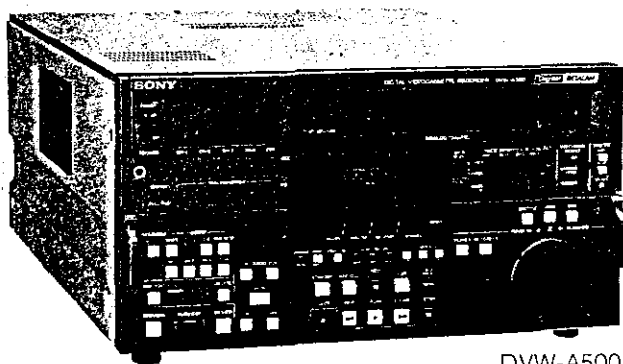


SONY

DIGITAL VIDEOCASSETTE RECORDER

DVW-A500/500 **DVW-A500P/500P**



DVW-A500

ANALOG COMPOSITE DECODER BOARD

BKDW-505

BKDW-506

PARALLEL (50P) INTERFACE KIT

BKDW-509

CONTROL PANEL EXTENSION KIT

BKDW-510

CONTROL PANEL CASE

BKDW-511

Digital BETACAM™

OPERATION MANUAL

English

1st Edition (Revised 1)

Serial No. 10001 and Higher (DVW-A500)

Serial No. 10001 and Higher (DVW-A500P)

Serial No. 10001 and Higher (DVW-500)

Serial No. 10001 and Higher (DVW-500P)

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About This Manual

This manual is intended for users of the DVW-A500/A500P/500/500P digital videocassette recorder. This section discusses the purpose and organization of the manual. Reading it first will help you decide which of the other chapters you should read most carefully, depending on your degree of experience with professional VTRs.

Purpose and audience of this manual

The DVW-A500/A500P/500/500P is designed for use by professionals working in broadcasting or production operators. This operation manual therefore assumes the operator already has a basic understanding of VTR and broadcasting technology, and experience with professional video equipment.

If you are already familiar with this type of VTR, read Chapter 2 "Location and Functions of Parts and Controls" and then refer to other chapters as necessary. Regardless of your degree of experience, however, Chapter 1 "Overview" is essential reading to ensure that you are aware of the many features of the DVW-A500/A500P/500/500P.

If you have no previous experience with this type of VTR, or have had limited experience with video equipment in general, we recommend that you read through the entire manual.

About This Manual

Organization of this manual

The following is a brief summary of the chapters and appendix constituting this manual. The opening page of each chapter also gives a summary of the contents of that chapter.

Chapter 1 Overview

Describes the principal features and functions of the DVW-A500/A500P/500/500P.

Chapter 2 Location and Functions of Parts and Controls

Explains the names and functions of the controls and other parts.

Chapter 3 Setting Up the VTR

Describes connections of external equipment and reference signals, initial settings and handling of videocassettes.

Chapter 4 Recording

Explains preparation for recording, time code settings, and basic recording operations.

Chapter 5 Playback

Describes preparation for playback, normal speed playback, jog and shuttle playback, capstan override playback, and DMC playback.

Chapter 6 Editing

Explains basic and advanced automatic editing, as well as manual editing.

Chapter 7 Maintenance

Explains basic VTR maintenance.

Appendixes

- **Specifications**

Gives general specifications, and the principal specifications of the video and audio systems.

- **Glossary**

Explains the technical terms related to the digital VTR.

Index

Conventions used

This manual uses the following formats to describe the operating procedures and to present related information and cross references.

Operating procedures

Control and switch numbers in the illustrations correspond to the step numbers explained in the text. Switches and indications which you may have to use or watch during operation are also shown in illustrations.

Information, such as definitions of technical terms, is given as footnotes.

Cross references are printed in *italics*.

Example

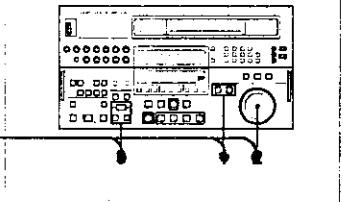
6-1. Basic Automatic Editing

6-1-4. Setting Edit Points

This section describes how to set edit points (IN and OUT points). In insert mode, a technique called split editing allows you to set edit points separately for video and audio.

Setting edit points

To set edit points, follow the procedure below.



Setting edit points

- 1 Press the RECORDER or PLAYER button to select the VTR for which edit points are to be set.
The button lights.
- 2 Rotate the search dial in jog or shuttle mode to find the edit point.
For details on jog/shuttle playback, see "3-2-2 Variable-Speed Playback in Jog/Shuttle Variable Modes" on page 5-8.
- 3 Press the ENTRY button together with the IN (or OUT) button. When the IN (or OUT) point is set, the IN (or OUT) buttons stop flashing, and instead lights steadily.

6-6 Chapter 6 Setting

Time Code switches are recorded, recorded, on the input video recorded, on the built-in time ed. ON. For time, refer to "1-10. Manual.

If by the time code for preset in the set OFF.

up the ID code, refer to section Manual.

VTR-A500/A500P only) C noise reduction format on tape. For Betacam playback, enabled for Betacam OFF.

Related information

- 11 Dolby NR
Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol DD are trademarks of Dolby Laboratories Licensing Corporation.

2-18 Chapter 2 Location and Functions of Parts and Controls

Format of operating procedure description

References

In addition to this operation manual, the following manuals are available for the DVW-A500/A500P/500/500P.

- **Installation Manual** (supplied)
Provides the information necessary to install the VTR and its peripherals.
- **Maintenance Manual Part 1** (supplied)
Gives the information necessary for users to maintain the VTR and its optional equipment.
- **Maintenance Manual Part 2** (available on request)
Gives the additional information to fully maintain the VTR. It contains details of adjustments that can be made, circuit diagrams, and so on.

Chapter 1

Overview

This chapter overviews the features of the DVW-A500/A500P and DVW-500/500P.

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1-1. Outline of the DVW-A500 series and DVW-500 series

The DVW-A500 series and DVW-500 series digital videocassette recorders adopt the digital Betacam format.

- The DVW-A500/A500P is capable of playing back analog Betacam and Betacam SP format cassette tapes.
- The DVW-500/500P is not compatible with either the analog Betacam or Betacam SP formats.

The DVW-A500/500 can be used in the NTSC color system while the DVW-A500P/500P can be used in the PAL color system, though they adopt component recording format.

1-2. Features

1-2-1. Digital Betacam Format

The DVW-A500/A500P/500/500P adopt the newly developed Digital Betacam format as an extension of the Betacam/Betacam SP format. The Digital Betacam format makes the best of the available recording area to achieve high-quality digital recording while keeping analog Betacam tape playback compatibility. The following are developed for this purpose:

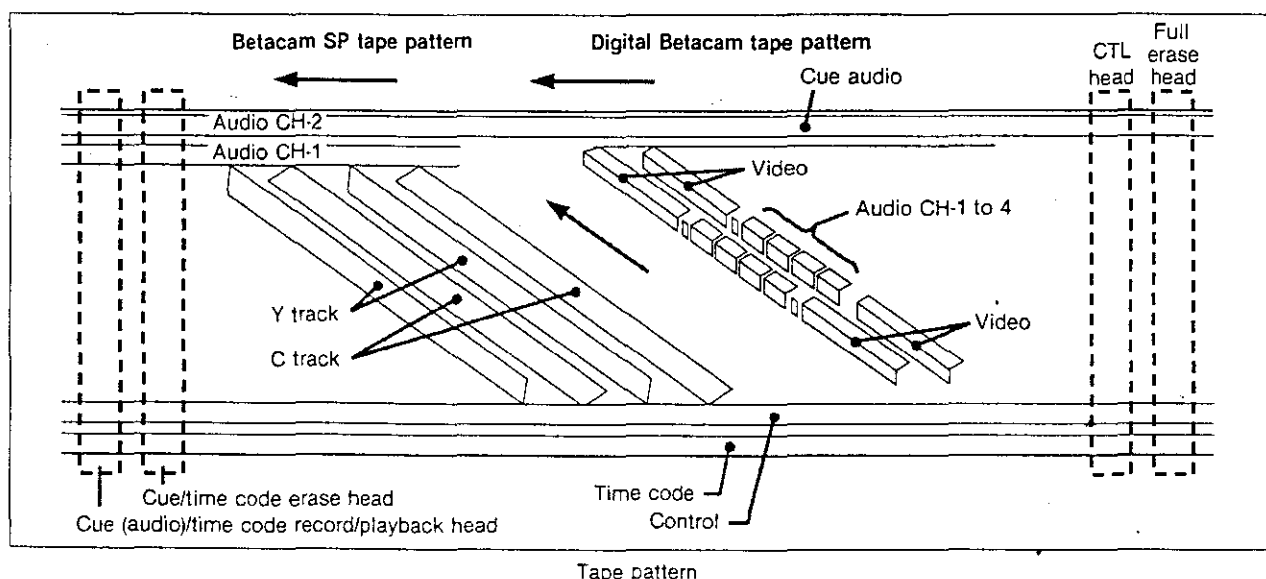
- Coefficient recording system
- Powerful error correction system
- High-quality precision heads and drum with dynamic tracking heads
- New auto tracking system

These enables the 120 minutes or more recording with Digital Betacam (when using the L-size cassette), while the cassette size of the Digital Betacam is exactly same as the normal Betacam and Betacam SP.

Tape recording format

The video and 4-channel audio signals of each field are recorded onto the tape with 6 helical tracks, using a slightly slower tape speed and three times faster drum rotation speed than the conventional Betacam and Betacam SP format.

The Digital Betacam format has three longitudinal tracks, CTL track, time code (LTC) track and the cue audio track, identical to the conventional Betacam and Betacam SP format. However, the conventional audio channel-1 track is deleted and used for expansion of the helical tracks. The larger drum in diameter enables optimum digital recording while analog Betacam playback compatibility is kept by specially developed time base corrector circuits.

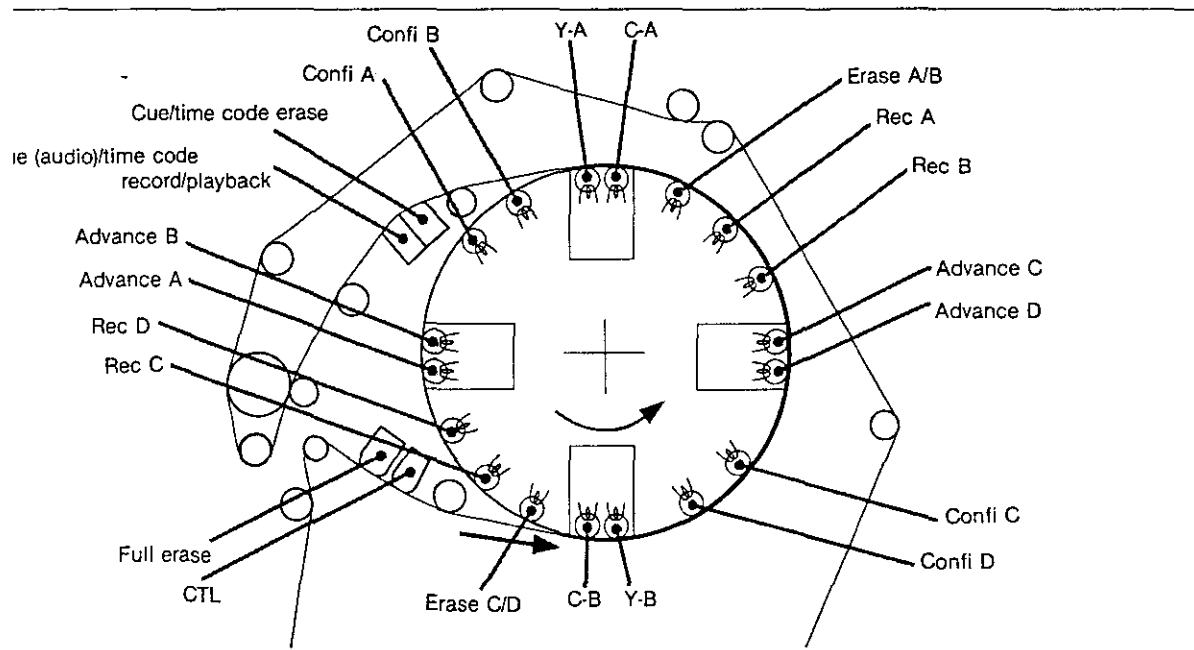


Features

Arrangement of stationary and rotary heads

The figure below illustrates the arrangement and location of the stationary and rotary heads.

The advance DT® (Dynamic Tracking) heads trace a few fields before the record heads for playback and pre-read, and the confidence heads trace one track after the record heads for confirmation of recording. The DVW-A500/A500P has Y-A, C-A, Y-B and C-B heads (DT heads) used for analog Betacam playback.



Configuration of stationary and rotating heads

Overview of the digital signal processing

The process of digital video signals is based on the 4:2:2 component digital D-1 format and the CCIR 601 standard quantization. In addition, the data rate is compressed with the coefficient recording system. Digital audio signals are processed in full bits conforming to the AES/EBU format.

Input interface

The component serial digital interface, conforming to the SMPTE 259M/EBU T.3267/CCIR 656-III standards, handles component video signal and 4-channel digital audio signals with a single BNC coaxial cable. Both analog component signal and composite signal (with the BKDW-505/506) are digitized into CCIR 601 standard parallel data. Audio data from the AES/EBU digital interface or A/D converted data from the analog input can be selected for recording.

Bit rate reduction encoder

The video data are suppressed to about half by newly developed coefficient recording system, whose key processes include field shuffling, blocking, discrete cosine transform (DCT), quantizing, and variable length coding.

ECC encoder

After the outer error correction code (ECC) is added to the compressed video and audio data, the inner ECC, ID data, and sync data are added. The Reed-Solomon code is employed for this error correction system.

Channel coding

The video and audio data with the ECC added are recorded in the form of serial data. The Digital Betacam format adopts Scrambled NRZI channel coding system that is superior in off-track and noise characteristics.

Playback signal processing

The playback digital data are equalized by auto EQ circuits and error-corrected by powerful inner and outer ECC, which can correct most data disturbed by noise and dropouts in the reproduced signal, and beyond the correction the data are compensated by the error concealment circuits.

Output interface

The component video data are converted into serial data and multiplexed with the audio data, then output in the serial digital interface format. For analog outputs, the component video data are D/A converted into analog component signal, while they are encoded into composite digital, then D/A converted into analog composite signal. For audio outputs, the AES/EBU digital interface and D/A converted analog audio are available.

1-2. Features

1-2-2. A Full Range of Editing Functions

Full range of editing functions

You can connect two DVW-A500/500 series units to enable automatic or manual editing in either assemble or insert mode. The VTR also features a full range of editing functions, including preview, review, preroll, and the setting or trimming of edit points.

Quick access to edit points

The search dial allows you to quickly access edit points in shuttle mode, at a speed of still to about ± 50 times normal playback speed, and jog mode, which gives you a choice of speeds between -1 and $+1$, and between -3 and $+3$. Noiseless color pictures can be monitored in variable mode at a speed between -1 and $+3$ times normal playback speed. Digital audio signals recorded on the tape can also be monitored in a recognizable degree for edit point access in jog, shuttle, and variable modes.

Dynamic Motion Control (DMC) editing

Using the Dynamic Tracking (DT®) head, you can play back a section of the edit at speeds between -1 and $+3$ times normal speed, and store the speed variation on memory for later use in automatic editing.

Split editing

In insert mode, you can set audio and video edit points separately.

Preread editing

You can execute preread editing, using video or digital audio signals recorded on the tape as the edit source for insert editing. Using this function, the previously read signals can be sent to mixers for mixing and returned to the original channels.

Cross fade editing

You can select cut in editing, cross fade editing and fade-out/in editing for the audio signals.

Edit duration display

When edit point data are set, you can display the duration between any two of the IN, OUT, AUDIO IN and AUDIO OUT edit points by simultaneously pressing two keys corresponding to those edit points.

Digital time counter

The time counter display shows CTL and time codes (LTC/VITC¹⁾), or user's bits data to enable the precise setting of edit points.

1) LTC (Longitudinal Time Code):

Time code recorded on a longitudinal track.

VITC (Vertical Interval Time Code):

Time code recorded on a video track during the vertical blanking interval.

1-2. Features

1-2-3. Advanced Recording and Playback Functions

High-quality digital recording

The DVW-A500 series and DVW-500 series adopt component digital video and the four channels of 20-bit digital audio recording system with advanced error correction and concealment system that together provide superb video and audio quality.

Playback compatibility with analog Betacam and Betacam SP (only for DVW-A500/A500P)

The DVW-A500 series provide playback capability with tapes recorded on the Betacam SP VTRs, so that Betacam users can upgrade to digital environment while still being able to access the enormous analog Betacam archives. This playback compatibility include playback compatibility for AFM audio but does not support PCM audio recorded on the BVW-85P.

Noiseless playback with DT heads

Using the playback DT heads, you can perform noiseless playback at any of 54 speeds ranging from -1 to 3 times normal speed, including still picture playback. Noiseless playback is also supported by both digital and analog Betacam playback.

Video and audio confidence heads

Video and audio confidence heads enable you to play back the video and audio signals on channels 1 to 4 while recording, to check the quality of the recording.

Internal time code generator and reader

The internal time code generator allows you to record LTC/VITC time codes and user's bits together with video and audio signals. Time codes and user's bits are read by the internal time code reader during playback.

Computer servo system

Computer-controlled servo motors provide direct drive for the drum, capstan and two reels, enabling quick and accurate tape access.

Capstan override function

You can adjust the playback speed by $\pm 15\%$ to ensure synchronization between two VTRs playing back the same program, for example.

Independent volume controls

The recording and playback levels of the four audio channels can be set independently while monitoring audio level meters.

1-2. Features

1-2-4. Ease of Operation Suitable for Editing

Setup menus

The initial settings for the interface between the connected equipment, and the VTR operation mode, easily using the lower control panel.

Easy-to-use front panel

All important controls are located on the easy-to-use front panel. The panel can be angled as necessary. The front panel can also be completely detached for use as a remote control unit, by combining it with the BKDW-510/511 Control Panel Extension Kit/Control Panel Case.

Compact, lightweight, low power consumption

The VTR is small and light enough to allow its use in outside broadcast vans or in Electronic Field Production (EFP) assignments.

Remote control operation

The VTR has RS-422A serial 9-pin and optional parallel 50-pin remote connectors. It can be connected directly to the vast majority of existing editing control equipment.

Digital hour meter

Three different kinds of hour display and one cycle count display are supported; total elapsed time since the VTR was turned on, total drum revolution time, total tape running time and total number of threadings and unthreadings.

Self-diagnosis

When enabled with the maintenance menu, any malfunction causes the VTR to perform self-diagnosis, after which it displays the relevant error code in the time counter display.

Easy-to-maintain plug-in boards

The VTR uses plug-in circuit boards to simplify servicing and inspection.

Mountable in standard 19-inch rack

The unit can be mounted in an EIA-standard 19-inch rack.
For rack mounting, refer to the Installation Manual.

1-3. Optional Accessories

The following accessories can be used with the VTR.

BKDW-505 Analog Composite Decoder Board

Enables the input of analog composite video signals (NTSC video format).

BKDW-506 Analog Composite Decoder Board

Enables the input of analog composite video signals (PAL video format).

BKDW-509 Parallel (50P) Interface Kit

Enables remote control from an external control unit with parallel interface.

BKDW-510 Control Panel Extension Kit

Enables the control panel of the VTR to be detached and used as a remote control unit by connecting it to the main unit with the supplied cable.

BKDW-511 Control Panel Case

Provides protection for the control panel when being installed in a control console.

Chapter 2

Location and Functions of Parts and Controls

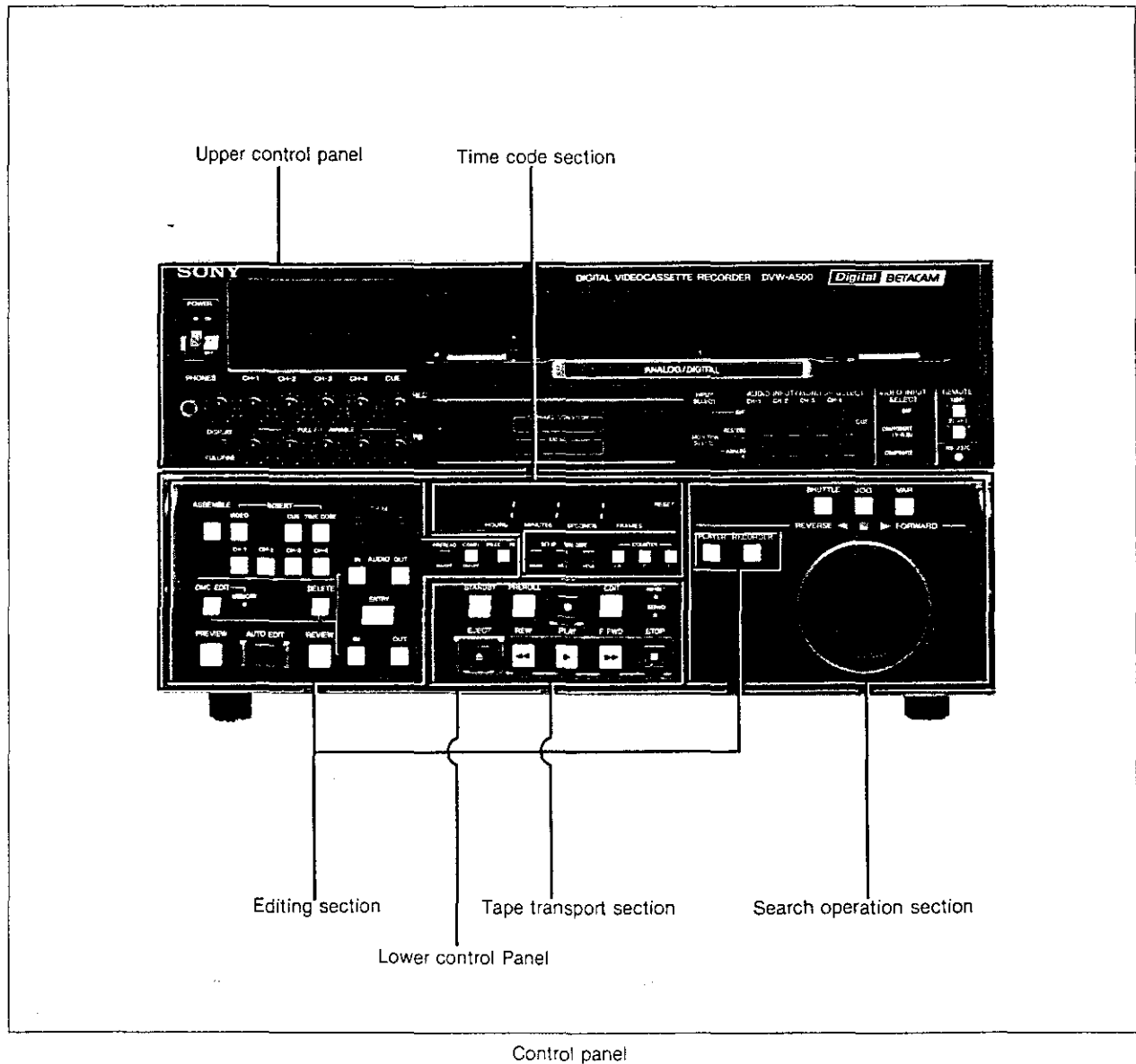
This chapter briefly describes the purposes and functions of the principal parts of the VTR.

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2-4. Connector Panel	2-20

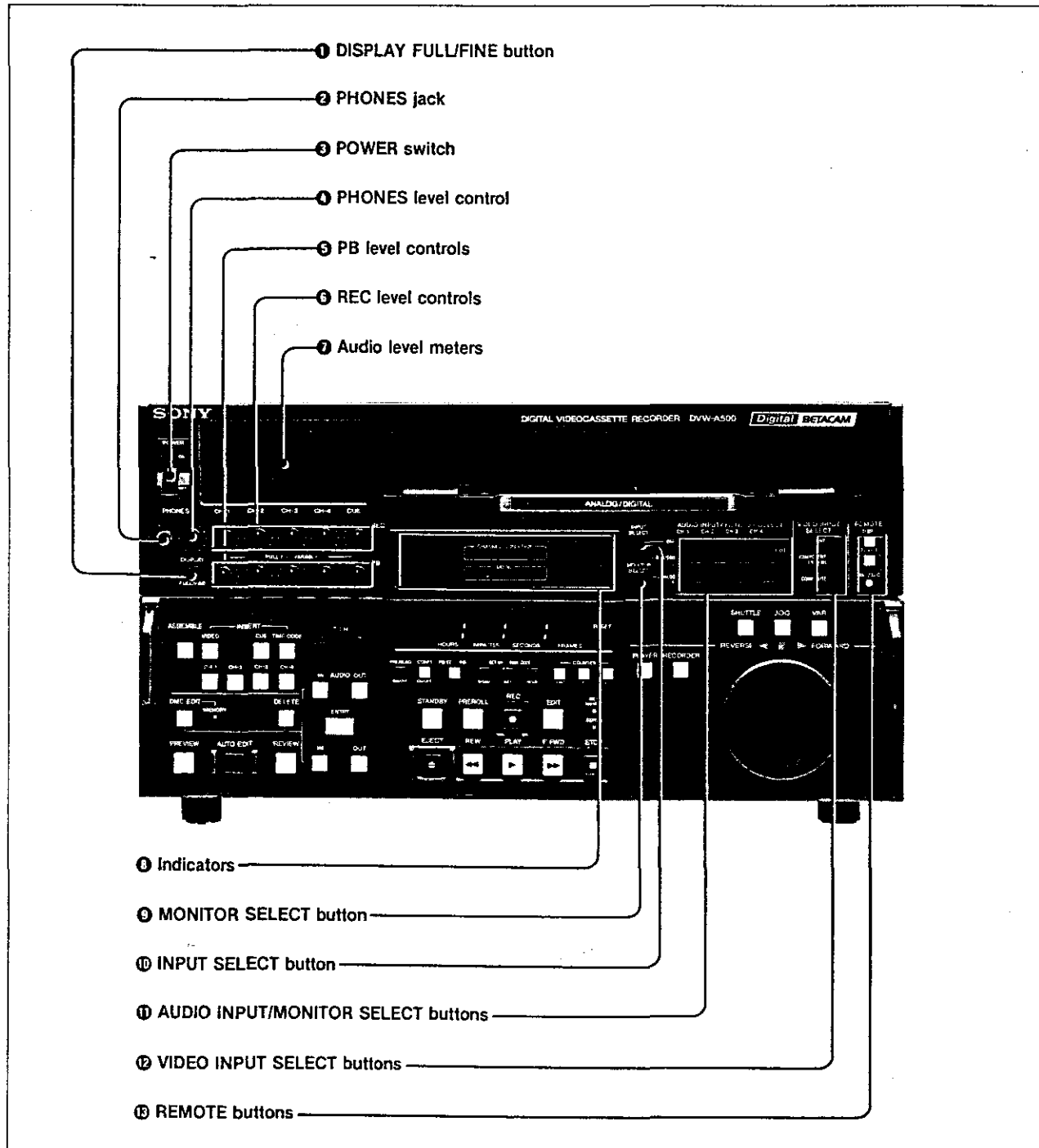
2-1. Control Panel

The control panel consists of the following sections.

- Upper control panel
- Lower control panel: editing section, tape transport section, search operation section, time code section



2-1-1. Upper Control Panel



Upper control panel

2-1. Control Panel

❶ DISPLAY FULL/FINE button

Switches the range of the audio level meters.

FULL: The level meter scale ranges from -60 to 0 dB or -40 to $+20$ dB. The scale range to be used is selected with the setup menu.

FINE: The level meter scale is enlarged, and the signal level is indicated in 0.25 dB steps. The center segment lights as the reference marker. If the signal level exceeds the maximum level of the enlarged scale, the uppermost segment will blink. If the signal level is below the minimum level, the lowermost segment will blink.

❷ PHONES jack

Connect 8Ω stereo headphones to monitor the audio during recording, playback and editing. Adjust the volume level with the PHONES level control.

❸ POWER switch

Set the switch to ON to power on the VTR. The audio level meters and time counter display will light.

❹ PHONES level control

Controls the level of the audio output from the PHONES jack. You can enable this control to simultaneously adjust the output level of the MONITOR OUTPUT connector on the control panel.

For details, refer to "1-9. Switch Settings on the Connector Panel and Boards" in the installation Manual.

❺ PB (playback) level controls

Independently adjust the audio playback levels for channels 1 to 4, and the cue (analog audio) channel.

To set the playback level, place the VTR in playback mode, pull out the control knobs and adjust the level while monitoring the audio level meter. Upon pushing in these control knobs, the audio playback levels are returned to the factory preset levels and cannot be adjusted.

❻ REC (recording) level controls

Independently adjust the audio recording levels for each of channels 1 to 4, and the cue channel. To set the recording level, place the VTR in E-E mode¹⁾, pull out the control knobs and adjust the level while monitoring the audio level meter. Upon pushing in these control knobs, the recording levels are returned to the factory preset levels (0 dB reference level for an input signal of $+4$ dBm) and cannot be adjusted.

❼ Audio level meters

Indicate the recording levels in record or E-E mode, and the playback levels in playback or CONF mode. Indication can be in two kinds of scale ranges.

These meters are factory set to indicate the scale of reference level 0 dB.

For details of changing the unit of indication, refer to "1-10. Setup Menu" in the Installation Manual.

1) E-E mode

Electric-to-electric mode.

A mode in which signals output from a VTR pass through internal electric circuits, but not through magnetic conversion circuits such as heads and tapes.

⑧ Indicators

Light or flash to show the status of the VTR.

VTR status indicators

Indicator	VTR status
DOLBY NR	Lights while the Dolby noise reduction circuitry is in operation.
KEY INHIBIT	Lights when the KEY INHIBIT switch on the sub control panel is set to ON.
CHANNEL CONDITION	Indicate the condition of the playback signal. Green indicator: indicates that the condition of the playback signal is good. Yellow indicator: indicates that the playback signal has some failures but is restorable. Red indicator: indicates that the playback signal is too poor to restore.
MENU 1/2/3	Indicate the menu bank selected by the SET UP SELECT switch of the system set-up panel.
DIGITAL	Indicates that the VTR is in digital mode. This indicator is normally lit, going off only when an analog Betacam cassette is inserted.
LTC	This indicator lights; • when the VTR is reading LTC signals on the playback tape. • when the VTR is recording LTC signals. • when the VTR is in E-E mode by pressing the REC button, while locked to the external time code.
VITC	This indicator lights; • when the VTR is reading VITC signals on the playback tape. • when the VTR is record/E-E mode and input video signal contains VITC signals. • when the VTR is in record/E-E mode and the VTR is ready for recording VITC signals by setting the VITC switch to ON.

⑨ MONITOR SELECT button

Selects the signals output from the MONITOR OUTPUT L and R connectors. Press the AUDIO INPUT/MONITOR SELECT buttons while this button is lit.

You can mix the signals to be monitored by pressing two or more channel buttons (CH-1 to 4) for the same output channel (L or R).

⑩ INPUT SELECT button

Selects the format and channel of the audio input signal. Press this button so that it lights, then press one or more of the following the AUDIO INPUT/MONITOR SELECT buttons.

The button indicators flash when selected digital audio signals are not input.

SIF CH-1 to CH-4: The audio signal being input to the SERIAL V/A INPUT connector is selected.

AES/EBU CH-1 to CH-4: The audio signal being input to the AUDIO INPUT (AES/EBU) connector is selected.

ANALOG CH-1 to CH-4: The audio signal being input to the ANALOG AUDIO INPUT connector is selected.

⑪ AUDIO INPUT/MONITOR SELECT buttons

Selects audio input signals when the INPUT SELECT button is lit, or monitor output signals when the MONITOR SELECT button is lit.

⑫ VIDEO INPUT SELECT buttons

Selects the video signal being input to the VTR. Press the button corresponding to the video signal format. The button indicator flashes when selected video signal is not input.

SIF: The serial digital video signal being input to the SERIAL V/A INPUT connector is selected.

COMPONENT (Y-R,B): The analog component video signal being input to the COMPONENT VIDEO INPUT connectors is selected.

COMPOSITE: The analog composite video signal being input to the COMPOSITE VIDEO INPUT connector is selected.

⑬ REMOTE buttons

Determine the device used to control the VTR. Press one of the following buttons as required.

1 (9P) button: The external equipment connected to the REMOTE I-IN (9P)/OUT (9P) connectors control the VTR. The button lights.

2 (50P) button: The external equipment connected to the PARALLEL I/O (50P) connector (with optional BKDW-509) controls the VTR. The button lights.

