

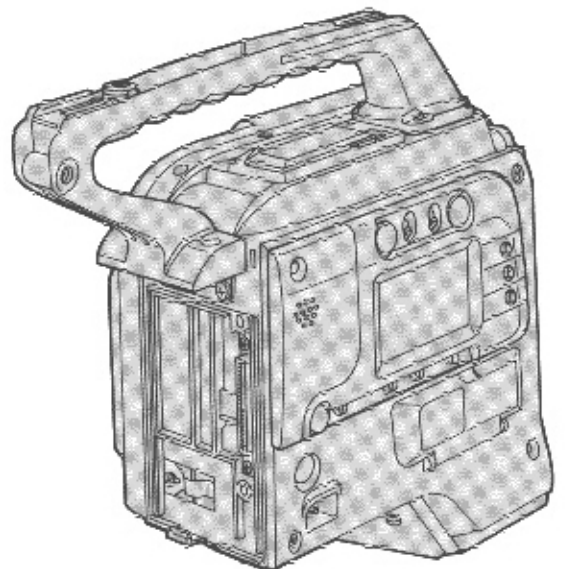
Panasonic[®]

Operating Instructions

AU-45H_P

CAMERA RECORDER

MII



Precautions for Handling Unit

1. Vibration

Do not use this camera recorder in an area subject to vibration.

2. Ambient temperatures

This camera recorder should only be operated when the surrounding temperature is in the range from 32°F to 104°F (0°C to +40°C). If used in temperatures outside of this range, differences in interrelated characteristics may arise, causing the camera recorder to operate abnormally and shortening the operational life of the unit.

3. Rain, humidity and dust

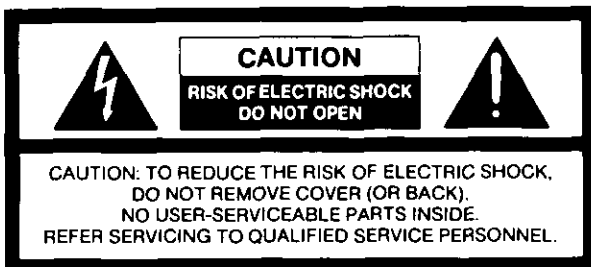
Refrain from using the camera recorder in the rain or in high humidity, as these can cause condensation to form inside the unit, which may result in damage to the internal components. Operating this camera recorder in a dusty environment will allow dust to accumulate inside the unit, with a corresponding degradation of performance.

4. Handling of the camera recorder

Do not drop the camera recorder or subject it to strong impacts. Such shocks can damage the unit. Furthermore, do not insert objects inside the camera recorder through the open cassette cover.

5. Strong electric and magnetic fields

Extremely strong electric or magnetic fields can cause interference with the video and audio capabilities of the camera recorder.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the appliance.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

WARNING:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

FCC NOTE:

This device complies with Part 15 of the FCC Rules. To assure continued compliance follow the attached installation instructions and do not make any unauthorized modifications.

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

CANADA ONLY/CANADA SEULEMENT

Caution:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Attention:

L'interférence radioélectrique générée par cet appareil numérique de type A ne dépasse pas les limites énoncées dans le Règlement sur les perturbations radioélectriques, section appareil numérique, du Ministère des Communications.

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Features

A Compact, Lightweight, Low-Power Reliable Recording

Constructed with the newly developed ML chassis, this camera recorder is compact, light, has a low center of gravity, and only uses 10 W of power when recording. Because it is equipped with a variety of checking functions, this unit also provides reliable recording.

High Picture Quality through Y/P_B/P_R Recording Format

This camera recorder is a dockable VTR that uses the 1/2" MII format, which can be played back on a 1/2" VTR and yields a high picture quality suitable for broadcasting purposes.

Simple Operation

The operating buttons have a soft touch and operate directly; these buttons are used to control fast forward, rewind, $\pm 5\times$ speed search, playback, stop, and cassette eject. The start/stop button for the camera starts and stops recording in turn each time it is pressed.

Playback is started by pressing the PLAY button. The image being played back is shown in black & white in the viewfinder, allowing you to monitor the image on the tape.

Auto-Backspace Function

When recording with the video camera is stopped by pressing the start/stop button, the tape automatically rewinds 20 frames (about 0.7 seconds), at which point it waits to begin recording again. This allows for smooth changes between scenes that are shot one after another.

Built-In Time Code Generator

This camera recorder contains a built-in time code generator that records the time code signal on the tape. There are two time codes: the VITC (Vertical Internal Time Code), which is recorded in accordance with the vertical blanking period of the video signal; and the LTC (Longitudinal Time Code), which is recorded in a special time code track on the tape.

Jam Sync

This camera recorder can record a continuous time code over the linked portion between two scenes recorded one after another.

External Time Code

This camera recorder can synchronize the VTR's internal time code with an external time code signal.

4-Channel Audio

This camera recorder can record a linear track two-channel (CH1 and CH2) audio signal and at the same time record an FM audio signal (CH3 and CH4) by multiplexing it in the color signal recording track. CH1 records the same audio signal as CH3, and CH2 is the same as CH4, so that both pairs provide mutual backup.

Features (cont'd)

Dolby NR System

The linear audio channels are provided with Dolby® C noise reduction.

Warning Function

A warning lamp brinks and a warning sound is emitted if a cylinder servo or capstan servo operates incorrectly, if the tape becomes slack or stops, if condensation develops, or a similar problem occurs. A warning display is also shown in the viewfinder.

Menu Setting Function

Because the VTR section of this camera recorder is set to standard mode when it is shipped from the factory, it can be used right away without making any changes. In order to allow the user to create a system that is even easier to use, however, the unit is equipped with a menu function for changing the VTR settings.

VTR Recording Check Functions

In order to make recording even more convenient, this camera recorder is equipped with the following functions:

1) Rec Review Function

When in the standby mode after recording, pressing the RET button on the camera allows you to review the recorded image through the viewfinder.

2) Cue-Up Function

With this function, search for the approximate end of the previous recording in SEARCH mode. Then press the RET button at the point where the search stopped and find the precise location where recording ended. Start the next recording from that position in order to begin recording from the end point of the last portion of recorded material.

3) Camera Connection Test

Press the INITIAL CHECK/CTCM button when a color bar signal is being input and the VTR is in EJECT, STOP and REC/PAUSE mode. The unit determines whether the video signal from the camera is being input to the VTR properly or not and displays the result in the viewfinder.

4) CTCM Check

Press the INITIAL CHECK/CTCM in playback mode and the CTCM playback image is displayed in the viewfinder.

Phantom Power Source

A phantom power source (+48 V) can be connected to the audio input for CH1 and CH2.

Mode Display Lamps

The play, fast forward, rewind, and recording modes are indicated by lamp.

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

Specifications

Power supply:	DC12 V +5.0 V/-1.0 V
Power consumption:	Approx. 12 W (2.5 W in power-saving mode/10 W in recording mode)

Recording method:	MII format 4 rotary heads, 2-track helical scanning system
Tape speed:	67.693 mm/sec.
Tape:	1/2-inch metal tape
Recording time:	20 minutes (when using AU-M20S tape)
Rewind time:	About 2 minutes (when using AU-M20S tape)
Operating temperature range:	32°F to 104°F (0°C to 40°C)
Humidity:	Less than 85%
Dimensions:	47/8" (W) × 10 15/16" (H) × 12 1/16" (D) [122.5 (W) × 277 (H) × 304.5 (D) mm] (with grip attached) 47/8" (W) × 8 5/8" (H) × 8 1/16" (D) [122.5 (W) × 218.5 (H) × 204 (D) mm] (without grip attached)
Weight:	6.16 lbs (2.9 kg) (with grip attached) 5.72 lbs (2.7 kg) (without grip attached)

VIDEO

Television format:	NTSC with 525 lines, 60 fields
Modulation system:	Y; Frequency modulation system C (P _w /P _n); Time base compression time division, Frequency modulation system
Bandwidth:	Y; 30 Hz to 4.5 MHz +1.0/-4.0 dB C (P _w /P _n); 30 Hz to 1.5 MHz +0.5/-3.0 dB
S/N ratio:	Y wide band; Better than 49 dB C (AM/PM); Better than 50 dB
DG:	Less than 3%
DP:	Less than 3°
K factor:	Less than 2%
Y/C delay:	Less than 20ns
Linearity:	Less than 3%

AUDIO

Linear (CH1/CH2)	
Frequency characteristics:	50 Hz to 15,000 Hz +2.0/-3.0 dB
S/N ratio (3% distortion):	Better than 54 dB (with Dolby NR OFF) Better than 72 dB (with Dolby NR ON <CCIR>)
Distortion:	Less than 1% (1 kHz reference signal)
Erasure:	Less than -65 dB
Wow and flutter:	Less than 0.15% rms

Specifications (cont'd)

AUDIO (cont'd)

FM (CH3/CH4)

Frequency characteristics:

20 Hz to 20,000 Hz +1.0/-2.0 dB

Dynamic range:

More than 80 dB (A curve, WTD)

Distortion:

Less than 0.5% (1 kHz reference signal)

Crosstalk:

Less than -65 dB (1 kHz reference signal)

Video/Audio Input

CAMERA/VTR:

68-pin multiconnector

Y; 1.0 Vp-p, 10 k Ω or more

P_b; 0.486 Vp-p

P_r; 0.486 Vp-p (75% color bar, 7.5% setup)

Video Output

VIDEO OUT:

BNC \times 1, 1.0 Vp-p, 75 Ω

Audio Input

AUDIO IN:

XLR, 3-pins \times 2

LINE; +4 dBu, 3 k Ω balanced

MIC; -60 dBu, 3 k Ω balanced

CAM; -60 dBu, 3 k Ω balanced/unbalanced
(switchable by menu)

CH1/CH3; CAM/REAR1/REAR2 switch, MIC/LINE switch

CH2/CH4; CAM/REAR1/REAR2 switch, MIC/LINE switch

Time Code Input/Output

TC IN:

BNC \times 1, 0.5 Vp-p to 8 Vp-p, less than 10 k Ω , unbalanced

TC OUT:

BNC \times 1, 2.2 Vp-p, less than 50 Ω , unbalanced

Audio Output

MONITOR OUT:

M3 earphone jack \times 1, $-\infty$ to -20 dB, 8 Ω

External DC Power Supply Input

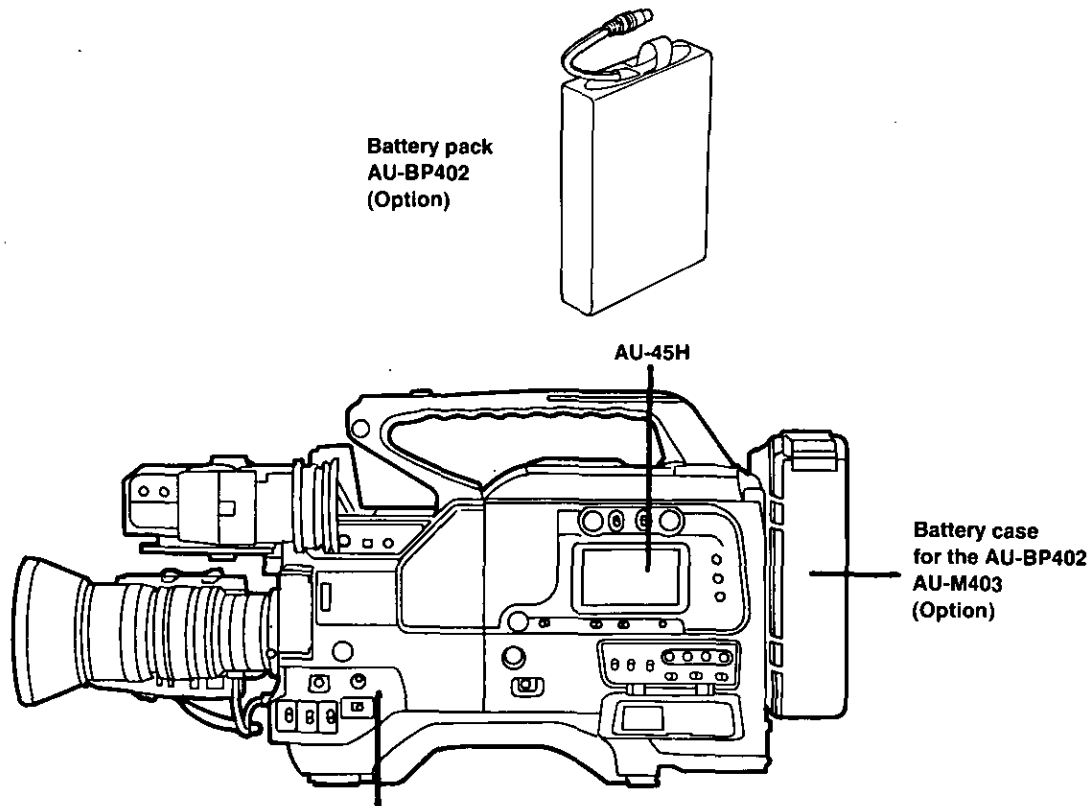
EXT.DC IN:

XLR, 4-pins \times 1

The values shown are the values yielded with playback on a standard studio VTR.

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Associated Component Equipments



Use a camera that is compatible with the AU-45H. The following cameras can be connected to this unit.

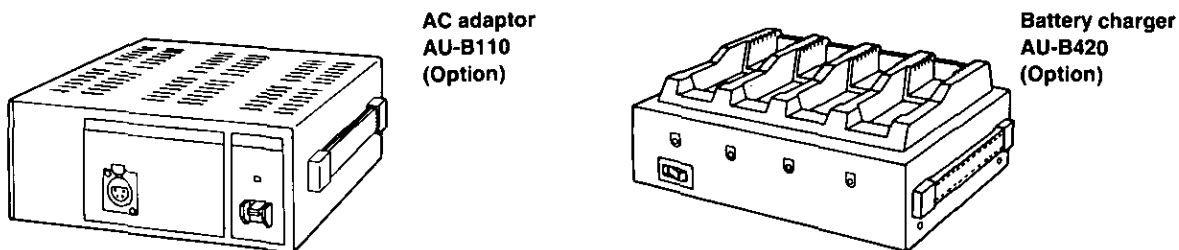
AQ-11, AQ-20 (Note 1)	(made by Matsushita Electric Industrial Co.)
WV-F250 (Note 2), WV-F500, WV-F700S	(made by Matsushita Communication Industrial Co.) (Note 4)
KY-27UCH (Note 3)	(made by Victor Company of Japan)

Note 1: When using the AQ-11 or the AQ-20, use the AQ-CA1 or AQ-CA50 camera adaptor to make the connection.

Note 2: When using a WV-F250 camera, no composite signal is output during recording.

Note 3: When using the KY-27UCH, it is necessary to replace the back panel of the camera with the KA-M27U.

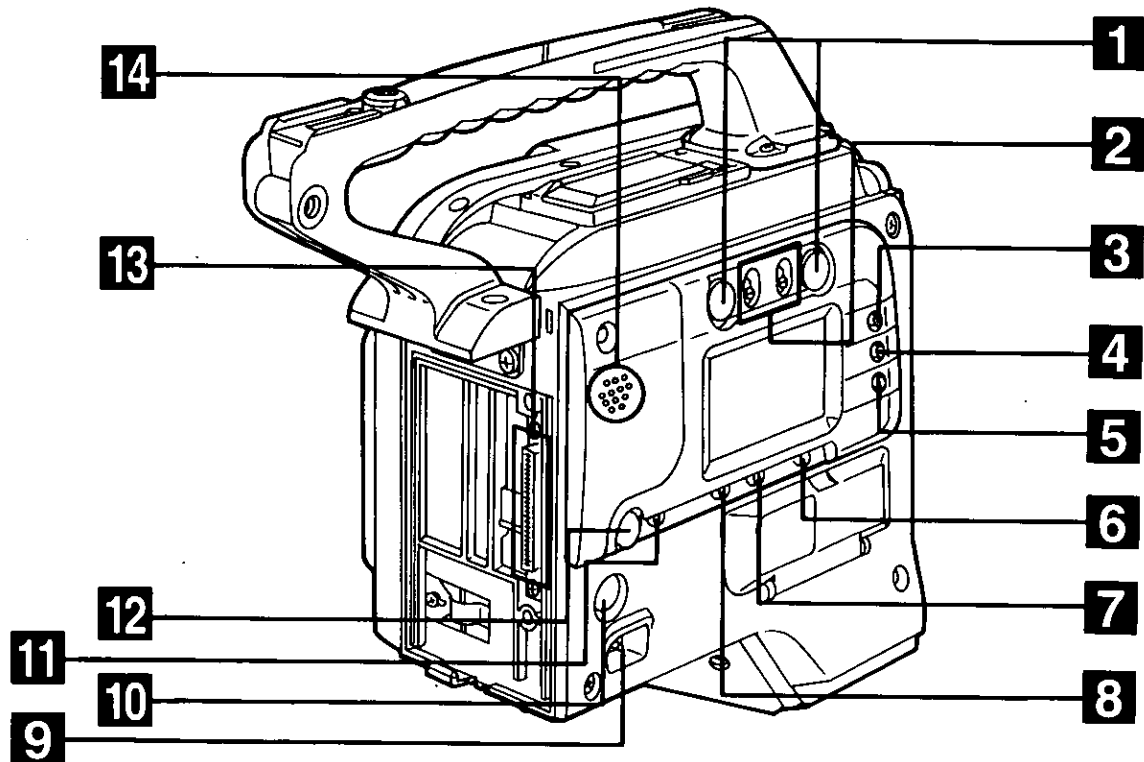
Note 4: The WV-F70 camera cannot be used.



This manual explains the operation of this camera recorder when it is connected to the WV-F500 camera. When connected to another camera, some functions may not be available. For details, refer to page 69.

The AU-45H contains a lithium battery for real time and time code FREE RUN back up. The operational life of the battery is roughly one year. If the message "BACK UP BATT EMPTY" appears and remains on for a few seconds after turning on the power, contact your dealer and replace the lithium battery with a new one.

Controls and Their Functions



- 1 Audio level controls**
When adjusting the audio level, turn these controls (for CH1/CH3 and for CH2/CH4) while looking at the level meter to adjust the input volume for each channel.
- 2 AUDIO AGC switch**
ON: The recording levels for CH1/CH3 and CH2/CH4 are adjusted automatically. When this switch is set to this position, the CH1/CH3 and CH2/CH4 audio level adjustment controls have no effect.
OFF: The recording levels for CH1/CH3 and CH2/CH4 can be adjusted manually.
- 3 RESET button**
If this button is pressed while the display is in the counter or TCG (Time Code Generator) setting mode, the display is cleared to "0".
- 4 HOLD button**
If this button is pressed, the data displayed in the display counter is retained. This mode is released if this button is pressed a second time.
- 5 NORMAL/REMAIN button**
When this button is pressed and held down, the amount of tape remaining is shown in the display counter. However, the calculation of the amount of tape remaining requires a short amount of time after the tape has begun running before it can be made. When the calculation has not yet been made, bars ("—") are displayed in the display counter.
- 6 WARNING lamp**
This lamp lights when an error has occurred.
- 7 LIGHT switch**
Set this switch to the ON position in order to illuminate the display.

8 Monitor switch

This switch switches the speaker and earphone audio signal.

CH1: Permits monitoring of the CH1/3 audio signal.

MIX: Permits monitoring of the mixed CH1/CH3 and CH2/CH4 audio signals.

CH2: Permits monitoring of the CH2/CH4 audio signal.

Note that only CH1 and CH2 can be monitored during playback.

9 Power switch

This switch turns the power for the camera section and the VTR section on and off.

10 CTCM/INITIAL CHECK switch

If this button is pressed during playback, the CTCM (Chroma Time Compressed Multiplex) playback picture is displayed in the viewfinder.

If this switch is pressed while a color bar mode is set to the camera section and the VTR is either in eject, stop or rec/pause mode, the unit checks to make sure that the video signal from the camera section is being input properly. The result is displayed in the viewfinder.

11 ALARM switch

Set this switch to "ON" if you want the alarm to sound.

12 Audio monitor level control

This control adjusts the audio monitor volume. Turn this control to the right to increase the volume.

13 Camera/VTR interface connector

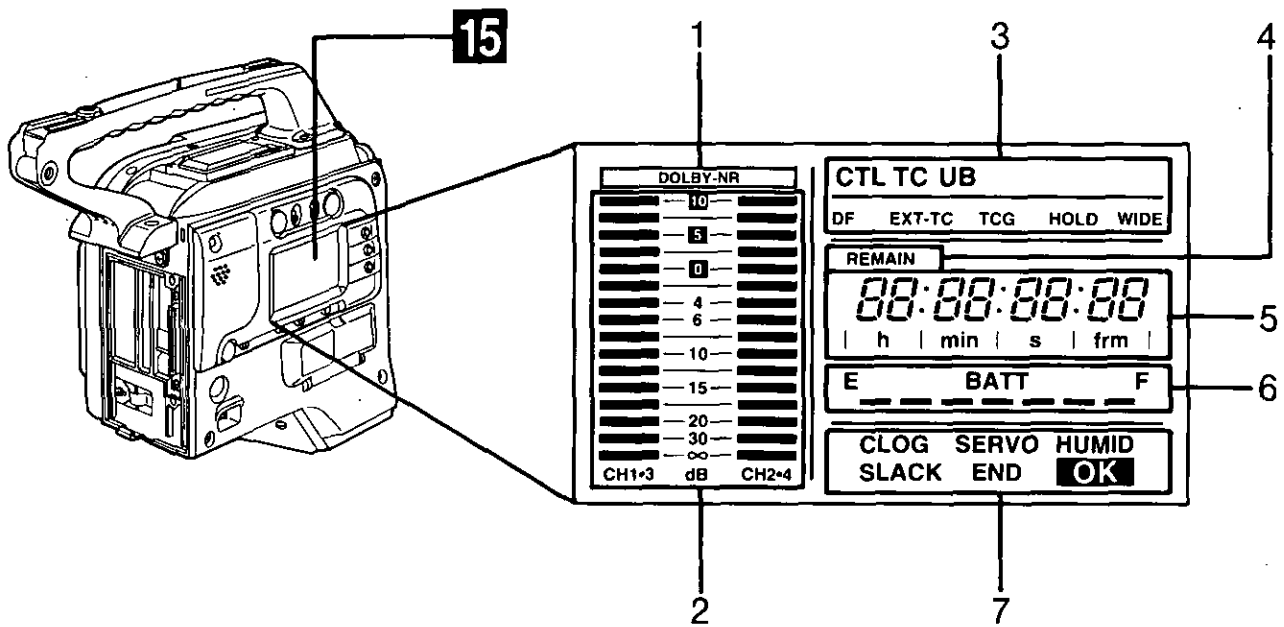
This connector links the camera section with the VTR section.

14 Speaker

Permits monitoring of the audio.

