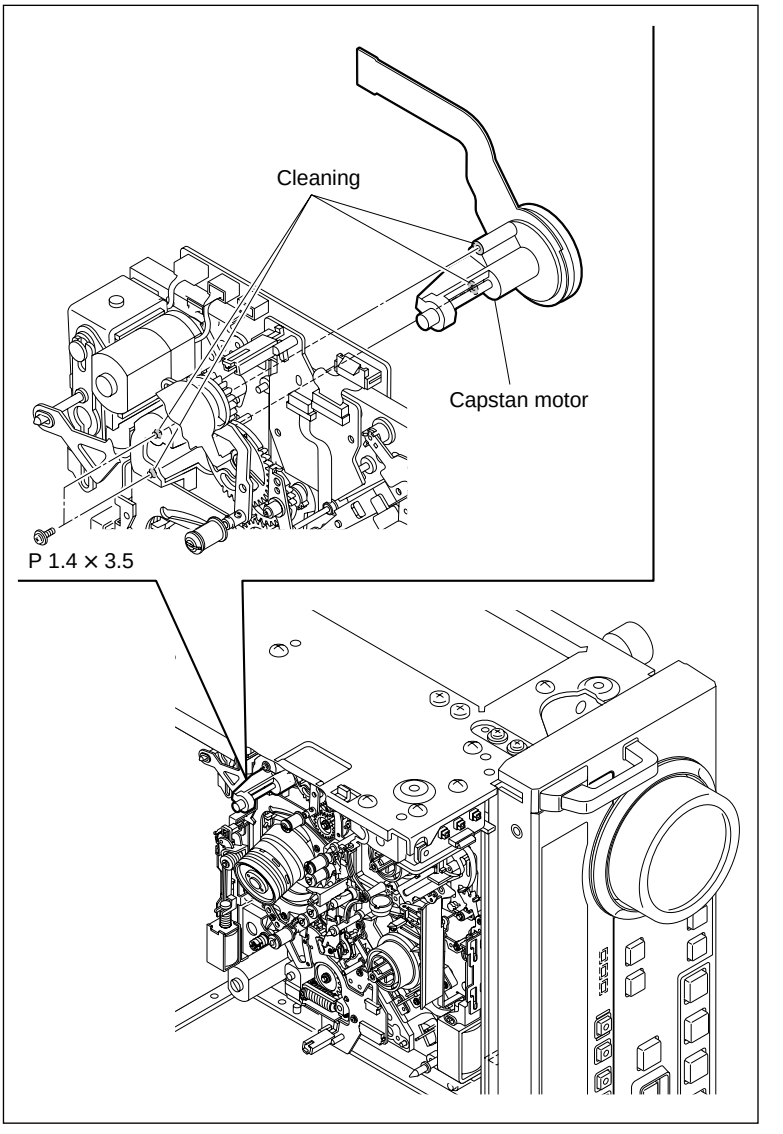


3. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)

4. Cleaning the Capstan shaft

Wipe the capstan shaft with a cleaning cloth moistened with cleaning fluid.



Adjustment after replacement

5. CAPSTAN ONLY adjustment

(Refer to Section 5-3-3.)

6. Checking the tape path adjustment

(Refer to Section 8-4.)

7-17. Loading Motor Replacement

Outline

Replacement

Disconnecting the connector
Replacing the loading motor assembly
Reconnecting the connector

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Tweezers

Replacement

1. Disconnecting the connector

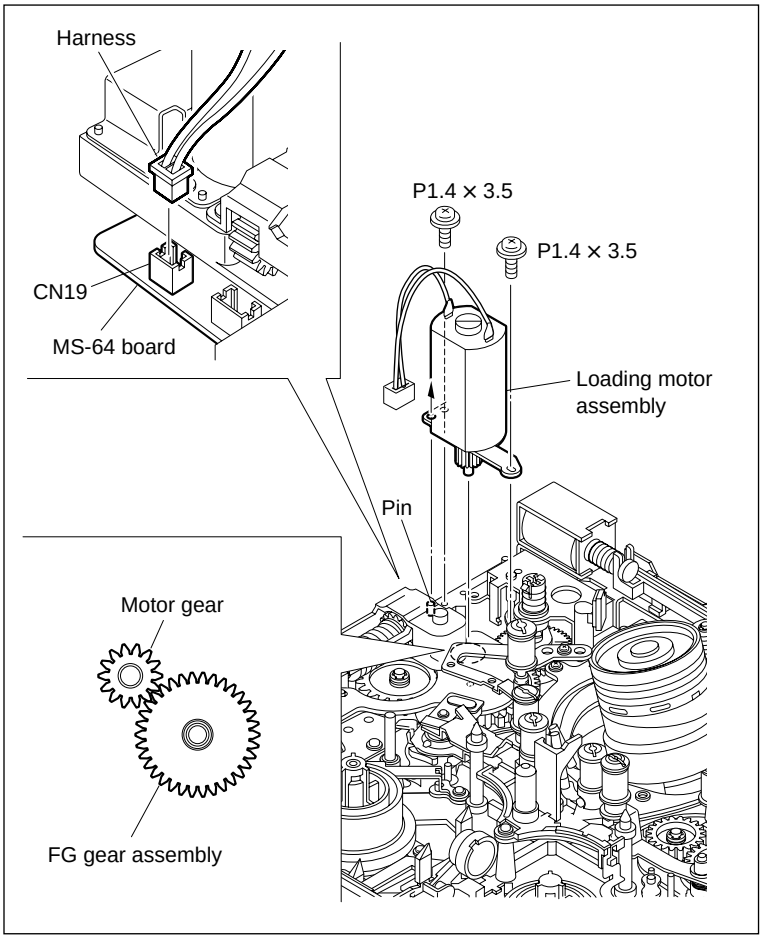
Disconnect the harness from the connector (CN19) on the MS-64 board with tweezers.

2. Replacing the loading motor assembly

(1) Remove the two screws to remove the loading motor assembly.
(2) Align a positioning hole in a new loading motor with the positioning pin on the MD chassis and engage the motor gear with the FG gear.
(3) Fix the loading motor assembly with the two screws.
Tightening Torque : 0.1 N•m {1 kgf•cm}

3. Reconnecting the connector

Reconnect the harness to the connector (CN19) on the MS-64 board with tweezers.



7-18. Reel Shift Motor Assembly Replacement

Outline

Replacement

Removing the pinch limiter assembly
Removing the pinch solenoid assembly
Replacing the reel shift motor assembly
Reattaching the pinch solenoid assembly
Reattaching the pinch limiter assembly

Note

Prepare a new stop washer when replacing the reel shift motor assembly.
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the pinch limiter assembly)

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3)
4. Remove the cassette compartment. (Refer to Section 3-4)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01
- Tweezers

Replacement

1. Removing the pinch limiter assembly

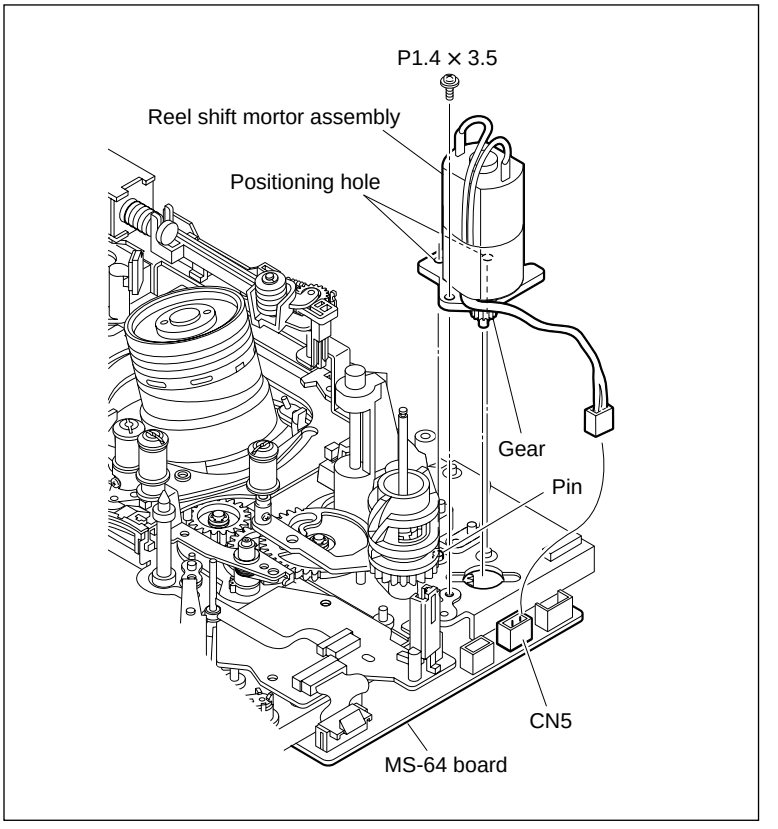
Remove the pinch limiter assembly.
(Refer to Section 7-5.)

2. Removing the pinch solenoid assembly

Remove the pinch solenoid assembly.
(Refer to Section 7-7.)

3. Replacing the reel shift motor assembly

(1) Disconnect the harness of the reel shift motor assembly from the connector (CN5) on the MS-64 board with tweezers.
(2) Remove the screw to remove the reel shift motor assembly.
(3) Fit two holes in a new reel shift motor assembly shown in the figure on the two pins on the MD chassis and engage it with the gear A.
(4) Reattach the reel shift motor assembly with the screw.
Tightening Torque : 0.1 N•m {1 kgf•cm}
(5) Reconnect the harness of the reel shift motor to the connector (CN5) on the MS-64 board.



4. Reattaching the pinch solenoid assembly

Reattach the pinch solenoid assembly.
(Refer to Section 7-7.)

5. Reattaching the pinch limiter assembly

Reattach the pinch limiter assembly.
(Refer to Section 7-5.)

7-19. MIC Assembly Replacement

Outline

Replacement

Removing the MD cover
Disconnecting the flexible card wire
Moving the S/T reel tables
Removing the L push plate
Removing the MIC spring
Replacing the MIC assembly
Moving the S/T reel tables
Reattaching the MIC spring
Reattaching the L push plate
Reconnecting the flexible card wire
Reattaching the MD cover

Note

Prepare a new stop washer when replacing the MIC holder.
Stop washer (1.2) : 3-559-408-11
Do avoid touching the terminal on the MIC holder and wiping it with cleaning fluid. When need cleaning, wipe it carefully with a soft dry cloth.
Use care not to lose a poly-slider washer between the base plate and the MIC assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottm panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver’s bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Tweezers

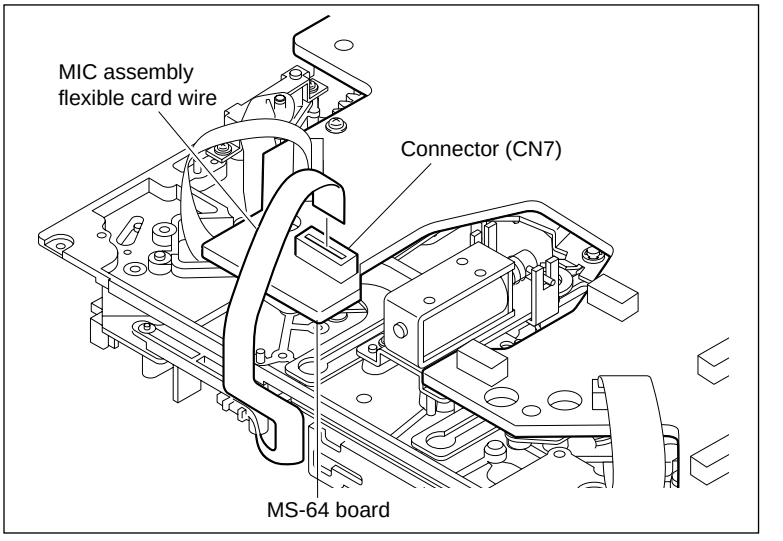
Replacement

1. Removing the MD cover

Remove the MD cover. (Refer to Section 7-2.)

2. Disconnecting the flexible card wire

Disconnect the flexible card wire from the connector (CN7) on the MS-64 board located on the back side of the MD chassis.

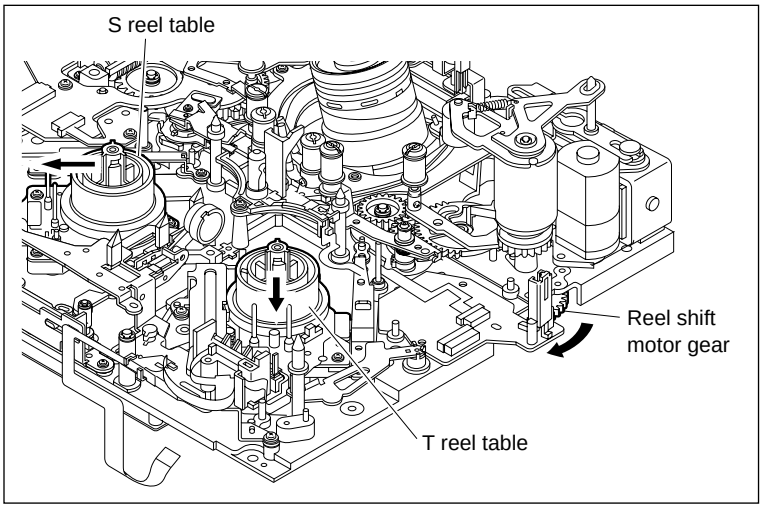


3. Moving the S/T reel tables

Turn the reel shift motor gear in the arrow direction by a finger and bring the S/T reel tables to the standard cassette position (the most front side).

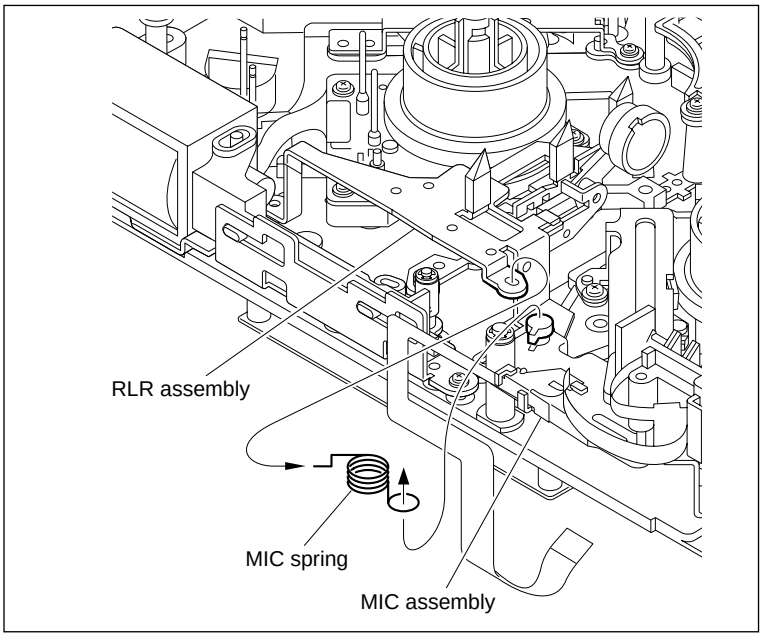
4. Removing the L push plate

Remove the L push plate. (Refer to Section 7-3.)



5. Removing the MIC spring

Unhook the hooks on the both ends of the MIC spring which hold the MIC arm and the RLR assemblies.



6. Replacing the MIC assembly

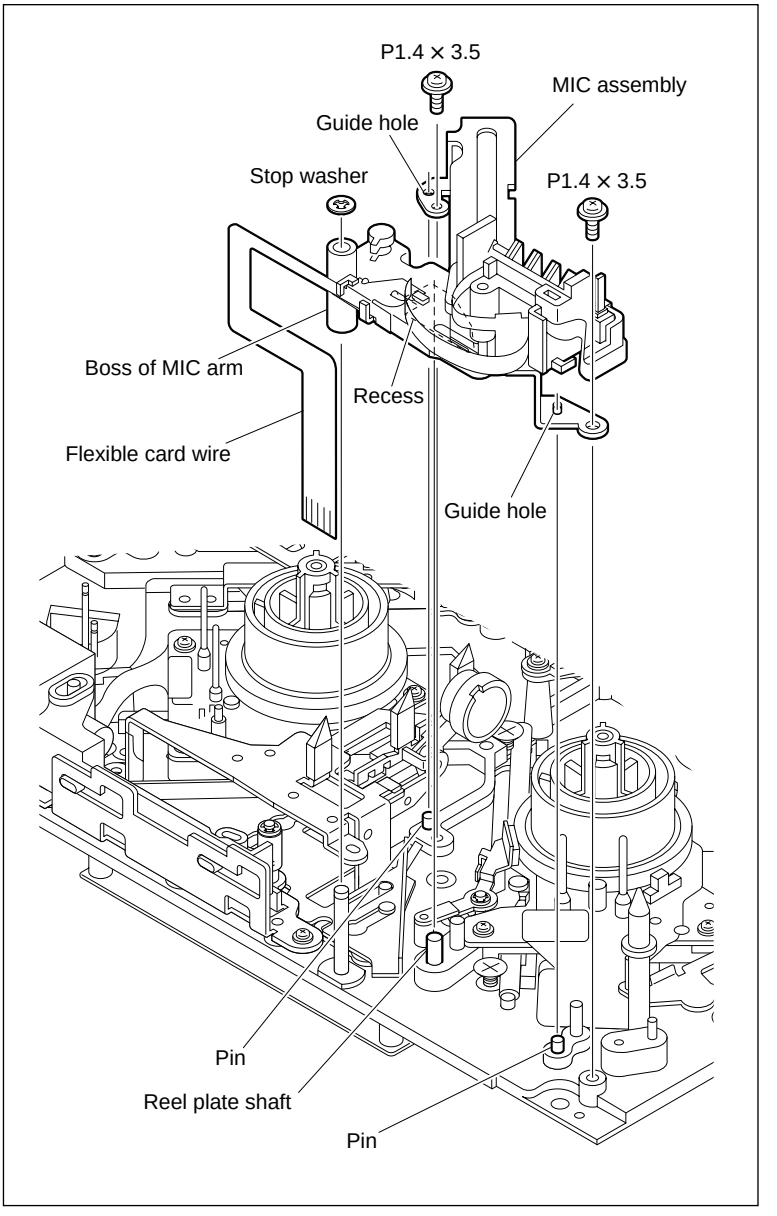
(1) Remove the stop washer and the two screws which secure the MIC assembly to the MD chassis, and remove the MIC assembly.

(2) Insert a tip of the flexible card wire of a new MIC assembly between the chassis and the front MD chassis to bring it to the back side of the unit.

Note

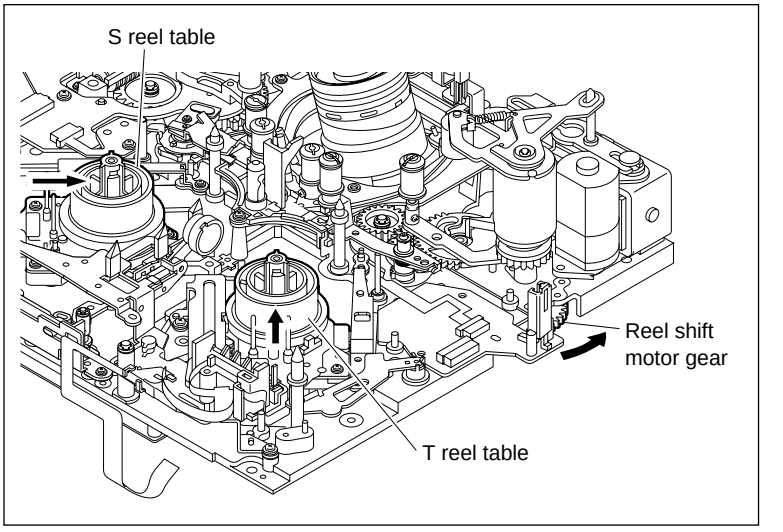
Use great care not to fold and scratch the flexible card wire during this operation.

