SONY

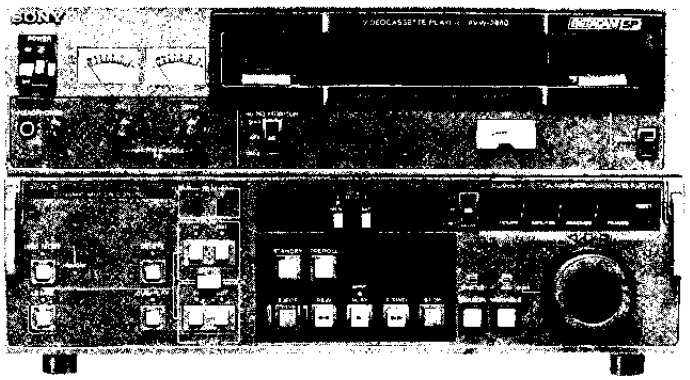
Videocassette Player

Model:

PVW-2650

Operating Instructions

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



BETACAM SP
2000PRO

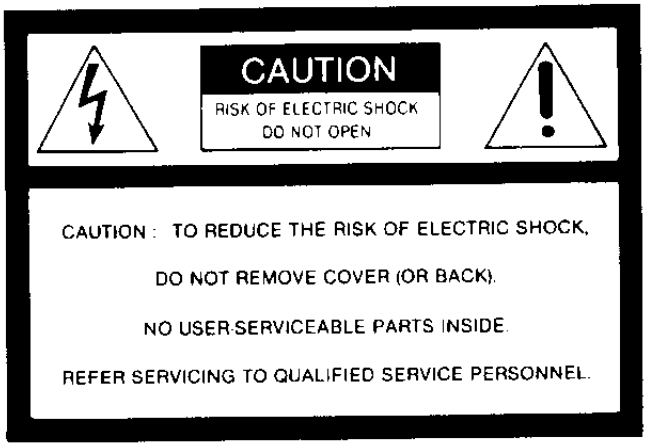
Owner's Record

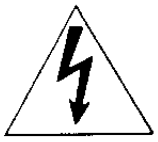
The model and serial numbers are located at the rear. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. PVW-2650 Serial No. _____

WARNING

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





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

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

For the customers in the USA

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

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

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

For customers in Canada

This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Table of Contents

About this Manual

This manual is a guidebook for users of the Sony PVW-2650 Videocassette Player. 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 of this Manual

This manual contains all the information you need to operate the PVW-2650, including the names and functions of the various component parts, details of settings and adjustments, and the procedures to follow for playback.
The PVW-2650 is a professional videocassette player designed for a wide range of users, from cable television stations to general business operators. In the same way, the manual was written to be read by a wide range of users, ranging from experienced engineers to users who have never used a professional VTR before. If you encounter any unfamiliar terms while reading the manual, please consult the footnotes at the bottom of the page as well as the index and glossary found at the end of the manual.

Organization of this Manual

The following is a brief summary of the chapters and appendices in this manual. But note that the opening page of each chapter also gives a summary of the contents of that chapter.

Chapter 1 Features of the PVW-2650

Describes the principal features and functions of the unit.

Chapter 2 Location and Function of Parts and Controls

Gives the names and functions of the controls and other parts. Experienced users of broadcast-quality or professional VTRs should be able to begin using the unit after a reading of this chapter. If this is the first time you have used a professional VTR, read through this chapter carefully in order to give yourself an overall understanding of the unit's features and how to use them.

Chapter 3 Setting Up the Unit

Describes connections, initial settings and reference signals, and some safety precautions which you should be aware of.

Chapter 4 Playback

Describes the basic operations of playback, and superimposition of titles and characters.

Chapter 5 Maintenance

Describes the unit's self-diagnosis functions, cleaning and maintenance, and the setup menu for less-used features.

Appendices

- Specifications
- Glossary

Index

Technical Terms

Technical terms are explained in the body of the text at the point where they first occur, or at the foot of the page. You may also consult the glossary of terms at the end of this manual.

Illustrations for operating procedures

As a general rule, the numbers indicated in the illustrations for operating procedures correspond to the operation step numbers in the text below the illustrations.
If necessary, the names of the parts and controls to be used for the operation are also indicated in the illustration.

Cross References

Throughout the manual you will find italicized references to sections of this manual or other manuals which contain additional information. Also printed in italics are questions which you should discuss with the Sony dealer from whom you purchased this unit.

Important Notes

Be sure to read the sections of the manual marked **Note**. They explain points which you should be aware of in order to operate the unit correctly and prevent malfunctions.

Chapter 1
Features of the PVW-2650

This chapter describes special features of the unit which you should be aware of before you operate it.

Features of the PVW-2650

The PVW-2650 is a professional videocassette player designed for use by cable television stations, business operators and others who require the high quality of Sony's Betacam SP (Superior Performance) format. Together with the other units in the Betacam SP 2000 PRO series, it combines high cost performance with the advantages of the SP format, widely used by broadcasters and production companies throughout the world.

You can use the PVW-2650 for standalone playback, or connect it to a Betacam SP, U-matic, Hi8 or 1-inch VTR[1] for electronic editing.

The Betacam SP Format

Metal tape

Using metal particle tape and newly developed video heads, the SP format offers improved signal-to-noise ratios, better frequency response, and superior waveform and detail reproduction characteristics.

The high durability of metal tape makes the unit suitable for use in demanding professional applications.

Longer playing time

Compared to the 30 minutes of conventional small cassette tapes, the large cassette tapes used in the Betacam SP format offer a maximum of 90 minutes of playing time.

Compatibility with conventional Betacam SP VTRs

Metal or oxide cassettes recorded with a conventional Betacam SP VTR may be played back on this unit. However, AFM [2] (Audio Frequency Modulation) playback is not possible.
The unit automatically detects the size and type of the cassette loaded.

1) **Connectable equipment:**
Betacam SP VTRs: PVW-2800, BVW-35/50/70/75
Betacam VTRs: BVW-40
U-matic VTRs: BVU-800/820/950
1-inch helical scan VTRs: BVH-2000/2500/3000/3100
Hi8 VTRs: EVO-9500A/9800A

2) **AFM (Audio Frequency Modulation):**
Audio signals are subjected to frequency modulation, and recorded together with the FM video signals in the video tracks.

Advanced Functions

DMC (Dynamic Motion Control) function

By previously playing back a specified segment of tape at speeds in the Dynamic Tracking (DT)® range (–1 to +3 times normal speed) while making the unit store those DT playback speeds in memory, you can make the unit automatically play back the same segment of tape at the stored speeds.

Quick search

The search dial gives you quick access to edit desired scenes via the SHUTTLE mode, with 19 speeds ranging from 0 to ±24 times normal speed, and the JOG mode, which gives you a choice of any speed between 0 and ±1. Color pictures may be monitored at speeds from 0 to ±10 times normal speed.

Digital time counter

The unit's time counter display indicates the CTL[1] running time, LTC/VITC [2] time code, or user bit data, for precise tape address location and scene identification.

1) **CTL (Control Signal):**
Pulse signals used to control tape movement and head position during recording and playback.

2) **LTC (Longitudinal Time Code):**
A frame-rate time code recorded on the longitudinal time code track.
VITC (Vertical Interval Time Code):
A field-rate time code recorded in video tracks during the vertical (blanking) interval.

Ease of Operation

Noiseless playback ensured by the DT (Dynamic Tracking) function

The unit contains DT playback heads for noiseless playback at any of 54 speeds in the range of –1 to +3 times normal speed.

Setup and control menus

Settings for control of the unit or the interface to other components are easily adjusted via menus, using controls located on the front panel.

Built-in time code reader

Time codes and user bits are read back by the built-in time code reader during playback.

Computer servo system

Four computer-controlled servo motors in the unit drive the drum, capstan and two reels, for quick and accurate tape access.

Dolby noise reduction system

The built-in Dolby C[1] noise reduction system uses the same circuitry adopted for other components in the Betacam SP series. Dolby noise reduction can be turned on or off as necessary for oxide tape playback.

Built-in time base corrector

The unit features a built-in time base corrector to adjust for timing irregularities. The unit's output signals comply with standards for video output signals, and may be used to supply stable video signals directly to all kinds of video equipment.

Easy-to-use front panel

All important controls have been concentrated on the easy-to-use front panel, which is divided into an upper and a lower control panel. The lower control panel can be tilted for the operator's convenience.

Mounts in standard 19-inch rack

The PVW-2650 can be mounted in an EIA standard 19-inch rack.

Please contact your Sony dealer for details regarding rack mounting.

1) Dolby noise reduction manufactured under licence from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol ⊡⊡ are trademarks of Dolby Laboratories Licensing Corporation.

Other Features

Compact, lightweight, low power consumption

The unit can be taken out of the studio for use in a variety of Electronic Field Production (EFP) assignments.

Remote control operation

The PVW-2650 can be controlled from an external unit over the standard RS-422A serial interface.

Digital hours meter

Four different kinds of hour values can be displayed: total elapsed time since the unit was turned on, total drum revolutions, total tape running time and total threadings and unthreadings.

Superimposed output

Time codes, tape speed and other information can be superimposed on video signal output and the monitor display. Superimposition can be turned on and off as necessary.

Self-diagnostics

In the event of a malfunction, the unit performs self-diagnostics and displays an error code in the time counter display on the front panel.

S-VIDEO connector

The PVW-2650 can be connected to any VTR or other component having an S-VIDEO input connector, to send video signals with very little degradation.

U-matic dubbing connector

The unit is equipped with a U-matic video output dubbing connector. You can use the connector to perform editing and dubbing to another unit with very little degradation.

The optional BKW-2020 U-matic dubbing output kit is required to use this connector. Please contact your Sony dealer for more information on the BKW-2020 U-matic dubbing output kit.

Chapter 2
Location and Function of Parts and Controls

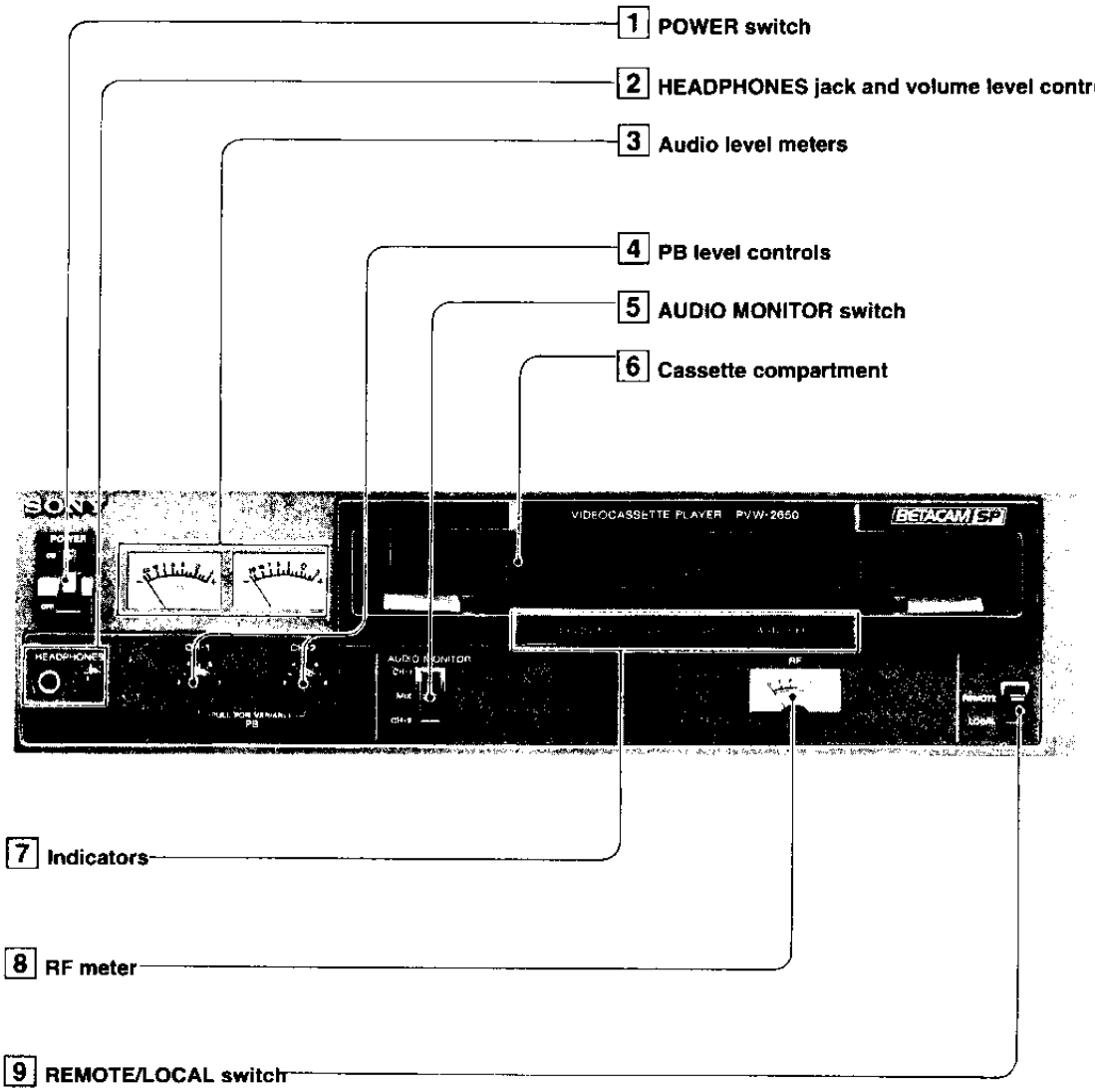
This chapter gives a brief description of the purposes and functions of the principal parts of the unit.

If you have used a professional VTR before, you should be able to begin using the unit after a reading of this chapter.

If this is the first time you have used a professional VTR, read through this chapter to familiarize yourself with the controls, then follow the procedures for setup and operation given in Chapter 3 and following. Refer to this chapter and the index to clarify the functions of the various controls.

Control Panel (Front)

Upper Control Panel



1 POWER switch

Set the switch to ON to turn on the power. The audio level meter, RF meter and time counter display will light up.

2 HEADPHONES jack and volume level control

Connect 8Ω stereo headphones to monitor the signal selected with the AUDIO MONITOR switch. Adjust the volume with the volume level control.

3 Audio level meters
Indicate audio playback level.

4 PB (playback) level controls
You can adjust audio playback levels independently for each channel. To adjust the playback level, put the unit in PLAY mode, pull out the control and adjust while monitoring the audio level meter.
If the controls are pushed in, the audio playback level is fixed at the factory preset level and cannot be adjusted.

Contact your Sony dealer if you wish to change the preset audio playback level.

5 AUDIO MONITOR switch
Select the audio output to the HEADPHONES jack, 8-pin MONITOR connector and the AUDIO MONITOR connector (XLR type) on the rear panel by setting the switch to one of the following settings.

Setting	HEADPHONES jack	MONITOR and AUDIO MONITOR connectors
CH-1	Channel 1 audio	Channel 1 audio
MIX	Stereo audio	Mixed Channel 1 and 2 audio
CH-2	Channel 2 audio	Channel 2 audio

6 Cassette compartment
Insert cassettes here. To insert a small cassette, align it with the marks in center of the compartment window

7 Indicators
AUTO OFF indicator
Lights when moisture condensation is detected on the head drum and when tape transport irregularities are detected.

DOLBY NR indicator
Lights when the DOLBY noise reduction circuits are activated.

LTC indicator
Lights if recorded LTC signals are detected on the tape.

VITC indicator
Lights if recorded VITC signals are detected on the tape.

8 RF meter
In PLAY mode, indicates the tape tracking status (RF signal level).

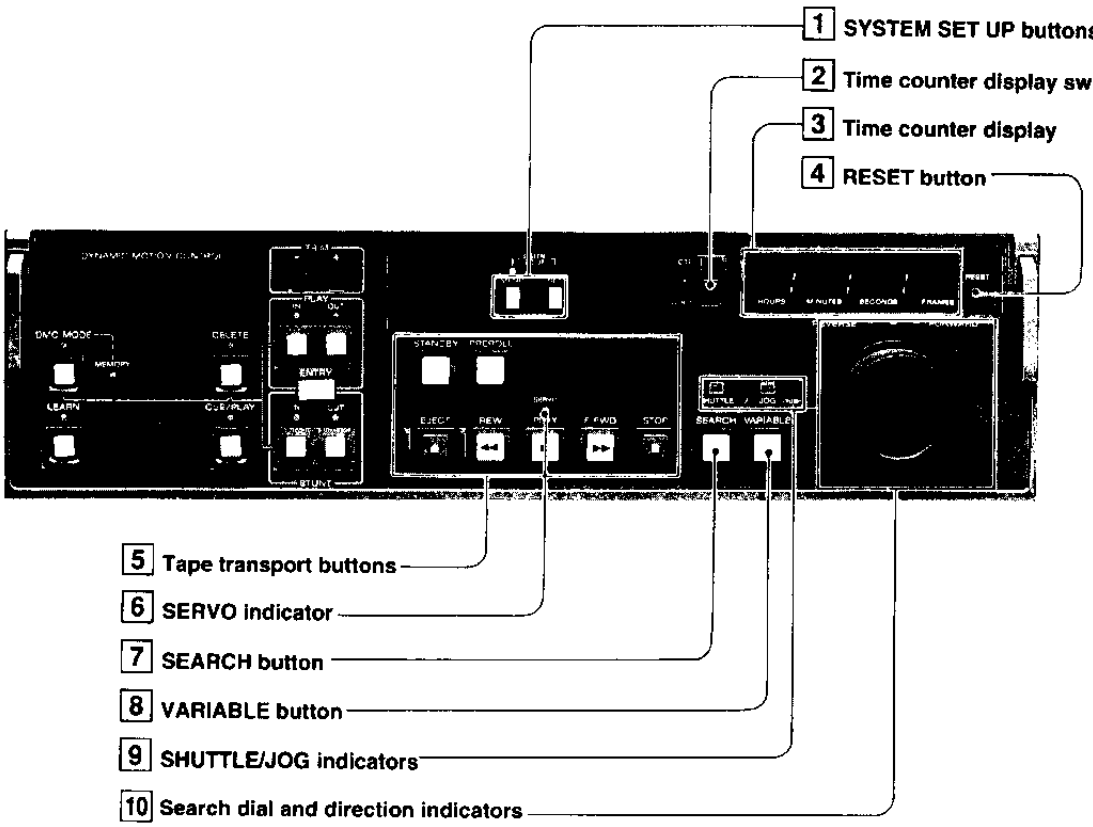
9 REMOTE/LOCAL switch
Set this switch to control the unit locally or from equipment connected to the REMOTE connector on the rear panel.

