SONY

DIGITAL VIDEOCASSETTE RECORDER

DNW-A28/A28P

BETACAM SX

OPERATION MANUAL English

1st Edition (Revised 3)

WARNING

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

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of th e FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

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 the customers in Europe

This product with the CE marking complies with the EMC Directive (89/336/EEC) issued by the Commission of the European Community.
Compliance with this directive implies conformity to the following European standards:
• EN55103-1: Electromagnetic Interference (Emission)
• EN55103-2: Electromagnetic Susceptibility (Immunity)
This product is intended for use in the following Electromagnetic Environment (s):
E1 (Residential), E2 (Commercial and light industrial), E3 (Urban outdoors) and E4 (Controlled EMC environment ex. TV studio)

Pour les clients européens

Ce produit portant la marque CE est conforme à la Directive sur la compatibilité électromagnétique (EMC) (89/336/CEE) émise par la Commission de la Communauté européenne.
La conformité à cette directive implique la conformité aux normes européennes suivantes:
• EN55103-1: Interférences électromagnétiques (émission)
• EN55103-2: Sensibilité électromagnétique (immunité)
Ce produit est prévu pour être utilisé dans les environnements électromagnétiques suivants:
E1 (résidentiel), E2 (commercial et industrie légère), E3 (urbain extérieur) et E4 (environnement EMC contrôlé ex. studio de télévision).

Für Kunden in Europa

Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt die EMV-Direktive (89/336/EEC) der EG-Kommission.
Die Erfüllung dieser Direktive bedeutet Konformität für die folgenden Europäischen Normen:
• EN55103-1: Elektromagnetische Interferenz (Emission)
• EN55103-2: Elektromagnetische Empfindlichkeit (Immunität)
Dieses Produkt ist für den Einsatz unter folgenden elektromagnetischen Bedingungen ausgelegt:
E1 (Wohnbereich), E2 (kommerzieller und in beschränktem Maße industrieller Bereich), E3 (Stadtbereich im Freien) und E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio)

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1-1 Features

The DNW-A28/A28P is a digital portable videocassette recorder for the Betacam SX format. The features of this unit include the following.

Betacam SX format

This unit supports the Betacam SX format, developed by Sony as the digital version of the Betacam SP format. No format conversion is needed for use with nonlinear editing systems and server systems.

Playback compatibility with Betacam SP

It can play tapes recorded in the Betacam and Betacam SP formats, allowing you to make effective use of Betacam and Betacam SP cassettes recorded in the past. You can assemble news gathering systems that combine this unit with conventional Betacam SP camcorders.

Digital signal processing

This unit processes 4:2:2 component digital signals in the D-1 format.

Inter-frame data compression

Inter-frame data compression by MPEG2 4:2:2 Profile @ Main Level (1 GOP = 2 frames) reduces the volume of data to about $^{1}/_{10}$.

Rich variety of input and output signals

The following input and output signals are supported.
- SDI (serial digital interface) video and audio
- Analog composite video
- Analog audio
- Timecode

Powerful editing functions

By connecting two DNW-A28/A28P units to a BVE-series or other editor, you can perform assemble editing, insert editing, and audio split editing. When both the source and recording sides use the Betacam SX format, you can perform DMC editing.
You can also perform editing by connecting this unit to a VTR such as the DNW-A100/A75 series.

Sequential recording

Connecting two DNW-A28/A28P units allows you to perform sequential recording from one unit to another. When you perform overwrite recording using only two cassettes, the last two hours recording can be obtained at any time. When you renew the cassette about every 1 hour, endless recording is possible.

Good Shot marks/Shot Data

During tape rewinds, this unit reads the REC Start (RS) and Good Shot (GS) marks recorded by Betacam SX camcorders, and builds an index. The index facilitates quick cue-ups of desired marks (index search function), for greater editing efficiency.
When shot marks are recorded on the tape, you can display and sort lists of the shot marks.

Preread editing

You can use video or audio signals recorded on the tape as the edit source for insert editing because this unit uses the preread heads to read the signals in advance. This type of editing is called “preread editing”.

Back space editing

To record multiple scenes as a single sequence, you can use the PAUSE button to record the scenes continuously with no noise or breakup between scenes.

AC and DC power

The BP-L60(A)/L90(A) or BP-90(A) battery or an AC adaptor can be used on this unit. The unit can operate for about 80 minutes with a BP-L90 battery mounted.
For AC operation, you can connect an AC-550/550CE or AC-DN2A adaptor.
To mount a battery or the AC-DN2A on this unit, attach the optional BKP-L551 Battery Adaptor.

525 or 625 versatility

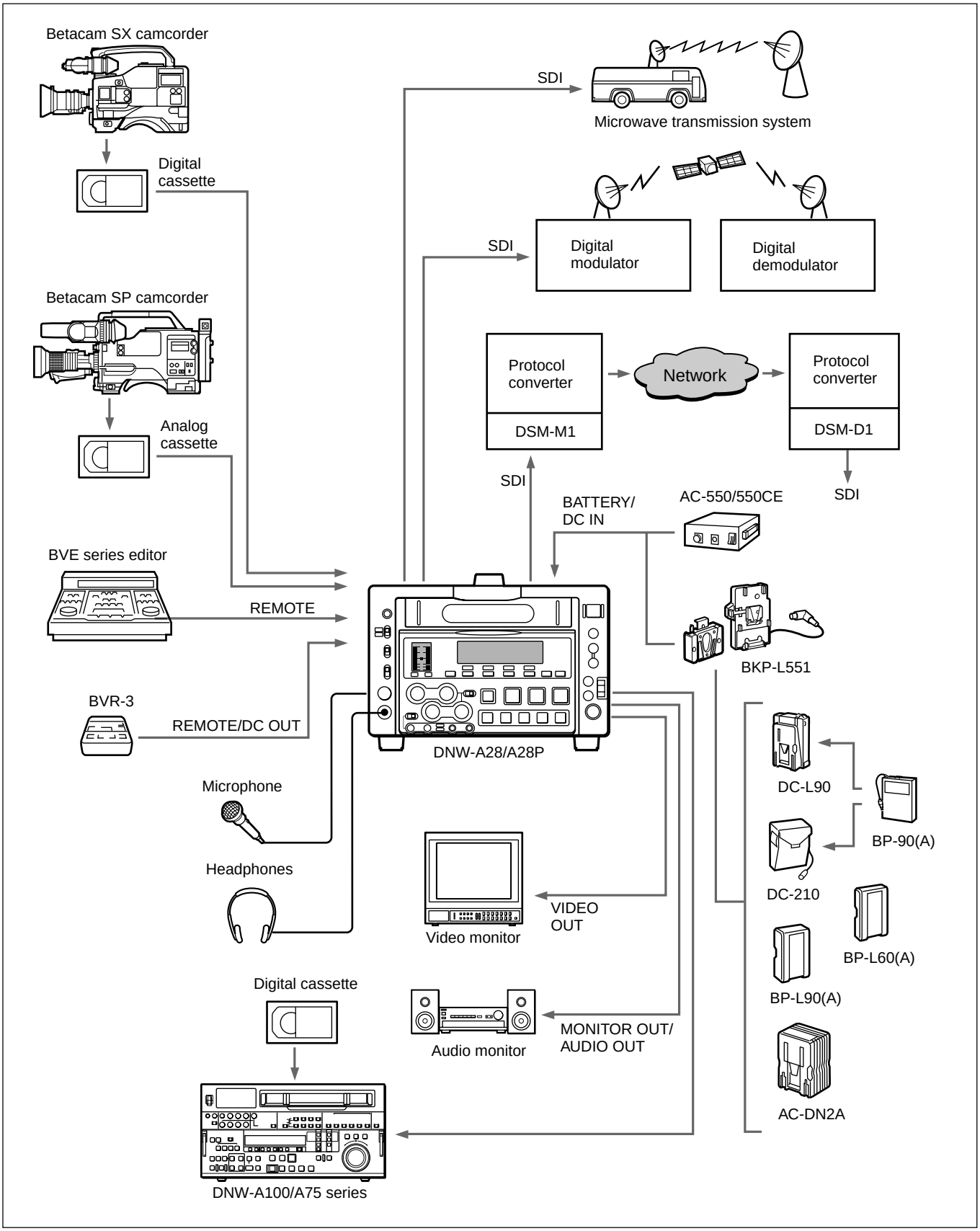
When using the Betacam SX format, 525 or 625 mode recording and playback can be selected from a menu. When using the Betacam and Betacam SP formats, only simple viewing is possible for tapes recorded in different mode.

Other

- Betacam SP cassettes and inexpensive UVW cassettes can be used in addition to Betacam SX cassettes.
- Special high-durability heads and components contribute to reduced maintenance costs.
- You can stack up to three DNW-A28/A28P units for use in recording and editing.

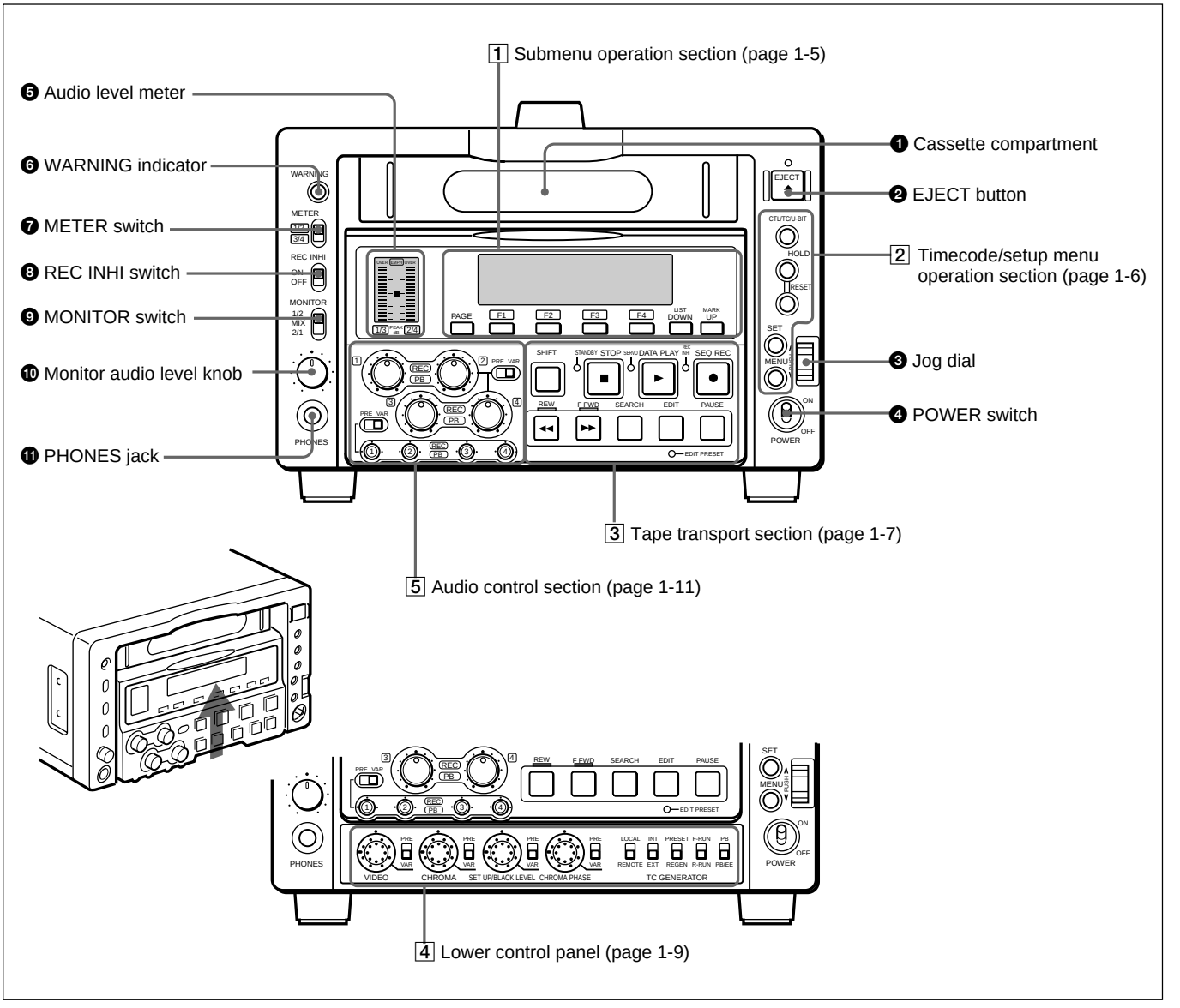
1-2 System Configuration

The figure below shows an example of an editing system configured around the DNW-A28/A28P.



1-3 Locations and Functions of Parts

1-3-1 Front Panel



❶ Cassette compartment

Insert a cassette here.

❷ EJECT button

Press to eject the cassette. The button lights while the cassette is being ejected. If you insert a cassette which cannot be used on this unit, the button flashes. Press the button to eject the cassette.

❸ Jog dial

Use to carry out searches in jog or shuttle mode and for menu operations. Rotate downward to search in the forward direction, and upward to search in the reverse direction. For menu operations, rotate to select a menu item and press to confirm the selection.

For more information about search and menu operations, see section 3-2 “Finding Edit Points – Search” and Chapter 6 “Setup Menu”.

❹ POWER switch
Powers the unit on and off.

❺ Audio level meter
Displays the recording and playback audio levels of two (CH-1/2 or CH-3/4) of the four audio channels (CH-1 to CH-4), as selected with the METER switch ❼.

❻ WARNING indicator
Lights when the battery is exhausted or an error occurs.
It flashes in the following cases.
- When the end of battery power is near
- When the number of memorized shot marks reaches to 200 during shot mark reading or when you start reading shot marks after 200 marks have been read.

❼ METER switch
Selects the audio channel whose level is displayed by the audio level meter.

CH-1/2: Display the recording, playback, and E-E levels of audio channels 1 and 2.

CH-3/4: Display the recording, playback, and E-E levels of audio channels 3 and 4.

❽REC INHI switch
When ON, recording to the tape is inhibited, regardless of the state of the cassette's erasure prevention plug. (The REC INHI indicator lights.)

❾MONITOR switch
Selects the output from the MONITOR OUTPUT L/R connectors. Settings made with this switch are enabled only when audio settings page 1-3 is selected.

1/2: Output the audio signals of channel 1 from the L connector and the audio signals of channel 2 from the R connector.

MIX: Output the mixed signals of channels 1 and 2 from both the L and R connectors.

2/1: Output the audio signals of channel 2 from the L connector and the audio signals of channel 1 from the R connector.

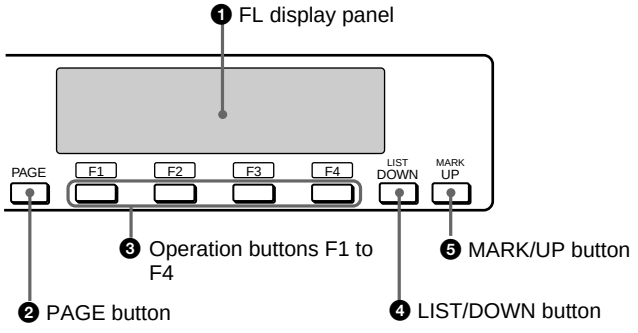
❿ Monitor audio level knob
Adjusts the volume of the headphones connected to the PHONES jack ⓫.

This knob can also adjust the level of the audio signal output from the MONITOR OUT connectors when MONITOR in the submenu is set to VAR. For details, see page 2-21.

⓫ PHONES (headphones) jack
Connect headphones.

1 Submenu Operation Section

Settings made by submenu include video and audio input and output settings, and reference video signal settings. For details, see section 2-7-1 "Displays on the Home Page of the Submenu".



❶ FL (fluorescent) display panel
Displays time data, status information, submenu, setup menu and error messages.

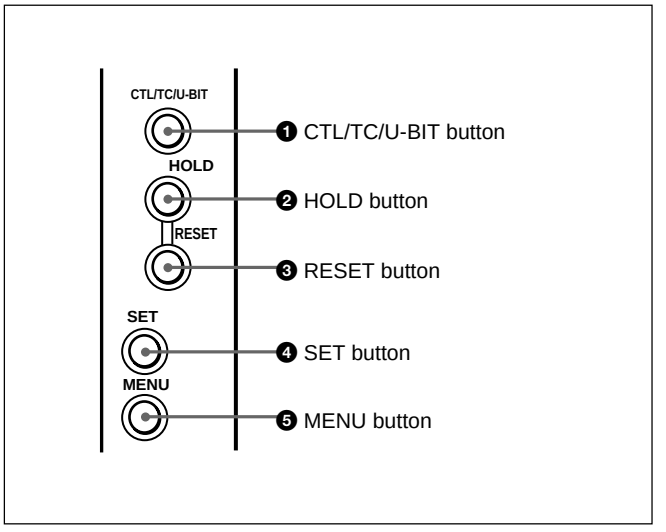
❷ PAGE button
Switches between pages in the submenu.

❸ Operation buttons F1 to F4
Select items in the submenu.
You can use operation button F4 for preroll *(see "❿ Source video signal display" on page 2-17)*.

❹ LIST/DOWN button
Press to make settings in the submenu.

❺ MARK/UP button
Press to make settings in the submenu.

2 Timecode/setup menu operation section



❶ CTL/TC/U-BIT button
Alternately selects CTL (control), TC (timecode), and U-BIT (user bits) as the time data used in editing and displayed in the FL display panel.

❷ HOLD button
Stops the progress of the timecode generator. Press this button before setting timecode or user bits to hold those values.

For more information, see section 2-6 "Setting Timecode".

❸ RESET button
Resets the CTL, TC, and U-BIT values displayed in the FL display panel to 0. Resetting the CTL value erase all edit points that have been set.

For more information, see section 2-6 "Setting Timecode".

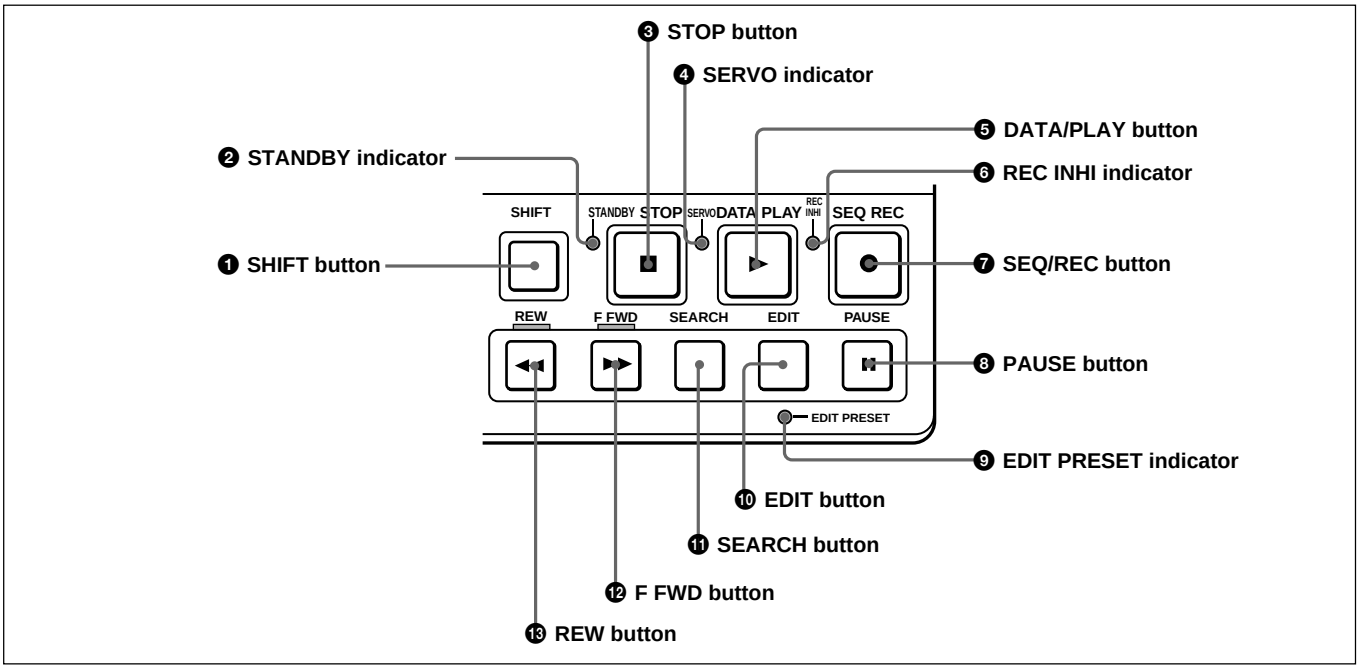
❹ SET button
Use to make setup menu settings, timecode settings, and user bit settings.

For more information about setup menu operations, see Chapter 6, "Setup Menu". For more information about timecode and user bit settings, see 2-6 "Setting Timecode".

❺ MENU button
Use for setup menu operations. The setup menu appears on the monitor connected to the VIDEO OUTPUT 2 (SUPER) connector and FL display panel when you press this button with the SUPER in the submenu set to other than OFF *(see page 2-24)*, and the original display appears when you press it again.

For more information about setup menu operations, see Chapter 6, "Setup Menu".

3 Tape transport section



❶ SHIFT button

Switches between functions for buttons with two functions. The following buttons have two functions.

LIST/DOWN button: Becomes the LIST button when the SHIFT button is pressed.

MARK/UP button: Becomes the MARK button when the SHIFT button is pressed.

DATA/PLAY button: Becomes the DATA button when the SHIFT button is pressed.

SEQ/REC button: Becomes the SEQ button when the SHIFT button is pressed.

❷ STANDBY indicator

Lights when the tape drum is rotating with tension applied (standby on). It goes out when the drum stops rotating and tension is released (standby off).
To protect the tape, the unit normally changes to standby off when stop or pause mode continues for longer than eight minutes. If you operate a dial or any of the tape transport buttons except STOP/PAUSE while the unit is in this state, the unit changes to standby on and enters the mode of the button or dial that you pressed.
Press the SHIFT and STOP buttons at the same time to switch from standby on to standby off manually.

For more information about tape protection, see the setup menu items in the 500s on page 6-13.

❸ STOP button

Press this button, lighting it, to stop playback or recording. When you stop playback, the monitor displays E-E or still picture playback, depending on the settings of the monitor output switches in the timecode and setup menu section.
When setup menu item 105 is set to ON (*page 6-8*), this button flashes if the reference video signal specified in the OUT REF item of the submenu (*page 2-22*) and item 309 in the setup menu (*page 6-11*) is not being input.

For more information about reference video signal settings, see page 2-7.

❹ SERVO indicator

Lights when the drum servo and capstan servo are locked.

❺ DATA/PLAY button

Press this button, lighting it, to start playback. Recording starts when you press this button together with the SEQ/REC button ❼, and manual editing starts when you press this button together with the EDIT button ❿. If you press this button only during recording or manual editing, recording or manual editing stops and the unit returns to playback mode. This button is also used to display the shot data if it is recorded on the tape.

For details, see 5-1-3 "Reading Shot Data".

❻ REC INHI (recording inhibit) indicator
Lights under the following situations.
• Set the REC INHI switch to ON.
• Press in the erasure prevention plug.
• Insert the Betacam cassette (oxide tape).

When the REC INHI switch is set to OFF, it is possible to set this indicator flashing instead of lighting under the latter two situations. For details, see setup menu item 107 on page 6-8.

❼ SEQ/REC (sequence/recording) button
Press together with the DATA/PLAY button ❺ to start recording.
When two DNW-A28/A28P units are connected, this button allows you to perform sequential recording from one unit to another.

For details, see 4-2 "Sequential Recording".

To monitor E-E mode
You can monitor input signals in E-E mode by pressing this button from stop mode. The button lights when pressed. To return to the original picture, press the STOP button ❸. You can view E-E video during playback, search, fast forward, and rewind by pressing this button. The E-E video continues for as long as the button is kept pressed.

❽ PAUSE button
Pauses the operation when pressed during recording or playback. You can execute continuous operations by pressing this button together with the SEQ/REC button ❼ and the DATA/PLAY button ❺.

For more information about continuous recording, see section 4-3 "Back Space Editing".

❾ EDIT PREST (preset) indicator
Lights when an item in the Edit Preset menu is set to ON.

For more information about the Edit Preset menu, see section 3-1 "Selecting an Edit Mode".

❿ EDIT button
Press this button to display the Edit Preset menu in the FL display panel, allowing you to select an edit mode.

For more information about the Edit Preset menu, see section 3-1 "Selecting an Edit Mode".

Press together with the DATA/PLAY button ❺ to perform manual editing.

To monitor E-E mode
You can monitor input signals in E-E mode by pressing this button from stop mode. The button lights when pressed, and the input signals selected in the Edit Preset menu appear in E-E mode. To return to the original picture, press the STOP button ❸. You can view E-E video during playback, search, fast forward, and rewind by pressing this button. The E-E video continues for as long as the button is kept pressed.

⓫ SEARCH button
Press to enter search mode. When the unit is in jog mode, keep this button depressed for about 1 second to enter shuttle mode, and vice versa.
In shuttle mode, you can start playback at preset speed by rotating the jog dial to the desired position and pressing this button.

For details on mode change, see the section 3-2 "Finding Edit Points – Search"

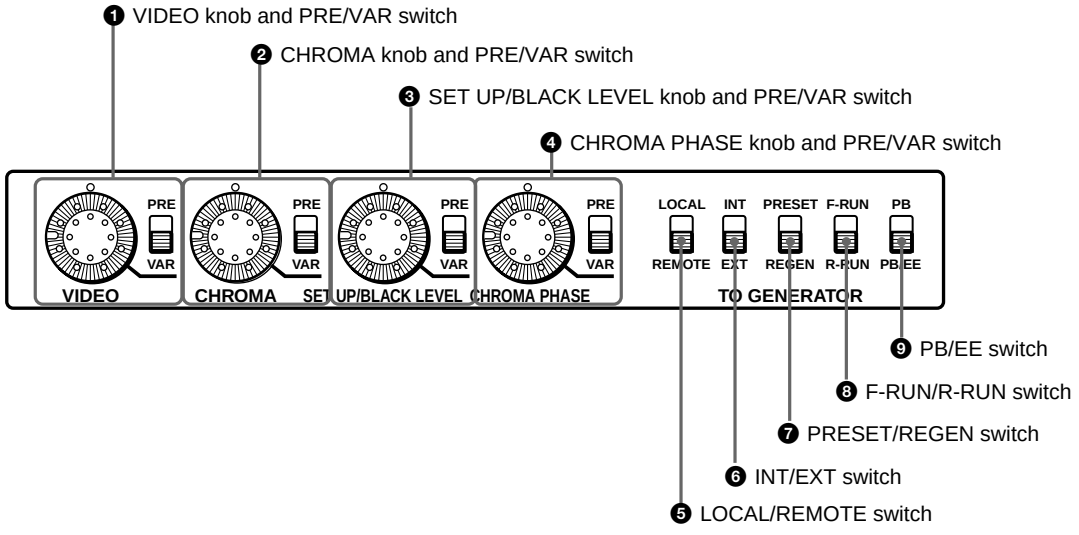
⓬ F FWD (fast forward) button
Press this button, lighting it, to fast forward the tape. When using a tape on which shot marks have been recorded, you can press this button together with the LIST/DOWN button to read shot marks from the tape, and press this button together with the MARK/UP button to cue up shot mark positions.

For details, see Chapter 5 "Shot Mark/Shot Data".

⓭ REW (rewind) button
Press this button, lighting it, to rewind the tape. When using a tape on which shot marks have been recorded, you can press this button together with the LIST/DOWN button to read shot marks from the tape, and press this button together with the MARK/UP button to cue up shot mark positions.

For details, see Chapter 5 "Shot Mark/Shot Data".

4 Lower Control Panel



❶ VIDEO knob and PRE/VAR (preset/variable) switch

Adjusts the video signal output level. The function of the knob changes as follows, depending on the position of the PRE/VAR switch.