- If an earphone is plugged into the PHONES jack, the speaker sound is cutoff automatically.
- The alarm sound is emitted from the speaker when the warning lamp blinks.
- The channels to be monitored are selected with the monitor switch.

Controls and Their Functions (cont'd)



15 Display

- 1) **DOLBY-NR display**
- 2) **Audio level meter**
- 3) **Mode display**

Lights when the menu item "DOLBY NR" is turned on.

Shows the respective audio levels of CH1/CH3 and CH2/CH4.

CTL: Lights when the counter is in CTL mode.

TC: Lights when the counter is in TC (Time Code) mode.

UB: Lights when the counter is in UB (User Bit) mode.

DF: Lights when the time code is in DF (Drop Frame) mode.

EXT-TC: Lights when an external time code is being input through the TC IN connector.

TCG: Lights when the counter is in TCG (Time Code Generator) mode.

HOLD: Lights when the HOLD button was pressed to put the counter display into the hold display mode.

WIDE: Lights when a wide-aspect TV camera is connected.

4) **REMAIN indicator**

Lights when the counter is displaying the amount of tape remaining.

5) **Counter**

Displays the time code, user bits, CTL, and other types of data in terms of hours, minutes, seconds and frames.



6) **Battery power remaining display**

Lights when the battery voltage reaches the levels shown in the chart below.

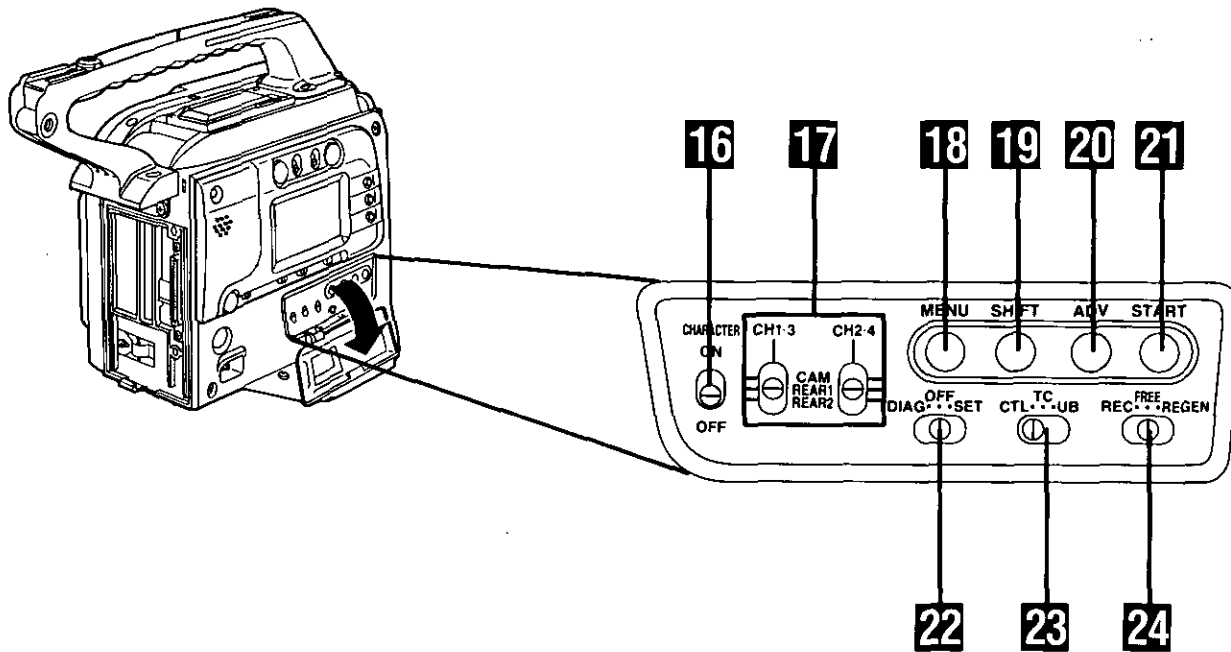
The battery setting is made through the menu settings. For details, refer to "Setting Menu Items" on page 57.

Battery setting	Under cut voltage	E BATT F						
		More than 11.4 V	More than 11.6 V	More than 11.7 V	More than 11.8 V	More than 11.9 V	More than 12.0 V	More than 12.5 V
Ni-Cd 12 V	10.2 V							
Ni-Cd 13.2 V	11.0 V	12.4 V	12.6 V	12.7 V	12.8 V	13.0 V	13.1 V	13.7 V
Ni-Cd 14.4 V	11.0 V	13.6 V	13.8 V	14.0 V	14.3 V	14.4 V	14.5 V	15.4 V
SILVER	12.0 V	12.5 V	12.7 V	12.9 V	13.2 V	13.5 V	14.1 V	14.7 V
DIGITAL	11.0 V	10%	20%	30%	50%	70%	90%	MAX

7) **Warning display**

- CLOG:** When this indicator blinks, it indicates that a video head is jammed.
- SERVO:** When this indicator blinks, it indicates that the servo system is not locked.
- HUMID:** When this indicator blinks, it indicates that condensation has formed on the cylinder.
- SLACK:** When this indicator blinks, it indicates that an abnormality has occurred in the tape running system, such as the tape going slack.
- END:** When this indicator blinks, it indicates that the end of the tape has been reached.
- OK:** This indicator lights when the CTCM/INITIAL CHECK button was pressed and the results of the check were normal.

Controls and Their Functions (cont'd)



16 CHARACTER switch

Set this switch to "ON" in order to display characters on the viewfinder.

- Even if this switch is set to "OFF", characters used for warnings are still displayed in the viewfinder.

17 Audio input selector switch

This switch is used to select audio input from CH1/3 or from CH2/4.

CAM: Set the switch to this position in order to record the audio signal from the camera's built-in microphone.

REAR1: Set the switch to this position in order to record the audio signal from the REAR1 (R1) connector.

REAR2: Set the switch to this position in order to record the audio signal from the REAR2 (R2) connector.

18 MENU button

When the VTR is in either eject, stop, or rec/pause mode and the DIAG/OFF/SET switch is set to "SET", the unit enters the menu setting mode.

19 SHIFT button

This button is used when setting the time code generator value, menu items, or self-diagnostics (DIAG) items.

20 ADV button

This button is used when changing the time code generator value and the menu settings.

21 START button

Press this button in order to display the time code generator value on the display.

This button is used to confirm the time code generator value or a menu item after being changed, and to select self-diagnostics (DIAG) items.

22 DIAG/OFF/SET switch

DIAG: Set this switch to this position when performing self-diagnostics.

OFF: Set this switch to this position during normal operation.

SET: Set this switch to this position when displaying or changing menu items.

23 CTL/TC/UB switch

CTL: Set this switch to this position in order to show the CTL counter on the display.

TC: Set this switch to this position in order to set or display time code data.

UB: Set this switch to this position in order to set or display user bit data.

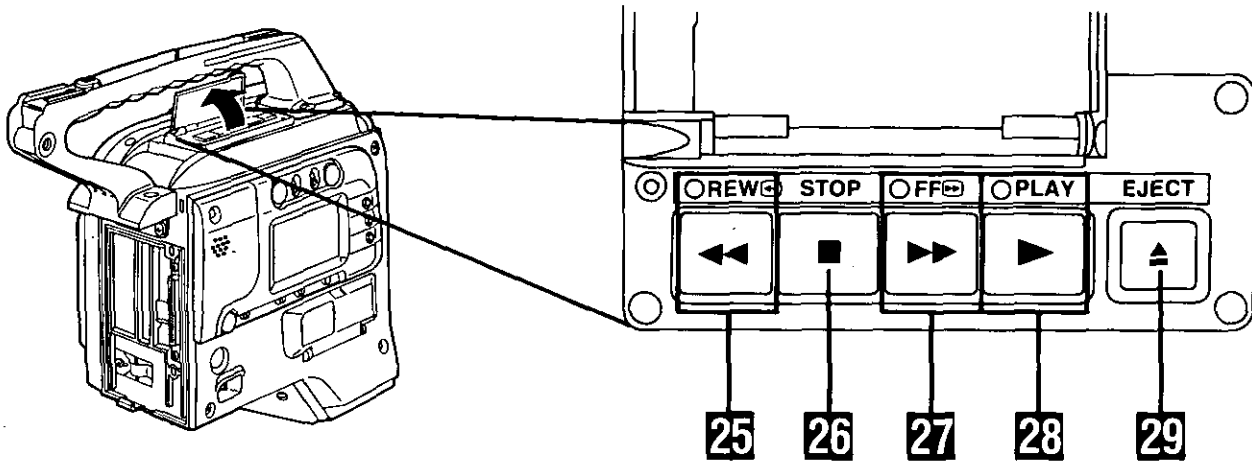
24 REC/FREE/REGEN switch

REC: Set this switch to this position in order to increment the time code only when the VTR is in recording mode.

FREE: Set this switch to this position in order to increment the time code the same as the time, regardless of the VTR mode.

REGEN: This position makes it possible to make continuous recordings with a continuous time code.

Controls and Their Functions (cont'd)



25 REW button/lamp

Pressing this button causes the tape to rewind.

- If this button is pressed at the same time as the PLAY button while playback is in progress, the unit enters search mode, rewinding at five times normal speed.

26 STOP button

Pressing this button causes the VTR to stop.

- If the REW, FF, or PLAY button is pressed while the unit is in REC/PAUSE mode, the VTR will not respond. In order to use any of those buttons, the STOP button must be pressed first.

27 FF button/lamp

Pressing this button causes the tape to fast forward.

- If this button is pressed at the same time as the PLAY button while playback is in progress, the unit enters search mode, fast-forwarding at five times normal speed.

28 PLAY button/lamp

Pressing this button causes the VTR to enter playback mode.

29 EJECT button

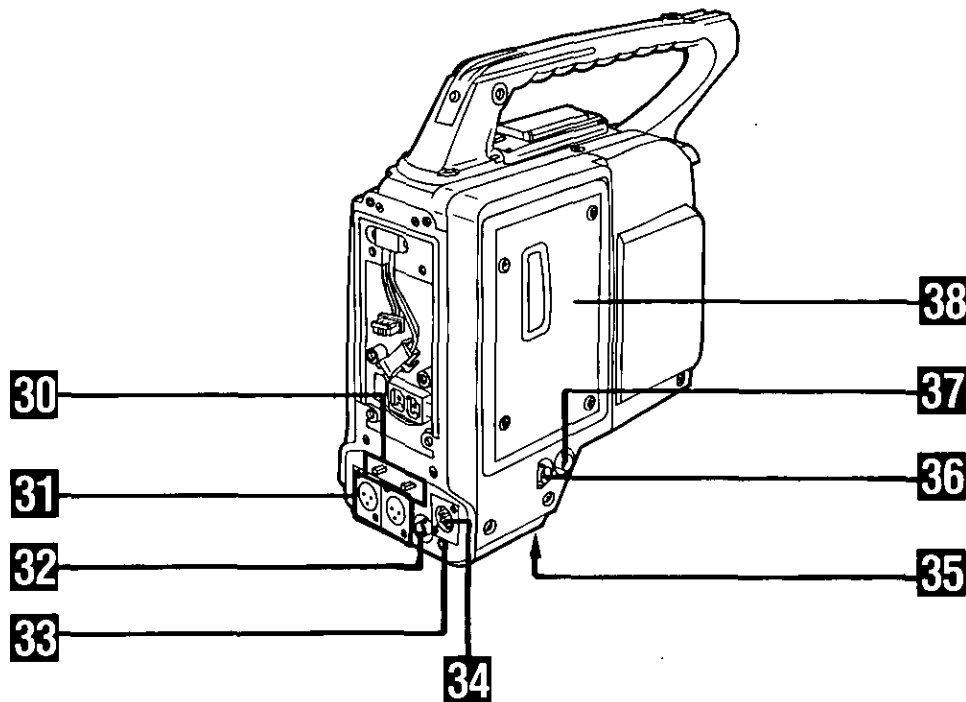
Pressing this button causes the cassette tape to be ejected.

VTR Status lamps and VTR Operation Modes

The state of the three status lamps (the REW lamp, the FF lamp, and the PLAY lamp) indicates the VTR operation mode as shown in the chart below.

VTR operation mode	REW lamp	FF lamp	PLAY lamp
Rewind mode	☀	●	●
Fast forward mode	●	☀	●
Playback mode	●	●	☀
Fast forward search mode	●	☀	☀
Rewind search mode	☀	●	☀

☀ : On ● : Off



30 Audio input level switch

MIC: Set this switch to this position in order to record the audio signal from an external microphone.

LINE: Set this switch to this position in order to record the audio signal from the line input.

31 Audio input connectors REAR1 and REAR2

Connect an external microphone or line input signal to these terminals.

32 Video output connector

This is a composite video signal output connector. A color signal is output while recording, but the output changes to black & white mode during playback.

33 Earphone jack

This is an earphone jack for monitoring the audio. If an earphone is plugged into this jack, no sound comes from the speaker.

34 External DC input connector

This is the input connector for an external power supply. Use an AC adaptor. If a power supply is connected here, it is automatically used as the power source.

35 Breaker (bottom)

Turns off if an abnormality develops.

36 Time code input connector

This connector is used to connect an external time code generator when an external time code is being used for recording.

37 Time code output connector

This connector is used to output the time code to another VTR.

38 Cassette holder

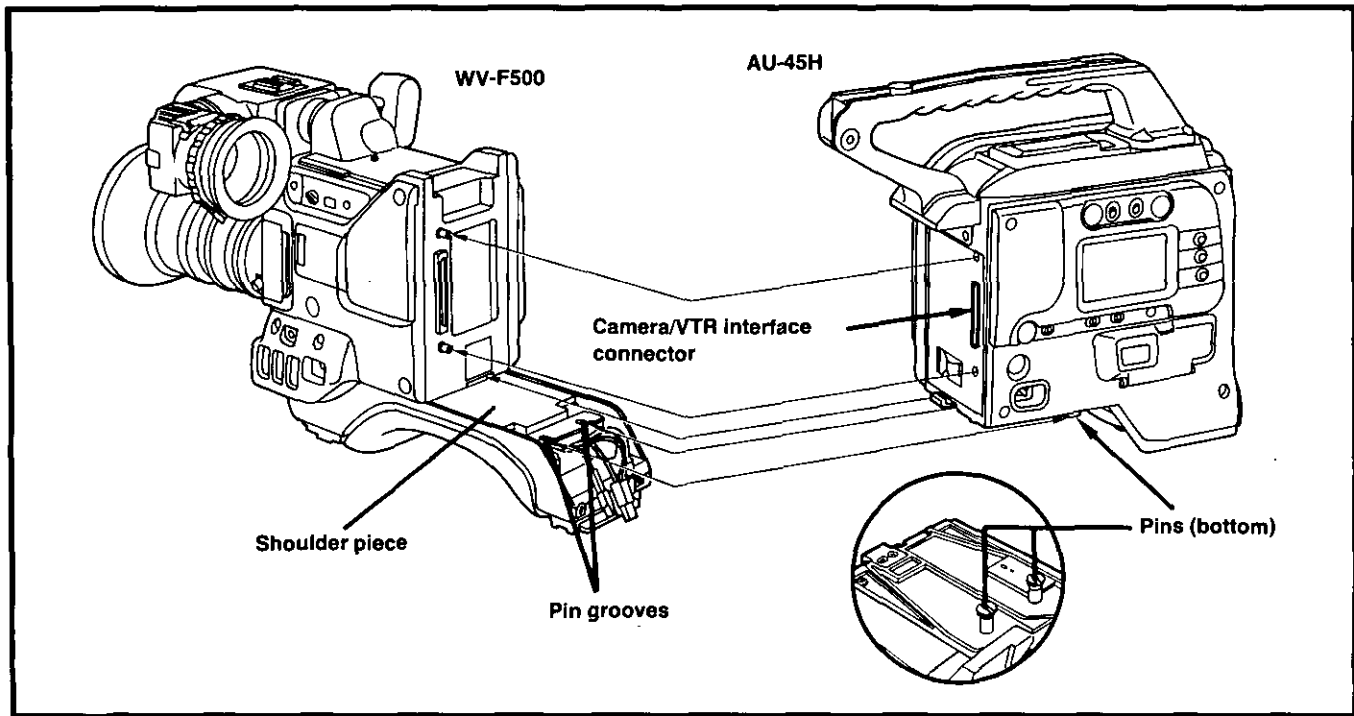
This is where the cassette tape is inserted.

Assembling the Camera Section and the VTR Section

1

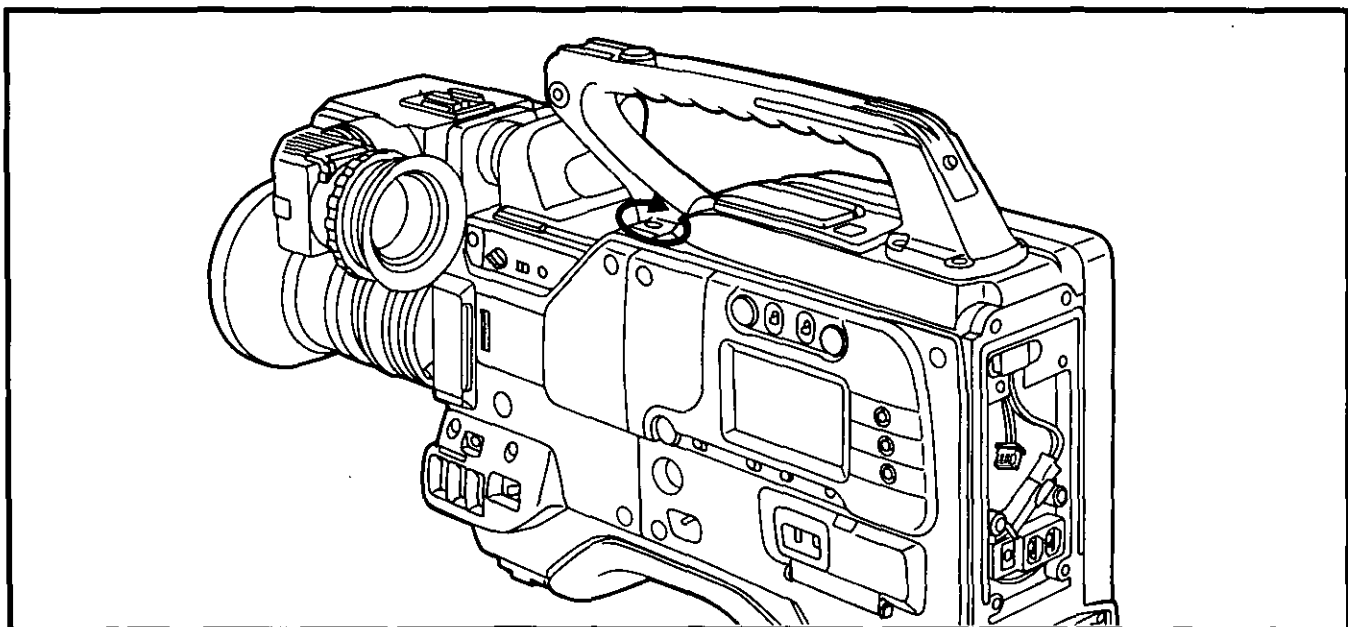
Slide this unit onto the shoulder piece and plug the camera/VTR interface connectors together.

Make sure that the pins fit into the corresponding pin grooves.



2

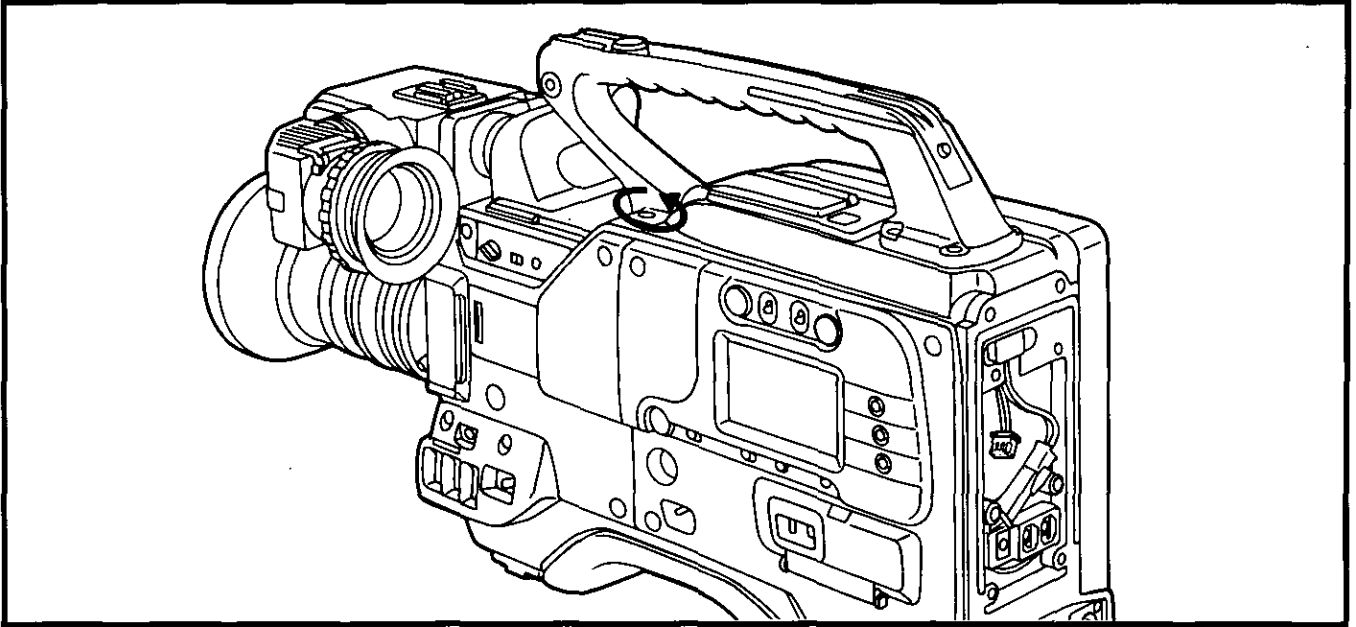
Attach the screw in the grip to the camera section.