REMOTE: The unit is controlled from an external component connected to the 9-pin REMOTE connector on the rear panel. Setting this switch to REMOTE disables all tape transport buttons on the control panel, except for the STOP and EJECT buttons.

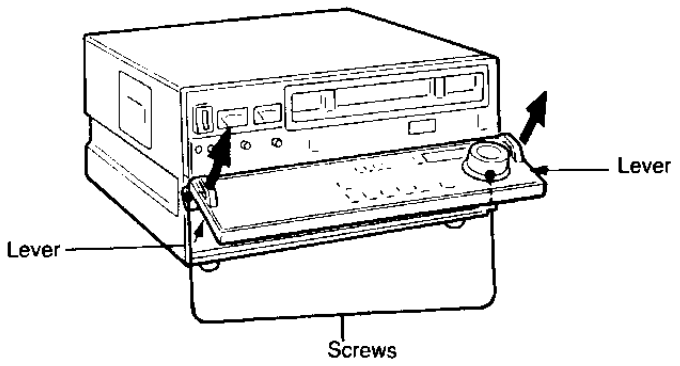
If you wish, you can enable any buttons including the STOP and EJECT buttons, or disable all buttons. For more information, refer to the explanation of Main Menu item 006 on page 3-4.

LOCAL: The unit is controlled from its control panel.

Lower Control Panel



How to tilt the lower control panel



1 Raise the panel to the desired angle.
2 While pressing the levers at the right and left sides of the panel, pull the panel up until it stops.
3 Tighten the screws on the right and left sides inside the panel by turning them clockwise.
4 While pressing the levers, lower the panel to the desired angle.

1 SYSTEM SET UP buttons

Use these buttons to change the settings on the setup menus. The item to be changed will be superimposed on the monitor and displayed in the time counter display.

MENU button and indicator

When you press this button, the indicator will come on and a menu will be displayed. If you press it again, the indicator will go off, and changes to the menu will not be saved.

SET button

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

For more information, see the section Changing Menu Settings on page 3-6.

2 Time counter display switch

Select the type of time data to be displayed in the time counter display 3.

CTL: Tape running time in hours, minutes, seconds and frames, as determined by counting the CTL signal. (Tape address is defined by CTL count data.)

TC: LTC or VITC time code read from the tape by the built-in time code reader. (Tape address is defined by time code.)

U-BIT: LTC or VITC user bits read from the tape by the built-in time code reader. (Tape address is defined by time code.)

Note

When the REMOTE/LOCAL switch on the control panel is set to REMOTE, the time data and tape address are determined by the connected equipment, regardless of the setting of this switch.

When this switch is in the TC or U-BIT position, the setting of the TC select switch on the system panel determines whether LTC or VITC time codes are shown.

3 Time counter display

Displays the time data selected by the time counter display switch 2.

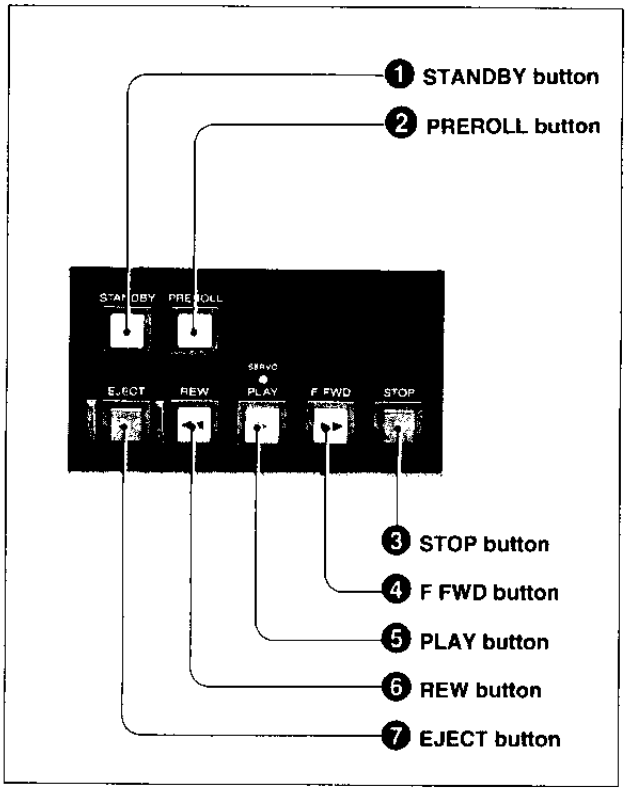
Regardless of the setting of time counter display switch, the time counter display will display "Error-" and an error code in the case of a unit malfunction.

See the self-diagnostics section in Chapter 5 for more information about error messages.

4 RESET button

Pressing this button when the time counter display switch 2 is set to CTL resets the CTL counter and displays 0:00:00:00 on the time counter display 3.

5 Tape transport buttons



1 STANDBY button

When the unit is in STOP mode (see the description of the STOP button 3), pressing this button switches the unit between STANDBY ON and STANDBY OFF modes. When this button is lit, it indicates that the unit is in STANDBY ON mode: the head drum is rotating and the tape keeps wound on the drum under tension. When in this mode, pressing any tape transport button other than STOP puts the unit into the mode called for by that button. When this button goes off, it indicates that the unit enters STANDBY OFF mode: the tape is released from tension going out of contact with the head drum, which is now stopped from rotating. The purpose of this mode is to protect the tape from fatigue and wear.

Note

The STANDBY button will not work except when the unit is in STOP mode.

2 PREROLL button

Pressing this button makes the tape run to the preroll point (5 seconds before the IN point) and then stop. Use this button to cue up the tape for broadcast or manual editing.
To cue up the tape to a point which has been set using one of the STUNT IN/OUT and PLAY IN/OUT buttons, press this PREROLL button simultaneously with that button.

You can change the preroll time. Refer to the Main Menu item 001 on page 3-4 for more information.

3 STOP button

When the tape is moving, pressing this button makes it light and puts the unit into STOP mode, or stops the tape.
Each time you insert a cassette, the unit enters STOP mode automatically and this button lights. Then, when the tape gets loaded (wound on the head drum), the STANDBY button 1 lights (STANDBY ON mode).
When about 8 minutes have passed since the unit entered STOP mode, the unit now enters STANDBY OFF mode automatically and the STANDBY button 1 goes off.
About the STANDBY ON and STANDBY OFF modes, see the description of the STANDBY button 1.

4 F FWD (fast forward) button

Press this button to run the tape fast forward.

5 PLAY button

Press this button to start playback.

6 REW (rewind) button

Press this button to rewind the tape.

7 EJECT button

A few seconds after you press this button, the unit will automatically eject the cassette. If the time counter display is set to CTL, the display is reset.

6 SERVO indicator

Lights when the drum servo and capstan servo lock.

7 SEARCH button

Press this button to begin a search mode playback. The playback will be noiseless at any of 12 speeds ranging from –1 to +3 times normal speed. Out of this speed range, guard band noise will appear in the playback picture. When the unit is in SHUTTLE mode for playback at a speed selected with the search dial in the range of –24 to +24 times normal speed, pressing the PLAY button and this SEARCH button alternately will switch the playback speed between the normal speed and the selected speed. Also, pressing the STOP button and this SEARCH button alternately will stop the tape and play it back at the selected speed alternately.

For more information, refer to "Using the SEARCH button" in Chapter 4, page 4-7.

8 VARIABLE button

Pressing this button puts the unit into VARIABLE mode. In this mode, the SHUTTLE mode playback speed range is narrowed down to '–1 to +3 times normal speed,' and playback is always noiseless at any of 54 speeds selectable with the search dial in that range.

9 SHUTTLE/JOG indicators

The SHUTTLE indicator lights when the unit is in SHUTTLE mode. The JOG indicator lights when it is in JOG mode.

10 Search dial and direction indicators

Rotate the search dial to change playback speed and direction when searching for particular scenes. The tape running direction is indicated by the direction indicators:

▷ : the forward indicator
◁ : the reverse indicator
□ : the still indicator

Press the dial to toggle between SHUTTLE or JOG modes. The SHUTTLE or JOG indicator will light to indicate which mode you have selected.

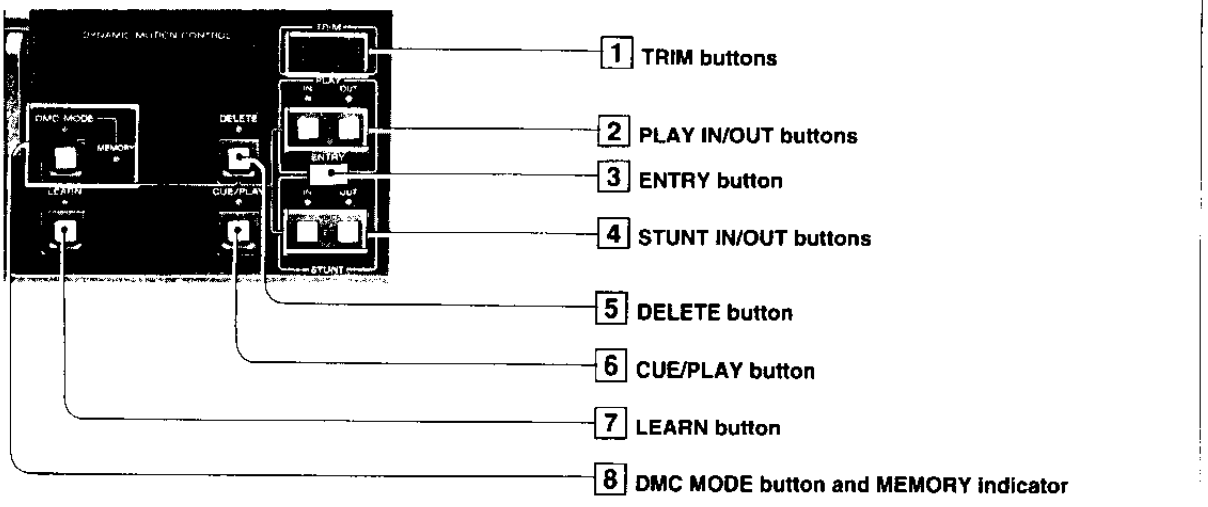
SHUTTLE mode: Rotate the dial to select a playback speed between –24 and +24 times normal speed, or between –1 and +3 times normal speed when the unit is in VARIABLE mode. The speed at the center position is 0, for a still picture.

JOG mode: Rotate the dial to select any speed between 0 and ±1 times normal speed. Unlike SHUTTLE mode, you will not feel clicks as you rotate the dial.

Note

As soon as you turn the unit on, set the dial to the center position so that the still indicator (□) lights before making any further adjustments.

DMC (Dynamic Motion Control) Playback Control Panel



1 TRIM buttons

To change a set DMC playback point (STUNT IN/OUT or PLAY IN/OUT point[1]) by one frame, press the + or – button while pressing at the same time the STUNT IN/OUT or PLAY IN/OUT button. The + button advances the set point by one frame, and the – button moves it back one frame. Hold down the + or – button to move the set point continuously forward or backward.

2 PLAY IN/OUT buttons

Press the PLAY IN button to set a PLAY IN point, and the PLAY OUT to set a PLAY OUT point, simultaneously with the ENTRY button. The indicator above the pressed button will light.

Press the PLAY IN or PLAY OUT button alone to display the value of the set PLAY IN or PLAY OUT point on the time couter display.

3 ENTRY button

To set a DMC playback point, press this button simultaneously with one of the STUNT IN/OUT and PLAY IN/OUT buttons.

4 STUNT IN/OUT buttons

Press the STUNT IN button to set a STUNT IN point, and the STUNT OUT to set a STUNT OUT point, simultaneously with the ENTRY button. The indicator above the pressed button will light.

Press the STUNT IN or STUNT OUT button alone to display the value of the set STUNT IN or STUNT OUT point on the time couter display.

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1) **STUNT IN point:**
The start point of a DMC playback at speeds stored in memory.
STUNT OUT point:
The end point of a DMC playback at speeds stored in memory.

PLAY IN point:
The start point of a DMC playback at normal speed.
PLAY OUT point:
The end point of a DMC playback at normal speed.

5 DELETE button

Press this button to delete a DMC playback point, or to exit DMC playback mode. If you have already set a DMC playback point using one of the STUNT IN/OUT and PLAY IN/OUT buttons, pressing that button simultaneously with this DELETE button will delete the DMC playback point corresponding to that button and turn off the indicator above that button. If the indicator begins flashing, you will have to set a different DMC playback point.

Note

The indicator above the DELETE button flashes to indicate incorrect DMC playback points. Reenter the points correctly and the indicator will go off.

6 CUE/PLAY button

After setting a PLAY IN and a PLAY OUT point, press this button to cue up the tape to the PLAY IN point. The button will begin flashing to indicate that the unit is ready for the DMC playback. Then, pressing the button again will make the unit execute an automatic playback at the speeds stored in memory using the LEARN button and the search dial.

7 LEARN button

After setting a STUNT IN and a STUNT OUT point, press this button to make the tape begin moving and store in memory one or more of 54 tape speeds controlled by the search dial in the range of –1 to +3 times normal speed. After storing the playback speeds in memory, pressing the button again will make the unit execute an automatic playback at the stored speeds.

Before setting a STUNT IN point, pressing this button will specify the current tape position as the STUNT IN point and make the tape begin moving, and store in memory the playback speeds after that point.

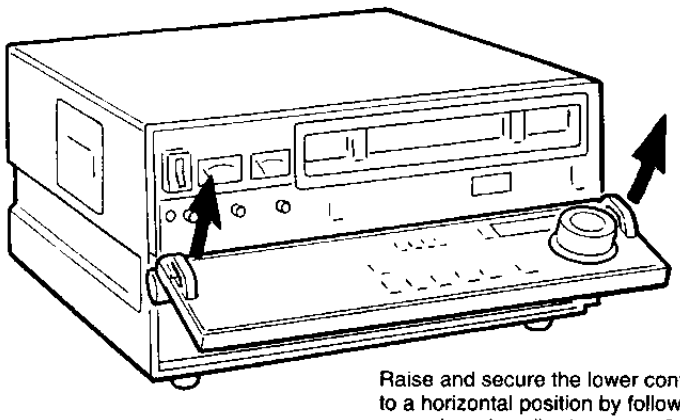
8 DMC MODE button and MEMORY indicator

The DMC MODE button is used for setting DMC playback points and the initial playback speed at the STUNT IN point as well as entering and exiting DMC playback mode.

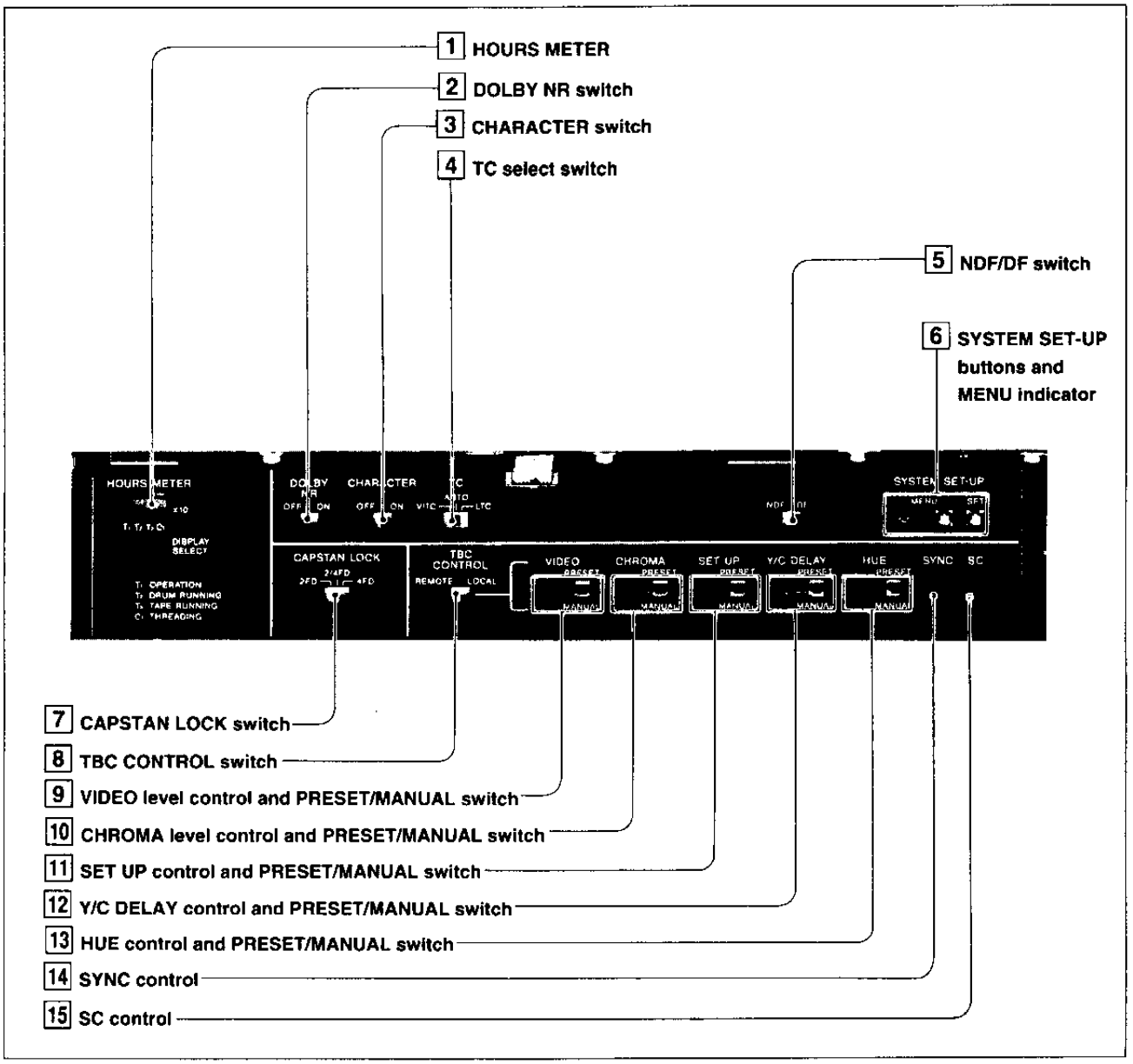
The MEMORY indicator flashes to indicate that the unit is storing playback speeds in memory, and lights to indicate that the storing has been finished.