PRE: This is the normal setting. Regardless of the knob position, the video signal output level is set to the standard value.

VAR: The video signal output level can be adjusted across a range of ±3 dB.

You can change the adjustment range by using setup menu item 714. For details, see page 6-18.

❷ CHROMA knob and PRE/VAR (preset/variable) switch

Adjusts the chroma signal output level. The function of the knob changes as follows, depending on the position of the PRE/VAR switch.

PRE: This is the normal setting. Regardless of the knob position, the chroma signal output level is set to the standard value.

VAR: The chroma signal output level can be adjusted across a range of ±3 dB.

You can change the adjustment range by using setup menu item 714. For details, see page 6-18.

❸ SET UP/BLACK LEVEL knob and PRE/VAR (preset/variable) switch

Adjusts the setup level (in 525/60 mode) and the black level (in 625/50 mode). The function of the knob changes as follows, depending on the position of the PRE/VAR switch.

PRE: This is the normal setting. Regardless of the knob position, the setup level is set to the standard value.

VAR: The setup level can be adjusted across a range of ±30 IRE (in 525/60 mode) and the black level can be adjusted across a range of ±210 mV (in 625/50 mode).

❹ CHROMA PHASE knob and PRE/VAR (preset/variable) switch

Adjusts the chroma phase (phase relative to burst). The function of the knob changes as follows, depending on the position of the PRE/VAR switch.

PRE: This is the normal setting. Regardless of the knob position, the chroma phase is set to the standard value.

VAR: The chroma phase can be adjusted across a range of ±30°.

❺ LOCAL/REMOTE switch

Selects the source for control of this unit. When two DNW-A28/A28P units are connected, set this switch on the playback-side VTR to REMOTE.

LOCAL: This unit is controlled from the control panel. Normally set the switch to this position.

REMOTE: This unit is controlled from the device connected to the REMOTE connector. In this case, all VTR operations using this unit's control panel are disabled except the STOP and EJECT buttons.

When the REMOTE is selected, you can determine which tape transport control buttons on the control panel are enabled. See setup menu item 006 on page 6-2.

❻ INT/EXT (internal/external timecode) switch

Selects the timecode to use.

INT: Use the timecode generated by this unit's built-in timecode generator.

EXT: Use external timecode. When the VITC/LTC/AUTO item of the submenu is set to LTC or AUTO, the external timecode input to the TC IN connector. When it is set to VITC, the VITC of input video signal.

For more information about the VITC/LTC/AUTO settings, see page 2-17.

❼ PRESET/REGEN (regenerate) switch

Selects the value set in the internal timecode generator.

PRESET: Preset the initial value of the timecode generated by the internal timecode generator, either by a control panel operation or by remote control from the device connected to the REMOTE connector.

REGEN: Synchronize the internal timecode generator with the timecode read by the internal timecode reader.

❽ F-RUN/R-RUN (free-run, rec-run) switch

Selects the progression method for the timecode generated by the internal timecode generator.

F-RUN: Timecode progresses continuously from the time when this unit is powered on, regardless of the unit's operating status.

R-RUN: Timecode progresses only during recording. When you use this switch, set the INT/EXT switch ❻ to INT, and set the PRESET/REGEN switch ❼ to PRESET.

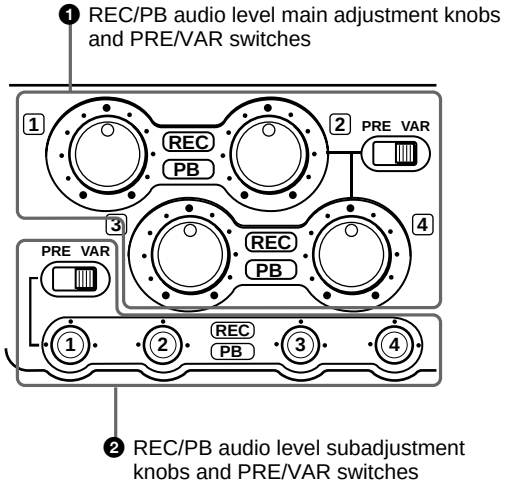
❾ PB (playback)/EE switch

Selects the output signals from the VIDEO and AUDIO OUTPUT connectors during fast forward, rewind, stop, and standby mode.

PB: Playback (PB) mode

PB/EE: E-E mode

5 Audio control section



❶ REC/PB audio level main adjustment knobs and PRE/VAR switches

Make level adjustments by channel for playback audio channels 1 to 4.

The function of the knobs changes as follows, depending on the position of the PRE/VAR switch.

PRE: Preset to fixed levels. Levels cannot be adjusted with the level adjustment knobs.

VAR: Levels adjustable with level adjustment knobs. This allows you to adjust the levels while viewing the audio level meters in E-E mode.

For more information about switching to E-E mode, see the descriptions of the SEQ/REC and EDIT buttons (page 1-8)

In the factory default configuration, the playback level is adjusted. But you can also switch the function of these knobs with the REC/PB audio level subadjustment knobs ❷, by using the MAIN VR setting in the submenu *(see page 2-20)*.

❷ REC/PB audio level subadjustment knobs and PRE/VAR switches

Make level adjustments by channel for audio input to this unit.

The function of the knobs changes as follows, depending on the position of the PRE/VAR switch.

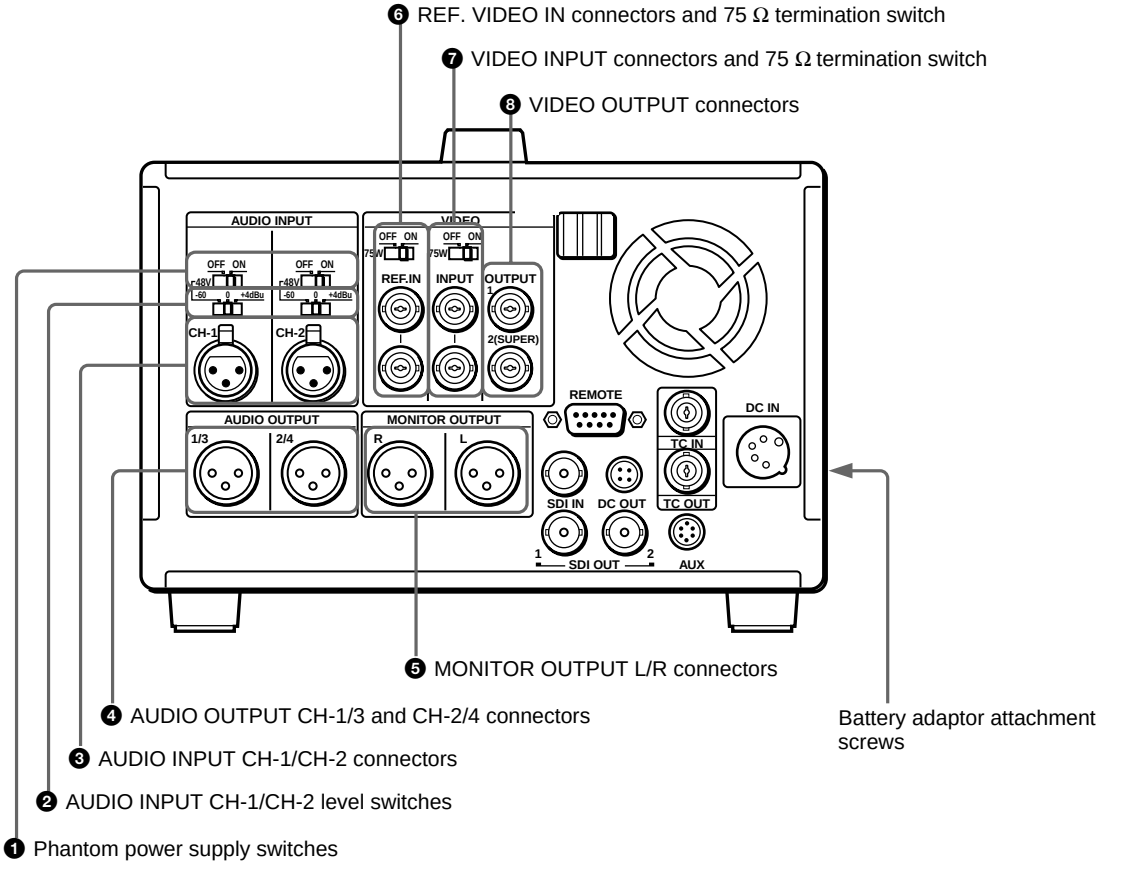
PRE: Preset to fixed levels. Levels cannot be adjusted with the level adjustment sliders.

VAR: Levels adjustable with the level adjustment sliders. This allows you to adjust the levels while viewing the audio level meter.

In the factory default configuration, the recording level is adjusted. But you can also switch the function of these knobs with the REC/PB audio level main adjustment knobs ❶, by using the MAIN VR setting in the submenu *(see page 2-20)*.

1-3-2 Rear Panel

Analog audio/video input and output section



❶ Phantom power supply switches

When the AUDIO INPUT CH-1/CH-2 level switches ❷ are set to –60 dBu, phantom power is supplied to the AUDIO INPUT connectors when these switches are set to ON.

❷ AUDIO INPUT CH-1/CH-2 level switches

Select the input level of the analog audio signals of input channels 1 and 2.
–60 dBu: Microphone input
0 dBu: Line audio input
+4 dBu: Line audio input
(0 dBu = 0.775 Vrms)

❸ AUDIO INPUT CH-1/CH-2 connectors (XLR 3-pin, female)
Input the analog audio signals of input channels 1 and 2.

❹ AUDIO OUTPUT CH-1/3 and CH-2/4 connectors (XLR 3-pin, male)
Output the audio signals of the channels selected with the LINE OUT in the submenu. You can select two combinations of output signals: channels 1 and 2, or channels 3 and 4.

For more information about LINE OUT settings, see page 2-21.

Note
The level can be adjusted from the control panel, but mixed signals cannot be output.

❺ MONITOR OUTPUT L/R connectors (XLR 3-pin, male)
Output the audio signals of the channels selected with the MONITOR L/R in the submenu. The level is adjustable, and mixing is possible. Connect these connectors when you want to output mixed signals.

For more information about MONITOR L/R settings, see page 2-21.

You can also adjust the output level of the LEVEL knob with the MONITOR in the submenu. For details, see page 2-21.

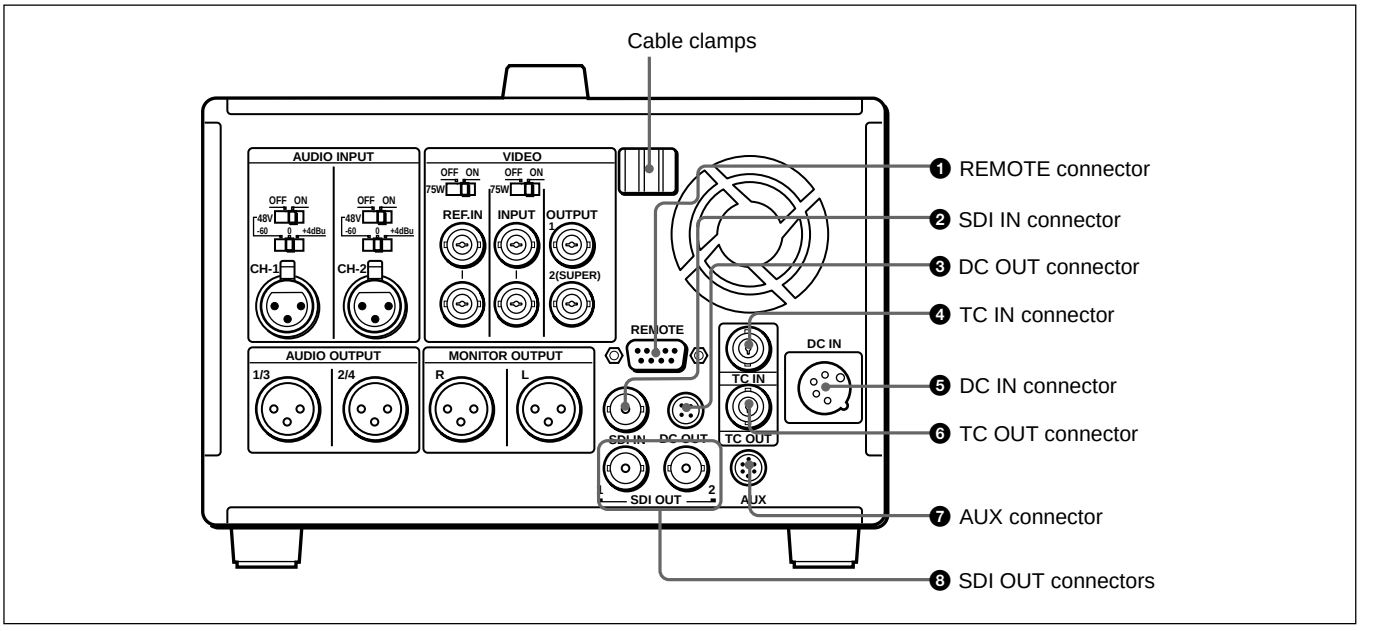
❻ REF. VIDEO IN (reference video signal input) connectors (BNC type) and 75 Ω termination switch
Input a video signal with color burst (VBS) or monochrome video signal (VS) as reference video signal. Set the 75 Ω termination switch to OFF when the signal is bridged, and to ON when the signal is not bridged.

❼ VIDEO INPUT (analog composite video input) connectors (BNC type) and 75 Ω termination switch
Input an analog composite video signal. Set the 75 Ω termination switch to OFF when the signal is bridged, and to ON when the signal is not bridged.

❽ VIDEO OUTPUT (analog composite video output) connectors (BNC type)
Output analog composite video signals. You can superimpose timecode, menu settings, error messages, or other information on the output of the 2(SUPER) connector. (The superimposed information varies depending on the setting of the SUPER in the submenu.)

For more information about SUPER settings, see page 2-24. For details about the superimposed information, see page 2-9.

Digital signal/timecode/remote control/power input and output section



❶ REMOTE (9-pin remote control) connector (D-SUB 9-pin)
When editing with two DNW-A28/A28P units, connect this connector on each unit using a 9-pin remote control cable (not supplied). When editing with this unit and D-1, D-2, Betacam VTR, Digital Betacam VTR or other external equipment, connect the external equipment.

❷ SDI IN (serial digital interface input) connector (BNC type)
Input a D-1 format video/audio signal. When editing with two DNW-A28/A28P units, connect the SDI OUT connector ❽ on the player unit with this connector on the recorder unit.

❸ DC OUT connector
This connector supplies power to the BVR-3 Remote Control Unit.

❹ TC IN (timecode input) connector (BNC type)
To record timecode from an external device, input the timecode from the external device's timecode output connector.

❺ DC IN (external power input) connector (XLR 4-pin, male)
When using the BKP-L551 Battery Adaptor to mount a battery or the AC-DN2A adaptor on the side of this unit, connect the power cable of the BKP-L551. When using the AC-550/550CE AC Adaptor, connect to the DC output connector of the AC-550/550CE. You can also use the DC-210 Battery Adaptor to connect a BP-90(A) Battery Pack.

For more information, see section 2-1 "Power Preparations".

❻ TC OUT (timecode output) connector (BNC type)
Outputs the following types of timecode, depending on the VTR operating status.

During playback: The playback timecode
During recording: The timecode generated by the internal timecode generator, or the timecode input through the TC IN connector.

❼ AUX (auxiliary) connector
This connector is used only for service.

❽ SDI OUT (serial digital interface output) connectors (BNC type)
Output a D-1 format video/audio signal. The same signals are output from the left and right connectors.

2-1 Power Preparations

This unit can be powered by batteries or AC power.

Note

If you attach or remove batteries or AC adaptors incorrectly, they may fall down and cause body injury. Follow the procedures described below to attach or remove them.

2-1-1 Usable Batteries

Batteries that can be used with this unit are as follows. For each type of battery, a special battery adaptor and battery charger is required.

Battery	Battery Adaptor	Battery Charger
BP-90(A) (mounted on this unit)	DC-L90	BC-210/210CE/410/ 410CE
BP-90(A) (connected to DC IN connector)	DC-210	BC-210/210CE/410/ 410CE
BP-L60(A)/L90(A)	BKP-L551	BC-L100/ L100CE/L50

Notes about battery usage

- Before using the batteries, be sure to charge them fully with the special battery charger. Refer to the operating instructions of your battery charger for more information about how to charge the batteries.
- Batteries may not be completely charged if you charge them immediately after use when they are still warm. You should wait until the batteries cool before charging them.

2-1-2 Using the BP-L60(A)/L90(A) Battery Pack

This unit can be operated for about 80 minutes at normal temperature on fully charged BP-L90 Battery Pack.

To charge the battery pack

Before use, charge the battery pack with the BC-L100/ L100CE Battery Charger. It takes about 2.5 hours to charge the BP-L60(A) and about 3.5 hours to charge the BP-L90(A).

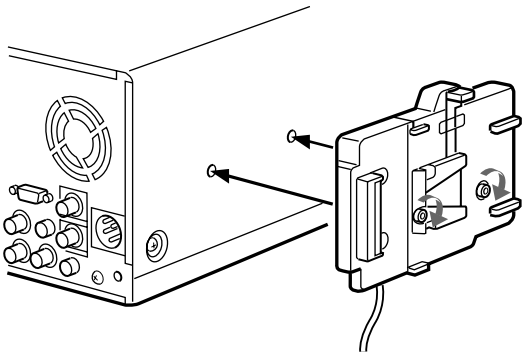
For more information about how to charge the battery pack, refer to the manual for the BC-L100/L100CE.

To attach the battery pack

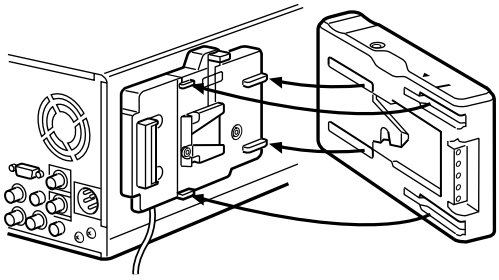
Attach the BP-L60(A)/L90(A) as shown in the figure below. Before attaching, remove the two screws on the side panel of this unit.

For details on attaching the BKP-L551, refer to the BKP-L551 installation manual.

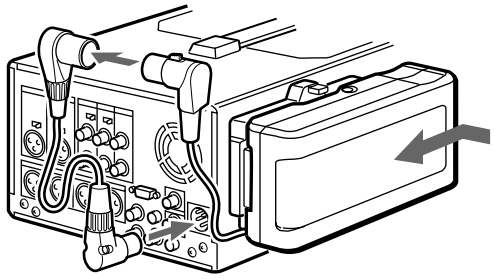
① Screw the BKP-L551 on the side panel.



② Align the groove on the top panel of the BP-L60(A)/ L90(A) with the guides.

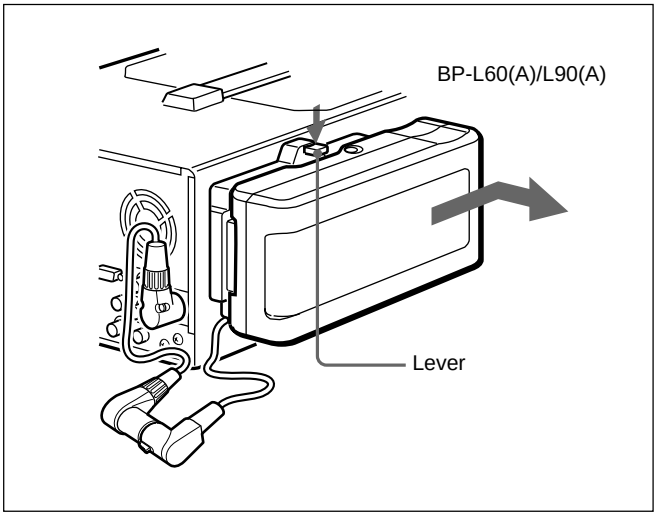


③ Slide the BP-L60(A)/L90(A) in so that its connector is firmly connected to the battery connector. Use the optional extension cable (part No. 1-790-446-11) to connect the DC cable of the BKP-L551 to the DC IN connecteor on this unit.



To remove the battery pack

With the lever pushed in, slide the BP-L60(A)/L90(A) out.



2-1-3 Using the BP-90(A) Battery Pack

Different battery adaptors are used when attaching the BP-90(A) on the side panel of this unit and when connecting it the DC IN connector.
This unit can be operated for about 60 minutes at normal temperature on a fully charged BP-90(A) Battery Pack.

To charge the battery pack

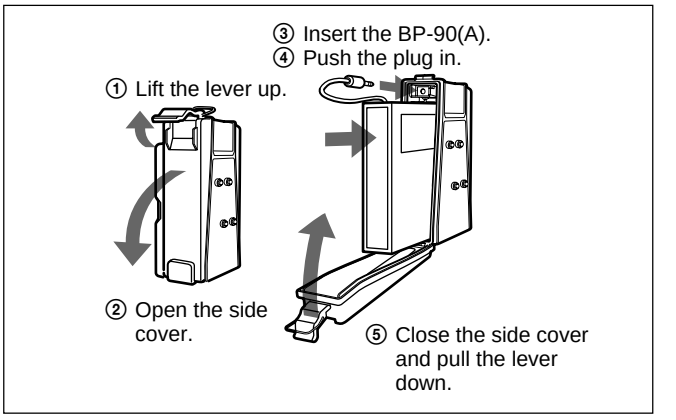
Before use, be sure to charge the battery pack with the BC-210/210CE/410/410CE Battery Charger. It takes about 2 hours to charge the BP-90(A).

For more information about how to charge the battery pack, refer to the manual for the BC-210/210CE/410/410CE.

To attach to side this unit

Use the DC-L90 Battery Adaptor.

1 Mount the BP-90(A) in the DC-L90.



2 Attach the DC-L90 to the side panel of this unit.

Use the same method that you use to attach the BP-L60(A)/L90(A). For details, refer to "To attach the battery pack" on page 2-1.

To connect to the DC IN connector

Use the DC-210 Battery Adaptor.

For more information about connections, refer to the operating instructions of the DC-210.

2-1-4 Using AC Power

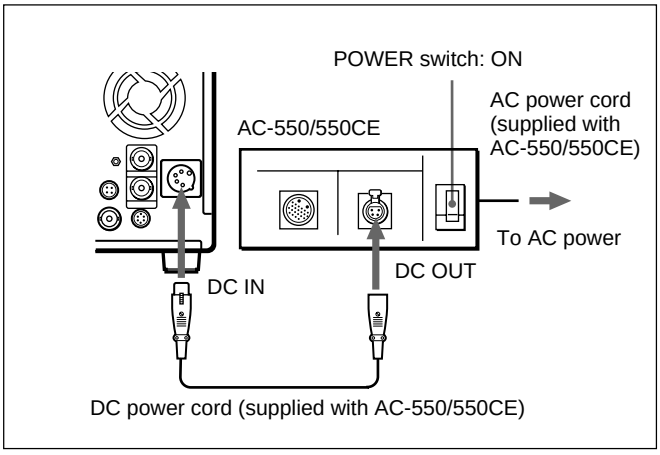
You can operate the unit from an AC power source by using the AC-550/550CE AC Adaptor or AC-DN2A AC Adaptor.

To use the AC-550/550CE

As shown in the figure on next page, connect the AC-550/550CE to the AC power source and turn it on.

Note

Noise may occur in video and audio signals at the moment when the unit switches from the battery pack to AC power.



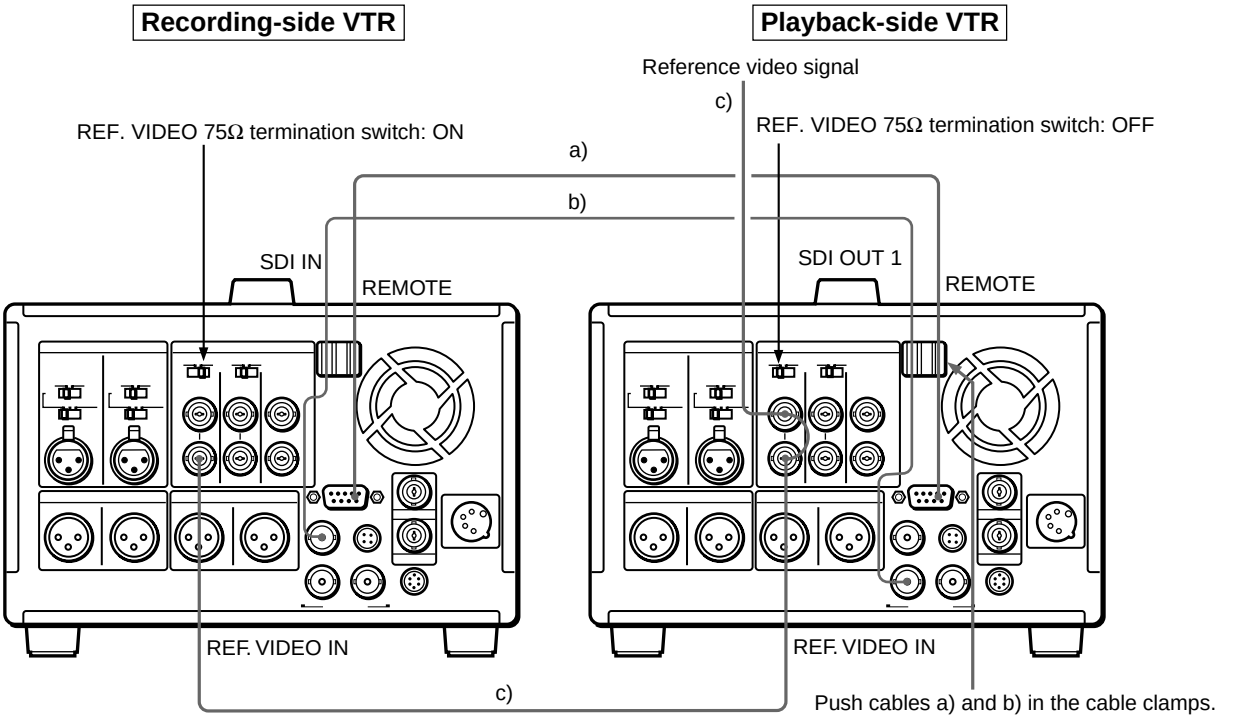
To use the AC-DN2A

Attach the AC-DN2A on the side panel of this unit, and connect to AC power.

Use the same method that you use to attach the BP-L60 (A)/ L90 (A). For details, refer to "To attach the battery pack" on page 2-1.

2-2 Connection

The figure below shows how to connect two DNW-A28/A28P units for editing.



a) 9-pin remote control cable (not supplied)
b) 75 Ω coaxial cable with BNC plugs (not supplied)
c) To input a reference video signal, connect a 75 Ω coaxial cable with BNC plugs (not supplied) and set the REF. VIDEO 75Ω termination switches as shown in the figure.

2-3 Handling Cassettes

To record with this unit, you can use half-inch width Betacam SX S cassettes, Betacam SP S cassettes (metal tape), or UVW S cassettes (metal tape).
The number in the model name of the cassette indicates the cassette's normal recording time in minutes (for example, 12 minutes in the case of the BCT-12SX). However, when you are using Betacam SP S cassettes and S cassettes for UVW VTRs on this unit, you can record up to twice the amount of time indicated on the cassette (see the table below).