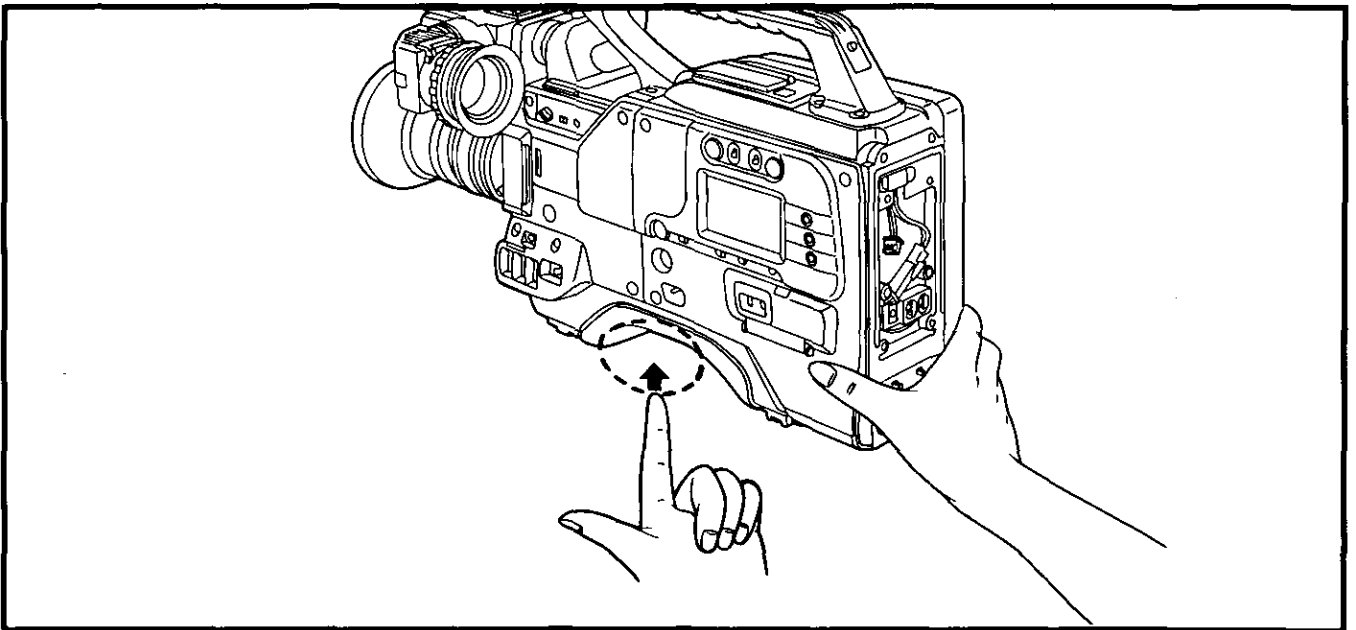
For details on lens assembly, refer to the operating instructions supplied with the camera.

Disassembling the Camera Section and the VTR Section

- 1** Remove the screw in the grip.

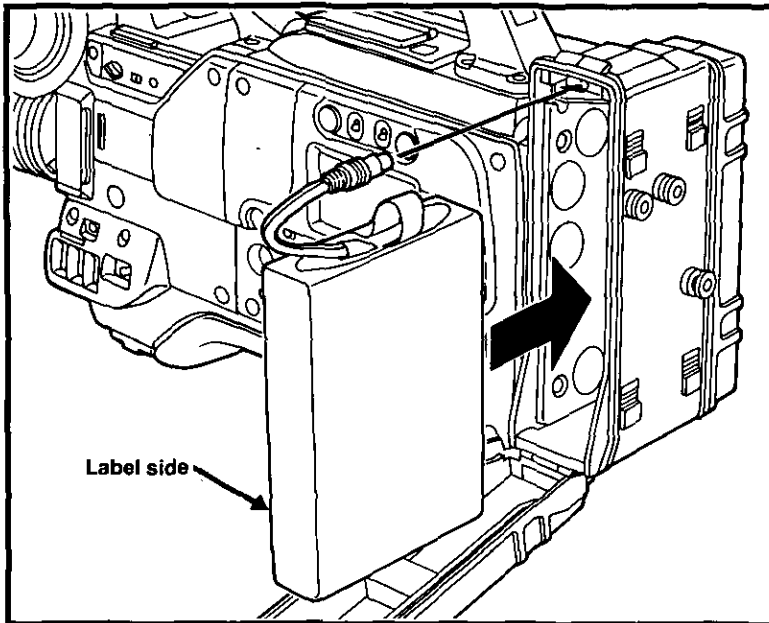


- 2** Hold down the red button on the bottom of the camera section and pull the VTR section in the direction indicated by the arrow.

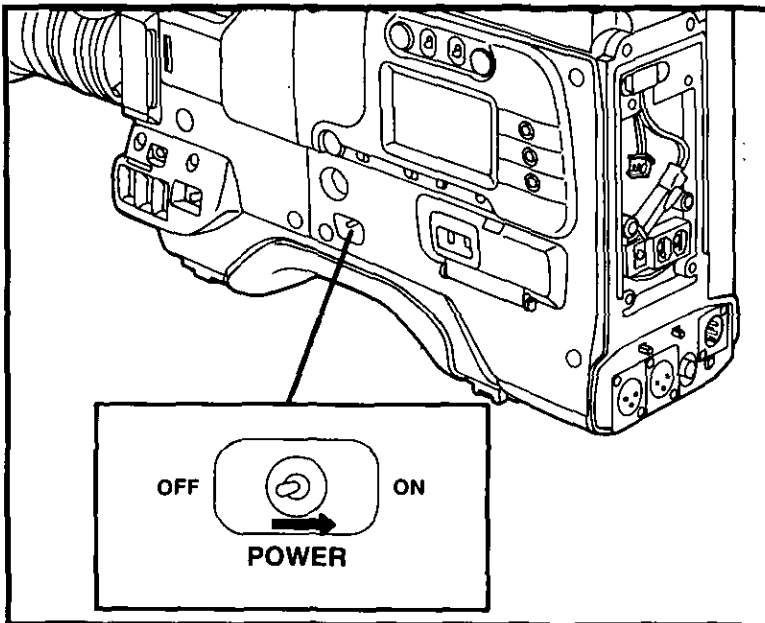


The Battery Pack and Battery Power Remaining

Slide the battery pack until it snaps into place.



Turn the power switch on.



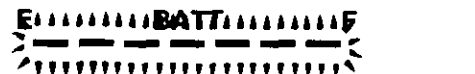
The amount of battery power remaining is shown on the display as described below.



As the battery gradually discharges, the bar display (—) will begin to disappear from the right.



If only one bar in the display is blinking, the remaining battery capacity is very small. Replacement with a fully charged battery is recommended.



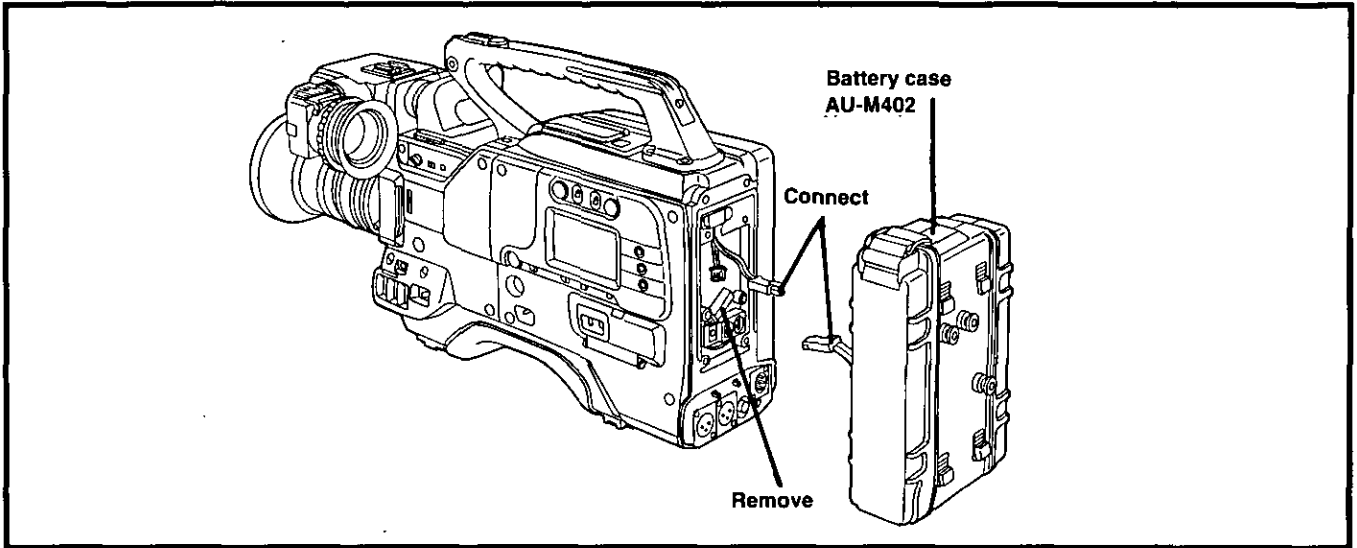
When the bar display disappears completely, the battery has no power remaining. Replace the battery pack with a fully charged battery pack.

- Whenever a battery pack is mounted on the unit, a small amount of power flows through the circuits, even if the power switch is off. In order to keep battery consumption to a minimum, remove the battery pack if the unit is not to be used for a long period of time.
Note that, because the time code circuit has a built-in power backup circuit, the time code is retained in memory even if the battery pack is removed.
- If Ni-Cd batteries are recharged repeatedly without having been totally discharged, their voltage will drop. This will impair the operation of the unit. Let the batteries discharge completely before recharging them.

Using the AU-BP402 Battery Pack

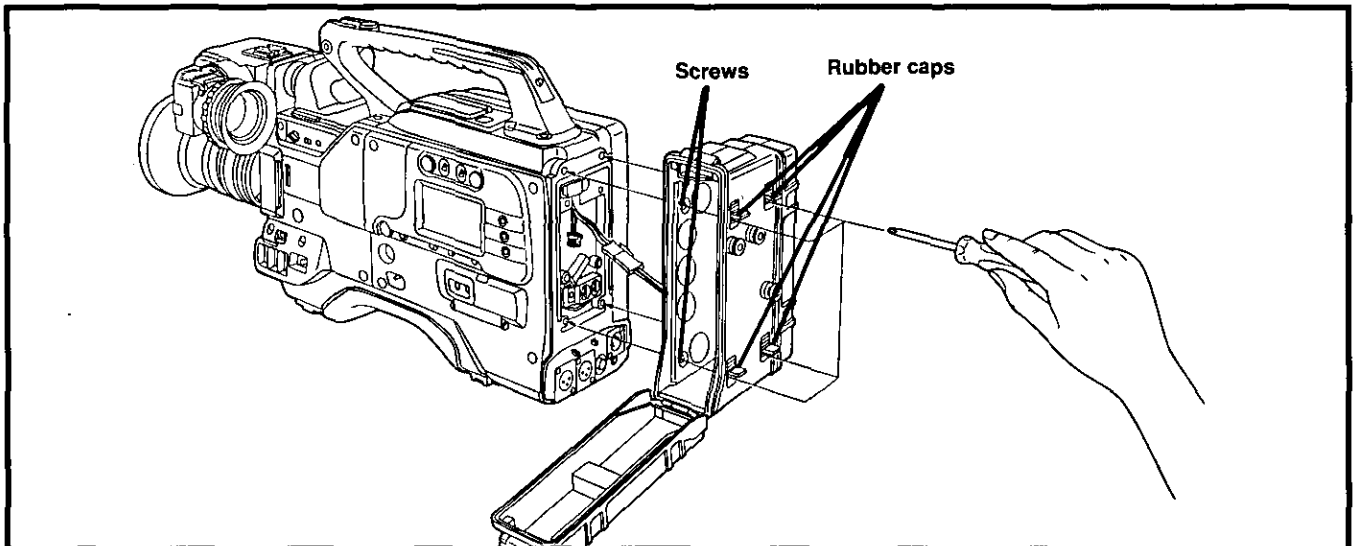
Before using the battery pack, charge it first using the AU-B420 battery charger. About one hour is required for charging. For details, refer to the operating instructions provided with the AU-B420 battery charger.

- 1** Connect the cable from the camera recorder to the cable from the AU-M402 battery case.



- 2** Mount the AU-M402 battery case on the camera recorder with a screwdriver.

Open the cover of the battery case and hold up the rubber cap, then a hole for screw fastening appears. With a screwdriver, tighten the screw to mount the battery case onto this unit. The screws must be tightened completely and accurately.



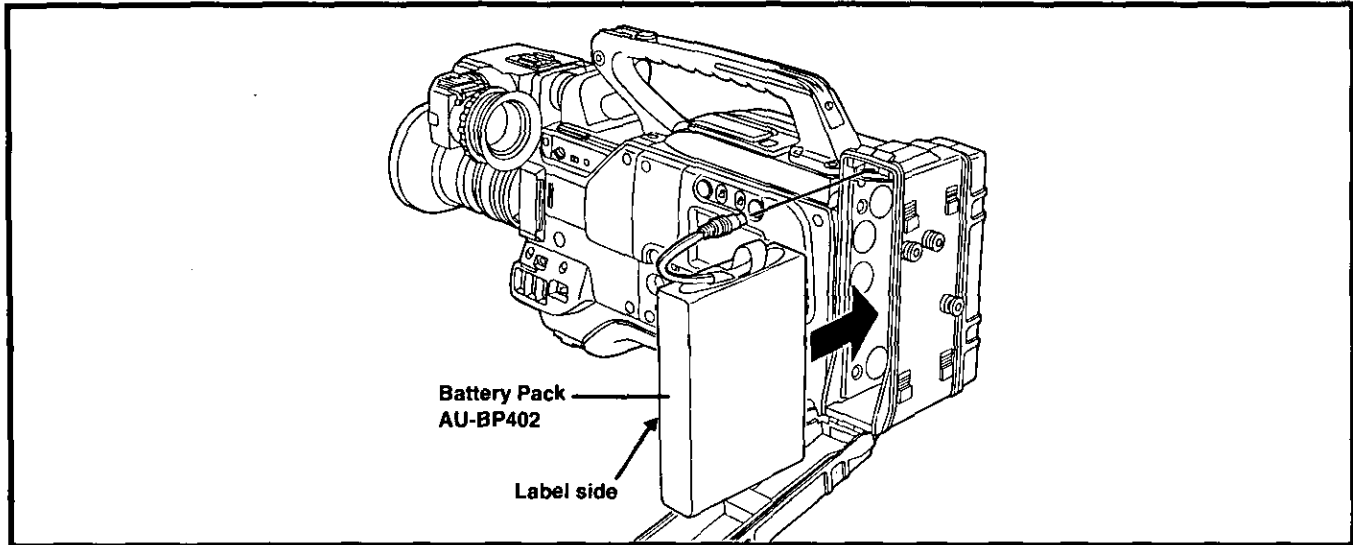
NOTE

Refrain from pulling the rubber cap forcefully.

Using the AU-BP402 Battery Pack (cont'd)

3

Connect the plug from the battery pack to the jack inside the battery case and then put the battery pack into the case.



NOTE

When connecting or disconnecting the plug, always be sure to turn the power off first.

4

Set menu item "4. BATTERY" (battery selection) to "Ni-Cd 12 V".

For details, refer to page 51 on "Setting Menu Items".

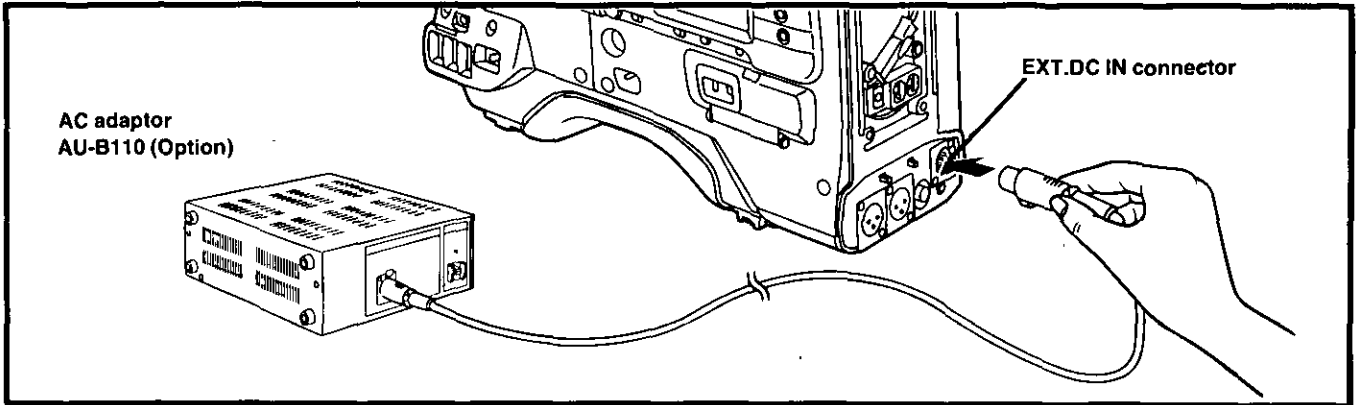
Menu setting screen (Viewfinder)

```
- USER SET MODE -  
01 OPERATION  
02 TIME CODE  
03 AUDIO  
->04 BATTERY  
05 MENU INITIALIZATION  
---- END OF DATA ----
```

Using an AC Power Source (When using the AU-B110 AC adaptor)

1

Connect the DC OUT connector of the AU-B110 AC adaptor to the DC IN connector on the camera recorder.



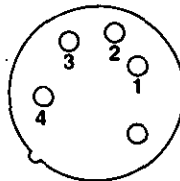
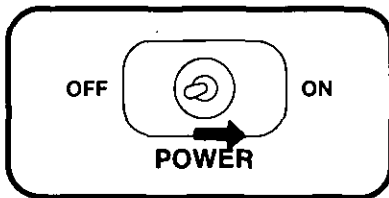
2

Turn the AC adaptor's power switch on.

3

Turn the camera recorder's power switch on.

When using an external power source other than the AU-B110 AC adaptor, check the signals carried on each pin of the EXT.DC IN connector.



Pin No.	Signal
1	GND
2, 3	—
4	+12 V

NOTES

- When both a battery pack and the AC adaptor are connected, external power from the AC adaptor takes precedence as the supply source.
- When using the AC adaptor, the "low battery" warning may appear, depending on the battery selection menu setting. If this should occur, it is recommended that the battery selection setting be set to "Ni-Cd 12 V".

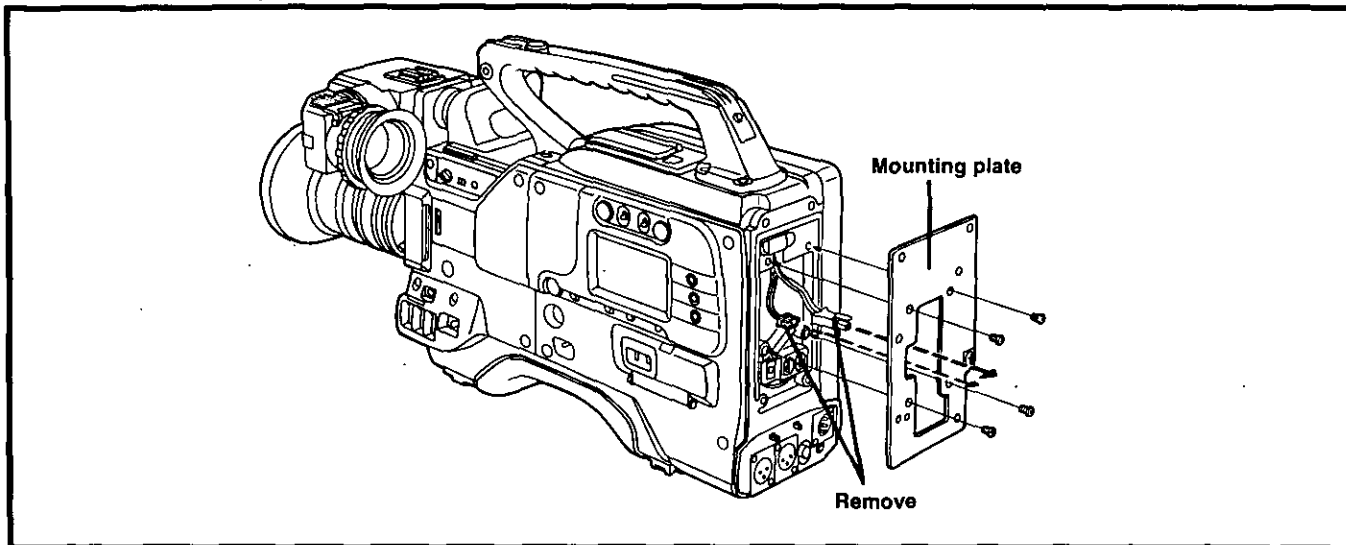
Using an Anton & Bauer Battery Pack

Recharging:

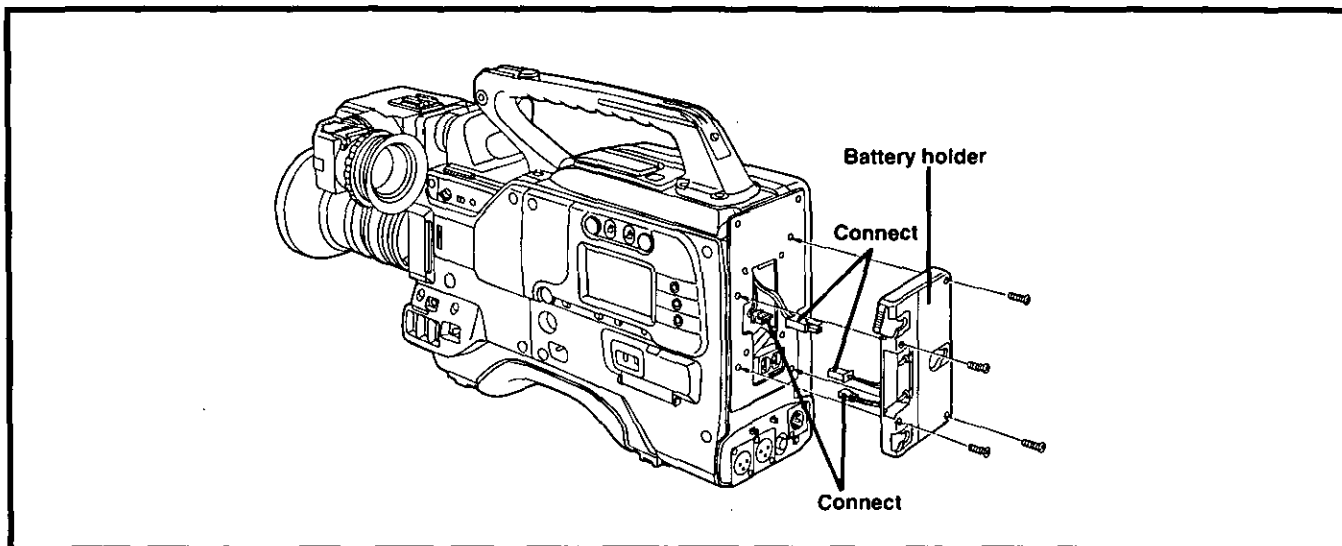
Before using the battery pack, be sure to charge it using an Anton & Bauer battery charger. For details on the charging time, refer to the operating instructions supplied with the battery charger.

- 1 Attach the mounting plate supplied with the Anton & Bauer QR AU45H battery mounting components to the camera recorder with screws.**

When mounting the plate, pass the connector for the disconnected cable through the hole in the mounting plate.