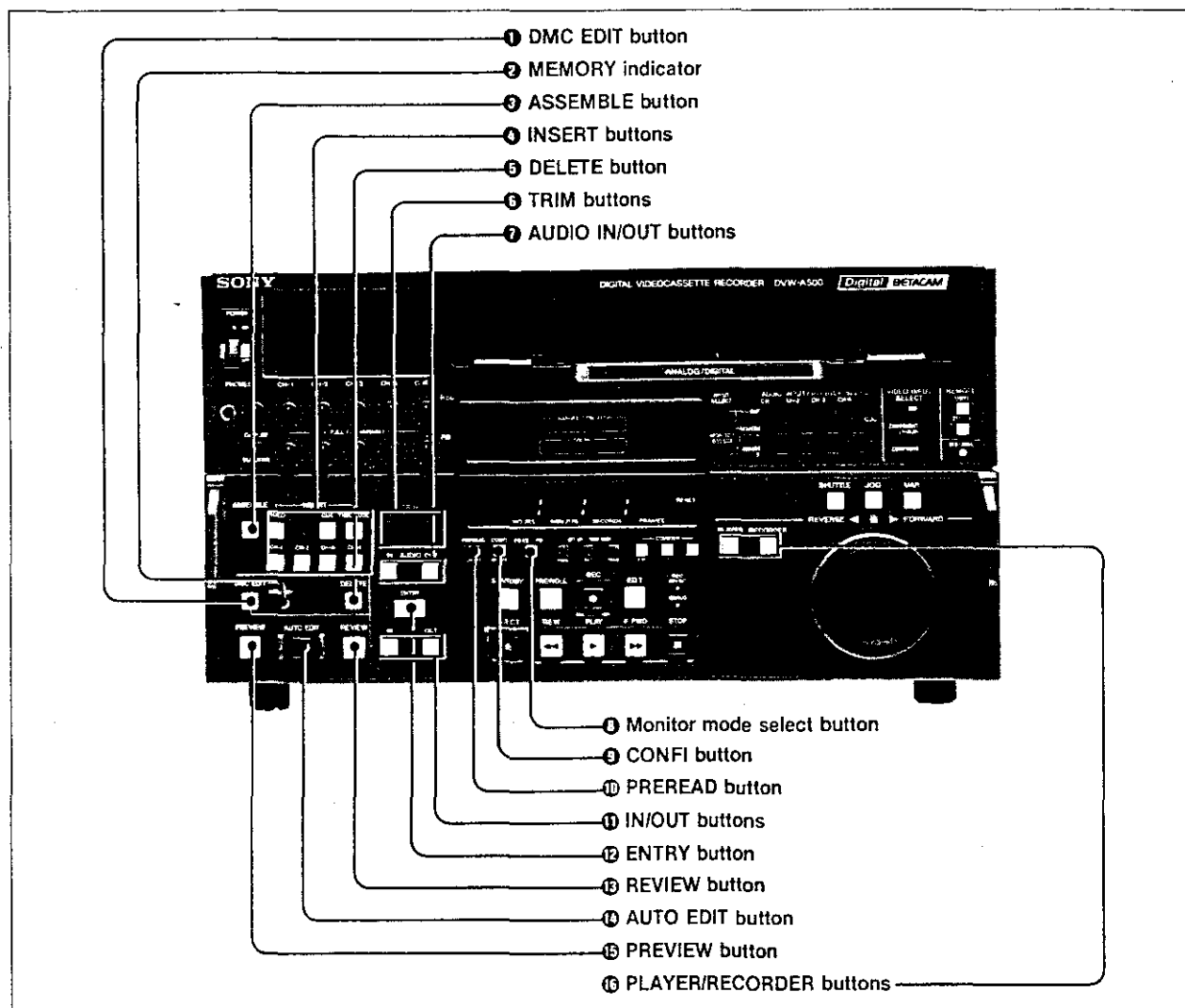
RS-232C indicator: This indicator lights when external equipment connected to the RS232C connector is communicating with the VTR.

When controlling the VTR from the external equipment (1 or 2), all of the tape transport buttons and editing buttons are disabled, except for the STOP and EJECT buttons.

For other settings, see the table "Items and values in the main menu" on page 3-9.

2-1. Control Panel

2-1-2. Lower Control Panel (Editing Section)



Lower control panel (editing section)

1 DMC EDIT button

Performs DMC playback or DMC editing at speeds between -1 and $+3$ times normal speed as stored in memory.

2 MEMORY indicator

Flashes to show that playback speeds are being stored in memory while performing DMC playback or DMC editing using the DMC EDIT button. Lights steadily once the speeds have been memorized.

3 ASSEMBLE button

Selects assemble edit mode. This button lights when pressed and goes off when pressed again.

4 INSERT buttons

Select the input signal channel (VIDEO, AUDIO CH-1, CH-2, CH-3, CH-4, CUE or TIME CODE) for insert edit. These buttons light when pressed and go off when pressed again.

⑤ DELETE button

Deletes an edit point or exits DMC mode. Pressing this button together with a lit IN, OUT, AUDIO IN or AUDIO OUT button deletes the edit point corresponding to that button. The button pressed together with this button will go off or flash. If it flashes, another edit point should be set.

⑥ TRIM buttons

Changes an edit point by one frame. Press either of the TRIM +/– buttons together with the IN, OUT, AUDIO IN or AUDIO OUT button. Pressing the + button advances the edit point by one frame, while pressing the – button moves it back one frame. Pressing the + or – button together with the PLAY button changes the playback speed by +8% or –8% (capstan override function).

⑦ AUDIO IN/OUT buttons

Set the audio IN and OUT edit points separately from the video edit points. Press one of these buttons together with the ENTRY button to set an audio IN/OUT point. If you press one of these buttons after setting an audio edit point, the corresponding time data will be shown in the time counter display.

⑧ Monitor mode select button

Selects the signal output while the VTR is in fast forward, rewind, stop or standby mode. Press this button to turn on the desired indicator.

PB/EE: Input signal

PB: Playback signal

When playing back an analog Betacam tape, the monitor mode is automatically set to PB regardless of your selection.

⑨ CONFI (confidence) button

Enables you to monitor the video and audio currently being recorded by simultaneously playing back them with the dedicated confidence heads.

⑩ PREREAD button

Performs pre-read (read before write) in insert editing mode.

⑪ IN/OUT buttons

Set an IN/OUT edit point.

Press one of these buttons together with the ENTRY button.

If you press one of these buttons after setting an edit point, the corresponding time data will be shown in the time counter display.

⑫ ENTRY button

Sets an edit point.

Press this button together with the IN, OUT, AUDIO IN or AUDIO OUT button. The IN/OUT buttons are for setting video IN/OUT edit points and the AUDIO IN/OUT buttons are for audio IN/OUT edit points. The button pressed together with this button lights.

⑬ REVIEW button

Reviews a section of the edit on the recorder monitor.

⑭ AUTO EDIT button

Starts automatic editing.

If an IN point is not set when you press this button, the current tape address is set as the IN point before automatic editing starts.

⑮ PREVIEW button

Lets you view the results of an edit on a monitor connected to the recorder without actually recording the edit to tape.

If an IN point is not set when you press this button, the current tape address is set as the IN point before the preview starts.

⑯ PLAYER/RECORDER buttons

Select which of the VTRs is to be controlled by the editing buttons and tape transport buttons of this VTR when this VTR is configured as a recorder with an external player VTR connected to the REMOTE 1-IN (9P)/OUT (9P) connectors.

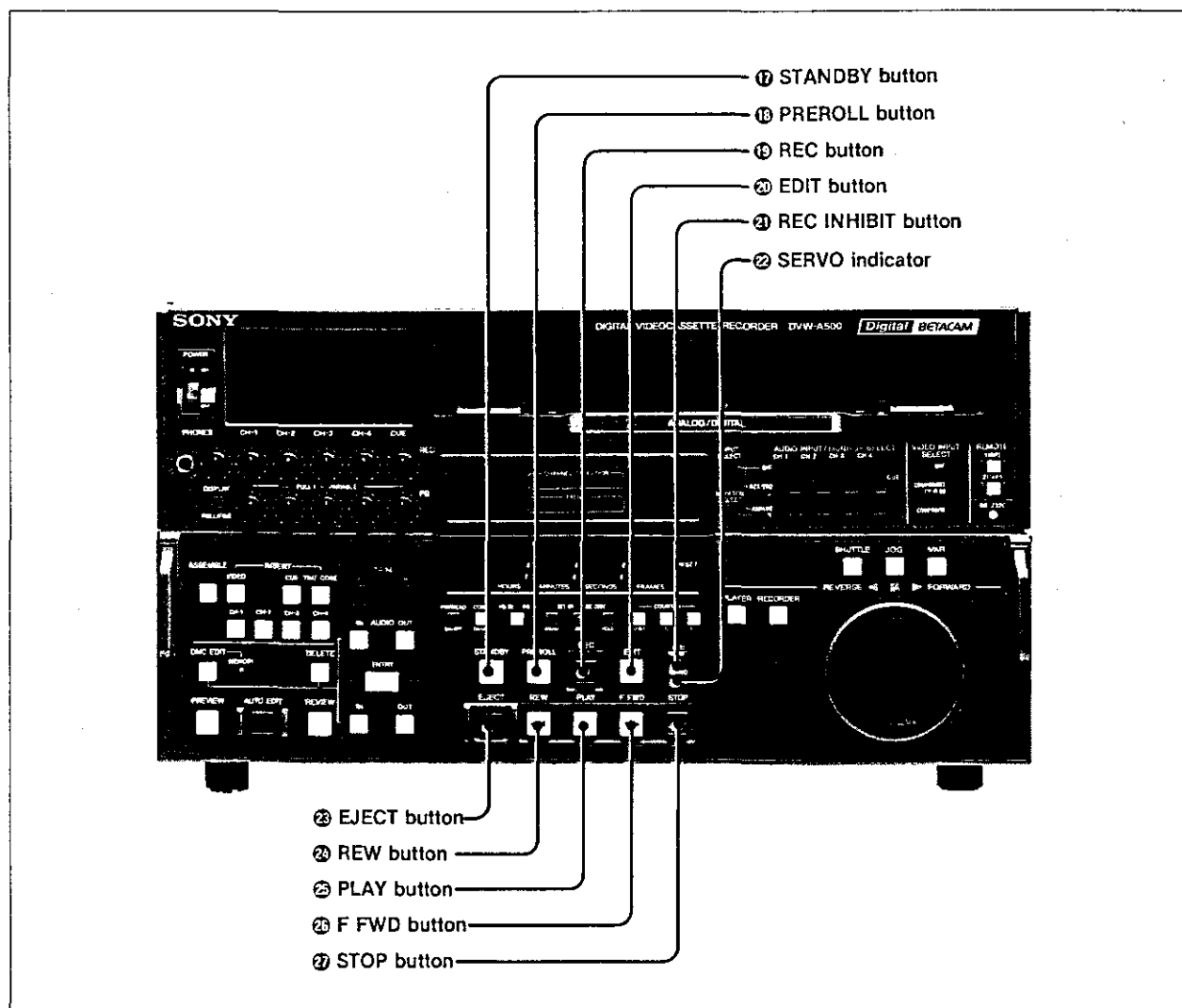
PLAYER button: When this button is pressed, it lights to show that the editing and tape transport buttons of this VTR control the external player VTR.

RECORDER button: When this button is pressed, it lights to show that the editing and tape transport buttons control the recorder VTR (this VTR).

These buttons have no effect when using the VTR alone.

2-1. Control Panel

2-1-3. Lower Control Panel (Tape Operation Section)



Lower control panel (tape operation section)

17 STANDBY button

Pressing this button in other than standby mode makes it light and places the VTR in standby mode. Since the head-drum rotates in standby mode, the tape can thus start sooner than in non-standby mode.

Pressing this button while in standby mode turns it off, the VTR exits standby mode, the tape tension is released, and the drum stops rotating. If more than eight minutes (factory preset) elapse while the VTR is set to standby mode, the VTR automatically exits standby mode to prevent tape and head clogging.

18 PREROLL button

Pressing this button positions the tape to the preroll point (factory preset to five seconds prior to the IN point).

Use this button to cue up a tape for broadcast or manual editing.

Pressing this button together with the IN, OUT, AUDIO IN or AUDIO OUT button cues up the tape to the edit point corresponding to the button.

For details of changing the preroll time, see "3-3. Setup Menu" on page 3-8.

⑮ REC (record) button

Pressing this button together with the PLAY button starts recording.

Holding down the REC button during playback, search, fast forward or rewind allows you to monitor the E-E video and audio.

Pressing the REC button while the VTR is in stop mode allows you to monitor the E-E video and audio. Pressing the STOP button while monitoring E-E signals returns you to the video and audio monitored before you pressed the REC button.

⑯ EDIT button

Pressing this button together with the PLAY button starts manual editing.

Pressing the EDIT button while the VTR is in stop mode allows you to monitor E-E signals selected with the ASSEMBLE or INSERT buttons.

Pressing the STOP button while monitoring the input signal release the edit E-E mode.

Holding down the EDIT button during playback, search, fast forward or rewind allows you to monitor E-E signals.

⑰ REC (record) INHIBIT indicator

Lights on or goes off according to the setting of the REC INHIBIT switch on the sub control panel and the status of the record inhibit plug of the cassette, as shown below.

Status of REC INHIBIT indicator

REC INHIBIT switch	Record inhibit plug	REC INHIBIT indicator
ON	Pushed down/ Not pushed down	Lit
OFF	Pushed down	Lit ^{a)}
	Not pushed down	Unlit

a) You can change the initial setting such that the indicator flashes here.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

Recording, editing and the selection of assemble or insert mode are possible only when this indicator is off.

⑱ SERVO indicator

Lights when the drum servo and capstan servo lock.

⑲ EJECT button

Ejects the cassette. Resets the display when CTL codes appear in the time counter display.

⑳ REW (rewind) button

Rewinds the tape.

㉑ PLAY button

Starts playback.

Pressing this button together with the REC button or EDIT button starts recording or manual editing. Pressing this button during recording or manual editing places the VTR in playback mode.

㉒ F FWD (fast forward) button

Fast forwards the tape.

㉓ STOP button

Stops the tape (stop mode).

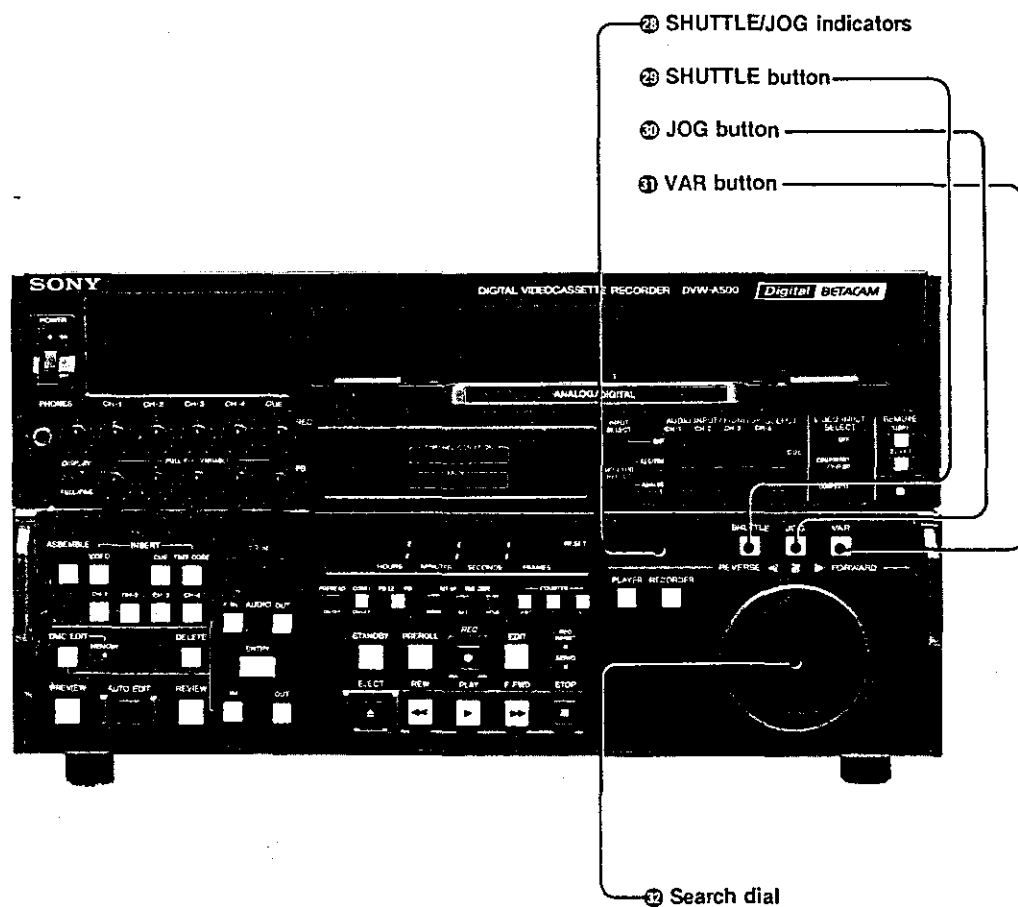
When the monitor mode is set to PB, pressing this button outputs a still picture. In stop mode, the tape is wound around the head-drum, but the head-drum continues to rotate. The VTR enters stop mode when a cassette is loaded.

This button flashes when the input video signal and the external reference signal are out of phase or when each signal is not supplied in the VIDEO INPUT and REF mode respectively. This indication can be switched off by setup menu item 105.

For details, see "1-10. Setup Menu" in the Installation Manual.

2-1. Control Panel

2-1-4. Lower Control Panel (Search Operation Section)



Lower control panel (search operation section)

②③ SHUTTLE/JOG indicators

One of these indicators lights to show the current search mode.

②④ SHUTTLE button

Selects shuttle mode to play back the tape at 0 to ± 50 times normal speed when playing back a Digital Betacam tape, and ± 35 (DVW-A500) or ± 42 (DVW-A500P) times normal speed when playing back an analog Betacam tape. The SHUTTLE indicator lights. The dial is indented at the positions corresponding to 0, -10 and $+10$ times normal speed. The playback speed corresponds to the angle of rotation of the dial.

②⑤ JOG button

Selects jog mode to play back the tape at 0 to ± 1 or ± 3 times normal speed (selectable with the menu setup). The JOG indicator lights. The dial is not indented. The playback speed corresponds to the rotational speed of the dial.

②⑥ VAR button

Selects variable speed playback mode with noiseless picture at any of 54 speeds within the range -1 to $+3$ times normal speed. The VAR indicator lights. The dial is indented at the positions of still and normal playback speed.

②⑦ Search dial

Searches for edit points.

Rotate the dial clockwise for forward playback (\blacktriangleright indicator lit) or counterclockwise for reverse playback (\blacktriangleleft indicator lit). While the VTR is in stop mode, the \blacksquare indicator lights.

When you press the dial, the VTR toggles between shuttle and jog modes, and either the SHUTTLE or JOG indicator lights to indicate the current mode.

Shuttle mode: The playback speed corresponds to the angle of rotation of the dial (0 to about ± 50 times normal speed when playing back a Digital Betacam tape, and ± 35 (DVW-A500) or ± 42 (DVW-A500P) times normal speed when playing back an analog Betacam tape.).

Jog mode: The dial is not indented. The playback speed corresponds to the rotational speed of the dial (0 to ± 1 or ± 3 times normal speed).

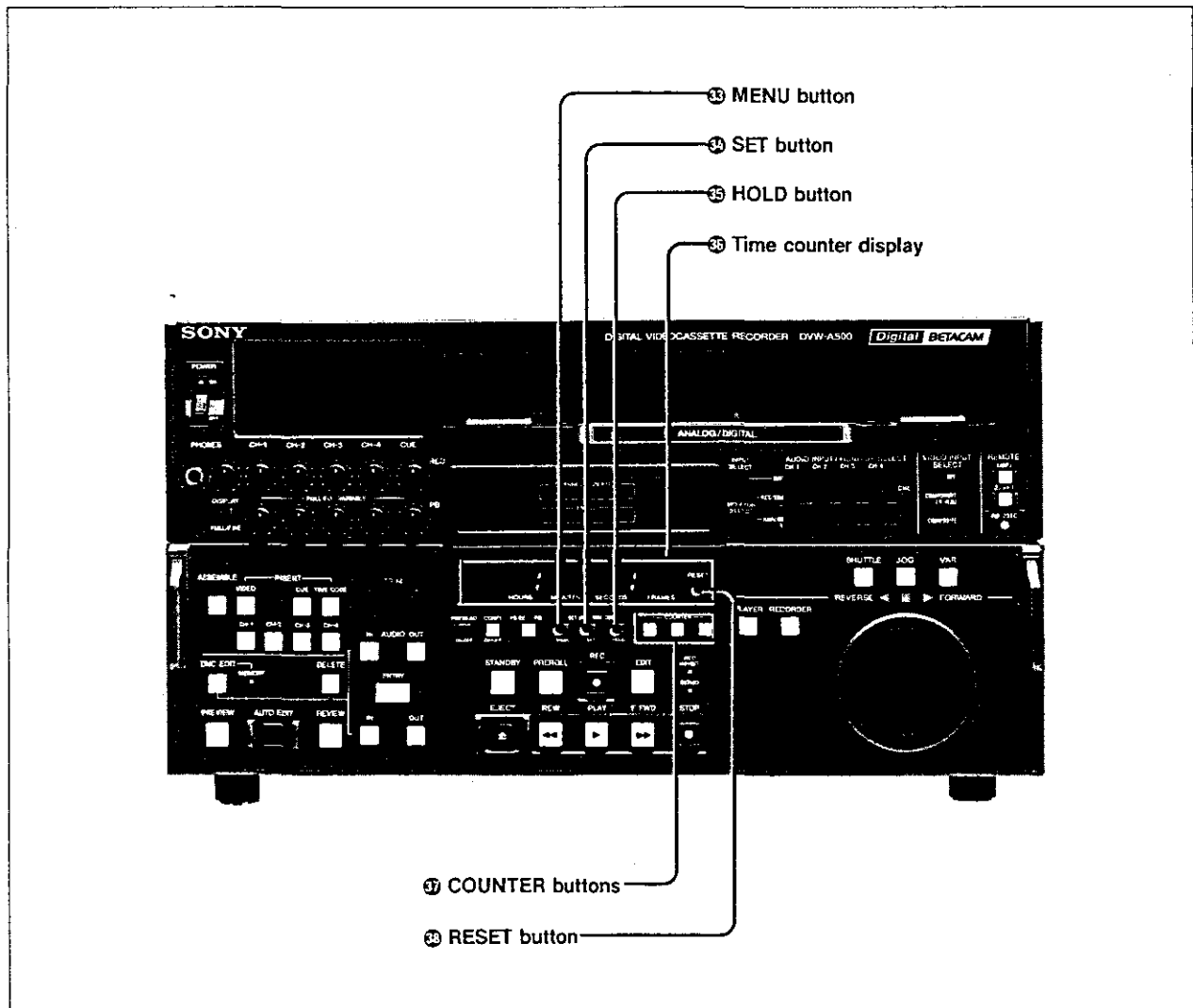
VAR: Playback speed is -1 times normal speed when the dial is rotated fully counterclockwise, and $+3$ times normal speed when rotated fully clockwise.

Capstan override mode: Rotating the dial while holding down the PLAY button changes the playback speed by up to $\pm 15\%$.

After turning on the power, always center the search dial (where the indicator lights).

2-1. Control Panel

2-1-5. Lower Control Panel (Time Code Section)



Lower control panel (time code section)

33 MENU button

When you press this button, the indicator will light and a menu will be displayed. If you press this button again, the indicator will go out, and any changes will not be saved.

34 SET button

Press this button to register the value shown in the time counter display with the time code generator, after setting the value using the search dial.

If you press this button after changing one or more items in the menu, those changes will be saved.

35 HOLD button

Press this button to temporarily halt the progress of the data in the time counter display. The indicator lights and the data in the time counter display freezes. Press the button again to resume display of the data presently being read. You should press this button first before setting the time code or user's bits.

③⑤ Time counter display

Displays the following time data according to the setting of the time counter display switch.

CTL: Tape running time in hours, minutes, seconds and frames, as determined by counting the CTL signal currently being recorded onto the tape or read from the tape currently being played back.

TC: Time code currently being recorded onto or read from the tape by the built-in time code reader. Either the LTC or VITC time code is displayed, according to the setting of the TC selector on the system set-up panel.

U-BIT: User's bits included in the time code currently being recorded onto or read from the tape. User's bits included in LTC or VITC time codes are displayed, according to the setting of the time code selector on the system set-up panel.

One of these indicators lights to show the current search mode.

For the meanings of the error codes ("Error-XX") displayed in the time counter display, refer to the Maintenance Manual Part 1.

③⑦ COUNTER buttons

Press one of the buttons corresponding to the type of data to be displayed in the time counter display.

COUNTER buttons, data displayed and editing tape address

The COUNTER buttons pressed	Data displayed	Editing tape address
U-BIT	User's bits	Time code
TC	Time code	Time code
CTL	CTL	CTL

When the REMOTE 1 (9P) button is pressed, the time data is displayed and the editing tape address is determined according to the equipment connected to the REMOTE 1 connector, regardless of the setting of these buttons.

③⑧ RESET button

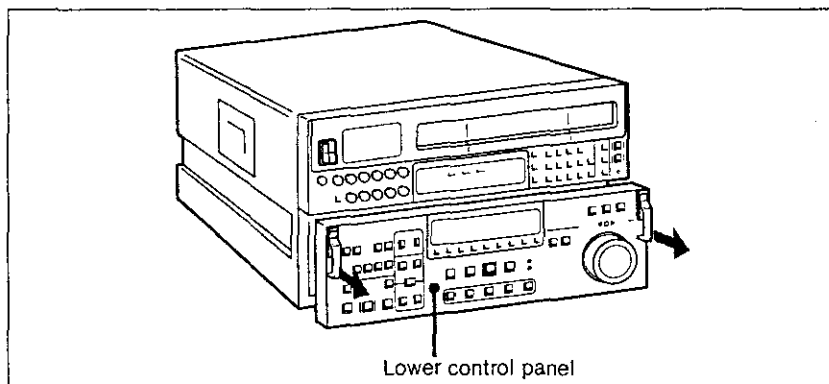
Resets the time counter as follows, according to the setting of the time counter display switch:

CTL: Sets the CTL display to 0:00:00:00. All currently set edit points are erased.

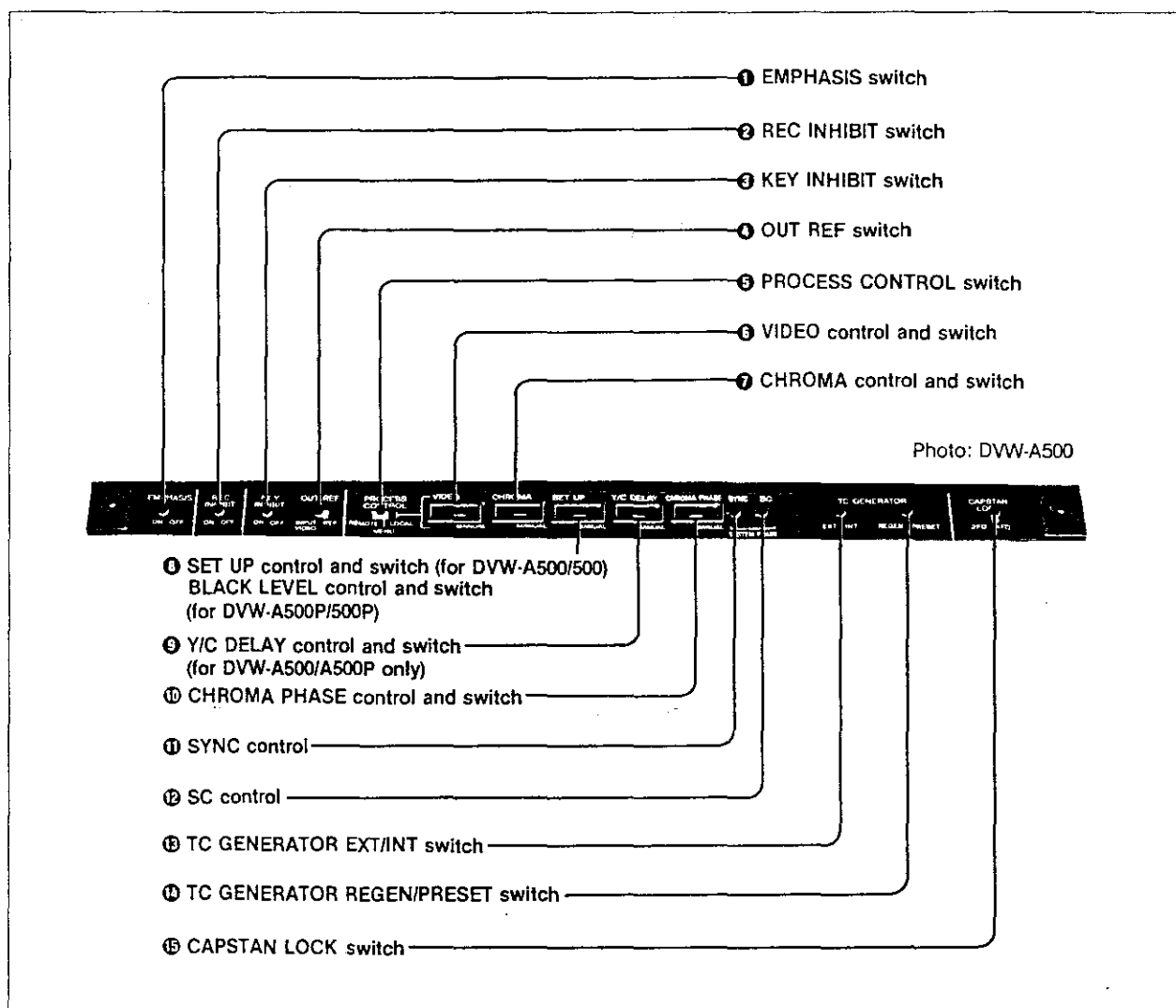
TC or U-BIT: Resets the time code generator and sets the time code to 00:00:00:00 (when set to TC) and user's bits to 00 00 00 00 (when set to U-BIT). Currently set edit points are not affected.

2-2. Sub Control Panel

Pull out the lower control panel to access the sub control panel.



How to access the sub control panel



Sub control panel

❶ EMPHASIS switch

Set this switch to ON to emphasize digital audio signals that have been converted from analog input signals and analog Betacam or Betacam SP playback signals to be digitized.

❷ REC INHIBIT switch

Setting this switch to ON turns on the REC INHIBIT indicator on the lower control panel and inhibits recording, editing and the selection of assemble or insert edit mode.

❸ KEY INHIBIT switch

Setting this switch to ON turns on the KEY INHIBIT indicator of the upper control panel and inhibits all or some key inputs of the REMOTE, VIDEO INPUT SELECT, AUDIO INPUT/MONITOR SELECT buttons, and the buttons in the editing section. The inhibited key inputs can be changed with the setup menu.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

❹ OUT REF switch

Selects the reference signal with which the output signals are synchronized.

REF: Selects the external reference signal to be input to the REF. VIDEO connector as the reference signal for playback and digital audio recording. The input video and digital audio signal should be synchronized with the external reference signal when recording. If they are out of phase or no reference signal is supplied, the STOP button flashes to warn that.

INPUT VIDEO: Selects the input video signal to be used as the reference signal for both playback and recording. To select the input video signal, press one of the VIDEO INPUT SELECT buttons.

❺ PROCESS CONTROL switch

Selects the equipment that controls the digital video processor.

Switching this switch during playback may cause momentary muting in the playback sound.

LOCAL: The video processor is set according to the settings of the controls and switches on the sub control panel of the VTR.

MENU: The video processor is set according to the setting of setup menu items 715 to 721.

For details, refer to "1-10. Setup Menu" in the Installation manual.

REMOTE: The optional BVR-50/50P remote control unit controls the video processor.

❻ VIDEO control and switch

Adjusts the output level of the video signal. Set the VIDEO switch as follows.

MANUAL: To manually adjust the output level of video signals by using the VIDEO control. The adjustment range is ± 3 dB, or $-\infty$ to $+3$ dB according to the setting of setup menu item 714. Note that only the ± 3 dB range is available when controlled from the BVR-50/50P.

PRESET: To set the output level of video signal to the preset standard level. The setting of the VIDEO control is ignored.

❼ CHROMA control and switch

Adjusts the chrominance signal output level. Set the CHROMA switch as follows.

MANUAL: To manually adjust the chrominance signal output level by using the CHROMA control. The adjustment range is ± 3 dB, or $-\infty$ to $+3$ dB according to the setting of setup menu item 714.

Note that only the ± 3 dB range is available when controlled from the BVR-50/50P.

PRESET: To set the chrominance signal output level to the preset standard level. The setting of the CHROMA control is ignored.

❽ SET UP control and switch (for DVW-A500/500)

Adjusts the setup level (black level). Set the SET UP switch as follows.

MANUAL: To manually adjust the setup level using the SET UP control. The adjustment range is ± 30 IRE.

PRESET: When the setup level is not to be adjusted. The setting of the SET UP control is ignored.

❾ BLACK LEVEL control and switch (for DVW-A500P/500P)

Adjusts the black level. Set the BLACK LEVEL switch as follows.

MANUAL: To manually adjust the black level using the BLACK LEVEL control. The adjustment range is ± 210 mV.

PRESET: When the black level is not to be adjusted. The setting of the BLACK LEVEL control is ignored.

❿ Y/C DELAY control and switch (for DVW-A500/A500P only)

Adjusts the Y/C delay of analog Betacam or Betacam SP playback. Set the Y/C delay switch as follows.

MANUAL: To manually adjust the Y/C delay using the Y/C DELAY control. The adjustment range is ± 100 ns.

PRESET: When the Y/C delay is not to be adjusted. The setting of the Y/C DELAY control is ignored.

2-2. Sub Control Panel

⑩ CHROMA PHASE control and switch

Adjusts the hue (burst and chroma relative phase). Set the CHROMA PHASE switch as follows.

MANUAL: To adjust the hue within ± 30 degrees with the control.

PRESET: When the hue is not to be adjusted, regardless of the control setting.

⑪ SYNC control

Adjusts the output sync phase by up to $\pm 15 \mu\text{s}$ with respect to the reference signal being input to this unit in E-E and playback mode. This control is inhibited while recording. Note that momentary muting on playback sound may occur when adjusting the sync phase during playback.

⑫ SC (subcarrier) control

Adjust the output sync and subcarrier phase within $\pm 200 \text{ ns}$ with respect to the reference signal being input to this unit. Use this control if you need to precisely adjust the unit's output in subcarrier phase order with the reference signal for editing composite signals. The output SCH (subcarrier to sync) phase is not changed with this control.

⑬ TC GENERATOR EXT/INT (time code external/internal) switch

Determines whether an external or internal time code is used.

EXT: The time code being input to the TIME CODE IN connector is used.

INT: The time code generated by the internal time code generator is used.

This switch is factory set to INT.

⑭ TC GENERATOR REGEN (regeneration) /PRESET switch

Selects the time code with which the internal time code generator synchronizes.

REGEN: Time code read by the time code reader.

PRESET: Time code set with the VTR.

⑮ CAPSTAN LOCK switch

When editing or playing back a tape on which decoded component signals are recorded (a tape on which composite signals were recorded with a Digital Betacam or a Betacam and Betacam SP VTR), set this switch according to your editing or playback requirements.