Usable Cassettes

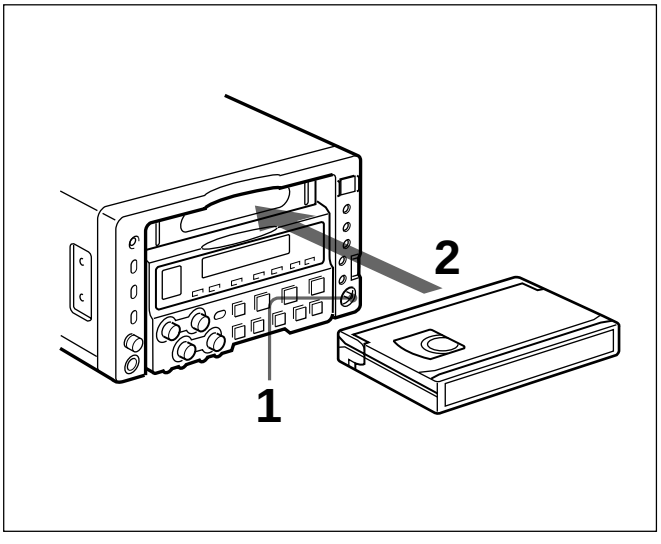
Betacam SX	BCT-6SX/12SX/22SX/32SX/60SX
Betacam SP (metal tape)	BCT-5MA/10MA/20MA/30MA (Recording time: 10/20/40/60 minutes)
UVW (metal tape)	UVWT-10MA/20MA/30MA (Recording time: 20/40/60 minutes)

Notes

- Digital Betacam cassettes cannot be used.
- Oxide tapes recorded in the Betacam format and metal tapes recorded in the Betacam SP format **can be only played back**.

2-3-1 Loading/Ejecting Cassettes

To load a cassette



1 Set the POWER switch to ON.

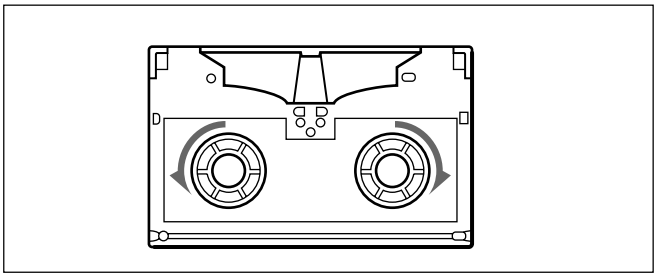
2 Load a cassette in the direction shown in the figure after checking the following points.
- That "ERROR-10" is not displayed in the FL display panel.
- That there is no slack in the tape.

If "ERROR-10" appears in the FL display panel

This means that there is condensation inside the unit. For the steps to take in this case, see "Moisture Condensation" *(page A-3)*.

If there is slack in the tape

Take up the slack by rotating the reels in the directions shown by the arrows in the figure, keeping one reel fixed by pressing it with your finger as you rotate the other reel.
The reels stop rotating when there is no more slack.



To eject the cassette

1 With the unit powered on, press the EJECT button.

A part of the cassette comes out from the unit.

2 Take out the cassette.

Note

The EJECT cannot be used to eject a cassette when battery power falls to below about 9 V. Remove the cassette manually *(see next page)*.

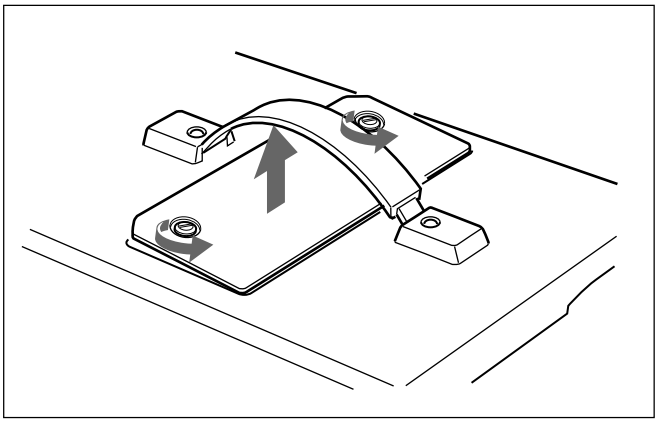
If there is no choice but to remove the cassette manually

Remove the cassette manually when battery power falls to below about 9 V.

Note

Power the unit off before removing the cassette manually. If the unit is powered, the drums may rotate and cause body injury.

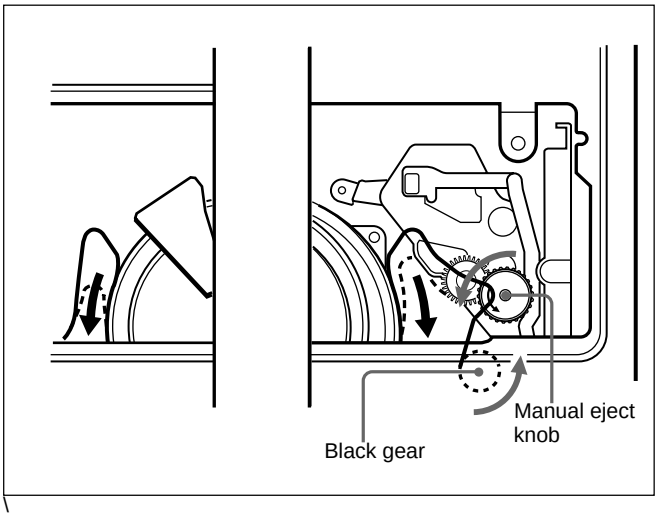
1 Remove the cover on the center of the top panel.



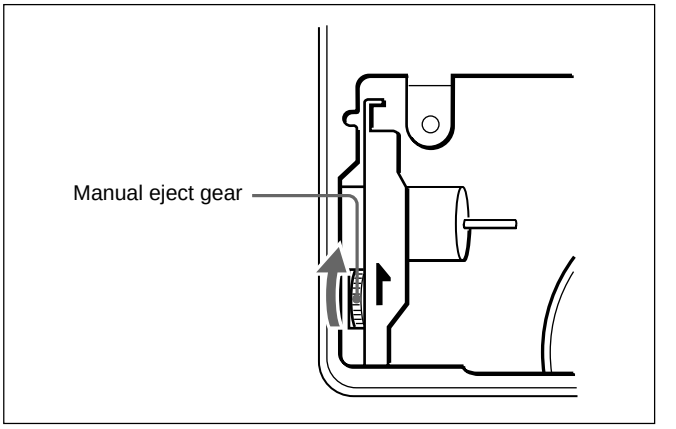
2 Press the manual eject knob (the red knob). Take up any slack in the tape by rotating the black gears on the top of the capstan in the counterclockwise direction.

Note

Perform the operation carefully so that edges of internal parts will not injure your hand.



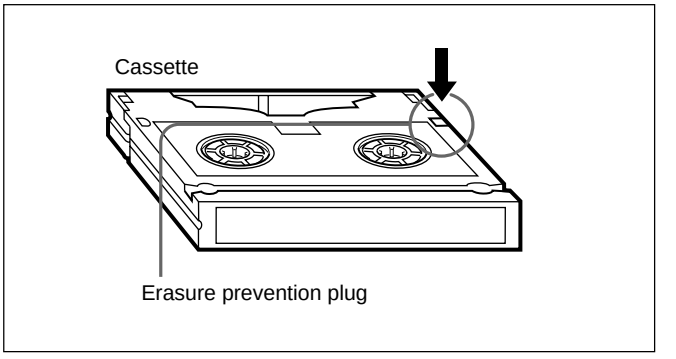
3 Check that all tape has be wound into the cassette, and eject the cassette by rotating the manual eject gear in the direction shown by the arrow.



4 Attach the cover to the top panel.

2-3-2 Preventing Accidental Erasures

To make it impossible to accidentally erase or record over the contents of a cassette, press in the erasure prevention plug. Return the plug to its original position when you want to record on the cassette again.



2-4 Setting Reference Video Signals

This section explains how reference video signals for synchronization of video output and servo lock are selected according to settings made with this unit.

Reference video signal for video output

Output video signals are synchronized with the signal generated by this unit's internal reference video signal generator. The internal reference video signal generator can be synchronized with an external reference video signal or with an input video signal (SDI or composite video).

Reference video signal for servo lock synchronization

Servo lock can be synchronized with an external reference video signal, with an input video signal (SDI or composite video), or with the signal generated by this unit's internal reference video signal generator.

As shown in the table below, a signal for synchronization of the internal reference video signal generator and a reference video signal for synchronization of servo lock are selected according to the setting of setup menu item 309, the setting of the OUT REF in the submenu, and the operating mode of the unit.

For more information about setup menu item 309, see page 6-11. For more information about the OUT REF, see page 2-22.

Setting	**Setting of setup menu item 309**	"AUTO (AUTO1/AUTO2)"		"EXT"
	OUT REF setting	"REF"	"INPUT"	–
Operating mode of this unit	**Recording** [a]	Input [d]	Input	Ref [c]
	Editing [b]	See below, "Reference video signals in editing"		
	Other	Ref		

a) During recording to tape.
b) When the assemble editing or insert editing mode has been selected.
c) Synchronize with external reference video signal (input to the REF. VIDEO IN connector).
d) Synchronize with input video signal (SDI or composite video), as selected with "source video signal" in the submenu *(see page 2-17)*.

Reference video signals in editing

When the OUT REF is set to REF, the signal shown in the table below is selected, depending on whether setup menu item 309 is set to AUTO1 or AUTO2.

Note

Normally select AUTO1 and synchronize the external reference video signal with the input video signal. Select AUTO2 when the external reference video signal is not synchronized with the input video signal.

If you select AUTO1 under these conditions, noise may enter the video and audio signals, making editing difficult.

Setting of setup menu item 309	AUTO1	AUTO2
Synchronization signal for internal reference video signal generator	External reference video signal	Input video signal
Synchronization signal for servo reference video signal	Input video signal	

When the signal selected in the menu is not being input

The servo reference video signal and internal reference signal generator synchronize as follows.

When “Input” is selected for the sync signal (see note d) of the table on previous page)

When a video signal is not being input, synchronize with an external reference video signal.

When “Ref” is selected for the sync signal (see note c) of the table on previous page)

When an external reference video signal is not being input, there is no external synchronization. The servo reference video signal synchronizes with the output of the internal reference video signal generator.

2-5 Information Displayed on the Monitor

The monitor connected to the VIDEO OUTPUT connector 2 (SUPER) displays setup menus, error messages, time data, and information about the unit's operating status.

For more information about the setup menus, see chapter 6 "Setup Menu".

To display superimposed text information

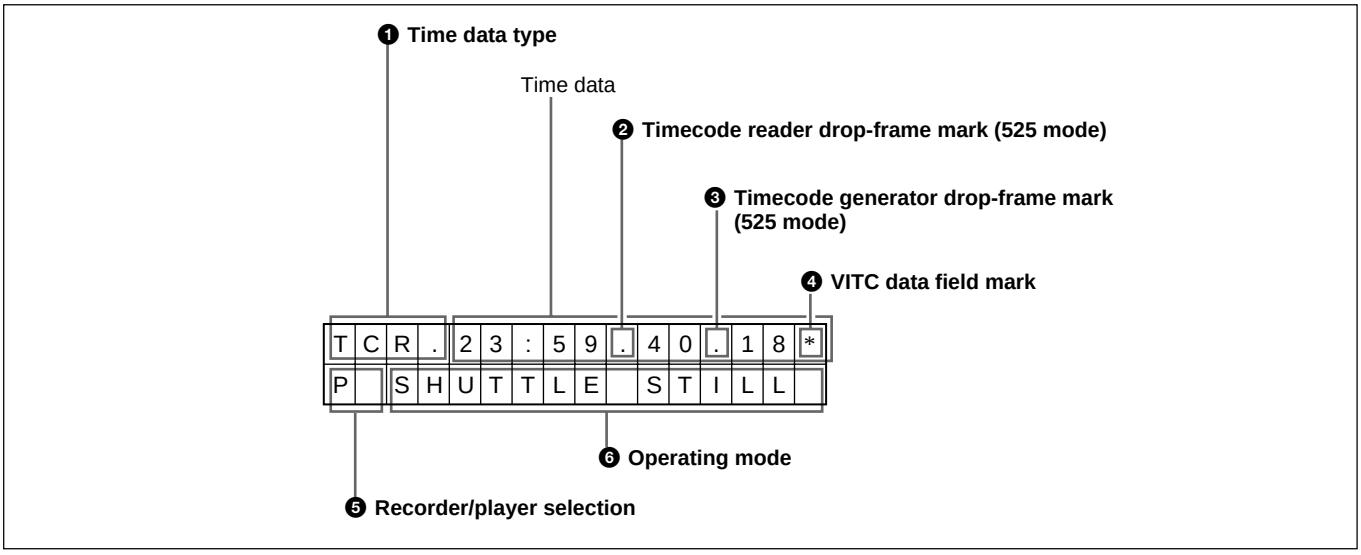
To display superimposed time data and text information about the operating status of the unit, set the SUPER in the submenu to ALL *(see page 2-23)*.

To adjust the displayed text

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

For details, see pages 6-1 and 6-2.

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



Note

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

For details, see page 6-2.

❶ Time data type

Display	Meaning
CTL	CTL counter data
TCR	LTC reader timecode data
UBR	LTC reader user bits data
TCR.	VITC reader timecode data
UBR.	VITC reader user bits data
TCG	Timecode generator timecode data
UBG	Timecode generator user bits data
IN[a)]	IN point time data
OUT[a)]	OUT point time data
AI[a)]	AUDIO IN point time data
DUR[a)]	The duration between any two of the three edit points (IN, OUT, AUDIO IN)

a) Displayed when this unit is used with an editor.

Note

Asterisks are displayed in this block when timecode or user bits could not be read correctly, for example as T∗R, U∗R.

❷ Timecode reader drop-frame mark (525 mode)

[.] (period): Indicates drop-frame mode.
[:] (colon): Indicates non-drop frame mode.

❸ Timecode generator drop-frame mark (525 mode)

[.] (period): Indicates drop-frame mode (factory default).
[:] (colon): Indicates non-drop frame mode.

❹ VITC data field mark

[ ] (blank): Display of fields 1 and 3
[∗] (asterisk): Display of fields 2 and 4

❺ Recorder/player selection

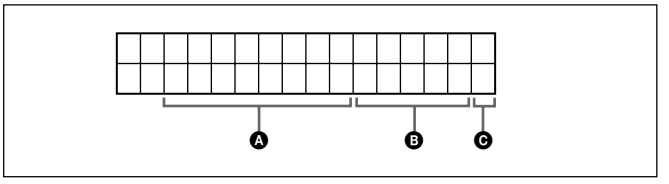
The indication changes depending on whether this unit is the recording-side VTR or the playback-side VTR.

No display: Neither of them
P: Playback-side VTR
R: Recording-side VTR

❻ Operating mode

The display is divided into blocks A, B, and C, shown in the figure below.

Block A: Operating mode
Block B: Servo lock status or tape speed
Block C: The ■ mark, indicating an auto editing segment



The contents displayed in each block are listed on next page.

Display		Operating Mode
Block A	**Block B**	
TAPE UNTHREAD		No cassette loaded
STANDBY OFF		Standby off mode
T. RELEASE		Tension release mode
STOP		Stop mode
F. FWD		Fast forward mode
REW		Rewind mode
PREROLL		Preroll mode
PLAY		Playback mode (servo unlock)
PLAY	LOCK	Playback mode (servo lock)
PLAY	% difference with respect to normal speed	Capstan override mode
REC		Recording mode (servo unlock)
REC	LOCK	Recording mode (servo lock)
SEQ REC		Sequential recording mode (servo unlock)
SEQ REC	LOCK	Sequential recording mode (servo lock)
EDIT		Editing mode (servo unlock)
EDIT	LOCK	Editing mode (servo lock)
JOG	STILL	Jog mode still picture
JOG	FWD	Forward jog
JOG	REV	Reverse jog
SHUTTLE	(speed)	Shuttle mode
VAR [a]	(speed)	Variable mode
PREVIEW [a]		Preview mode
AUTO EDIT [a]		Auto edit mode
REVIEW [a]		Review mode
D-PREV [a]	(speed) [b]	DMC edit preview mode
D-EDIT [a]	(speed) [b]	DMC edit mode
DMC-SPD [a]	(speed)	DMC initial speed setting

a) Displayed when this unit is used with an editor
b) Initial speed or speed stored in memory

To create new text data

Use Setup Menu items 005 and 017 *(pages 6-2 and 6-3)*.

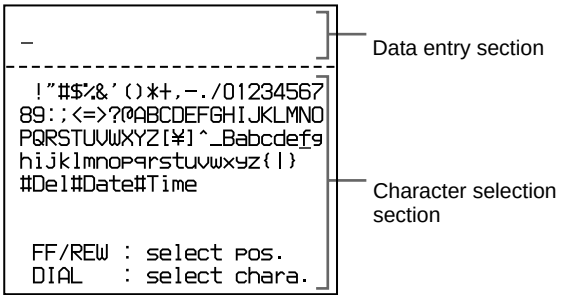
1 Set Setup menu item 005 to CHARCTER.

For more information about menu operations, see Chapter 6 "Setup Menu".

2 Set Setup menu item 017 to ON.

3 Press the SET button.

The Text Data Creation Screen appears and the F FWD button lights.



4 Enter the data in the data entry section.

To specify the data entry position: Move the cursor to the right by pressing the F FWD button or to the left by pressing the REW button.

To select a character to enter: Rotate the jog dial to move the cursor to the desired character, then press the jog dial.

Operation	Cursor movement
Rotate upwards	Moves to the right. When the last character is reached, moves to the first character.
Rotate downward	Moves to the left. When the first character is reached, moves to the last character.
Rotate upwards while pressing the SHIFT button	Moves one line up. When the cursor is in the top line, moves to the bottom line.
Rotate downward while pressing the SHIFT button	Moves one line down. When the cursor is in the bottom line, moves to the top line.

To delete a character from the data entry section: Select #Del in the character selection section.

To enter the date: Select #Date in the character selection section.

To enter the time: Select #Time in the character selection section.

2-6 Setting Timecode

There are four ways to record timecode.

	INT/EXT switch	PRESET/REGEN switch
(1)	INT	PRESET
(2)	EXT	PRESET
(3)	INT	PRESET
(4)		PRESET

(1) Record the output of the internal timecode generator with setting an initial value.
(2) Record the output of the internal timecode generator, which has been synchronized with an external timecode generator.
(3) Record the output of the internal timecode generator, which has been synchronized with playback timecode. (This method is always used during editing.)
(4) Record the output of an external timecode generator without regeneration.

For more information about timecode generator settings, see the setup menu "Item 600 series: timecode generator settings" (page 6-14).

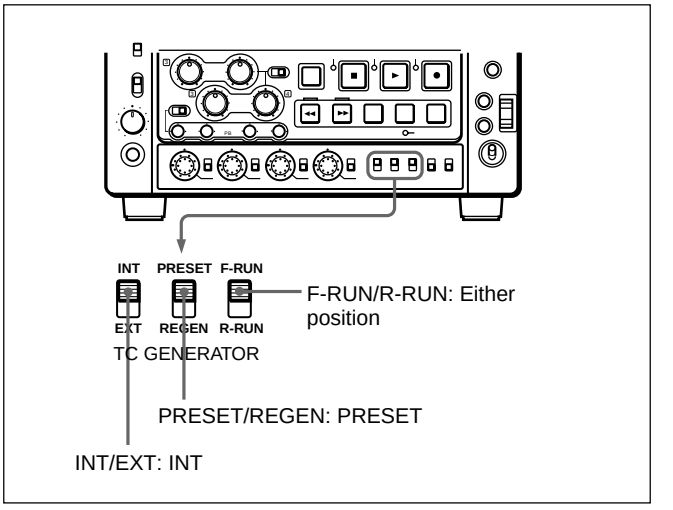
For more information about playback timecode settings, see page 4-4.

In addition to the INT/EXT switch and the PRESET/REGEN switch, the following settings are made with submenus.
• VITC ON/OFF: (home page)
• VITC/LTC/AUTO: (home page)
• DF/NDF (525 mode): (general settings page)

For more information about submenus, see section 2-7-1 "Displays on the Home Page of the Submenu".

2-6-1 Setting an Initial Value and Recording Timecode

Set the switches and submenu items as shown below.

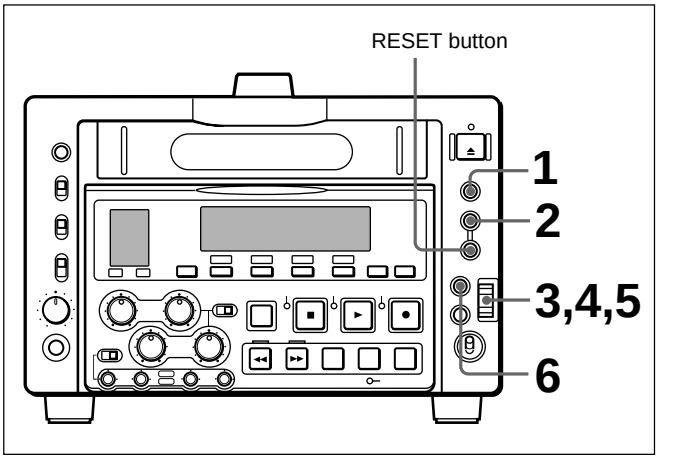


Submenu settings

Item	Setting
VITC ON/OFF (home page)	Desired setting (ON for recording)
VITC/LTC/AUTO (home page)	No setting required (ignored)
DF/NDF (general settings page)	Desired setting (in 525 mode)

To set an initial timecode value

Perform the following procedure.



1 Press the CTL/TC/U-BIT button and select TC.

2 Press the HOLD button.

The first digit of the time data (hours:minutes:seconds:frames) in the FL display panel starts flashing at 1 Hz (every second).

To set all digits to 0
Press the RESET button.

3 Select the digit to set by rotating the jog dial and press the dial.

The selected digit starts flashing at 2 Hz (every 0.5 second).

4 Set the value for the flashing digit by rotating the jog dial.

5 Repeat steps **3** and **4** until you finish setting all digits.

6 Press the SET button.

If the F-RUN/R-RUN switch is set to F-RUN, the timecode starts to advance immediately.

To set timecode to the current time

1 Set the F-RUN/R-RUN switch to F-RUN and the DF/NDF in the submenu to DF (in 525 mode only) *(see page 2-23)*.

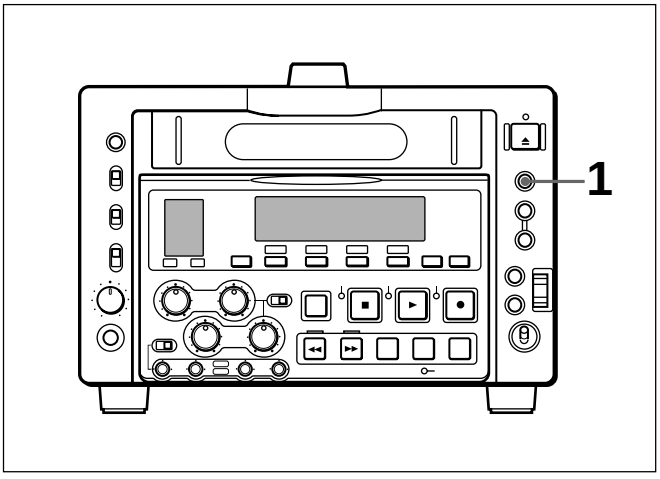
2 Carry out steps **1** to **5** of "To set an initial timecode value" to set the timecode to a time slightly ahead of the current time.

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

To set user bits

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

Proceed as follows.



1 Press the CTL/TC/U-BIT button and select U-BIT.

2 Carry out steps **2** to **6** of "To set an initial timecode value".

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

You can record ID codes in user bits. For details, see setup menu items 603 and 604 (page 6-14).

2-6-2 Synchronizing the Internal Timecode Generator with an External Signal

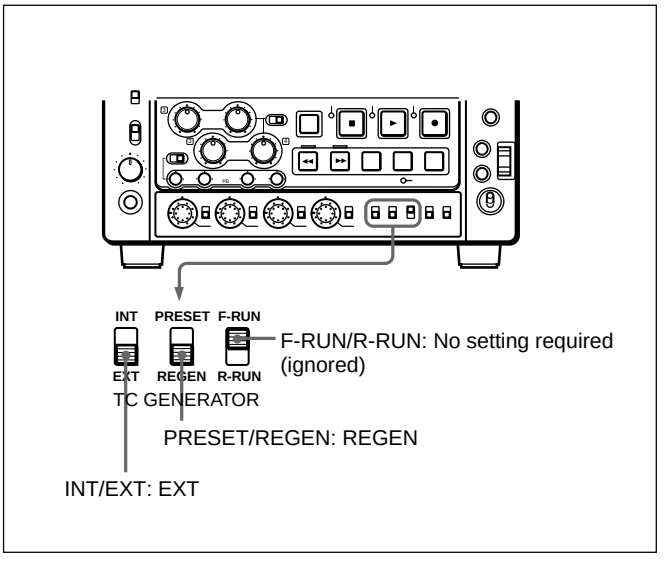
Use this method to synchronize multiple VTRs with an external timecode generator, and when you want to record the playback timecode signals of an external VTR without deterioration in the signal waveform. You can synchronize the internal timecode generator with either of the following kinds of external timecode.

- The output of an external timecode generator, or the timecode output (LTC) of an external VTR.
- The timecode (VITC) in an input video signal.

Proceed as follows.

1 **To synchronize with external timecode output (LTC):** Connect the output of an external timecode generator or the timecode output of an external VTR to the TC IN connector.
To synchronize with the timecode (VITC) of an input video signal: On the home page of the submenu, select the input signal containing the VITC.

2 Set switches and submenu items as follows.



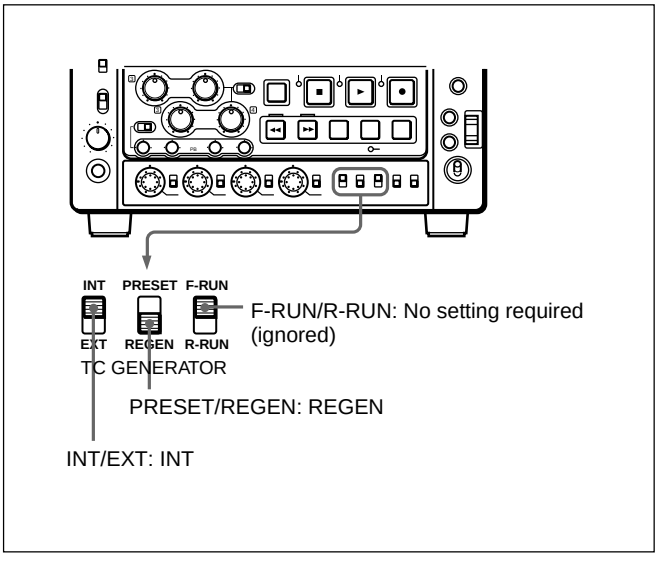
Submenu settings

Item	Setting
VITC ON/OFF (home page)	Desired position (ON when recording VITC)
VITC/LTC/AUTO (home page)	VITC or LTC, depending on which signal you want to synchronize with (LTC when set to AUTO)
DF/NDF (general settings page)	No setting required (ignored)

The internal timecode generator begins to run in synchronization with the external signal. Once external synchronization is achieved, the internal timecode generator continues to run even if you disconnect the external timecode generator.

2-6-3 Synchronizing the Internal Timecode Generator with Playback Timecode –Timecode Recording during Auto Editing

Set switches and submenu items as follows.



Submenu settings

Item	Setting
VITC ON/OFF (home page)	Desired position (ON when recording VITC)
VITC/LTC/AUTO (home page)	VITC or LTC, depending on which signal you want to synchronize with (LTC when set to AUTO)
DF/NDF (general settings page)	No setting required (ignored)

In automatic editing, timecode is recorded by using the output of the internal timecode generator, which has been synchronized during preroll with playback timecode read from the tape. For this reason, regardless of the actual settings of the INT/EXT and PRESET/REGEN switches, the unit operates as if the switches were set to INT and REGEN.

See setup menu item 610 (page 6-15) if you do not wish to have the INT/EXT and PRESET/REGEN settings fixed during automatic editing.