(3) Fit the boss of the MIC arm on the shaft of the MD chassis and also fit the recess on the reel plate shaft.
Fit the two guide holes in the MIC assembly on the pins on the MD chassis, and fix the assembly with the two screws and a new stop washer.
Tightening Torque : 0.1 N•m {1 kgf•cm}



7. Moving the S/T reel tables

Turn the reel shift motor gear in the arrow direction by a finger and bring the S/T reel tables to the S-cassette position (the drum side). Confirm that the S/T reel tables and the MIC assembly shift smoothly.



8. Reattaching the MIC spring

Reattach the MIC spring removed in step 5 to the MIC arm and RLR assemblies.

9. Reattaching the L push plate

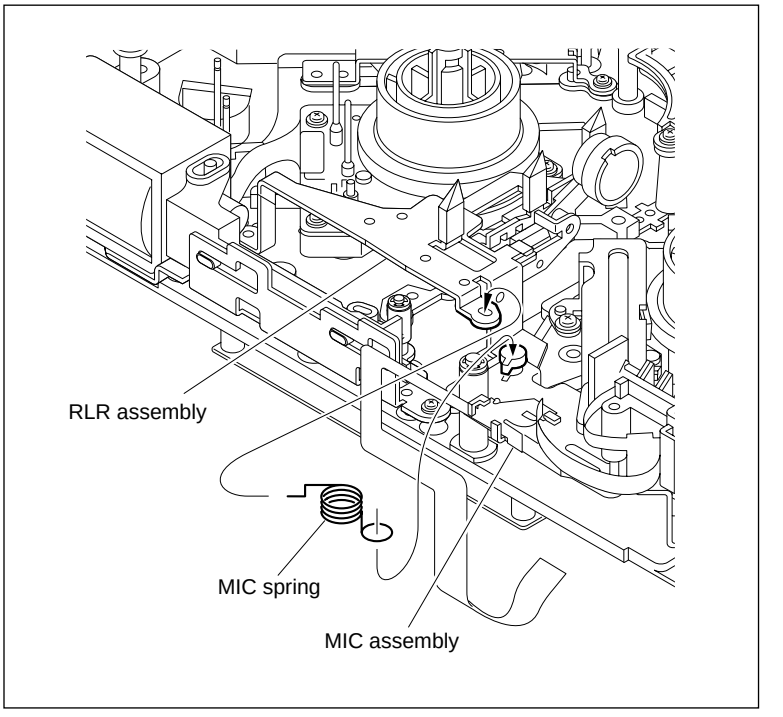
Reattach the L push plate. (Refer to Section 7-3.)

10. Reconnecting the flexible card wire

Reconnect the flexible card wire to the connector (CN7) on the MS-64 board located on the back side of the MD chassis.

11. Reattaching the MD cover.

Reattach the MD cover. (Refer to Section 7-2.)



7-20. MIC Holder Assembly Replacement

Outline

Replacement

Removing the MD cover
Removing the MIC assembly
Replacing the MIC holder assembly
Reattaching the MIC assembly
Reattaching the MD cover

Note

Prepare new stop washers when replacing the MIC holder.
Stop washer (1.2) : 3-559-408-11 × 2 (for mounting the MIC holder assembly)
Stop washer (1.5) : 3-669-465-01 × 1 (for mounting the MIC assembly)
Do avoid touching the terminal on the MIC holder and wiping it with cleaning fluid. When need cleaning, wipe it carefully with a soft dry cloth.
Use care not to lose a poly-slider washer between the base plate and the MIC assembly.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the bottm panel. (Refer to Section 3-3.)
5. Remove the right side panel. (Refer to Section 3-3.)
6. Remove the cassette compartment. (Refer to Section 3-4.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.5 : J-6082-231-A
- Washer mounting fixture Ø1.2 : J-6082-232-A
- Tweezers

Replacement

1. Removing the MD cover

Remove the MD cover. (Refer to Section 7-2.)

2. Removing the MIC assembly

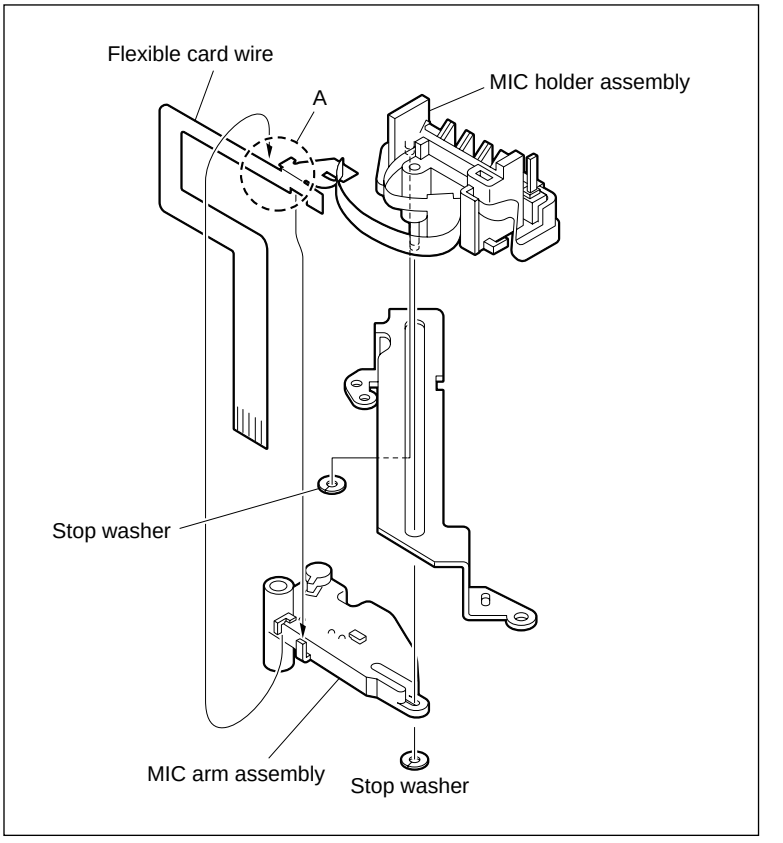
Remove the MIC assembly.
(Refer to Section 7-19.)

3. Replacing the MIC holder subassembly

(1) Remove the portion A shown of the flexible card wire from the MIC arm assembly as shown in the figure.
(2) Remove the two stop washers from the back side of the MIC assembly and remove the MIC holder assembly.
(3) Fix a new MIC holder assembly to the MIC assembly with two new stop washers (1.2).

Note

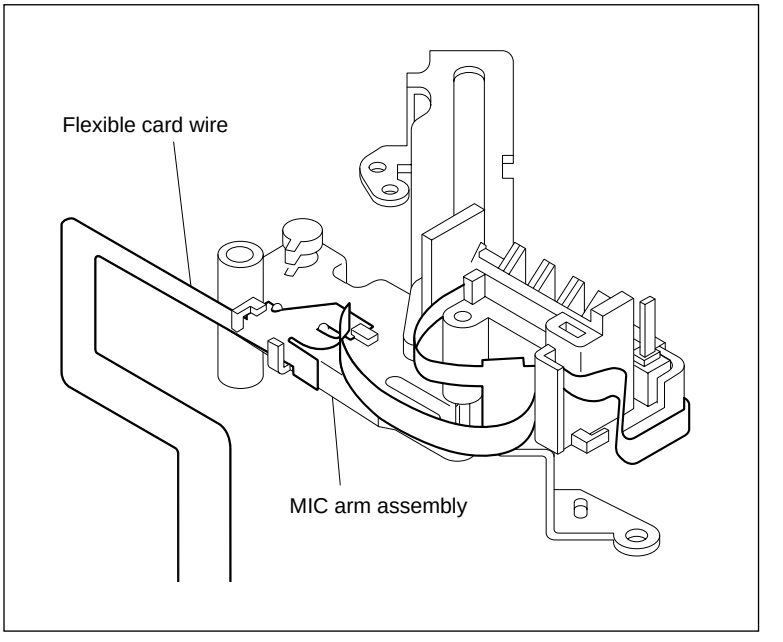
Use great care not to fold and not to scratch the flexible card wire when reattaching.



(4) Fix the flexible card wire to the MIC arm assembly as shown in the figure.
(5) Insert a tip of the flexible card wire of the MIC assembly between the chassis and the front MD chassis to bring it to the back side of the unit.

Note

Use extreme care not to fold and not to scratch the flexible card wire at this operation.



4. Reattaching the MIC assembly

Reattach the MIC assembly.
(Refer to Section 7-19.)

5. Reattaching the MD cover

Reattach the MD cover. (Refer to Section 7-2.)

7-21. HC Roller Assembly Replacement

Outline

Replacement

Disconnecting the connector
Removing the head cleaner assembly
Replacing the HC roller assembly
Reattaching the head cleaner assembly
Reconnecting the connector

Note

Prepare a new stop washer when replacing the HC roller assembly.
Stop washer (0.8) : 3-315-414-31 × 1
Bare-handed touch to the HC roller assembly is prohibited. Do put on cloth gloves before replacing.

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Washer extracting fixture (A) : J-6082-234-A
- Washer mounting fixture Ø1.8 : J-6082-233-A

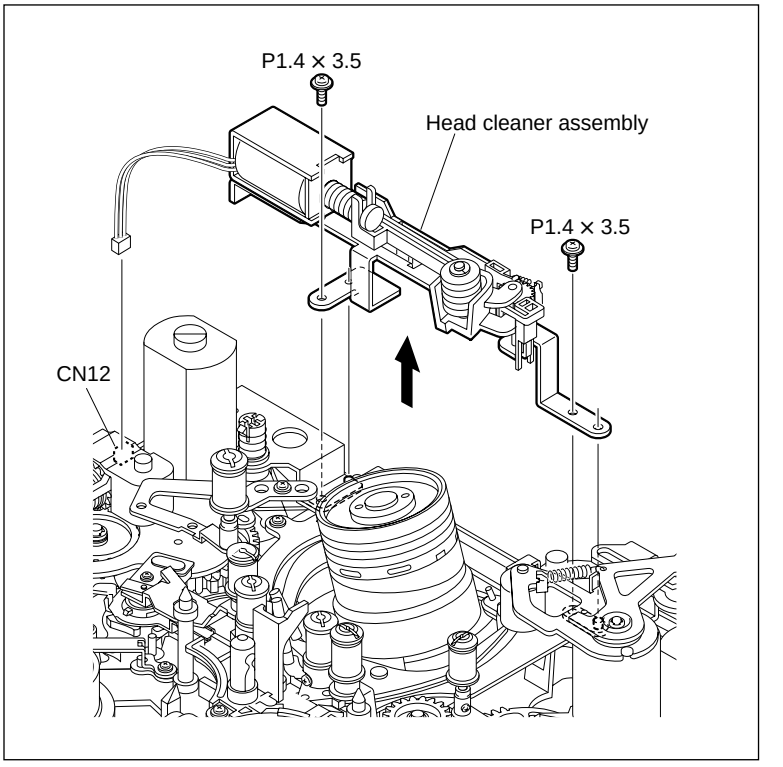
Replacement

1. Disconnecting the connector

Disconnect the harness from the connector (CN12) on the MS-64 board with tweezers.

2. Removing the head cleaner assembly

Remove the two screws and pull off the head cleaner assembly in the arrow direction.



3. Replacing the HC roller assembly

(1) Remove the stop washer to remove the HC roller assembly.

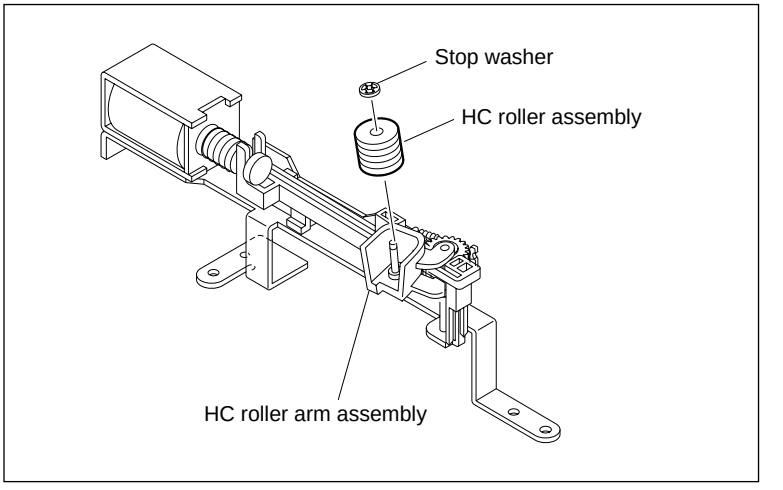
(2) Attach a new HC roller assembly with a new stop washer.

Note

Avoid bare-handed touch to the HC roller assembly.

In addition, do not give an excessive force to it at removal and reattachment, it may cause deformation.

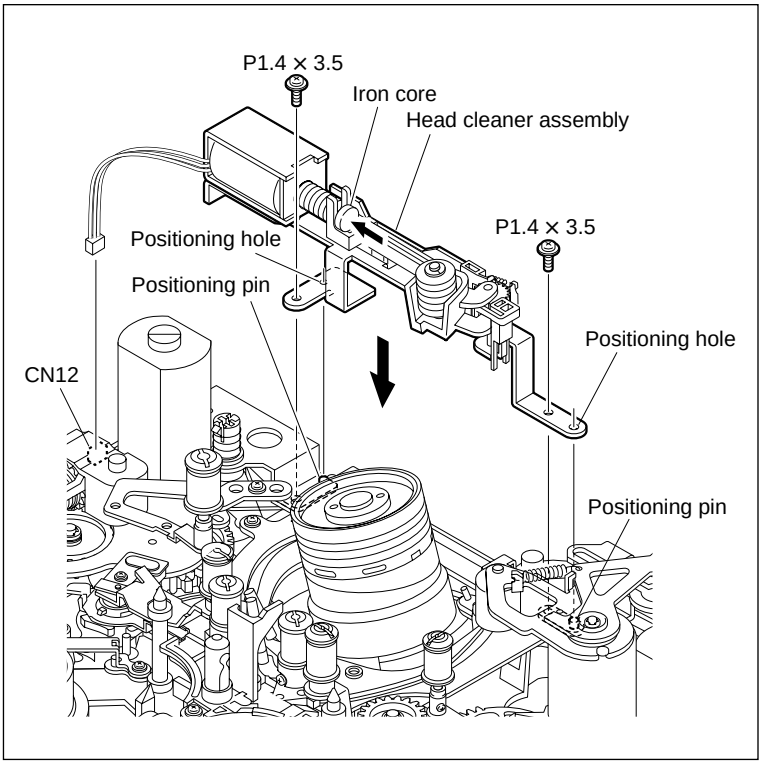
Operation supporting the back side of the HC roller assembly by fingers is required.



4. Reattaching the head cleaner assembly

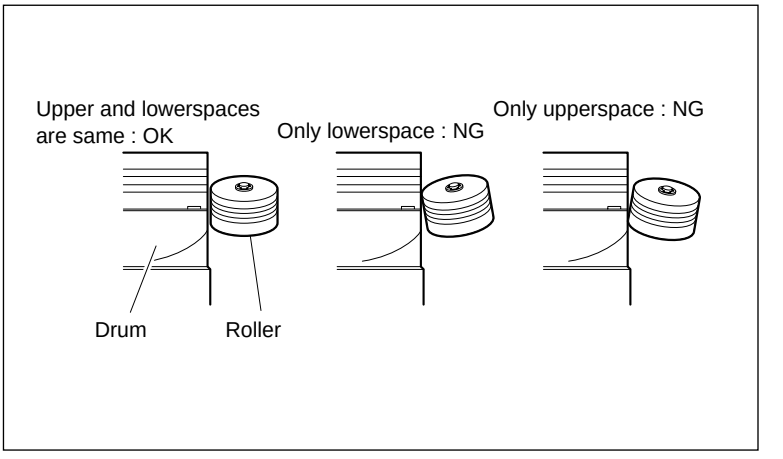
Align the two positioning holes in the head cleaner assembly with the two positioning pins on the MD chassis and fix the assembly with the two screws.

Tightening torque : 0.1 N•m {1 kgf•cm}



5. Checking the performance of the head cleaner assembly

Check that the HC roller assembly contacts the drum assembly in parallel when the solenoid's iron core of the head cleaner assembly is in the pull-in state by being pressed in the arrow direction.



6. Reconnecting the connector

Reconnect the harness to the connector (CN12) on the MS-64 board.

7-22. Head Cleaner Solenoid Replacement

Outline

Replacement

Removing the head cleaner assembly
Replacing the head cleaner solenoid
Reattaching the head cleaner assembly
Checking the performance of the head cleaner assembly

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)

Tools

- Torque screwdriver's bit (for M1.4) : J-6325-110-A
- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A

Replacement

1. Removing the head cleaner assembly

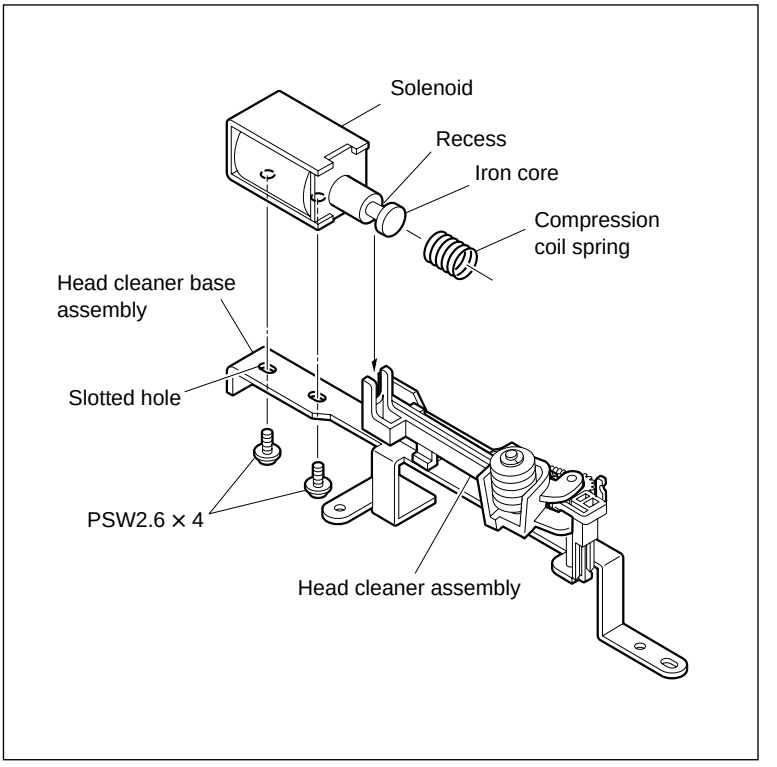
Remove the head cleaner assembly.
(Refer to Section 7-21.)