For DVW-A500/500

2FD: Capstan servo locks in units of 2 fields.

Since color framing lock is inhibited, there is no phase shift (H-shift) of the output video signal. Set to 2FD for component signal editing/playback. However, optimum composite signal frequency response can be obtained by shifting the video phase (H-shift) while referring to the decoded SC phase or the color frame ID, which is enabled by using the setup menu item 712 for composite editing with quick servo lock.

4FD: Capstan servo locks in units of 4-field color frame. Optimum composite frequency response is kept and there is no picture shift at any edit point or stop/start point during playback. Set to 4FD for composite editing/playback or A-B roll editing that requires stable and continuous video phase.

For DVW-A500P/500P

2FD: Capstan servo locks in units of 2 fields.

Since color framing lock is inhibited, there is no phase shift (H-shift) of the output video signal. Set to 2FD for component editing/playback. However, optimum composite frequency response can be obtained by shifting the video phase (picture shift) while referring to the decoded SC phase or the color frame ID, which is enabled by using the setup menu item 712 for composite editing with quick servo lock.

4FD: Capstan servo locks in units of 4 fields. Optimum composite frequency response can be obtained by shifting the video phase (H-shift) while referring the decoded SC phase or the color frame ID. Set to 4FD for composite signal editing with quick servo lock.

8FD: Capstan servo locks in units of 8-field color frame. Optimum composite signal frequency response is kept and there is no picture shift or V-shift at any edit point or stop/start point during playback.

Set to 8FD for composite editing/playback or A-B roll editing that requires stable and continuous video phase.

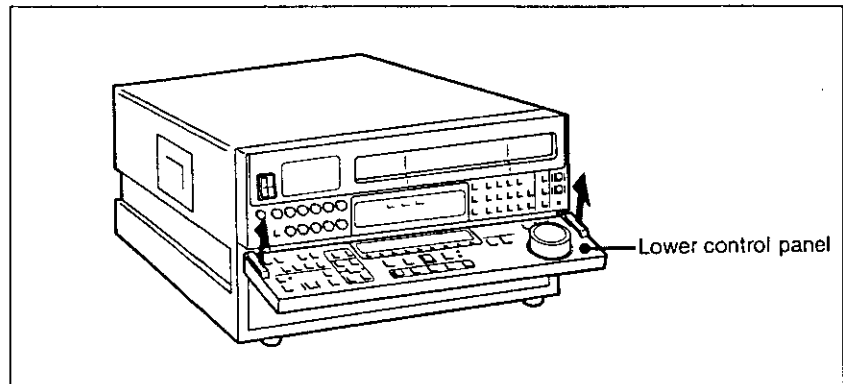
Note

In playback of Digital Betacam tape on which component source is recorded, picture shift control is inhibited in any mode.

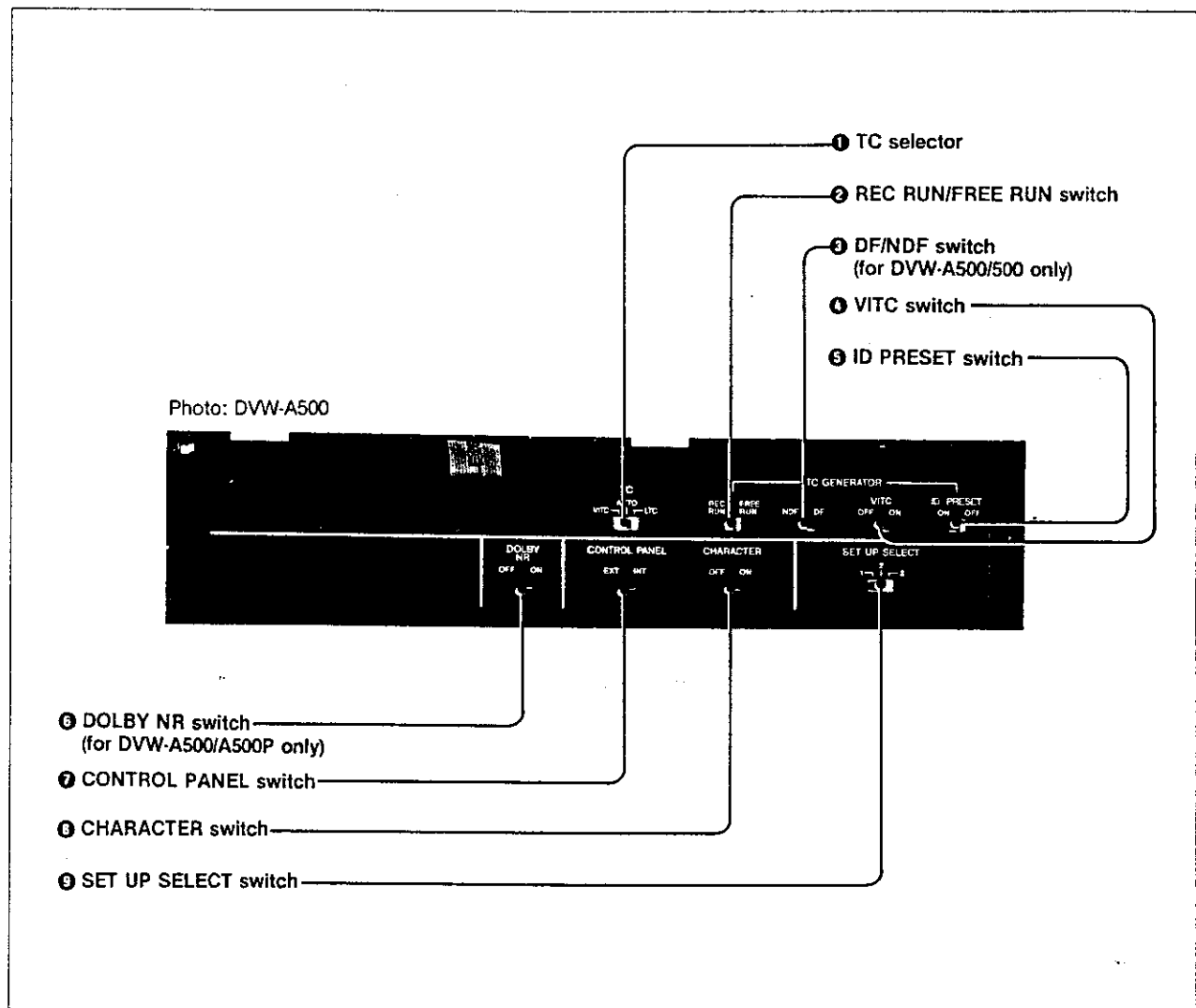
As for composite source recording with the BKDW-505/506, the video phase is automatically adjusted so that SCH phase becomes zero if the phase is shifted.

2-3. System Set-Up Panel

Lift the lower control panel up into its horizontal position to access the system set-up panel.



How to access the system set-up panel



System set-up panel

2-3. System Set-Up Panel

❶ TC (time code) selector

Determines whether the time code displayed in the time counter display on the lower control panel is LTC or VITC. When this switch is set to AUTO, the time counter display shows LTC when the tape speed exceeds $\pm 1/2$ times normal speed, but VITC when the speed is within $\pm 1/2$ times normal speed.

This switch is factory set to LTC.

❷ REC RUN/FREE RUN switch

Selects the operation mode of the time code generator.

REC RUN: The time code advances only during recording. When you set the switch to this position, set the TC GENERATOR EXT/INT switch on the sub control panel to INT and the TC GENERATOR REGEN/PRESET switch on the sub control panel to PRESET.

FREE RUN: Regardless of the operation mode of the VTR, the time code advances as long as the VTR is powered on.

This switch is factory set to FREE RUN.

❸ DF/NDF (drop frame/non drop frame) switch (for DVW-A500/500 only)

Selects whether the time code generator and CTL counter advance in drop frame mode or non-drop frame mode.

NDF: Non-drop-frame mode.

DF: Drop frame mode.

This switch is factory set to DF.

If the TC GENERATOR REGEN/PRESET switch is set to REGEN, this switch has no effect since the time code generator synchronizes with the external or playback time code.

❹ VITC (Vertical Interval Time Code) switch

Selects whether VITC signals are recorded.

OFF: VITC signals are not recorded.

Note that VITC signals in the input video signals are automatically recorded.

ON: The VITC generated by the built-in time code generator is recorded.

This switch is factory set to ON.

For details of the VITC insertion line, refer to "1-10. Setup Menu" in the Installation Manual.

❺ ID PRESET switch

Sets the user's bits generated by the time code generator to the ID code value preset in the set up menu.

This switch is factory set to OFF.

For details of setting and storing the ID code, refer to "1-10. Setup Menu" in the Installation Manual.

❻ DOLBY NR switch (for DVW-A500/A500P only)

Turns on and off the Dolby C noise reduction system when using Betacam format oxide tape.


ON: Dolby NR system is used for Betacam playback.

OFF: Dolby NR system is disabled for Betacam playback.

This switch is factory set to OFF.

1)Dolby NR

Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.

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

7 CONTROL PANEL switch

Selects which control panel controls this VTR.

INT: The control panel on the front panel controls this VTR.

EXT: An external control panel, connected through the CONTROL PANEL connector, controls this VTR.

This switch is factory set to INT.

8 CHARACTER switch

Selects whether character signals such as time codes are superimposed on the video signals output from the SERIAL V/A OUTPUT 4 (SUPER) and COMPOSITE VIDEO OUTPUT 3 (SUPER) connectors.

ON: Superimposed.

OFF: Not superimposed.

This switch is factory set to ON.

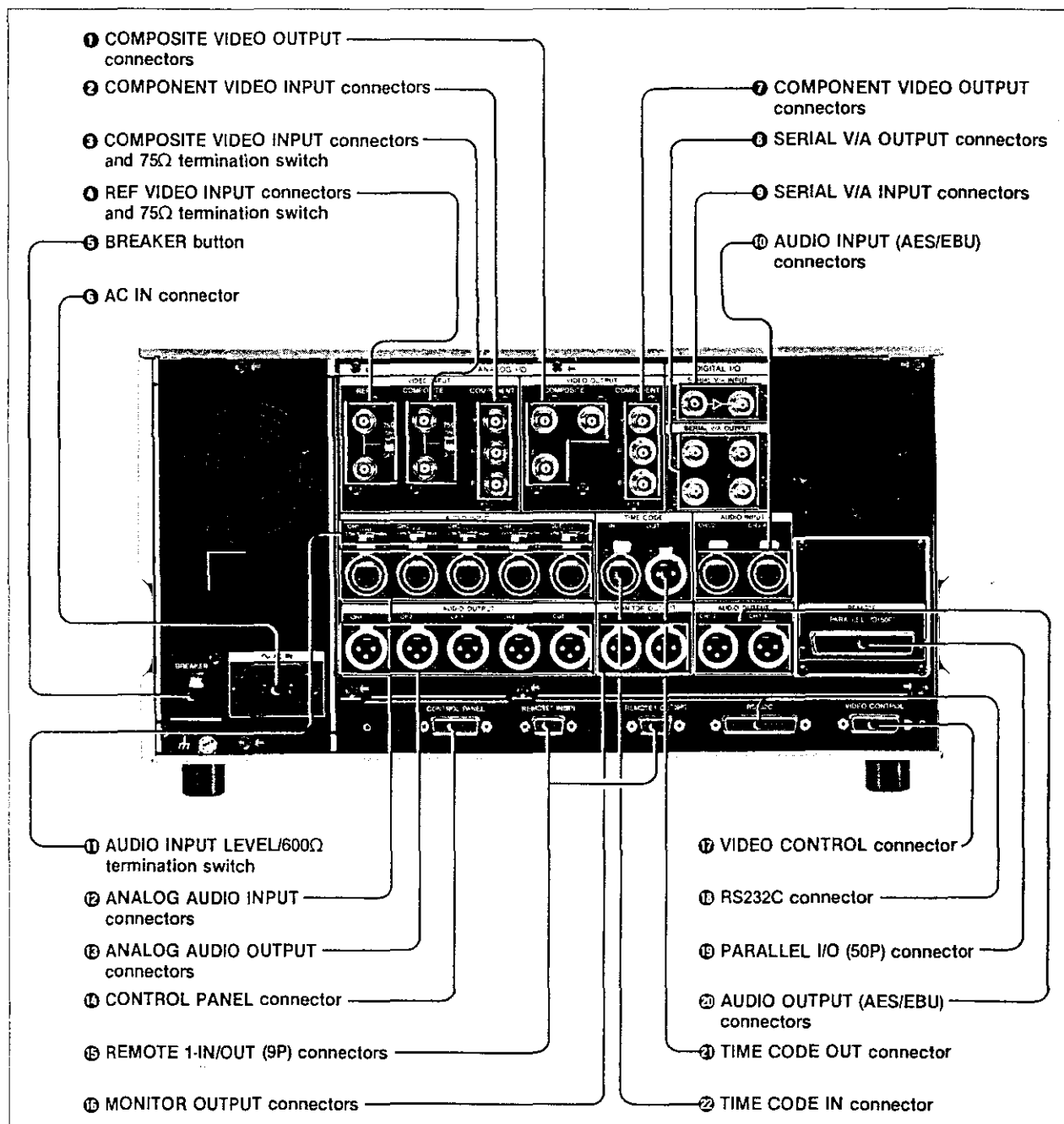
9 SET UP SELECT switch

Selects the memory bank used to store set up menu settings for VTR operation. The VTR will be set according to the settings in the selected memory bank.

Pressing the MENU button displays the setup menu for the selected memory bank in the time counter display and/or on the monitor screen.

For details of the setup menu, refer to "3-3. Setup Menu" on page 3-8 and "1-10. Setup Menu" in the Installation Manual.

2-4. Connector Panel



Connector panel

❶ COMPOSITE VIDEO OUTPUT connectors (BNC)

Output analog composite video signals. The signal output from connector 3 (SUPER) contains superimposed characters for time data or menu data when the CHARACTER switch is set to ON.

❷ COMPONENT VIDEO INPUT connectors (BNC)

Accept analog component video signals (Y/R-Y/B-Y).

❸ COMPOSITE VIDEO INPUT connectors (BNC) and 75Ω termination switch (with optional BKDW-505 for NTSC system, or BKDW-506 for PAL system)

Accept an analog composite video signal. Set the 75Ω termination switch to OFF when using both of the COMPOSITE VIDEO INPUT connectors for a bridging connection. Otherwise, set it to ON.

❹ REF. (reference) VIDEO INPUT connectors (BNC) and 75Ω termination switch

One of these connectors accepts a reference video signal. Use an analog video signal with chroma burst (VBS) or a black and white video signal (VS) as a reference video signal.

When making a bridging connection with a loop-through output, set the 75Ω termination switch to OFF. Otherwise, set it to ON.

❺ BREAKER button

Disconnects the primary circuit of the AC power transformer should an excessive current be defected.

❻ AC IN connector

Connect to an AC outlet using the power cord supplied with the VTR.

❼ COMPONENT VIDEO OUTPUT connectors (BNC)

Output analog component video signals (Y/R-Y/B-Y).

❶ SERIAL V/A (video/audio) OUTPUT connectors (BNC)

Output four (1 to 4) serial digital video/audio signal lines. The signal output from connector 4 (SUPER) contains superimposed characters for time data or menu data when the CHARACTER switch is set to ON.

❷ SERIAL V/A (video/audio) INPUT connectors (BNC)

The left connector accepts serial digital video/audio signals. When the VTR is powered on, the right connector serves as an active loop-through output.

❸ AUDIO INPUT (AES/EBU) connectors (XLR-3-31)

Accepts a maximum of two lines (four channels: channels 1/2 and channels 3/4) of AES/EBU format digital audio signals.

❹ AUDIO INPUT LEVEL/600Ω termination switch

Set according to the audio input level of each channel input to the ANALOG AUDIO INPUT connectors and for the audio input impedance.

LOW with OFF

Audio input level: -60 dBu (microphone input)

Audio input impedance: High (about 20 kilohms)

HIGH with OFF

Audio input level: +4 dBu (line input)

Audio input impedance: High (about 20 kilohms)

HIGH with ON

Audio input level: +4 dBm (line input)

Audio input impedance: 600Ω

❹ ANALOG AUDIO INPUT connectors (XLR-3-31)

Accept up to five analog audio signal lines (channels 1 to 4 and cue).

2-4. Connector Panel

⑬ ANALOG AUDIO OUTPUT connectors (XLR-3-32)

Output up to five analog audio signal lines (channel 1 to 4 and cue).

⑭ CONTROL PANEL connector (15-pin)

Connects the control panel using the 15-pin cable supplied with the optional BKDW-510 Control Panel Extension Kit when using the control panel as a remote controller.

⑮ REMOTE 1-IN (9P)/OUT (9P) connectors (D-sub 9-pin)

Connect to another DVW-A500/500 series VTR or D-1, D-2, or Betacam SP VTR via the 9-pin remote control cable supplied with the VTR. Used when you edit using two VTRs and the BVE-900/910/2000/9000/9100 editing control unit. The REMOTE 1-IN and OUT connectors can be used to make a bridge connection.

⑯ MONITOR OUTPUT connectors (XLR-3-32)

Output signals to the audio monitor. These connectors output two signal lines: L and R. Select the signals to be output with the MONITOR SELECT button and the AUDIO INPUT/MONITOR SELECT buttons. You can make setting to enable adjustment of the volume level with the PHONES level control of the upper control panel.

Refer to "1-9. Switch Settings on the Connector Panel and Boards" in the Installation Manual.

⑰ VIDEO CONTROL connector (D-sub 15-pin)

Connects to the optional BVR-50/50P remote control unit to enable remote control of the video processor.

Before connecting the remote control unit, turn off the power of the VTR.

⑱ RS232C connector (D-sub 25-pin)

Accepts or sends the RS-232C remote control signal and/or VTR status data from/to the external equipment. When this connector is being used for communication, the RS-232C indicator on the upper control panel lights.

⑲ PARALLEL I/O (50P) connector (D-sub 50-pin, with optional BKDW-509)

Inputs an external remote control signal.

For details, refer to the Installation Manual.

⑳ AUDIO OUTPUT (AES/EBU) connectors (XLR-3-32)

Output a maximum of two lines (four channels: channels 1/2 and 3/4) of AES/EBU format digital audio signals.

㉑ TIME CODE OUT connector (XLR-3-32)

Outputs one of the following time codes according to the VTR operation mode.

In playback mode: Playback time code.

In record mode: Time code generated by the internal time code generator, or that input to the TIME CODE IN connector.

㉒ TIME CODE IN connector (XLR-3-31)

When recording a time code supplied from external equipment, this connector accepts the time code signal.

Connect to the time code output terminal of the external equipment.

Chapter 3

Setting Up the VTR

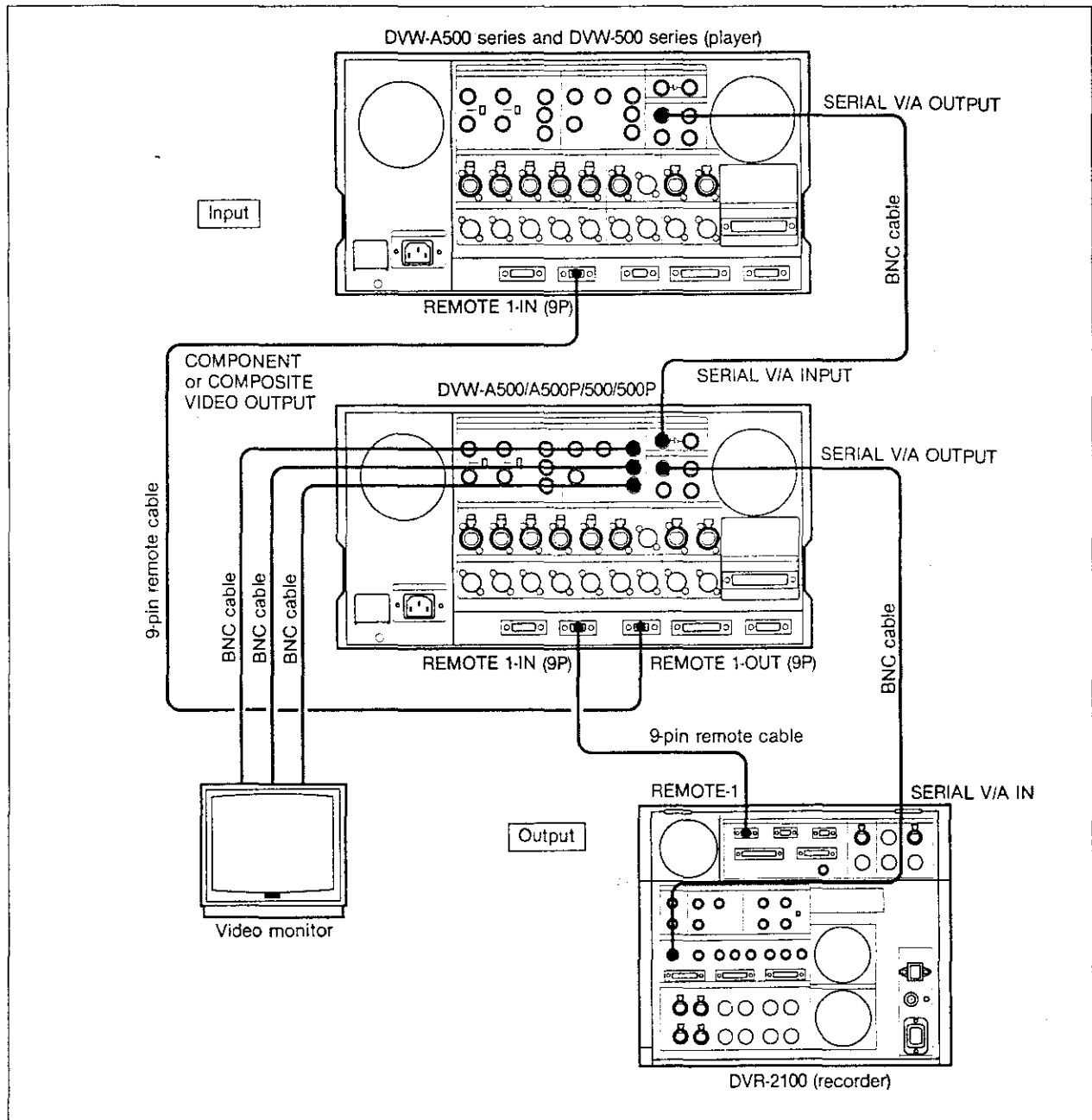
This chapter explains the preparations that must be completed attempting to operate the VTR.

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3-1. Connecting External Equipment

3-1-1. Connecting Digital Signals

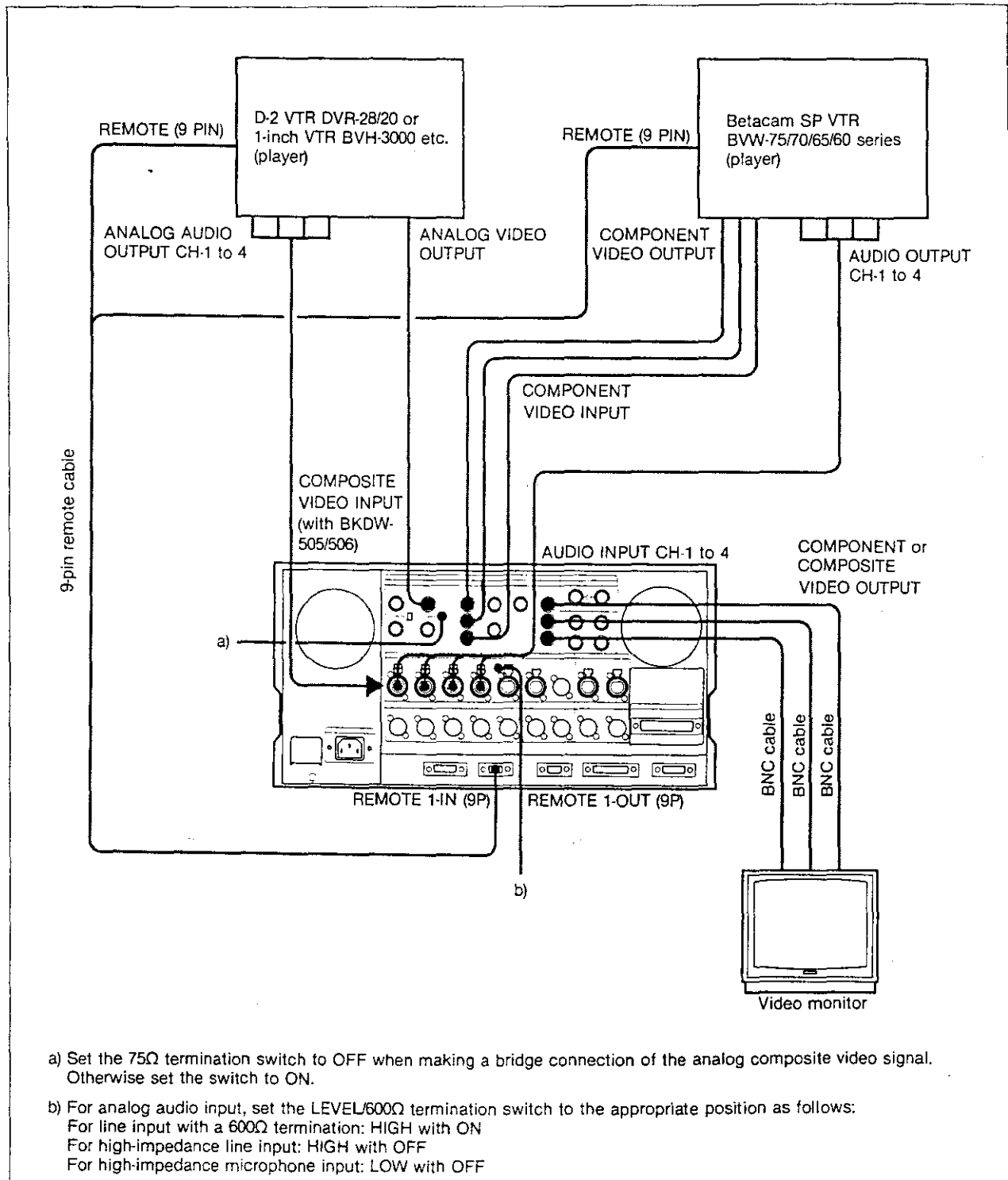
The diagram below shows how to connect digital signals from another DVW-A500/500 series VTR, used as a player, and to a DVR-2100 D-1 component digital VTR, used as a recorder.



Connecting Digital Signals

3-1-2. Connecting Analog Signals

The diagram below shows how to connect analog video and audio signals from a Betacam/Betacam SP VTR, 1-inch VTR, or D-2 VTR.



Connecting Analog Signals

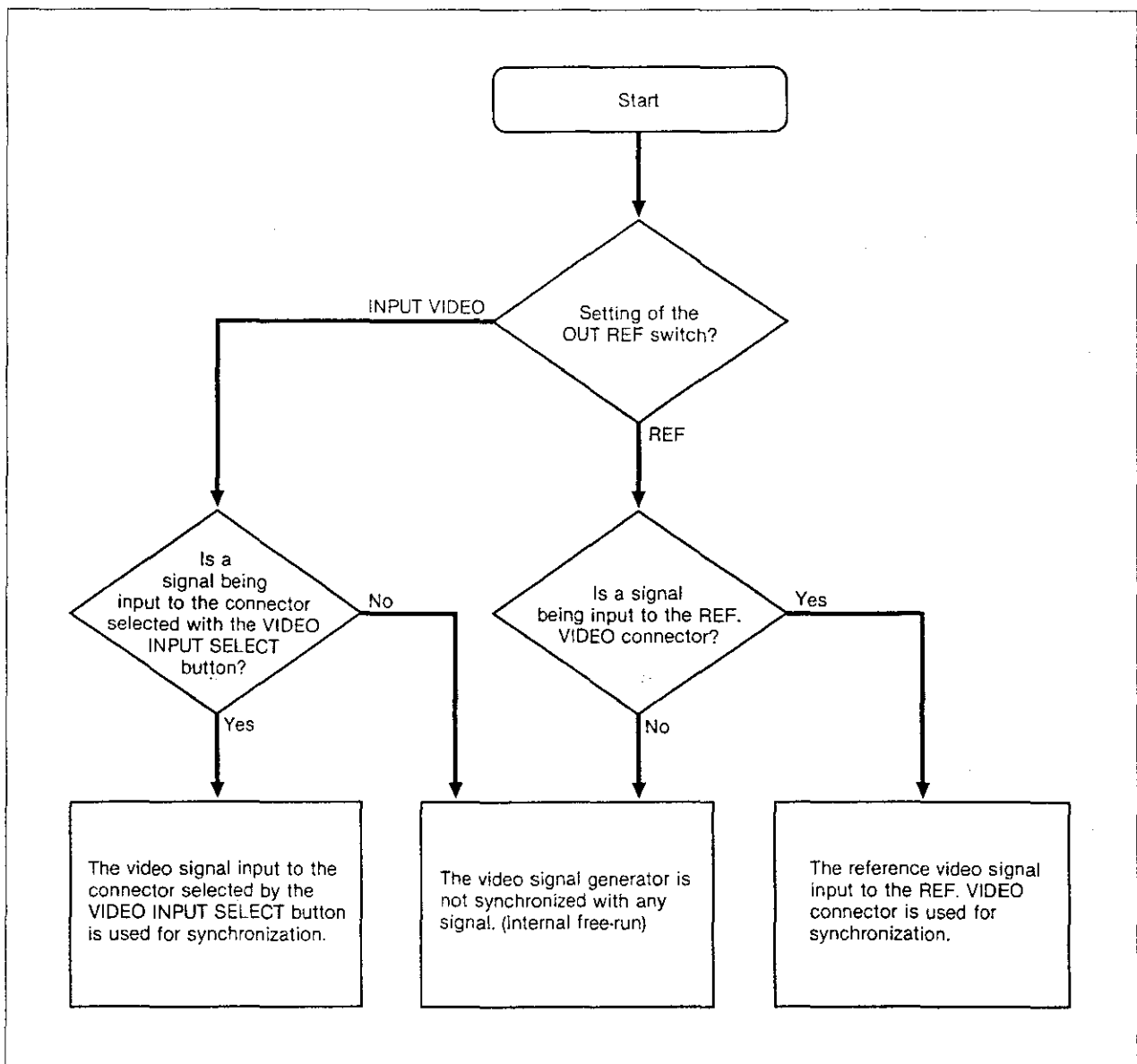
3-2. Reference Signals for Video Output and Servo System

This section describes how reference signals for the video output and servo system are selected.

The output from the internal reference video signal generator is supplied to the video processor and servo circuits as a reference signal.

3-2-1. External Sync Signal for the Internal Reference Video Signal Generator

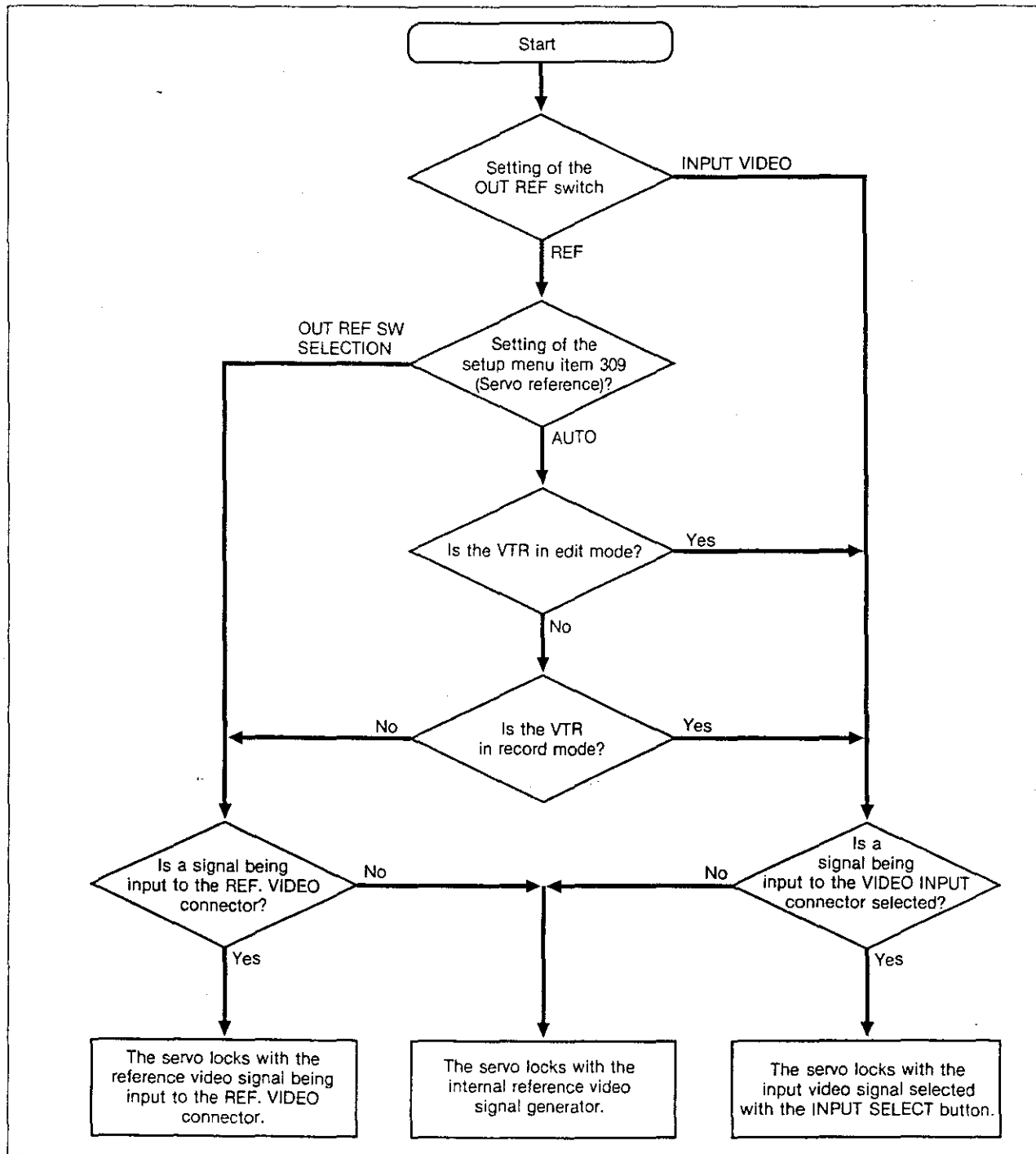
The internal reference video signal generator synchronizes with either the input reference video signal or an input video signal. Which of the two signals is used for synchronization depends on whether a signal is being input and the setting of the OUT REF switch on the sub control panel, as shown in the following flow chart.