System Panel

How to access the system panel



Raise and secure the lower control panel to a horizontal position by following the procedure described on page 2-3.



1 HOURS METER

The HOURS METER has four modes, showing the total time since power was turned on for the first time, the drum running time, the tape running time or the total number of threadings and unthreadings, in units of 10. Its clock runs on the unit's internal battery, which should be changed once every five years.

Contact your Sony dealer for more information about changing the battery.
For more information about the Hours Meter, refer to the section About the Hours Meter in Chapter 5.

2 DOLBY NR (noise reduction) switch

Set this switch to ON to play back LNG audio on oxide tape with the Dolby C noise reduction system.
When using metal tape, the Dolby NR system is activated automatically.

ON: Play back oxide tapes using the DOLBY NR system.
OFF: Play back oxide tapes without using the DOLBY NR system.
Factory setting: OFF

3 CHARACTER switch

ON: Superimpose a time code or other characters on the output signals from the VIDEO OUTPUT 3 (SUPER) connector or the MONITOR connector.
OFF: Output without superimposition.
Factory setting: ON

4 TC (time code) select switch

This switch determines whether the time code or user bits displayed in the time counter display are LTC or VITC values. If the switch is set to AUTO, the unit automatically displays VITC for tape speeds of $\pm 1/2$ normal speed or less, and LTC otherwise.
Factory setting: LTC

5 NDF/DF (drop frame mode select) switch

NDF: The CTL counter runs in non-drop frame mode.
DF: The CTL counter runs in drop frame mode.
Factory setting: DF

6 SYSTEM SET-UP buttons and MENU indicator

Change reference settings for unit operations or the external interfaces. Pressing the MENU button causes the MENU indicator to light, and a menu item to appear on the monitor and in the time counter display. Rotate the search dial to find the item you wish to change. Then depress the SEARCH button and rotate the search dial again to select a setting. When you are finished making changes, press the SET button to save them. To quit without saving any changes, press the MENU button again to turn off the MENU indicator.

For more information, see the section Changing Menu Settings on page 3-6.

7 CAPSTAN LOCK switch

Selects the capstan servo lock mode for playback or editing.

2FD: Capstan servo locks in units of 2 fields for editing and playback. Since color framing lock is inhibited, there is no phase shift (H-shift) of the video output signals during playback. Set the switch to this position when the signals recorded on the tape are nondecoded component signals and you wish to use an external editing controller to perform color frame control.

2/4FD: Capstan servo locks in units of 2 fields for editing and playback. The decoded information recorded on the tape is used to automatically compensate for the difference between the decoding and encoding subcarrier phases, so as to produce the best video frequency characteristics. The output video signal may shift a maximum of 140 ns. Set the switch to this postion if you wish to allow H-shift and also to obtain both high picture quality and quick editing.

4FD: Capstan servo locks in units of 4 fields for editing and playback. The phase shift of the video output signals remains constant, even in the case of repeated starts and stops during playback.

Set the switch to this position when continuity of the video signal phases at edit points is required, or when you perform A/B roll editing.

Note

If video signal phase continuity at edit points is not obtained with the switch set to the 4FD position, it is necessary to adjust the color subcarrier phase and sync phase using the SC and SYNC controls on the system panel.

8 TBC (time base corrector) CONTROL switch

LOCAL: Control the time base corrector from the system panel of this unit.

REMOTE: Control the time base corrector with a BK-2006 or BVR-50 remote control unit (not supplied).

9 VIDEO level control and PRESET/MANUAL switch

Adjust the video output level.

MANUAL: Adjust the video output level within ±3 dB with the control. If the CHROMA level switch is also set to MANUAL, the level may be adjusted over ±6 dB.

PRESET: Set the level to the reference level regardless of the control.

10 CHROMA level control and PRESET/MANUAL switch

Adjust the chroma output level.

MANUAL: Adjust the chroma output level within ±3 dB with the control. If the VIDEO level switch is also set to MANUAL, the level may be adjusted over ±6 dB.

PRESET: Set the level to the reference level regardless of the control.

11 SET UP control and PRESET/MANUAL switch

Adjust the setup level.

MANUAL: Adjust the setup level within the range of 0 to +15 IRE with the control.

PRESET: Set the level to the reference level regardless of the control.

12 Y/C DELAY control and PRESET/MANUAL switch

Adjust the Y/C delay.

MANUAL: Adjust the Y/C delay within ±50 ns with the control.

PRESET: Set the delay to the reference delay regardless of the control.

13 HUE control and PRESET/MANUAL switch

Adjust the output hue (burst and chroma relative phase).

MANUAL: Adjust the hue within ±15 degrees with the control.

PRESET: Set the hue to the reference value regardless of the control.

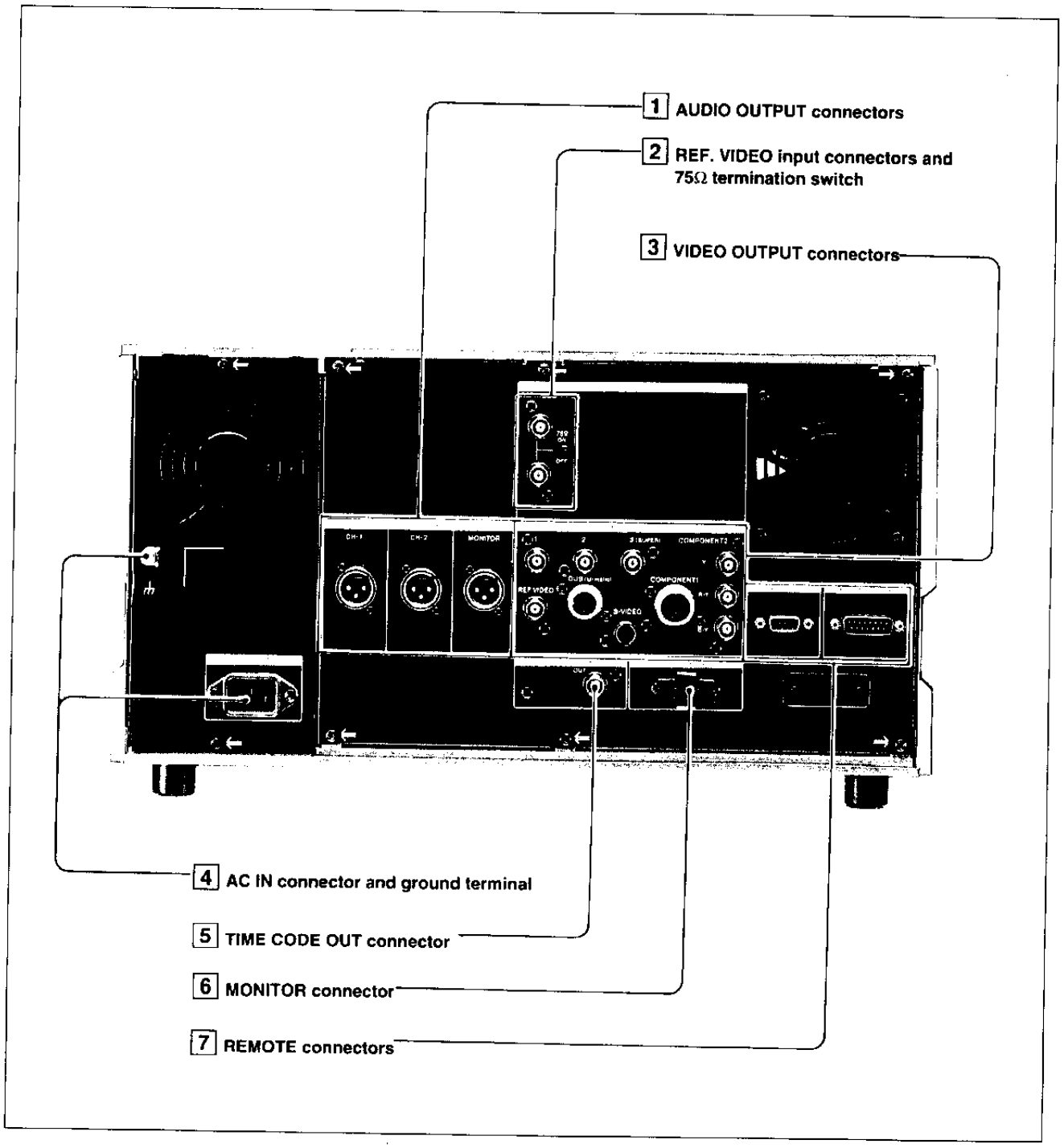
14 SYNC control

Adjust the output sync phase within −1 to +3 µs with respect to the reference input to this unit. Use this control if you need to synchonize the unit's output sync phase with a reference signal, or if you wish to achieve special effects such as fades or dissolves when using this unit with other VTRs.

15 SC (system subcarrier) control

Adjust the output subcarrier phase within 360 degrees p-p with respect to the reference input to this unit. Use this control if you need to synchronize the unit's output subcarrier phase with a reference signal, or if you wish to achieve special effects such as fades or dissolves when using this unit with VTRs.

Connector Panel (Rear)



1 AUDIO OUTPUT connectors

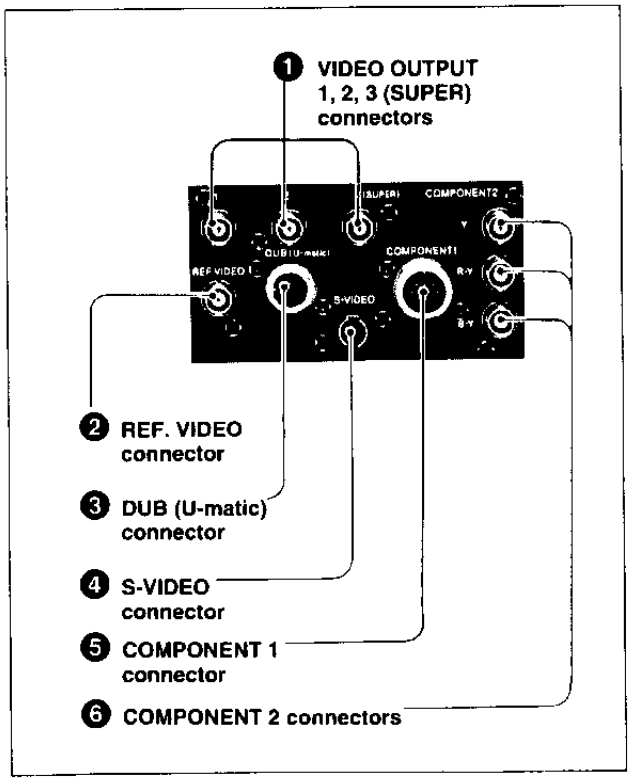
AUDIO OUTPUT CH-1/CH-2 connectors (XLR 3-pin)
The levels of audio signals ouput from these connectors can be adjusted using the PB level controls on the upper control panel.

AUDIO MONITOR OUTPUT connector (XLR 3-pin)
Outputs audio signals from the channel selected with the AUDIO MONITOR switch on the upper control panel.

2 REF. (reference) VIDEO input connectors (BNC type) and 75 Ω termination switch

Connect reference video signals. When both connectors are used for a bridging connection, set the termination switch to OFF. Otherwise, set the switch to ON.

3 VIDEO OUTPUT connectors



❶ VIDEO OUTPUT 1, 2, 3 (SUPER) connectors (BNC type)

Connect to VTRs or monitor video input connectors to output composite video signals. Output of time codes or other superimposed characters through connector 3 (SUPER) is governed by the CHARACTER switch on the system panel.

❷ REF. (reference) VIDEO connector (BNC type)

The output connector for the built-in black burst generator. When you do not have access to reference signals at the edit location, connect to the REF. VIDEO IN or EXT. SYNC connector of other editing system component.

❸ DUB (U-matic) connector (7-pin)

Outputs 688kHz U-matic Y and C signals. Connect to VO-series or BVU-series U-matic VTRs (such as the VO-9800/9850 and BVU-800/820/950).

Requires the BKW-2020 U-matic dubbing output kit (not supplied). For more information, please contact your Sony dealer.

❹ S-VIDEO connector (4-pin)

Outputs a Y signal and a C signal (3.58 MHz) in separated format. Can be connected to any VTR which features an S-VIDEO input connector.

❺ COMPONENT 1 connector (12-pin)

Outputs luminance (Y) and chrominance (R-Y, B-Y) signals. Connect to the COMPONENT input connector of a recorder VTR with a VDC-C5 12-pin dubbing cable (not supplied).

❻ COMPONENT 2 connectors (BNC type)

Output Y, R-Y and B-Y signals.

4 AC IN connector and ground terminal

AC IN: Connect to an AC power source with the AC power cord (supplied).

⏚ **(ground) terminal:** Connect to ground line.

5 TIME CODE OUT connector (BNC type)

Outputs playback time code.

6 MONITOR connector (8-pin)

Connect to the VTR connector of a color video monitor with the 8-pin connecting cable (not supplied) to output audio and video signals, including superimposed time codes or other messages. Audio signals are output from the channel selected by the AUDIO MONITOR switch on the upper control panel.

7 REMOTE connectors

REMOTE connector (9-pin)

When using this unit for editing, connect to a VTR or editing control unit (see the list below) with the 9-pin remote control cable (supplied).

Connectable equipment:

Betacam SP VTRs: PVW-2800, BVW-35/50/70/75
Betacam VTRs: BVW-40
U-matic VTRs: BVU-800/820/950
1-inch helical scan VTRs: BVH-2000/2500/3000/3100
Editing control units: BVE-600/800/910, RM-450

TBC REMOTE connector (15-pin)

To remotely control the built-in time base corrector, connect an optional BK-2006 or BVR-50 remote control unit.

Note

Always turn off the power before connecting remote control equipment to the TBC REMOTE connector.

Chapter 3
Setting Up the Unit

This chapter explains safety precautions, connections, and the proper handling of cassettes.

Precautions

Safety Precautions

Power supply

- Connect to a 120 V AC power outlet.
- Do not drop or place heavy objects on the power cord. If the power cord is damaged, turn off the power immediately. It is dangerous to use the unit with a damaged power cord. Disconnect the power cord from the AC outlet by grasping the plug, not by pulling the cord.

Keep foreign objects out of the cabinet

Dropping flammable or metal objects into the cabinet, or spilling liquids nearly can lead to accidents.

In case of trouble

If you notice an unusual sound, smell or smoke, turn off the power immediately, disconnect the power supply and contact your Sony dealer.

Handling Precautions

Location

Do not store or use the unit under any of the following conditions:

- In excessive heat or cold (permissible temperature range: 5°C to 40°C (41°F to 104°F)).
- In direct sunlight or near heaters. Remember that the temperature inside a locked automobile in summer can rise as high as 50°C (122°F).
- In damp or dusty locations.
- Near vibrations.
- Near strong magnetic fields.
- Near locations where strong radio frequency energy is generated.

Use in a horizontal position

This unit was designed to be used in a horizontal position. Do not install it vertically, or tilt at angles of 20° or greater.

Protect from impact

Do not drop the unit or subject it to severe shocks.

Keep well ventilated

To keep temperatures from rising inside the unit, keep the unit uncovered and well ventilated while it is in operation.