2. Replacing the head cleaner solenoid

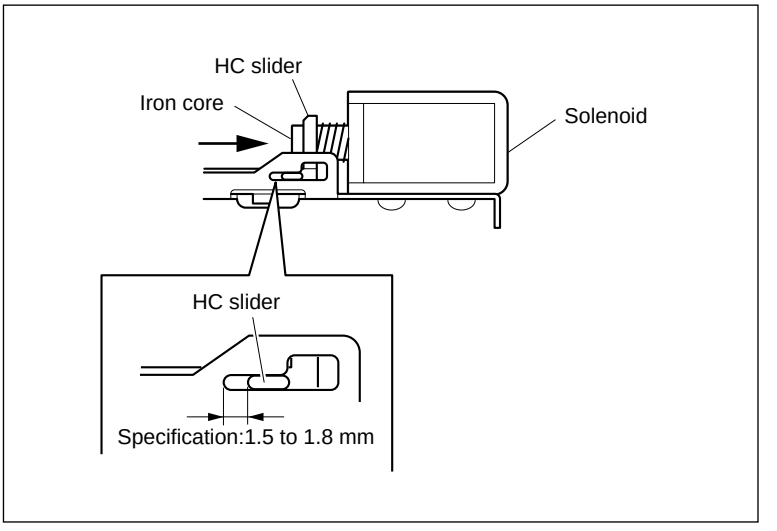
(1) Remove the two screws on the back side of the head cleaner assembly.
(2) Remove the solenoid with the spring on it.
(3) Remove the compression coil spring from the solenoid.
(4) Fit the compression coil spring on a new solenoid's iron core.
(5) Pull out the iron core until a recess comes in sight, then fix the solenoid to the head cleaner assembly.
(6) Align the two holes in the solenoid with the two slotted holes in the HC base assembly and fix temporally with the two screws.

Note

Tighten the screws just enough to move the head cleaner solenoid.



(7) Adjust the solenoid position to meet the specification of the clearance between the HC roller arm assembly and the tip of the HC slider under the condition that the iron core comes to the pull-in state by being pressed in the arrow direction, then tighten the two screws.
Tightening torque : 0.2 N•m {2 kgf•cm}



3. Reattaching the head cleaner assembly

Reattach the head cleaner assembly.
(Refer to Section 7-21.)

4. Checking the performance of the head cleaner assembly

Check the performance of the head cleaner assembly. (Refer to Section 7-21.)

7-23. Cassette Compartment Motor Replacement

Outline

Replacement

Removing the motor gear assembly
Replacing the motor assembly
Reattaching the motor gear assembly

Preparation

1. Set the unit to the unthreading end status.
2. Power off the unit.
3. Remove the top panel. (Refer to Section 3-3.)
4. Remove the cassette compartment. (Refer to Section 3-4.)

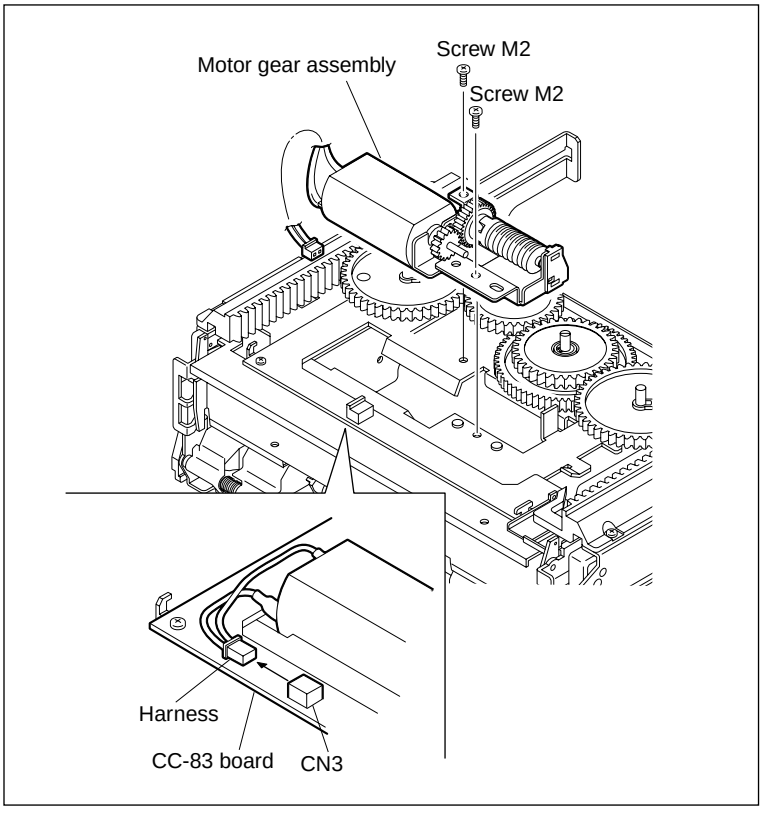
Tools

- Torque screwdriver (for 3 kgf•cm) : J-6325-400-A
- Torque screwdriver's bit (for M2) : J-6325-380-A
- Grease (SGL-941) : 7-662-001-39
- Tweezers

Replacement

1. Removing the motor gear assembly

(1) Remove the harness of the motor gear from the connector (CN3) on the CC-83 board in the cassette compartment.
(2) Remove the motor gear assembly from the cassette compartment by removing the two screws.



2. Replacing the motor assembly

(1) Release the upper and lower claws of the pivot bracket to remove the pivot bracket.

Note

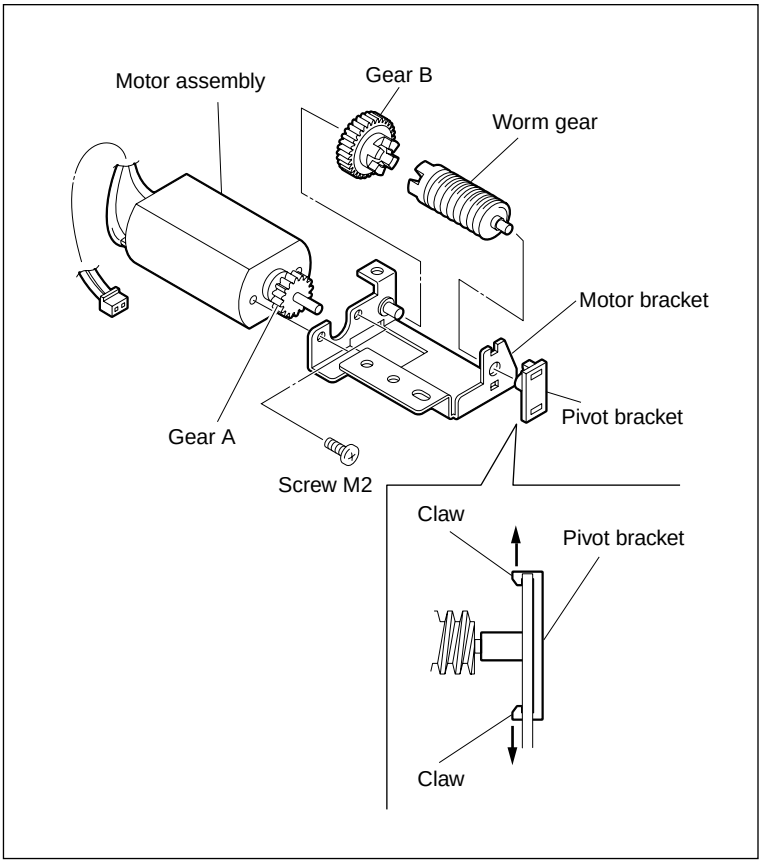
Be careful not to lose the worm gear, which also comes off at this operation.

(2) Remove the gear B from the shaft of the motor bracket assembly.
(3) Remove the two screws to remove the motor assembly from the motor bracket.
(4) Fix a new motor assembly to the motor bracket positioning as shown in the figure with the two screws.

Note

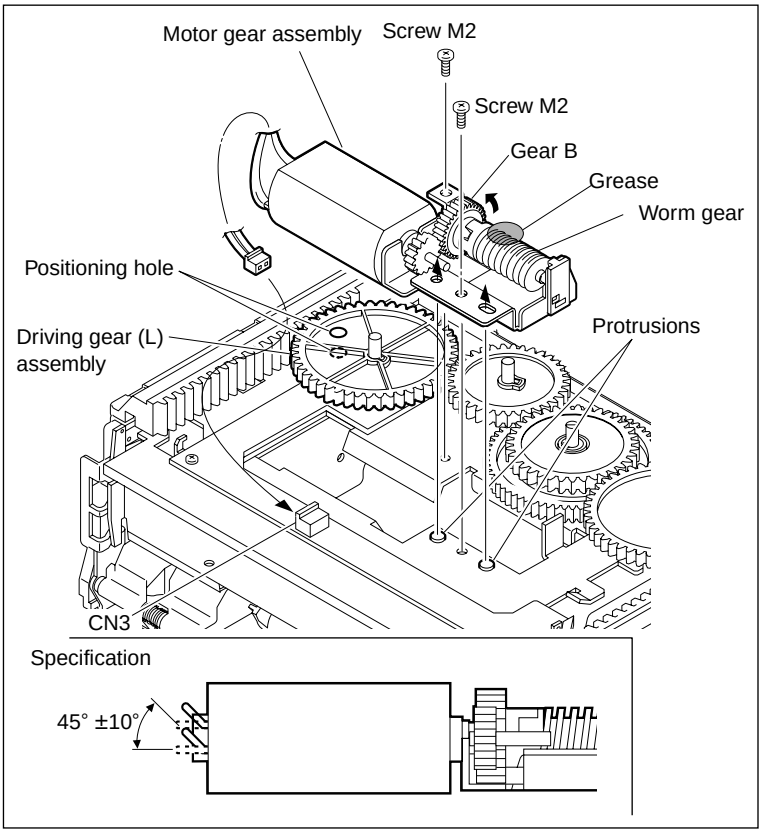
Be reminded a new motor assembly has the gear A on its shaft.
Tightening torque : 0.2 N•m {2 kgf•cm}

(5) Reattach the gear B to the shaft of the motor bracket assembly.
(6) Make a coupling between the worm gear and the gear B and insert the pivot bracket shaft from another side of the worm gear.
(7) Fix the upper and lower claws to the motor bracket.



3. Reattaching the motor gear assembly

(1) Bend the two terminals in the motor gear assembly to meet the specification of their bent angle shown in the figure.
(2) With the worm gear in the motor gear assembly engaged with the worm wheel, insert the two protrusions of the motor gear assembly into the holes in the cassette compartment and fix with two screws.
(3) Align the hole in the drive gear (L) assembly with the hole in the cassette compartment by turning the gear B of the motor gear assembly by a finger.
(4) Apply a grain of grease on the worm gear in the motor gear assembly.
(5) Reconnect the harness of the motor gear assembly to the connector (CN3) on the CC-83.



7-24. Switching Regulator Replacement

Outline

Replacement

Disconnecting the connectors
Replacing the switching regulator
Reconnecting the connectors

Preparation

1. Power off the unit.
2. Remove the top panel. (Refer to Section 3-3.)

Replacement

1. Disconnecting the connectors

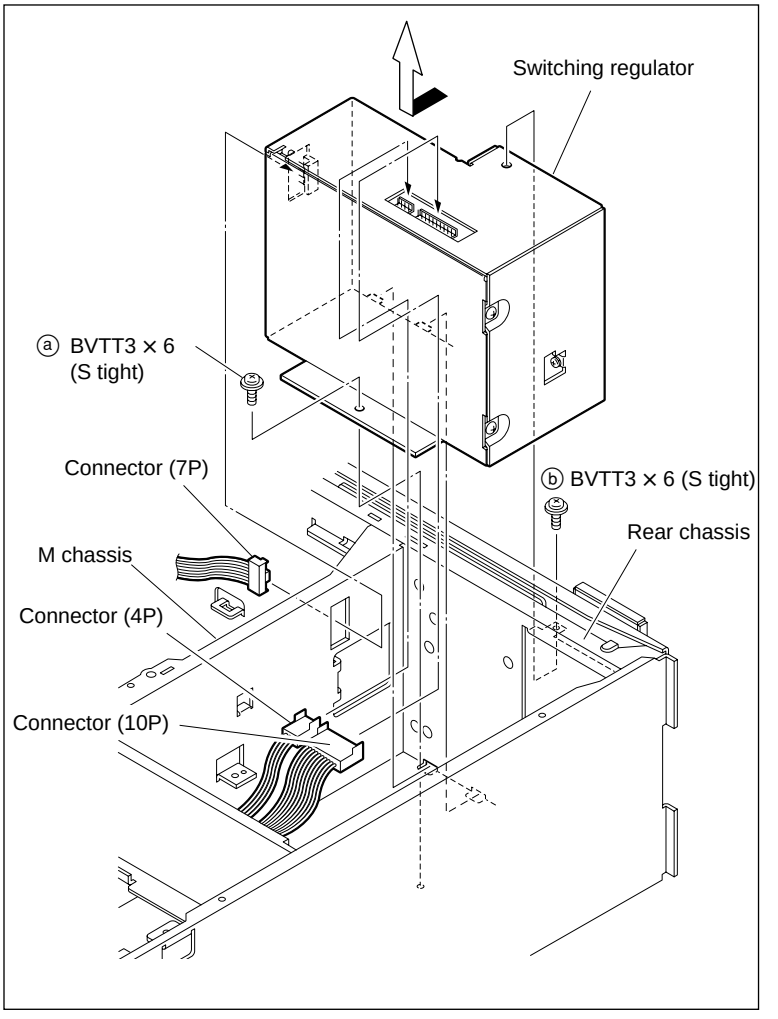
Disconnect the three connectors, the two connectors (4P and 10P) on the upper side of the switching regulator, and one connector (7P) on the side.

2. Replacing the switching regulator

(1) Remove the two screws.
(2) Pull out the switching regulator in the arrow direction.
(3) Set a new switching regulator at the base of the unit and slide it along the chassis M in the reverse direction of the arrow as far as it pushes the rear chassis.
(4) Tighten the two screws (ⓐ and ⓑ) to fix the switching regulator.

3. Reconnecting the connectors

Reconnect the three connectors removed in step 1.



Section 8
Tape Path Alignment

Tape path adjustment is very important adjustment to run tape under the optimum conditions for tape.
If this adjustment is not performed correctly, tape may be damaged.
Perform this adjustment with utmost attention.
Perform this adjustment after the cassette compartment assembly is removed from VTR.

8-1. General Information for Tape Path Adjustment

Tools

1. Alignment tape

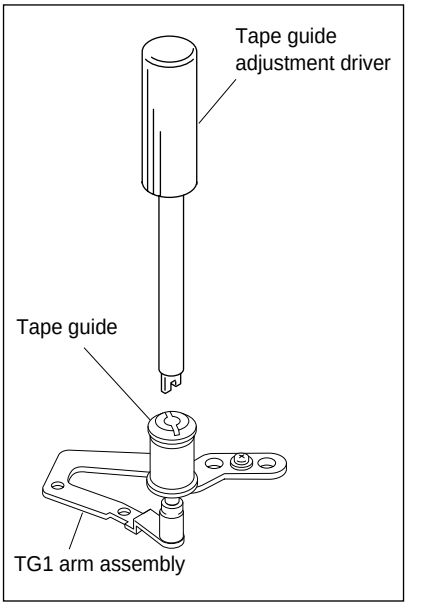
The following alignment tapes are necessary for tape path adjustment.

- XH2-1AST (Standard cassette) : 8-967-999-02
- XH5-1A2 (Mini cassette) : 8-967-999-22 (NTSC)
- XH5-1AP2 (Mini cassette) : 8-967-999-26 (PAL)

2. Tape guide adjustment driver

The following tape guide adjustment driver which is available as the Sony service tool is necessary for height adjustment of tape guide.

- Tape guide adjustment driver : J-6082-362-A



3. Tape path adjustment board

Use the tape path adjustment board (DJ-461) to parforme the tape path adjustment.

- Tape path adjustment board, DJ-461 : J-6444-610-B

4. The required tools in addition to the above listed tools.

- Oscilloscope (Tektronix 2445B or equivalent)
- Small mirror for adjustment : J-6080-029-A
- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

Preparation of Tape Path Adjustment

1. Cassette compartment assembly

It is not necessary to remove the cassette compartment assembly during tape path adjustment.

2. Cleaning the tape running surface

Clean the tape running surface of tape guides, head drum and video heads using the cleaning cloth moistened with cleaning fluid.

- Cleaning cloth : 3-184-527-01
- Cleaning fluid : 9-919-573-01

3. Information to use the tracking alignment tape (XH2-1AST)

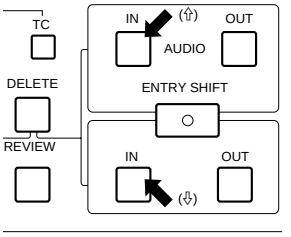
Check the following items before entering the tracking adjustment mode.

- How to enter the maintenance menu, refer to Section 5-2-2.
- How to exit the maintenance menu, refer to Section 5-2-3.

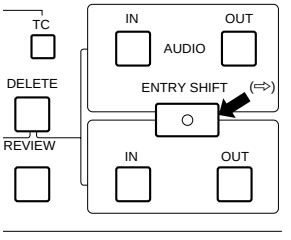
4. Operating procedures of tracking adjustment

(1) Enter the maintenance menu.

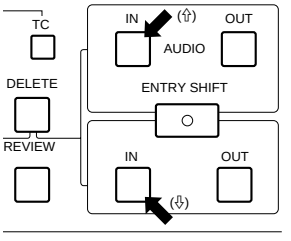
(2) Move the cursor to “TAPE PATH ADJUST” which is displayed with a white background using the AUDIO IN (⇧) or IN (⇩) key.

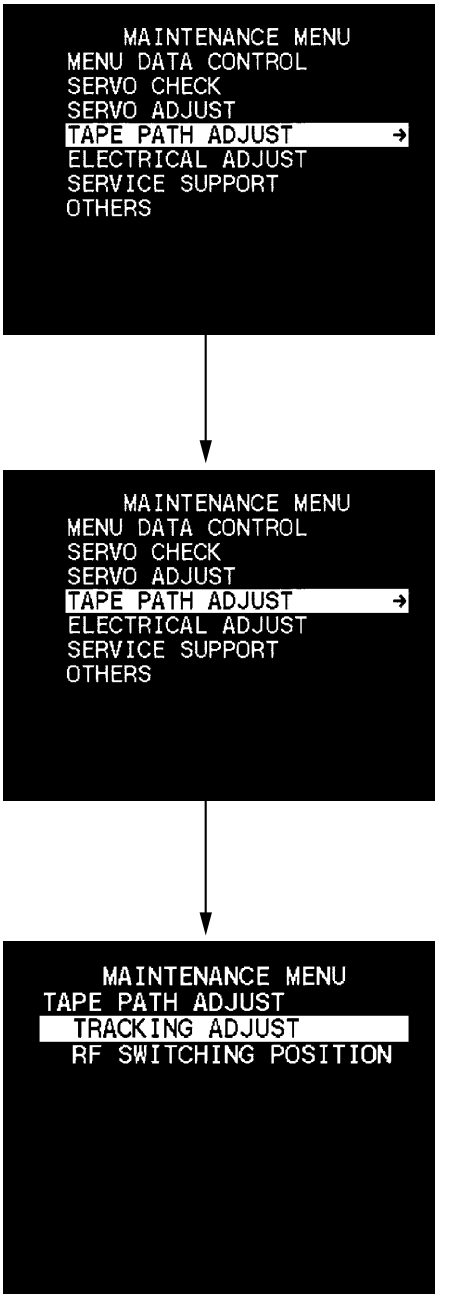


(3) Press the ENTRY SHIFT (⇨) key.
This selects “TAPE PATH ADJUST” and menu of the lower level directory appears.