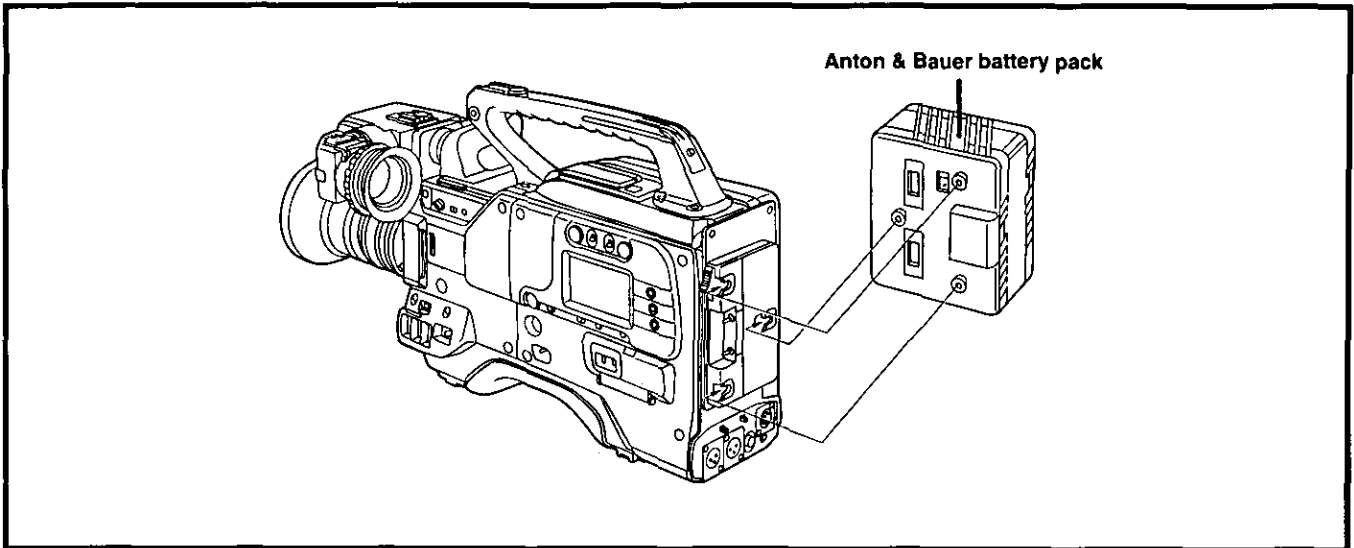


- 2 After attaching the connector that were passed through the hole in the mounting plate to the connector on the battery holder supplied with the QR AU45H components, attach the battery holder to the camera recorder with flathead screws.**



3 Mount the Anton & Bauer battery pack.

Plug the battery pack in and then slide it in the direction indicated by the arrow.



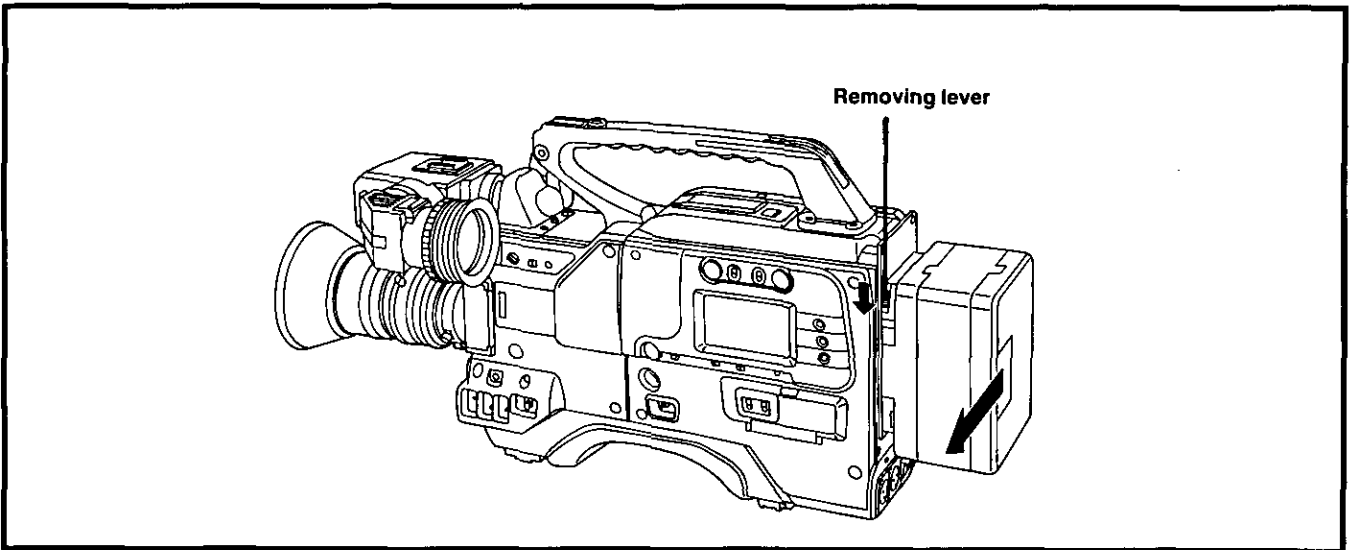
4 Set menu item "4. BATTERY" (battery selection) to the desired battery to be used.

For details, refer to page 51 on "Setting Menu Items".

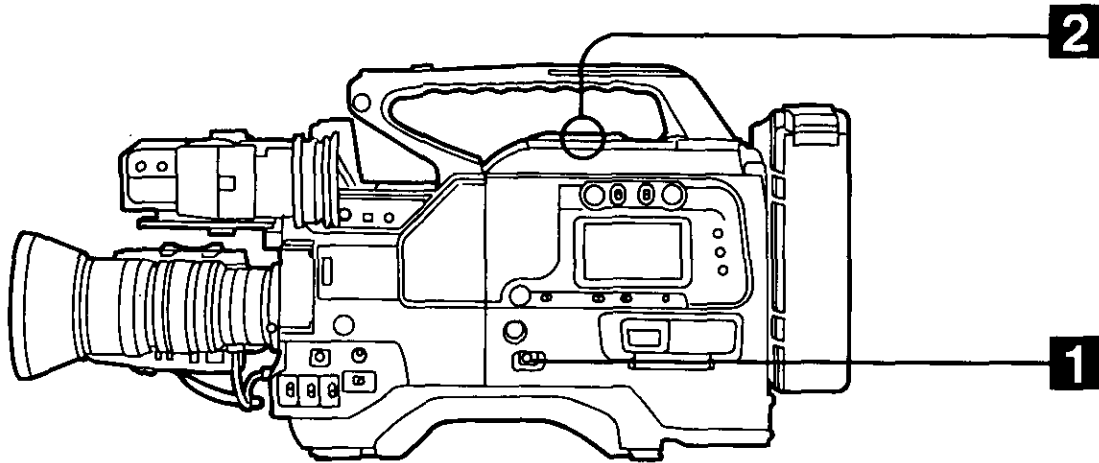
Reference

Removing the battery pack:

With the battery holder removing lever as far down as it will go, slide the battery pack in the direction indicated by the arrow.

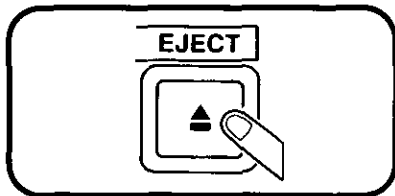


Loading and Ejecting Cassette Tapes

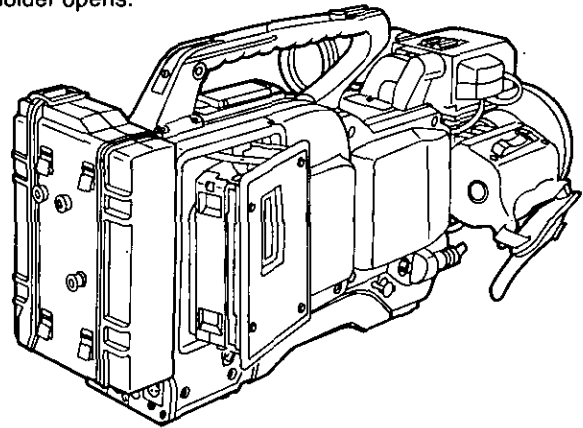


1 Turn on the power switch.

2 Press the EJECT button.

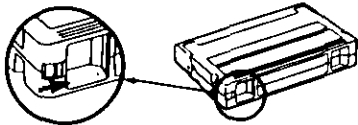


The cassette holder opens.



Cautions for Cassettes Handling

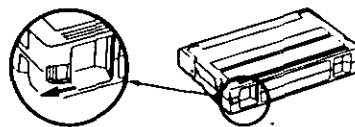
■ **When recording**
Check the erase prevention slide lever on the cassette tape.
Move the slide lever, on the back of the cassette shell, to the right hand side to enable recording. Note that if the erase prevention slide lever is set to the left to protect the tape from accidental erasure, "REC INHIBIT" is displayed in the viewfinder and recording is impossible.



To record, slide the lever to the right.

Small cassette (AU-MPS series)

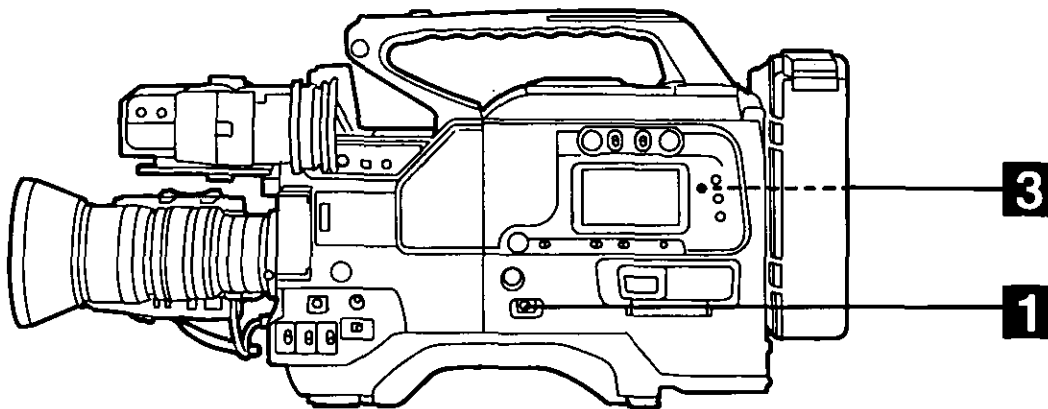
■ **To prevent accidental erasure**
Check the erase prevention slide lever on the cassette tape.
By moving the erase prevention slide lever to the left, recording will be inhibited.



To prevent accidental erasure, slide the lever to the left.

Small cassette (AU-MPS series)

Normal Recording



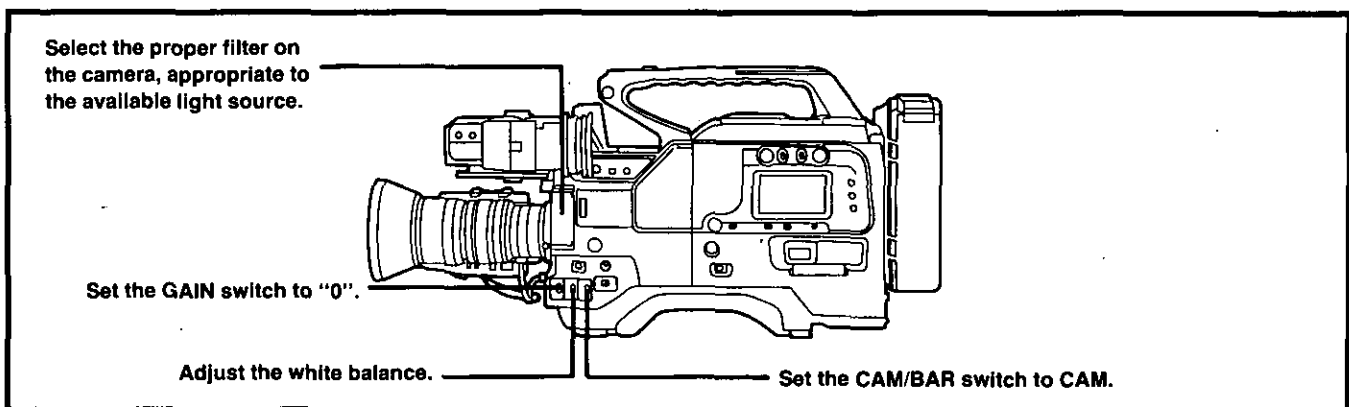
1 Turn the power switch on.

2 Move the DC POWER switch on the camera section from OFF to SAVE, wait a moment, and then set the switch to ON.

3 Insert a cassette tape.

When recording, always make sure before hand that the erase prevention side lever on the cassette is positioned to the right.

4 Set the switches on the camera section as follows:



5 Point the camera towards the object to be recorded, and adjust the focus and zoom setting.

Normal Recording (cont'd)

6 Press the VTR START/STOP button to start recording.

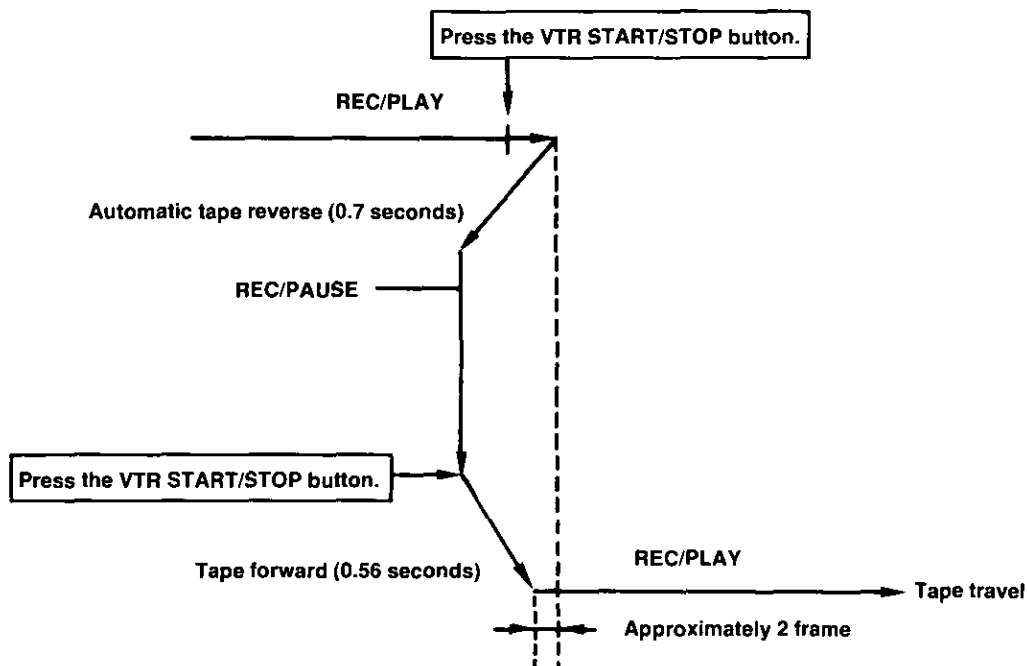
The REC tally lamp in the viewfinder blinks until the unit is in recording mode; once recording starts, the lamp stays lit.

7 Press the VTR START/STOP button to stop recording.

NOTE

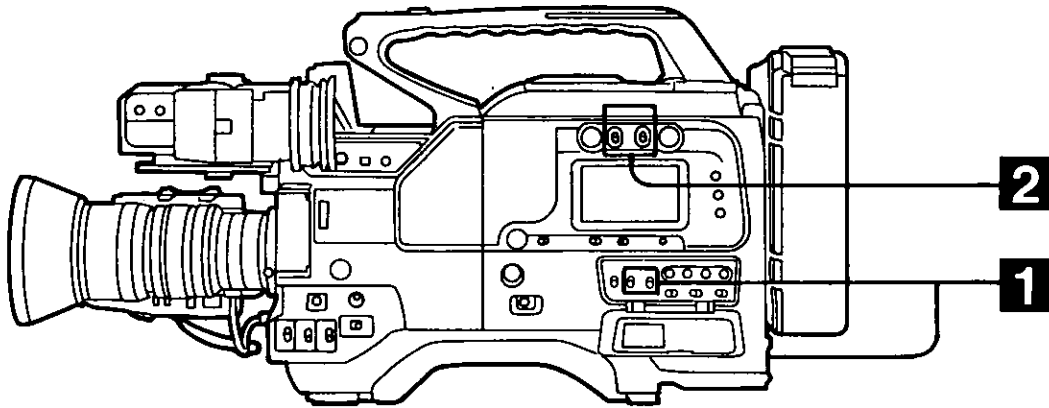
In order to protect the tape and the drum head, the tape is rewound 3 frames every five minutes while the unit is in REC/PAUSE mode. If the unit remains in REC/PAUSE mode for more than about 1.5 hours, the unit switches to STOP mode (so that the tension on the tape is released and the drum still rotates).

As shown in the diagram below, when recording is stopped the tape is rewound about 20 frames (approximately 0.7 seconds) and then the unit enters REC/PAUSE mode. If recording is resumed, the tape is played back for about 17 frames and then starts recording overlapping a little.

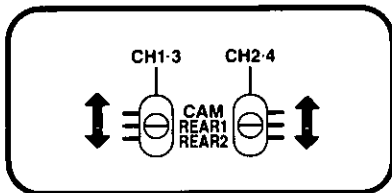


• If the REC/FREE/REGEN switch is set to REGEN, the time code signal is continuously recorded.

Audio Recording

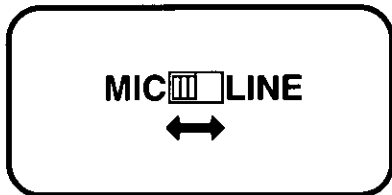


1 Select the desired input signal with the audio input selector switch.



The same audio is input to CH1/3 and CH2/4 respectively. CH1 and CH2 are linear audio, and CH3 and CH4 are FM audio.

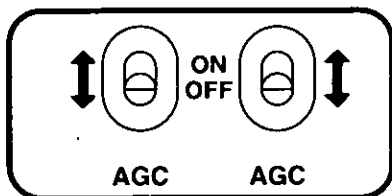
When either REAR1 or REAR2 is selected, set the audio input level switch in accordance with the type of the external audio input.



Switching the audio input to CH1/3 and to CH2/4

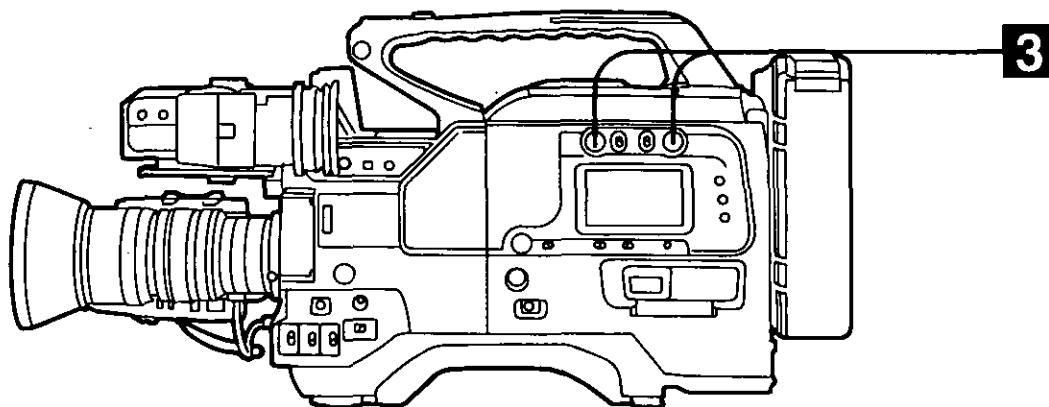
When using the built-in microphone	⇨	CAM
When using the REAR1 connector	⇨	REAR1
When using the REAR2 connector	⇨	REAR2
When using an external microphone	⇨	MIC
When using line audio input	⇨	LINE

2 Set the AGC switch to "OFF".



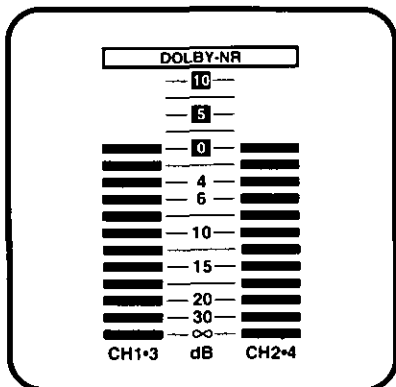
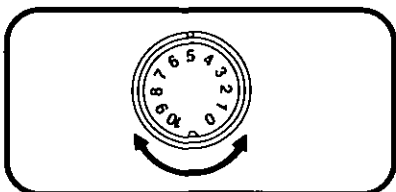
■ If the AGC switch is set to ON, the input level will be automatically adjusted to the appropriate level regardless of the setting of the audio level adjustment control.

Audio Recording (cont'd)



3

Adjust the audio level adjustment control so that the level shown on the level meter on the display is at the regular position.



- For details on the audio input level shown inside the viewfinder, refer to the operating instructions supplied with the camera section.
- When using the camera's built-in microphone, adjust the volume by setting the level control on either the camera section or the VTR section to maximum and then using the other control to set the desired volume.
- If the audio monitor speaker volume is too loud, howling may occur. If this happens, adjust the audio monitor level control until the howling stops.

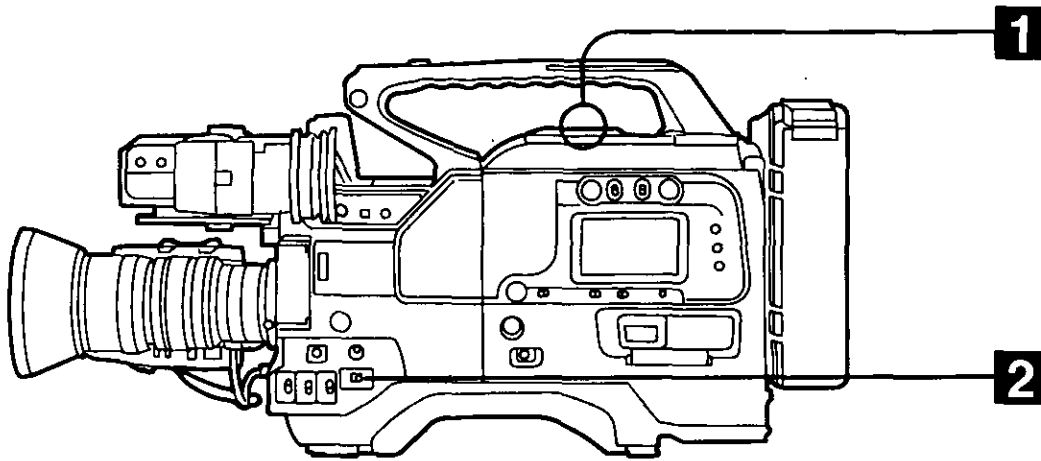
Using the Phantom Microphone

A phantom microphone can be used with the microphone on this unit (CH1/CH2).