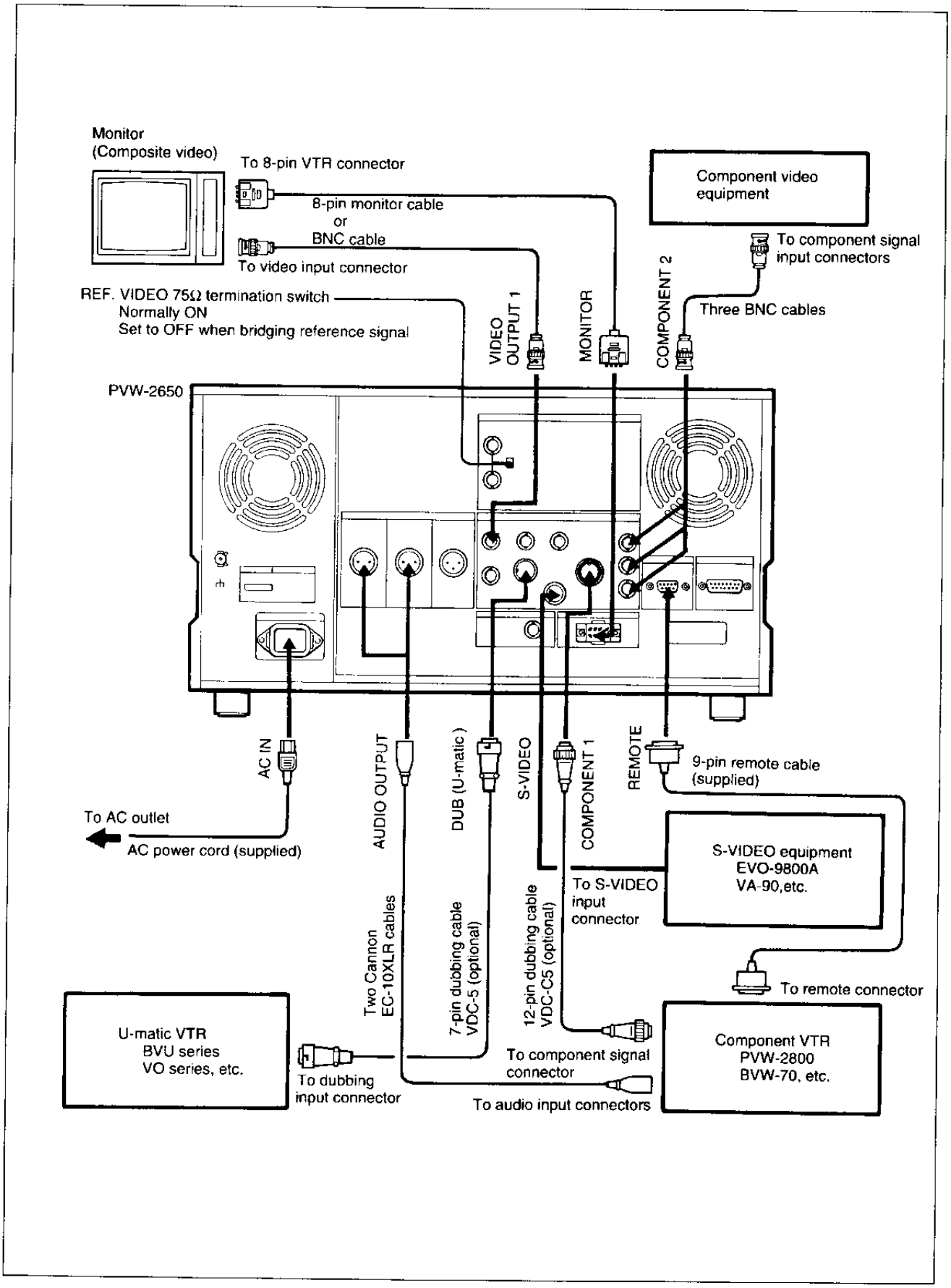
Maintenance

Clean the cabinet and panels by wiping with a soft, dry cloth.
For severe stains, moisten the cloth with a small amount of neutral solvent, and finish by wiping with a dry cloth. Do not use alcohol, benzine, thinners or volatile liquids, as these may discolor or damage the cabinet surface.

Transporting

- Remove cassettes from the cassette compartment.
- Protect from impact by transporting in the supplied carton or a protective case.

Connections



Connections

Reference Control Settings

The major reference control settings on the PVW-2650 are set with two menus, the Main Menu and the System Menu. This section explains the Main Menu.

For information on the System Menu, see the explanation on page 5-2.

Main Menu

The Main Menu contains the settings you will want to change most often. The table below summarizes this menu. The numbers enclosed in boxes in the Value column indicate the factory preset settings. **Normally use the unit on the factory preset menu settings.**
Menu items are displayed on the monitor and in the time counter display. The monitor display indicates the item number, item title, and current value. The time counter display indicates the item number and current value.

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 3 seconds is recommended when using this unit for editing.
002 a)	CHARACTER H-POSITION	00 ↓ [1E] ↓ 57	Adjust the horizontal screen position of the first one of the superimposed characters. The hexadecimal value 00 is for the far left of the screen and 57 (decimal 87) for the far right. Increasing the value moves the position of the characters to the right.
003 a)	CHARACTER V-POSITION	00 ↓ [64] ↓ 7B	Adjust the vertical screen position of the first line of superimposed characters. The hexadecimal value 00 is for the top of the screen and 7B (decimal 123) for the bottom. Increasing the value lowers the position of the characters .
005	DISPLAY INFORMATION SELECT	[0] 1 2 3 4	Determines the kind of information to be displayed as superimposed characters. 0: Timer information and VTR status. 1: Timer information and user bits. 2: Timer information and CTL code. 3: Timer information (LTC and VITC). 4: Timer information (LTC or VITC).
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 and EJECT buttons are enabled. 2: All buttons except RECORDER and PLAYER are enabled.

a) Menu items 002 and 003 determine the type and position of characters superimposed on signals output from the VIDEO OUTPUT 3 (SUPER) connector and the MONITOR connector when the CHARACTER switch on the system panel is set to ON. Adjust them by rotating the search dial while viewing the characters on the monitor.

Item Number	Title	Value	Explanation
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.
009 a)	CHARACTER TYPE	[0] 1 2 3	Determines the type of superimposed characters. 0: White characters on a black background. 1: Black characters on a white background. 2: White outline characters. 3: Black outline characters.
010 a)	CHARACTER H SIZE	[01] 02	Determines the horizontal size of superimposed characters. 01: Standard size 02: 2 times standard size
011 a)	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

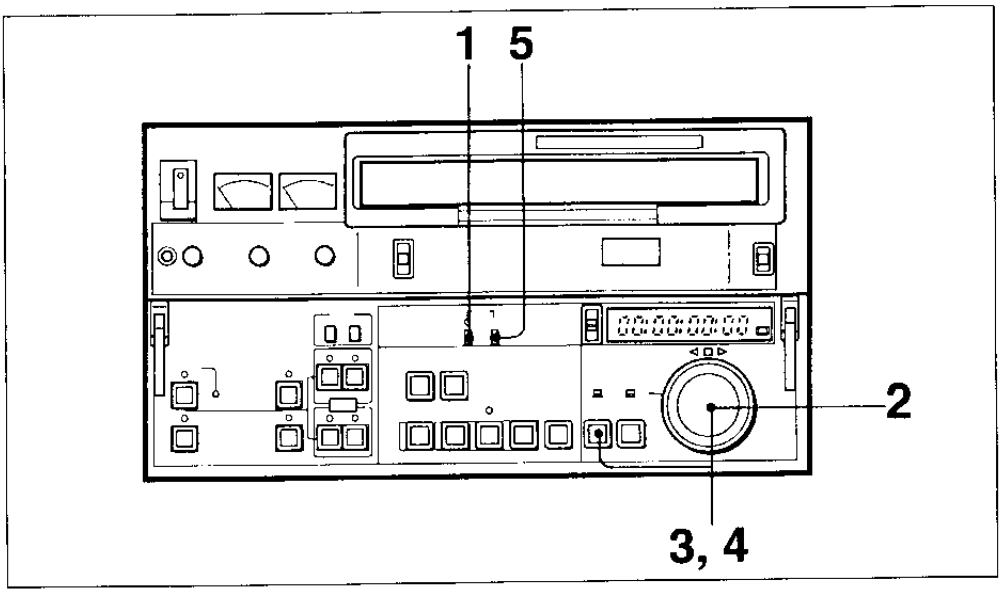
a) Menu items 009, 010 and 011 determine the type and position of characters superimposed on signals output from the VIDEO OUTPUT 3 (SUPER) connector and the MONITOR connector when the CHARACTER switch on the system panel is set to ON. Adjust them by rotating the search dial while viewing the characters on the monitor.

Changing Menu Settings

There are two ways to change items in the menus.

- Use the MENU and SET buttons in the SYSTEM SET UP section of the lower control panel. These buttons affect only the items in the Main Menu.
- Use the MENU and SET buttons in the SYSTEM SET-UP section of the system panel. These buttons affect all menu items.

To change a menu item, proceed as follows. The explanation will assume that the buttons on the lower control panel are used, but the procedure is the same when using the buttons on the system panel.



Changing menu items with buttons on the lower control panel.

1 Press the MENU button.
The indicator above the MENU button will light. The item number and current value of a menu item will appear in the time counter display, with the item number flashing. The SEARCH button will light.

2 Rotate the search dial to find the item you wish to change.
Rotate the dial clockwise to display higher-numbered items, and counterclockwise to display lower-numbered items.

3 Pressing the SEARCH button, rotate the search dial to increase or decrease the item's value.
The item number will stop flashing, and the item value will begin flashing.

4 Release the SEARCH button to select the current value.
The item value will stop flashing, and the item number will begin flashing.

Repeat Steps **2** through **4** until you are satisfied with the settings of all menu items. To cancel the changes and restore the former settings, press the MENU button.

5 When you are finished making changes, press the SET button to save them.

Note

The other buttons on the control panel are disabled while the MENU indicator is lit.

Restoring the factory settings

The RESET button to the upper right of the time counter display allows you to clear the user settings of the menus and restore the factory settings.

- To restore the Main Menu factory settings, press the MENU button on the lower control panel and then press the RESET button.
- To restore the System Menu factory settings, press the MENU button on the system panel and then press the RESET button.

Cassettes Playable on this Unit

This unit can play back programs recorded on any of the following 1/2-inch Betacam or Betacam SP cassette tapes.

Small Cassette Metal tapes:
BCT-5M/10M/20M/30M, or equivalent.

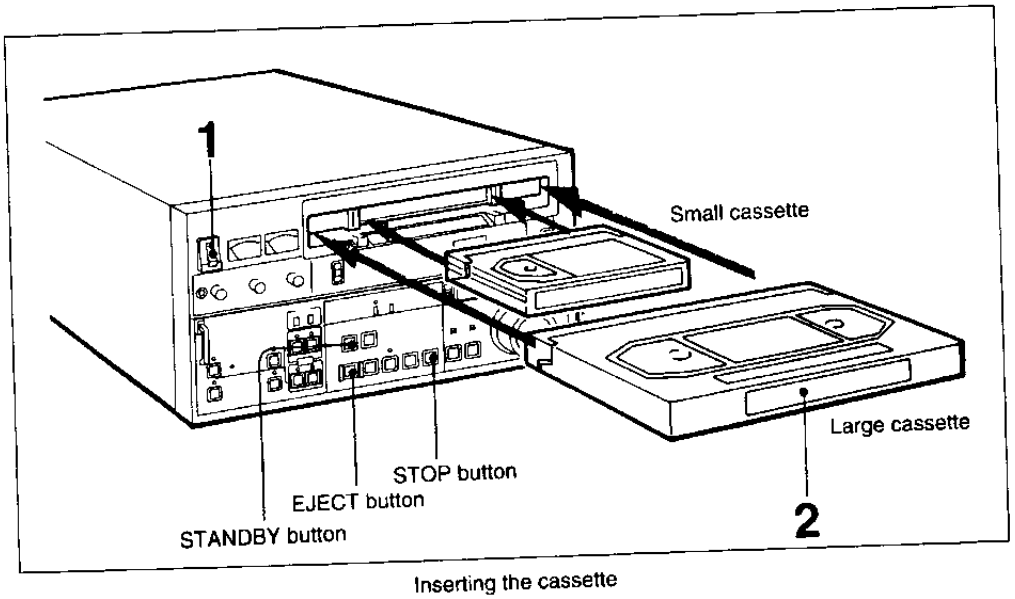
Large Cassette Metal tapes:
BCT-5ML/10ML/20ML/30ML/60ML/90ML, or equivalent.

Small Cassette Oxide tapes:
BCT-5G/10G/20G/30G, or equivalent.

Large Cassette Oxide tapes:
BCT-5GL/10GL/20GL/30GL/60GL/90GL, or equivalent.

Inserting and Ejecting the Cassette

Inserting the cassette



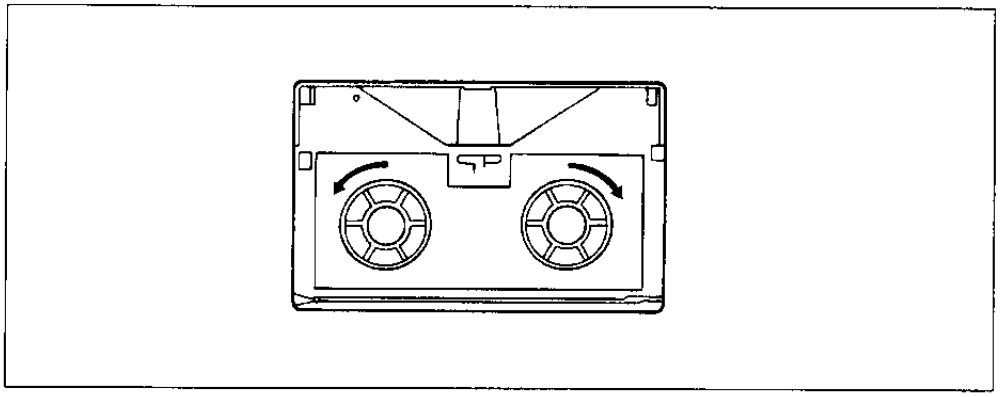
Inserting the cassette

1 Turn the POWER switch ON.

2 After taking up any slack in the cassette, hold it with the clear window facing upward, and insert as indicated by the arrows in the diagram. Align small cassettes with the marks on the cassette compartment. The cassette is loaded automatically, and the drum starts rotating. The STOP and STANDBY buttons light.
When a cassette is loaded, the orange lock-out bar appears to prevent another cassette from being inserted.

Checking the tape for slack

Press the reels in lightly, and rotate gently in the directions shown by the arrows. If the reels will not move, there is no further slack.



Ejecting the casssette

Press the EJECT button.
The tape is unthreaded and the cassette is ejected.

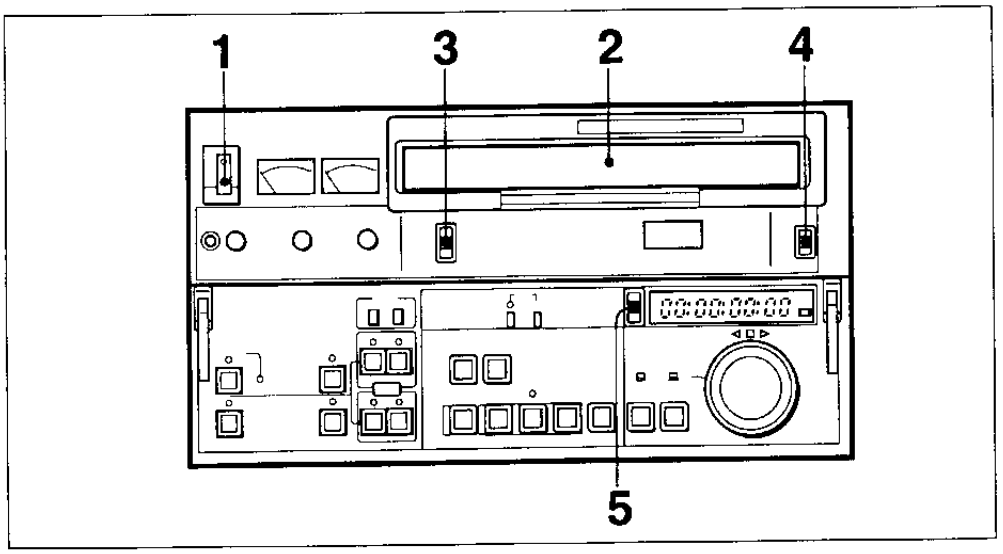
Chapter 4
Playback

This chapter explains playback operations, and the information superimposed on the monitor screen.

Playback

Preparing for Playback

Prepare for playback as follows.



Preparing for playback

1 Turn the POWER switch ON.

2 Insert the cassette.

On how to insert, see page 3-8.

3 Set the AUDIO MONITOR switch to the audio signal you wish to monitor.

Switch setting	Audio signal output	
	HEADPHONES jack	MONITOR connector (8-pin), AUDIO MONITOR OUTPUT connector (XLR)
CH-1	Channel 1 audio	Channel 1 audio
MIX	Stereo audio	Mixed Channel 1 and 2 audio
CH-2	Channel 2 audio	Channel 2 audio

4 Set the REMOTE/LOCAL switch to LOCAL.

5 Set the time counter display switch to the time code you wish to display.

CTL: Tape running time as determined by counting the CTL signal (Playback tape address: CTL).

TC: LTC or VITC time code (Playback tape address: time code).

U-BIT: LTC or VITC user bits (Playback tape address: time code).

Selecting the time code to display

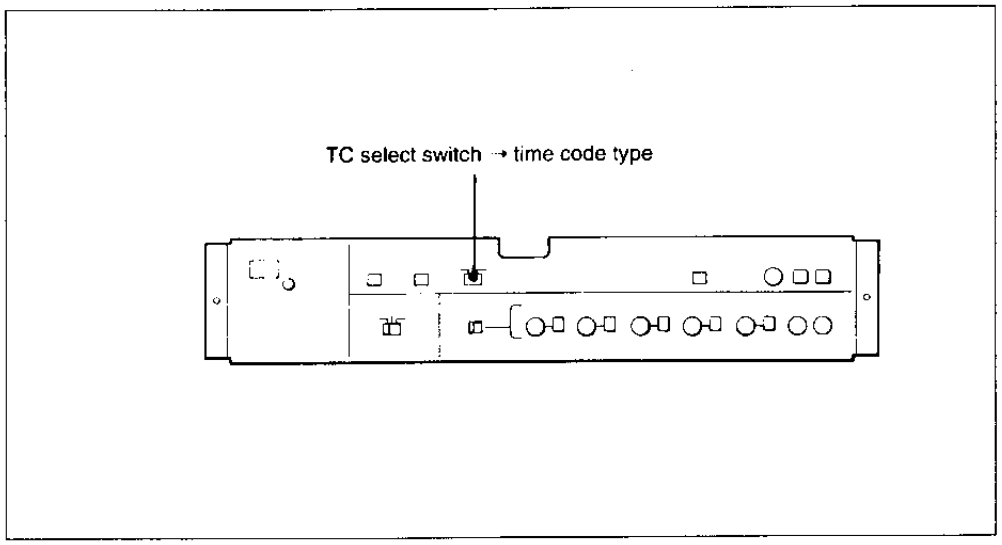
Set the time counter display switch to the recorded time code you wish to display during playback.