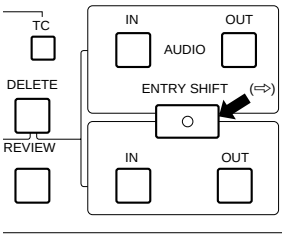


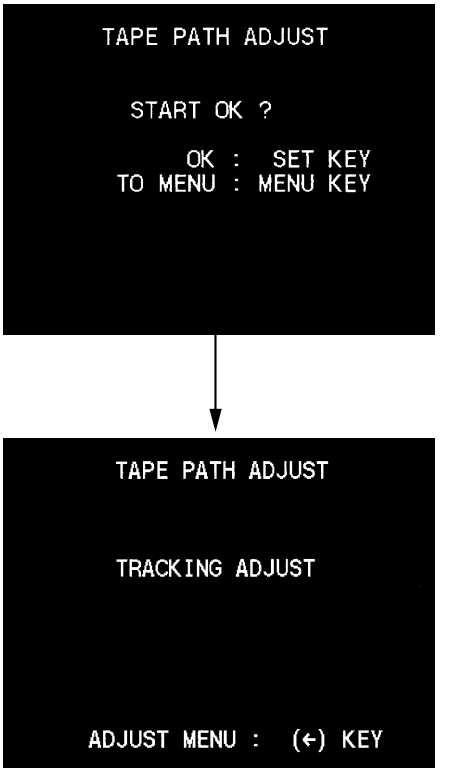
(4) Move the cursor to “TRACKING ADJUST” which is displayed with a white background using the AUDIO IN (⇧), or IN (⇩) key.



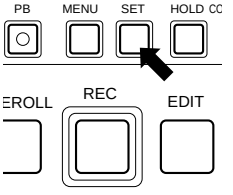


(5) Press the ENTRY SHIFT (⇨) key to show the "START OK?" display.





(6) Press the SET key.

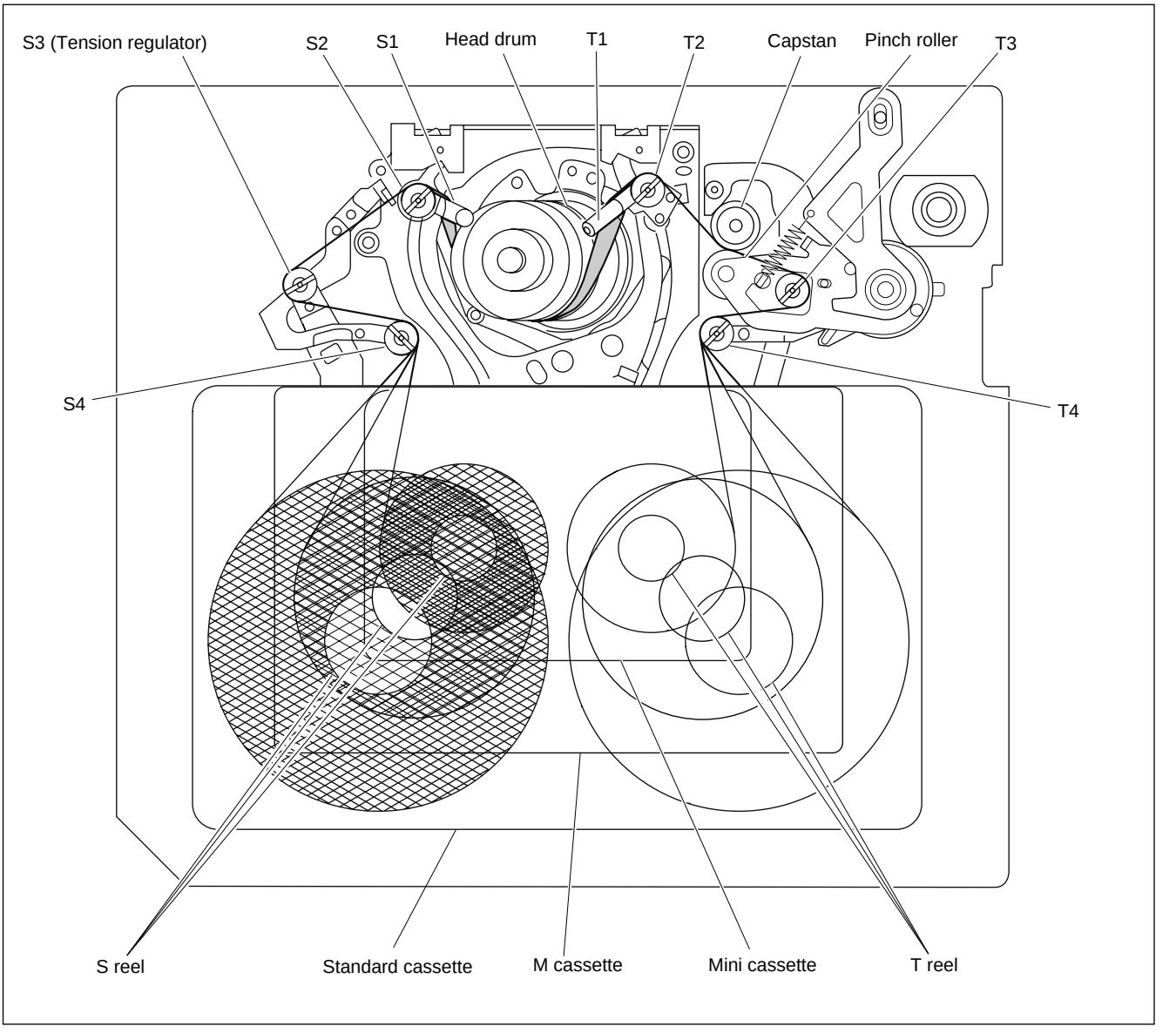


(7) Display the "TRACKING ADJUST" on the screen. The adjustments that are described in sections 8-2, 8-4 to 8-8 are performed under this mode.

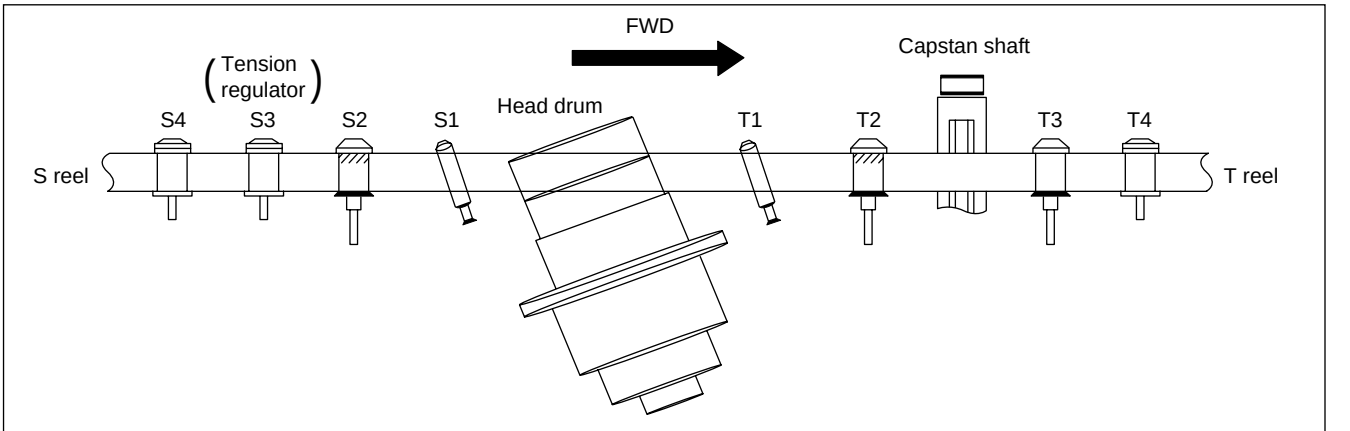
Note

This unit does not have the tracking shift function. Instead of having the tracking shift function, the tracking alignment tape XH2-1AST has already been recorded in the factory so that the servo is locked at 50 % off-track automatically.

5. Tape guide locations



6. Tape running condition



The hatched areas (marked by /////) are contacting with tape or pressing tape.

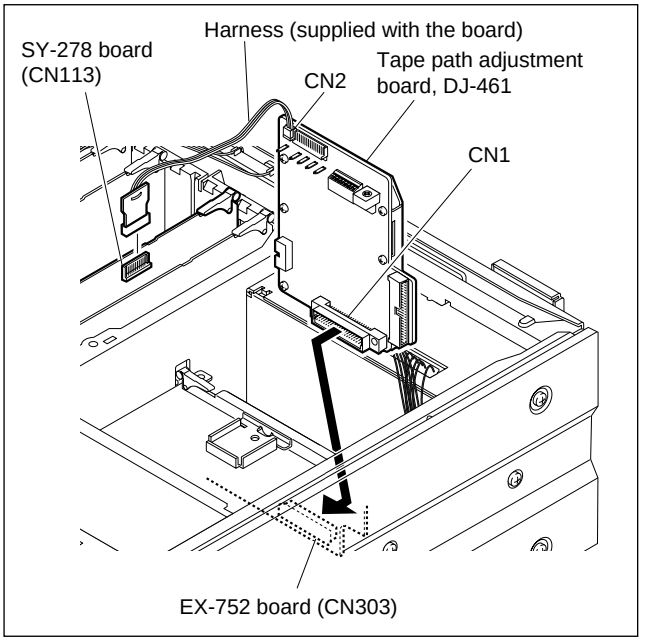
7. Preparation of signal measurement

Use the tape path adjustment board DJ-461 (J-6444-610-B) to perform the tape path adjustment.

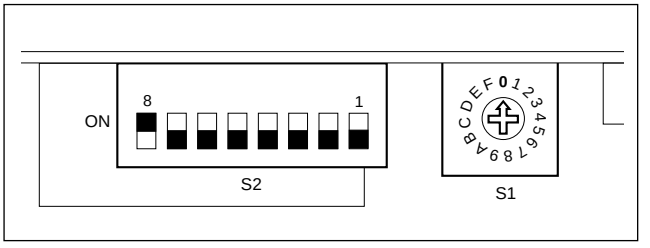
(1) Setting of the tape path adjustment board

Connect the connector CN1 on the tape path adjustment board with the connector CN303 on the EX-752 board of the unit.

Connect the connector CN2 on the tape path adjustment board with the connector CN113 on the SY-278 board using the harness supplied with the board.



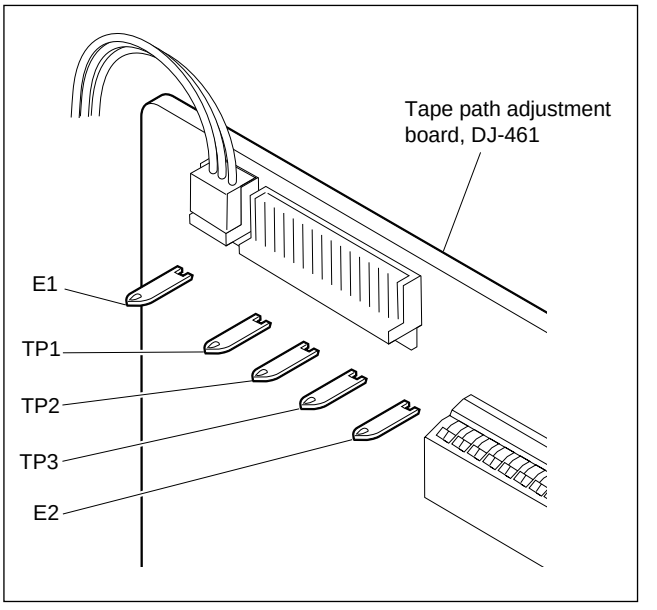
(2) Switch setting of the tape path adjustment board



SW	Bit	Setting	Function
S1	-	0	Select the REC head.
S2	1	OFF	
	2	OFF	
	3	OFF	
	4	OFF	
	5	OFF	
	6	OFF	
	7	OFF	
	8	ON	Activate the switch setting of DJ-461

(3) Measuring points/signal for adjustment

Signal name	Board	Measuring point
RF output (signal after envelope detection)	DJ-461	TP2
Switching pulse output	DJ-461	TP3
GND	DJ-461	E1
	DJ-461	E2



Preference

SW / HEAD	S2 [2]	S2 [5]	S1	SWITCHING
REC E	OFF	OFF	[0]	H
REC O	OFF	OFF	[1]	H
PRE E	OFF	OFF	[0]	L
PRE O	OFF	OFF	[1]	L
WJPB E1	OFF	OFF	[2]	H
WJPB E2	ON	OFF	[3]	H
WJPB O1	OFF	OFF	[2]	L
WJPB O2	ON	OFF	[3]	L
NJPB E1	OFF	ON	[2]	H
NJPB E2	ON	ON	[3]	H
NJPB O1	OFF	ON	[2]	L
NJPB O2	ON	ON	[3]	L

8-2. Tape Path Adjustment

Basic knowledge

To perform the tracking adjustment using the alignment tape (XH2-1AST), refer the following items.

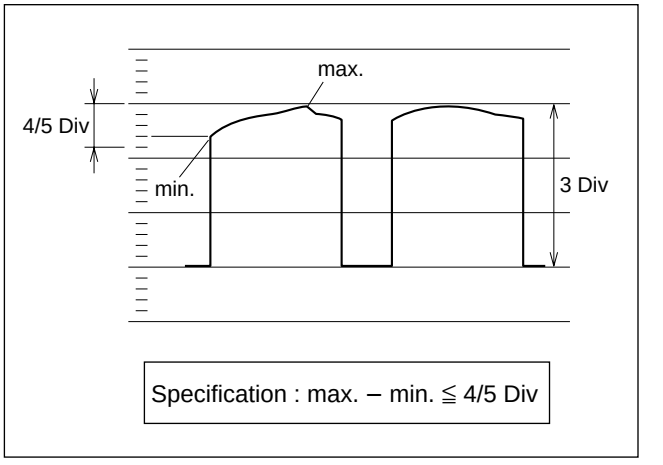
- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 8-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Dual trace oscilloscope

Check procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Put the unit into PLAY mode.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.



5. Adjust the RF waveform until it satisfies the specification by changing the height of the S2 and T2 guides.
   - When the RF waveform at the entrance side forms the shape of the solid line shown in Fig.1, turn the guide S2 clockwise to obtain the flat waveform.

   Note

   This adjustment must end with the clockwise rotation of the guide S2

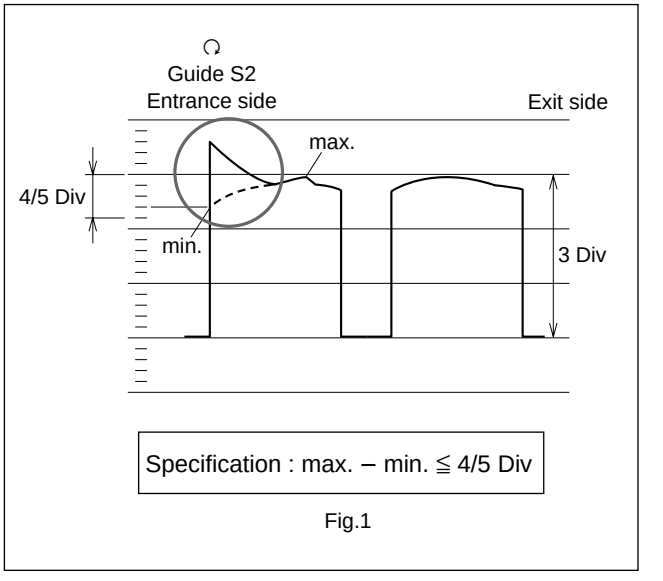
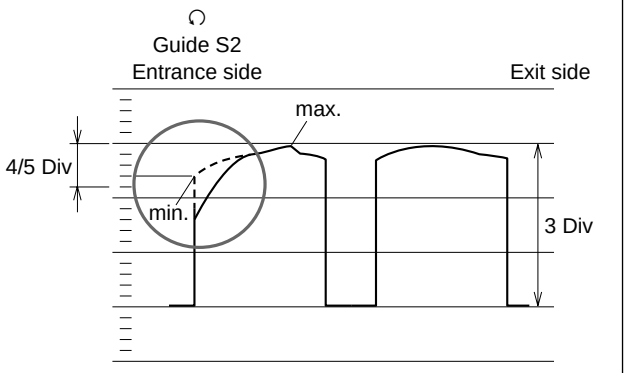


Fig.1

- When the RF waveform at the entrance side forms the shape of the solid line shown in Fig.2, turn the guide S2 counterclockwise to waveform as shown by the solid line in Fig.1. Then turn the guide S2 clockwise to obtain the desired waveform.

Note

This adjustment must end with the clockwise rotation of the guide S2.



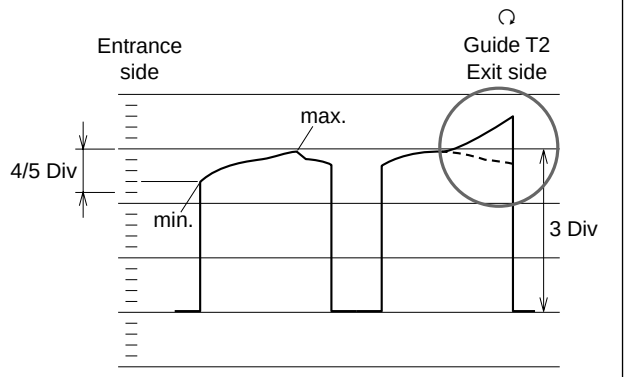
Specification : max. – min. ≦ 4/5 Div

Fig.2

- When the RF waveform at the exit side forms the shape of the solid line shown in Fig.3, turn the guide T2 clockwise to obtain the flat waveform.

Note

This adjustment must end with the clockwise rotation of the guide S2.



Specification : max. – min. ≦ 4/5 Div

Fig.3

- When the RF waveform at the exit side forms the shape of the solid line shown in Fig.4, turn the guide T2 counterclockwise to waveform as shown by the solid line in Fig.3. Then turn the guide T2 clockwise to obtain the desired waveform.

Note

This adjustment must end with the clockwise rotation of the guide T2.