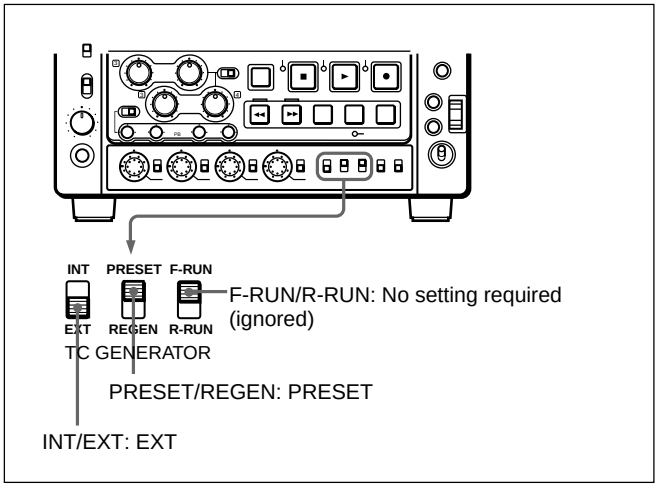
2-6-4 Recording External Timecode without Regeneration

When this method is used, the internal timecode generator is not affected by the external timecode. If you want to record the playback timecode of an external VTR, the method explained in section 2-6-2 “Synchronizing the Internal Timecode Generator with an External Signal” is recommended.

Proceed as follows.

1 Connect the timecode output of an external timecode generator to the TC IN connector when LTC or AUTO is selected in the home page of the submenu *(see page 2-17)*.

2 Set switches as follows.

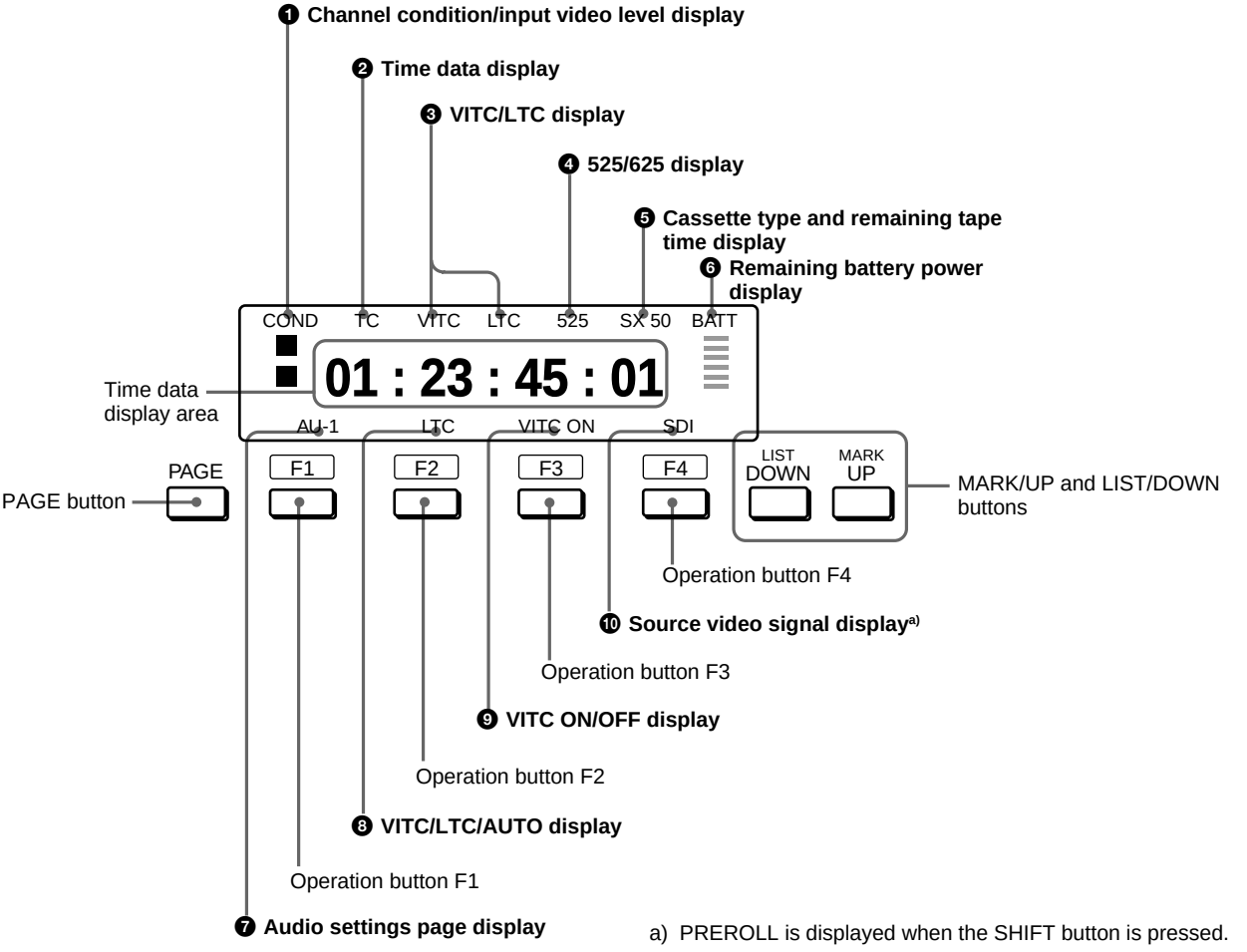


2-7 Submenu

Information about the settings and operating status of the unit is displayed in the FL display panel.

2-7-1 Displays on the Home Page of the Submenu

The home page of the submenu is displayed when you power the unit on.



❶ Channel condition/input video level display

Depending on the unit's operating status, one of the following is displayed here.

COND: Displayed during playback. The playback condition is displayed on a scale of three levels.

CONFI: Displayed during crash recording when the CONFI is set to ON in video settings page 1/2 *(see page 2-22)*. The playback condition of recorded signals is displayed on a scale of three levels.

VIDEO: Displayed in E-E mode. When using composite video, the video level is displayed on a scale of nine levels.

PRE-R: Displayed when PREREAD on video setting page 1/2 is set to ON. During playback, the playback condition is displayed on a scale of three levels. When using composite video in E-E mode, the video level is displayed on a scale of nine levels.

❷ Time data display

Displays the time data and its type.

TC: Timecode

UB: User bits

No display: CTL

❸ VITC/LTC display
Depending on the unit's operating status, one of the following is displayed here.
During playback: VITC when VITC timecode has been read, LTC when LTC has been read.
During recording: The timecode being recorded.
During E-E: The timecode to be recorded, when it has been read.

❹ 525/625 display
Displays 525 when the unit is being used as with the 525 system, and 625 when it is being used with the 625 system.

❺ Cassette type and remaining tape time display
Displays the type of cassette in use and its remaining time (in 2-minute increments).
SX: Betacam SX
SP: Betacam SP
OX: Oxide tape
– –: No cassette is loaded.
When the remaining time falls to 2 minutes or less, the indication becomes 0 and flashes together with the cassette type indication.

❻ Remaining battery power display
Displays the remaining battery power on a scale of seven levels. When the power is nearly exhausted, the BATT display flashes. When the power is completely exhausted, a flashing E (End) appears.

❼ Audio settings page display
To select one of the groups of the audio settings pages (AU-1 to AU-4) or MIX/SWP, press operation button F1 to highlight this display, then press the MARK/UP or LIST/DOWN button. The selected page in the group or the audio settings sub page appears when you press the PAGE button.

For details, see the next section, "To switch between menu pages".

❽ VITC/LTC/AUTO display
To select the type of timecode to use, press operation button F2 to highlight this display, then press the MARK/UP or LIST/DOWN button. If you select AUTO, the type of timecode is distinguished automatically during playback (VITC if the playback speed is within ±1/2) and set to LTC during recording.
You can switch to the general settings page by pressing the PAGE button after pressing operation button F2 to highlight this display.

For details, see the next section, "To switch between menu pages".

❾ VITC ON/OFF display
Set to ON to record VITC timecode.
You can toggle the display between ON and OFF by pressing operation button F3 to highlight this display and then pressing the MARK/UP or LIST/DOWN button.
You can switch to the general settings page by pressing the PAGE button after pressing operation button F3 to highlight this display.

For details, see the next section, "To switch between menu pages".

❿ Source video signal display
You can select CMPST (composite) or SDI as the source video signal by pressing operation button F4 to highlight this display and then pressing the MARK/UP or LIST/DOWN button.
CMPST: Composite signal
SDI: SDI signal
If you press the PAGE button after highlighting this display, the video settings page appears, allowing you to make advanced settings.

For details, see the next section, "To switch between menu pages".

When you set SG on video setting page 2/2 to one of AUDIO, VIDEO, and BOTH *(see page 2-22)*, "SG" appears in this position.
If you press the MARK/UP or LIST/DOWN button with the SG indication highlighted, you can select one of the following: CMPST, SDI, and the option selected for "SG" on video setting page 2/2 (AUDIO, VIDEO, or BOTH).

If you press and hold the SHIFT button, "PREROLL" is displayed here. While holding the SHIFT button, you can perform preroll by pressing operation button F4.

2-7-2 Submenu Basic Operations

To switch between menu pages

In addition to the home page, the submenu has pages that allow you to make settings for input and output of video and audio signals, and other general settings. You can switch between pages by pressing the buttons shown in the figure below.

For more information about the video and audio settings pages, see section 2-8 “Input and Output Settings for Video and Audio Signals (Submenu)”.

To select an item

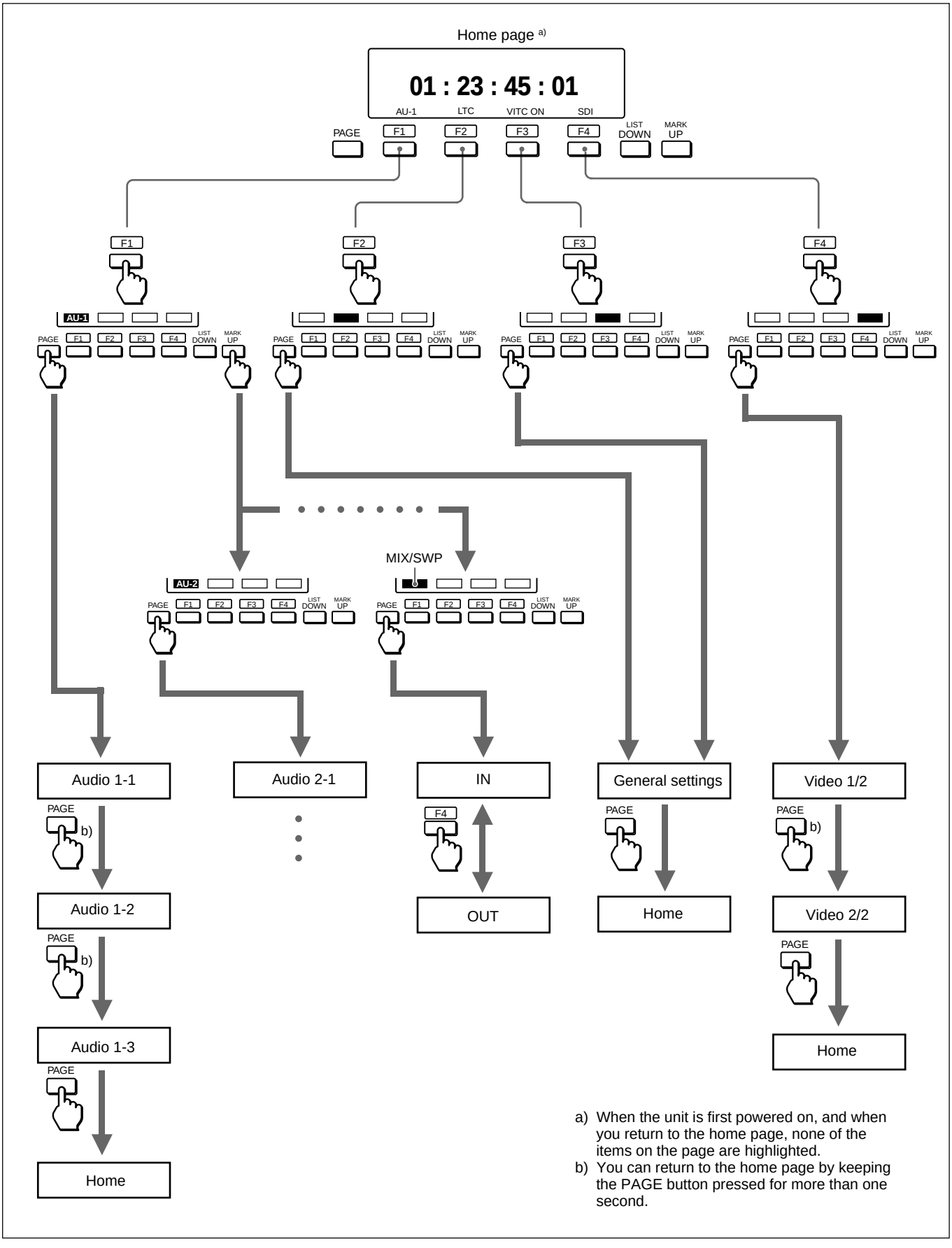
Display the page that contains the item you want to select, then press the operation button, F1 to F4, that is located in the same column as the item.

The selected item is highlighted. Press the button repeatedly until the item that you want to select is highlighted.

To change a setting

With the item that you want to change highlighted, press the MARK/UP or LIST/DOWN button.

The setting changes.
Press the MARK/UP or LIST/DOWN button repeatedly until the item is set to the value that you want.



a) When the unit is first powered on, and when you return to the home page, none of the items on the page are highlighted.

b) You can return to the home page by keeping the PAGE button pressed for more than one second.

2-8 Input and Output Settings for Video and Audio Signals (Submenu)

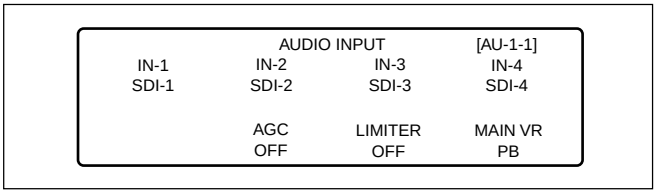
Using the submenu, you can make channel settings and adjust the input and output characteristics of video and audio signals.

For more information about basic submenu operations, see section 2-7-2 “Submenu Basic Operations”.

2-8-1 Making Settings in the Audio Settings Pages

The audio settings pages are divided into four groups, AU-1 to AU-4. To call up one of the settings pages in a group, select the group from the home page. Each settings page has a number that indicates its group and its position within the group. For example, audio settings page 1-1 is the first page in group AU-1.

Audio settings page 1-1

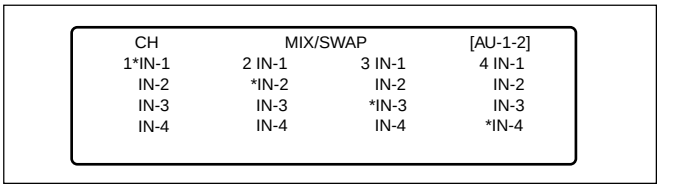


Item		Setting
AUDIO INPUT		Select the signals of audio input channels 1 to 4
	IN-1	SDI-1 or ANALOG 1
	IN-2	SDI-2 or ANALOG 2
	IN-3	SDI-3 or ANALOG 1
	IN-4	SDI-4 or ANALOG 2
AGC		Turn the audio input AGC circuits ON and OFF (enabled when the REC/PB audio level PRE/VAR switch[a)] is set to PRE).
LIMITER		Turn the audio input limiter circuits ON and OFF (enabled when the REC/PB audio level PRE/VAR switch[a)] is set to VAR).
MAIN VR		Toggle the functions of the REC/PB audio level main adjustment knobs and the REC/PB audio level subadjustment knobs. REC: Adjust the recording level with the REC/PB audio level main adjustment knobs. PB: Adjust the playback level with the REC/PB audio level main adjustment knobs.

a) The switch for the main adjustment knobs when MAIN VR is set to REC, and the switch for the subadjustment knobs when MAIN VR is set to PB

To switch to audio settings page 1-2
Press the PAGE button.

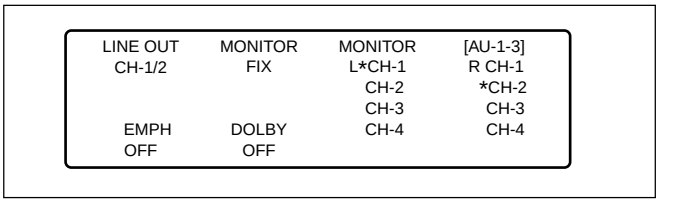
Audio settings page 1-2



Item	Setting
MIX/SWAP CH 1 to 4	Select up to two audio input signals (IN-1 to IN-4) to be assigned to channels 1 to 4. When two signals are selected, they are mixed. **To select** Select the channel using operation buttons F1 to F4, and press the MARK/UP or LIST/DOWN button to add asterisks to the position of the desired input signal.

To switch to audio settings page 1-3
Press the PAGE button.

Audio settings page 1-3



Item		Setting
LINE OUT		Select channels 1/2 or 3/4 as the line out channels.
MONITOR		Select FIX for an output level determined according to the setting (either PRE or VAR) of the REC/PB audio level PRE/VAR switch[a], or VAR for an output level linked also to the LEVEL knob.
MONITOR[b]		Select monitor output L and R signals (up to four). **To select** Select channel for L using operation button F3 and channel for R using operation button F4, and press the MARK/UP or LIST/DOWN button to add the asterisk to the position of the desired channel.
	L	Select from channels 1 to 4.
	R	Select from channels 1 to 4.
EMPH		Set to ON when you want to add emphasis.
DOLBY NR		When playing back oxide tapes recorded in Betacam format, set to ON or OFF to match the Dolby NR[c] setting at the time of recording.

a) The switch for the main adjustment knobs when MAIN VR is set to REC, and the switch for the subadjustment knobs when MAIN VR is set to PB

b) Monitor output signals cannot be selected from audio settings page 1-3 (they can be selected from audio settings pages 2-3 and 3-3). The selection made with the MONITOR switch is displayed.

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

Audio settings pages 2-1 to 4-3

Make settings in the same way as pages 1-1 to 1-3.

2-8-2 Making Settings in the Audio Settings Subpage

Use the audio settings subpage to make mix and swap input and output settings for channel 1 and channel 2.

To display the audio settings subpage

1 Press operation button F1 to highlight the audio settings item in the home page.

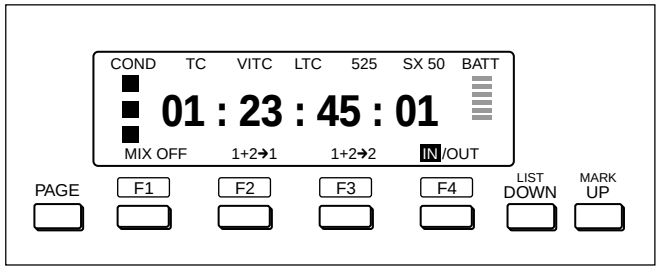
2 If the item displayed is not "MIX/SWP", press the MARK/UP button until "MIX/SWP" appears.

3 Press the PAGE button.

The audio settings subpage appears as shown below.

To return to the home page

Press the PAGE button.



Contents of the audio settings subpage

By pressing operation buttons F1 to F3, you can make the following three settings for mixing of input signals in audio channels 1 and 2. The selected setting is highlighted. To select input signals, use audio settings page 1-1.

MIX OFF: Assign IN-1 to channel 1, and assign IN-2 to channel 2.

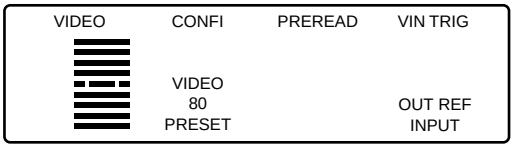
1+2 → 1: Assign mixed signals of IN-1 and IN-2 to channel 1, and assign IN-2 to channel 2.

1+2 → 2: Assign IN-1 to channel 1, and assign mixed signals of IN-1 and IN-2 to channel 2.

2-8-3 Making Settings in the Video Settings Pages

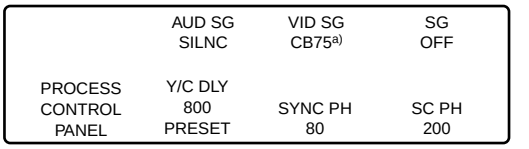
The following tables show the items that can be set in the video settings pages.

Video settings page 1/2



Item	Setting
VIN TRIG	Select whether or not to output a GPI signal from pin 5 of the AUX connector at the IN points of a video auto-edit (excluding audio split editing). OFF: Do not output a GPI signal. ON: Output a GPI signal.
CONFI	Select whether or not to carry out CONFI playback during crash recording. OFF: No CONFI playback ON: CONFI playback **Note** In insert or assemble editing, CONFI playback is not possible.
PREREAD	Select whether or not to carry out preread editing. OFF: No preread editing ON: preread editing
VIDEO IN	Set the input level of composite video input signals. PRESET: Fixed at factory default level. VAR: Adjustable as desired. **To adjust** The current input level is displayed when you select VAR. Press the MARK/UP or LIST/DOWN button to change the displayed value. Adjust so that the input video level display bar is close to the center.
OUT REF (See page 2-7 for details.)	Select the signal to which the internal reference video signal generator is synchronized. REF: Synchronize with the signal input to the REF. INPUT connector. INPUT: Synchronize with the signal selected in the home page (composite video signal or SDI signal).

Video settings page 2/2



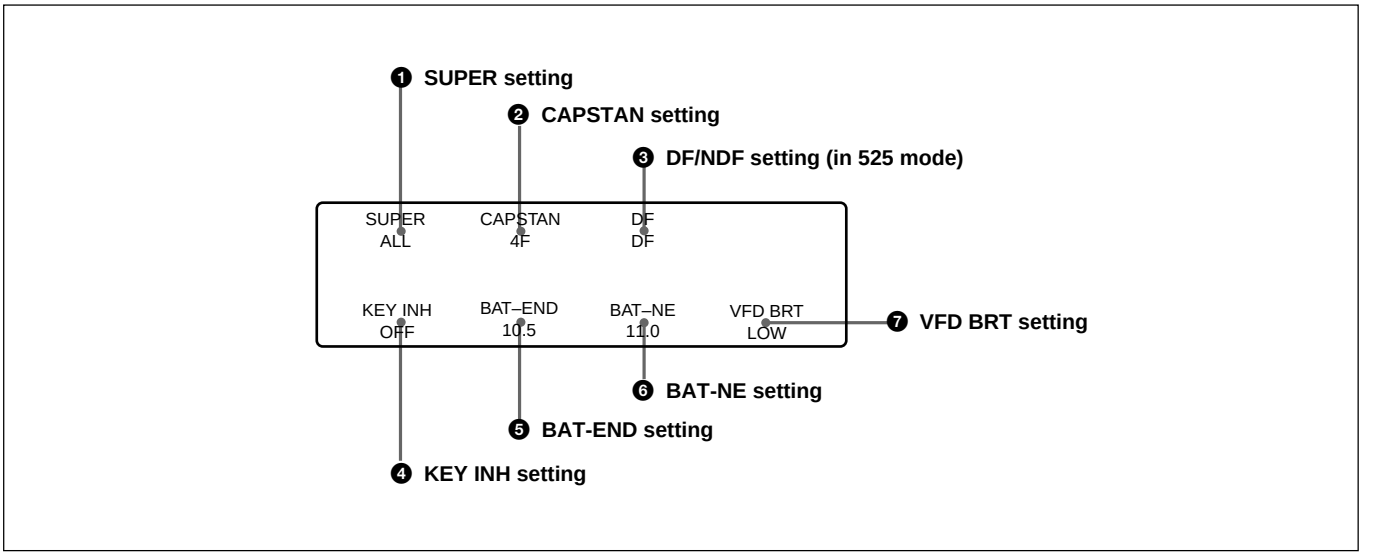
a) For 525 mode, CB100 for 625 mode.

Item	Setting
PROCESS CONTROL	Select SETUP when you want to adjust the following items with the setup menu, and PANEL when you want to adjust them with the submenus and the lower control panel. • Output video level • Chroma output level • Setup level (525/60 mode) • Black level (625/50 mode) • Chroma phase • Y/C delay • Sync/subcarrier phase
Y/C DELAY	When the “PROCESS CONTROL” is set to PANEL, set the Y/C delay value. PRESET: Fixed at factory default level. VAR: Adjustable as desired. **To adjust** Press operation button F4 to indicate the VAR, press F4 again to highlight the value, and then press the MARK/UP or LIST/DOWN button to change the value.
SYNC PH	When the “PROCESS CONTROL” is set to PANEL, adjust the sync phase by pressing the MARK/UP or LIST/DOWN button.
SC PH	When the “PROCESS CONTROL” is set to PANEL, adjust the subcarrier phase by pressing the MARK/UP or LIST/DOWN button. The SC-H value is constant.
SG	Select the output of the internal audio or video signal generator for the source signal. OFF: Neither of the output of the internal audio nor video signal generator AUDIO: The output of the internal audio signal generator VIDEO : The output of the internal video signal generator BOTH: Both of the output of the internal audio and video signal generators
AUD SG	Select the operation of the internal audio test signal generator. SILNC: Silent signal. 1kHz : At 1 kHz, –20 dB FS sine wave is supplied to all audio input channels. ID: Signal for recognizing each channel.

Item	Setting
VID SG	Select the test signal to be output from the VTR's internal test signal generator. The internal test signal generator operates and outputs the selected test signal. This signal can also be recorded. CB100 (625 mode) : 100% color bar signal CB75 (525 mode) : 75% color bar signal CB75R: 75% color bar signal (reverse) BOW: Bowtie signal PLSBR: Pulse & bar signal MLTBS: Multi-burst signal HSWP: H sweep signal 5STEP: 5-step signal RAMP: Ramp signal SH: Shallow ramp signal RED: Red signal GRAY: 50% flat signal WHITE: 100% flat signal BB: Black burst signal SDI: SDI check field signal NTC7: NTC 7 test signal (selectable only in 525 mode) LN330: Line 330 test signal (selectable only in 625 mode)

2-9 General Settings Page of the Submenus

The general settings page contains the items shown below.



❶ SUPER (superimpose) setting

Set to ALL, OFF, or MENU to specify output of superimposed text from the VIDEO OUT2(SUPER) connector.

ALL: Timecode, menus, error messages, and shot mark lists are output.

OFF: Error messages are output.

MENU: Menus are output.

For details about the information displayed, see "To display superimposed text information" on page 2-9.

❷ CAPSTAN (capstan lock) setting

Set the capstan servo lock mode.

2F: Lock the capstan servo on 2 fields. When performing picture shift under the 525 system, set setup menu item 712 to ON *(see page 6-18)*.

4F: Lock the capstan servo on 4 fields.

8F: Lock the capstan servo on 8 fields (625 system only).

❸ DF/NDF setting (in 525 mode)

Select DF to advance timecode in drop-frame mode, and NDF to advance timecode in non-drop frame mode.

❹ KEY INH (key inhibit) setting

Set to ON to disable the buttons on the control panel. (Submenu operations can still be performed even when this item is set to ON.)

You can select the buttons that are disabled under setup menu item 118 *(see page 6-9)*.

If you try to operate the disabled buttons, the message "!!KEY INH.!" appears in the time data display area on the FL display panel.

❺ BAT-END (battery end) setting

Set a voltage value to indicate the shutdown voltage of this unit depending on the batteries you are using.

❻ BAT-NE (battery near end) setting

For alarms that alert you when the end of power as specified in the battery end setting ❺ is near, specify a voltage that at which to begin the alarm display.

❼ VFD BR (FL display panel brightness) setting

Set to HIGH to make the FL display panel brighter, or to LOW to make the FL display panel darker.