Displaying CTL codes

Set the time counter display switch to CTL.
The CTL signals recorded on the tape will be displayed. To reset the display to a specific tape position, press the RESET button. The display will change to 0:00:00:00, and rewinding the tape past this position will display negative values[1].

Displaying time codes

Set the time counter display switch on the control panel to TC and select the type of time code (VITC or LTC) with the TC select switch on the system panel.



Selecting the time code to display

The TC select switch allows you to specify VITC or LTC time codes, or automatic selection. If the switch is set to AUTO, the unit automatically displays VITC for tape speeds of ±1/2 normal speed or less, and LTC otherwise.

The LTC indicator lights if LTC signals are detected on the playback tape. The VITC indicator lights if VITC signals are detected.

Note

The time code read from the tape by the built-in time code reader, is output from the TIME CODE OUT connector.

1) When Main Menu item 007 TAPE TIMER DISPLAY is set to 1 (24 hours), the minus mark does not appear.

For more information, see page 3-5.

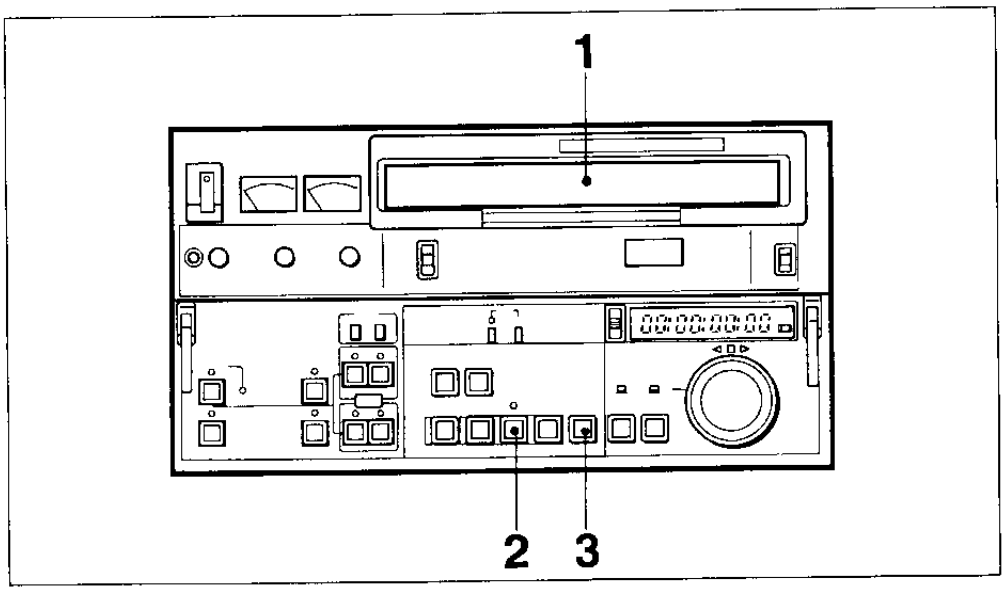
Displaying user bits

Set the time counter display switch to U-BIT.

As in the case of time code display, the type of user bits to be displayed is governed by the setting of the TC select switch on the system panel.

Normal Speed Playback

Proceed as follows to play back video and audio signals.



Normal speed playback

1 Insert the cassette. *(See page 3-8.)*

2 Press the PLAY button.
The SERVO indicator lights when head rotation and tape speed stabilize.

3 Press the STOP button to halt playback.

If played to the end, the tape is automatically rewound to the beginning and then stops.

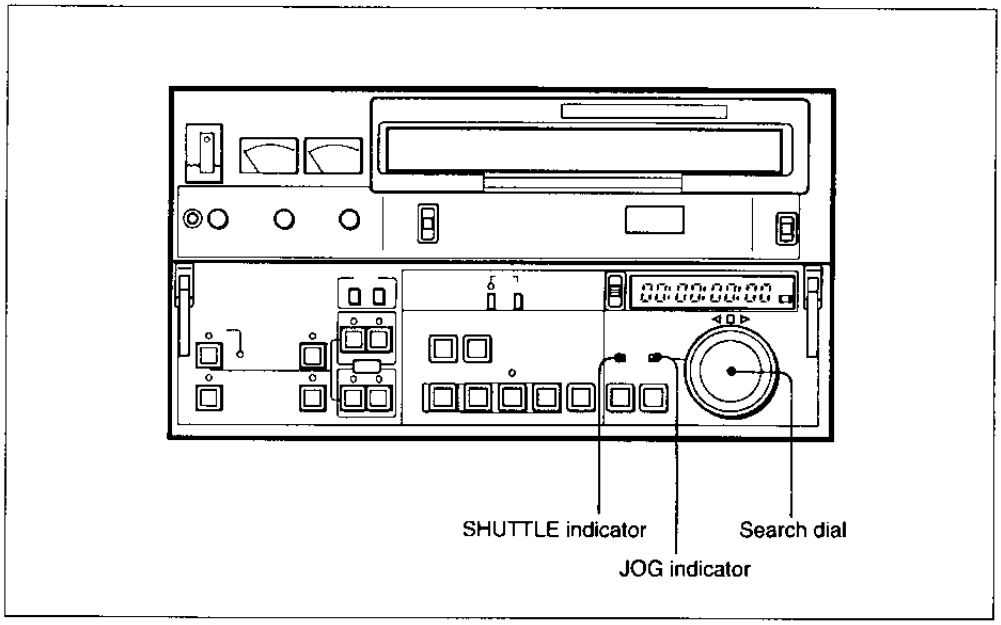
Adjusting the audio playback level

Playback levels can be adjusted independently for each channel. To adjust the playback level, put the unit into PLAY mode, pull out the PB control on the upper control panel, and adjust while monitoring the audio level meter.
Push in the PB controls for preset level audio playback. The reading of the audio level meter will be 0 VU for a signal level of +4 dBu. (0 dBu = 0.775 Vrms)

Contact your Sony dealer if you wish to change the preset level.

JOG and SHUTTLE Mode Playback

JOG and SHUTTLE are variable speed playback modes. Rotate the search dial to set the speed, and press the dial to toggle between JOG and SHUTTLE modes. The current mode is indicated by the JOG and SHUTTLE indicators.



Variable speed playback (JOG and SHUTTLE modes)

JOG mode (JOG indicator lit):
Speed varies in the range of –1 to +1 times normal speed, corresponding to the rotation speed of the search dial.

SHUTTLE mode (SHUTTLE indicator lit):
- With the SEARCH button lit, speed varies between –24 and +24 times normal speed, corresponding to the angle of the search dial.
- With the VARIABLE button lit, speed varies between –1 and +3 times normal speed, corresponding to the angle of the search dial.

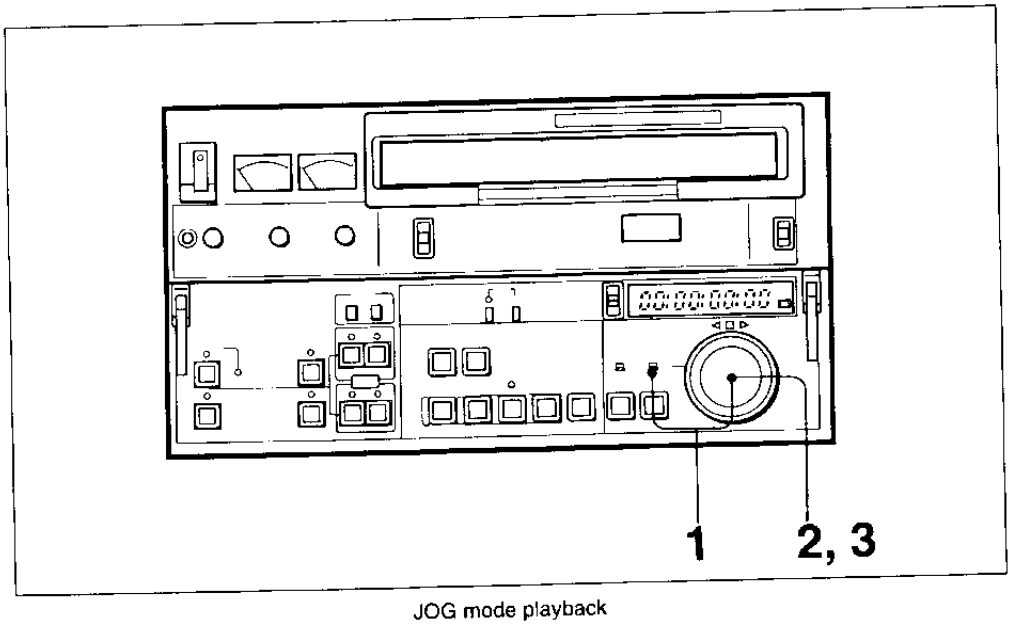
As shipped from the factory, the unit is preset so that rotating the search dial automatically puts the unit into either SHUTTLE or JOG mode.

You can change the factory defaults, so that rotating the search dial does not automatically put the unit into SHUTTLE or JOG mode.

For more information, see the explanation of System Menu item 101 on page 5-2.

JOG mode playback

In JOG mode, noiseless playback is ensured at any speed between –1 and +1 times normal speed. Follow this procedure:



JOG mode playback

1 Push in the search dial to light the JOG indicator.
The monitor shows a still picture, and the still indicator (□) lights.

2 Rotate the dial at the desired speed.
Slow-motion playback starts, at a speed corresponding to the rotation speed of the dial. The direction indicators (◁ and ▷)indicate the direction of playback.

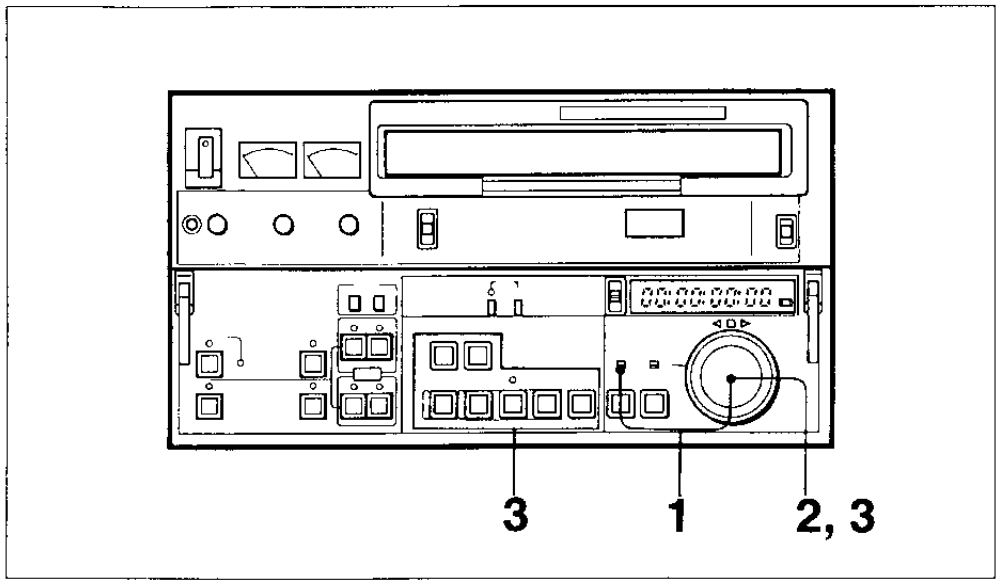
3 To stop JOG mode playback, stop turning the dial.
The still indicator (□) lights.

SHUTTLE mode playback

In SHUTTLE mode, the playback speed range is as indicated below, depending on whether the SEARCH or the VARIABLE button is lit:

- –24 to +24 times normal speed with the SEARCH button lit,
- –1 to +3 times normal speed with the VARIABLE button lit.

Note, however, that the speed range of noiseless playback by the DT heads is always –1 to +3 times normal speed regardless of whether the SEARCH or the VARIABLE button is lit.



SHUTTLE mode playback

1 Push in the search dial to light the SHUTTLE indicator.
The monitor shows a still picture, and the still indicator (□) lights.

Note

Always set the search dial to the center position after turning on the power. The still indicator (□) will light each time you turn the unit on, regardless of the position of the search dial.

2 Rotate the dial to the desired speed.
The dial clicks at the center position, corresponding to a speed of 0. Playback begins at the indicated speed. The direction indicators (◁ and ▷) show the direction of playback.

3 **To stop SHUTTLE mode playback,** return the search dial to the center position, or press STOP or one of the other tape transport buttons.
To resume normal playback, press the PLAY button.

Using the SEARCH button

In SHUTTLE mode, the SEARCH button can be used in the following way. Pressing the PLAY button alternately with the SEARCH button plays the tape at normal speed and at the speed selected with the search dial. Pressing the STOP button alternately with the SEARCH button alternately stops and starts playback at the selected speed.

Variable-Speed Playback — DMC (Dynamic Motion Control) Playback

The unit can play back any specified segment of tape at the speeds stored in memory during the previous SHUTTLE mode playback of that segment. This is called DMC (Dynamic Motion Control) playback.

Note

You can achieve DMC editing[1] by connecting this unit to a PVW-2800 videocassette recorder or equivalent VTR. Unlike DMC editing, DMC playback can be achieved when you use this unit without connecting to a recorder VTR.

Overview of DMC playback

DMC playback operation flowchart

1 Set the STUNT IN/OUT and PLAY IN/OUT points. *(See page 4- 10.)*

↓

2 Set the initial playback speed at the STUNT IN point. *(See page 4-12.)*

↓

3 Store in memory the desired variations in playback speed. *(See page 4-14.)*

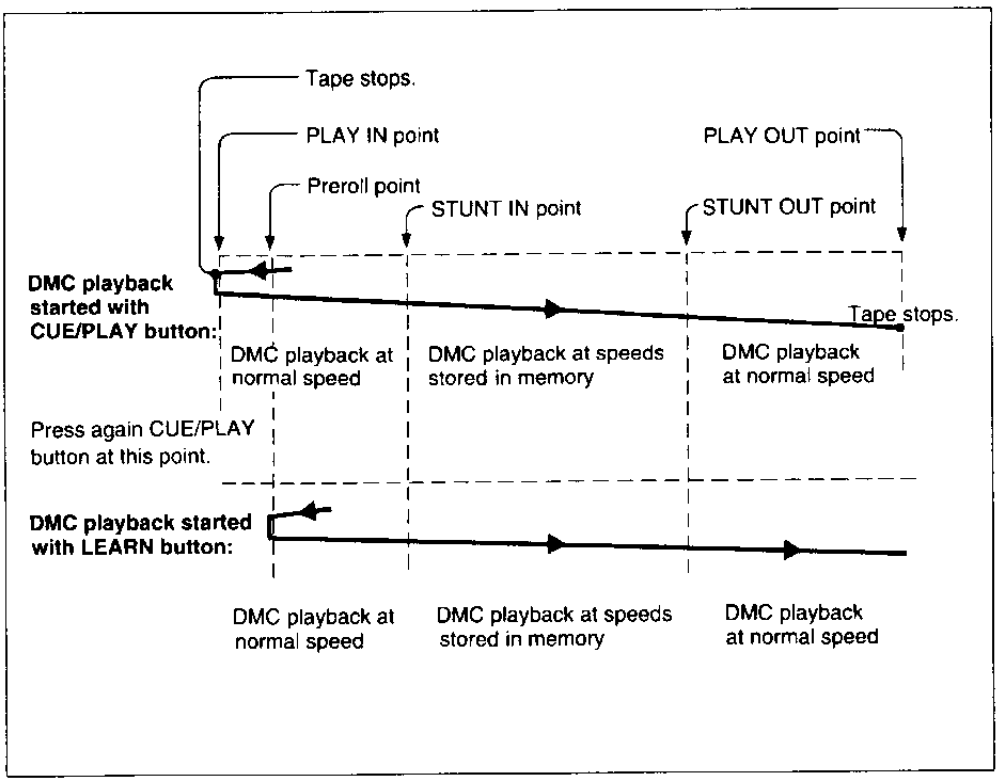
↓

4 Execute the DMC playback. *(See page 4-16.)*

1) A variable-speed mode editing which can be carried out while controlling the speed of playback on the player from the recorder VTR.

Tape movement during DMC playback

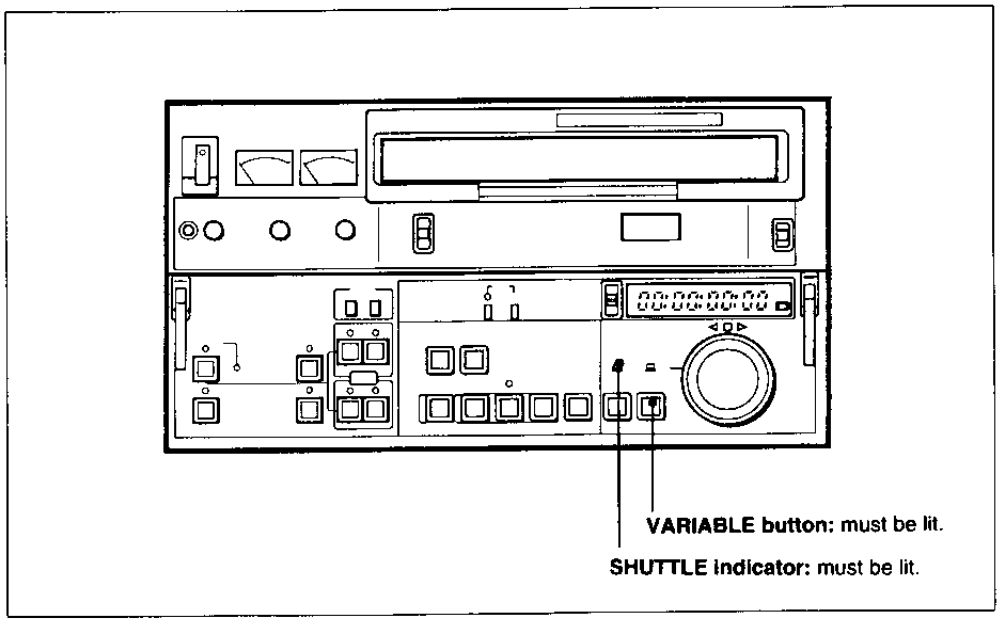
The following diagram illustrates the tape movement during DMC playback.