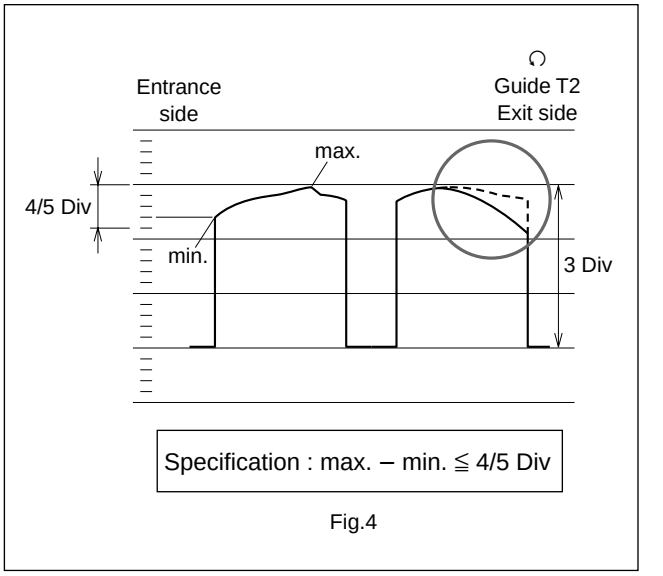
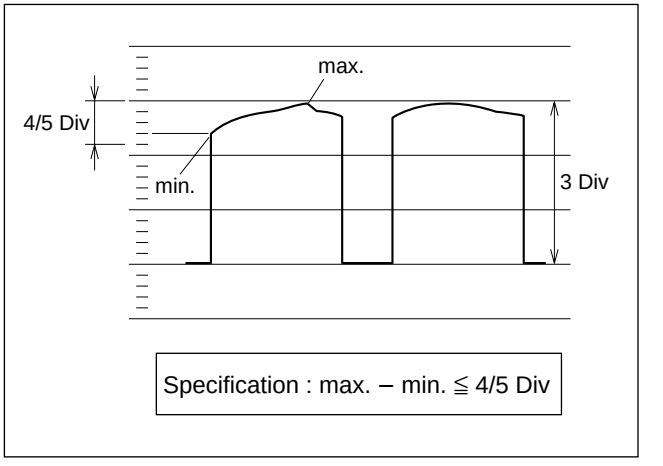


Fig.4

6. Measure the minimum amplitude of the RF waveform, and confirm that the amplitude difference between the maximum and the minimum of the RF waveform satisfies the specification.



8-3. RF Switching Position Adjustment

Be sure to perform the RF switching position adjustment whenever the tape path adjustment (refer to Section 8-2) is performed.
Perform this adjustment in the AUTO mode.

Basic knowledge

To perform the RF switching position adjustment using the alignment tape (XH5-1A2 for NTSC or XH5-1AP2 for PAL), refer the following items.

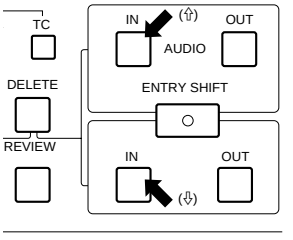
- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.

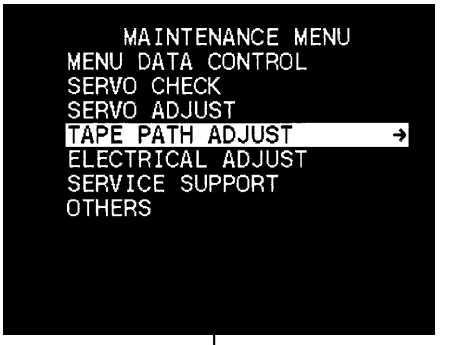
Tools

Alignment tape,	XH5-1A2 :	8-967-999-22 (for NTSC)
	XH5-1AP2 :	8-967-999-26 (for PAL)

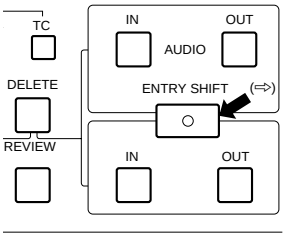
Adjustment procedure
RF switching position adjustment using the [AUTO adjustment]

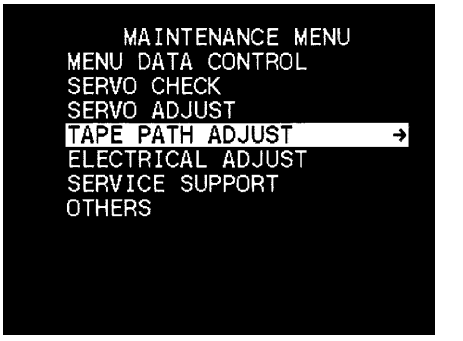
1. Enter the maintenance menu.
2. Move the cursor to “TAPE PATH ADJUST” which is displayed with a white background using the AUDIO IN (⇧) or IN (⇩) key.



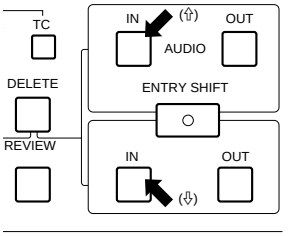


3. Press the ENTER SHIFT (⇨) key.
“TAPE PATH ADJUST” is selected and its lower layer submenu appears.

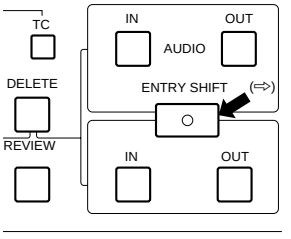




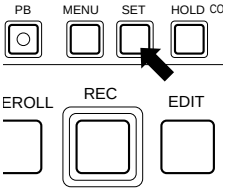
4. Move the cursor to “RF SWITCHING POSITION” which is displayed with a white background using the AUDIO IN (⇧) or IN (⇩) key.



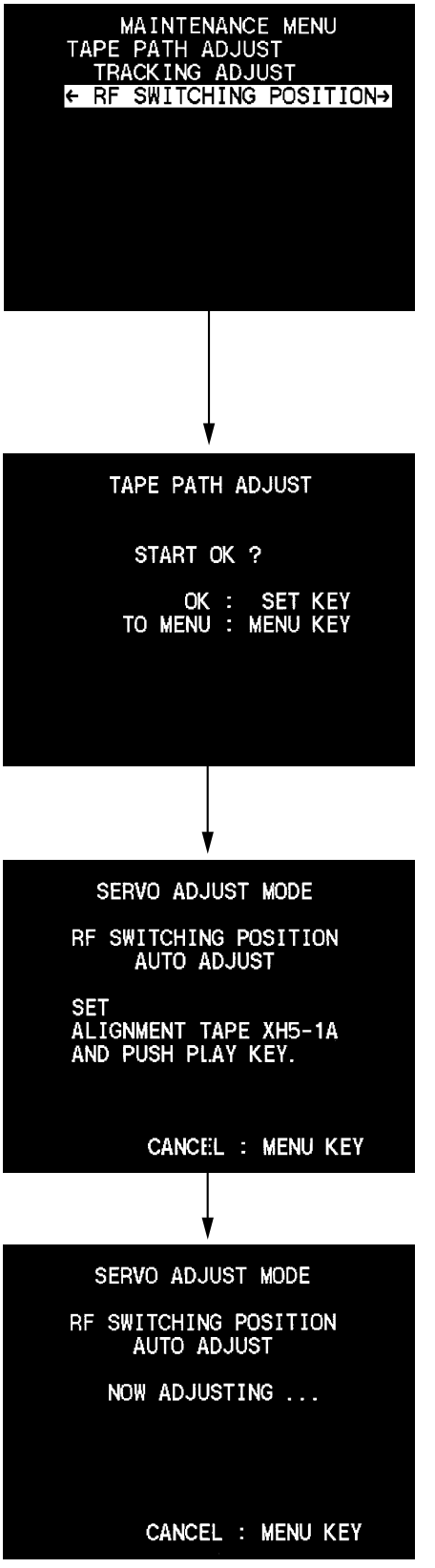
5. Select “START OK?” by pressing the ENTRY SHIFT (⇨) key.



6. Press the SET key.



7. Playback the alignment tape XH5-1A2 for NTSC or XH5-1AP2 for PAL. (display ②)
Then the unit starts the RF switching position automatic adjustment. (display ③)



④

8. When the adjustment is completed, the display ⑤ "COMPLETE" appears and alignment tape is automatically ejected.

   Note

   When the "ADJUST INCOMPLETE" appears on the monitor screen, check that the alignment tape which is played back is XH5-1A2 for NTSC, or XH5-1AP2 for PAL.

⑤

9. Press the MENU key to return to the maintenance menu.

8-4. Tape Path Adjustment Confirmation

Be sure to perform tracking adjustment described in Section 8-3 after performing the tracking adjustment in Section 8-2.

Basic knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

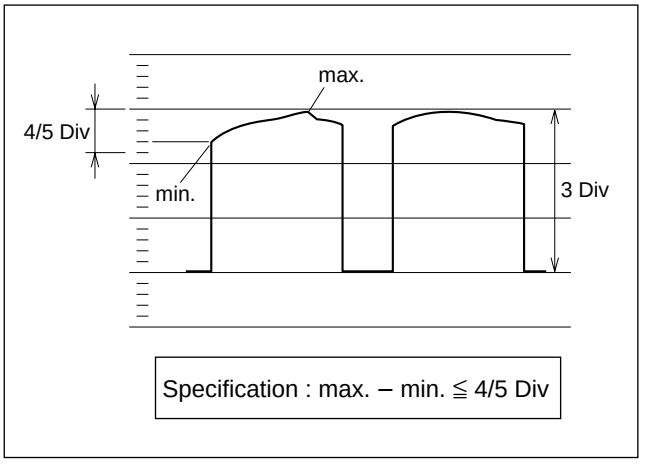
- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 8-1.

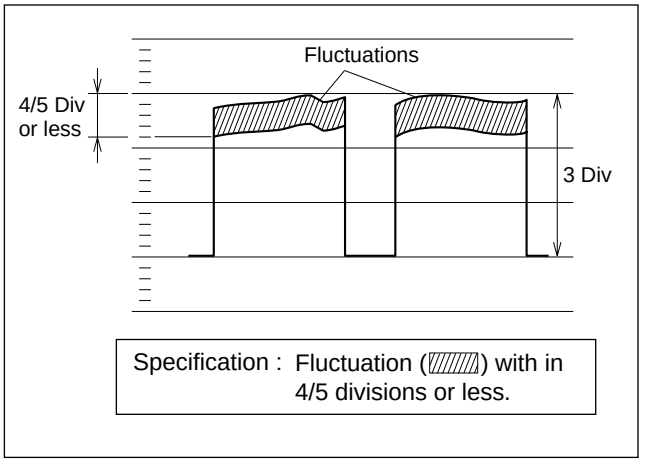
Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Dual trace oscilloscope

Check procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Put the unit into PLAY mode.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Measure the minimum amplitude of the RF waveform, and confirm that the amplitude difference between the maximum and the minimum of the RF waveform satisfies the specification.
6. Confirm that fluctuation of the RF waveform satisfies the specification.





8-5. Search Forward (×5) Waveform Check

Basic knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 8-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Dual trace oscilloscope

Check procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Set the JOG dial search FORWARD to the ×5 position.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Confirm that the RF waveform should be almost the same amplitude with constant intervals as shown in Fig.1.
6. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from search FORWARD (×5) to PLAY.

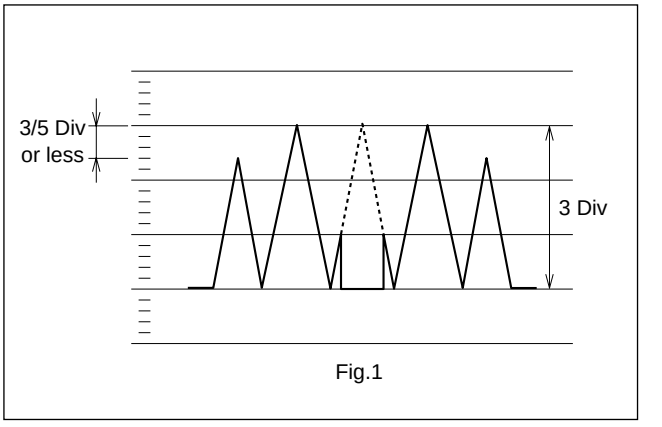
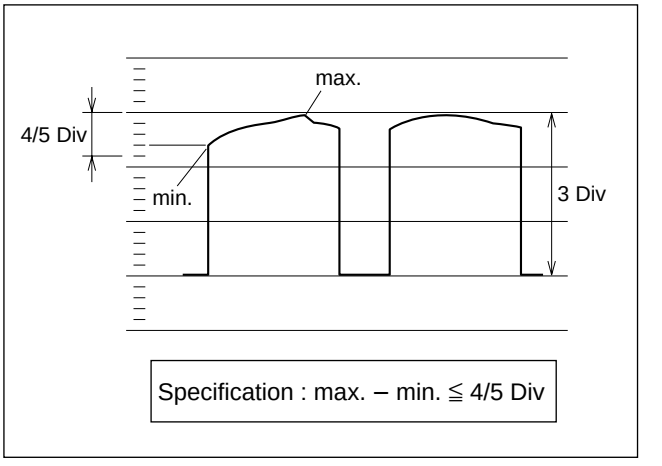


Fig.1



8-6. Search Reverse (×5) Waveform Check

Basic knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 8-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Dual trace oscilloscope

Check procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Set the JOG dial search REVERSE to the ×5 position.
4. Adjust the variable VOLTS/DIV control of the oscilloscope so that the maximum amplitude of the RF waveform becomes the three DIVISIONs on the oscilloscope.
5. Confirm that the RF waveform should be almost the same amplitude with constant intervals as shown in Fig.1.
6. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from search REVERSE (×5) to PLAY.

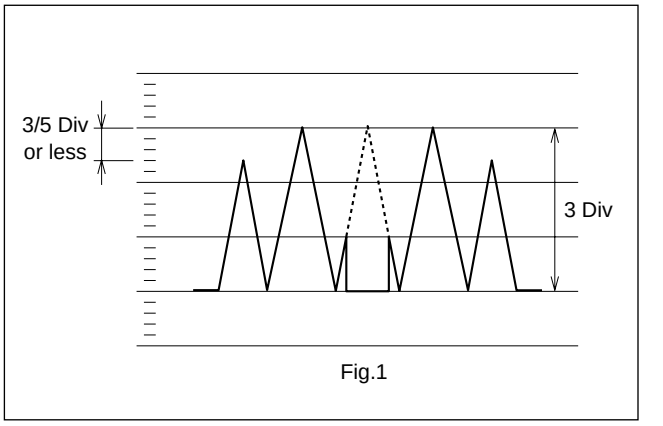
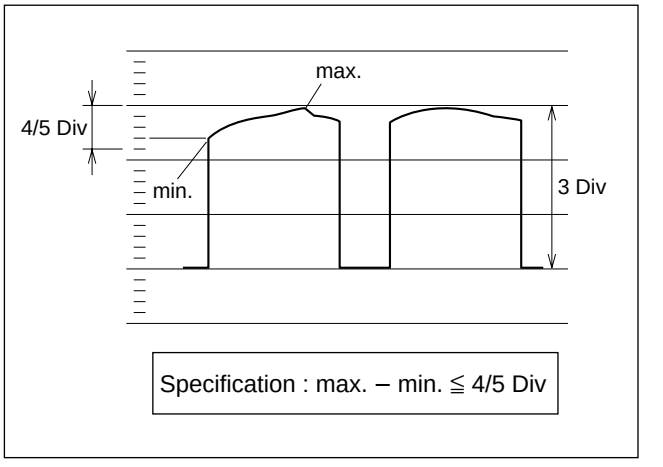


Fig.1



8-7. RF Waveform Raiseup Check

Basic knowledge

To perform tracking adjustment using the alignment tape (XH2-1AST), refer to the following items.

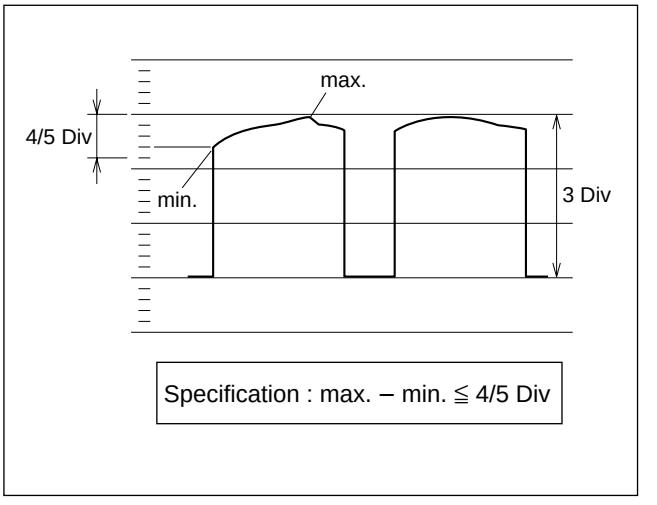
- For the procedure to enter the maintenance menu, refer to Section 5-2-2.
- For the procedure to exit the maintenance menu, refer to Section 5-2-3.
- For the operating procedure of the maintenance menu during the tracking adjustment, refer to Section 8-1.

Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Tape path adjustment board, DJ-461 : J-6444-610-B
- Dual trace oscilloscope

Check procedure

1. Connect the oscilloscope as follows :
   CH-1 : TP2 / DJ-461
   CH-2 : TP3 / DJ-461
   TRIG : CH-2
2. Insert the alignment tape XH2-1AST on the VTR.
3. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from EJECT → PLAY → EJECT → PLAY repeatedly.
4. Confirm that the RF waveform raises up within two seconds at the specified amplitude when the mode is changed from FF → PLAY and from REW → PLAY.



8-8. Tape Curl Check at Tape Guide

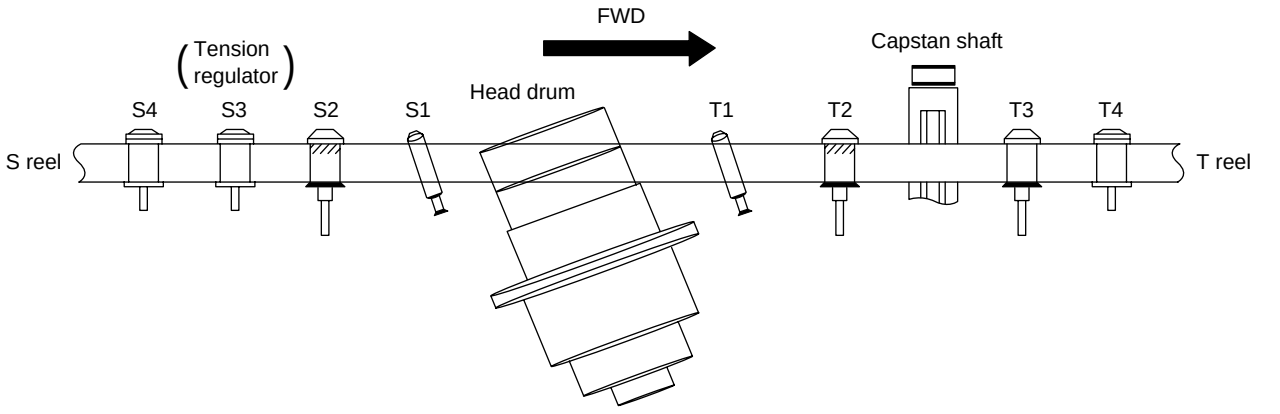
Tools

- Alignment tape, XH2-1AST : 8-967-999-02
- Dental mirror : J-6080-029-A

Check procedure

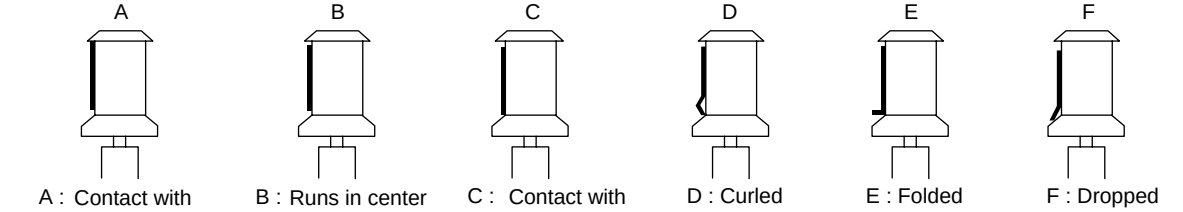
Confirm that tape runs at each tape guide as specified by the following figure when the unit put into the modes of PLAY, FF, REW, search FORWARD ×5 and search REVERSE ×5 respectively.