Selection can be made on the viewfinder in menu item, "BATTERY". For details, refer to page 56, "Menu Items".

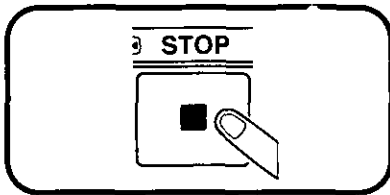
[The phantom power supply voltage is set to +48V. When the unit is shipped from the factory, it is set for use with a normal microphone (phantom power off).]

Power-Saving Mode



If the DC POWER switch on the camera is set to the SAVE side, the VTR is put into power-saving mode, which reduces the amount of power consumed from the battery pack.

1 Set the VTR to STOP, EJECT or REC PAUSE mode.



2 Set the DC POWER switch on the camera to "SAVE".

The VTR is put into power-saving mode. The drum stops rotating, the tape stops while it is wound around the drum, and the video and audio are turned off. In addition, the backlight for the counter of the display section is also turned off.

3 To resume recording, set the camera's DC POWER switch to "ON", and then press the VTR START/STOP button on the camera section after about 5 seconds.

NOTE

Recording cannot start for about 5 seconds (the time required for the drum to reach a stable rotational speed) after the camera's DC POWER switch is turned on.

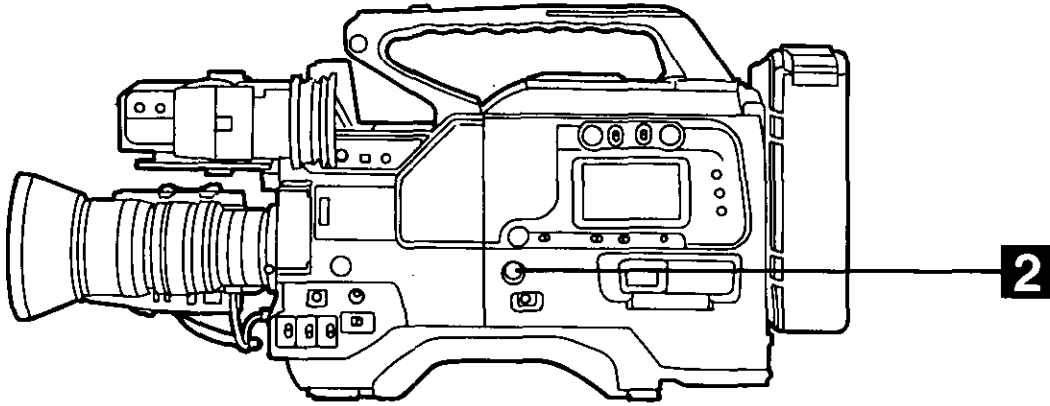
REFERENCE

Fast-forward, rewind, and eject operations can be performed from the power-saving mode. In this case, once the STOP button is pressed, or the fast-forward, rewind, or eject operation is completed, the unit returns to the power-saving mode.

System Test (Initial check)

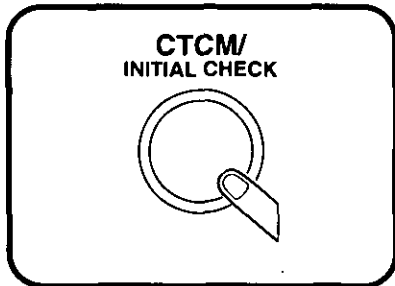
If the CTCM/INITIAL CHECK button is pressed while the VTR is in one of the operation modes below, the unit performs a system test.

■ EJECT, STOP or REC/PAUSE mode:



1 Set the CAMERA/BAR switch on the camera to "BAR".

2 Hold down the CTCM/INITIAL CHECK button.



The following system test is performed while the button is held down:

- Test of the connection with the video system of the camera (Y, P_B, P_R).

The display while the system check is in progress and the display showing the results of the check are shown below. These displays are made only while the CTCM/INITIAL CHECK button is held down.

■ Display in the viewfinder

Display during system check	Display of results of system check	
<div data-bbox="193 497 496 761"> <p>- SYSTEM TEST -</p> <ul style="list-style-type: none"> ■ BATTERY MENU → Ni-Cd 12V ■ PHANTOM POWER → OFF ■ CAMERA MIC IN → BAL ■ CAMERA CONNECTION CHECKING </div> <p data-bbox="140 838 544 1038">Wait while the check is in progress. During the test, the contents of three menu items (BATTERY MENU to CAMERA MIC IN) are displayed as shown in the screen above. Check the settings to make sure that they are correct.</p>	<div data-bbox="587 400 900 427" style="text-align: center;">< When all checks are OK ></div> <div data-bbox="587 497 890 761"> <p>- CAMERA CONNECTION -</p> <pre> 0000 KK KK 000000 KK KK 00 00 KK KK 00 00 KKKKK 00 00 KKKK 00 00 KKKKK 00 00 KK KK 000000 KK KK 0000 KK KK </pre> </div> <p data-bbox="587 838 943 866" style="text-align: center;">The results of the check were OK.</p>	<div data-bbox="1034 400 1385 453" style="text-align: center;">< When one or more problems were found ></div> <div data-bbox="1023 497 1326 761"> <p>- CHECK CAMERA CONNECTION! -</p> <div data-bbox="1091 570 1150 651" style="border: 1px solid black; padding: 2px; display: inline-block;"> <input type="checkbox"/> Y <input checked="" type="checkbox"/> PB <input type="checkbox"/> PR </div> <p data-bbox="1043 668 1262 695" style="text-align: center;">IS SWITCH AT COLOR BAR?</p> </div> <p data-bbox="1023 838 1417 895">The items where there is a problem with the connection.</p> <p data-bbox="1023 927 1437 1102">A problem was detected. Is the camera's CAMERA/BAR switch set to "BAR"? Are the camera and VTR securely connected together? Check these two points once again.</p>

■ Display on the display panel

When all items are OK, the "OK" indicator in the lower right corner lights.

DOLBY-NR

- 10 -

- 5 -

- 0 -

- 4 -

- 6 -

- 10 -

- 15 -

- 20 -

- 30 -

- ∞ -

CH1•3 dB CH2•4


CTL

DF

88:88:88:88

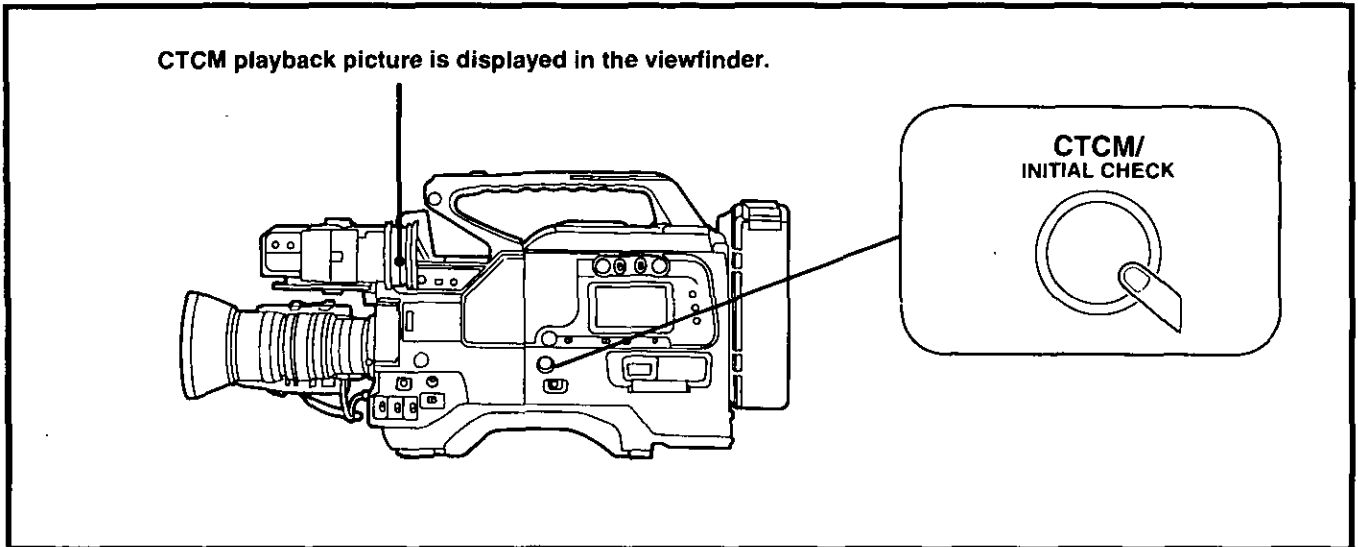
| h | min | s | frm |

E BATT F

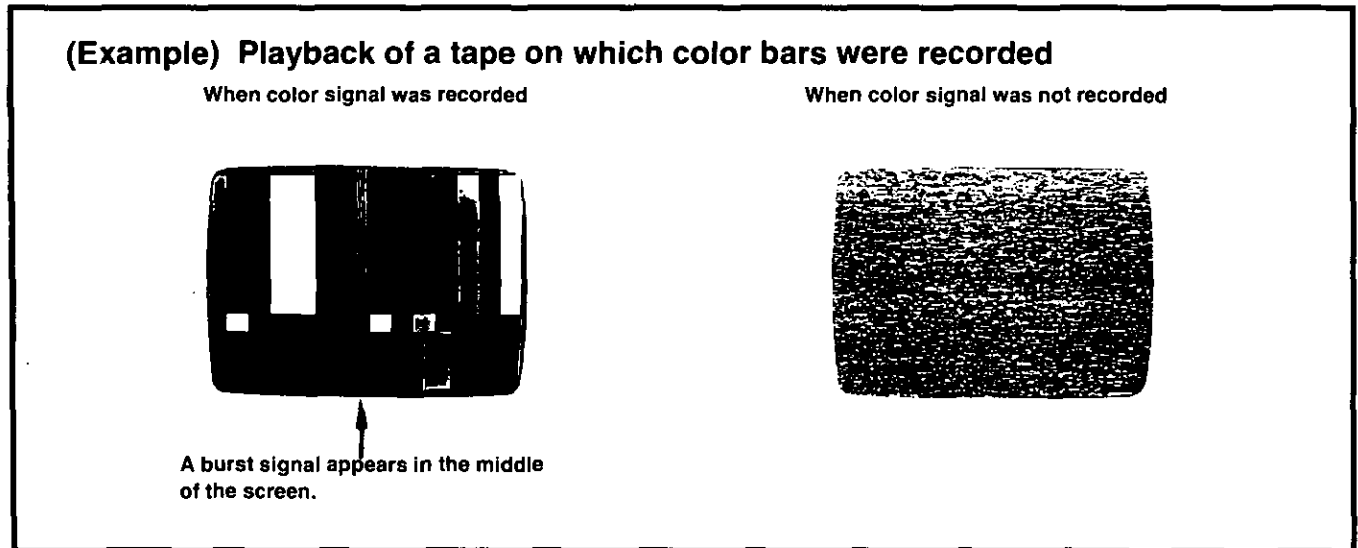


CTCM Check (Color signal recording check)

While the CTCM/INITIAL CHECK button is held down during playback, the color signal playback picture can be checked through the viewfinder and on the monitor. For details on playback, refer to page 37.



As shown below, after the CTCM/INITIAL CHECK button is pressed, the image displayed on the screen differs depending on whether the color signal was recorded or not.

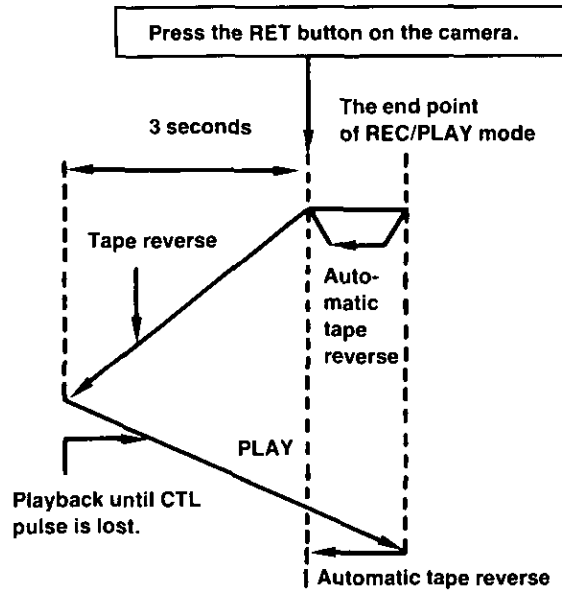


NOTE

If an operation other than playback is performed while the CTCM/INITIAL CHECK button is held down, the CTCM playback picture displayed in the viewfinder disappears.

Rec Review

When the VTR is in REC/PAUSE mode (the mode after automatic tape reverse) or stop mode, pressing the RET button on the camera will start the REC review operation, allowing you to check previously recorded material.



As long as the RET button is pressed and the unit is playing back a tape in REC review mode, the picture being played back is displayed in the viewfinder.

< When the segment around the starting point for REC review has not yet been recorded >

The playback picture for the non-recorded segment is displayed in the viewfinder.

< When the recorded segment continues for a long time (when the CTL pulse is never lost in the playback operation illustrated above) >

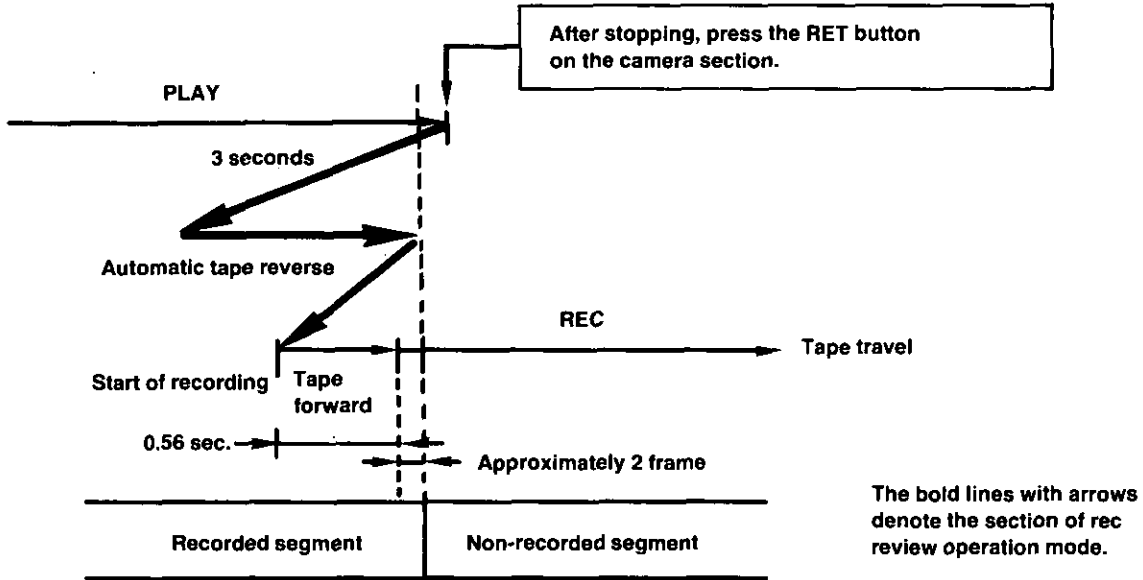
Playback continues two seconds beyond the point at which REC review began, and then the tape is automatically rewound and the unit is put into the REC/PAUSE mode.

NOTES

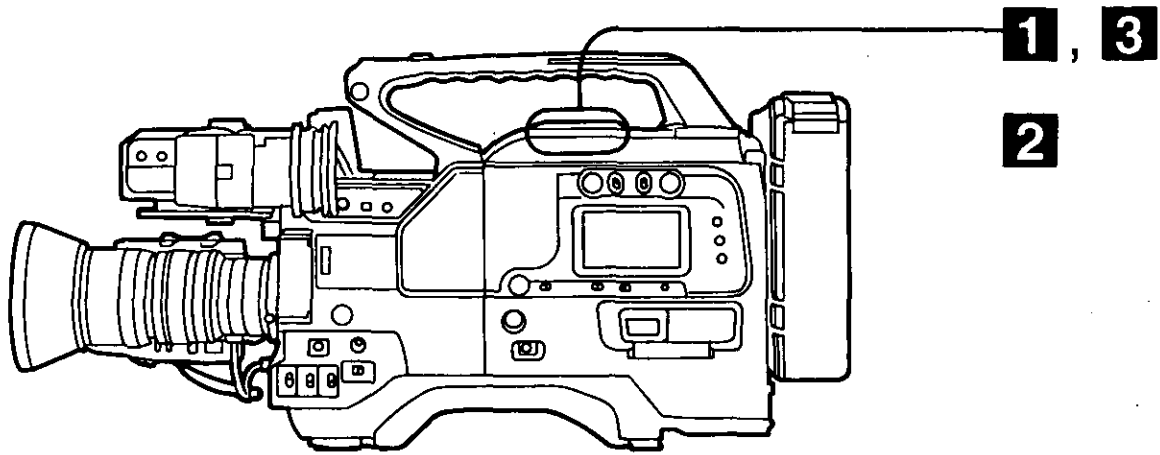
- Even if the REC review button is held down, the REC review operation is not repeated.
- If REC review is performed from STOP mode, the unit is put into the REC/PAUSE mode after the REC review operation is completed.

Cue-Up Function

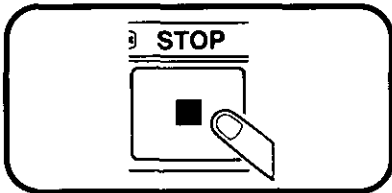
The REC review function described on the previous page can be used to find the end of the recorded segment of a tape. Search for the approximate end of recording using the FF, REW or PLAY button, and then stop within ± 2 seconds of the end of the recorded segment. Next, if the RET button on the camera section is used to perform the REC review operation, the VTR finds the precise end of the recorded segment and stop. If the next recording is started from that position, there will be a smooth transition between the previous recording and the next recording.



Playback



1 Press the STOP button so that the unit is in stop mode.



Pressing the STOP button while the VTR is recording or playing will not cause the unit to enter STOP mode. First press the VTR START/STOP button and interrupt recording (putting the unit in REC/PAUSE mode) and then press the STOP button.

2 Press the PLAY button.



- Playback in the viewfinder starts.
- The signal from the video output terminal is played back in black and white.

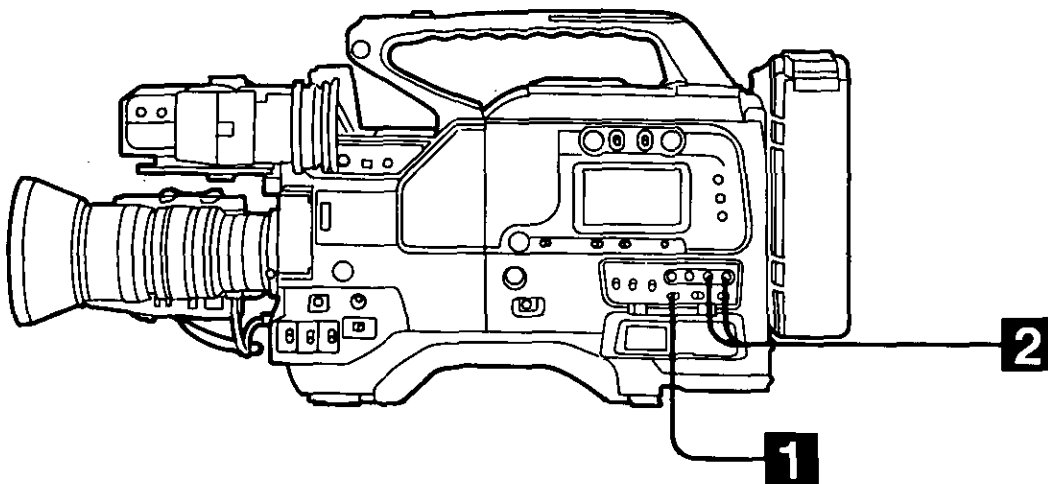
The appropriate tracking adjustments for normal use are made in the factory prior to shipment. If using the VTR in an area of extreme temperature, the tracking can be adjusted manually. For details on the manual adjustment procedure, refer to the following page.

3 Press the STOP button.

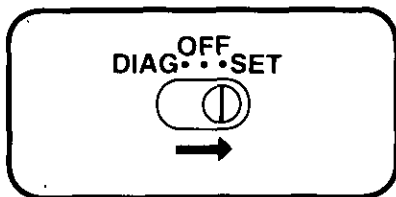
The camera's VTR START/STOP button does not work for playback. Playback must always be started by pressing the PLAY button on the VTR unit.

Playback (cont'd)

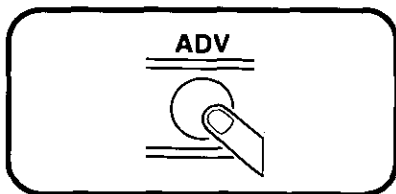
■ Manual Tracking Adjustment Procedure



- 1** Set the DIAG/OFF/SET switch to "SET".



- 2** While watching the viewfinder screen, press the ADV button ("+" direction) and the START button ("- " direction) to adjust the tracking.

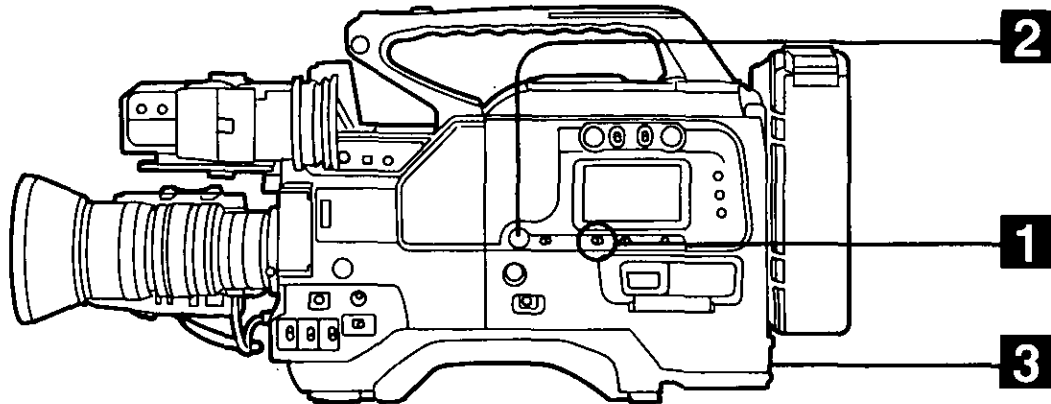


NOTE

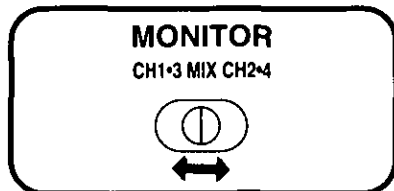
- The tracking value set by the above procedure is only effective for the duration of the playback operation during which it was set. (Once the playback mode is released, the tracking value returns to the factory setting.)