3-1 Selecting an Edit Mode

When you use two DNW-A28/A28P units and an editing control unit, you can do two types of editing: assemble editing and insert editing. This section provides an outline of each type and explains how to select an edit mode.

Note

Before starting editing operation, set the recorder side LOCAL/REMOTE switch to LOCAL and the player side LOCAL/REMOTE switch to REMOTE.

3-1-1 Assemble Editing

In assemble editing, you record video and audio materials in order from the start of the tape. In addition to video, audio, CTL and timecode are recorded. If timecode is already recorded on the tape, the new timecode is recorded so as to form a continuous sequence with the existing timecode.
Assemble editing is convenient when you are recording on a new tape.

Note

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

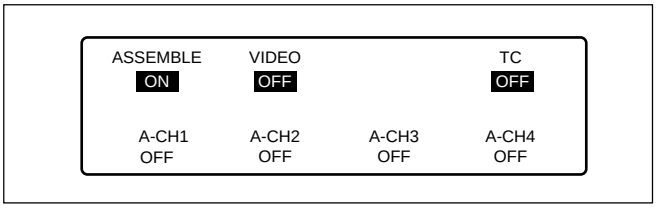
Selecting assemble mode

1 Press and hold the EDIT button on the recording-side VTR.

While holding the EDIT button, the Edit Preset menu is displayed.

2 Using the F1 to F4 operation buttons, set VIDEO, TC (timecode), and A-CH1 to A-CH4 (audio of channels 1 to 4) to OFF. Set ASSEMBLE to ON. You can toggle between ON and OFF when the ON/OFF display of the desired item is highlighted. If the ON/OFF display of the desired item is not highlighted, release the EDIT button and again press and hold it.

See the following section in the right column.



Edit Preset menu operations

To toggle a menu item between ON and OFF: With the ON/OFF display highlighted, press the corresponding operation button (F1 to F4).

Operation button	Menu items controlled
F1	ASSEMBLE, A-CH1
F2	VIDEO, A-CH2
F3	A-CH3
F4	TC, A-CH4

To highlight the ON/OFF display: When the ON/OFF display for the items in the upper row is highlighted, release the EDIT button and again press and hold it to highlight the ON/OFF display for the items in the lower row and vice versa.

To close the menu: Release the EDIT button.

3-1-2 Insert Editing

In insert editing, you insert video, audio, and timecode at desired positions on an already recorded tape. You can insert all three types of data at the same time, or insert one of the types separately. For audio, you can select multiple channels from among channels 1 to 4.
Use insert editing when you want to do the following:

- Replace video and audio on unneeded sections of the tape with other video and audio.
- Insert music and narration into a tape with edited video.
- Insert video into a tape with edited audio.
- Record new timecode over already recorded timecode.

Note

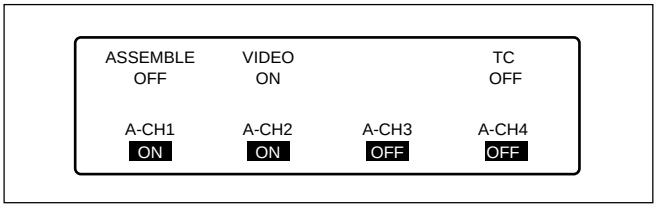
Before you use an unrecorded tape in insert editing, video signal such as black signal, CTL and timecode must be recorded on all over the tape.

Selecting insert mode

1 Press and hold the EDIT button on the recording-side VTR.

While holding the EDIT button, the Edit Preset menu is displayed.

2 Using the F1 to F4 operation buttons, set ASSEMBLE to OFF. Then specify the signals to insert by setting one or more of VIDEO, TC (timecode), and A-CH1 to A-Ch4 (audio of channels 1 to 4) to ON.
You can toggle between ON and OFF when the ON/OFF display of the desired item is highlighted. If the ON/OFF display of the desired item is not highlighted, release the EDIT button and again press and hold it.



For more information about using the Edit Preset menu, see "Edit Preset menu operations" on the previous page.

3-2 Finding Edit Points – Search

Playback in search mode using the jog dial allows finding edit points quickly.
On this unit, you can perform search in the following three modes: jog and shuttle

Jog mode

Playback speed is determined by the rotation speed of the jog dial between ±1 times normal speed. Rotate the dial downward to search in the forward direction, and rotate the dial upwards to search in the reverse direction.

Shuttle mode

Playback speed is determined by the rotation angle of the jog dial between ±24 times normal speed (13 steps). Rotate the dial downward to search in the forward direction, and rotate the dial upward to search in the reverse direction.
When using the cassette recorded in Betacam/Betacam SP format, the playback speed range is between ±10 times normal speed (19 steps).

Switching between each mode

To put this unit into a search mode, press the SEARCH button, or rotate the jog dial.
When you press the SEARCH button, the unit enters the most recently used search mode. When you rotate the jog dial, the unit enters jog mode.
To switch between search modes, press the jog dial for 1 or more seconds.

To switch between normal playback and search modes

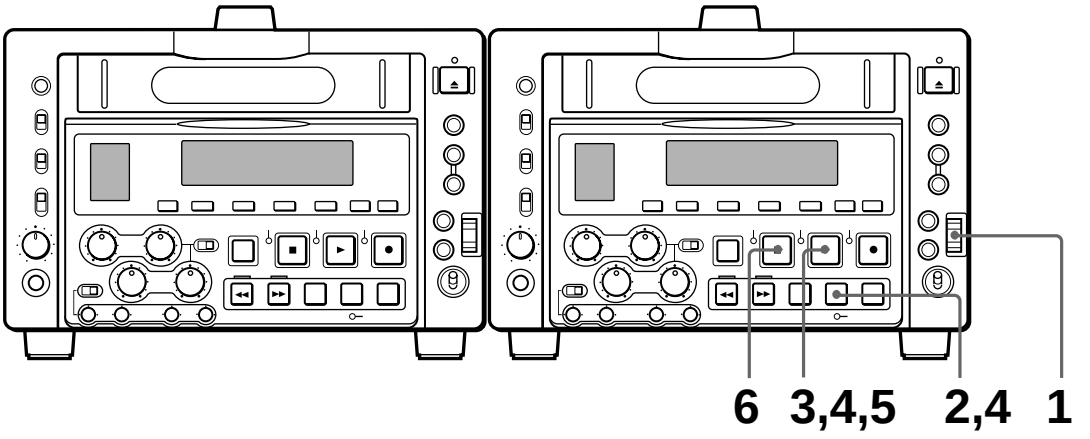
Press the DATA/PLAY and SEARCH buttons alternately.

As factory default setting, rotating the jog dial switches to jog mode at any time except during recording and editing.
If you change the setting of setup menu item 101, the above function will be disabled and switching to search mode will be possible only when the SEARCH button is pressed.

For details about setting, see item 101 on page 6-8.

3-3 Manual Editing

You can perform manual editing by using two DNW-A28/A28P units.
Manual editing operations are carried out on the recording-side VTR.



1 Use the jog dial to find the point where the edit will start (the recorder IN point), and stop the tape slightly in advance of this point.

Note

There will be some screen breakup at this point if the edit starts with the recording-side VTR in stop mode.

2 Select the edit mode.

3 Press the DATA/PLAY button.

The recording-side VTR starts playback.

Note

About 2 seconds are required for the picture to stabilize. You should begin playback at a point on the tape more than 2 seconds in advance of the section you will use in the edit.

4 Press the EDIT button together with the DATA/PLAY button at the point where you want to start the edit (the recorder IN point).

The edit starts.

5 Press the DATA/PLAY button at the point where you want to end the edit (the recorder OUT point).

The edit ends but the playback-side VTR continues playback.

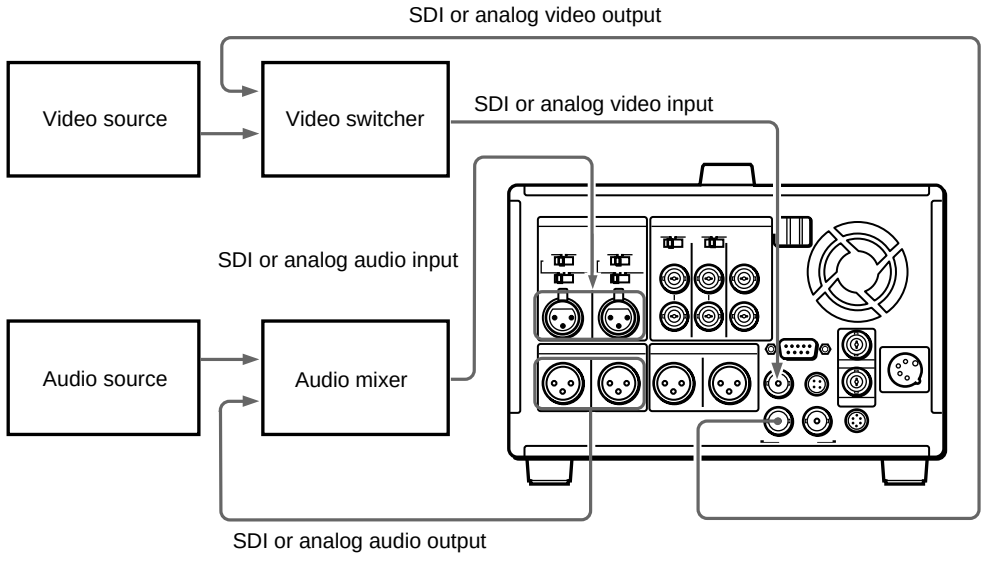
6 Press the STOP button to stop the recording-side VTR's playback.

3-4 Preread Editing

Video and audio signals, already recorded onto the tape, can be used as an edit source for insert editing, because this unit uses the preread heads to read the signals in advance. This type of editing is called “preread editing”.

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, set the “PREREAD” item on Video Setting Page 1/2 of the Submenu to “ON”.



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” item on Video Setting Page 1/2 of the Submenu to “REF” and set the item 309 in the setup menu to “AUTO1” to select the external reference signal for preread editing.
- When preread mode is selected, this unit 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:

1 Set the PB/EE switch to “PB”.

2 On Video Setting Page 1/2 of the Submenu, set “PREREAD” to “ON”.

3 Make the necessary connections for the preread editing.

4 Execute the preread editing after selecting the desired insert editing.

For details of executing insert editing, see 3-1-2 “Insert Editing”.

5 After preread editing, break the connections used for the preread editing.

6 On Video Setting Page 1/2 of the Submenu, set “PREREAD” to “OFF”.

7 Make sure that no loop connection remains.

- When using an external switcher, set setup menu item 727 *(page 6-20)* to EXT.
- Some switchers cannot be used due to their delay time. For details, consult Sony service personnel.

4-1 Recording

This section describes recording of external input signals.

Note

When two DNW-A28/A28P units are connected, set both LOCAL/REMOTE switches to LOCAL.

4-1-1 Preparations for Recording

Perform the following procedure.

1 Connect the source signals.

2 Select video and audio signals which you want to record.
Video: SDI or composite signal *(see "❿ Source video signal display" on page 2-17)*
Audio: SDI or analog audio signals for each channel *(see pages 2-20 and 2-21)*.

3 Make settings for reference video signals *(see page 2-7)*.

4 Make settings for timecode *(see page 2-12)*.

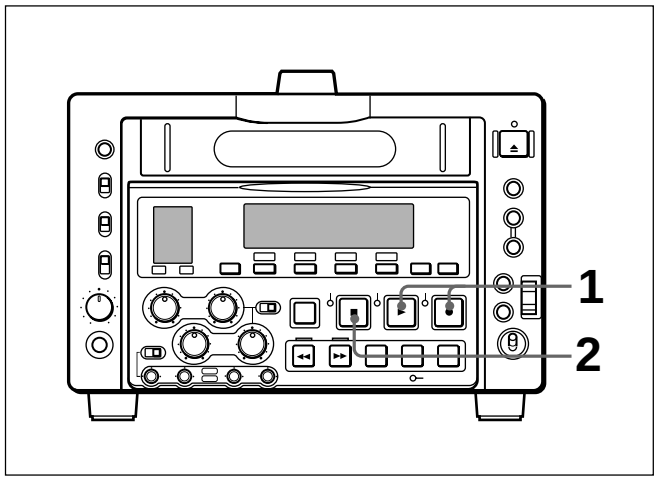
To adjust audio input level

Set the REC/PB audio level PRE/VAR (subadjustment) switches to VAR. Turn the REC/PB audio level subadjustment knobs, monitoring the input levels indicated by audio level meter.

Instead of using the REC/PB audio level subadjustment knobs, you can adjust the input level with the REC/PB audio level main adjustment knobs. To do so, set MAIN VR on the submenu to REC (*see page 2-20*).

4-1-2 Recording Operation

Confirm that the cassette type display on the FL display panel is "SX" and that the REC INHI indicator on the control panel is not lit.
Then, follow the procedure below.



1 Press the SEQ/REC and DATA/PLAY buttons at the same time.

2 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.

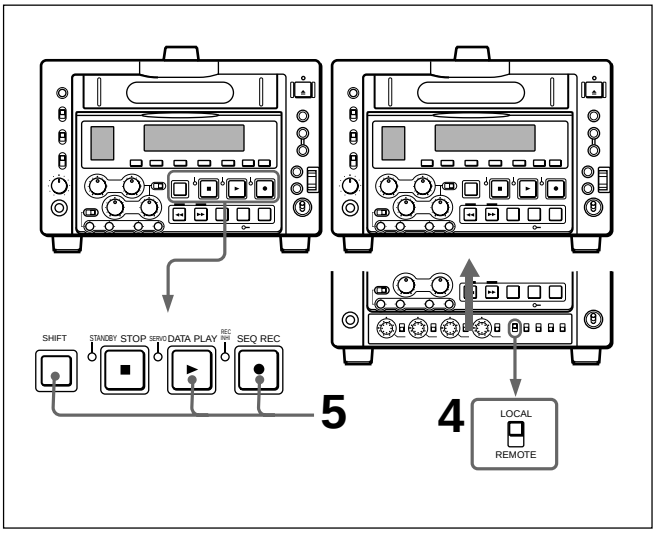
4-2 Sequential Recording

When you connect two DNW-A28/A28P units, you can perform sequential recording from one unit to another.
If you use only two cassettes, the last two hours recording can be obtained at any time.
If you renew the cassette about every 1 hour, endless recording is possible.

Use the following procedure. You can do control panel operations on the both units during sequential recording.

Note

Set the starting VTR's LOCAL/REMOTE switch to LOCAL and the other VTR's LOCAL/REMOTE switch to REMOTE beforehand.



Rewind the tape to the top beforehand.

1 Connect two VTRs as for editing *(see page 2-4)*.

2 Insert the cassettes into the both VTRs.

3 Set setup menu item 014 to a setting other than OFF *(see page 6-3)*.

4 Confirm that the starting VTR's LOCAL/REMOTE switch is set to LOCAL.

5 Simultaneously press the second VTR's SHIFT button, SEQ/REC button, and DATA/PLAY button.

The starting VTR begins recording.
The STANDBY indicator of the second VTR goes out.

The second VTR starts recording automatically when the remaining time of the tape reaches 2 minutes on the currently-recording VTR.

The setting of Setup menu item 014 affects what happens when a tape ends.

When AUTOMATIC OVERWRITE is selected
Endless recording on the same cassette continues, overwriting on the previous contents.

When MANUAL CASSETTE REPLACE is selected
When the tape end is reached, the tape is rewound and the EJECT button begins to flash.
To continue recording, insert a new cassette into the VTR. When the remaining time of the tape reaches 2 minutes on the currently-recording VTR, the other VTR will automatically start recording.

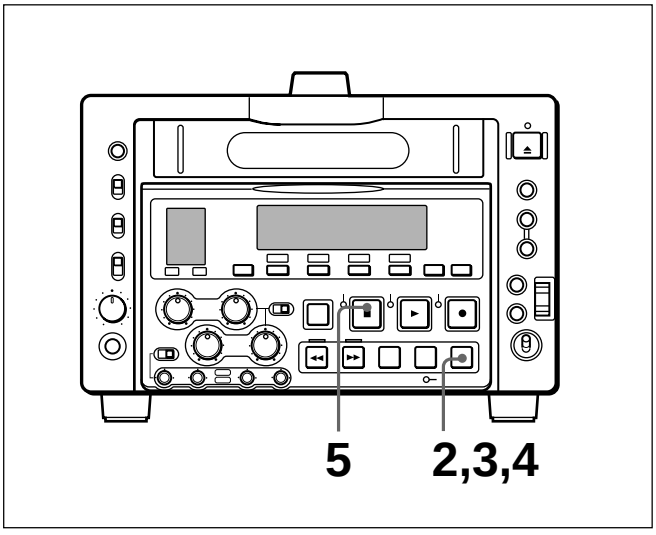
To stop sequential recording

Sequential recording stops in the following cases.
- When a tape transport button (DATA/PLAY, STOP, F FWD, REW) or the SEARCH button is pressed during recording.
- If the cassette is not exchanged when the EJECT button flashes though setup menu item 014 is set to MANUAL CASSETTE REPLACE.

4-3 Back Space Editing

You can record multiple scenes as a single sequence with no noise or breakup between scenes (back space editing).

Proceed as follows.



1 Carry out step **1** in the section 4-1-2 " Recording Operation" on the previous page to start recording a scene.

2 When recording finishes, press the PAUSE button.

The tape is rewound to a point 3 seconds before you pressed the PAUSE button, and the unit enters recording pause mode.

Note

When recording is paused, do not do any of the following. Back space editing will be interrupted.
- Eject a cassette
- Play back, rewind, or fast forward the tape
- Press the STOP button

3 At the next scene, press the PAUSE button.

The tape moves to the recording start position and recording starts.

4 Repeat steps **2** and **3** to record more scenes.

5 When you are finished recording scenes, press the STOP button.

To record continuous timecode

Set item 610 in the Setup menu to a setting other than MANU *(see page 6-15)*.

4-4 Playback

This section describes playback of tapes.

Note

When two DNW-A28/A28P units are connected, set both LOCAL/REMOTE switches to LOCAL.

For playback using the jog dials, see 3-2 "Finding Edit Points–Search".

4-4-1 Preparations for Playback

Perform the following procedure.

1 Connect video/audio signal output connectors to external equipment if necessary.

2 Select output audio signals *(see page 2-21)*.

3 Press the CTL/TC/U-BIT button to select the time data.

When using CTL
Press the RESET button to set the value to "0:00:00:00".

When using timecode or user bits
Select the type of timecode (VITC/LTC/AUTO) using the submenu *(see page 2-17)*.

4 Set the METER switch to CH-1/2 or CH-3/4 to select the channels indicated by audio level meter.

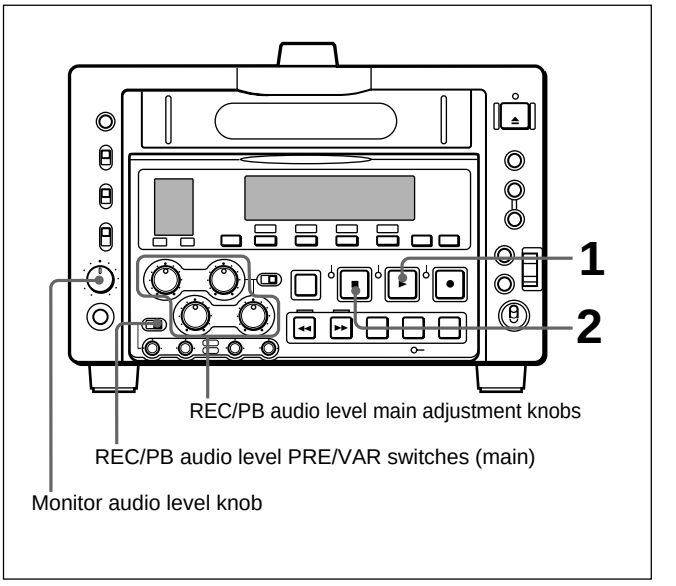
To output the timecode synchronized with the output video signal

The playback timecode or the timecode read by the timecode reader can be output from the TC OUT connector.

Select REGEN in setup menu item 606 *(see page 6-15)*, set the INT/EXT switch to INT, and the PRESET/REGEN switch to REGEN.

4-4-2 Playback Operation

Confirm the recording format of the cassette (SX, SP or OX) indicated on the FL display panel.
Then, perform the following procedure.



1 Press the DATA/PLAY button.

Playback starts.

To adjust headphones audio level
Rotate the monitor audio level knob.

To adjust audio playback level
Set the REC/PB audio level PRE/VAR switches (main) to VAR, and adjust using the REC/PB audio level main adjustment knobs.

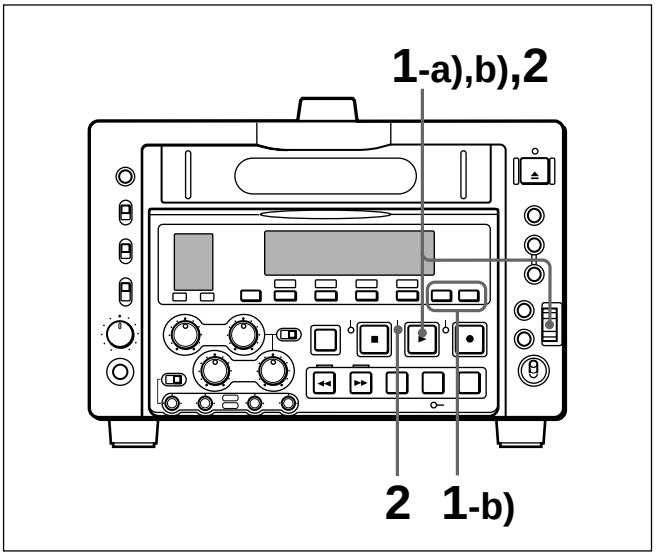
Instead of using the REC/PB audio level main adjustment knobs, you can adjust the playback level with the REC/PB audio level subadjustment knobs. To do so, set MAIN VR on the submenu to PB (*see page 2-20*).

2 Press the STOP button to stop playback.

If playback continues to the end of the tape, the tape automatically rewinds to the beginning and stops.

4-4-3 Capstan Override Playback

When playing back the same program on two units, the capstan override function is convenient for frame synchronization of playback pictures.



1 Adjust the playback speed using either method a) or b).

a) Holding down the DATA/PLAY button, rotate the jog dial. The adjustment range is ±15% in steps of 1%.

b) Holding down the DATA/PLAY button, press the MARK/UP or LIST/DOWN button. The adjustment range is ±8%.

2 Release the DATA/PLAY button when the adjustment is completed.

The VTR returns to normal speed playback and the SERVO indicator lights.

5-1 Overview of Shot Mark/Shot Data Function

This unit can record shot marks or use shot marks recorded with Betacam SX camcorders (shot marker function). The shot mark function enables quick access to the marked points, for efficient editing.
When shot data is recorded on the tape, you can display the data and make use of it for sorting shot marks.

5-1-1 Shot Mark Function Features

The shot mark function has the following features.

(1) Listing shot mark types and timecodes

There are four types of shot marks: REC Start (R), Shot Mark 1 (S1), Shot Mark 2 (S2) and Post Mark (mark added with this unit).
The unit memorizes the mark type and the timecode (LTC) for the mark position for MARK/UP to 200 marks read from a tape. Once the marks have been memorized, they remain in memory even when the unit is powered off. You can display the list of shot marks on the monitor. You can also use the Shot Mark Operation menu to create shot mark lists by reading in only the specified shot mark types, and delete all or a part of data in a list when it is no longer needed.

For more information about shot marks, refer to the Operation Manual of your Betacam SX camcorder.

(2) Writing and deleting shot marks

You can use the Shot Mark Operation menu to specify whether REC Start marks are recorded. You can write additional shot marks at any position on the tape and delete individual marks that are no longer needed.

(3) Creating virtual shot marks

You can add virtual shot marks to the shot mark list during playback or search. (They are not recorded on the tape.)

(4) Inserting memo marks

You can place a memo mark (#) on shot marks that you want to remember.

(5) Sorting shot marks

Each time that marks are read in, they are sorted and displayed in a list. When shot data is recorded, you can sort the marks to display which cassette they were read from. You can also sort shot marks by timecode. If two marks with the identical timecode are read, one of the marks is deleted.

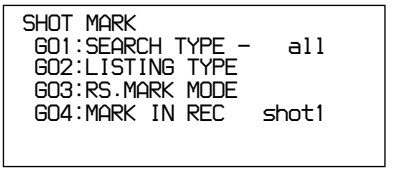
(6) Cueing up shot marks

You can cue up a shot mark by selecting it from the shot mark list. You can also cue up a shot mark located close to the current position (index function).

5-1-2 Shot Mark Operation Menu

To display the Shot Mark Operation menu, press the MENU button while pressing the MARK/UP button.

The menu shown in the figure appears.



The Shot Mark Operation menu is composed of four items, G01 to G04. The settings for each item are shown below.

Number	Name	Settings
G01	SEARCH TYPE SELECT	Select the type of shot marks to index. rec start mark shot mark 1 shot mark 2 post mark all
G02	LISTING TYPE SELECT	Select whether to include marks types in the mark list. rec start mark: Include REC Start marks(ON /OFF) shot mark 1: Include Shot Mark 1 (ON/OFF) shot mark 2: Include Shot Mark 2 (ON/OFF) post mark: Include Post Mark (ON/OFF).
G03	REC START MARK MODE	Select whether to record REC Start marks, for each operating mode. crash REC: Write REC Start marks in crash REC mode (ON /OFF) assemble: Write REC Start marks in assemble mode (ON /OFF) insert: Write REC Start marks in insert mode (ON/ OFF)
G04	MARK SELECT IN REC/ ASSEMBLE	Select the type of marks written during recording and in assemble mode. shot mark 1 shot mark 2 post mark

To change the settings

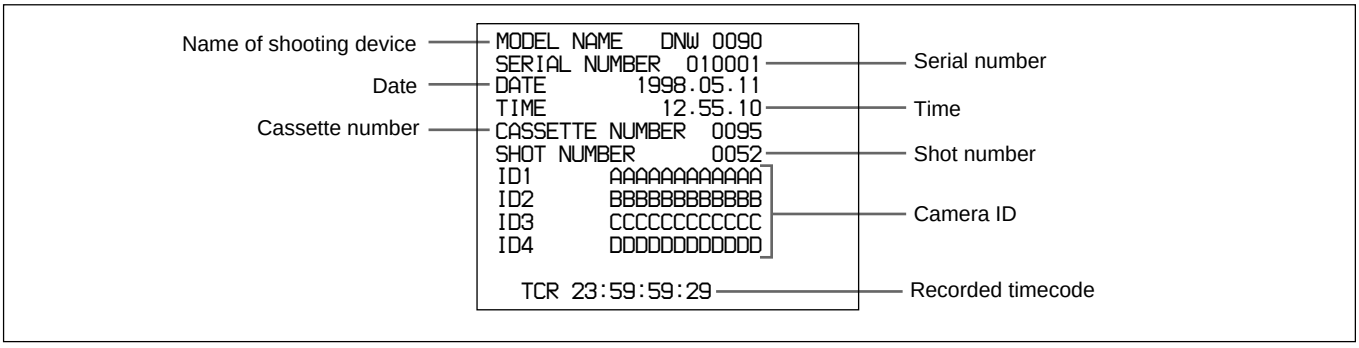
The procedures for selecting and changing menu items are the same as the procedures for the Setup menu. To change items G02 and G03, press the STOP button and select the item whose ON/OFF setting you want to change. Then rotate the jog dial to select ON or OFF and press the dial.

For more information about using the Setup menu, see section 6-2-2 “Basic Menu Operations”.

5-1-3 Reading Shot Data

Shot data is recorded continuously on the tape during shooting.
To display shot data, press the DATA/PLAY button together with the SHIFT button.

The tape is played back, and the display shown below appears.



The contents of the display change as the shooting conditions change (for example, the date and time or shooting device change). Sections where no data is recorded because you changed the shooting device are blank.