Tape running condition



The hatched areas (marked by /////) are contacting with tape or pressing tape.

	Tape running condition					
Tape guide	A (Contact with upper flange)	B (Runs in the center)	C (Contact with lower flange)	D (Curled)	E (Folded)	F (Dropped)
S4	○	○	○	×	×	×
S3	○	○	○	×	×	×
S2	○	×	×	×	×	×
T2	○	×	×	×	×	×
T3	○	○	○	×	×	×
T4	○	○	○	×	×	×



Section 9
Adjustment When Replacing Board

9-1. Adjustment/Check Items When Replacing Board

No adjustment is required for the board other than below.

Board name	Setting/Adj. after replacement (Reference Section)	Contents
APR-45 board	10-2. Audio Adjustment	10-2-1. Audio OUTPUT Level Adjustment 10-2-2. Audio EE Level Adjustment
MS-64 board	5. Maintenance Menu	5-3-3. Servo Adjust S/T-REEL & CAPSTAN Adjustment TENTION Adjustment
	6-2. Hours Meter	Initialize the Resetable Hours Meter
	Operating Instructions Chapter 6. Setup Menu	Resetting of Setup Menu Data
SV-212 board	5. Maintenance Menu	5-3-3. Servo Adjust S/T-REEL & CAPSTAN Adjustment TENTION Adjustment
SY-278 board	5. Maintenance Menu	5-3-1. Menu Data Control MENU/SW DATA SAVE/LOAD
RP-111 board	5. Maintenance Menu	5-3-5. Electrical Adjust PLL F0 Adjustment EQ (DVCAM) Adjustment EQ (DV) Adjustment
VPR-62 board	10-3. Video Adjustment	10-3-1. to 10-3-32.

Section 10
Electrical Alignment

10-1. Electrical Alignment Overview

10-1-1. List of Adjustment Parts

APR-45

VPR-62

10-1-2. Measuring Equipment and Tools

Type of measuring equipment	Equivalent	Remarks
Oscilloscope	Tektronix 2445	150 MHz or more
Video signal generator	TSG-130A (Op.02)	for NTSC
	TSG-131A (Op.02)	for PAL
Waveform monitor	Tektronix 1760 Op. SC/1765 Op. SC	
Audio signal generator	HP339A	
Audio level meter	HP3400A/MeguroMN-446	
Frequency counter	Advantest TR5821	
Extension board	DJ-493 (J-6444-930-A)	
Blank tape	DVM30ME, DVM30NME	On the market

10-1-3. Reference Tape for Alignment

XH5-1A2 (8-967-999-22) (for NTSC)

Recording contents are followings.

VIDEO	TIME CODE (h) (m) (s)	REC (s)	AUDIO		
Black Burst	23 : 59 : 00	60	No Signal		
75 % Full Color Bars	00 : 00	60	1 kHz		
60 % Multi Burst	01 : 00	60	20 Hz		
Bowtie with Mod 12.5T	02 : 00	30	14.5 kHz		
Shallow Ramp	02 : 30	30	10 kHz		
	03 : 00	30	No Signal		32 kHz
Cross Hatch (index)	03 : 30	30	1 kHz 0 dBFS		4 ch
Line 17	04 : 00	40	1 ch	1 kHz	
75 % Full Color Bars	04 : 40	40	2 ch		
Quad Phase	05 : 20	40	3 ch		
	06 : 00	40	4 ch		
Black Burst	06 : 40	5	No Signal		
	06 : 45	5			
60 % Multi Burst (for Composite)	06 : 50	60	1 kHz		
Mod 12.5T	07 : 50	30	20 Hz		
Shallow Ramp (B-Y/R-Y OFF)	08 : 20	30	20 kHz		
	08 : 50	30	10 kHz		
Cross Hatch (index)	09 : 20	30	1 kHz 0 dBFS		
Chroma Noise	09 : 50	30			
Line 17	10 : 20	30			
75 % Full Color Bars	10 : 50	180			48 kHz
60 % Multi Burst	13 : 50	60			2 ch
Mod 12.5T	14 : 50	30			
Shallow Ramp	15 : 20	60	1 kHz		
75 % Full Color Bars	16 : 20	100			
75 % Full Color Bars (R-Y OFF)	18 : 00	180			
75 % Full Color Bars (B-Y OFF)	21 : 00	180			
Blanking Marker	24 : 00	180			
Line 17 (R-Y OFF)	27 : 00	180			
Line 17 (B-Y OFF)	30 : 00	180			

∗1 Audio levels are –20 dBFS (Reference), except 1 kHz 0 dBFS part.

XH5-1AP2 (8-967-999-26) (for PAL)

Recording contents are followings.

VIDEO	TIME CODE (h) (m) (s)	REC (s)	AUDIO		
Black Burst	23 : 59 : 00	60	No Signal		
100 % Full Color Bars	00 : 00	60	1 kHz		
60 % Multi Burst	01 : 00	60	20 Hz		
Bowtie with Mod 10T	02 : 00	30	14.5 kHz		
Shallow Ramp	02 : 30	30	10 kHz		
	03 : 00	30	No Signal		32 kHz
Cross Hatch (index)	03 : 30	30	1 kHz 0 dBFS		4 ch
Line 17	04 : 00	40	1 ch	1 kHz	
100 % Full Color Bars	04 : 40	40	2 ch		
Quad Phase	05 : 20	40	3 ch		
	06 : 00	40	4 ch		
Black Burst	06 : 40	5	No Signal		
	06 : 45	5			
60 % Multi Burst (for Composite)	06 : 50	60	1 kHz		
Mod 10T	07 : 50	30	20 Hz		
Shallow Ramp (B-Y/R-Y OFF)	08 : 20	30	20 kHz		
	08 : 50	30	10 kHz		
Cross Hatch (index)	09 : 20	30	1 kHz 0 dBFS		
Chroma Noise	09 : 50	30	1 kHz		48 kHz
Line 17	10 : 20	30			2 ch
100 % Full Color Bars	10 : 50	180			
60 % Multi Burst	13 : 50	60			
Mod 10T	14 : 50	30			
Shallow Ramp	15 : 20	60			
100 % Full Color Bars	16 : 20	100			
100 % Full Color Bars (R-Y OFF)	18 : 00	180			
100 % Full Color Bars (B-Y OFF)	21 : 00	180			
Blanking Marker	24 : 00	180			
Line 17 (R-Y OFF)	27 : 00	180			
Line 17 (B-Y OFF)	30 : 00	180			

∗1 Audio levels are –18 dBFS (Reference), except 1 kHz 0 dBFS part.

10-2. Audio Adjustment

10-2-1. Audio OUTPUT Level Adjustment

Conditions for adjustment	Specification	Adjustment
• MENU ENHANCED ↓ AU REF LEVEL ; −20 dB (for NTSC) −18 dB (for PAL) OUTPUT LEVEL ; +4 dB VIDEO INPUT SELECT ; SG AUDIO INPUT SELECT ; SG • AUDIO REC & PB AUDIO VR/ Control panel ; PRESET • PB mode 1 kHz Ref. level (32 kHz ; 4CH)/SG (1 kHz)	AUDIO OUTPUT 1/3 & 2/4 (600 Ω loaded) Spec. +4.0 ±0.1 dBm	CH-1 ; ⊘RV201/APR-45 (L-1) CH-2 ; ⊘RV202/APR-45 (L-1) CH-3 ; ⊘RV203/APR-45 (L-1) CH-4 ; ⊘RV204/APR-45 (M-1)

10-2-2. Audio EE Level Adjustment

Conditions for adjustment	Specification	Adjustment
• MENU ENHANCED ↓ AU REF LEVEL ; −20 dB (for NTSC) −18 dB (for PAL) OUTPUT LEVEL ; +4 dB VIDEO INPUT SELECT ; SG AUDIO INPUT SELECT ; ANALOG • AUDIO REC & PB AUDIO VR/ Control panel ; PRESET • AUDIO INPUT CH-1/CH-2/CH-3/CH-4 ; 1 kHz, +4 dBu • EE mode	AUDIO OUTPUT 1/3 & 2/4 (600 Ω loaded) Spec. +4.0 ±0.3 dBm	CH-1 ; ⊘RV1/APR-45 (M-3) CH-2 ; ⊘RV4/APR-45 (N-3) CH-3 ; ⊘RV101/APR-45 (P-3) CH-4 ; ⊘RV104/APR-45 (P-3)

10-3. Video Adjustment

[Switch Setting]

For NTSC

This setting should be fixed in position unless otherwise specified.

LOCAL/REMOTE	; LOCAL	PROCESS CONTROL	; LOCAL
CHARACTER	; ON	VIDEO	; PRESET
MENU ITEM 713-1, INPUT LEVEL	; 0.0 %	CHROMA	
MENU ITEM 713-2, OUTPUT LEVEL	; 0.0 %	SET UP	
		Y/C DELAY	
		HUE	

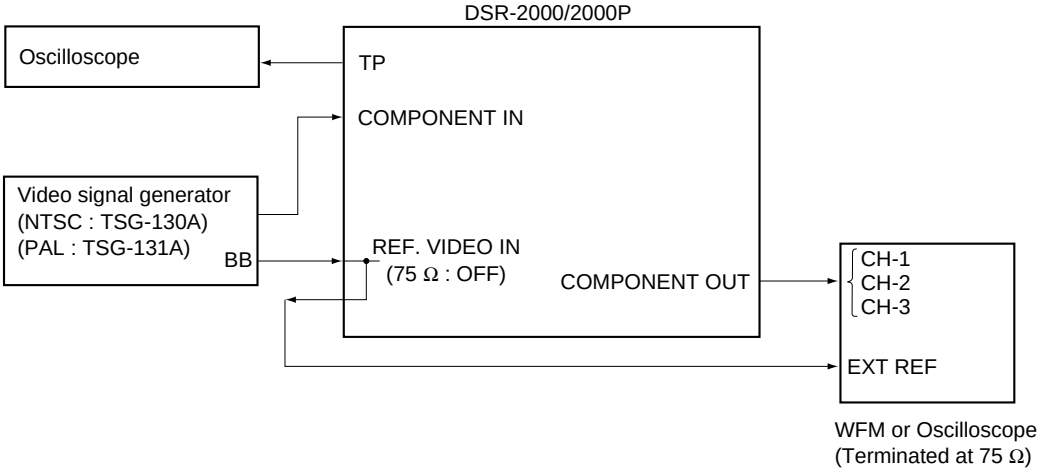
For PAL

LOCAL/REMOTE	; LOCAL	VIDEO	; PRESET
CHARACTER	; ON	Y/C DELAY	
PROCESS CONTROL	; LOCAL		

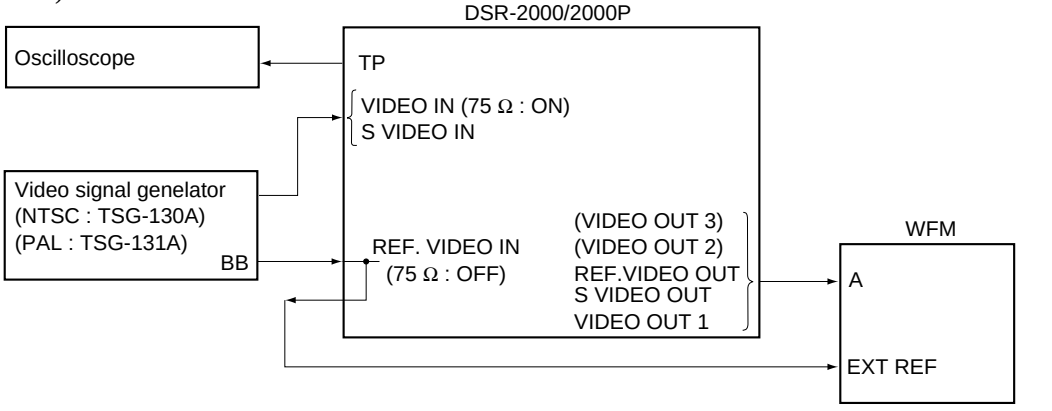
[Connection]

Connect some equipment as following unless otherwise specified.

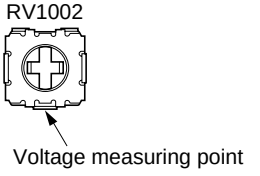
(Connection 1)



(Connection 2)

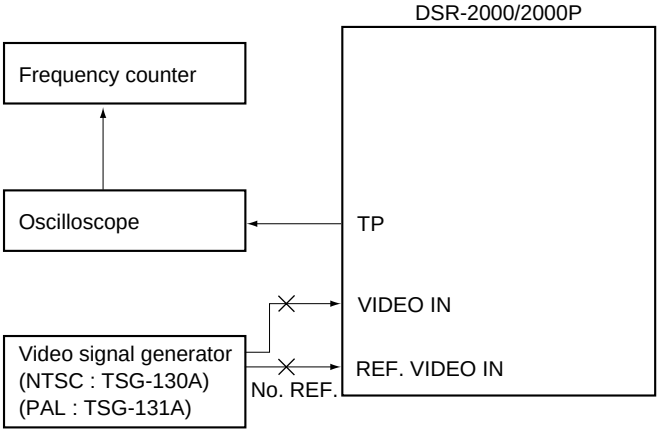


10-3-1. INT SC Frequency Adjustment

Conditions for adjustment	Specification	Adjustment
Oscilloscope or voltmeter • STOP mode Connection 1	① Mesure the voltage (Vo) at TP1003/ VPR-62 (H-4). ② Measure the voltage at the center terminal of RV1002.  Spec. V = Vo ±0.1 Vdc	⊘RV1002/VPR-62 (G-4)

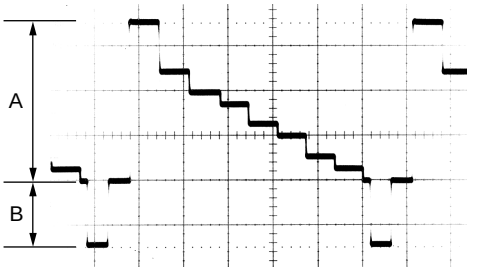
10-3-2. HCK Frequency Adjustment

(Connection)

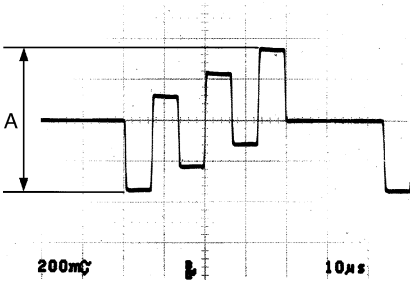


Conditions for adjustment	Specification	Adjustment
Frequency counter • STOP mode • REF. VIDEO IN ; No signal • VIDEO IN Select ; Composite • VIDEO IN ; No signal	TP1004/VPR-62 (G-4) Spec. f = 13,500,000 ±35 Hz	⊘RV1001/VPR-62 (G-4)

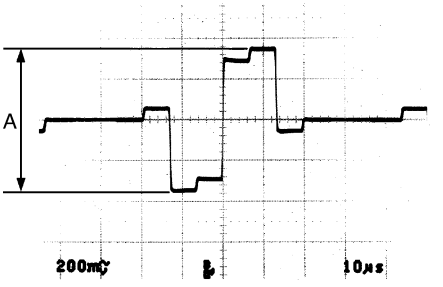
10-3-3. COMPONENT Y OUT Level Adjustment

Conditions for adjustment	Specification	Adjustment
[For NTSC] WFM or Oscilloscope • MENU ITEM 713-2, OUTPUT LEVEL ; 7.5 % • PB mode 75 % Color bars/XH5-1A2 [For PAL] WFM or Oscilloscope • PB mode 100 % Color bars/XH5-1AP2 Connection 1	COMPONENT Y OUT (75 Ω terminated) (A) Y/S-Y Level (B) Y/S-Y SYNC TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) B = 0.286 ±0.003 V (40 ±0.5 IRE) [For PAL] A = 0.700 ±0.007 V B = 0.300 ±0.003 V	⊘RV801/VPR-62 (M-4) ⊘RV805/VPR-62 (L-4)

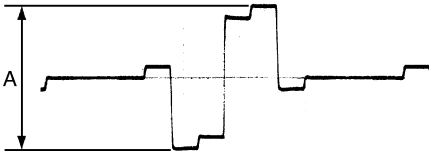
10-3-4. COMPONENT B-Y OUT Level Adjustment

Conditions for adjustment	Specification	Adjustment
[For NTSC] WFM or Oscilloscope • MENU ITEM 713-2, OUTPUT LEVEL ; 7.5 % • PB mode 75 % Color bars/XH5-1A2 [For PAL] WFM or Oscilloscope • PB mode 100 % Color bars/XH5-1AP2 Connection 1	COMPONENT B-Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.700 ±0.007 V (98 ±1 IRE) [For PAL] A = 0.700 ±0.700 V	⊘RV605/VPR-62 (K-4)

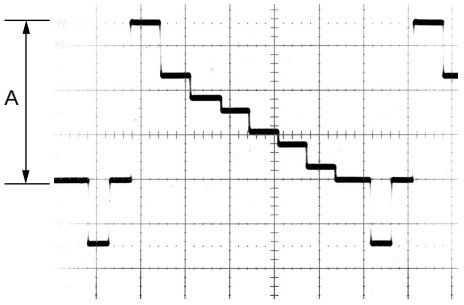
10-3-5. COMPONENT R-Y OUT Level Adjustment

Conditions for adjustment	Specification	Adjustment
[For NTSC] WFM or Oscilloscope • MENU ITEM 713-2, OUTPUT LEVEL ; 7.5 % • PB mode 75 % Color bars/XH5-1A2 [For PAL] WFM or Oscilloscope • PB mode 100 % Color bars/XH5-1AP2 Connection 1	COMPONENT R-Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.700 ±0.007 V p-p (98 ±1 IRE) [For PAL] A = 0.700 ± 0.007 V p-p	⊘RV607/VPR-62 (K-3)

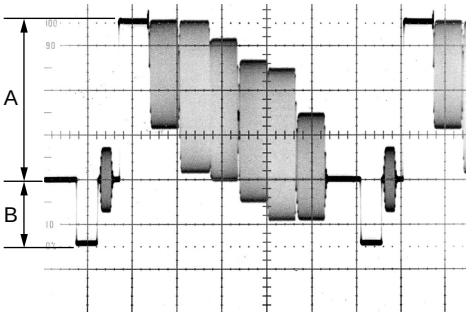
10-3-6. SETUP OFF Chroma Level Check (NTSC only)

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 **Note** Check that MENU ITEM 713-2, OUTPUT LEVEL ; 0.0 % Connection 1	COMPONENT R-Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. A = 0.757 ±0.007 V p-p (106 ±1 IRE)	

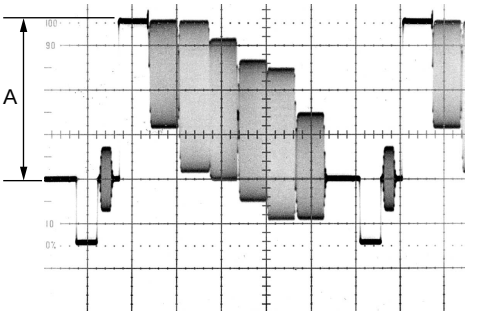
10-3-7. S VIDEO OUT Y Level Check

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	S VIDEO (Y) OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) [For PAL] A = 0.700 ±0.007 V	