Tape movement during DMC playback

Preparing for DMC playback

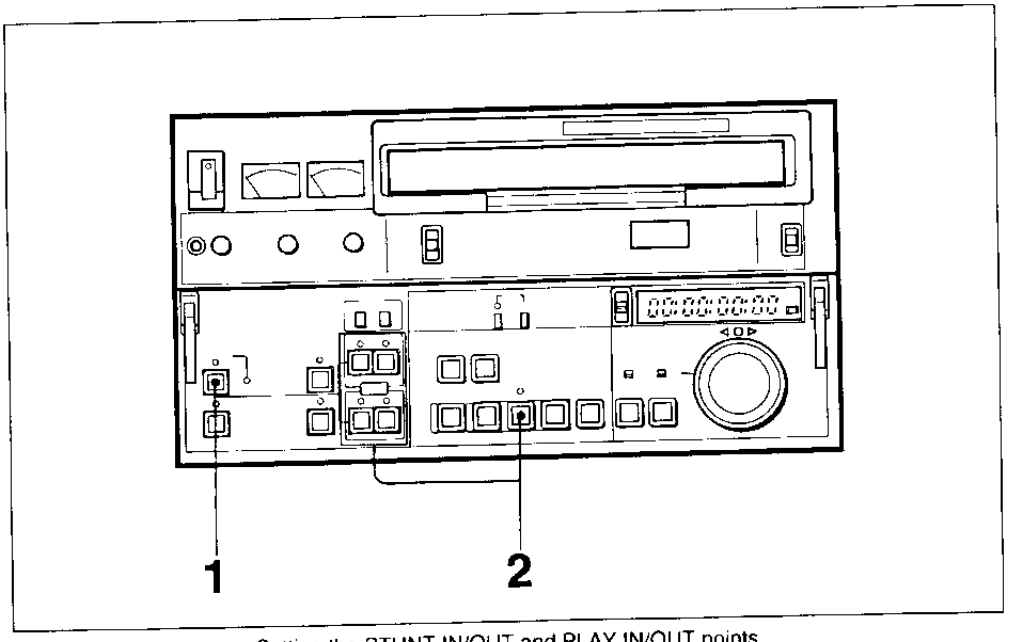
Check the VARIABLE button and the SHUTTLE indicator.



Preparing for DMC playback

Setting the STUNT IN/OUT and PLAY IN/OUT points

To set the STUNT IN/OUT and PLAY IN/OUT point, follow this procedure:



Setting the STUNT IN/OUT and PLAY IN/OUT points

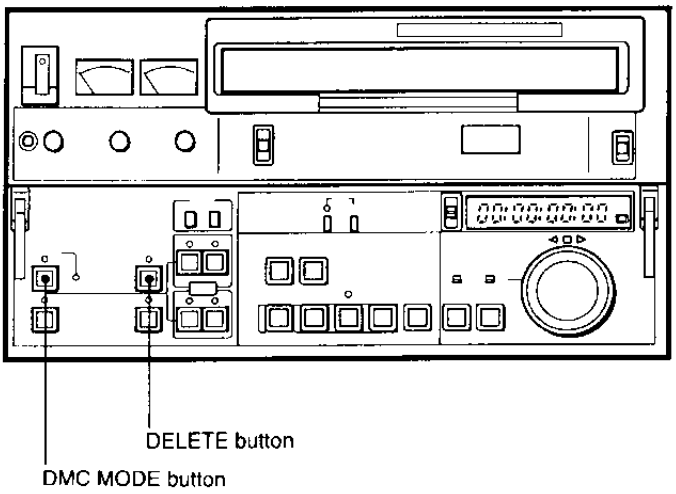
1 Press the DMC MODE button.
The indicator above the button will light.

2 While playing back the recorded tape, store in memory the DMC playback points as follows.

- To store the PLAY IN point in memory, press the PLAY IN button simultaneously with the ENTRY button.
- To store the STUNT IN point in memory, press the STUNT IN button simultaneously with the ENTRY button.
- To store the STUNT OUT point in memory, press the STUNT OUT button simultaneously with the ENTRY button.
- To store the PLAY OUT point in memory, press the PLAY OUT button simultaneously with the ENTRY button.

The indicator above each pressed button will light.

To exit DMC playback mode



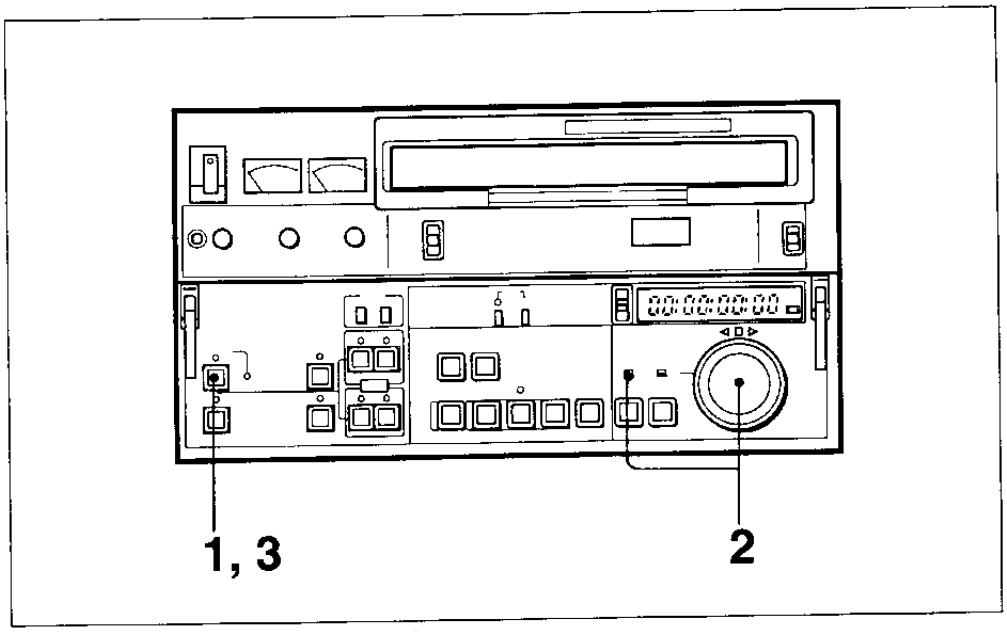
To exit DMC playback mode

Press the DELETE button simultaneously with the DMC MODE button. The indicator above the DMC MODE button will go off.

Setting the initial playback speed at the STUNT IN point

The initial playback speed at the STUNT IN point is determined by the position of the search dial.
For example, if the search dial is in its center position (namely, the still (□) indicator is lit), the unit is initially in still mode.

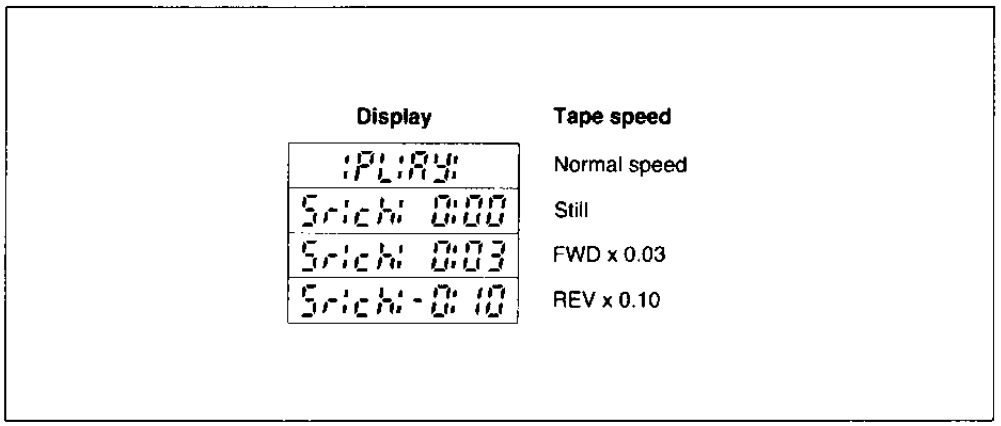
To set the initial speed, proceed as follows.



Setting the STUNT IN/OUT and PLAY IN/OUT points

1 Hold down the DMC MODE button.
The time counter display shows the current set speed in the columns for seconds and frames.

2 Making sure that the SHUTTLE indicator is lit to indicate that the unit is in SHUTTLE mode, select the desired initial speed by rotating the search dial. To select the normal speed as the initial speed, press the PLAY button. The time counter display shows the selected speed, but the tape is not running yet.



Initial speed display (example)

3 Release the DMC MODE button.

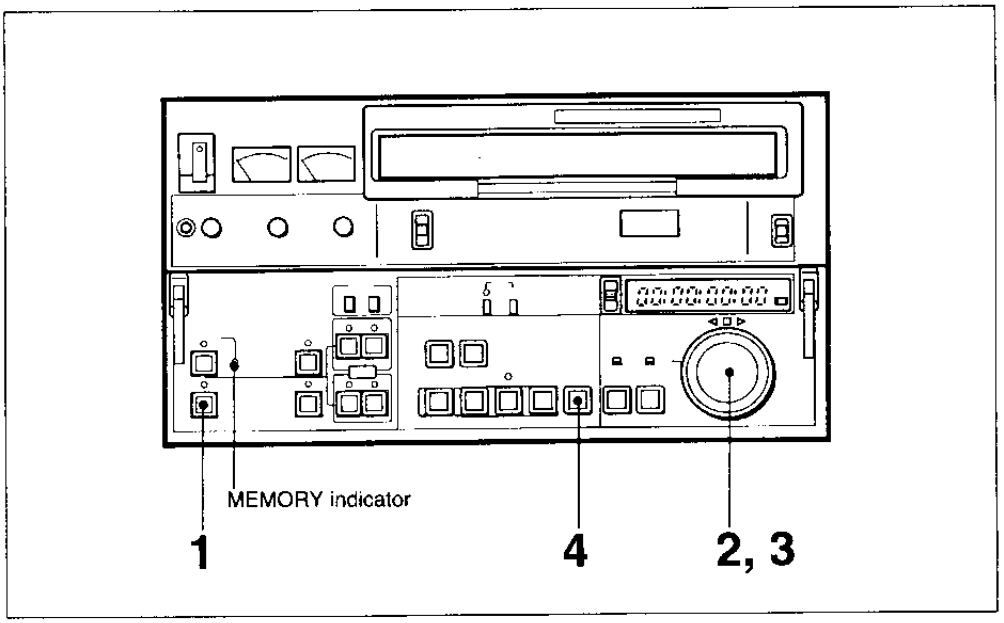
Setting a default initial speed

If you always use the same initial speed in DMC playback, you can specify a default speed by setting item 306 (DMC INITIAL SPEED) in the System Menu.

For further details, refer to the explanations of System Menu item 306 on page 5-3.

Storing DMC playback speeds in memory

To store in memory DMC playback speeds corresponding to different positions of the search dial, proceed as follows.



Storing DMC playback speeds in memory

1 Press the LEARN button.
The tape rewinds to the preroll point, and then runs up to the STUNT IN point at normal playback speed.

2 The MEMORY indicator begins flashing when the STUNT IN point is reached. Manipulate the search dial for the desired speed variations.
The unit stores in memory the speed variations while the MEMORY indicator is flashing (or over the specified segment of tape for variable-speed playback).

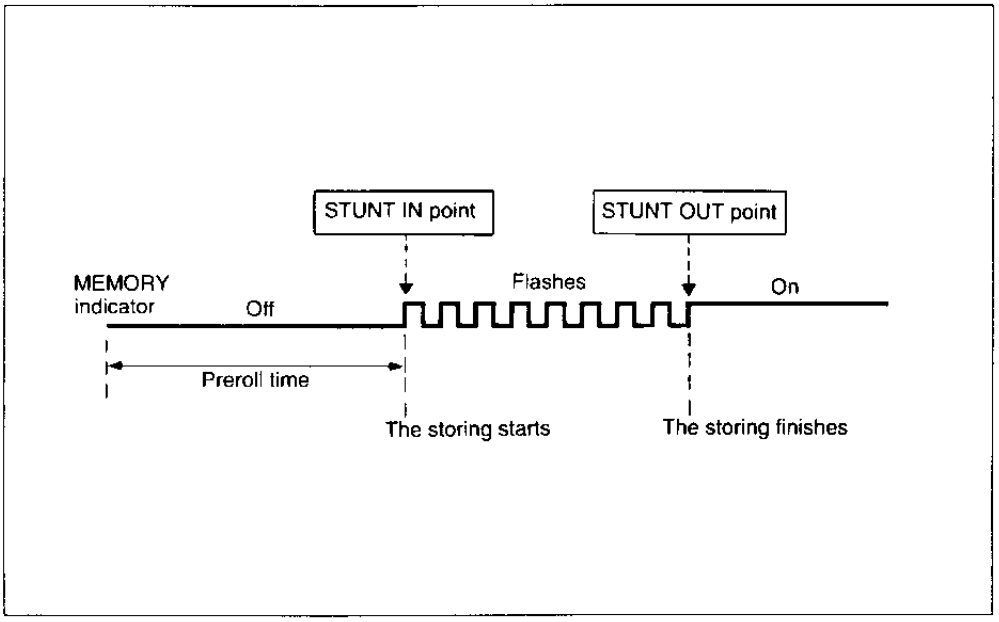
3 When the STUNT OUT point is reached, the state of the MEMORY indicator changes from flashing to lighting and the storing is complete. Stop manipulating the seach dial.

Note

If the state of the MEMORY indicator changes from flashing to lighting before the STUNT OUT point, the unit's memory capacity has been exceeded and no more data can be stored. The memory capacity is 120 seconds.

4 Press the STOP button to stop the tape.

About the state of the MEMORY indicator during storing of playback speeds in memory



State of the MEMORY indicator during storing of playback speeds in memory

Checking and correcting stored speeds

Press the LEARN button. The unit automatically plays back the segment of tape between the STUNT IN and the STUNT OUT point at the speeds stored in memory. At this time, if necessary, you can correct the speeds by manipulating the search dial.

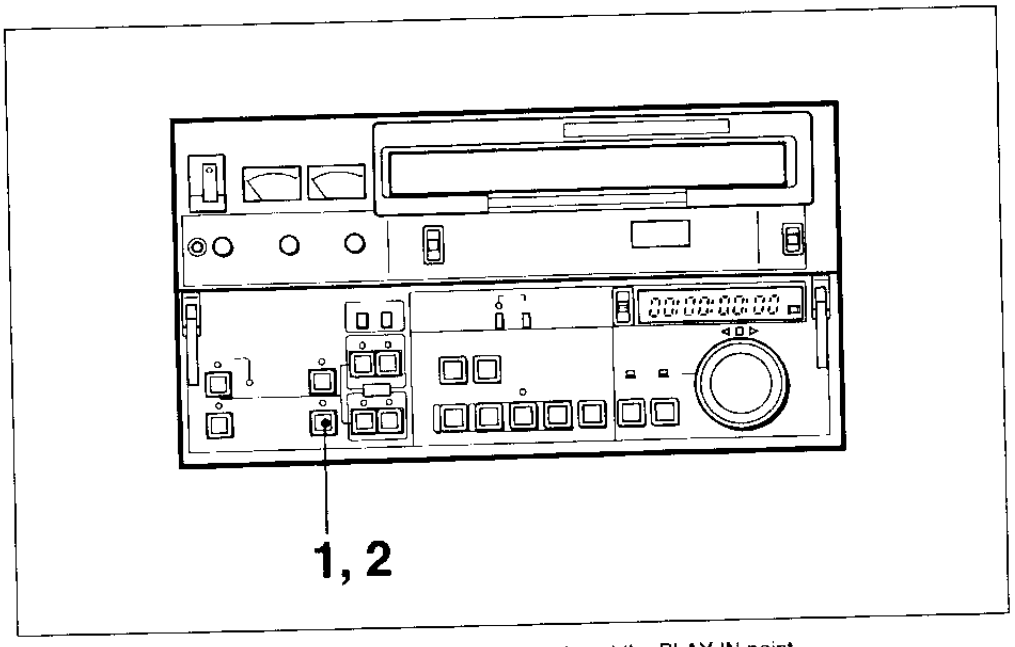
Interrupting the playback speed storing operation

Press the ENTRY and the STUNT OUT button simultaneously.

Executing a DMC playback

There are two ways of executing a DMC playback:
- The one by starting the playback at the PLAY IN point, and
- The other by starting the playback at the preroll point.