Automatic selection of external sync signal for internal reference video signal generator

3-2-2. Reference Signal for the Servo System

The VTR automatically selects either the input video signal or the output from the internal reference video signal generator as the reference signal for the servo system. Which of the two signals is selected depends on the operational status of the VTR, as shown in the following flow chart.



Automatic selection of reference signal for the servo system

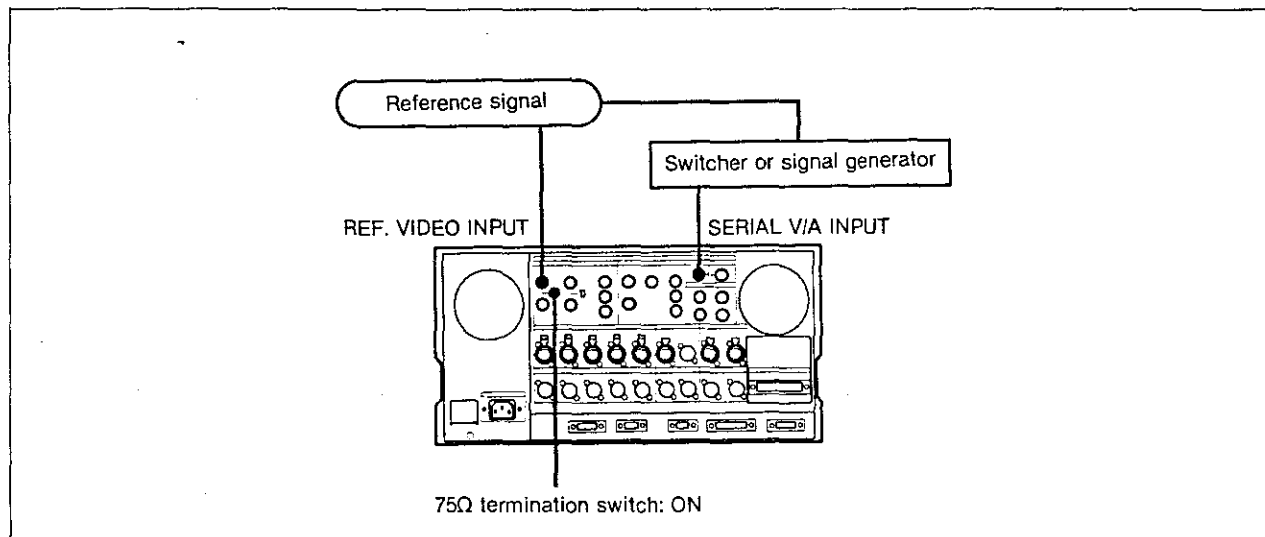
3-2. Reference Signals for Video Output and Servo System

3-2-3. Connecting Reference Signals

Connect reference signals according to your recording or playback requirements.

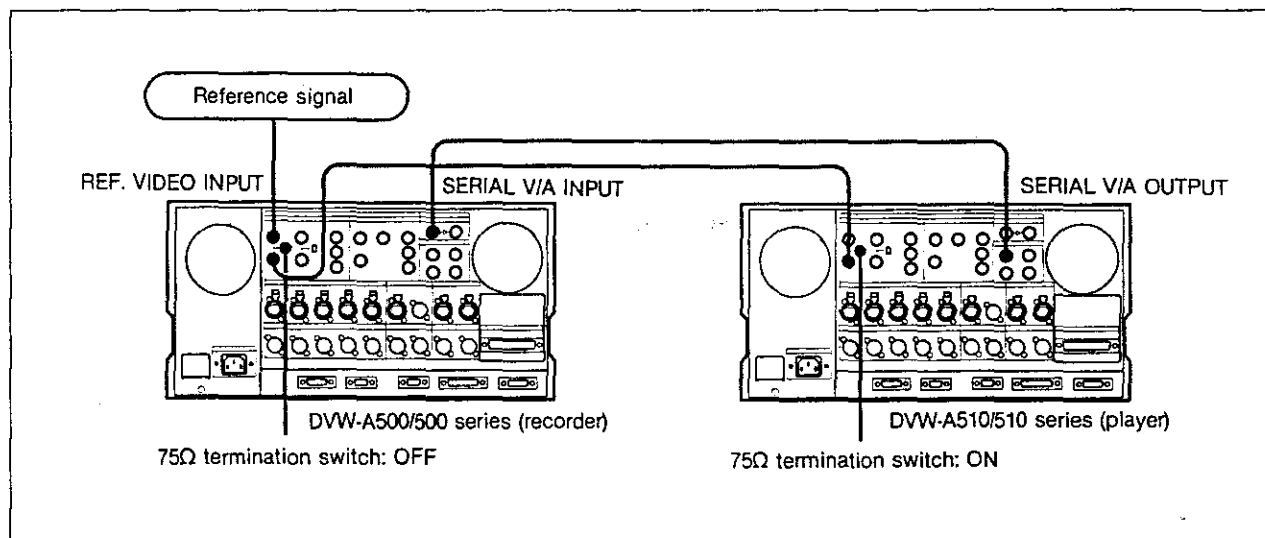
Reference signal connections

For recording signals from a switcher or signal generator



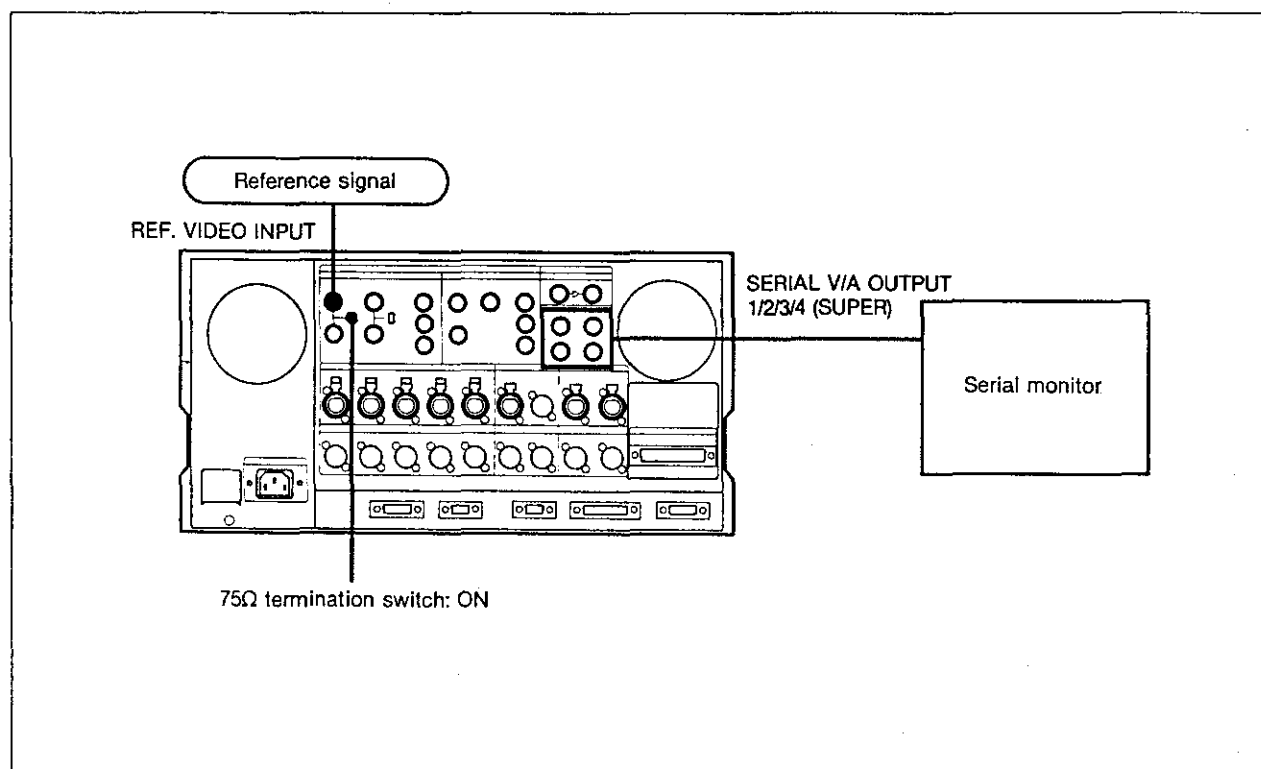
For recording signals from a switcher or signal generator

For recording signals from a VTR



For recording signals from a VTR

For playback



For playback

3-3. Setup Menu

The setup menu contains the settings changed most often, such as the preroll time, and the position and type of the characters superimposed on the output to the monitor.

The setup menu consists of the main menu and system menu. This section describes the items in the main menu and explains how to change menu settings.

For details of each menu, refer to "I-10. Setup Menu" in the Installation Manual.

3-3-1. Items in the Main Menu

The items in the main menu are shown in the listed table. The value in a rectangle is the factory setting.

Items and values in the main menu

Item number	Title	Value	Explanation
001	PREROLL TIME	00 05 15	Set the preroll time to between 0 and 15 seconds. A preroll time of at least 5 seconds is recommended when using the VTR for editing.
002 (DVW-A500/500)	CHARACTER H-POSITION	00 1C 24	Adjust the horizontal screen position of the one of superimposed characters. The hexadecimal value 00 is for the far left of the screen and 24 (decimal 36) for the far right. Increasing the value moves the position of the characters to the right.
002 (DVW-A500P/500P)	CHARACTER H-POSITION	00 1C 22	Adjust the horizontal screen position of the one of superimposed characters. The hexadecimal value 00 is for the far left of the screen and 22 (decimal 34) for the far right. Increasing the value moves the position of the characters to the right.
003 (DVW-A500/500)	CHARACTER V-POSITION	00 56 57	Adjust the vertical screen position of the first line of superimposed characters. The hexadecimal value 00 is for the top of the screen and 57 (decimal 87) for the bottom. Increasing the value lowers the position of the characters.
003 (DVW-A500P/500P)	CHARACTER V-POSITION	00 6A 6F	Adjust the vertical screen position of the first line of superimposed characters. The hexadecimal value 00 is for the top of the screen and 6F (decimal 111) for the bottom. Increasing the value lowers the position of the characters.
004	SYNCHRONIZE	0 1	When editing with two VTRs connected over the 9-pin remote cable, with the VTR used as the controller, this item determines whether or not to operate the two VTRs in phase synchronization. 0: Operate in phase synchronization. 1: Do not operate in phase synchronization.
005	DISPLAY INFORMATION SELECT	0 1 2 3 4 5	Determines the kind of information to be displayed as superimposed characters. 0: Time counter display information and VTR status. 1: Time counter display information and user's bits. 2: Time counter display information and CTL. 3: Time counter display information and time code (LTC or VITC). 4: Time code (LTC or VITC) only. 5: "R" (replay) is displayed during DT playback mode.

Items and values in the main menu (continued)

Item number	Title	Value	Explanation
006	LOCAL FUNCTION ENABLE	0 1 2	Determines which buttons on the control panel are enabled when this unit is controlled from external equipment. 0: All of the buttons are disabled. 1: Only the STOP button and EJECT button are enabled. 2: All buttons except RECORDER button and PLAYER button are enabled.
007	TAPE TIMER DISPLAY	0 1	Determines whether the CTL counter should display 12-hour or 24 hour time. 0: 12-hour time. 1: 24-hour time.
008	MONITORING SELECTION FOR VTR-TO-VTR EDITING	0 1	For recorder-player editing with only one monitor, connected to the recorder. Determines whether the recorder is forced into E-E mode when the recorder's PLAYER button is pressed to view the player's playback signals on the monitor. 0: Do not force the recorder into E-E mode. 1: Force the recorder into E-E mode.
009	CHARACTER TYPE	0 1 2 3	Determines the type of superimposed characters. 0: White letters on a black background. 1: Black letters on a white background. 2: White outline letters. 3: Black outline letters.
011	CHARACTER V SIZE	01 02 03 04	Determines the vertical size of superimposed characters. 01: Standard size 02: 2 times standard size 03: 3 times standard size 04: 4 times standard size

About the digital hours meter

The main menu also includes items for digital hours meter (item number H01 to H14).

For details, see "7-4. Reading Hours Meter".

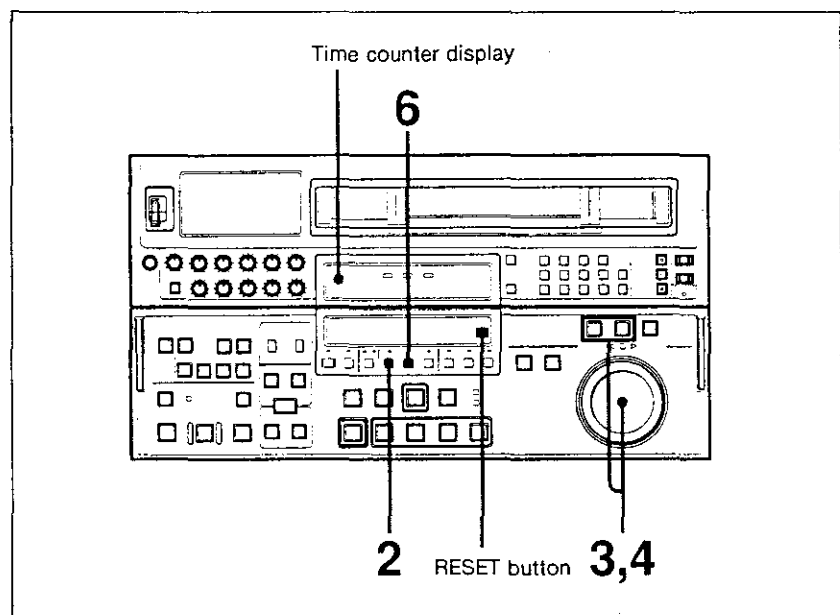
3-3. Setup Menu

3-3-2. Changing Menu Settings

This section describes how to change the factory preset values for each menu setting.

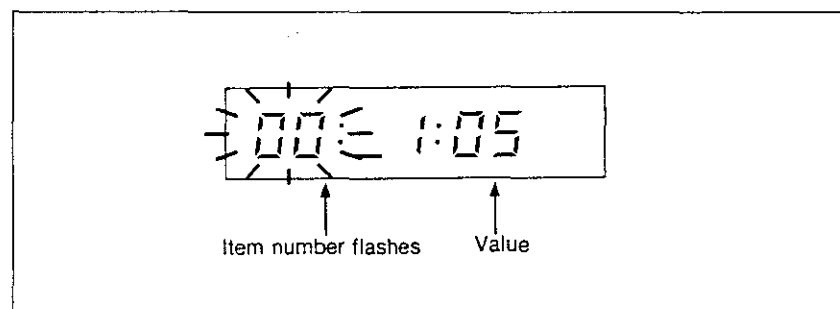
Refer to "1-10. Setup Menu" in the Installation Manual for an explanation of how to select the memory bank.

Change the factory preset values by following the procedure below.

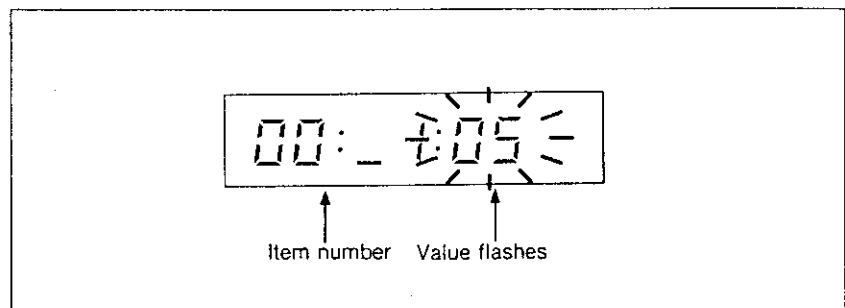


Changing menu settings

- 1 Select the desired memory bank with the SET UP SELECT switch on the system set-up panel.
- 2 Press the MENU button to display the menu in the time counter display.



- 3 Rotate the search dial to select the item to change.
The item number increases as you turn the search dial clockwise, or decreases as you turn the dial counterclockwise. The search dial operates in both SHUTTLE and JOG modes in the same way as you search for edit points.
- 4 To change the value, rotate the search dial while holding down the SHUTTLE or JOG button. Once you have selected the desired value, release the button.



- 5 Repeat Steps 3 and 4 to change the other items.
- 6 To save your changes, press the SET button.
The display returns to the time data display.

To exit the menu without saving changes

Press the MENU button before pressing the SET button.
The changes you have made are not saved.

Selecting the menu items in blocks of menu group.

Rotate the dial while holding down the VAR button.
The menu superimposed on the monitor screen changes in blocks of menu group.

Restoring the factory preset values

To restore the factory preset values, follow the procedure below.

- 1 Select the memory bank to be preset with the SET UP SELECT switch on the system set-up panel.
- 2 Press the MENU button to display the menu in the time counter display.
- 3 Press the RESET button in the time counter display section.

3-4. Superimposed Characters

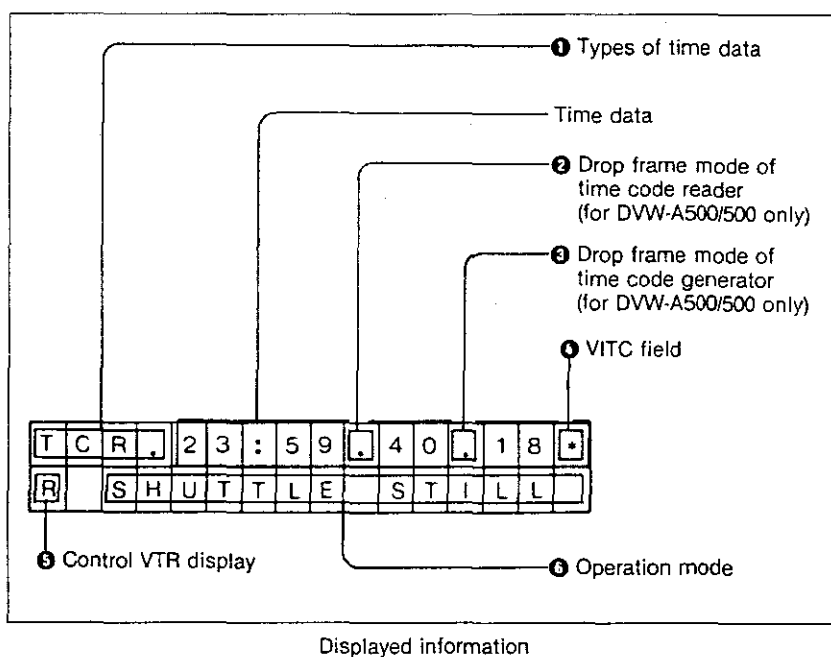
If you set the CHARACTER switch on the system set-up panel to ON, messages indicating the time codes and operation modes are superimposed on the signals output from the SERIAL V/A OUTPUT 4 (SUPER) or COMPOSITE VIDEO OUTPUT 3 (SUPER) connector.

Adjusting the character display

You can adjust the position, size and type of the superimposed characters by using the setup menu.

For details, see "3-3. Setup Menu" on page 3-8.

Information displayed



① Types of time data

Types of time data

Display	Meaning
CTL	CTL counter data
TCR	LTC reader time code
UBR	LTC reader user's bits
TCR.	VITC reader time code
UBR.	VITC reader user's bits
TCG	Time code generator time code
UBG	Time code generator user's bits
IN	IN point or DMC memory start point
OUT	OUT point or DMC memory end point
AI	AUDIO IN time data
AO	AUDIO OUT time data
DUR	Duration between any two of the four edit points (IN, OUT, AUDIO IN, AUDIO OUT)

Note

If the time data or user's bits cannot be read correctly, they will be displayed with an asterisk. For example, "T*R", "U*R", "T*R." or "U*R.".

② Drop frame mode for time code reader (for DVW-A500/500 only)

③ Drop frame mode for time code generator (for DVW-A500/500 only)

“.”: Drop frame mode (factory preset)

“:”: Non-drop-frame mode

④ VITC field

“ ”(blank): Fields 1 and 3

“*”: Fields 2 and 4

⑤ Control VTR display

When editing with two VTRs, indicates whether the VTR control panel controls the recorder or the player. When not editing with two VTRs, nothing is displayed in this field.

R: The control panel controls the recorder (the RECORDER indicator on the control panel lights).

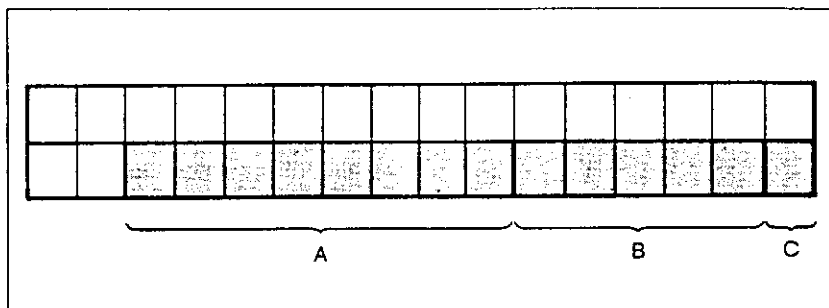
P: The control panel controls the player (the PLAYER indicator on the control panel lights).

3-4. Superimposed Characters

⑥ 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, or the memorization period during memorization and playback in DMC mode.



Operation mode display

Operation mode messages

Message		Operation mode
Block A	Block B	
TAPE UNTHREAD		Displayed from the time the EJECT button is pressed and the cassette is ejected until a cassette is next inserted.
STANDBY OFF		Standby off mode
T.RELEASE		Tape tension released
STOP		Stop mode
F.FWD		Fast forward mode
REW		Rewind mode
PAUSE		Pause mode
PREROLL		Preroll mode
PLAY		Playback mode (servo unlocked)
PLAY	LOCK	Playback mode (servo locked)
PLAY	Deviation from normal speed (%)	Capstan override mode or program play 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
DMC	(Speed ^a)	DMC playback mode
D-PREV	(Speed ^a)	Preview in DMC edit mode
D-EDIT	(Speed ^a)	DMC edit mode
DMC-SPD	(Speed)	DMC initial speed setting
PLY-SPD	Deviation from normal speed (%)	Speed setting for program play
PREVIEW		Preview mode
AUTO EDIT		Automatic editing mode
REVIEW		Review mode

a) Initial speed or speed stored in memory

3-5. Handling Cassettes

3-5-1. Recommended Cassettes

For DVW-A500 series

You can use 1/2-inch Digital Betacam video cassettes for both recording and playback. 1/2-inch Betacam/Betacam SP video cassettes for playback only.

For DVW-500 series

You can use 1/2-inch Digital Betacam video cassettes only.

Digital Betacam cassettes

Small cassettes	BCT-D6/D12/D22/D32/D40
Large cassettes	BCT-D34L/D64L/D94L/D124L

Betacam/Betacam SP cassettes

	Metal tape	Oxide tape
Small cassettes	BCT-5M _A /10M _A /20M _A /30M _A	BCT-5G/10G/20G/30G
Large cassettes	BCT-5ML _A /10ML _A /20ML _A / 30ML _A /60ML _A /90ML _A	BCT-5GL/10GL/20GL/ 30GL/60GL/90GL

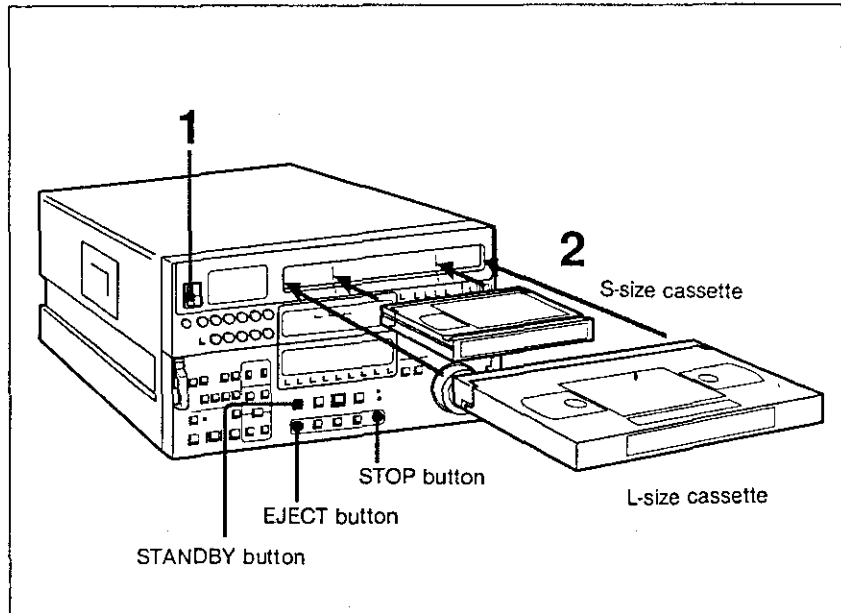
Storage of cassettes

Store your cassettes in the location of normal temperature and humidity.

3-5-2. Inserting and Ejecting Cassettes

Always turn on the power of the VTR before attempting to insert or eject cassettes.

Inserting a cassette



Inserting a cassette

- 1 Set the POWER switch to ON.
- 2 Before inserting the cassette, check the following points.
 - There is no slack in the tape.
 - "Error-10" is not displayed in the time counter display.
 - The window of the cassette is facing up.

If there is any slack in the tape, refer to "Removing slack in the tape" on the next page. If "Error-10" is displayed in the time counter display, see "7-3. Moisture Condensation".

When inserting a small cassette, align it with the marks on the cassette insertion slot.

The cassette is loaded automatically, and the tape is wound around the drum. The head-drum starts to rotate, the tape stops, and the STANDBY and STOP buttons light.

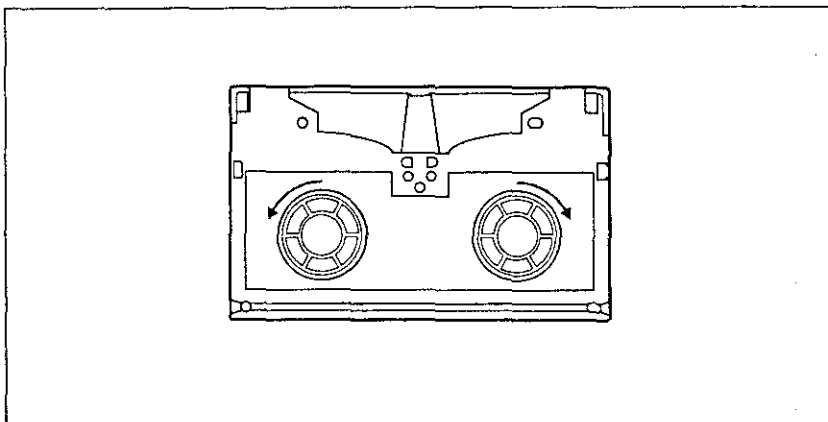
When a Betacam/Betacam SP video cassette is loaded to the DVW-A500/A500P, the DIGITAL indicator goes out.

When a Betacam/Betacam SP video cassette is loaded to the DVW-500/500P, the tape is automatically ejected.

3-5. Handling Cassettes

Removing slack in the tape

Press one of the reels in slightly, then carefully rotate it in the direction of the arrows until it stops.



Removing slack in the tape

Preventing double cassette insertion

When a cassette is loaded, an orange lock-out bar appears in the cassette insertion slot to prevent users from attempting to load another cassette.

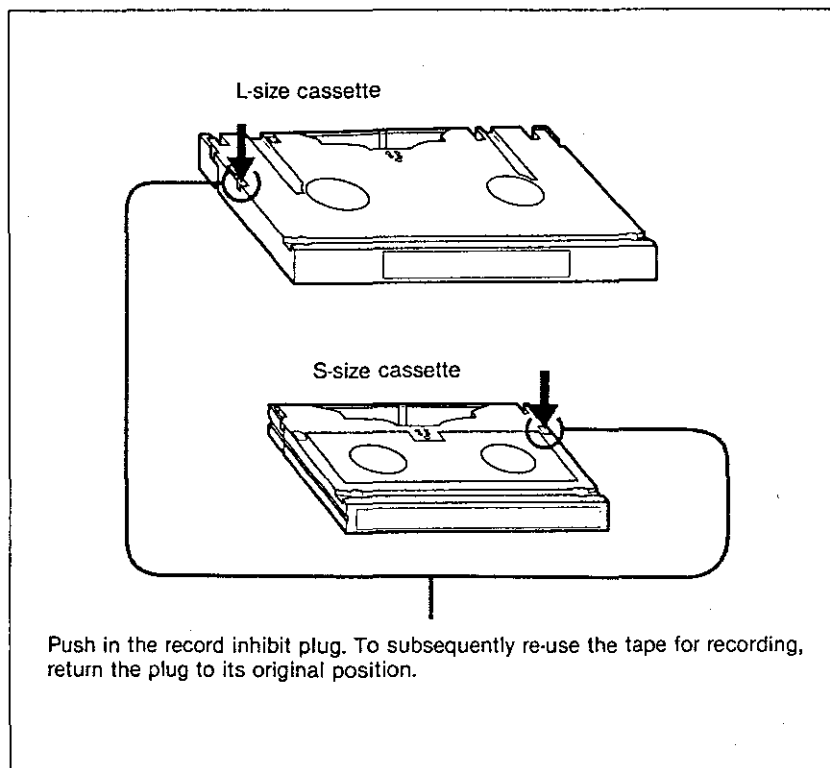
Ejecting the cassette

Press the EJECT button.

The tape is unthreaded and the cassette is automatically ejected. This operation takes a few seconds.

3-5-3. Preventing Accidental Erasure

To prevent accidental erasure of material recorded on a tape, perform the following:



Preventing accidental erasure

When a cassette with this plug pushed in is inserted into the VTR, the REC INHIBIT indicator on the lower control panel will light and recording will not start, even if you press the REC button.

Chapter 4

Recording

This chapter explains preparation for recording, time code setting, and basic recording.

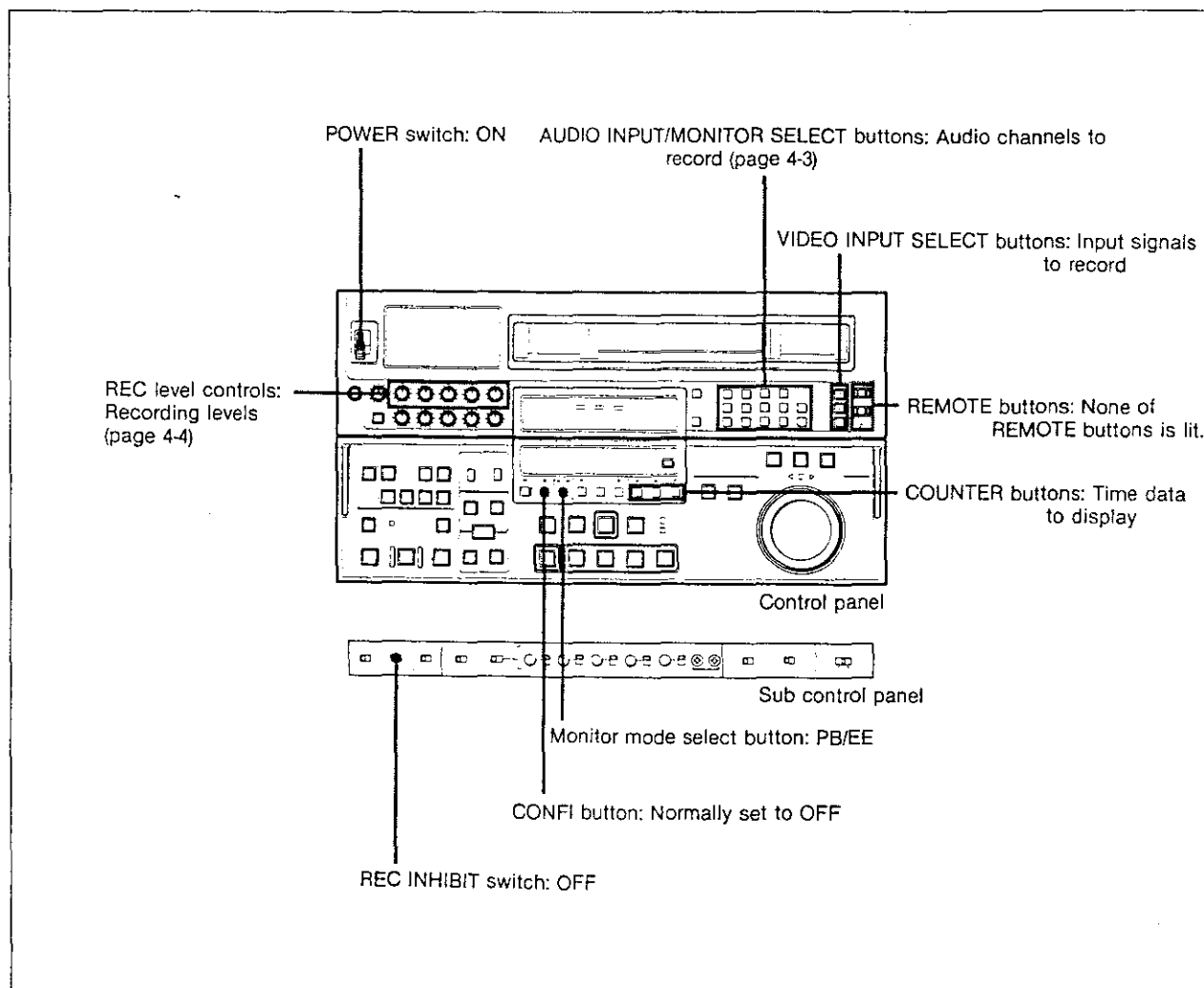
4-1. Preparing for Recording.....	4-2
4-1-1. Setting Switches	4-2
4-1-2. Selecting Audio Signals	4-3
4-1-3. Adjusting the Audio Recording Level.....	4-4
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4-1-5. Setting for the Input Analog Audio Recording.....	4-5
4-2. Recording Time Codes and User's Bits.....	4-6
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4-2-3. Recording External Time Codes without Change....	4-11
4-3. Recording	4-13

4-1. Preparing for Recording

4-1-1. Setting Switches

Prior to recording, set the switches as shown in the diagram below.