To turn off the display

Press the SHIFT button again together with the DATA/PLAY.

5-2 Shot Mark Operations

Use local mode for shot mark operations. (Remote control shot mark operations are not possible.)

5-2-1 Reading Shot Marks

To read shot marks, insert a cassette on which shot marks have been recorded into the recorder or player and press the LIST/DOWN button while holding the F FWD or REW button.
The FWD or REW button flashes while the shot marks are being read.
The search stops when it reaches the tape end.

Note

The maximum number of shot marks that can be read is 200. Reading stops when 200 marks have been read. At the same time, the message “SHOT LIST FULL” appears in the FL display panel and the WARNING indicator flashes.
The same message and warning are given if 200 marks have already been read in at the time when reading starts.
To cancel the alarm, press one of the tape transport buttons.

To stop reading shot marks

Press the STOP button.

To read shot marks from multiple cassettes

You can read shot marks from multiple cassettes by exchanging the cassettes. The unit adds marks from the new cassettes to the end of the shot mark list, until the limit of 200 marks is reached. For example, if 190 marks have already been read, up to 10 marks can be read from the next cassette.
A dividing line (broken line) is displayed between the data of the first cassette and the data of the next cassette.

To read only selected mark types

If you need only a specific mark type, use item G02 on the Shot Mark Operation menu to select that type.

5-2-2 Writing Shot Marks

To write REC Start marks

You can write REC Start marks during crash REC, assemble, and insert mode. Under item G03 of the Shot Mark Operation menu, change the setting of the mode you want to use to ON.

Note

For insert mode, set the TC in the edit preset menu to ON.

To write shot marks

To write shot marks in recording and assemble mode

Under Shot Mark Operation menu item G04, select the type of mark you want to write. To write a mark, press the MARK/UP button while holding the SHIFT button at the point where you want to write the mark. The message “RECORD SHOT MARK” appears on the monitor and in the lower part of the FL display panel while the mark is being written.

To write marks in playback, stop, and search modes

You can only write Post Marks in these modes.
To write a mark, press the MARK/UP button and keep it pressed for 2 seconds or longer. This puts the unit into shot mark write and delete mode (the SHIFT button flashes). At the position where you want to write the mark, press the MARK/UP button while holding the SHIFT button. The message “RECORD SHOT MARK” appears on the monitor and in the lower part of the FL display panel, and the SEQ/REC button lights while the mark is being written.

Note

LTC user bits are used to record shot marks.
If LTC user bits are used for recording other data, this data may be affected by the shot marks.

5-2-3 Creating a Virtual Shot Mark

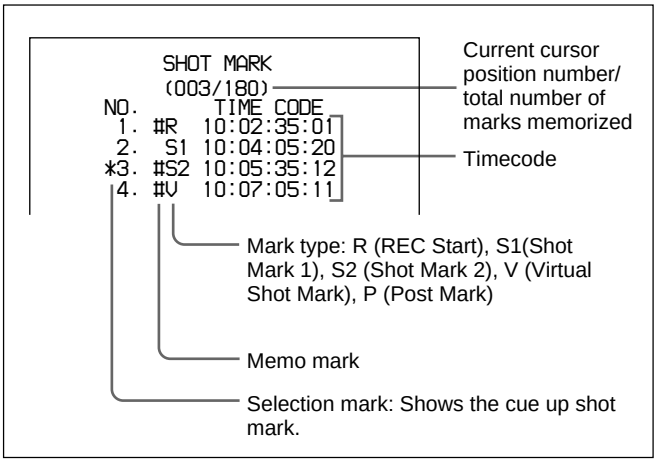
During playback or search, press and hold the SHIFT button, and press the MARK/UP button while holding the SHIFT button.

A virtual shot mark is entered, and the message "V-MARK xxx" appears on the monitor and in the lower part of the FL display panel (xxx is the mark number).

5-2-4 Displaying Shot Mark List

To display the shot mark list, press and hold the SHIFT button, and press the LIST/DOWN button while holding the SHIFT button.
Press the buttons again to cancel the display.

The figure below shows the contents of the shot marker list.



To view a help screen, you can press the MENU button with the shot mark list displayed.
The help screen explains which buttons to use in the following operations.

To select a mark

Rotate the jog dial to move the selection mark (∗) to the left of the number of the mark you want to select.

To attach a memo mark (#)

Select the mark to which you want to attach the memo mark, then press the SET button.

Detaching the memo mark

Select the mark from which you want to detach the memo mark, then press the SET button.

To make the shot mark list of selected shot marks

1 Display the shot mark list and press and hold the STOP button, and press the SET button while holding the STOP button.

The mark selection display appears.

2 Rotate the jog dial to select a mark.

3 Rotate the jog dial while holding down the SEARCH button to select ON or OFF for the selected mark. Select ON to list it and select OFF to skip it.

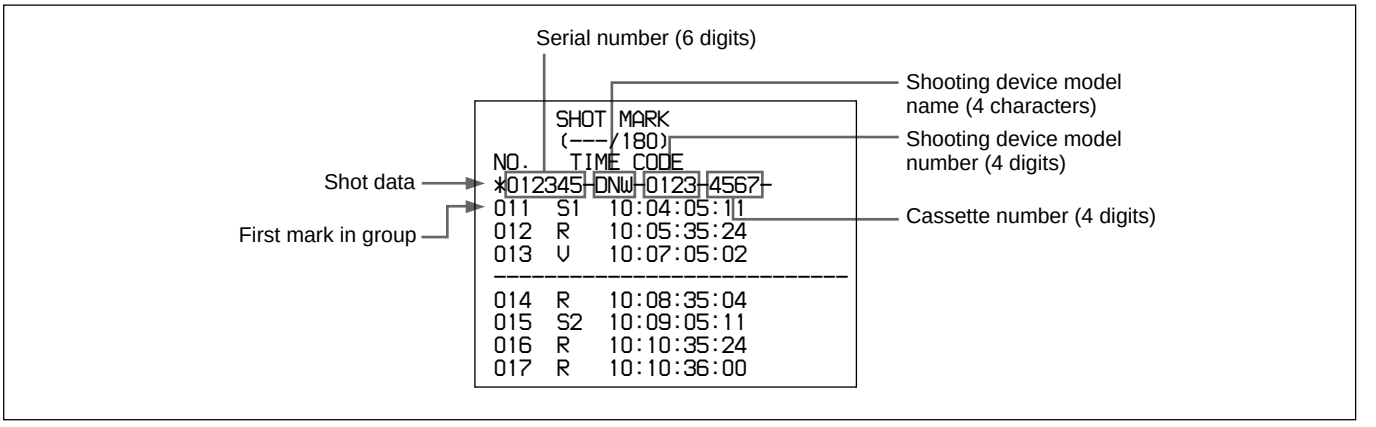
Returning to the shot mark list display

Press the STOP button together with the SET button.

To display shot marks and shot data at the same time

At one of the broken lines in the shot mark list, rotate the jog or shuttle dial to move the selector mark (∗). If shot data was recorded for the first mark in the group below the broken line, the following data is displayed.

You can sort the marks in the list by the information in shot data. For details, see section 5-2-6 “Sorting Shot Marks”.



To delete shot marks from the list

Proceed as follows to select and delete shot marks that are no longer needed.

1 In the shot mark list, select the mark to delete.

2 Press the MARK/UP button.

While you press the button, an “X” is displayed in the list after the number of the selected mark. The “X” mark indicates deletion, and disappears when you release the button.

If you only want to delete one mark, proceed to step **4**.

3 While keeping the button pressed, rotate the jog dial to select a range of marks to delete.

4 While keeping the button pressed, press operation button F1.

The marks with “X” marks are deleted.

To cancel the deletion

Press operation button F1 while pressing the SHIFT button.

Deleting the list

Press and hold operation button F1, and press the LIST/DOWN button while holding operation button F1.

5-2-5 Deleting Shot Marks

You can select shot marks from the list and delete them from the tape.
To delete shot marks, press the MARK/UP button and keep it pressed 2 seconds or longer to put the unit into shot mark write and delete mode (the SHIFT button flashes). Display the shot mark list and select the marks you want to delete, then press the MARK/UP button while holding operation button F1. While the mark is being deleted, the message “ERASE SHOT MARK” appears on the monitor and in the lower part of the FL display panel, and the SEQ/REC button lights.

Notes

- This operation deletes the shot marks that were recorded on the tape. Once they are deleted, shot marks cannot be recovered.
- If you change cassettes or turn off the unit after reading shot marks, you cannot delete the shot marks.

5-2-6 Sorting Shot Marks

Proceed as follows to classify shot marks by cassette and sort them in timecode order.

1 With the shot mark list displayed, press the STOP button together with the SET button.

The mark selection screen appears.

2 Rotate the jog dial to select “SORTING LIST” and press the dial.

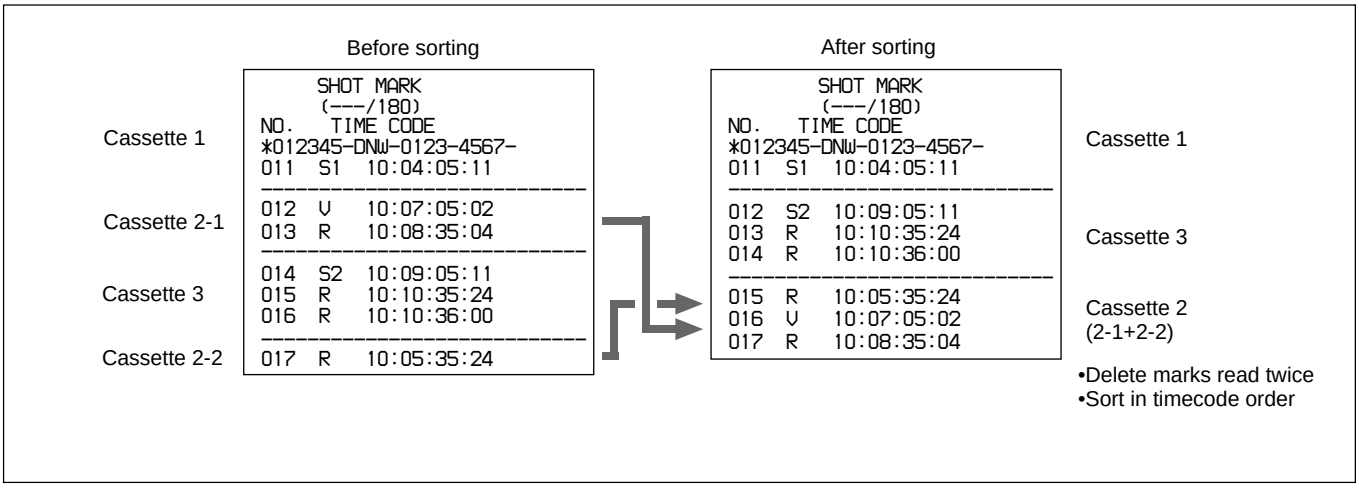
3 Rotate the jog dial to change the setting to ON.

Sorting of the list starts.
When sorting finishes, the setting returns to OFF.

To return the list to its original state

Press operation button F1 while pressing the SHIFT button.

The following example shows the results of sorting, using a list that contains marks that you have read twice from the same cassette.



5-2-7 Cueing up a Mark

Select the mark displayed in the list and press operation button F4.

To cue up a mark located close to the current tape position

Press the MARK/UP button together with the F FWD or REW button. The F FWD or REW button flashes during the operation.

Note

It is impossible to cue up a virtual shot mark.

6-1 Menu System Configuration

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

• Basic menu
This menu is used to make settings relating, for example, to the following.
– the hours meter
– the preroll time
– the character information superimposed on the output to the monitor
– switching between the 525/60 (NTSC) system and 625/50 (PAL) system
– the menu banks for retaining menu settings

For detailed information about menu operation relating to the hours meter, see "Digital Hours Meter" (page A-3).

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

6-2 Basic Menu

6-2-1 Items in the Basic Menu

The basic menu contains the following items.

In the "Settings" column of the table, the factory default settings are underlined.

Item number	Item name	Settings
001	PREROLL TIME	0S... 5S ...30S: Set the preroll time to between 0 and 30 seconds in steps of 1 second. A preroll time of at least 5 seconds is recommended when using this unit for editing.
002 a)	CHARACTER H-POSITION	Adjust the horizontal screen position of the character information (as a hexadecimal value) which is superimposed on output from the VIDEO OUTPUT 2(SUPER) connector and display on the monitor. 00... 14 ...24 (525 mode, 37 steps)/00... 12 ...22 (625 mode, 35 steps): The hexadecimal value 00 is for the far left of the screen. Increasing the value moves the position of the characters to the right.
003 a),b)	CHARACTER V-POSITION	Adjust the vertical screen position of the first line of the character information (as a hexadecimal value) which is superimposed on output from the VIDEO OUTPUT 2(SUPER) connector and display on the monitor. 00... 56 ...6A (525 mode, 107 steps)/00... 6A ...81 (625 mode, 130 steps): The hexadecimal value 00 is for the top of the screen. Increasing the value lowers the position of the characters.
004	SYNCHRONIZE	When editing with two VTRs connected via a 9-pin remote control cable, this item determines whether or not to operate the two units in phase synchronization. ON : Operate in phase synchronization. OFF: Do not operate in phase synchronization.

a) When setting items 002, 003, 009, and 011, watch the monitor screen, and adjust to the required state.
b) When displaying time code values, there is a slight time delay. Therefore, when creating a tape for off-line editing, the information inserted in the upper half of the screen may be delayed by one frame.

Item number	Item name	Settings
005	DISPLAY INFORMATION SELECT	Determines the kind of character information which is superimposed on output from the VIDEO OUTPUT 2(SUPER) connector and display on the monitor when the SUPER in the submenu is set to ALL/MENU. T&STA : Time data display information and the unit's status. T&UB: Time data display information and the user bits. T&CTL: Time data display information and CTL. T&T: Time data display information and time code (LTC or VITC) only. CHARACTER: User-specified text data If there is an overlap between the setting of this item and the setting of the CTL/LTC/U-BIT button, it is automatically avoided. For example, if CTL is selected by the CTL/TC/U-BIT button and this menu item setting is T&CTL, then CTL and LTC are output.
006	LOCAL FUNCTION ENABLE	Determines which tape transport control buttons are enabled when this unit is controlled from external equipment. DIS: All buttons and switches are disabled. ST&EJ : Only the STOP button and EJECT button are enabled. ENA: All buttons and switches are enabled.
007	TAPE TIMER DISPLAY	Determines whether to display the CTL count in 12-hour mode or 24-hour mode. + –12H : 12-hour mode 24H: 24-hour mode
008	MONITORING SELECTION FOR VTR-TO-VTR EDIT	For editing with two DNW-A28/A28P units, determines whether the recording-side VTR is forced into E-E mode to view the playback-side VTR's playback signals on the monitor connected to the recording-side VTR. MANU : Do not force the recording-side VTR into E-E mode. AUTO: Force the recording-side VTR into E-E mode.
009 a)	CHARACTER TYPE	Determines the type of character information (timecode, etc) which is superimposed on output from the VIDEO OUTPUT 2(SUPER) connector and display on the monitor. WHITE : White letters on a black background. BLACK: Black letters on a white background. W/OUT: White outline letters. B/OUT: Black outline letters.
011 a)	CHARACTER V-SIZE	Determines the vertical size of character information (timecode, etc) which is superimposed on output from the VIDEO OUTPUT 2(SUPER) connector and display on the monitor. × 1 : Standard size × 2: 2 times standard size × 3: 3 times standard size × 4: 4 times standard size

a) When setting items 002, 003, 009, and 011, watch the monitor screen, and adjust to the required state.

Item number	Item name	Settings
013	525/625 SYSTEM SELECT	Specify whether to enable switching between the 525 (NTSC) and 625 (PAL) systems. OFF : Do not enable system switching. ON: Enable system switching. Setting this item to ON and switching the system enables the unit to operate in the system switched to. **Notes** • All items in the setup menu are set to the current values for the system switched to (different from the values for the original system). • For Betacam/Betacam SP cassettes, only simple viewing is possible. For details about switching procedure, see “Switching between 525/625 line systems (menu item 013)” on page 6-5.
014	SEQUENTIAL RECORD MODE	Select the mode for sequential recording when using two units. OFF : No sequential recording. MANUAL CASSETTE REPLACE: Do sequential recording one time. Exchange the cassettes when one sequential recording finishes. AUTOMATIC OVERWRITE: Do sequential recording, overlaying previously recorded contents. (Do not exchange cassettes.)
017	CHARACTER PRESET	Select whether to create user-specified text data. ON: Open the Text Data Creation Screen and create the data (see page 2-11). OFF: Do not create user-specified text data.

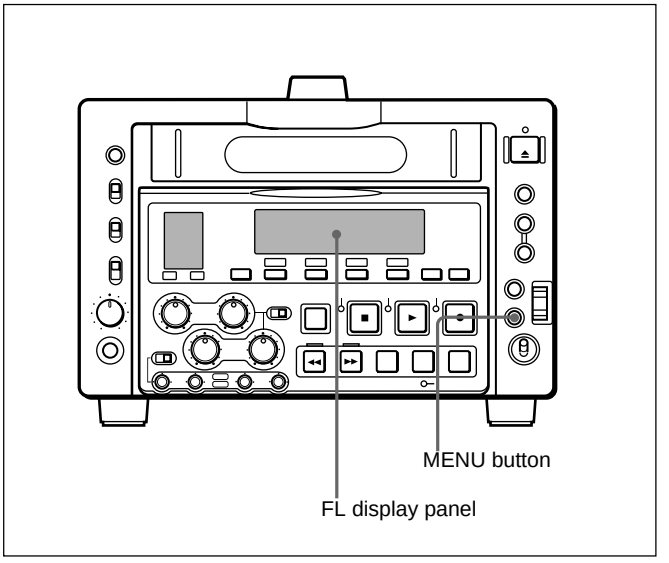
Item number	Item name	Settings
B01	RECALL BANK 1	Set to ON to recall menu settings from menu bank 1.
B02	RECALL BANK 2	Set to ON to recall menu settings from menu bank 2.
B03	RECALL BANK 3	Set to ON to recall menu settings from menu bank 3.
B04	RECALL BANK 4	Set to ON to recall menu settings from menu bank 4.
B11	SAVE BANK 1	Set to ON to save current menu settings to menu bank 1.
B12	SAVE BANK 2	Set to ON to save current menu settings to menu bank 2.
B13	SAVE BANK 3	Set to ON to save current menu settings to menu bank 3.
B14	SAVE BANK 4	Set to ON to save current menu settings to menu bank 4.
B20	RESET SETUP	Set to ON to reset current active settings to factory default values.

6-2-2 Basic Menu Operations

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

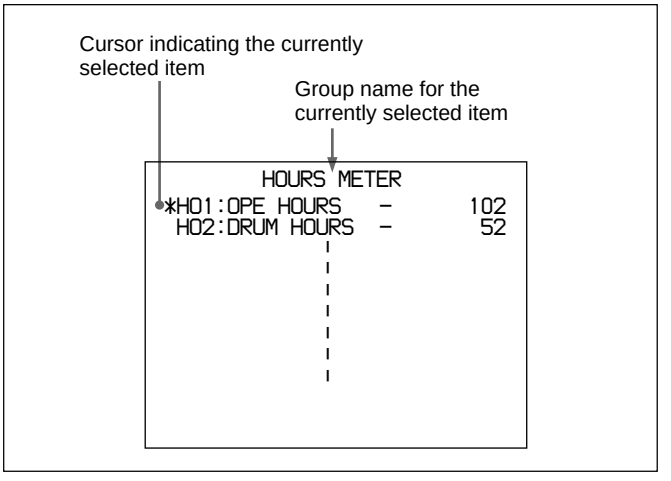
For information about how to use item 013, see the section "Switching between 525/625 line systems (menu item 013)"(page 6-5), and for information about how to use items B01 to B14, see the section "Menu bank operations (menu items B01 to B14"(page 6-6).

Displaying the menus

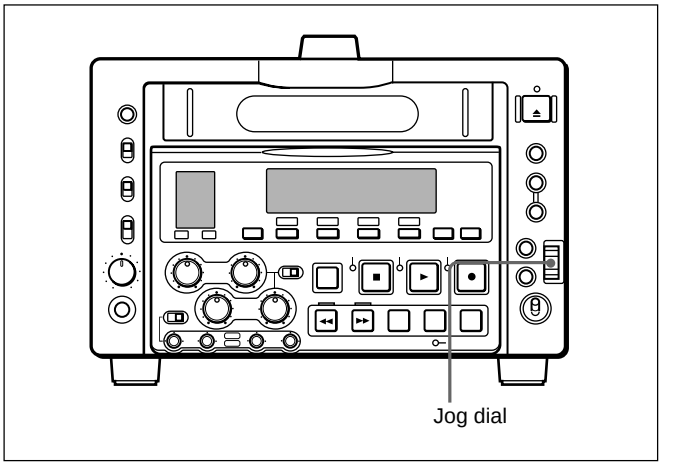


Press the MENU button.

When the SUPER in the submenu is set to other than OFF, the setting of the currently selected menu item appears on the monitor connected to the VIDEO OUTPUT2(SUPER) connector and on the FL display panel.



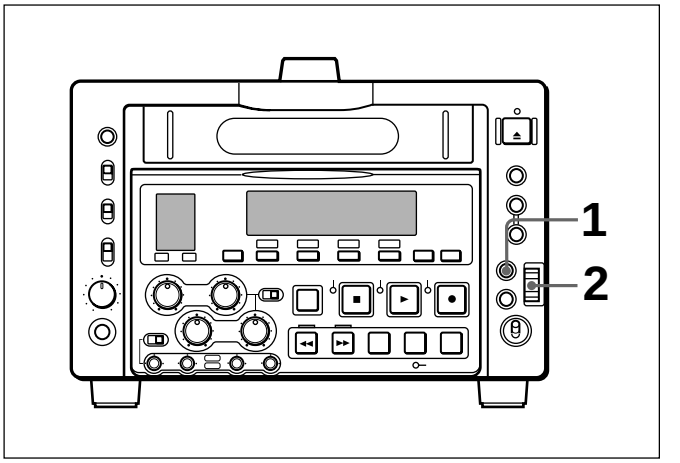
Changing the currently displayed menu item



Turn the jog dial.
Turning the dial downward increments the item number, and turning it upward decrements the item number.
When the desined menu item is displayed, press the dial.

Changing a menu item setting value

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



1 Turn the jog dial.

The setting value changes at a rate depending on the jog dial rotation speed.

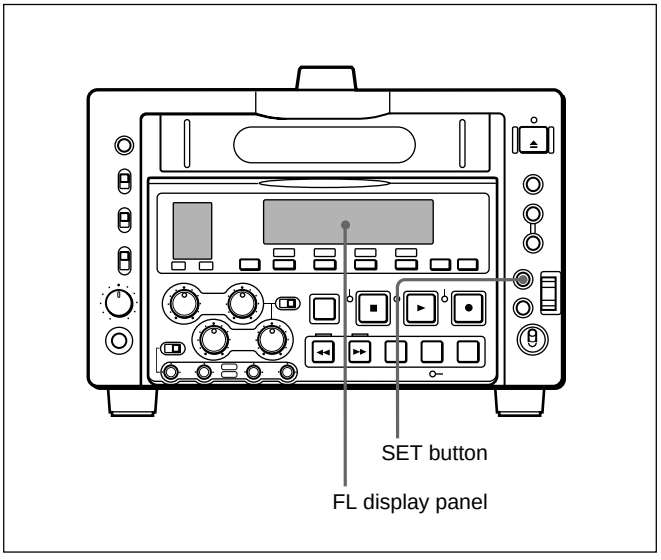
2 When the desired setting value is displayed, press the SET button.

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

To abandon making a change

Press the MENU button before pressing the SET button.
The menu display disappears from the monitor and FL display panel, without the new setting value being saved.

Resetting the menu settings to their factory default values (menu item B20)



1 Set menu item B20 RESET SETUP to ON.

"PUSH SET BTN" appears in the FL display panel, and "Push SET button" appears on the monitor.

2 Press the SET button.

The current active menu settings are reset to their factory default settings.

3 Press the SET button again.

The settings are saved and the menu display disappears.

Switching between 525/625 line systems (menu item 013)

Using the following procedure, you can set basic menu item 013, 525/625 SYSTEM SELECT, to "ON", and then switch between 525 (NTSC) and 625 (PAL). (The following procedure shows by way of example how to switch from a 525 (NTSC) system to a 625 (PAL) system.)

Note

After switching, playback of Betacam/Betacam SP cassettes is also performed in the selected mode. However in 625 mode, only simple viewing is allowed and the capstan lock mode is fixed to 2FD.

1 Select menu item 013.

The monitor shows the following display.

```
ITEM-013

525/625 SYSTEM
SELECT

OFF
```

2 Turn the jog dial to change the setting from "OFF" to "ON", then press the jog dial.

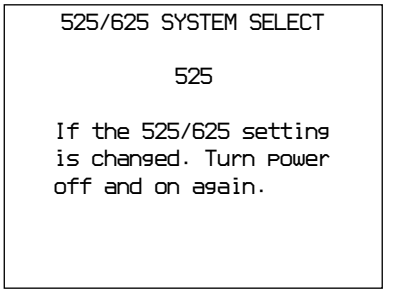
The display changes as follows.

```
ITEM-013

525/625 SYSTEM
SELECT

ON

Push SET button!!
```

(Continued)

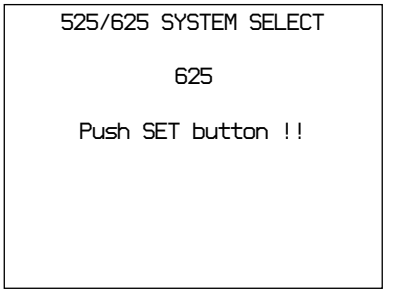
3 Press the SET button.

The display changes as follows.



4 Turn the jog dial to change the setting from “525” to “625”, then press the jog dial.

The displays change as follows.



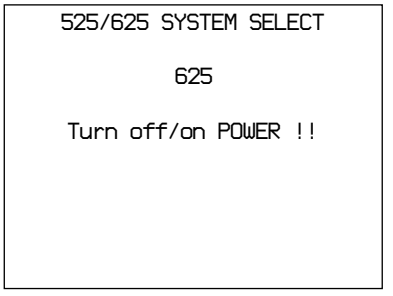
To abandon the 525/625 setting operation
Press the MENU button a required number of times to exit from the menu.

Note

Once you execute step **5**, it is not possible to abort the operation.

5 Press the SET button.

The displays change as follows.



6 Turn the POWER switch off momentarily, then on again.

This switches from a 525(NTSC) to 625(PAL) system; the 525 indicator goes out, and the 625 indicator lights in the FL display panel.

Menu bank operations (menu items B01 to B14)

This unit allows four different complete sets of menu settings to be saved in both 525 and 625 modes in what are termed “menu banks” numbered 1 to 4. Saved sets of menu settings can be recalled for use as required.