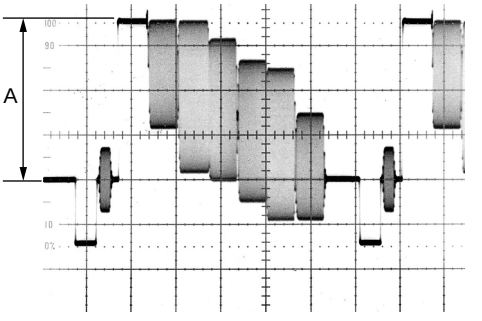
10-3-8. VIDEO OUT 1 Video/Sync Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	VIDEO OUT 1 (75 Ω terminated) (A) Video Level (B) Sync Level TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) B = 0.286 ±0.003 V (40 ±0.5 IRE) [For PAL] A = 0.700 ±0.007 V B = 0.300 ±0.003	⊘RV803/VPR-62 (M-4) ⊘RV804/VPR-62 (L-4)

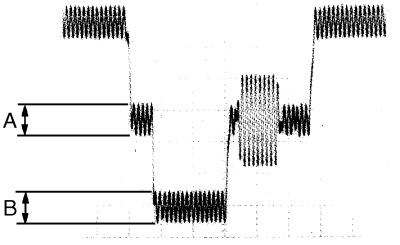
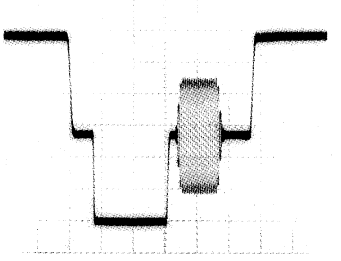
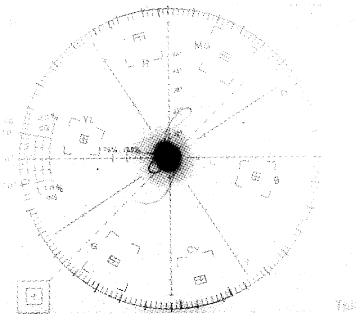
10-3-9. VIDEO OUT 2 Video Level Check

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	VIDEO OUT 2 (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) [For PAL] A = 0.700 ±0.007 V	

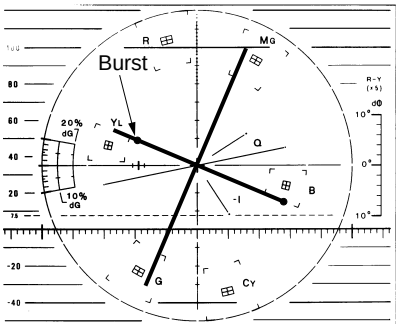
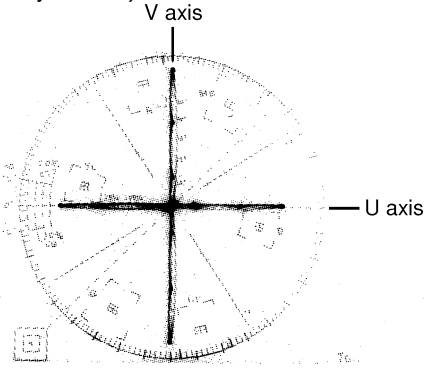
10-3-10. VIDEO OUT 3 Y Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	VIDEO OUT 3 (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) [For PAL] A = 0.700 ±0.007 V	⊘RV806/VPR-62 (L-4)

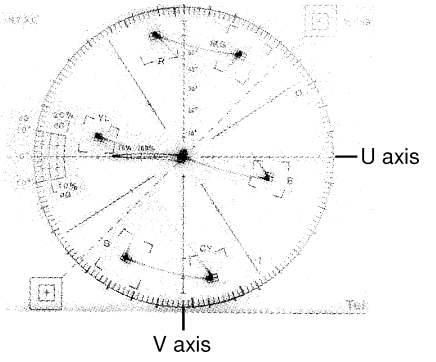
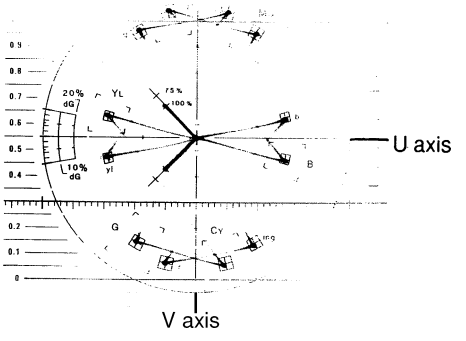
10-3-11. ENC SC Leak Adjustment

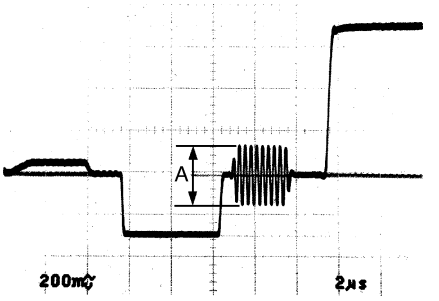
Conditions for adjustment	Specification	Adjustment
Step 1 • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) • Set the time axis of the WFM to magnification mode Connection 2	VIDEO OUT 1 (75 Ω terminated) (A) V SC Leak (B) U SC Leak TRIG : REF. VIDEO WFM Before adjustment  (Spec. Adjust the A and B alternately.) ⇩ After adjustment  Spec. Minimize the A, B. A, B ≦ 0.007 V (1 IRE)	⊘RV703/VPR-62 (D-1) ⊘RV704/VPR-62 (D-1)
Step 2 (Check) • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO Vector  Spec. Maximum the gain of the Vector and check the dot is at center.	

10-3-12. U-V Axis (B-Y, R-Y) Phase Adjustment

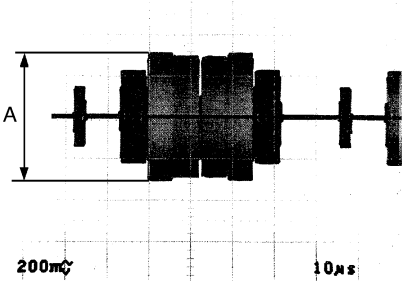
Conditions for adjustment	Specification	Adjustment
• PB mode [Flow] (A) Burst preset • PB mode Quad Phase/XH5-1A2 or XH5-1AP2 (05:20-06:00) (B) V-axis phase adjustment • PB mode Quad Phase/XH5-1A2 or XH5-1AP2 (05:20-06:00) Connection 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst preset (B) V-axis (U/V OFFSET) TRIG : REF. VIDEO Vector (Before adjustment)  ⇩ (After Adjustment)  Spec. (A) Set the dot of the burst in the right position on the scale. (B) Set the dots of the R-Y on the V axis of the vector. C = 0 ±0.5 °	⊘PHASE control/Vector ⊘RV902/VPR-62 (F-1)

10-3-13. PB VIDEO OUT 1 Chroma/Burst Level Adjustment

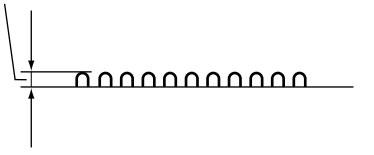
Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL)	VIDEO OUT 1 (75 Ω terminated) Step 1 Chroma Level (A) Burst preset	 ⊘PHASE control/Vector
Note The “Setup ON/OFF” setting of the DSR-2000 and that a vectorscope must have been set to the same position beforehand.	(B) ENC R-Y LEVEL ENC B-Y LEVEL TRIG : REF. VIDEO Vector (for NTSC)  Vector (for PAL)  Spec. (A) Set the dot of the burst in the right position on the scale. (B) All dots should be inside the “⊞” mark on the vector by adjustment RV200 and RV201 alternately.	⊘RV701/VPR-62 (D-1) ⊘RV702/VPR-62 (C-1)
Connection 2		

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	Step 2 Burst Level TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.286 ±0.003 V (40 ±0.5 IRE) [For PAL] A = 0.300 ±0.003 V	⊘RV705/VPR-62 (D-2)

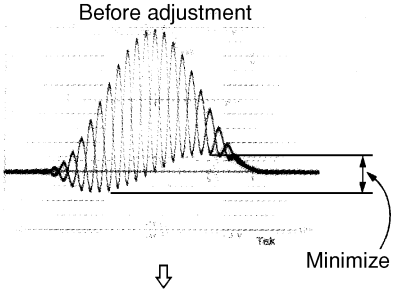
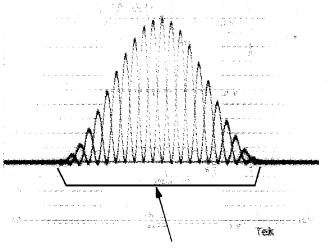
10-3-14. PB S VIDEO Chroma Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • MENU ITEM 713-2, OUTPUT LEVEL ; 7.5 % • PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) Connection 2	S VIDEO (C) OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.627 ±0.007 V p-p (87.7 ±1 IRE) [For PAL] A = 0.885 ±0.006 V p-p	⊘RV802/VPR-62 (N-5)

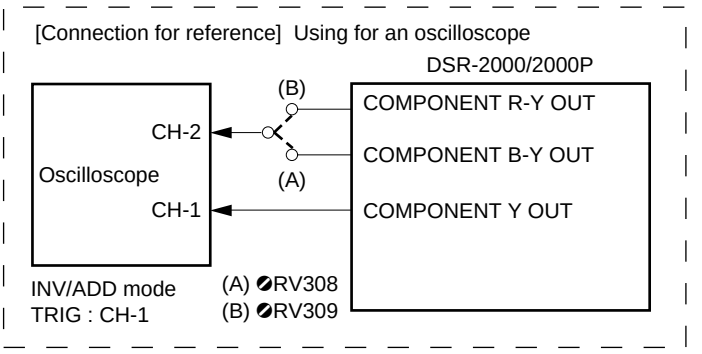
10-3-15. PB COMPOSITE C/C Delay Adjustment

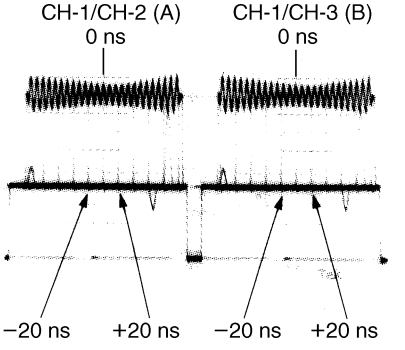
Conditions for adjustment	Specification	Adjustment
Oscilloscope Vertical mode : INV +ADD • PB mode Bowtie/XH5-1A2 or XH5-1AP2 (02:00-02:30) Connection 2	CH-1/Oscilloscope TP602/VPR-62 (D-2) CH-2/Oscilloscope TP603/VPR-62 (D-1) Spec. Minimize 	⊘RV603/VPR-62 (B-1)

10-3-16. PB COMPOSITE Y/C Delay Adjustment

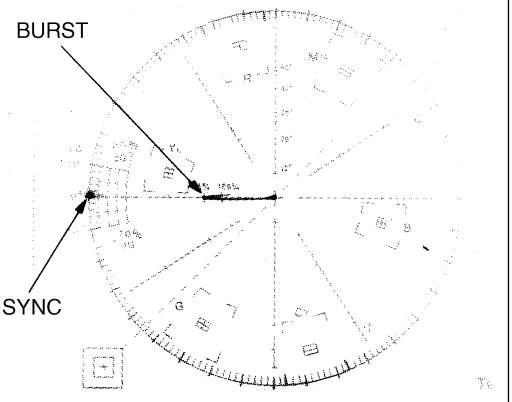
Conditions for adjustment	Specification	Adjustment
• PB mode Mod 12.5T/XH5-1A2 or XH5-1AP2 (07:50-08:20) Connection 2	VIDEO OUT 1 (75 Ω terminated) TRIG : INT/WFM WFM 12.5T portion (for NTSC) 10T portion (for PAL) Before adjustment  Minimize ⇩ After adjustment  Spec. Flat	⊘RV602/VPR-62 (B-1)

10-3-17. PB COMPONENT Y/C Delay Adjustment

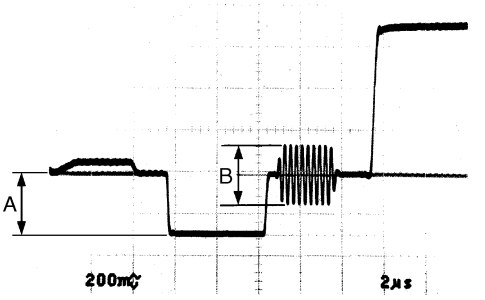


Conditions for adjustment	Specification	Adjustment
• PB mode Bowtie/XH5-1A2 or XH5-1AP2 (02:00-02:30) Connection 1	COMPONENT OUT (75 Ω terminated) (A) B-Y Delay (B) R-Y Delay TRIG : INT/WFM Bowtie mode  Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. 0 ±20 ns	⊘RV604/VPR-62 (J-4) ⊘RV606/VPR-62 (J-3)

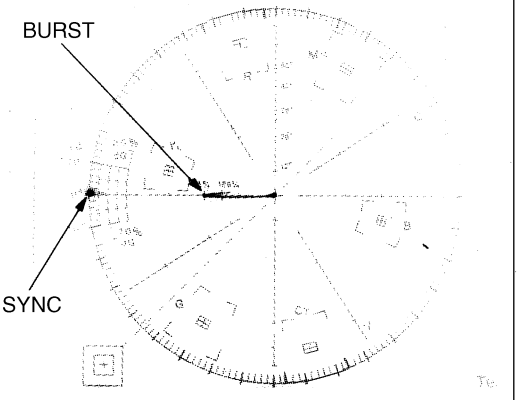
10-3-18. PB INT SCH Phase Adjustment

Conditions for adjustment	Specification	Adjustment
• PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) • REF. VIDEO INPUT ; No signal • AFTER ADJUSTMENT IS COMPLETED, RE-CONNECT THE REF. VIDEO INPUT. Connection 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst Preset (B) INT SC TRIG : INT/WFM SCH mode  Spec. (A) Set the dot of the burst in the right position on the scale. (B) The SYNC should be in the same phase as the burst (SCH = 0 °).	⊘PHASE control/Vector ⊘RV903/VPR-62 (F-1)

10-3-19. REF. VIDEO OUT Sync/Burst Level Adjustment

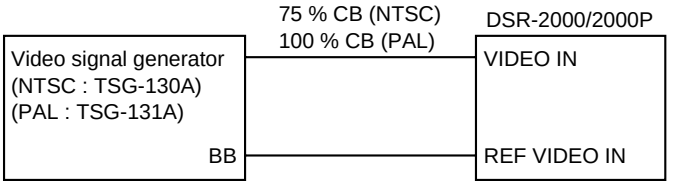
Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope ・PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) ・REF. VIDEO INPUT ; No signal ・AFTER ADJUSTMENT IS COMPLETED, RE-CONNECT THE REF. VIDEO INPUT. Connection 2	REF. VIDEO OUT (75 Ω terminated) (A) Sync Level (B) Burst Level TRIG : INT/WFM  Spec. [For NTSC] A, B = 0.286 ±0.003 V (40 ±0.5 IRE) [For PAL] A, B = 0.300 ±0.003 V	⊘RV904/VPR-62 (L-3) ⊘RV906/VPR-62 (M-3)

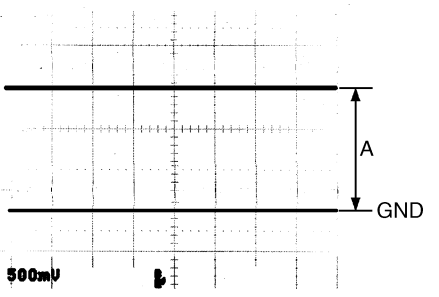
10-3-20. REF. INT SCH Phase Adjustment

Conditions for adjustment	Specification	Adjustment
• PB mode 75 % Color bars/XH5-1A2 (for NTSC) 100 % Color bars/XH5-1AP2 (for PAL) • REF. VIDEO INPUT ; No signal	REF. VIDEO OUT (75 Ω terminated) (A) Burst Preset (B) Sync Phase TRIG : INT/WFM SCH mode  	⊘PHASE control/Vector ⊘RV901/VPR-62 (L-3)
• AFTER ADJUSTMENT IS COMPLETED, RE-CONNECT THE REF. VIDEO INPUT. Connection 2	Spec. (A) Set the dot of the burst in the right position on the scale. (B) The SYNC should be in the same phase as the burst. (SCH = 0 ±3 °)	

10-3-21. SPCK Error Adjustment

(Connection)

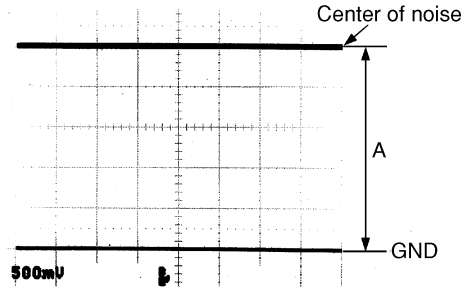


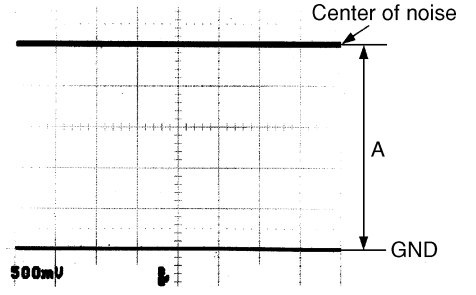
Conditions for adjustment	Specification	Adjustment
Oscilloscope • EE mode • VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL)	TP500/VPR-62 (A-3)  Spec. A = 1.5 ±0.1 V dc	⊘CT500/VPR-62 (A-4)

10-3-22. COMPOSITE 4Fsc PLL DC Check/Adjustment

<table>
<tr><th>Conditions for adjustment</th><th>Specification</th><th>Adjustment</th></tr>
<tr><td rowspan="2">Oscilloscope
• EE mode
• VIDEO IN ; 75 % Color bars (for NTSC)
100 % Color bars (for PAL)
• VIDEO IN select/MENU ; COMPOSITE

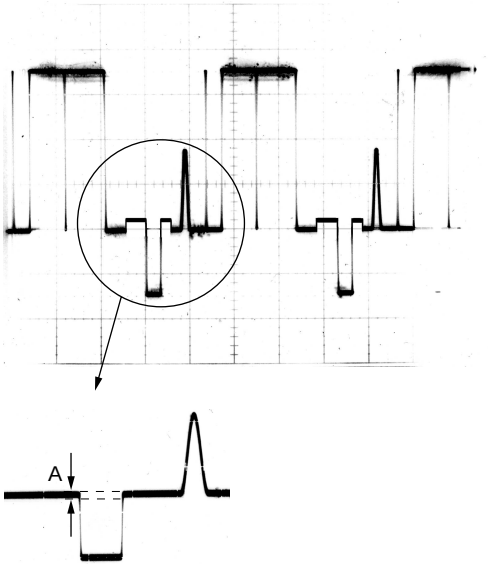
Connection 1</td><td>TP301/VPR-62 (P-2)

[Check]
 

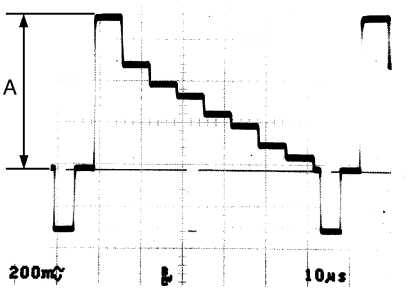
Spec. A = 2.5 ±0.5 V dc</td><td></td></tr>
<tr><td>TP300/VPR-62 (P-2)
 