Monitoring

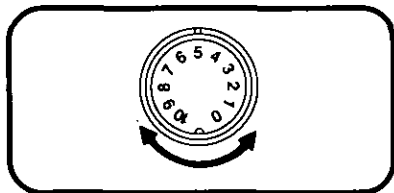
Audio monitoring is performed as follows.



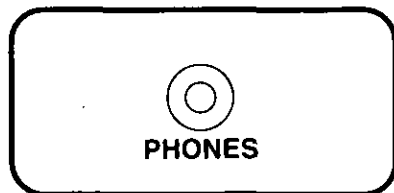
1 Set the audio monitor switch.



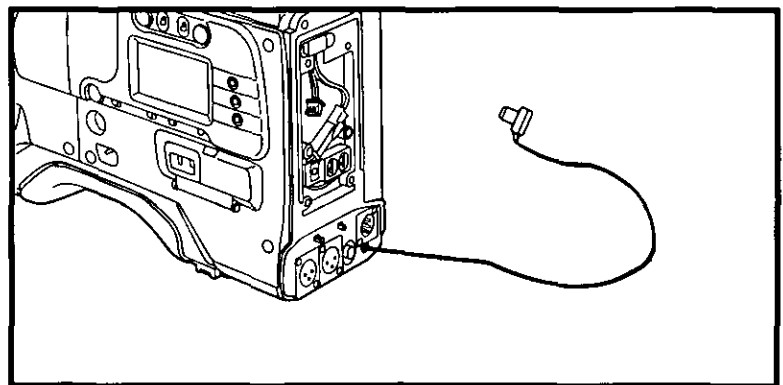
2 Turn the audio monitor level control and adjust the speaker volume as desired.



3 When monitoring with an earphone, plug in the earphone.



•When connecting a headphone while already connected the XLR connector to EXT DC IN, the plug adaptor may come into contact with the XLR connector, making it impossible to connect it. In such a case, use Panasonic RP-PA70A plug adaptor to convert the 1/4" plug to a mini plug and then connect this to the PHONES jack.

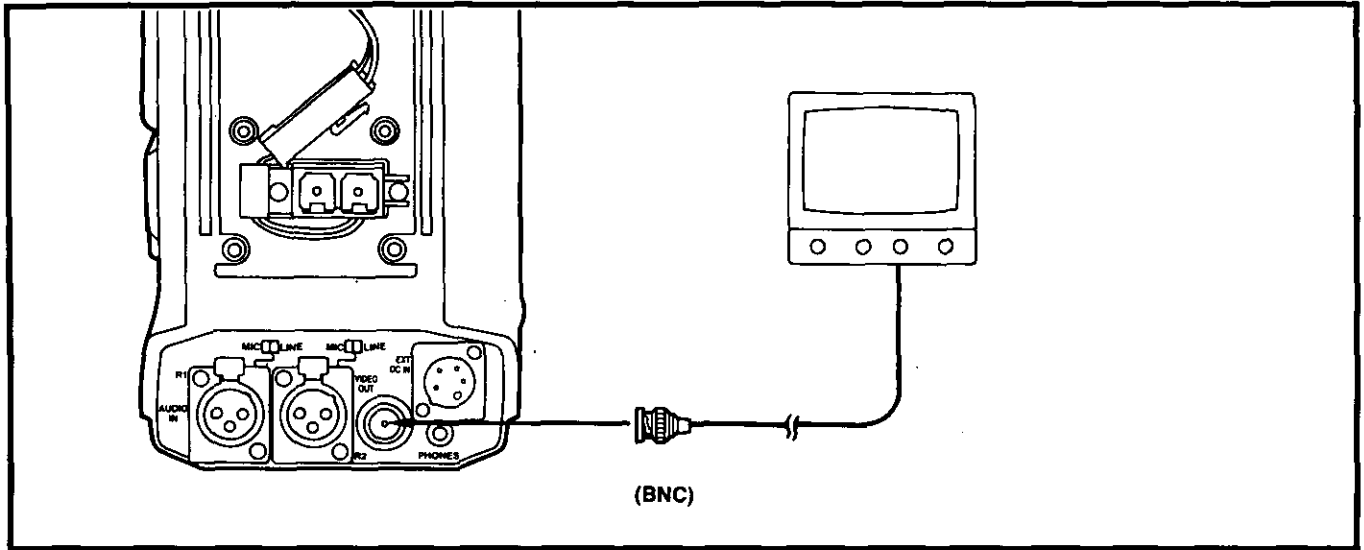


■ When an earphone is plugged in, it is not possible to monitor the audio through the speaker.

Monitoring (cont'd)

To perform video monitoring, make the connections illustrated in the diagram.

- During recording, EE video monitoring is possible.
- During playback, the playback picture can be monitored in black & white mode.



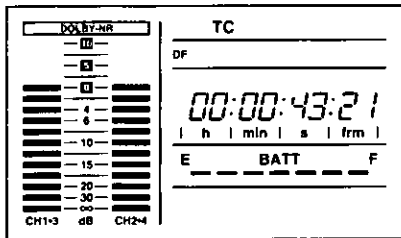
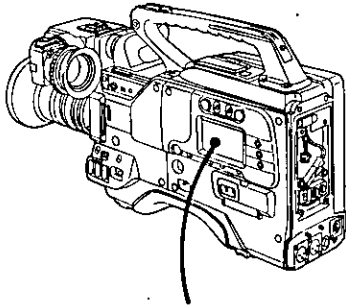
NOTE

To monitor the EE picture during playback, use the VIDEO OUT connector on the camera section.

Time Code/User Bit Display

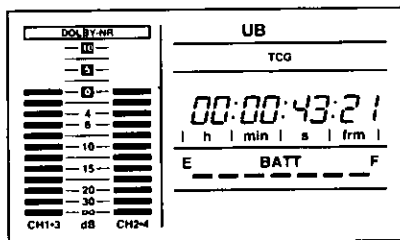
The time code signal is recorded at the same time as the video and audio. Recording of the time code signal is distinguished according to whether the built-in time code generator is used or an external time-code generator is used. In this VTR, the time code is simultaneously recorded on the time code track (LTC) as well as in video signal blanking period (VITC). Only LTC signal is played back.

The time code and user bits shown on the display panel are explained below.

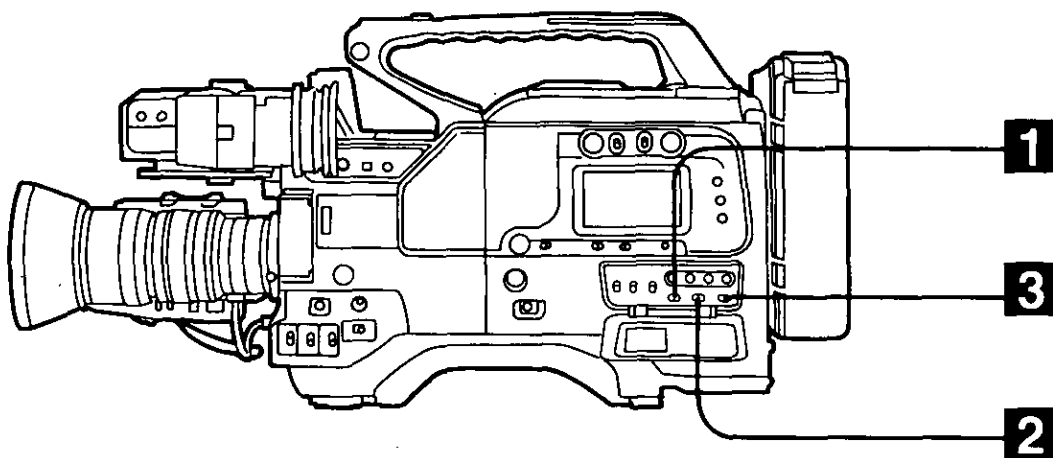


The time code advances in accordance with the tape.

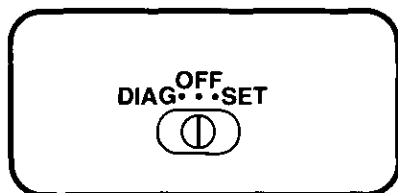
<p>CTL (control signal) and counter display mode</p>	
<p>LTC time code playback</p>	
<p>Time code setting/recording mode using the built-in time code generator</p>	
<p>LTC user bit playback mode</p>	
<p>User bit setting/recording mode using the built-in time code generator</p>	



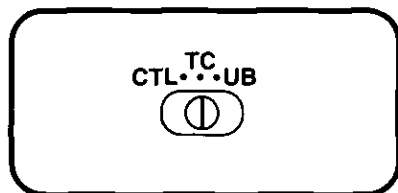
Time Code Signal Setting



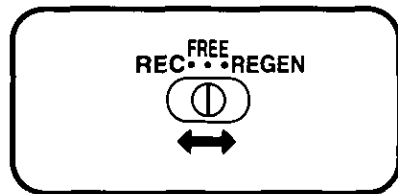
1 Set the DIAG/OFF/SET switch to “OFF”.



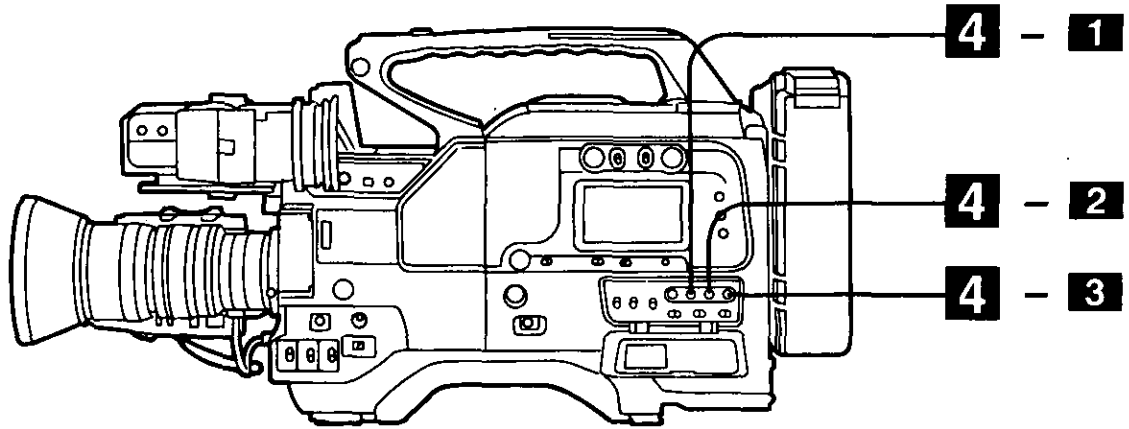
2 Set the CTL/TC/UB switch to “TC”.



3 Set the REC/FREE/REGEN switch to the desired setting.

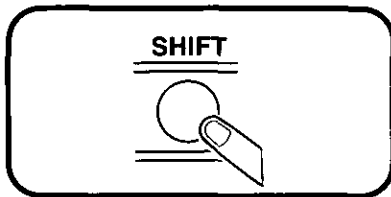


■ Time code setting is not possible if this switch is set to “REGEN”.

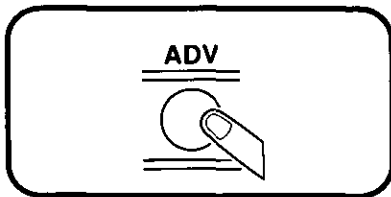


4 Set the time code.

- 1 Press the SHIFT button.



- 2 Press the ADV button to change the flashing number.



■ At this point, if the RESET button is pressed, the time code is cleared to 0 and the time code setting mode is released.

- 3 Once setting has been completed, press the START button.



Time Code Signal Setting (cont'd)

REFERENCE

- The selection of the time code drop frame/non-drop frame mode can be made through the menu. For details, refer to page 56, "Menu Items".
- **REC RUN and FREE RUN**
 - REC RUN:** Time code increments only when the VTR is in recording mode. It starts counting on start of recording and stops counting on completion of recording.
 - FREE RUN:** Time code always increments, regardless of the operating mode of the VTR. If the generator is set in accordance the actual time, the recording time can be recorded on tape.
- **Drop Frame (DF) and Non-Drop Frame (NDF)**
 - Drop frame:** In order to compensate for the time lag between color synchronizing and the actual time over a long period, two frames (00 and 01) are skipped from the start of each minute except 0, 10, 20, 30, 40, 50 minutes.

00:00:59:29 ⇒ 00:01:00:02

Non-drop frame: The time lag from the actual time is anticipated without changing the time code signal.

00:00:59:29 ⇒ 00:01:00:00

NOTE

Even if the time code drop frame/non-drop frame setting is made in the menu, in the following cases the DF indication on the display may differ from the setting:

(1) When an external time code is being input

The external time code drop frame/non-drop frame setting takes precedence over the menu settings.

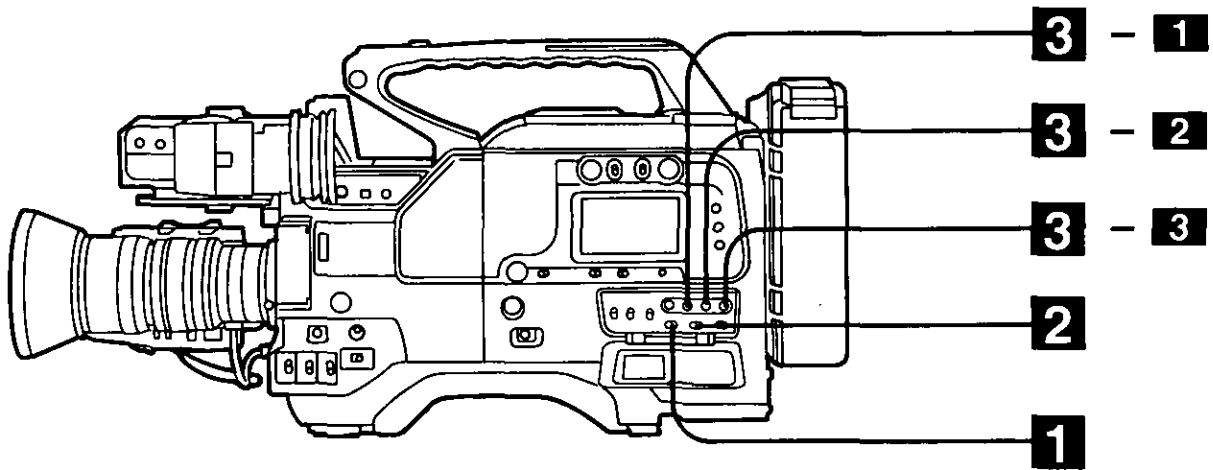
(2) When the VTR is in other than REC mode

The time code assumes the playback status. The DF display differs, depending on whether the time code on the tape was recorded in drop frame mode or non-drop frame mode.

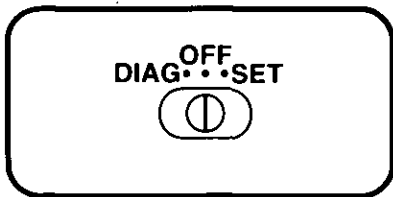
(3) When the REC/FREE/REGEN switch is set to "REGEN"

In REGEN mode, the preceding recorded time code data is read at the start of recording and continuous time code data is recorded. Recording is done according to the mode used for the preceding recording, regardless of the drop frame/non-drop frame setting in the menu.

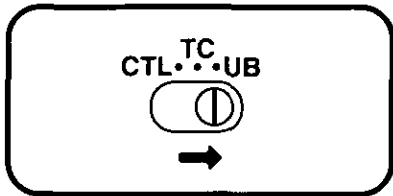
Setting the User Bits (Including Real Time)



1 Set the DIAG/OFF/SET switch to "OFF".

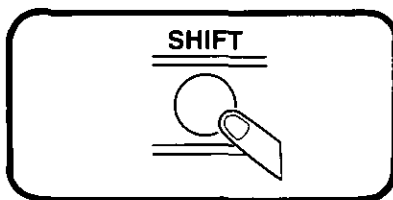


2 Set the CTL/TC/UB switch to "UB".



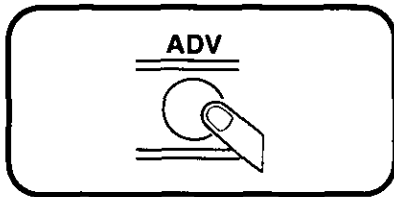
3 Set the user bits.

1 Press the SHIFT button.

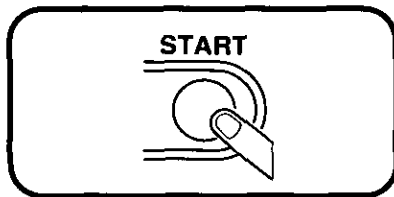


Setting the User Bits (Including Real Time) (cont'd)

- 2** Press the ADV button to change the flashing number.



- 3** Once setting has been completed, press the START button.

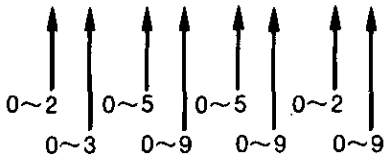


REFERENCE

■ Display on the display panel

For real time setting

00 00 00 00



(0 to 9 when the first digit is 0 or 1)

For user bit setting

00 00 00 00

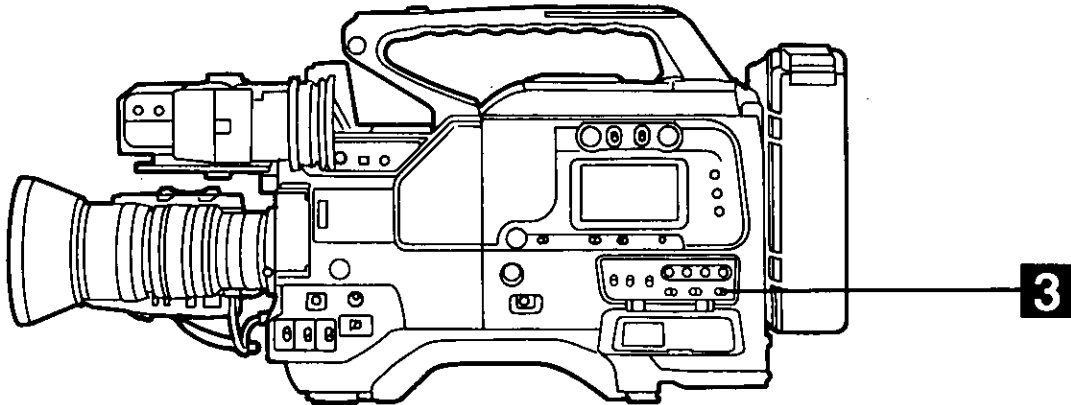


The sequence is from 0 to 9, A to F, 0 to 9, A to F...

NOTE

The real time/user bit selection is made through the menu item "UB REAL TIME". For details, refer to page 56, "Menu Items".

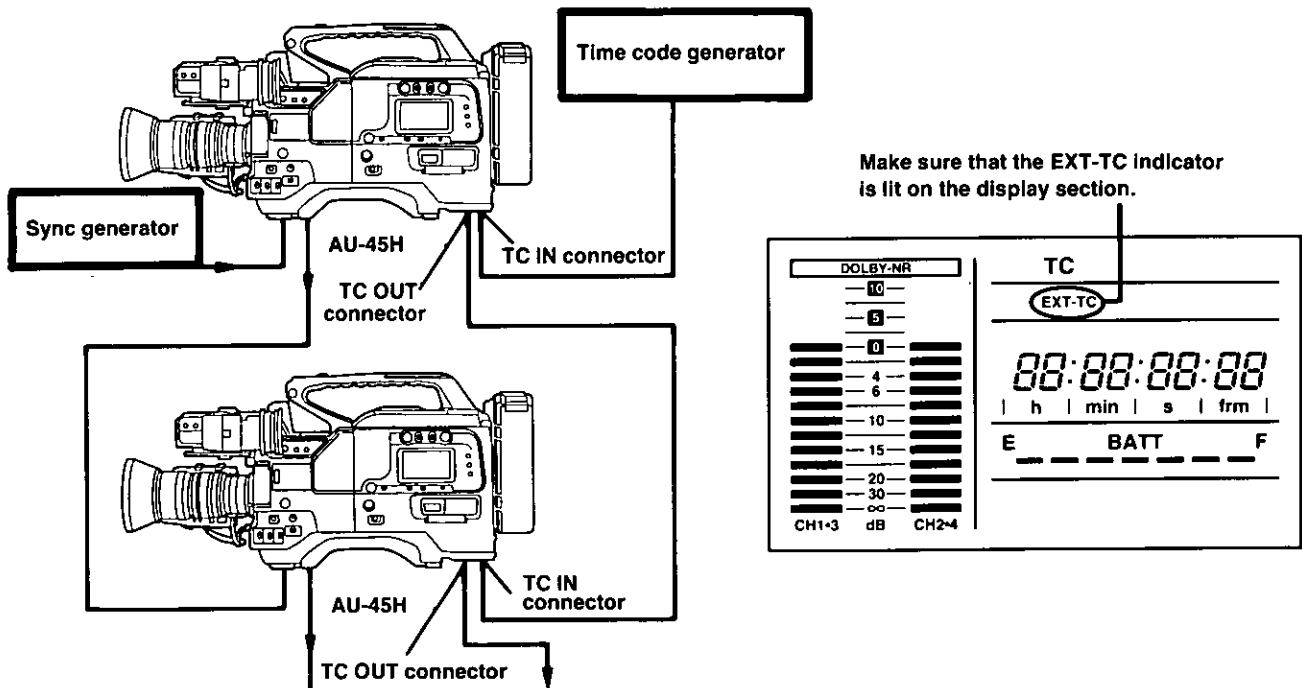
Locking the Internal Time Code Generator onto an External Time Code



1 Input a time code signal that has been synchronized with a reference video signal into the time code input connector.

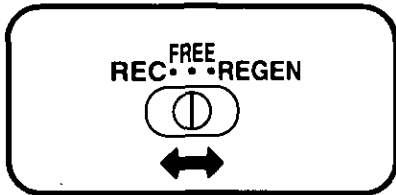
2 To lock more than one VTR at the same time, connect them as shown in the diagram below.

If this unit is put into the recording mode when the power for this unit is on or the tape is stopped, the time code is "slave" locked to the external time code signal. Aside from using an external time code generator for locking in the time code signal, it is also possible to use this unit as a master unit for the time code signal.



Locking the Internal Time Code Generator onto an External Time Code (cont'd)

3 Set the REC/FREE/REGEN switch.



The operation of this unit's internal time code generator differs, depending on the setting of this switch. Normally, this switch should be set to "FREE".

- When set to "REC", the time code generator is not incremented if the external time code signal is not being input.
- If set to "REGEN" or "FREE", incrementation of the time code generator continues even if the input of the external time code signal is cut off.