To access to menu item B01 quickly

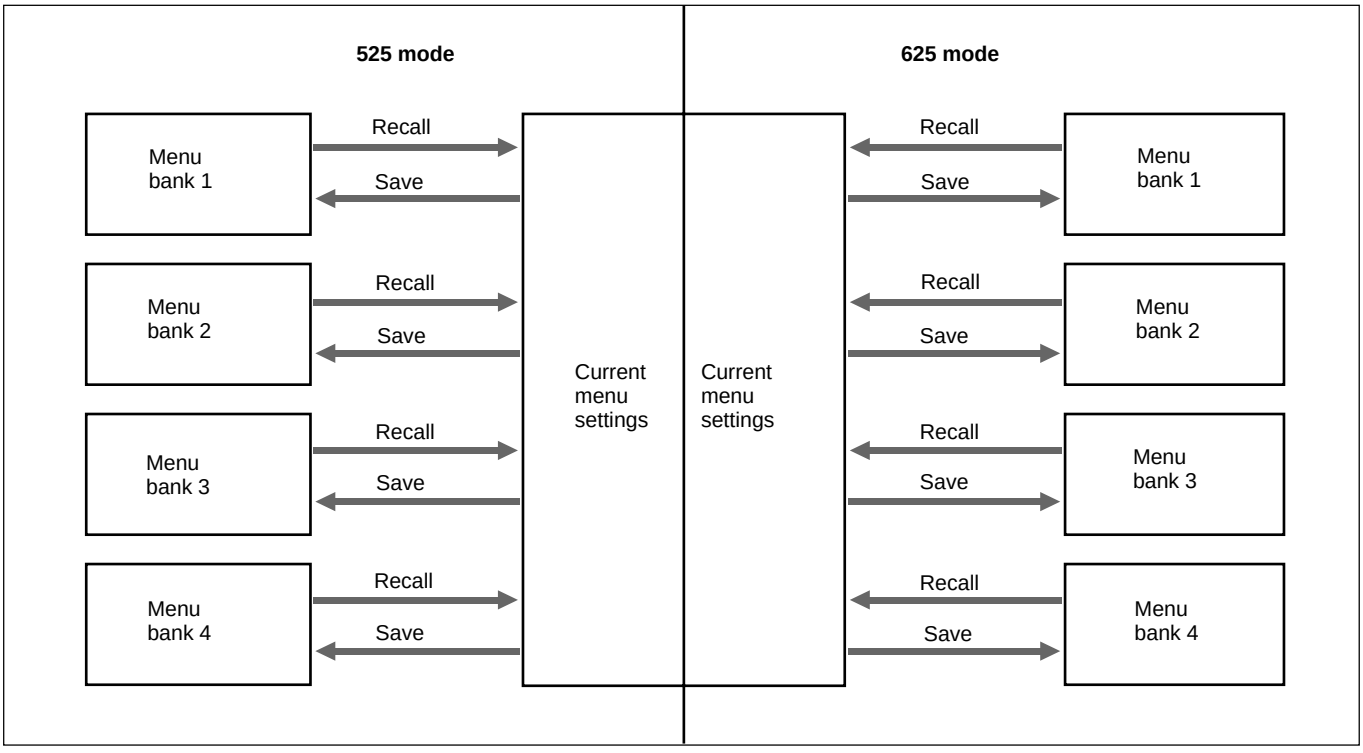
You can recall any required menu item by turning the jog dial after pressing the MENU button.
If you press the MENU button first, then the CTL/TC/U-BIT button, you can jump directly to menu item B01 or H01. The recalled menu item toggles between B01 and H01 every time you press the CTL/TC/U-BIT button.

Saving the current active menu settings

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

Recalling settings from a menu bank

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


525 mode
625 mode
Menu bank 1
Recall
Save
Menu bank 2
Recall
Save
Menu bank 3
Recall
Save
Menu bank 4
Recall
Save
Current menu settings
Current menu settings
Recall
Save
Menu bank 1
Recall
Save
Menu bank 2
Recall
Save
Menu bank 3
Recall
Save
Menu bank 4

6-3 Extended Menu

6-3-1 Items in the Extended Menu

The extended menu contains the following items.

- Menu items in the 100s, relating to the control panels (page 6-8)
- Menu items in the 200s, relating to the remote control interfaces (page 6-9)
- Menu items in the 300s, relating to editing operations (page 6-10)
- Menu items in the 400s, relating to preroll (page 6-13)
- Menu items in the 500s, relating to tape protection (page 6-13)
- Menu items in the 600s, relating to the timecode generator (page 6-14)
- Menu items in the 700s, relating to video control (page 6-16)
- Menu items in the 800s, relating to audio control (page 6-21)
- Menu items in the 900s, relating to digital processing (page 6-22)

In the “Settings” column of the table, the factory default settings are underlined.

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

Item number	Item name	Settings
101	SELECTION FOR SEARCH DIAL ENABLE	Select how the unit enters the search mode. DIAL : Turning the jog dial switches to search mode (jog mode) at all times except during recording/editing. KEY: The SEARCH button must be pressed to switch to search mode (selected last).
104	AUDIO MUTING TIME	Select the length of time for which audio muting occurs when the unit switches to playback either from stopped or from still playback in the search mode (for Betacam or Betacam SP playback only). OFF : Set the audio muting time to zero (i.e. no muting). 0.1S... 1.0S: Set the audio muting time from 0.1 seconds to 1.0 second, in 0.1-second increments.
105	REFERENCE SYSTEM ALARM	Select whether or not to display a warning when the video/audio reference signal selected by the OUT REF in the submenu, is not supplied or is out of phase with the input video signal. OFF : No warning. ON: Flash the STOP button as a warning.
106	CAPSTAN LOCK	Select the capstan servo lock mode. SW : The capstan servo lock mode is determined by the CAPSTAN in the submenu. 2F: The capstan servo locks every two fields regardless of the setting of the CAPSTAN in the submenu. 4F: The capstan servo locks every four fields regardless of the setting of the CAPSTAN in the submenu. 8F (For 625 mode only): The capstan servo locks every eight fields regardless of the setting of the CAPSTAN in the submenu
107	REC INHIBIT LAMP FLASHING	Select whether or not to flash the REC INHI indicator when recording is prevented though the REC INHI switch is set to OFF. OFF : Light the REC INHI indicator. ON: Flash the REC INHI indicator.
108	AUTO EE SELECT	When a cassette recorded in Betacam SX format is inserted and the PB/EE switch is set to PB/EE, select the operation modes in which input video and audio signals are automatically handled in E-E mode. S/F/R : In STOP/EJECT/F FWD/REW modes STOP: In STOP/EJECT modes
109	FORCED EE WHEN TAPE UNTHREAD	During tape threading and unthreading, and when no cassette is inserted, select whether the PB/EE switch controls the output signal PB/EE setting. ON : No control by the monitor output switch (the signal is always an E-E signal). OFF: Control by the monitor output switch.

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

Item number	Item name		Settings
118	KEY INHIBIT SWITCH EFFECTIVE AREA		Select which switches and buttons can be operated when the KEY INH in the submenu is set to ON. The following sub-items control different sets of switches and buttons independently.
	Sub-item		
	118-1	REMOTE SELECT	Select whether the LOCAL/REMOTE switch is enabled. DIS : Disabled. ENA: Enabled.
	118-2	CONTROL PANEL	Select which switches and buttons operations are enabled. DIS : All switches and buttons are disabled. EDIT: All switches and buttons for editing operations are disabled. ENA: All switches and buttons are enabled. ST&EJ: All switches and buttons except STOP and EJECT buttons are disabled.
119	VARIABLE SPEED LIMIT IN KEY PANEL CONTROL		Select the playback speed range when carrying out playback in variable mode. OFF : –1 to +1 times normal speed. ON: 0 to +1 times normal speed.
120	CTL LOCK IN VAR/ SHTL		Select whether the tape transport should be phase-locked to the CTL during playback in variable or shuttle mode. OFF : Not phase-locked. ON: Phase-locked at the following speeds: –1, –0.5, +0.5 and 1.0 times normal.
122	AUTO EE WITH ANALOG TAPE		Select whether or not the setting of item 108 also applies to a cassette recorded in Betacam/Betacam SP format. Item 108 selects the VTR modes in which input video and audio signals are automatically handled in E-E mode, when a cassette recorded in Betacam SX format is inserted. DIS : When a cassette recorded in Betacam/Betacam SP format is inserted, always use PB mode. ENA: When a cassette recorded in Betacam/Betacam SP format is inserted, follow the setting of item 108.

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

Item number	Item name	Settings
201	PARA RUN	Select whether or not to use synchronized operation for two or more VTRs. DIS : No synchronized operation. ENA: Use synchronized operation. **Note** To use synchronized operation for two or more VTRs, set item 201 to “ENA” on all of the VTRs.
202	CF FLAG (only valid in 625 mode)	Select the mode for locking color framing sent to a remote control unit. 8F : Eight-field locking mode 4F/8F: Four- or eight-field locking mode

Menu items in the 300s, relating to editing operations

Item number	Item name	Settings
301	VAR SPEED RANGE FOR SYNCHRONIZATION	Select the playback speed range when carrying out playback in variable mode from a remote control unit connected to the REMOTE (9P) connector. –1~+1: –1 to +1 times normal speed. ~1.5 : –1.5 to +1.5 times normal speed.
302	CAPSTAN RE-LOCKING DIRECTION	**In 525 mode** When the CAPSTAN in the submenu is set to 4FD, select whether the capstan servo should lock by accelerating or decelerating. DECEL : Lock by decelerating. ACCEL : Lock by accelerating.
		In 625 mode When the CAPSTAN in the submenu is set to 4FD or 8FD, select whether the capstan servo should lock by accelerating or decelerating. DECEL: Lock by decelerating. ACCEL : Lock by accelerating.
305	SYNC GRADE	When editing in phase-synchronized mode with item 004 set to ON, select the target phase synchronization accuracy. ACCUR : ± 0 frame accuracy. ROUGH: ± 1 frame accuracy.
306	DMC INITIAL SPEED	When performing DMC editing with an editing control unit, select the initial tape speed which is set automatically. MANUAL : the speed determined by rotation speed of the jog dial PLAY: normal playback speed STILL: still playback speed ±0.03 to ±1: the speed selected in this range (±0.03, ±0.1, ± 0.2, ±0.5, and ±1 times normal speed can be selected.)
307	AUTO-DELETION FOR INCONSISTENT DATA	Select what happens when an erroneous edit point is set. MANU : A warning is given by flashing the DELETE button. The operator must manually delete the unnecessary edit point . NEG&E: When inconsistent edit points are set, such as when an OUT point is before an IN (or audio IN) point, or when too many edit points are specified, the previously set edit point is deleted. NEG: When inconsistent edit points are set, such as when an OUT point is before an IN (or audio IN) point, the previously set edit point is deleted. When too many edit points are specified, the DELETE button flashes to give a warning. **Note** Pressing the button corresponding to an edit point to be deleted and the DELETE button simultaneously deletes the edit point. If an erroneous edit point is set (the DELETE button is flashing), editing is not executed.
308	SELECTION OF STD/NON-STD FOR COMPOSITE VIDEO IN	Select the STD or NON-STD mode in accordance with a composite video input. AUTO : Detect automatically whether the input video luminance and chrominance signals are interleaved or not. If they are interleaved, select the STD mode. If they are not interleaved, select the NON-STD mode. STD: The STD mode is always used (forced STD mode). N-STD: Use this setting when color framing of the input video signal is unstable (forced NON-STD mode).

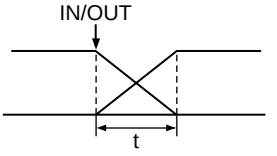
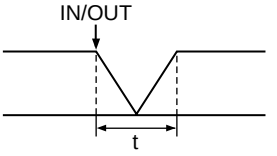
Menu items in the 300s, relating to editing operations (continued)

Item number	Item name	Settings
309	SERVO/AV REFERENCE SEL	Select the servo reference signal. AUTO1 : During recording, an analog composite or digital input video signal is used as the servo reference signal. During playback, the signal selected by the OUT REF in the submenu is used as the servo reference signal. If the signal selected by the OUT REF in the submenu is not connected, an internal reference signal is used. AUTO2: When the OUT REF is set to REF, and any of the ASSEMBLE, VIDEO, and A-CH-1 to A-CH-4 is set to ON in the Edit Preset menu, the reference signal for video/audio signal processing is locked to the input video signal. EXT: The servo reference signal is forced to be “EXT” (an external reference video input signal is used). *For details, see 2-4 “Setting Reference Video Signals”.*
310	REC INHIBIT	Select the conditions under which recording is inhibited when the REC INHI switch is set to ON. ALL : All tape recording is inhibited. CRASH: Crash recording is inhibited. Select this setting when you wish to carry out assemble editing. **Note** When the REC INHI switch is set to ON, the REC INHI indicator on the control panel lights. If an operation inhibited by this item is attempted, the REC INHI indicator flashes.

Items 311 to 314 (settings for digital audio editing): If you use an editor (BVE-600, etc) or a remote controller which cannot control digital audio edit preset, select how to activate edit preset of each digital audio channel on the unit using the analog audio edit preset function of the editor or remote controller.

Item number	Item name	Settings
311	ANALOG AUDIO EDIT PRESET REPLACE FOR CH 1	Select how to activate the CH-1 edit preset of the unit. NO DEFINITION : Not defined ANALOG CH 1 : Use the edit preset for analog audio channel 1. ANALOG CH 2 : Use the edit preset for analog audio channel 2. ANALOG CH 1+CH 2: Use the edit preset for analog audio channel 1 or channel 2.
312	ANALOG AUDIO EDIT PRESET REPLACE FOR CH 2	Select how to activate the CH-2 edit preset of the unit. NO DEFINITION: Not defined ANALOG CH 1: Use the edit preset for analog audio channel 1. ANALOG CH 2 : Use the edit preset for analog audio channel 2. ANALOG CH 1+CH 2: Use the edit preset for analog audio channel 1 or channel 2.
313	ANALOG AUDIO EDIT PRESET REPLACE FOR CH 3	Select how to activate the CH-3 edit preset of the unit. NO DEFINITION : Not defined ANALOG CH 1: Use the edit preset for analog audio channel 1. ANALOG CH 2 : Use the edit preset for analog audio channel 2. ANALOG CH 1+CH 2: Use the edit preset for analog audio channel 1 or channel 2.
314	ANALOG AUDIO EDIT PRESET REPLACE FOR CH 4	Select how to activate the CH-4 edit preset of the unit. NO DEFINITION : Not defined ANALOG CH 1: Use the edit preset for analog audio channel 1. ANALOG CH 2 : Use the edit preset for analog audio channel 2. ANALOG CH 1+CH 2: Use the edit preset for analog audio channel 1 or channel 2.

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

Item number	Item name	Settings
317	AUDIO EDIT MODE	Specifies the type of editing for digital audio signals. CUT EDIT: Cut editing (discontinuity in audio signal may result at the editing point, causing noise.) CROSS FADE : Cross-fade  FADE IN/OUT: Fade out and fade in  The “t” in the figures is the time set by item 803 “DIGITAL AUDIO FADE TIME”.
318	EDIT RETRY	When editing with two DNW-A28/A28P units, set for the recording-side VTR. Selects the operation if the recording-side VTR was not synchronized in time. OFF: Editing is not carried out, and the unit stops. ON : The editing is automatically retried (up to twice).
319	PREREAD SELECT	Select the signals used for preread editing. A/V : Both audio and video signals AUDIO: Audio signal only VIDEO: Video signal only.
320	DIGITAL AUDIO PB PROCESS ON EDIT POINT	Select the treatment of audio at edit points. CUT: Carry out a cut (possibly resulting in audio discontinuities at the edit point). FADE : Fade out and fade in.
326	AUTOMATIC IN	ENTRY AFTER AUTO EDIT Select whether or not to set the OUT point timecode for the IN point of the next auto-edit automatically when an auto-edit is completed. OFF : Do not set the IN point timecode automatically. R-IN: Set the recoder IN point timecode automatically. R-IN, P-IN: Set the recoder and player IN points timecode automatically. **Note** For audio split editing, only the video IN point is set automatically.

Menu items in the 400s, relating to preroll

Item number	Item name	Settings
401	FUNCTION MODE AFTER CUE-UP	Select the state that the unit goes into after a cuing-up operation. STOP : Stops (the “STOP mode”). STILL: Still playback (in search mode). **Note** When controlling this unit from an editor with the standard constants set, select “STOP”.
402	TIME REFERENCE FOR PREROLL	When prerolling a tape section at which timecode signals are discontinuous, select which to use, the timecode or CTL signals recorded preceding the section, for timecode advance and preroll. CTL : Using CTL signals. TC: Using timecode signals.
403	AUTOMATIC PREROLL REFERENCE ENTRY	Select whether or not the edit IN point is automatically set by pressing the PREROLL button when the IN point is not set before starting preroll. DIS : IN point is not set automatically. ENA: IN point is set automatically.

Menu items in the 500s, relating to tape protection

Item number	Item name	Settings
501	STILL TIMER	Select the time delay from the tape transport stopping (either the STOP/PAUSE mode or the still playback mode in search mode) until the unit automatically switches to the tape protection mode, in order to protect the rotary heads and the tape. 0.5S... 8M ...30M: Set the value in the range 0.5 seconds to 30 minutes.
502	TAPE PROTECTION MODE FROM SEARCH	Select the operation of the protection mode to protect the rotary heads and tape when in the still playback mode in search (jog/shuttle) mode. STEP : Step forward at $^{1}/_{30}$ normal speed every 2 seconds. STDBY: Switch to “Standby OFF mode” (the unit not on standby).

Menu items in the 600s, relating to the timecode generator

Item number	Item name	Settings
601	VITC POSITION SEL-1 **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.	**In 525 mode** Select a line to insert the VITC in. 12H... 16H ...20H: Select any line from 12 to 20. **In 625 mode** Select a line to insert the VITC in. 9H... 19H ...22H: Select any line from 9 to 22.
602	VITC POSITION SEL-2 **Note** You can insert the VITC signal in two places. To insert it in two places, set both items 601 and 602.	**In 525 mode** Select a line to insert the VITC in. 12H... 18H ...20H: Select any line from 12 to 20. **In 625 mode** Select a line to insert the VITC in. 9H... 21H ...22H: Select any line from 9 to 22.
603	ID CODE PRESET	Select whether or not to set the ID code. OFF : Do not set the ID code. ON: Set the ID code. **To set the ID code:** ❶ Set this item to ON. The time data display area in the FL display panel flashes. ❷ Turn the jog dial to select the column, then hold down the SEARCH button while turning the jog dial to change the digit value. ❸ When the ID code setting is complete, press the SET button. This saves the ID code setting, and the setting of this item returns to “OFF”.
604	ID CODE SW	Select whether or not to record the ID code set using item 603 in the user bits. OFF : Record the normal data in the user bits. ON: Record the ID code in the user bits.
605	TCG REGEN MODE	Select the signal to be regenerated when the time code generator is in the regeneration mode (i.e., when the PRESET/REGEN switch in the timecode section is set to REGEN, or the unit is in automatic edit mode). TC&UB : Both the timecode and user bits are regenerated. TC: Only the timecode is regenerated. UB: Only the user bits ane regenerated.

Menu items in the 600s, relating to the timecode generator (continued)

Item number	Item name	Settings
606	TC OUTPUT SIGNAL IN REGEN MODE	Select the signal output from the TC OUT connector during normal (×1) speed playback in the following two cases: • For tape playback when the INT/EXT switch in the timecode section is set to INT and the PRESET/REGEN switch is set to REGEN. • For preroll or postroll playback during automatic editing with the tape. TAPE : During tape playback, the playback timecode signal is output without regeneration (in this case the output video and the time code values output from the TC OUT connector do not agree). REGEN: The playback time code is output after regeneration.
607	U-BIT BINARY GROUP FLAG	Select the user bits to be used in the time code generated by the time code generator. 000 : Character set not specified. 001: 8-bit characters compliant with ISO 646 and ISO 2022. 010: Undefined. 011: Undefined. 100: Undefined. 101: SMPTE 262M page/line multiplex system. 110: Undefined. 111: Undefined.
608	PHASE CORRECTION	Select whether or not to carry out phase correction control on the LTC generated by the timecode generator. OFF : No control. ON: Carry out control.
609	TCG CF FLAG	Select whether or not the color framing flag is set in the blank bit of the timecode. OFF : Color framing flag is not set. ON: Color framing flag is set. AUTO: Color framing flag is set or not depending upon the color framing phase relationship between the recorded video signal and the timecode. When AUTO is selected, color framing is controlled as follows according to the operating mode of the timecode generator. • In INT PRESET mode (the INT/EXT switch is set to INT, the PRESET/REGEN switch is set to PRESET, and in modes other than the automatic editing mode): the timecode is generated with color framing locked to the video signal, and the color framing flag is set. • In INT REGEN mode (the INT/EXT switch is set to INT, the PRESET/REGEN switch is set to REGEN, and in the automatic editing mode), and also in EXT mode (the INT/EXT switch is set to EXT): the timecode is generated with color framing locked to the video signal, and the color framing flag is not set.
610	REGEN CONTROL MODE	When editing with two DNW-A28/A28P units, if you use the lower control panel for editing operation, select whether or not the timecode is automatically regenerated. AS&IN : In editing with this unit as the recorder, regardless of the setting of the INT/EXT and PRESET/REGEN switches, in assemble and insert editing , the timecode generator regenerates according to the timecode on the tape. ASSEM: In editing with this unit as the recorder, regardless of the setting of the INT/EXT and PRESET/REGEN switches, in assemble editing only, the timecode generator regenerates according to the timecode on the tape. MANU: Regardless of whether this unit is the recorder or player, the timecode generator operates in accordance with the setting of the INT/EXT and PRESET/REGEN switches. FULL: Regardless of whether local or remote, when any of the ASSEMBLE, VIDEO, A-CH-1 to A-CH-4, and TC is set to ON in the Edit Preset menu, the timecode generator regenerates according to the timecode played back from the tape.

Menu items in the 700s, relating to video control

Item number	Item name		Settings
701	SELECTION OF VIDEO/SYNC DELAY		An E-E video signal is output delayed with respect to the video input signal by the time for video circuit processing. With this item, select whether or not to delay the sync signal attached to the output video signal by an amount corresponding to the delay. SYNC: Delay the sync signal by the corresponding amount before attaching it. VIDEO : Attach a sync signal with the same timing as the input signal.
703	BLANK LINE SELECT		Switch blanking on or off for individual lines in the vertical blanking interval. The Y/C signal and odd/even fields are blanked simultaneously. **Note** For playback of an analog Betacam cassette (Betacam SP, etc.) regardless of the setting of this item, the chrominance signal is blanked up to line 15.
	Sub-Item		
	0	ALL LINE	- - - : Specify the blanking for each line separately. BLANK: Regardless of the setting of other sub-items, blank all lines which can be specified in this menu item. THROU: Regardless of the setting of other sub-items, switch off blanking for all lines which can be specified in this menu item.
In 525 mode	12...20	LINE 12... LINE 20	Specify blanking for lines 12 to 20. BLANK : Carry out blanking. THROU: Switch off blanking.
	21	LINE 21	Specify blanking for line 21. BLANK : Carry out blanking. HALF: Carry out half-blanking. THROU: Switch off blanking.
In 625 mode	9...22	LINE9... LINE 22	Specify blanking for lines 9 to 22. BLANK : Carry out blanking. THROU: Switch off blanking.
	23	LINE 23	Specify blanking for line 23. BLANK : Carry out blanking. HALF : Carry out half-blanking. THROU: Switch off blanking.
704	DECODE Y/C SEP MODE		Select the method of processing the input video signal in the vertical blanking interval, independently for each line.
	Sub-item		
In 525 mode	12...20	LINE12... LINE 20	Make the selection for lines 12 to 20. BPF: Carry out Y/C separation. B&W : Treat all as luminance signal.
	21...22	LINE 21... LINE 22	Make the selection for lines 21 and 22. BPF: Carry out Y/C separation. B&W: Treat all as luminance signal. COMB : Process with an appropriate Y/C separation.
In 625 mode	9...22	LINE 9... LINE 22	Make the selection for lines 9 to 22. BPF: Carry out Y/C separation. B&W : Treat all as luminance signal.

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

Item number	Item name	Settings
705	EDGE SUBCARRIER REDUCER MODE	During recording and playback of a composite signal, in the playback circuit the edge subcarrier reducer (ESR) is automatically switched on or off according to the VTR operation. When recording a “Non-Standard” signal, for example, if the color edge is not as good as with a proper signal, the ESR can be forced on. This item makes this selection. AUTO : ESR is switched on and off automatically. ON: ESR operation is forced on.
706	VERTICAL BLANKING V SHIFT	During noiseless variable playback, when the playback signal is an odd field and the reference signal is an even field, the playback signal is shifted by 1H (1 line) to suppress the vertical movement of the playback picture (“Y-add” function). This item selects whether or not to apply a 1H shift to the vertical blanking interval. ON : Carry out vertical blanking shift. OFF: Do not carry out vertical blanking shift. **Note** If the 1H shift is applied during the vertical blanking interval, the signal recorded in line 21 may intermittently appear at noiseless playback.
707	FORCED VERTICAL INTERPOLATION OFF	The “Y-add” function is normally switched on automatically during noiseless variable playback. This item selects whether or not to force the “Y-add” function off. AUTO : Automatically switches the “Y-add” function on. OFF: Force the “Y-add” function off.

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

Item number	Item name	Settings
712	VIDEO PROCESS ON CAP LOCK 2FIELD	When the CAPSTAN in the submenu or setup menu item 106 is set to 2FLD for 2-field playback, select whether or not to carry out a “picture shift”. OFF : No picture shift. ON: Carry out picture shift. **Note** To eliminate the adverse effect of the residual chrominance subcarrier component in the Y signal that is the result of the Y/C separation, this unit automatically applies a shift to the playback image in the H direction, so that even in 2-field playback a satisfactory image can be obtained.
713	VIDEO SETUP REFERENCE LEVEL (525 system)	Set the video setup amounts to be removed from a recording signal and Betacam playback signal, and to be added to a composite output signal. There are independent settings for a recording signal (referred to below as an input signal), a Betacam signal, and a composite output signal (referred to below as an output signal). **Notes** • Setup removal is carried out only with respect to a Batacam format CAV input signal (menu setting) and NTSC composite input signal. It is not carried out with respect to other input signals. • The setup amounts specified in this menu item have no connection with the SETUP/ BLACK LEVEL knob.
	Sub-Item	
	0 MASTER LEVEL	When the input signal, Betacam playback signal, and output signal settings are “MSTER” (master), the setup amount specified for this sub-item is removed from the input signal and Betacam playback signal, and is added to the output signal. 0.0% ... 7.5% ...10.0%: Setting in this range, in 0.5% increments.
	1 INPUT LEVEL	MSTER : Set the input signal to the master setting. 0.0% ... 7.5% ...10.0%: Set the setup amount be removed from the input signal in this range, in 0.5% increments.
	2 INPUT VBLK CONT	REMOV: Remove the setup amount in the vertical blanking interval of the input signal. THROU : Do not remove the setup amount in the vertical blanking interval of the input signal.
	3 BETACAM PB LEVEL	MSTER : Set the Betacam playback signal to the master setting. 0.0%...7.5%...10.0%: Set the setup amount to be removed from the Betacam playback signal in this range, in 0.5% increments.
	4 OUTPUT LEVEL	MSTER : Set the output signal to the master setting. 0.0%...7.5%...10.0%: Set the setup amount to be added to the output signal in this range, in 0.5% increments.
714	VIDEO ADJUST RANGE	Select the variable range of the VIDEO and CHROMA knobs when the PROCESS CONTROL in the submenu is set to PANEL. –3~+3 : –3 dB to +3 dB WIDE: – ∞ to +3 dB

Items 715 to 721: Settings for controlling the video processing system according to the menu settings.

Item number	Item name	Settings
715	VIDEO GAIN CONTROL	Adjust the video output level. Default value: 800H
716	CHROMA GAIN CONTROL	Adjust the chroma output level. Default value: 800H
717	CHROMA PHASE CONTROL	Adjust the chroma phase. Default value: 80H
718	SETUP LEVEL	Adjust the setup level (black level). Default value: 110H
719	SYSTEM PHASE SYNC	Adjust the system sync phase. Default value: 80H
720	SYSTEM PHASE SC	Adjust the system sub-carrier phase. Default value: 0H
721	Y/C DELAY	For playback from an analog Betacam cassette, adjust the Y/C delay. Default value: 800H

Note

When you make settings for items 715 to 721, set the PROCESS CONTROL in the submenu to SETUP. When set to SETUP, all controls on the lower control panel and settings in the submenu are disabled.