Starting the playback at the PLAY IN point

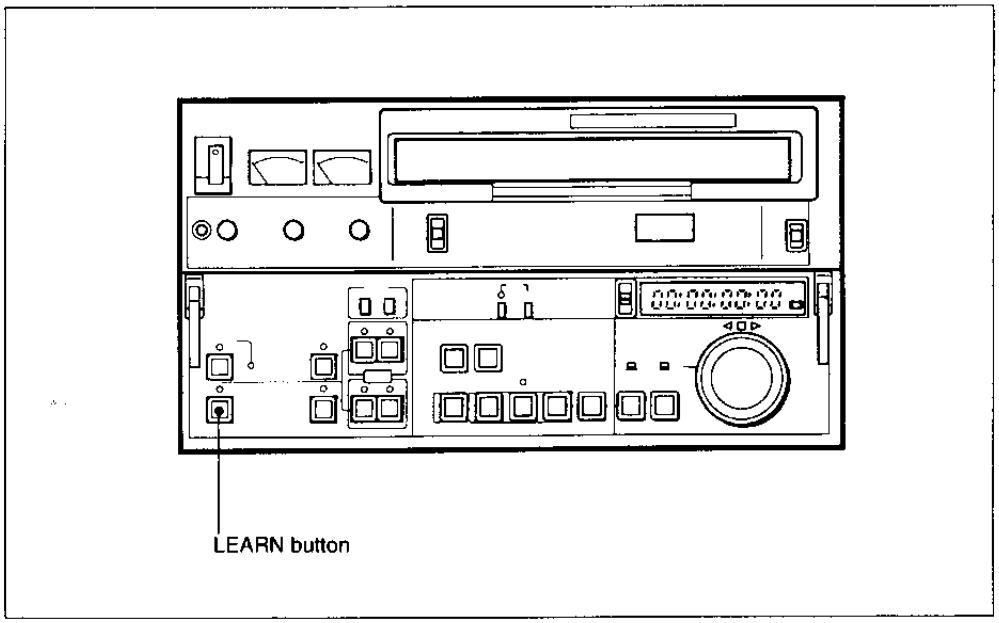


Executing a DMC playback by starting at the PLAY IN point

1 Press the CUE/PLAY button.
The indicator above the button lights, and when the tape is cued up to the PLAY IN point the indicator begins flashing.

2 Just after the indicator begins flashing, press again the CUE/PLAY button.
The state of the indicator changes from flashing to lighting, and the playback starts at normal speed.
From the STUNT IN point to the STUNT OUT point the DMC playback is executed at the speeds stored in memory. Beyond the STUNT OUT point the playback is again at normal speed and ends at the PLAY OUT point.

Starting the playback at the preroll point



Executing a DMC playback by starting at the preroll point

Press the LEARN button.
The indicator above the button lights.
The tape is cued up to the preroll point, and from the STUNT IN point to the STUNT OUT point the DMC playback is executed at the speeds stored in memory.
Beyond the STUNT OUT point the tape runs at normal playback speed.
To stop the tape, press the STOP button.

Stopping the tape during DMC playback

Press the STOP button.

Exiting DMC playback mode

Press the DMC MODE and the DELETE button simultaneously.

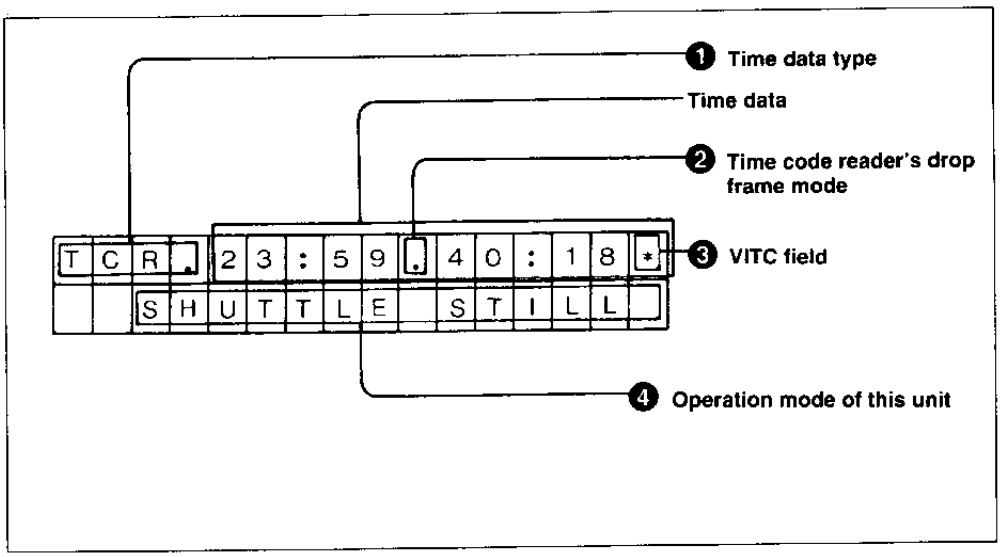
If the CHARACTER switch on the system panel is set to ON, time codes and information about the status of the unit can be superimposed on the monitor display or "burned into" a workprint through the VIDEO OUTPUT 3 (SUPER) connector on the rear panel.

Adjusting the position and size of superimposed characters

The size, type and position of superimposed characters can be adjusted using the Main Menu. Character types include white, black, and white or black outline.

For more information, see the explanation of the Main Menu, pages 3-4 and 3-5.

About the information displayed



Information displayed

❶ Types of time data

The following abbreviations are used to indicate time data type.

CTL : CTL counter data
TCR : LTC reader time code
UBR : LTC reader user bits
TCR.: VITC reader time code
UBR.: VITC reader user bits

Note

If the time codes or user bits could not be read correctly, they will be displayed with an asterisk, for example as "T*R" or "U*R".

❷ Time code reader's drop frame mode

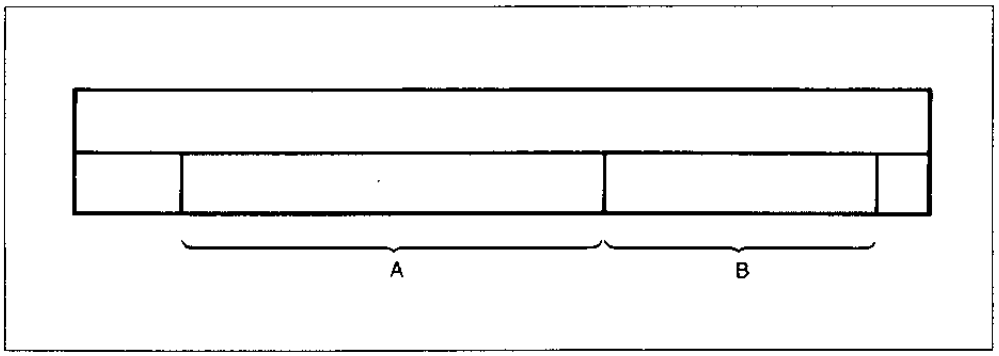
" . " : drop frame mode (factory preset)
" : " : nondrop frame mode

❸ VITC field

" "**(blank):** fields 1, 3
"*": fields 2, 4

❹ Operational mode of this unit

This field is divided into two blocks, A and B. Block A indicates the operation mode, and block B the servo lock status or tape speed.



Operational mode of this unit

The table below lists the operational mode messages.

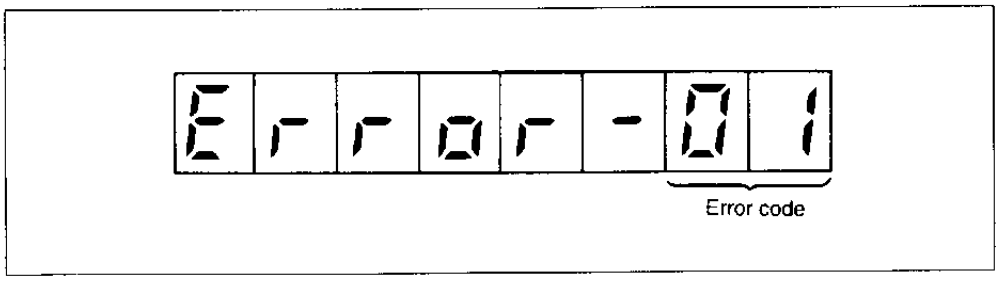
Message		Operational mode
Block A	**Block B**	
TAPE UNTHREAD		A tape is not threaded. This message is displayed from the time the EJECT button is pressed and the tape is rewound until the next cassette is loaded and wound on the head drum.
STANDBY OFF		Standby off mode
T. RELEASE		Tape tension released
STOP		Stop mode
F. FWD		Fast forward mode
REW		Rewind mode
PREROLL		Preroll mode
PLAY		Play mode (servo not locked)
PLAY	LOCK	Play mode (servo locked)
JOG	STILL	A still picture in jog mode
JOG	FWD	Jog mode in the forward direction (▷ indicator lights)
JOG	REV	Jog mode in the reverse direction (◁ indicator lights)
SHUTTLE	(speed)	Shuttle mode and playback speed
VAR	(speed)	Variable mode and playback speed

Chapter 5
Maintenance

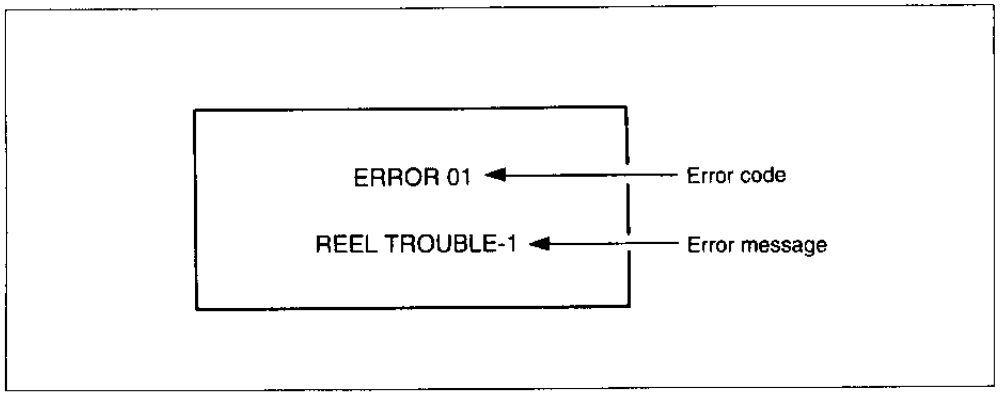
This chapter explains the System Menu, maintenance and the unit's self-diagnostics features.

Self-diagnostics

This unit features self-diagnostics. When trouble is detected, an error message is displayed immediately in the time counter display on the lower control panel, and also on the monitor. (To display error messages on the monitor, the monitor must be connected to the VIDEO OUTPUT 3 (SUPER) connector, and the CHARACTER switch on the system panel must be set to ON.)



Error message in the time counter display



Error message displayed on the monitor

When an error message is displayed

Error-10

Indicates moisture condensation on the head drum.

Take the steps described on page 5-10 of this manual.

Other error messages

Eject cassette if loaded, turn off the power and contact your Sony dealer.

About the System Menu

As explained in Chapter 3, this unit's main operational parameters are set using two menus, the Main Menu and the System Menu.

This section explains settings on the System Menu. Compared to items in the Main Menu, items in this menu will not need to be changed often.

Change items in the menu using the search dial and the SYSTEM SET-UP buttons on the system panel.

For details, refer to "Changing Menu Settings" in Chapter 3, page 3-6.

System Menu

The table below summarizes the System Menu. The boxed numbers in the Value column indicate the factory preset settings.
Menu items are displayed on the monitor and in the time counter display. The monitor display indicates the item number, item title, and current value. The time counter display indicates the item number and current value.

Operation

Item Number	Title	Value	Description
101	SELECTION FOR SEARCH DIAL ENABLE	[0] 1	Determines when the unit is put into search mode. 0: Whenever the search dial is rotated. 1: Whenever the SEARCH button is pressed.
102	MAXIMUM TAPE SPEED	0 [1] 2	Sets the maximum tape speed for fast forward and rewind, and the maximum tape speed selectable with the search dial. 0: 35 times normal speed. 1: 35 times normal speed for fast forward and rewind, and 24 times normal speed for the search dial. 2: 24 times normal speed.
104	AUDIO MUTING TIME	[00] 01 02 03 04 05 06 07 08 09 10	Determines the length of time during which audio signals are muted when moving from stop or still mode to playback mode. Can be set to any value between 0 and 1.0, in steps of 0.1 second. 00: OFF (no muting) 01: 0.1 seconds 02: 0.2 seconds 03: 0.3 seconds 04: 0.4 seconds 05: 0.5 seconds 06: 0.6 seconds 07: 0.7 seconds 08: 0.8 seconds 09: 0.9 seconds 10: 1.0 second
105	REF VIDEO MISSING ALARM	[0] 1	Issue warning if reference video signals are not being supplied through the REF. VIDEO input connectors. 0: Do not issue warning. 1: Warn by flashing the STOP button.

Item Number	Title	Value	Description
106	CAPSTAN LOCK	[0] 1 2 3	Select the capstan lock mode. 0: Use the setting of the CAPSTAN LOCK switch on the system panel. 1: Always 2FD, regardless of CAPSTAN LOCK switch setting. 2: Always 2FD/4FD, regardless of CAPSTAN LOCK switch setting. 3: Always 4FD, regardless of CAPSTAN LOCK switch setting.

Editing

(Items concerning operational settings when you use this unit as a player in an editing system)

Item Number	Title	Value	Description
301	VAR SPEED RANGE FOR SYNCHRONIZATION	[0] 1	Selects the playback speed range when controlling playback speed from a remote control unit connected to the REMOTE connector (9-pin). 0: –1 to +3 times normal speed 1: –1.15 to +3.45 times normal speed **Note** When using this unit for DT editing by connecting to a BVE-910 editing control unit or other editing controller, select "1" (namely, the range of –1.15 to +3.45 times normal speed). In that case, playback picture interruptions may occur during DT playback at speeds out of the range of –1 to +3 times normal speed, but this does not mean a malfunction of the unit.
302	CAPSTAN RE-LOCKING DIRECTION	[0] 1	Determines whether capstan speed is incremented or decremented to lock. This setting is ignored unless the CAPSTAN LOCK switch on the system panel is set to 4FD. 0: Speed is decremented. 1: Speed is incremented.
306	DMC INITIAL SPEED	[00] 01 02 03 04 05 06 07 08 09 10 11 12 13	Determines the default initial speed of DMC playback. 00: A speed corresponding to the position of the search dial. 01: Normal speed 02: Tape is stopped. 03: +0.03 times normal speed 04: +0.1 times normal speed 05: +0.2 times normal speed 06: +0.5 times normal speed 07: +1 times normal speed 08: +2 times normal speed 09: –0.03 times normal speed 10: –0.1 times normal speed 11: –0.2 times normal speed 12: –0.5 times normal speed 13: –1 times normal speed

(continued)

Editing (continued)

Item Number	Title	Value	Description
307	AUTO-DELETION FOR INCONSISTENT DATA	[0] 1 2	Determines what happens when an erroneous playback point, such as a PLAY (or STUNT) OUT point located before a PLAY (or STUNT) IN point, or unnecessary playback point is set. 0: Issue a warning by flashing the DELETE indicator. The operator must manually delete the unnecessary playback point or correct the erroneous playback point. 1: When an incorrect playback point is set, the previously set playback point is deleted automatically. 2: When an incorrect playback point is set, the previously set playback point is deleted automatically. When an unnecessary playback point is set, the DELETE indicator flashes to issue a warning. **Note** Delete playback points by pressing the DELETE button simultaneously with one of the STUNT IN/OUT and PLAY IN/OUT buttons. Playback cannot be executed if the DELETE indicator is flashing.

Preroll

(Items concerning operational settings when you use this unit as a player in an editing system)

Item Number	Title	Value	Description
401	FUNCTION MODE AFTER CUE-UP	[0] 1	Determines the unit's mode after cue-up. 0: Stop mode. 1: Still mode.
402	TIME REFERENCE FOR PREROLL	[0] 1	When the unit must preroll over a tape section containing a non-continuous sequence of time codes, determines whether or not to use CTL signals to generate a continuous sequence, beginning with the time codes before the break in continuity. 0: Use CTL signals to generate a continuous sequence. 1: Do not use CTL signals to generate a continuous sequence. **Note** When 0 is selected, maximum tape speed during cue-up or preroll is limited to 10 times normal speed.
403	AUTOMATIC PREROLL REFERENCE ENTRY	[0] 1	When an IN point has not yet been set at preroll time, determines whether pressing the PREROLL button on the recorder (PVW-2800) should set an IN point automatically. 0: Do not set the IN point automatically. 1: Set the IN point automatically.

Tape protection

Item Number	Title	Value	Description
501	STILL TIMER	00 01 02 03 04 05 06 07 08 09 10 11 12 13 [14] 15	If the unit remains in stop or still mode for a certain period of time, it is put automatically into tape protection mode in order to protect the tape and video heads. This item determines the length of time allowed to pass before the unit is put into tape protection mode. The time may set to one of the following 16 values, ranging between 0.5 seconds and 30 minutes. 00: 0.5 seconds 01: 5 seconds 02: 10 seconds 03: 20 seconds 04: 30 seconds 05: 40 seconds 06: 50 seconds 07: 1 minute 08: 2 minutes 09: 3 minutes 10: 4 minutes 11: 5 minutes 12: 6 minutes 13: 7 minutes 14: 8 minutes 15: 30 minutes **Note** The measures taken to protect the tape vary, depending upon whether the unit enters tape protection mode from standby (search) mode or from stop mode, and upon the settings of the next three items in this menu.
502	TAPE PROTECTION MODE FROM SEARCH	[0] 1 2	Determines the measures taken to protect the tape if the unit remains in still mode for a period longer than the period specified in item 501 of this menu. 0: The tape is repeatedly advanced at 1/30 of normal speed for periods of 2 seconds. 1: The unit goes into standby OFF mode. The tape remains wound, and rotation of the drum is as specified in menu item 504. 2: The unit goes into tension release mode. The tape tension is relaxed.
503	TAPE PROTECTION MODE FROM STOP	[0] 1	Determines the measures taken to protect the tape if the unit remains in stop mode for a period longer than the period specified in item 501 of this menu. 0: The unit goes into standby OFF mode. 1: The unit goes into tension release mode. The tape tension is relaxed.
504	DRUM ROTATION IN STANDBY OFF	[0] 1	Determines whether the head drum stops turning in standby OFF mode. 0: Drum stops turning. 1: Drum does not stop turning.