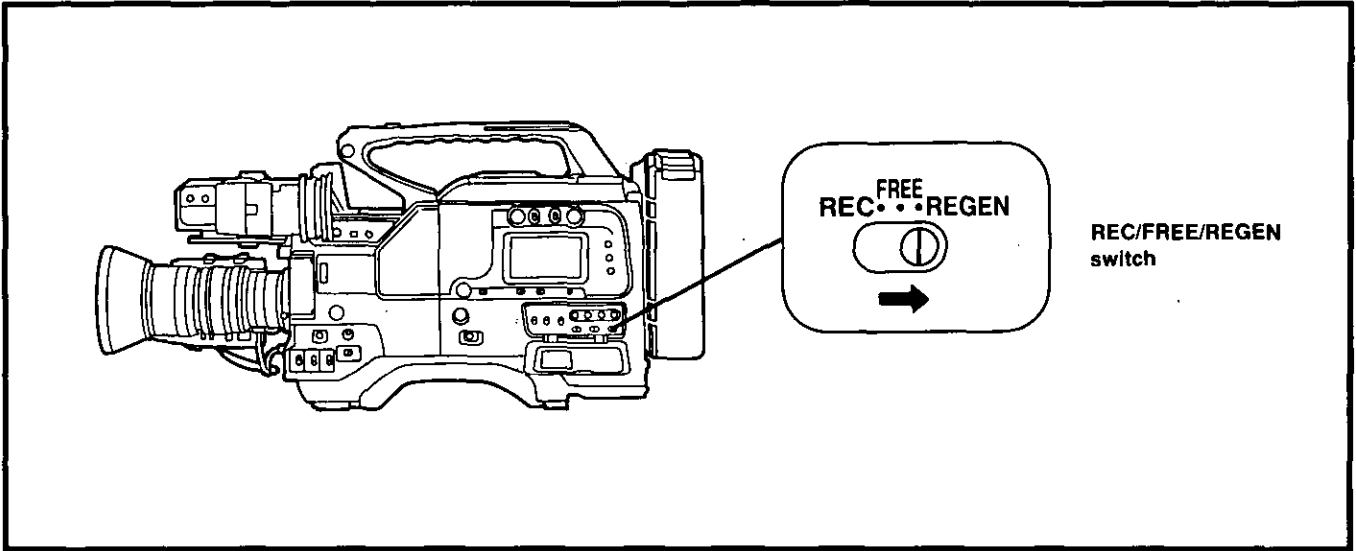
NOTES

- To lock the internal user bit values to the external time code, select "EXT UB REGEN" on the menu.
- When locking onto the generator using a camera which is not equipped with reference-through connectors, a reference signal distributor is required.

Continuous Recording of the Time Code when performing back space editing

Set the REC/FREE/REGEN switch to "REGEN".

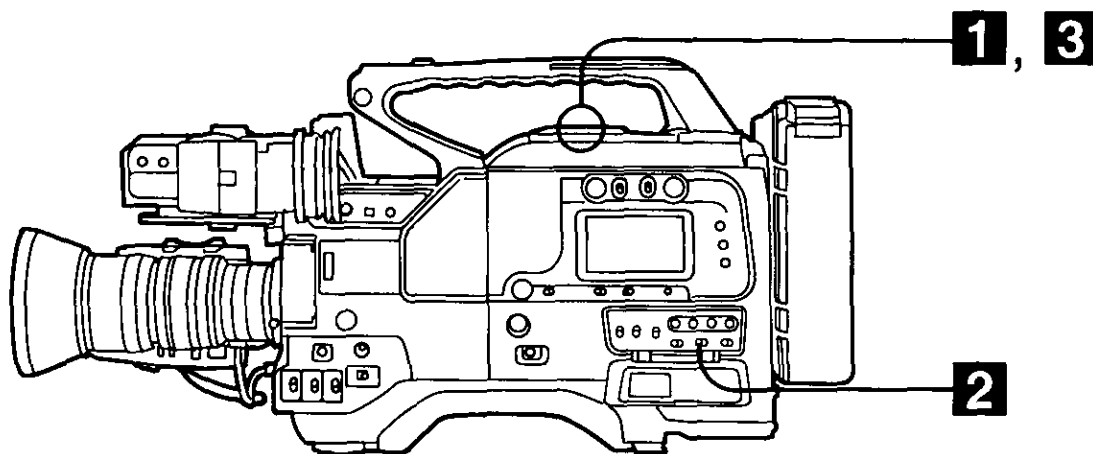
This setting makes it possible to record the time code with a value that continues from the previously recorded segment.



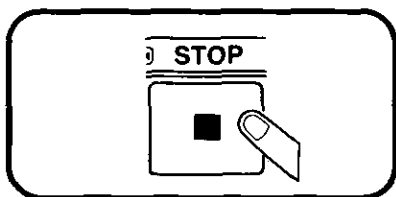
NOTE

When an external time code is input, continuous recording of the time code is not possible when shooting continuous scenes.

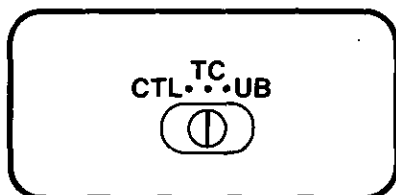
Time Code Playback



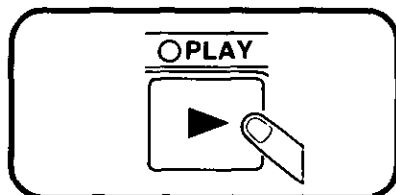
1 Press the **STOP** button so that the VTR is in **STOP** mode.



2 Set the **CTL/TC/UB** switch to "**TC**" or "**UB**".



3 Press the **PLAY** button to start playback.



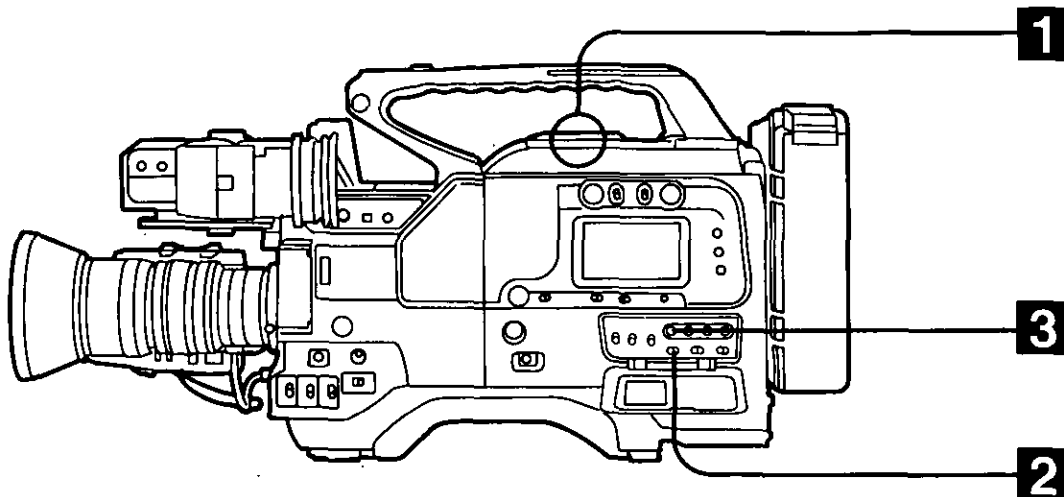
REFERENCE

- In drop frame mode, the DF indicator lights on the display panel.
- LTC playback is possible, but VITC playback is not possible with this unit.
- When the time code cannot be read, time code interpolation is done by reading the CTL signal instead of the time code.



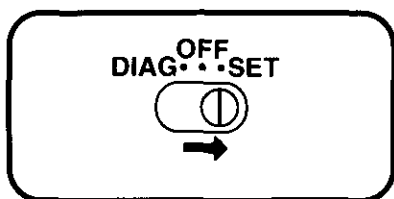
Colon (:) between seconds and frames disappears.

Setting Menu Items

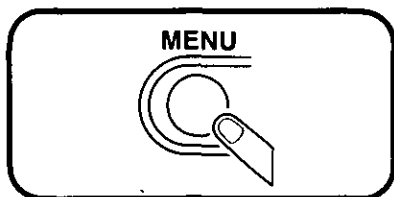


1 Set the unit to either EJECT, REC/PAUSE or STOP mode.

2 Set the DIAG/OFF/SET switch to "SET".

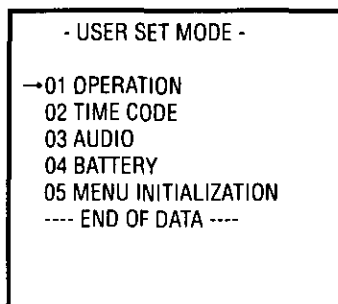


3 Press the MENU button.

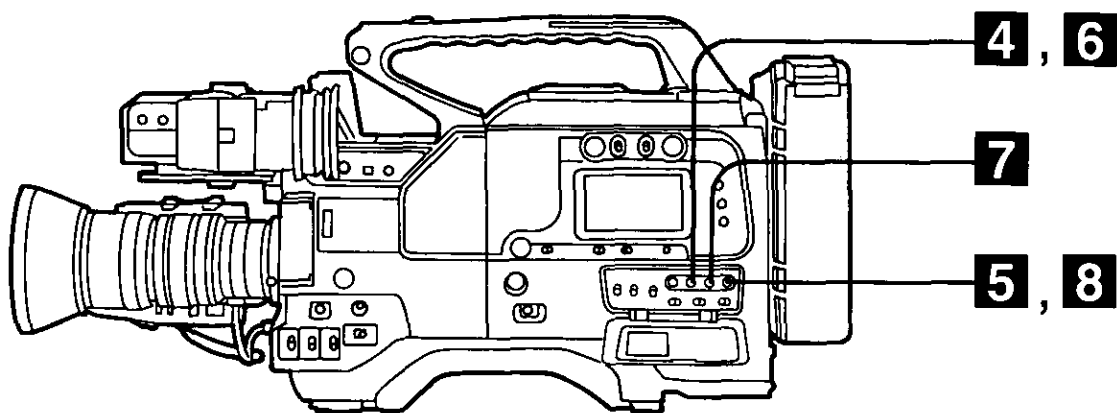


The main menu screen is displayed in the viewfinder.

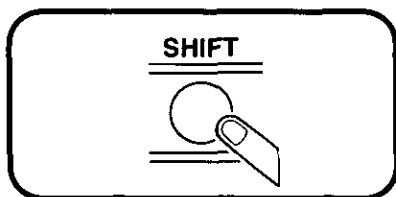
Viewfinder



Setting Menu Items (cont'd)



4 Press the SHIFT button to select the desired menu.



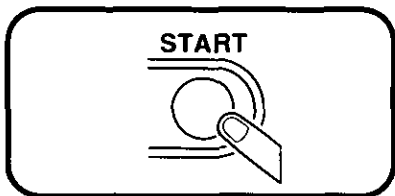
The cursor to the left of the menu moves up and down.

Viewfinder

```

- USER SET MODE -
01 OPERATION
→02 TIME CODE
03 AUDIO
04 BATTERY
05 MENU INITIALIZATION
---- END OF DATA ----
    
```

5 Press the START button.



The main menu screen is replaced with a sub-menu screen.

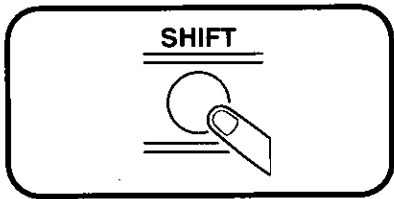
Viewfinder

```

- TIME CODE -
→01 VITC POSITION(1) 16
02 VITC POSITION(2) 18
03 VITC REC ON
04 UB REAL TIME OFF
05 EXT UB REGEN OFF
06 TCG CF FLAG ON
07 DF/NDF DF
---- END OF DATA ----
    
```

6

Press the SHIFT button to select an item on the sub-menu.



The cursor to the left of the sub-menu moves up and down.

Viewfinder

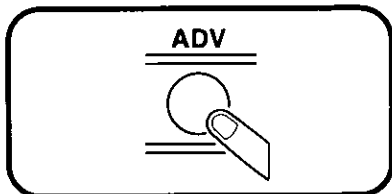
```

- TIME CODE -
01 VITC POSITION(1) 16
→02 VITC POSITION(2) 18
03 VITC REC       ON
04 UB REAL TIME   OFF
05 EXT UB REGEN   OFF
06 TCG CF FLAG    ON
07 DF/NDF         DF
---- END OF DATA ----

```

7

Press the ADV button to set the sub-menu item.



The setting of the sub-menu item next to the cursor changes.

Viewfinder

```

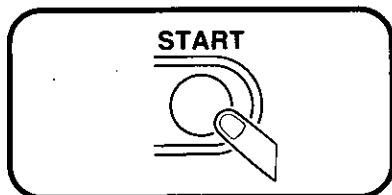
- TIME CODE -
01 VITC POSITION(1) 16
→02 VITC POSITION(2) 19
03 VITC REC       ON
04 UB REAL TIME   OFF
05 EXT UB REGEN   OFF
06 TCG CF FLAG    ON
07 DF/NDF         DF
---- END OF DATA ----
      PUSH START KEY

```

If the settings have been changed, the message "PUSH START KEY" flashes.

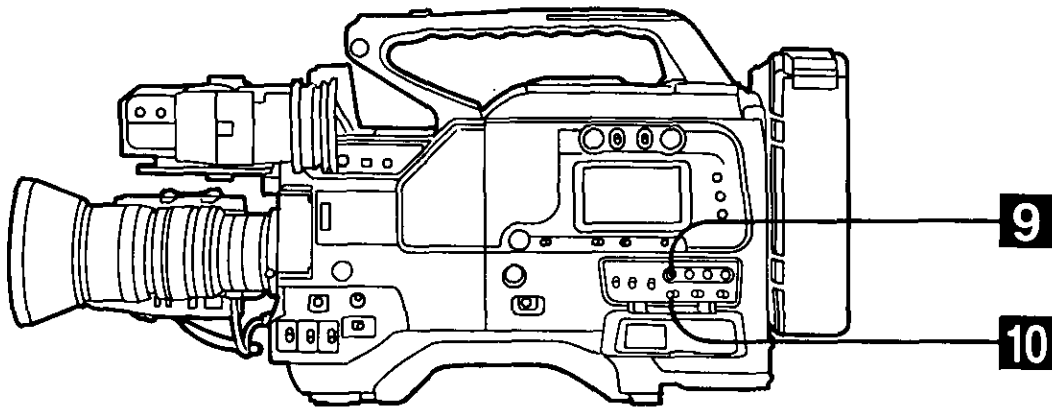
8

Press the START button to establish the settings.



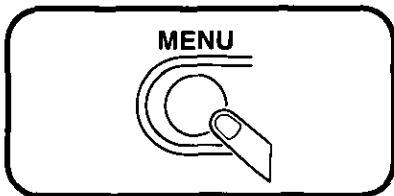
Once you have confirmed the changes by pressing the START key, the "PUSH START KEY" message disappears.

Setting Menu Items (cont'd)



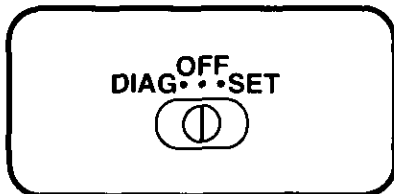
9

To make other settings after returning to the main menu, press the MENU button and repeat steps 6 through 8.



10

To terminate the menu settings, set the DIAG/OFF/SET switch to "OFF".



NOTE

If you press the camera's START/STOP button while making menu settings, the menu setting process is halted and recording begins. (In this event, recording may start without the correct menu settings being made.)

Menu Items

OPERATION Menu

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description
CAM THROUGH OUT	ON OFF	Sets whether to output the normal encoder video from the camera to the video output connector or to output the video signal switched by the VTR operation mode. ON: The encoder video is output to the video output connector. (Useful when recording with a backup VTR.) OFF: Output the video signal switched by the VTR operation mode (recording, playback, menu setting, etc.) to the video output connector. Use this mode during normal operation.
BACK TALLY	ON OFF	Sets whether to display the back tally lamp or not. ON: Display the back tally lamp. OFF: Do not display the back tally lamp.

TIMECODE Menu

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description
VITC POSITION (1)	12H 13H 14H 16H 17H 18H 19H 20H 21H	Sets the VITC signal input line. 12H: Input the VITC signal on line 12. 13H: Input the VITC signal on line 13. 14H: Input the VITC signal on line 14. 16H: Input the VITC signal on line 16. 17H: Input the VITC signal on line 17. 18H: Input the VITC signal on line 18. 19H: Input the VITC signal on line 19. 20H: Input the VITC signal on line 20. 21H: Input the VITC signal on line 21.
VITC POSITION (2)	12H 13H 14H 16H 17H 18H 19H 20H 21H	Sets the VITC signal input line. 12H: Input the VITC signal on line 12. 13H: Input the VITC signal on line 13. 14H: Input the VITC signal on line 14. 16H: Input the VITC signal on line 16. 17H: Input the VITC signal on line 17. 18H: Input the VITC signal on line 18. 19H: Input the VITC signal on line 19. 20H: Input the VITC signal on line 20. 21H: Input the VITC signal on line 21. ■ The same line as VITC POSITION (1) can not be selected.

Menu Items (cont'd)

TIMECODE Menu (cont'd)

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description
VITC REC	ON OFF	Selects whether to record a VITC signal or not. ON: Record the VITC signal generated by the internal time code generator. The VITC signal is recorded simultaneously with the video signal. OFF: Do not record the VITC signal.
UB REAL TIME	ON OFF	Selects whether to set the user bits to real time or not. ON: Set the user bits to real time. OFF: Set the user bits to user settings.
EXT UB REGEN	ON OFF	Selects whether to "slave" lock the user bits of the external time code signal. ON: "Slave" lock the user bits. OFF: Do not "slave" lock the user bits.
TCG CF FLAG	ON OFF	Selects whether to set the color frame flag for the time code generator or not. ON: Set the CF FLAG. OFF: Do not set the CF FLAG.
DF/NDF	DF NDF	Selects drop frame mode or non-drop frame mode. DF: Drop frame mode NDF: Non-drop frame mode

AUDIO Menu

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description
LIMITER	ON OFF	Selects whether the limiter should be on or off. ON: Turn the limiter on. OFF: Turn the limiter off.
DOLBY C NR	ON OFF	Selects whether Dolby C NR should be on or off. ON: Turn Dolby NR on. OFF: Turn Dolby NR off.
PHANTOM POWER	ON OFF	Selects whether the MIC phantom +48 V for the REAR1 and REAR2 external microphone (AUDIO IN) connectors should be on or off. ON: Turn the MIC phantom +48 V on. OFF: Turn the MIC phantom +48 V off.

AUDIO Menu (cont'd)

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description
CAMERA MIC IN	BAL	<p>Selects whether the camera MIC connection in the 68-pin interface is balanced or unbalanced.</p> <p>BAL: Camera MIC input should be balanced.</p> <ul style="list-style-type: none"> ■ Select this setting when using the WV-F500, AQ-11, AQ-20 and KY-27UCH cameras. <p>UNBAL: Camera MIC input should be unbalanced.</p> <ul style="list-style-type: none"> ■ Select this setting when using the WV-F250 camera or the WV-F700S camera. <p>This setting switches the connection for the camera and the VTR (the 68-pin interface) between balanced and unbalanced mode. This setting is not for switching between the use of a balanced-connection microphone and an unbalanced-connection microphone for the camera microphone.</p>
	UNBAL	

BATTERY Menu

[The shaded portions indicate the initial settings.]

Viewfinder sub-menu item	Settings	Description	Usable battery name (Name of goods) NOTE
SELECT	Ni-Cd 12 V	Selects when AC adaptor or Ni-Cd battery (12 V) is used.	AU-BP402, AU-BP220, NP-1, BP-90
	Ni-Cd 13.2 V	Selects when Ni-Cd battery (13.2 V) is used.	Magnam 13 battery
	Ni-Cd 14.4 V	Selects when Ni-Cd battery (14.4 V) is used.	Magnam 14 battery
	SILVER	Selects when the silver-zinc battery is used.	Silver-zinc battery
	DIGITAL	Selects when the digital Ni-Cd battery (13.2 V, 14.4 V) is used.	Magnam 13 digital battery, Magnam 14 digital battery

NOTE) AU-BP402 and AU-BP220 batteries are made by Matsushita Electric Industrial Co.

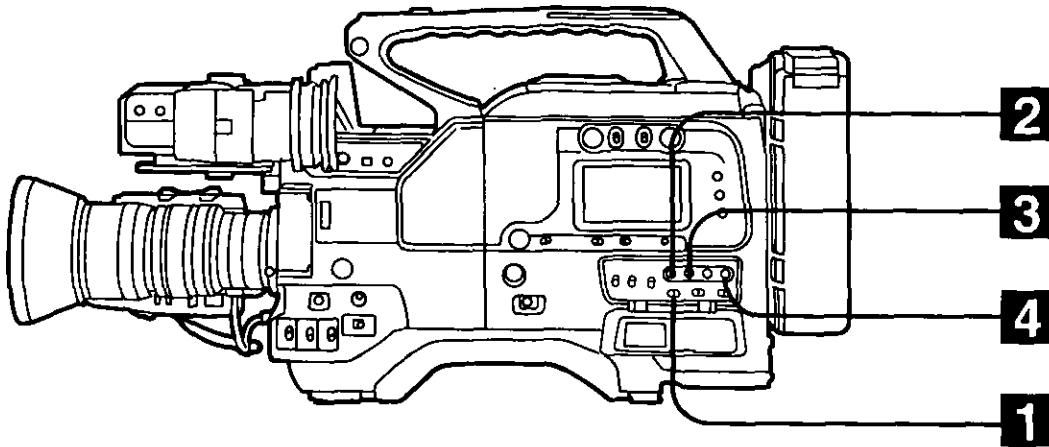
NP-1 and BP-90 batteries are made by Sony Corporation.

The batteries of Magnam series and silver-zinc battery are made by Anton & Bauer Corporation.

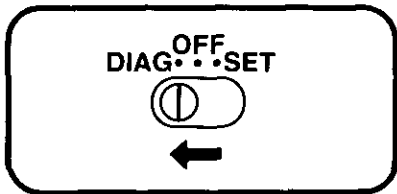
MENU INITIALIZATION Menu

Viewfinder Submenu Item	Description of Function and Operation
USER SET MENU INIT.	<p>Initialize the menu to the factory settings.</p> <p>YES: To initialize to the factory settings, press the START button.</p> <p>NO: To not initialize to the factory settings, press the MENU button.</p>

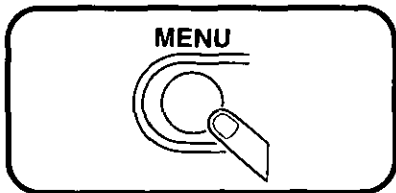
Executing Self-Diagnostics



1 Set the DIAG/OFF/SET switch to "DIAG".

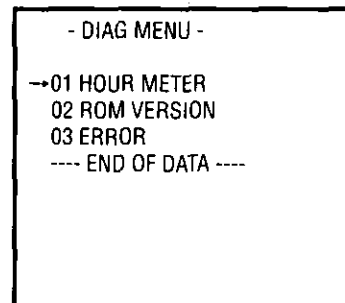


2 Press the MENU button to enter the DIAG menu mode.



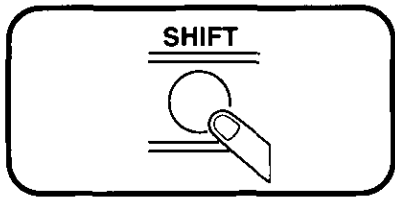
The main menu is displayed in the viewfinder.