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

Item number	Item name		Settings
723	INPUT VIDEO BLANK		Switch blanking on or off for individual lines in the vertical blanking interval of an input video signal. The Y/C signal and odd/even fields are blanked simultaneously.
	Sub-Item		A signal with blanking carried out according to this setting is recorded.
	0	ALL LINE	- - - : Specify the blanking for each line separately. BLANK: Regardless of the setting of other sub-items, blank all lines which can be specified in this menu item. THROU: Regardless of the setting of other sub-items, switch off blanking for all lines which can be specified in this menu item.
In 525 mode	12...20	LINE 12... LINE 20	Specify blanking for lines 12 to 20. BLANK : Carry out blanking. THROU: Switch off blanking.
In 625 mode	9	LINE 9	Specify blanking for line 9. BLANK: Carry out blanking. THROU : Switch off blanking.
	10...21	LINE 10... LINE 21	Specify blanking for lines 10 to 21. BLANK: Carry out blanking. THROU : Switch off blanking.
	22	LINE 22	Specify blanking for line 22. BLANK: Carry out blanking. THROU : Switch off blanking.

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

Item number	Item name	Settings
726	H BLANKING WIDTH	Select the horizontal blanking width of a video output signal. NARROW: Digital blanking (narrow) Selecting NARROW is recommended for longer H-period of video when editing is performed between digital devices. WIDE : Analog blanking (wide, complied with SMPTE 170A) Selecting WIDE is recommended for broadcast transmission or editing in which an analog device (i.e. BVW-series VTR) is used as recorder.
727	VIDEO EDIT PREVIEW SWITCHER	Set the output phase for the video playback signal when any of the ASSEMBLE, VIDEO, A-CH-1 to A-CH-4, and TC is set to ON in the Edit Preset menu. INT : The video playback signal output phase is the same as the output phase in the E-E mode. Use this setting when editing with a single VTR, or when previewing while watching the VTR output signal. EXT: The video playback signal output phase is the same as the phase of an input video signal or external reference signal. **Note** Whichever setting is used, the correct editing results will be obtained. When, however, you are using an external switcher to switch the video output signal from this unit for the purposes of preview, select EXT. This will prevent any image shifts at editing IN and OUT points.
728	OUTPUT SCH PHASE SETTING	Adjusts the SCH phase. Default value: 800H
730	PICTURE SHIFT	Shifts the picture played back in Betacam SX mode. OFF : Do not shift. 1/4H: By 1/4 of the display area in the horizontal direction 3/4H: By 3/4 of the display area in the horizontal direction 1/4V: By 1/4 of the display area in the vertical direction 3/4V: By 3/4 of the display area in the vertical direction

Menu items in the 800s, relating to audio control

Item number	Item name	Settings
802	DIGITAL AUDIO MUTE IN SHUTTLE MODE	Set the digital audio muting conditions during shuttle playback. OFF : Not muted. CUEUP: Muted during cue-up or preroll operations. FULL: Muted in shuttle mode.
803	DIGITAL AUDIO FADE TIME	Specifies the time for cross-fade or fade in/out processing of digital audio signals. 5 ms, 10 ms , 15 ms, 20 ms, 25 ms [a], 50 ms [b], 85 ms, 115 ms [c] **Note** Cross-fade, fade in, or fade out processing is applied to the recordings after the IN or OUT point. Setting this item allows rewrite of the recordings after the OUT point. Even when the minimum value (5ms) is selected, one-field recordings are rewritten. To avoid rewrite, select CUT in menu item 317. However, the audio signals discontinue at edit points. (There is no effect on the recordings of the video signal.)
805	AUDIO MONITOR OUTPUT MIXING	Select the audio mixing method used for digital audio signals and Betacam playback analog audio signals supplied to the MONITOR OUTPUT connector. ADD: Simple addition. RMS : Root-mean-square. AVE: Simple average.
807	AUDIO OUTPUT PHASE	Select the output timing of a digital audio playback signal (SDI only). The reference position corresponds to a setting of 80H; when the setting is less than 80H, the output timing is advanced, and when it is higher than 80H, the output timing is delayed. (80H, 128 samples=approx. 2.7 ms, 1 sample=approx. 20 µs) 0... 80 ...FF: Setting in this range
810	AUDIO EDIT PREVIEW SWITCHER	Set the output phase for the audio playback signal when any of the ASSEMBLE, VIDEO, A-CH-1 to A-CH-4, and TC is set t ON in the Edit Preset menu. INT : The audio playback signal output phase is the same as the output phase in the E-E mode. Use this setting when editing with a single VTR, or when previewing while watching the VTR output signal. EXT: The audio playback signal output phase is the same as the phase of an input video signal or external reference video signal. **Note** Whichever setting is used, the correct editing results will be obtained. When, however, you are using an external switcher to switch the audio output signal from this unit for the purposes of preview, selecting EXT will prevent any muting or discontinuities in the audio at editing IN and OUT points.

a) The cross-fade time is 24 ms.
b) The actual value is 49 ms.
c) The actual value is 114 ms.

Menu items in the 900s, relating to digital processing

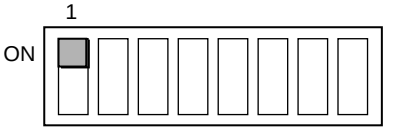
Item number	Item name	Settings
911	NO COMPRESSION LINE	Specify the “NO COMPRESSION” line (1 line in 1 field) for video input . OFF : No specification. 12H...21H (in 525 mode): Specify one of lines 12 to 21. 9H...22H (in 625 mode): Specify one of lines 9 to 22. **Notes** • The data in the specified line will be recorded and played back without video data rate compression. • Data values 0x00 and 0xFF will be converted to 0x01 and 0xFE for playback. • For the line specified in this item, it is not possible to carry out video adjustment, chroma adjustment, or other output adjustments. • When item 726 is set to WIDE, a number of words at the beginning and end of each line will be subject to horizontal blanking, and will not be played back. • For playback of a composite signal in jog or variable mode, according to the setting of item 705, the data will be subject to ESR (edge subcarrier reducer) processing.
912	SEQUENTIAL RECORD INPUT SIGNAL	Selects the signal input method for sequential recording. PARALLEL : The video and audio signals you will record are input to the each VTR separately. CASCADE: The video and audio signals you will record are input to the one VTR, and input to the other VTR as SDI output signals.

6-3-2 Extended Menu Operations

To access the extended menu, consult qualified Sony service personnel.

How to access the extended menu

Set switch 1 of the S201 on the internal SY-259 board to ON.



S201

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

For details of basic menu operation, see section 6-2-2 “Basic Menu Operations”.

To set sub-items

1 Turn the job dial to select the menu item, and press the dial.

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

3 Turn the jog dial to change the value for the selected sub-item.

Removing a Cassette When Tape Slack Occurs

If tape slack occurs in the unit, it is necessary to open the control panel manually and perform the procedure described on page 2-6.

Note

Tape slack should be dealt with by a trained service technician.

Head Cleaning

To clean the rotary and stationary heads, always use the special-purpose Sony BCT-5CLN cleaning cassette.
Follow the instructions with the cleaning cassette carefully, as inappropriate use of the cleaning cassette may damage the heads.

To carry out head cleaning, use the following procedure.

1. Insert the cleaning cassette.
2. Press the EJECT button while holding down DATA/PLAY button.

   Head cleaning starts.

   After a head cleaning operation which lasts for about 5 seconds, the cleaning cassette is automatically ejected.

Note

When carrying out head cleaning without using the automatic cleaning/ejecting function described above, be sure to eject the cleaning cassette immediately after the cleaning completes. If you leave the cassette in the unit, the heads will be worn down.

Error Messages

This unit has a self-diagnostics function to detect internal errors.
When an error is detected, the WARNING indicator lights and an error message appears on the monitor and the FL display panel (provided that the setting of SUPER in the submenu is other then MENU).
If an error message appears, contact qualified Sony service personnel.

Note

Depending on the type of error message, it may appear only on the FL display panel.

Error message list

Code	Message	Meaninng:
01	REEL TROUBLE	Tape slack was detected in an unthreading operation.
02	REEL TROUBLE	Tape slack or broken tape was detected in SEARCH, FF, or REW mode.
03	REEL TROUBLE	Tape slack or broken tape was detected in REC or PLAY mode.
04	REEL TROUBLE	A tape transport speed malfunctional was detected in FF or REW mode.
06	TAPE TENSION	Excessive tape tension was detected in REC or PLAY mode.
07	CAPSTAN TROUBLE	• Abnormal capstan motor rotation speed was detected in REC, PLAY, SEARCH, or REW mode. • Malfunction of capstan FG was detected in REC or PLAY mode.
08	DRUM TROUBLE	Drum motor malfunction was detected.
09	FUNC.CAM TROUBLE	Threading or unthreading malfunction was detected.
10	HUMID	Condensation was detected.
12	TAPE TOP SENSOR	Tape top sensor malfunction was detected.
13	TAPE END SENSOR	Tape end sensor malfunction was detected.
14	FAN MOTOR	Cooling fan motor malfunction was detected.
40	DPR-87 BOARD 1	Abnormal operation of IC on DPR-87 board was detected.
43	DPR-87 BOARD 4	Abnormal operation of IC (SDRAM) on DPR-87 board was detected.
92	INTERNAL I/F 1	Abnormality was detected in the interface between SYS1 CPU (on SY-259 board) and other CPU/MPU.
93	CPU INITIALIZE	Abnormality was detected in the communication between SERVO CPU (SV-194 board) and DRUM MICOM (SV-194 board).
96	SY NV-RAM ERROR	Abnormal operation of an NV-RAM (on SY-259 board) for the system control system was detected.
97	SV NV-RAM	Abnormal operation of an NV-RAM (on SY-194 board) for the servo system was detected.
98	RF NV-RAM ERROR	Abnormal operation of an NV-RAM (on EQ-72, or DM-114/114P board) for the RF system was detected.
99	INTERNAL I/F2	Abnormality was detected in the interface between SYS2 CPU (on SY-260 board) and SERVO CPU (on SV-194 board) or MPU (on EQ-72, DM-114/114P,or SDI-123 board) .

Moisture Condensation

When the unit 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, it can adhere to the drum. To prevent such a condition from occurring, the unit is provided with a moisture detecting function.

If this happens, the drum and capstan motors stop. Then, the drum starts to rotate again to dry its surface. In this state, the unit is not operable. When the moisture has evaporated, the error message disappears and the WARNING indicator goes out.

If "ERROR-10" appears and the WARNING indicator lights immediately after powering the unit on

Leave the unit powered on and wait until the indicator goes out.
While the indicator is lit, you cannot insert a cassette. When the indicator goes out and the error message disappears, you can use the unit.

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

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

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

There may be moisture condensation on the tape. Wait until the tape warms.

Regular Checks

Digital Hours Meter

The hours meter can display seven items of information, in corresponding display modes, about the operational history of the unit. Use it as a guide in scheduling periodic maintenance.

Display modes of the hours meter

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

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

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

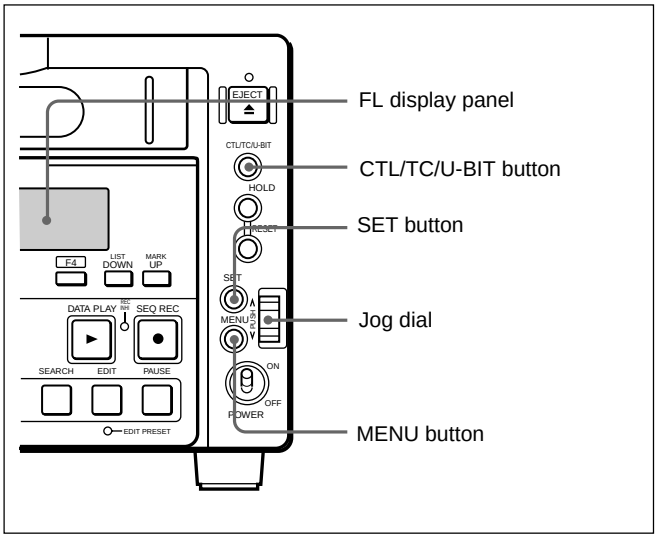
H04: THREADING mode
Display the total number of times tape has been threaded in the unit.

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

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

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

Displaying the hours meter



To display the hours meter

Press the MENU button, then turn the jog dial to display the required item on the monitor and FL display panel.

To access menu item H01 quickly

Press the MENU button, then the CTL/TC/U-BIT button.
Every time you press the CTL/TC/U-BIT button, menu item H01 or B01 is recalled alternately.

To exit from the hours meter

Press the MENU button or SET button.

Replacing Components

Use the following table as a timing guide for replacing components of the unit.

Note

These intervals are not guaranteed lifetimes; the timing for replacing components depends on the particular conditions of use. In particular, depending on the degree of dirt contamination and abrasion, pinch rollers and cleaners may require replacement earlier than suggested by this table.

Components	Part No.	Timing for replacing components (based on display of the hours meter)	
		Display mode	Hours
DJR-20B-R upper drum assembly	A-8317-461-B	H02 or H12	2000
Slip ring assembly 4ch (RP)	A-8317-463-A		2000
4ch (RP) brush assembly	A-8317-464-A		2000
DJH-20B-R drum assembly a)	A-8317-459-B		4000
V cleaning roller assembly	X-3949-109-1	H03 or H13	1000
CR cap	3-615-320-01		1000
Pinch roller	X-3678-926-1		1000
Swing gear	A-8278-829-C		2000
Tension regulator band	A-8278-704-C		2000
Timing belt	3-611-544-01		3000
S main brake shoe	3-611-473-01		3000
SCV-0703A/J-N DC motor	8-835-590-01		6000
SRV11A/J-N DC motor	8-835-589-01		6000
Tension spring	3-613-709-01	H04 or H14	23000

a) When the DJH-20A drum assembly is replaced, the DJR-20A upper drum assembly and 4ch (RP) slip ring assembly are also replaced.

Specifications

General

Recording format Betacam SX
Power requirements
12 V DC
Power consumption
58 W
Operating temperature
0°C to 40°C
(32°F to 104°F)
Storage temperature
–20°C to +60°C
(–4°F to 140°F)
Humidity 25 to 80%
Mass 5.8 kg (12 lb 12 oz)
Dimensions 210 × 132 × 425 mm
(8 3/8 × 5 1/4 × 16 3/4 inches)
(w/h/d, without projections)

Tape transport system

Tape speed Betacam SX: 59.6 mm/s
Analog Betacam:
118.6 mm/s (525 system),
101.5 mm/s (625 system)
Digital record/playback time
60 minutes with
BCT-60 SX
Analog Betacam playback time
30 minutes with
BCT-30MA
Rewind time Approx. 3 minutes with BCT-60SX
Search speed Shuttle mode: Still to approx. ±24 times normal playback speed (Betacam SX), still to approx. ±10 times normal playback speed (Betacam/Betacam SP)
Jog mode: Still to ±1 times normal playback speed
Variable mode: Still to ±1 times normal playback speed
Servo lock time 0.5 seconds or less (from standby on, 2FD Lock)
Load/unload time Load time: Approx. 8 seconds
Unload time: Approx. 5 seconds

Recommended cassettes
Betacam SX cassette (S): BCT-6SX/12SX/22SX/32SX/60SX
Betacam SP cassette (S): for both recording and playback
Betacam cassette (S): only for playback

Video system

Digital video signal system

Sampling frequency
Y: 13.5 MHz
R–Y/B–Y: 6.75 MHz
Quantization
8 bits/sample
Compression
MPEG2 4:2:2 Profile @ Main Level

Analog composite recording/playback

Bandwidth (Y) 0 to 4.5 MHz+0.5 dB/–3.0 dB (525 mode),
0 to 5.5 MHz +0.5 dB/–3.0dB (625 mode)
S/N 53 dB or more
Differential gain 2% or less
Differential phase
2° or less
Y/C delay 15 ns or less
K factor (2T pulse)
1.5% or less
Output SCH phase
Based upon RS-170A/ITU-R BT.624-3

Audio system

Digital audio signal system

Sampling frequency
48 kHz (synchronized with video)
Quantization 16 bits/sample
Wow and flutter Below measurable level
Headroom 20 dB (or 18 dB, selectable)
Emphasis T1=50 µs, T2=15 µs (on/off selectable in recording mode)

Analog output

A/D, D/A quantization
16 bits/sample

Frequency response
20 Hz to 20 kHz +0.5 dB/
–1.0 dB (0 dB at 1 kHz)

Dynamic range 88 dB or more (at 1 kHz, emphasis on, 30 kHz LPF ON)

Distortion 0.05% or less (at 1 kHz, emphasis on, reference level (+4 dBm), 30 kHz LPF ON)

Crosstalk –80 dB or less (at 1 kHz, between any two channels, 1 kHz BPF ON)

Others

Channel coding S-I-NRZI PR-IV

Error correction Reed-Solomon code

Analog Betacam playback (DNW-A28)

Video

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

Audio (LNG)

	Metal tape	Oxide tape
Frequency response [a)]	50 Hz to 15 kHz +1.5 dB/–3.0dB	50 Hz to 15 kHz ±3.0dB
S/N [b)]	72 dB or more (Dolby NR on, weighted IEC-179A ave.)	50 dB or more (Dolby NR off, weighted DIN Audio rms)
Distortion [c)]	1.5% or less	2% or less

a) at 10 dB below reference level (+4 dBm)

b) at 3% distortion level

c) THD at 1kHz reference level (+4 dBm)

Analog Betacam playback (DNW-A28P)

Video

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

Audio (LNG)

	Metal tape	Oxide tape
Frequency response [a)]	50 Hz to 15 kHz +1.5 dB/–3.0dB	50 Hz to 15 kHz ±3.0dB
S/N [b)]	62 dB or more	58 dB or more
Distortion [c)]	1.5% or less	2% or less

a) at 20 dB below peak level (3% dist. Level)
b) at 3% distortion level, CCIR 468-3 weighted
c) THD at 1kHz reference level (+4 dBm)

Processor adjustment range

Video level ±3 dB/–∞ to +3 dB selectable
Chroma level ±3 dB/–∞ to +3 dB selectable
Setup level (525 mode)
±30 IRE
Black level (625 mode)
±210 mV
Y/C delay ±100 ns (in Betacam/Betacam SP playback)
Chroma phase ±30°
System phase Sync: ±15 µs (SC step)
SC: ±200 ns

Input connectors

SDI IN BNC (1)
Serial digital (270 Mbits/s)
SMPTE 259M/ITU-R BT.656-3
REF. VIDEO IN BNC (2 in loop through connection with 75 Ω termination)
Black burst
40 IREp-p (525 system) or 0.3 Vp-p (625 system), 75Ω, sync negative
VIDEO INPUT BNC (2 in loop through connection with 75 Ω termination)
1.0 Vp-p, 75Ω,
sync negative
AUDIO INPUT CH-1/2
XLR 3-pin, female (2)
–60/0/+4 dBu, high impedance, balanced
TC IN BNC (1)
0.5 to 18 Vp-p, 10kΩ
DC IN XLR 4-pin

Output connectors

SDI OUT 1/2 BNC (2)
Serial digital (270 Mbits/s)
SMPTE 259M/ITU-R BT.656-3
VIDEO OUTPUT 1/2(SUPER)
BNC (2) (Character superimpose is possible on the 2 (SUPER) output.)
1.0 Vp-p, 75Ω, sync negative
AUDIO OUTPUT CH-1/3, CH-2/4
XLR 3-pin, male (2)
+4 dBm at 600 Ω load, low impedance, balanced
MONITOR OUTPUT L/R
XLR 3-pin, male (2)
+4 dBm at 600 Ω load, low impedance, balanced
TC OUT BNC (1)
1.0 Vp-p, 75 Ω
HEADPHONES
JM-60 stereo phone jack
–∞ to –20 dBu at 8 Ω load, unbalanced

Remote connectors

REMOTE D-sub 9-pin, female
AUX

Accessories supplied

Operation Manual (1)
Installation Manual (1)

Optional accessories

AC-DN2A AC Adaptor
AC-550/550CE AC Adaptor
BP-L60(A)/L90(A) Battery Pack
BP-90(A) Battery Pack
BC-L100/L100CE/L50 Battery Charger (for BP-L60(A)/L90(A))
BC-210/210CE Battery Charger (for BP-90(A))
BC-410/410CE Battery Charger (for BP-90(A))
DC-L90 Battery Adaptor (for BP-90(A))
BKP-L551 Battery Adaptor
BVR-3 Remote Control Unit (limited function)
BCT-5CLN Cleaning Cassette Tape
BKNW-25 DV Interface Box (complied with IEEE 1394)

Design and specifications are subject to change without notice.

Glossary

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

Bridge connection
A connection which allows a signal input to an input terminal to pass through the unit and exit from an output terminal as input to external equipment.

B-Y signal
One of the color difference signals, the B (blue) signal minus Y (luminance) signal.

Capstan
A drive mechanism that moves the tape at a specified speed. Its rotation is normally synchronized with a reference sync signal.

Chrominance signal
A signal which carries information about hue and saturation. Also called “C signal”.

Condensation
Moisture which condensed on tape transport mechanisms. If there is condensation on the head drum, tape sticks to drum and the VTR may malfunction.

CONFI playback
This refers to playback of the audio and video signals immediately after recording, using the confidence heads, the signal being output to all intents and purposes simultaneously with recording. This is used to check recording.

Component video signal
A signal that consists of a luminance signal (Y) and two chrominance signals (Y–R, Y–B).

Composite video signal
A signal that consists of video, sync and color burst signals.

CTL
Control signal in the form of regular pulses recorded along a longitudinal track on the videotape. By counting these pulses, it is possible to determine the number of frames, and hence the tape’s running time. Used mainly to adjust the tracking position of video heads, and to achieve timecode continuity in continuous recording.

Digital VTR
On a digital VTR, video and audio signals are recorded on magnetic tape and, unlike on an analog VTR, can be played back without any quality deterioration.

Drop frame mode
Time code runs at 30 frames/sec. The NTSC system, however, runs at about 29.97 frame /sec. Drop frame mode adjusts this difference. The timecode and video are synchronized by dropping the first two frames of the timecode every minute, except at the ten-minute marks.

Drum
See “Head drum”.

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

Emphasis
The signal is emphasized at high frequencies. During playback, it is de-emphasized. This suppresses noise without affecting the original signal.

External lock
Synchronizing one equipment (slave unit) to another (master unit). The signal and tape run of the VTRs used for editing, player and recorder, are usually synchronized.

Head drum
A metal cylinder to which a video head is attached. This drum is rotated at high speeds in synchronization with the sync signal during recording and playback.

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

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

Non-drop frame mode
The number of frames of the timecode and video run is not adjusted. When you use the timecode in non-drop frame mode, the real playback time will be about 86 seconds shorter per day than the timecode. If you edit frame by frame or if you determine the length of a shot by counting the timecode, use drop frame mode.

Loading
Also called “threading”. To pull the tape out of the cassette case, thread it along the specified tape path, and wrap it on the drum in order to prepare it for recording or playback. The VTR automatically loads the cassette tape when you insert the cassette into the cassette compartment. There are two loading modes: standby-on mode and standby-off mode.

LTC
Abbreviation of “Longitudinal Time Code”. This timecode is recorded on a longitudinal track on the tape. Reading is unreliable at low speeds, and not possible at all during still playback. See also “VITC”.

Luminance signal
A signal that determined the brightness of the picture. Also called “Y signal”.

Preroll
Running of a video tape to a prior to an edit-start point to enable the tape to reach a steady speed and to be synchronized with other video tapes.

Quantization
The level resolution when an analog signal is sampled before converted into a digital signal. 8-bit quantizing has 256 levels and 10-bit quantizing has 1024 levels. Generally, 8-bit quantizing is used for video signals and 16-bit quantizing is used for audio signals. The fewer the quantizing steps, the more distortion is in the analog signal when the digital signal is reconverted into analog signal.

Reference video signal
A video signal which contains a sync signal or sync and burst signals, used as a reference for synchronization of video equipment.

Glossary

R-Y signal
One of the color difference signals, the R (red) signal minus Y (luminance) signal.

Sampling frequency
The unit of time used when converting an analog signal with a continuously varying level to digital form by sampling the level at a fixed interval. In general, a higher sampling frequency makes it possible to digitize analog signals of a higher frequency.

SCH
Abbreviation of Sub Carrier to Horizontal. The phase of the subcarrier with respect to the phase of the horizontal synchronization signal. In editing of monochrome video, phase continuity is maintained by editing in units of frames (two fields), so that the continuity of the horizontal synchronization signal phase is maintained. Editing of color video must be done in units of two frames (four fields) to maintain subcarrier continuity. The SCH of a field can be checked to find out which of the four fields it represents. This allows edited video signals to be joined while maintaining subcarrier continuity.

Search
Viewing the picture or timecode by running the tape in fast forward or rewind mode, in order to search for a particular scene.

Servo
A mechanism that controls the number and phase of rotations of the head drum or capstan. Servo mechanism allows playback of the video signal without guard band noise. The reference signal of the servo control is normally a vertical sync signal.

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

SMPTE
Abbreviation of Society of Motion Picture and Television Engineers, a professional association established in the USA.

S/N
Signal-to-Noise ratio. The relation of the strength of the desired signal to the accompanying electronic interference, the noise. If S/N is high, sounds are reproduced with less noise and pictures are reproduced clearly without snow.

Standby-off mode
One of the stop modes. In this mode, head drum rotation is stopped and the tape tension is slackened. It is not possible to switch instantaneously from this mode to recording or playback mode. This mode is not harmful to the tape or heads.

Standby-on mode
One of the stop modes. In this mode, the head drum continues rotating and the tape remains wound onto the drum. This mode enables instantaneous switching to recording or playback mode. To prevent damage to the tape or heads, the device automatically switches from standby-on mode to standby-off mode after a certain period of time.

Subcarrier
Color information contained in a composite video signal. Its amplitude is for color saturation and its phase to color burst is for hue.

Superimpose
To put one picture (or characters) onto another so that both can be seen at the same time.

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

Tape tension
The tension applied to a tape. For the tape to run properly while being wound on the drum, it must be pulled lightly in the opposite direction to the direction of transport. Improper adjustment of tape tension can cause deviations along the temporal signal axis. In analog VTRs, these deviations are evident as skew and distortion in the upper part of the screen.

Time code
The timecode is a tape position information signal that includes time and frame data that are recorded onto the tape so as to facilitate searching of editing points and recorded scenes when viewing or editing.
SMPTE timecode is applied to NTSC system, and EBU timecode is applied to PAL/SECAM systems. There are two kinds of signal recorded on tape. One is longitudinal timecode (LTC) recorded along the tape (the same way as audio and CTL signals). The other is vertical interval timecode (VITC). This code is inserted in the vertical blanking period and its recorded on the tape with video signals.

Time data
This refers either to time data that is generated by a timecode generator or time data that is played back from a tape and read by a timecode reader.

Unloading
When the EJECT button is pressed, the VTR automatically winds the tape back into the cassette case. Also called “Unthreading”.

User bits
These are also referred to as “users’ bits”. The user bits are a 32-bit segment of the timecode recording area. The user can select what to record in this segment and how to use the recorded data. For example, it can be used to record data information in addition to the timecode data or ID numbers for tape reels or programs.
LTC user bits is used to record good shot marks.

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

Video gain
Amount of amplification for video signals, expressed in decibels (dB).

VITC

Abbreviation of “Vertical Interval Time Code”. This timecode is inserted in the vertical blanking interval and recorded on the video tracks. It can be read at low speeds and during still playback, but not during high-speed playback.
See also “LTC”.

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Sony Corporation
B & P Company

DNW-A28/A28P
(SY, 英)
3-867-690-**04**(1)

Printed in Japan
2001.06.13

http://www.world.sony.com/