For details, see the pages indicated in the parenthesis.



Switch setting for recording

4-1-2. Selecting Audio Signals

This section describes how to select the audio signals to be input and be monitored.

For details of the location of switches, see "4-1-1. Setting Switches" on page 4-2.

Selecting audio input signals

Set the buttons in the AUDIO INPUT/MONITOR SELECT section of the upper control panel as follows:

- 1** Press the INPUT SELECT button so that it lights.
The lit buttons in the AUDIO/MONITOR SELECT section indicate the audio signals currently being input.
- 2** Select the channels to be input by pressing the following buttons.
 - SIF CH-1 to CH-4 buttons: audio channels 1 to 4 being input to the SERIAL V/A input connector.
 - AES/EBU CH-1 to CH-4 buttons: audio channels 1 to 4 being input to the AUDIO INPUT (AES/EBU) connectors.
 - ANALOG CH-1 to CUE buttons: audio channels 1 to 4 and CUE being input to the AUDIO INPUT connectors.

Selecting audio signals to monitor

To select the audio signals output from the PHONES jack and the MONITOR OUT L and R connectors, set the buttons in the AUDIO INPUT/MONITOR SELECT section of the upper control panel, as follows.

- 1** Press the MONITOR SELECT button so that it lights.
The lit button in the AUDIO INPUT/MONITOR SELECT section indicates the currently monitored signal.
- 2** Assign each of channels 1 to 4 and the cue channel to monitor channels L and/or R by pressing the corresponding buttons so that they light.

To adjust the audio monitor level output from the PHONES jack
Rotate the PHONES level control on the upper control panel.

To adjust the audio monitor level output from the MONITOR OUTPUT connectors

You can make setting to enable the adjustment of the volume level with the PHONES level control of the upper control panel.

For details, refer to "1-9. Switch Settings on the Connector Panel and Boards" in the Installation Manual.

4-1. Preparing for Recording

4-1-3. Adjusting the Audio Recording Level

Adjusting the recording level

Recording with the reference level

If the REC level controls are pushed in, signals are recorded at the reference level (0 dB reference level indicated in the audio level meter for +4 dBm input).

Recording with the desired recording level

On the upper control panel, pull out the REC level controls for the appropriate channels and rotate those controls such that the audio level meters indicate approximately 0 dB for the average audio signal input level.

Selecting the meter scale mode of the audio level meters

You can switch the meter scale by pressing the DISPLAY FULL/FINE button.

FULL mode: The meter scale ranges from -60 to 0 dB or -40 to $+20$ dB.

FINE mode: The meter scale is enlarged, and the signal level is indicated in 0.25 dB steps with the LED of the reference marker being lit to indicate the center.

For details of selecting the displayed range in the FULL mode, refer to "1-10. Setup Menu" in the Installation Manual.

4-1-4. Monitoring Simultaneous Playback Video and Audio As They Are Recorded

Monitoring signals currently being recorded

You can monitor the audio and video signals currently being recorded.

Press the CONF1 button on the lower control panel so that the CONF1 indicator lights.

You can set so that the periods before and after the edited portions are played back with the confidence heads.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

Monitoring previously recorded signals while recording

You can monitor the audio and video signals already recorded on the tape while recording (preread function).

Press the PREREAD button on the lower control panel so that the PREREAD indicator lights.

Using the preread function, you can execute preread editing.

For details, see "6-2-4. Executing Preread Editing" on page 6-31.

4-1-5. Setting for the Input Analog Audio Recording

Recording with emphasis

You can record an analog audio signal input to the AUDIO INPUT connectors with emphasis. The emphasis function enables to suppress high frequency noise without affecting the original signal by de-emphasizing the emphasized signals in playback.

To record with emphasis, set the EMPHASIS switch on the sub control panel to ON.

When playing back the signals emphasized, the playback signal is de-emphasized automatically regardless of the setting of the EMPHASIS switch.

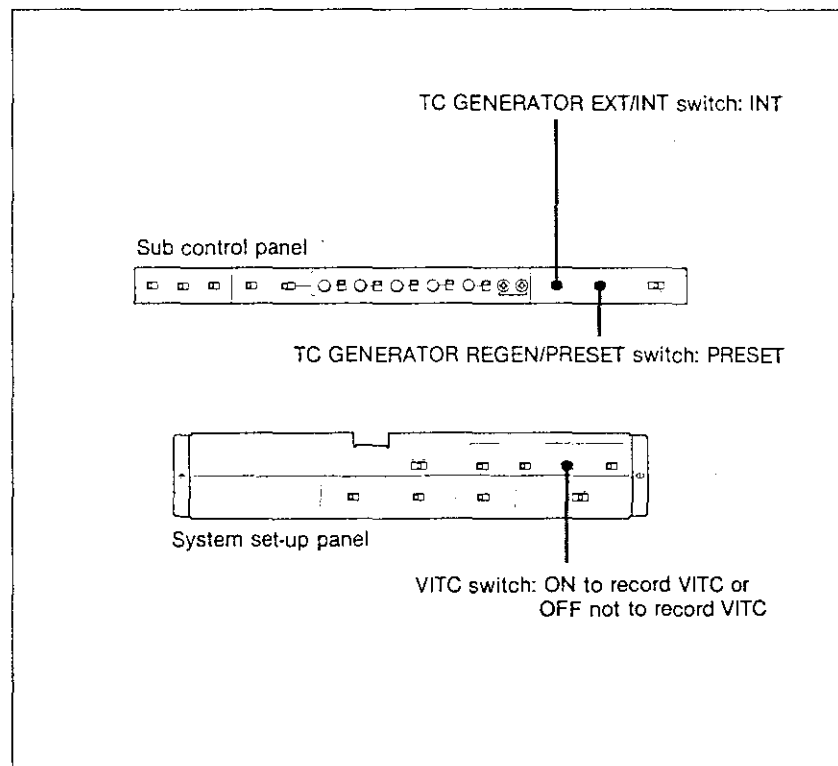
4-2. Recording Time Codes and User's Bits

You can record time codes generated by either the internal time code generator or by an external time code generator.

The time codes generated by the internal time code generator can be initialized with an arbitrary value, or synchronized with an external time code generator.

4-2-1. Recording Time Codes Generated by the Internal Time Code Generator

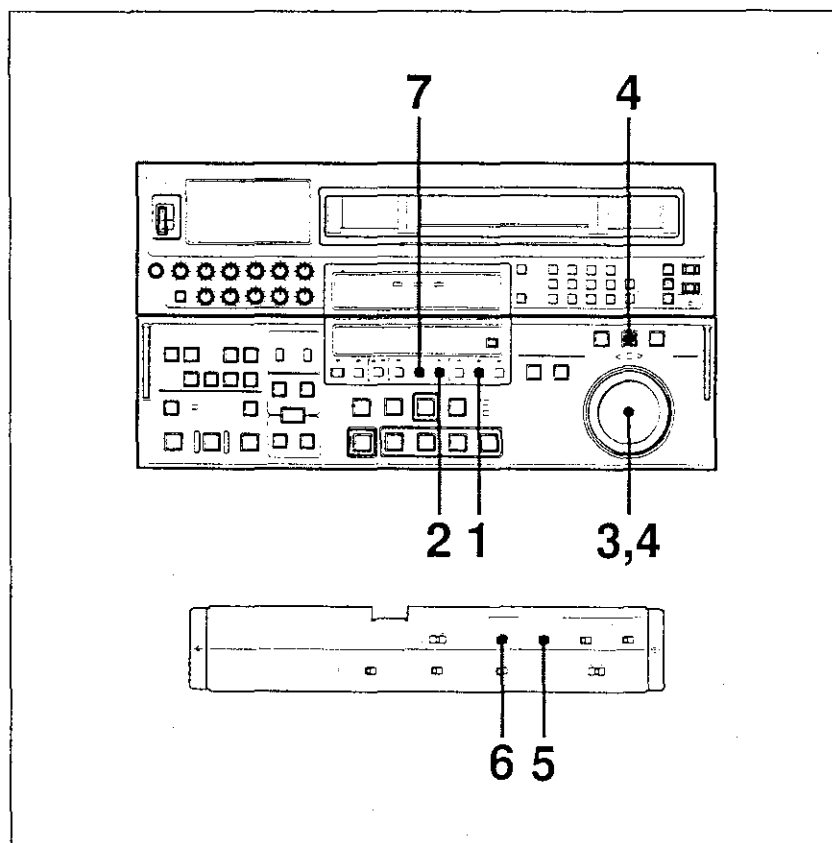
Set the switches on the sub control panel and system set-up panel as shown below.



Switch settings for setting time code

Setting time codes

To set the time codes, follow the procedure below.



Setting time codes

- 1** Press the TC button. Its indicator lights.
- 2** Press the HOLD button.
The HOLD indicator lights and the leftmost digit in the time counter display flashes. (The digits indicate hour, minute, second and frame.)
If necessary, set all the digits to 0 by pressing the RESET button of the time counter display section.
- 3** Select a digit using the search dial.
Flashed position moves as you rotate the search dial. (If the leftmost or rightmost digit flashes, the flashed position does not change to the left or right.)
- 4** Set the time code by rotating the search dial while holding down the JOG button.
Repeat Steps 3 and 4 until you have set all the digit.

(Continued)

4-2. Recording Time Codes and User's Bits

- 5 If you are using the DVW-A500/500, set the DF/NDF switch to the appropriate position; otherwise, skip this step.
 - Drop frame mode: DF
 - Nondrop frame mode: NDF
- 6 Set the REC RUN/FREE RUN switch to the appropriate position.
 - To allow the time code to advance regardless of the operational status of the VTR: FREE RUN
 - To allow the time code to advance only during recording: REC RUN

After step 7, the time code starts to advance as soon as recording begins and stops the moment the recording stops.
- 7 Press the SET button.
The HOLD indicator goes off.

Setting user's bits

- 1 Set the ID PRESET switch on the system set-up panel to OFF.
- 2 Press the U-BIT button. Its indicator lights.
- 3 Set the user's bits by following Steps 2 to 4 of "Setting time codes" on page 4-7. User's bits values of hexadecimal "A" or larger are displayed by the time counter as follows.

Hexadecimal value	A	B	C	D	E	F
Display	A	b	c	d	E	F

- 4 Press the SET button.

Setting real time

- 1 Follow Steps 1 through 6 of "Setting time codes" on page 4-7, selecting DF in Step 5 (for DVW-A500/500) and FREE RUN in Step 6.
- 2 Press the SET button at the moment the real time matches the value you have set.

4-2-2. Synchronizing the Internal Time Code Generator with External Time Code Generator

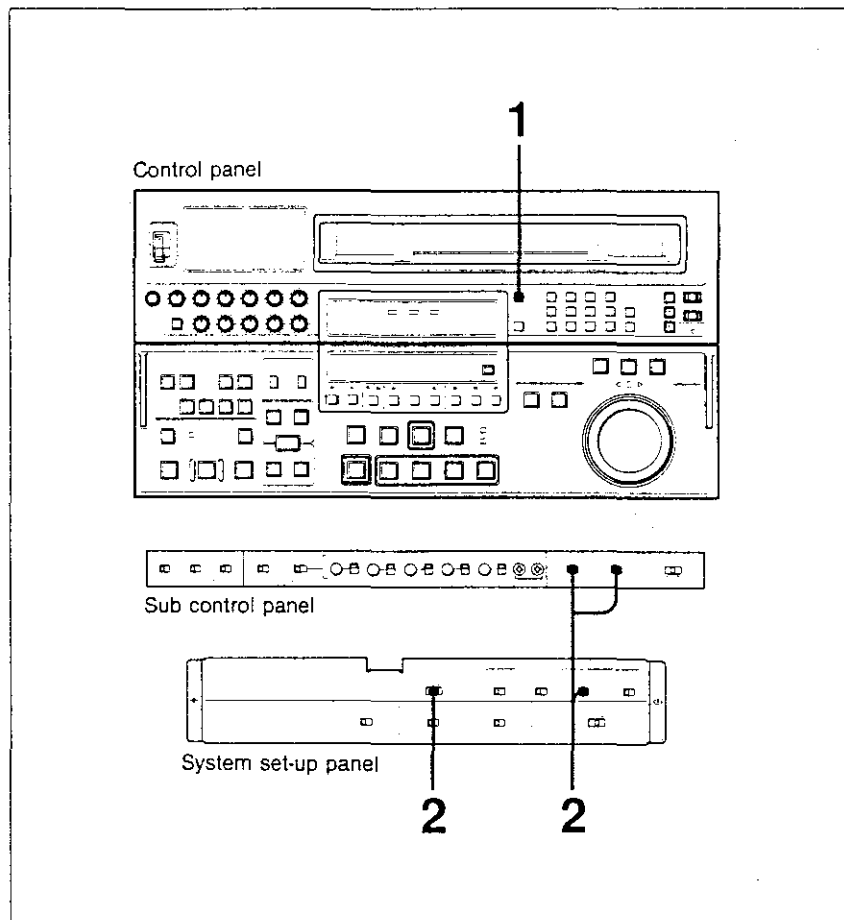
Use this method to synchronize the time code generators of two or more VTRs, or to record playback time code signals from an external VTR without distorting the signal wave forms.

When the internal time code generator is synchronized with an external signal, the REC RUN/FREE RUN and DF/NDF switch settings of the VTR are ignored.

Synchronizing with external time code

You can synchronize the internal time code generator with two types of the time code, the LTC (longitudinal time code) and the VITC (vertical interval time code) contained in the input signals.

To synchronize the internal time code generator with an external time code generator, follow the procedure below.



Synchronizing with external time code

(Continued)

4-2. Recording Time Codes and User's Bits

1 Synchronizing with the LTC

Connect the time code output from the external time code generator or external VTR to the TIME CODE IN connector.

Synchronizing with the VITC

Press the INPUT SELECT button corresponding to the signals with the VITC to be synchronized.

2 Set the switches as follows.

- TC GENERATOR EXT/INT switch: EXT
- TC GENERATOR REGEN/PRESET switch: REGEN
- VITC switch: ON when recording VITC
- TC switch: LTC when synchronizing with LTC
VITC when synchronizing with VITC

The moment you set the switches, the internal time code generator starts to advance, under the control of the external time code generator.

Once the internal time code generator is synchronized, the internal time code continues to advance even if the external time code generator is disconnected.

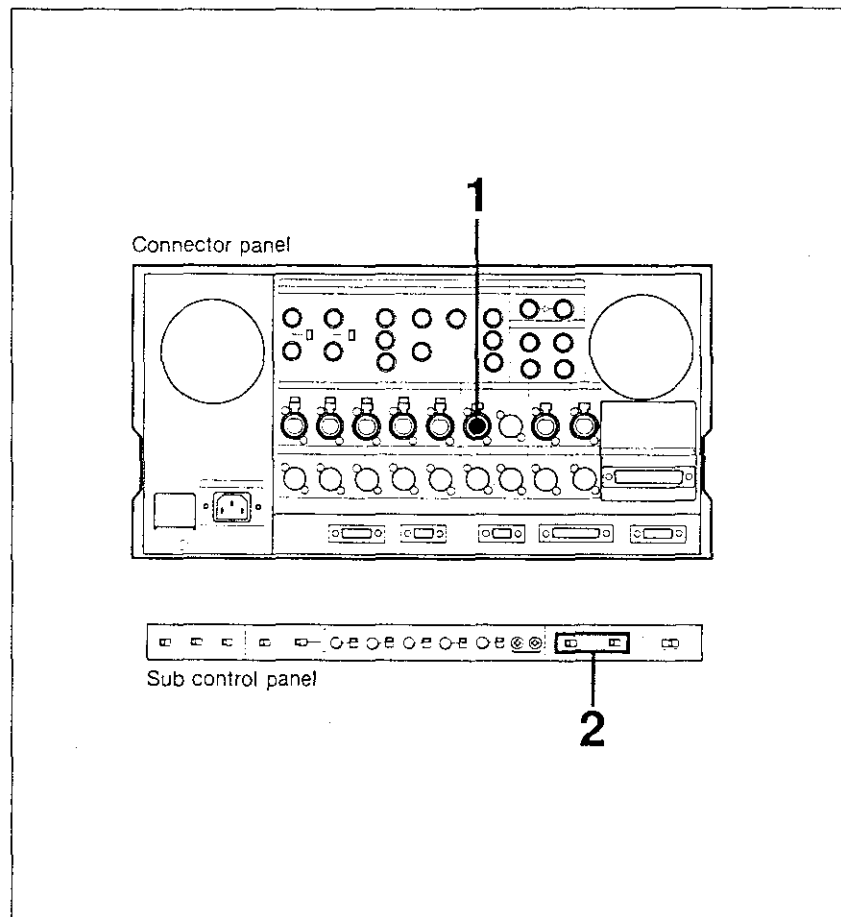
Confirming the advance of the internal time code generator

Put the VTR into stop mode, and press the REC button.

Confirm that the time code displayed in the time counter display is advancing in synchronization with the external time code.

4-2-3. Recording External Time Codes without Change

By using this method, you can record external time codes without affecting the advance of the internal time code generator. However, the method described in “4-2-2. Synchronizing the Internal Time Code Generator with External Time Code Generator” on page 4-9 is recommended for recording playback time codes from an external VTR.



Recording external time codes without change

- 1 Connect the time code output from the external time code generator to the TIME CODE IN connector.
- 2 Set the switches as follows.
 - TC GENERATOR EXT/INT switch: EXT
 - TC GENERATOR REGEN/PRESET switch: PRESET

4-2. Recording Time Codes and User's Bits

Recording an ID code as user's bits

You can store an ID code in non-volatile memory as user's bits data and subsequently recall it for recording.

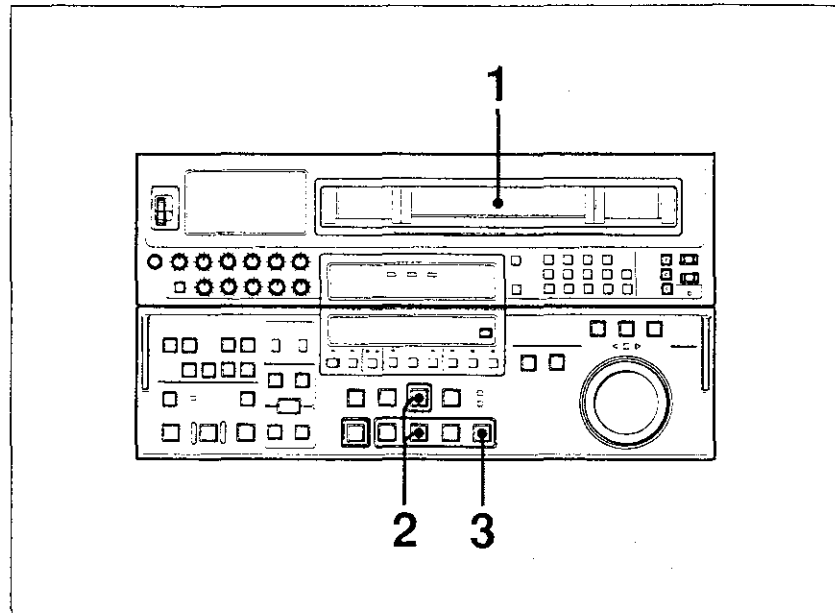
To record the ID code, set the ID PRESET switch on the system set-up panel to ON.

To record the user's bits, set the ID PRESET switch on the system set-up panel to OFF.

For details of setting and storing an ID code, refer to "1-10. Setup Menu" in the Installation Manual.

4-3. Recording

To record signals, follow the procedure below.



Recording

- 1 Insert the cassette after checking that the REC INHIBIT indicator is off and that the REC INHIBIT switch on the sub control panel is set to OFF.

For details, see "3-5-2. Inserting and Ejecting Cassettes" on page 3-17.

- 2 Press the REC and PLAY buttons together.
Recording starts and the SERVO indicator lights to show that the servo is locked.

- 3 Press the STOP button to stop recording.

If recording continues to the end of the tape

The tape automatically rewinds to the beginning and stops.

Chapter 5

Playback

This chapter describes the preparation necessary prior to playback, and the various means of playback.

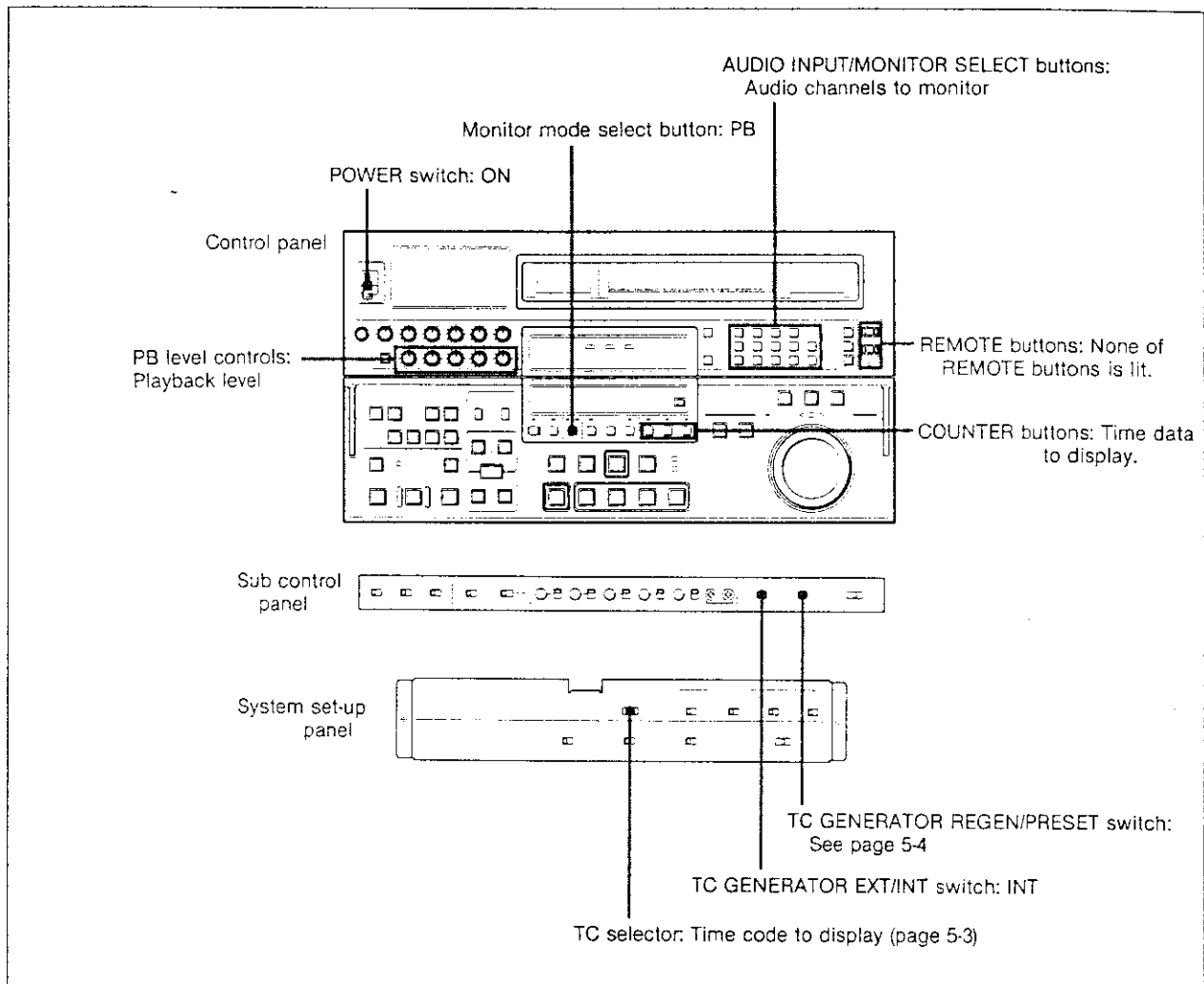
5-1. Preparing for Playback	5-2
5-1-1. Setting Switches	5-2
5-1-2. Selecting Time Data to be Displayed	5-3
5-1-3. Adjusting Audio Playback Level	5-5
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5-1. Preparing for Playback

5-1-1. Setting Switches

Before starting playback, set the switches as follows.

For details, see the pages indicated in parenthesis.



Switch settings for playback

5-1-2. Selecting Time Data to be Displayed

Select one of the following types of time data to display on the time counter display.

- CTL counts
- Time codes
- User's bits

For details of the locations of the switches used in the following operations, see "5-1-1. Setting Switches" on page 5-2.

Displaying CTL counts

Press the CTL button on the lower control panel.

The VTR counts the CTL signals recorded on the tape and displays the tape running time in hours, minutes, seconds and frames.

Resetting the display

Press the RESET button in the time counter display section.

The value is reset to "0:00:00:00". A minus sign appears if the tape is rewound from that position.

Displaying the time codes

Press the TC button.

To select the type of time code to display, set the TC selector on the system control panel as follows.

LTC: LTC

AUTO: • VITC if the playback speed is within $\pm 1/2$ times normal speed.

- LTC if the playback speed exceeds $\pm 1/2$ times normal speed.

VITC: VITC

The VITC or LTC indicator on the upper control panel lights to indicate the type of time code recorded on the tape.

The playback time code, or the time code read by the time code reader, is output from the TIME CODE OUT connector.

5-1. Preparing for Playback

Supplying a playback time code to an external VTR without waveform distortion

Using the following method allows time code signals, generated by the internal time code generator and synchronized with the playback time code, to be output from the TIME CODE OUT connector.

- 1** Select 1 for Item 606 of the system setup menu.

For the setting procedure, see "3-3-2. Changing Setup Menu".

For details of the system setup menu, refer to "1-10. Setup Menu" in the Installation Manual.

- 2** Set the TC GENERATOR REGEN/PRESET switch on the sub control panel to REGEN.

- 3** Set the TC GENERATOR INT/EXT switch on the sub control panel to INT.

Outputting playback time codes as is

Set the TC GENERATOR REGEN/PRESET switch to PRESET.

Displaying user's bits

Press the U-BIT button.

In the same way as when displaying time codes, user's bits contained in either LTC or VITC time codes are displayed according to the setting of the TC selector on the system set-up panel.

5-1-3. Adjusting Audio Playback Level

If the PB level controls on the upper control panel are pushed in, the audio signals are output at the preset level.

For details of changing the preset reference output level, refer to “1-9. Switch settings on the Connector Panel and Boards” in the Installation Manual.

To manually adjust the audio playback level

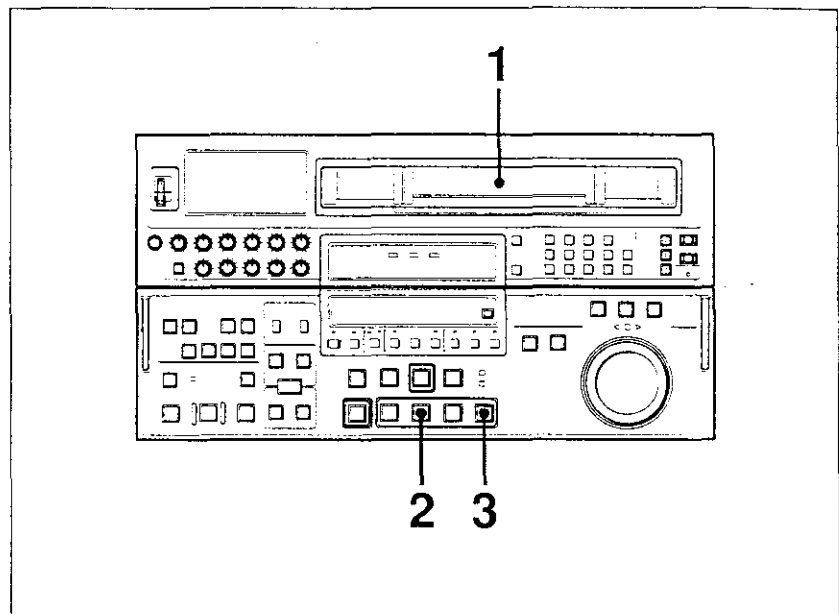
Pull and rotate the PB level controls for the appropriate channels.

5-2. Playback

There are four variations of playback:

- Normal speed playback
- Jog/Shuttle/Variable mode playback
- Capstan override playback
- Dynamic Motion Control (DMC) playback

5-2-1. Normal Speed Playback



Playing back at normal speed

Follow the procedure below to play back at normal speed.

- 1** Insert the cassette.

For details, see "3-5-2 Inserting and Ejecting a Cassette" on page 3-17.

2 Press the **PLAY** button.
Playback starts and the **SERVO** indicator lights to show that the servo is locked.

3 Press the **STOP** button to stop playback.

If playback continues to end of the tape

The tape automatically rewinds to the beginning and stops.

Using noise reduction

The DVW-A500/A500P is equipped with the Dolby C noise reduction system for Betacam and Betacam SP playback.

To turn on Dolby C noise reduction when playing back an oxide tape, set the **DOLBY NR** switch on the system set-up panel to **ON**. When playing back a metal tape, the DVW-A500/A500P automatically turns on the Dolby C noise reduction regardless of this switch setting.

5-2. Playback

5-2-2. Variable-Speed Playback in Jog/Shuttle/Variable Modes

In the Jog/Shuttle/Variable modes, you can vary the playback speed as follows.

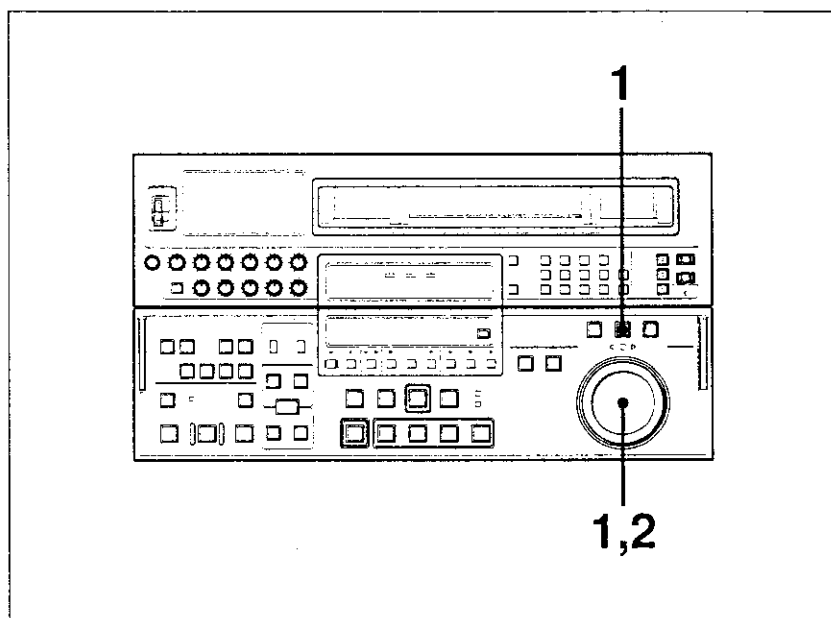
Jog mode: Between -3 and $+3$ or between -1 and $+1$ (selectable in setup menu) times normal speed, as determined by the rotational speed of the search dial.

Shuttle mode: Between -50 and $+50$ times normal speed, as determined by the angle of rotation of the search dial. When playing back analog Betacam or Betacam SP cassette, between -35 and $+35$ (for DVW-A500) or between -42 and $+42$ (for DVW-A500P).

VAR mode: Between -1 and $+3$ times normal playback speed, as determined by the angle of rotation of the search dial.

Jog mode playback

To play back in jog mode, follow the procedure below.



Jog mode playback

- 1** Press the search dial or the JOG button so that the JOG indicator lights.
The VTR toggles between jog mode and shuttle mode as you press the dial. Either the JOG or SHUTTLE indicator lights to indicate the current mode.
The ■ indicator lights and the VTR enters still picture mode.
- 2** Rotate the search dial in the direction of playback.
Slow playback is executed at the speed corresponding to the rotational speed of the search dial. One of the direction indicators (◀ or ▶) lights to show the direction of playback.
- 3** To stop jog mode playback, stop rotating the search dial for still picture with the ■ indicator lit, or press the STOP button for stop mode.

Note

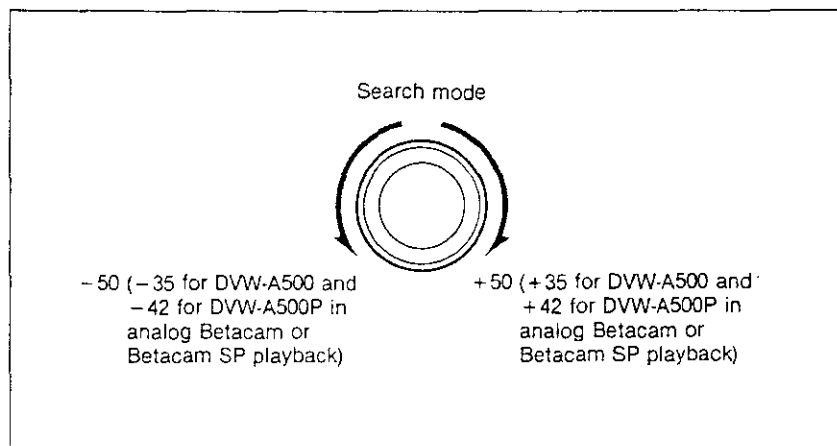
In the factory setting, pressing the search dial switches jog and shuttle modes. You can prohibit this function.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

Shuttle mode playback

Follow the procedure below to play back in shuttle mode.

- 1** Push in the search dial or the SHUTTLE button so that to the SHUTTLE indicator lights.
The VTR toggles between jog mode and shuttle mode as you press the dial. The JOG or SHUTTLE indicator lights to indicate the current mode.
The ■ indicator lights and the VTR enters still picture mode.
After turning on the power, always set the search dial to its center position, such that the ■ indicator lights.
- 2** Rotate the search dial in the direction of playback and set it to the position where the angle of rotation corresponds to the appropriate playback speed.
You can set the following playback speeds depending on the playback mode.