Spec. A = 2.5 ±0.5 V dc</td><td>⊘RV300/VPR-62 (P-2)</td></tr>
</table>

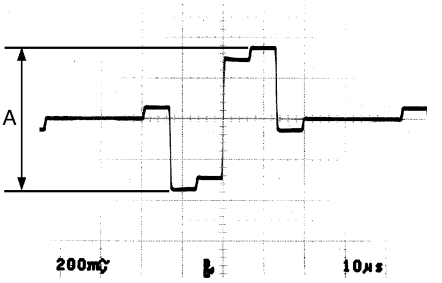
10-3-23. REC Y Clamp Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • COMPONENT IN ; Pluse & Bar **Note** Check that only NTSC MENU ITEM 713-1, INPUT LEVEL ; 0.0 % Connection 1	COMPONENT Y OUT (75 Ω terminated)  Spec. A = Minimize the level difference A at setup.	⊘RV403/VPR-62 (J-2)

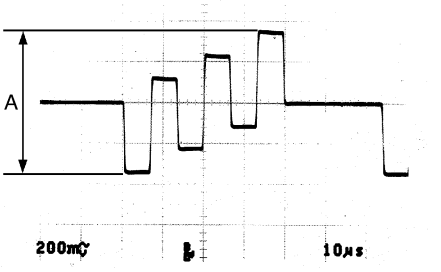
10-3-24. REC Y Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • COMPONENT IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) Connection 1	COMPONENT Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) [For PAL] A = 0.700 ±0.007 V	⊘RV400/VPR-62 (J-2)

10-3-25. REC COMPONENT R-Y Level Adjustment

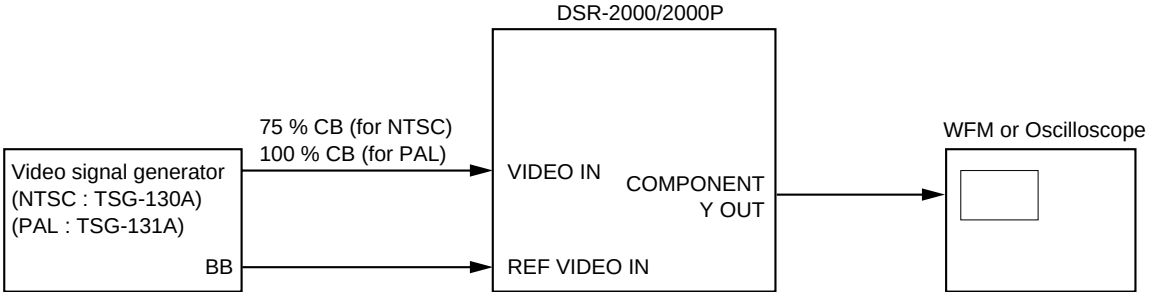
Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • COMPONENT IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) Connection 1	COMPONENT R-Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.700 ±0.007 V p-p (98 ±1 IRE) [For PAL] A = 0.700 ±0.007 V p-p	⊘RV402/VPR-62 (K-2)

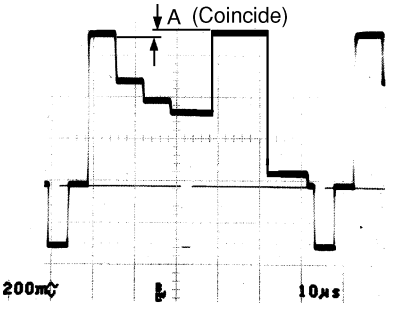
10-3-26. REC COMPONENT B-Y Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • COMPONENT IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) Connection 1	COMPONENT B-Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.700 ±0.007 V p-p (98 ±1 IRE) [For PAL] A = 0.700 ±0.007 V p-p	⊘RV401/VPR-62 (K-1)

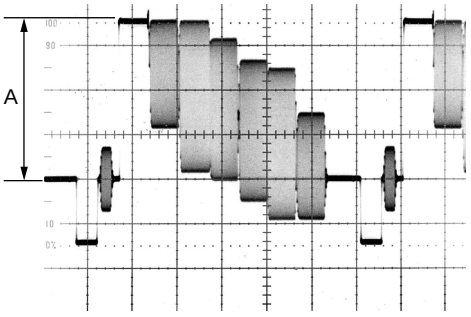
10-3-27. REC A/D Y Level Adjustment

(Connection)

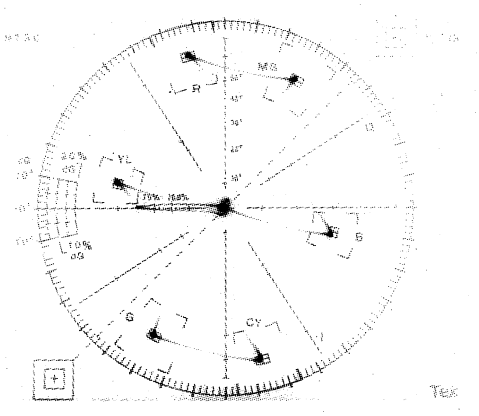
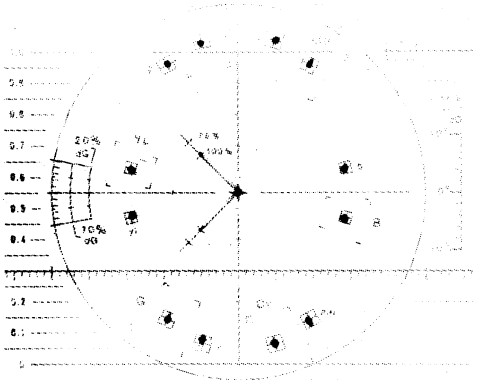


Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; COMPOSITE • S101-1/SV-212 (L-1) ; ON • S200/VPR-62 (M-1) ; ON • After Adjustment, S101-1, S200 ; OFF	COMPONENT Y OUT (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0 ±0.007 V (0 ±1 IRE) [For PAL] A = 0 ±0.007 V	⊘RV103/VPR-62 (P-5)

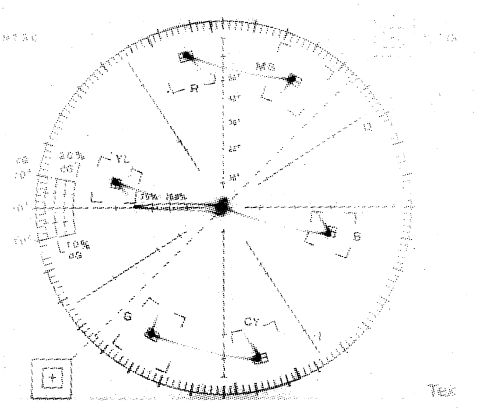
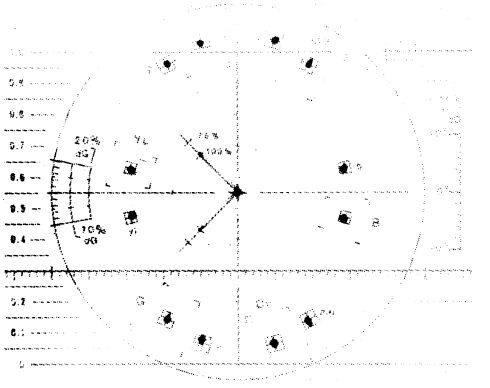
10-3-28. REC COMPOSITE Y Level Adjustment

Conditions for adjustment	Specification	Adjustment
WFM or Oscilloscope • EE mode • VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; COMPOSITE Connection 2	VIDEO OUT 1 (75 Ω terminated) TRIG : REF. VIDEO  Spec. [For NTSC] A = 0.714 ±0.007 V (100 ±1 IRE) [For PAL] A = 0.700 ±0.007 V	⊘RV200/VPR-62 (L-1)

10-3-29. REC COMPOSITE Chroma Level Adjustment

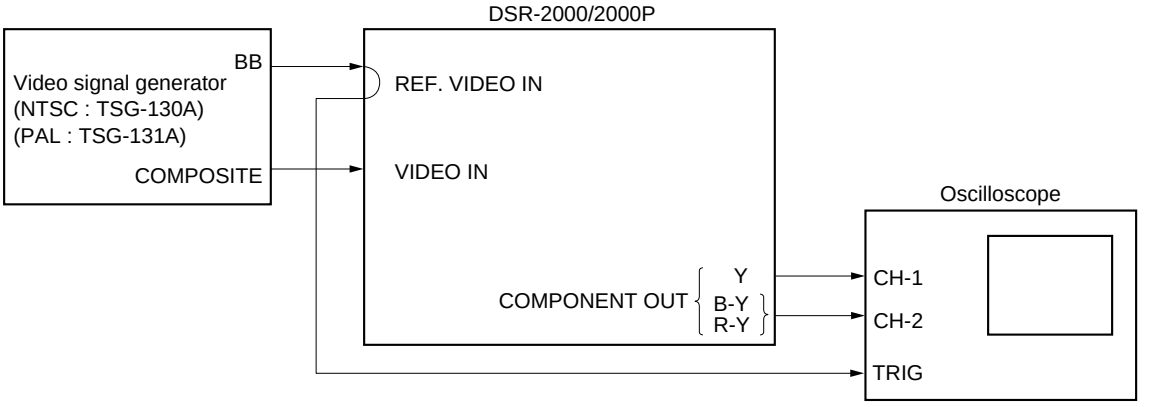
Conditions for adjustment	Specification	Adjustment
• EE mode • VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; COMPOSITE **Note** The “Setup ON/OFF” setting of the DSR-2000 and that a vectorscope must have been set to the same position beforehand. Connection 2	VIDEO OUT 1 (75 Ω terminated) (A) Burst (B) Composite Chroma Level TRIG : REF. VIDEO Vector (for NTSC)  Vector (for PAL)  Spec. (A) Set the dot of the burst in the right position on the scale. (B) All dots should be inside the “田” mark on the vector.	⊘PHASE control/Vector ⊘RV201/VPR-62 (L-1) ⊘RV202/VPR-62 (M-1)

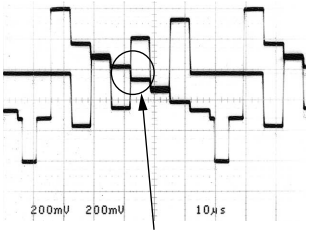
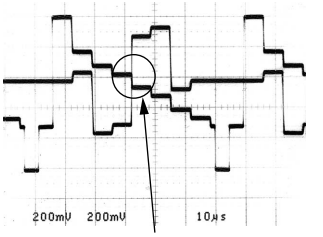
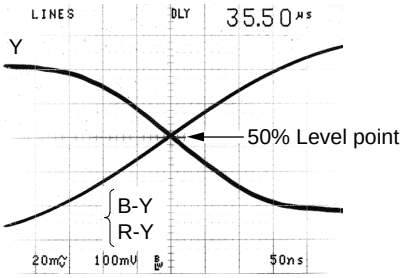
10-3-30. REC S VIDEO Chroma Level Adjustment

Conditions for adjustment	Specification	Adjustment
• EE mode • S VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; S VIDEO **Note** The “Setup ON/OFF” setting of the DSR-2000 and that a vectorscope must have been set to the same position beforehand. Connection 2	S VIDEO (C) OUT (75 Ω terminated) (A) Burst (B) S-C Level TRIG : REF. VIDEO Vector (for NTSC)  Vector (for PAL)  Spec. (A) Set the dot of the burst in the right position on the scale. (B) All dots should be inside the “⊞” mark on the vector.	⊘PHASE control/Vector ⊘RV101/VPR-62 (P-6)

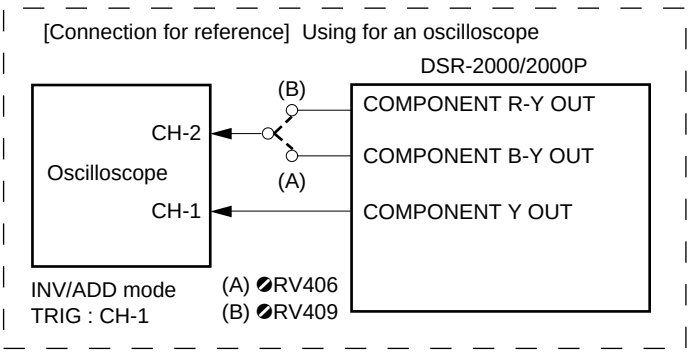
10-3-31. REC COMPOSITE Y/C Delay Adjustment

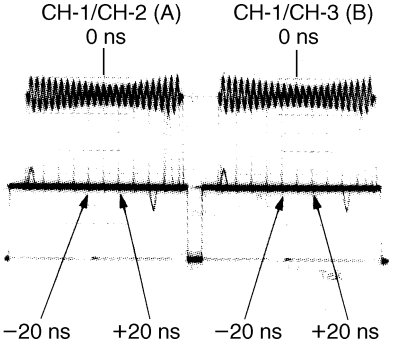
(Connection)



Conditions for adjustment	Specification	Adjustment
• EE mode • VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; COMPOSITE	COMPONENT OUT (75 Ω terminated) B-Y  A portion R-Y  A portion (Detail of A portion)  Spec. 0 ±20 ns	B-Y : ⊘RV404/VPR-62 (K-1) R-Y : ⊘RV407/VPR-62 (K-2)

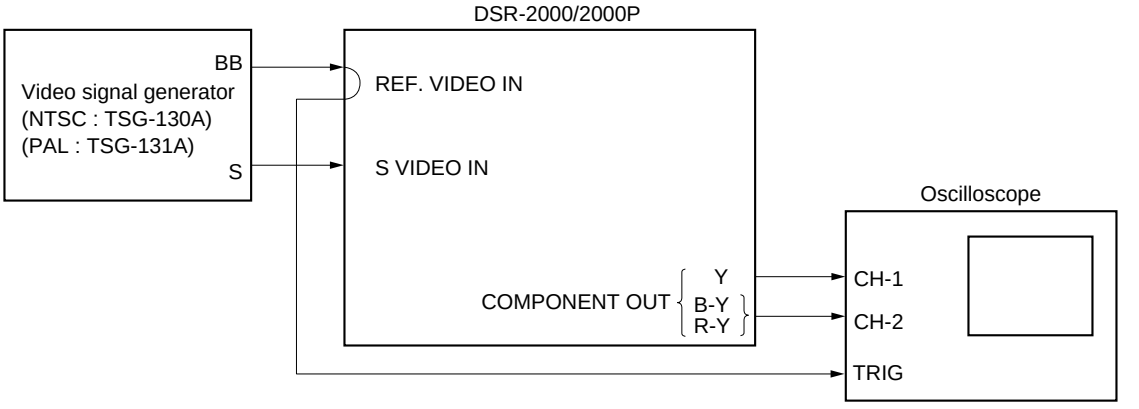
10-3-32. REC COMPONENT Y/C Delay Adjustment

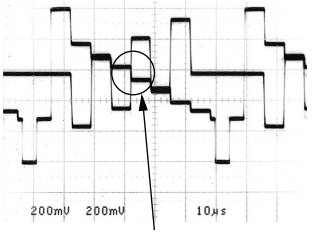
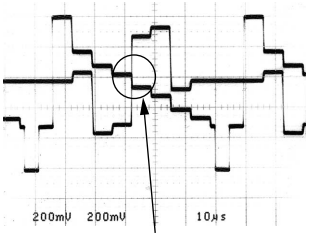
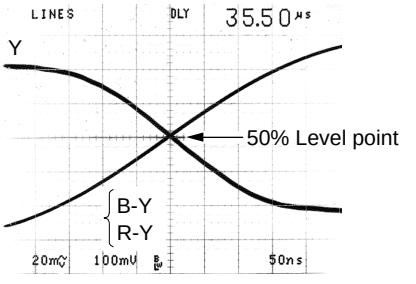


Conditions for adjustment	Specification	Adjustment
• EE mode • COMPONENT IN ; Bowtie	COMPONENT OUT (75 Ω terminated)	
	(A) B-Y Delay (B) R-Y Delay	⊘RV406/VPR-62 (K-1) ⊘RV409/VPR-62 (K-2)
	TRIG : INT/WFM Bowtie mode	
		
	Spec. Set the each Bowtie dip point of (A) and (B) on the center marker. 0 ±20 ns	
Connection 1		

10-3-33. REC S VIDEO Y/C Delay Adjustment

(Connection)

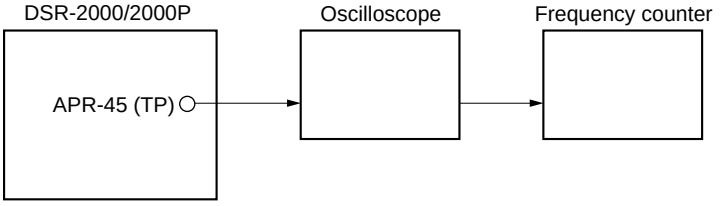


Conditions for adjustment	Specification	Adjustment
• EE mode • S VIDEO IN ; 75 % Color bars (for NTSC) 100 % Color bars (for PAL) • VIDEO IN select/MENU ; S VIDEO	COMPONENT OUT (75 Ω terminated) B-Y  A portion R-Y  A portion (Detail of A portion)  Spec. 0 ±20 ns	B-Y : ⊘RV405/VPR-62 (K-1) R-Y : ⊘RV408/VPR-62 (K-2)

10-4. SDI/SDTI

10-4-1. Free Run Adjustment

(Connection)



Conditions for adjustment	Specification	Adjustment
Step 1 • E-E mode • Connect jumper wire between TP1501/ APR-45 (C-2) and E704/APR-45 (A-1). • After adjustment, remove jumper wire.	TP751/APR-45 (A-1) TP1502/APR-45 (E-1) Spec. 27.0 ±0.1 MHz	⊘RV751/APR-45 (A-1) ⊘RV1501/APR-45 (A-1)
Step 2 • E-E mode • Connect jumper wire between TP1551/ APR-45 (E-2) and E1501/APR-45 (E-1). • After adjustment, remove jumper wire.	TP1552/APR-45 (E-1) Spec. 27.0 ±0.1 MHz	⊘RV1551/APR-45 (F-1)
• E-E mode • Connect jumper wire between TP801/ APR-45 (B-1) and E704/APR-45 (A-1). • Select SDTI with INPUT SELECT. • After adjustment, remove jumper wire.	**Step 1** TP701/APR-45 (A-2) Spec. 27.0 ±0.1 MHz	⊘RV701/APR-45 (A-2)
	Step 2 TP802/APR-45 (B-4) Spec. 27.0 ±0.1 MHz	⊘RV801/APR-45 (C-2)

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

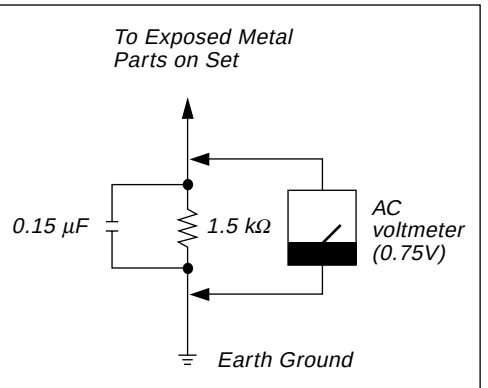


Fig A. Using an AC voltmeter to check AC leakage.

DSR-2000 (UC)
DSR-2000P (CE) E
9-955-186-12

Sony Corporation
B&P Company

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