Video control

Item Number	Title	Value	Description
703 [a]	BLANK LINE SELECT	For lines 12 to 20 [0] 2	Determines blanking ON/OFF for video output signals. Each of the lines from 12 to 20 may be set to ON or OFF separately. 0: Blanking ON (For line 20, only a half of it is blanked on fields 2 and 4, and the entire line is blanked on fields 1 and 3.) 2: Blanking OFF. The factory setting is "0" for all of lines 12 to 20.

a) To choose lines for menu item 703, rotate the search dial while pressing the STOP button.

About the Hours Meter

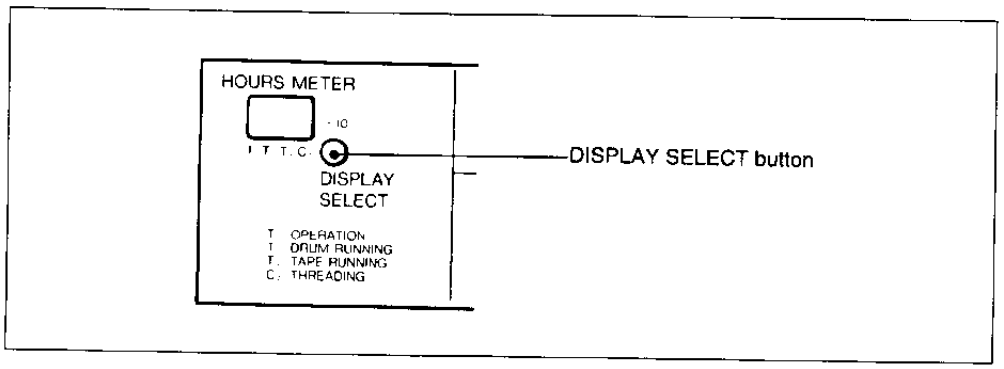
The hours meter is a 4-digit digital clock on the left side of the system panel. It displays four kinds of information about the operational history of the unit. Use it as a guide in scheduling periodic maintenance.

Periodic maintenance should be carried out by a qualified technician. For more information, contact your Sony dealer.

Note

The hours meter runs on the unit's internal batteries, which should be changed once every five years. For more information, contact your Sony dealer.

Meaning of the displayed values



Hours meter

When you press the DISPLAY SELECT button, the display changes in the following way.

$$\rightarrow T_1 \rightarrow T_2 \rightarrow T_3 \rightarrow C_T \rightarrow$$

T_1: OPERATION (Total time)

Displays the total number of hours that the unit has been in operation, with the power turned on.

T_2: DRUM RUNNING

Displays the total number of hours that the drum has run with tape threaded.

T_3: TAPE RUNNING

Displays the total number of hours that the unit has been in fast forward, rewind, playback and search modes.

C_T: THREADING

Displays the total threadings and unthreadings.

Reading the hour totals (T_1, T_2 and T_3)

Numbers displayed in the meter should be multiplied by 10 to give the actual value.

This display indicates a total in the range from 110 hours, 0 minutes and 0 seconds to 119 hours, 59 minutes and 59 seconds. The maximum value that may be displayed is 99,999 hours, 59 minutes and 59 seconds.

Display example of hour totals (T_1, T_2 and T_3)

Reading the threadings total (C_T)

Numbers displayed in the meter should be multiplied by 10 to give the actual value.

This display indicates total threadings and unthreadings in the range from 110 to 119. The maximum value that may be displayed is 99,999.

Display example of total threadings and unthreadings (C_T)

Head Cleaning and Moisture Condensation

Head Cleaning

Clean the video and audio heads with the optional BCT-5CLN cleaning cassette. Read the cleaning cassette instructions carefully, as improper usage can damage the heads.

Note

Be sure to eject the cleaning cassette after cleaning to avoid damage to the heads.

Moisture Condensation

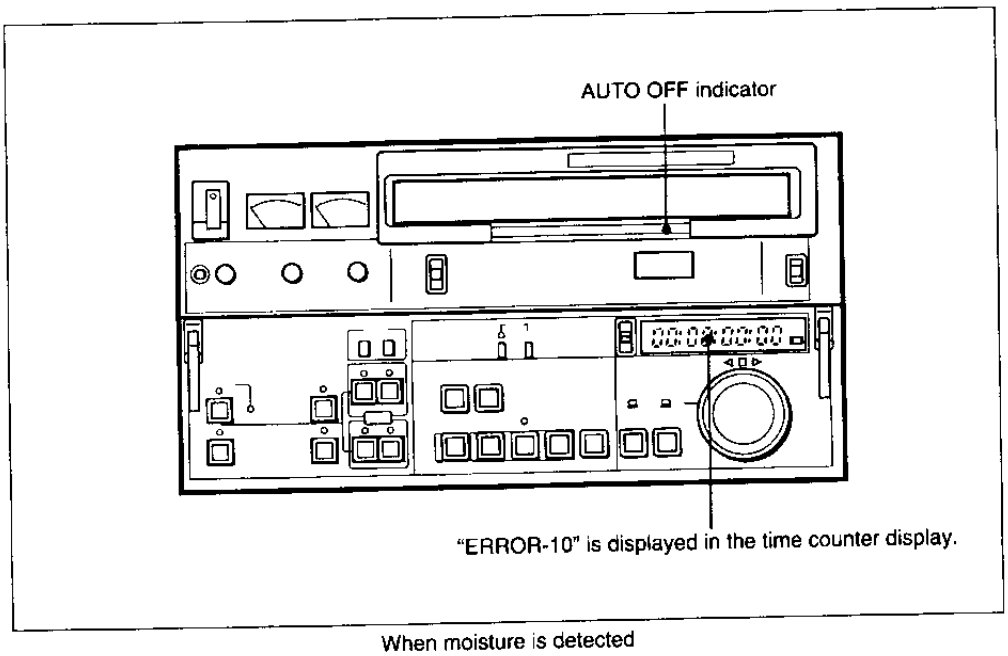
Moisture can condense on the head drum and tape guides when the unit is moved from a cold to a warm location, when the heating is turned on in a cold room, or when the unit is placed in a very warm room.
Videotapes played when the unit is in this state may adhere to the moistened surfaces. To prevent this, the unit features a condensation detector.

Note

The condensation detector requires about 10 minutes to detect moisture on the drum and tape guides. When using the unit under conditions like those described above, wait about 10 minutes before turning on the power.

When moisture is detected

If moisture is detected on the head drum during operation, the AUTO OFF indicator on the front panel lights, and the "Error-10" message is displayed in the time counter display.



When moisture is detected

As soon as moisture is detected, the drum and capstan motors halt, the cassette is ejected, and the drum begins rotating again. In this state, all unit functions are disabled.
When the moisture has evaporated, the AUTO OFF indicator goes off and the error message disappears.

When moving the unit from a cold to a warm location

The condensation detector requires about 10 minutes to detect moisture on the drum and tape guides. After moving the unit wait about 10 minutes before turning on the power.

If the AUTO OFF indicator lights or the "Error-10" message is displayed when power is turned on

Leave the power on, and wait for the indicator to go off and the message to disappear. Cassettes cannot be inserted while the indicator is lit.

If the AUTO OFF indicator does not light and no error message is displayed when power is turned on

It is safe to begin using the unit.

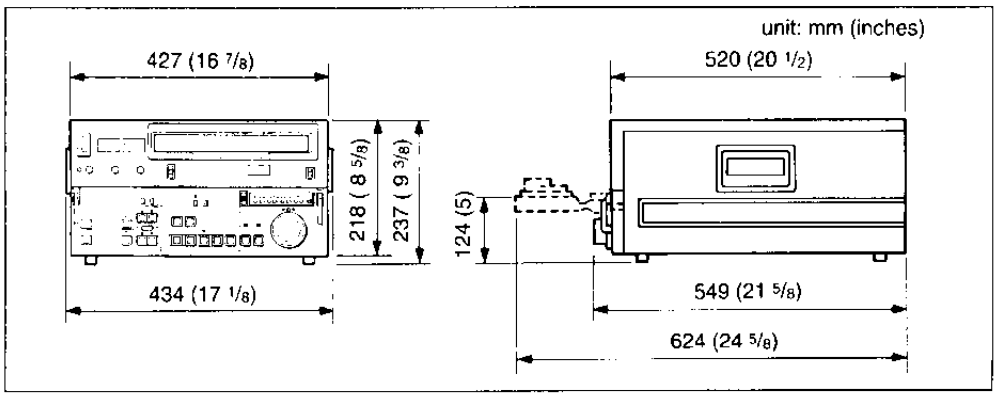
Appendices

Specifications

General

Power requirements	120 V AC, 50/60 Hz
Power consumption	130 W
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	80% or less
Weight	25 kg (55 lb 2 oz)

Dimensions (w/h/d, excluding the projections)
427 × 237 × 520 mm
(16 7/8 × 9 3/8 × 20 1/2 inches)



Normal tape speed	118.6 mm/s
Maximum playback time	90 minutes or longer with BCT-90ML cassette
Fast forward/rewind time	180 seconds or less with BCT-90ML
Search speed	Shuttle: Still, 0.03, 0.1, 0.2, 0.5, 1, 3, 5, 10, 24 and 35[1] times normal speed, forward and reverse Jog: Variable from still to normal speed, forward and reverse

DT (Dynamic Tracking) range
–1 to +3 times normal speed

Recommended cassettes	1/2-inch Betacam or Betacam SP cassette metal tapes: BCT-5M/10M/20M/30M, BCT-5ML/10ML/20ML/30ML/60ML/90ML or equivalent Oxide tapes (playback only): BCT-5G/10G/20G/30G, BCT-5GL/10GL/20GL/30GL/60GL/90GL or equivalent

1) To search at 35 times normal speed, it is necessary to change the setting of System Menu item 102.

For more information, see the explanation of System Menu item 102 on page 5-2.

Video

Video recording — Luminance: FM
Chrominance: FM (Compressed Time Division Multiplex)

		Metal tape	Oxide tape (Playback)
Bandwidth	Luminance	30 Hz to 4.5 MHz $^{+0.5}_{-4.0}$dB	30 Hz to 4.0 MHz $^{+0.5}_{-6.0}$dB
	Chrominance	R-Y: 30 Hz to 1.5 MHz $^{+0.5}_{-3.0}$dB B-Y: 30 Hz to 1.5 MHz $^{+0.5}_{-3.0}$dB	
S/N	Luminance (COMPONENT IN/OUT)	51 dB or greater	48 dB or greater
	Chrominance	AM: 53 dB or greater	AM: 50 dB or greater
		PM: 53 dB or greater	PM: 50 dB or greater
K-factor (2T pulse)		2% or less	3% or less
DG		3% or less	
DP		3° or less	
Y/C delay		20 ns or less	

Audio

Audio recording — Bias

	Metal tape	Oxide tape (Playback)
Frequency response	50 Hz to 15 kHz $^{+1.5}_{-3.0}$dB	50 Hz to 15 kHz ±3.0 dB
S/N (3% distortion)	72 dB or greater	50 dB or greater (DOLBY NR OFF)
Distortion (THD) (Reference level 1 kHz)	1% or less	2% or less
Wow and flutter	0.1% rms or less	

Processor adjustment range

Video level	± 3 dB
Chroma level	± 3 dB
Setup level	$^{+15}_{0}$ IRE
Hue	±15°
System SC phase	360° p-p
System sync phase	$^{+3}_{-1}$ µs
Y/C delay	±50 ns

Input connector

Video input

REF.VIDEO	BNC type (2, for bridging connection) Black burst or 1.0 Vp-p ±0.3 V, 75 Ω, sync negative (286 mV)

Output connectors

Video output

REF.VIDEO	BNC type (1) Black burst, 75 Ω, sync negative (286 mV)
VIDEO OUTPUT 1, 2, 3 (SUPER)	BNC type (3) Composite video, 1.0 Vp-p, 75 Ω, sync negative (286 mV) Superimposed time codes etc. output from VIDEO OUTPUT 3 (SUPER), as specified by CHARACTER switch
COMPONENT 1	12-pin multi (1, female) Luminance: 1.0 Vp-p, 75 Ω, sync negative Chrominance: R-Y: 0.7 Vp-p, 75 Ω B-Y: 0.7 Vp-p, 75 Ω
COMPONENT 2	BNC type (3) Y: 1.0 Vp-p, 75 Ω, sync negative R-Y: 0.7 Vp-p, 75 Ω B-Y: 0.7 Vp-p, 75 Ω
S-VIDEO	DIN 4-pin (1)

Audio output

CH-1, CH-2	XLR 3-pin (2, male) +4 dBu at 600 Ω load, low impedance, balanced (0 dBu = 0.775 Vrms)
MONITOR	XLR 3-pin (1, male) +4 dBu at 600 Ω load, low impedance, balanced (0 dBu = 0.775 Vrms)

Monitor output

MONITOR	8-pin multi (1, female) Video: 1.0 Vp-p, 75 Ω, sync negative Superimposed time codes etc., output as specified by system panel switches Audio: –5 dBu, 47 kΩ, unbalanced (0 dBu = 0.775 Vrms)

Time code output

TIME CODE OUT	BNC type (1) 2.2 Vp-p, 600 Ω, unbalanced

Headphone output

HEADPHONES	Stereo phone jack Maximum –14 dBu, 8 Ω (0 dBu = 0.775 Vrms)

Remote connectors

TBC REMOTE: 15-pin multi (1)
REMOTE: 9-pin multi (1)

Accessories supplied

AC power cord (1)
RCC-5G 9-pin remote cable (1)
PSW 4×16 screws for rack mounting (4)
Operation manual (1)

Optional accessories

BKW-2010 extension cable kit for remote control panel
BKW-2020 U-matic dubbing output kit
BK-803 control panel case
RMM-110 rack mount adaptor
BCT-5CLN cleaning cassette
BK-2006 TBC remote control unit
BVR-50 TBC remote control unit

Please contact your Sony dealer for details on use of BKW-2010, BKW-2020, BK-803 and RMM-110.

Design and specifications are subject to change without notice.

B-Y signal
One of the color difference signals, the B signal minus the Y signal.

Chrominance signal
Signal which carries information about hue and color. Also called C signal.

Condensation
Water which has condensed on tape transport mechanisms. Videotape tends to adhere to and be damaged by condensation on the head drum.

CTDM
Abbreviation of Compressed Time Division Multiplex. A processing method employed to record color difference signals. When composite video signals are recorded, the narrow bandwidth color difference signals (R-Y, B-Y) are compressed by time division, multiplexed, and recorded in a single track. CDTM video is characterized by its broad bandwidth and high picture quality.

CTL signal
Abbreviation of Control signal. In VTRs, regular pulses used to synchronize tape movement and the scanning position of the video heads. Recorded in a special track so that the video heads can scan the playback tape accurately.

Drop frame mode
In NTSC format, the actual number of frames per second is approximately 29.97, while that for the time code is specified as 30. Drop frame mode is a mode in which the time code is advanced in such a way that the difference in frame value between real time and the time codes is corrected. In this mode, 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.

Guard band noise
Noise generated when guard bands seprating recorded tracks on the tape are played back because of incorrect tracking.

LTC
Abbreviation of Longitudinal Time Code. A time code recorded in a separate track at the edge of the tape.

Luminance
The signal which carries information about brightness. Also called the Y signal.

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 time code, which causes problems when editing programs in units of seconds using the number of frames as a reference.

Metal tape
Magnetic tape coated with a fine metallic powder of needlelike spines mixed with a binder. Metal tape is noted for its high recording density.

Oxide tape
Magnetic tape coated with needlelike spines of ferrous oxide mixed with a binder.

Reference video signal
A video signal consisting of a sync signal or sync and burst signals, used as a reference.

R-Y signal
One of the color difference signals, the R signal minus the Y signal.

S/N
Signal-to-Noise ratio. The higher the signal-to-noise ratio, the better is picture quality.

Search mode
A VTR mode used when searching for specific scenes by viewing the video picture or time codes while rewinding or playing the tape fast forward.

Servolock
The mechanisms which control the phase of the head drum and the speed of tape transport during recording or playback are called servo mechanisms. Servolock is synchronization of drum rotation and tape speed with a reference signal.

Superimpose
To superimpose two or more video images in layers.

Sync signal
A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning patterns of the video camera and the monitor.

TBC
Abbreviation of Time Base Corrector. Electronic circuits to electrically stabilize the playback signals by removing color variation and roll in the playback picture caused by irregularity in drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signals.

Time code
A digital code recorded on the videotape to supply information such as the hour, minute, second and frame of each frame. LTC and VITC are time code formats.

Tracking
Control of playback tape speed in such a way that video heads are able to scan the recorded signals correctly.

User bits
Sections of the digital time code signal left open so that the user can record any information which may be necessary, for example the actual clock time.

V-blanking

The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electron beams in the cameras and monitors are turned off so that they can return from the bottom of the screen to the top without showing traces of movement on the screen. When the position of V-blanking is not adjusted correctly, a horizontal black bar appears on the screen.

Video gain

Amplification of video signals, expressed in decibels (dB).

VITC

Abbreviation of Vertical Interval Time Code. A time code inserted during the vertical blanking interval between two fields. Unlike LTC codes, VITC codes are stored in the same tracks as the video information, so they can be read even while the tape is not moving.

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