Viewfinder



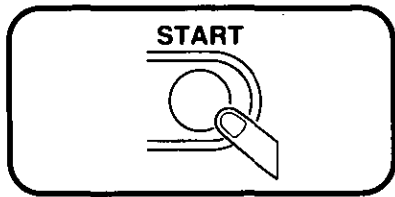


3 Press the **SHIFT** button to select the desired **DIAG** menu.



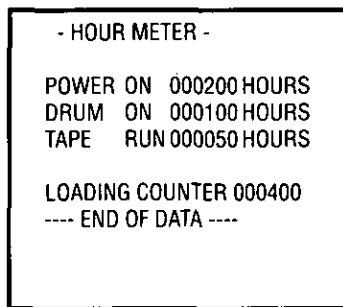
The display changes each time the SHIFT button is pressed.

4 Press the **START** button to establish the selection of the item to be checked.



1) If the **HOUR METER** item was selected:

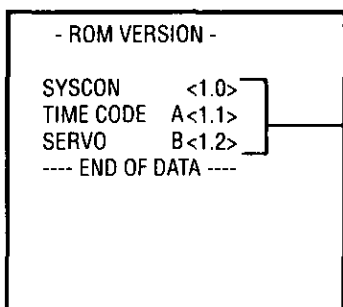
Viewfinder



The check is performed automatically and the results of the check are displayed in the viewfinder.

2) If the **ROM VERSION** item was selected:

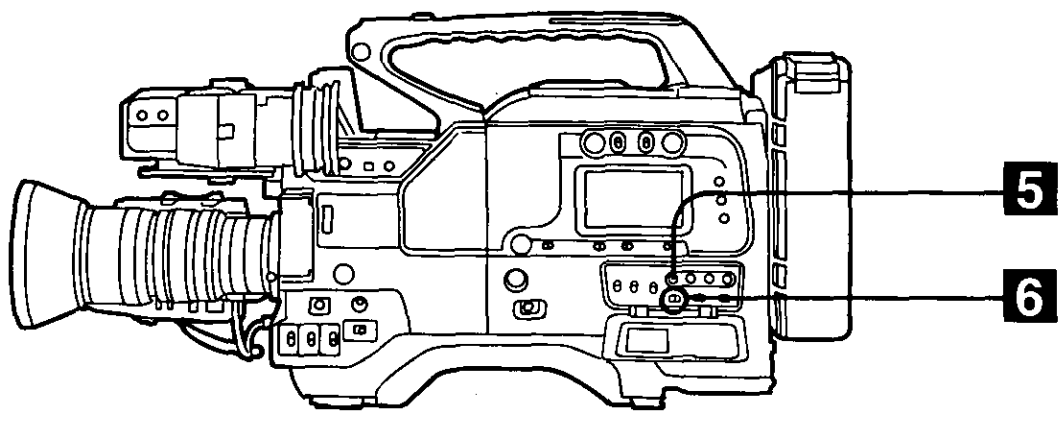
Viewfinder



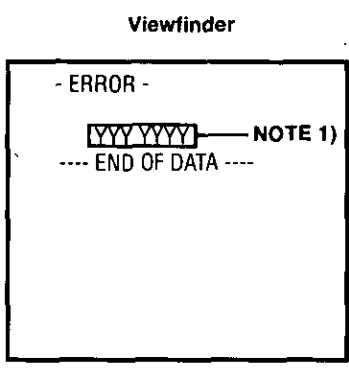
The check is performed automatically and the results of the check are displayed in the viewfinder.

The ROM version is displayed.

Executing Self-Diagnostics (cont'd)



3) If the ERROR item was selected:

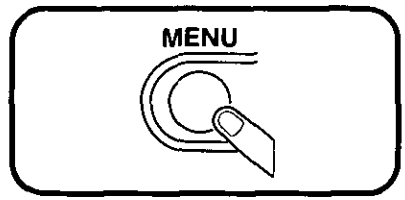


If the VTR shut itself off automatically because of some sort of problem, the contents of the error are displayed, even if the power was turned off once and then turned back on.

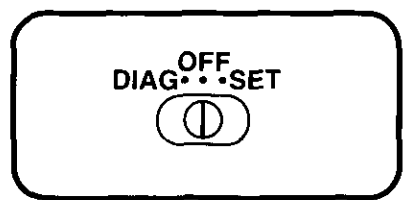
The error that caused the VTR to shut itself off automatically the last time the power was turned off is displayed in the viewfinder.

NOTE 1) Contents of an error is displayed. For details, refer to page 63 on "Warning Lamps". Note that the information displayed only concerns slack tape.

5 In order to check other menu items after returning to the main menu, press the MENU button again.



6 To terminate the self-diagnostics, set the DIAG/OFF/SET switch to "OFF".



Self-Diagnostics Menus

HOURL METER Menu

Items shown in the viewfinder	Time display shown in viewfinder display	Description
POWER ON	Minimum display: 000000 HOUR	Indicates the amount of time the power for the VTR has been on.
DRUM ON		Indicates the amount of time the drum has been rotating.
TAPE RUN	Maximum display: 999990 HOUR	Indicates the amount of time the tape has been running.
LOADING COUNTER	Minimum display: 000000 Maximum display: 999990	Indicates the number of times a cassette tape has been loaded into the VTR.

ROM VERSION Menu

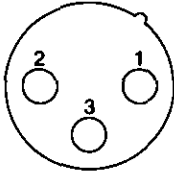
Items shown in the viewfinder	Description
SYSCON	Indicates the version number of the SYSCON ROM.
TIME CODE	Indicates the version number of the TIME CODE ROM.
SERVO	Indicates the version number of the SERVO ROM.

ERROR Menu

Items shown in the viewfinder	Description
Display for contents of errors	Indicates the error that caused the VTR to shut itself off automatically the last time the power was turned off.

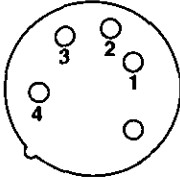
Connector Signals

Audio Input Connector (XLR-3P)



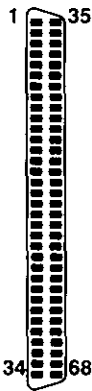
Pin No.	Signal
1	GND
2	HOT
3	COLD

External DC Input Connector (XLR-4P)



Pin No.	Signal
1	GND
2, 3	
4	+12 V

Camera/VTR Interface Connector (68 pins)



Pin No.	Signal	Pin No.	Signal
1	—	35	—
2	MIC Lch 1ch/Hot	36	MIC Rch 2ch/Cold
3	—	37	MIC GND
4	PB AUDIO Lch	38	PB AUDIO Rch
5	PB AUDIO Lch GND	39	PB AUDIO Rch GND
6	POWER SAVE	40	VTR START/STOP
7~9	—	41	REC TALLY
10	COUNTER RESET	42, 43	—
11	—	44	F250
12	RETURN Y	45	REC CHECK
13	RETURN Y GND	46~48	—
14~17	—	49	TAPE REVERSE
18	ENC VIDEO GND	50~53	—
19	—	54	VTR WARNING
20	BATT WARNING	55, 56	—
21	CTL PULSE	57	A.BATTERY REMAIN
22	—	58	S.VHS/MII/RGB
23	UNSWITCHD 12 V	59	—
24	COMPOSITE SYNC	60	ENC VIDEO
25	UNSWITCHD 12 V	61, 62	—
26~28	—	63	WIDE
29	VTR CHARACTER	64	CAM MIC VOLUME
30	MII PR	65	POWER GND
31	POWER GND	66	MII (Y/P _B /P _R) GND
32	MII Y	67	POWER GND
33	POWER GND	68	—
34	MII PB		

Warning Lamps

The operational status of the VTR can be determined, as shown in the table below, by information provided by warning indicators such as the lamp inside the camera's viewfinder, the warning lamp on the VTR, and warning sounds from the speaker or earphone.

Cause	Display panel indication	VTR warning lamp indication	Warning sound	Camera indications			
				REC/TALLY lamp	BATT lamp	Character display in the viewfinder (NOTES 1 and 2)	
Head clog	"CLOG" lights	Flashes 4 times/second	Sounds 4 times/second	Flashes 4 times/second	—	Cause of clog (NOTE 3)	
Servo not locked	"SERVO" lights	Flashes 4 times/second	Sounds 4 times/second	Flashes 4 times/second	—	SERVO	
Condensation (NOTE 4)	"HUMID" lights	Lights	REC Sounds 4 times/second	Flashes 4 times/second	—	HUMID	
			Except REC Continuous sound				
Tape slack (NOTE 5)	"SLACK" lights	Flashes 4 times/second	Continuous sound	Flashes 4 times/second	—	The display of concrete factor for tape slack (NOTE 6)	
Tape end	Near tape end	"END" flashes	Flashes 1 time/second	—	Flashes 1 time/second	—	
	Tape end	"END" lights (NOTE 7)	Lights	Continuous sound	Flashes 4 times/second	—	"TAPE END" is displayed.
Battery power remaining	Low battery	One bar on the "battery power remaining" flashes.	Flashes 1 time/second	—	Flashes 1 time/second	Flashes 1 time/second	—
	Undercut	Seven bars on the "battery power remaining" flash.	Lights	About 1 second	Flashes 4 times/second	Lights	—
Backup battery replacement needed	—	—	—	—	—	BACK UP BATT EMPTY (NOTE 8)	
No tape loaded	—	—	—	—	—	"NO TAPE" is displayed for several seconds if the VTR START/STOP button is pressed.	

NOTE 1: The warning displays in the viewfinder are always made in EE mode (during the eject, recording, standby, or stop modes), regardless of the setting of the VTR's CHARACTER ON/OFF switch.

NOTE 2: When multiple warnings are generated at the same time, only the latest warning is displayed in the viewfinder.

Warning Lamps (cont'd)

NOTE 3: The character display messages concerning head clogs shown in the viewfinder are as follows:

Cause of clog	Character display on viewfinder
Y1 head clog	Y1
Y2 head clog	Y2
C1 head clog	C1
C2 head clog	C2
CTL head clog	CTL
TC head clog	TC

Head clog detection is performed during the preparatory running of the tape before recording. When an attempt at consecutive recording is made using a tape on which neither video, CTL, nor TC signals are correctly recorded, the CLOG message may be displayed, but only at the start of recording.

NOTE 4: If condensation develops while recording is in progress, recording continues unaffected.

If an operation other than recording is in progress, the VTR stops after the tape is unloaded. Only eject and power off mode operations are possible.

NOTE 5: If slack tape develops, the VTR performs an emergency stop and will only accept the power off operation.

NOTE 6: The cause of slack tape is indicated in the viewfinder as follows:

Display in Viewfinder	Explanation
SLACK-S REEL NG	The S reel locked up.
SLACK-T REEL NG	The T reel locked up.
SLACK-REEL NG	The S and T reel both locked up.
SLACK-CAPSTAN NG	The capstan locked up.
SLACK-EJECT NG	An abnormality occurred during the "cassette up" operation.
SLACK-LOADING NG	An abnormality occurred during the loading operation.
SLACK-UNLOADING NG	An abnormality occurred during the unloading operation.
SLACK-TENSION NG	The tape tension is abnormal.
SLACK-POWER NG	The +9 V power supply was lost.

NOTE 7: Because a short rewind is performed after the tape end is detected, the tape end warning is released once the short rewind is completed.

NOTE 8: When the power is turned on, the message "BACK UP BATT EMPTY" appears and remains on for a few seconds.

If this message appears, the real time and time code FREE RUN backup battery is dead. Contact your dealer and replace the lithium battery with a new one.

Troubleshooting

If you experience a problem with the unit, check the following table. If you still can not resolve the problem, contact your dealer.

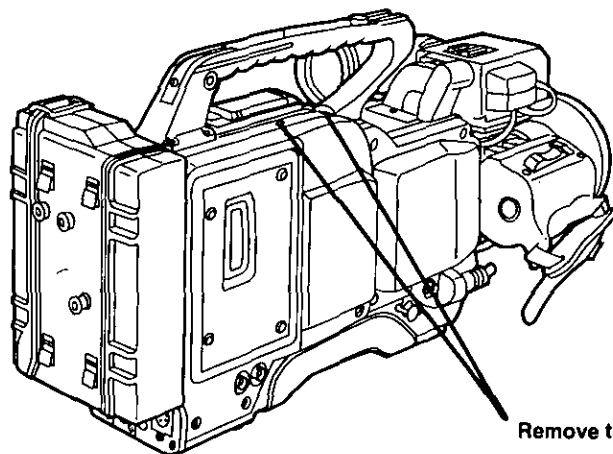
Symptom	Check/Adjust	Reference page
The power does not come on.	Is the battery fully charged?	20
The "low battery" warning appears.	Is the battery charged sufficiently? Is the battery setting menu set correctly? When using the AC adaptor, set the battery selection menu setting to "Ni-Cd 12 V".	13, 23, 51
When the power is turned on, the message "BACK UP BATT EMPTY" appears. The real time is not accurate.	It is possible that the backup battery has reached the end of its operational life (approximately one year). Contact your dealer and replace the battery with a new one.	9, 63
The unit does not respond when a button is pressed.	Is an error message being displayed in the viewfinder?	63, 64
The tape can not be fast forwarded/rewound.	Has the tape already been fast forwarded/rewound?	—
Noisy playback	The video heads may be dirty. Use a cleaning tape (AU-MPSCL).	68
The playback picture is in black and white.	The playback outputs are outputting a black and white signal.	37
The tape went slack.	If the tape cassette is in poor condition, slack tape may occur. Turn the power back on and replace the tape cassette.	—
Playback, rewind, and fast forward do not work.	The functions at left will work after the unit is put in stop mode. Press the STOP button and then check the operation of the desired function.	16
The sound is abnormal.	Is the DOLBY setting correct?	56

Emergency Eject

If the tape still cannot be removed when the EJECT button is pressed, perform the following procedure.

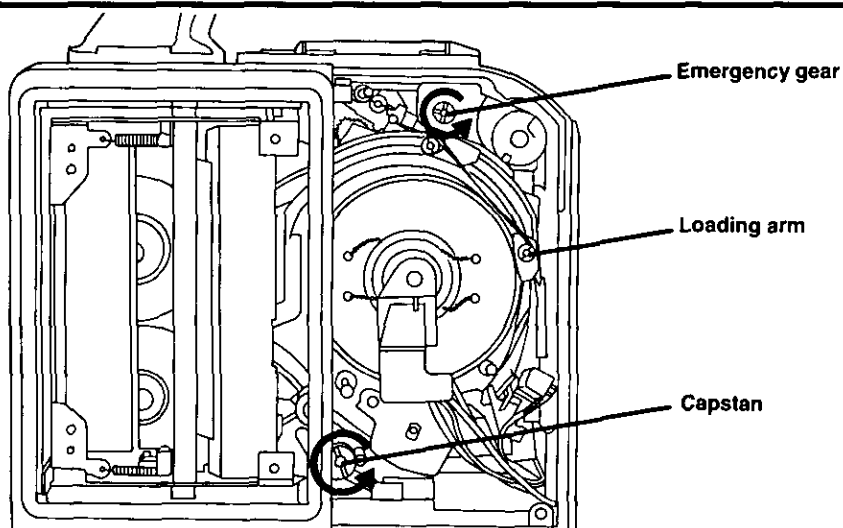
1 Turn the power off and remove the battery pack.

2 Remove the cover.



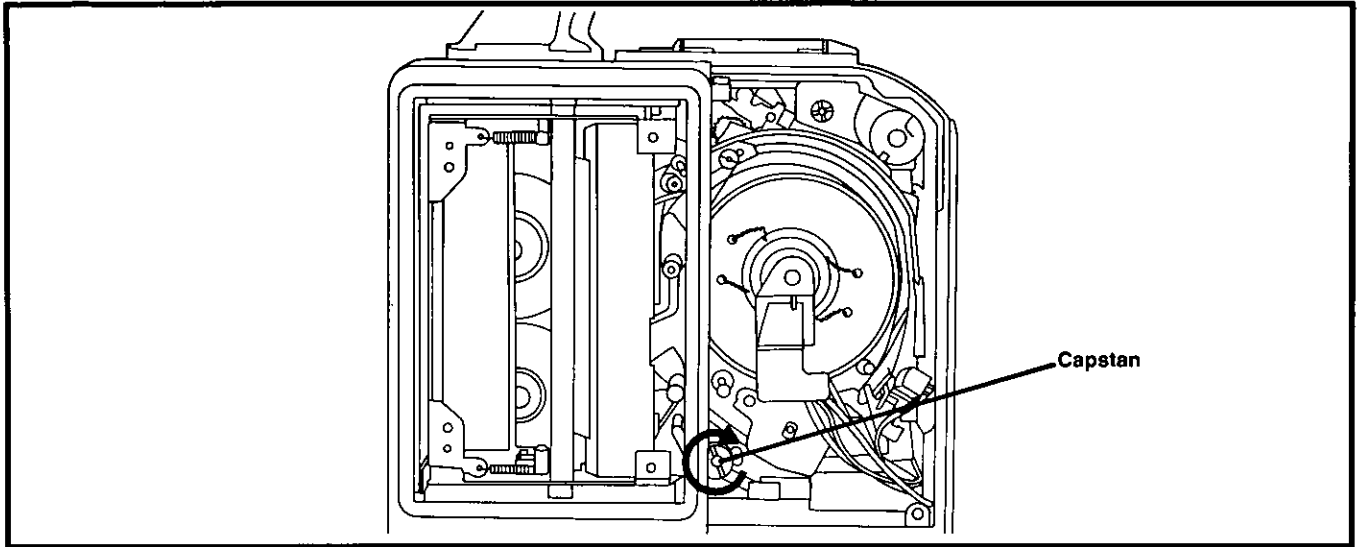
3 While turning the emergency gear to the left with a Phillips screwdriver, rotate the capstan to the left at the same time with your hand.

Turn the emergency gear until the tape is taken up and the loading arm is pulled in. Once the loading arm comes to a stop, turn the emergency gear an additional quarter turn (90°).



4 Turn the capstan to the right.

The tape will be ejected.



5 Reattach the cover.

Notes

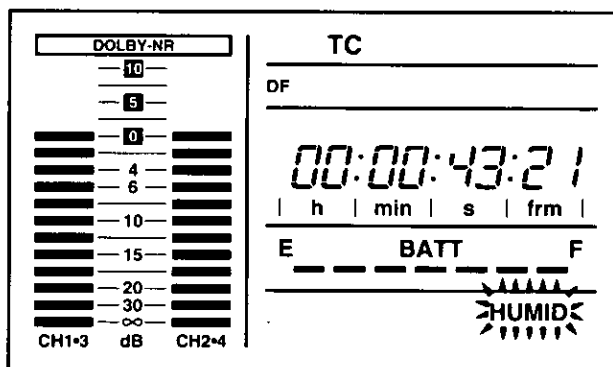
- Perform the emergency tape ejection procedure only if the unit has malfunctioned.
- Do not turn the emergency gear more than necessary.
- When loading another tape, be sure to turn on the power. (The tape may not be loaded properly if the power is off.)

Condensation

If this unit is moved from a cold to a warm area or is used in an area of high humidity, moisture may accumulate on the cylinder. If the unit is used under such conditions, the cylinder and/or tape may be damaged.

Pay attention to the following points:

- Before inserting a cassette, turn the CAM/VTR (or POWER) switch to "ON" or "POWER SAVE" and make sure that the warning lamp is not flashing and that the "HUMID" indication is not shown on the display.
- Avoid as much as possible using the unit under conditions that may produce condensation.
- When moving the unit from one location to another, remove the cassette tape.
- If the "HUMID" indication flashes while a cassette tape is loaded in the unit, take the following steps:
 1. Turn the power switch to "ON" or "POWER SAVE".
 2. Press the EJECT button and remove the cassette.Wait until the "HUMID" indicator disappears.
Once the "HUMID" indicator disappears, insert a cassette tape, and then run it and make sure that there are no problems.



Head Cleaning

This unit includes an automatic head cleaning feature that works during normal operation. If head cleaning should become necessary, it is recommended to use the Panasonic head cleaning tape. Be careful to carefully read the instructions provided with the cleaning tape, however, since incorrect use of the cleaning tape could result in damage to the video head.

Table of Functions which depend on the Camera Used

Some functions can not be used when certain cameras are connected to this camera recorder. Use the following table as a reference when using the camera recorder.

The camera used Function	Matsushita Communication Industrial Co., Ltd.			Matsushita Electric Industrial Co., Ltd.	Victor Company of Japan, Ltd.
	WV-F500	WV-F700S	WV-F250	AQ-11 AQ-20	KY-27
Character display for menu settings, initial check, etc. (page 33, 55~57)	○	○	○	△ Operation of camera return switch required.	△ Operation of camera return switch required.
Character display of VTR status (page 14)	○	△ Only warning information can be displayed.	△ Only warning information can be displayed.	△ Operation of camera return switch required.	△ Operation of camera return switch required.
Video signal out (page 17, 55)	○	○	△ Playback only is possible. (No video signal is output during recording.)	○	○
Adjustment of audio recording level using control on camera (page 30)	○	×	×	○	×
Direct start of recording from POWER SAVE mode	×	×	×	○	○
REC review (page 35)	○	○	○	×	×
Cue-up function (page 36)	○	○	○	×	×
Monitoring the playback picture through the viewfinder (page 37)	○	○	○	△ Operation of camera return switch required.	△ Operation of camera return switch required.

- : Function can be used.
- △: Function can only be used partially.
- ×: Function can not be used.

Memo



Memo



Panasonic

Broadcast & Television Systems Company

Division of Matsushita Electric Corporation of America
Executive office: One Panasonic Way (4B-7), Secaucus, NJ 07094

REGIONAL OFFICES:

EASTERN: New Jersey: One Panasonic Way, Secaucus, NJ 07094
Sales: Panazip 4B-7 (201) 348-7671 Service: Panazip 2A-4 (201) 348-7975
Washington, D.C.: Sales: (703) 759-6900 Service: (202) 362-7265
1854 Shackleford Court, Suit 1-250, Norcross, GA 30093
Sales: (404) 717-6772 Service: (404) 717-6410

CENTRAL: 1707 North Randall Road, Elgin, IL 60123 Panazip EIC-3
Sales: (708) 468-5160 Service: (708) 468-5164

WESTERN: 4001 W. Alameda Ave., Suite 100, Burbank, CA 91505
Sales: (818) 562-1501 Service: (818) 562-1579

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga, Ontario L4W 2T3

Printed in Japan
VQT4705

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F0792N1122-11 (A)