5-2. Playback

The tape is played back at the speed corresponding to the angle of rotation of the search dial. One of the direction indicators (◀ or ▶) lights to show the direction of playback.

The search dial is indented at the positions corresponding to -10, 0, and +10 times normal speed.

- 3 To stop shuttle mode playback, set the search dial to the center position for still picture, or press the STOP button for stop mode.

To return to normal speed playback

Press the PLAY button.

To alternate between normal speed playback and shuttle mode playback

After setting the search dial to the position corresponding to the appropriate playback speed, press the PLAY button and SHUTTLE button alternately to switch between normal speed playback and shuttle mode playback.

To alternately stop and start shuttle mode playback, press the STOP button and SHUTTLE button alternately.

Note

In the factory setting, just rotating the search dial starts jog or shuttle mode playback from any other operation mode.

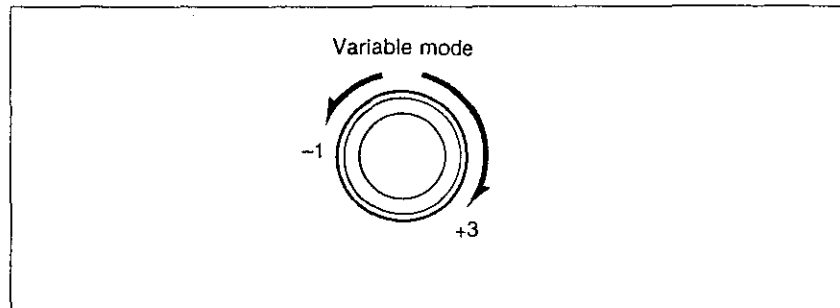
For details of the settings necessary to disable jog/shuttle/variable mode playback unless the JOG/SHUTTLE/VAR button is pressed, refer to "1-10. Setup Menu" in the Installation Manual.

Variable mode playback

To play back in the variable mode, follow the procedure below.

- 1 Press the VAR button so that the VAR button lights. The ■ indicator lights and the VTR enters still picture mode. After turning on the power, always set the search dial to its center position, so that the ■ indicator lights.

- 2** Rotate the search dial in the direction of playback and set it to the position where the angle of rotation corresponds to the appropriate playback speed.
You can set the following playback speeds depending on the playback mode.



The tape is played back at the speed corresponding to the angle of rotation of the search dial. One of the direction indicators (◀ or ▶) lights to show the direction of playback. The search dial is indented at the positions of still and normal playback speed.

- 3** To stop variable mode playback, set the search dial to the center position for still picture, or press the STOP button for stop mode.

To return to normal speed playback

Press the PLAY button.

To alternate between normal speed playback and shuttle mode playback

After setting the search dial to the position corresponding to the appropriate playback speed, press the PLAY button and VAR button alternately to switch between normal speed playback and variable mode playback.

To alternately stop and start shuttle mode playback, press the STOP button and VAR button alternately.

5-2. Playback

5-2-3. Capstan Override Playback

When playing back the same program with two VTRs, the playback phases of the two VTRs can be adjusted so that they are synchronized with each other.

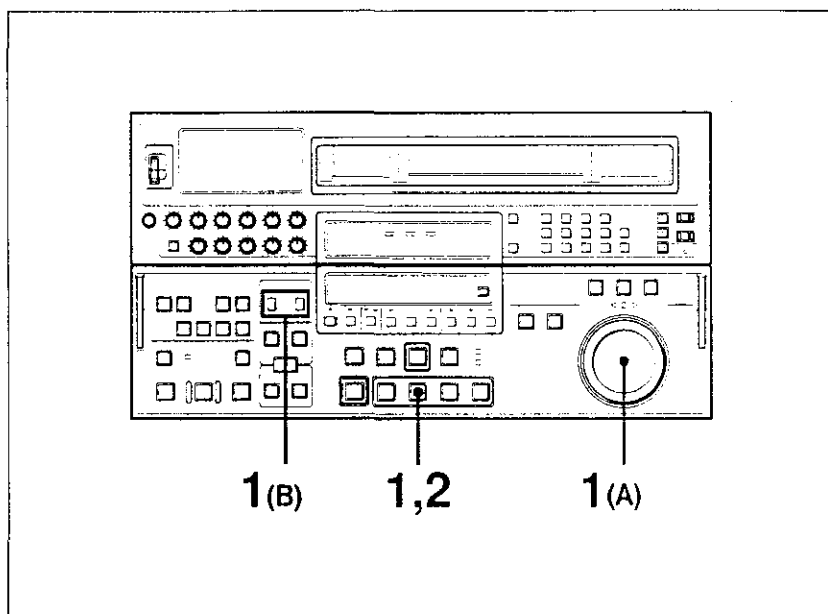
There are two ways of making this adjustment.

- (A) Use the search dial
- (B) Use the TRIM buttons

Note

When using method (A), change the system setup so that jog/shuttle mode playback is inhibited unless the search button is pressed. Doing so prevents the VTR from accidentally entering the search mode during capstan override playback.

For details of changing the system setup, refer to "1-10. Setup Menu" in the Installation Manual.



Playing back using the capstan override function

- 1 Follow either method (A) or (B).
 - (A) To adjust the playback speed, rotate the search dial while holding down the PLAY button.
The adjustment range is $\pm 15\%$ (in steps of 1%) of normal playback speed.
 - (B) To adjust the playback speed, press one of the TRIM buttons while holding down the PLAY button.
While the buttons are held down, the playback speed becomes 8% faster or slower than normal playback speed.

While playing back the tape at the set speed, the SERVO indicator does not light since the servo is not locked (capstan override).

- 2** Release the PLAY button after completing adjustment of the playback phase.
The VTR returns to normal speed playback and the SERVO indicator lights.

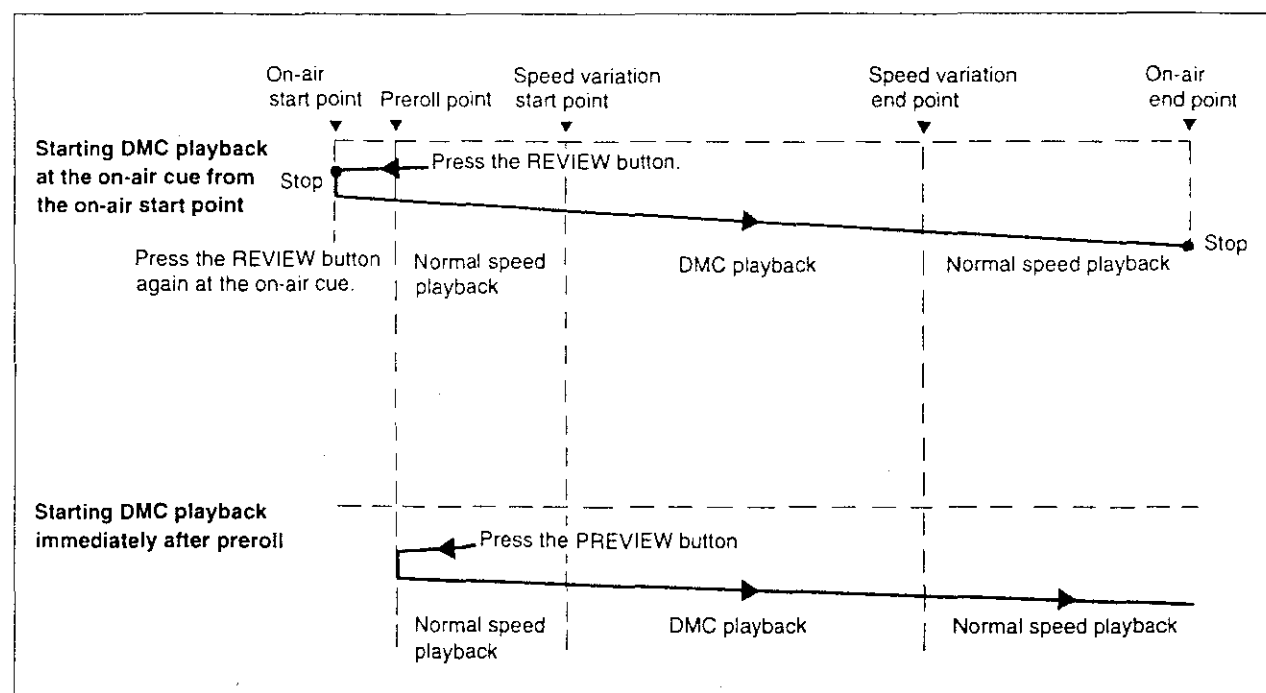
5-2-4. Dynamic Motion Control (DMC) Playback

Overview of DMC playback

DMC playback allows you to vary playback speed between -1 and $+3$ times normal speed during a certain section of the tape, then store the varied speeds in memory for later playback.

For example, during a live broadcast of a sporting event, you can set the start and end points of important scenes while recording, and immediately play back and broadcast those scenes using DMC playback.

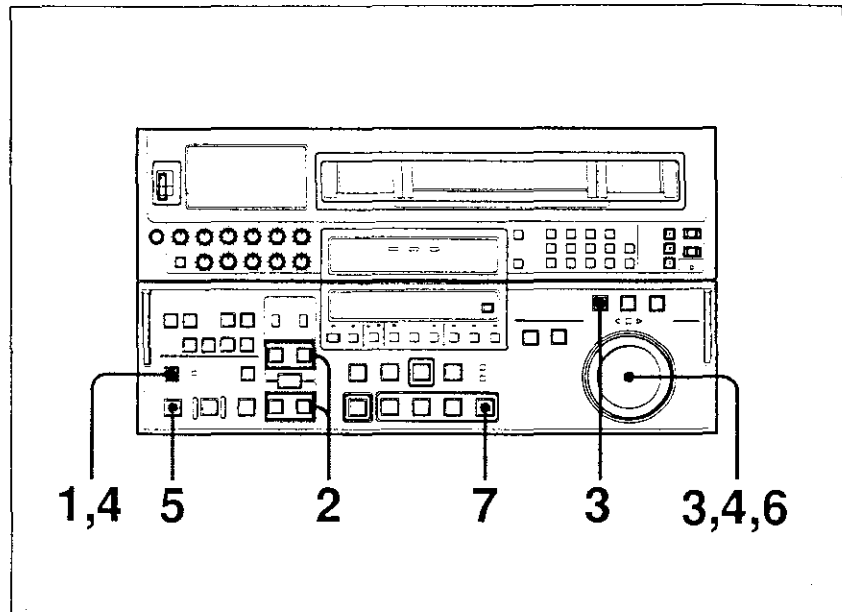
During DMC playback, the tape moves as shown in the diagram below.



Tape movement during DMC playback

Storing playback speeds in memory

To store playback speeds in memory for DMC playback, follow the procedure below.



Storing playback speeds in memory

- 1** Press the DMC EDIT button, so that it lights.
- 2** During playback or recording, press one of the following buttons together with the ENTRY button 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
- 3** Press the search dial or the SHUTTLE button to enter shuttle mode.
The SHUTTLE indicator lights.

(Continued)

5-2. Playback

- 4** To select the initial playback speed, rotate the search dial while holding down the DMC EDIT button.
The selected speed is shown in the time counter display as follows.

PLAY	Normal speed playback
Search 0:00	Still picture playback
Search 0:03	Forward playback at 0.03 times normal speed
Search-0:10	Reverse playback at 0.1 times normal speed

While the playback speed is being selected, the tape does not move.

Once the selection has been made, release the DMC EDIT button.

- 5** 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.
The moment the tape passes the speed variation start point, the MEMORY indicator starts to flash and the tape is played back at the initial speed selected in Step 4.
- 6** Set the search dial to the position corresponding to the appropriate playback speed.
The speed variation is stored in memory while the MEMORY indicator is flashing.
The moment the tape passes the speed variation end point, the MEMORY indicator stops flashing and lights to indicate that memorization of the playback speed has been completed.

- 7** Press the STOP button to stop the tape.

If the MEMORY indicator lights before the tape reaches the speed variation end point

The VTR cannot store any further playback speed variations. The capacity of the playback speed memory is 120 seconds.

To confirm and change the stored speed

Press the PREVIEW button. Rotate the search dial to change the speed as required.

To set the initial speed to normal speed

Press the PLAY button in Step 4.

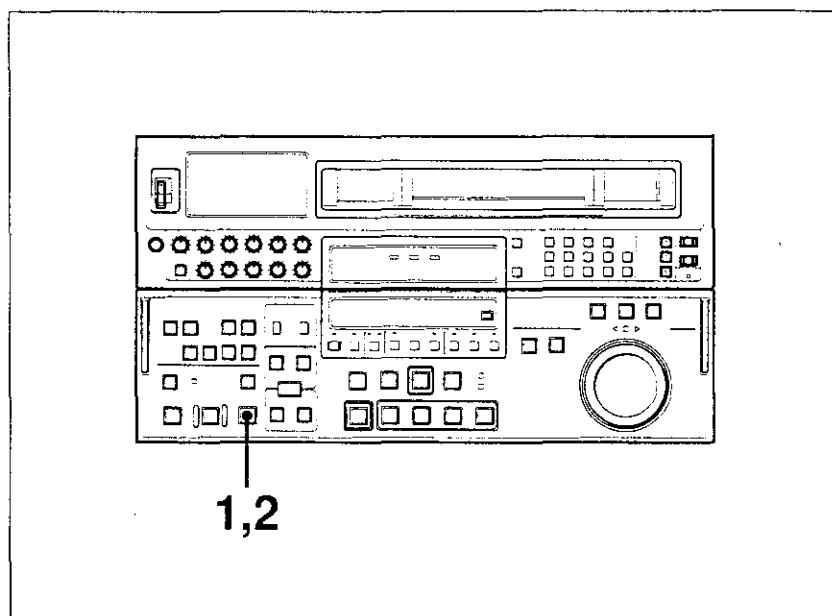
Executing DMC playback

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 VTR alone when performing DMC playback.
- If two VTRs are connected for editing, you can still perform DMC playback, but only with the recorder VTR, and only when both the RECORDER and PLAYER buttons are off.



Executing DMC playback

To start playback at the on-air cue from the on-air start point

- 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 again.
The REVIEW button flashes. When the tape passes the speed variation start point, DMC playback starts and continues at the speed(s) stored in memory. When the tape passes the speed variation end point, normal speed playback starts and the tape stops at the on-air end point.

5-2. Playback

To start playback immediately after preroll

Press the PREVIEW button.

The PREVIEW button flashes. When the tape passes the speed variation start point, DMC playback starts and continues at the speed(s) stored in memory. When the tape passes the speed variation end point, normal speed playback resumes.

To stop the tape during DMC playback

Press the STOP button.

To exit DMC playback mode

Press the DMC EDIT button together with the DELETE button.

The DMC EDIT button goes out while the DMC playback data is stored in memory.

Chapter 6

Editing

This chapter describes the steps involved in basic automatic editing, and introduces advanced editing methods. It also explains manual editing.

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Automatic edit modes

Assembly mode

Insert mode

Both of these two edit modes support DMC editing. In insert mode you can also use split editing.

To use time codes as the address of edit points, the time codes must be recorded on the tape in ascending order.

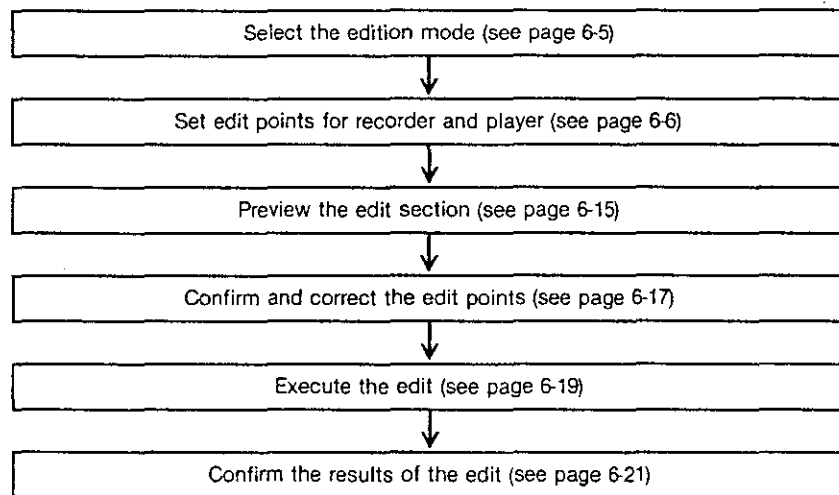
As long as they are recorded in ascending order, the time codes do not have to be continuous. The CTL counter automatically interpolates data for editing even if there are breaks in the continuity of the time codes.

During automatic editing, time codes recorded on the tape always follow immediately from the time codes recorded immediately before edit start point, regardless of the setting of the TC GENERATOR EXT/INT switch and the TC GENERATOR REGEN/PRESET switch on the sub control panel in the factory preset condition.

For details of the switch settings necessary to change the time codes to be recorded, see “4-2. Recording Time Codes and User’s Bits” and “1-10. Setup Menu” in the Installation Manual.

Steps in automatic editing

The sequence of steps in automatic editing with two VTRs is as shown below.



Steps in automatic editing

Editing precautions

Using an editing control unit

When using an editing control unit to control the VTR, set the edit delay on the control unit so that CUT-IN and CUT-OUT commands are sent to the VTR five frames ahead of the actual edit point.

Video signals output to a monitor

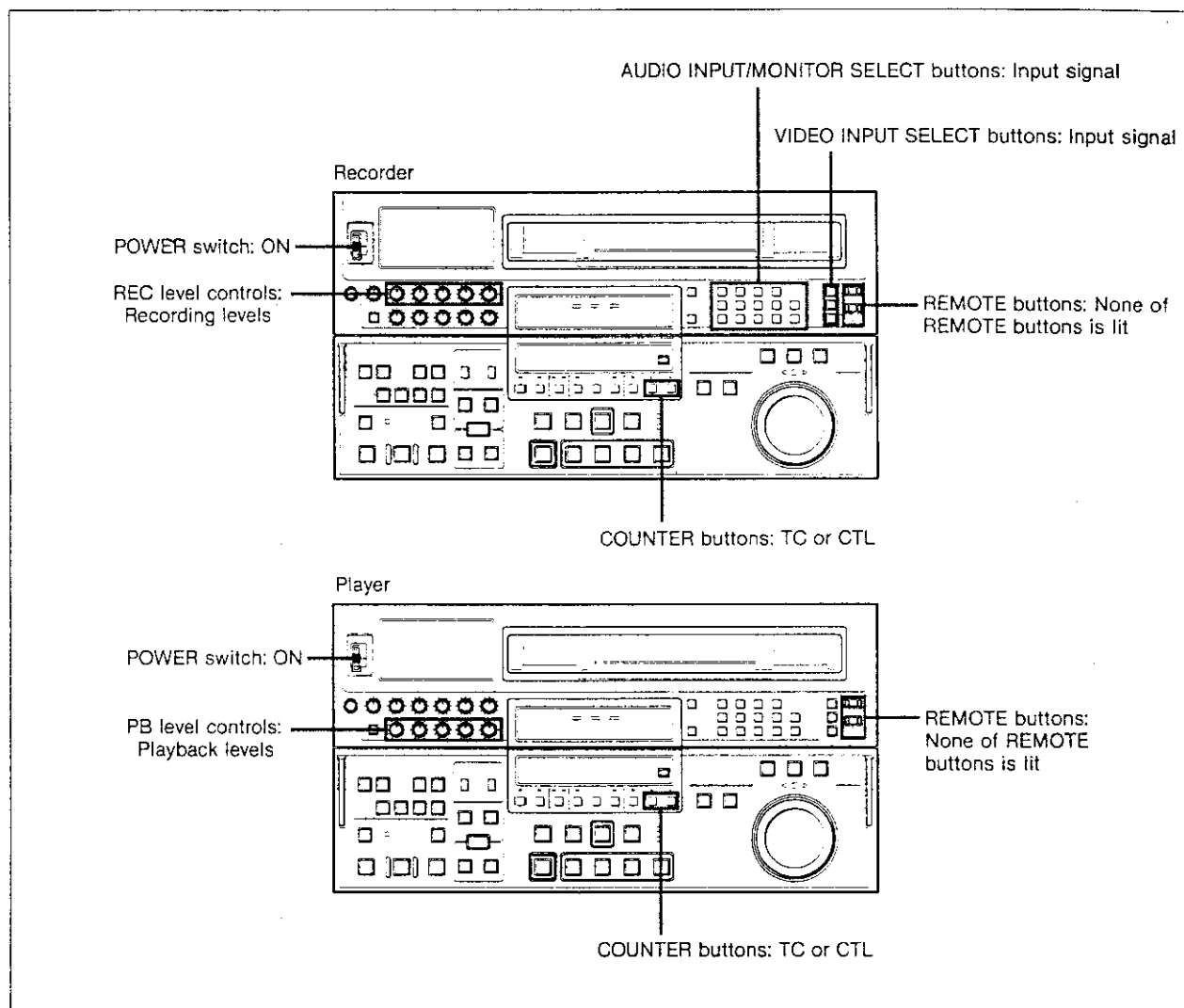
While in E-E mode or when playing back in edit mode, the V-sync phase of the video output is delayed 6H (on the DVW-A500/500) or 4H (on the DVW-A500P/500P) with respect to the external reference signal. You can adjust the V-sync phase to the external reference signal phase while leaving the video signal delay.

For details of changing the V-sync phase, refer to "1-10. Setup Menu" in the Installation Manual.

6-1. Basic Automatic Editing

6-1-2. Setting Switches

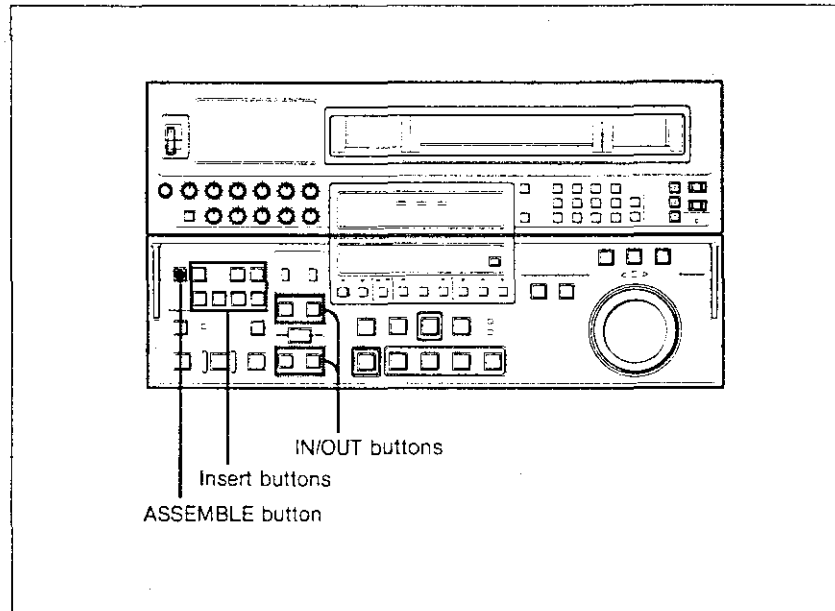
Before editing, set the switches shown below.



Switch settings for editing

6-1-3. Selecting Edit Mode

Select either assemble or insert mode.



Selecting edit mode

Press one of the following buttons.

- Assemble mode: ASSEMBLE button
- Insert mode: Appropriate INSERT buttons (VIDEO, AUDIO CH-1 to CH-4, CUE and/or TIME CODE)

When edit mode is selected, the IN/OUT buttons flash to show that edit points need to be set.

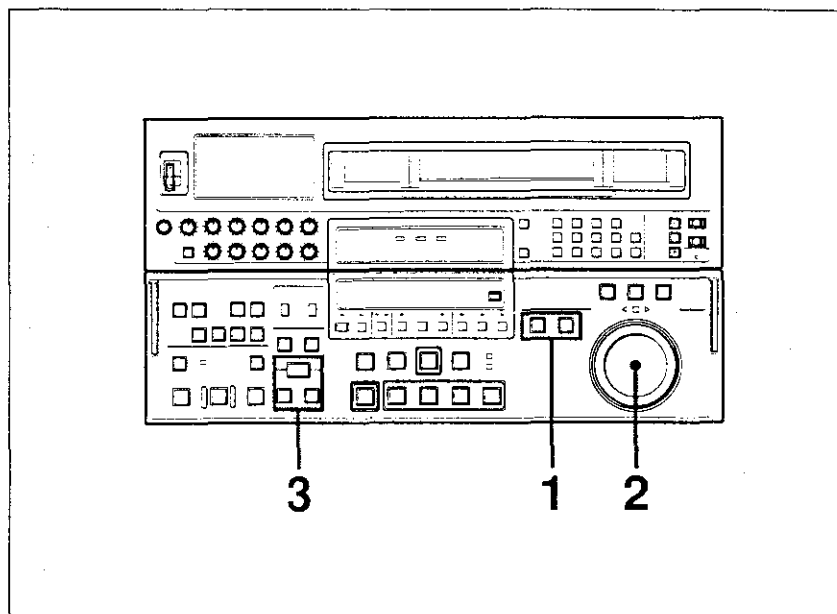
6-1. Basic Automatic Editing

6-1-4. Setting Edit Points

This section describes how to set edit points (IN and OUT points). In insert mode, a technique called split editing allows you to set edit points separately for video and audio.

Setting edit points

To set edit points, follow the procedure below.



Setting edit points

- 1** Press the RECORDER or PLAYER button to select the VTR for which edit points are to be set.
The button lights.
- 2** Rotate the search dial in jog or shuttle mode to find the edit point.
For details on jog/shuttle playback, see "5-2-2 Variable-Speed Playback in Jog/Shuttle/Variable Modes" on page 5-8.
- 3** Press the ENTRY button together with the IN (or OUT) button.
When the IN (or OUT) point is set, the IN (or OUT) buttons stops flashing, and instead lights steadily.

- 4 Repeat Steps 1 through 3 to set all of the required edit points. When IN points are set for both the recorder and player, the PREVIEW and AUTO EDIT buttons flash to show that the VTR is ready for preview or edit.

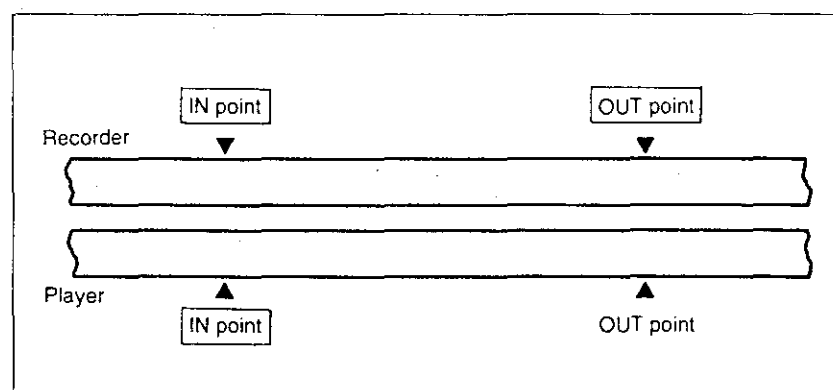
Note

If you set four or more points for the recorder and player, the DELETE button starts to flash, indicating that editing is impossible. Delete all unnecessary edit points by using the DELETE button.

For details, see "Deleting edit points" on page 6-17.

About automatic edit point setting

Editing requires a total of four edit points; IN and OUT points for recorder and player. However, as soon as you set three edit points, the VTR automatically sets the fourth point. In the diagram below, the boxed points have been set manually, while the player OUT point has been set automatically.



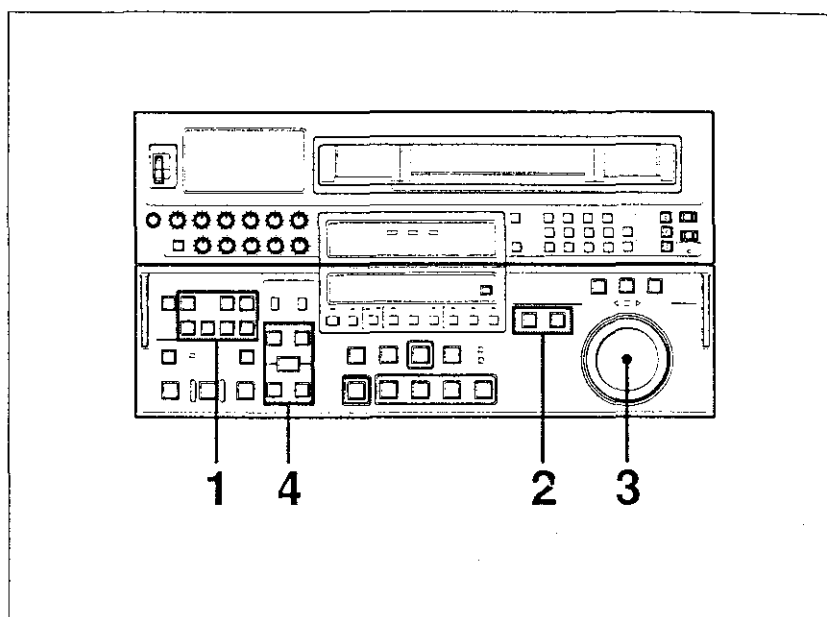
Automatic edit point setting

Regardless of whether it was set manually or automatically, any edit point can be corrected or deleted later.

6-1. Basic Automatic Editing

Setting split edit points

Split edit allows you to set edit points separately for video and audio. Set audio edit points with the AUDIO IN/OUT buttons and video edit points with the IN/OUT buttons.



Setting split edit points

- 1** Press the appropriate INSERT button (VIDEO, AUDIO CH-1 to CH-4 and/or TIME CODE).
The IN, OUT, AUDIO IN and AUDIO OUT buttons flash.
- 2** Press the RECORDER or PLAYER button to select the VTR for which edit points are to be set.
The button lights.
- 3** To find the edit point, rotate the search dial in jog or shuttle mode.

See "5-2-2. Variable-Speed Playback in Jog/Shuttle/Variable Modes" on page 5-8 for details of jog/shuttle/variable playback.

-
- 4 Press the ENTRY button together with one of the IN, OUT, AUDIO IN or AUDIO OUT buttons.
Once an edit point is set, the pressed button stops flashing and instead lights steadily.
 - 5 Repeat Step 2 through 4 to set the required edit points.

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 such a set up is impossible. Delete all unnecessary edit points using the DELETE button.

For details, see "Deleting edit points" on page 6-17.

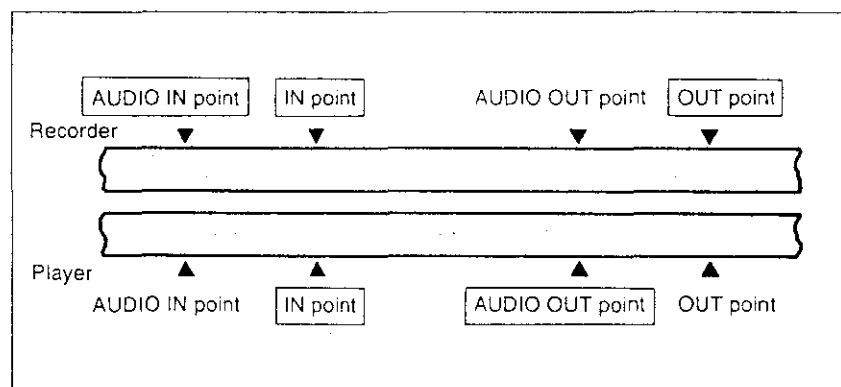
6-1. Basic Automatic Editing

About automatic split edit point setting

Split editing requires a total of eight edit points; video IN/OUT points and AUDIO IN/OUT points for both the player and recorder. However, as soon as you set five edit points, the VTR automatically sets the remaining three edit points. For example, if you set three edit points for video (or audio) and two for audio (or video), the remaining three points are automatically set, regardless of whether these points are for the recorder or player.

In the example shown in the diagram below, the boxed points have been set manually, and the AUDIO OUT point for the recorder, and the AUDIO IN and OUT points for the player have been set automatically.

Note that, regardless of whether it was set manually or automatically, any edit point can be deleted or corrected later.



Automatic split edit point setting

You can set audio cut-in, crossfade, and fade out/fade in editings in the setup menu.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

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

As long as the AUDIO OUT point is set, the VTR is ready for preview or editing. If the AUDIO IN point has not been set, the current tape address is automatically set as the AUDIO IN point.

Using a VTR without the split editing function

When using a player VTR which does not support the separate setting of edit points for video and audio, set AUDIO IN and AUDIO OUT points on the recorder and three video edit points for split editing.

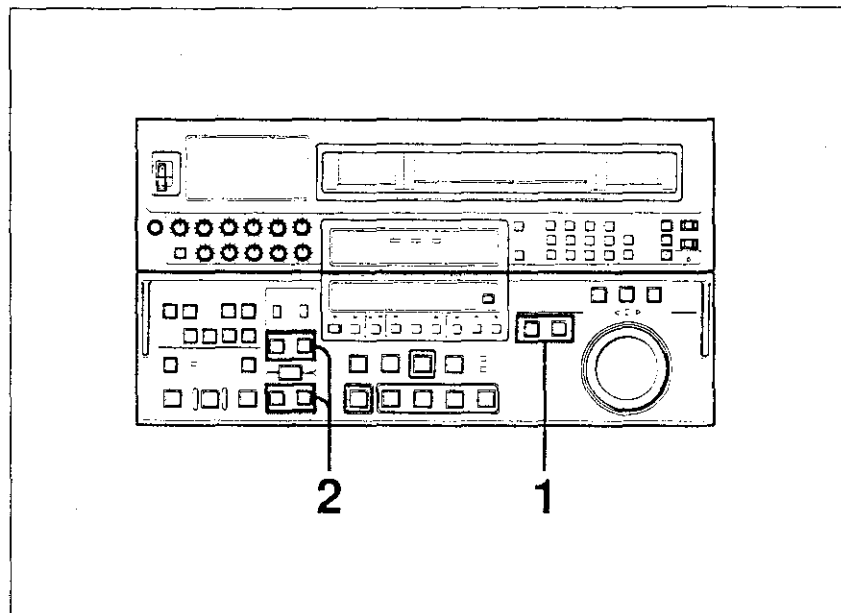
6-1-5. Confirming Edit Points

You can confirm the following types of data in the time counter display.

- Time data for edit points
- Duration between two edit points

Confirming time data for edit points

Follow the procedure below to display time data for edit points in the time counter display.



Confirming edit point time data

- 1** Press the RECORDER or PLAYER button to select the VTR on which you wish to confirm the edit points. The button lights.
- 2** Hold down the IN, OUT, AUDIO IN or AUDIO OUT button. The time data for the edit point corresponding to the button is displayed in the time counter display.

Displaying the duration between two edit points

The following six kinds of duration can be displayed in the time counter display

- Between IN and OUT points
- Between IN and AUDIO OUT points
- Between IN and AUDIO IN points
- Between OUT and AUDIO OUT points
- Between OUT and AUDIO IN points
- Between AUDIO IN and AUDIO OUT points

The displayed duration differs for each of the following cases.

- When two edit points are set: Duration between the two points.
- When only one of the edit points is set: Duration between the set edit point and the current tape address
- When no edit points are set: Duration of the previous edit section

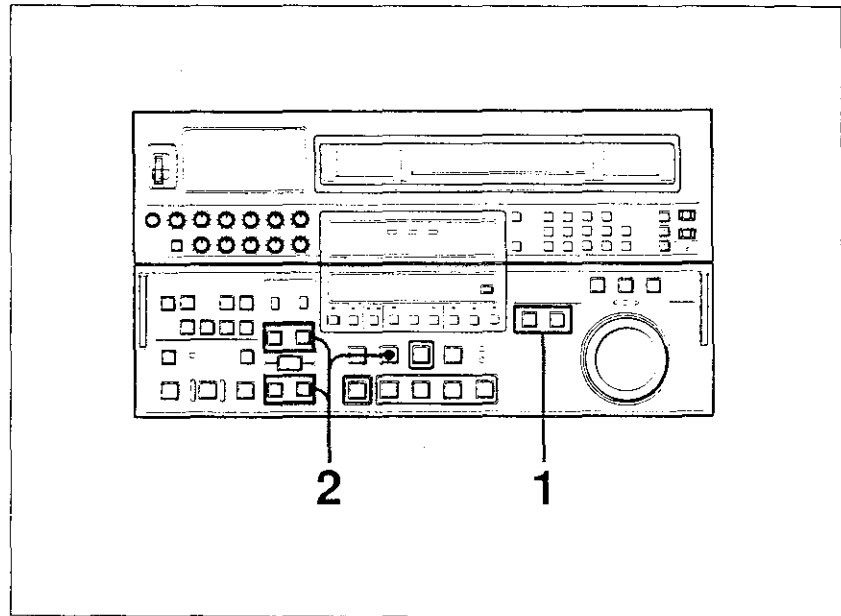
To display the duration, follow the procedure below.

- 1** Press the RECORDER or PLAYER button to select the VTR for which you wish to confirm the duration.
The button lights.
- 2** Hold down any two of the IN, OUT, AUDIO IN and AUDIO OUT buttons.
The duration between the points corresponding to the buttons is displayed in the time counter display. The value can be negative.

6-1-6. Cue Up and Preroll

You can preroll the tape to a point prior to the edit start point (preroll point), or cue up the tape to any edit point. When prerolling the tape in split editing, the VTR regards the earlier of the IN or AUDIO IN points as being the edit start point.

Follow the procedure below to cue up or preroll the tape.



Cue up and preroll

- 1** Press the RECORDER or PLAYER button to select the VTR to operate.
The button lights.
- 2** **To cue up the tape to the edit point**
Press the PREROLL button together with the IN, OUT, AUDIO IN or AUDIO OUT button.
The tape moves to the edit point corresponding to the button, then stops.
To preroll the tape
Press the PREROLL button.
The tape is rewound to a point five seconds prior to the edit start point.

Note

Cuing up in the CTL mode is slightly slower than that in the TC mode, in order to keep the CTL signals' accuracy (factory preset setting).

To change the factory setting of cuing up speed modes, see "1-10. Setup Menu" in the Installation Manual.

6-1. Basic Automatic Editing

Changing the preroll time

The preroll time is factory set to 5 seconds, but can be set to any time between 0 and 15 seconds, in 1 second steps.

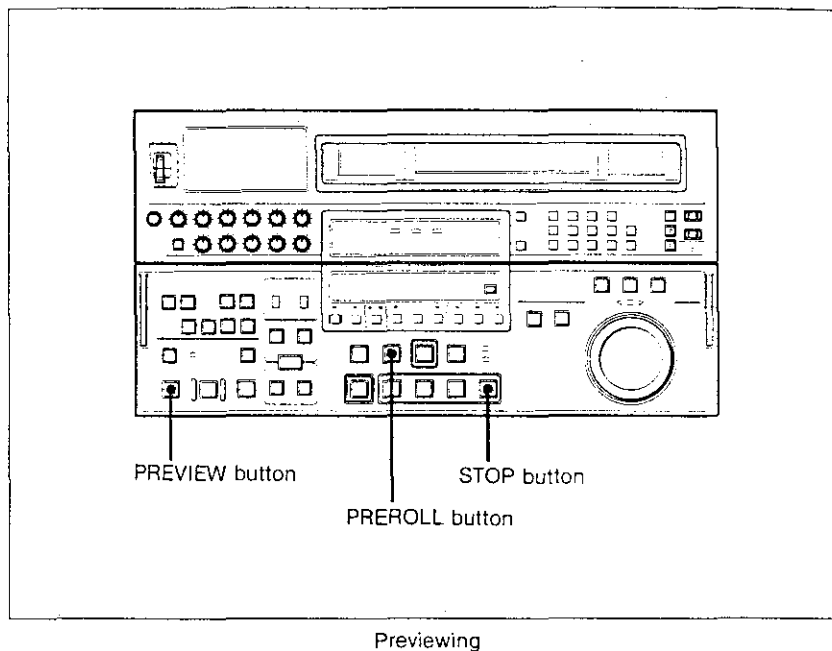
For details of changing the preroll time, see "3-3. Setup Menu" on page 3-8.

When changing the preroll time, set it so that the recorder section prior to the edit start point is longer than the preroll time.

The preroll time used in automatic editing is the preroll time set for the recorder.

6-1-7. Preview

When all the necessary edit points have been set, the PREVIEW button flashes to show that the VTR is ready for preview.



Press the PREVIEW button to preview the results of the edit.

During preview, the PREVIEW button lights.

After preview, correct the edit points as required, and preview again.

For details of correcting the edit points, see "6-1-8. Correcting Edit Points" on page 6-17.

To stop preview

Press the STOP button.

The tape stops immediately.

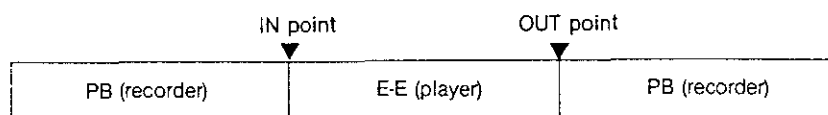
To rewind the tape to the preroll point

Press the PREROLL button.

To rewind the tape to the edit point

Press the PREROLL button together with the button corresponding to the edit point.

During preview, you can view the following video and audio signals on the monitor connected to the recorder.

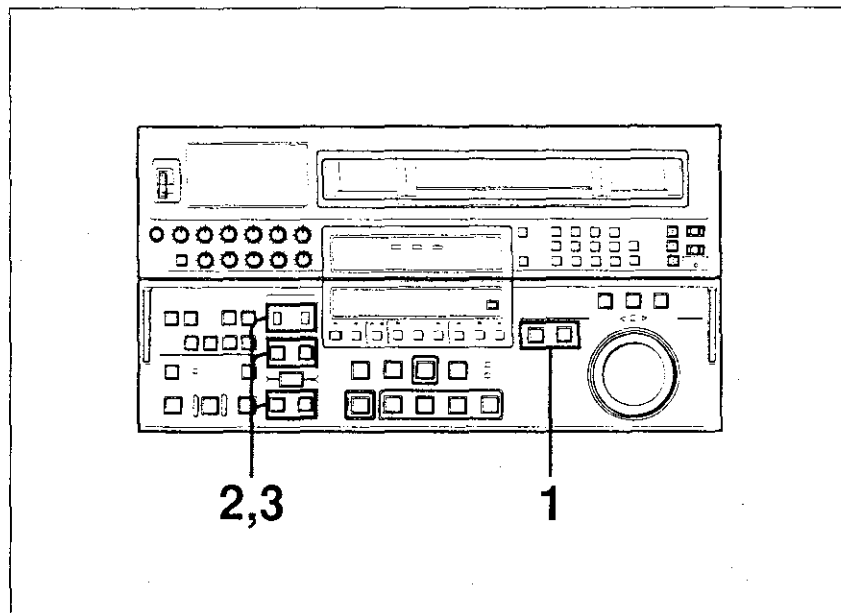


6-1. Basic Automatic Editing

If the button pressed with the DELETE button flashes
Set a new edit point.

To turn off the DELETE button without deleting an edit point
Press the DELETE button.
The DELETE button goes off but edit point deletion is not done.

Correcting edit points



Correcting edit points

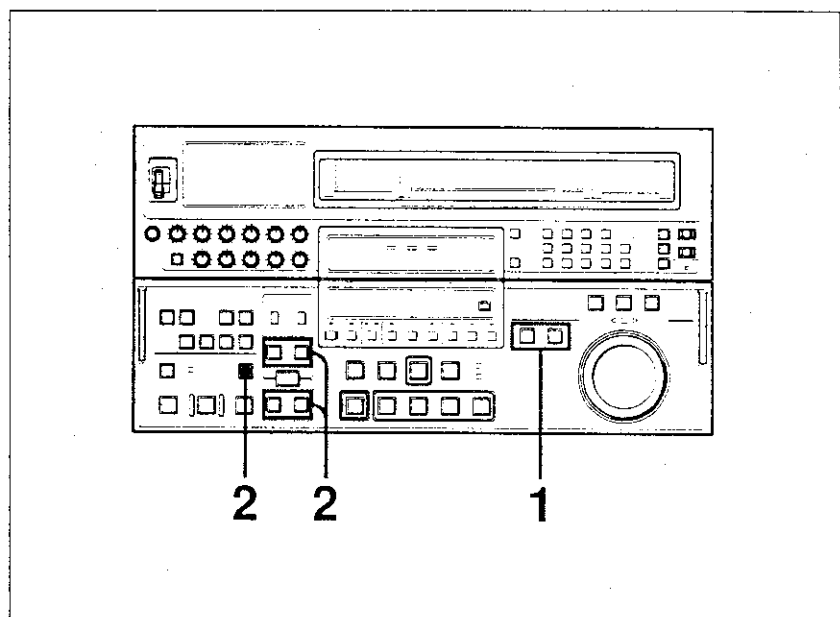
- 1** Press the RECORDER or PLAYER button to select the VTR on which an edit point is to be corrected.
The button lights.
- 2** Press one of the TRIM buttons (+ or -) together with the IN, OUT, AUDIO IN or AUDIO OUT button.
The time data for the edit point corresponding to the button is displayed. When the + or - button is pressed, the edit point is moved one frame forward or back.
- 3** Release the button corresponding to the edit point once the correction has been made.

6-1-8. Correcting Edit Points

If edit points are set incorrectly, for example, if an OUT point is located before an IN point or the length of an edit section is different for the recorder and player, the DELETE button flashes to show that the VTR cannot perform the edit or preview. In this case, delete the edit points and set valid edit points.

Even if the DELETE button is not flashing, edit points can be deleted in the manner described in this section. You can modify edit points in units of one frame.

Deleting edit points



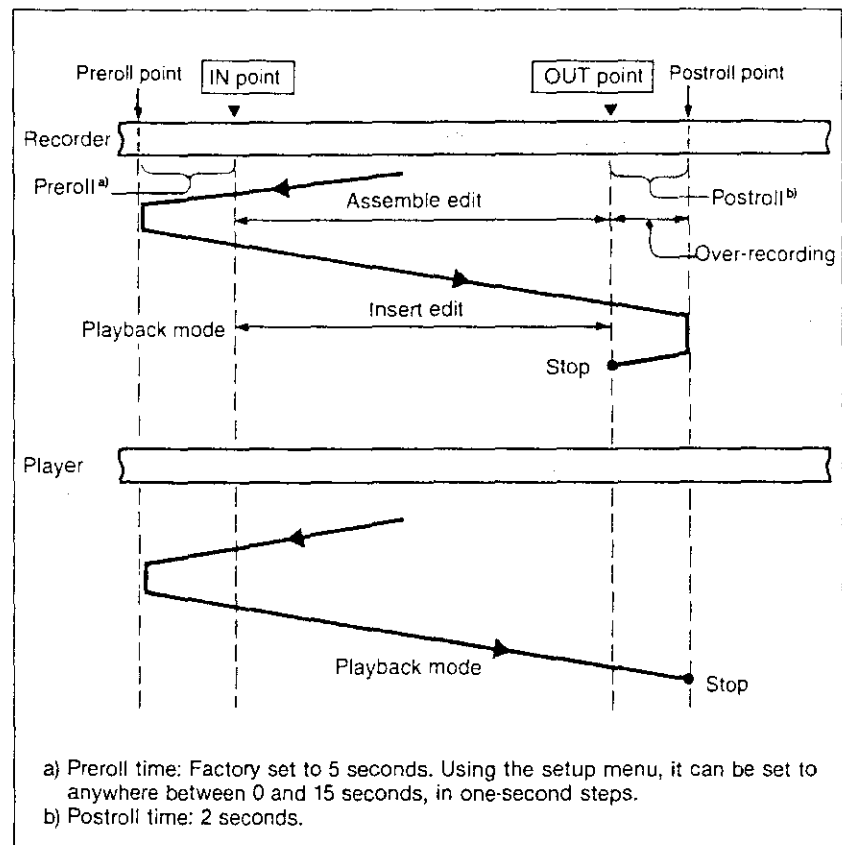
Deleting edit points

- 1** Press the RECORDER or PLAYER button to select the VTR on which an edit point is to be deleted. The button lights.
- 2** Press the DELETE button together with the IN, OUT, AUDIO IN or AUDIO OUT button. The DELETE button goes off and the edit point corresponding to the button is deleted. The correct edit point is set automatically if all other edit points have already been set.

6-1-9. Executing Automatic Editing

Overview

Once the necessary edit points have been set, the AUTO EDIT button flashes to show that the VTR is ready for automatic editing. During automatic editing, the recorder and player tapes move as shown in the diagram below.



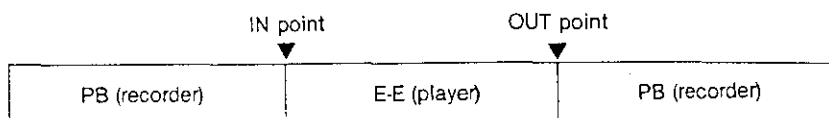
Tape movement during automatic editing

6-1. Basic Automatic Editing

Monitoring edit

During the edit, you can monitor the following video and audio signals on the monitor connected to the recorder.

- Between preroll and IN points: playback picture of the recorder can be monitored
- Between IN and OUT points: playback picture of the player can be monitored in E-E mode
- Between OUT and postroll points: playback picture of the recorder can be monitored



You can also monitor the video and audio signals just recorded during editing by setting the CONF1 button to on.

In addition, you can set up for monitoring the signals from the preroll to postroll points using the confidence heads.

For details, refer to "1-10. Setup Menu" in the Installation Manual.

Viewing both the recorder and player tapes on a single monitor

The following method allows you to perform editing efficiently even if only one monitor is available.

1 Connect the monitor to the recorder.

2 Set the value for setup menu item 008 to 1.

For details of how to change the menu setting, see "3-3-2. Changing Menu Settings" on page 3-10.

3 Press the PLAYER button on the recorder VTR to place the recorder into E-E mode.

Playback signals from the player are output to the monitor.

Note

Insert edit requires that CTL signals are recorded onto the recorder tape. Any sections of the tape onto which CTL signals have not been recorded cannot be used for insert edit.

6-2. Advanced Editing

This section explains the following advanced editing methods.

- DMC editing
- Quick editing
- Continuous editing
- Preread editing

6-2-1. Executing DMC Editing

Using a VTR equipped with DT® (Dynamic Tracking) capability as a player allows you to perform variable-speed editing by controlling the playback speed of the player from the DVW-500 series. This type of editing is called DMC editing.

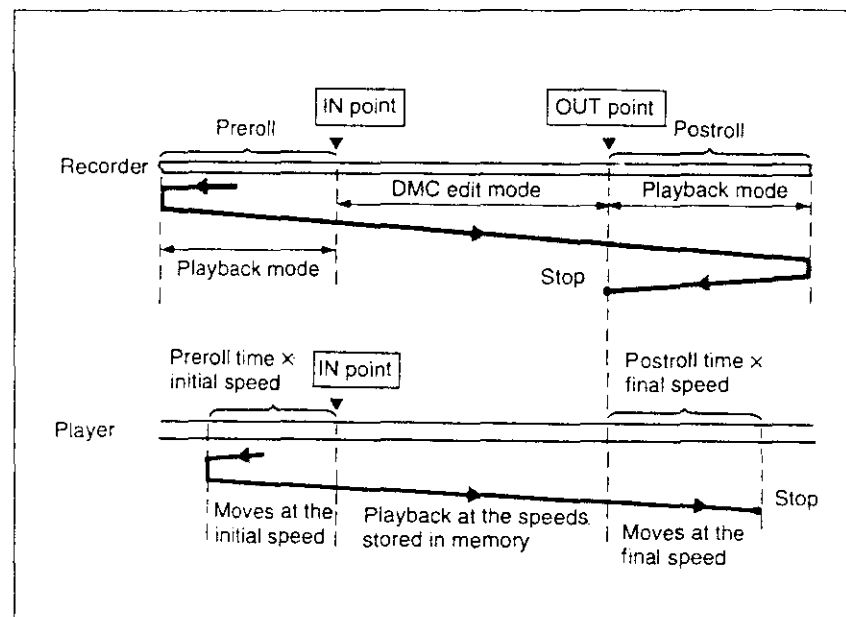
Overview

Requirements for DMC editing

- DMC editing is possible in either assemble or insert edit mode, but is not possible when executing split edit.
- The player VTR must support DT playback.

Tape movement during DMC editing

During DMC editing, the tape moves as shown in the diagram below.

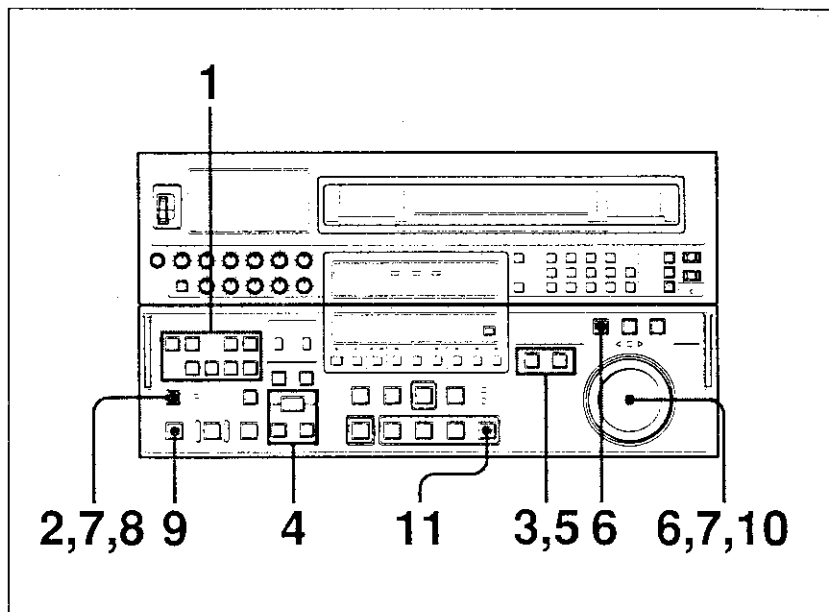


Tape movement during DMC editing

6-2. Advanced Editing

Setting edit points and playback speeds

Set the edit points and playback speeds for DMC editing as explained below.

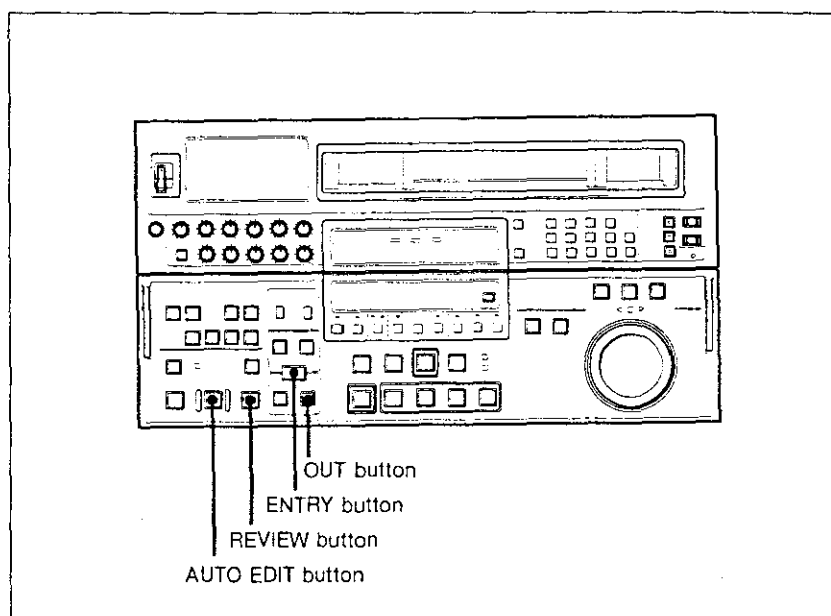


Setting edit points and playback speeds

- 1** Press the ASSEMBLE or INSERT button to select edit mode.
- 2** Press the DMC EDIT button.
The DMC EDIT button lights and the VTR enters DMC edit mode.
- 3** Press the RECORDER or PLAYER button to select the VTR to operate.
The button lights.
- 4** To set an edit point, press the ENTRY button together with the IN or OUT button. Note that you cannot set an OUT point for the player.
- 5** Press the PLAYER button.
The button lights.
- 6** Enter shuttle mode by pressing the search dial or the SHUTTLE button.
The SHUTTLE indicator lights.

Starting Editing

Press the AUTO EDIT button to start the edit.
The AUTO EDIT button lights during the edit, and goes off when it ends.



Starting editing

To stop editing

Press the ENTRY button together with the OUT button.
The point where the buttons are pressed is regarded as being an OUT point and the edit ends at that point.

To confirm the results of the edit

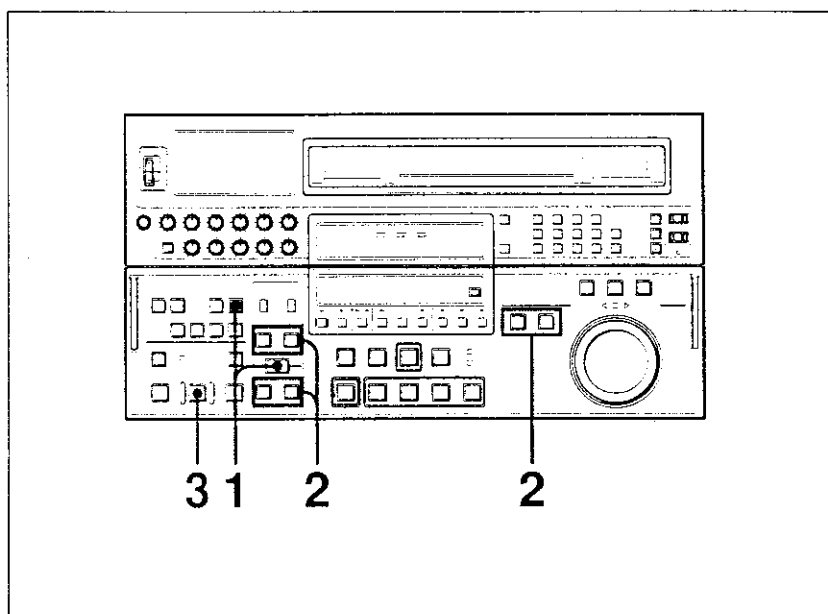
Press the REVIEW button to confirm the results after editing.
Once the review ends, the tape is rewound to the OUT point, then stops.

6-1. Basic Automatic Editing

Correcting edit points for later automatic editing

When you execute an automatic edit, the IN, OUT, AUDIO IN and AUDIO OUT buttons go off but the time data for the edit points remains stored in memory. Using the stored data, you can correct the edit points and execute another automatic edit, even after completing the previous edit.

Follow the procedure below to correct the edit points after executing automatic editing.



Correcting edit points for later automatic editing

- 1** Press the DELETE button together with the ENTRY button.
The edit points used for the previous automatic edit are restored.
- 2** Correct the edit points.
For details of correcting edit points, see "6-1-8. Correcting Edit Points" on page 6-17.
- 3** Press the AUTO EDIT button.
The VTR executes the automatic editing.

-
- 7** Set the initial playback speed by rotating the search dial while holding down the DMC EDIT button.
The time counter display shows the set speed.
If you wish to set the initial speed to normal speed, press the PLAY button.
 - 8** Once the initial speed has been set, release the DMC EDIT button.
 - 9** Press the PREVIEW button.
The tape is prerolled. The recorder tape runs at normal speed and the player tape runs at its initial speed.
 - 10** When the MEMORY indicator starts to flash, indicating that the tape has reached the IN point, rotate the search dial to the position corresponding to the desired playback speeds.
The variations in playback speed are stored into memory while the MEMORY indicator is flashing.
When the tape passes the OUT point, the MEMORY indicator stops flashing, and instead lights steadily to show that memorization of playback speed has been completed.
 - 11** Press the STOP button to stop the tape.

If the MEMORY indicator lights steadily before the tape passes the OUT point

The VTR cannot store any more variations in playback speed. The capacity of the playback speed memory is 120 seconds.

To exit DMC edit mode

Press the DMC EDIT button together with the DELETE button.
The DMC EDIT button goes off.

6-2. Advanced Editing

Executing DMC editing

After storing the playback speed(s) in memory preview mode, press the AUTO EDIT button to execute the DMC edit.

DMC edit is executed at the playback speed(s) stored in memory. Once the DMC edit has been completed, the playback speed(s) in memory are cleared.

To confirm the results of the edit

Press the REVIEW button.

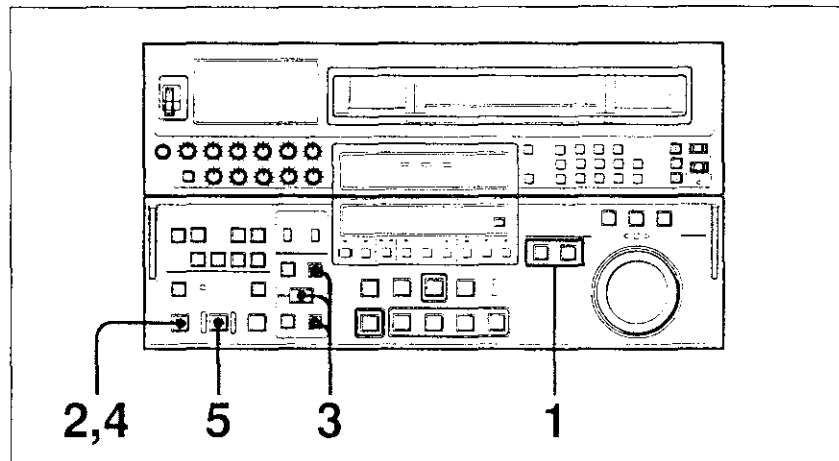
To control DT VTRs

When using a dynamic tracking VTR as a player, note the following.

- **SHUTTLE mode:** pressing the SHUTTLE button enables noiseless playback at 12 speeds ranging from -1 to $+3$ times normal speed. If the playback speed exceed the noiseless playback range, the block noise appears. And note that the noiseless playback speed depends on the VTR specification.
- **VAR mode:** pressing the VAR button enables noiseless playback at 54 speeds ranging from -1 to $+3$ times normal speed. You cannot vary the playback speed exceeding the noiseless playback range. Note that the noiseless playback speed depends on the VTR specification.

6-2-2. Executing Quick Editing

After selecting edit mode, you can save on editing time by setting edit points and previewing the results at the same time. Execute quick editing as follows.



Executing quick editing

- 1** Select the VTR to operate by pressing the PLAYER or RECORDER button. Find an IN point and stop the tape at that IN point.
Repeat for the other VTR.
- 2** Press the PREVIEW button to execute preview.
The points selected in Step 1 are set as IN points and the IN buttons on both the player and recorder light.
- 3** Once the tape reaches the appropriate OUT point, press the ENTRY button together with the OUT button.
The OUT point is set and the OUT button stops flashing and, instead lighting steadily. After two seconds, both the player and recorder tapes stop.
- 4** Execute preview again and correct the edit points using the TRIM buttons as required.
For trimming the edit points, see "Correcting edit points" on page 6-17.
- 5** Press the AUTO EDIT button.
Editing starts.
Once the edit ends, the recorder tape stops at the OUT point and the player tape stops two seconds after the OUT point.

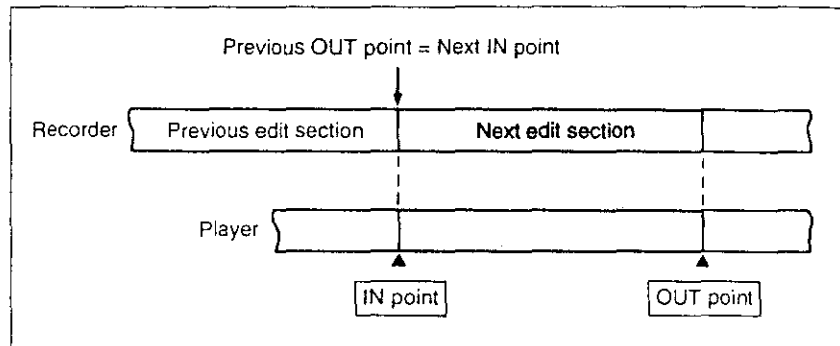
6-2. Advanced Editing

To save even more editing time

- 1** Select the VTR to operate by pressing the **PLAYER** button or **RECORDER** button. Find an **IN** point and stop the tape at the **IN** point.
Repeat for the other VTR.
- 2** Press the **AUTO EDIT** button to start the edit.
- 3** While viewing the monitor, press the **ENTRY** button together with the **OUT** button at the point where you wish to stop editing.
The point at which you started editing becomes the **IN** point, while the point where you stopped editing becomes the **OUT** point.

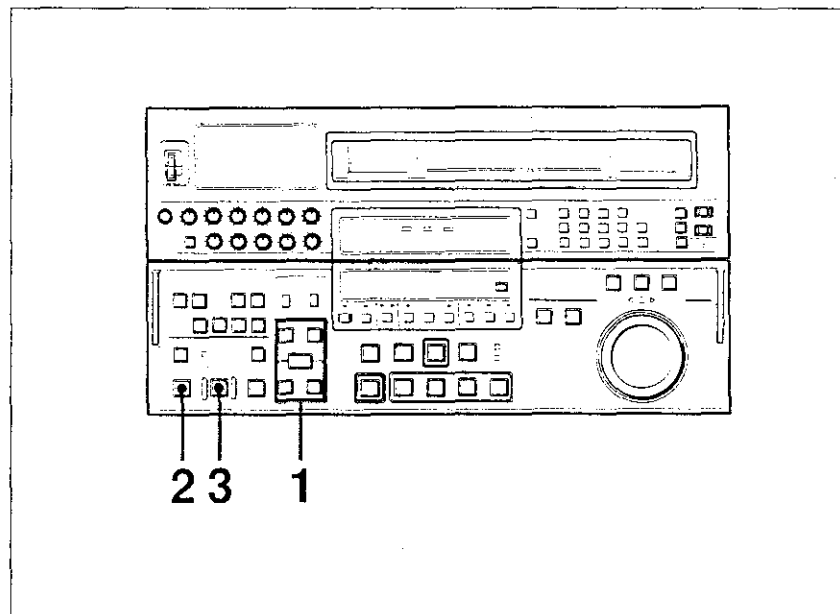
6-2-3. Executing Continuous Editing

When automatic editing ends, the recorder tape is automatically rewound to the OUT point. From the next edit on, you can set the IN and OUT points for the player only. This technique is called continuous editing. The OUT point for the recorder will be the IN point for the next edit.



Continuous editing

To execute continuous editing, follow the procedure below.



Executing continuous editing

- 1** Set IN and OUT points for the player.
The unit automatically sets the previous OUT point as the new IN point for the recorder.
- 2** Press the PREVIEW button to preview.

(Continued)

6-2. Advanced Editing

3 Press the AUTO EDIT button.

The edit starts.

Once the edit ends, the recorder tape stops at the OUT point and the player tape stops two seconds after the OUT point.

Repeat Steps 1 to 3 to execute continuous editing.

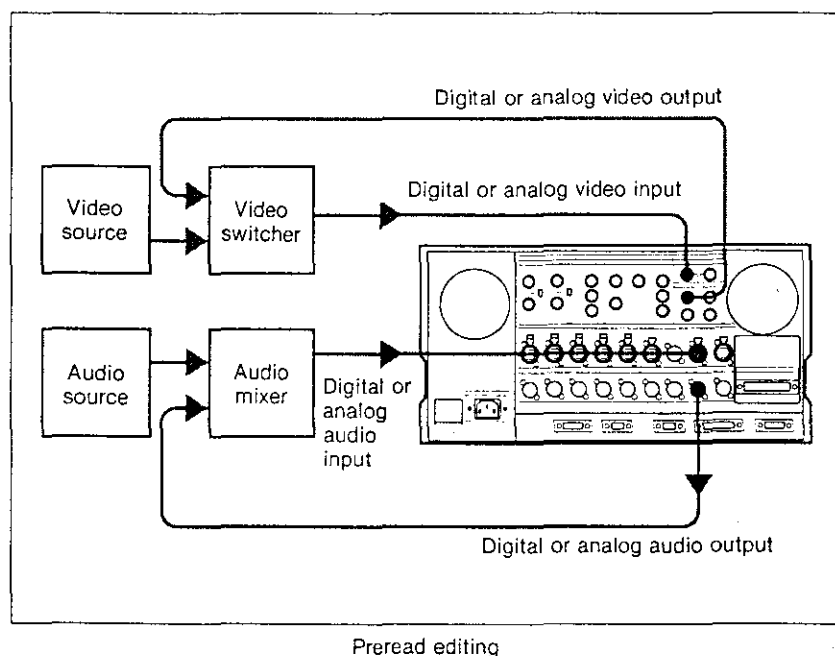
To stop editing

Press the ENTRY button together with the OUT button.

6-2-4. Executing Preread Editing

Video or audio signals (channels 1 to 4), already recorded onto the tape, can be used as an edit source for insert editing. This type of editing is called “Preread editing”, as the VTR uses the preread heads to read the signals in advance. Signals read in advance can be sent to mixers for mixing and can be returned to the original channels or other audio channels (1 to 4).

For preread editing, press the PREREAD button such that the PREREAD indicator lights.



Notes

- In preread editing, if an input video signal is used as the reference signal for the output video signal, oscillation may occur because of loop-closing. To avoid this, set the OUT REF switch on the sub control panel to REF and set the item 309 in the setup menu to 1 to select the external reference signal for preread editing.
- When preread mode is selected, the VTR will not shift into E-E mode in any operation mode, to avoid oscillation caused by the loop connection. When preread mode is turned off, however, the E-E signal is output and oscillation may occur if connection between the input and output of the same channel is not removed after preread editing.

To prevent the oscillation, select PB mode for the video and digital audio channels in all the modes before the preread editing, as follows:

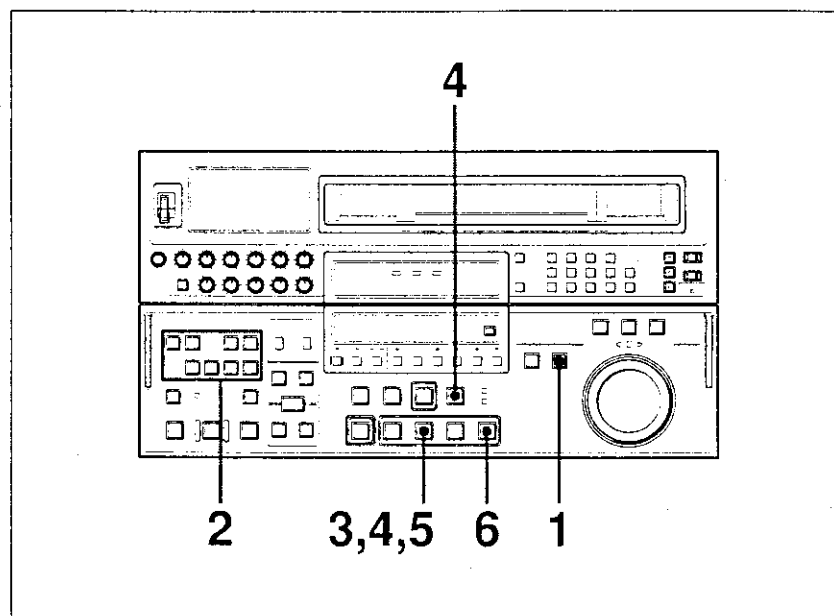
[illegible]

- For details of executing insert editing, see “Chapter 6 Editing”.*

6-3. Manual Editing

Manual editing is convenient for relatively simple edits in which precision is not an important factor. Unlike automatic editing, edit points are manually set, once by one, as editing proceeds, instead of being registered in advance.

Execute manual editing by following the procedure below.



Manual editing

- 1** After pressing the RECORDER button, find an edit point in jog or shuttle mode. Stop the tape a little before the edit point.
- 2** Press the ASSEMBLE button or the appropriate INSERT button to select the edit mode.
- 3** Press the PLAY button.
Playback starts.
- 4** Press the EDIT button together with the PLAY button at the point at which you wish to start editing (the IN point).
The edit starts.
- 5** Press the PLAY button at the point at which you wish to end editing (the OUT point).
The edit ends, but the tape continues to run in playback mode.

(Continued)

6-3. Manual Editing

6 Press the STOP button to stop the tape.

Notes

- Note that noise will appear on the picture at the edit start point if you start an edit while the VTR is in stop mode.
- To ensure a stable picture, start playback at least two seconds before the edit start point.

Chapter 7

Maintenance

This chapter explains basic maintenance.

7-1. Removing the Cassette When the Tape is Slack	7-2
7-2. Head Cleaning	7-4
7-3. Moisture Condensation	7-5
7-4. Reading Hours Meter	7-6

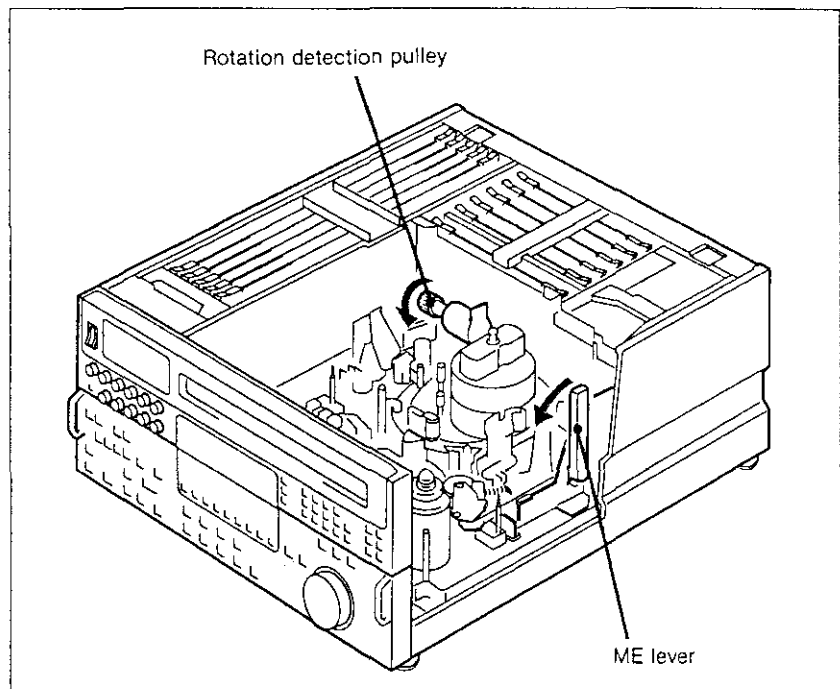
7-1. Removing the Cassette When the Tape is Slack

When the tape in the VTR is slacked, take out the cassette tape carefully not to damage the tape and recorded data.

To take out the cassette from the VTR, follow the procedure below.

- 1 Turn the power off.
- 2 Remove the upper panel.
- 3 Remove the sound insulation panel.
- 4 Rotate the rotation detection pulley of a threading motor block in the direction of arrows illustrated below at half rotation so that the tape is loosened.
- 5 Move the ME lever to front panel side so that the tape is wound up.

Repeat Steps 4 and 5 until the VTR is in unthreading completed state.



7-2. Head Cleaning

Clean the heads using the special BCT-5CLN cleaning cassette. Read the instructions for the cleaning cassette carefully, as improper usage can damage the heads.

Follow the procedure below.

- 1** Insert the cleaning cassette.
- 2** Press the EJECT button simultaneously with the PLAY button. Head cleaning starts.

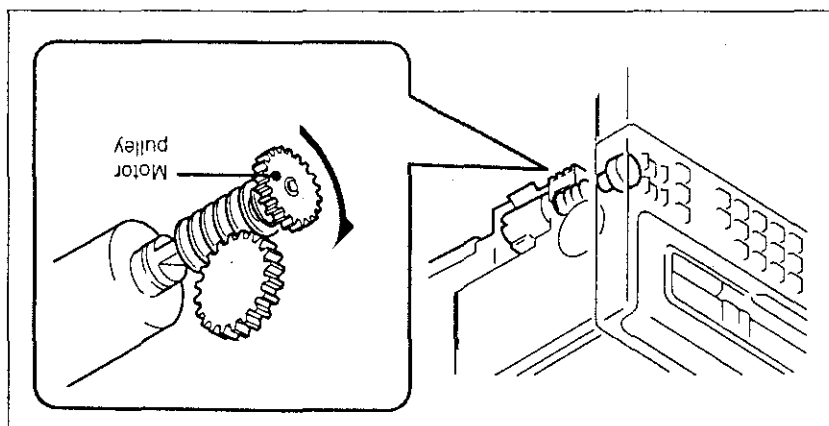
Head cleaning is executed for 5 seconds.

When head cleaning ends, the cleaning cassette is automatically ejected.

Note

When not using the automatic eject method above, be sure to eject the cleaning cassette after cleaning not to damage the heads.

Note Do not move the ME lever unless the tape slack is occurred.

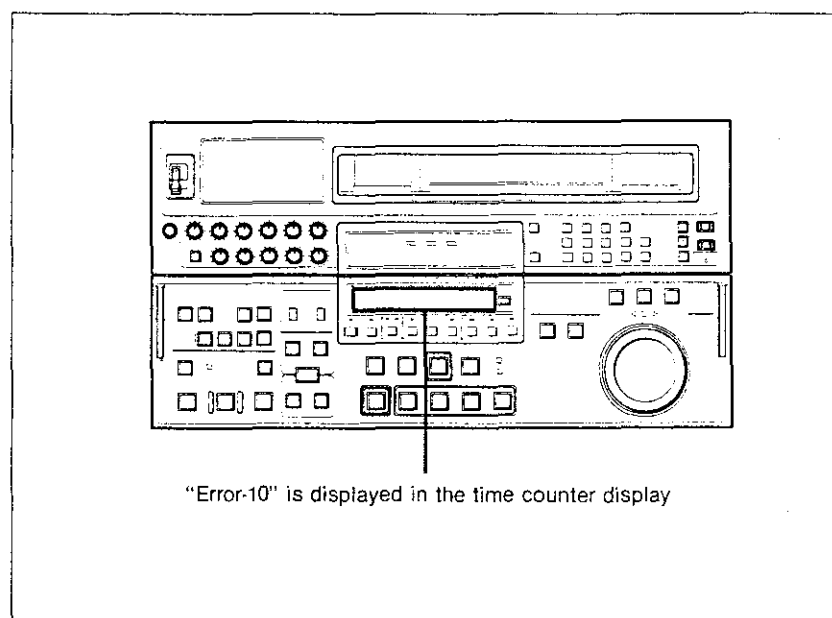


- 7** Rotate the motor pulley (in yellow) in the direction illustrated below so that the tape is completely ejected.
- 6** Pull out the lower control panel and fix it at 90 degrees.

7-3 Moisture Condensation

If moisture condensation occurs while operating the VTR
When the VTR is suddenly moved from a cold to a warm location, or used in a very humid place, moisture from the air can condense on the head-drum. This is called moisture condensation. If the tape is run in this state, the tape can adhere to the drum.

If moisture condenses on the head-drum while you are operating the VTR, "Error-10" is displayed in the time counter display.



If moisture condensation occurs

If this happens, the drum and capstan motors stop and the cassette is automatically ejected. Then, the drum starts to rotate again to dry the surface of drum.

When the moisture has evaporated, the error message disappears.

If "Error-10" appears immediately after powering the VTR on

Leave the VTR powered on and wait until the indicator goes off.

While the indicator is lit, you cannot insert a cassette.

When the indicator goes off and the error message disappears, you can use the VTR.

If you move the VTR from a cold to a warm location

Leave the VTR powered off for about 10 minutes, in order to give the VTR time to detect moisture condensation.

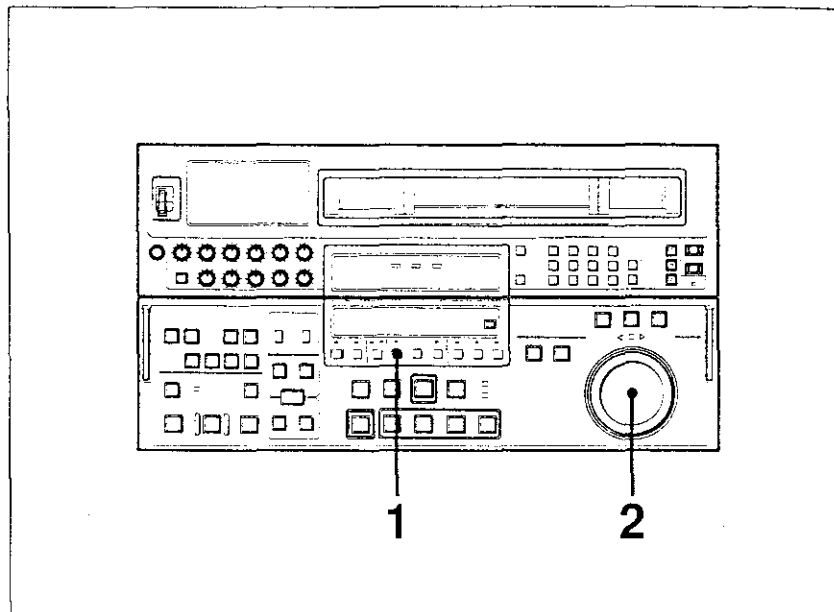
7-4. Reading Hours Meter

The hours meter which inform you the operational history can be superimposed on the monitor screen as a part of the setup menu. It displays seven kind of information about the operational history of the VTR described below. Use it as a guide in scheduling periodic maintenance.

Hours meter

Meter number	Title	Explanation
H01	OPERATION HOURS	Displays the total number of hours in units of ten hours that the VTR has been in operation, with the power turned on.
H02	DRUM RUNNING HOURS	Displays the total number of hours in units of ten hours that the drum has run with tape threaded.
H03	TAPE RUNNING HOURS	Displays the total number of hours in units of ten hours that the unit has been in fast forward, rewind, playback, search, recording and editing (except for stop and still) modes.
H04	THREADING COUNTER	Displays the total threadings and unthreadings in units of ten cycles.
H12	DRUM RUNNING HOURS (can be reset)	Displays the total number of hours in units of ten hours that the drum has run with tape threaded since you reset this parameter. Use this parameter to know the relative drum running times from your desired point.
H13	TAPE RUNNING HOURS (can be reset)	Displays the total number of hours in units of ten hours that the unit has been in fast forward, rewind, playback, search, recording and editing (except for stop and still) modes since you reset this parameter. Use this parameter to know the relative tape running times from your desired point.
H14	THREADING COUNTER (can be reset)	Displays the total threadings and unthreadings in units of ten cycles since you reset this parameter. Use this parameter to know the relative threading and unthreading times from your desired point.

Reading hours meter



Reading hours meter

- 1** Press the MENU button to display the hours meter (item H01) in the time counter display.
If another menu item previously used is displayed, press the TC button in the time counter display section to display item H01.
- 2** Rotate the search dial to select the hours meter to display.
The desired parameter of the hours meter appears in the time counter display.

Notes

- The values of the hours meter are normally displayed with four digit in units of ten hours or ten cycles.
By pressing the JOG or the SHUTTLE button, the hours meter changes into six-digit indication in units of hours or cycles.
- When displaying hours meter, the hours meter is also displayed in the monitor screen in unit of an hour (six-digit indication) whether you press the JOG or SHUTTLE button or not.

To return to the normal indication

Press the MENU or SET button.

The indication displayed in the time counter display returns to the normal indication.

Specifications

General

Power requirements	100 to 240 VAC $\pm 10\%$, 50/60 Hz
Power consumption	DVW-A500/A500P: 540 VA (240W) DVW-500/500P: 480 VA (220W)
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	25 to 80% (relative humidity)
Mass	DVW-A500/A500P: 35 kg (77 lb) DVW-500/500P: 33 kg (73 lb)
Dimensions	427 × 237 × 520 mm (w/h/d) (16 ³ / ₄ × 9 ³ / ₈ × 20 ¹ / ₂ inches)
Recording format	Digital Betacam
Tape speed	Digital Betacam: 96.7 mm/s Betacam playback: 118.6 mm/s (DVW-A500) 101.5 mm/s (DVW-A500P)
Digital record/playback time	124 minutes with BCT-D124L
Analog Betacam playback time	DVW-A500: 90 minutes with BCT-90ML _A cassette DVW-A500P: 100 minutes with BCT-90ML _A cassette
Fast forward/rewind time	Approx. 3 minutes with BCT-D124L
Search speed	Shuttle mode: Digital Betacam: Still to approx. ± 50 times normal playback speed Betacam playback: Still to ± 35 (for DVW-A500) Still to ± 42 (for DVW-A500P) Variable mode: - 1 to + 3 times normal playback speed Jog mode: 0 to ± 1 or ± 3 times normal playback speed (selectable in setup menu)
Dynamic Tracking range	- 1 to + 3 times normal playback speed
Servo lock time	0.5 seconds or less (from standby on)
Load/unload time	6 seconds or less
Recommended tapes	Digital Betacam cassette (S, L) BCT-D6/D12/D22/D32/D40/ D34L/D64L/D94L/D124L or equivalent Betacam/Betacam SP cassette (S,L) for playback with DVW-A500/A500P

Digital video

Sampling frequency	Y: 13.5 MHz R-Y/B-Y: 6.75 MHz
Quantization	10 bits/sample
Compression	Coefficient recording system
Channel coding	S-NRZI PR-IV
Error correction	Reed-Solomon code
Error concealment	Adaptive three dimensional

Digital serial input to analog component out

Bandwidth	Y: 0 to 5.75 MHz ± 0.5 dB R-Y/B-Y: 0 to 2.75 MHz ± 0.5 dB
S/N ratio	62 dB or more
K factor (2T Pulse)	1% or less

Analog component input to analog component output

Input A/D quantization	8 bits/sample
Bandwidth	Y: 0 to 5.75 MHz $+0.5$ dB / -0.7 dB R-Y/B-Y: 0 to 2.75 MHz $+0.5$ dB / -0.7 dB
S/N ratio	56 dB or more
K factor (2T pulse)	1% or less
LF non-linearity	2.5% or less

Analog composite input (with optional BKDW-505/506) to analog composite output

Bandwidth	Y: 0 to 5.75 MHz $+0.5$ dB / -0.7 dB
S/N ratio	58 dB or more ¹⁾
Differential gain	2% or less
Differential phase	2° or less
Y/C delay	15 ns or less
K factor (2T Pulse)	1% or less
Output SCH phase	Based upon RS-170A/CCIR R.624-3

1) measured in video setup 0% mode for the BKDW-505 as well.

Specifications

Digital audio (CH-1 to CH-4)

Sampling frequency	48 kHz (synchronized with video)
Quantization	20 bits/sample
Wow and flutter	Below measurable level
Headroom	20 dB (or 18 dB selectable)
Emphasis	T1 = 50 μ s, T2 = 15 μ s (on/off selectable in recording mode)

Analog input to output

A/D, D/A quantization	18 bits/sample
Frequency response	20 Hz to 20 kHz +0.5 dB/–1.0 dB (0 dB at 1 kHz)
Dynamic range	More than 95 dB (at 1 kHz, emphasis on)
Distortion	Less than 0.05% (at 1 kHz, emphasis on, reference level ¹⁾)
Crosstalk	Less than –80 dB (at 1 kHz, between any two channels)

Analog audio (Cue track)

Frequency response	100 Hz to 12 kHz \pm 3 dB
S/N ratio	More than 45 dB (at 3% distortion level)
Distortion	Less than 2% (T.H.D at 1 kHz reference level ¹⁾)
Wow and flutter	DVW-A500/500: Less than 0.2% rms DVW-A500P/500P: Less than 0.2% (DIN 45507 weighted)

1) Reference level: +4 dBm

Betacam SP playback (for DVW-A500/A500P only)

Video

	DVW-A500		DVW-A500P	
	Metal Tape	Oxide Tape	Metal Tape	Oxide Tape
Bandwidth Y	30 Hz to 4.5 MHz +0.5 dB/-3.0 dB	30 Hz to 4.1 MHz +0.5 dB/-6.0 dB	25 Hz to 5.5 MHz +0.5 dB/-3.0 dB	25 Hz to 4.0 MHz +0.5 dB/-6.0 dB
Bandwidth R-Y/B-Y	30 Hz to 1.5 MHz +0.5 dB/-3.0 dB	30 Hz to 1.5 MHz +0.5 dB/-3.0 dB	25 Hz to 2.0 MHz +0.5 dB/-3.0 dB	25 Hz to 1.5 MHz +0.5 dB/-3.0 dB
S/N Ratio Y	51 dB or more	48 dB or more	48 dB or more	46 dB or more
S/N Ratio R-Y/B-Y	48 dB or more	45 dB or more	48 dB or more	45 dB or more
K factor (2T pulse)	2% or less	3% or less	1.5% or less	3% or less
LF non-linearity Y	3% or less			
LF non-linearity R-Y/B-Y	4% or less			
Y/C delay	20 ns or less			

Audio

DVW-A500

		Metal Tape	Oxide Tape
LNG	Frequency response (at 10dB below reference level ^{a)})	50 Hz to 15 kHz +1.0 dB/-2.0 dB	50 Hz to 15 kHz \pm 3.0 dB
	S/N Ratio (at 3% distortion level)	More than 72 dB	More than 50 dB (Dolby NR off)
	Distortion (T.H.D at 1kHz reference level ^{a)})	Less than 1%	Less than 2%
	Wow and flutter	Less than 0.1% rms	
AFM	Frequency response (at reference level ^{a)})	20 Hz to 20 kHz +0.5 dB/-2.0 dB	
	S/N Ratio (at 3% distortion level)	More than 85 dB	
	Distortion (T.H.D at 1kHz reference level ^{a)})	Less than 0.5%	

a) Reference level: +4 dBm

DVW-A500P

		Metal Tape	Oxide Tape
LNG	Frequency response (at 20 dB below peak level ^{b)})	50 Hz to 15 kHz +1.0 dB/-2.0 dB	50 Hz to 15 kHz \pm 3.0 dB
	S/N Ratio (CCIR 468-3 weighted, at 3% distortion level)	More than 68 dB	More than 62 dB
	Distortion (T.H.D at 1kHz reference level ^{a)})	Less than 1%	Less than 2%
	Wow and flutter (DIN 45507 weighted)	Less than 0.1%	
AFM	Frequency response (at reference level ^{a)})	20 Hz to 20 kHz +0.5 dB/-2.0 dB	
	S/N Ratio (at 3% distortion level)	More than 72 dB (CCIR 468-3 weighted)	
	Distortion (T.H.D at 1kHz reference level ^{a)})	Less than 0.5%	

a) Reference level: +4 dBm

b) Peak level: +8 dB above reference level

Unless otherwise specified, all values in the above table were obtained by measuring analog output signals with Dolby noise reduction circuitry on.

Specifications

Processor adjustment range

Video level	± 3 dB/ $-\infty$ to $+3$ dB selectable
Chroma level	± 3 dB/ $-\infty$ to $+3$ dB selectable
Setup/Black level	± 30 IRE/ ± 210 mV
Y/C delay	± 100 ns (in Betacam playback on DVW-A500/A500P)
Chroma phase	$\pm 30^\circ$
System phase	Sync: ± 15 μ s SC: ± 200 ns

Input connectors

SERIAL V/A INPUT	BNC (1 with active through out) Serial digital (270 Mbits/s) SMPTE 259M/CCIR 656-III
ANALOG I/O VIDEO INPUT	
REF. VIDEO	BNC (2 in loop through connection) Black burst or composite sync 0.3 Vp-p, 75 Ω , Sync negative
COMPONENT	BNC (3 for 1 set) Y: 1.0 Vp-p, 75 Ω , Sync negative R-Y/B-Y: 0.7 Vp-p, 75 Ω , with 100% color bar for DVW-A500P/500P and with 100% or 75% color bar selectable for DVW-A500/500
COMPOSITE	BNC (2 in loop through connection) 1.0 Vp-p, 75 Ω , Sync negative (with optional BKDW-505/506)
AUDIO INPUT (AES/EBU) CH-1/2, CH-3/4	XLR, 3-pin, female (2) AES/EBU format, balanced
AUDIO INPUT CH-1/2/3/4/CUE	XLR, 3-pin, female (5) LOW OFF: -60 dBu, high impedance, balanced HIGH OFF: $+4$ dBu, high impedance, balanced HIGH ON: $+4$ dBm, 600 Ω termination, balanced
TIME CODE IN	XLR, 3-pin, female (1) 0.5 to 18 Vp-p, 10k Ω , balanced

Output connectors

SERIAL V/A OUTPUT	BNC (4 including 1 for character superimpose) Serial digital (270 Mbits/s) SMPTE 259M/CCIR 656-III
ANALOG I/O VIDEO OUTPUT	
COMPONENT	BNC (3 for 1 set) Y: 1 Vp-p, 75 Ω , Sync negative R-Y/B-Y: 0.7 Vp-p, 75 Ω , with 100% color bar for DVW-A500P/500P and with 100% or 75% color bar selectable for DVW-A500/500
COMPOSITE	BNC (3 including 1 for character superimpose) 1 Vp-p, 75 Ω , Sync negative
AUDIO OUTPUT (AES/EBU) CH-1/2, CH-3/4	XLR, 3-pin, male (2) AES/EBU format, balanced
AUDIO OUTPUT CH-1/2/3/4/CUE	XLR, 3-pin, male (5) +4 dBm at 600 Ω load, low impedance, balanced
TIME CODE OUT	XLR, 3-pin, male (1) 2.2 Vp-p at 600 Ω load, balanced
PHONES	JM-60 stereo phone jack - ∞ to -12 dBu at 8 Ω load, unbalanced

Specifications

Remote connectors

CONTROL PANEL	D-sub 15-pin, female
REMOTE 1-IN	D-sub 9-pin, female
REMOTE 1-OUT	D-sub 9-pin, female
RS232C	D-sub 25-pin, female
VIDEO CONTROL	D-sub 15-pin, male
	(for optional BVR-50/50P)
REMOTE PARALLEL I/O (50P)	D-sub 50-pin, female
	(with optional BKDW-509)

Accessories supplied

AC power cord (1)
RCC-5G 9-pin remote control cable (1)
PSW 4 × 16 screws for rack mounting (4)
Operation Manual (1)
Installation Manual (1)
Maintenance Manual Part 1 (1)

Optional accessories

BKDW-505/506	Analog Composite Decoder Board (NTSC/PAL)
BKDW-509	Parallel (50P) Interface Kit
BKDW-510	Control Panel Extension Kit
BKDW-511	Control Panel Case
BVR-50/50P	TBC Remote Controller
RMM-110	Rack Mount Adaptor
ECD-3C/10C/30C	AES/EBU Digital Audio Cable
BCT-5CLN	Cleaning Cassette Tape

Design and specifications are subject to change without notice.

Glossary

Advance head

See Preread editing.

AES/EBU audio

A digital audio signal conforming to AES/EBU format, as proposed by the EBU (Europe Broadcast Union) to the AES (Audio Engineering Society), and approved in 1986. It allows the transfer of digital audio with a sampling frequency of 48 kHz, and the quantization of 16 bits to 20 bits. Two audio channels are transferred via one line by time division multiplexing, so four audio channels can be input and output through two connectors: CH 1/2 and CH 3/4. The XLR-type connectors, identical to those used for analog audio, are used, but the input/output impedance and cable specifications are designated specifically for digital audio because of its wider bandwidth.

AFM

Abbreviation for Audio Frequency Modulation. Analog audio signals are frequency-modulated and recorded together with the FM video signals on the tape's video track. A high head-to-tape velocity makes it possible to use part of the high-frequency video bandwidth to obtain a wide audio bandwidth and support multi-channel recording. In the analog Betacam system, AFM recording is possible only on metal tape. A Digital Betacam VTR with analog Betacam playback compatibility can playback such metal tape AFM recordings.

Assemble editing

An edit mode for appending new scenes to the end of previously recorded scenes. In this mode, all the video, audio and control signals are newly recorded. Continuity of the CTL signals at the edit points is maintained electrically.

Bridging connection

A connection that allows a signal input to an input terminal to pass through the unit and exit from an output terminal for input to a third piece of equipment.

Coefficient recording

Digital video data compression technology, developed for Digital Betacam format recording. Digital video data is converted into frequency domains by Discrete Cosine Transform method (DCT). The frequency domains are then weighted with DCT coefficients that correspond to human eyesight characteristics. Data within a field is then compressed by assigning short codes to frequently appearing data. Coefficient recording is well-suited to high-quality digital VTRs that are capable of editing in units of fields.

Color framing

A method of maintaining continuity of four-field color frames (NTSC) or eight-field color frames (PAL). This prevents horizontal shift of the picture at edit points when editing composite signal. In the Digital Betacam system, too, color framing is necessary when editing a tape onto which component signals have been recorded after being converted from an input composite signal.

Component signal

A video signal that consists of a luminance signal (Y) and two chrominance (color-difference) signals (R-Y, B-Y).

Composite signal

A signal that consists of video (luminance and color sub carrier), sync (horizontal and vertical), and color burst signals.

CONF1 (confidence) heads

Additional heads used for playing back the signals currently being recorded onto the tape. A Digital Betacam VTR can play back audio and video signals with these heads to ensure that they are being recorded correctly.

Cross-fade editing

A type of audio editing, where an existing audio signal is switched to another by gradually lowering the level of the former and raising that of the latter. This avoids an abrupt change in audio level and achieves a natural audio transition at an edit point. In a cut-in edit, an existing audio signal is not lowered and instead switched to another audio signal at the same level. In addition, first lowering the existing audio completely and then raising the other is called fade-out/fade-in editing.

CTL

Abbreviation for control signal. This is a pulse signal recorded on a longitudinal tape track in units of frames. It is used to adjust the relationship between the scanning position of the video heads and tape movement during playback so that it matches that during recording. Counting this signal, and hence the number of frames, provides a means of displaying the tape running time.

Drop frame mode

In NTSC system, the actual number of frames per second is approximately 29.97, while the time code value advances one second every 30 frames. In drop frame mode, the time code is advanced in such a way that this difference in the value between real time and the time codes is corrected. Specifically, two frames are skipped at the beginning of each minute, except for every tenth minute, so that the frame value for time codes matches that for real time.

See also Non-drop frame mode.

Dynamic tracking

A mechanism for tracing a helical track correctly during variable speed playback, by moving a rotary head at right angles to the helical track to be traced. A piezo device such as bimorph moves the head to perform adjustments called tilt angle correction, jumping control, and wobbling. Tilt angle correction adjusts the head tracing angle to the helical track angle according to the playback speed. Jumping control is the jumping and aligning of the head to the correct track at the track entrance. Wobbling keeps moving the head over a helical track to detect the playback RF level and hence achieve optimum tracking. This ensures optimum automatic tracking and allows the VTR to play back even tapes whose tracks are slanted or excessively tilted.

E-E mode

Abbreviation for Electric-to-Electric mode. Input signals are passed through the recorder's electronics and output through the output connectors. This mode is used for confirming input signals or adjusting the input level.

Emphasis

Emphasizing the high frequencies of video or audio signals prior to recording. Emphasizing a digital audio signal while recording, then de-emphasizing it during playback suppresses the high frequency noise caused by A/D and D/A conversions and ensures a wider dynamic range (better S/N).

Insert editing

An edit mode for inserting new scenes into the middle of previously recorded scenes. In this mode, video and audio signals can be recorded separately. The recorder uses the CTL signals already recorded on the recorder tape to control tape travel. Insert editing is often used to make a tape with one continuous program. For this purpose, a tape with continuous CTL signals recorded is first prepared by recording black burst signals (black video, burst and composite sync) over the entire length of the recorder tape.

Longitudinal time code

See LTC.

LTC

Abbreviation for Longitudinal Time Code. This is the time code recorded onto a longitudinal track of the tape. During the playback of still pictures, LTC cannot be read since the tape is not moving. During slow playback, the LTC output is so small that it may not be read correctly, depending on the playback speed. In these cases, the Digital Betacam VTR compensates for the LTC by using VITC, CTL or the pulses from a capstan frequency generator. See also VITC.

Non-drop frame mode

A mode of advancing the time code in such a way that the difference in frame values between real time and the time code is neglected. Using this mode produces a difference of approximately 86 seconds per day between real time and the time code, which causes problems when editing programs in units of seconds using the number of frames as a reference.

See also Drop frame mode.

Preread editing

A kind of insert editing performed by reading video and audio signals from the tape by using the preread (advance) heads, processing them with an external switcher or mixer, then insert recording them onto the same or a different channel on the tape.

Reference video signal

A video signal containing a sync signal or sync and burst signal, used as a reference for synchronizing video equipment.

Serial digital A/V interface

An interface for transferring digital video and audio signals serially via a coaxial cable with BNC connectors. Besides the serial transfer method, digital signals can be transferred via parallel interface using a 25-core cable.

The Digital Betacam system adopts the serial digital component format (conforming to SMPTE 259M and CCIR 656 Type III). This allows the transfer of 10-bit component video and 20-bit audio signals, multiplexed with information including multi-channel audio, time codes, color frames, wide picture, and self-diagnosis, etc.

Time code

Signals recorded onto the tape to supply information on the tape position, including the hour, minute, second, and frame. This assists in setting edit points or in searching for a particular scene. There are two types of time code: LTC and VITC.

Tracking

The synchronizing of the head drum rotation phase and tape transport phase, with respect to the CTL signals, during playback and recording. In this way, the video heads scan the tape in the same pattern during playback and recording. Besides tracking with CTL signals, the Digital Betacam system uses tracking pilot signals, recorded on helical tracks, to allow the correct tracing of even a narrow track for digital recording/playback, especially for insert editing. In addition, the system always uses the DT (Dynamic Tracking) heads respectively for playing back digital and analog signals.

User's bits

Sections of the time code, consisting of a total of 32 bits, used for recording information such as the year, month and day, tape ID number or program ID number.

Vertical interval time code

See VITC.

VITC

Abbreviation for Vertical Interval Time Code. This is a time code recorded on a video signal track during the vertical blanking interval. It can be read correctly even during slow or still picture playback.

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